

## *General News*

In my last editorial I expressed a desire to spend more time in Southern Africa this year. This comment has led to any number of bemused "chirps" about my whereabouts at any time. Although much of my travel has been local, I have also had the opportunity to visit Madeira, Morocco and the UK in the past few months. Some of my experience and/or opinions are included in this edition of the SPESFEED News.

We have a new addition to the technical team at SPESFEED. Colleen Englbrecht, who worked for us for a few years before her husband was transferred to Mpumalanga, will be joining us as our ruminant specialist. In addition to functioning as a feed mill nutritionist, Colleen has had 7 years of solid dairy experience since leaving us and we look forward to making the best use of her expertise as both a general nutritionist and as a dairy specialist.

I was reading the Winter 2004 edition of SPESFEED News. I quote the *Landbou Weekblad* (April 7), which reports that Mr Bully Bothma, Grain SA chairman, is urging grain farmers to plant less maize so that the prices that producers achieve will be higher. This despite the fact that plantings were

down this season as it is, and that the famous record crop of 12 mil tons is unlikely to ever be achieved again. How good it is to be completely wrong.

### [Poultry Nutrition Course](#)

For the first time in 13 years we have had to delay the poultry course that was to have been held in February to a date in October (3rd to 5<sup>th</sup>). This is the same week that the WPSA scientific day and AFMA forum. Please contact Bianca if you wish to attend.

### [Hubbard in ISA Hubbard in Southern Africa](#)

After a break of many years both the Hubbard broiler (The Highflex) and the ISA Brown layer will be available in Southern Africa again. CFI Holdings in Zimbabwe has imported breeding stock of both strains. The breeds were launched in Harare during March and will be available throughout the geographic area currently serviced by Ross Zimbabwe.

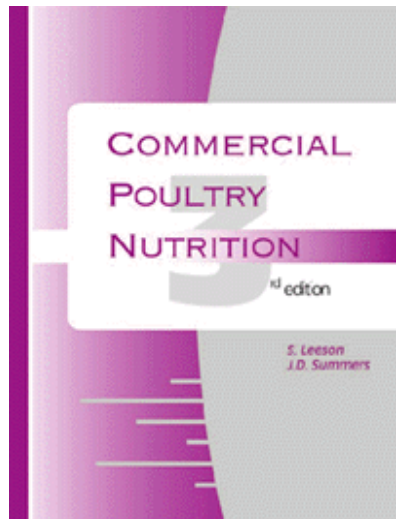
My experience with the Hubbard in Russia leads me to believe that the local poultry industry may well have another viable option when it comes to breed selection.

### [Commercial Poultry Nutrition 3<sup>rd</sup> Edition.](#)

Steve Leeson and John Summers have just brought out the third edition of their very popular book 'Commercial Poultry Nutrition'. The book has been completely revamped and updated. A new layout makes it far easier to read and it now contains far more information than the previous edition.

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In their foreword the authors make the following statement: "The first edition of this book was published in 1991, while the second edition followed in 1997. It has been an interesting exercise to follow the development of poultry production over this time, and to encapsulate ideas of associated changes in nutrition and feeding management." This pretty much sets the tone of the new edition. Many of the basics are still the same, but there have certainly been new developments and a change in emphasis in many areas.

In my opinion it is a must have for any nutritionist or poultry producer. SPESFEED have imported a number of copies for our clients (the bulk shipping makes it far cheaper), and we will be offering them for sale at a price of about R 600.00, (excluding VAT), depending on the exchange rate. Please contact Bianca if you would like a copy.

### [Schering-Plough IDEA conference](#)

In March I was invited to attend a technical seminar, organised by Schering-Plough, in Madeira. The meeting's theme was "Changing Paradigms in Poultry Nutrition and Management".

Schering-Plough manufactures the Paracox range of anti-coccidial vaccines. In essence the conference dealt with how vaccinated birds should be fed, as it is believed that vaccinated birds should be offered a somewhat different dietary regime than birds being fed coccidiostats. The IDEA concept was developed to put this philosophy across. The truth is, the

concept has as much to do with the feeding and production of all broilers, in particular those reared on drug free regimes, as it has to do with vaccinating birds against coccidiosis.

Use of the Paracox vaccine is said to be a technique that only causes low levels of stress in the bird. It is the additional stresses of poor management and inadequate feeding programs that result in the multiple stresses that the birds do not handle well.

In addition, there is little doubt that the ionophores that we use for coccidiosis control also have a mild anti-biotic/growth promoting effect. Thus, when they are removed from the diet, together with the AGP's, additional stress is placed on the gut of the bird. For this reason the make-up of the diet requires scrutiny.

