Table of Contents

Click On A Blue Subject Line Below To View That Section

ARTICLES OF SPECIAL INTEREST

Ostrich Feeds & Feeding

2001

A Book of Blue Mountain Ostrich Nutrition Bulletins & Special Articles

by

Daryl Holle

1st Edition

Preface

This book is a collection of Ostrich Nutritional Bulletins and Articles written during 1997, 1998, 1999, 2000 and 2001. All of the Blue Mountain Ostrich Nutrition Bulletins have been published on the Internet and some of the articles have been published in major Ostrich magazines and in Ostrich association newsletter periodicals.

This book is designed as a supplement or companion to the other Blue Mountain books entitled 'Understanding Production Ostrich Nutrition - First Edition' published in 2001 and 'Ostrich Diagnostic Centre - First Edition' published in 2001. For a complete background of Ostrich nutrition, Ostrich feed management and Ostrich farm management, all three books thoroughly compliment each other resulting in a complete picture of production Ostrich information.

There are some references to the Blue Mountain Feeds company in this book. This book was not intended to be used as an advertising tool. It was intended to educate the producer with an awareness that all manufactured feed and feed premixes are not the same--and, how to identify the difference. Please keep in mind that all statements referring to this company's products are still nutritional facts based on sound nutritional principals

It is my hope, through this publication, to increase the awareness of adequate nutrition practices for all Ostrich producers. Many problems we are fighting each day can be solved with proper nutrition and nutrition management. It is the first step towards a successful and productive livestock operation.

If you have any comments or questions, I would enjoy talking with you.

Daryl Holle
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Ostrich Feeds & Feeding 2001

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by Daryl Holle

The cost of this publication was sponsored in part by the following Blue Mountain trademarked products:

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Disclaimer

This book has been prepared in good faith to provide a useful world-wide guide to Ostrich breeders and farmers. The author, through his own experience of farming Ostrich and to the best of his knowledge, believes that the information contained in this book is true and accurate. No warranty of accuracy or reliability is given and the author cannot accept responsibility or liability for the results of applying information contained in this book to any particular situation.

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Ostrich Feeds & Feeding 2001

A book of Blue Mountain Ostrich Nutrition Bulletins and Articles for anyone involved with the production of Ostrich.

By Daryl Holle
Animal Nutrition Consultant

Ostrich Feeds & Feeding 2001, published by

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About the Author.....

Animal Nutrition is not anything new to Daryl Holle, President of Blue Mountain Feeds, Inc. He started, with his father as the tutor, developing balanced feed rations for his livestock projects when he was growing up on a northeast Kansas farm. These livestock projects included poultry, beef cattle, hogs, pheasants, and quail. He began intensifying his study of nutrition, at an early age, in order to help his brother increase production on a large poultry operation of 4000 laying hens. After that, Daryl went to work for IBM as a technical troubleshooter flying all over the United States solving various problems. In 1979, Daryl returned to the farm life that he had missed and bought a dairy farm of 600 milking cows. Using the computer skills Daryl learned at IBM, combined with his previous background in nutrition, he become very proficient at nutrition and feed formulation. He experimented with new ideas and concepts constantly. Other farmers noticed his work and began asking Daryl to do their nutritional consulting and a whole new business began. In 1991, Daryl sold the dairy farm because the nutritional consulting business had become almost full time.

Today, Daryl still does some dairy cattle nutritional work and some contract nutritional work for a large vitamin and mineral premix company. But his new love is Ostrich nutrition.

He formulated Blue Mountain Ostrich Feeds in 1991 after purchasing Ostriches and was unable to find feed that he felt would work well enough to be a high-potency, performance feed. "These birds respond more to good nutrition than any animal I have ever worked with and that makes it fun," says Daryl. Blue Mountain Ostrich Feed began interstate distribution in 1992 after friends and neighbors began asking Daryl for his feed and the demand just kept growing. The Blue Mountain feed is currently being distributed in many U.S. States and in 1998 began international distribution overseas.

One of Daryl's main objectives is to educate farmers about feed--specifically the feedstuffs, minerals and vitamins and how they all must work together. Daryl has been traveling extensively throughout the region speaking at local community meetings, seminars and workshops in an effort to help people become knowledgeable about the details of feed. He has also taken many field trips to help solve various bird nutritional problems that farmers are experiencing.

In addition to managing his company, Blue Mountain Feeds, Inc., Daryl keeps busy assisting others who have trademarked license agreements for processing and marketing Blue Mountain Ostrich Meats, Blue Mountain Ostrich Leather, Blue Mountain Ostrich Oil and Blue Mountain Feeds International.

Daryl and his wife, Donna, have been raising Ostriches for a number of years and will continue to do so in order to fully understand and help achieve the industry goals of the future.

Fiona Benson
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Fiona Benson grew up in the United Kingdom, the daughter of Rex Paterson OBE who had the largest diary farming enterprise in the country for several decades. He was a pioneer of modern dairy farming practices. In his words Rex "was never afraid to question the reasons for commonly accepted practices. We would find ways of measuring everything which occurred. As our business developed, we found that many things in farming followed unexpected, but clearly defined patterns. This particularly related to the influence of men and feeds on milk yields." Fiona has inherited that questioning approach.

She spent 10 years running her own dairy farm As a result of divorce she left agriculture and became involved in development of computer- based management accounting systems. This experience has also proved invaluable in assisting in extracting information and interpreting that information.

In 1994, now living in Cape Town, South Africa she became interested in the Ostrich Industry and ostrich meat in particular. She and her husband Richard recognised that Ostrich Meat would become a major meat for informed consumers as a result of its quality and particularly the health benefits.

Very quickly they learnt that very little was known about the meat and production levels on farm were exceedingly low. They purchased a smallholding and by the end of 1995 had their first Ostriches to help understand where the problems lay.

It became clear very quickly that there were a combination of factors - nutrition, farming practices and the monopoly situation that had controlled the industry till the end of 1993 being the most significant.

In the latter part of 1996 Fiona started to use the Internet as one method of gathering information. At the end of 1996 a major incident resulted in a temporary ban of SA Ostrich Meat to Europe. At the First Ostrich Meat Congress, held in Oudtshoorn in February, 1997 Fiona heard for the first time a plea from those marketing Ostrich Meat. The message was sent to the industry to please overcome the inconsistencies in colour, taste, aroma etc. in the meat being produced.

At the same time, through the Internet, Fiona became aware of Daryl Holle sending out the same message. This led to communication that made it clear to Fiona that Daryl Holle was providing solutions. It was clear he had studied the birds intensely and understood them well. Blue Mountain International was established as a mechanism to enable this expertise to be available to producers outside the US.

In June 2000, Fiona and Richard moved to Blue Mountain Ostrich Farm to enable expansion of the farming operation.

As a member of NOPSA and The BDOA she has attended meetings of the IOA and taken part in Strategic Analysis Sessions of both the SA Industry and the Global Industry.

Visiting, listening to and observing the problems of the processors, working directly with the consumers of our end products, and having the opportunity to visit many farms - large and small both within South Africa and overseas - has provided the opportunity to verify many things.

She remains committed to assisting producers achieve their objectives of producing Quality products - Cost Effectively.

Feeding Management, Is It Important?

Ostrich Nutrition Bulletin #1

December 15, 1996

By: Daryl Holle

The art of feeding birds properly for good performance is one thing many folks take for granted. Some feel that you simply feed and water them and that's it. You can be feeding the best nutritional feed in the world, but if your feeding management is poor, the performance results will be very disappointing. This is true for any livestock specie, but especially true on Ostrich. Ostrich do NOT tolerate poor feeding management. You might be asking yourself 'what does Daryl mean by feeding management'?

A perfect example of a feeding management situation happened this weekend. I received a call from a large rancher in a nearby state. He stated that they have been raising birds for several years now. This last year, they had 24 breeder pairs of Ostrich over 4 years of age. These breeder birds laid a total of 48 eggs. Out of the 48 eggs, only half were fertile. Out of the 18 chicks hatched, only 11 are alive today and they are not well. To make matters even worse, he stated that when the weather turned colder the first of December, they began loosing some adult birds. Since December 1st, he said they lost 3 adult birds. When these birds were posted--no problem was found. The rancher was NOT using our Blue Mountain feed, but told him I would make a field trip to see if I could help.

When I arrived at the ranchers place, I stopped and examined these birds from across the fence. The birds were reasonably feathered, but on a second look, were very thin. The spine of most birds stuck out the top of their back like a razor blade. As a couple birds came to greet me at the fence, they allowed me to lift their wings and view their body. There was NO FAT on THESE birds, and the biggest problem I saw was that there was NO MEAT either. After contacting the rancher at his house and walking through the rest of the birds, we discussed the situation over a cup of coffee.

The rancher filled me in on his background of feeding the birds during the last several years. He had tried almost every brand of commercial feed (except Blue Mountain because he claimed it was inconvenient for him to get and was rather expensive), and never had any luck with any of them. He then resorted to grinding/mixing his own feed using a supplement put together by some local Ostrich rancher. I then asked him if these supplement bags had a tag on the bags and he replied "no, they did not". I saw no clue so far as to his problems other than a total disregard for what was in those unmarked supplement bags.

I then asked a series of diagnostic questions. 'Have you had your alfalfa tested for protein and Nitrates'? The answer was no. 'Are you on well water and how much do the birds drink per day?' He replied he was on well water and he did not have any idea if the birds even drank water--he assumed they did. 'Have you ever had your well water tested for bacteria and Nitrates?' He replied no. 'Does your grinder have scales on it or how do you weigh out the ingredients?' He replied no, I just kind of know how much to put in of each ingredient. I asked him how much he fed each bird per day on the average and he replied 'about 4 lbs.'. I asked how he knew that--do you weigh the amount to each pen every day or what? He replied that he knew just about how much was enough and that's what they got. I asked him how many times per day he fed as the birds had no feed when I walked around the pens. He replied 'well, normally I feed twice per day. But, it was so windy last night that I thought I would

wait until this morning to feed as it would just blow away'. 'I wanted to feed first thing this morning, but the wind is still a blowing'. 'They say it should die down here pretty soon'. I looked at my watch and it was 12:00 noon--straight up!

This is a perfect example of INCORRECT feeding management. There is NO WAY to help this gentleman find his problem. It could be starvation, water problems, alfalfa problems, erratic feeding schedules, inaccurate weights causing bad rations, or any number of other things. He has never tested anything and has this bad habit that he knows how much something weighs without weighing it each time. Anyone of the above items may not be a disaster by itself, but add them all together, and it is a nightmare waiting to happen--AND IT HAS! Ostrich do not perform well on poor feeding management practices--and sometimes they die because of it.

In summary, I spent two hours with this rancher discussing GOOD feeding management practices. He is going to test the well water every 3 months, his alfalfa on every NEW batch, and make sure that his birds are drinking enough water. He is putting up windbreaks around the feeders and promises he will feed exactly at the same time every day and weigh the amount fed. Lastly, we discussed his loosely defined nutrition program and changed it into an aggressive program with performance factors built in. He now knows how to read bag tags and identify what he is getting for his money spent on feed. It will probably take a full year for him to totally recover from this mess--but there is no time like the present to begin.

Planning Your Feeding Program Strategy

Ostrich Nutrition Bulletin #2

January 1, 1997

By: Daryl Holle

Step 1 to keep in mind when feeding your birds is to first decide whether your Ostrich are PETS or PRODUCTION LIVESTOCK. If they are your pets, then most any kind of feeding program will work as not much is expected except survival. If you own Ostrich for production livestock purposes, which means you want them to produce and re-produce as well as possible, your best bet is to dive in and understand as much as you can about nutrition as it WILL make the difference between success and failure.

With the advent of so many commercial dog foods in the last 20 years, many ranchers dogs are fed MUCH better than their Ostrich are--and it's the Ostrich they are trying to make money from as production livestock. However, the temptation is just TOO great for many ranchers. "We need to get our feed costs down", they say. Lowering feed costs is a goal we all should have to allow our operation to run as efficiently as possible. But, feeding a little fish food, cattle supplement, calf starter, corn, alfalfa, and putting out some minerals and vitamins in a bucket for the birds (just in case they might need it) is an absolute disaster waiting to happen. It may take one year, or maybe two years, but it will come crashing down--sooner or later.

Your best evidence of what you need to know about animal nutrition lies in ranchers of other livestock species. Now, I am NOT talking about the backyard farmer with a steer and 10 chickens--I am talking about the farmer who makes his LIVING from his production livestock. Search out a large dairy farmer, cattleman, hog farmer, poultry farmer, that makes a living off the livestock. Ask for the "man in charge" and see what he knows about the nutrients he is giving to his livestock daily. If he is an efficient operator, he will be able to tell you "right off the top of his head" what the percentage of protein is for each group AND WHY. In addition, he can tell you the fiber level, energy level, fat level, and how much the average animal consumes each day because everything is weighed and controlled. You might be shocked to learn that he can also tell you the level of calcium, phosphorus, vitamin A, vitamin D, vitamin E, and selenium for each group of animal rations. He can also tell you how he adjusts different rations to achieve a desired result during the different seasons of the year.

Most profitable livestock ranchers have "dug in" and learned all this nutrition stuff by making an EFFORT to do so. They understand that what comes out of a production unit can be no better than what was put into it. It is NOT the COST of feed these nutritionally intelligent folks worry about. IT IS the cost per pound of gain, the cost per hundred pounds of milk, the cost per baby pig born, the cost per dozen eggs, the cost per fertile egg, and so on. Low feed cost per bag has NOTHING to do with profit.

If there presently is no market for birds in your area, then production probably is not your present goal, and it is tempting to feed as cheaply as possible with poor nutritional diets, until a market develops. Birds with good production capabilities cannot be turned on or off like a switch. Down feeding birds

with good production genetics over a period of a year or two will have detrimental effects on their production abilities for the rest of their lives. Ranchers of other livestock species have already tried this when certain government programs came along making it advantageous to hold animals out of production for a long period of time. The animals just don't come back to high production units again. In parting this time, I want to leave you with one last thought. The method that some Ostrich ranchers use to get their feed costs down with poor quality commercial feeds and "home brew" mixtures has ALREADY BEEN TRIED by ranchers of other livestock species. It doesn't work! It did work 30 years ago as the cost of feed ingredients was cheap and the products produced by the livestock were high in comparison. But today, ALL those ranchers are GONE as they could not survive. Ostrich ranchers need to pay attention to this history of livestock production and nutrition so we don't re-invent the wheel at the sacrifice of many ranchers.

The feeding strategy choices for all livestock ranchers is always the SAME. You are either going to learn as much as you can about nutrition and feed for production, or you're going to feed the animals as pets, or get out of the business. There is no "riding the fence" halfway between as you will lose. If you are going to feed for production, work to understand what that is. If you are going to feed the birds as pets, look on a bag of quality, dry dog food and see how many minerals and vitamins have been added to balance the ration to see if your birds are getting a similar balanced diet of needed nutrients. Spend as much time on learning about nutrition as you spend on the other aspects of your incubating and bird raising. After all, nutrition affects everything in your operation--you can't get to first base without it!

Achieving an Economical, Quality Feed

Ostrich Nutrition Bulletin #3

January 15, 1997

By: Daryl Holle

In working the phones at Blue Mountain during the week, I get to hear a lot of rancher comments about their idea of what they looking for in feed for their birds. The comment I hear the most often is: "I'm just looking for an economical feed with quality". I know what is meant by most people when they say this, but sometimes this statement means different things to different people. When using the words "economical" and "quality" in the same sentence, it can become a paradox like going to Tiffany's and asking on what floor the garage sale is!

To some ranchers, economical means "cheap price" period. To other ranchers, economical means "cost effective" without any restrictions on price. To some ranchers, quality means it keeps the birds "alive" and they like to eat it. To other ranchers, quality means "performance" in units of production, health, and overall effect on profit.

If you are looking for a "cheap price" commercial feed that is of the quality to bring ultimate "performance" to your birds, I can tell you the search is a waste of your time--it does not exist. In order to lower the cost of a superior quality feed, something has to go--and it won't be the manufacturer's profit that is left out, it will be a lower quality of ingredients and less of the performance nutrients. That is life as it is in the feed business. There is nothing more costly to a bird operation than a cheap priced feed with poor performance factors. I receive calls all the time from folks that have n 't raised a chick yet, and some with several pairs of 4-5 year old birds that have never laid an egg. All of them have one thing in common. They have tried every cheap feed there is as they are NOT going to pay the higher price for quality feed.

Is it possible for a rancher to come up with a lower cost feed that has high quality performance factors built in? The answer is a big YES! There are two secrets to doing this--First, understand nutrition well enough to know a well fortified, quality feed ration when you see one. To accomplish that takes some work, but it is the biggest SINGLE thing you can do for your bird operation. Now, I do not mean that you have to become a nutritionist, I only mean it is important to understand how important protein, fat, fiber, energy, calcium, phosphorus, potassium, zinc, selenium, magnesium, copper, manganese, vitamin A, vitamin D, vitamin E, are to the success of quality feed. It is also important to realize that vitamins such as choline, niacin, riboflavin, thiamine, d-panto acid, and biotin need to be added to your feed rations. You can get this information from any library in books on animal nutrition. However, this information is also included in a simple to understand format in my book entitled "Ostrich Feeds & Feeding". If you don't already have a copy, order one today as it will help you understand the basics and how to identify them.

The SECOND secret is to do more of the work of making feed yourself. Select your own quality ingredients, add on all of the good things you now know you need as you have spent some time researching the nutrients in step #1. You can either make up this feed with your own grind/mix

equipment, or have it made for you at a local mill to your specifications. Work to save money on ingredients in feed you don't need and spend more money on ingredients causing your birds to perform. This will bring you HIGHEST QUALITY feed in the most cost effective manner.

We have been working with ranchers and their feeding programs all over the U.S. for several years now. We have rations and feed making guidelines for most parts of the country. One part of our business is to supply TON PAKS with the correct vitamins, trace minerals, and amino acids to MATCH these recommended rations.

More often than not, the right sources of these trace minerals and vitamins are hard to find locally that match the recommended rations. This Ton Pak system makes it easier for the average Ostrich rancher. But, it does take extra work--which causes many to abort the idea and just feed the cheapest commercial feed they can find. A good, cost effective, quality feed can only be achieved with effort. If it is performance you are looking for from your birds, I highly recommend you get started on this project today!

Effects of Good Nutrition on Ostrich

Ostrich Nutrition Bulletin #4

February 1, 1997

By: Daryl Holle

Many Ostrich ranchers have never had livestock before, and many have never raised livestock as an income producing operation. A successful livestock rancher already has the advantage of knowing that what goes in the mouth of the animal determines its productivity and the productivity of its offspring. It is amazing to most Ostrich ranchers just how many things can be directly related to a good nutrition program or a BAD nutritional program.

In its research and testing programs, Blue Mountain Feeds has found the following things can be directly related to a poor nutritional feeding program and usually can be corrected, or partially corrected, with a higher quality, good nutritional program:

BREEDER PAIR NUTRITION

Impactions

Sluggish breeding activity

Infertility

Birds going off feed

Males not coming in season

Low or no egg production

Nervous birds and habits

Sudden death syndrome

Ruptured Arteries

Poor feather quality

Low tolerance to extreme weather

Less tolerance to bacterial infections

EGG/EMBRYO PROBLEMS

Extreme egg sizes
Egg shell quality
Egg shell porosity
Chalky eggs
Egg shell too hard
Early embryo deaths
Late embryo deaths
Weak pipping strength
Many assisted hatches
Chick deformities
Abnormal yolk absorption
Crooked legs, toes, beak
Early chick death

All the above symptoms can be affected by the breeder pair nutrition, both for the breeder parents AND the egg/embryo/chick. The laying hen has to pass on an adequate amount of nutrients to the egg yolk for the embryo and chick to have the best chance of survival. The egg yolk is what the embryo develops from and is the most important source of needed nutrients for proper development. After hatching, the chick is still relying on these yolk nutrients to get its start in life.

Diluting the complete feed ration with corn and alfalfa also will cause the items shown in the above list. Doing this alters the level of some nutrient ratios and diminishes the amount of many. Adding WH ITE paint to RED paint does not make it MORE RED.

In my opinion, there is only one way to feed breeder birds and that is with the best nutrition you can find. Here again, the cost per bag is irrelevant! The performance value of the feed is what makes the feed cost effective. There is usually only around $100 difference per breeder pair feed cost per YEAR between so-so feed and excellent feed. As you can see from the above list, it won't take long to pay back that $100 extra many times over. And, make raising your birds and incubating the eggs a WHOLE LOT EASIER!

How to Identify Good Nutrition for Ostrich

Ostrich Nutrition Bulletin #5

February 15, 1997

By: Daryl Holle

Follow up On The Feed Management Discussion In Bulletin #1

In Bulletin #1, I talked about a field trip I made in the middle of December at the request of an Ostrich rancher in a nearby state. The indicated problems were adult birds dying, chicks not growing at all, and very slow weight gains on slaughter birds. The summary of this bulletin was that these birds were on a very poor nutritional feeding program and that the feeding management was less than desirable. The rancher started immediately on an aggressive Blue Mountain feeding program around December 20th.

I spoke with this rancher yesterday and the report was excellent. No more adult birds have perished--even during the sub-zero temperatures we had during January. All birds have gained a good 40 pounds, according to the rancher, and all chicks are showing rapid growth. All breeder pairs are showing signs of court ing with several pairs mating. The rancher is very pleased as this kind of activity never occurred before April or May in years past. Once again, a good nutritional diet along with good feeding management pays off in a big way. I just can't say it any more clear than that!

How To Identify Good Nutrition For Ostrich

Identifying a feed, or feed formula, with good performance characteristics is difficult and takes concentrated effort. If it is a commercial feed, they are tell-tale clues listed on the tag. However, this tag reading takes some practice and a general understanding of WHAT to look for.

Feed quality and consistency are also tell-tale clues. This is usually where the manufacturers selection for ingredients used in the feed comes into play. Also, the manufacturing quality of the product itself is very important. If the feed was not mixed correctly, or was poorly manufactured, the feed will NOT be a performance feed.

The age of feed has a significant effect on the performance of the feed. Complete pelleted commercial feed will hold its potency for a least 3 months from manufacturing if stored correctly. Some trace mineral/vitamin premixes will hold their potency for 6 months or more. For longer periods of storage, the vitamins begin to break down and degrade.

For this reason, we at Blue Mountain Feeds manufacture feed by order only. And, we do not except dealers or distributors wanting to put in large inventories of stock in case a new customer comes by in a few months. The advance order system works GREAT if everyone plans ahead just a little bit. It also ensures that feed is fresh and the customers gets the biggest bang for the buck.

Adult Birds Dying
What Is Good Feed Fortification?

Ostrich Nutrition Bulletin #6

March 1, 1997

By: Daryl Holle

Adult Birds Are Dying

I have received several calls this last week from ranchers around the U.S. asking for help with the problem of adult birds dying suddenly. In EVERY case upon examining the feed tags, the nutritional diet was extremely short on some very basic nutrients Ostrich need. Most all of the feeds reviewed were extreme low or had no added copper which will cause arteries to burst. Many feeds had no supplemented calcium or phosphorus or inadequate amounts of these important minerals. The cheap feeding concept is finally catching up with many ranche r s and unfortunately has ruined a few already. It is hard to raise chicks when the breeder birds are dead.

One important item for all ranchers to remember is that it takes almost 1 full year to determine the full impact of your feeding program. If you have just changed to a better feed, you will realize the benefits from this a year from now. The ultimate benefits will come in two years from now. If you have just changed to a worse feed, you won't see the full impact of that change until a year from now and the extreme impact of that change two years from now. Changing feeds is a SERIOUS matter. Study all you can to make SURE you made the right decision!

What Is Good Feed Fortification?

I am sure you have heard feed company advertisements saying Aour feed is fortified with trace minerals and vitamins. Or, "our feed is fortified with chelated minerals." All these types of buzz word statements may be true of a certain product, but I look at the word "fortified" much differently.

An Ostrich feed, or any feed in general, has to be very well thought out to achieve the goal of being a feed with "good fortification". A well fortified feed is when all components and ingredients in the feed have a specific purpose and each of those components and ingredients are from the very best sources to ensure that the specific purpose gets done within the body of the bird. This is called "proper ingredient selection".

An example of proper ingredient selection would be the mineral Calcium. There are many feed ingredients that can be used to achieve the correct level of calcium in the birds total diet. But, some of them are very high in other minerals, or metals, that are NOT desirable for Ostrich and can cause slow weight gains, poor production, and off flavor meat if used.

A feed with good fortification not only contains the proper ingredient selection, but it also contains a

"balance" of nutrients. Many ranchers, and some feed mills, do NOT understand what this balance term means. Let's look at this term by using a children's Teeter-Totter as an example. On one end of the Teeter-Totter is the feedstuff ingredients such as alfalfa, corn, soybean meal, wheat midds, or whatever. On the other end of the Teeter-Totter is minerals, trace minerals, vitamins, and additives. A feed with good fortification will be designed by the nutritionist so BOTH ends of this Teeter-Totter carry the same weight towards the performance goals of the feed.

To explain balance another way, the feedstuffs must work in a manner that they can carry 50% of the expected performance of the feed. The minerals, trace minerals, vitamins, and additives must carry the other 50% of the expected performance of the feed. If either of these two entities fall short of carrying their full 50% load, the formulation will fall short of being a 100% performance diet for the birds.

The last step in defining a feed with good fortification is manufacturing the feed. Using our children's Teeter-Totter example again, imagine the feedstuffs on one end and the minerals, trace minerals, vitamins, and additives on the other end. Underneath the Teeter-Totter, is a center support (fulcrum point) that holds all this up to a perfect balance . This center support is the manufacturing quality.

A nutritionist can do a most wonderful job of putting ingredients together in just the right way to achieve a feed with good fortification and balance. But, if the manufacture (or person mixing the feed) does not put the formula together correctly by making errors, the whole Teeter-Totter will come tumbling down and someone is going to get hurt!

Good feed fortification is correct ingredient selection, balance, and manufacturing quality. Cheap feed using inexpensive ingredients, or good feed that is out of balance, or feed with the correct ingredients with balance but manufactured poorly can NEVER be a feed with good fortification. If it is performance you are looking for, learn how to identify feed with good fortification. You can start this process by learning to read the tag on the bag. It can be very revealing!

Loosing Chicks at 2-3 Weeks of Age From Clostridium Perfringens

Ostrich Nutrition Bulletin #7

March 15, 1997

By: Daryl Holle

"My Chicks Are Dying At 2-3 Week Of Age"

If I had $10 for every time I heard the above statement this last year, I could retire! I have the opinion that a good deal of this death loss is coming from an overgrowth of bacteria called Clostridium Perfringens. Clostridium is everywhere--in the dirt, in the water, and is normally an important part of the digestive system in animals. The problem occurs when they overgrow beyond normal ranges in the gut. Following is a brief outline of the complicated subject of Clostridium bacteria along with an outline of corrective steps that need to be taken. Since no drugs or additives have been approved for Ostrich, our liability insurance will not allow us to give out specific solution procedures to the general public. However, if you are a Blue Mountain customer, we will assist you with specific information if you are presently using our Breeder and Chick nutrition programs as the correct nutritional diet is an important key to fixing the clostridium overgrowth problem.

What Is Clostridium Bacteria?

The dictionary defines Clostridium as: "any of various spore-forming mostly anaerobic soil or intestinal bacteria."

There are many strains of Clostridium bacteria. Several well known diseases are caused by a certain strains of Clostridium:

One strain causes TETANUS.
One strain causes BOTULISM (bad food).
One strain causes BLACKLEG (animal disease).
Six strains causes MALIGNANT OEDEMA (Gas Gangrene).
One strain causes BRAXY (sheep).
One strain causes NECROTIC HEPATITIS.

Then, there is a family called Clostridium Perfringens which has the following family members:

Type A
Type B
Type C
Type D

Clostridium Perfringens seem to be the family of Clostridium that affects Ostrich the most. Rhea are

the most susceptible, followed by Ostrich, then Emu. It is a well known fact in the Veterinary world that Clostridium bacteria overgrowths in the gut of an animal can be the PRIMARY cause of illness, or the SECONDARY cause of illness when some other factor happened first allowing the Clostridium bacteria to overgrow in the gut.

Clostridium Perfringens, type A through D, all result in a disease called "Enterotoxemia". These bugs work in the gut excreting an extremely toxic substance. The action of this bacteria and its toxin cause damage to the gut wall. Some of this toxin is absorbed through the gut wall and into the bloodstream causing the bird to become toxic, slowly go off feed, become nutrient deficient, and die.

Tubing the chick works for a while, but unless the clostridium overgrowth is controlled immediately, the gut lining is damaged rendering the chick unable to absorb any tubed nutrients. If caught too late, the chick will usually die anyway, even if the clostridium is brought under control, as its gut lining has been damaged to the point it can no longer transfer the needed nutrients into the bloodstream.

Clostridium Perfringens

PRIMARY Cause
It is my opinion, green or brown slim appearing in eggs or coating the chick at hatch is Clostridium Perfringens. Usually this will be from an egg laid in the mud, rained on, or contaminated is some way. If this contaminated chick hatches and survives, its manure will contain high levels of clostridium spores. When eaten by healthy chicks, they slowly will increase to a clostridium overgrowth in their gut and will shed spores through manure which is eaten by other chicks--and on and on it goes until almost every chick is sick!

If The Chick Lives. . . . . .

Consequences Are Nutritional Deficiencies:

1. Bones become soft and weak.
2. Tendons become weak.
3. Beaks can become soft.

Problem created:

Bones/tendons do not rebuild as fast a muscle is growing (weight gain)

Result:

Ostrich: Splayed Legs
Emu: Turned Legs
Rhea: Rubber Leg Syndrome

Summary:
Even if the chick survives the Clostridium overgrowth without leg problems, it usually has severe gut damage and will be a slow growing chick resulting in a very small sized bird for its age. Usually the wing feathers will be long and out-of proportion to its body size.

Clostridium Perfringens

SECONDARY causes

Primary cause = STRESS:

Chicks Too Hot
Chicks Too Cold
Rain Storms
Lightning Storms
Chased by Animals
Moved to New Pen
Handled Too Often
Nutrient Deficient Diet

Primary cause = GUT PH CHANGE:

Body Temperature Change
Incorrect Feed PH
Too Much Treat Feeding
Abnormal Water PH

Primary cause = POOR BREEDER NUTRITION:

Breeder hen deficient of body reserves.
Proper nutrients NOT passed through egg.

CORRECTIVE ACTION

1. Lower the Clostridium population level in the gut:

    a. Slow down the bacteria reproduction rate.
    b. Decrease the amount of toxin produced.
    c. Decrease the amount of spores shed in manure.

2. Neutralize the existing toxins:

    a. Neutralize toxins present in the gut immediately.
    b. Neutralize toxins present in the bloodstream.

3. Administer probiotics to the gut:

    a. To increase population of good bacteria.
    b. To increase nutrient digestion.

4. Correct the primary cause of problem:

a. Change to feed with adequate nutrients.
b. Change to feed with PH adjustments.
c. Correct Breeder Nutrition deficiencies.
d. Have water checked for normal PH.
e. Eliminate other primary causes--if possible.

5. Implement an immunity program:

a. Develop a natural immunity for the chicks.
b. Develop immunity from parents to embryo.

Now is the time to get your clostridium prevention program in place. Don't wait until it happens to your chicks as it will be too late. Work with your Vet to get his ideas to accomplish ALL the above corrective actions. And, above all, get those breeder birds and chicks on an excellent feeding program.

Animal Protein Products in Feeds Part 1

Ostrich Nutrition Bulletin #8

April 1, 1997

By: Daryl Holle

I would like to bring to attention three specific items that are problems found in Ostrich Meat the whole world over:

1. Over the next few years, many people will be trying Ostrich/Emu/Rhea meat for the very first time.

2. Meat inconsistency and objectionable tasting meat may be brought on by poor diets being fed birds.

3. The consumer market wants meat that is free of animal protein products, growth hormones, and steroids.

This Ostrich industry has one of the finest red meat products for consumers to purchase that it has seen for a long, long time. But, it appears that the industry is bound on a course that may me ss that m arket up badly unless everyone pays attention to what they are feeding their birds. Now, you m a y be thinking to yourself that Daryl owns a Ostrich feed company and is just trying to sell his feed. The real truth is that Daryl won't need his Ostrich feed company if the rancher can't sell his meat birds because the consumer doesn't like the meat. I am really concerned about this problem and every rancher should be too. I have talked a lot previously about feeding your birds BAD diets and imbalanced diets and how that effects meat quality. Today, I would like to begin a discussion on Animal Protein Products that many Ostrich feeds contain and are being fed to birds daily.

Many ranchers ask me: "What are Animal Protein Products?". Animal Protein Products is a nice name for anything animal that is left over from some type of animal processing that can't be used for human food production--so it is put in animal feed and fed to animals that ARE used for human food production. If that procedure makes SENSE to you, then I have some swamp land for sale in Florida I'd like to sell you. If you are knowledgeable about Animal Protein Products and disagree with what I just said, I recommend you stop reading here as you are NOT going to like what I have to say through the rest of this article.

"Animal Protein Products" is a collective term ingredient statement. When that term is used on the tag of a bag of Ostrich feed, it means that some animal ingredient was used in making the feed. Many ranchers, especially Ratite ranchers, have the idea that their birds will benefit by having some fresh meat in their diet. Therefore, the thought is that animal protein products is a plus in their feed as it is a good source of meat protein that these birds need. I understand the reasoning behind this thought, but that is all it is--A THOUGHT! Animal protein products are NOT anywhere CLOSE to a fresh meat product. In fact, it is closer to being exactly the opposite and once you understand what the products really are, you too will agree with me and say: "What the heck is this stuff doing in our Ostrich feeds?".

The following are some specific products manufactured for use in animal protein products. These specific products may be listed on your Ostrich feed bag instead of the collective term Animal Protein Products.

Blood Meal
Meat & Bone Meal
Fish Meal
Poultry Meal
Meat Meal

These are the most common animal protein products that are used in Ostrich feeds. However, the American Feed Control Officials handbook list nearly 30 different products under the classification of animal protein products. The important question is "where do these products come from ?". Being a former Dairyman, I can tell you about some raw ingredients furnished for Meat & Bone Meal. Dairy cows can become ill and die, so do some beef cattle in feed lots. Have you ever wondered what happens to all these carcasses? Are they buried out in a field somewhere? The answer to those questions is simple. The carcasses are hauled off to a rendering plant and end up in Meat & Bone Meal or Meat Meal. On some of the large Dairy and Beef operations today around the county, it is NOT possible to bury or dispose of each carcass in any other manner. The carcass is usually given to the rendering plant in exchange for them hauling it off the premises. Dead Horses are the same way. Deer carcasses along the highway are also handled in a similar manner.

Now, keep in mind that it is a rarity for a Dairy cow or Beef steer to die of old age in the farmers feedlot. Animals are retained for milk or meat production and then slaughtered when that production is complete. When one of these animals die, it is usually due to some virus, bacterial infection, disease, or metabolic disorder. The rancher and vet did everything they could to try to save this animal as it represents a large dollar loss if it dies. This treatment usually includes a variety of drugs, steroids, antihistamines, and so on. If the animal dies, the ranchers are good about calling the animal carcass pickup people to get it off the farm as soon as possible. But sometimes, this may take several days as the rendering plant has to arrange its routes to be economical in its pickup operations. Well, you can catch my drift here what happens to a carcass laying out in the hot sun for a couple days. Now, aren't you glad that this carcass (and I mean ALL of it, including intestinal contents) went into Meat & Bone Meal so your birds can have FRESH MEAT in their diet?

I am NOT objecting to the use of animal protein products in feed for animals NOT used for human consumption. I just STRONGLY feel these products should not be recycled into the HUMAN food chain.
The next couple issues of the Bulletin will be a continuation of the discussion on Animal Protein Products. In the next issue, I will explain ONE more product called Poultry Meal and where this product comes from--I think this one needs to be understood so YOU can make a fair choice. We have a lot to discuss on this issue as it is so misunderstood by most ranchers and is the one factor that could bring this industry to a fast halt!

Animal Protein Products in Feeds Part 2

Ostrich Nutrition Bulletin #9

April 15, 1997

By: Daryl Holle

Following is a reprint of an article appearing in the Southwest Ostrich Breeders Association newsletter dated April, 1997:

"News Update.....Mad Cow Disease. It has come to the attention of the news media that England is and has been grinding the slaughter herds of cattle with Mad Cow Disease into Blood Meal and Meat & Bone Meal and feeding it back to other food animals.....Result.....disease is spreading. Their misfortune is our good fortune, we stand at the threshold of a market that is ready to explode because we have the answer with our BETTER RED MEAT. So, hang in there and be ready to fill the gap."

Even though the above news update may be accurate as to how the Mad Cow Disease is spreading, I find it confusing to understand how the ostrich market is going to explode when 90-95% of the Ostrich feeds in the U.S. are made with the same animal protein products of Blood Meal, Meat & Bone Meal, Poultry Meal, Fish Meal, and Meat Meal. We claim to have the better red meat and WILL HAVE as soon as these animal protein products have been removed from our birds diet!

In part one of this series, I committed to you an explanation of Poultry Meal and just what that ingredient is and how it is made. I really don't enjoy sharing the gruesome details, but I think it is important for ranchers to understand where these ingredients come from.

It used to be, years ago, that poultry meal came from all the unwanted products left over after chickens were processed for human food consumption. But, the poultry industry has changed somewhat since that time. Poultry hens come to a point in their productive life when they must be replaced with younger stock. These older hens are called "spent" hens. The meat from these hens is generally a tough meat and is good only for soup meat. Soup companies used to buy these hens for their chicken soups and so forth. However, large buyers of these spent hens began to realize difficulties with these older hens as the bones were brittle and bone chips would occasionally appear in their products. The soup companies changed from spent hens to younger broiler chickens. This left a BIG gap for the poultrymen as there was no where to go with the spent hens.

Today, these spent hens are disposed of in a different manner. It may seem rather gruesome to you , but it is humane and does utilize the products from these hens. Poultry houses contain thousands of hens and when it is time to replace the hens, the entire house is gassed or exterminated at once. The spent hen carcasses are then carried out and loaded on a truck and shipped to the rendering plant. At this plant, the entire carcass is ground into poultry meal--feathers, feet, intestinal contents, and all. There is no distinction between carcasses carrying disease organisms or ones that are not. The resultant product

from this process is then dried at high heat to make a meal.

That probably is enough discussion about how Animal Protein Products are manufactured and where they come from. The thought of all this type of stuff ending up in our Ostrich feed is enough to turn ones stomach. Ostrich are unique in that the meat is so lean, it tends to quickly pick up any flavors from the feed and will have meat of similar odor and flavor. When I eat a steak produced by an Ostrich, I don't want to be eating meat with a fishy odor or taste coming from Fish Meal--let alone flavors given off by Meat & Bone, Poultry Meal, Blood Meal, and so on.

The health risk to humans eating meat from birds fed Animal Protein Products is probably remote, at least that is what we keep telling ourselves. England would not agree with that these days. However, all that it takes to cause a SEVERE problem is for someone to make a mistake in manufacturing these products or for a new organism to evolve that is resistant to the heat temperature used in manufacturing these products.

To conclude this segment, I re-ask the question: WHY do we want to take those risks of contamination and bad tasting meat because of the Animal Protein Products in our feeds? They are NOT necessary ingredients and the only purpose they serve is to allow feed to be manufactured at a lower cost. In my opinion, it is too BIG a price to pay for the savings realized.

Animal Protein Products in Feeds Part 3

Ostrich Nutrition Bulletin #10

May 1, 1997

By Daryl Holle

Why do most feed companies use Animal Protein Products in Ostrich feeds? The answer is very simple--COST! While it would be easy to blame the feed companies for this undertaking, much of the responsibility lays in the attitudes of most Ostrich ranchers. About two years ago, ranchers started voicing their opinions to feed companies that the price of Ostrich feed had better COME DOWN. It quickly became obvious that whatever feed company was willing to lower the cost of feed, that was the company that stood to gain a tremendous increase in sales of feed. Many ranchers became NOT interested in the nutritional performance of feed, but rather its cost per bag and how far they had to drive to get it.

This "cheaper feed" attitude, along with the price of birds coming down to lessen the liability risk for feed companies, created a whole new WAVE of "low cost" feeds to enter the Ostrich feed industry. Along with this wave of low cost feeds came feed formulations designed for low price tags and had very little concern for nutritional adequacy or performance of the birds. Why, you may ask, did this happen? The answer is because that is what the ranchers wanted! That is what would sell!

The Ostrich feed companies that are "concerned" about the performance of their feed and want to further the industry with its goals for quicker weight gains and higher production are still pricing their feed about the same as they always did as it just can't be made any cheaper using quality ingredients and performance formulations. While it is tempting for companies like our Blue Mountain Feeds company to use less than desirable ingredients such as Animal Protein Products to get the cost down, it is our opinion that the lower bird performance, odd tasting meat products, and slower weight gains are NOT a good trade off for the rancher--Or, for the industry.

Animal Protein Products in Feeds Part 4

Ostrich Nutritional Bulletin #11

May 15, 1997

By: Daryl Holle

Nutritionally speaking, are Animal Protein Products a good source of protein for Ostrich?

Some nutritionist will say yes to that question, but I will say a definite "NO". Animal Protein Products are usually always high in protein and therefore can be an economical source of protein. However, much of the protein contained in them is in the form of protein that is hard to dissolve and utilize quick enough by Ostrich. I have noticed in our research a definite correlation to this Ostrich protein utilization problem. In cattle, this part of the protein is more commonly known as "Bypass" protein.

Now, before all the animal nutritionists get completely upset with me on this subject, I want to clarify farther. I am NOT saying that Ostrich are cattle, and I am NOT saying that By-Pass protein applies directly to Ostrich nutrition. What I am saying is that I have found that Ostrich do respond in a similar manner to By-Pass protein as cattle do--only in the opposite direction--Ostrich do NOT respond well to it at all.

Cattle can use a significant amount of Bypass protein because of their long digestive tract (48-72 hours) and the rumen fermentation gut design which allows Bypass protein enough time and activity to be broken down into useable protein by microbes. The Ostrich do NOT have a digestive tract this long with rate of food passage through the gut being 24-36 hours for Ostrich and 6-8 hours for Emu. The Ostrich does not have a rumen fermentation system, although part of its gut does some digestive fermentation. The Emu does not have much food fermentation ability as the feed passes through the system in a short period of time.

It has been my experience in Ostrich that the shorter the length of elapsed time from when food goes in the mouth to when it goes out-on-the-ground, the less Bypass protein is going to be utilized. Again, I repeat. By-Pass protein usually only applies to cattle. However, I have noticed a strong correlation between the amount of By-Pass protein for cattle and the amount of protein performance in Ostrich. Let's take a look at how Animal Protein Products and Grain or Seed Protein Products compare in Bypass protein amounts:

ANIMAL PROTEIN PRODUCTS

Item	Digestible Protein	By-Pass Protein
Blood Meal	**18%**	**82%**
Meat Meal	**28%**	**72%**
Fish Meal	**35%**	**65%**
Meat/Bone Meal	**48%**	**52%**

GRAIN/SEED PROTEIN PRODUCTS

Item	Digestible Protein	By-Pass Protein
Soybean Meal	**68%**	**32%**
Sunflower Meal	**62%**	**38%**
Peanut Meal	**72%**	**28%**
Wheat Midds	**78%**	**22%**

You can clearly see on the above tables that Grain/Seed Protein Products carry with them a high amount of digestible protein while Animal Protein Products carry very low amounts of digestible protein. An example of what this causes might be using Blood Meal in Emu feed. Since Blood Meal is 82% Bypass protein, the majority of protein coming from Blood Meal will go out-on-the-ground if used in feed for Emu as it cannot utilize much Bypass protein. In this example, the feed tag may be guaranteed as 18% Emu Grower feed, but if a considerable amount of that 18% protein is coming from Blood Meal, the Emu cannot utilize it as an 18% protein feed. Again, I am not trying to change the science books here by saying By-Pass protein applies to Ostrich. I AM stating that the less By-Pass protein you have in Ostrich feed, the better the total ration will work for Ostrich.

Keep in mind the most important factor about Ostrich feed--In order for feed to be a productive feed, the bird has to be able to utilize the nutrients it contains regardless of what the tag on the bag guarantees! The feed may contain the necessary nutrients and can be verified by lab test, but if the nutrients are not being utilized, the resulting bird performance will indicate a nutrient deficiency.

Are there ANY Ostrich feeds made WITHOUT Animal Protein Products?

Unfortunately, the answer is "not very many". I have reviewed hundreds of Ostrich feed tags over the last 7 years and have only found 3 brands of feed th at do NOT contain Animal Protein Products or fish meal, meat and bone meal, meat meal, blood meal, and so on. Two of those three brands are Blue Mountain Ostrich Feed and GoldRush Ostrich Feeds which are both made by Blue Mountain Feeds and developed by me. I am sure there may be a few more companies out there whose tags I have not seen and hopefully some of them have chosen NOT to add Animal Protein Products to their brand of feed. However, from what I have seen, over 98% of the feed companies ARE using some amount of Animal Protein Products in Ostrich feeds.

I encourage you to work with your feed company to change this scenario. This Ostrich industry has the best quality end-products to come along in a very long time. Since it is a proven fact that what goes in the bird's mouth affects the quality and taste of its meat, why not feed our birds a diet containing wholesome ingredients and help make the end-product the healthiest product of high quality and good taste as it was NATURALLY meant to be!

Feeding Ostrich for Production Part 1

Ostrich Nutrition Bulletin #12

June 1, 1997

By: Daryl Holle

New Bulletin Series On "Feeding Ostrich For Production"

Starting with this bulletin #12, we will begin a new bulletin series entitled "Feeding Ostrich For Production". Many Ostrich ranchers have never fed livestock before--at least not in a productive capacity. There is a whole lot more to feeding Ostrich for production than just opening a sack of feed and giving them some. This series of bulletins will address some tips and methods to get birds fed correctly to the productive potential you are trying to achieve. In Ostrich, feeding for production can mean feeding for egg production, fertility, hatchability, survivability, chick growth, and meat/fat production. When the feed management is correct along with a good nutritional feeding program, all these areas will show optimum results.

Production Feeding Begins At Hatch--Day One!

I hear from lots of ranchers that ask me why their 5-6 year old pairs of ostrich are not laying eggs or breeding. They tell me they have tried almost every kind of feed including Blue Mountain Feeds and just can't get the birds interested in reproduction. The causes of this non-productive problem in breeders birds can be many. It can be a physical defect, poor feeding management, inadequate nutrition, stress causing location, and even genetics can play a role. However, there is one factor that most folks are not aware of--or forget to consider. How the birds have been fed during their development years is most important. The first two years of a breeder birds life is most crucial to the success or failure of the rest of its productive life. Proper nutrition plays a key role in the success of that development. During the first year, there is not only a terrific growth rate in birds, but also a rapid development of all internal organs--including reproductive organs. During the second year, this initial development progresses from adolescence to maturity. Good nutrition during the birds growing years will ensure that the bird can develop to its full genetic potential. Without it, even the best genetic bird will fail to perform. I am sure you have heard the phrase "this hen is out of a mother hen that laid 120 eggs a year". When I hear that phrase, it may mean that this offspring has genetic potential, but it doesn't mean a hill of beans if the offspring weren't fed correctly the first two years of their life.

Other production livestock species witness this same problem. A dairy heifer that has been raised on poor nutrition will most likely never be a good milk producing animal even if it is fed a good nutritional program when it begins milk production at around two years of age--IT IS TOO LATE! The same goes with our birds. The time to start a good nutritional program is during the first week of a birds life--AND, continue that practice each and every day throughout the birds life.

Another reason for non-producing breeder birds is the manner in which they were fed during the winter. The need for proper nutrition during the winter rest period is just as important as proper nutrition during the breeding season. The nutritional requirements are different for the two seasons, but good nutrition during both seasons will help ensure a good productive season to follow the next year. When it comes to producing animals, there is NEVER a good time to cheap feed them to save dollars. It will always result in the m ost expensive mistake you can make.

FDA Bans Animal Protein Products In Some Livestock Feeds

Ostrich Nutritional Bulletin #13

June 15, 1997

By: Daryl Holle

Short Break From Our Bulletin Series

The FDA announced on June 3rd that it has set a rule for a ban on the use of certain Animal Protein Products in feed manufactured for cattle, sheep, and goats. Since I just completed a series about Animal Protein Products and their use in Ostrich feeds, I thought it would be informative for the bulletin readers to know that the FDA has taken some initial steps to keep Animal Protein Products out of feeds for some animals used for human food consumption. I personally wish the FDA would have extended the ban for ALL animals (including Ostrich) used for human food consumption, but they did NOT. However, the ruling is an important first step. Following is a direct quote by the FDA taken from their Internet web site concerning this ruling. In the next issue, we will continue our series on Feeding Ostrich For Production, Part Two.

FDA direct quote:

"FDA PROHIBITS MAMMALIAN PROTEIN IN SHEEP AND CATTLE FEED"

"The Food and Drug Administration today announced publication of a final regulation that prohibits the use of mammalian protein (with certain exceptions) in the manufacture of animal feeds given to ruminant animals such as cows, sheep and goats. The rule will take effect 60 days after its publication June 5. The following may be used to answer questions.

This prohibition is a preventive measure designed to protect animals from transmissible degenerative neurological diseases such as bovine spongiform encephalopathy (BSE) and to minimize any potential risk to humans. No case of BSE has ever been documented in cattle in the U.S. But if a case of BSE were ever found here, these measures would prevent the spread of BSE through feeds by precluding amplification of BSE in U.S. cattle.

In January, FDA proposed a regulation that would have prohibited the feeding of ruminant protein to other ruminant animals. In a draft rule published April 17, FDA expanded that prohibition to include nearly all mammalian protein. Like the proposal, however, the final rule allows the use of products believed to pose a minimal risk of BSE transmission. These products include blood, blood products, gelatin, milk, milk products, protein derived solely from swine and equine sources, and inspected meat products which have been offered for human food and further heat processed for food, such as plate waste from restaurants and other institutions.

By prohibiting nearly all mammalian protein from being used in ruminant feed, FDA believes it has made the final regulation more practical and effective. Pure pork and pure equine protein are excluded because these animals are not known to have transmissible spongiform encephalopathies (TSEs), and because the protein is processed so that it is not contaminated by potentially infective proteins.

In addition to prohibiting tissues with the potential to spread TSEs such as BSE, the final regulation also requires process and control systems to ensure that feed for ruminants does not contain the prohibited mammalian tissue.

The first case of BSE was reported in the United Kingdom in 1986. Epidemiological evidence gathered in the U.K. suggests an association between the outbreak there and the feeding to cattle of protein derived from sheep infected with scrapie, another TSE.

Today's final rule caps a period of intense discussion about the most appropriate way to provide an additional layer of protection against the potential risk from BSE in this country. In the last year, FDA has sought comment on the best course of action by publishing an Advance Notice of Proposed Rulemaking, a Proposed Rule and a Draft Rule. The agency has received more than 1460 formal comments on this issue, and has held two open public meetings to discuss the most appropriate course of action.

The current state of knowledge concerning TSEs is far from complete. FDA will continue its close collaboration with the scientific community and with pubic health officials, at home and abroad, on measures to reduce the potential risk of these diseases."
End of quote!

Feeding Ostrich for Production Part 2

Ostrich Nutrition Bulletin #14

July 1, 1997

By: Daryl Holle

How Many Times To Feed Per Day?

This subject can be one of the more controversial subjects in the Ostrich industry as there is so little data available to use as reference. However, there is a lot of data available on feeding frequencies with other livestock species--so maybe there are some guidelines that can be developed from that experience.

It has been my experience that there are as many ways to feed Ostrich as there are Ostrich ranchers. Some feed 3 times per day, some feed twice per day, some feed once per day, some feed in large tires or drums once per week, while still others will dump piles of feed on the ground every two weeks or so in an attempt to save labor costs of feeding birds. In my opinion, the difference in these ideas lie in whether or not you are feeding your birds for peak production. Again, feeding Ostrich for production means feeding for best egg production, best fertility, best hatchability, and best growth and development.

If you are NOT feeding for production, the feeding method or frequency does not really matter as long as birds are humanely fed an adequate amount to sustain life. But, if you are trying to achieve a good production rate, there are some guidelines to use as a reference. The best production results in other egg layers, such as chickens and turkeys, are when birds are fed at least 3 times per day. In most large poultry operations, birds are fed hourly. I have done many feeding trials in dairy cattle feeding frequencies and the best production comes from feeding diary cows 6 times per day at even intervals around the clock. However, this is not cost effective for dairy cows as labor costs outweigh the benefits derived. A good cost tradeoff versus income received is to feed dairy cows 3-4 times per day. Beef cattle being raised for optimum weight gains in a feedlot are fed 2-4 times per day.

Most all Ostrich are very sociable animals and look forward to feeding time if the feeding time is the same time every day. In other livestock, the more often you do this, the fresher the feed will be, and less problems with feed oxidation damage will occur. When feed is exposed to sunlight and moisture from the air, the vitamins and other nutrients will start to degrade. A few hours will do little damage, but a few days will do significant damage to the potency and performance value of the feed.

I once had a Ostrich rancher tell me that he fed birds once every two weeks by putting feed in piles on the ground as he didn't have time to feed every day. He theory was that no loss occurred to the feed as the birds were always eating off the top of the pile and feed underneath was always sheltered from the elements. This theory may sound reasonable in fantasy land, but in reality it does not work that way. Feed laying out in the open like that is exposed to high amounts of air flow and oxygen causing

oxidation damage. The morning dew everyday and occasional rain showers are providing the moisture factor. To me, it is a shame to spend all that money on expensive feed and then allow it to turn into a non-productive feed resulting in less-than-desirable production. It only makes sense to me that you already have spent the dollars for feed, so make that work for you in the most productive way possible.

Some folks are feeding birds in large feeding containers and fill them once per week or so. The feed is protected from the weather and sunshine in these containers. This will work okay IF YOUR FEED IS DESIGNED for this purpose. Since birds, under this feeding method, are able to eat as much or little as they want (free choice feeding), it is imperative that the feed formula be designed with this in mind. Putting a feed designed to be fed at the rate of 4.5 pounds per bird per day into a free choice feeder will result in overly fat birds that don't perform well at all.

The best program I can come up with is to feed the mature birds at least 2 times per day at exactly the same times everyday--and then feed only the recommended amount of feed per bird split between these two feedings. Feeders should be out of the weather and sunshine and cleaned at least every other day. Doing this appears to be just the right amount of social intervention and keeps the feed in good condition with the least amount of degradation. All other feeding methods appear to start the beginning of tradeoffs and compromises.

Feeding Ostrich for Production Part 3

Ostrich Nutrition Bulletin #15

July 15, 1997

By: Daryl Holle

How Much To Feed Per Day?

How much to feed your birds per day depends entirely on what you are trying to accomplish in your operation and what feed formula you are using. The Ostrich will vary in the amount of feed they eat per day--And, the amount they eat in different seasons of the year also varies. In this article, we will try to understand how much to feed per day.

The amount to feed an Ostrich depends on several inputs. As said earlier, one factor is what you are trying to achieve in your operation. If you want to feed your birds for ultimate production in breeding, fertility, hatchability, and chick growth, it is important to be using the correct feed designed for that purpose. If you are feeding breeder birds, feed a breeder feed. For growing chicks, use a well-designed grower feed, and so on. DO NOT dilute the commercial feed with alfalfa, corn, or other ingredients as this will lower the intake of the crucial minerals, trace minerals, and vitamins causing production problems.

Feed the recommended amount stated on the tag of the bag. This is where the design or feed formulation comes into play. A well designed feed that was developed with production parameters in mind will contain a bag tag with specific feeding rate instructions. A poorly designed feed formula has no specific feeding recommendations on the bag tag and usually says something like "feed free choice to breeding birds during the breeding season" (if it's a breeder feed). As with all production livestock, a productive feed formula is designed to control the amount of nutrients ingested by the animal to achieve a certain production result--Ostrich is no different. A well-balanced productive ration starts with a total daily intake of feed per bird per day--Then, the amount of nutrients needed to perform that production goal are packed into those daily feeding rate pounds. With a productive feed formula, having control of the bird's daily feed intake usually results in control of production if all other aspects of the operation are in order.

There are two exceptions to the above paragraph. Growing chicks are constantly increasing their feed consumption per day as each month goes by. It is difficult to be specific about feeding rates in this circumstance. However, the design of the grower formula should be such that as the chick grows in body weight, the amount of nutrients consumed should increase right with it to encourage good growth and weight gains. The other exception is maintenance feeds. Some maintenance feeds are designed specifically for the average breeder bird during the off season with the bag tag stating specific amounts to feed per bird per day. Other maintenance feeds are purposely designed as a variable intake feed so the body condition of the bird can be altered. If the bird is too fat at the end of the production year, a lesser amount of feed can be fed per day to take off some of that body fat. If the bird is too thin at the

end of the production year, more maintenance feed can be fed to increase the bulk of the bird without it getting too fat. These two examples are called body condition feed formulas. It is important to watch the body condition of the bird and feed them for optimum body condition. Again, DO NOT dilute these body condition rations with alfalfa, corn, or other ingredients as that could have a severe detrimental affect of the birds future productive performance--it also defeats the purpose of the intended feeding program.

Once you have identified how much to feed per bird per day, the most IMPORTANT aspect is to be sure that amount gets to the birds each day. The only way to do this correctly is to WEIGH THE FEED EACH DAY. A well designed feed formulation is based on average feed consumption. A quarter pound more or less can make the difference between a bird that is too fat or a bird that is too thin. It can also make a difference between an excellent laying hen or a so-so laying hen. The same is for growing chicks. Many ranchers use coffee cans to feed their birds--this works just fine except the coffee can should be weighed each time. The volume of a coffee can varies on how full you fill it--even if you think you are filling it the same amount each time, it can be as much as a quarter pound difference on how much the can is heaped with feed. Feed density also varies at different times of the year which means a full coffee can in July may weigh more or less in December. If you are interested in feeding your birds for production, do it right all the way and WEIGH THAT COFFEE CAN each feeding.

A professionally operated livestock feeding program will also include the daily recording of feed consumption. The reason for this record keeping is to be able to quickly identify when birds suddenly reduce their feed intake as sometimes this can indicate an illness condition brewing. Doing this allows early detection of illness and remedial steps can be started before the birds even show physical signs of illness.

