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Lohmann Everywhere!

Yes, we did it!

The continuing outbreaks of Avian Influenza all over the world during the last two years and the administrative consequences which came with it, have challenged us, during the worst time ever, to still continue to supply to you, the entire layer community, with our genetics and we succeeded!

There is not enough space in this magazine to disclose all the inconveniences we've experienced. The logical and less logical restrictions we had to overcome are now a part of history, but the bottom line remains, we managed to do it and that is all that really matters.

Nowadays, without relevant consequences in your respective production planning, every country has, as it was, the possibility to receive our Lohmann Breeders.

Congratulate yourselves for putting in all the efforts; congratulate everybody involved in the process, and a big THANK YOU from us to you for trusting us again and helping us to grow further, TOGETHER with you.

Yours sincerely,

Javier Ramírez Villaescusa
Managing Director.

Javier Ramírez Villaescusa

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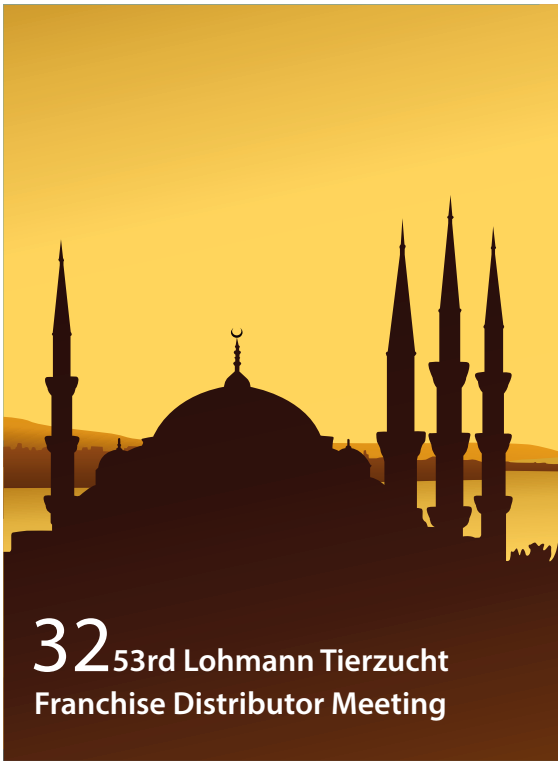


COVER STORY

TECHNICAL

CUSTOMERS

ANNOUNCEMENTS

» We cannot predict today when the next adjustment of performance standards will take place, but probably in 4-5 years from now. However, you can be sure, that the genetic work at LTZ will continue to create genetic progress. «

New performance standards: Genetic progress continues

The performance standards for all Lohmann Layer strains have been used for more than 4 years now without any changes. However, in every generation the genetic potential is increasing through the selection of the best individuals as parents of the next pureline generation. Genetic progress is delivered to our customers with every new Grandparent and Parent stock generation and therefore realised on the commercial level. Additionally, an improved management and improved feeding technologies (for example new feed enzymes) in commercial and PS flocks, contribute to an increasing performance level. Since we do not change the performance standards with every generation, the genetic and environmental progress have been accumulated for four years now. The new performance standard levels have therefore been adjusted and were released at the end of 2015.

In 2008, separate standards were introduced for the alternative housing systems, which will be continued in the current update. However, seven years later after having gained gained more experience with the performance profile of our birds under alternative systems, the relation of the standards between cages and alternative systems needed to be reviewed.

The major changes can be summarised in increased egg numbers for all standards that are based on:

1. Due to improvement in persistency, a higher increase at older ages
2. Extension of the cage standards from 90 to 95 weeks in one cycle
3. Alternative standards are still based on 85 weeks of age
4. Alternative standards have increased more due to smaller differences between cage and alternative housing
5. Slight reduction of egg size in alternative standards, especially at older ages
6. No change in body weight and feed intake

Improvement of persistency

Especially after 60 weeks of age, the laying performance of the hens has improved. This is the consequence of the top-ranking selection target of laying persistency with saleable shell quality. The increased number of saleable eggs from a longer production cycle of a flock gives an economic advantage to the egg producer. The cost for the pullet is covered a higher number of eggs, thereby reducing the costs of the pullet per egg. Under field conditions, more and more flocks are showing a longer production period

and the length of the cage standards have therefore been prolonged from 90 to 95 weeks of age (without molting). In alternative management, it is still more difficult to keep the flocks as long as one does with cages. Thus, the standards for the alternative housing systems have not yet been prolonged. They are still based on up to 85 weeks of age. However, in future, with the next update of standards, we will also prolong the alternative standards to an older age.