In broad terms the IDEA concept can be spelt out as follows:

**I - Impulse:** This stands for the impulse that the birds need to be given from day old through to the end of the starter period (14 days). This has to do with the development of the gut (physiologically), the development of the immune system and the development of a healthy gut micro flora.

Dr. Andrea Machado Leal Ribeiro, a colleague of Mario Penz who is well known in South Africa, presented a paper entitled 'Maximizing development of the Intestinal Tract and Immune System'. Some very interesting data was presented but I was unable to take notes fast enough to use any of the data here. We have been promised a copy of the paper, and when I receive mine I will be able to carry some of the information in the SPESFEED News.

Marcus Kenny from Aviagen (Ross Breeders) was able to demonstrate just how important getting birds off to a good start is, in terms of their future performance.

**D - Digestibility:** This has to do with increasing the digestibility of the diet as a whole. It is during what we would call the Grower period that Necrotic Enteritis (NE) rears its ugly head in non-medicated broilers, and the presence of any undigested food components leads to a proliferation of the *Clostridium perfringens* bacteria, which are known to be the root cause of NE.

If one looks at digestibility from the perspective of NE, then it makes sense to be concerned about the digestibility of the grower diet. As nutritionists we know that it is equally as important that the diet be digestible in the period immediately post hatch.

Steve Leeson was to have addressed this issue in his paper, but sadly he had the 'flu and could not travel. In communicating with him subsequently, he told me that he was to have dealt with the 'indigestibilities' contained in the feed and how best to deal with them.

**E - Economics:** Obviously the economics of both the feeding program and the use of the vaccination need to be looked into. Dr. Barragan, a poultry consultant from Spain, showed how changing the number and the manner in which the various phases of broiler diets are fed can save money. This is something that we already know, but it was well worth reinforcing.

Dr. Robert Teeter of the Oklahoma State University in the USA gave us an excellent overview of the energy metabolism of broilers with particular reference to the energetic cost of mounting a disease challenge. Much of the data he presented bears repeating and I will do so at a later date.

**A - Advances:** New alternatives and advances in nutrition continually need to be examined. In my opinion, this aspect was not well covered during the meeting. Some of the holes in our knowledge base could have been identified and/or discussed.

For example, it is known that nearly 90% of all of the enteric bacteria species in the gut of the chicken has yet to be identified. Surely if you are interested in gut health this is an area that requires further funding and research?

Another possible avenue of research would be the use of Nucleotides (see SPESFEED News Summer 2004). Nucleotides have been demonstrated to improve the villi development in the gut, but also to boost the immune response. They would have a role to play in birds that are vaccinated against coccidiosis at day old.

All in all, the meeting was excellent. I learnt a lot and have been forced to re-think how I would feed broilers, particularly drug free broilers, in a different light. The IDEA concept is sound and if applied will lead to better production. I am not sure that specific times should be attached to any of the components. Rather, each of the aspects needs to be considered at all times when designing broiler diets.

Thank you to Schering-Plough for making it possible.

**Rick Kleyn**

## *Challenges in feeding the modern sow*

As recently as 25 years ago, it was relatively easy to feed replacement females in a commercial piggery. They could be reared to first service on a normal finisher diet and a single diet was fed to dry and lactating sows. Whilst the dry sow diet has not changed dramatically over the last twenty years, rearing the modern gilt and catering for the demand on the lactating sow has required the development of special feeds for these animals.

The challenge in feeding gilts and sows is largely influenced by genotype of the animals, general environment, management and disease status of the herd under consideration. The Nutritionist is required to design feeds that give optimum performance for a given set of these influences and often decisions need to be made on subjective assessments. Fairly good information exists on nutrient requirements for changes in environmental temperature and humidity, but there is little consensus on the nutrient partitioning in animals that need to mount an immune response to a disease challenge. All the feeds then need to be designed to give maximum profitability per piglet weaned per sow per year.

### *Gilt Rearing*

Modern gilt rearing diets are high in energy (13.5 MJ/kg DE & total lysine: DE of 0.62) with typical digestible lysine values of 6.9 g/kg in diets on an as-fed basis. The ideal amino acid ratios are

based on growing pigs and the crude protein of these diets is usually around 180 g/kg.