Feeding Ostrich for Production Part 4

Ostrich Nutrition Bulletin #16

August 15, 1997

By: Daryl Holle

Tips For Identifying A Good Nutritional Feed

Identifying a good nutritional feed with performance characteristics can be an overwhelming task. However, there are some clues that are obvious enough to lead you in the right direction. When dealing with commercial feeds, the tag on the bag is the first place to begin close examination. In the following paragraphs, we will take a look at some crucial areas usually contained on a bag tag:

Guaranteed Analysis Section
Feed Ingredients Section
Feeding Recommendations Section

Guaranteed Analysis: This section of the tag states manufacturer guarantees to the consumer as to specific nutrient content. All state laws require that Protein, Fat, and Fiber have to be guaranteed to the consumer on each tag. If the tag does not specify "guaranteed analysis" of these three items, it probably is a "black market" feed that is illegal and not registered with the state it was sold in. This should cause your eyebrows to immediately raise about 1/2 inch and begin to look elsewhere for your performance feed.

Any other guaranteed nutrients, other than the required three mentioned above, is absolutely voluntary by the manufacturer. It only makes sense that the more nutrients shown at guaranteed levels, the more assurance you have that reasonable levels of those nutrients were added to the feed. Any nutrient that is guaranteed on the tag is subject to verification of that guaranteed level by the State Feed Inspection Division. That is why most feed companies ONLY guarantee the minimum 3 required nutrients. Most companies are of the policy not to subject themselves to any more verifications than absolutely necessary.

If a feed company displays a guaranteed analysis of additional nutrients like Calcium, Phosphorus, Selenium, Vitamin A, Vitamin D, and Vitamin E, these are some good comparisons you can make as to the overall performance value of the feed. Just make sure that when comparing one companies tag to another, that both tags state "guaranteed" and not words like "approximate" or "average". Unless it states the word "guaranteed, the information is useless as the company can state most any average or approximation they want as those statements are not enforceable by state inspection authorities.

Also, some companies may list quantities, or guaranteed amounts, in different terms and that can be an easy thing to miss that is very important. One company might list the vitamins as International Units

per Pound (IU's/LB.) while another company might list the vitamins as International Units per Kilogram (IU's/KG). There is a big difference between the two statements (a factor of 2.2). There are 2.2 pounds in a Kilogram. The company listing in "iu's/kg" states vitamin D levels of 5,500 iu/kg. The company listing in "iu's/lb" may also show 5,500 iu/lb. On the surface, both companies appear to have the same level of vitamin D in their feed as the number is the same. But, the company listing the vitamin D as iu/kg really only has 2,500 iu/LB (5,500 divided by 2.2) compared to the other company's 5,500 iu/LB (a factor of less than half the amount).

In helping ranchers with different bird problems, I have run across the following problem many times. "My vet says I have a calcium deficiency problem and that I should check with my feed company to see how much calcium and vitamin D are in the feed as vitamin D is very crucial to calcium being utilized. This information wasn't on the bag tag, so I called the company up and they said.....". My advice is to NEVER, NEVER, rely on information TOLD you by certain company representatives as to what the feed contains. If it is NOT guaranteed on the bag tag, what the individual TELLS you is not necessarily going to be accurate either as there is NO system of accountability with verbal statements. If you are having bird problems and your vet tells you to check out your feed nutrient levels, check the bag tag first. If the nutrients in question are not guaranteed on the tag, have the feed tested at a lab and find out for yourself what the truth is! When you have the lab sample in hand, then talk with the feed company to see if there is any discrepancies.

Life can be very complicated at times and the subject of proper bird nutrition can make even more complicated. The secret to identifying a good quality feed with performance characteristics is to make the effort to research and understand the differences between different feed brands. Don't rely on anyone else to do this for you. Listen to what makes sense, then research it on your own. After doing this for a while, you will be able to intelligently sift the seed from the chaff. There are hundreds of different Ostrich feeds out there and NO TWO are alike--even if they are made at the same mill with similar ingredients.

Feeding Ostrich for Production Part 5

Ostrich Nutrition Bulletin #17

September 15, 1997

By: Daryl Holle

Tips For Identifying A Good Nutritional Feed

Ingredients Section of the Bag Tag:

All of the ingredients contained in most Ostrich feeds can be classified into the following 8 groups:

Forages
Grains

Protein Feeds
Major Minerals
Minor Minerals
Trace Minerals
Vitamins
Additives

Examples of these classifications might be:

FORAGES: Alfalfa Meal, Grass Meal, etc.

GRAINS: Corn, Barley, Oats, Wheat, Distillers Grains, Wheat Midds, etc.

PROTEIN FEEDS: Soybean Meal, Cottonseed Meal, Peanut Meal, etc.

MAJOR MINERALS: Calcium, Phosphorus, etc.

MINOR MINERALS: Magnesium, Potassium, Zinc, etc.

TRACE MINERALS: Copper, Selenium, Manganese, etc.

VITAMINS: Vitamins A, D, E, and K plus all the B-Vitamins, etc.

ADDITIVES: Amino Acids, Probiotics, Yeast Cultures, etc.

Using one or many ingredients from each classification will allow a good Ostrich nutritionist to put together a performance feed product. It gets a lot more complicated than that, but this does explain how a formula is started in its simplest terms. Forages are generally high in fiber, Grains are generally high in energy, and Protein Feeds are high in protein content. Using ingredients from these 3

classifications, a good nutritionist can balance the protein, energy, and fiber to his desired level. Then, he can add ingredients from the Major Minerals, Minor Minerals, Trace Minerals, Vitamins, and Additives classifications to balance out a complete diet to predetermined nutrient levels and goals.

Now, most tags will list the ingredients in order of volume. So, there are some clues to you as what type of feed the bag contains. If Grains (like ground corn) are listed first, you may have a clue that this feed is a high energy feed. This may be good or bad depending what birds you are feeding it to. If it is being fed to breeder birds, this may NOT be a good thing--in my opinion--as they might get overly fat and not produce well. If ingredients from Forages is first on the list, it probably is a higher fiber feed. And, if follow by an ingredient from Grains, it probably is a medium energy feed.

If you can't find any ingredients from the Protein Feeds classification, then look for Animal Protein Product ingredients such as Meat & Bone Meal, Fish Meal, Blood Meal, and so on. These Animal products I am very negative about in Ostrich feeds as you well know by now as I have discussed them in length in earlier bulletins. Some feeds will contain both Protein Feeds and Animal Protein Products which is still not a good thing--IN MY opinion. Looking for the source of protein in the feed will give you some clues as to the performance qualities of the feed.

There are still some Ostrich feeds being manufactured with collective terms statements in the ingredients section. Terms like Plant Protein Products, Processed Grain Products, Roughage Products, Animal Protein Products, are all collective term statements. They are legal, but don't tell you anything about what ingredients were used to make this feed and this decision is up to the manufacturer and can be changed at any time without notice. I am against this type of feed labeling--even though it is legal. I think the consumer should be told what specific ingredients were used in making the feed and have the assurance that each batch was made using those same ingredients. Severe ingredient changes in Ostrich feeds is the LEADING cause for low production in Breeders and chicks going off feed and dying.

There is one more subject concerning ingredients that needs attention. Some feeds may contain a classification called "Roughage Products". The purpose of roughage products in some Ostrich feeds is to provide extra fiber or simply to act as a filler to the feed. Some examples of roughage might be Corn Cob fractions, Wheat Straw, Cottonseed Hulls, Soybean Hulls, etc. In my opinion, Ostrich feeds has no place for roughage products. If the ration is short on fiber, it means the Forage part of the ration was shorted for one reason or another. Plenty of fiber can be had from good quality Forage ingredients if the ration balance was done correctly. Roughage Products are also very hard for the Ostrich to digest properly and get the digestible fiber it really needs. In some cases, big problems with impactions can result on Ostrich using roughage products. As a parting thought, sawdust and cardboard are high in fiber also. Would you want that kind of fiber in your Ostrich feed?

Feeding Ostrich for Production Part 6

Ostrich Nutrition Bulletin #18

October 15, 1997

By: Daryl Holle

Tips For Identifying A Good Nutritional Feed

HOME BREW MIXES:

Keep in mind that when feeding a concoction of ingredients developed in some rancher's mind in order to save feed dollars, you are putting yourself at a huge risk to follow his recommendations of feeding same. There are probably about twice as many secret and magical feed formulas out there as there are ranchers. Great care MUST be taken before trying out these home brew mixes on your birds. The consequences of a mistake can last a long, long time. When assisting ranchers with bird health and production problems over the phone, the cause of the problem is usually found in a bad feed formula developed by a non-Ostrich nutritionist, a bad commercial feed formula that has not been proven, or the rancher is feeding some type of home brew mix that either he made up or one of his rancher friends made up. When I ask the caller how they arrived at a decision to feed this mix, the answers can be routinely identified in 3 areas:

1. "So and So said to do this and he said it would fix my problem."
2. "My neighbor does it and it works well for him."
3. "The seminar speaker said it would work just fine!"

As you can see, all these reasons given are based on rumor and gossip--usually by someone that has the nutritional sense of a Bull in a china shop. All of you should know by now that what you hear is not necessarily the truth--especially in the Ostrich industry. My advice is the NEVER try out these home brew mixes without first checking out the nutritional adequacies of the mix. NEVER takes someone else's word for his performance fantasies on his birds. Besides, just because it works on his birds does NOT mean it will be good for yours.

TREAT FEEDING:

A piece of apple, a piece of orange, or a small bite of lettuce is not going to hurt an adult Ostrich. However, a quarter-pound of one of those things will upset the diet and can cause complications with production performance. Chicks are more sensitive to this than any age group as the ph of their gut appears most sensitive to any change. Also remember that ANY addition to the feed diet will dilute the rest of the nutrients in that already balanced diet feed. A very small amount is not going to bother much, but any more than 5% of the birds diet will have a significant impact on the production outcome (depending on what it is, of course).

ADDITIVES:

I just came back from a Ostrich seminar this last weekend and there were more feed additive products displayed by different companies than there were ranchers attending the seminar. In my opinion, 99% of all these additives are designed to get your attention about fixing a certain problem that most ranchers have--if they are having problems. The real problem is the ranchers feed is wrong. Throwing additives in the feed is like pitching a baseball through a 12 inch hole 60 feet away. Occasionally, you might get lucky--But, most often you won't! The problem is the feed you are using and no additive is going to fix that problem--especially if it is a bad formula feed.

I also do not believe in the concept of free choice feeding of mineral, trace mineral, and vitamin mixtures if you are seeking performance goals in your birds. It has been said by some that birds will pick and choose only what they instinctively know they need. I can't even get these birds to instinctively seek shelter in a hail storm--how can I expect them to control their diet properly by selecting the right combinations of nutrients. The free choice concept could possibly work if the birds diet was severely deficient of one or two nutrients--but my opinion is that the bird will only satisfy this need to a level of body maintenance as the bird has NO production performance goals in its mind! A good performance feed diet will have production performance goals (whether is be egg production, fertility, hatchability, or weight gains) to bring out the full genetic potential of the bird. Free choicing nutrients allows THE BIRD to control exactly what it wants to and at best that will only be to maintain its body only.

Another extension of this opinion is the importance of the hen passing an adequate amount of nutrients through the egg yolk to the embryo and chick. The hen does not know how much of certain nutrients (and in what ratio) to pass onto the egg yolk to prevent late term chick deaths in the shell during incubation. In this example, it is up to the nutritionist to solve this problem by adjusting certain nutrient levels and ratios in the feed to eliminate the problem. I also sincerely doubt that a hen would know how to change her free choice diet to solve a rotating leg problem in her chicks. An experienced Ostrich nutritionist would know how to solve that problem by adjusting certain nutrient levels in her daily diet.

Free choicing specific nutrients also destroys the performance goals of "Challenge Feeding". Challenge Feeding is a nutritional technology which consists of feeding the bird with adequate levels of nutrients to take it beyond what it normally would produce if left to select its own pace. The magic with Challenge Feeding is that it allows the bird to produce at its full genetic potential while still maintaining excellent health and production longevity. Challenge Feeding will always be a part of a performance feed diet.

Controlled feeding with specific nutrient levels in the correct amount and ratios is the ONLY way to feed for performance. Controlled feeding allows a nutritionist to attack specific problems in a specific species, and believe me, we have plenty of them to work on when feeding Ostrich for good performance.

This completes the six part series on "feeding Ostrich for good production". I hope it has helped you understand that feeding birds right is a little more complicated than throwing some feed in the pan.

Selenium Levels In Ostrich Feeds

Ostrich Nutrition Bulletin #19

November 15, 1997

By: Daryl Holle

Question From Rancher Regarding Selenium

Dear Daryl,

"I have questions about selenium levels. A few companies offer selenium 'additives', but I'm worried that people don't know what level the selenium is at in their local grains.... I'm specifically talking about people that have their own feed ground locally. I know that some places have toxic levels of selenium in the local grains, and I also know that some places have zero selenium."

"How does a person check their grains? Is there a lab we should send a sample of our ground feed to? And if there is, what is a good level of selenium? Should a person do a blood test on a bird or two to see what their selenium levels are?"

"Just a thought for a future article. I've been preaching to the members of our cooperative that they NEED to check their selenium levels... I just want confirmation that I'm preaching correctly, and if I am, when it comes from someone like you...it makes much more sense than from someone like me!!"

"Thanks Daryl for your continued bulletins on nutrition and other information! It's been a great source of information for me!"

REPLY:

The subject of Selenium is one of the hardest nutrients to write about as it is so misunderstood by most ranchers. Selenium is also one of the most touchy trace minerals that an animal nutritionist has to deal with. A deficiency of Selenium in the feed diet will result in egg hatchability problems--and if severe enough, will also result in chick/embryo deformities such as missing eyes or deformed feet and wings. An excess of Selenium in the feed diet will quickly lead to toxicity problems in birds that will cause even greater problems than a deficiency.

In adolescent and adult birds, a Selenium deficiency can cause appetite problems, blind staggers, lameness, liver problems, poor feather coat, constant biting and feather pecking, and also may show up in harvest birds with multi-colored meat muscles.

It is easy to understand that the correct Selenium level in the birds diet is MOST important to the birds health. But, like many nutrients, the LEVEL of Selenium by itself IS NOT the only factor as Selenium works closely with other nutrients in the total ration. Therefore, the other nutrients in the feed working with Selenium must also be at correct levels. A perfect example of this is Vitamin E. Selenium is directly related to the efficient absorption of Vitamin E. A Vitamin E deficiency can also effect such things as hatchability, feather coat, liver functions, and much more. If Vitamin E is at adequate levels

but Selenium is deficient--Vitamin E will not be efficiently absorbed and problems will result. If Selenium is adequate in the feed but Vitamin E is deficient, the symptoms can closely relate to a Selenium deficiency when it really is NOT. There are several other interactions that Selenium has with other trace minerals and vitamins. Simply adding more Selenium to the birds diet is NOT always the answer--in fact, it could be a toxic answer that will cause greater problems that the ones you were trying to solve.

I strongly discourage anyone from using the Selenium additives to supplement their birds diet--it is a very risky proposition. NEVER free choice any trace m ineral supplement with high levels of Selenium. The line between a deficiency diet and a toxic diet is very narrow. I also don't recommend relying on bird blood tests showing a deficiency of Selenium. It has been my experience that when the blood test is taken again at a different time, the results change. Besides, even if the blood tests show a deficiency of Selenium, how do you know how much to add to correct that without getting into a toxicity problem.

If you are grinding/mixing your own feeds or having custom feed made up at a local feed mill, you should be sure that a trace mineral/vitamin pak is being used from a reputable Ostrich feed company with experience. You should also be using a ration formula from that same company that MATCHES the trace mineral/vitamin pak you are using. All Blue Mountain complete feeds, supplement feeds, and trace mineral/vitamin Paks are designed to match the formulas provided to achieve a proper balance and amount of Selenium and the nutrients that work with Selenium--And, at the same time, prevent any possible toxicity problems.

In the above question, it is true that some areas of the United States have grains with very high levels of Selenium. Other areas are very deficient of Selenium. If you are grinding/mixing your own feeds, the answer to this problem again is to make sure you are using the recommended ration formula along with a matching trace mineral/vitamin pak--AND make sure that these formulas and Paks are from an experienced Ostrich feed company. A feed formula that calls for 85% grain in an area with Selenium toxicity problems in grain is surely going to be a disaster. No Ostrich feed formula should be containing 85% grain in the first place and that should give you a clue as to the experience behind this formula. If the feed formula is balanced using recommended forages, grains, proteins, minerals, trace minerals, and vitamins, Selenium toxicity in grains will not be a problem when mixed correctly with the matching trace mineral/vitamin pak. In areas where Selenium is deficient in most feed ingredients, it still won't be a problem IF the correct formula is used with the matching trace mineral/vitamin pak as there will be sufficient nutrients coming from the Pak if it was designed correctly from a Ostrich feed company with experience.

Another point that is most important here is the protein level in the finished Ostrich feed formula. Higher protein feeds tend to neutralize the Selenium toxicity coming from areas of high Selenium grain problems. If the ration is balanced correctly to a performance level with the right protein levels, the toxicity problem corrects itself as less grain/more protein feeds are used and the higher protein ration helps compensate for the toxic Selenium proportions.

Using a feed formula or premix designed for cattle or hogs is the first mistake most Ostrich ranchers make. Doing this will almost always result in a Selenium/trace mineral/vitamin deficiency in Ostrich. The reason is density of nutrients in the total diet versus the intake daily of the feed. A cow can eat 50 pounds of feed per day while an ostrich will eat 5 pounds and an emu may eat 3 pounds. That adult cow can eat 10 times as much as an adult ostrich, but its body weight is NOT 10 times as much as an adult ostrich (it is closer to 5 times the body weight of an adult ostrich). Therefore, the density of trace

minerals/vitamins for the cow can be far less in the feed than is needed for the ostrich. Doubling the cow premix is not the answer as then the mineral portions will be far too excessive for the Ostrich causing greater problems. Using a premix for Ostrich that was designed for other livestock rarely results in good Ostrich performance.

Remember that it takes at least ONE FULL YEAR to correct a nutrient deficiency problem in your birds AFTER you start feeding a well balanced diet. The full performance effects of a well balanced diet will take effect after the second year of feeding your birds correctly. The same result will happen in reverse when changing to a nutrient deficient feed. The first year, not too much difference in production/hatchability is noticed. However, the second year problems begin to significantly show up and the third year production almost comes to a halt. I have heard people blame this scenario on weather and environment, but more likely than not, it is a poor nutritional diet!

The Dilution Factor, Part 1

Ostrich Nutrition Bulletin #20

December 15, 1997

By: Daryl Holle

Many people ask me what the most common rancher problem is in the Ostrich industry with feeding birds. You might think that this question would take a moment to ponder on, but it doesn't. I can immediately answer that the most common problem ranchers have with feeding their birds is the practice (or malpractice) of adding ingredients to the balanced feed rations for their birds. To me, it is very simple. All productive animals need a balanced diet of nutrients to perform a certain productivity schedule. When we start messing with that balanced diet, the productivity will suffer--if not now, next year! But, Ostrich ranchers have difficulty with this reasoning, not only in the U.S., but all over the world.

In discussions with ranchers, it is very easy to discover that the majority are adding a slab of alfalfa, a scoop of corn--others are adding some minerals, others some vitamins, while still some others add extra protein and so on to their birds daily feed diet. The most common reasons given for this practice are:

"The cost of my commercial feed is too high priced, I need to cheapen it down a little by adding some corn."

"Its been cold lately and my birds need extra corn for more energy--besides that, they really like it."

"My birds act like they are bored and really like the slab of alfalfa I give them every day and will peck at it all day long."

"Someone told me to add more protein to the feed and it will kick the birds into egg production."

"Feed companies put far more nutrients into the feed than the birds need, so I only give them one pound of that feed and fill'em up on alfalfa and corn. Feeding one pound will ensure the birds get all the minerals and vitamins they need."

I could go on and on with this, but I think by now you have the point! Adding things to the diet of birds has a dilution effect of ALL the balanced nutrients in the original feed. I call this effect The Dilution Factor. The Dilution Factor is the most common cause of non-productive birds in this industry. Most often, it is the cause of poor egg production, poor fertility, poor egg quality, poor shell quality, poor hatchability, poor chick survivability, and poor chick growth. It is also one of the leading causes of poor meat quality in harvest birds.

Why are Ostrich ranchers doing this? "They know not what they do" is the best answer I can use to express the concern. The majority of ranchers simply are NOT aware of complications The Dilution Factor can cause to the total balanced diet the birds need for good productivity of any kind. Other

livestock ranchers, such as beef, dairy, poultry, and so on, would not even consider The Dilution Factor to cut their feed costs as experience has taught them it would be biting off their nose to spite their face ending up in a certain productivity wreck! Does this mean that Ostrich ranchers are different somehow? No, it only means that most Ostrich ranchers are NOT AWARE of the consequences of intentionally altering a birds diet. If you are grinding/mixing your own Ostrich feed, there are ways to incorporate different ingredients you may want to add and still retain the balance of the total ration. However, if you are feeding a commercial pelleted Ostrich feed, it becomes very risky to add extra things to the birds diet UNLESS that pelleted feed was designed with that in mind.

In upcoming issues of the nutrition bulletin, we will cover the nuts and bolts of what happens, nutritionally speaking, when The Dilution Factor is practiced by ranchers. It can be a real learning experience if you understand what The Dilution Factor is and work on your feeding management style to prevent it from occurring in your operation.

Before I sign off this time, there is one more discussion going on in the industry that I would like to comment on. I am hearing and reading statements like:

"Feed companies really have no idea what these birds need and little research has been done. Therefore, it is recommended to feed Ostrich like avian's (poultry)."

"No one has any idea what these birds really need and it is a wild guess as to what may work the best."

These statements are not only being said by some ranchers, but also by some feed companies--that is the shocking part! Please allow me to be perfectly clear about this. I have been working every day with Ostrich nutrition for over 7 years now. Blue Mountain has done extensive studies and research in many areas of Ostrich nutrition over those seven years. Even though a lot is yet to be learned, we know twice a much about Ostrich nutrition than we did 7 years ago and if we are doing our job, we will know twice as much again 5 years from now. We have come A LONG WAY is a relatively short period of time. This takes sincere dedication to meet the needs of a productive Ostrich diet rather than simply throwing some ingredients together and putting them into a bag. If a company honestly feels that no one has any idea on what the productive Ostrich diet should be, it only makes common sense that this is an admission that this same company has no idea either. My question is--WHY ARE THEY MAKING AND SELLING OSTRICH FEEDS?

To formulate rations and feed Ostrich like chickens is similar to feeding chickens like hogs. No animal nutritionist would consider doing that. Why are so many willing to feed Ostrich like chickens? Food for thought--would you agree?

The Dilution Factor, Part 2

Ostrich Nutrition Bulletin #21

January 15, 1998

By: Daryl Holle

In Part 1, I promised you we would get right to the nuts and bolts of "The Dilution Factor" beginning with Part 2, so here we go. It is slightly complicated so you may have to give full attention--But then, nutritional subjects usually are that way.

In order to fairly explain what happens to Ostrich feed when The Dilution Factor is involved, we need to start off with a point of reference that would be considered an adequate diet for Ostrich. This subject, by itself, can be as controversial as anything you ever run across. But, I am writing this article so I will pick the parameters that I know would be a good example of a breeder bird ration that will result in reasonable production performance.

Table 1

ITEM	AMOUNT	PROTEIN	FAT	FIBER	ENERGY
Breeder Ration	100%	21.0%	4.0%	11.0%	67%

Allow me to explain Table 1. The AMOUNT column is the percentage portion of the birds total daily intake--in this case it is 100%. The protein content of the example breeder ration is 21% crude protein. The fat content of this ration is 4.0% crude fat and 11.0% crude fiber. If you disagree with any of these numbers, that is fine, just keep in mind that this is an example and I am trying to demonstrate The Dilution Factor and not debate the who is wrong and who is right on nutrient levels.

For the nutritionists out there reading this information, when you are done laughing about the ENERGY column, allow me to put some reason to this category. The average Ostrich rancher does not understand ALL the energy systems and cannot relate to them. There are probably more different ways to calculate energy than I have fingers and toes. And, all livestock rations do not use the same one to calculate diets--This is very confusing to the average person. But, most everyone can understand the word ENERGY. What method was used to calculate this energy number does NOT matter. What is important is the assigned number I have put in the ENERGY category and to see if it changes when The Dilution Factor in implemented.

Let's take a look at some other feed ingredients and see how they stack up on the nutrient table. I am using average nutrient values except for ENERGY which is my own relative number.

Table 2

ITEM	AMOUNT	PROTEIN	FAT	FIBER	ENERGY
Breeder Ration	100%	21.0%	4.0%	11.0%	67%
Corn (maize)	100%	8.5%	3.5%	2.9%	88%
Alfalfa (lucerne)	100%	18.0%	2.2%	30.0%	58%
Grass Hay	100%	15.0%	2.8%	32.0%	52%
Wheat Straw	100%	3.0%	1.5%	42.0%	40%
Dehulled Soymeal	100%	47.5%	1.2%	3.0%	87%

If you have looked at Table 2 closely, I think you can get a good feel for what impact The Dilution Factor has on feeding Ostrich. You can see that some very common feed ingredients vary widely in their nutrient content. Some are high in protein while others are very low. Some are high in energy while some are very low. Some are high in fat and fiber while others are very low.

When a feed ration has been balanced, in this case it means the Breeder ration is 21% protein, 4 % fat, 11% fiber, and so on. Adding corn, as an example, to this balanced diet will change the nutrient characteristics of the feed and make it something different than it was intended to be. Example:

Table 3

ITEM	AMOUNT	PROTEIN	FAT	FIBER	ENERGY
Breeder Ration	75%	21.0%	4.0%	11.0%	67%
Corn	25%	8.5%	3.5%	2.9%	88%
New Ration Avg.	**100%**	**17.9%**	**3.9%**	**9.0%**	**72%**

You can see in Table 3 that by adding the 25% corn to the birds daily diet, the protein in the daily total diet dropped to 17.9% which is severely low for any type of reproductive performance in my opinion. The fat did not change much but is slightly lower yielding less energy when the bird really needs it during breeder season. The fiber dropped down to a lower level--especially for Ostrich. The energy was pushed way up and during breeding season, this alone could cause the birds to become too fat.

The new ration average numbers above are not anywhere close to what the birds we re intended to get for a daily diet. The entire relationship between the nutrients is out-of-balance and bird production performance will be decreased by the severity of the imbalance.

You might be saying to yourself at this point: "Well, if the protein is low, let's add some more protein like soym eal to the diet to raise it closer to what it should be."

Example:

Table 4

ITEM	AMOUNT	PROTEIN	FAT	FIBER	ENERGY
Breeder Ration	63%	21.0%	4.0%	11.0%	67%
Corn	25%	8.5%	3.5%	2.9%	88%
Dehulled Soymeal	12%	47.5%	1.2%	3.0%	87%
New Ration Avg.	**100%**	**21.0%**	**3.5%**	**8.0%**	**75%**

Well, we fixed the low protein level by adding the Dehulled Soymeal to get it back to the ration diet of 21% protein, but it didn't fix the rest of the numbers. The fat content is even lower still at 3.5%, the fiber level is still very low, and the energy level is higher than ever resulting in fat birds and maybe even obese birds after they have been on this ration for awhile. The more you try to add to a complete balanced ration, the worse it gets out of balance!

You may have noticed in the above chart that the Breeder Ration AMOUNT percent a ge dropped from 75% to 63%. This was done to make room for the 12% soymeal. Remember that the 100% represents the TOTAL diet that the birds can eat in one day. That could be 5 pounds or it could be 10 pounds of feed. If you want to add something like corn or soymeal, the percentage added must come OUT of some other ingredient as the birds can only eat 100% of what they eat! It has been my experience that when Ostrich ranchers add something to the complete diet, they usually cut down on the complete diet to save dollars. This is why I lowered the Breeder Ration to allow room for the 12% soymeal (even though in reality that was not the correct thing to do).

Next, let's take a look at another common practice or malpractice done by ranchers. The pen the breeder birds are in has a nice growth of green mid-summer grass. The rancher has the idea that since the birds are eating the grass, he can cut down on the complete feed (saving dollars) and FORCE them to eat more of the green grass in the pen.

Example:

Table 5

ITEM	AMOUNT	PROTEIN	FAT	FIBER	ENERGY
Breeder Ration	75%	21.0%	4.0%	11.0%	67%
Grass Hay	25%	15.0%	2.8%	32.0%	52%
New Ration Avg.	**100%**	**19.5%**	**3.7%**	**16.3%**	**63%**

The example in Table 5 would closely represent the rancher feed about 3 pounds of Breeder Ration complete feed per day and the rest of the diet being consumed as grass. You can see that the protein was lowered slightly, but the fiber went sky high and the energy dropped severely. Again, out-of-

balance! With those low energy levels and the birds breeding and laying, the body condition is bound to be poor going into the colder winter weather. There are many more things to point out here, but I think you get the message. Grass grazing with feeds designed as complete diets is not a good thing to do. A specially designed supplement feed should be used for that purpose.

There are also some ranchers that grind up wheat straw and mix it with their feed at the rate of 25% of the birds diet. When I ask "why are you doing this?", the answer always is that "these birds need extra fiber and it sure cheapens my feed cost".
Example:

Table 6

ITEM	AMOUNT	PROTEIN	FAT	FIBER	ENERGY
Breeder Ration	75%	21.0%	4.0%	11.0%	67%
Wheat Straw	25%	3.0%	1.5%	42.0%	40%
New Ration Avg.	**100%**	**16.5%**	**3.4%**	**18.8%**	**60%**

I think you will agree that feeding breeder birds a 16% protein, 19% fiber, and only 60% energy as in Table 6 is a disaster waiting to happen and it usually does. This diet does not even qualify for a maintenance ration--in my opinion and not only is a waste of time but also a waste of good dollars as it has no productive performance whatsoever.

This is about all the space I can use to begin the description and effect of The Dilution Factor as it relates to protein, fat, fiber, and energy nutrients in the birds diet. As you can see, we could go on-and-on with different combinations but the facts will always show that the more stuff you add to the balanced diet, the farther away from a balanced and productive diet you get. In the next issue of the bulletin, we will take a look at some other important nutrients such as calcium and phosphorus and see how they are affected by The Dilution Factor.

The Dilution Factor, Part 3

Ostrich Nutrition Bulletin #22

February 15, 1998

By: Daryl Holle

In Part 2, we covered in detail the effects of adding things to your complete feed ration (The Dilution Factor) and how that changes the Protein, Fat, Fiber, and Energy part of the ration. In this Part 3, let's take a look at some other important nutrients in the ration such as Calcium, Phosphorus, and Vitamin D to see how their levels are affected by The Dilution Factor.

First, it is important to know that Calcium and Phosphorus are very crucial to almost ALL performance parameters in Ostrich. These two minerals have a direct effect on egg production, egg size, egg shell porosity, egg shell texture, fertility, ease of incubation, embryo growth and gestation time, hatchability, and embryo survivability. These two minerals also control frame growth, muscle growth, and weight gains in all birds. After that statement, you can easily understand that these two minerals MUST be in the daily feed ration in the correct amounts, in the correct ratio, and from a source that is easily utilized by the bird for good performance to occur.

You have often heard me say that nutrients in the feed must be balanced as to levels, ratios, and sources. This is true of many, many nutrients. Vitamin D levels and ratios are extremely important to good utilization of Calcium and Phosphorus. Vitamin D acts as a carrier for Calcium and Phosphorus. Low levels of Vitamin D in the feed will actually show up as a deficiency of Calcium or Phosphorus--as if there wasn't enough Calcium or Phosphorus in the feed when there actually is plenty.

This is why Vitamin D is usually always SUPPLEMENTED in Ostrich feeds. Even though feedstuffs, such as Alfalfa and Corn, have some natural Vitamin D in them, this source is very unpredictable and sometimes nearly non-existent depending on the age and processing methods of the feedstuff. It is always best to work in terms of supplemented vitamin levels when formulating feed rations as that way there is assurance that enough quantity of the vitamin is there to work correctly with other important nutrient functions.

In order to fairly explain what happens to Ostrich feed when The Dilution Factor is involved, we need to start off with a point of reference that would be considered an adequate diet for Ostrich. This subject, by itself, can be as controversial as anything you ever run across. But, I am writing this article so I will pick the parameters that I know would be a reasonable example of a breeder bird ration that will result in reasonable production performance.

Table 1

ITEM	AMOUNT	CALCIUM	PHOSPHORUS	VITAMIN D
Breeder Ration	100%	2.0%	1.0%	6,000 IU/LB

Allow me to explain the Table 1 chart. The AMOUNT column is the percentage portion of the birds total daily intake--in this case it is 100%. The calcium content of the example breeder ration is 2% calcium. The phosphorus content of this ration is 1% phosphorus and the supplemented vitamin D is 6,000 International Units per pound. If you disagree with any of these numbers, that is fine, just keep in mind that this is an example and I am trying to demonstrate The Dilution Factor and not debate the who is wrong and who is right on nutrient levels.

Let's take a look at some other feed ingredients and see how they stack up on the nutrient table. You will notice that the Breeder ration is the only listing with vitamin D as the vitamin D we are showing is only supplemented vitami n D.

Table 2

ITEM	AMOUNT	CALCIUM	PHOSPHORUS	VITAMIN D
Breeder Ration	100%	2.0%	1.0%	6,000 IU/LB
Corn (maize)	100%	0.02%	0.28%	n/a
Alfalfa (lucerne)	100%	1.3%	0.25%	n/a
Grass Hay	100%	0.7%	0.22%	n/a
Wheat Straw	100%	0.1%	0.04%	n/a

If you have looked Table 2 chart closely, I think you can get a good feel for what impact The Dilution Factor has on feeding Ostrich. You can see that some very common feed ingredients vary widely in their nutrient content. Some are high in calcium while others are very low. Most are very low in phosphorus and that is why extra phosphorus always needs to be supplemented to Ostrich feeds.

When a feed ration has been balanced, in this case it means the Breeder ration is 2.0% calcium , 1.0% phosphorus, and 6,000 iu/lb of vitamin D to make it all work well together. Adding corn, as an example, to this balanced diet will change the nutrient characteristics of the feed and make it something different than it was intended to be.

Example:

Table 3

ITEM	AMOUNT	CALCIUM	PHOSPHORUS	VITAMIN D
Breeder Ration	75%	2.0%	1.0%	6,000 IU/LB
Corn	25%	0.02%	0.28%	n/a
New Ration Avg.	**100%**	**1.5%**	**0.88%**	**4,650 IU/LB**

You can see in Table 3 that by adding the 25% corn to the birds daily diet, the calcium in the daily total diet dropped by 25% as corn has nearly no calcium content. This results is severely low calcium for any type of reproductive performance in my opinion. The phosphorus changed slightly lower--yielding

less effectiveness AND the supplemented vitamin D was lowered--yielding even less utilization of calcium and phosphorus (compound effect).

The "new ration average" numbers above is not anywhere close to what the birds were intended to get for a daily diet. The entire relationship between the nutrients is out-of-balance and bird production performance will be decreased by the severity of the imbalance.

Next, let's take a look at another common practice or malpractice done by ranchers. The pen the breeder birds are in has a nice growth of green mid-summer grass. The rancher has the idea that since the birds are eating the grass, he can cut down on the complete feed (saving dollars) and FORCE them to eat more of the green grass in the pen.

Example:

Table 4

ITEM	AMOUNT	CALCIUM	PHOSPHORUS	VITAMIN D
Breeder Ration	75%	2.0%	1.0%	6,000 IU/LB
Grass Hay	25%	0.7%	0.22%	n/a
New Ration Avg.	**100%**	**1.68%**	**0.86%**	**4,650 IU/LB**

The example in Table 4 would closely represent the rancher feeding about 3 pounds of Breeder Ration complete feed per day and the rest of the diet being consumed as grass. You can see that the calcium, phosphorus, and supplemented vitamin D content went down significantly. There are many things that could be pointed out here, but I think you get the message. Grass grazing with feeds designed as complete diets is not a good thing to do. A specially designed supplement feed should be used for that purpose.

There are also some ranchers that grind up wheat straw and mix it with their feed at the rate of 25% of the birds diet. When I ask "why are you doing this?, the answer always is that "these birds need extra fiber and it sure cheapens my feed cost".

Example:

Table 5

ITEM	AMOUNT	CALCIUM	PHOSPHORUS	VITAMIN D
Breeder Ration	75%	2.0%	1.0%	6,000 IU/LB
Wheat Straw	25%	0.1%	0.04%	n/a
New Ration Avg.	**100%**	**1.54%**	**0.82%**	**4,650 IU/LB**

I think you will agree that adding things to complete breeder bird rations is a problem causing less performance in all areas of production. Some ranchers tell me they are feeding ONE pound of the complete breeder ration and 4 pounds of a 50/50 mix of alfalfa and corn. They make sure to also tell me that they feed the one pound of complete breeder feed to ensure the birds get their minerals and

vitamins each day. What rationale is used to come up with that idea is beyond me. Here are the results of feeding birds that way:

Table 6

ITEM	AMOUNT	CALCIUM	PHOSPHORUS	VITAMIN D
Breeder Ration	20%	2.0%	1.0%	6,000 IU/LB
Corn	40%	0.02%	0.28%	n/a
Alfalfa	40%	1.3%	0.25%	n/a
New Ration Avg.	**100%**	**0.92%**	**0.43%**	**1,240 IU/LB**

Feeding birds in the manner shown in Table 6 will definitely cause a severe deficiency of calcium, phosphorus and vitamin D. These levels are not even enough for a Maintenance ration let alone an egg production ration. All sorts of problems will result from feeding this ration over a period of time. How soon the problems begin to develop depends entirely on the body reserves of the birds--but sooner or later, it WILL be a big problem.

As you can see, we could go on-and-on with different combinations but the facts will always show that the more stuff you add to the balanced diet, the farther away from a balanced and productive diet you get. The Dilution Factor is the leading cause of bird problems and egg/embryo problem s all over the world. This ends The Dilution Factor series of articles. I hope it has helped you to think twice before adding things to your feed to lower the feed cost.

Animal Protein Products in Ostrich Feeds

Ostrich Nutrition Bulletin #23

March 15, 1998

By: Fiona Benson

There have been many writings recently by Ostrich feed companies, their employees and nutritionists, about the use of Animal By-Products in Ostrich feeds - both pro and con. Most of these articles make reference to many topics that are of great concern to me in our efforts to achieve a sustainable market for our meat products.

Ostrich Meat`s greatest selling point is its health benefits as a red meat. To feed them animal protein products from any source, in the light of current evidence, does not in my opinion allow the industry to call it a healthy red meat. I will return to this issue later.

Reference was made to the reasons being given for inclusion of' carcass meal was as a result of research done in South Africa. As an Ostrich Farmer in South Africa maybe this is an opportunity to provide a greater understanding on the industry here.

Until 1993 the marketing of all ostrich products could only go through one channel. Ostrich farming had been conducted in an atmosphere of not wishing too many ostriches to survive in fear of flooding the market. Therefore maximum production was not a pre-requisite to formulating rations. Many producers outside South Africa are not aware that hide and feathers where the primary products and the meat was sold as a by-product to the meat processing industry. It was not considered of good enough quality to be sold fresh. That is why we still do not have a developed ostrich meat market here in South Africa. For this reason South Africa is NOT the ideal pattern to follow when developing feed rations for high quality Ostrich meat, maximum production from breeder birds, or maximum chick survivability.

To satisfy the hide and feather market a 14mth slaughter age was considered the ideal. With meat quality and productivity NOT a consideration. With deregulation came a number of new entrants to Ostrich Farming in South Africa, these farmers have been looking to the work done OUTSIDE South Africa as they were not satisfied with the feed performance and information available from within South Africa. It surprises me greatly that some US feed companies are trying to follow South African recommendations.

At the First International Ostrich Meat Congress held at Oudtshoorn 12 months ago a clear message was sent to the industry. That message - if we were to sell our meat we MUST ensure the quality is improved, that the meat contains no animal by-products, no growth stimulants, no routine use of antibiotics and all other nasties as perceived by the consumer - OUR CUSTOMERS.

Following that meeting a number of our feed manufacturers here in South Africa have listened to the message and now ensure that their feeds are free of such products. Sadly not all yet.

Reference was made to the misconception that the animal by-products impart an off-taste to the meat. This is NO misconception! The comment has been made to me by a South African consumer on how

he had recently eaten Ostrich Meat and could taste the Fish Meal in the meat. He did not like it. Have you ever been in a cold store where carcasses from animals fed Fish Meal are hanging? It is more like walking into a fish store.

In other livestock, feeding onions and garlic will flavour the meat and odour with onion and garlic. Alfalfa and Corn are neutral and do not have strong flavours, but the total rations still needs to be a balanced ration or odd flavours can result. Too much IRON in the diet from other feedstuffs and minerals will cause Ostrich meat to taste somewhat like liver. Liver is high in iron and that is why it has its distinct flavour.

Meat quality - meat with off tastes, inconsistent texture, odd colour etc. - was discussed at our most recent monthly South African Ostrich industry meeting, it remains a problem to the development of our industry. A pre-requisite to good quality meat in any species is fast growth rates. The South African formulations were geared to obtaining 210 lbs at 12-14mths. These can be reached by 7mths with a well formulated feed and in time, improved genetics combined with well formulated feed will produce faster gains and larger birds. It is interesting to note the improvements made in the last 7 years by Blue Mountain Feeds Farmers - both in weight gains and overall production, compared to the little change in 150 years of South African farming.

Whether or not animal by-products are legally allowed in the feed, we as farmers have a responsibility and obligation NOT to use them in any of our Ostrich livestock rations, including Breeders, as they will go to slaughter someday and be turned into meat for our consumer. In the light of the evidence about the health risks of Animal By-products in animal feeds, we cannot continue to use them. Here a few examples why :

"The critical experiment came when Marsh inoculated scrapie infected sheep brain into US cattle. [63] If you do this in England the cows go mad, twitching [16] and kicking into a rabid frenzy. [12] But in America, cows instead stagger to their deaths like downer cows do [65], supporting the notion that a form of BSE is already here in the United States."

"BSE has been able to infect and (therefore) kill cats, antelopes, and even ostriches from presumably eating infected protein.[l] Experimentally, one can give BSE to monkeys [56], pigs, mice, sheep, goats [l], and chimpanzees. [8] There is no reason to believe that BSE will not similarly infect humans. [8] So far, BSE has proven more infectious than most other transmissible spongiform encephalopathies. [39] In fact 6 out of 7 attempts to transfer the disease to different mammalian species have been successful. [39] That does not bode well for the human race."
"Spongiform encephalopathies are invariably fatal [29] neurodegenerative [17] diseases. There is no treatment [55] nor cure. [18] The novel [3] infectious agents evoke no immune response [50] and consequently slowly accumulate [14] for an incubation period of up to 30 years. [60] You can't detect them [28], isolate them [35], nor purify them. [13] In fact, only an autopsy can tell if you ever even had them. [45] They aren't viruses and they aren't bacteria. [66] The consensus is that they are prions, or infectious proteins. [60] Without detectable DNA nor RNA [41], not only does no one know how they replicate, but the whole concept challenges the basic tenets of biology. [45]"

Last year the Nobel Prize in Medicine or Physiology was awarded to Stanley B. Prusiner for his pioneering discovery of an entirely new genre of disease-causing agents and the elucidation of the underlying principles of their mode of action. The infectious particles that Prusiner discovered, which he named prions (PREE-ons). are made of protein and do not contain any genes or genetic material -- a

detail that distinguishes them from all other kinds of infectious agents such as viruses, bacteria, fungi and parasites. Prusiner began his search for prions in 1972, after one of his patients died from dementia resulting from Creutzfeldt-Jakob disease, the human equivalent of "mad cow" disease. He has linked the prions to other degenerative brain disorders including Altzheimers Disease and Kuru in humans and Scrapies in sheep.

Prusiner has showed that prion diseases can sometimes be passed from one species to another. This work has taken 25 years. How can anyone be absolutely sure that recycling Animal By-Products back into the food chain is not building up further problems for the future that are still unidentified? The answer is WE CANNOT.

Comment was made that bans on animal by-products only referred to sheep and cattle products. This as a result of the link between transmission from sheep to cattle. It must be remembered that cattle have a very much longer life than swine or poultry. When reading the above and the still unknown incubation time of some of these prions, can we be sure that they are not present in swine and poultry, who do not live long enough for such diseases to develop? The answer is WE CANNOT.

Before moving to South Africa I was a dairy farmer in the UK. Never did I question what I was feeding my cattle. I trusted my feed company. When the BSE outbreak hit - it was not the feed companies that where blamed by the press even though they where the ones formulating the Animal By-Products in the feed. The blame was attributed to us farmers for being greedy and putting profit before our consumers health and safety by allowing and purchasing feed with Animal By-Products in them.

It is clearly evident that the only way feed companies call be forced to change their practices is from pressure from the farmers. The best producing ostriches both here in South Africa and in the US are reared on feeds free of any animal protein products. The technology to replace Animal by-products in feeds has existed for over 30 years - there is NO GOOD REASON for feed companies to be using these products as superior bird productivity and meat quality can be better achieved without them.

My ideas and opinions are not intended to do damage to any livestock industry whatsoever. In fact, my concern is to help livestock farmers in general and ostrich ranchers in particular, by asking each to take the RESPONSIBILITY for what your livestock is fed to protect YOUR industry. There is enough evidence about the feeding of Animal by-products to cause a health risk concern. It is the opinion of many that there are FAR TOO MANY DOUBTS regarding the safe use of these products. In the light of the evidence that is available farmers and nutritionists have a RESPONSIBILITY and OBLIGATION NOT to use these products in our animal feeds when the animal is used for human consumption.

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Feeding Rates, Performance, and Bird Condition

Ostrich Nutrition Bulletin #24

April 15, 1998

By: Fiona Benson & Daryl Holle

With the US winter nearing an end, the phones at the Blue Mountain Office have been busy with calls from concerned farmers slaughtering birds with very little fat. On some Ostrich carcasses, the belly fat was reported as little as 1/2 inch (12.7mm) thick when the normal should be about 1 to 1 1/2 inches (38.1mm). In some cases the birds are becoming very weak and/or dying from any little stress that comes along. Investigation in EVERY case has shown that the farmer has been short feeding (not enough feed), diluting feed by adding other ingredients, or feeding a brand of feed that was nutritionally inadequate.

When feeding any animal it is necessary to ensure that they receive a certain level of nutrients in a 24 hour period. A good Nutritionist will design feeds to ensure that these levels are achieved when the feed is consumed at the recommended feeding rates, which will be determined by the normal daily consumption of that particular species.

Farmers tend to judge feed by the percentage levels, number of units of vitamins and so on in the feed. This is relevant only as a guide. The actual amount of POUNDS, or GRAMS, of ACTUAL nutrients consumed per day at a given feeding rate is what matters. You can have the best feed in the world, but if you don't feed enough of it or dilute it, bird problems can result.

Let us take Protein as an example to illustrate this point. Following is a table to demonstrate the effect of feed consumption on the ACTUAL protein consumed.

Table 1

AMOUNT FED	PROTEIN %	ACTUAL PROTEIN CONSUMED
3.3 lbs / 1.5 kgs	**30%**	**1.0 lbs / 454 grams**
5.0 lbs / 2.25 kgs	**20%**	**1.0 lbs / 454 grams**
6.25 lbs / 2.84 kgs	**16%**	**1.0 lbs / 454 grams**
10.0 lbs / 4.5 kgs	**10%**	**1.0 lbs / 454 grams**

The chart in Table 1 shows how the different levels of protein fed in the complete feed at varying amounts can end up with the SAME amount of ACTUAL protein consumed in the day. Different feed companies have different protein levels in their complete feeds. It can be seen from the above that it takes 5 lbs of a 20% protein feed to achieve 1 lb/454 grams of protein - but 6.25 lbs/2.84 kgs of a 16%

protein feed to achieve the same daily intake of protein - a 25% HIGHER feeding rate per day.

Now let us look at the effect of different feeding rates on a standard ration of a complete feed containing 20% protein:

Table 2

AMOUNT FED	PROTEIN %	ACTUAL PROTEIN CONSUMED
5.0 lbs / 2.26 kgs	**20%**	**1.00 lbs / 454 grams**
4.6 lbs / 1.03 kgs	**20%**	**0.92 lbs / 417 grams**
4.0 lbs / 1.80 kgs	**20%**	**0.80 lbs /363 grams**
3.5 lbs /1.60 kgs	**20%**	**0.70 lbs / 318 grams**

Table 2 demonstrates that feeding different AMOUNTS of feed daily has a big impact on the total protein actually consumed each day. Remember that all other + or - 60 nutrients provided in the feed will be affected in a similar manner. To short feed will leave birds thin - to over feed will end up with birds that are excessively fat. Ostrich eat very little in a day - so it takes very little over or under feeding to make a SIGNIFICANT difference to the overall performance of that ration. It is ESSENTIAL THAT FEED MUST BE WEIGHED.

To make an error of 1/2 lb in a Dairy Cow will make a difference of only 1% in the daily intake. To make an error of 1/2 lb/227 grams in Ostrich will be a difference of 10% in the daily intake. That 1/2 lb in Emu and Rhea is an even greater percentage difference as their daily dry matter intake is lower than Ostrich. A 10% cut in daily rations is severe and will result in poor growth, poor performance, poor health and poor condition. In some cases farmers have reported feeding as little as 3.5 lbs/1.58 kgs per day. This is a 30% cut in total daily nutrients - near starvation level if the feed was designed to be fed at 5 pounds per bird per day.

Most feeds are designed for optimum performance in average conditions. As with all livestock, it is necessary to observe the CONDITION of your livestock. This has been somewhat confused by Ostrich processors complaining that birds are too fat--leading to farmers being nervous about overfeeding. To be in good condition the birds MUST carry a certain amount of fat. To achieve good muscle growth (meat production) the birds MUST produce a certain amount of fat to get through stressful times of bad weather, etc.

A bird in good condition will have a good sheen to their feathers, a rounded appearance, the backbone must not be prominent and the thigh muscles should be well developed. DO NOT judge the prominence of the backbone by looking from a distance! The feather covering will fool you. It is best to feel along the backbone with your fingertips and estimate how far it protrudes above the back on each side of the backbone. If it is more than 1/2 inch, the bird is likely to be too thin. If the backbone is inset in the back, the bird is likely to be too fat. When slaughtering yearling birds, there will be some fat cover over the back, particularly towards the rear of the back. The belly fat will be about 1" to 1 1/2" (38mm) thick on a properly fed bird. The fat should be a white or beige colour - NEVER yellow. The skin must NOT have a yellow tinge to it. The liver will be a medium brown colour, not yellow or with green markings. The liver and heart should be of a good size. The heart should be firm with a little fat

cover.

If a bird looks like this it should be fit to withstand most stressful situations. It can mobilise the fat easily into energy in times of extreme cold or other times of stress. If there is a shortage of fat and muscle, this could be from underfeeding, diluting feed, wastage from wind, etc, or feeding an inadequate feed. Make sure that you are truly feeding the recommended quantity and not diluting with any other ingredients. If you are confident that you are feeding the recommended level and the birds condition is still poor - adjust the daily amount upwards. If that doesn't work, change to a different brand of feed with higher nutrient levels. As can be seen from the tables above, it takes very little to make a severe shortage. WATCH THE CONDITION OF YOUR BIRDS!

Another factor that cannot be overlooked when birds are failing to thrive. The chick may have survived an attack of Clostridium bacteria with the resultant damage to the gut. In this case the chick is unable to absorb the nutrients correctly and adequately.

Shortfeeding can also be the feed is short on nutrient levels - therefore it will be necessary to adjust upwards to reach the required daily intake of total nutrients. If this is the case, it may be more cost effective to look for a feed with higher nutritional levels.

If the birds are carrying too much fat, this may come from overfeeding, it may also come from an imbalanced diet - either from diluting the original or the wrong feed formula. If the fat is yellow and/or the liver a poor colour, then the cause will be the wrong feed formula. In this situation the muscle growth is also likely to be poor. If the fat is white, the liver a good colour and size, and good muscle growth - then overfeeding is probably the cause of excess fat.
When fed correctly the Ostrich will respond to a good nutritional diet like no other livestock specie - I trust the above has made it a little easier to understand just how little margin for error there is when feeding our Ostrich. WATCH the CONDITION of your Ostrich at all times. It will be the best method to ensure that the birds are receiving the required level of nutrients for best production performance.

Measuring The Cost of Feed

Ostrich Nutrition Bulletin #25

May 15, 1998

By: Fiona Benson

Some recently published comments raise some interesting issues that affect the fundamentals of the Ostrich Industry:

"In answer to a question about why 95-105kg (210-230lbs) being the "ideal" specs: John mentioned it had to do with the size of the hide: 14/15sq ft being achievable only with the heavier birds."

"We like to receive birds ..... weighing between 90-110kgs (198-242lbs) and being between 11-15mths."

Some Comments from the Draft Proposals for Carcass Grading and Classifications:

"In an ostrich the carcass weight and muscle conformity, as well as age, go hand in hand. If a carcass weighs less than 42 kg, the muscles are not fully developed yet and the percentage of meat in relation to bones and fat is much lower than in a carcass of e.g. 45 kg."

"Carcasses of more than 48 kg have the same weight of muscles as 42-48 kg carcasses, since this extra weight is caused by fat or a heavy bone structure caused by age."

To refer to birds of those weights as heavier birds is misleading. On a good nutritional diet Ostriches will reach these weights in 7mths. Encouraging these low target weights in plus/minus 12 months encourages poor feeding practices - the problem is that the carcasses are then demonstrating many health problems which are contributing to the poor meat that has been discussed before. Farmers are now achieving 40kgs + boneless meat from a carcass - and in some cases even 50kgs in plus/minus 12 months.

In June the IOA have a meeting to determine - "Classifications of Carcass"; "Quality of Carcass"; "What is Quality Meat?" amongst other items on the agenda. The poor quality meat is recognised by the industry as a reason for the slow development of the markets. To achieve the long term prosperity the Ostrich Industry requires an understanding of what is achievable when the Ostrich is fed a good nutritional diet and the effects a good diet has on meat quality. Currently most processors are presented with birds with no fat, birds with significant amounts of fat (few birds with white fat) - most have fat that is yellow in colour. Many have livers that vary from just starting to turn yellow - to very yellow. Some have green livers. The hearts and livers are small. Some birds have suffered from airsacolitis, encephalitis - I could go on, but hope that I have made the point that the number of carcasses demonstrating serious nutritional/health problems is VERY significant. When defining quality, carcasses that demonstrate any of the above signs and others will have to be downgraded. It is these symptoms that are the primary cause of the current inconsistencies in the meat being offered for sale.

A good quality carcass will have a reasonable cover of fat and belly fat of about 1 1/2 inches (38mm) - but that fat must be white. The liver must be a good dark colour and of a good size. The heart must be firm, of good size and with a small cover of fat. There must be no sign of disease from any cause. When a carcass is presented in this condition the bird will have been raised on a good diet and should have plenty of good tasting meat. It will have been economical to rear. The processor had plenty of good quality saleable meat which can attract a premium price enabling him to reward the farmer accordingly.

This comment was made by a processor when discussing costs. "You need to look at a benchmark feed price of 2kg per day at ,100/tonne." To put this in perspective. A well formulated Ostrich Ration will be made up of grains, forages, protein feeds, oil, vitamins and minerals. The approximate cost of wheat/barely is ,80/tonne; maize ,160/tonne; grass nuts and Lucerne ,130/tonne; Soyameal ,180/tonne. It does not take any knowledge of how rations are made up to see that it is IMPOSSIBLE to make a balanced ration for ,100/tonne. If presented with a cheap ration in any other currency - compare the local cost per tonne with the cost of the ingredients required. You can then judge for yourself if there is any chance that the ration contains the necessary quality ingredients essential to the formulation of a balanced ration for Ostrich. There is NO room for filler ingredients in any Ostrich ration.

The Vitamins and Minerals are the engine of the rations and are expensive. When included at the right levels, from the right sources and in the right proportions to each other and the other ingredients in the ration, they can enhance the performance of that ration by up to 50% by enabling the birds to adequately digest and utilise the nutrients provided in that ration.

Too often one receives the comment "but the industry is in depression right now, we cannot afford to feed a good quality feed." The industry is in depression as a RESULT of feeding inferior rations and producing carcasses that in many instances are not fit to be sold as high quality, good tasting Ostrich meat.

A good quality feed will produce a good quality carcass. It will have plenty of good tasting meat - probably about 70% of carcass weight will be boneless meat. Once the nutrition is right it will be possible to identify Genetic influence enabling farmers to implement a program of genetic selection for good frame size, speed of growth and muscle development.

Table 1 gives an indication of typical consumption rates and the effect on liveweight when a good conversion rate is achieved.

Table 1

AGE RANGE	FEED CONSUMED	CONVERSION	LIVE WEIGHT
0 - 7 Months	224 kgs / 494 lbs	2.4:1	93 kgs / 206 lbs
0 - 10 Months	415 kgs / 915 lbs	3.5:1	119 kgs / 261 lbs
0 - 12 Months	543 kgs/ 1197 lbs	4:1	136 kgs / 299 lbs
0 - 12 Months	543 kgs / 1197 lbs	5:1	109 kgs / 239 lbs

Just look at the difference in the liveweight when the conversion rate drops by 1 point. What is the cost in terms of return and margin? What will be the cost if the carcass is downgraded for poor quality? If you are achieving conversion rates higher/slower growth rates than the above and still producing a good quality carcass - it could be that the birds are consuming more per day in order to consume the correct amount of nutrients daily. It could be that the nutrient value in the ration is insufficient to provide adequate daily nutrient intake for fast growth. This results in poor weight gains, poor quality carcasses and all too frequently chick mortalities. It also means that the cost of feed per kilo/pound of saleable meat will be too high.

With fat an essential to good muscle growth, it could be that a better measure of feed performance will be to take the boneless meat that is achieved from the carcass. Paying the farmer for boneless meat rewards the good farmer, thus encourages good farming practices and ensures that the processor pays only for that he can sell.

There are significant variations in kill out percentages being achieved from birds of similar carcass weights. The differences will be bone and more often fat, this can render live weight gain as a misleading guide. The table 2, table 3, and table 4 demonstrate the differences in boneless meat that is achieved from carcasses of the same weight dependent on kill out percentage.