New international performance standards for cages

Strain	72 weeks			95 weeks		
	Egg number/ H.H.	Egg weight cum. (g)	Egg mass/H.H. (kg)	Egg number/ H.H.	Egg weight cum. (g)	Egg mass/H.H. (kg)
LSL Classic	325.3	62.6	20.36	438.4	63.5	27.84
LSL Lite	328.6	61.0	20.04	445.1	61.9	27.57
LB Classic	320.0	63.9	20.44	430.0	65.2	28.02
LB Lite	323.0	62.3	20.13	434.5	63.4	27.56

New performance standards for alternative housing systems

Strain	72 weeks			85 weeks		
	Egg number/ H.H.	Egg weight cum. (g)	Egg mass/H.H. (kg)	Egg number/ H.H.	Egg weight cum. (g)	Egg mass/H.H. (kg)
LSL Classic	321.0	62.2	19.97	387.0	62.9	24.34
LSL Lite	324.0	60.7	19.32	392.0	61.3	24.03
LB Classic	314.5	63.5	19.96	379.9	64.2	24.40
LB Lite	318.0	62.0	19.73	384.6	62.8	24.17

As an example, please refer to the following table for a comparison of old standards with the new standards for LSL CLASSIC in cages as well as for alternative housing. The egg number at 72 weeks has increased in the cage standard by 2.6 eggs, but for the alternative standard, the egg number has increased by 3.9 eggs. As a result, the difference in egg numbers between cages and alternative housing has now been reduced from 7.0 to 4.3 eggs.

Table: Comparison of old and new standards for LSL CLASSIC in cage and alternative housing systems at 72 and 85 weeks

		Cage			Alternative			Diff. Cage-Alternative	
wk		New	Old	Diff	New	Old	Diff.	New	Old
72	EN/HH	325.3	322.7	+2.6	321.0	315.7	+3.9	4.3	7.0
	Egg weight	62.6	62.6	0	62.2	62.4	-0.2	0.4	0.2
85	EN/HH	392.4	388.5	+3.9	387.0	381.9	+5.1	5.4	6.6
	Egg weight	63.2	63.3	-0.1	62.9	63.1	-0.2	0.3	0.2
95	EN/HH	438.4	–	–	–	–	–	–	–
	Egg weight	63.5	–	–	–	–	–	–	–

How to read the performance standards

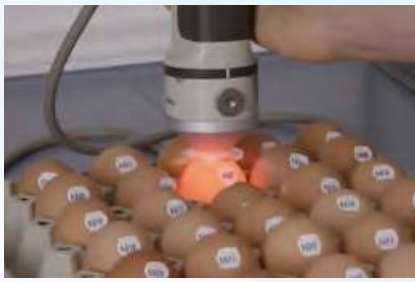
The LTZ breeding standards for both cages and alternative housing systems are created in such a way, that the target values do not correspond to the maximum performance that can be reached. The maximum performance will only be achieved if perfect conditions for the birds are always provided. This is not realistic in real field conditions. Our standards are therefore based on average field conditions and should be realistic and reachable under average management and environmental conditions. The genetic potential of Lohmann Layers is much higher than the performance targets and is represented in the top performing flocks which can reach 20-30 eggs more than the standards. It is very clear, that under moderate climate conditions like in Europe, it is easier to achieve the targets than under hot climate conditions in which the birds are challenged by much higher disease pressure and more severe vaccination programs.

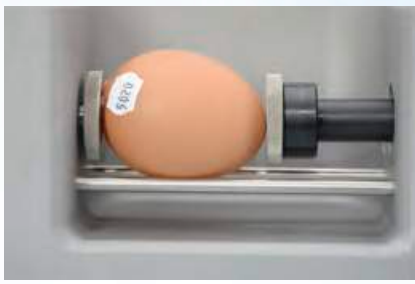
Feed Efficiency

There was no major change in the feed intake of the birds, so with nearly the same feed intake, more egg mass is produced which results in better efficiency. The better efficiency is not based on a lower feed intake, it is the result of a higher output. The balanced breeding strategy for better efficiency results in birds with a flexible feed intake and the ability to eat enough feed, i.e. if the feeding space and stocking density is adjusted to the needs of the birds. In alternative systems, the birds need to consume more feed as compared to those in cages due to a higher level of activity and consequently, the feed efficiency is not as good. Nevertheless, an improvement of feed efficiency has also been realised in alternative systems by means of a higher egg mass production.

