

## The Welfare of Ostrich and Malnutrition

By: *Fiona Benson, Blue Mountain International*  
*Daryl Holle, Blue Mountain Feeds, Inc.*

### Introduction

There is discussion currently on a move in Germany to ban the production of Ostrich in that country. It is believed by some less-than-knowledgeable people that it is cruel to farm ostrich in Europe. The Ostrich Industry is a new Livestock production industry that has attracted many investors with no previous livestock experience. As a result of fast-talking sales people, misleading research projects and conflicting advice, this has naturally presented difficulties for people to sift fact from fiction.

Without exception, everyone producing ostrich wishes to prevent serious neglect or abuse when raising any animal...especially malnutrition. How to define or recognise malnutrition in Ostrich is more difficult at this time as a result of the proliferation of the conflicting advice in the industry. This document is aimed to discuss this topic, from the information and experiences currently available, to enable people to make an informed judgement.

I suggest that the starting point is the encyclopaedia [1] definition of Malnutrition...whilst this references malnutrition in humans, I believe all readers will agree that the principles are the same no matter which specie:

***Malnutrition:** insufficiency of one or more nutritional elements necessary for health and well being. Primary malnutrition is caused by the lack of essential foodstuffs—**usually vitamins, minerals, or proteins**—in the diet. In some areas of the world a poor economy or such regional conditions as drought or overpopulation cause a scarcity of certain foodstuffs, and a certain portion of the population is malnourished because essential nutrients are not available. However, even when food is plentiful, malnutrition can result from **poor eating habits**. Secondary malnutrition is caused by **failure of absorption or utilization of nutrients** (as in disease of the gastrointestinal tract, thyroid, kidney, liver, or pancreas), by increased nutritional requirements (growth, injuries, burns, surgical procedures, pregnancy, lactation, fever), or by excessive excretion (diarrhoea).*

### Discussion

As a starting point for this discussion, I will take some of the statements made in the above definition and discuss how they relate to all that is now known for Ostrich.

#### **“Vitamins, Minerals or Proteins”**

As long ago as 1993, it was reported [2] that high levels of vitamins and minerals were required in Ostrich rations. Many articles have been written subsequent to this article that highlighted the importance of good levels of vitamins and minerals in Ostrich rations to substantiate that statement. Nearly a decade later we still have senior researchers never once referencing the vitamins and mineral levels in their “experimental” rations. They continue to lower the levels of protein in their rations.

In 1996, an Ostrich article [3] referenced some common average daily consumption levels of several vitamins while stating that the actual levels needed by Ostrich were

much higher than those averages referenced. However, those average levels stated were more than double levels we still see in many Ostrich rations today. It is always dangerous to look at any single nutrient level in isolation, as many nutrients are interdependent on other vitamins, minerals and/or other nutrient levels in the rations.

The most recent research projects from South Africa are working with comparative rations at 10%, 12% and 14% protein levels. This research is being done despite the fact that the best results have been clearly documented with 21% protein levels in Ostrich Breeder rations having adequate levels of vitamins and minerals. This low nutrient level research is being done despite the fact that farmers are seeking answers to the high levels of chick mortality of which most is caused by severe Breeder bird malnutrition.



Figure 1- 12 month Fat no Meat Low Protein Low Vit and Min Diet  
Figure 2 – 60 Days Later High Protein, High Vit and Min Diet  
Figure 3 – 12 Month Bird  
All raised in Cold Winters and Warm Summers

In the photos above, Figures 1 and 2 are the same bird. For the first 12 months this bird had been fed a diet of Lucerne and maize, plus a few cattle vitamins and minerals. As can be seen in Figure 1, it is fat, poorly feathered with poor bone density and minimal muscle development. After 60 days of receiving a ration reported at 20% protein and high levels of vitamins and minerals, a complete transformation has taken place on this bird as shown in Figure 2. Excellent feather growth, the fat has gone and been replaced with muscle, additional growth has taken place and the bird looks “very well”. This totally disproves the theory that birds only put on fat after 12 months if fed a high nutrient diet. The bird in Figure 3 is further proof of this fact. This is a well grown, healthy 12-month-old slaughter bird. To give an indication of the size of this bird, the farmer is 1.9 meters (6ft 3 inches) tall. This is a **quality** slaughter bird in PRIME health.