Table 2 (95 kgs / 210 lbs Live Weight)

LIVE WEIGHT	KILL OUT PERCENTAGE	BONELESS MEAT
95 kgs / 210 lbs	25%	23.75 kgs / 53 lbs
95 kgs / 210 lbs	30%	33.25 kgs / 63 lbs
95 kgs / 210 lbs	35%	33.25 kgs / 73 lbs

Table 3 (115 kgs / 253 lbs Live Weight)

LIVE WEIGHT	KILL OUT PERCENTAGE	BONELESS MEAT
115 kgs / 253 lbs	25%	28.75 kgs / 63 lbs
115 kgs / 253 lbs	30%	34.50 kgs / 76 lbs
115 kgs / 253 lbs	35%	40.25 kgs / 89 lbs

Table 4 (130 kgs / 286 lbs Live Weight)

LIVE WEIGHT	KILL OUT PERCENTAGE	BONELESS MEAT
230 kgs / 286 lbs	25%	32.50 kgs / 72 lbs
230 kgs / 286 lbs	30%	39.00 kgs / 86 lbs
230 kgs / 286 lbs	35%	45.50 kgs / 100 lbs

A 10% increase in killout percentage represents an increase of 40% in saleable product on a carcass of

the SAME weight. The higher kill out percentages can ONLY be achieved with a good quality ration. If one assumes that the birds eat the same amount of the cheap ration lets take a look at the effects on the cost of that feed input.

If slaughtering on weight - the birds fed a high quality feed will reach the weights more quickly - therefore consuming less feed and producing more saleable meat. If slaughtering on age - then the faster growth rate will produce a heavier carcass at that age - so the increase in saleable meat for the kilos fed will be significantly more than 40% and could well be increased by 100%.

Added to that mortalities will be reduced and you can guarantee a carcass that is unlikely to be downgraded providing even lower return for the limited quantity of meat produced.

Given the above, which is the most COST EFFECTIVE method of feeding? Good quality feed will cost more per kilogram/pound but will cost less per kilogram/pound of saleable meat.

To take this industry forward to the 21st Century we need to recognise a few fundamentals. There is no other species that responds to good nutrition and good feed management as well as the Ostrich. A quality carcass is not so different to a quality carcass in other species and a prerequisite to success. Good Nutrition is the correct path to profitability for the farmer and the processor!

Nutrition, Genetics, and the Future

Ostrich Nutrition Bulletin #26

June 15, 1998

By: Daryl Holle

After visiting many farms and while driving through the US countryside, a good deal of time was spend by Fiona Benson and myself discussing the future of the Ostrich industry and what part genetics will play in its future success. I have been asked by farmers many times about what part genetics play in egg, meat, hide, and oil production. Genetics are most often blamed when things don't go right for the Ostrich rancher. It has been my experience that genetics are rarely the problem when it comes to egg production, fertility, hatchability, and chick survival--it usually is a feeding management or nutritional diet problem.

However, genetics will play an important part of our industry future starting today! In the Ostrich industry, as an example, we need the bird that will net the highest pounds of boneless meat per bird, the highest quality hide, and the highest quality oil in order to raise these birds cost effectively. It is my opinion that during the next two years, 65 pounds of boneless meat from an Ostrich 12-14 months old will not be cost effective to raise if the meat is to be of high quality that our consumers are demanding. We need 90 to 100 pounds of boneless meat from that 12-14 month old bird and that meat must be of high quality and consistency! That is when we will have a profitable market for our Ostrich.

How do we get to those high boneless meat averages per bird? We get there through genetics and proper nutrition. This is where the confusing part comes into play. What comes first--Genetics or Nutrition? The answer is VERY SIMPLE! You cannot identify the best genetic bird unless the nutritional diet is well balanced and correct. The Breeder diet has to be the best it can be to give a true picture of the breeder genetic qualities. The Breeder diet has to be the best it can be to give a true picture of the weight gain and survival genetics of the chicks. The Chick diet has to be the best it can be to give an accurate picture of the survivability, weight gain to feed ratio, and total meat production versus age comparisons.

It takes nearly TWO YEARS for an excellent nutritional diet to bring out the best of the bird genetics. Many farmers are now selecting future genetics from birds fed a very poor diet--THIS IS A MISTAKE. When birds are fed a poor diet, the situation exists that some birds are experiencing a nutrient deficiency instead of a genetic deficiency. This makes it impossible to pick the right genetics. I have proved to myself time and time again that a poorly fed super-genetic chick from poorly fed super-genetic breeder birds will turn out no different than any other bird from poor genetic stock--sometimes worse as the superior genetic bird is working harder and is the first to become nutritionally deficient. Proper nutrition is the FIRST STEP to genetic selection!

I highly recommend you GET STARTED today by first feeding your birds RIGHT, then begin your genetic selection for high boneless meat yields (with consistent meat quality) and high oil production (with consistent quality) on the slaughter birds. The future in this industry will demand this from EVERY rancher looking to realize a profit in his/her Ostrich operation.

When the superior genetics begin to surface (which they already have in some areas), that is when the good commercial Ostrich feeding programs and formulas will experience its greatest improvements in technology in order to nutritionally support these superior genetic birds. Feeding cattle feed, cat fish food, and home brew mixes to your Ostrich with no nutritional forethought will "not cut the mustard" in the near future. Keep positive and focus on your future in the Ostrich industry. You may not have much to be positive about today, but if you don't plan ahead and "get serious" about your nutritional program and genetics, you won't be happy about your future in the industry during the next few years either.

Report of the 3rd Meeting of the International Ostrich Association

Ostrich Nutrition Bulletin #27A, Part 1

July 1, 1998
By: Fiona Benson

The Third Meeting of the International Ostrich Association (IOA)-Part 1

By Fiona Benson, Blue Mountain Feeds International

Israel has recently hosted the third meeting of the International Ostrich Association. The meeting was smaller than previous meetings with 30 plus delegates from 13 countries. The quality of topics discussed were good. Meat Quality, New Castle Disease, Hide Standards and Marketing being the main issues.

The meeting was opened by the Chairman Pieter Strijdom outlining the current state of the industry and highlighting some of the reasons. One reason given is the fact that only Japan and the US had been developed as a market for hides. Bags made outside Japan were generally sold to buyers from Japan. The US being limited to Cowboy boots. He made the statement that to date this industry has been selling products - not Marketing Products.

CARCASS AND MEAT QUALITY

There were a number of sessions on the different aspects that determine meat quality. Dr. P. Walstra, Ph.D. from ID-DLO in the Netherlands outlined general principals to be taken into consideration when determining the Classification of Carcasses. The original draft issued a few months ago and subsequent comments from a number of specialists were not discussed at this time.

Factors such as Colour, Juiciness, Tenderness, Freshness, Odour and Taste were mentioned as important factors in determining the quality of the Meat. The variations being seen in colour (light and dark coloured meat - meat turning grey during storage and so on) were considered a severe problem. Both age at slaughter and nutrition were given as reasons for the variations in colour. Stress prior to and at slaughter and nutrition were given as a major cause of the other problems mentioned. It was noted that the thin (undernourished) birds can be seen to continue leaking for 2 days when hanging, leaving the meat very dry.

Chef Schmeider highlighted a major problem that he has come across in the US and that is the feeding of Cat Fish Food to Ostriches - leaving the birds with a very fishy odour and taste - as does the inclusion of fish meal in the diet.

Amongst the reasons given for developing an adequate grading and classification system were to provide a means to reward the good farmer and to provide the producer with a means of feed back to help him improve. 4 Classes for condition and 3 for fitness were mentioned but no discussion followed

nor conclusion reached at this time.
Mr. Hagel Ron from Israel led a discussion on meat quality. He listed the following issues as influencing Quality of Meat:

A. Hygiene - This included bacteria which can produce toxins which will remain on the meat, viruses and other parasites. Mr. Ron also mentioned toxins such as chemicals, heavy metals, drugs and hormones that can be found in meat.

B. Size of Muscles

C. Colour

D. Structure

E. Nutritional Value - low fat and low cholesterol

F. Shelf Life
Under Factors that influence the quality of fresh meat he noted the following issues:

a. Genetic Differences

b. Feeding

c. Type of Rearing - Feed lot Vs free range for example

d. Age of Slaughtering - His belief for meat quality was that 8mths was the best and his experience little difference after 10 months - he admitted to having insufficient knowledgeable to comment on older birds. Their plant slaughters at 8mths - 14mths to maintain a meat supply for 12 mths a year.

e. Method of Slaughtering - The minimum amount of stress prior too and at slaughter was raised on a number of occasions throughout the meeting. There was a technical discussion on the effect that stress has on pH, muscle condition and shelf life.

f. Ageing - A little discussion took place on the effect of ageing. Chef Schmeider said that they had done some work on 6 birds up to 8 days after slaughter - with no significant variations.

g. Dissection of the meat - muscles

h. Packing - The pros and cons of various systems were discussed.

I. Storage

j. Sanitary of conditions - HACCP. HACCP is Hazard Analyses of Critical Control Points. Following the procedures does ensure maximum control of bacteria within the slaughter house and processing plants.

There was a separate session discussing the stunning methods given by Dr. Lambooij from ID-DLO. Dr. Lambooij has just completed a study and explained some of the factors that he had found. The

study has been funded by NOPSA and the Dutch Government and it has been decided that it will only be made available to others on payment to help share the costs.

This issue of how to fund research that is for the benefit of all in the industry is proving a difficult one to resolve. Readers thoughts and suggestions would be welcomed.

Some Personal Thoughts:
There will no doubt be considerable discussion on the issues mentioned to arrive at some solutions to the Classifications, Grades and so on by the time we all meet again at Barcelona in October. The Barcelona Conference is the annual World Congress run by the European Ostrich Association and open to all involved in the Ostrich Industry. Previous years this conference has been held at Hengelo in Holland.

It is my opinion, I am not alone in this opinion, that as an industry we need to clearly identify some classifications, grades and have a clear idea of what constitutes quality as quickly as possible. Too often I am being told that the as an industry we do not know what the Ostrich nutritional requirements truly are. This is no longer the case. Blue Mountain has solved many of the problems and will continue their research to improve performance to maximize the genetic potential.

Many processors from many countries tell me that they receive birds with extremely variable carcasses such as: Inconsistent Meat Colour, White Fat, Yellow Fat, Lots of Fat, No fat, Livers of variable colours and conditions and so on. This variability would not be accepted in other species. As they can be controlled with good nutrition in Ostrich as well, it is safe to assume that we should be producing slaughter birds of the same high standards as would be expected in other species and more consistent quality meat would be the result.

There will need to be a change in payment systems to farmers supplying slaughter birds to processors. Processors will need to implement payment systems that reward the good farmers who produce a high quality carcass with plenty of good saleable meat.

To achieve scientific answers to such things as toxin levels in fat and meat and whether livers demonstrating certain conditions are operating effectively will require funding. The question then has to be asked who pays for this funding? The IOA provides the best vehicle to direct this research, but it can only be done with adequate funding and support.

Report of the 3rd Meeting of the International Ostrich Association

Ostrich Nutrition Bulletin #27B, Part 2

July 1, 1998
By: Fiona Benson

The Third Meeting of the International Ostrich Association (IOA)-Part 2

By Fiona Benson, Blue Mountain Feeds International

NEW CASTLE DISEASE

Dr. Willum Burger from the KKK gave an outline on where the research is to date. With the EU still determining the rules under which Ostrich meat will be harmonized this remains an important issue for European producers and Southern African Producers. Dr. Burger reported that there will be a meeting on 7-8th July when the EU will take a further vote to establish if the Ostrich will be categorized independently of poultry. The recent research carried out in South Africa and funded by NOPSA members has proven that the risk of transmission in vaccinated birds is minimal.

Dr. Burger discussed the different strains. Indicating that the strongest is very severe to the 3 mild versions that produce few symptoms. It is one of these that is used to produce the vaccine. Dr. Burger gave the recommended vaccine doses and provided graphs to demonstrate the levels of immune response following vaccination. He noted that the current research paper is at the review stage. In response to the question about the need to vaccinate adult birds - he recommended this annually to provide the chicks with immunity for their first 3 weeks.

MARKETING

There was a discussion on price. Zorb Caryer from Camdeboo Meat Packers in South Africa led the discussion on what is the right price for the meat. It was determined that generally Ostrich meat is trading at 10-15% below the price of beef and it was felt that it should be higher - but at what level was the question. To provide a bench mark Zorb indicated that they are achieving 30% above the price of beef on their sales of venison.

The prices being discussed were ex abattoir, whole muscle CIF in Europe. It was accepted that prices will vary a little from country to country. The price for steak cuts ranged from $7 - $10/kg and for the Filet cuts from $11-$18/kg.

Other comments during the discussions:
The prices are currently demand led and there is a shortage.

The customer's needs must NOT be forgotten.

Marketing research should be done to find out what the customer wants with regards to Price, Standards, Packaging etc. and this may well vary between countries.

Production must be related to demand

Currently most of the revenue is coming from the meat and this is making the cost of production very high.

Fred van der Horst from Holland (secretary of the IOA and EOA) led the discussion on marketing. He emphasized the need to work together to get the basic marketing world wide - but that funding is a problem that needs to be addressed. A few suggestions including a levy per kilo produced and looking for certain government/EU schemes that are available.

Chef Schmeider also led a discussion putting across many of his suggestions including:

Using a star system to identify degree of tenderness. He felt that this would overcome the language problem as the meat is marketed globally. Making more use of the Hearts, Gizzards and Livers - emphasizing that in the Chicken industry these alone are worth $45m. He highlighted again the problems created by producing meat that was inconsistent in colour. Educating Dieticians and Doctors on the health benefits. He again mentioned the feeding of Cat Fish pellets to Ostriches and the problems it creates with smell. He gave an example of some chickens he had been offered by the school - that when he collected were inedible as a result of the smell from fish meal fed to the birds.

It was concluded that research was necessary to determine what customers are looking for in Price, Standards, Packaging etc. This will vary between countries.

Some Personal Thoughts

From the time that I entered this industry I have perceived our best marketing point on the meat is the health benefits of the Ostrich. The Ostrich Industry developed in the shadow of the problems relating to Beef and to capitalize on this as an industry we needed to be sure that we produced the birds in as healthy a manner as is possible. Ostrich, when fed a good nutritional diet free of all nasties, has a great auto immune system and is proven to perform better on a ration free of Animal Source Proteins. So why have so many farmers continued to feed rations that include these products when it is accepted that we are offering a healthier option and these products are under suspicion by the consumer?

Pieter Strijdom's opening statement on the limited market that has been developed for hides is absolutely true. The majority of our potential customers still do not recognize Ostrich Leather - so how can they ask to buy it. I experienced another clear example of this. At the end of a flight from New York to London en route to Israel I was sitting next to a seasoned International traveler. As I took my Ostrich Leather brief case from the over head locker he asked me what it was!!

Report of the 3rd Meeting of the International Ostrich Association

Ostrich Nutrition Bulletin #27C, Part 3

July 1, 1998
By: Fiona Benson

The Third Meeting of the International Ostrich Association (IOA)-Part 3

By Fiona Benson, Blue Mountain Feeds International

HIDES

Zorb Caryer led the discussion on skinning and handling of hides. Zorb described the methods they use at their slaughter facility making the point that it works for them but may not be the only way. He emphasized that whilst cuts outside the quill area do not affect the grading he felt that in the future they will and care should be taken to ensure that there are no cuts in that area as well.

He presented a diagram of where the cuts should be made and emphasized that great care must be taken that the outside of the skin at no time comes into contact with the meat. They estimate that it takes 600 knife strokes to remove a skin. It is preferable to have the surplus fat on the skin to avoid risk of knife damage to the skin. The method of deskinning with the carcass on a rack and two men working at the same time was discussed. Experience had shown that this can cause a higher number of nicks as when two men work together - however carefully - one can move the carcass and the other's knife slips. As a result of this experience Zorb said that they only allow one man to work on a carcass at any one time during the deskinning process.

The use of compressed air was discussed. Rightly or wrongly some health authorities do not permit in fear of meat contamination. Some reported that there had been problems with the tanning as a result of over ballooning.

To ensure correct preservation the critical points he pointed out are to ensure that you get rid of the bacteria, that the cold chain is maintained and the hides are NOT frozen.

At their plant the deskinning area is the start of the cold chain - the temperature being around 14-16 degrees centigrade. The washing down will also have a cooling effect. The skins are then placed in a biocide solution for 30 minutes before being taken to the cold store, salted and stored at 4 degrees centigrade. They use 5kgs of salt per skin. When asked the length of time they could be stored before processing the answer was that currently they have skins stored up to 6 months successfully. Zorb emphasized that it is his belief that the success lies in the treatment during those critical first few hours. Another critical factor during storage was pointed out. NO iron or steel must be present near the skin - such as nails on pallets or the shovel used to handle the salt. This will damage the skin.

Zorb made the point that as an industry it is important that we do all cut to the same standards to ensure

the market knows what is the standard.
Pieter Strijdom then led a discussion on prices and grading.

The delegates were given a copy of the grading system that was introduced by Frik Kriek of the KKK at the meeting at Oudtshoorn in February 1997 and has now been discussed with the Japanese Reptile Association. Whilst this system has been accepted by the NOPSA tanneries Pieter emphasized that we must produce what the market wants.

Prices of hides were discussed as were the ratio. Tanned hides it was reported as trading between $18-$37 /sq ft. for grade 1. With grade 2 15% less and grade 3 15% less than grade 2. It was felt that the ratio of 60/30/10 was moving more to 40/40/20 now.

Pieter Strijdom commented on the need to get products into new markets and made reference to Blue Mountain's work on getting birds to 90kgs at 7mths. He stated that farming practices must improve to get a larger percentage of grade 1 hides onto the market. He suggested that we should try to achieve $28/sq ft and that we must deliver the same consistent colours.

NOPSA MINIMUM GRADING STANDARD - as accepted by:
The Japanese Reptile Association
The Japanese Leather Goods Manufacturers Association

A. AIM
The aim of this grading standard is to stipulate a minimum norm for different grades of ostrich leather.

All ostrich leather marketed by NOPSA members will comply with this minimum standard.

B. DEFINITIONS
1. A defect can be: a hole, a scratch, a loose scab, a healed wound or bacterial damage.

2. The crown is the area with quills, except in the neck, down to the wingfold and also the stomach quill.

3. For grading purposes the crown is divided into four quarters.

4. Dividing lines: The lines dividing the crown area in 4 quarters will be 25mm wide. The vertical line will stretch frm base of neck to the bottom of crown and horizontal line will stretch between the widest quill on either side of the crown area.

C. GRADE ONE
1. A defect in one of the quarters as long as it is not larger than approximately 40mm x 40mm.
2. At least three quarters must be free from defects.

3. Defects on the cutting lines do not affect the grade.

4. A few less visible scars are allowed as long as they are outside the crown area.

D. GRADE TWO

1. A skin with defects affecting two quarters.
2. At least half the skin must be free from defects.

3. Visible defects outside the crown area are allowed and will not affect the grading.

E. GRADE THREE
1. At least one quarter of the skin must be free from defects.

2. Visible defects outside the crown area are allowed.

F. GRADE FOUR
1. At least one quarter of skin must be free from defects.

2. Extensive visible defects outside the crown area are allowed and will affect grading.

G. TRIMMING
1. Neck will be trimmed 20cm above the featherline.

2. Leg will be trimmed in the middle of the "knee".

H. GENERAL
1. Colour variations cannot be considered as an element to change the grading of leather but is it the prerogative of both buyer and seller to discuss a price adjustment.

2. Tannage cannot be considered as an element to change the grading of leather, but it is the prerogative of both buyer and seller to discuss a price adjustment.

3. Hair follicles are genetically caused defects and an extensive occurrence of it in at least two quarters will allow for downgrading by one grade.

4. Pinholes are externally caused by bacterial damage and an extensive occurrence of it in at least two quarters will allow for downgrading by one grade.

5. A skin is a "Torn" skin when a tear extends into the crown.

6. A natural scar is a healed scar and would remain a defect.

7. Rough surface is damaged grain.
8. "Loose grain" is where the grain is separated from the "base" of the leather.

9. "Vein marks" is a defect if it is very obvious and covering a substantial area of the skin.

10. Size in Square Decimeters:

A 120+
B 100-119 Price 10% less than A
C 80-99
D 50-79

E 30-49

Some Personal Thoughts

Whilst the above should be a guide line and the minimum grading standard - the comments made that the Customer's needs must be heard are very relevant.

When visiting tanneries in the US this month, one of the most important points for me personally was to see what the hides from Reds and Blues were like compared to the Blacks as we only have African Blacks in South Africa at this time. One of our South African tanners had told me about some hides from overseas that were a beautiful white colour, he did not know the reason.

A tanner that I visited informed us that these white hides come from Reds. He went onto show us a number of green hides that were from - in his opinion - red/blue crosses. Personally, I had expected the difference in hides to be quill size, spacing and the area of the quill cover. It was a surprise to see that colour differences were significant. The hides from the crosses were variable in colour within the hides with the tanner highlighting the difficulties in obtaining consistency in colour.

It would be helpful if readers working with different breeds could report back their thoughts and experiences. Is this tanner correct in his belief that the variations in colour are breed related or could it be in the methods used for curing?

Report of the 3rd Meeting of the International Ostrich Association

Ostrich Nutrition Bulletin #27D, Part 4

July 1, 1998
By: Fiona Benson

The Third Meeting of the International Ostrich Association (IOA)-Part 4

By Fiona Benson, Blue Mountain Feeds International

FARM VISITS

The meeting was not only made up of sessions with discussion - but also included some farm visits and a visit to two slaughter facilities. The Israelis were wonderful hosts answering all questions and allowing as many photographs of whatever any one wished to take. The first slaughter facility allowed us to watch the slaughter process to observe techniques and discuss carcass quality. The farms were all a significant size ranging from long established to only a couple of years.

Slaughtering is generally from 8mths - 14mths to ensure a 12 month supply of meat. One farm slaughters from 8mths. If the birds are not at 85kgs they are returned till 10mths old - again if not at 85kgs will be returned till 12mths. They are slaughtered at 12mths regardless of weight. 95kgs plus being preferred.

Some of the farms share incubation and chick rearing facilities with the birds being returned to the individual farms at 3 months to grow out to slaughter.

The only ostrich meat we ate all week was at a farm BBQ or Braai as it is known in South Africa. The event was enjoyed by all.

CONCLUSION

Yacoov Or from Israel and a member of the IOA committee, closed the sessions by sharing his thoughts on the Industry. He stated that we are now at a Critical Crossroads in the Industry and went onto outline his thoughts in the different areas.

1. Market

Hides - He highlighted the need to identifying their exclusive image, the current small supply, the need for maintaining quality and their uniqueness. Meat - Is noted is still a new product with curiosity value, the current small supply and highlighted the nutritional advantages.

2. Ostrich as a Production Animal

Currently production is lacking efficiency in food conversions being achieved, small hides that require experience in tanning, cutting and sewing - skills to still be learnt by many.

3. Cash Flow
As he stated - a problem we all know about all too well!

Christoph Kistner the President of the EOA closed the meeting thanking the Israelis for their hospitality and stating that whilst competition is necessary emphasising the benefits of working together in a spirit of co-operation. He felt that we should meet about twice a year. A view that was shared by all attending.

As with all such meetings there was significant exchange of ideas and communication around the bar in the evenings and during a few trips to visit the historical sites of Israel. A good week for the industry.

Some Personal Thoughts

The reference made by Yacoof Or to the poor feed conversion rates was of concern. This, in my opinion, comes from the initial requirement to grow the birds to 95kgs at 14mths to satisfy the needs of the hide and feather market - before meat was a major product. Therefore cheap, inefficient rations were used. On a good ration, with good feed management and the right genetics it is possible to achieve 95kgs live weight at 7mths and excellent food conversion rates. Blue Mountain's leading farmers are achieving 140kgs plus at 12mths at conversion rates of 4:1 and producing 100lbs/50kgs plus of saleable meat. These conversion rates are superior to most other species. Only when the nutrition is at the correct levels can the full genetic potential can be determined. As an industry we have hardly started on identifying and improving the genetic potential of meat producing birds.
Having never before visited Israel I found it extremely interesting. Not only from the historical point of view, but also from what they have achieved in developing dessert land into productive agricultural land. I would personally like to thank our Israeli hosts for a very enjoyable and informative week.

The Art of Mixing Feed

Ostrich Nutrition Bulletin #28

July 15, 1998

By: Daryl Holle

When making statements regarding the performance characteristics of a feed, there is always one statement that we make -- "Subject to Good Feed Management". Whether you have only a few birds or many, many thousands, the principals of good feed management remain the same. Management methods will differ according to scale and local conditions.

Good feed management starts with mixing the feed. It matters little how well a feed is designed by the nutritionist if:

1. The ingredients is not of the right QUALITY.

2. The ingredients used are not the same that he/she included in the formulation.

3. Sufficient care is not taken when mixing.

4. The ingredients are not weighed correctly.

5. As a result of an ingredient not being available, substitution is made without consulting the nutritionist. ie. Soyameal at 47% was used in the formulation, but only 44% is available. Or, 18% Alfalfa was used in the formulation, but the batch to be used is 20% or 16%.

The feed will not provide the performance that you may have expected if the mixing and ingredient quality is not completed exactly as recommended. These principals apply whether mixing on farm, subcontracting to a mill, or purchasing a complete feed.

When the Ostrich list was first established a member of the list asked: "How can we as farmers be absolutely sure that the feed we are buying is what we believe it to be. Does pelleting destroy any of the nutrient values?"

Daryl Holle submitted a reply to the list. At that time the list was small and it seems to me that this is a good opportunity to reprint his words. Even for those who read it at the time, a worthy reminder. Whilst it refers to manufactured feed - the principals remain the same when mixing on farm.

"You have brought up a subject that is ONE of the biggest problems in the feed industry everywhere! You can't be SURE that the feed you are buying is what you believe it to be--not without a lot of expensive lab testing. As humans, I think you will agree that we make errors. Feed manufacturing personnel are human and also make errors. However, as in the rest of the business world, it usually is not the intention of plant employees to make errors on a regular basis. I have found that if employees are made AWARE of the seriousness of errors they make, they make far less errors and the severity of the errors are greatly diminished."

"What has really worked at the Blue Mountain feed plant, which is 500 miles from where our office is located, is to frequently hold information meetings with plant employees to make them aware of WHAT NOT TO DO WHEN MAKING OSTRICH FEED. Plant errors can come from purchasing agents ordering the wrong ingredients from a supplier or ordering the cheapest ingredient for more profit--when there is a better choice. Plant errors can happen when the truck delivering the ingredient has brought the wrong thing and it is put in the same bin anyway--or, the vendor has loaded a lower quality ingredient on the bottom half of the truck that won't be noticed, such a moldy corn or whatever. Plants errors can also be made by unloading the truck and directing it to the wrong bin. Plant errors can be made if the feed mixing operator pulls the wrong handle or pushes the wrong button when mixing the feed formula."

"At our plant, these types of errors have almost disappeared by enlarging the holding pit under the trucks where they dump. A designated plant employee has to be present to unload the truck and sample the merchandise coming out of the truck constantly. If all is okay and the product looks correct (this takes training also to recognize that fact), then everything is a go. If it is questionable, a plant supervisor is notified and if product is not acceptable, it is loaded back on the truck and sent back to the vendor."

"As far as mixing the feed, the mixing operator is in a closed booth and is not disturbed by anyone while mixing feed (distractions). As each ingredient is put in, that item is checked off the formula list. This operator, and his backups, are trained by me to understand the hazards of making a mistake. If a mistake is made, that batch is put into a holding bin until I am notified of the error. If I can correct that error by re-formulating to come out to the same nutrient levels, I do that. If not, the feed batch is dumped and will not be used in Ostrich feed whatsoever."

"I could go on and on about this, but this subject is called MANUFACTURING QUALITY CONTROL. It is very important as no matter how good of a job the nutritionist did to formulate the ration--it is in the hands of the mill that makes the feed. Poor manufacturing quality control will result in poor feed."

"In answer to your question "does pelleting damage feed?", yes it can. The optimum temperature to pellet feed is 165 degrees F(74 degrees C). However, many plants pellet feed at 200 degrees F (93 degrees C). or higher. The faster you push the pellet machine trying to meet production quotas, the hotter the machine gets. At temperatures of 180 degrees F (82 degrees C) and over, the natural enzymes in the feed are destroyed. That is why we pellet at around 170 degrees F. It results in a softer pellet that tends to break up easier if not handled carefully, but the feed has its FULL POTENCY that way. The softer pellet is also easier for the bird to begin digesting. To do an experiment on your own, place some HARD pellets on a plate and pour some water over them. Do the same with some soft pellets. You will see a BIG difference in the amount of time it takes for the pellets to break down."

"Again, vitamin losses depend upon pelleting temperature. The higher the temp., the higher the loss. Extruded Ostrich feed experiences temperatures in the 250 degree F (121 degrees C) range during the extrusion process."

A few further points to remember when mixing feed:

When the feed is not pelleted the particle sizes must be the same. For example if the mix is basically ground feed but contains lucerne pellets and/or whole maize/corn, it is very likely that some birds will

pick out the corn or the lucerne pellets in preference to the other ingredients and visa versa. Imbalances will result with causing reduced performance.

If your mill or farm also mixes feed for cattle or poultry they may use additives that are toxic to Ostrich. Ensure that the bins are cleaned thoroughly before the Ostrich feed is manufactured, to avoid any possibility of cross contamination.

QUALITY CONTROL is essential when manufacturing Ostrich Feed. Cattle and hogs will tolerate some bad formulations and mixing errors - Ostriches will not.

Quality Carcasses Equal Quality Meat!

Ostrich Nutrition Bulletin #29

August 15, 1998

By: Fiona Benson

As I talk with buyers, processors and producers - there is one word continuously repeated - Quality. The buyers wanting assurances of quality, the processors working hard to achieve quality and producers assuming that they are providing quality.

Producers work hard to raise their birds with the best management and spend lots of dollars on feed. The results they assume must be a quality product. Past bulletins have covered a wide range of topics to help farmers identify a good feed and what contributes to the production of a quality carcass. The aim of this bulletin is to help to provide some clearly defined guidelines to what constitutes Quality.

A quality carcass:

1. The Fat must be white in colour

2. The Belly Fat should be 1 - 1.5 inches (38.1mm) thick.

3. The liver should be a good colour brown - even throughout with no odd colours present and no sign of disease.

4. The Heart should be of normal size

5. The skin, fat, or liver should not be yellow

6. There should be no signs of disease. - past or present

7. The carcass should not be "wet or slimy" in appearance

8. The birds should be under 18 months of age
9. The Meat a good red colour and uniform for all muscles (not black or multi-coloured).

Provided the liver is healthy and the fat white - any excess fat should not be a problem and provide added yield to those utilising the fat. Birds with very little or no fat is an indication of nutritional deficiencies either from poor feed or birds not able to utilize feed and the meat will be of poorer quality. At this stage of our industry, with the wide variation of genetics, carcasses should not be evaluated by weight - PROVIDED they meet the above criteria the meat should good tasting and a good quality.

Having produced a good quality carcass is the first stage of the production chain. Other factors that influence meat quality are the slaughter techniques that include:

A. Minimal stress prior to and at slaughter

B. Adequate bleeding

C. Adequate attention to the cold chain from the time of slaughter

D. Good hygiene systems

If the fat has a red tinge to it, that is a sign of extreme stress or trauma. This may be from accident - the reason for slaughter, accident in transit or simply stress at the time of slaughter. Stress has been proven to be the cause of high pH levels in the meat. High pH levels in meat of any species have an effect on the shelf life, taste and texture.

The inclusion of certain ingredients in the diet will affect the flavour of the meat. For example - fish meal will leave a fishy taste and smell. Ingredients high in iron will leave a livery taste. Care must be taken to avoid such ingredients in the rations fed. At the same time, it is extremely important to feed a balanced diet derived from quality feed ingredients with correct levels of added minerals, trace minerals, and vitamins. A quality feeding program produces a quality carcass resulting in quality meat our consumers demand!

Eminent nutritionists have mentioned to me that it is not possible to produce white fat when feeding yellow maize and/or Lucerne/grass. It is interesting to note that ALL the white fat carcasses that I have seen, combined with healthy livers, have been fed a level of yellow maize *(corn)* from 20% - 40% in their diet with similar levels of Lucerne *(alfalfa)*. The rations have also included reasonable levels of Soyameal (protein from a quality source), and added vitamins, minerals and trace minerals.
If meat has come from carcasses as described above, been well slaughtered, the cold chain adequately maintained and high levels of hygiene management throughout, the meat should be consistent enough to satisfy the following criteria and be defined as Quality Meat:

1. Meat that is a good red colour

2. There is even colour throughout each muscle

3. No off tastes

4. Meat that is tender in line with the muscle grading

5. Minimal leakage of fluids - especially when thawed
6. No odd odours

7. Meat has a good flavour

8. Reasonable shelf life

As a producer, if your carcasses do not achieve the above criteria it will be necessary to review your nutritional program. Work with your feed company or nutritionist to implement improvements or look for a company that is proven to produce birds with carcasses meeting the above criteria. The benefit will not be restricted only to producing quality meat. A nutritional program capable of producing a

quality carcass produces birds with improved survival rates, faster growth rates and increased food conversion.

Feeding birds for quality meat may not be cost effective RIGHT NOW in your area depending on the price you are receiving for your harvest birds. However, our Consumers will not re-order bad tasting, poor quality and meat that is inconsistent in quality. The ONLY choice is to feed these birds correctly NOW for the best tasting, consistent meat that will enable us to build a sustainable market.
We have potentially the best red meat. When produced correctly, it is healthy, in demand and capable of achieving significantly higher prices than currently achieved for other red meats. It is to the benefit of us all to be sure that we recognise what constitutes quality and start producing that quality NOW!

Feeding For Performance, Part 1

Ostrich Nutrition Bulletin #30

September 15, 1998

By: Daryl Holle

NEW Bulletin Series Entitled "Feeding For Performance"

I have been asked hundreds of times how a rancher can tell the difference between a good quality feed that is designed for performance and a not-so-good quality feed with no performance factors in mind other than to keep the birds alive (hopefully). The answer is never simple as there are as many ways to design feed formulas as there are people that design them. The common variables that differ in formulas are ingredient selection (source), ingredient amounts (levels), the ingredient ratios (one ingredient to another), and the ingredient quality with the word "quality" meaning the ingredient inherently has the maximum amount of nutrients contained therein with the least amount of adulteration.

Once the feed formula itself has been put together with Source, Levels, Ratios, and Quality in mind, then the next trick is to get that formula mixed together as it was intended (manufacturing quality). The last steps in feeding for performance is correct feeding management along with a high level of farm management. The result of all this effort is a performance feeding program that is well thought out and always will be the most cost effective for any operation.

Instead of just writing about Feeding for Performance, I have designed a series of QUIZ questions that you can answer for yourself and then RATE yourself as to your knowledge about performance feeding in your operation. The questions are an accumulation of my experience with feeding birds and relate to key areas of Blue Mountain's ongoing research with feed performance results and feeding practices. Your final RATING at the end of the series should give you a good idea of the Performance Potential of your bird operation and a clue to areas that need improvement.

Feeding For Performance - Part 1
THE FEED ITSELF!

To each of the following questions, answer YES, NO, or DON'T KNOW. Most questions are in reference to the feed tag (label) statements. If there is no complete ingredient listing on your feed tag, answer "Don't Know":

1. Does your feed tag list collective term ingredients such as Grain Products or Processed Grain By-Products? Yes___No___Don't Know___

2. Does your feed tag list collective term ingredients such as Plant Protein Products or Forage Products? Yes___No___Don't Know___

3. Does your feed tag list collective term ingredients such as Roughage Products?

Yes___No___Don't Know___
4. Does your feed tag list collective term ingredients such as Animal Protein Products? Yes___No___Don't Know___

5. Does your feed formula contain the ingredient Meat and/or Bone Meal? Yes___No___Don't Know___

6. Does your feed formula contain the ingredient Fish Meal?
Yes___No___Don't Know___

7. Is added Magnesium ABSENT from your feed formula?
Yes___No___Don't Know___

8. Is added Potassium ABSENT from your feed formula?
Yes___No___Don't Know___

9. Is added Copper ABSENT from your feed formula?
Yes___No___Don't Know___

10. Does your feed formula contain the ingredient Oyster Shell?
Yes___No___Don't Know___

11. Does your feed formula contain the ingredient Fossil Shell Flour?
Yes___No___Don't Know___
12. Does your feed formula contain the ingredients Grass Meal or Beet Pulp?
Yes___No___Don't Know___

13. Does your feed formula contain the ingredients Rice Hulls or Soy Hulls? Yes___No___Don't Know___

14. Does your feed formula contain added Active ingredients of Rumensin, Monensin, or Lasalacid?
Yes___No___Don't Know___

15. Is there more than one ingredient listed with the word oxide in its name?
Yes___No___Don't Know___

16. Is there more than two ingredients listed with the word chloride in its name? Yes___No___Don't Know___

17. Is added Manganese ABSENT from your feed formula?
Yes___No___Don't Know___

18. Is added Aelenium (Sodium Selenite) ABSENT from your feed?
Yes___No___Don't Know___

19. Is added Choline Chloride ABSENT from your feed formula?
Yes___No___Don't Know___

20. Is the added Vitamin A content of your finished feed less than/greater than a range of 8,000-20,000 iu's/lb (or 17,600-44,000 iu's/kg)? Yes___No___Don't Know___
21. Is the added Vitamin D content of your finished feed less than/greater than a range of 2,000-6,000 iu's/lb (or 4,400- 13,200 iu's/kg)? Yes___No___Don't Know___

22. Is the added Vitamin E content of your finished feed less than/greater than a range of 100-300 iu's/lb (or 220-660 iu's/kg)? Yes___No___Don't Know___

23. Is the added Selenium content of your finished feed less than/greater than a range of 0.1-0.3 ppm or mg/kg? Yes___No___Don't Know___

24. Is added Vitamin B6 and Vitamin B12 ABSENT from your feed formula?
Yes___No___Don't Know___

25. Is added Thiamine and Niacin ABSENT from your feed formula?
Yes___No___Don't Know___

26. Is added Biotin and Riboflavin ABSENT from your feed formula?
Yes___No___Don't Know___

27. Is the average Calcium content in your finished feed less than/greater than a range of 1.5% - 2.0%? Yes___No___Don't Know___

28. Is the average Total Phosphorus in your finished feed less than/greater than a range of 0.85% - 1.0%? Yes___No___Don't Know___

29. Calculate the Calcium to Phosphorus Ratio (divide average calcium percent in finished feed by the Total Phosphorus percent in the finished feed). Is the Cal/Phos ratio less than/greater than a range of 1.5 to 1 - 2.0 to 1? Yes___No___Don't Know___

30. Is the added Salt content in your finished feed formula less than/greater than a range of 0.35% - 0.65%? Yes___No___Don't Know___

There you have it! Already 30 questions and we have only lightly covered the BASICS of good performance feed ingredients and certainly NOT all of them. It would take at least another 100 questions to do a thorough job of finding the true feed performance value, but this should be enough to help identify if your feed formula is on track or not.

SCORING: Each question has a value of 5 points for "NO" answers only. "YES" answers and "Don't Know" answers count 0 points.

YOUR NUTRITIONAL RATING:
150 = EXCELLENT POTENTIAL PERFORMANCE VALUE
130-145 = GOOD POTENTIAL PERFORMANCE VALUE
110-125 = FAIR POTENTIAL PERFORMANCE VALUE
90-105 = NOT-SO-GOOD POTENTIAL PERFORMANCE VALUE
Below 90 = NO POTENTIAL PERFORMANCE VALUE

The number of questions you answered with "Don't Know" is a tell-tale clue as to how well you know your feed and whether it is capable of meeting your performance expectations or not. The more questions you "Don't Know" about your feed, the more likely it is not a performance feed.

YOUR "DON'T KNOW" RATING:

Number of questions answered with "Don't Know":

0 = You definitely know your feed very well.
1 - 2 = Understandable, but you should try to find answers soon!
3 - 5 = Start searching for answers immediately and verify accuracy!
6 - 10 = Knowledge about your feed is seriously lacking!
Over 10 = Your performance feeding program is NOT in your knowledgeable control and may not even exist!

Keep this Bulletin and your scoring as we will be using it again for FINAL scoring!

Report of the 2nd International Ratite Scientific Conference

Ostrich Nutrition Bulletin #31

October 1, 1998

By: Fiona Benson

27th September, 1998

The last week has seen around 140 ratite scientists, researchers and other role players review progress, compare notes, exchange information and promote solidarity in the Ratite Industry. There were +/- 20 countries represented. Delegates from the United States were sadly conspicuous by their absence - especially considering the size of their Emu industry.

The programme consisted of 10 invited papers and 40 contributed papers on Ratite Biology, Ecology, Nutrition, Genetics, Breeding, Reproduction, Anatomy, Physiology, Meat Science, Product Technology, Embryology, Incubation, Behaviour, Husbandry and Veterinary Aspects. There were a few papers on Rhea and Emu. It is obviously impossible to report in detail on every paper.

Highlighting the theme of the Congress - Ratites in the Competitive World - Dr. Fritz Huchzermeyer in his address emphasised the need for efficiency as the only answer in a highly competitive environment. He translated this as meaning:

-Higher Productivity - more eggs, more chicks, better survival and faster growth.

-Lower Production Costs - feeding, housing and labour

-High Quality of Products.

He reminded delegates that with other production species there are thick text books available for consultation, with Ostrich and other ratites there is little. Much of what there is has many gaps which are filled with extrapolations from other species, notably poultry, often even without acknowledging that fact. He highlighted the problem that what is published tends to be distributed over a wide range of publications, making them less accessible to individual researchers and other end users.

To enable better communication, he spoke about the founding of an International Ratite Science Association. This had been agreed in principal at the first International Scientific Ratite Congress, held in Manchester, UK two years ago. With the electronic age of email and the WWW he felt that this could now be organised as the costs are minimal compared to printing and distributing magazines and other information.

During discussion later in the week it was agreed that a web site be generated for accessing published data and an email list be started for all those involved in research to communicate. Those working on research will be able to let others know of any projects they are working on. This will have a number of

benefits. It will prevent duplication of work and allow others who may have work relevant to be able to pass on information.
In his continuing effort to facilitate communication within the Ratite industry, Daryl Holle of Blue Mountain Feeds has made arrangements for this list to be operational as soon as the committee have finalised the rules, membership etc. We will inform you as soon as it is up and running and what rules have been decided regarding membership and topics to be discussed.

Dr.Mike Jarvis gave a slide presentation of the different races to explain how the genetics had adapted to the local environment. The slides clearly showed the desert species as being small in both frame and size. He also highlighted different feather colours on the various body regions, leg and skin colours and eye colour between the different races. He clearly identified 8 races and not the normal 3 (Red, Blue and Black) popularly referred to.

It has been our experience that some birds sold as Blacks are more likely the 3 desert races with the smaller frames - from Namibia, the South African West Coast and the Kalahari Desert.

There was a paper on "Where to go with the Ostrich Industry, Its Problems, Challenges and Future." It included a detailed report of the Logical Framework Analysis that was carried out in Oudtshoorn last month. Around 30 participants, representing all the role players of the South African Ostrich Industry contributed in this participatory planning session, under the leadership of Professor D'Haese an economist from the University of Gent, Belgium.

The objective was to first Identify the core problem and problems that contributed to that problem and then develop a strategy to help over come these problems. All participants were asked to write down the problems as they perceived them. From this a problem tree was developed. Whilst the debate was restricted to the South African Ostrich Industry, the principals identified apply generally.

As a participant of this meeting my personal summary was that it was a great step forward to develop some structure to the Industry. However, there remains a lack of knowledge of the production potential of the Ostrich.

The only other paper that I will report on was presented by Adriaan Olivier on work done at the Ostrich Unit, Onderstepoort Veterinary Institute here in South Africa. "The Importance of Antibiotic Resistance from Bacterial Isolates in Ostrich Samples". He reported on a detailed study carried out during 1996/97 chick rearing season on diagnostic investigations on chicks with enteritis, fading chicks, non-starters and respiratory conditions.

The work highlighted significant resistance to the major antibiotics in use and the indiscriminate use of these drugs by many farmers. He pointed out that antibiotic resistance constitutes a major threat to public health. He suggested the following as an aid to eliminating the indiscriminate use of antibiotics:

-Greater use of Probiotics

-Better Nutrition

-Better Farm Management and greater attention to biosecurity and hygiene methods.

-Better use of Vaccines

-Recommended that antibiotics should in future only be available for administering by Vets

As I have been writing this article a popular Investigative program on our Television has done a piece on bacteria resistance to antibiotics. They concluded that it is widely used in animal feeds as a growth stimulant and that they are therefore present in meat that we (the consumer) eat. The use of antibiotics certainly varies from country to country - but it is up to us all to ensure that the feed we are using does NOT contain growth stimulants or antibiotics. Growth Stimulants and antibiotics are no replacement for good nutrition.

When used prudently antibiotics have a vital role to play in animal health, but their effectiveness is threatened through indiscriminate use.

As is usual with events of this nature, many new associations were made outside the conference hall with further exchanges of information. With the development of a Web site dedicated to Ratite Science, the papers should be available for all to access.

It was decided that the next Ratite Scientific Conference will most likely be held in 3 years and again in Southern Africa, most likely Zimbabwe, in view of the comments on the excellent exchange rate being enjoyed by those from outside Africa.

Feeding For Performance, Part 2

Ostrich Nutrition Bulletin #32

October 15, 1998

By: Daryl Holle

Part 2, FEEDING MANAGEMENT

In the last Nutrition Bulletin, we discussed how to identify a good quality high performance feed. Today, we will discuss feeding management. In November we will write about farm management. These three areas of concern, and how they are implemented on your farm, determine the effectiveness of your Feeding for Performance program.

I have learned over the last couple decades that success in livestock depends on the farmers ability to feed for performance. You can have the best feed in the world, but if the feeding management is not correct, the results will be disappointing. Feeding management is a term I use for the feeding strategy used by the farmer to feed his birds. Some farmers do an excellent job of feeding management and practice it everyday. Others, do not pay attention to it at all and usually end up blaming the feed, weather, or other environmental factors for their poor production results.

Poor feeding management can break a farmer. Excellent feeding management will yield excellent results and produce the highest number of healthy chicks along with the best quality products being produced from those chicks. You have already spent the money for the best feed formula that will result in bird performance. Why mess it up with poor feeding management practices? There is a favorite saying that applies to feeding management: "If you can't do it right, why bother doing it at all".

In all fairness, many farmers do not know what "right" means when it comes to feeding birds. Many have not raised livestock for production before and simply don't understand (or are not aware) of good feeding management practices. Others have raised livestock previously, but have gotten away with poor feeding management practices. Ratites will not tolerate poor feeding management practices and the result will develop problems somewhere along the production line.

Take the following feeding management QUIZ and see how you fare with the feeding strategy on your farm:

Feeding For Performance - Part 2 Quiz
FEEDING MANAGEMENT!

To each of the following questions, answer YES, NO, or DON'T KNOW. Most questions are in reference to the feeding strategy used at your farm. If you do not know the answer to a question, answer "Don't Know":

1. Do you weigh the feed fed the birds at EVERY feeding by means of an accurate electronic scale, table scale, or hanging scale? Yes___No___Don't Know___

2. Do you feed the precise amount of feed per bird per day that is recommended by the feed manufacturer? Yes___No___Don't Know___

3. Do you know the exact feeding rate per bird per day recommended by your feed manufacturer? Yes___No___Don't Know___

4. Does your feed manufacturer HAVE a recommended feeding rate other than "free choice" to all groups of birds? Yes___No___Don't Know___

5. Is it true that you do NOT change brands of feed or severely change ingredients any more than once every 2 years? Yes___No___Don't Know___

6. Do you know for certain that your feed manufacturer does not make severe ingredient changes from time to time? Yes___No___Don't Know___

7. Is it true that you do not add Oyster Shell to your feed? Yes___No___Don't Know___

8. Is it true that you do not add extra Alfalfa (lucerne) to your complete feed formula? Yes___No___Don't Know___

9. Is it true that you do not add extra Corn (maize) to your complete feed formula? Yes___No___Don't Know___

10. Is it true that you do not add extra minerals to your complete feed formula? Yes___No___Don't Know___

11. Is it true that you do not add extra vitamins and trace minerals to your complete feed formula? Yes___No___Don't Know___

12. Is it true that you do NOT allow your birds "free choice" access to major minerals such as calcium and phosphorus? Yes___No___Don't Know___

13. Is it true that you do NOT allow your birds "free choice" access to trace minerals? Yes___No___Don't Know___

14. Is it true that you do NOT allow your birds "free choice" access to vitamins? Yes___No___Don't Know___

15. Do you feed your birds at least two separate feedings per day? Yes___No___Don't Know___

16. Do your birds have access to FRESH feed within two hours after sunrise and again two hours before sunset? Yes___No___Don't Know___

17. Is it true that the birds feed is NOT out in the sunshine for most of the day? Yes___No___Don't Know___

18. Is the birds feeder protected from winds, rain and snow?
Yes___No___Don't Know___
19. Do you watch the birds for proper consumption occasionally to make sure that each bird is approximately getting his/her fair share of feed? Yes___No___Don't Know___

20. Do you have adequate feeder space so all birds have reasonable access to the feeding area without in-fighting, pushing, and shoving? Yes___No___Don't Know___

21. Is it true that you would provide a separate feeding area for timid birds or shy birds that are intimidated by "boss" birds? Yes___No___Don't Know___

22. Do you clean out the bird feeders daily to prevent insect and mold contamination? Yes___No___Don't Know___

23. Do you visually check the feed each feeding to make sure it does not contain bugs, mold, or other noticeable contaminates? Yes___No___Don't Know___

24. Do you store your feed supply in a cool, dry place away from rodents, chemicals, extreme heat, moisture and sunshine? Yes___No___Don't Know___

25. Do you make sure the birds have access to CLEAN water 24 hours per day?
Yes___No___Don't Know___

26. Does the watering unit your birds drink from have enough water surface area that birds can scoop up the water as they drink? Yes___No___Don't Know___

27. In the wintertime, do your birds have access to warm water above 70 degrees Fahrenheit? Yes___No___Don't Know___

28. Do you feed a proper Breeder ration to the breeder birds during the breeding/laying season? Yes___No___Don't Know___

29. Do you feed a proper Maintenance ration to the breeder birds during the off season (non laying season) in the correct amounts without adding extra additives or ingredients?
Yes___No___Don't Know___

30. Do you understand the consequences of poor breeder feed and poor feeding management during the "off season" and the laying season before? That it will usually show up as problems the following year and it may take as long as 2 years to witness the total response to a good feeding program? Yes___No___Don't Know___

There you have it! Already 30 questions and we have only lightly covered the BASICS of good feeding management and certainly NOT all of them. It would take many more questions to do a thorough job of finding the true feeding management performance value, but this should be enough to help identify if your feeding management is on track or not.

SCORING: Each question has a value of 5 points for "YES" answers only. "NO" answers and "Don't Know" answers count 0 points.

YOUR FEEDING MANAGEMENT RATING:

150 = EXCELLENT POTENTIAL FEEDING MGMNT PERFORMANCE
130-145 = GOOD POTENTIAL FEEDING MGMNT PERFORMANCE
110-125 = FAIR POTENTIAL FEEDING MGMNT PERFORMANCE
90-105 = NOT-SO-GOOD POTENTIAL FEEDING MGMNT PERFORMANCE
Below 90 = NO POTENTIAL FEEDING MGMNT PERFORMANCE

The number of questions you answered with "Don't Know" is a tell-tale clue as to how well you know your feeding management and whether it is capable of meeting your performance expectations or not. The more questions you "Don't Know" about your feeding management, the more likely you are not on a performance feeding program.

YOUR "DON'T KNOW" RATING:

Number of questions answered with "Don't Know":

0 = You definitely know what is going on at your farm.
1-2 = Understandable, but you should try to find solutions soon!
3-5 = Start some new procedures immediately and verify they are done!
6-10 = Knowledge about your operation is seriously lacking!
10+ = Your "feeding for performance" program is NOT in your knowledgeable control and may not even exist!

Keep this Bulletin and your scoring as we will be using it again for FINAL scoring!

Feeding For Performance, Part 3

Ostrich Nutrition Bulletin #33

November 15, 1998

By: Daryl Holle

Part 3, FARM MANAGEMENT

In the last two Nutritional Bulletins, we discussed how to identify a good quality high performance feed and good feeding management. Today, in the last of our Feeding For Performance series, we are discussing farm management. These three areas of concern, and how they are implemented on your farm, determine the effectiveness of your Feeding for Performance program.

I have learned over the last couple decades that success in livestock depends on the farmers ability to feed for performance. You can have the best feed in the world, but if the feeding management is not correct, the results will be disappointing. Feeding management is a term I use for the feeding strategy used by the farmer to feed his birds. Some farmers do an excellent job of feeding management and practice it everyday. Others, do not pay attention to it at all and usually end up blaming the feed, weather, or other environmental factors for their poor production results. Farm Management has similiar rewards and consequences. A good Farm Management program enhances Feeding Management and High Performance Feeding programs. A poor Farm Management program destroys the efforts of ALL other programs--no matter how good they are.

Farm Management problems can occur in many different areas of a typical ratite operation and for any number of reasons. Sometimes farmers tend to take short cuts while devising their feeding programs as it is the easiest of all options available. Sometimes farmers manage their farm by tradition, rather than common sense, as it has always been done that way. Sometimes farmers develop a mental attitude that says "I am feeding the best feed and feeding it right so nothing else matters and I am doing the best I can". Meanwhile, the breeder birds are not laying, the chicks are not growing, and the eggs are not hatching as no attention has been paid to Farm Management.

Take the following "Farm management QUIZ" and see how you fare with the management strategy on your farm:

Feeding For Performance - Part 3 Quiz
FARM MANAGEMENT!

To each of the following questions, answer YES, NO, or DON'T KNOW. Most questions are in reference to the feeding strategy used at your farm. If you do not know the answer to a question, answer "Don't Know":

1. Do you allow Breeder pairs, trios, quads, and colonies together year around?
Yes___No___Don't Know___

2. Do you have a perimeter fence outside the breeder pen fence to keep predators away a fair distance? Yes___No___Don't Know___

3. Do you have your breeder pens as secluded as possible away from busy roads, housing developments, oil drilling rigs, airports, and other loud interruptions? Yes___No___Don't Know___

4. Does your feeding program blend with what the breeder birds are actually exposed to (example: no grazing--complete feed, grazing--supplement feed)? Yes___No___Don't Know___

5. Do you keep records of production, fertility, and hatchability from each breeder hen? Yes___No___Don't Know___

6. Do you regularly analyze your records and cull out birds known for poor production, fertility, and hatchability? Yes___No___Don't Know___

7. Do you tag or identify the chicks of breeder birds to be able to track weight gain/growth progress of the chicks? Yes___No___Don't Know___

8. Do you weigh chicks at certain stages during the first year so you can identify excellent performing progeny ? Yes___No___Don't Know___

9. After reviewing chick weight gains/growth records, do you make a concentrated effort to replace poor performing parentage with new bloodlines showing improved performance potential. Yes___No___Don't Know___

10. Are your chicks raised in conditions that are not overcrowded? Yes___No___Don't Know___

11. Are your chicks grouped by size for proper feeding and social environment? Yes___No___Don't Know___

12. Are you chicks mostly in a stress free environment protected from sudden surprises, threats, inclement weather, drafts, chills, or overheating. Yes___No___Don't Know___

13. Are you cautious about moving chicks to new pen using a gradual transfer to a nearby location to avoid stress? Yes___No___Don't Know___

14. Are you recording the boneless, saleable meat weights from your slaughter birds so you can see your genetic progress each year? Yes___No___Don't Know___

15. Are your slaughter birds averaging 80-100 pounds (36.4kg-45.5kg) of boneless, saleable meat between 12-14 months of age (not including heart, liver, or gizzard)? Yes___No___Don't Know___

16. Are your boneless, saleable meat averages per bird increasing about 2.5% per year? Yes___No___Don't Know___

There you have it! Already 16 questions and we have only lightly covered the BASICS of good Farm Management and certainly NOT all of them. It would take many more questions to do a thorough job of finding the true Farm Management performance value, but this should be enough to help identify if your Farm Management is on track or not.

SCORING: Each question has a value of 10 points for "YES" answers only. "NO" answers and "Don't Know" answers count 0 points.

YOUR FARM MANAGEMENT RATING:

160 = EXCELLENT POTENTIAL FARM MGMNT PERFORMANCE
130-150 = GOOD POTENTIAL FARM MGMNT PERFORMANCE
110-120 = FAIR POTENTIAL FARM MGMNT PERFORMANCE
90-100 = NOT-SO-GOOD POTENTIAL FARM MGMNT PERFORMANCE
Below 90 = NO POTENTIAL FARM MGMNT PERFORMANCE

The number of questions you answered with "Don't Know" is a tell-tale clue as to how well you know your farm management and whether it is capable of meeting your performance expectations or not. The more questions you "Don't Know" about your farm management, the more likely you are not on a performance feeding program.

YOUR "DON'T KNOW" RATING:

Number of questions answered with "Don't Know":

0 = You definitely know what is going on at your farm.
1-2 = Understandable, but you should try to find solutions soon!
3-5 = Start some new procedures immediately and verify they are done!
6-8 = Knowledge about your operation is seriously lacking!
8+ = Your "feeding for performance" program is NOT in your knowledgeable control and may not even exist!

FINAL SCORING!

This ends the 3 part QUIZ series on "Feeding for Performance". Now tally your TOTAL score for all 3 parts. The 3 parts include:

Part 1 - The Feed Itself Quiz - Dated September 15, 1998
Part 2 - Feeding Management Quiz - Dated October 15, 1998
Part 3 - Farm Management Quiz - Dated November 15, 1998

Add up your total scores (rating) for all 3 quizzes (ignore the "don't know" ratings).

YOUR TOTAL PERFORMANCE RATING:

460 = EXCELLENT OVERALL PERFORMANCE RATING
390-440 = GOOD OVERALL PERFORMANCE RATING
330-370 = FAIR OVERALL PERFORMANCE RATING
270-310 = NOT-SO-GOOD OVERALL PERFORMANCE RATING
Under 270 = NO PERFORMANCE RATING AT ALL!

Blue Mountain Ostrich Carcass Grade & Yield System

Ostrich Nutrition Bulletin #34

December 15, 1998

By: Daryl Holle

INTRODUCTION:

One of the most perplexing problems that remains to be addressed in the Ostrich meat industry is meat quality. For far too long, Ostrich meat has been sold as Ostrich meat with no qualifier as to quality of product. This has led to all sorts of difficulties with marketing to our consumers. Some of the Ostrich meat available from processors is of excellent quality, some of fair quality, and some of not-so-good quality. From this experience, it should be easy to understand that all Ostrich meat is NOT the same--similar to all beef, pork, or chicken is not the same.