Today, we cannot predict when the next adjustment of performance standards will take place, but probably in 4-5 years from now. However, you can be sure, that the genetic work in LTZ will continue to generate genetic progress. With investments in new breeding farms (Canada), new technologies (genomic selection) new equipment (enriched single cages in Germany) and continued testing of cross-bred birds under challenging field conditions in Russia, Spain and Columbia, the future of genetic progress is safeguarded and sustainable. The progress is not only based on economic important traits like laying rate and feed conversion, but also in improved shell quality and livability. After many generations of intense selection, the genetic parameters (heritability) are still showing a clear potential for further improvement. Due to careful management of the level of inbreeding, there are no negative signs like inbreeding depression or reduced variability. The biological limit of one egg per day is for sure reached during laying peak in high performing flocks, but longer laying sequences still give potential for improved persistency with improved shell quality. The testing period on the pureline birds was extended to over 100 weeks in one cycle. A combination of data captured from the purelines in single cages and family groups are complemented with improved genomic selection that will therefore continue to drive the genetic progress.

Dr. Schmutz





Dry matter content in the egg – who needs such data?

The consumer is asking for a table egg of high quality. However, preferences vary a lot. Large or small eggs, ones with a pale or striking golden yellow and/or orange yolk colour – the perfect egg to meet everyone's preference. But, how high is the dry matter content of an egg? Who is even interested in knowing that? A question which has hardly or never even crossed the mind of many consumers.

The development and release of an egg from the ovary requires an enormous metabolic performance of the hen. The egg formation starts with the ovulation in an ovary of 60 g. Due to ruptures in the follicle wall, the yolk granule is released into the 60 cm fallopian tube. In the first stage, the egg will be fertilised, i.e. provided that semen is available in the sperm glands. Various egg white proteins that contain bactericidal effects and influence the coagulation properties will then be accumulated. The albumen will then be covered with the egg membrane before the calcification of the eggshell begins. The fine-pored eggshell is 0.2 to 0.3 mm thick and guarantees the necessary exchange of air and moisture for the embryo. The cuticle of the eggshell protects the inside of the egg in terms of microbial invasion and dehydration.

The modern layer lays an egg almost every day. The formation of an egg takes about 24 hours. Considering that the egg is a small "miracle of nature" as it ensures the life of offspring and it's multipurpose application in human nutrition, this is indeed a very short time frame.

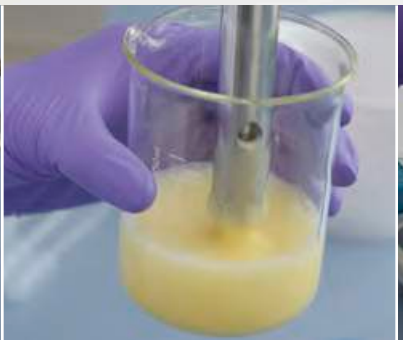
Is the dry matter content of an egg of importance to anyone?

For consumers it only plays a minor role. Their attention is focused mainly on aesthetical traits as the eggshell and yolk colour that have no influence whatsoever on the nutritional value of the egg. On the other hand, the stability of the eggshell is a very functional trait particularly since the egg has to withstand all forces from the point of oviposition right up to the delivery to the consumer without getting any ruptures. The freshness of an egg that is measured by the air chamber on the blunt end of an egg, as well as blood and meat spots or inclusions of insects and manure, are important quality characteristics for table eggs. The dry matter content of an egg, on the other hand, is of importance to the embryo and has an impact on the hatchability. The egg yolk has a dry matter content of 50 % whereas the egg white contains up to 88 % of water. The egg yolk is the main supplier of nutrients and is the source of food for the embryo. The yolk sac serves as a means of nutrition for the day-old chicks. Therefore, an insufficient yolk proportion can influence the chick's body condition and its liveability. The egg processing industry demands a dry matter content of 24 % for the whole egg in order to produce a maximum quantity of saleable egg products. The production of various egg products indirectly affects the consumer. Egg yolk, egg white as well as the whole egg can be acquired pasteurised, refrigerated or dried. Furthermore, the egg is processed in convenience food, e.g. mayonnaise, noodles or baking premixes.

The impact of breeding on the dry matter content

During the last decades, the proportion of the egg yolk has reduced slightly due to intensive breeding for laying performance. Today, layers have the potential to lay 300 eggs per year, i.e. the hens lay an egg on subsequent days on end. These eggs contain a high proportion of egg white to maintain the desired high egg weight. The high amount of aqueous egg white lowers the dry matter content of the whole egg and with that, the content of valuable nutrients. The dry matter content of an egg can be genetically influenced by the egg yolk percentage or the dry matter content itself. To calculate the yolk proportion, the breeder captures data on the egg and egg yolk weight. More efforts are needed to record the dry matter content with the so-called "sea-sand" method. In order to do this, the egg yolk and egg white have to be homogenised. 2g of this mixture of egg fluid is filled into a 35 g of sea-sand and the sample will then be placed in a drying oven at 103 °C for four hours. Afterwards, the difference of the weight before and af-






ter drying is measured to calculate the dry matter content.