Most recommendations advocate an *ad libitum* feeding schedule up to ovulation and subsequent mating, but genotype must be considered when using such a strategy. If gilts become too fat, either a reduction in diet density or physical feed restriction may be necessary. Years of selection for low fat levels in pigs, improved growth rates and better feed conversion have reduced feed intakes and compromised the breeding ability of sows. However, feeding to maximum protein gain improves ovulation rate in gilts and the suggested optimum criteria for age and body composition at sexual maturity are:

- 220 to 230 days of age
- 130 to 140 kg's body mass
- 18 to 20 mm P<sub>2</sub> back fat
- Mate at the 2<sup>nd</sup> or 3<sup>rd</sup> oestrus

For practical purposes, monitor the P<sub>2</sub> and body weight of gilts to achieve the best results on your farm (table 1). Control feed to influence lean and fat growth in the body (2.5 to 4.5 kg feed/gilt per day) and flush feed (i.e. feed *ad libitum*) for two weeks prior to mating to achieve optimum ovulation rate.

**Table 1. The performance of sows according to body weight and P<sub>2</sub> value at first mating (Challinor *et al.*, 1996)**

Body weight at mating (kg)	P <sub>2</sub> at mating (mm)	No. of piglets born	
		Parity 1	Parity 1 to 5*
117	14.6	7.1	51.0
126	15.8	9.8	57.3
136	17.7	10.3	56.9
146	20.0	10.5	59.8
157	22.4	10.5	51.7
166	25.3	9.9	51.3

\*Only sows that achieved 5 parities

### *The dry sow*

The early developing embryo requires surprisingly low levels of nutrients relative to the sow's requirements for maintenance and growth. A target maternal weight gain of 20 to 25 kg's during pregnancy for mature sows, and

40 to 50 kg's in the hyperprolific first parity sow is suggested.

Energy intake during gestation remains the most important nutrient in monitoring maternal weight change. Changes in P<sub>2</sub> in response to energy intake are less clear although there is usually an increase in P<sub>2</sub> during early to mid-gestation and then a decrease during the final stages of pregnancy. Embryo survival (ES) is a complex phenomenon and the critical time is during the first 21 days of pregnancy. High feed intake (energy levels) during this time can be detrimental to embryo survival and ultimate litter size (table 2).

**Table 2. Effect of feed intake between mating and 30 days post coitum (BSAP, 1983)**

Feed Intake	2.0 kg's/day	4.0 kg's/day
Ovulation rate	23.4	23.9
No. of embryos/sow	17.6	16.7
ES %	75.2	69.8

A 7.7% reduction in ES %

Typical dry sow diets are 13.0 MJ/kg DE, with crude protein of 140 g/kg and a Lysine: DE of 0.5. Depending on environmental temperature and humidity, feeding levels from 2.0 kg's to 2.5 kg's per sow per day are recommended and increasing feeding levels 2 to 3 weeks pre-partum may have a positive influence on piglet birth weight. Several reviews suggest that piglet weight increases by about 8 g for each 1 MJ/kg increase in DE per day up to a maximum piglet birth weight of around 1.4 kg's.

### *The lactating sow*

By day 11 of lactation, the average sow cannot produce sufficient milk to meet all the nutrient requirements of a 10 pig litter and in the absence of creep feed to piglets, the demand on the sow is enormous. Often, feed intake in lactating sows is the limiting factor and if this is exacerbated by diets that are low in energy and/or protein, it has been shown that there would be adverse effects on return to oestrus, ovulation and embryo survival. It has been calculated that for a 175 kg sow, a 25% reduction of dietary energy and protein intake below requirements over a 28

day lactation period results in the mobilisation of 4.4 kg's protein and as much as 11.6 kg's of fat from maternal tissues. This is associated with a concomitant liveweight loss of 31 kg's. The higher the relative body weight loss of the animal (i.e. body weight loss as a proportion of body weight), the longer the period between weaning and mating.

Typical lactating rations are high in energy and protein with a DE value of 13.8 MJ/kg, lysine: DE of 0.64 and a protein value of 190 g/kg on an as-fed basis. High, nutrient-dense diets are often low in fibre and recent work suggests that use of purified fibres reduces incidence of MMA (mastitis, metritis, agalactia) in lactating sow rations. Modern feeding strategy encourages feed intakes to be as high as possible after 7 to 10 days post partum and ideal conditions for the sow to achieve this are:

- Adequate supply of water - 2 litres/minute (sow consumes 40 litres/day)
- Ideal environmental temperature of 18 °C
- Highly palatable, nutrient dense feed
- Feed often - At least three times per day if possible
- Soaking feed can improve intakes
- Following a set feeding curve
- Never over-feed during pregnancy

Several lactation feeding systems have been proposed and figure 1 shows a suggested practical feed intake. The *Nottingham System* is based on 1.8 kg's feed for the sow and 0.5 kg's for each piglet suckled. Food is introduced at a rate of 2 kg's on day one and increased by 0.5 kg's per day until maximum has been achieved. The *Stotfold Feeding Strategy* developed by Baker, based on the work of Close suggests feeding a standard scale to 10 days post partum. Sows are offered 2.5 kg's on day 1, increasing by 0.5 kg's to 7 kg's on day 10 and thereafter fed individually to litter size and piglet weight.