The meat from other livestock species goes through a grading system to identify the meat quality. Each specie has its own grading system. Then, that grade quality is labelled and priced accordingly to the consumer. Blue Mountain Ostrich has been working on an Ostrich grading system for over 2 years now and we have discovered some strong clues as to the cause and effect differences between high quality Ostrich meat and low quality Ostrich meat. We have also learned that it IS possible to produce and identify HIGH quality Ostrich meat in a consistent manner if certain critical parameters are obeyed.

The nutritional diet of the Ostrich is directly connected to meat quality. This is nothing new in the livestock industry and applies to all other species as well. When the meat muscles of the Ostrich grow fast without extreme amounts of exercise, the meat will be high quality, tender, and consistent IF the diet is designed correctly for maximum meat production along with eliminating meat odours, off tasting meat, and uneven color of meat.

Another problem existing in the Ostrich industry is the prices paid for slaughter Ostrich. Far too often, a price is paid PER BIRD no matter what the meat yield results might be. There is a big difference in meat yield between a well-fed bird on a good nutritional diet and a poorly-fed bird on a bad nutritional diet. The difference can be as much as 100% in meat yield between the 2 examples. When the processor pays BY BIRD, this automatically discourages the farmer from attempting to raise a quality bird with high quality meat as there is no incentive to do so. This farmer payment BY BIRD encourages the farmer to feed his birds as cheaply as possible with no regard for meat quality. This is the single most common problem existing in the Ostrich industry today--farmers are encouraged to produce poor quality meat which also results in poorer quality hides!

Blue Mountain Ostrich took a different approach to this problem. An approach that is widely used in some other livestock species. It should be obvious that a farmer feeding his birds correctly for high quality meat will result in birds yielding high quantities of meat per bird compared to poorly-fed birds. Since the processing costs are almost the same per bird, no matter what the bird yields, it is very understandable for a processor to pay higher dollars for a higher yielding bird and lower dollars for a

poor yielding bird. Paying the farmers in this manner encourages them to produce high yielding birds and results in a higher quality meat to keep our meat markets coming back for more. The YIELD system for farmer payment really works well for Ostrich and is a fair system for both the farmer and processor. It also creates positive progress towards making Ostrich meat better and better quality as time goes on rather than the negative of putting out a poorer quality product as time goes on.

Blue Mountain has used the Grade & Yield System for some time now and has proven that it works to encourage farmers to raise birds of HIGH quality and be profitable doing so. A farmer producing poor quality meat will not survive and should not as it is a detriment to our industry.

The Blue Mountain Carcass Grade & Yield System is constantly being updated as new information becomes available. We are already on Version 3.0 and as time goes on, it will just get better with experience. To keep updated, check in at our Blue Mountain web site (www.blue-mountain.net) once in a while as updated versions will be posted there.

Blue Mountain Ostrich Carcass Grade & Yield System

December 15, 1998
Version 3.0

Carcass Grades:

Prime
Choice
Select
Utility
Non-Food

Yield Class:

YIELD CLASSES - WEIGHTS IN BONELESS MEAT (NOT CARCASS WEIGHT)

CLASS	KILOGRAMS	POUNDS	SUGGESTED VALUE
Class 1	45+kg	99+lbs.	100% Full Price
Class 2	40 to 45kg	88 to 99lbs.	Less than Class 1 price
Class 3	35 to 40kg	77 to 88lbs.	Less than Class 2 price
Class 4	30 to 35kg	66 to 77lbs.	Less than Class 3 price
Class 5	25 to 30kg	55 to 66lbs.	Less than Class 4 price

Note: The Yield Class price is directly connected to processing costs per bird. A lower yielding bird warrants a lower price per kg/pound of yield to keep all meat costs the same no matter what Yield Class the meat came from.

PRIME GRADE:

A Prime grade Ostrich carcass shall exhibit the following desirable traits:

-Less than 16 months of age.
-White Belly Fat
-Even Red Muscle Coloring Throughout
-Normal Heart in Size & Texture
-Mid-Brown Liver with no abscesses or ulcerations
-No disease symptoms
-No Oedema - "jell-like" substance on Heart, Thigh, or Sternum.

Note: A Prime Grade carcass will yield the highest amount of primary meat cuts with a consistent degree of tenderness throughout all the primary meat muscles.

CHOICE GRADE:

A Choice grade Ostrich carcass shall exhibit the following traits:

-Between 16 months to 24 months of age.
-White Belly Fat
-Even Red Muscle Coloring Throughout
-Normal Heart in Size & Texture
-Mid-Brown Liver with no abscesses or ulcerations
-No disease symptoms
-No Oedema - "jell-like" substance on Heart, Thigh, or Sternum.

Note: A Choice Grade Ostrich carcass will yield a few primary meat cuts, if carefully selected, with a reasonable degree of tenderness. The majority of the Choice carcass will be secondary meat cuts and ground meat.

SELECT GRADE:

A Select grade Ostrich carcass shall exhibit the following traits:

-25 months of age and over
-White Belly Fat
-Even Red Muscle Coloring Throughout
-Normal Heart in Size & Texture
-Mid-Brown Liver with no abscesses or ulcerations
-No disease symptoms
-No Oedema - "jell-like" substance on Heart, Thigh, or Sternum.

Note: A Select Grade carcass should ONLY be used for value-added products (processed products) and ground meat products.

UTILITY GRADE:

A Utility Grade Ostrich carcass will exhibit one or more of the following undesirable traits:
-Yellow Belly Fat
-Multi-coloring of Muscles (pink to dark red)
-White areas in some muscles
-Small heart or heart that has spongy texture
-Yellow, Green, or Black Liver
-Liver abscesses or ulcerations
-Oedema - "jell-like" substance on Heart, Thigh, or Sternum

Note: A Utility Grade carcass should ONLY be used for value-added products (processed products) and not for primary cuts, secondary cuts, or ground meat products.

NON-FOOD GRADE:

A Non-Food Grade Ostrich carcass will exhibit one or more of the following undesirable traits:

Any disease symptoms:

-Muscles with abscesses or channels in meat
-Spotty Livers
-Light or dark spots on muscles

Note: A Non-Food Grade carcass must not be used for human consumption.

Grade & Yield Overview:

The Grades are rather obvious and it is recommended that the PRIME & CHOICE Grades be connected with the Boneless Meat Yield Class in an effort to encourage the farmer to raise quality birds with lots of boneless meat. This type of bird will almost always mean a bird that has been fed a well-balanced diet that will result in high quality meat with consistent taste and color. It is recommended that the Yield Classes be a different price per pound for each different class with Class 1 being the highest paid price per pound/kilo.

It is not recommended to implement the Boneless Meat Yield Class with the SELECT & UTILITY Grade but rather pay the farmer a single price. The price for UTILITY grade Ostrich should be low enough to discourage this type of Ostrich production. A Non-Food Grade carcass should be of no payment to the farmer and may carry a "charge back" for the slaughtering costs involved.

The Grades of Prime, Choice, Select, and Utility are meat grades and can be implemented with BOTH farmers and consumers alike. The Yield Class is a processor/farmer program to encourage the farmer to raise a high quality product that is profitable for the processor to process and market.

Working Towards Production Targets!

Ostrich Nutrition Bulletin #35

January 15, 1999

By: Fiona Benson

Over the months these bulletins have provided guidance on how to achieve the best performance from our birds through good nutrition and good feed management. What constitutes 'good performance' has not been defined. It must be made clear that the following criteria are achievable GOALS that we all should be working towards.

-Average 100 eggs per hen - from 4 years and consistency each year

-Min. 90% Fertility

-Min. 90% Hatchability

-Min. 90% Survivability

-Min. 35kgs saleable meat at 9mths and min. 45kgs at 12mths (Red, Blues or Blacks)

-Min. 70% First Grade Hides

-Breeding in 2nd year

-Egg Laying 12 months of the Year

The fact that all of the above are being achieved now, by some breeder birds and a few producers some of the time, is an indication that these targets ARE achievable. In most categories there are a few farmers doing better than the goals listed above. It must be made clear that NO producer is achieving ALL of the above at this time. It is necessary to understand what constitutes good production in order to be able to work towards achieving these targets. It will take a number of years to reach these goals, but it is essential to start NOW.

All producers will agree that nutrition is the foundation to achieving good production in their livestock (whatever species). The farming of Ostrich as a production animal is new and this has led to what we now know as low levels of production being considered the norm. Not so long ago any one able to keep chicks alive were considered to have done well.

There are a number of statements made regarding production and reasons given for not being able to achieve the above targets:

1. Males cannot remain active throughout a season as they become tired.
2. End of season chicks are weak.
3. It is a waste of money to try to raise chicks born in late summer/early Autumn.

4. It is necessary to separate breeder birds to give them a rest from production.
5. 30 chicks per annum/hen is an acceptable level of production.
6. Winter chicks do not thrive or grow well.
7. Birds should be weighing 210-250lbs. (95-112kgs) around 12-14mths.
8. 65lbs (30kgs) meat yield at +/-12mths is typical yield.
9. Birds only put on fat (not meat) after 10 mths.
10. Meat is a paler colour from younger birds.
11. It is not possible to produce white fat from birds fed Yellow Maize in their diet.
12. Chicks reared in a damp climate will suffer lung problems.

This list is not exhaustive, but gives an indication of the current thought process for many producers (large and small) at this time. With increasing data being collected and improved communication - ALL these theories are proving to be INCORRECT. Let us discuss them in a little more detail.

Items 1-6 are all related to breeder nutrition and management. It is clear that a breeder ration of 14-16% protein and low levels of vitamin and mineral supplementation will not provide the same nutrients to the birds to sustain them throughout the season compared to a ration that contains high quality ingredients, high levels of vitamin and mineral supplementation and a protein level of around 21%. That is only the first step.

If that breeder ration is designed to be fed at 5lbs/2.1kgs per day but it is only fed at 3lbs/1.3kgs per day - those breeders will be short fed by 40%. NO Dairy Farmer, NO Beef Farmer, NO Poultry Farmer Nor Pig Farmer would do that to their production livestock - so why do we find many Ostrich farmers doing this? I have read articles written by "experts" talking about feeding rates at these lower levels - increasing only in bad weather. There has also been advice on reducing the complete feed as the birds are grazing - instead of feeding a ration balanced to the grazing intake. There are large production farms putting out the feed once a day, every other day and even every fourth day. Farmers of other production livestock species feed their animals several times a day, why do Ostrich farmers think their birds are different? Once feed is exposed to the air it will deteriorate very quickly thus losing much of the nutrient value farmer's have invested heavily in.

It only makes sense that if the breeder birds are receiving insufficient nutrients throughout the season their productivity will be reduced. It also makes sense when the breeders are receiving insufficient nutrients, that the eggs towards the end of the season will LACK the necessary nutrients to achieve good fertility, hatchability and good strong healthy chicks with strong immune systems. This sets up a chain reaction:

In most cases where the breeder nutrition is falling short, the chick nutrition is also falling short. At the end of the season there is a combination of weak chicks, poor chick nutrition and colder weather. Weak chicks are slower to come to eat - reducing further their daily nutrient intake and compounding the already weakened state. Cold weather brings colder water and less water intake - further reducing feed intake. This is the explanation for weaker winter chicks. Farmers with breeders on high levels of nutrition are achieving good strong chicks throughout the year - that continue to grow well through the winter months, when combined with access to an adequate supply of water at the right temperature at ALL times and with all other good feed and farm management practices.

Environmental factors do have a significant role to play in the productivity of breeder birds - even when all nutritional factors are right. The following are examples of environmental factors that will also

affect productivity: extreme weather conditions, predators, breeder compatibility, good nesting area, adequate shelter to suit the local climatic conditions, regular feeding schedules. There is still much to learn in this area, but these lessons will only be truly learnt when the nutritional deficiencies currently experienced have been eliminated.

Many farmers report variable productivity from year to year from the same breeders and environmental factors are commonly given as the reason. This is generally NOT the case, but rather a result of poor breeder nutrition - this can also be the cause of short breeder seasons. When the birds are nutritionally short, their first concern will be to provide available nutrients to meet their own needs to ensure their survival and when this happens, reproduction will cease.

A factor that is all too often overlooked is that Good Breeder Nutrition starts from DAY 1 of the breeders life as a chick - and before - the nutrition of this chick's parents will have an influence. This has been proven time and again in other species - Ostrich is NO different. Consider for a moment the conditions that are showing up in most birds currently offered for slaughter - reported at length in previous bulletins. It must be concluded that these are all conditions that will be showing in the birds retained for breeder stock as they are in most cases fed the same rations during the growth period. How can birds showing these nutritional deficiencies be productive - many of the conditions being irreversible? The answer is they cannot. Improving the nutrition of existing breeders will help, but the significant improvements in performance will only be noticeable when progeny from these breeders are fed correctly from DAY 1 and throughout their productive lives.

Items 7-12 are related to Chick nutrition - with the same principals as discussed in the section above on breeder nutrition. All are proven to be symptoms of low nutritional levels in the feed and/or imbalances in the rations. Even if the chick rations are the best available, adequate attention must be paid to Feeding Management, Farm management and environmental factors.

There are many production farms withdrawing water from baby chicks mid afternoon. One sees chicks shut in for the night well before dusk and let out well after dawn. They will be shut in with NO water and many with NO feed as well. Chicks eat a considerable amount of their daily intake just before sunset and immediately after sunrise. To settle for the night with dry feed in their stomach with no water slows down the digestion and will most certainly lower the production potential.

In the higher latitudes, where daylight hours are limited in winter, it will be necessary to add artificial light to increase the available feeding time. The importance of regular feeding times, at least twice a day, cannot be over emphasised. Many production farms have been feeding growing birds once a day and even as far apart as every 4 days. The consumption of birds on free feed (as much as they can eat) is increased when fed little and often. Good feed intake is essential to achieve high weight gains with good feed conversion ratios.

With quality rations, fed from Day 1 under good management practices, the full influence of the genetic performance of the birds can be realised. This is the final step to improving performance and achieving the significantly higher levels of production that are proving to be possible when all things are right. There are many breeder birds achieving some reasonable performance levels - 40+chicks to slaughter per hen, in spite of less than optimum nutrition and management systems. Imagine what these same birds would be capable of under optimum conditions?

The targets that are set above may seem to many out of reach right now, but they are the future of

Ostrich production. They have been proven to be achievable and in time they will be exceeded. The first step is to understand and recognise rations that will produce performance. Let me leave you with a couple of statements from Bulletin #2, written January 15, 1997 - words that set me on the track of making more of an effort to understand what constitutes Performance Rations for Ostriches:

"Most profitable livestock ranchers have dug in and learned all this nutrition stuff by making an EFFORT to do so. They understand that what comes out of a production unit can be NO better than what was put into it."

"You are either going to learn as much as you can about nutrition and feed for production ..... or get out of the business."

Counting the COST of Poor Feeding Management!

Ostrich Nutrition Bulletin #36

February 15, 1999

By: Fiona Benson

You hear Daryl Holle and I qualify every statement we ever make when talking about feeding and performance with the statement SUBJECT TO GOOD FEED MANAGEMENT. The feed bill is the single most expensive input into any Ostrich Farming enterprise and the feed used is the single most important factor in the success or failure of that enterprise. The feed determines the ability to produce a marketable slaughter bird or productive breeder bird.

In this bulletin I am going to discuss two personal experiences that emphasises the importance of Feed Management and how it can have a devastating effect on the results achieved if the feed is not fed correctly, even when spending a great deal of money on purchasing a good feed.

Recently I purchased a batch of chicks. I chose the farmer as I knew him to be feeding his birds a good brand of feed. From the day they arrived they started dying on me. Around 50% have died - this I am sure sounds familiar to many - but a new experience for me. Examination ruled out any type of bacteria or viral infection, but there was something about the chicks that made us immediately look to the breeders and their diet.

After long discussions with the farmer these are some of the factors that make it impossible to pin point any one factor - other than it is clear that the breeders were most certainly lacking in some way.

1. Balanced Rations:

The breeders, in the early part of the season, had been fed a Lucerne Supplement. This designed to be fed with Lucerne - but these breeders were grazing Grass. As grass contains significantly different levels of minerals to Lucerne - this is the first clue that there will be significant imbalances in the breeder ration.

When supplementing any grazing birds great care is required to ensure that sufficient DRY MATTER is taken in of the grazed material to ensure the total daily intake of nutrients by the birds reaches the required levels.

More recently the breeders have returned to a complete breeder ration.

2. Feeding Rates:

The farmer was totally unable to tell me exactly how much these breeders were eating each day. It is the TOTAL DAILY NUTRIENT INTAKE that is important - if the birds do not receive sufficient AMOUNTS - even if the feed is the best performance feed available on the market, the birds will receive TOO LITTLE, become deficient and performance will suffer. When a feed is lacking, even when fed at the correct levels, the birds become seriously deficient.

3. Feeding Times:
The farmer was putting out the feed twice a week. Feed when exposed to the air for extended periods will very quickly lose the potency of many of the vitamins in the feed. The vitamins are the most expensive ingredients in the feed. It only makes sense that having spent so much money on ensuring that you have the right levels of vitamins and other nutrients in the feed that you do NOT let them become destroyed before the birds can receive the benefit. The result is that the birds end up with serious deficiencies even if fed at the correct levels. Imagine the compounding effect if the birds are short fed - even by a few grams?

There are a number of other factors that have an effect when the feed is standing out for several days, such as:

* Greedy birds have a greater opportunity to over feed, increasing the risk of other birds getting short fed. This is a possible explanation why some chicks survive and for the variations seen in growth rates.

* If not watched closely the birds may stand for long periods of time with no feed as all has been eaten too quickly.

* The feed becomes less palatable the longer it is exposed to the air resulting in reduced intake.

4. Age of Feed:
The farmer had been buying in feed on a weekly basis to ensure that the feed was fresh. Unfortunately he had failed to notice that those responsible for feeding the birds had not been paying attention to rotating the feed as new shipments came in. The feed currently being fed is 8 months old. Vitamins go off relatively quickly depending on the storage environment. Therefore much, if not all, of the vitamins had been lost leading to serious deficiencies.

Of the chicks that survive, how many will fail to grow and develop to their full genetic potential as a result of these deficiencies that has slowed their initial development? This is impossible to quantify. At four weeks old the smallest of my batch are about 1.5kgs (3.3lbs) and the largest only +/- 3.5kgs (7.7lbs)of those that have survived. They should be closer to 6kgs (13lbs). This is the age when they are capable of extremely good food conversion rates.

In this case the farmer had chosen a good Breeder feed, but through misunderstanding the need for good Feed Management it has proved as costly as a poor breeder feed fed correctly.

The other personal example of the effects of Feed Management was experienced last year when I was rearing chicks on contract. A farmer close by was also rearing chicks from the same source and using the same feed. However, she was suffering a significant number of broken legs and slower growth rates.
In discussing aspects of management one factor very quickly came to light. In her efforts to do the best she could for her birds she was supplementing the birds with a mineral mix, in spite of the feed company's warnings to supplement absolutely NOTHING else with the feed. The effect was that instead of helping her birds she had thrown the delicate balance of minerals out completely. It must be remembered that the knowledgeable nutritionist will be watching 50 or 60 different nutrients when balancing the rations. Needless to say she stopped the practice immediately once she was aware of the problems it created.

Later in the season we had some extremely wet weather overnight. Our farms are close enough that conditions are virtually the same. Remember, same feed and chicks from the same source. After the storm she had lost 17 birds and we had suffered no losses. Our discussions highlighted that due to factors totally beyond her control she was forced to short feed the birds by at least 10%. This equates to only 200 grams or 1/2 pound for an adult, even less in a growing chick. The dead chicks, she confirmed had yellow fat and the livers were not the colour they should be. When fed at the correct levels these rations produce birds with white fat and healthy livers. As a result of short feeding the birds were no longer receiving the correct TOTAL DAILY NUTRIENT intake required to maintain healthy birds and therefore demonstrated the symptoms associated with nutritional deficiencies.

It needs to be remembered that at times of stress - and bad weather is one such time - the birds will use their fat reserves to provide the extra energy and nutrients required to over come the effects of that stress. The white fat will mobilise quickly - the yellow fat is not able to mobilise fast enough to provide the benefits required.

In view of the downturn in the market at this time she is now raising chickens and made the comment to me that she weighs absolutely EVERYTHING as a minor error with the chickens will make the difference between profit and loss. She has asked me to pass this message on in the hope that others will benefit. It has been a significant lesson to her - as she said, with her ostriches she did not weigh her feed with the same diligence she now does with her chickens as they have taught her how essential it is. She hopes to return to Ostriches and has told me that she most certainly will weigh everything and NEVER supplement anything.

Ostriches are a production animal. The farmers that thrive will be those that pay attention to all aspects of their farm management. Feeding Management is just one of these aspects. Through sharing our practical experiences with you, we hope the above helps all readers to understand the impact Feeding Management has on the success of your whole operation.

The Hazards of "Off-Specie" Feeding

Ostrich Nutrition Bulletin #37

March 15, 1999

By: Daryl Holle

The practice of Off - Specie feeding is when a farmer feeds a certain livestock specie feed that is designed and manufactured for another livestock specie. A good example of this is feeding Ostrich a feed that is designed, manufactured, and labeled as Chicken feed. There are also some farmers that feed Ostrich a feed designed, manufactured, and labeled as Cattle feed. Many unknowledgeable farmers are under the impression that a feed designed for birds can be fed to ANY bird. Some even think that any feed designed for an animal is okay to feed to ANY animal! These opinions come about from a total lack of understanding of reasonable animal nutrition and usually always lead to trouble with livestock productivity in one form or another. The hazards of off-specie feeding can be severe depending on the mis-match of the feed being fed to a certain specie.

In order to understand WHY this off-specie feeding does NOT work, it is important to understand a couple basics about animal nutrition (or human nutrition for that part). An animal needs to ingest a certain volume of nutrients per day--this amount can be pounds, ounces, grams, or milligrams of a particular nutrient depending on the nutrient needed and the job it is to perform within the animals body. Some examples of nutrients are protein, fat, fiber, energy, calcium, phosphorus, trace minerals, and vitamins. Blue Mountain Feeds watches approximately 60 different nutrient levels when formulating their feed formulas. All of them are different levels (amounts) and ratios to one another depending on the body function that needs to be achieved within the animal.

A well thought out feed formula for an animal will be one that balances the nutrient levels and ratios for different tasks the animal is to perform. Some of these tasks might be body maintenance, egg production, milk production, fertility or conception rate, weight gains or growth, or fat production. All these different body functions require different nutrient combinations in order to achieve the desired goals. All animals (and birds) do not have the same nutrient requirements to perform these body functions. Therefore, feeding a chicken breeder feed to a breeder Ostrich is a terrible mistake! Let's expand on this particular example for a moment:

Remember that I said above that in order to achieve the proper nutrient level for a certain body function, the animal HAS to INGEST the correct AMOUNT of feed. You can have the best nutrient feed in the world, but if the correct amount does NOT get into the body, it is not going to get the job done. This is why the correct feeding rates per head per day are so important. A common Chicken laying ration is designed on the basis the adult laying hen will consume 0.25 pounds of feed per day. This is calculated off the basis that this adult laying hen will weigh an average of 3 pounds in body weight. This 0.25 pounds of feed is designed for body maintenance, egg production, fertility, and so on, that if eaten daily will provide the necessary nutrients for all those body functions.

Now think this through for a second--0.25 pounds feed for a 3 pound bird is the feed design for a chicken. To get the same performance results per pound of body weight from an Ostrich, a 300 pound breeder Ostrich would need to eat 25 pounds of chicken feed per day to get the same nutrient level PER

POUND OF BODY WEIGHT (which most nutritionist use to calculate nutrient levels and performance when designing feed). Now this isn't always true of some nutrients in the feed like protein and fiber, but it is true of the PRODUCTIVE nutrients like minerals, trace minerals, and vitamins. Since an Ostrich cannot eat 25 pounds of feed per day (closer to 5 pounds), it will come up VERY short on many nutrients and depressed production, slow growth, and poor hatchability will result.

In the above example, another problem exists. Poultry do not utilize fiber well so most all rations designed for poultry contain very little fiber. Ostrich NEED high levels of quality fiber and derive energy from that fiber digestion--poultry does not! So poultry feeds will generally be low in fiber and HIGH in grain energy which does nothing but make an Ostrich FAT! Cutting back on the daily feeding rate to prevent an Ostrich from getting overly fat just compounds the problem. This will cause a severe deficiency of PRODUCTIVE nutrients.

A well-designed MAINTENANCE ration should maintain daily body maintenance functions plus replenish any lost body reserves from the previous breeding/production season. A well-designed PRODUCTION ration should not only maintain body maintenance functions, but also support extra productivity like breeding, egg production, good transfer of nutrients through egg yolk, fertility, hatchability, survivability, weight gains on chicks, and early maturity of chicks. Which one (or more) of these extra productivity functions is needed from the animal determines how the feed is designed for proper nutrient levels and ratios to accomplish the tasks.

Feeding Chicken feed, Cattle feed, Goat feed, or Horse feed to Ostrich is NOT going to work. The productivity design of these feeds is totally different than a well-designed productive Ostrich feed. Don't be mislead into thinking you can lower feed cost by buying off-specie feed for your Ostrich. It could be the most expensive mistake you can make. This is one of the most misunderstood practices going on in the Ostrich industry world wide and is causing a great deal of Ostrich productivity problems, chick survivability problems, growth problems, and meat quality problems. It can easily be compared to replacing the engine in your Buick with the engine from your Tractor--unless you are planning on doing your spring plowing with the Buick, you may be in for a real surprise!

Economics of Ostrich Farming

Ostrich Nutrition Bulletin #38

April 15, 1999

By: Fiona Benson

The fact that the Nutrition of any Livestock farming enterprise is the single most important factor in the success of that enterprise is not disputed by anyone.

Nutrition affects:

The Quality of the End Products from that Animal.

The Overall Health of the Animal.

The Reproductive Ability of the Animal.

The Food Conversion Ability of the Animal.

The Ability to identify the superior genetics and to develop a breeding program to improve the genetic ability of the species.

Too many Ostrich farmers are forgetting these important factors and are measuring their feed costs by the price per ton. This, we all know, is leading to poor production, and more importantly, inferior products such as:

- Meat that is inconsistent and all too frequently not even acceptable to the farmer's themselves.

- Hides that rarely achieve greater than 25% - 30% First Grade and many that are of no value.

First it is important to recognise that price alone is no guarantee that a ration does have production characteristics. How to recognise a ration with production characteristics has been the subject of many of our previous bulletins as has the subject of achievable production targets. The currency used in the examples below is not relevant - what is relevant is the effect that production has on the margins in relation to the cost of feed - but to work in real values, rather than percentages, is easier for many to understand.

BREEDERS

The performance of breeder birds is measured by the number of chicks produced with a high level of survivability - not simply the number of eggs laid. These eggs must be fertile and the chicks hatched must not only be viable - but have the ability to gain weight from Day 1. Too many chicks currently being hatched have immature internal organs (to a greater or lessor degree) as a result of deficiencies in the Breeder rations. The degree of immaturity increases as the season goes on when the breeder ration is falling short.

Current Breeder production varies from a few chicks per hen to 100 + chicks per hen. In many countries land is expensive and therefore it only makes sense to maximise the production of the Breeder Birds. Nobody disputes the importance of Good Breeder Nutrition. The response of Ostrich to good nutrition is more dramatic than any other species - yet a breeder bird consumes very little per annum compared to the potential output. There are farmers now proving that One Male can service 3 Females effectively for 12mths of the year. It will be some time before this becomes standard, but will only be possible when all Breeders are nutritionally supported for maximum production - from Day 1.

Taking feed cost variations and related to production - it is interesting to note the impact on the cost per surviving chicks.

Table 1 - Breeder Bird Feed Cost/Chick

Example	Feed Cost	Slaughter Birds	Cost/Chick
1	816	216	**3.78**
2	612	144	**4.25**
3	452	81	**5.58**
4	452	32	**14.12**
5	1020	216	**4.72**
6	306	32	**9.56**

Example 1: Feed Cost is based on 1 Male and 3 Hens consuming 800kgs per annum (1740lbs), producing 72 chicks to slaughter/sale. The cost per chick is 3.78.

Example 2: This is the same performance as Example 1 - except a Trio (1 Male and 2 Hens). The feed cost has risen to 4.25 - an increase of 12.5% on feed costs. The costs of infrastructure (land, fencing, water facilities, labour etc.) will also be increased as there is one less production hen in the pen.

Example 3: Is also based on a Trio (1 Male and 2 Hens) on a feed cost 25% less than the above examples and production reduced pro-rata. The feed cost/chick has risen by almost 50%. It is already proven that lower priced feeds not only produce fewer chicks - the chicks produced generally suffer higher levels of mortality and slower and more inconsistent weight gains and food conversion.

Example 4: As Example 3 - but with a lower performance. There will be too many who can relate to this level of production and lower. Even though the feed cost is 25% lower than the first examples, the cost per chick is now nearing 4 times the cost of the high producing breeders on a more expensive ration.

Example 5: This is exactly the same basis as Example 1 - except that the feed cost is increased by 25%. It is interesting to note that the feed cost per chick is only just over 10% more than Example 2 - but the other costs will remain at the same level as Example 1.

Example 6: Is the same basis as Example 4 but with the feed costs reduced by a further 25% - 1/2 of the base Feed cost used in these examples. The feed cost per chick is still 2 1/2 times greater than Example 1 and twice as costly as Example 5.

These are illustrations of how to Cost Breeder Bird Production - and clearly demonstrates that to measure the cost of feed by cost per tonne can be incredibly misleading and costly.

It must be remembered that even if the feed is the best productive ration available - maximum production will only be achieved if fed according to instructions. To short feed either to save money, failure to weigh accurately or underestimate the loss from wind, sun and/or wild birds - will result in loss of production. If the shortfall is too great then the viability of the eggs and chicks will also be affected.

SLAUGHTER BIRDS

The performance of Slaughter birds is measured by:

Quality of Carcass at Slaughter.
The Yield of Total Boneless Meat at Slaughter.
The Yield of Primary, Secondary, and Trim Muscles.
The Age of Slaughter.
The Conversion of Feed to live weight and/or Boneless Meat.
The Percentage of Grade #1 Hides.

Having ensured that the chicks are from well fed Breeders the effects on improvements in conversion rate can be significant. It is important to ensure that the live weight gain is good muscle growth (and not fat) as this determines the meat yield, therefore measuring feed input to live weight can sometimes be misleading and must be done with caution.

Table 2 demonstrates the margins achievable given certain parameters:

Table 2 - Margin over Feed Costs Slaughter Birds

	Example 1	**Example 2**	**Example 3**	**Example 4**	**Example 5**	**Example 6**
	Base Feed Cost	**Base Cost Plus 10%**	**Base Cost Plus 25%**	**Base Feed Cost**	**Base Cost less 10%**	**Base Cost Less 25%**
7 mo. Yield	31 kgs/68 lbs.			24 kgs/53 lbs.		
9 mo. Yield	37 kgs/82 lbs.			32 kgs/70 lbs.		
12 mo. Yield	48 kgs/100 lbs.			34 kgs/85 lbs.		
Margin 7 mo.	117.22	111.26	102.32	52.85	92.53	100.21
Margin 9 mo.	118.63	109.34	95.41	48.26	91.95	99.63
Margin 12 mo.	116.22	101.94	80.52	9.81	59.22	66.90

The given parameters of Table 2 are:

-Feed Consumption is taken as: 7mths 240kgs/530lbs; 9mths 374kgs/825lbs and 12mths 576kgs/1270lbs in all the examples.

-Meat Yield is assumed at 53% Live weight to Carcass and 61% Carcass to Boneless Meat.

-Experience has shown that better yields are achievable as well as lower yields more commonly achieved on lower quality diets. Also greater feed consumption is often found when the feeds are falling short.

-In Examples 1,2 and 3 the conversion rate is taken at:

2.5:1 to achieve a live weight of 96kgs/210lbs at 7mths - yielding 31kgs/68lbs, Yield Class 4

3:1 to achieve a live weight of 102kgs/225lbs at 9mths - yielding 37kgs/82lbs, Yield Class 3

4:1 to achieve a live weight of 140kgs/309lbs at 12mths - yielding 48kgs/100lbs, Yield Class 1

-In Examples 4,5 and 6 the conversion rate is taken at:

3.2:1 to achieve a live weight of 75kgs/165lbs at 7mths - yielding 24kgs/53lbs, Yield Class 5

4:1 to achieve a live weight of 94kgs/207lbs at 9mths - yielding 32kgs/70lbs, Yield Class 2

5.5:1 to achieve a live weight of 105kgs/231lbs at 12mths - yielding 34kgs/75lbs, Yield Class 2

-Example 1: Assumes the Base Feed Cost (based on the Cost of BM Feed as it is perceived as an expensive feed when measured in costs per tonne and the performance levels used are being achieved by a number of farmers)

-Example 2: Assumes the Base Feed Cost plus 10%

-Example 3: Assumes the Base Feed Cost plus 25% - to demonstrate the effect on the margin when compared to lower cost feeds with less performance.

-Example 4: Assumes the Base Feed Cost but lower performance

-Example 5: Assumes the Base Feed Cost less 10% and lower performance

-Example 6: Assumes the Base Feed Cost less 25% and lower performance

Note: Yields are Boneless Meat, not Carcass Weight.

What is most interesting about these figures is the margin for the farmer is lower when the lower cost feed is introduced, resulting in lower and more traditional performance levels. It should also be noted that the 7mth bird in Examples 4,5 and 6 will be too small to slaughter as the hide will not be of sufficient size - unless for a specialist market. It also needs to be remembered that most slaughter birds currently fall into the Utility Grade and therefore the meat is more inconsistent when the ration is not designed for performance and meat and hide quality.

The trend is similar when I test the assumption on several different currencies, when feed costs and meat revenue differ some. In all these examples I have used current market price for the meat and not assumed a premium. Prime Carcasses should attract a premium price over the current meat prices being achieved in most producing countries.

The benefit that is not so easy to measure when feeding to maximise the genetic potential of the birds is the ability to identify the better performing genetics and therefore develop a breeding program of improvements. This is not possible when working with birds that are showing the signs of the nutritional deficiencies that we currently see at this time.

Processors who introduce Yield Class Payment systems will achieve significant advantages as they will no longer be paying excessively for the smaller birds, will have happier farmers and achieve quality carcasses to work with - which will be marketed more easily.

HIDES

A quick note on hides. It is proven that the better the level of nutrition the higher the percentage of Grade 1 hides achieved by farmers. In the examples below the revenue differs by 25% in the lower and higher examples. Imagine how much easier it will be to market hides when they are consistently achieving high grades! Buyers currently are most frustrated at the inconsistencies that abound and a number of potential buyers are not yet entering the market until they can see that as an industry we can supply a consistent product in a sustainable supply.

The Slaughter bird margins above have included hide revenue as in Table 3

Table 3

HIDE	Price	Percentage	Value
Grade 1	90	50%	45
Grade 2	75	30%	22.5
Grade 3	60	20%	10
Average Price		**100%**	**77.5**

Table 4

HIDE	Price	Percentage	Value
Grade 1	90	20%	18
Grade 2	75	30%	22.5
Grade 3	60	50%	25
Average Price		**100%**	**65.5**

Table 5

HIDE	Price	Percentage	Value
Grade 1	90	90%	81
Grade 2	75	5%	3.75
Grade 3	60	5%	2.5
Average Price		**100%**	**87.25**

Conclusion

Producers, take a little time to understand the economic effects of production levels on the potential profitability of your enterprise. Processors, take a little time to learn what is achievable in Ostrich production and adjust your payment structure to encourage the producers. That way we all win as ultimately it will result in more consistent products of a higher quality that will be more easily marketed and are more cost effective to produce.

Interpreting Published Data on Ostriches!

Ostrich Nutrition Bulletin #39

May 15, 1999

By: Daryl Holle

It is easy for most farmers of OTHER livestock species to properly identify and interpret data such as feeding rates, weight gains, production statistics, feed to gain ratios, and so on. This is because most other livestock species have been around for a while in active commercial production of meat, milk, and eggs and there is a considerable amount of normal production data available to compare with on most issues. This experience allows the farmer to make sound judgements when he is interpreting NEW data being published concerning feed company test trials and he can quickly identify any misleading or misconstrued data.

Ostrich farmers usually don't have the experience to be readily familiar with what is Normal production so it is harder for them to gauge and interpret data given from certain Ostrich feeding trials and studies. The Clue that we should all use to interpret Ostrich data is common sense. Let it be our guide to understanding the data presented. Then, we can do some simple calculations to find out for ourselves the validity of the data presented and understand the exact light in which data was presented.

I attended an Ostrich seminar a couple years ago when a feed company presented a slide program showing the latest test trials. One of the slides showed a feed to weight gain ratio on slaughter birds of 1 pound of feed to 1 pound of gain if you used their feed as recommended. Many in the audience were impressed by this data and were most encouraged of this NEW REVELATION in Ostrich feeding technology. My "common sense" AND "experience" told me this could NOT be true. At 1:1 conversion, this would mean the birds had eaten between 250lbs - 325lbs (110-150kgs) in 12 mths - the live weight range of birds at 12mths. Growing birds will eat closer to 1250-1300lbs (560-590kgs) TOTAL dry feed in 12mths. That is an average conversion at 250lbs live weight in excess of 5:1 improving to under 4:1 for the 325lb bird (divide the total feed intake by the liveweight). The quality of the ration, combined with good feed management and genetic potential of the birds will determine the ability to convert. It is important to keep in mind that during the first part of the chicks life, the feed conversion is much better--and much poorer during the last half of its life

Genetics may take us to greater accomplishments some day, but for this era in the Ostrich industry, the numbers I just gave are NORMAL with a reasonable nutritional program and reasonable genetics.

Let's say, for example, that a NORMAL feed conversion on a reasonable nutritional program for Ostrich is 5:1 (5 pounds of feed to 1 pound of gain). The question then is: How did this gentleman at the Ostrich seminar come up with a A1:1" feed conversion number?

Heres how it was done! You feed slaughter ostrich 2.5 pounds of ground alfalfa per bird per day that you grow YOURSELF (getting suspicious yet?). You feed 1.5 pounds of corn per bird per day that you grow YOURSELF (isn't this frustrating?). Next, you feed 1.0 pound of a protein/mineral supplement that you buy from this feed company AND LIKE MAGIC, you can also achieve a 1 pound of feed to 1 pound of gain as that is all the feed you PURCHASED. Now, this presentation of Ostrich data is most

misleading as the gentleman was NOT counting the total feed intake--only HIS purchased feed intake! The true feed intake per bird was 5 pounds and that yielded a hefty 1 pound gain per day--that is a 5 to 1 feed conversion ratio--NORMAL! Nothing special here but it certainly got your attention, didn't it?

The next "misleading" part of this presented data was the birds were 8 months of age when slaughtered. Since the BEST weight gains to feed used are ALWAYS in the early months of the birds life, attention should be drawn to the fact that conversion of an 8 month bird should be much lower (closer to 3.2:1) than that of a 12 month bird and NOT compared to that of a 12 month bird. The 5:1 feeding ratio for an 8 month old bird is rather POOR. This presentation was not at all what the audience thought it was that day--too bad for the industry as it misleads farmers into thinking this particular feed company is progressing with the industry when it is not! It is actually doing a great disservice to the Ostrich industry with erroneous data.

Here is some more published data I saw in a recent magazine:

Feedlot birds--no forage
Age at Slaughter: 11 months
Live weight: 241.2 pounds
Feed conversion: 3.15 to 1
Total feed cost: $76.89

The above indicates that it is possible to raise a slaughter bird to 11 months of age for a total feed cost of $76.89 and these birds weighed in at 241 pounds. Let's get our calculator out and see if this data makes common sense. First of all, 11 months is approximately 334 days. 241 pounds in 334 days is 0.72 pounds gain per bird per day (very NORMAL).

Next, the bird weighed 241 pounds and ate 3.15 pounds per pound of gain. So, it must have eaten approximately 759 pounds of feed in the 11 months of life (not counting the original chick hatch weight of 3 pounds or so). This means the bird ate an average of 2.27 pounds of feed per day over the 11 month life (759 pounds divided by 334 days). Oh, Oh! This is NOT NORMAL or even close to NORMAL or any kind of common sense. This 11 month old bird should have eaten closer to 3.5 pounds of feed per day (1170 pounds) over the entire 334 days to gain that amount of weight--can't be any other way without violating the Ostrich laws of natural weight gains and normal feed intake. Someone is not counting some other feed ingredients or something. This 2.27 pounds fed daily is misleading the Ostrich farmer into thinking this is achievable when it is NOT! Another disservice to the industry!

A note of interest here is the comment Feedlot birds-No forage at the beginning of the published data. One can assume from that statement these birds must have been dry lot fed having no access to grazing and all feed intake was counted. Or, it could mean the birds were dry lot fed but the Alfalfa/Lucerne was not included in the total feed intake, the cost of total feed, or in the feed conversion number. Whatever the case, the numbers indicate something not NORMAL or reasonable.

In all likelihood, these test birds ate a NORMAL 3.5 pounds average per bird daily (maybe even more). With the quoted 759 pounds of feed costing $76.89, the true feed cost was around 10 cents per pound which would be a NORMAL cost for grind/mix rations in most areas. But one might highly suspect that the birds ate closer to 3.5 pounds per day average resulting in the true feed eaten by the 11 month old bird to be 1170 pounds of feed for a REAL feed cost of $117.00 per bird.

EVERYTHING fed during the growth period of an animal has to be taken into consideration when calculating total Feed Costs - this includes any vitamin/mineral supplements that may be added to the water in the early months or any additional supplements. When the birds are grazing - the estimated dry feed intake of the grazed material MUST be included in the total feed consumed to slaughter and costed accordingly. Even pasture grazing has a cost--nothing is free, and all intake by the birds affects the feed conversion numbers. If you don't know what the grazing cost is or how much the birds are eating, it is impossible to identify true feed costs and accurate feed conversion numbers.

One must use common sense when interpreting published data on Ostriches. It is NOT REASONABLE to believe data that portrays cutting feeding rates and feeding costs in half and still get normal weight gains. It is NOT REASONABLE to believe data that portrays results of 1 pound of feed to 1 pound of gain. There are many ways to present data, one must analyse it thoroughly BEFORE making a judgement as to its accuracy.

Yellow Liver on Baby Chicks is NOT Normal!

Ostrich Nutrition Bulletin #40

June 1, 1999

By: Daryl Holle

There has been a misunderstanding among professionals and farmers in the ostrich industry concerning the proper color of the liver in baby ostrich chicks. It is thought, in some countries, that the proper color of the liver should be YELLOW along with yellow colored skin. It was thought that a yellow-colored skin chick was a healthy chick. When I first heard of this, I couldn't believe what I was hearing as, IN MY OPINION, a yellow livered, yellow skinned chick is a strong indication of an unhealthy and malnutritioned chick with a malfunctioning liver.

However, sometimes one person's words are not sufficient to educate the minds of others that have never experienced anything but yellow livered, yellow skin chicks and consider it normal. Therefore, on May 21st, 1999, Blue Mountain performed some Ostrich chick dissection studies on some Blue Mountain fed chicks that came from Blue Mountain fed breeder birds.

The first chick studied was 8 days of age since hatching and was a healthy bird in all respects. The skin of the bird before euthanising was an opaque light blue color (demonstrating good blood flow being supplied by a healthy heart). There was NO sign of yellow skin on the chest or yellow eye lids. Upon opening the body cavity, the liver and heart were both of a even, clean, reddish brown color with no heart deformities or liver discoloration noted. The yolk sack had about 1/2 cup left in it and it was an army green color--NOT YELLOW.

We then took an egg out of the hatcher with a chick inside had just begun to pip through the shell. Before euthanising, the skin of this chick was the same color as the first 8 day old chick--an opaque light blue. The heart was a reddish brown color, the liver was a tan or light brown color with NO YELLOW colors found. The yolk sack was full and of a soft yellow color on the bottom 2/3rd's (as it lay on the table with the connecting tubes to liver and intestines to the top). The top 1/3 of the yolk sack was totally leached with channels of bright green bile production from the liver. The liver also contained some bright green bile pockets that appeared to be some sort of temporary reserve for bile. We clearly observed the bile being fed through connecting tubes from the liver to the yolk sack.

Now, what did we learn from all this? We learned a great deal! It is now time for a good Ostrich Pathologist or Scientist to take over and define the actual metabolic process but we were able to clearly define a NORMAL chick from an ABNORMAL chick. It is also possible to clearly dispute the old thought that chick livers are yellow as they are absorbing the yellow yolk sack. Seeing what we saw, we can also theorize somewhat as to the differences seen in a NORMAL chick and an ABNORMAL chick. A NORMAL chick is one that came from a healthy and nutritive egg yolk. This egg yolk would have been produced by the parent hen (breeder hen) that was fed a healthy,

balanced diet containing balanced levels of minerals, trace minerals, and vitamins and feed ingredients of a non-toxic nature along with high absorption capabilities. The chick can be no better than the egg yolk laid by the hen, the yolk produced by the hen can be no better than the diet fed to the hen.

If the hen laying the yolk is poorly fed, it also may have a slightly malfunctioning liver (pale brown, yellow, black, or multicolored liver). It is a well-known fact the LIVER of the HEN participates in producing the YOLK for the EGG. A malfunctioning hen liver will automatically produce a nutritionally deficient yolk. A nutritionally deficient yolk will produce a nutritionally deficient embryo AND CHICK. A yellow livered baby chick clearly demonstrates a malfunctioning liver (caused by the malfunctioning liver of the hen producing the yolk) which causes a severe decrease in bile production in the chick. Bile normally is pumped to the yolk sack and its purpose is to break down the FATS in the yolk so they can be absorbed by the chick. When the chick liver is malfunctioning, the chick is automatically nutritionally deficient.

A yellow-livered, nutritionally deficient chick is one that is facing a high mortality rate. Some can survive, but many will not overcome the battle. Chicks at ANY age with a YELLOW LIVER are NOT NORMAL and a clear sign of nutritional deficiencies passed on by the breeder hen.

My sincere thanks and appreciation to the chicks that gave their lives to this study. Their contribution hopefully will save thousands of other chick lives in the years to come and will allow us to understand WHY IT IS IMPORTANT TO FEED OUR BREEDER BIRDS THE BEST DIET WE CAN. The chick health at your farm depends on it!

There were many other valuable things learned about the anatomy of healthy chicks and how they compare to unhealthy chicks such as differences in the size of the Thymus gland (gland connected to the immune system of the chick). More will be discussed about these findings in a later bulletin.

Report of the 4th Meeting of the International Ostrich Association

Ostrich Nutrition Bulletin #41A

June 12, 1999

By: Fiona Benson

4th Meeting of the International Ostrich Association - Part 1
3rd - 10th June, 1999

It is difficult to believe that months have passed since we all met in Israel last June. It was a busy week with delegates this year from 12 countries and 5 continents. The meeting was a combination of formal sessions to discuss both Meat and Leather Issues, Strategic Planning sessions and visits to farms, abattoirs, a tannery, a meat industry exhibition and an Elephant Park - where we enjoyed watching a family of elephants of all ages from a couple of weeks old upwards.

The major emphasis of the meeting was to understand the various influences that dictate the current and future market conditions and to determine which direction the industry is likely to move in the future. There was a noticeable conflict between the hide and meat interests and which should be or will be the driving force. When considering the manner in which Ostriches were farmed, low productivity and poor meat quality, it is understandable that it should be considered by some that these birds will not make cost effective meat production animals. Therefore, for some, it may seem sensible to preserve the "high value" Exotic hide status with very limited and controlled production.

However, we are already past that situation and the industry will become, if it is not already, a meat driven industry and this point was emphasised. Some considering that preservation of the superior hide value may be by servicing the meat industry from "broiler" type of meat production, slaughtering at 4-6 mths and therefore producing a different type of hide. It is questionable whether this will be cost effective for some areas in view of high processing costs. Some meat buyers have expressed the opinion that they could do a great deal more with the meat if the muscle sizes are larger. Now consider that birds are already being produced with meat yields double the weight that these buyers currently have access to - what is the potential in 10-20 years from now?

An interesting point was made by one speaker that the correction in the price of hides that took place last year only brought the price back to where it had been before the boom. That, despite extremely poor marketing and quality, the price of leather maintained that value and that this should be seen as a very positive sign. It is worth noting that those advocating that the industry should work to preserve the very high value "exotic" status of the leather in a very controlled environment did not participate in the Strategic Planning Process. This I will discuss in Part 2 of the report.

We were all welcomed onto a number of farms, the two most modern abattoirs - Mosstrich and Swartland and one tannery - Exotan. On Sunday we visited a meat industry exhibition - exhibitors were suppliers of equipment from slaughter to retail.

Having started in Pretoria, flown to Port Elizabeth (in the South East) and driven along the South Coast to Cape Town (South West), I was delighted to welcome all to Heen en Weer - my own farm - to conclude the meeting. The visits took us to the largest farm in South Africa - and I suspect the smallest as Heen en Weer is only 4.5 hectares.

While at Heen en Weer we discussed the Blue Mountain Carcass Grading and Yield Payment System. It was alarming to receive comments from meat dealers who had previously considered that all Ostrich Meat was the same. "Surely the age does not matter so long as the meat looks good" was one question I was asked!! We had witnessed the colour variations, that one of the speakers had confirmed he sees regularly, during the abattoir visits. Ostrich Meat is NO different to any other meat - it's quality is affected by age and rearing methods, which includes the correct nutrition.

A number of people have asked me if there is a need for an International Ostrich Association. The answer has to be yes, but it has to be well run and properly funded. This can only come through the support of those actively involved in the Industry. This is an international industry with the majority of players operating across International boarders. It was clear from the discussions that the lack of standards has led to a confused customer base through lack of education, information and product inconsistencies. We were reminded that for Every ONE customer who has a BAD experience EIGHT people will hear about it; whereas for Every ONE customer who has a GOOD experience only ONE other person may hear about it.

Generic Standards and Codes of Practice will be developed from those with practical experience, which it is clear is only now becoming available due to the immaturity of the industry. Support of Associations enables communication channels to be developed to assimilate and disseminate the information.

When summing up on "how to implement the results of the logframe" (Part 2), Christoph Kistner from Germany, reminded us all of the statement made by John F. Kennedy:

"Don't ask what your Country can do for You - but What You can Do for Your Country". The same applies for us all through our National Associations to the International Association:

"Don't ask What your Associations can do for you - but What YOU can do for YOUR Associations and Industry".

Report of the 4th Meeting of the International Ostrich Association

Ostrich Nutrition Bulletin #41B

June 12, 1999

By: Fiona Benson

4th Meeting of the International Ostrich Association - Part 2
3rd - 10th June, 1999

Two days of the meeting were devoted to a Strategic Planning Process. The South African Industry had done a similar exercise last July. My reason for reporting on this in detail is that so many of the issues that affect us all were analysed by those very active in all aspects of the production chain and working hard to take the industry forward through sharing their knowledge gained from experience. I hope it will provide you all with some explanations as to why you may not currently be making the returns you expected, provide you with an indication of the potential and what is required by all to achieve that potential.

At the end of the session a comment from a producer participating "The message that I am getting from you ALL is that I am not providing you with the right product". He was absolutely correct in this statement - that is only the first, but most critical, step. Without the farmer producing the correct product, everything else we do is in vain. However, the processor then has to process and package correctly and then the transporters deliver that product in the correct state to the marketers and/or end user. This applies to all aspects of the industry be it Live Birds, Meat, Hides, Oil or Feathers.

The Strategic Planning Process is a structured brain storming exercise. In this case to Astablish a mature ostrich industry through the development of a growing market for ostrich products world wide. It was led by Prof. Luc D'Haese (Prof. of Economics - University of Gen, Belgium) and assisted by Prof. Johan van Rooyen (Universtity of Pretoria and the SA Agriculture Business Chamber) and Mr. Dirk Esterhuizen (SA Agricultural Business Chamber).

The strategic planning process is split into 4 sections:

1. An environmental analysis (SWOT - Methodology)

2. Logistical Framework Analysis (Identification of the Problems and ObjectiveStatements)

3. Strategy Analysis

4. Action Plans

ENVIRONMENTAL ANALYSIS

All delegates were invited to write at least one powerful statement of what we believed to represent the Strengths, Weaknesses, Opportunities and Threats of the industry. The statements identified are obviously too many to report in detail, but included such items as:

Strengths = Healthy Products, Quality Products, Product Range
Weaknesses = Inconsistencies, Poor Health of Livestock, Distrust
Opportunities = Large Market Potential, Growth Potential, Niche Markets
Threats = Animal Rights, Poor Quality Products, Low Efficiency

PROBLEM FOCUS

Each thought presented was analysed in detail to establish the route problems and the cause and effect of each problem. At all times all aspects of the industry were being considered - Bird Sales, Meat Sales, Leather Sales, Oil Sales etc. - not just one single sector. For me personally I could identify with a number of the problems in my effort to get the BM technology available to those outside the US wishing to benefit from it.

It became clear that the problems at this stage could all be attributed to Industry Immaturity which has resulted in Undeveloped Markets. This could be clearly defined in 4 Sectors:

1. Product Inconsistency - Production and Processing

2. Logistical Distribution - Transport and Distribution

3. Confusing Messages to Consumer - Lack of Standards and An Uneducated Market at all levels of the production chain.

4. Weak Institutional Environment - At Governmental level and National and International Association Level.

How were these conclusions reached? It can be clearly seen how all these relate to the immaturity of the industry.

PRODUCT INCONSISTENCY - Production at Producer Level

Low skill levels, inappropriate production systems and a general lack of nutritional technology were identified at producer level. These all contribute to the poor quality bird, demonstrating the poor health status seen on slaughter lines that contribute to the low production levels, inefficiencies and poor product quality that lead to a lack of viability. Examples:

- Inexperienced nutritional technology leading to very low production levels - impacting on the viability, product quality and consistency

_- Poor transportation of birds leading to hide damage

PRODUCT INCONSISTENCY - Production at Processing Level

Low skill levels, inappropriate production systems and a general lack of processing (meat, hide etc) technology were also identified at production level. Examples:

- The method of hide removal, treatment and storage as a result of inexperience have led to many hides being worthless

- Poor slaughter techniques, lack of maintenance of the cold chain, poor hygiene practices - have led to short shelf life.

LOGISTICAL DISTRIBUTION PROBLEMS

Whether it be getting slaughter birds to the abattoir, breeder birds to a different continent, green hides to the tannery, frozen meat by sea, fresh meat by sea or air - all have logistical problems. These have to be learnt and errors will and have been made, from which lessons have been learned. Whether it be a producer error or shipper error - the result impacts on the quality of the product and/or credibility of the supplier. There is always the risk that a major problem may occur that can have an impact on the industry. Examples:

- A shipment of birds from the UK to New Zealand resulted in deaths in the birds. This created bad publicity at the time - but lessons were learned to ensure such a tragedy would not be repeated

- Airlines may not always take sufficient care over the maintenance of the cold chain - if this is not identified it can impact on the shelf life of the meat.

CONFUSING MESSAGES TO END USER

General lack of product knowledge from producer level right through the chain - as a result of being a new industry, the market is confused with different information. Examples:

- Dark and Light coloured muscles being accepted as normal and/or age or genetic related. It is proven to be nutrition related.

- Genetic influences on hides have been taken as caused by age at slaughter

- Steak Cuts being sold as Filet quality

WEAK INSTITUTIONAL ENVIRONMENT
Governmental Level

As a new farmed species in most areas there have been no regulations in place. These have had to be developed and this takes time as there was no information available to draw upon. The lack of such directives has led, in some cases, to short cuts being taken by some traders in order to survive. Examples

- No protocols in place for importation of Birds, Meat or Hides. Each country has had to define their requirements imposing delays and other problems when importation first requested

- Health Certificates had to be drawn up with few or no references available - creating delays.

- Ignorance leads to unnecessary and confusing legislation such as the Dangerous Wild Animal Act imposed on UK producers and interpreted differently by each region - increasing producer costs.

- Repackaging and Cross Boarder smuggling has resulted in severe meat quality problems - this would be eliminated if all boarders open

ASSOCIATION/INDUSTRY LEVEL

The lack of standards combined with the lack of use or misinterpretation of those standards that were in place was identified as a contributing factor to the inconsistencies that have been experienced. A lack of integrity and distrust between players were also identified as real problems. Examples:

- Different muscle names used for the same muscles by different countries. With much of the meat traded internationally, this has caused considerable confusion as the International Numbers assigned to each muscle have not been used.

- Inconsistent interpretations of Hide Gradings

- No available guide lines to enable new buyers to recognise a quality breeder bird - buyer totally dependent on the Salesperson for guidance

- Many producers remain unpaid in a number of regions in the world

STRATEGY ANALYSIS

From The Problem Analysis it was possible to define some clear Objectives to Develop the Market for Ostrich Products:

1. To positively influence the International Institutional Environment.

2. To transmit clear messages about the Industry and its products to the end User.

3. To promote an improved logistical system, including transportation and communication networks.
4. To deliver a consistent product to the market.

These were developed into 4 clearly defined projects:

1. To Establish a set of Product Standards and Codes of Conduct.

2. To Establish Communication.

3. To Develop IOA Policy Statements.

4. To Develop a Strategy for Promotion of the Ostrich Industry.

These projects will be developed through the activities of the following Strategies:

Strategy 1 - Standardisation in the Industry
Strategy 2 - IOA Lobbying
Strategy 3 - Informing the End User
Strategy 4 - Improved Logistic Systems for the Ostrich Industry
Strategy 5 - Product Consistency in the Ostrich Industry
Strategy 6 - Promotion of the IOA as an important industry role player

ACTION PLANS

The implementation will start with the IOA secretariat developing an Action Plan and Budget to be completed within 2 months.

It is worth mentioning that attendance at this meeting was open to members and non-members providing everyone with the opportunity to contribute. Several delegates sent messages from their associations that they would like to work with the International Association. Membership of the International Ostrich Association can either be through your National Association or independently. The Fee is: Associations: $1000/annum; Individual or Company: $500/annum.

Ostriches and Pressure Treated Lumber - CAUTION!

Ostrich Nutrition Bulletin #42

June 15, 1999

By: Daryl Holle

What possible connection could occur between Ostriches and Pressure Treated Lumber? The connection is one of concern--enough so I think it is of utmost importance that every rancher be aware of the potential disaster.

First, it helps to know WHAT Pressure Treated lumber is. In the US, it is the green lumber that you find at the local lumber yard. It is a weatherproof lumber that is resistant to insects, rot, and so on. It is used extensively for posts, poles, decks, porches, outdoor buildings, fences, feed bunks, and the like. Years ago, in order to make wood water/rot proof we used creosote (a tar like substance). It is almost impossible to find a creosote post anymore as the green colored lumber has totally replaced that market.