An alternative to the sea-sand method

Since the sea-sand method is very costly in terms of time and materials, there is a necessity to find a simpler method. In view of this, two different refractometers were tested for a comparative study. A refractometer works with the refraction of light to determine the density of a substance and finally, the dry matter content. In a study conducted by Lohmann Tierzucht, 150 eggs each of LSL and LB layers were tested. The layers were 41 weeks of age and the eggs were tested for the dry matter content. The dry matter content was measured with the sea-sand method, once per egg, and three times per egg with each of the two refractometers. One refractometer was provided by the company A. Krüss Optronic, and the second by Kyoto Electronics Manufacturing Co. Ltd. The measurements were statistically and individually analysed for each flock. The average egg and yolk weight as well as the average dry matter content from each of the three measurements were calculated for the LSL and LB eggs. Additionally, phenotypic correlations between all traits as well as between the repeated measurements were estimated. The phenotypic correlation reflects the relationship between different traits and varies between rp= -1 to rp= +1. The closer the values respond to – 1 or + 1, the stronger the negative or positive relationship.

Results

The egg weight is related to the age of the hen and its origin. However, there is a difference between white and brown eggs. The average egg weight of the LSL hens is around 62 g, whereas the eggs of the brown layers show an average egg weight of 65.9 g. The yolk proportion is negatively related to the egg weight. Therefore, the yolk proportion of the white eggs is with 28.1 % higher than that of the brown eggs with an average of 26.8 %. Due to the higher yolk proportion of the white eggs, the dry matter content of these eggs is also higher as compared to the brown eggs. Measuring the dry matter content with the sea-sand method, the average value is 23 % for the white eggs and 21.7 % for the brown eggs. The dry matter contents measured with the refractometer tend to be similar. As for the LSL eggs, the average values are around 24.1 % (KEM) and 23.9 % (Krüss). The lower dry matter contents for the brown eggs are calculated with 23.2 % (KEM) and 22.5 % (Krüss). The phenotypic correlations between the egg weight and yolk proportion, or respectively, for each of the dry matter measurements, are negative. The estimated correlations range between rp= - 0.12 to rp= - 0.26 for the white eggs and between rp= - 0.24 and rp= - 0.40 for the brown eggs. The consistent positive correlation between the yolk proportion and dry matter content with all of the methods tested clearly shows that the yolk proportion determines the dry matter content of the whole egg. Regardless of the origin of the flock, the estimated correlation is rp= + 0.60. Furthermore, the highly positive correlations of rp= +0.70 between the three repeated measurements with the refractometers indicate a high accuracy of the refractometer devices.

Comparable results were obtained with all three methods, i.e. the sea-sand method and the two refractometers of Kyoto Electronics Manufacturing Ltd. and A. Krüss Optronic. Moreover, there are some advantages for the refractometer to measure the dry matter content of the whole egg. Due to a less extensive sample preparation and no drying time, the recording of the dry matter content is much faster with a refractometer as compared to the traditional sea-sand method. When testing a large amount of tested eggs, the application of the Krüss refractometer has its advantages. Integrated digital data storage is very useful to handle the data measured. Additionally, both refractometers can be used directly on the farm. No special laboratory is necessary to test the eggs for their dry matter content.

In summary:

- The dry matter content of the egg white is around 12 % and for the yolk, around 50 %
- A high yolk proportion has a positive influence on the embryonic development, the liveability of young chicks as well as for further egg processing
- From the breeders point of view, an increase in the dry matter content of the whole egg can also be reached by an increase of the yolk proportion or rather, a shift in the proportion of egg yolk to egg white
- As an alternative to the traditional sea-sand method, the dry matter content can be measured with a refractometer
- In general, white eggs have a higher dry matter content as compared to brown eggs.
- The refractometers of A. Krüss Optronic und Kyoto Electronics Manufactoring Co. Ltd. have been tried and tested in the tests performed by Lohmann Tierzucht

Dr. Wiebke Icken




Management of Laying Hens under Tropical Conditions Begins During the Rearing Period