Figure 4 – 4 Month Chicks  
High Protein, High Vits and Mins - Poland



Figure 5 – 12 Month Chicks  
Low Protein, Low Vits and Mins - Poland

The chicks shown in Figure 4 are 4 months of age. The chicks shown in Figure 5 are 12 months of age. When comparing these photos, also compare the feather development as well as size of birds, body depth, muscling and size of body frame. Both groups are raised in a country believed by many to be too cold. The management of the chicks in Figure 5 was excellent with the farmer doing everything according to the instructions he had been provided. The difference is the nutrient levels the birds were receiving.



Figure 6 – 6 Month Old Chicks  
Mid-US...Cold winters,



Figure 7 – 6 Month Old Chicks  
SA Hot Summers– Mild Winter



Figure 8 – 6 Month Old Chicks  
SA Hot Summers– Mild Winter

Fig 6 & 7 raised on high protein with high vits and mins

Figure 8 raised low protein low vits and mins + grazing

The above photographs are further clear illustrations that climate has very little to do with the welfare of the birds, but proper Nutrition has everything to do with the welfare of the birds. The above photos also illustrate that even with excellent management, if the rations fed to the birds are lacking in high levels of vitamins, minerals, protein and other important and essential nutrients, the birds will demonstrate stunted growth and other symptoms of malnutrition.

#### “Poor Eating Habits”

This can be translated into an imbalanced ration in livestock production. With Ostrich, they may have plenty to eat, but with their limited daily intake of feed, the birds will have symptoms of malnutrition if the overall daily intake is insufficient in total nutrients no matter how much they actually eat.

Many publications reference the fact that Ostrich should have access to grass and/or vegetables, or other green feed, as a contribution to their overall daily feed intake. As this breaks all the rules of production nutrition because it creates severe nutrient variables, these recommendations are clearly made with no scientific basis. If improvements are seen following this incorrect advice it is most likely for two reasons:

1. The basic rations were of low nutrient levels, with high levels of grains (poor fibre) and low in supplemented vitamins. Fresh Forages are known to generally have a higher vitamin content...therefore the vitamin content of the rations are improved by adding Fresh Forage. However, the reason a positive response is seen by adding Fresh Forage is that the “basic feed formula” fed to the birds is seriously lacking proper nutrients. The productive method to feed birds is to correct the basic feed formula and eliminate the variable of Fresh Forage feeding.
2. With many rations containing high grain content and poor fibre sources, these added greens are improving the fibre content of the rations from a forage source. In production nutrition, this is not the correct way to achieve this goal.

Again, the productive method to feed birds is to correct the basic feed formula and eliminate the variable of Fresh Forage feeding.

If optimum health and good production is an objective, the advise to add green feed to a basic feed diet is a serious mistake in domesticated Ostrich rearing unless extremely high levels of management are present [4] and the exact nutrient value of the green feed is accounted for in the total balanced diet of the bird.