Sometimes with advances in technology comes SERIOUS disadvantages. Sometimes the disadvantages are obvious to the public and sometimes they are a fairly well kept secret. Green lumber is one of those technologies where the potential hazards are not often discussed. The reason the Pressure Treated lumber is resistant to insects is it is impregnated under high pressure with ARSENIC! As I am sure you already know, Arsenic is one of the most deadly substances there are. Also impregnated into the Pressure Treated lumber is Chromium and Copper (Copper gives the wood the green tint appearance). The addition of Chromium and Copper (along with some other chemicals) cause a bond that makes the wood resistant to water rot and is SUPPOSED to bind the Arsenic so it stays within the lumber and does not leach out into (or onto) the ground.

There are known incidents where this binding process is not working too well and leaching of Arsenic is occurring into the ground surrounding the Pressure Treated lumber and into ground water. It is reported that there are situations when the ground or water surrounding the green colored lumber contains a certain structure of minerals and trace minerals that unlock the binding chemicals in the Green Wood. When this happens, leaching of Arsenic occurs and potential hazards begin.

How does all this relate to Ostrich? Ostrich are inherently dirt eaters and on occasion just love eating the dirt around posts, fences, and buildings. Are you getting the connection now? It doesn't take much Arsenic to kill a bird FLAT DEAD! How serious the matter depends on how much Arsenic has leached from Pressure Treated lumber. A gentleman in the US collapsed 3 days after finishing a boat dock he made from Pressure Treated lumber. He worked with the lumber for 3 weeks, handling it, breathing the sawdust particles while cutting the pieces, and working in the water around the dock frequently according to a recent article in a woodworking magazine. The cause of his collapse was finally diagnosed as Arsenic poisoning due to tell-tale signs on the skin.

Burning scraps of Pressure Treated lumber is a VERY HAZARDOUS situation. Tearing down old structures built of Pressure Treated lumber and burning it is another most HAZARDOUS concern. There is enough Arsenic left in the ashes that 5 teaspoons of ashes ingested by a cow will KILL the cow. ONE TEASPOON of ashes is enough to kill a human. Now imagine if you had just built a new Ostrich pen around a spot where someone before you burned a pile of old Pressure Treated lumber. Over the years, those ashes leached the ground and contaminated it with Arsenic. Now your wonderful Breeder birds are eating the dirt laced with Arsenic. You can bet the outcome of that is not going to be good.

Ostrich chicks would even be MORE susceptible to this problem as they spend a good part of their first 3 months trying to eat anything but feed. If one teaspoon of green lumber ashes will kill a human, it certainly would take much less to kill a baby Ostrich chick.

The sawdust from cutting Pressure Treated lumber is also toxic as that is where the Arsenic is stored. If you are building a structure with green lumber inside your Ostrich pens, BE SURE to clean up ALL the sawdust so it is not eaten by the birds. I don't know what to recommend on how to dispose of this stuff--this product does NOT sound like an environmentally safe product to me. Sometimes what we do to ourselves in unbelievable.

There are always circumstances when a rancher has the best feeding program and still can't get production results from certain animals. Usually this circumstance is either due to genetics, feeding management, farm management, or some hidden factor on the farm that cannot be easily discovered. Pressure Treated lumber is a good example of a hidden factor that is almost IMPOSSIBLE to diagnose as it may not be killing the birds but just keeping some of them constantly feeling poorly and non-productive.

Ostrich Feeding Management Guidelines

Ostrich Nutrition Bulletin #43

July 15, 1999

By: Fiona Benson

When making statements regarding performance, there is always one statement that we make--"Subject to Good Feed Management". Whether you have only a few birds or many, many thousands, the principals of good feed management remain the same. Management methods will differ according to scale and local climatic conditions.

For too long emphasis has been on how to keep Ostrich chicks alive - and too little emphasis on seeking rations that ensure maximum growth and production - the technology is available.

Too much emphasis has been placed on keeping the cost of rations as cheap as possible and too little emphasis on understanding the full production potential of the birds and how to achieve it cost effectively.

Too much emphasis has been placed on utilising cheap by-products and too little understanding on their effect on product quality and productivity.

Too much emphasis has been placed on keeping labour costs down and feeding infrequently and too little emphasis on the importance of good feed management and its effect on productivity. Most farmers of other species feed their livestock several times a day - many Ostrich farmers feed their birds once a day and even as infrequently as every four days. This leads to feed going ›off', loss of nutrient value - especially the vitamins, reduced feed intake, greedy birds overeating and weaker birds not receiving their full rations. All of these things cause poor growth, poor weight gains and loss of production.

Recently I had the pleasure of spending a couple of days with a producer who has now also become a processor. He is now seeing many of the problems and inconsistencies that we have discussed in previous bulletins regarding the quality of the carcasses presented for slaughter. He shared with me some of his payment sheets for farmers - and was saddened that he could pay many so little. A bird of 110kgs at slaughter can produce 36kgs of meat and yet he has been presented with birds of that weight achieving only 26kgs of meat. This is a difference of 40% in meat yield. In the country that he is operating, the difference in feed cost from a so-so feed to a quality feed is about US$30 - difference in price per tonne not quantity fed, which may well be less if the feed is of the right quality. The increased revenue to the farmer would be in the region of US$93 on meat alone on a carcass yielding 33% instead of 26kgs. The increase in payment on the meat alone is of the order of 200%!!!!!

Add to that, the meat quality of the better fed bird will be a Prime Grade Carcass rather than a Utility Carcass Grade Carcass. Our buyers are seeking Prime Grade Carcasses and it makes it so much easier to sell the meat and achieve repeat orders. When all birds presented for slaughter meet the

criteria of any other quality red meat producing animal - THEN we can achieve prices that are ABOVE other meat prices and not similar to or very much lower as I reported from in the report from the recent IOA meeting--Bulletin No. 41.

In Bulletin No. 40, we mentioned the ›chick yellow liver syndrome' and reported that this is directly related to Breeder bird nutrition. The subject of this bulletin is feed management - with that in mind let me report a comment from a friend raising chickens. She raised a batch that for some reason she had to short feed. Not only did she suffer a loss of meat yield (which she expected) - she was also unable to sell the livers from this batch. Instead of their normal colour - they were all YELLOW - indicating that the birds were nutritionally deficient. The feed was the same - but the correct feeding RATES were not observed. The knowledgeable nutritionist designs rations around a specific daily feeding rate to ensure the correct daily intake of all required nutrients - it is the responsibility of the producer to ensure that he/she feeds at the correct feeding rate to ensure the animals being fed receive the correct daily intake. With Ostrich eating so little per day an error of a few grams can make the difference between the birds receiving the correct daily intake and being ›short fed'.

As some birds will eat faster than others - the law of averages has to apply. The skill comes in eliminating all the aspects that one can control as there will always be many we cannot control. These guide lines are designed to help producers:

FEEDING MANAGEMENT GUIDELINES

1. MIXING

When mixing one's own feed, it is essential that the rations you use have been developed by a knowledgeable person with proven ability on Ostrich and that you follow the formulations exactly. The formulations will be designed to match a specific vitamin and mineral supplement. It is very dangerous to substitute one company's premix with a formulations done by another company or to use a premix designed for other species. If using a local mill to mix for you - ensure that they use the ingredients specified and the amounts requested. To the mill, a minor alteration or substitution to the formula may seem insignificant, but to the birds it will have a negative impact on their performance.

Ensure that the ingredients used are of the highest quality. The forage, preferably Lucerne/Alfalfa, will need to be analysed for each batch. If there is a variation of more than 1% from the previous formulation, it may be necessary to adjust the formulations to allow for this depending on other factors in the formula. If the formulation calls for 47% Soyameal, ensure that it is just that and not 44%. If only 44% is available - it will be necessary to reformulate.

When mixing, everything must be WEIGHED exactly and mixed thoroughly. Ostriches cannot tolerate mixing errors.

The particle sizes must be the same. For example if the mix is basically ground but contains lucerne pellets and/or whole maize/corn, it is very likely that some birds will pick out the corn or the pellets in preference to the other ingredients and visa versa. Imbalances resulting in immediate loss of performance in Ostrich.

2. WEIGH FEED EVERY FEEDING

Determine how much should be fed of a particular ration and whether the ration should be LIMIT

FED or AD LIB (free choice).

LIMIT FED is a controlled, specific quantity per bird per day. The quantity fed at each feeding will depend on the number of times the birds are fed per day. It is ESSENTIAL that the birds are fed exactly the amount specified. Too much or too little will end up with either fat birds or thin birds and loss of production in breeder birds. Remember to allow for any potential loss from such factors as wind or wild birds.

If using a feed container to measure feed, weigh each container every time. Practical examples that I have personally experienced--My feed container when feeding a pelleted feed had a variation of 15% between batches of feed. 15% is very significant in terms of performance.

If feeding from bags - have scales to ensure that each bag is the weight it should be. Speaking from personal experience again - since changing to ground feed the same size bag can hold 30kgs or 40kgs - depending on the ration - that is a variance of 25% !!!!!

If feeding direct from bulk supplies - put in place a system to ensure the correct weights are fed to each group of birds. The technology is available - use it.

AD LIB feeding allows the birds to eat as much as they like as the birds are growing and increasing their intake daily as they grow. To feed AD LIB efficiently is an art.

The approximate daily intake should be known for the given age of the birds. Feed should be put out at least 3 times a day. If the correct amount is put out the troughs should be almost empty at the next feed time. If they are empty - increase the amount put out, if there is food left cut back a little. NEVER put fresh food on top of the old. Move the older food to one end of the trough and clean troughs EVERY morning.

Weigh any food taken away and monitor closely the total daily consumption. If the birds slow down eating this is the first sign of impending problems - it could be an indication of a faulty batch of feed or maybe reduced water intake for some reason. I have heard of a number of examples when feed mills have, when pressed by their customers, admitted to serious errors. The losses to these producers as a result of these errors have been significant.

Food will deteriorate if exposed to the sun/air and becomes less palatable very quickly. Take care that the food does not get wet.

Birds eat a significant amount just after dawn and just before dusk - especially in hot climates. Ensure that there is adequate feed available at these times. Do not shut up the baby chicks for the night without food and water.

3. Feed at the Same Time EVERY Day
Feeding times must be the same every day and absolute minimum twice per day.

4. Observations - Feeding
Taking a few moments at feeding time will help to learn the "norm".

Look for signs that are out of the "norm":

a. There is sufficient trough space to allow all birds are able to eat at the same time.
b. A bird not coming to feed
c. A bird not eating properly
d. Birds slower to eat than normal
e. Signs of any injury

5. Observations - Water Intake
Observe the daily water consumption to learn the "norm".

Note if consumption decreases - particularly at times of a drop in temperature. Birds will slow down drinking if water is too cold. In cold climates, a proper water heater should be installed to keep water at 70-90 degrees F. (21-32 degrees C) to maintain steady consumption by the birds. Most common heaters only keep the water from freezing (around 40-45 degrees F; 4-7 degrees C) and that is too cold on wintery days causing the water consumption to fall by 50% or more. When water consumption drops, feed utilisation drops right with it. There are special heaters available that will keep the water temperature at much higher levels and the birds love it. This will allow water consumption in winter to be nearly the same as summer water consumption and allows good growth and weight gains to continue through the winter months if the feed formula is correct.

Ensure that baby chicks have water available to them at ALL times.

6. Observations - General
Observe general behaviour, droppings etc. to establish the "norm".

Droppings - walk through pens and check dropping consistency

Activity - take note of any change in the norm.

a. Not showing the normal curiosity
b. Sitting more than usual
c. Standing or sitting alone
d. General Stance
e. Not sitting following feeding

7. Supplementation
Do NOT supplement with anything--this will lead to serious imbalances in the rations and lost production.

The Golden Bird - Or Is It?

Ostrich Nutrition Bulletin #44

August 15, 1999

By: Fiona Benson

May be not a 'Golden Bird' - but most certainly a bird with tremendous potential, but for too many it most certainly has not proved to be such a Golden Bird.

How many of you reading this bulletin when purchasing your birds were told one or more of the following:

-Ostriches can live off Grass with little or no supplementation.

-Ostriches can utilise fibre well and therefore can be fed straw and other low quality/cheap by-products.

-Ostriches can be raised for slaughter for less than $100.

-Ostriches can be fed for less than .10p (per day US$0.16).

-Ostriches do well when fed Animal Protein Products - ie. Fish Meal, Meat and Bone Meal, Carcass Meal.

-Ostriches can be fed Vegetables

These are just some of the statements that have been reported back to us. By the time many find out the above information is incorrect they have LOST a great deal of money and all to often have been forced to leave the industry. The trend has been the same for processors as far afield as the US, Europe and Australia as the carcasses resulting from such practices have proved inconsistent, difficult to market and expensive to process. What is of concern is that much of this information is still being advocated in spite of ALL the evidence that these types of feeding practices are barely adequate for survival with farm level production very poor throughout the world.

While this information may have been issued in good faith, it was given with little knowledge or understanding of farming for production or the unique requirements of Ostrich. It is worth remembering that at the beginning of the decade the industry in South Africa was still a controlled monopoly. It operated as a hide and feather driven industry, with high margins achieved from the sale of the Hides. It was NOT a meat industry. It was NOT a livestock production industry. The grazing available was veldt. Veldt grazing is very different from grass fields. The birds were ranging over large areas of veldt, which provides a wide variety of different vegetation - whilst this does not provide adequate nutrition for good production, it does provide a diversity of nutrients for survival.

As South Africa was perceived as having the experience - attention was focused on advice from South Africa - with little understanding that the Ostrich Industry as a meat industry and PRODUCTION industry was as new in SA as it was to all those just starting out. There was little or no published research. There has been a belief that if a South African gave the advice, they must know what they were talking about. What was not understood was that there were many new farmers in South Africa also seeking the same answers as so much of the information being provided made little sense.

The emphasis on a slaughter bird of 95kgs (210lbs) at 12-14mths has been misleading - as anyone achieving these targets or even better have believed that they were doing well. What was not recognised was that birds of that weight at that age are displaying very clear signs of malnutrition - producing meat that is a disservice to our industry. The poor results in hatching and problems of chick rearing have been accepted as normal - so any rations that achieve high levels of chick survival are considered to be successful. They are still NOT production rations - but rather inadequate and imbalanced rations with many using very poor feed ingredients.

High production costs have often been cited as the reason for poor producer returns and many producers looked to lowering feed costs (measured by cost per tonne). This DOES NOT WORK as many have found out to their cost. The result is little or NO production and all too often worse - high levels of mortalities. The solution to reducing production costs is to INCREASE production. Unless production on the farm is HIGH - with good egg laying (80+), fertility (90%+), hatchability (90%+), survivability (90%+) and weight gains (1lb/day-.45kg/day minimum average to 12mths) with good feed conversion (2.5:1 at 7mths; less than 4:1 at 12mths) - production costs will remain very high.

There is a more serious aspect to be aware of from the practices of reducing feed costs by feeding the birds as cheaply as possible - when measured by cost per tonne. That is the long term damage to the breeding flock and future breeders. The longer this continues, the longer it will take to achieve the production levels mentioned above when commencing feeding rations designed for maximum production and genetic development.

Blue Mountain laid the groundwork to establish the Ostrich industry as a livestock production industry at the beginning of the decade. Within a couple of years following introduction of Ostrich into the United States, birds with double the meat yields were being produced with feed conversion rates slashed. What other livestock industry has achieved that in so short a time? It is an indication of the severe underestimation of the nutritional requirements of Ostrich and the near starvation rations being advocated.

Many involved in Ostrich Production are new to Livestock production. It has therefore been more difficult to interpret and understand nutritional information. When explaining to a new Ostrich farmer a few weeks ago about the degree of accuracy that was required when mixing the feed - he understood INSTANTLY. His business was Paint. Any minor errors in mixing colours are a major problem and instantly attract customer complaints. With paint these errors are visual.

With Ostrich nutrition these errors cannot be seen - other than through lost production and progressively gets worse as time goes by. Feeding for Production and Profit requires precision and attention to detail - in the design and formulation of the rations, the ingredient selection and mixing and most importantly in the feeding. Feeding once a day, every two days or even every four days

will never be profitable - farmers of other species know this - many Ostrich producers (large and small) still have this basic lesson to learn. With greater volume, rations will be developed to maximise the different stages of growth and not simply two or three rations to see birds through from Day 1 to Slaughter.

Reports are now coming in of contracts being placed with farmers to encourage farmers back into production. This is excellent news. Now is the time to fully understand what is required TO FEED FOR PRODUCTION AND PROFIT. Now is the time to understand WHAT IS QUALITY MEAT. Now is the time to understand just because it is Ostrich does NOT mean that it will to be good, that it has to be produced correctly to be not only good - but EXCELLENT. Now is the time to GET IT RIGHT! NOW IS THE TIME to feed your birds for PRODUCTION and QUALITY!

GET CONNECTED with a feed company that is committed to the industry with research, development, and sound advice. Quit buying the cheap-low productive feed from companies that just want to sell feed for a profit and return NOTHING to the industry. All things can AND WILL work together once everybody has the same goals!

Do Blue Mountain Fed Birds Grow Forever?

Ostrich Nutrition Bulletin #45

September 15, 1999

By: Fiona Benson & Daryl Holle

The answer is obviously NO, they do not. They do however continue to put on muscle (meat) well past 10mths, when traditionally it was considered that growth starts to flatten at that age period.

This was a question that I was asked by an eminent Ostrich Nutritionist some months back. The full question in fact was: "To what do you contribute the fact that you didn't experience a flattening of your growth curve OR is it that on Blue Mountain birds will grow forever?".

When chicks from well fed Breeder birds are fed correctly from Day 1 - they will keep putting on muscle well after the normally accepted 10mth time for flattening of the growth curve - regardless of Breed- provided they are of good genetic origin.

Observing the publication of the Blue Mountain trial results, which was updated on a monthly basis while the trial was being conducted (1997), rather than waiting for the trial to be over before publication, was one of the reasons that I was attracted to understanding what lay behind the rations and ultimately asking if we could have this expertise available to those of us farming ostriches outside the United States.

Blue Mountain is a little different to many Feed Companies as it is run by producers - those who have had to make their living from the raising of production livestock and understand the importance of performance and how it can impact on the profit margin of the producer. More importantly, they also understand what is required to achieve high levels of performance, which does not all come out of text books. There are many things text books and pure science are unable to quantify. Quantifying some of these unknowns comes from the experienced eye of the good stockman observing the responses to certain things on a daily basis that comes from working daily in direct contact with the livestock.

Frequently I hear the comment on the need for scientific proof, scientific evidence or "so and so has some good scientific data". This led me to look up the exact definition, as many things that I have seen advocated as scientific evidence and/or scientific proof has made little sense to me when interpreted into practical applications. A definition of science is "the state of knowing: knowledge as distinguished from ignorance or misunderstanding." A definition of scientific method is: "By following principles and procedures for the systematic pursuit of knowledge involving the recognition and formulation of a problem, the collection of data through observation and experiment, and the formulation and testing of hypotheses."

I would suggest that there are many different methods to collect meaningful data and methods of

experimentation. In the case of livestock nutrition the PROOF of these is the final result achieved on a consistent basis. It then has to be determined if the FINAL results are WHAT is required. When it is 95kgs live weight at 10-12mths, or even as late as 14mths as if often the case, this is NOT the desired result that one should be looking for. Checking that the carcasses produced will meet Prime Quality criteria, checking the survivability of the chicks and particularly is the survivability consistent through out the season ARE some of the results we should be looking for.

When examining the published work on Ostrich, one can see a trend that is NOT providing the final results required by a profitable Ostrich producer. As certain standards are not met, the questions should be WHY these standards have not been met and WHY are we not searching for solutions instead of making certain assumptions that may not have merit. Some examples:

1. When trials set to verify the Gompertz model constructed in 1991 by Du Preez, the targets were down graded as believed not achievable under practical conditions. The question should have been asked WHY was the performance so far short? The answer is the ration fell very short on the requirements for Ostrich, as it is BLUE MOUNTAIN PROVEN that Ostrich can keep gaining muscle far longer than has been traditionally experienced on a consistent basis and in far more severe climatic conditions.

2. When it was discovered that test Ostriches were not utilizing the protein in the diet, it was assumed that they do not require the protein. The question should be asked WHY are they not utilizing the protein? The answer is that the protein source may be wrong and/or sufficient vitamins and minerals were not included in the ration to utilize that protein. It is BLUE MOUNTAIN PROVEN that ostrich can utilize higher levels of protein if the protein is of the correct source with high levels of minerals and vitamins to utilize the protein.

3. Extra weight gains above 95kgs in African Blacks is stated to be only fat. The question should be asked WHY is this occurring and where is the diet falling short if only fat is being achieved at that liveweight which leads to the failure of maximizing muscle development for longer growth periods. It is BLUE MOUNTAIN PROVEN that good genetic birds fed the correct diet will continue to gain good muscle mass long after the liveweight of 95kgs.

4. There have been a number of statements made that only younger birds will produce meat of a good red color. The question should be asked WHY are the birds not producing meat of a good color at all ages? The answer is nutritional deficiencies and/or imbalances or short feeding. It is BLUE MOUNTAIN PROVEN that the meat will consistently be of an even red color throughout at all ages if the diet is correct.

5. As small hens have tended to be better layers it is assumed that size is the reason. The question should be asked WHY a higher proportion of larger framed hens ARE poorer layers. The answer is that they need a greater proportion of their diet for maintenance and therefore the rations are falling short of nutritional adequacy. It is BLUE MOUNTAIN PROVEN that hens of all sizes have the same laying ability when a proper diet is fed accordingly - and the productive results depends on their genetics--NOT breed or size.

6. The question should be asked WHY genetic influence is usually given as the reason for poor performance. The proper nutritional diet must be right first before the true genetic influence can be determined. With nutrition of most ostriches around the world still falling very short of what is

proven to provide high levels of performance - there are many ostriches being culled for nutritional deficiencies as a cause of poor performance and not genetic. It is BLUE MOUNTAIN PROVEN that it is nearly impossible to select the correct genetic influence unless the proper diet is fed FIRST!

7. For many years it has been assumed that Ostriches can only survive in hot, dry conditions. The question was never asked WHY are they not thriving in cooler damper climates. It had never been considered that nutritional deficiencies and imbalanced diets could possibly be the cause. It is BLUE MOUNTAIN PROVEN that Ostriches can experience excellent weight gains and production even in inclement weather conditions if the proper diet is fed and good management practices are observed.

8. When it became clear that Slaughter Ostriches were being presented with many variable liver conditions, most ideas for this cause were that Ostrich are a different species and should not be judged along the same criteria as other livestock livers. The question had not been asked WHY are some Ostrich livers so variable in color and what is causing this problem. It is BLUE MOUNTAIN PROVEN that Ostrich livers are no more variable than any other livestock specie. A poorly fed animal will have variable liver colors, a poorly fed Ostrich will have variable liver colors, a properly fed Ostrich will have a medium brown beautiful liver color just like any other animal's liver.

9. For some time it has been commonly accepted in the Ostrich industry that it is normal for a 1 week old baby Ostrich chick to have a yellow liver due to the chick absorbing the yellow yolk sac. But yet many of these yellow livered chicks die or never grow well. Instead of the scientific community asking WHY are baby chick livers yellow, it was simply assumed that this was a normal condition in baby chicks and the diagnosis for deaths and poor growth was always no problem found. It is BLUE MOUNTAIN PROVEN that yellow livered baby chicks are NOT normal but rather a strong indication of severe parental malnutrition.

10. Regularly the comments are made that in order for the Fat of a Quality carcass to be white fat, it is recommended to eliminate the use of ingredients such as Lucerne and Maize with high levels of Chlorophyll - the reason given all TOO OFTEN for the production of Yellow Fat. Whilst the majority acknowledge that White Fat is ideal and a sign of optimum health and indication of quality meat - too many still do not see the importance of it. It is BLUE MOUNTAIN PROVEN that diet is capable of controlling the fat quantity, fat quality, and fat color. The fat color of a properly fed bird will be Snowy White even when the diet contains high levels of ingredients such as Lucerne, Maize, or Chlorophyll IF the total daily ration is a BALANCED ration AND when the Minerals, Trace Minerals and Vitamins are balanced with the rest of the ingredients in the diet and fed correctly.

Over the last few years I have seen details of a number of research projects that need to be interpreted with a clear understanding as to what they are proving because the results CAN BE misleading:

11. We often hear comments on pelleted feed vs forage diets or ground feed. What is important in comparisons is comparing like for like - it is the ration CONTENT that determines the difference rather than whether the ration is pelleted or non pelleted. Blue Mountain did a trial some time ago comparing a pelleted ration vs the ground ration. Both formulations being exactly the same. The results were similar with details published on the ostrich list. At 300 days (10mths) the ground fed birds averaged 288lbs/130kgs at the end of the trial and the pellet fed birds averaged 273lbs/124kgs per bird. The ground fed birds carried a 25% lower feed cost (not counting the on farm mixing

costs). It is BLUE MOUNTAIN PROVEN that there is little difference in performance between pelleted and non-pelleted feed IF the ration formulations are precisely the same.

12. Some published work on ingredient nutrient values for Ostrich do not provide the effect on performance when the given ingredients are incorporated into rations over an extended period of time. Whilst the findings may be accurate, many of the ingredients recorded are proven to have NO place in a productive ration for livestock- Ostrich are no different in this regard. Caution needs to be taken in making use of them in a ration designed for Ostrich. It is BLUE MOUNTAIN PROVEN that Ostriches perform best over a long period of time with specific ingredient selections of a specific quality origin.

13. A paper was presented at the Scientific conference last year on a study on the addition of a mineral supplement and the effect on Breeder Bird performance. On questioning by a fellow scientist, it was determined that the levels of the mineral in the diet were not taken into consideration in evaluating the results, nor was any reference made to the importance of this when used with different diets. The supplement was only tested with one ration. This particular mineral works with Vitamin A, Calcium, Phosphorous and Potassium. The knowledgeable nutritionist will have balanced these with extreme care in the ration. A point for consideration here, it is BLUE MOUNTAIN PROVEN that if an improved response is observed from supplementation of anything to the normal complete diet - then the basic ration will be falling short of nutritional adequacy.

14. The vitamins and mineral content of rations is critical to the manner in which any livestock species gain maximum utilization of the nutrients within any ration. When evaluating any data - the whole ration nutrient values need to be taken into consideration in interpreting the results. Too little emphasis is placed on this in much of the research undertaken. It is BLUE MOUNTAIN PROVEN that if the Ostrich diet is formulated properly and fed properly, feed additives and magic ingredients have very little effect on long term bird performance.

The phrase "scientific evidence" carries with it a ring of professional accuracy. Sometimes this is true, sometimes it is NOT TRUE! The accuracy of the scientific evidence is totally dependent on the parameters used and the overall accounting of ALL the inputs that may have effected the results of the data. Only when this is done will the scientific evidence become a reward to the Ostrich industry. Blue Mountain Feeds is totally dedicated to science which has the dictionary definition "the state of knowing: knowledge as distinguished from ignorance or misunderstanding." Blue Mountain Feeds has a long history of evidence from its many feed trials and industry experiments, But the best evidence is found in long-term farmer bird performance as that is where the bottom line HAS to come right. More of our best evidence is found in the extremely consistent meat produced by Blue Mountain fed birds and how well the consumer loves that quality Ostrich meat with the consistency that is unheard of elsewhere in the industry.

If you are looking for scientific evidence, Blue Mountain has always been on the cutting edge of new technology and a leader in the Ostrich industry for PROVEN practices and methods concerning Ostrich nutrition. Blue Mountain makes common sense out of its scientific evidence and continually passes that knowledge along to its customers. It is time to pay attention to the FACTS and give Blue Mountain PROVEN products a try at your farm.

Fat Color, Meat Color, Indicates Quality of Product!

Ostrich Nutrition Bulletin #46

October 15, 1999

By: Fiona Benson

FAT COLOUR

Why it is an indicator of The Health Status and Meat Quality of the Birds?

Over the past few months there has been considerable discussion from a number of regions questioning the relevance of the colour of the fat on the birds - particularly in relation to its affect on the quality of the meat. Many processors that I meet are very pleased to see a carcass with White Fat and most producers of oil products only wish to work with the white fat - but there seems to still be some confusion as to the significance of fat colour. Most processors also report being presented with birds with Yellow Fat, rarely, if ever seeing birds with White Fat.

The significance of Fat Colour is because it is ONE indicator as to the General Health of the Birds (or most any livestock species) and therefore can be used as a dependable indicator of the quality and consistency of the meat from those birds.

There is the thought that yellow fat is only a cosmetic affect and as Ostrich meat is sold with no fat on the meat, it is of no importance. Another thought is that the yellow is simply caused by the use of Maize (corn) and/or Lucerne (alfalfa) or grass in the rations and it is the chlorophyll in these ingredients causing the yellow colour. These thoughts are NOT the case. WHY NOT?

The knowledgable nutritionist understands that from a nutritional point of view Yellow Fat is an indication of deficiencies and/or imbalances in the diet of any species and that may have an impact on meat quality, performance, muscle growth and most importantly the general health of the animal. Ostriches are NO different - there is no reason to re-invent the wheel. Ostriches and most other species are produced with snow white fat on diets that are high in maize (corn). Whilst fat colour is ONE indicator to help identify a quality and healthy carcass - fat colour alone is NOT A GUARANTEE of quality meat. The fat colour can be correct - but the birds may still be lacking good muscle growth, demonstrating multi colouration in the muscles, showing poor organ condition etc. depending on the adequacy of the total rations they are being fed.

However to achieve the most cost effective feed conversion, fast muscle growth, good meat yields, good colour muscles, healthy organs and a quality carcass - will also mean that the fat WILL be white in colour - as it is ONE of the indicators of a totally balanced ration and healthy bird. When rendered down, the yellow fat will have an unpleasant odour - the degree of odour will depend on the degree of the imbalances or deficiencies. White fat when rendered down is almost odourless. This must surely be telling us something, wouldn't you agree?

From a farmer's point of view he/she needs to see the white fat as it is one clue to the adequacy of his rations and his ability to maximise feed conversion. What is not understood by many is that animals draw on their fat reserves at times of stress. The white fat is very easily mobilised and can be quickly converted into energy. The yellow fat mobilises much more slowly and when the deficiencies are severe, as we see all too often, the animal has significant difficulty in mobilising that fat. We have seen birds die from starvation even though they were carrying plenty of fat. It was that they simply could not mobilise the fat fast enough to meet the sudden demand for extra energy.

Most of us will have read articles and heard advisors stating that fat comes from overfeeding - and therefore to achieve birds with less fat, the farmers are instructed to feed the bird less feed. This will NOT work! As has been mentioned above, when the fat is wrong the birds cannot mobilise it for use, to cut back on feed will simply compound the problem and starve the birds further.

What controls fat and meat production? Some extracts from "Fat vs Meat Production" by Daryl Holle of Blue Mountain Feeds:

Quote: "Phosphorus is not only key in bone growth, but also very necessary for muscle growth (meat production). When phosphorus levels are low in the total diet, very little EXTRA meat production is going to take place other than what the bird needs to survive. The low phosphorus level also contributes to a poor utilization of the high energy and again causes even greater FAT production.

Calcium, Phosphorus, Zinc, Manganese, Copper, Selenium, Magnesium, Potassium, and Salt are also important minerals/trace minerals that assist with the total digestion process and are key to FAT production and MEAT production. Vitamins A, D, and E also help with the digestion/conversion process. In addition, the B-vitamins such as Choline, Niacin, Biotin, etc, help convert body fat to mobilized energy in the bird. If the bird has some body fat but cannot mobilize it for use, it just gets fatter.

Minerals, Trace Minerals, and Vitamins must be BALANCED to the rest of the ingredients in the diet so everything will work together. Dumping in "some of this and some of that" into feed rations is very risky and usually comes out with a skinny bird with NO FAT and NO MEAT, or a FAT bird with NO MEAT.

Nutritional diets CAN control the amount of fat desired and accomplish good meat production along with it." End Quote.

It is time for ALL involved in Ostrich production at all stages of the production chain to WAKE UP and recognise that Ostrich production is NO different than other red meat species. The same criteria apply in recognising health aspects and what controls meat quality and taste that apply to the other species. THIS HAS BEEN PROVEN.

MEAT COLOUR

Why it is an indicator of The Health Status and Meat Quality of the Birds?

Muscles that vary in colour from almost black to very pink and in some cases white, and meat that turns black and/or grey when exposed to the air, are problems that consumers are continually complaining about. Some time ago I was told by a processor that the white on muscles was caused by the muscle being close to the bone. If I was told that, how many others have been given the same advice and believed it? When attending a conference last year there was a presentation on how to debone a leg, identify the muscles, and advise on their uses. The muscles being cut up demonstrated the multi-colouration seen all too often - the advice given by the speaker was that this is seen often and was caused by Mother Nature and could not be avoided.

Of course both these statements are totally WRONG and very mis-leading. All these aspects have been PROVEN to be controlled through nutrition in other species as well as Ostrich. The belief that they were normal has been an indication of the immaturity of the industry that until it became a meat industry - these issues were not important and therefore never addressed. As this poor meat colour was all that was seen, it was assumed that it must be normal by people who have no knowledge of the nutritional causes. When birds are seen with meat that is not a good even red colour throughout, that turns black when exposed to the air, some white or very pale colouration etc., it is a further clue of severe nutritional deficiencies - no different to most other species producing Red Meat.

What controls meat colour? Some extracts from "Meat Consistency is an Important Concern" by Daryl Holle of Blue Mountain Feeds:

Quote: "Multi-colored muscle meat from the same carcass can be caused by inadequate levels of Calcium, Phosphorus and the major Vitamins A, and D. White to Pink colored muscles are sometimes referred to as "white muscle disease" in other livestock species. However, it is actually a nutritional deficiency and not a disease. White muscle disease is usually caused by inadequate levels of Vitamin E and Selenium.

The correct levels of Vitamins A and E helps maintain the good red colour and prevent the blackening of the meat on exposure to the air. These vitamins act as antioxidants which will keep the meat in the package a bright red and extend the shelf life of the meat." End Quote.

Whilst other meat species may sometimes produce their meat with some variation in muscle colour - this should not be taken as a reason for it to be acceptable in Ostrich, particularly at this stage of the Industry. Just because it has been seen in other species does not mean it is a correct condition. When seen in other species, the meat is generally sold as a lower grade and therefore lower price. Time to be reminded of the report from the First World Ostrich Meat Congress back in Feb '97.

"There was an excellent presentation covering what the housewife/consumer is looking for, what makes the consumer buy the product and how to create an International awareness. Great emphasis was also given to the fact that there will be many people over the next few years buying Ostrich for the first time. If the product is not good and that first experience is a bad one - that consumer may well never try the product again. It was noted that there has been an inconsistency in the product in the past which must now be addressed. This inconsistency is most probably a combination of the variety of ages of slaughter birds, the effects of diet, variety in classification between countries of the various muscles etc.

The price, presentation, colour of the meat were also aspects mentioned. The health aspects were seen as a major priority - the speaker highlighted the fact that we have a free range meat, that the market wants animals reared on feed free of meat source proteins, routine antibiotics, growth hormones etc."

TWO AND A HALF YEARS LATER - What Progress Have We Made?

We have an International Meat Buyers Guide to identify muscles by Numbers and clearly defines the classifications (filet quality, steak quality, processing quality) to avoid misunderstandings working with popular names which vary from country to country - are they being used? The answer is generally NO!

Many processors have done excellent work on slaughter techniques to improve the quality as best they can with regards to shelf life from a bacteria point of view - but are still presented with carcasses that are, for the most part, a DISGRACE to our industry and many times unacceptable to our consumers.

In spite of all the evidence and proof that answers many of the factors mentioned above - there is still debate on their relevance amongst far too many - instead of ACTION taken to eliminate them.

Throughout the world Ostriches are still being fed rations that contain Animal Protein Products and other unhealthy diets - in spite of the fact that our MAJOR selling point for Ostrich is the "HEALTHY red meat of the future".

How can the meat be healthy and "Clean and Green" when:

Animal Protein Products are included in the rations of many Ostriches!

Growth Stimulants are sometimes included in rations at ANY stage - yes I still see rations claiming this!

Birds at slaughter continue to display many symptoms of severe nutritional deficiencies - as described above, including a variety of liver disorders and many other symptoms of mal-nutrition!

Antibiotics remain the first line of defence to cope with symptoms of mal-nutrition in many areas of the world!

IN CONCLUSION

Industry success depends on the farmers willingness to present a PROPERLY FED bird to its consumers and Processors insisting on receiving only a PROPERLY FED, Healthy bird. The longer we wait to start doing it, the less chance we have for ANYONE to be successful. We owe it to our consumers to provide them with the product we claim -- "Ostrich, the HEALTHY red meat".

Report of the European Ostrich Association World Congress

Ostrich Nutrition Bulletin #47

Portugal, 1999

By: Fiona Benson

Report on 1999 EUROPEAN OSTRICH ASSN WORLD CONGRESS

The meeting this year was held in Portugal from 5th - 7th November. Attending were approximately 200 people from 15 countries. Day 1, the emphasis was on veterinary aspects, with day two and three more general. The papers presented included three totally different approaches to Ostrich nutrition with one approach presented by Blue Mountain Feeds International, another by Dr. Burlini of Italy, and another by Dr. Fanus Cilliers of South Africa. There were several reports and comments on both the situation on the industry globally and within Europe specifically, a number of veterinary topics for both Vets as well as a producer's point of view, incubation and carcass grading and classification.

There were two practical sessions done under video camera for all to see displayed on the video screen. The first was a chick autopsy and the second the deboning of a 1/2 carcass. Both sessions generating some good discussions.

Dr. Burlini (Italy) sent a clear message to all that we are a production livestock industry and this must not be forgotten. This, of course, a message that Blue Mountain have been sending for some years now. Several of Dr.Huchzermeyer's (South Africa) papers were on subjects that continue to be problems for farmers - but are coping with symptoms rather than tackling the route cause. Too often we hear that the immune system in chicks is immature - he emphasised that "Immune Suppression can seriously interfere with the body's ability to fight off infection. Cold, malnutrition and stress being the most important immune suppressing factors in ostriches". Blue Mountain would suggest that malnutrition is the most critical aspect here as any animal suffering from malnutrition will be less able to cope with cold and/or stress. The condition of many birds currently presented for slaughter demonstrate symptoms to a greater of lessor degree of malnutrition - the 1/2 carcass that was deboned and the chick autopsied were both demonstrating symptoms of malnutrition.

Fiona Benson, of Blue Mountain Feeds International, opened the main session with a report on the Current Situation in the Global Industry. Her focus was on the short time the industry has in fact been developing, the complexity of the Production Chain and the many new skills that have had to be learnt. The time it takes to gain experience and trends to become apparent as we reached each new stage of the Production Chain. She also highlighted the fact that we sell our meat as the 'HEALTHY RED MEAT' and that we must ensure that it is JUST THAT. She also gave a report on the Strategic Analysis Session held at the IOA meeting in June - the subject of Blue Mountain Bulletin #41B.

Walter Murray (UK) discussed the markets within Europe and who the buyers are for both meat and leather. Key points being that there is certainly room for growth, prices are sensitive at peak production times, quality and service are essential, those able to supply consistently are receiving a premium and the Quality of meat and Slaughter Techniques are a MUST. He also highlighted the development of groups and abattoirs tying up with tanneries. Walter covered some important points relating to deskinning techniques, the treatment of hides post slaughter, during storage and shipping.

During the Veterinary Session Dr. Julio de Lucas Burneo (Spain) discussed some work with Anaesthesia and Sedation of Ostriches and the use of certain drugs and the use of Enrofloxacine (Baytril) - Pharmacokinetics Behaviour in Domestic Ostriches. These papers were presented in Spanish.

The subject of Feed Management (Blue Mountain Bulletin #43), the importance of which is all too often overlooked, was also a topic that Fiona Benson covered on the second day.

The meeting concluded with the deboning of the 1/2 carcass and discussion on the Blue Mountain Grading and Yield Payment System. Fiona Benson provided some practical illustrations of how the Blue Mountain Yield Payment System works in practice. The 1/2 carcass provided an excellent opportunity to highlight the multi coloured muscles that are being seen all too often. This particular carcass was also very small with almost no fat and very poor muscle development - but very typical of many of the carcasses currently being presented for processing. The internal organs had been removed, so were not available for observation and discussion.

There were a good number of trade stands offering Leather Goods, Meat products, Feed, Fencing, Incubation Equipment, Feed Mixing Equipment, Mobile Slaughter Plant and a most interesting Franchise option. Many thanks and congratulations to Robert Baronigg and the Portuguese Association for a well run (including translations) and well attended conference with delegates from many countries.

Climatized Feed Formulas for Ostrich Fact or Fiction!

Ostrich Nutrition Bulletin #48

November 21, 1999

By: Daryl Holle

Farmers are often told by feed companies, or feed company representatives, Veterinarian's and such, that feed formulas for Ostrich need to be climatized or changed to allow for different climates. They claim that the nutritional requirements of the birds are different between Northern Europe and Saudi Arabia or between Northern Minnesota and the deserts of Arizona. They claim that feed designed for use in the United States will not be the right feed for birds in Greece or feed designed for use in Canada will not work in Mexico. FACT or FICTION, that is the question.

While this statement (and many others just like it) seems to be clearly understood as common sense by most farmers, the REAL TRUTH is that statements like this are mostly FICTION! But, they certainly get the attention of the farmers and cause them to think that the person saying it really knows what he/she is talking about when the real FACT is it was a statement made that farmers can relate to (believable) that has very little merit behind it for Ostrich formulations.

In this Bulletin, I will attempt to explain why climatizing feed for Ostriches is mostly fiction. The answer can get rather technical so please bear with me. First of all, it is important to understand that the BASIC nutritional requirements for an Ostrich are the SAME no matter where it is located. The body functions are the SAME no matter if the bird is located in a wet, rainy, cold climate or hot, dry, desert climate. The bird needs a certain amount of daily nutrients per pound of bird body weight to perform all its functions--growth, production, weight gains. Now that we have established that FACT, we can go on to some variables that exist.

There is no question about the fact that climates vary. They vary from city to city, state to state, and country to country. Climate and weather conditions vary greatly in most areas right on the same farm throughout the year. Here in Colorado, we can vary from below Zero degrees F. in January to above 105 degrees F. in August--That is a 105 degree F. swing in temperature throughout the year. Humidity can also vary greatly location to location. The amount of rain, sunshine, and wind chill will also vary greatly from one area of the world to another. All of these things are environmental factors that CAN change the birds daily required nutrients amount but DOES NOT require a feed formulation change simply because the environmental factors are present.

Now, before one jumps to the wrong conclusion of what I just stated, it is important to understand that ALL birds in ALL parts of the world need a different feed formulation for Breeder birds during the laying season, Growing birds, Baby Chicks, and Breeder birds during the off-laying season (maintenance season). But, that feed formulation designed for a specific group can be used anywhere in the world IF the formulations are designed correctly and put together with proven methods of good feed formulation.

So, how does one vary the daily required nutrient amounts to compensate for changes in weather conditions (environmental factors)? If the feed is a balanced formula and properly designed feed, the nutrient amount is varied by varying the AMOUNT FED DAILY! Simple as that! If birds are correctly fed year around and managed to a proper body condition, they will perform beautifully in any climate if it is in their genetics to do so. Feed management is the important step to ensure birds are properly fed in certain climatic conditions. If it is the middle of winter, 5 degrees F. below Zero, the birds will need MORE FEED--as much as 20% more feed. DO NOT give the birds extra corn or other additives or change the formula at all. Give them more feed of their complete diet to supply the extra nutrients required. If it is the middle of summer and 120 degrees F. in the shade, birds may not eat as much feed per day--allow them to adjust for that. Just make sure that the feed is a well balanced diet with high levels of trace minerals and vitamins so the birds do not become nutrient deficient during this time.

What is important is that birds GET the amount of nutrients that they need daily. This is done by varying the feed intake (or varying the total Dry Matter Intake) for the bird. Believe it or not, the biggest environmental factor that causes the most grief for Ostrich is extremely high HUMIDITY--not heat, not cold, not rain, not cloudiness. But, this is not unlike most other livestock as they respond in the same manner--us humans do to if we are not used to it. Most often it is not necessary to alter feed formulas even for high humidity UNLESS the Dry Matter Intake year around is extremely low per bird per day and they are not getting enough nutrients to meet the production needs. Again, the feed diet MUST be a balanced diet with adequate nutrient levels--if it is not, climate will have a GREAT effect on bird performance.

If any adjustments are to be made to a birds diet to climatize it for a special area, it is the average DRY MATTER INTAKE per bird that dictates whether or not an adjustment is needed. THEN, one does NOT adjust the FORMULA, but rather adjusts the nutrient DENSITY of the feed. Did I lose you yet?

Allow me to explain that last sentence another way. If climatic conditions exist (high humidity for example), that birds will only eat an average Dry Matter Intake of only 3 1/2 pounds of feed per day (1.6 kgs) and the feed is designed to be fed at 4.6 pounds per birds per day (2.1 kgs), the DENSITY of the feed is not great enough as all the nutrients is the 4.6 pounds of feed is NOT in the 3 1/2 pounds of feed so the bird is getting shorted on nutrients. All that would be needed in this most unusual case is to CHANGE THE RATION DENSITY so all the nutrients contained in the 4.6 pound formula appear in the 3 1/2 pound formula.

However, it is important to know that Blue Mountain has NEVER had to change the DENSITY of a feed ration to date as Blue Mountain is formulated for full nutrient availability at the recommended daily feeding rate of 4.6 pounds of "As Fed" feed or 4.15 pounds of DRY MATTER feed. Most any bird in ANY type of climate can eat this amount of feed unless they have too much grass to eat in their containment area. If birds are eating too much of other things, such as grass, then a complete feed should not be use anyway, but rather a supplement feed specifically designed for grass grazing.

If someone tells you the feed formula needs to be changed due to different Climatic Conditions, there is something not right with the feed formula itself that is causing a need for formula changes--and doubtful the next formula will fix the problem!

I have heard the following comments from people over the years:

I live in Canada so I have to feed lots of corn in the wintertime - **FICTION!**

I live in New Mexico so I have to cut way back on the corn for my birds - **FICTION!**

I live in a desert area and Blue Mountain feed is far too potent for this area - **FICTION!**

I live in a wet and rainy climate so my birds need a different feed formula - **FICTION!**

I live in a cloudy climate so my birds need a special formula - **FICTION!**

There are many others but I am sure you get the point. All of these statements have NO nutritional basis behind them whatsoever. They are statements that make common sense but have no nutritional sense behind them. The secret to birds withstanding different climatic conditions is a balanced feed formula that is well-designed with high levels of nutrients, good feeding management, and good farm management--that's it!

I have also heard comments from individuals in some countries that Blue Mountain Feed is too hot, too rich, and of course the phrase mentioned above "too potent". These comments usually come from individuals that have NEVER tried Blue Mountain feed but are speculating on it for one reason or another. These comments also indicate that the individual must think his birds, or his customers birds, do not need good sound nutritional principals and are different in their nutritional needs than any other bird in the world. This I sincerely doubt and so should you! When asked directly, most people making the too hot, rich, potent remarks don't even know what it is they are trying to say as they have no idea what is actually contained in the Blue Mountain Feed (the formula). The next time you hear someone make these type of comments, ask them specifically what they mean--the answer might surprise you as without knowing the total formula, how can one make that determination!

Lastly, when other nutritionists tell me that they change feed formulations for varying weather conditions around the world, my first question to them is: "What do you change?". The answer always is more protein, less protein, more energy, less energy, and so on. Now, I ask all of you to stop and think through this one for a minute. You all have heard (at least I hope you have) that Ostrich digest fiber very well. In fact, Ostrich have the ability to convert large amount of Fiber to ENERGY. This is a proven fact and there should be no question about it.

Note: Here comes the technical part, please read carefully:

The theory for adjusting the formula for climate is that in HOT CLIMATES birds do not need so much energy so less grain should be used (usually corn or maize). Now, any nutritionist knows that when you take something OUT of the formula, something has to go back into the formula to replace the amount of grain removed. The unique problem in feedstuff nutrition is that most all grains (high energy feeds) are low in fiber and high in energy. Replacing that energy feed causes new problems as low energy feeds are usually very high in FIBER. Ostrich digesting Fiber creates intestinal HEAT and they are converting a great deal of that Fiber back to energy. So, what has one gained except the risk to make matters MUCH WORSE. This is not the correct nutritional technology to use and most times imbalances the ration to a point that it doesn't work for production at all.

The theory for adjusting the formula for climate is that in COLD CLIMATES birds need lots more energy so more grain should be used. Again, when you put something more into a feed formula, something has to come OUT. In this case it is usually FIBER ingredients that comes out as the extra grain has diluted the formula's Energy to Fiber ratio. Less Fiber means less energy coming from fiber and less intestinal heat coming from Fiber digestion. So, what has one gained by doing all this except to risk making matters MUCH WORSE. It would have been much safer to INCREASE the amount fed of a well-designed balanced diet to supply the extra nutrients needed by the birds.

I hope this helps to clear up some MYTHS and FICTION going on in the industry. They sound so good and make so much common sense but that is about all those statements are good for as there is no nutritional merit behind them for Ostrich. That has been proven time and again by Blue Mountain Feeds for nearly a decade.

Understanding Ingredients Used in Ostrich Feeds, Part 1

Ostrich Nutrition Bulletin #49

December 15, 1999

By: Fiona Benson & Daryl Holle

Starting with this Bulletin (Part 1), we introduce a new series on the subject of Ostrich feed ingredients. This is a very informative series but is rather lengthy with a wealth of information and is split into 4 parts. The series is organized in the following manner:

1. Forages, Part I, Bulletin #49

2. Grains, Protein Feeds, Part II, Bulletin #50

3. Minerals, Trace Minerals, Vitamins/Additives, Oils/Fats, Part III, Bulletin #51

4. Farmer Responsibility, Formulations, Conclusion, Part IV, Bulletin #52

One of the most important aspects to the success of any Livestock ration is the quality of the feed ingredients used. When working with farmers wishing to start mixing their own feeds or using their local mill to assist in producing feed, the first requirement is to establish the availability and costs of the local feed ingredients. Most people would assume this to be a fairly simple task. Those of you who have gone through this exercise with us both will confirm that we find it to be anything but simple. Standards most certainly vary from country to country and area to area as does the apparent knowledge of many people marketing these ingredients. This problem is compounded as many farmers raising Ostriches are new to Livestock farming and have little or no previous experience on how to achieve optimum Animal Health and Cost Effective Livestock Production.

One of the Rules of Good FEEDING MANAGEMENT is to ensure the ingredients used to make the feed are as specified by the person developing the formulas. We are therefore starting a Bulletin series that will be a discussion of feed Ingredients used for Ostrich feed.

As reported in Bulletin No. 17, which discusses how to identify a balanced and productive ration, it is important to recognise that the feed rations must include feed ingredients from the following different feed groups:

1. Forages - Ingredients such as Lucerne (Alfalfa) Hay or Meal, Grass Meal etc. Ingredients with high fibre/medium protein/medium energy content.

2. Grains - Grains such as Maize (Corn), Barley, Wheat, Wheat Middlings/Bran. Ingredients with high energy/low protein/low fibre content.

3. Protein Feeds - Soyabean Meal, Cottonseed Meal, Peanut Meal. Ingredients with high protein/low fibre/medium energy content.

4. Major, Minor and Trace Minerals - Calcium and Phosphorous; Magnesium, Potassium, Zinc; Copper, Selenium, etc.

5. Vitamins and Additives - Vitamins A,D,E and K plus all B-Vitamins etc; Amino Acids, Probiotics, Yeast Cultures, etc.

6. Fat/Oil - Refined Vegetable Oils, Hydrolysed Animal Fats, etc.

1. Forages

Lucerne (Alfalfa) Hay and/or Meal and Grass Meal are the most desired forages - with Lucerne being the first choice for high quality Ostrich production.

The main differences between Lucerne and Grass is that Lucerne is from the Legume family and Grass is from the Grass family. They have inherent differences in their mineral content and basic nutrient characteristics. Their quality as a dried product depend on the stage of growth at harvest and the manner in which they are dried. Farmers need to harvest at the optimum stage of growth to ensure the higher quality of fibre and protein.

Lucerne, if not properly maintained, will have grasses growing up between the crop - this problem is very common with lucerne samples containing low protein levels and will also affect the mineral levels and ratios. Any forage that samples low in protein will usually be higher in fibre (with the fibre being less digestible), and lower in total nutrients available.

We see a number of formulations that include Lucerne Hay (Alfalfa) - without any qualification as to what quality the Lucerne Hay is. Lets take a look at the implications of this. The uneducated farmer will see lucerne hay in his rations and assume that any Lucerne will do. Naturally going for the cheapest he can get - so why should he proceed with caution--and why is it wrong to simply specify Lucerne Hay with no qualification as to its quality?

We can demonstrate very clearly that it is not only the protein content that changes Lucerne quality by looking at some typical Lucerne Average Analysis tables and listing just a few critical nutrient values:

GRADE	PROTEIN	FIBRE	CALCIUM	PHOSPHORUS
13% Very Mature	13%	38%	1.2%	0.19%
15% Mature	15%	34%	1.3%	0.21%
18% Average	18%	29%	1.4%	0.24%
20% Good	20%	26%	1.6%	0.29%
22% Premium	22%	23%	1.8%	0.32%

The higher the fibre content - the less digestible that fibre will be along with lower nutrient levels (pound for pound) available for optimum bird performance. If a ration is formulated specifying 18% protein Lucerne and only 15% protein Lucerne is used - severe deficiencies and ration imbalances will occur. The result is a loss in production. The better the Lucerne quality, the higher the

digestibility and the greater the mineral and vitamin levels. It is a good practice for farmers to mix their good and premium quality Lucerne with their average quality -- to obtain a consistent Lucerne for mixing with their rations throughout the season. It is NOT a good practice to mix their good and/or premium quality with the mature and very mature quality Lucerne - this will lead to inconsistencies and overall health and performance of the birds will be compromised. When purchasing milled Lucerne from your local feed mill, this is something to watch for.

Comments that we hear from feed mills regarding Lucerne Meal quality are:

"We formulate on 14% protein content to be sure - the misperception that anything higher will be a bonus".

"We formulate on 17% protein content - our supplies are usually somewhere around there".

"We think our Lucerne Meal has molasses mixed with it".

"We think our Lucerne Meal has Wheat Middlings mixed with it to increase the protein level of the Lucerne Meal".

"Our Lucerne Meal is top grade - It is 16% protein".

As can be seen from the variations shown in the above table - these sort of practices and assumptions will NOT work. If growing your own Lucerne - get each batch sampled. Different formulations are required for different grades of Lucerne. Any Lucerne below 17% protein content is best used on other livestock. The different grades have different nutrient characteristics and a BALANCED ration includes modifying the amount of ADDED minerals, trace minerals, and vitamins to compensate for the increased/decreased Lucerne quality.

The same problems are inherent with Grass if it is used as the forage source. Grasses are also higher in nutrient value at the early part of the season and progressively become lower after the peak season-- round mid-May in the Northern Hemisphere, even when well managed throughout the season.

The management of grass is critical and has a significant impact on its quality. The grass type is also important as is the mixture. Some grass mixtures will have a portion of Clover - Clover is from the Legume Family and not the Grass Family - different minerals - different characteristics. This will need to be known by the nutritionist formulating the rations.

Silage - either Maize (Corn) or Grass - can be used for Ostrich but needs to be introduced slowly and certain aspects have to be watched carefully. As with other species, the analysis of each batch must be known to provide a ration that will be IN-BALANCE. If Maize Silage is used instead of Grass Silage or Lucerne or Grass hay - further complications arise. Maize silage has only around 8%-9% protein levels as opposed to 17% plus protein in quality Lucerne or Grass Hay - energy levels are also very different between Maize silage and Lucerne Hay. This demonstrates that it is impossible to simply substitute one for the other. It is also impossible to formulate a productive ration for Ostrich using maize silage as the ONLY forage in the ration.

Feeding any feed with a high moisture value will require very high standards of feed management

and there is always a risk of increased inconsistencies as not all birds will eat the same amount of silage and supplement if they are fed separately to each other.

It has been suggested that Wheat Bran may be substituted for Lucerne in areas where it is not possible to obtain Lucerne. As can be seen from the above, they are ingredients from two different Feed Groups with very DIFFERENT characteristics - this will NOT work if optimal health, production and carcass quality are to be achieved. A productive ration should contain a balance of ingredients from all the feed groups. The amount and type of fibre in a grain ingredient and a forage ingredient are very different from each other.

The ability of Ostrich to digest fibre has led to the misleading thought that any fibre source can be used - such as straw, soya hulls, grape residue, mill screenings and we have even been heard of sawdust being used. Ostriches can digest fibre - but that fibre must be from the right source with DIGESTIBILITY, and be high in nutrient value to provide a POSITIVE contribution to the ration.

There is NO room in an Ostrich ration for filler ingredients if that ration is to be productive, cost effective to feed and produce healthy birds. The definition of filler is: "Something used to fill a gap or cavity or to increase bulk". WHY waste money on ingredients that will contribute NOTHING towards production and more importantly may have a negative affect on production? Many feed companies proclaim in their advertising that "We don't use Filler ingredients in our feeds", but yet listed in their ingredients are things like Straw, soya hulls, and roughages. Learn to identify these things for yourself.

The word Roughage is also used regularly to describe the forage or fibre portion of a diet. This also has misleading connotations. The definition of Roughage is: "Fibrous, indigestible material.....". In a nutritional sense, Roughages have no place in Ostrich rations. They are high in fibre but not very digestible fibre and have no practical value for containing much of any other important nutrients.

It is known that Ostriches can digest fibre well and that it is an essential part of their rations-- it only makes commercial sense to ensure that the fibre source provides maximum benefit and a positive influence in the diet rather than simply taking up room in the birds stomach.

Understanding Ingredients Used in Ostrich Feeds, Part 2

Ostrich Nutrition Bulletin #50

December 15, 1999

By: Fiona Benson & Daryl Holle

Part II - Grains, Protein Feeds

2. Grains

Grains are included in a ration for their energy value - they are generally low in protein and fibre content. Maize (Corn) has the highest energy values, but is about the lowest protein of the grains. Grains also come in different qualities. Establishing that quality is an area that is also proving to be not as straight forward as one would imagine it to be, especially in areas where a significant amount of the maize is imported.

Some interesting statistics - six nations (USA, China, Brazil, Mexico, France, Argentina) produce 75% of the world's maize supply. The USA alone produces 39% of the total. One state alone produces 8.5% of total world production, approximately the total production of Mexico, France and Argentina put together. Why are these statistics relevant to Ostrich nutrition?