**Peter Chrystal**  
NRM, New Zealand

## *Protein Levels in Broiler Breeder Diets*

I have recently come across a paper published by Brazilian scientists (de Brum, Penz, Guidoni, Albino and Fialho): all in Portuguese. Using the English abstract, an internet dictionary and the friendly fellow at the corner shop (who comes from Madeira I discovered) I have managed to translate enough of it to make some sense of the publication.

They report on an experiment in which broiler breeders were fed diets differing in protein and lysine level from the onset of lay until the laying period had been completed. Using some of the results, I have been able to do some of my own calculations which I have included in the tables.

In essence, two strains of breeds -the EMBRAPA and the Arbor Acre - were used in the trial. The birds were then fed diets containing different protein and amino acid levels, but the same energy level (Table 1). An identical feeding program was used for all of the birds in the experiment. What I did find a little puzzling is that the Methionine level (3.5 g/kg) was kept constant in all treatment.

**Table 1: Nutrient Levels of the Diets used in the Experiment.**

Nutrient	Diets				
Protein (g/kg)	120	135	150	165	180
Lysine (g/kg)	5.3	6.2	7.2	8.1	9.1
ME (MJ/kg)					

In table 2 I have included some of the more salient details of the feeding program, together with the calculated protein and Lysine intakes (my own calculation).

**Table 2: Crude protein (g/bird day) and lysine (mg/bird day) intake at various times during the feeding program.**

Age (Week)	Feed (g/bird/d)	12,1	13,6	15,0	16,6	18,1
24	125	15,1	17,0	18,8	20,8	22,6
30-33	175	21,1	23,8	26,3	29,1	31,7
34-35	180	21,7	24,4	27,0	29,9	32,6
36-38	185	22,3	25,1	27,8	30,7	33,5
<b>Lysine mg/bird/d</b>		<b>980</b>	<b>1147</b>	<b>1332</b>	<b>1498</b>	<b>1683</b>
39	183	22,1	24,9	27,5	30,4	33,1
52-55	160	19,3	21,7	24,0	26,6	29,0
56	156	18,8	21,2	23,4	25,9	28,3
<b>Lysine mg/bird/d</b>		<b>826</b>	<b>967</b>	<b>1123</b>	<b>1264</b>	<b>1420</b>

Of interest to the nutritionist is that the Lysine intake ranges from 826 mg/bird per to more than double this amount at 1683 mg/bird day.

The production results are shown the tables that follow.

**Table 3: Body weight (grams) of the birds at different ages**

Age (week)	12	13.5	15	16.5	18
24	2723	2654	2728	2777	2729
40	3866	3896	3899	3854	3878
56	4398	4451	4400	4397	4337

As can be seen there were no significant differences in the body weights. In addition, it was shown that there were no differences in carcass composition at 56 weeks of age.

**Table 4: Cumulative egg number and egg weight (grams) of the birds at different ages**

Age (week)	12	13.5	15	16.5	18
<b>Egg Number</b>					
28	4.8	4.4	5.1	4.3	4.7
40	66.4	66.0	67.0	66.4	67.8
56	140.9	136.3	141.2	139.5	143.0
<b>Egg Size (grams)</b>					
28	57.5	57.4	57.5	58.8	57.9
32	62.5	62.8	62.3	64.0	63.9
56	71.5	72.0	71.0	72.1	71.8

Although numerically different at 56 weeks of age, the increased production in the birds on the 18% diet was statistically significant. There was a significant difference in the egg size at 32 weeks of age, with the birds on the 16.5 and the 18% diets both producing slightly larger eggs. By 36 weeks of age this had normalised.

The authors concluded that the protein level of the diet did not affect the total number of eggs produced, bird live weight or carcass composition and that it was possible to use diets containing as little as 12% protein for breeder hens from the 24 to 56 weeks of age. There were no differences between strains.

What, then, does this experiment mean to us?

The first issue to be dealt with is that of the strain of bird used in the experiment. It is true that neither strain is used in South Africa, and the validity of the data could be questioned on these grounds. Whilst it is true there may well be differences between strains, they will be nowhere as big as the difference between feeding a 12 or 18% protein diet to broiler breeders. In short, if Ross and/or Cobb birds were to have been used, I believe that similar results would have been achieved.