Let's use grass as an example to discuss this topic, as there are a number of references that grass grazing is adequate for Ostrich. Grass is a very poor feed for Ostrich as grass is variable in protein, amino acid structure, changes in nutrient value throughout the year and has a poor mineral balance for Ostrich. It has been observed that when the rations are correctly balanced and provided in the correct quantity, Ostrich will eat very little of the grass available in their pen. It has also been observed by farmers that Ostrich will choose clover, Lucerne and/or weeds before they touch the grass. It could be suggested that if Ostriches are found eating a large amount of grass, then the nutrients supplied in the supplemented rations are falling severely short and the birds are therefore starving. In the wild, Ostrich have been observed as selecting young shoots of a variety of plants and only plants that are very high in many nutrients. [5]



Figure 9 – 4 Month Chicks  
Grazing and Supplementation



Figure 10 – 1 Month Chicks  
Control Fed



Figure 11 – 2 Month Chicks  
Rations Containing High Vitamins and Mineral Supplementation

#### **“Failure of Absorption or Utilisation of Nutrients”**

This can be caused by disease, but it can also be caused by incorrect ingredient selection for the particular specie. It can also be caused by a deficiency in one or more particular nutrients that are required for correct utilisation. It has been proven and well documented that the same crops today are sampling with extremely variable vitamin and mineral levels from location to location and year to year. This is further evidence of the need for supplementation at high levels. To substantiate this statement, the NRC Tables for Dairy Nutrition now stipulate that only supplemented vitamins and trace minerals should be calculated in the rations and the inherent vitamins and trace minerals in the crops should be ignored. The benefit of these high supplementation levels of vitamins and minerals in Ostrich can be visibly seen in the photographs above when combined with high protein levels using the correct ingredients.

#### **Evidence of Malnutrition in Ostrich**

- How often have we heard the suggestion that “Ostriches die for No Reason”?
- Research projects referencing +/- 60% Chicks from Eggs [6]
- Continual problems with Chick Mortality
- Stunted Growth
  - Figures 1,5,8 and 9
  - Liveweight variations in excess of 50% at the same ages and even 100% at certain ages. [7]

- Growth rates better than the current industry average on rations designed for a different specie [7]
- As much as 300% variations in meat yields [8]
- Many slaughter birds with incorrect livers [9]
- Chicks Hatched with Bright Yellow Livers [10]
- Multi-Coloured Muscles, Excess Fat, Too Little Fat, Yellow Fat [11]

Slow Breeding, Low Egg Production, Variable Fertility, Low Hatchability, Yolk Sac Infections, Bad Legs, High Chick Mortality, Slow Growth, Yellow colouration of the skin and/or eyes and we can continue the list...are all clinical symptoms of **malnutrition** in Ostrich.

Other major production livestock species have overcome all these symptoms and moved forward to find that simply eliminating the symptoms is insufficient for profitable farming. [12] They no longer define nutritional adequacy as freedom from deficiency symptoms as it has been found that nutritional essentiality has set its sights dangerously low. It has been found that focusing only on achieving freedom from "symptoms of deficiencies" provides little better than a breakeven return to the farmer. When nutrient levels are lifted further to a production level, real profits are achievable even though the initial feed costs are higher. Feeding a productive feed, without suffering the malnutrition syndrome causes the animals to be healthier, the birds begin to be productive with less mortality, and the farmer increases his profits.

As can be seen in this discussion, Ostrich production has not yet achieved "freedom from deficiency symptoms" and is clear proof that the majority of our birds still suffer from malnutrition or, at best, clinical unthriftiness.

### **Why is this?**

How many can share the experience of this now enlightened writer? I have blanked out the countries involved in this discussion, as this is a general problem:

#### **Quote**

*About a year ago (on a typical cold and grey afternoon) a friend of mine showed me an article in a newspaper praising the ostrich industry (particularly one farm). The article was saying how profitable the business was and that the ostriches will also be popular in my country. Within few days we decided to buy our first ostrich breeders (two trios) and a month later I become a proud owner of an "ostrich farm". At that stage I knew NOTHING about the ostriches and I simply treated the whole thing as a business where I was an investor and my friend was to look after the birds.*

*The owner of the company importing the ostriches (where we bought our first "breeders") gave us some information on how to look after them and how to feed them etc. I was waiting for the first book to be put on sale hoping to get the answers to all my questions about the ostrich business. Everything seemed to be so easy: Just give the ostriches some grain, lucerne, cabbage, onions, hay, grass and just about anything else (as we were told by "experienced" farmers), collect the eggs, incubate them, raise the chicks sell them, make money, etc, etc. All too easy to be true.*