The reason this is important is that it indicates that if not operating in one of the above countries - the maize used will most likely be imported. South Africa is 11th on the list of some 159 countries - but still imports significant quantities. Once dealing with an imported product control of quality becomes a greater problem.

The problem of maize consistency first became apparent to me when a reputable British Feed Mill asked if we preferred to work with US or French Maize. The reason behind the question was that the nutritionist's experience had been that the quality of the maize he had seen used in US mills was very different to the maize they received from their importers. Subsequent experiences indicate that the variation in quality is far greater than we would imagine. A number of farmers have experienced significant chick losses that had been attributed to the poor quality of the maize their country had imported. I have been informed that in South Africa much of the imported maize, if great care is not taken, is 15%+ moisture content, with all the inherent problems that creates. Why is this?

Suggestions put forward have been that grain is traded Internationally by Commodity Dealers who have little concerns about anything much more than price and their margins. Their buyers tend to work on price for the most part, rather than quality. So only the large, discerning buyers will be knowledgeable enough and concerned enough to ensure that the quality they are purchasing is to the highest standards. Buying decisions should never be made on price alone but that is a practice very common to the feed industry. A common rule of thumb in the feed ingredient industry is "Buyer beware--you get what you paid for, and sometimes you don't get what you paid for".

Maize (Corn) is the best grain to use in rations. Wheat and/or barley are also excellent grains - but it is most difficult to achieve a productive Ostrich ration without the inclusion of maize as a portion of the ration as it has some unique nutrient qualities that are nearly impossible to replace using other grains. Oats do not work so well as the ONLY grain as result of the poor fibre content and is best avoided if possible in a ration for Ostrich when optimum health and production are required.

Wheat Middlings, when used in limited quantities, can have a positive effect in a production ration - but here again there can be difficulties in establishing the consistency of the local product. Wheat Middlings, Wheat Pollard, Wheat Feed are all different names used for similar (but not the same - different fibre/nutrient levels) products depending on which country or area one is working in and how they are sold. These products are by-products of the flour milling industry and the consistency will depend on which product they were manufacturing that day or week or the specialty of the particular mill. Care needs to be taken that the source used is consistent. These products generally include ground screenings from cleaning, particles of bran, germ, flour remnants and the offal from the milling process. Wheat Bran, in comparison, is only the skins/hulls of the wheat.

3. Protein Feeds

The best protein ingredient is Dehulled Soybean Meal. There has been some controversy concerning soybean meal being toxic to Ostrich or causing digestive upsets and poor health. This is simply NOT TRUE! Blue Mountain has done experimentation with and without soybean meal and has learned, without a doubt, that rations with reasonable levels of high grade soybean meal will far outperform rations without soybean meal. However, the source must be a quality source. Whole Raw Soybeans should never be fed to Ostrich.

The correct product to use is 47% Dehulled Soymeal - known as Hi-Pro in some areas. It is high in protein, with an excellent amino acid structure and proven ideal for use in rations where high density is required. 44% Dehulled Soymeal will work but anything lower is of a lessor quality and insufficient protein to achieve the correct protein levels in the ration. We see rations for farmers stating only Soybean oilcake or meal - NO qualification as to what quality. As with the LucerneHay - without qualification the uneducated farmer will not know what is required and will most likely go for the cheapest product. If the rations are formulated for 47% protein and the farmer uses 44% protein the performance will be significantly compromised. If the protein level is even lower then the deficiencies will be serious.

To understand the processing of the Soybean may help those unfamiliar with the differences in the products. When the soybean is processed it first goes through a cleaning, cracking and dehulling process and oil extraction. The resulting flakes are toasted (controlled steam heat process) to reduce the antinutritional factors, most typically the trypsin inhibitors. This process is not a high heat treatment. The resulting meal is typically 47.5% protein. In order for meal processing facility to dispose of some of the soybean hulls leftover from the process (which have little or no nutritional value), some hulls are blended back to some meal and this results in the 44% protein product. Therefore when purchasing the 44% protein soybean meal - effectively one is purchasing 3% hulls. Whilst these will do the birds no harm - it is wasted space in the ration that could be used for a more productive ingredient that must be made up from some other source. Soyahulls are classified as a filler ingredient - remember the definition of filler "Something used to fill a gap or cavity or to increase bulk."

Full Fat Soya is the Whole Soybean seeds, heat processed without the fat or hulls removed. If used in an Ostrich ration care needs to be exercised to maintain the correct levels of fat in the rations. Full Fat Soya can rarely be used as the ONLY protein feed in the feed formula due to its high fat content which will imbalance the amount of total fat in the finished feed (too high).

Sunflower Meal, Cottonseed Meal, Canola Meal, Peanut Meal, Lupins are all high protein ingredients but do not have the same benefits that Soyameal can provide - but can be used in limited quantities in certain rations for ostrich. Maize Gluten Meal 60%, when available, is also acceptable in limited quantities in a ration - but is not readily or consistently available to many. Do not get confused with Maize Gluten Feed 20% - which is classed as an energy feed, a poor and inconsistent by product - it is not a protein feed.

Fishmeal, Meat and Bone Meal, Carcass Meal etc. are also high protein products - but of animal and not vegetable origin. There have been many discussions on the merits or otherwise of their inclusion in livestock rations both on nutritional grounds and customer preference. Most are agreed that the benefit of Ostrich Meat is the Clean and Green image. The meat cannot have the Clean and Green image with these products incorporated in the rations.

Distillers Grains and Brewers Grains are also classed as Protein feeds. Only grains from the distilling industry should be considered for inclusion into production rations and in limited quantity. The source must be a source that produces a product with absolute consistency - those from the brewing industry (Usually called Brewers Grains) are proven to be very inconsistent and should be avoided.

Understanding Ingredients Used in Ostrich Feeds, Part 3

Ostrich Nutrition Bulletin #51

December 15, 1999

By: Fiona Benson & Daryl Holle

Part III - Minerals, Trace Minerals, Vitamins, Additives, Fats & Oils

4. Minerals

The minerals, vitamins and additives are generally purchased as a premix as this is a very specialized and most critical area. It is important that the premix used is designed for Ostriches and not for any other species as each species have their own unique requirements. Some examples: Ostriches require high levels of copper but sheep and goats are very sensitive to copper. Cattle synthesise their own Choline - but Ostriches require high levels of Choline supplementation. Conversely Cattle require high levels of iron supplementation and Ostriches very limited levels. Ostriches are a Red Meat production animal that lays eggs and grows feathers with its own unique digestive system.

Some premixes will contain only the MINOR minerals, trace minerals, vitamins and additives. Others will also contain the MAJOR minerals. High Protein supplement products will generally have all the minerals, trace minerals, vitamins and additives included as well as most, if not all, the protein ingredients.

Major Minerals

When it is necessary to add one's own major minerals, such as Calcium and Phosphorous, it is necessary to ensure that the sources are a good one. The source can be from organic and inorganic origin. Lucerne is a major organic source of Calcium and limestone is an inorganic source of calcium. In order to BALANCE the feed formula to a proper level of Calcium, it is the limestone source that is required to be added. Another source of calcium is meat and bone meal - but all are agreed that nutritional reasons apart - to ensure we maintain the Clean and Green image, these meat products MUST NOT be used in Ostrich feed rations.

There are many grades of limestone and it is important that only the highest grades - min. 38% Calcium - are utilised as lower grades are less digestible and contain impurities. These impurities can cause mineral interferences and maybe even toxicity problems - which result in lost performance and can impact on the general health of the birds.

The source of DCP - Dicalcium Phosphate (Phosphorus) needs to be chosen with care to ensure that there are no unacceptable impurities.

Egg and Oyster shells are a further source of calcium - but Blue Mountain's research has found the use of shell as a source of calcium has a negative impact on the quality of the egg shell. We do NOT recommend using egg shells or oyster shells for calcium sources.

Minor & Trace Minerals
These are such items as magnesium, potassium, zinc as the Minor Minerals and Copper, Selenium and Manganese as Trace Minerals. There are many more in each category, but just giving you a representative idea here. These all need to be from a quality source to ensure no impurities that may interfere with the other minerals in the ration. Ostriches are more sensitive to these impurities than other species as a result of the high density required to achieve production rations.

5. Vitamins and Additives

These also are included in the premixes. Included under vitamins are Vitamins A, D, E, and K plus all the B Vitamins. Under additives, the Amino Acids, Yeast products and probiotics. Ostriches respond well to high levels of vitamin supplementation.

NOTE: A productive ration is achieved by balancing the premix AND the ingredients in the ration - with attention to the nutrient levels, mineral interrelationships, ratios of organic sources of vitamins and minerals to inorganic sources, total amino acids and ratios to each other to ensure the ration is capable of performing the task it is designed for. ie. Maximising Egg Production, ensuring fertility and chick survivability or Meat Production at maximum feed conversion and at the same time maintaining the health of the livestock. DO NOT include a premix without following the instructions of the premix company. DO NOT include a premix designed for a different species.

6. Fats and Oils

The area of fats can be confusing as there are many products on the market and different countries work with different products. A fat product should be as pure fat as possible - such as Refined Vegetable Oil or a hydrolysed Animal Fat produced only from fat from a reputable slaughter plant. Some of these products have a variety of other ingredients or are made from oil producing plants - such as Palms, Soybean, Maize and can be extremely inconsistent and care needs to be taken that the right quality product is in fact being used. There are products that vary dramatically in colour, consistency and aroma from bag to bag yet sold as the same product. The aroma from a sweet vanilla smell to a very strong and very nasty smell that will not only put the ostriches off feed but will have different characteristics in the diet leading to inconsistencies in performance and the general health of the birds.

If the product analysis of the fat ingredient is lower than 99% Fat, it is important to know what other ingredients are in these products to ensure that they do not interfere with the other ingredients in the feed formula. One such product that a farmer was offered contained 15% Calcium - for example.

There is a practice of selling recycled fats from the retail trade - past sell by date - and used oils from the restaurant trade. These get mixed together and sold to the animal feed industry. These should be avoided. If offered an oil product that is significantly cheaper - make sure that it is not recycled fats and oils. Speaking from personal experience - the salesman of such products gave me all the assurances the oil product he was offering to me was not recycled - but with further investigation it was found that the product was in fact recycled.

Understanding Ingredients Used in Ostrich Feeds, Part 4

Ostrich Nutrition Bulletin #52

December 15, 1999

By: Fiona Benson & Daryl Holle

Part IV - Farmer Responsibility, Formulations, Conclusion

7. Farmer Responsibility

There have been 3 major incidents in recent years that are worthy of note as they have severely cost the Farmer, as well as ALL in the Production Chain, and have cost millions of Tax Payer dollars. It is also considered that these incidents have put human health at risk.

UK - BSE - although associated with UK Beef, there is evidence that it is far more widespread - and the cause is Feed Company Use of Animal Protein Products in the feed - in this case it is reported not heat treated at a high enough temperature.

Belgium - Dioxine - The discovery of Fat used with traces of Dioxin resulted in ALL food on supermarket shelves both within Belgium and Belgium exports being withdrawn. This incident cost the producers, and ALL in the production chain (and the Belgium Tax payers) a great deal of money - into the hundreds of millions of dollars.

France - Traces of Human Sewage in Cattle Feed.

It is the responsibility of all farmers to make sure that the ingredients are of the right quality as these three cases were all caused by Livestock Feed Companies. Know and understand exactly what you are feeding your birds. The farmer's profit comes from the ability of his feed to provide all the functions relating to body maintenance, health and production - cost effectively. If we put a low grade fuel into a vehicle designed for high performance - the performance will not be achieved. Put a low grade fuel into an animal - the loss of performance is lost production which equates to lost profits. If the grade is too low - the result is not only lost performance it can be higher chick mortalities and in severe cases mortalities of older birds as well. The ultimate product produced also has a lower market value - if it can be sold at all. The low grade - cheap fuel - being the most expensive fuel you can buy.

8. Formulations

The knowledgeable nutritionist, when formulating rations will include ingredients from each of the previously mentioned feed ingredient groups - the proportions will vary dependent on the type of rations ie. Breeder, Starter, Grower etc. to achieve the required nutrient levels such as protein, fat, energy, fibre, vitamins and minerals.

With other species there are minimum guide lines laid down on recommended daily intake of each nutrient levels that will ensure that the animals sustain life and health at basic levels of production. From that basis, dependent on the approach of the mill, nutritionist or farm - rations will be formulated to provide body maintenance along with a certain level of production goals to be supported by the feed formula. However, that is not always the case. Some mills and nutritionist, due to the lack of published information on Ostrich, simply do not understand how to identify the difference between a survival only ration and a production ration and they have no personal experience of such differences. This has led to THOUSANDS of different feed formulas floating around the world and it becomes most difficult for the uneducated farmer to sift through to identify the correct one.

Most feed formulas can be summarized into TWO CLASSES--Survival Rations and Production Rations. A Survival ration really has no plan to its basis other than HOPEFULLY keeping the adult birds alive. This type of ration has no plan for egg production, chick hatchability, chick survival through egg yolk nutrient transfer, or chick growth. A production ration will not only be formulated for adequate body maintenance (adult survival), but will also be based on certain production parameters mentioned above. A production ration will also include parameters for replacing lost body reserves in breeding stock after a long year of egg production. A Production ration has a PLAN that fits the nature of the production of Ostrich--much more than just keeping the adult birds ALIVE!

A true Production ration will always have a built-in benefit of maximizing the genetic production potential of the birds. It is hard for an excellent genetic bird to continue producing high records year after year when the ration being fed is a Survival ration rather than a Production ration. In fact, high producing birds of excellent genetic qualities are usually the FIRST to falter when fed a Survival ration as their body reserves are the first to be depleted. This single subject is a major problem in the ostrich industry and makes it most difficult to identify the TRUE GENETIC POTENTIAL birds.

Following are some other discussions concerning Survival and Production rations for Ostrich:

Survival Rations: Usually formulated to the most basic recommendations that ensures the survival of the animal and maintains basic health - most likely using least cost formulations. Least cost formulations will result in a ration that will use the ingredients in each group that are the cheapest buy of the day and results in ingredient changes from batch to batch of feed. These changes can often be quite severe and lead to Ostriches going off feed.

There is an added problem with Ostrich as there are no basic recommendations developed from years of research as with other species. Currently in Ostrich these types of formulations lead to many of the problems experienced by farmers - such has poor and erratic breeder bird production, high chick mortality and Carcass Weights of 40kgs - 50kgs (meat yields of +/-25kgs) at 12 - 14mths. Little muscle growth and poor feed conversion. At slaughter carcasses fall into the Utility Grade Category.

Rations developed using the advice below will fall into the Survival category:

* Recommendations that an ingredient from one group may be substituted with an ingredient from another group. ie. Grain by product such as Wheat Bran is acceptable as a substitute for a

Forage - Lucerne.

* Formulation recommendations that do not specify the quality of the ingredients - ie. Lucerne Hay or Soybean Meal with no qualification of protein content.

* Recommendations that say it is safe to use grain by-products for Ostrich as a result of Ostrich's ability to digest fibre.

Farmers utilising these types of rations generally have the additional expense of frequent vets visits as well as low productivity.

Production Rations: Some nutritionists will increase the levels from the basic recommendations for body maintenance to have some plan of production from the species. Other species have reached the level that many rations will have the basic recommendations increased substantially over the minimum Survival guidelines. When applied to Ostrich - Survival rations that keep the birds alive achieve 40-50 slaughter birds/hen per annum and meat yields around 35kgs at 12mths are currently taken as successful when they are actually numbers that equate to the bare minimums of Ostrich. Ostrich have a much greater potential than that with a good productive ration, good feeding management, and good farm management.

Maximising Genetic Potential: The ability to achieve rations that maximise production by challenging and nutritionally supporting the genetics, eliminate metabolic problems when achieving optimum production and quality of product of any species will come from nutritionists who go beyond the text books. A certain flair for understanding the unique tolerances and responses of the different species to certain ingredients and combinations of nutrients is required--especially for Ostrich.

Modern nutritional technology has also moved beyond severe changes in rations from production periods to rest periods. In the past, some nutritionists thought that it was necessary to use a flushing ration to prepare for the next production season and some people are still advocating that thought. The flushing technology is of yesteryear technology replaced by more modern nutritional technology that says when birds are fed correctly YEAR AROUND, there is no need for flushing. Breeder birds fed correctly during the laying and rest periods will automatically come into full production when the laying season begins. And, the birds will far outproduce (closer to genetic potential) the flushing technology as their body reserves are adequate to support such sustainable production.

9. Conclusion

Every farm operation needs production goals and targets. Blue Mountain has made specific goals and targets that we deem as achievable and reflect the true potential of these wonderful birds. You can review this production targets at: http://www.blue-mountain.net/feed/p0001689.htm.

If your farming operation is not achieving the Production Targets as highlighted at the bottom of the article, then I would suggest that you take a close look at your current rations, the type and quality of the ingredients used, the levels of the Supplemented Vitamins and Minerals and the overall design of the rations. Check that the birds are being fed with the correct frequency and that the feed is not exposed to the air and sun for more than a few hours each day, that the correct amount is being fed

and that the birds are consuming that amount. Ensure that there is a clean supply of water, at the correct temperature for the season, available at all times. If you are not achieving those targets - then we are here to assist you in achieving those goals.

The High Cost of Blue Mountain - Fact or Fiction?

Ostrich Nutrition Bulletin #58

December 15, 1999

By: Fiona Benson

Few dispute that Daryl Holle of Blue Mountain Feeds understands the nutritional requirements of Ostrich and what is required to build a successful Ostrich Industry. This comment was made to me this past week: "I have talked in the past months a lot about BM food and the only thing I get reported back that it is great but unbelievably expensive and therefore not economical." As I am well aware of this misperception let us examine the economics in more detail. Once these are understood the Ostrich Industry can make rapid progress forward.

Many of you may not be aware that Daryl Holle farms Ostriches himself and started his nutritional work with Ostrich when he recognized from his experience that the advice being offered and the rations available simply would not be cost effective - and this is proving to be true. As a producer, it clearly makes no sense for Daryl to design rations that would not be cost effective - total waste of time and effort. We all know his continuing dedication to the success of this industry as a result of his understanding of all that controls production and the quality and consistency of the products.

The single most important factor that is overlooked by producers and support specialists everywhere is how LITTLE Ostrich eat given their production potential and their sensitivity and response to the correct nutrition. Many of you will have purchased additional vitamins to add to water or feed as a supplement and observed the difference in results. Vitamins are expensive and required at high levels B but are not the only factor that enhances performance and improves the general health of the Ostrich. The Ostrich requires a dense ration (high nutrient value) and that comes at a high cost per tonne B but LOW cost per UNIT of production.

BREEDERS:

All of us know that hens are capable of laying in excess of 60 eggs per annum and some in excess of 100. How many can tell me that their breeders are achieving this consistently year after year B many find that the production fluctuates from year to year? How many of you that are setting all eggs laid report only 10 or 20 chicks to reach slaughter birds or pre-breeder? For some I know it is even lower.

How many additional chicks per annum would it take to pay for the additional cost per tonne? The answer of course will vary depending on where you are located and the costs of your current nutritional program. Remember it is essential to cost in EVERY input B Grass or Lucerne grazed, Supplementary Vitamins and/or minerals, Licks, Vitamin Injections and so on B these are ALL contributing to the total daily nutrient intake of your birds.

One large producer has told me that he works on 2 eggs for one chick. Now add the savings in incubation costs per chick if that figure is reduced to 1.2 eggs for one chick.

Land and fencing is expensive in many areas B if a trio can double their production of viable eggs B what is the savings in the costs of infrastructure B either by requiring fewer breeders to achieve your production objectives B or through increasing your turnover?

Add these together and even if the cost of the breeder rations were double your current cost B what is the Cost per Chick on the Ground compared to current levels of production?

To assist in the calculations it is prudent to work on 800kgs per breeder per year B for a trio this will be 2400kgs of feed per annum.

20 chicks per trio requires 120kgs of Breeder Feed per chick on the ground.
40 chicks per trio requires 60kgs of Breeder Feed per chick on the ground.
80 chicks per trio requires 30kgs of Breeder Feed per chick on the ground.
120 chicks per trio requires 20kgs of Breeder Feed per chick on the ground.
160 chicks per trio requires 15kgs of Breeder Feed per chick on the ground.

Further but less easily quantifiable benefits of nutritionally supporting your Breeder Birds:

The chicks once on the ground are much stronger and healthier. They have greater resistance to disease and have strong and healthy organ development to enable them from Day 1 to be able to utilise the nutrition they are receiving to maximise their incredible ability to convert feed to muscle and growth.

With Breeder birds nutritionally supported it is then possible to identify those breeders that are genetically superior Breeders.

Chicks from breeders that are correctly fed and nutritionally supported at the right levels throughout their growth period reach puberty significantly earlier than is commonly seen B both males and hens producing in their second season following hatch - this for Reds, Blues and Blacks. Thereby coming into production 12 months and in some cases 24 months earlier than is traditionally considered possible. What are the cost savings of 12 or 24 months of non-production B not only feed but also additional infrastructure and labour? One Oudtshoorn farmer told me that only 20% of their potential breeders actually become productive breeders. I have also been told that no chicks from the first month of production will be sold, as they know these to be the strongest chicks and therefore retained for their own use.

SLAUGHTER BIRDS:
A slaughter bird from a correctly fed Breeder and fed correctly during the whole of the growth period should reach the traditional slaughter weight of 95kgs well before 7mths. At 9mths there should be in excess of 35kgs of meat and more likely in excess of 40kgs of meat. It requires 50% MORE feed to take a bird from 9mths to 12mths.

What are the cost savings and benefits here?

Reduced chick mortality

7mths B 240kgs Feed required
9mths - 375kgs Feed required
12mths B 575kgs Feed required

Reduced infrastructure to hold birds for 3 months longer

Shorter period of financing of those birds

Improved Cash Flow

Min. 50% Greater Meat Yield B faster grown muscle produces higher quality meat B Quality determines Value

Skin Quality is more consistent from well nourished birds, with greater resistance to scarring. Earlier slaughter also brings reduced opportunity for scarring and damage from fighting. At current SA tannery Farmer skin prices the difference in Dollar value between a Grade 1 skin and a 4th grade or below is: $130.00. The difference in a Grade 1 skin and 3rd Grade skin is $50.00.

Current average Grade 1 finished skins is below 20% - in some regions it is below 5%.

It costs exactly the same to process a bird yielding 25kgs of meat as a bird yielding 40+kgs of meat B reduction in processing costs/kg.

It costs exactly the same to tan a skin whether it has a finished value of $320+ or is a reject with a finished value that barely covers the costs of tanning.

GENETICS:
Apart from developing good quality Feather Birds, there has been NO breed improvement carried out since Ostrich farming commenced 150 years ago. Below is a list of Symptoms of mal-nutrition that indicates why B as most can identify with many of those symptoms. Only when Ostriches are nutritionally supported will it be possible to identify the good genetic birds and develop the species. The current production targets that we set are achievable with most birds currently in production.

For the next few years B those that work with Blue Mountain rations and the whole feed and farm management program, will see improvements in performance as the current breeders become stronger and healthier. When we have several generations of correctly fed birds genetic selection can commence. At the same time the rations can then be developed to support these improved genetics.

SYMPTOMS OF MAL-NUTRITION

BREEDERS:
Low Egg Laying B below 40 eggs per season as a guide
Variations from Season to Season
Inactive Breeders
Irregular Laying in Extreme Weather
Late Start in Season
Early Finish
Irregular Feather Moult
Yellow Colour of Skin
Too Fat
Too Thin
Health Problems
Irregular Egg Sizes
Poor Egg Shell Porosity
Fertility below 90%
Early Embryo Death
Dead in Shell
Assisted Hatches
Deformities in Hatched Chicks
Chick Mortalities
Irregular Growth Rates within a batch
Records indicating slower growth rates as the season progresses
Records indicating poorer feed conversion as the season progresses
Increased Chick Mortality as the season progresses

There are environmental factors that can cause some of the above B but for the most part currently poor Breeder Nutrition is the primary cause.

GROWERS :
High Mortality
Slow to Eat
Highly sensitive to Temperature Change
Yellow Colouration
Deformities
Leg Rotations
Yolk Sac Infection
Slow Growth Rates
Limited muscle development
Poor Food Conversion
Poor Organ Development
Poor or NO Growth in the Winter
Prone to Disease
Prone to Bacterial and Fungal Infections
Prone to Parasites (Worms and Mites)
At Slaughter:
Small and/or Livers that demonstrate disease of odd colours

Fatty Livers
Small Hearts, Mushy Hearts
Yellow Fat
Excessive Fat
Oedema
No Fat
Dark Meat
Black Meat and Black Spots when exposed to the air
Pale Meat B White tinges to some muscles
Low Meat Yield

CONCLUSION
To optimise the feeding of Ostriches at all stages of the production chain, it is essential to recognise the production potential of the Ostrich and their outstanding ability to respond to good nutritional practices.

The TRUE cost benefit is the resulting High Quality Meat associated with these high levels of production. Whilst there are producers who see only the skins as the product - it only makes commercial sense to maximise the potential return from these birds. Feeding for Production and Consistent "Quality" is of the utmost importance - BM is proven that it can bring these results.

If any of you would like me to cost BM formulations in your area I would be pleased to do so. To do this I would require the local costs of:

Lucerne Alfalfa min. 17% Protein
Maize - min. #2 Yellow Maize
Dehulled Soyameal - 47% Protein (if not available 44% Protein)
Wheat
Wheat Middlings
Hydrolised Animal Fat or Refined Vegetable Oil

Closest port for shipping and numbers of birds to be fed if living Outside the US.
If in the US the miles that you are from: David City, Nebraska or Omaha, Nebraska.

Fat As Health Status Indicator for Ostriches

Ostrich Nutrition Bulletin #62

August 15, 2000

By Cooper, Benson, Holle

Message From Daryl Holle:

Many of you have been requesting that the Ostrich Nutrition Bulletins contain some Ostrich scientific articles rather than the laymans language of the continuous subjects of feed, feeding managment, and farm management. While all 3 of those areas are of most importance in any production Ostrich operation, it may be worthwhile to break from those discussions for a short while and re-print some scientific data that has been accomplished to date. Blue Mountain Feeds has contributed a tremendous amount of nutritional information to the Ostrich industry and much of it is now being converted to scientific data for all to benefit from.

The following article was accepted and published by The International Journal on Feed, Nutrition, and Technology. The Authors of the article are Daryl Holle of Blue Mountain Feeds, USA, Fiona Benson of Blue Mountain International, South Africa, and RG Cooper of the Department of Physiology, University of Zimbabwe. The article is lengthy but hope you enjoy!

FAT AS HEALTH STATUS INDICATOR FOR OSTRICHES
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Dietary lipid and cholesterol are reported to play a major role in reproductive performance of ostriches and are thus influential on flock expansion. The omission of fat in feed is detrimental to health due to an inability to utilise fat-soluble vitamins. A blend of animal fat and vegetable oils has been shown to improve fat mobilisation.

Fat colour is important in gauging the general health and meat quality from the birds. The avoidance of yellow fat in red meat production is seen as important due to its lack of consumer acceptance as a result of its appearance and, sometimes, unpleasant odour. Yellow fat has erroneously been considered not important in the ostrich, as it has no fat trim or marbling. It is, however, an indicator of dietary imbalances. This emphasises the need for a balanced ration in order to maximise body energy and protein gain, and of the beneficial influence of supplemental fats on energy utilisation from non-dietary lipid constituents. The development of such rations can be achieved most effectively through the joint efforts of producers and scientific researchers.

APPROPRIATE NUTRITION VITAL

Adequate nutrition is vital for good ostrich productivity[13]. Ideally knowledge of the specific nutrient requirements of ostriches is needed to achieve maximum growth rates[28] and good meat yields [6]. Indeed, good quality meat is vital if the ostrich farmer is to maximise his return on investment[11],[12]. Within the domestic birds, the current literature of lipid utilisation is restricted mainly to poultry, much of which discusses the effect of dietary inclusions on lipid balance[1],[2],[4],[9],[20] and the provision of metabolisable energy[23].

Dietary lipid and cholesterol have been reported to play a key role in the reproductive performance of poultry[14],[15],[19],[32] and are thus likely to be important in ostrich productivity. The correct balance of protein and carbohydrate in the diet is important given their association with body fat content[29] via hepatic metabolism. Imbalances are liable to lead to the deposition of yellow fat [6], and can arise from sudden changes of dietary fat sources[25]. The aim of this review, therefore, is to discuss the importance of lipid in the diet of the ostrich, and its role in productivity via its influence on growth and development.

FAT DEPOSITION IN OSTRICHES

Fat deposition in ostriches is as a result of hepatic mobilisation of fatty acids and glycerol. There are currently only a limited number of reports on dietary fat digestibilities in ostriches. In one study the feed used contained 7.3 % fat (Soya bean oil) and 33.9 % neutral detergent fibre (NDF), the digestibilities of which were shown to increase with age[3] (Table 1).

Table 1: Apparent NDF and fat digestibilities in ostriches of different ages

Age	NDF Digestibility %	Fat Digestibility %
3 weeks	6.5a	44.1a
6 weeks	27.9b	74.3b
10 weeks	51.2c	85.7c
30 months	61.6d	92.9d
SEM	4.5	3.7

Means with different superscripts are significantly different ($p<0.05$)
Source: Angel (1993)

Studies of nutrient mobilisation in Ratites are limited. One study[31] makes an attempt to discuss nutrient utilisation in emus, although the data presented therein cannot be related directly to ostriches, because of anatomical differences between these two Ratite species[27]. It has been reported that the omission of animal fat in feed formulations is detrimental to the utilisation of fat-soluble vitamins[18]. The author describes the mobilisation and storage of vitamins A, D3, E and K as being most efficient in the natural body fat of the ostrich, being efficiently achieved with a dietary blend of vegetable fat and animal fat.

Unfortunately, many manufactures of ostrich feed do not observe fat levels adequately. Observing a balance of quality animal and vegetable fat in the ration at levels to match the nutrient levels in the ration, ensures the efficient carriage of fat-soluble vitamins into the bloodstream on a daily basis. In the laying ostrich hen, stress may arise from high production or extreme weather, resulting in the mobilisation of its fat reserves and fat-soluble vitamins for the development of eggs and embryos.

It is reported in poultry that most lipid in egg yolk is formed in the liver by using fatty acids obtained from the diet or from novo synthesis. Therefore the provision of dietary fat decreases the need for hepatic fatty acid synthesis and generally increases yolk formation and weight of the egg. Indeed, it has been reported by the NRC Nutrient Requirements for Poultry (U.S.A.) that vitamin A is important in egg production, hatchability and fertility; vitamin D in egg production, hatchability, fertility and shell quality; vitamin E in hatchability; and vitamin K in hatchability.

The addition of fat to the layer diet in turkeys has been reported to result in an increased egg production, fertility and body weight[15]. Other studies in poultry describe a significantly ($p<0.01$) improved fat mobilisation in birds when vegetable oils, and animal-vegetable blend fat is added to their diets[21]. In this study, diets containing no supplemental fat acted as controls, against which diets containing 5 % of tallow, corn oil, soybean oil, animal-vegetable blend fat, or canola oil were compared. However, in birds fed diets containing palmitic acid, oleic acid or a 50:50 (wt/wt) mixture of these fatty acids, there was a significant ($p<0.05$) reduction in the apparent retention of nitrogen, magnesium and calcium. This was confirmed in an earlier study[5] in which metabolisable energy values of diets followed a trend similar to fat retention and independent of dietary calcium levels. Hence the importance of ensuring a combined animal-vegetable fat mixture to the diet.

FAT COLOURING

Many studies fail to note the fat colour, liver condition and meat yield in their birds. It is often considered that the yellow colour is simply caused by the use of maize and/or Lucerne, or grass in the rations and it is the beta-carotene in these ingredients that is responsible for the yellow colouration[26], making many believe that fat colour is not a significant problem. The significance of fat colour is because it is one indicator as to the general health of the birds and can be used as a dependable indicator of meat quality and consistency from the birds[24].

There are also many references in other animals of lower meat yields due to poor muscle development. For instance, grass-fed cattle consistently achieve a lower grade to those fed a balanced ration for a number of days prior to slaughter, and yellow fat is perceived as a significant problem[22]. Lower meat yields go hand in hand with carcasses that have yellow fat. Experiments with grass-fed cattle being supplemented for a period prior to slaughter have experienced improved muscle growth, fat and meat colour, and meat yield[24],[26], implying that ration imbalances and/or nutrient deficiencies are prevalent in cattle grazing. Indeed, grazed animals rarely have access to adequate vitamin and mineral supplementation resulting in deficiencies of essential nutrients, and, like grazing cattle, ostriches being fed a deficient diet, will experience lower meat yields and develop yellow fat.

From a farmer's point of view, the presence of white fat is a useful "clue" as to the adequacy of his/her rations and his/her ability to maximise feed conversion in his/her birds[22]. What is not understood by many is that animals draw on their fat reserves during times of stress[16]. Whereas white fat is very easily mobilised and can be quickly converted into energy, yellow fat is tightly bound and mobilises much more slowly especially when nutrient deficiencies are severe[6]. When fat is easily mobilised, a healthier bird will result especially during the winter months when slaughter birds are growing the

fastest, and require additional energy during bad weather.

CONTROLLING FAT PRODUCTION

There are many components in the diet that control fat production and mobilisation. It is well documented that an excess of energy in a diet will cause excess fat to be laid down and that an excess of protein will convert to fat. One study demonstrated that in chicks fed diets deliberately void of protein ingredients, carbohydrate and fat utilisation were significantly ($p<0.01$) diminished[30]. The response surface of body energy gain was roughly parallel to that of metabolised energy, the former being dependent on the caloric ratio of dietary carbohydrate to fat. Another study reports that the addition of a relatively unsaturated fat or saturated fat to the diet enhances the dietary metabolisable energy[23]. The authors also describe the inclusion of fat in the diet as increasing the utilisation of energy from sucrose.

These studies emphasise the need for a balanced ration in order to maximise body energy and protein gain, and of the beneficial influence of supplemental fats on energy utilisation from certain non-dietary lipid constituents. An excess of these nutrients may be caused through the inclusion levels in the ration being too high, but more often, the cause of excesses is a shortage and/or imbalance of vitamins and/or minerals in a ration that results in the animal's inability to utilise the nutrients in the rations.[8],[10] It has been reported that low phosphorus levels contribute to a poor utilisation of the high energy and causes even greater fat production[17].

Calcium, phosphorus, zinc, manganese, copper, selenium, magnesium, potassium, and salt are also important minerals/trace minerals that assist with the total digestion process and are key to fat and meat production. Phosphorus, for instance, increases energy utilisation by helping livestock make better use of carbohydrates in the rations. Vitamins A, D3, E and K also help with the digestion/conversion process via their general effect in promoting weight gain and feed efficiency. In addition, the B-complex vitamins including Choline, Niacin and Biotin, help convert body fat to mobilised energy in the bird.

The B-complex vitamins control or regulate enzyme activity in the body, and are principally involved in the breakdown of feed nutrients for absorption into the bloodstream. As such, these enzymes stimulate appetite, and promote an increase in production, more efficient feed utilisation and improved reproduction. Deficiency symptoms are often severe; for instance, chicks deficient in Niacin show poor feathering, scaly dermatitis and sometimes a "spectacled eye". Certainly, if the bird has some body fat but cannot mobilise it, it just gets fatter[17] with undesirable effects on meat quality[11].

CONCLUSIONS

Minerals, trace minerals and vitamins must be balanced with the rest of the ingredients in the ostrich diet in order to maximise metabolic utilisation. Indeed, diets can be carefully formulated so that they control the amount of fat desired and enhance meat yields[7]. The importance of using common sense in the development of a productive ratite diet by the producer through observation, understanding and experimentation, should not be overlooked as this is often crucial to successful flock growth. Working hand-in-hand with scientific researchers in order to develop a more practical focus for improving ostrich farming is also important.

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Prolapse In Ostrich Chicks - Causes & Remedies

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By Daryl Holle

A Prolapse condition in Ostrich chicks is one of those disorders that if you have never experienced it, you may not even know what it is. However, once you have experienced and witnessed it, it will never be forgotten as it can be a most frustrating condition to deal with. Before we get into causes and remedies, it would be wise to exactly identify the Prolapse Condition so all farmers are on the same page in diagnosing this condition:

Exactly, what is a Prolapse condition?

Prolapse is the falling down or falling out, inversion, or displacement of a part of the animals anatomy. Depending on the animal affected, some examples of common Prolapse can be a rectal prolapse, a oviduct prolapse, an anal prolapse, a uterine prolapse or a vaginal prolapse. A common Prolapse in cattle is the Uterine Prolapse. If it is going to occur, it will be after calving with the entire Uterus coming out the back end of the cow, turn inside out, and hangs like a large pendulum. Of course, when this happens, all of the major Uterine arteries of the cow are exposed and tearing or bumping one of them will immediately cause the cow to bleed to death in a short period of time--so it is a most serious condition that needs immediate attention.

In Ostrich, the most common Prolapse is the rectal prolapse with an occasional anal prolapse. It is also possible in Breeder Ostrich to have an oviduct prolapse, although I have never personally seen one. An oviduct prolapse is also commonly referred to as a Blowout of the birds oviduct and is characterized by a large mass protruding from outside the vent. A rectal prolapse in Ostrich is when the last portion of the intestine (or colon) tears lose and actually and comes out the back end of the bird inverted (inside out). This can be a most startling condition to witness and most often happens in Ostrich chicks of a young age--rather than adults.

A book called The Merck Veterinary Manual, Fourth Addition describes rectal prolapse as A complete inversion of the posterior portion of the rectum through the anus, usually characterized by the protrusion of a large cylindrical mass covered with a congested, inflamed and often hemorrhagic mucosa.

What is the CAUSE of Ostrich chick Prolapse?

There are many theories and reasons floating around the world as to the cause of Ostrich chick prolapse. Some say it is a genetic problem, while others say it is caused by the chick trying to pass very hard pellet-like fecal material causing undue strain on the colon forcing it to tear lose from its supporting connective tissue and allowing it to come out the back end of the bird. I personally DISAGREE with

all those statements. It has been my explicit experience that Prolapse is clearly caused by nutritional deficiencies in the animal's diet. Correcting the nutritional deficiencies corrects the problem and prevents prolapse from occurring in the first place.

In support of my opinion, I again quote from The Merck Veterinary Manual which says: "Rectal prolapse is encountered most frequently in young animals which are depleted in Protein, Vitamins and/or Fluids, and which may have been consuming a higher fiber diet". My opinion, however, is greatly expanded from this statement:

Prolapse in Ostrich chicks is caused by weak connective tissue and muscles supporting the intestine and weak sphincter muscles supporting the vent. This weakness of the supporting tissue and muscles creates a flaw in the digestive system of the bird. This flaw can be easily corrected with a proper and balanced diet OF ALL nutrients required by the bird including Protein, Energy, Fat, Fiber, Minerals, Trace Minerals, and Vitamins in adequate amounts. When the bird's diet is properly balanced, fed to the birds in proper amount, and ingredients are such that they are utilized by the bird properly, the bird's muscles and connective tissue grow much stronger eliminating the digestive flaw, or weakness, in the system. It is the weakness in the digestive system that allows constipated birds to strain and tear lose the connective tissue and muscles surrounding the intestine. Therefore it is not the strain of moving constipated fecal material through the intestine by itself that caused the prolapse, but rather the weakened tissue and muscles surrounding the intestine, holding it in place, that allows the prolapse to occur.

The proof of all this is the fact that when chick farms experiencing high incidences of chick prolapse correct their feeding programs, eliminating the nutritional deficiencies, the prolapse problem eventually CEASES. Chicks can still occasionally pass constipated fecal material without problems, difficulties, or threat of prolapse. The same is true of cattle in my experience. A Prolapsed Uterus can be totally eliminated after a period of time following a good feeding program containing an intense management of proper and balanced nutrition and good nutritional feeding with high nutrient utilization factors. Even after difficult calving births, the cow's uterus will stay connected and not be torn lose from its anchoring tissues and muscles.

There is a secondary factor that can cause prolapse in Ostrich chicks, and that is a bird that is heavily parasite infected. However, the nutritional deficiency syndrome is still the major contributing factor to the prolapse in this case as the parasite(s) are robbing the bird from its nutritional needs thereby weaking the connective tissues and muscles of the intestine.

Remedy for Prolapse Conditions:

Once an Ostrich Chick has prolapsed, it can be surgically fixed by an experienced Veterinarian. This is usually done by stuffing the contents back in the bird, then suturing back and forth across the vent to hold all in place. However, the success of this totally depends how quickly the connective tissue grows back to hold all in place so the sutures can be removed. If the bird continues the constant straining of the gut, the success of all this procedure is most certainly impeded.

The BEST remedy is a preventive remedy. That, of course, is to feed the birds a balanced diet in proper levels allowing the overall health of the bird to prevent the prolapse problem. Feeding the proper diet will also greatly improve digestive by moving feed faster through the gut, with higher fluid levels, causing less strain on the intestinal connecting tissues automatically. Even in times when the

chick is not feeling well and is experiencing some constipation for one reason or another, the healthy connective tissues and muscles are strong enough to hold the intestine in place without problem.

It is also wise to make sure that prolapsed birds are not heavily infected with parasites. If they are, this falls under good farm management practices and all birds should be treated for those parasites using Veterinarian recommendations. After the parasite treatment is complete, then the feeding programs, feeding management, and farm management practices must be re-analyzed and changed to prevent prolapse from re-occurring.

Summary:

The Prolapse condition in Ostrich chicks is directly related to nutritional deficiencies either in the diet of the chick, or the diet of the Breeder Birds laying the egg that the affected chick was hatched from, or from some condition that is causing the chick to be nutrient deficient. If your farm is experiencing problems with Ostrich chick prolapse, get some help NOW to totally analyze the diets being fed and how they are being fed. You can be assured that this condition can be remedied with corrective action to your feeding programs, feeding management and farm management methods.

Chalky Ostrich Eggs - Causes & Remedies

Ostrich Nutrition Bulletin #64

February 1, 2001

By Daryl Holle

1. Imbalanced Diet or Poor Diet:
The leading cause for this symptom is Bird diet. An imbalanced diet will usually be reflected in poor egg qualities. A hen needs certain nutrients supplemented daily in her feed to ensure good production and high quality eggs.

Chalky eggs can be a deficiency of several important nutrients in the feed being fed the hen. If almost every egg laid by this hen is chalky and the shell is only one single layer thick, it more than likely is a nutrient deficiency or nutrient incompatibility somewhere in the diet (maybe several of them).

2. Two Shells On One Egg:
Every once in a while, the hens internal egg factory can get out of timing. It is not unusual to find a chalky egg that has two shells. The inside shell is normal, but the outside shell is "inside out" or rough side out. You can quickly identify this egg by breaking it and seeing two layers of shell with the normal shiny surface of the first shell in between the two layers.

These double shell eggs are almost impossible to incubate as the embryo cannot get sufficient air supply without some sort of alterations to the egg.

These double-shelled eggs are rare, but can occur 2-3 times per season from some hens.

Another good clue that the chalky egg is a double-shell egg is if you find a wet spot in the pen (and maybe a few fragments of egg skin) where a "skin egg" was also layed by the same hen. Birds usually always eat skin eggs right away (they have no shell). In other words, two eggs were layed, one egg received both shells and the other egg none!

3. Severe Bacterial Infection In The Egg Tract:
Chalky eggs can be a result of a severe bacterial infection in the egg tract of the hen. This occurs because the tissue walls of the tract are severely inflammed and swollen in some areas. Sometimes, this inflammation causes the cuticle gland (the gland that produces the shiny coating on the egg) not to fuction properly giving the egg a very chalky appearance.

If this is the cause of the chalky eggs, almost every egg layed by this hen will be chalky until the infection clears. Contact your Veterinarian to perform a swab sample of the egg tract and follow his/her recommended treatment to eliminate the infection.

4. Genetics:
Genetics play an important role in egg quality. However, it is difficult to determine if genetics are responsible for the egg deformity unless one makes sure FIRST that the diet of the hen is correct. If

changing the diet to a fully balanced diet with no added ingredients along with feeding the proper amount per bird per day does not have an effect on the chalky egg syndrome, then genetics may be the dominating factor.

Some birds can have defects in their egg factory that result in constant laying of chalky eggs. If a certain hen lays eggs that are difficult to incubate, it may be wise to dispose of this hen at the earliest opportunity.

To GRIT or Not To GRIT - That Is The Question!

Ostrich Nutrition Bulletin #65

March 8, 2001

By Daryl Holle

Over the years, I have heard more Pros and Cons about feeding Grit to Ostriches than probably any other subject. Some folks feel Grit feeding is crucial to good digestion and bird health, others feel it is not necessary to Grit feed at all. In order to fairly answer this question, one must ascertain a lot of facts and understand them thoroughly, then separate that from FICTION to make a decision that is correct for the individual farmer and his/her operation.

FICTION:

Fiction Statement:
"Ostrich have to ingest grit to aid in grinding feed in their Ventriculus (Gizzard). Chickens have Gizzards and need grit in the Gizzard to grind feed, so therefore Ostrich need grit also."

Answer:
Just because a bird has a Gizzard does not automatically mean it needs to be fed Grit. The practice of feeding Grit to chickens stopped decades ago as it was found that feeding a balanced diet of proper nutrients will cause the gizzard muscles to be much stronger enabling it to grind feed wonderfully on its own.

Fiction Statement:
"My Vet says that he notices a distinct difference in the health of the intestines and internal organs when Ostrich are fed Grit versus not being fed Grit and the birds fed Grit are always much more healthy".

Answer:
In my opinion, the above statement is a matter of preference statement and has nothing to do with FACTS. I have personally examined hundreds of Ostrich Gizzards and intestinal tracts and have yet to find ANY correlation to the health of the organs and intestines in regards to feeding Grit or not feeding Grit. What I do CLEARLY see is differing health conditions depending on the diet fed. I have seen just as many unhealthy organs on birds being fed Grit as I have on birds NOT being fed Grit.

Fiction Statement:
"The correct size of Grit to be fed Ostrich is that the grit should be about the size of the width of their toenail"

Answer:
That statement is a guideline statement and I understand that. It is not wise to feed Grit to small chicks

that is the size of large marbles. However, if one is trying to aid the grinding system within the Gizzard of the bird, small grit is also important to the grinding action. For Adult birds, a mixture of sizes appears to do the best job and is what most Adult Gizzards contain--many sizes!

Fiction Statement:
"Ostrich being fed longer stem alfalfa (lucerne) or whole corn (maize), or grazing on grass MUST be fed Grit in order to grind these more course materials".

Answer:
In my experience, the above thought is not necessarily true at all. If fact, large Grit used on Adult birds can sometimes cause more trouble than it does good by slowing down digestion and the rate of feed passage through the gut. Upon examination of some Gizzards, large stones and Grit actually wad up into a ball causing a large lump that just cannot go anywhere. The large Grit also keeps the Gizzard from closing down completely preventing a good grind of the feed.

The Ostrich Gizzard is a powerful organ. On a healthy bird, the Gizzard muscle can sometimes be as thick as 3 inches on both sides of the Gizzard. If the bird is being fed a good balanced diet of Calcium, Phosphorus, trace minerals and vitamins, these nutrients will allow VERY STRONG muscle contractions allowing the Gizzard to grind away on almost anything--and at the same time, move that feed right through the intestinal tract for proper digestion of nutrients.
I have examined Gizzards that contain some whole corn that was being fed to Ostrich without any grit or stones in the Gizzard whatsoever. That whole corn was totally pulverized by the time it reached the small intestine--without the aid of any Grit or stones.

FACTS:

Fact Statement:
"Granite Grit is the right Grit to feed as it contains sharp edges for good grinding and has very little mineral content that can interfere with a balanced feed diet."

Answer:
If one is going to feed Grit, Granite Grit is the right Grit to feed for all the reasons mentioned above. NEVER fed Oyster Shells as Grit to Ostrich. Oyster Shells are very high in Calcium. While much of that Calcium contained in Oyster Shells is undigestible for Ostrich, it still may be enough to upset the dietary balance (ratio) between Calcium and Phosphorus causing other difficulties with fertility and proper bone/muscle growth.

Fact Statement:
"Grit feeding can sometimes cut down on dirt pecking and dirt eating--especially if the birds are eating dirt to search for stones".

Answer:
In some cases, the above statement is a true statement--but not always! Some amount of dirt eating is common for Ostrich and most times it is a social event if birds are corralled in close quarters.

Fact Statement:
"Grit feeding can sometimes make matters worse in the Gizzard as long stemmed objects get tightly wrapped around the Grit stones causing a large ball that cannot get out of the Gizzard and into the

small intestine (slight impaction)".

Answer:
The above statement is very true and I have personally seen it in Gizzards many times. The ball of material can get wrapped SO TIGHT that it will take forever for that size object to grind itself down. This large ball then also prevents other material around the ball from being ground as the Gizzard cannot close down tight enough to do so. This whole process greatly impedes proper digestion in a timely manner and slows down the whole process.

Fact Statement:
"Feeding a proper nutrition diet to birds allowing them most vibrant muscle contractions in the entire gut system is probably much more important than the practice of feeding Grit".

Answer:
The above statement really needs no answer as it is a factual statement in itself.

SUMMARY:

Grit feeding is an option that is entirely up to the individual farmer. In my opinion, it is NOT a necessary part of good feed digestion but some people have tremendous good fortune feeding Grit while others see absolutely no difference with or without feeding Grit. I have heard some folks say that when they quit feeding Grit, the fecal material expelled by the birds gets harder and more pelleted--when they start feeding grit again, the fecal material expelled gets softer again. In my experience, the hard stool versus soft stool is caused by the amount of water intake per bird per day and the rate of passage of feed through the gut and the time it has to mix with volumes of water. It only makes sense that if less feed is moving through the gut with usual volumes of water being consumed each day, the stools will be more liquid than normal. If that is the case, that is not always a good thing.

I have also been told by many farmers feeding whole corn as an ingredient that without Grit, they will find some partially undigested corn and other feed material in the droppings. But, I have also seen that problem in bird droppings that were fed aggressive amounts of Grit. On the other side of that coin, I have seen birds who never have had access to Grit all their lives grinding and digesting their feed so well you cannot find anything left in their droppings.

In observing slaughter birds at the processing plant last year, I opened every Gizzard I had time for. On properly fed birds, some had stones and grit in the Gizzard, some did not. No matter which way, (Grit or no Grit) the weight of the bird or the boneless meat yield of the bird did not vary between the two types of Gizzards--which seems to correlate strongly that it is the diet being fed that is most important.

I am convinced that the practice of feeding Grit depends entirely on the nutritional diet being fed the birds. If the diet is slightly deficient causing very weak muscle contractions--Grit may be of aid, but yet sometimes may be a hindrance.

So, To Grit or Not To Grit--that option is up to YOU and what works best for YOU!

Poor Nutrition Effects On Egg Follicles!

Ostrich Nutrition Bulletin #66

April 6, 2001

By Daryl Holle

Blue Mountain has just completed another most interesting project on Egg Follicle quality differences within Ostrich Hens. The condition of a cluster of egg follicles within the hen can clearly be a determining factor on whether the hen is healthy and whether she can produce high quality egg yolks that will produce high quality chicks.

It has been thought for some time that when an Ostrich hen is fed a nutrient deficient diet that is not enough to sustain her own body Maintenance, she will begin to draw from her own body reserves of which SOME of that reserve is found in her own egg yolk follicles.
Dr. Pier Bertoni, of Italy, has also carried out research work on Ostrich reproductive organs with the use of ultra sound scanning. He has reported that the sizes of ovaries vary considerably from bird to bird and farm to farm. He has also referenced his observations of the birds drawing nutrients from the egg follicles when the feed rations fed are nutrient deficient.

The results of the Blue Mountain project have been most interesting. It is clear proof that birds fed improper diets attempt to draw from the egg follicles in order to correct their diet. This results in very poor egg yolk qualities for the embryo or hatchling chick to grow on thereby causes all sorts of malnutrition problems with the severity of the problem depending on the severity of the malnutrition of the hen laying the eggs.

Since this project and descriptive analysis required PHOTOS for comparative purposes, I have put an article on the Blue Mountain web site along with the photos to show what we found. Please click on the link below and read the article on Poor Nutrition Effects On Egg Follicles for yourself:

http://www.blue-mountain.net/feed/p0002111.htm

Hope you enjoy the article and can learn from it. These birds are quite wonderful in the way they fend for themselves. But, if the nutrition is deficient, poor egg production and poor chick quality will most certainly result as this project clearly demonstrates.

Do Male & Female Ostrich Require Separate Feed Rations?

Ostrich Nutrition Bulletin #67

May 7, 2001

By Daryl Holle

This question is asked most frequently these days from all around the world. The concern of the farmer is that Ostrich hen breeder feed rations usually contain high levels of Calcium for egg shell production. Since the Male Ostrich does not produce eggs, there becomes an automatic assumption that these high levels of Calcium in breeder feeds is too much Calcium for the Male causing him infertility and a whole list of other assumed problems.

Since the above explanation makes so much sense to farmers, they assume it to be correct. Therefore, it only takes one feed company representative, one researcher without the facts, or one farmer that thinks this assumption is REAL and the rumors begin to spread. In every case that I have followed up trying to find some FACTS behind this rumor, there were no facts to support the high Calcium theory whatsoever by itself but rather many other factors involved. High Calcium feeds being fed to Male Ostrich has been blamed for almost everything that can go wrong with the breeding Ostrich Male when it simply is not the case IF THE FEED IS A BALANCED FEED THAT HAS BEEN FORMULATED CORRECTLY.

One of the main theories behind Ostrich Males getting too much Calcium is that it will cause sterility. This has happened in some other species and research supports that theory but Ostriches are NOT another specie--they are Ostrich. Most Ostrich Male breeding problems can be traced to other feed formula problems--either being fed in the present day or how they were fed in the past.

The FACT is that too much of ANYTHING can be toxic to Male Ostriches and may even cause sterility. There are some very poor feed formulations being used around the world these days that not only will cause problems in Male Ostriches, but Female Ostriches as well. Calcium requires an adequate level of Phosphorus, Magnesium, Trace Minerals, and Vitamins to be proper utilized and handled within the bird. If these elements are in place in balanced proportions within the feed, both Male and Female can handle them well by taking what they need and excreting the excess in the feces and urine.

Male Ostriches NEED good amounts of Calcium, but they also need the supporting nutrients to handle it properly. Calcium is needed for exercise and heavy breeding activity. It is also needed along with other nutrients for semen and hormone production but it MUST be balanced properly with other nutrients.

As an example of how important Calcium is for Ostrich Males, I will reference a case I worked on in the USA many years ago. An entire flock of Ostrich Breeder birds were showing a severe deficiency of calcium. Most breeders at this farm had stiff joints (both Males and Females) and the hens were laying

chalky eggs. After a while, there was no breeding activity whatsoever and the condition continued to progress until some of the breeder birds sat down and could no longer get up to stand. The most interesting part of this severe Calcium deficiency was that THE MALES went down FIRST and were affected most severely. The hens were still walking around, laying chalky eggs, but most of the Males were down on the ground and could not get up to stand. There was a severe imbalance in the feed of Trace Minerals and Vitamins and a poor source of Calcium was being used in the feed causing all these problems. Fixing those problems got all the birds back to normal within two weeks.

The important lesson to be learned from that experience is the fact that Male ostriches DO require large amounts of Calcium--just like the Females--but they need the supporting nutrients to be able to utilize and handle within their body, just like the Females. This case made me even more suspicious that Male Ostriches may need Calcium even more than Females but cannot prove that as a FACT even though this case clearly showed that suspicion.

The most important thing to remember when feeding both Males and Females is to feed a BALANCED breeder diet. Also, feed a properly balanced Maintenance diet to the breeders in the off season to replenish body reserves. NEVER feed extra calcium to breeder birds. If you are having troubles with chalky eggs, something is WRONG with the feed or the bird itself. Change the feed formula and make sure it is adequate, do not start supplementing things in an attempt to solve the problem. Putting extra Calcium feeders in the breeder pen is a mistake. Feeding extra Oyster Shells is a mistake even though some feed companies recommend it. Feeding extra Alfalfa (Lucerne) is a mistake even though some feed companies see no problem with it. Doing any of those things will upset the BALANCE of Calcium to the rest of the nutrients in the feed formula.

In summary, Male and Female Ostrich CAN eat the same breeder feed with no problems IF THE FEED IS PROPERLY FORMULATED.

What Is A "Balanced" Ostrich Feed Ration?

Ostrich Nutrition Bulletin #68

June 4, 2001

By Daryl Holle

This question is hardly ever asked these days as most people around the world feel they have an understanding of what a balanced ration is. The TRUTH is that the word balanced has been used SO MUCH in relation to Ostrich Feed, that its true meaning when talking about Ostrich feed has really been considerably skewed and is somewhat adrift from its original descriptive intent.

Webster's Dictionary describes Balance with many different applications and definitions depending on the subject that the word balance is referring to. In the subject of Ostrich Feed Rations, the appropriate definitions of Balance refers to:

"Being equal between contrasting or opposing elements", "Equality between the totals of two sides of an account", "to arrange so that one set of elements exactly matches the other", "to bring into harmony or proportion", "a means of judging or deciding".

Concerning Ostrich Feed Formulations, you have heard me say many, many times that the FEEDSTUFF portion of the ration (examples: the alfalfa (lucerne), corn (maize), soybean meal) account for the majority of the Protein, Energy, and Fiber in a ration and the feedstuff ingredients must be of a high quality and correct sources in order to provide Protein, Energy, and Fiber at a level that can be easily utilized by the birds. But, the feedstuff portion of the ration accounts for only 50% of the total productivity of the total ration and is only one side, one element, one portion of the total ration.

Minerals, Trace Minerals, Vitamins, Amino Acids and Additives to Ostrich Feed provide the OTHER 50% of the total productivity of the total ration. The quality, amounts and sources of these ingredients determine how well they can function to hold up their 50% of the total productivity of a total ration. These elements are the other side, the other element, the other portion of a total ration formulation and are called the SUPPLEMENTED portion that allow the whole ration formulation to work well.

Therefore, when the 50% FEEDSTUFF portion of the ration is BALANCED to the 50% SUPPLEMENTED portion of the ration and BOTH SIDES are working together trying to be equal and work in harmony, we now have a 100% productive Ostrich Feed Formulation. That is the TRUE definition of Balance when referring to feeding Ostrich a balanced ration.