In broad terms production remained the same at all levels of protein in the diet. This confirms my own opinion that we consistently overfeed broiler breeders all amino acids. A lysine intake of 980 mg/day is far higher than the level we feed commercial laying hens which although smaller, produce considerably more eggs.

It was a little surprising to me that all the birds had similar body weights, carcass composition and egg weights. I would have expected the higher protein diets to have resulted in heavier, leaner birds that produced bigger eggs.

**Rick Kleyn**

## *Mycoplasma gallisepticum*

*Mycoplasma gallisepticum* (Mg) is one of the major challenges facing the poultry industry at the moment. Mg is one of the smallest bacteria, possesses no cell wall, has very modest genetic material and cannot survive very long outside the host; yet it can cause significant production losses in poultry.

### *Clinical Symptoms*

Mg is typically a disease of the upper respiratory tract and at the onset of the disease a slight snick is heard. The outcome of the disease depends upon climatic conditions as well as the presence of other pathogens. The incubation period of the disease is long - typically 2-3 weeks.

The current strain of Mg appears to be very virulent and the main losses occur through mortality. In commercial layer there appears to be a shift from the chronic airsacculitis to a more acute mortality syndrome. Mortality typically starts when the birds are nearing peak production (22-26 weeks), and losses of up to 4% per week have been seen. Egg production is usually not severely affected and drop in production is seldom more than 5%.

Broilers are also severely affected and in uncontrolled complicated cases, the mortality can reach up to 20%, with most of the birds dying at 30 days of age. Growth can be depressed by as much as 150 grams at term and FCR deteriorates, mainly as results of high late mortality and poor growth.

### *Spread of the organism*

Vertical transmission plays an important role in the transmission of the disease. Although the rate of transmission can be very small (2-6%), it ensures the organism is transmitted from one generation to the next. Mg will survive in the host despite the presence of antibodies and birds will remain carriers for a long time.

Mg does not spread quickly through a house. This is often reflected by the increase in percentage of positive blood tests that are found when a house is bled over a period of time. This has implications for medication and could explain why the disease appears to recur when medication is stopped. *Mycoplasma synovium*, on the other hand, spreads very quickly through a house.

Mg can be carried on the human mucous membrane of the eyes and nose, it will however only survive there for a very short time (24hrs).

### *Diagnosis of Mg*

The diagnosis of the disease is not always as straightforward as it seems, the following methods are currently available:

- **Blood tests** the most common test use is the plate agglutination test. It is a simple test to perform but there are some pitfalls that can result in false positive or false negative results. In many cases blood tests only become positive several weeks after infection, which could lead to the interpretation of a false negative test. Elisa tests are also available which allows quantification of the antibody level.
- **Culture of the organism.** There are not many laboratories that can culture and identify Mg in our country, and it is an area that needs to be addressed by the poultry industry.
- **PCR.** This is the method of choice for routine field diagnosis and there are several laboratories that provide a very good service.

Vaccination complicates the diagnosis of Mg as it is difficult to distinguish between vaccine and field strain through blood tests and PCR.

### *Control of the disease*

Mg is an economically important disease and should be controlled from a national level throughout the industry. The main aim should be to eradicate the disease and if primary breeding stock is infected, they should be slaughtered

out. It is well known that the organism is vertically transmitted and those producers that buy day old chicks or point of lay pullets should insist on Mg negative. The status must be confirmed through PCR tests. Strict biological risk control programmes should be in place and particular attention should be paid to the movement of people and equipment. Mg can be carried by wild birds and these should be excluded from poultry houses.

The response to medication programmes is highly variable, and products that work well on some farms do not appear to work on other. One of the challenges that face the veterinarian is to predict the susceptibility of the organism to various antibiotics. This should be done based on minimum inhibitory tests in the laboratory but it is technically difficult and not routinely performed in our country. Treating Mg alone normally does not yield a very good result and treatment should include a product that controls E coli as well.

There are two live vaccines in the country: TS-11 and 6/85 and there is currently a significant interest in the F-strain. This is a vaccine strain that is commonly used in the USA particularly in commercial layers. Inactivated vaccines are also receiving renewed attention. The efficacy of these vaccines is well reviewed in the literature.

### *Conclusion*

Infection due to Mg does not make headlines like AI or Newcastle Disease, yet the cumulative losses due to this organism could easily exceed outbreaks of those diseases. Although the current focus is on detecting and controlling the disease through medication and vaccination, it should shift to eradication. This can only be done through a concerted effort by the industry as a whole.

**Dr. Herman Bosman  
Port Elizabeth**

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