*In April last year I finally purchased the only book available on ostriches (written in language). Again everything seemed to be so easy: the book gave me many answers to my questions. I could read about the "standards" and how to achieve them. The book told me how to feed the breeders (something like: 30% ostrich feed, 30% corn, 30% barley etc.....) It was my ostrich bible then. Excellent business, cheap feed, quick return.... nothing seemed to go wrong.*

*We had our first egg on the 1st of April (April fools day!!! coincidence?). Do you remember "your" first ostrich egg? Some time later we hatched our first 12 chicks. The book was saying nothing about chick rearing methods and all the "experts" around us were giving different*

*information ie: don't give any food and water, use heated pads, don't touch the chicks, use lucerne only, don't use any Lucerne, etc., enough to say all the chicks were dead by 10th day.*

*Our first failure which then was a tragedy. Now I know it was the DAY when I stopped being a passive investor and I turned into a "baby ostrich farmer". I knew that since I invested so much money into this "business" I had to take the matter further.*  
End quote

We get many messages for help...but this message sums up exactly why we have such a severe problem currently in the Ostrich industry. The good news is that this farmer studied hard, took corrective action and immediately saw positive results. The sad news is this bad information is STILL being advocated by too many.

## **Conclusion**

It is time for all involved in our industry at whatever stage of the value chain to protect our fledgling industry and help it to grow by acknowledging that the PROOF is clearly there, that malnutrition continues to plague Ostrich Production. It is time for the industry to take measures to eliminate malnutrition in our ostriches. The evidence is all there these birds require daily balanced rations of high nutrient levels with high levels of supplemented vitamins, minerals and trace minerals when in our care.

Setting targets to achieve Optimum Health and Welfare go hand in hand with optimising the profit potential.

=====

[1] The Columbia Electronic Encyclopaedia Copyright © 1994, 2000, Columbia University Press. Licensed from Columbia University Press.

[2] Daryl Holle: Are Vitamins and Trace Minerals Necessary for Ostrich, Ratite Marketplace, 1993

[3] Daryl Holle: I Said Breeder Nutrition, Breeder Nutrition, Breeder Nutrition, Blue Mountain Nutritional Articles, <http://www.blue-mountain.net/articles/p39.htm> 1997

[4] Fiona Benson: Optimisation of Ostrich Rations, 6<sup>th</sup> Professional Meeting about Ostrich Production - "Reproduction, Pathology and Marketing" Barcelona, SPAIN 2000

[5] Animal Planet TV Channel: Ostriches in the Wild, 2002

[6] Fiona Benson: Report on World Congress – 2002, Blue Mountain Nutritional Bulletin No. 85, 2002

[7] Fiona Benson: Potential Meat Yield of Ostrich – Blue Mountain Nutritional Bulletin No. 81 2002

[8] Daryl Holle and Fiona Benson: Understanding Difficulties of Economic Ostrich Processing – Eastern Cape Ostrich Producers Association Journal – 2001

[9] Daryl Holle and Fiona Benson: Ostrich Nutrition and Health - Course specializing in the Production of Ostrich Nutrition and pathology", UST (University of Santo Tomas), Chile, April, 2001, Fiona Benson

[10] Daryl Holle: Yellow Livers in Baby Chicks is NOT Normal – Blue Mountain Nutritional Bulletin No. 40, 1999

[11] Daryl Holle: Fat versus Meat Production in Ostrich – Ostrich Farmer Fortnightly, 1997

[12] Paul Bond, Bruce Boren, Donnie Campbell, Scot Williams, Jon Wilson, Carl Zimmerman: Optimum Vitamin Nutrition for Optimum Animal Health and Performance, Roche Nutrafacts v3n2