The problems that have occurred in the Ostrich Industry is that Everybody is feeding a balanced ration in their own eyes. All farmers have been told by their feed salesman that they are feeding a balanced ration. There is also a myth in the industry that when a farmer adds a small bag of vitamins to his home-mixed feed formula, it automatically becomes a balanced ration. To prove my point on

this subject, I can clearly say that I get hundreds of emails from farmers asking for help with their birds problems. The majority of the emails start out by saying something like the following:

"I am feeding a balanced feed ration to my birds but they will not produce any fertile eggs."

"My adult breeder birds are dying for no apparent reason, the vet doesn't know what is wrong, I am feeding a balanced feed formula from a local mill."

"My chicks all die within 3 weeks of hatching and I have had the Breeder birds and chicks on a balanced diet for over 4 years now."

"My hens constantly lay chalky eggs and I cannot understand it as they have had nothing but a balanced feed diet produced by a local feed company here."

"I grind and mix a balanced diet for my birds, but the breeders will not mate at all."

You will notice that in ALL these cases, the "assumption is that the feed diet is balanced--when the majority of the time, it is NOT! Think of it this way: Most all of the above bird problems are Nutritional Deficiency Problems. If the diet was truly balanced and the birds were being fed properly, there would not be all these problems. The diagnosis of most all these problems when everything is closely analyzed, and many others like them, is that the diet is NOT BALANCED causing severe nutritional deficiencies in the birds.

I have seen some feed formulas produced by feed mills that were clearly designed for CHICKENS and yet it was acclaimed to be a balanced feed diet for Ostrich. I have seen feed formulas that included Straw, Animal Protein Products, with very low levels of Calcium, Phosphorus and Vitamins--but yet it was acclaimed to be a balanced diet for Ostrich. I have seen farmers feed nothing but alfalfa (lucerne) and only and some trace minerals and vitamins in the drinking water claiming it to be a balanced diet.

The lesson to be learned from all of this is NEVER ASSUME that the diet being fed your birds is a balanced diet. This is where Webster's dictionary definition of "a means of judging or deciding" most certainly becomes FACT. BALANCE is clearly judged in the eye of the beholder and the term balanced diet has many different meanings among farmers, feed mills, nutritionists, and other industry people. It can mean anything and one should never put too much credibility in that balanced diet statement. One thing you CAN count on is the fact that if you are having bird problems, your total bird diet is probably NOT BALANCED--or is not being fed properly to allow the balance to work well.

In Technical Terms, my opinion of a balanced diet for any animal, including Ostrich, is when the FEEDSTUFFS portion (50% of the total ration productivity) are of the source, type and amount to MATCH OR EQUAL the other portion of the ration, the SUPPLEMENTED portion (the other 50% of the total ration productivity), which contains the correct source, type and amount of Minerals, Trace Minerals, Amino Acids, Vitamins and Additives. When these TWO SIDES work together in harmony, that is when full 100% productivity potential becomes reality and it is truly a balanced diet for Ostrich.

Two New Ostrich Nutrition Books Are Available!

Ostrich Nutrition Bulletin #69

July 3, 2001

By Daryl Holle

You have heard me say many times that "Ostrich respond to good nutrition more than any other animal species I have ever worked with". That statement is even more true today than it ever has been. Ostrich farmers around the world are finding out that their nutritional programs are lacking causing terrible problems with viable Ostrich PRODUCTION. When nearly 70% of the cost of raising Ostrich is the expense of feeding them, it is a most prudent decision to make sure the feed diet is a productive feed diet. The task of identifying whether or not your Ostrich feed is a productive feed can be most complicated and a real challenge. To help with that task, you need:

Book #1 -- "UNDERSTANDING PRODUCTION OSTRICH NUTRITION"

A new book written by Daryl Holle of Blue Mountain Feeds and co-authored by Fiona Benson of Blue Mountain International. This book is probably the most comprehensive book available on the subject of Productive Ostrich Nutrition and is most certainly one of a kind in that respect. It is completely written is straight forward laymans language and covers every topic on productive nutrition for Ostrich along with lots of writings on Feeding Management and Ostrich Farm Management. You can view the table of contents index for this new book and read more about it on the Blue Mountain Web Site at:

http://www.blue-mountain.net/feed/p0000231.htm

Book #2 -- "The OSTRICH DIAGNOSTIC CENTRE"

A book written by Daryl Holle of Blue Mountain. This book is based on years of experience working with thousands of Ostrich all over the world. This book is not only one of a kind, but the first of its kind and a book no Ostrich farmer or Ostrich Veterinarian should be without. If you or your Vet are having trouble figuring out a problem in your Ostrich operation, that symptom can probably be found in this book along with a suggested cause of the problem. This book covers more than 90% of the most common symptoms found in most Ostrich operations.

The book is well-designed and arranged so the user can start with only a symptom being witnessed in a bird group (breeder birds, chicks, growers, etc.). That symptom will get defined more clearly with a series of questions and links to other pages in the book showing more detailed symptoms and eventually leads the user to a final page for that defined symptom. On this final page are explanations for the possible causes of the symptom so that it can be corrected if at all possible.

The Ostrich Diagnostic Centre has a tremendous amount of Ostrich information and is most

interesting reading for educational purposes even if you are not having any present Ostrich problems. Reading through this book is of great help to keep an eye out for some of these symptoms in Ostrich and be ready to react to them when you see them in your birds. You can view the all-encompassing table of contents at the Blue Mountain web site at the following address:

http://www.blue-mountain.net/feed/p0002182.htm

ORDER YOUR PERSONAL COPY OF BOTH BOOKS TODAY:

You can order directly from the Blue Mountain web site at the pages indicated above. Or, you can drop me an email at daryl@blue-mountain.net and I can personally assist you. I am really excited about both of these new books as they most informative on subjects that will help every farmer (and others) in the world.

Determining Manufacturing Quality of Ostrich Feed "Pellets"

Ostrich Nutrition Bulletin #70

August 4, 2001

By Daryl Holle

There are many Ostrich farmers around the world that prefer to feed their Ostrich feed in the PELLET form that is made by a local feed mill. Some prefer this physical form of pellet feeding rather than feeding a mash, meal, or ground feed. Pelleted Ostrich feed works great also if it is a quality feed formula designed for production and then manufactured into a pellet correctly.

In my years of Ostrich Nutrition Consulting, I have been sent hundreds of feed samples from many countries of which many of them are pelleted feed samples. I have noticed that very few feed samples have been properly pelleted and am seeing all sorts of what I call Crimes against a quality feed formula because of an incorrect pelleting process. Part of these crimes are caused by customer preference in what he/she is requesting of the mill, part is caused by the local mill itself during the actual pelleting process.

In order to fully understand what the crimes are in pelleting feed, it is first most important to understand that one can have the very best feed formula in the world that is designed for good Ostrich production and growth, but that great formula can be absolutely DESTROYED if the pelleting process is incorrect. Next, it is important to understand what the attributes are of a good quality pellet:

Pellet Parameters:

Diameter Size
Length
Amount of Heat Used
The Amount of Moisture Used
The Hardness of the Pellet
The Mix of each Pellet

To explain the proper and improper methods of each of the above items in detail:

DIAMETER SIZE:
The pellet size used by the mill making the pellets is crucial and directly affects the quality of the feed for Ostrich. In order to understand that statement with some common sense, understand that the worst enemies of quality feed--things that degrade quality feed are Heat, Moisture, Friction and Pressure. One must be very careful when applying heat, moisture, friction and pressure to feed as if any of those enemies are too high, the feed nutrient value will greatly suffer.

To best explain the pelleting process, imagine a large tube-like chamber that has an auger inside it with

a die at the end of the chamber containing small holes (the size of the pellet) that the feed must pass through. To manufacture pellets, feed is fed into the chamber and mixed with STEAM which moistens the feed allowing the auger to press the feed through the holes at the end of the chamber. The heat and moisture generated during this process cause the pellet to form and stick together after the pellet cools.

The diameter SIZE of the pellet is most crucial here as it should make common sense to you that the smaller the size, the more friction and pressure it takes to get feed through those small holes. The larger the size, the less resistance it takes to get feed through the holes--lowering the friction and pressure. Also, the smaller the size of the pellet, the hotter the die gets because of more friction (heat). The larger the size of the pellet, the lesser the heat because of less friction to get feed through the holes.

The ideal temperature of pelleting feed is between 165 -170 degrees F. (74-77 degrees C.). This temperature will allow most of the natural enzymes and the greatest amount of supplemented vitamins in the feed formula to SURVIVE. Pelleting temperatures in excess of those numbers, enzymes will begin to disappear and vitamins begin to degrade rapidly. This requires careful monitoring by the feed mill so that the feed ingredients do not get scorched.

Many feed mills are operating under tight schedules and they are mostly concerned with throughput each day. Running a pellet machine at high speed will yield more tons of pellets per hour (pellets faster) BUT causes extra HEAT and FRICTION--plus PRESSURE. All enemies of a quality feed formula.

Now I am sure you can apply some common sense to why the PELLET SIZE can be a tell-tale fact of pellet quality. There are many very small pellets being made in the world, I call them mini-pellets. They measure a diameter of about 1/16th inches (1.6 millimeters) in size and they are ALWAYS glazed very shiny indicating a lot of heat was applied to force this feed into this tiny pellet. These mini-pellets should not be used for Ostrich feed AT ALL. Not even for baby chicks as the feed gets too hot and results in scorching the feed. As much as 20% or more of some feed nutrients can be lost manufacturing feed using the tiny mini-pellet.

On the other extreme, there are LARGE pellets showing up in the industry. These pellets measure a diameter of 1/4 inch (6.35 millimeters) and larger. While this may be ideal for solving the heat, moisture, friction and pressure problems of pelleting feed, they are too large for many smaller growing birds to eat well. And of course chicks do not stand a chance to eat and swallow this large pellet. Adult Ostrich seem to do well on this large pellet size as long as the pellet is NOT TOO LONG. More on length later.

The correct and optimum diameter size for an Ostrich pellet is around 3/16 inches (4.75 millimeters) in diameter. This size is a great compromise on the heat, moisture, friction and pressure problems plus most all groups and bird sizes can eat this pellet readily. Newly hatched chicks can be fed easily by crumbling this size pellet with a crumblizing machine at the mill. This allows the baby chicks to consume good amounts of feed and the feed will still have the majority of its nutritive value.

LENGTH OF PELLET:

Pellets should never be more than 3/4 to 1 inch (19-25 mm) in length for any Ostrich. All pellet

machines have a cut off blade as the pellets exit the holes that cuts the pellets to length. If this cut-off blade is adjust to a great length, the pellets will be too long. This causes slower feed intakes in Ostrich--especially if the pellets are HARD. I have seen some feed pellets 2-3 inches long (50-76 mm) and that is far too long for even adult Ostrich to choke down into their stomach.

AMOUNT OF HEAT USED:

As said earlier, the optimum temperature of the pelleting chamber is around 165-170 degrees F. (74-77 degrees C.). That will result is somewhat a softer pellet, which some farmers do not like, but also will result in a feed that is FULLY FORTIFIED according to its production feed formulation. In other words, the birds are going to get all the feed fortification that you PAID for. Don't mess that up by allowing the feed mill to pellet at too high of temperatures. Your birds will suffer for it.

Excess heat being used can always be identified by a pellet GLAZE on the outside of the pellet. This glaze is like a mirror finish to the pellet. That glaze means excess heat was used to make the pellet which damaged some of the nutrients in the feed.

HARDNESS OF THE PELLET:

Pellet hardness goes right along with the amount HEAT used. Some farmers really object to there being fines or powdered meal in their pelleted feed. They claim the birds won't eat these fines, or that the wind blows them away and so on. So, they tell the feed mill making the pellets that there had better be no fines in the feed. The only way the mill can be sure of this is crank UP the temperature to achieve a very hard pellet that will not break up into some powder. Some mills also use a product called pellet binder and sometimes this helps to prevent fines in the feed and sometimes it doesn't--just depends on the feed formula and the outside environmental temperature and humidity on the pelleting day. Operating the pellet machine at high temperatures will eliminate most fines, causing a very hard pellet, and a scorched pellet all at the same time--most undesirable.

So, be careful about your complaints about FINES in the feed. It is much better to have a softer pellet made at lower temperatures which has retained as many feed nutrients as possible in the feed. That is what you are paying the high feed prices for--NUTRIENTS--don't destroy those nutrients by trying to eliminate fines in the feed. The birds will suffer from it.

It is a much better idea to try to figure out WHY your birds don't eat the fines or powder in feed pellets. Usually this is because some of the ingredients in the feed are not quality ingredients and the powder of those poor ingredients are not appetizing to the birds at all. Keep in mind that many farmers feed MEAL feeds which is nothing but fines and powder and have great success with that. So powdered feeds are eaten by Ostrich every day. In general, if the feed formula is correct and the feed has not been scorched by pelleting, 90% of the birds will eat the fines or powder just fine. Those that won't, just clean the fines out of the feeder and discard them--at least they are getting the full potency of the pellets they ate.

AMOUNT OF MOISTURE USED:

Pelleting feed requires moisture to enable the pellets to stick together. Most pelleting machines use STEAM as a source of moisture as it thoroughly can penetrate the feed in the chamber quickly before it enters the die containing the holes that form the pellets. Excess steam can cause wet feed and the

pellet moisture will be too high causing it to mold quickly in the warm summer months. High moisture is also an enemy of feed nutrients causing them to degrade quickly. It can also cause the feed pellets to be TOO SOFT causing them to break up resulting in lots of fines and powder. The pelleting process takes lots of experience to operate correctly as outdoor temperatures and humidity most certainly changes the factors on how the pelleting machine is to be operated on a certain day.

HARDNESS OF THE PELLET:

We have already discussed this in some of the above topics, but it is most important that the pellet is not too hard. High heat, friction and pressure are the main causes of a hard pellet. Hard pellets will also usually demonstrate a mirror Glaze on the outside of the pellet. The ideal pellet hardness is a pellet that shows no signs of glazing and breaks up easily by rolling it briskly through your fingertips. This softer pellet will cause more fines and powder, but you are getting the FULL POTENCY of nutrients to your birds and that is what you are spending your hard-earned dollars for.

Another reason that pellet hardness is an important factor is the elapsed times of digestive functions within the Ostrich. To experiment with this yourself, take a handful of pellets and place them in a shallow pan with about 1/4 inch (6-7 mm) of water added to the pan. See how long it takes for those pellets to absorb the water and begin to swell and break up in the pan--don't stir or move them around, just let the pellets absorb the water naturally. Very hard and glazed pellets may take 4-5 hours before they finally start absorbing water, softer pellets will begin to breakup in 1-2 hours. You can easily see by doing this experiment that a hard pellet causing DELAYS in digestive breakdown of the pellets. An Ostrich only has 24-36 hours to totally digest feed before it passes out of the digestive system. So, you want a pellet hardness that will allow this to begin as soon as possible. Very hard and glazed pellets delay the digestive process--the feed doesn't stop moving, it continues to move through the gut but the total digestion of all nutrients is missed because of the delayed breakdown.

THE MIX OF THE PELLET:

It only makes common sense that the feed must be thoroughly mixed well before the feed goes into the pelleting machine. If it is not, the result will be pellets in the feed of varying colors. A poor mixing operation will cause some pellets to be green, some brown, some gray. Each and every pellet the Ostrich eats should contain the same nutrients if the feed was thoroughly mixed before pelleting. Varying pellet colors in the same handful of feed indicate that the feed was not mixed thoroughly. This means that the bird eating those off-color pellets is going to get a different diet (possibly unbalanced diet) than other birds eating the normal colored pellets. Birds can be selective on color and some birds will actually pick out a certain pellet color--so make sure the feed is all of the same color which validates your feed was mixed properly before pelleting.

On the subject of pellet color, there is one more factor that should be most important to you. Most Ostrich feeds are green in color reflecting the good quality Alfalfa (Lucerne) ingredient used to make the formula. When Alfalfa (Lucerne) is scorched (burned) during the pelleting process, it will cause the pellets to be very DARK green. Scorched pellets come about in two ways: If all the pellets are very dark green, the pelleting temperature was far too high scorching all the pellets and damaging the feed nutrients considerably. If there is only a few pellets in the feed here and there, those few dark green pellets are probably the pellets left in the HOT DIE of the pelleting machine from the batch of feed made previously. There usually is no way to empty the die (holes) of a pelleting machine until the next batch of feed is run forcing the feed of the previous batch out of the die holes. But, during the time that

feed was in that hot die, it was scorched and damaged. This is only a very small amount of feed and can be witnessed by only a few pellets being dark green in the total feed mix. It is hard to prevent that problem and most mills simply ignore it which is proper. But, it does show you the difference between scorched pellets and proper pellets. If ALL your pellets are very dark green, some changes are most certainly recommended as you are not getting the proper nutrition to your birds as was intended by your feed formulation.

Lastly, there are still some mills making Extruded Ostrich feed pellets. An Extruder machine operates totally different than a pelleting machine. The feed ingredients passing through an extruder experience tremendous Heat, Friction and Pressure--many times more than a pelleting machine. Extruder temperatures can run as high as 300-400 degrees F. (148-200 degrees C.). The results of Ostrich feed being fed through an extruder machine is most negative due to the high losses incurred by the high temperatures, friction and pressures. Ostrich feed should never be manufactured by the extruded feed method.

Ostrich Chick Raising Difficulties!

Ostrich Nutrition Bulletin #71

September 17, 2001

By Daryl Holle

RESULTS OF THE "REQUEST FOR QUESTIONS" BULLETIN SURVEY:

Thanks to all the people that sent in questions for Ostrich nutrition subjects and bird problems--there were a significant number of responses. The most popular subjects sent in order of popularity were:

1. **"My chicks have diarrhea and are dying at 7-14 days of age--WHY?"**

2. **"My chicks are dying from Fading Chick Syndrome symptoms, please help."**
3. **"What is the answer for preventing Splayed or Turned Out Legs in Ostrich?"**

4. **"How do farmers change feeding programs as the breeding seasons change?"**

5. **"Has there been any work done on Amino Acid requirements of Ostrich?"**

6. **"What are the minimum nutrient requirements for Ostrich?"**

7. **"Why do my baby Ostrich chicks get gut impactions on grass?"**

Blue Mountain has previously written a lot of information on all the above subjects many times over either through previous Bulletins, Articles or Books. We have researched these subjects intensely for over 10 years now. Many of the questions do not have SIMPLE one-step answers but the answers ARE KNOWN. Unfortunately, it takes a great deal of reading and understanding to find the answers to most of these problems. However, it is most important to understand that there ARE answers to all of these problems as they are all most common problems and questions related to Ostrich production.

Thorough discussions by Blue Mountain of the above subjects can be found in one or more of the following locations:

The Blue Mountain Web Site: http://www.blue-mountain.net/feed/index.htm

Blue Mountain Book: "Ostrich Diagnostic Centre"
Blue Mountain Book: "Understanding Productive Ostrich Nutrition"

Past Blue Mountain Bulletins: http://www.blue-mountain.net/feed/index.htm

There also will be a NEW BOOK coming out, written by myself, called "Ostrich Feeds & Feeding 2001" (replacing "Ostrich Feeds & Feeding 1999") which will contain ALL the Ostrich Bulletins published since inception of the Blue Mountain Ostrich Nutritional Bulletin program (nearly 5 years

now). If you are interested in purchasing any of these books, email me at daryl@blue-mountain.net as I will guide you in the right direction.

Unfortunately, people are generally looking for a SINGLE FIX or MAGICAL SOLUTION to their chick raising problems and rarely is that ever the case. The correct solutions generally lay in a total revision of their Nutritional feeding program, Feeding Management program, and Farm Management program. People generally don't like to hear those words as they just want to quickly fix the problem which is nearly impossible to do long term unless the BASIS of those problems are revised and repaired FIRST.

A perfect example of this is the Fading Chick Syndrome problem--and the problem of chicks dying at an early age with green diarrhea as the only observed symptom. Fading Chick Syndrome is a catch all phrase for chicks that mysteriously die at an early age--sometimes with diarrhea present--sometimes not! Blue Mountain has written a great deal of information about Fading Chick Syndrome (FCS), it causes, its solutions, and how to prevent this terrible syndrome and deal with it consequences. FCS is not a mysterious virus, nor is it a strange or unknown problem in Ostrich--it is most common throughout the world in Ostrich production.

Below is an excerpt from the Blue Mountain Book called "Ostrich Diagnostic Centre" that is an introduction to the causes of the FCS problem in Ostrich Chicks. This will give you a good idea of how complex these birds raising problems are and they already have been thoroughly researched by Blue Mountain. ALL Ostrich farmers should have a copy of this book and also the book called "Understanding Production Ostrich Nutrition". By thoroughly reading these books several times, loads of knowledge can be gained that will allow farmers to begin making changes and finding solutions in the right direction.

OSTRICH CHICK RAISING DIFFICULTIES

(The following is an excerpt from pages 68 and 69 of "Ostrich Diagnostic Centre" Book written by Daryl Holle of Blue Mountain Ostrich Feeds)

Fading Chick Syndrome (FCS):

Fading Chick Syndrome (herein referred to as FCS) is a most complicated syndrome to diagnose properly. It is the opinion of Blue Mountain, developed by many years of experience doing chick autopsies, working with many farmers experiencing FCS, and experiencing it ourselves, that the causes of FCS are numerous.

Rarely is there ONE set of circumstances that cause FCS. It most often is an entire set of multiple circumstances that set themselves up properly, creating an end result of severe FCS problems in chicks. Chicks die for any number of reasons--not all of these reasons are due to FCS. So, first it is helpful to identify the FCS symptoms as we know them to be.

Blue Mountain Definition of FCS:

The symptoms of "Fading Chick Syndrome" are just what the name implies. Very young chicks, usually between 7 to 21 days of age, quit eating feed and then gradually start to fade away, getting weaker and weaker, usually ending in death. The 7 to 21 days of age is not a stable factor as we have seen FCS in chicks up to 5 months of age, but usually it is first noticed in the newly-hatched chicks just getting

started in life.

Visible Symptoms of FCS:
1. Chicks stop eating or gradually cut back on feed consumption.

2. Fecal droppings sometimes range between extreme diarrhea and extreme constipation--color of droppings may also vary. The important clue here is that rarely are droppings "normal" during FCS.

3. Chicks severely cut back on water consumption.

4. When a group of chicks run together, the FCS affected chicks will run a short way, then sit down and close their eyes--sometimes making a trilling sound.

5. In advanced stages of FCS, chicks are listless, lethargic, and spend a lot of time sitting.

6. Chicks die suddenly for no other apparent cause. FCS death rates in groups of chicks are usually very high. The first chick dies one day, and second and third die the following day, and then it escalates through the entire group of chicks with very few surviving the event in severe cases.

7. In SOME FCS cases, an autopsy may reveal brownish/greenish liquid in the intestines, or the stomach, or the gizzard. There also may be easily identified "enteritis" (redness or hemorrhaging) on some of the intestines. In TRUE FCS cases, the stomach is usually void of feed but may contain sticks and other large objects due to the stress the chick was experiencing. There also will be very little fat left on the bird on autopsy--little or no fat around the heart, little or no fat on its belly, and minimal fat within the body cavity itself.

Causes of FCS in Ostrich Chicks:
It is most important to understand that the cause of FCS usually is not ONE thing, but rather a multitude of causes that combine to "set up" the FCS situation. Below is a list of known causes that either individually, or in combination, will result in an FCS situation. Go to any topic below for an explanation on that subject:

Notes:
FCS can hit any farm at any time. There are farms that have gone years without an FCS problem and suddenly it occurs. We have witnessed two farms that claim to be producing chicks exactly in the same manner, with the same chick raising techniques, and suddenly ONE farm will get FCS and the other farm will not--even when chicks have been hatched in the same incubator for both farms.
In most all cases of FCS that we have worked with (hundreds), no matter how confusing the circumstances, we have been able to identify and attribute the cause to one or more of the areas listed above.

Most FCS incidences can be prevented with the implementation of good nutritional diets, good feeding management practices, and good farm management practices. But, if one makes an error in any of those 3 areas, it is only a matter of time before FCS will appear in the chicks.

(End of Excerpt from "Ostrich Diagnostic Centre" Book)

There are nearly 40 pages dedicated to FCS and chick raising difficulties in this book--far too much information to post in monthly Bulletins--although portions of this information has been used as Bulletin subjects in the past. Again, both Blue Mountain books work together to give the farmer a good understanding of what is required to productively raise Ostrich in a viable manner. Farmers that have read these books several times and have studied them have finally come to an understanding of how to fix many of these Ostrich production problems--so can you!

Minimum Nutrient Requirements & Ostrich Feed Formulas!

Ostrich Nutrition Bulletin #72

October 8, 2001

By Daryl Holle

The most frequent comments and questions we are asked these days are:

"What are the Minimum Nutrient Requirements for Ostrich?"
"Please recommend premix composition"
"Please comment on our rations and provide corrections as appropriate?"
"We need a feed formula, please advise"
"We are feeding our birds to South Africa recommendations!"

When people request the Minimum Nutrient Requirements for Ostrich, it is like asking "Why is there rain?" The answer to the both questions are known, but there are so many parameters and variables surrounding the answer that it is impossible to quantify it with a simple answer of stated measurements. There is a GREAT difference between Minimum requirements and Production requirements for Ostrich. There are also major differences in Minimum Production Requirements and Maximum Production Potential Requirements.

The needed nutrients vary significantly between Breeder birds in-season and out of season, growing chicks or adolescent growers--and so on. Each group of birds has different nutrient needs--each production goal has varying needs within each group.

Feedstuff ingredient compatibility is an extremely important factor to be considered as part of ration formulations but is not referenced in the Nutrient Requirements. How nutrients are utilized (or how they perform) depends totally on the type (source) of feed ingredients used. One could develop two breeder feeds that look identical from a nutritive content (21% protein Breeder feed as an example) and the outcome would be that they are totally different feeds from a "production" point of view depending on the sources and types of feedstuff ingredients used. It is very likely that only one will be successful or very possibly NEITHER of them are successful. Feeding Ostrich (or any other specie) for good production goes well beyond knowing the Minimum Nutrient Requirements--therefore, knowing the Minimum Nutrient Requirements alone is of very little value.

There is a difference between Nutrient Requirements and Feed Formulation Recipes and there is evidence of some confusion between the two in some cases. The Feed Formulation Recipe defines the exact level of Ingredients in each formulation as opposed to the actual Nutrient levels. Most premix companies provide the Feed Formulations recipes that match their premixes. If you are provided with a Feed formulation recipe without an accompanying premix, the results will be disappointing. The premix can be considered as the "engine" of a formula...a well designed premix provides 50% or more of the production performance characteristics of any feed formula. A poorly designed premix can have a

negative impact on performance and in some cases compromise the health of the birds....especially when a premix designed for a different species is utilised in an Ostrich feed ration. The comments above regarding the importance of ingredient sources are as critical in the premix as they are with the major ingredients.

We have reported to us regularly, by mills and farmers in different areas, that their Feed Formulations are based on South African Recommendations as if this is something to be sought after, well researched and successful. The difficulties experienced by so many producers using so-called South African Recommendations are proof that this is not the case. South Africa is as new to production ostrich as all other countries now producing Ostrich. Until 1993 Ostrich was a controlled monopoly industry in South Africa based on controlled supply of feathers and skins with meat being a by-product and overproduction always feared. Production statistics have been well documented as being very low. In growing birds, the 14 month perceived optimum slaughter age to allow for harvesting of an additional feather crop and producing an ideal skin led to rations to hold the birds as cheaply as possible. These rearing methods required a high value for the skins to be profitable. As the industry moves to greater volumes and a market driven industry, there are a number of South African farmers that now recognise the need to change to more productive types of Ostrich feed formulas and management systems if they are to remain competitive.

Therefore at present, feeding your birds to South African Recommendations may not necessarily be a good thing as most South African feed formulas are tailored to totally different and specific goals and do not always include the crucial parts of a productive feed formula resulting in good fertility, hatchability, chick survivability, growth, and excellent Ostrich end-product qualities.

It is worth noting that many of our requests for the Nutrient Requirements and/or feed formulas for Ostrich are coming from other feed companies, nutritionists or scientists employed by producers which strongly indicates a total lack of knowledge throughout the world on the subject. Blue Mountain has worked intensely over the years to establish the Nutrient Requirements and productive feed formulas for Ostrich at their own expense and did not offer their products or services to the public until these items were production verified and proven. Blue Mountain's only reimbursement for all this effort is through the sale of its feed products, programs and nutrition management consulting. Blue Mountain stands ready to help any farmers in any country get on the right track towards a productive and viable Ostrich operation by working together towards the same goals. Let us know how we can help YOU.

Stopping The Ostrich Industry "Downward Spiral" In Your Country!

Ostrich Nutrition Bulletin #73

November 5, 2001
by Daryl Holle

Since the Ostrich Nutrition Bulletin is sent to subscribers in almost every country of the world these days, I thought I would share some thoughts and observations that continually happen from producer to producer and country to country. The pattern is always the same and it is most frustrating--not only to me but to all Ostrich producers around the world.

With the today's wonderment of instant email communications, it probably is a good time to discuss the Downward Spiral that I see in the Ostrich Industry that is continually being developed country by country. Maybe by stating the facts as I know them to be, some newer Ostrich countries will recognize the symptoms and take steps to side-step them before it is also too late for them. Experience is always the best teacher, and experience in the Ostrich industry says that the industry in any country MUST PROGRESS at a constant rate or it will fail in the very same manner as many countries already have before it.

The pattern of what I call The Downward Spiral is most recognizable. The pattern is almost always the same. It starts with lots of hopes and dreams that can be realized if progressive steps are taken to advance the industry. These hopes and dreams are usually squelched when the local industry in a country begins taking regressive steps backwards in an effort to economize and those steps are usually the beginning of the END for most individual country Ostrich Industries. It happened it the United States and was most predictable--and since then is happening over and over again--country by country.

The GOOD NEWS is that the Downward Spiral is clearly preventable and does not need to happen. However, trying to convince people of that in a time when their local industry is in total turmoil is next to impossible unless the people are willing to pay attention to what makes sense in a progressive livestock industry and quickly begin moving in a progressive direction.

What is "The Downward Spiral?"

The Downward Spiral is a complicated set of circumstances that take place over a period of time within the local Ostrich Industry. Lots of it has to do with Human Nature but most of it has to do with Economics and the producers ability to raise a Economically Viable bird. If the producer is not raising an Economically Viable bird for the processor, and a good quality meat, hide, and oil product for the consumer, things rapidly begin going downhill. This forces most everything in the local industry to continue towards a regressive path downward. Finally, the local industry comes to a close (for the most part) as the regressive movement can only go down so far before it ENDS.

What is the main cause of "The Downward Spiral?"

Using proper or improper Animal Nutrition on Ostrich quickly determines whether the local industry is going to be progressive or regressive. Allow me to demonstrate as best I can a scenario of why Nutrition plays such an important role in the outcome of the local Ostrich Industry:

Scenario:

Step 1:
A producer purchases and imports some Breeding Ostrich (adults) from another country. Most times these Breeder birds have been fed inadequate diets and even though the birds may look very nice, their productive capabilities have been damaged by poor quality feed and feeding practices.

Result:
The new producer that imported these birds immediately begins feeding these birds some local feed diet that again has not been proven for good production in Ostrich. The production results are much less than planned, but usually the first year or two a few chicks will be raised.

Step 2:
The new producer tries to be most economical with feeding the few chicks that he is raising for slaughter in order to maximize his profits (he thinks). This results is low meat yields and lower quality meat and many times lower quality skins.

Result:
The processor buying these slaughter birds from the producer has fixed costs of processing--and pretty much fixed costs for marketing and distribution of the meat and skins. So, the lower yields of meat and lower qualities of the end products from the bird result in a lower price being paid to the producer raising and feeding the birds. There is NO CHOICE in the matter for the processor--he can only pay for what he is given.

Step 3:
As the processor prices go down, as the end product yield and quality go down, the farmer/producer is forced to think of ways to lower his production costs of raising the birds. Since feed costs are usually 75-80% of the production costs, the first place the producer looks to economize is to lower his feed costs. (First major regressive move).

Result:
Because of the regressive feeding program fed to the slaughter birds, now the end-product yield and quality is going down even farther. This is usually when very low meat yields per bird begin showing up and also multi-colored and off-tasting meat start showing up in some instances. The producer may have lowered his feed costs but the feed is now even less of a productive feed and has lowered the economic viability of the bird being furnished the processor. (Regression again)

Step 4:
Because of what the farmer/producer did in Step 3, the processor now is forced to lower the price again to the producer as he is now getting Chef/consumer complaints on meat quality and his production costs per unit of product have significantly increased due to the lower yields experienced on the birds furnished to him (Regression again).

Note: The cycle of Step 3 and Step 4 continue to repeat several times with each time regressing a little farther downward both in quality of birds and processor prices paid for those birds.

Result:
It finally comes to a point that the farmer/producer can not lower his feed costs anymore. He is feeding the birds as cheaply as possible and the price paid to him by the processor is not enough to make a profit and is usually a loss. At the same time, the producer also started feeding the Breeder birds a lower cost and non-productive feed which has now resulted in chronic chick hatching and chick rearing problems. This total regressive pattern has now come to a point that not only can the producer not provide the processor with a economically viable slaughter bird, but the producer is not raising any chicks from his Breeder birds either.

END RESULT:
The local Ostrich industry is at its end! The farmer/producer is totally frustrated, the processor is totally frustrated, and nobody is able to produce, process, market or distribute an economically viable bird that consumers are happy with. As the Ostrich Chef Schmeider has often said:

Chef Schmeider quote:
"You can disappoint a Chef/consumer once, you may be able to do it twice, but if it happens a third time--you will never have another opportunity".

NEXT CYCLE:
The local farmer/producer then wants out of the bird business and sometimes sells his Breeder birds, usually to a import/export broker, and the birds are again shipped to a NEW country that starts the Downward Spiral all over again.

How to STOP the Downward Spiral Cycle:

1. Before buying and importing any Breeder birds from another country, research the QUALITY FEED availability in your country FIRST. Make sure that you are able to feed these new Breeder birds with the best nutritional technology available. Find out what that technology is and study it intensely--your success in the Ostrich industry depends on it. DO NOT buy the Breeder birds until you are assured without a doubt that you can feed them a correct diet that is designed for PRODUCTION. Work only with feed companies that have a proven history of good Ostrich production and then PROGRESS with them to make it even better. There is no doubt that working with a good feed company that has technologically proven production products will be more expensive as the costs of putting together those types of feed products cost more, but there really is no other good choice or alternative as the success of your Ostrich operation is most crucial. Measuring the cost of feed by it's cost per pound or kilogram has NOTHING to do with raising an Economically Viable bird. Measuring the cost of feed by it's cost per unit produced has EVERYTHING to do with raising an Economically Viable bird.

It has been our experience that most all of the newer countries starting into the Ostrich industry demonstrate very similiar type problems when purchasing feed for their birds:

a. Farmers begin feeding a feed made by the local feed company who has no experience whatsoever in formulating productive ostrich feeds and sometimes put together ingredients based on other animal species or using the limited data that is available which is now clearly proven to be most inadequate for

Ostrich.

b. Farmers follow the advice of well-known, world-wide, major feed companies that they have used in feeding other livestock species trusting that this company will understand how to feed Ostrich for good production. This has not been working well as the feed formulations put out by some of these companies vary greatly from country to country causing severe inconsistencies in Ostrich production.

c. Most countries have not understood that the feed formulations they have available (and are using) are exceedly POOR until it is too late. By the time it is obvious that they have been using a severely nutrient deficient feed, the farmers are already in a financial crisis, birds are not producing, chicks are not surviving and his operation is to an end.

2. Since most birds available for export have been on some very questionable feeding programs in the previous country, start a progressive feeding program immediately on these Breeder birds. Then, plan on culling out the lower producing breeder birds with your own replacement chicks (new breeder stock) and genetically select the best progeny with the highest production potential. Your original Breeder birds may have been damaged with poor nutritional practices before you received them--these damaged birds will never be able to produce to the production levels you need to operate a viable Ostrich operation. Plan on replacing them with your own well-fed birds that you have raised and fed properly.

3. From day one, feed your chicks with the best nutritional technology available in your country. NEVER try to cut feed costs by feeding a cheaper and lower quality feed that may end up cutting down the slaughter bird yield and quality. Your slaughter bird meat and skin yields should be going UP each year and your number of chicks hatched and raised should also be going UP each year. Work on your feeding management and farm management to INCREASE the fertility, hatchability and overall output of your operation. Find a proven feed company that has modern production feeding technology and work closely with them to improve and PROGRESS. Don't follow the temptation to REGRESS and participate in the Downward Spiral.

4. Work steadily to give your processor a better bird each year--not a worse bird each year. Encourage your processor to buy your birds with a price based on pounds of boneless meat yield per bird. That way the processor gets what he paid for and so do YOU. That will give the farmer/producer automatic encouragement to produce the best quality bird with the highest meat yield and the best quality meat will accompany that effort which will in turn help the processor again to sell and distribute his product to the consumer.

SUMMARY:

The goal of any livestock industry is to PROGRESS, not REGRESS! Far too often, the Ostrich industry in any given country is caught up in a regression mode that it can't seem to get itself out of. The solution to that problem is to break the cycle and change from the Downward Spiral direction to an Upward Spiral direction. Regressing with participation in the Downward Spiral always brings an Ostrich industry to an end as has been proven in many countries already. Progressing with participation in the Upward Spiral will result in a viable bird and a viable Ostrich industry in your country. The most intelligent change any farmer/producer in any country can do is begin working closely with the country processors to PROGRESS by producing, processing, marketing and distributing a HIGH QUALITY BIRD that just continues to get better with every new hatching season. Don't ever be tempted to backup, only go forward. The nutritional technology is there to help make this all happen in the

right way--USE IT!

Blue Mountain has recognized this Downward Spiral pattern state by state, and country by country. For this reason, we have set up an infrastructure to help all countries to gain access to well-researched production Ostrich formulations. Let us know how we can help you STOP the Downward Spiral in your country!

I personally encourage all new countries now working in the Ostrich production industry to NOT go the way many other countries have gone. It doesn't have to be that way at all--learn from others and prevent those same mistakes from happening again in your country.

"Scientific Evidence" Or Proven Facts?

Ostrich Nutrition Bulletin #74

November 5, 2001
by Daryl Holle
& Fiona Benson

Blue Mountain is a little different to many Feed Companies as it is run by producers - those who have had to make their living from the raising of production livestock and understand the importance of production performance and how it can impact on the profit margin of the producer. More importantly, they also understand what is required to achieve high levels of production performance, which does not all come out of text books. There are many things text books and pure science are unable to quantify. Quantifying some of these unknowns comes from the experienced eye of the good stockman observing the responses to certain things on a daily basis that comes from working daily in direct contact with the livestock.

At Blue Mountain, frequently we hear the comment on the need for scientific proof, scientific evidence or so and so has some good scientific data, where is yours?. This led us to look up the exact definition of science, as many things that we have seen advocated as scientific evidence and/or scientific proof has made little sense to us when interpreted into practical Ostrich production applications. A definition of science is:

"**the state of knowing: knowledge as distinguished from ignorance or misunderstanding.**"

A definition of scientific method is:

"By following principles and procedures for the systematic pursuit of knowledge involving the recognition and formulation of a problem, the collection of data through observation and experiment, and the formulation and testing of hypotheses."

We would suggest that there are many different methods to collect meaningful data and methods of experimentation. In the case of livestock nutrition, the PROOF of these is the final result achieved on a consistent basis. It then has to be determined if the FINAL results are WHAT is required. When it is 95kgs live weight at 10-12mths, or even as late as 14mths as if often the case, this is NOT the desired result of weight/age that one should be looking for in Ostrich slaughter birds (as an example). Raising birds that will carry a live weight of 120kgs at 9-10 mths of age and checking that the carcasses produced will meet Prime Quality criteria, checking to ensure a high survivability rate of the chicks and that the survivability rate is consistent throughout the season ARE some of the results we should be looking for--and they are very achievable!

When examining the published work on Ostrich, one can see a trend in the industry that is NOT providing the final results required by a profitable Ostrich producer who is trying to raise an Industry Viable bird. As certain needed bird production standards are not met, the questions should be asked WHY these standards have not been met and WHY are we not searching for clear solutions to

correct them. Some examples:

1. When trials set to verify the Gompertz model constructed in 1991 by Du Preez, the production targets for Ostrich were down graded as believed not achievable under practical conditions. The question should have been asked WHY was the production performance falling so short? The answer is the feed formulations being formulated for Ostrich fell very short of the production requirements for Ostrich, as it is BLUE MOUNTAIN PROVEN that Ostrich can keep gaining muscle far longer than has been traditionally experienced on a consistent basis and in far more severe climatic conditions.

Increasingly, we have reported to us the fact of producers who ARE also achieving increased growth rates as many now know that the original growth rate as shown in the 1991 Gompertz model can be achieved and HAS TO BE achieved and even surpassed for a profitable Ostrich production operation.

2. When it was discovered that test Ostriches were not utilizing the protein in the diet, it was assumed that they do not require the protein. The question should be asked WHY are they not utilizing the protein? The answer is that the protein source may be wrong and/or sufficient vitamins and minerals were not included in the ration to utilize that protein. It is BLUE MOUNTAIN PROVEN that ostrich can utilize higher levels of protein if the protein is of the correct source with high levels of minerals and vitamins to utilize the protein.

We have witnessed a disturbing trend on the encouragement by some to reduce protein levels even further than advocated a couple years back...particularly in Breeder Bird diets. This is resulting in extremely poor production, low fertility and/or hatchability and high levels of chick mortality. Many producers are reporting increasingly deteriorating production in subsequent seasons. One group of producers acknowledging without a doubt that their production is worse each year.

Blue Mountain will repeat again ... we have PROVEN beyond any doubt that not only can the birds utilize higher levels of protein in their feed rations, but they are also essential for optimum health, production and quality of Ostrich end-products.

3. It is thought by many in the industry that extra weight gains above 95kgs in African Blacks will be only gains of fat. The question should be asked WHY is this occurring and where is the diet falling short if only fat is being achieved at that liveweight which leads to the failure of maximizing muscle development for longer growth periods. It is BLUE MOUNTAIN PROVEN that good genetic birds fed the correct diet will continue to gain good muscle mass long after the liveweight of 95kgs.

4. There have been a number of statements made that only younger birds will produce meat of a good red color. The question should be asked WHY are the birds not producing meat of a good color at all ages? The answer is nutritional deficiencies and/or imbalances or short feeding. It is BLUE MOUNTAIN PROVEN that the meat will consistently be of an even red color throughout at all ages if the diet is correct.

5. As small hens have tended to be better layers it is assumed that size is the reason. The question should be asked WHY a higher proportion of larger framed hens ARE poorer layers. The answer is that they need a greater proportion of their diet for body maintenance and therefore the rations are presently falling short of nutritional adequacy. It is BLUE MOUNTAIN PROVEN that hens of all sizes have the same laying ability when a proper diet is fed accordingly - and the productive results depends on their genetics--NOT breed or size.

6. The question should be asked WHY genetic influence is usually given as the reason for poor performance. The correct answer is that the proper nutritional diet must be right first before the true genetic influence can be determined. With nutrition of most ostriches around the world still falling very short of what is proven to provide high levels of production performance - there are many ostriches being culled for nutritional deficiencies as a cause of poor performance and not necessarily poor genetic performance. It is BLUE MOUNTAIN PROVEN that it is nearly impossible to select the correct genetic influence unless the proper diet is fed FIRST to allow the true genetic potential of the bird to develop!

Many producers are now beginning to realize that poor nutritional diets can cause stunted growth. When visitors view Fiona Benson's birds in South Africa that are on Blue Mountain production performance feed formulations, she receives the following comments:

a. You must have good genetics?
b. These birds are not from Oudtshoorn stock as they do not achieve that size.
c. I have never seen African Blacks so big!

The birds being discussed are all from Oudtshoorn Origin and arrived on the farm initially for contract rearing to 50kgs for return to feedlots for finishing. The supplying farm carried out no genetic selection at all with the breeders running in breeding colonies of 200 plus. This is an indication of the untapped potential of these birds without even beginning to implement a full genetic development program.

7. For many years it has been assumed that Ostriches can only survive in hot, dry conditions. The question was never asked WHY are they not thriving in cooler, damper climates. It had never been considered that nutritional deficiencies and imbalanced diets could possibly be the cause. It is BLUE MOUNTAIN PROVEN that Ostriches can experience excellent weight gains and production even in inclement weather conditions if the proper diet is fed and good management practices are observed.

It is worth noting that the Blue Mountain benchmark feeding trial birds ... 3 different batches, experienced sub-zero conditions for several weeks during the winter period and exceptionally heavy rainfall following the winter months. Their feed to weight gain conversion was under 4:1 from hatch to 12 months.

8. When it became clear that Slaughter Ostriches were being presented with many variable liver conditions and colors, most ideas for this cause were that Ostrich are a different species and should not be judged along the same criteria as other livestock livers. The question had not been asked WHY are some Ostrich livers so variable in color and what is causing this problem. It is BLUE MOUNTAIN PROVEN that Ostrich livers are no more variable than any other livestock specie. A poorly fed animal will have variable liver colors, a poorly fed Ostrich will have variable liver colors, a properly fed Ostrich will have a medium brown beautiful liver color just like any other animal's liver.

There are a number of producers reporting slaughter birds with normal healthy livers, yet we still have processors reporting they are being presented with birds displaying the type of variable liver conditions referenced above. Any bird displaying these problems are inefficient converters of feed to meat and therefore uneconomic to raise. Most all liver problems currently experienced are symptoms of nutritional deficiencies and/or imbalanced rations.

9. For some time it has been commonly accepted in the Ostrich industry that it is normal for a 1 week old baby Ostrich chick to have a yellow liver due to the chick absorbing the yellow yolk sac. But yet many of these yellow livered chicks die or never grow well. Instead of the scientific community asking WHY are baby chick livers yellow, it was simply assumed that this was a normal condition in baby chicks and the diagnosis for deaths and poor growth was always no problem found. It is BLUE MOUNTAIN PROVEN that yellow livered baby chicks are NOT normal but rather a strong indication of severe parental malnutrition.

It has now been recently acknowledged by several support specialists in the industry that Blue Mountain's comments in reference to the "yellow liver chick syndrome" is indeed a sign of Breeder Bird Nutritional deficiencies and is NOT normal. It needs to be made clear that the "yellow" referenced in this syndrome is very different to the tan seen at hatch, which is normal in avian specie.

10. Regularly the comments are made that in order for the Fat of a Quality carcass to be white fat, it is recommended to eliminate the use of ingredients such as Lucerne and Maize with high levels of Chlorophyll - the reason given all TOO OFTEN for the production of Yellow Fat. While the majority acknowledge that White Fat is ideal and a sign of optimum health and indication of quality meat - too many still do not see the importance of it. It is BLUE MOUNTAIN PROVEN that diet is capable of controlling the fat quantity, fat quality, and fat color. The fat color of a properly fed bird will be Snowy White even when the diet contains high levels of ingredients such as Lucerne, Maize, or Chlorophyll IF the total daily ration is a BALANCED ration AND when the Minerals, Trace Minerals and Vitamins are balanced with the rest of the ingredients in the diet and fed correctly.

Over the last few years, we have seen details of a number of research projects similar to this fat color controversy that needs to be interpreted very carefully as sometimes these misinterpretations CAN BE most misleading:

11. We often hear comments on pelleted feed vs forage diets or ground feed. What is important in comparisons is comparing like for like - it is the ration CONTENT that determines the difference rather than whether the ration is pelleted or non pelleted. Blue Mountain did a trial some time ago comparing a pelleted ration vs the ground ration. Both feed formulations being exactly the same. The results were similar with details published on the Blue Mountain ostrich mailing list. At 300 days (10mths) the ground fed birds averaged 288lbs/130kgs at the end of the trial and the pellet fed birds averaged 273lbs/124kgs per bird. The ground fed birds carried a 25% lower feed cost (not counting the on-farm mixing costs). It is BLUE MOUNTAIN PROVEN that there is little difference in performance between pelleted and non-pelleted feed IF the ration formulations are precisely the same.

12. Some published work on ingredient nutrient values for Ostrich do not provide the effect on performance when the given ingredients are incorporated into rations over an extended period of time. Whilst the findings may be accurate, many of the ingredients recorded are proven to have NO place in a productive ration for livestock- Ostrich are no different in this regard. Caution needs to be taken in making use of them in a ration designed for Ostrich. It is BLUE MOUNTAIN PROVEN that Ostriches perform best over a long period of time with specific ingredient selections of a specific quality origin.

13. A paper was presented at the Scientific conference a couple years ago on a study on the addition of a mineral supplement and the effect on Breeder Bird performance. On questioning by a fellow scientist, it was determined that the levels of the mineral in the diet were not taken into consideration in

evaluating the results, nor was any reference made to the importance of this when used with different diets. The supplement was only tested with one ration. This particular mineral works with Vitamin A, Calcium, Phosphorous and Potassium. The knowledgeable nutritionist will have balanced these with extreme care in the ration. A point for consideration hereBIt is BLUE MOUNTAIN PROVEN that if an improved response is observed from supplementation of anything to the normal complete diet - then the basic ration will be falling short of nutritional adequacy.

14. The vitamins and mineral content of rations is critical to the manner in which any livestock species gain maximum utilization of the nutrients within any ration. When evaluating any data - the whole ration nutrient values need to be taken into consideration in interpreting the results including the ratio of one nutrient to another. Too little emphasis is placed on this in much of the research undertaken. It is BLUE MOUNTAIN PROVEN that if the Ostrich diet is formulated properly and fed properly, feed additives and magic ingredients have very little effect on long term bird performance.

To this day, there continues to be research projects undertaken by some researchers in the industry with no reference to the vitamin and mineral supplementation levels in the test rations being used. When this is done, it is impossible to ascertain the validity of the test performed--or its outcome.

The phrase scientific evidence carries with it a ring of professional accuracy. Sometimes this is trueBsometimes it is NOT TRUE! The accuracy of the scientific evidence is totally dependent on the parameters used and the overall accounting of ALL the inputs that may have effected the results of the data. Only when this is done will the scientific evidence become a reward to the Ostrich industry. Blue Mountain Feeds is totally dedicated to science which has the dictionary definition:

"**the state of knowing: knowledge as distinguished from ignorance or misunderstanding."**

Blue Mountain Feeds has a long history of evidence from its many feed trials and industry experiments, but the best evidence is found in long-term farmer bird performance as that is where the bottom line HAS to come right. More of our best evidence is found in the extremely consistent meat produced by Blue Mountain fed birds and how well the consumer loves that quality Ostrich meat with the consistency that is unheard of elsewhere in the industry.

If you are looking for scientific evidence, Blue Mountain has always been on the cutting edge of new technology and a leader in the Ostrich industry for PROVEN practices and methods concerning Ostrich Nutrition, Ostrich Feeding Management and Ostrich Farm Management. Blue Mountain makes common sense out of its scientific evidence and continually passes that knowledge along to its customers. It is now becoming most clear that all the things that Blue Mountain has been advocating for nearly 10 years now are quickly becoming the correct path to follow for cost effective Ostrich production and a viable Ostrich Industry. We still don't have all the answers and that is why we continue to work daily at finding better solutions, but we have come a long way by developing sound and proven methods to progress the industry. It is time to pay attention to the FACTS and let Blue Mountain PROVEN products help you get productive at your farm.

The Key To Chick Survival is . . . .

Breeder Nutrition,
Breeder Nutrition,
Breeder Nutrition!

by Daryl Holle

As we draw closer to the end of the Ostrich laying season, it is a good time to reflect over this last year to identify any problems you had with reproduction on your farm. If you experienced less-than-desirable results with fertility, egg production, odd shaped eggs, and eggs that were hard to incubate, you may be feeding your Breeder pair an inadequate nutrition program. Most ranchers are not aware, or forget from time to time, that the Breeder nutritional program is also directly related to hatchability and chick survival during the first 3 weeks of its life. Some clues to Breeder nutritional deficiencies are chicks that won't pip out on their own, chicks with yolk sack infections, chicks with left legs that spin out during the first 3 weeks, and chicks that go off feed between 10 and 14 days of age. All of these clues indicate a poor Breeder pair nutrition program.

Solving these kinds of reproductive problems requires dedication to the best nutrition you can find for your Breeder pairs--not just during the laying season, but YEAR AROUND. It is tempting for some ranchers to cut back on feed costs during the off season by purchasing the cheapest feed that they can find. This usually is a big mistake as the off season is the time for birds to regain lost body reserves of important nutrients while regaining lost body weight without getting too fat. During the breeding season, it is of utmost importance to maintain a balanced diet with feed that contains high levels of minerals, trace minerals, and vitamins to ensure these nutrients will be passed on to the yolk and shell of the egg.. The next step is to be sure you are feeding the recommended amount per bird per day so they have a chance to actually consume those levels of nutrients. If you are feeding 3 lbs. of feed per bird per day and the manufacturer recommends 4 lbs, it is only a matter of time before this "short feeding" catches up with you. And, it usually catches up with you when you least expect it--and, in places you never thought possible.

Our research shows that in addition to higher levels of minerals, trace minerals, and vitamins, it is also important that the major ingredients in the feed are from quality sources that are easily utilized by the bird. Some feeds contain poultry meal, blood meal, meat & bone meal, and fish meal. These are animal by-products that have high levels of inert "by-pass" or bound protein due to the manner in which they were processed. The Ostrich species sometimes has trouble completely digesting these ingredients as there is not enough time to dissolve this bound protein before it goes out on the ground. The result is poor bird performance, and if severe enough, the birds will actually have a starved appearance to them. The severity of this problem depends entirely on the number of these products used and the total amount in the feed. One animal product, at low levels, will not be significant and may actually help the overall ration performance. Two or more of these ingredients along with lower levels of added minerals, trace minerals, and vitamins could have a severe effect on the nutritional adequacy of the Breeder pair. Animal by-products were all once very wet and were dried using high heat. In addition to the bound protein problem, the natural enzymes and vitamins will most certainly be lost during this

high heat drying or processing. This will result in a feed without much "punch" to it.

Why are high levels of minerals, trace minerals, and vitamins important?

We just completed a survey of our Blue Mountain customers, from several states, who have been feeding Blue Mountain feed to their ostrich Breeder pairs for the second full year. These ranchers report an average of 82.5% survival rate from EGGS LAID to 2 months of age. This includes fertility, hatchability, and chick survival. They also reported there were very few assisted hatches, no yolk sack infection problems, no leg problems, and very few problems with chicks going off feed. These farms also commented that Breeder pairs started mating earlier and are laying longer this year, despite the heat, than ever before. The eggs are more uniform in size with the best shell porosity they have seen. The evenly spaced, deeper pores of the shell allow easier incubation because of a more uniform weight loss. The chicks appear to be more resistant to bacterial and virus infections and are easier to raise than before. The farms surveyed were larger, well managed farms with at least 50 chicks on the ground past 2 months of age. Some farms were as large as 400 chicks. Many of these ranchers reported that because of the extreme weather this year, the total number of eggs laid is less than last year due to many breaks in the laying routine. However, these same ranchers report they will net about 20% more chicks than last year because of the higher survival rates.

I report these facts from the standpoint that an adequate nutritional program is a must for your Breeder pair. Higher levels of minerals, trace minerals, and vitamins played a instrumental role in the overall success of these ranches. In addition, minimal usage of animal by-products in the feed ensured that enough "punch" or potency was there to get the job done. Another significant fact to be learned from these results is that it takes a FULL TWO YEARS using a good nutrition program to realize its fullest benefit. However, you may see small improvements along the way. Many people will change feeds every 3 months or so as they don't see any results. It takes much longer than this to have any affect on chick survival rates. If you're already having troubles in the above mentioned areas, it is obvious that your laying hen is deficient of needed nutrients. It will take one complete season or cycle of the laying hen to build up the reserves again. Then, after an off season of controlled feeding with adequate nutrition, the eggs laid the following year will carry a much improved chick survival rate. Nothing happens overnight when it comes to total nutrient conversions inside the body.

How do you identify if there is enough added minerals, trace minerals, and vitamins in your feed?

The above success farms were using a Breeder feed that was approximately 2% calcium and 1% phosphorus. Other supplemented minerals were potassium, magnesium, and zinc. High levels of trace minerals including copper, manganese, and selenium were used along with low levels of iron as Ostrich are extremely sensitive to iron. High levels of inert iron are found in the lower grades of calcium and phosphorus. Only higher grades of calcium/phosphorus should be used in Ostrich feeds to prevent this iron sensitivity problem. Total vitamin A consumption per bird per day was a minimum of 75,000 IU. Total vitamin D consumption was a minimum of 25,000 IU per bird per day. Total vitamin E consumption was a minimum of 600 IU per bird per day. The actual amounts consumed were more than indicated, but that information is confidential. This may sound like a lot to you, and some feed company nutritionist may tell you that this much is not needed and is a waste of money. I report to you with this writing that our research shows that feeding any less than these amounts will cause chick survival problems to appear. The severity of which is directly related to lessening amounts.

The water soluble vitamin content of the feed is also crucial. These vitamins include thiamine, niacin,

biotin, choline, riboflavin, folic acid, d-pantothenic acid, vitamin B6, and vitamin B12. These vitamins have a significant effect on chick hatching and growth during the first 3 weeks of age. The mentioned water soluble vitamins are the most overlooked by most nutritionists who usually put a minimal amount in Ostrich feed--if any at all. Breeding birds need high levels of these vitamins at correct ratios to one another to ensure a good nutrient transfer from hen to egg, and egg to chick. The levels of these vitamins and trace minerals used in these studies are confidential. But, if you are having chick survival problems, this is the first place to look for improvements. The levels of this group of vitamins are extremely important to chick survival rates.

If you are using a mineral premix and grinding/mixing your own feed, how do you identify if the finished feed has enough trace minerals and vitamins for your Breeder birds?

Major minerals are usually listed in percent and should be guaranteed on the tag of the premix. Trace minerals, if listed on the tag, are usually stated in parts-per-million (ppm). Fat soluble vitamins A, D, and E are listed as international units (IU). The water soluble vitamins are usually listed as milligrams per pound (mg per lb). The calculation is the same for all measures. You first must know the amount of the ingredient contained in the premix as guaranteed on the label. Then, you need to know the inclusion rate of the premix per ton of finished feed. I will use an example of a mineral premix containing 280 IU of vitamin E per lb. The recommended usage, or inclusion rate, is 2 bags per ton of feed or 100 lbs. The formula can be done in 3 steps:

1. (Inclusion rate per ton) multiplied by (Units per lb listed on tag) = Total units in 1 ton of finished feed

2. (Total units per 1 ton of finished feed) divided by (2000 lbs) = Units per lb of finished feed

3. (Units per lb of finished feed) multiplied by (lbs consumed daily) = Total Intake

Vitamin E example:

100 lbs inclusion rate times 280 IU per lb	= 28,000 Total units
28,000 total units divided by 2000 lbs	= 14 units per lb of finished feed
14 units per lb of feed times 4 lbs per bird daily	= 56 units vitamin E per bird daily

This example is typical of what exists in the Ostrich feed industry these days. Vitamin E is an expensive ingredient and most feed manufacturers have cut back on the amounts to enable them to lower the cost of the feed. In this example the 280 units of vitamin E per pound of premix sounds at first like it may be in the area of an acceptable amount. But, when you are only adding 100 lbs of mineral premix per ton, it dilutes down to only 14 units of vitamin E per pound of finished feed. If your Breeder hen eats 4 lbs of this finished feed, she will get a total of only 56 IU of supplemented vitamin E daily. As I mentioned earlier, our best results for chick survival were when the hen consumed not less than 600 units of vitamin E daily. That equals a factor of over 10 times more vitamin E. Vitamin E works with the trace mineral selenium to enhance the immune system of the embryo and chick. This combination will increase resistance to bacterial and viral infections--and will also increase feed efficiency in the gut. This example is only one of about 30 that can be checked on your feed to see if it is nutritionally adequate for your Breeder birds. Just keep in mind that what you first see may not be a good as it first appeared. You must interpret the feed tag.

Another problem occurring in the Ostrich feed industry is many companies leaving out a form of

"protected" animal fat. Also, many grind/mix on the farm rations are omitting this ingredient because it is expensive and rather hard to procure. Most are adding some form of vegetable fat while others are not adding any form of added fat at all in order to lower the cost of feed. The "fat soluble" vitamins A, D, and E are metabolized in the blood stream and stored in the natural body fat of the bird most efficiently with a blend of vegetable fat and animal fat. Omitting this blend of both fats allows less storage of these important vitamins. When stress occurs from high production or extreme weather, the hen will mobilize this fat to be used as extra energy and along with this comes extra amounts of the stored vitamins at a time she needs them most. During times of stress, the laying hen needs every resource to enable these nutrients to pass along to the egg , embryo, and chick. Many farmers have told me they thought the purpose of liquid fat was to keep the dust down in the feed. This is only a small factor. A blend of fat has a very significant role in the nutritional utilization of the feed.

I hope this has helped you to understand the importance of a good year-around Breeder nutrition program. It pays off in so many ways. The difference in feed cost between a good nutritional program and a program that is lacking necessary nutrients averages about $120 per year per Breeding pair. It doesn't take many dead chicks to justify that expense many times over. Good nutrition is always the least cost for the highest return.

FAT versus MEAT Production In Ostrich

By: Daryl Holle

I hear lots of people talking about Ostriches being too fat these days. There are also a lot of processing plants complaining they can't dress out enough meat per bird during slaughter. If you have Emu, excess fat might be a plus some day as the oil market progresses. However, it is also beneficial to grow some extra meat pounds on Emu in order to help offset the slaughtering expenses.

Can nutrition control the amount of Fat and the amount of Meat on Ostrich? You bet it can! A simple way to explain this is to understand the following nutritional principals:

EXCESS FAT PRODUCTION

1. Excess Protein turns into FAT.

2. Excess Energy turns into FAT.

3. A deficiency of minerals, trace minerals, and vitamins causes normal levels of Protein and Energy to become excess protein and energy which turns into FAT.

LOW MEAT PRODUCTION

1. A shortage of Protein results in LOW MEAT PRODUCTION.

2. A shortage of Energy results in LOW MEAT PRODUCTION.

3. A shortage of minerals, trace minerals, and vitamins results in LOW MEAT YIELDS.

An example of the above resulting problems might be feeding a Ostrich a 50/50 mixture of alfalfa and corn with no mineral, trace mineral, or vitamin supplementation to balance out the nutrient levels needed by the bird. If the alfalfa is 18% protein and the corn is 8% protein, that would be an average of 13% protein in the total diet in a 50/50 mix. 13% protein is low for a constant diet and the bird will not grow very fast or build any more muscle than absolutely necessary. However, if the energy of the alfalfa is 58% and the energy of the corn is 90%, that equals an average of 74% energy in the total diet at a 50/50 mixture. 74% energy is very high for a complete diet for Ostrich. In this example, you can see there is a possible shortage of protein and an excess of energy. The excess energy will probably turn to FAT and the shortage of protein will cause LOW MEAT PRODUCTION.

The third rule that yet needs to be addressed in this example is minerals, trace minerals, and vitamins. Since none of these items were added to the alfalfa/corn mixture, the only source of minerals is coming from the alfalfa and corn. Both of these ingredients are extremely low in the

phosphorus mineral. Phosphorus is not only key in bone growth, but also very necessary for muscle growth (meat production). When phosphorus levels are low in the total diet, very little EXTRA meat production is going to take place other than what the bird needs to survive. The low phosphorus level also contributes to a poor utilization of the high energy and, again, causes even greater FAT production.

In conclusion to the discussion of the third rule, Calcium, Phosphorus, Zinc, Manganese, Copper, Selenium, Magnesium, Potassium, and salt are also important minerals/trace minerals that assist with the total digestion process and are key to FAT production and MEAT production. Vitamins A, D, and E, also help with the digestion/conversion process. In addition, the B-vitamins such as Choline, Niacin, Biotin, etc, help convert body fat to mobilized energy in the bird. If the bird has some body fat but cannot mobilize it for use, it just gets fatter.

Minerals, Trace Minerals, and Vitamins must be BALANCED to the rest of the ingredients in the diet so everything will work together. Dumping in some of this and some of that into feed rations is very risky and usually comes out with a skinny bird with NO FAT and NO MEAT or a FAT bird with NO MEAT.

Nutritional diets can control the amount of fat desired and accomplish good meat production along with it. These principals of good nutrition are going to play a significant role in the near future for the Ostrich industry--stay tuned to it, prepare to change with it, or you may be left behind as processors will not want your birds or will dock you severely for them. Our records show a well-fed bird usually dresses out around 70% of the carcass weight into boneless meat. A bird fed an improper diet will dress out around 62% of the carcass weight as boneless meat. If you were the processor, which carcass would you want to buy? The processors are learning fast what type of birds are profitable for them, and it will always be the well-fed bird with lots of tender, good tasting, MEAT.

Mmmm.....This Meat Tastes Good....or does it?

By Daryl Holle

Our phone has been ringing a lot these days with comments about the differences people are noticing in the taste, tenderness, color, and moistness of different Ostrich carcasses. The comments are coming from chefs, meat brokers, meat processors and customers. As the Ostrich industry approaches a rapidly growing meat market in 1996, it is important for all ranchers to realize that only they have control of the meat quality on birds being raised for the meat market. As with other livestock species, adequate nutrition to encourage fast weight gains and strong muscling is the determining factor for high quality meat and consumer acceptance.

Chefs, meat brokers and meat processors are already noticing differences in taste, tenderness, color and moistness of Ostrich meat raised on different farms.

The Beef, Pork, Chicken and Turkey industries have known for a long time that nutrition has a direct affect on flavor, appearance, tenderness and overall customer acceptance of their products. A good example of this is the chicken egg. When the nutritional ration of the laying hen is balanced for ultimate egg production, the yolk of the egg becomes very pale. Cooks, chefs and homemakers want a bright yellow yolk when they break the egg in the pan. Therefore, special ingredients are added to the feed, such as marigold flower meal or corn byproducts, to bring the color of the yolk back to the preferred level of customer acceptance.

Another good example is Beef sold in the supermarket. The Beef people know that consumers will usually pick the brightest red meat package if there is a choice. The dark red meat is not attractive to the consumer as it appears to have been in the package for a long period of time. To help with this problem, premium beef prices are being paid to some ranchers who feed high levels of Vitamin A and Vitamin E. These vitamins act as antioxidants which will keep the meat in the package a bright red and extend the shelf life of the meat. The highest grade beef, which is achieved with excellent nutrition, usually goes to the better restaurants and at a higher price, of course. If you've ever bought a steak at the supermarket that was tough, bad tasting, and almost inedible, it was from a carcass that was probably grass fed with little mineral and vitamin fortification in the diet.

High levels of Iron in an Ostrich diet can cause extremely dark red meat with a metallic taste when cooked.

What can we learn from this as Ostrich meat producers? Many ranchers are under the misconception of feeding their slaughter birds as cheaply as possible these days without any regard for the quality of the final meat product. This trend is being noticed by the professional meat people. Meat brokers are saying that some carcasses have a strong metallic taste and the meat is so dark red it is almost black. Ostrich have a unique metabolism about them which includes a normally high level of Iron in their bloodstream. Some diets formulated by ranchers and feed companies contain additional high levels of Iron caused by incorrect ingredient selections. When

the diet is high in Iron, along with a normally high level of Iron in the blood, the meat will be a very dark red. It can be so severe as to cause the metallic taste when the meat is cooked. Another cause of high Iron levels is birds eating dirt containing high levels of Iron. Birds eating dirt can be caused by a poor nutritional diet or pens being too small. Birds with the bored syndrome will sometimes eat the rust off metal pipe posts. The rust is Iron Oxide which is a concentrated source of Iron they do not need. A balanced diet, that has been carefully thought out, will correct most of these Ostrich idiosyncracies.

Meat processors and meat brokers are also noticing that some carcasses have cuts that vary in color from muscle to muscle on the same carcass. Some muscles are dark red and some are nearly pink in color. This causes a problem with ground meat as it will be multi-colored and suggests some other type of meat (like chicken or turkey) was mixed with the Ostrich meat. Multi-colored muscle meat from the same carcass is a strong indication of a poor nutritional diet while the bird was being raised. It usually is caused by inadequate levels of Calcium, Phosphorus and the major Vitamins A, D, and E. It is sometimes referred to as white muscle disease in other livestock species. However, it is actually a nutritional deficiency and not a disease.

Multi-colored muscle meat is a strong indication of a poor nutritional diet and is a problem to the meat industry.

The best Ostrich meat that consumers are really enjoying is from birds that were raised for the fastest weight gains in the shortest period of time. Meat from these birds has good coloring, great flavor, is very tender and has an acceptable moisture content after cooking. To achieve this type of meat product requires a diet formula containing good levels of minerals, trace minerals, vitamins and feed ingredients that are geared to fast muscle growth and development. Feeding these birds just Alfalfa or grazing them on grass with little or no supplementation will result in slow weight gains and poor quality meat products.

An unfortunate part of feeding animals for fast weight gains is unwanted FAT production. This holds true for all livestock that are fed for meat production. There has been lots of discussion about fat from every professional person in every aspect of this industry. The processor does not want to buy your birds live weight, as he is afraid of too much fat that is of no use to him. The hide company is telling you that there is too much fat under the hide and it's causing them a problem. Everyone is telling you to readjust the slaughter bird diet so there isn't so much fat on the bird. This pressure has caused many to malnourish their birds with a poor nutritional program in order to limit fat production. Poor nutritional programs are causing the meat products to be less than desirable, and it appears we are working against ourselves.

Concerns with Fat production can be handled with genetics and must not limit our endeavors to raise fast gaining, good tasting, tender meat birds.

A well balanced diet will produce some extra fat, but this is not near the problem some would like us to think. First of all, the Ostrich does not put the extra fat in the meat or muscle like beef cattle do. They store it in pockets outside of the muscle in different parts of their body. Just because a bird is fat does not mean the meat will be higher in fat content by any significant amount. In order to get good meat production, some extra fat will come along with that production. The answer for limiting fat production lies in genetics. For example, in the hog industry, 20 years ago slaughter

hogs had an average of one and one-quarter inch of fat on their backs. Today, through genetics, most lean breed hogs have only one-quarter inch of back fat.

A good nutritional program for your harvest birds will result in 140-160 pound hanging-weight carcasses near 12 months of age. The processor is happy because he paid you a hanging-weight price with the fat removed, and you gave him a large enough carcass so he can butcher only one bird instead of two birds yielding 75 pound carcasses. The meat broker is happy because you gave him an excellent quality product with more uniform color and more steak cuts due to larger muscles. The hide company is happy because you grew them a hide that is larger and thicker with a grade one quality if it was handled correctly. And, most important, you are happy because you raised a high quality product in a cost effective manner that everyone wants--all because of your great nutritional program.

Feeding For Production & Quality

By: Fiona Benson

Part 1 - UNDERFEEDING

Nearly two years ago I asked myself the QUESTION if we have such wonderful productive birds producing such a wonderful range of products then:

"WHY are farmers NOT profitable?"

"WHY are our products NOT selling?"

The two questions interrelate to each other. The ability on farm to raise as many chicks to a marketable quality have been affecting both the sales and the prices achieved for the end products. Putting the politics and dynamics of the industry aside - it became clear that farmers were not producing a product that is of marketable quality. Too little is understood about what constitutes quality and it seems it had rarely been achieved.

The ANSWER, as most of you now know, I discovered is NUTRITION - the foundation of any livestock industry.

The purpose of this series of articles is to explain some of the aspects that prove that the industry in general is UNDERFEEDING the birds. Part 1 is to highlight many symptoms in the production chain that are proven to be corrected when the nutritional levels are correct.

Many farmers have experienced the following problems:

BREEDER BIRDS

- Impactions
- Off Feed Condition
- Sluggish Breeding
- Infertility
- Low Egg Production
- Extreme Egg Sizes
- Chalky Eggs
- Egg Shell too Hard
- Egg Shell Pourosity
- Early Embryo Death
- Late Embryo Death
- Weak Pipping Strength
- Many Assisted Hatches
- Abnormal Yolk Absorption
- Crooked Chick Legs, Toes, Beaks
- Early Chick Death

GROWING BIRDS

Impactions
Off Feed Condition
Bowed Legs
Legs out of Joint
Slipped Tendons
Yolk Sac Infection
Poor Quality Feather
Slow Weight Gains and Slow Growth
Poor Water Consumption
Disease Problems
Fading Chick Syndrome
Poor Muscle Growth (Meat)
Virus Infection Problems
Chick Deformities
Liver Disorders
Incorrect Fat colour and Fat Yield problems

- Fading Chick Syndrom Small, Slimy Hearts and Small Livers

ALL of the above are proven to be corrected or eliminated when the birds receive adequate nutrition. Farmers experiencing the above generally have their birds downgraded when presented for slaughter. The carcasses demonstrating one or more of the following symptoms:

CARCASS PROBLEMS

- Lots of Fat
- NO Fat
- Yellow Fat
- Yellow Livers/Fatty Livers
- Livers with other abnormal colourations
- Spongy Hearts - Small Hearts, Small Livers
- Disease - Airsacolitis, Encepholitis, etc,
- Muscles dark in Colour
- White Muscle Disease
- Muscles of differing Colouration

All the above symptoms are NOT found in birds that are fed an adequate, balanced diet. It is worth asking ones self, if our product is so good and we produce so little of it, then:

"Why are the repeat orders difficult to achieve?"
"Why are marketers continually seeking out new markets?"
"Why, with so little meat available, are some finding it difficult to achieve the price they expect as demand should be outstripping supply?"

Talking with processors, meat inspectors and standing on slaughter lines have confirmed that the majority of carcasses presented for slaughter show one or many of the above symptoms. This leads to serious inconsistencies in the meat. Just consider that if the liver is not able to function properly it means that the blood is not being filtered adequately and toxins will be remaining in the muscles (meat).

How many producers are content to achieve 30kgs/65lbs of boneless/saleable meat from their birds? How often are we told that this is normal - average? The answer is too often. There are farmers achieving 40kgs - 50kgs (80lbs - 100lbs) and occasionally higher at +/- 12-14mths. This is the way of the future. Birds achieving these types of yields will generally have good quality carcasses. Another factor, the rations used to achieve these will have been high in nutrient value and geared towards fast growth rates, plenty of muscle growth and therefore produce carcasses that meet the quality grading criteria and chick survival should be high.

There will be some readers saying - but these birds must be Blues or Reds - yes many of them are but there are also good quality Blacks achieving similar yields. There are Blues and Reds also achieving ONLY 30kgs of boneless, saleable meat.

The next few articles will cover some of the causes of underfeeding.

Feeding For Production & Quality

By: Fiona Benson

Part 2 - THE CHALLENGE - To achieve adequate Nutrients in 2kgs/day Dry Matter

It would be possible to right a number of 'chapters' explaining all the factors that prove that underfeeding is the route cause of most farm production problems. This series will discuss a few of the factors that will provide a clue.

The fundamental reason for Underfeeding is the need to pack ALL the nutrient requirements into 2kgs/day for an adult bird - growing birds eat even less per day. It must be remembered that for their body weight the Ostrich eats very little per day and there is NO room in a ration for ingredients that do not supply a high level of nutrients. If that principal can be understood - **the rest begins to make a lot of sense.**

Rations Falling Short - Why?

Comparison to other Production/Reproduction Livestock

	Adjustment	Final Daily Intake
Dairy Cow		
455-545kgs. Body Weight	**x 25%**	**114-136 kgs bw**
Vitamin A = 280,000 iu/day	x 25%	70,000 iu/day
Vitamin D = 70,000 iu/day	x25%	17,500 iu/day
Ostrich Breeder Bird		
114-136kg Body Weight		**114-136kgs bw**
Vitamin A = 41,000 iu/kg	x 2kg/day	82,000 iu/day
Vitamin D = 13,000 iu/kg	x 2kg/day	26,000 iu/day
Typical Ostrich Feeds		
Example One		
Vitamin A = 12500 iu/kg	2kg/day	25000 iu/day
Vitamin D = 3000 iu/kg	2kg/day	6000 iu/day
Example Two		
Vitamin A = 15000 iu/kg	2kg/day	30000 iu/day
Vitamin d = 5000 iu/kg	2kg/day	10000 iu/day

Figure 1

When designing a ration for any animal the nutritionist knows THE TOTAL DAILY NUTRIENTS required for that species - and there are 50-60 different nutrients that have to be included and balanced with each other to ensure maximum **utilisation and availability.** He/She has to ensure that all the nutrients are available within the daily Dry Matter intake of that species. With Ostrich the total Daily Nutrient requirements have been seriously underestimated.

The comment has been made to me that these birds eat MORE than any other bird - combined with their ability to digest fibre - it allows the nutritionist to use ingredients like Soya Hulls and other LOW value FILLER ingredients and grain by-products. In fact NOTHING could be further from the truth - for their body weight they eat very little per day.

Figure 1 shows the total daily requirements of a production dairy cow for a couple of the vitamins and the adjustment pro-rata to demonstrate the number of daily international units required for a similar body weight as the Ostrich. It also provides some comparison of typical Ostrich rations and it is clear how far short these fall in just these two vitamins. If these are falling short - what about the rest of the 50-60 nutrients in the ration? Many companies I have seen are including the same level of vitamins in every ration. It is clear that the person responsible for formulating these rations has little knowledge of Ostrich needs. The needs of a Growing Ostrich will be very different to that of a Breeder bird producing 50-60 or even 100 plus eggs, these needs will be very different to a bird on a maintenance ration.

There is much talk about the Ostrich's ability to utilise fibre. This is correct - but the fibre source must be highly digestible and it MUST contain adequate nutrients to ensure that the birds receive

their total daily nutrient requirements. This is **impossible** when ingredients of low digestibility and low nutrient value are used in the ration.

Figure 2 is a list of typical sources of fibre included in rations. Grains contain a certain amount of fibre - it is not very digestible and must NOT be the only source of fibre otherwise imbalances will occur.

Rations Falling Short Fibre Source

- Sources
  - Forage - Lucerne, Grass,
  - Rice/Bean/Wheat Straw
  - Soyabean/Rice Hulls
  - Corn Cob Fractions
  - "Roughage Products"
  - Grains

Figure 2

When a feed label contains what we call 'collective terms' - such as: Roughage Products, Protein Products, Processed Grain Products - it is an indication that the feed company may use 'least cost formulations'. This means that ingredients may change from batch to batch - something Ostriches cannot tolerate and very often leads to them going 'off feed' - another cause of underfeeding. 'Roughage products' allows companies to include absolutely any roughage source that may be available to them. Sawdust can be described as Roughage - most will agree that there is no nutrient value in Sawdust!!

Rations Falling Short Fibre Comparisons

Source	Protein	Fat	Fiber	Calcium	Phos
Lucerne	18%	2.2%	30.0%	1.3%	.25%
Grass	16%	2.5%	23.0%	.70%	.22%
Wheat Str	3.0%	1.5%	42.%	.1%	.04%

Fibre MUST Be

HIGHLY DIGESTIBLE - - - HIGH NUTRITIONAL

Filler ingredients provide NO nutritional value

Figure 3

Remembering the statement **"The Challenge"** is to get adequate nutrients into 2kgs/day - compare the major nutrients available in these 3 commonly used fibre sources in Figure 3. Grass is low in Calcium and will require that calcium to be made up from another source. It is also low in some other essential minerals. Straw is a favourite Fibre ingredient - how do you make up the missing nutrients? Remembering also that straw is not very digestible - the answer is that it is impossible - something will have to be compromised. The other fibre sources are not mentioned as they have nothing of any nutritional value to offer. It is clear that they have NO place in Ostrich rations - when profitable levels of production and quality are required.

As soon as a high level of by-products are used in a ration - deficiencies will occur as many of the nutrients have been extracted in the processing. Yet they are used all to frequently. If the birds are being kept as pets - if you are lucky - you may get a way with it. This series is NOT about raising pets.

Part 3 will cover the interrelationships of ingredients and their significance.

Feeding For Production & Quality

By: Fiona Benson

Part 3 – Interrelationships

The source and relationships of all the ingredients are critical when achieving a fully productive ration for any animal.

Vitamins and Minerals are supplied from the major ingredients - Organic Source and supplemented through the premix in a ration - inorganic sources. Whilst the feed may analyse with the right nutrient levels - it is important to ensure that they are supplied from a source that the birds can **utilise.** I will use Calcium as just ONE example to explain the concept:

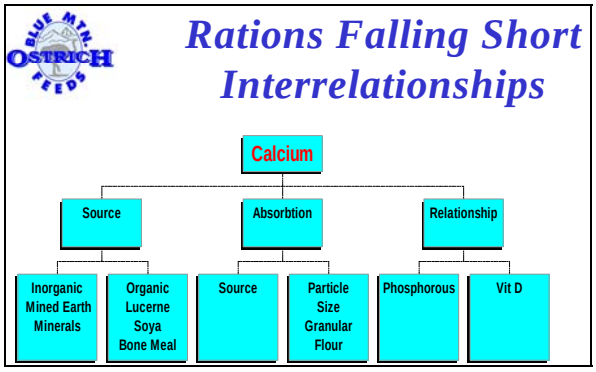

Figure 1

In this example the inorganic source for Calcium will generally be Limestone - there are however, many different grades of limestone. The lower grades have low levels of calcium and contain other contaminants that will cause interferences with other minerals in the rations.

The major organic source is from Lucerne. Soyameal and Bone meal also supply a certain level of calcium. Fortunately Bone Meal is NO longer allowed by many countries. When included as a source of calcium it has a very low absorption rate and results in very little of the calcium being utilised by the Ostrich.

Particle size is also important as this also affects the rate of absorption. It is common knowledge that the calcium/phosphorous ratio is critical. If however the calcium is from a source that is absorbed very slowly and the phosphorous from a source that is absorbed very quickly (for example) - they will not be in the digestive system together to work with each other - and deficiencies will occur. The ration will analyse correctly - but the birds will show symptoms of deficiency.

In order for the calcium and phosphorous to be utilised the ration must contain adequate levels of vitamin D to carry the calcium and phosphorous into the blood stream.

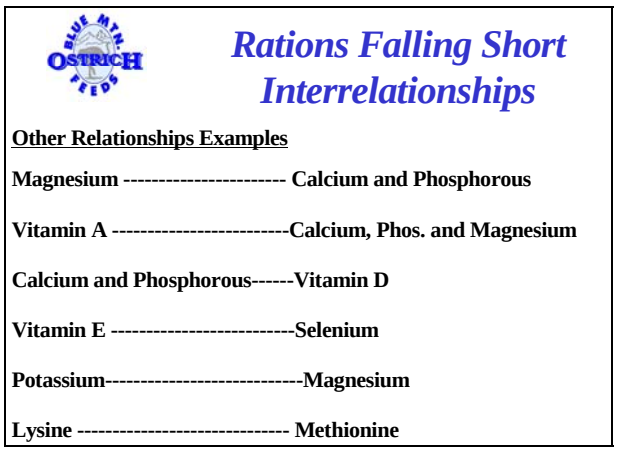

Figure 2

Figure 5 provides just a few more examples of other nutrients that need to be in balance with each other and their need to work together. All are explained in detail in the book Ratite Feeds and Feeding by Daryl Holle.

The knowledgeable nutritionist will be observing all these interrelationships, ratios of organic to inorganic sources as well as the actual nutrient levels included in the ration. It is essential that the rations not only contain the right levels of nutrients - these nutrients must be **available and be able to be utilised** by the animal the ration is designed for.

Feeding For Production & Quality

By: Fiona Benson

Part 4 - Feed Management

Even the best formulations, if not fed correctly, will lead to short feeding. Most other production livestock farmers know that to stay in business it is essential to mix the feed with absolute accuracy, know the analysis of their ingredients and measure the feed when dispensed to ensure that their animals receive exactly the nutrients required for maximum performance.

It is amazing how few Ostrich farmers currently do this. A coffee can or similar container is seen all too often. That is fine as a tool to fill the bucket or whatever - but that bucket must be weighed each time. Personal experience has shown me that I can have a 20% variation with the same pelleted feed in exactly the same can - the density of the ration can vary from batch to batch. Even a 10% variation for a 2mth Ostrich is less than 100grams - for an adult is only 200grams - this would equate to an error of 1% in a cow - not significant - in Ostrich extremely significant.

Loss can also come from underestimating the amount consumed by wild birds, vermin or simply blown away by the wind. It is essential to estimate any loss from these causes adequately. Always weigh any feed cleaned from the troughs.

Some farmers cut back their concentrate ration when the birds are grazing. In some cases the birds do this themselves when the concentrate ration is not as palatable as it could be and is falling short in certain vitamins, minerals, trace minerals etc. If birds are grazing it is necessary to provide a balancing ration and not simply cut back on a complete ration. If grazing grass and that grass is being taken as part of the total daily intake, it is essential to manage that grass correctly. It will always be difficult to judge exactly the nutrients available from grazing as there is significant variation:

1. In dry matter intake per bird/day
2. Varieties of Grass
3. Grass management systems
4. Time of year

To grow grass efficiently is NOT cheap - any old grass will NOT do if taken as part of the daily nutrient intake. Dairy farmers in some areas long ago gave up grass as a major source of nutrient value for high yielding cattle. Leading Dairy farmers in the more traditional grass land areas of the United Kingdom and New Zealand are now beginning to recognise the need for change as margins become tighter and higher levels of production are required to achieve a profit. Grass for Ostrich is NOT a good productive feed, even when managed well.

Grazing is just one aspect of the affects of the Dilution Factor. The dilution factor is a common practice found with farmers and is caused by farmers feeding other ingredients with their complete ration, without adjusting the basic ration. This leads to serious imbalances and interferences.

Prot	Fibre	Energy	Cal.	Phos.	Salt	Vit A*	Vit D*	Vit E*	Sel ppm
18%	11%	1250	1.6%	.95%	.5%	8000	2500	50	.3
14.7%	10%	1300	1%	.60%	.25%	4000	1200	25	.15

Figure 1 Imbalanced Feeding - The Dilution Factor

* = International Units per kg.
Row 1 = Goldrush Grower
Row 2 = Goldrush Grower diluted with 1lb maize and 1/2lb Lucerne

Figure 6 is a typical example of farmers believing they are adding a little extra maize to help their birds through the winter by adding a little extra energy to the diet. Figure 2 is the same ration illustrated graphically. The top line representing the balanced ration and the lower line representing the adjusted ration. As can be seen - the major nutrients fall seriously short and the whole ration becomes imbalanced. Remember - there are 50 or 60 nutrients that the **knowledgeable** nutritionist will have balanced to formulate a production ration.

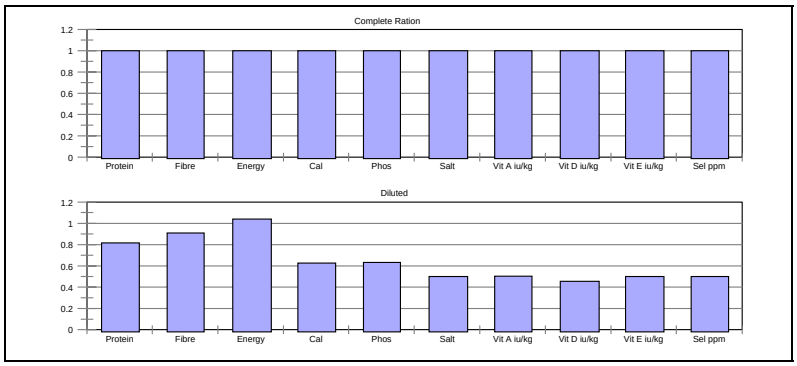

Figure 2 Imbalanced Feeding - The Dilution Factor

Remember also, that for nutrients to be available they must be in the right proportions to each other and to work together to enable the birds to **utilise** those nutrients. Everything is now SERIOUSLY out of balance. Look how little extra energy was in fact achieved through adding the extra maize. It takes a very small error in weight fed to change the proportions of daily intake, as these birds total daily Dry Matter intake is very limited.

Figure 8 is an illustration of the imbalances that occur from other common dilution practices. It is worth noting that some recent research done in South Africa was instigated as a result of measuring the protein

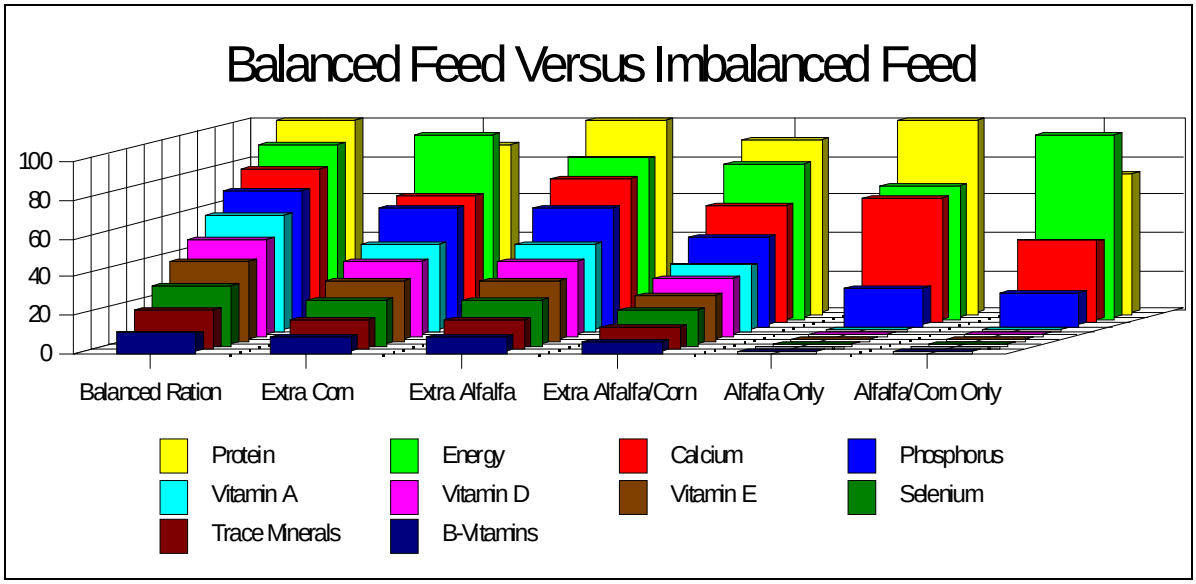

Figure 3

level in the faeces and discovering that there were very high levels of protein. Instead of asking the question "WHY" are they not **utilising** the protein it was assumed that they did not require it.

If the protein sources are wrong OR there are insufficient vitamins, minerals and trace minerals balanced to each other and the other ingredients in the rations - the nutrients cannot be **utilised** fully by animals - Ostrich is no different.

Feeding For Production & Quality

By: Fiona Benson

Part 5 - Effects of Imbalanced Feeding

Feeding Ostriches for production in slaughter birds is all about achieving maximum muscle growth as cost effectively as possible and the muscles must be of a good colour and even throughout.

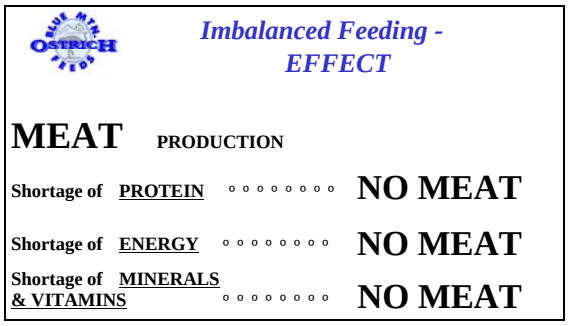

Figure 1

Too often we hear people say that it is wrong to feed to high a level of protein as it is wasted, will cause the birds to get too fat and so on. Even when the levels are high, if the protein is from the wrong source or there are insufficient vitamins, minerals and trace minerals to enable the birds to **utilise** the protein or energy - then it will result in symptoms of deficiency of protein and energy. The result will be very poor muscle growth - MEAT PRODUCTION.
How often do we hear the comment that the birds are too fat? !!!

An example of imbalanced feeding might be feeding an Ostrich 50/50 mixture of Lucerne and maize with NO mineral, trace mineral or vitamin supplementation to balance out the nutrient levels needed by the bird. If the Lucerne is 18% protein and the Maize 8% protein, that would be an average of 13% protein in the total diet of a 50/50 mix. 13% is low and the bird will not grow very fast or build any more muscle than is absolutely necessary. The energy levels of this ration will be extremely high - the result will be poor meat production and excess fat.

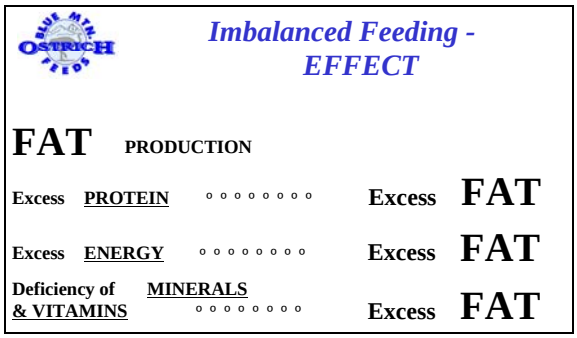

Figure 2

In this ration there would only be the vitamins and minerals coming from the Lucerne and Maize (organic sources). Both are low in Phosphorous. Phosphorous is not only the key in bone growth, but also very necessary for muscle growth (meat production). When phosphorous levels are low in the total diet, very little EXTRA meat production is going to take place other than what the bird needs to survive. The low phosphorous level also contributes to a poor utilisation of the high energy and again causes even greater FAT production.

Calcium, Phosphorous, Zinc, Manganese, Copper, Selenium, Magnesium, Potassium and Salt are also important minerals/trace minerals that assist with the total digestion process and are key to FAT production and MEAT production. Vitamins A, D and E also help with the digestion/conversion process. In addition the B-Vitamins such as Choline, Niacin, Biotin etc. help convert body fat to mobilised energy in the bird. If the bird has some body fat, but cannot mobilise it for use, it just gets fatter. Symptoms of these deficiencies is Yellow Fat.

Minerals, Trace Minerals and Vitamins must be BALANCED to the rest of the ingredients in the diet so everything will work together. They must be at the right levels and from the right sources. Mixing some of this and some of that, diluting or simply short feeding all end up with deficiencies that usually results in a thin bird with NO FAT and NO MEAT or a FAT bird with NO MEAT. The diet CAN control the amount of fat desired and the type of fat desired, whilst at the same time achieving excellent MEAT production.

Feeding For Production & Quality

By: Fiona Benson

Part 6 - Measuring Performance

For several years now I have been advising producers that they need to ensure that the birds they produce are of marketable quality. Too often I hear the statement: "I will feed for production/quality when there is a market" "I cannot afford to feed for quality." For the same length of time I have been warning that if the farmer does not feed for quality, there will be no market, as it is impossible to build a market with inferior products. This is proving to be true.

Lets examine how to measure performance and cost and demonstrate that to feed for production and quality is the only commercially viable option.

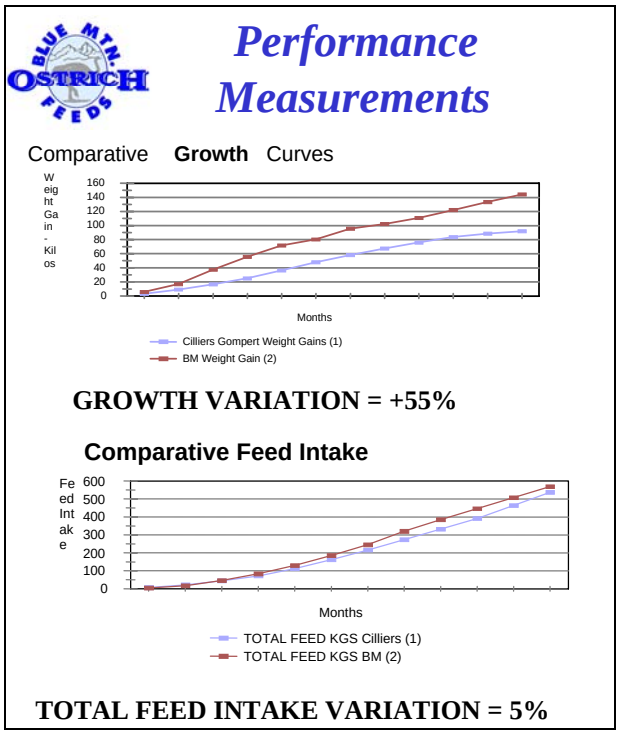

Figure 1

Bearing in mind that the maximum daily intake of these birds is limited, here is proof that significantly increased yields can be achieved when the rations are designed for fast growth and good conversion - and fed according to instructions.

In Table 11, the first graph shows the comparison of the Gompertz Model of Cilliers et al 1995 vs Blue Mountain Farmer Field Trial birds. Note that the increase in production was 55%.

The second shows the feed intake estimate to develop the Gompertz model vs the Actual feed the Blue Mountain trial birds consumed. Note that the intake is only 5% more, yet he achieved 55% increase in growth.

These particular birds were slaughtered shortly after the trial at about 13mths. They yielded an AVERAGE of 118lbs/53.5kgs of boneless, **saleable** meat.

A few months ago I wrote an article titled 'Measuring the Cost of Feed'. Figure 12 is a graphical illustration of the figures that I included in that article. The purpose of this graph is to illustrate the difference in meat yield when a 25% killout is achieved as opposed to a 35% killout. The important factor to note here is that very few birds slaughtered at 95kgs at 12mths are achieving 30% and above killout - many will be achieving considerably less. Too many heavier birds are achieving below 30% killout as a result of the birds producing too much fat.

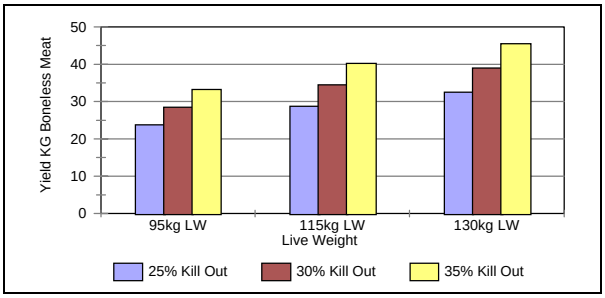

Figure 2

It is possible to achieve 95kgs at 7mths, when this is achieved the kill out percentage will most probably be above 30% as a result of the balanced diet that is required to achieve this rate of growth. If that same rate of growth is maintained to 12-14mths, then the meat yields will remain above the 30% (farmers are regularly achieving +/- 33%)

and a significant increase in revenue will be achieved. An interesting trend that Blue Mountain are finding is that in the older birds slaughtered the primary (filet) muscle yield as a percentage of total yield is increased, providing evidence that these muscles are maintaining growth when the diet is right.

There has been a considerable amount of debate over which age is the best for slaughter. Slaughter age will ultimately depend on:

1. **Local Processing Costs vs Local rearing costs.**

2. **Ability to provide a 12mth sustainable supply of meat** from birds that produce 7-8mths of the year. In time we may be able to extend the laying life of the birds. Since some farmers already receive eggs for 9-10mths a year - early layers starting in January/February and late layers finishing November/December, it seems that it must be possible, in time to have a 12 month supply of eggs?

3. **Hide buyers requirements** and the industry's ability to promote a variety of hide products.

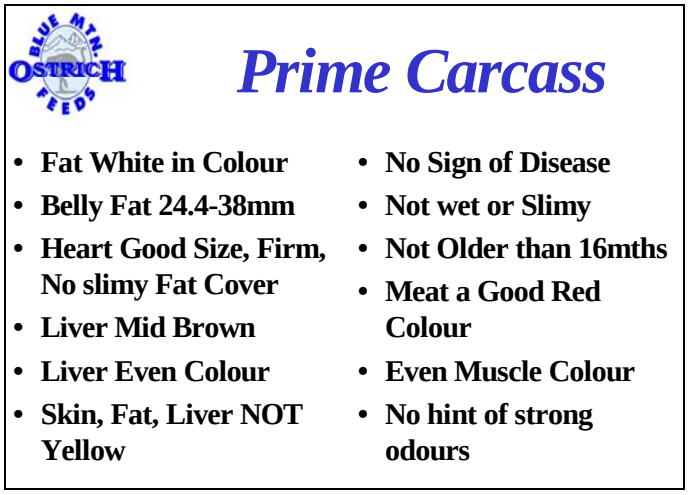

Figure 3

In order to maximise the return on the meat it is necessary to produce a first grade carcass (Figure 3). Whatever slaughter age - maximum growth rates and cost per kilo of gain will remain paramount. Birds fed rations geared for maximum growth will also produce carcasses meeting all the criteria outlined in figure 3. Survival rates and other rearing problems will be substantially reduced, if not eliminated.

This series of articles has outlined various areas that explain how it in most cases farmers are underfeeding their birds and/or feeding imbalanced rations and how this is causing carcasses that are NOT of marketable quality.

The knowledge that is now available needs to be used to break the cycle of poor quality birds being presented for slaughter, resulting in low income for the farmer which leads to the farmer producing consistently poorer birds and/or going out of business. Farmers need to encourage their processors to pay different rates based on carcass quality AND the boneless meat percentage. It costs the same to process a bird, regardless of its size - it therefore makes sense that the farmer with the higher yielding birds is rewarded accordingly.

A POOR carcass fed incorrectly, with inconsistent meat quality, and little of it, should be worth nothing as it costs more to process the meat than the public is willing to pay for it. Birds of this quality usually yield a low percentage of 1st Grade hides - further reducing the revenue to the processor and the farmer. These birds are not economic for anyone to produce or process.

Raising birds along the principals outlined will have the benefit that production throughout the farming chain will be significantly increased. When the nutritional levels are adequate, genetic influences can be identified. This will allow farmers to identify their superior genetic birds - both in terms of egg laying and growth rates. The species can then be improved to further increase production in the same manner other production livestock farmers have achieved over the past few decades.

I hope this series has helped producers and those involved in processing to understand a little more just how unique our Ostriches are. To understand the reasons for the problems of the past and how to feed for Production and Quality is the ONLY way forward.

Soya Meal, An Important Component of Ostrich Diets

Originally published in Feed Mix Volume 8. No. 2

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Introduction

Nutrition is a key element in ostrich production. It is only with an adequate knowledge of nutrient requirements at each growth stage of the ostrich that the correct contents of formulating diets will be realized. In the past, nutritional results obtained for poultry have been erroneously adopted to fit ostrich diets, thus resulting in various nutrition-related problems[1]. An accurate evaluation of any diet, therefore, should determine the extent to which an ingredient will provide essential nutrients for growth and development, the potential utilization capacity of the nutrient and performance outcomes[2].

Some studies describe the anti-nutritional effects of soybean due to an interference with normal gut and systemic metabolism[3]. However there are many personal observations that soya meal is in fact beneficial as a good source of amino acids[4-5] and minerals[6] given correct processing procedures. These include heat processing[7] in order to denature inhibitory enzymes like urease and haemagglutinin and an inclusion in the meal of not more than 25-30% Soya. Indeed it is emphasized that soybean can be used in feed without detrimental effects on growth rate and body conformation[8]. The aim of this article, therefore, is to discuss the importance of soya meal in the diet of ostriches in terms of its beneficial effects on growth and development.

Soya meal

Soybean meal is a concentrated source of protein and energy and is lower in crude fiber than most other oilseed meals. The higher protein, energy and lower fiber content of soybean meal enable formulation of diets which are proven more efficient in the conversion of feed to meat in for most livestock.

Soyabean meal is available in two grades. Both meals are produced following the same basic process - the only difference being that the 44% has some hulls blended back. Dehulled 47% protein soyameal is preferred by most nutritionists who wish to achieve a dense ration, as the difference is soyahulls that have no place in rations designed for production. Full fat Soya is the whole bean toasted and provides a high protein source and high fat source. The fat levels are too high for use in Ostrich rations.

Soybean meal provides the best balance for amino acid deficient cereal grains [9]. Table 1 - demonstrates this very clearly. It is the most economical protein available to most livestock producers and is much more uniform in composition than any of the by-products available from the meat or fish industry.[10] Arginine has been reported to be thee most efficiently digested amino acid

in dehulled soybeans at 93% and lysine more digestible than sunflower. Other protein sources are products such as: Cotton Cake - which carries a risk of 'Gossypol' Toxin. Peanut Meal that carries a risk of Aflatoxins and is also low in lysine and methionine and has some extremes on others such as arginine and threonine. Soyabean meal has been proven the safest high protein cereal grain to use in any livestock ration and has been used safely for many years in US livestock and in recent years with Ostrich.

Table 1 [11]

Comparative Amino Acid Composition of Oilseed Meals (1)(a)

	Soybean	Dehulled Soybean	Cottonseed	Canola	Peanut	Rapseed	Sunflower
Arginine	3.4	3.8	4.6	2.3	4.6	2.0	3.5
Lysine	2.9	3.2	1.7	2.3	1.8	1.7	1.7
Methionine	0.65	0.75	0.52	0.70	0.42	1.5	1.5
Cystine	0.67	0.74	0.64	0.47	0.73	0.7	0.7
Tryptophan	0.6	0.7	0.5	0.4	0.5	0.5	0.5
Histidine	1.1	1.3	1.1	1.1	1.0	1.0	1.0
Leucine	3.4	3.8	2.4	2.6	3.7	2.6	2.6
Isoleucine	2.5	2.6	1.3	1.5	1.8	2.1	2.1
Phenylalanine	2.2	2.7	2.2	1.5	2.0	2.2	2.2
Threonine	1.7	2.0	1.3	1.7	1.2	1.5	1.5
Value	2.4	2.7	1.9	1.9	1.9	2.3	2.3

Protein is essential in any ration for optimum growth and development, meat and egg production and reproduction. Ostriches perform best on rations that carry a high level of protein. The other grain sources of protein carry lower levels of protein compared to Soyameal, (with the exception of Peanut Meal that is too risky to use) making it more difficult, if not impossible, to formulate a productive ration for ostriches. See Table 2.

Table 2.[11]

Comparative Composition of Various Oilseed Meals (1)(a)

	NRC Ref. No.	Crude Protein Extract %	Ether Fiber %	Crude %	Energy(b) kcal/kg
Soybean meal	5-04-604	44.0	0.5	7.0	2240
Soybean meal(c)	5-04-612	48.5	1.0	3.0	2475
Canola meal	5-08-135	38.0	3.8	11.1	2110
Cottonseed meal	5-07-872	41.0	0.8	12.7	1940
Linseed meal	5-02-048	33.0	0.5	9.5	1400
Peanut meal	5-03-656	48.0	1.5	6.8	2200
Rapeseed meal	5-03-871	36.0	2.6	13.2	1770
Safflower meal	5-07-959	42.0	1.3	15.1	2040
Sesame meal	5-04-220	42.0	7.0	6.5	2255
Sunflower meal	5-04-739	42.0	2.3	21.0	1760

(a) As-fed basis
(b) metabolizable energy for poultry
(c) Dehulled

Improper oilseed processing damages amino acids, rendering the proteins biologically unavailable.[12] Care needs to be taken that the source of the meal used is reliable and supplies a consistent product.

After soyabeans have been cleaned, dehulled, flaked and deoiled, the white flakes should be toasted (steam heated) to remove antinutritional factors, especially trypsin inhibitors, thus removing factors that will upset digestion.

Conclusion

Soyabean meal is a quality protein source in ostrich feed, being typically 47.5% crude protein. As with all ingredients, the quality must be correct and inclusion levels reasonable and in balance to other ingredients in the rations. The importance of soyabean meal in reducing the loss of mineral ions[6, 14] should be investigated further especially in the most vulnerable period of an ostrich chick's life, 0-3 months. Indeed ostrich rations including reasonable levels of high-grade soyabean meal have been proven to far outperform any rations without soyabean meal. Hence the necessity of including soyabean meal in ostrich diets.

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Glossary

Nutrition

Ad Lib: Also known as Free Choice. Sufficient Feed is made available at all times to enable the animal to eat as much as it can eat.

Air Dry Basis: A parameter of stating the nutrient value of feed ingredients or feed that has naturally dried in the open air until it can not dry or dissipate any more moisture (usually around 10-12% moisture

Amino Acids: Building Blocks of Protein.

Animal Protein Products: The protein ingredient that is made from Meat, Bone meal, Carcasses, Blood, Feathers of any animal and/or Fish that is treated at very high temperatures. Ingredients that our consumers do not wish to see fed to the animals supplying the meat that they eat.

As Fed Basis: Weight of the feed or ingredient ***including*** moisture (water) content.

Balanced Ration: To be balanced a ration must contain the 5 essential elements - Water, Protein, Energy, Vitamins and Minerals in the proper amount and ratios for the specie being fed. A specific formula designed for a specific task - i.e.. Meat Production, Egg Production, Body Maintenance

Complete Feed: A ration that provides ALL the nutrients required. This can be purchased or it can be made up on farm

Deficient/Deficiencies: Short of certain nutrients

Density: When applied to the rations, describes the amount of nutrients within a measurement unit of the total ration.

Digestible: Easily digested by the animal

Dry Matter: The portion of the feed remaining after removal of the moisture.

Dry Feeds: Complete feeds, Hay and supplements - Feeds that are around 90% Dry Matter

Farm Management: The attention to detail on all aspects of managing the total farm operation.

Feed Formula: The list of ingredients and their inclusion levels that are required to make up a ration.

Feeding Rate: The amount in pounds or kilos that a specific feed must be fed per bird per day or per bird per feeding.

Feed Ingredient Group: Ingredients fall into different categories - ie. Grain, Forage, Protein, Fat, Vitamin or Mineral

Feed Label/Feed Tag: The details of a specific ration that should contain information such as Animal the feed is designed to be fed to, Ration purpose (grower, layer, maintenance), Nutrient Levels, Ingredients, Feeding Rate, Special warnings, Batch Number

Feed Management: The attention to detail on all aspects of feeding an animal

Flushing: A system that used to be used in Livestock Nutrition. It is the feeding of a ration to prepare for the next production season for production animals that have been fed a poor ration during their 'off season'. Modern Nutrition Technology provides 'production' livestock with 'replenisher' rations during the 'off season'.

Ground Feed: A ration fed in meal form and not pelleted. It is a courser chop than 'meal feed.

Inclusion Level: The amount in pounds or kilos that a specific ingredient is included within a ration. This will be measured in pounds, kilograms, parts per million (ppm), International Units (IU) etc. dependent on the specific ingredient referenced.

Ingredients: The components that make up a ration - such as Lucerne, Maize, Soyameal

Inorganic: The source of the nutrient is a "mined from the earth" Mineral or Trace Mineral.

Interrelationships: All nutrients in a ration depend on other nutrients in a ration to be utilised correctly.

Limit Fed: Rations fed at a specific amount per animal per day.

Major Minerals/Macro Minerals: Minerals such as Calcium and Phosphorous that included in a ration in relatively large amounts. Usually measured in Grams/day

Meal Feed: A finely ground feed.

Metabolised: The process whereby the food is digested to enable the animal to utilise the nutrients

Minor Minerals/Trace Minerals: Minerals such as Copper and Zinc that are included in a ration in very small amounts. Usually measured in 1/1000 of a gram or fractions of a milligram per head per day.

Nutrients: Items such as Protein, Fat, Fibre, Energy, Minerals, Trace Minerals, and Vitamins.

Organic: The source of a nutrient is Vegetable or Animal Origin

Pelleted: A ration that goes through the process to compact the ration into a pellet.

Performance: The measurement of production achieved. Eg. Eggs/hen; Feed Conversion Ration (FCR), Cost per kilo of Gain

Premix: A very broad term to describe a mixture of more than one component. It may be a number of vitamins. Generally when discussing a complete ration - the premix will include all the Vitamins, Trace Minerals, Amino Acids and other additives such as yeast that are in specific quantities and ratios for that particular ration for the particular specie. Some premixes will include the major minerals as well.

Ration: A ration may be fed as a complete ration - or it may be made up of Grazing plus a balancing supplement.

Roughage: A misleading term that is often used to describe the Fibre content of a diet leading farmers to believe that its only purpose in a ration is to aid digestion.

Source: All ingredients contribute a number of nutrients to a ration. An example - Protein sources can be Soyameal, Lucerne, APPs, Grains. It can also be used to describe where an ingredient came from - its origin.

Supplement: This is a fairly broad term and can have a number of different applications:

1. A specific ration designed to be fed to Grazing animals or animals on hay or silage fed separately. This will include the protein, energy (grain), supplemented vitamins, minerals, amino acids to balance with forage portion of the diet

2. A specific ration as above to be added to the Grain and Forage on farm to make up a complete feed

3. Any nutrient fed in addition to the basic ration is also a supplement to the overall rations and will contribute to the overall Total daily Nutrient Intake. Example is vitamin packs that can be added to the water.

Supplementation: Vitamins, Minerals, Amino Acids, Probiotics etc. are fed in addition to those available from the main ingredients when included within a Premix that forms part of the ration.

Total Daily Nutrient Intake: EVERY nutrient that an animal consumes in a day has a contribution towards the total daily nutrient needs of that animal.

Undigestible: Not easily digested by the animal.

Utilisation: The ability of the animal to make use of all the nutrients within the ration

Wet Feeds: Feeds such as Fresh Grass or Lucerne (grazed or fed chopped) and Silage. Ingredients with a high moisture content

Effects of Nutrition/Measurements of Performance

Boneless Meat: The weight of all saleable meat

Carcass Weight: The weight of a bird at slaughter after deskinning and evisceration. Same as Rail Weight

Feed Conversion Ratio: (FCR) - The amount of feed intake to make 1 kilo or pound of weight gain. Usually referenced to Liveweight

Fertility: Percentage of all eggs set that are Fertile - capable of developing an embryo

Genetic Potential: Every animal has a certain inherited ability to produce eggs, develop muscle etc.

Growth Rate: Rate at which an animal achieves certain weights between two dates.

Hatchability: The percentage of eggs that hatch successfully. This maybe expressed as a percentage of all eggs laid, it may be expressed as a percentage of all Fertile Eggs

Live Weight: Total weight of any live animal at any stage of development

Malnutrition: Insufficient Nutrition

Mortality: The percentage of chicks/or adult birds that die

Survivability: The percentage of all Chicks hatch that develop to slaughter or adulthood

Feed Products

There are many different terms used to describe different feed products manufactured. It is important to understand what is meant by all these terms. The hard part is that terms and names will vary from feed mill to feed mill and country to country. In general, the following descriptions will be true:

Premix or Premixes: Many different products are manufactured under the name of "Premix". The following products are most relevant to the Ostrich Farmer:

- Vitamin and Mineral Premix Without Macro Minerals. Most usually contains vitamins, micro minerals (trace minerals) and amino acids. Salt, yeast, calcium, and phosphorus will be added during the mixing process by the farm or mill.
- Vitamin and Mineral Premix With Macro Minerals. Most usually contains all required vitamins, minerals, micro minerals (trace minerals), salt, yeast, and amino acids. This is a complete vitamin/mineral/additive package that can be mixed with feedstuffs for a complete ration.

Most animal feed companies will purchase either of these two products from specialist feed companies. Some work closely with the Premix development company for ration formulations. Others simply add the products to their own formulations.

Farmers mixing on the farm also use either of the above products. The supplying Premix Company provides the required ration formulations based on the suitable ingredients the farmer has available either grown on the farm or purchased locally.

Protein Supplements/Concentrates: Feed Mills manufacture these products. They will include all the vitamins, minerals and additives and also the protein ingredient of a ration formulation. They

are designed for the farmer to add to his own grown grain and forage ingredients. Care needs to be taken when using these supplements that particle sizes of the individual ingredients in the complete ration match. For example: If a farm is adding Lucerne (alfalfa) pellets, the supplement must be pelleted and the maize (corn) fed whole. If a farm is feeding chopped Lucerne (alfalfa), the supplement should be ground with the maize (corn) also ground. This helps prevent birds selectively choosing different ingredients and eating too much of one particular ingredient.

Grazing and Forage Supplements or Concentrates: Also manufactured by feed mills and will include vitamins, minerals, and additives. They also will include the protein ingredients and sufficient grain ingredients to match the forage source used on the farm. Take great care that such supplements are designed to be fed with the forage available on the farm. Example: Do Not use a supplement designed to be fed with Grass when using Lucerne (alfalfa). Do Not use a supplement designed to be fed with Lucerne (alfalfa) when feeding Grass.

Farmers may also mix their own Grazing & Forage Supplement or Concentrate using a purchased vitamin and mineral Premix.

Note: The authors do not recommend this method of feeding Ostriches if optimum performance is to be achieved. It can be done if done wisely and correctly but many variables usually exist causing production variables.

Complete Feeds: These products supply ALL the nutrients required to provide a complete balanced ration to the birds. These complete feeds can be pelleted feeds or meal (ground) feeds. Under no circumstances should anything further be fed to the birds when using complete feed products.

Mineral Licks: A mineral lick is a mineral product that provides "free choice" mineral supplementation to grazing animals.

The Authors do no recommend the use of mineral lick product as they DO NOT fit into our policy of providing cost effective balanced rations with high performance for Ostrich. They do not form part of ‘production’ nutrition. It is the authors’ opinion that Ostriches should never have "free-choice" of any mineral product as imbalances in the diet will result.