Environmental temperatures play a major role in the optimal rearing of layer pullets, the basis of a financially successful production period of the layer bird. The optimal temperature for a white layer is 23 degrees celcius, respectively, 24 degrees for brown layers. Every degree Celsius above this level will cause reduced feed intake and as a result, a decrease in egg numbers, shell quality and egg size. This problem can easiesily be solved by housing the birds in an environmentally controlled house with optimal temperature. Due to lack of infrastructure such as electricity or financial means, many farmers in hot climates cannot provide such a solution and need to rely on feeding techniques and special feed formulations, lighting programs such as midnight snack as well as water quality and temperature to achieve a satisfying production. Feeding techniques help the bird to eat at optimal times during the day, feed formulations ensure that the hens are supplied with all the required nutrients, midnight snacks, provide extra time for feeding during the coolest period of the day and optimal water temperatures ensure the birds are able to reduce their body temperatures and maintain their appetite.

Chickens originated from the jungles of Southeast Asia some 10,000 years ago, and the earliest known domestication occurred in Northern China 8,000 B.C. as determined from archaeological chicken bones (Lawler, 2015). From here on, poultry production has spread worldwide with the first industrialization in the Northern hemisphere with cool and moderate climates. Nowadays, the industry is continuously navigating back and forth between Asia and the Southern part of the world as a result of increasing populations in Asia, Africa and South America in combination with declining birthrates as well as strict animal right laws in Western countries. Asia today accounts for 54.6% of the world poultry population, followed by the American continent with 26% and Africa with 8.2%. This means the production of poultry meat and eggs is in hot climates.

In order to facilitate cost effective egg production in these challenging environments, special management strategies have to be applied. Poultry scientists have reported results of their own experiments and reviewed the available literature during the last decades which help to understand the needs of hens under heat challenge. This article is focused on the application of these results in practice.

Sufficient body weight at onset of lay

The basis of good egg production is a successful rearing phase, at the end of which, the hen should have reached her standard body weight with a well-developed frame and corresponding appetite or feed intake capacity. Already about 50 years ago, Payne (1966) compared pullets reared from 6 to 21 weeks of age in environments of 20°C vs. 33°C. The birds reared at 33°C were 118g lighter at 21 weeks of age and their eggs consistently smaller throughout the laying period than the group reared at 20°C. The response of feed consumption to increasing ambient temperature and its effect on later performance is shown in tables 1 and 2. Pullet body weight plays an important role in egg production, and I recommend to target 10% higher body weight in hot climates than the weight standards published by primary breeders for moderate climates. Heavier hens will consume more feed which will result in higher peaks, better persistency and bet-

Table 1: Decrease of daily feed consumption of growing pullets with increasing house temperature. Source: Bell and Weaver (2002)

Average daytime house temperature		
°F	°C	% Change in feed consumption for each 1 °F (0.6°C) change in temperature
90–100	32.2–37.8	3.14
80–90	26.7–32.2	1.99
70–80	21.1–26.7	1.32
60–70	15.6–21.1	0.87
50–60	10.0–15.6	0.55
40–50	4.4–10.0	0.30

ter resistance to heat stress and diseases. Twelve week weights are reliable predictors of 20 weeks weights, that is: pullets that are below breed standard at 12 weeks of age will remain low at 20 weeks, whereas a pullet which is heavy in 12 weeks of age will be heavy at 20 weeks of age. Therefore special attention should be focused on pullet weight development to 12 weeks of age.

I have found it useful and strongly recommend to separate the birds into 2-3 groups on bodyweight as early as possible and then adjust the feed composition/ phasing accordingly so that underweight birds have a better chance to catch up in their development before sexual maturity. The first 8 weeks are critical for the skeletal development of the bird and therefore the base of a well developed hen. Smaller birds will have the chance of growing according to the standard without having to compete with larger and more dominant birds resulting in a more uniform flock in production. Later in the phase of 9-16 weeks, the hen can be trained in high feed intake capacity due to the less dense developer feed without risking of running into problems with bodyweights at the end of rearing. Transfer to the laying house (with higher light intensity!) can then also be organized stepwise according to development. This will help to minimize the risk of prolaps and cannibalism due to overstimulation of underweight pullets.

Additional space to minimize heat stress

If the birds are placed in naturally ventilated houses, it is better to start with 10% fewer chicks for a given space than during normal temperature conditions. This will give the chicks more floor space and better ventilation between the chicks as well as more water and feed space. Increased density of hens in cage or on floor increases effects of heat stress, i.e. reduced egg production due to reduced feed intake, increased feed requirement due to heat stress and increased mortality. Researchers at North Carolina State University recommend 460 cm^2 per bird in hot climates in fan ventilated houses and even more space when only natural ventilation is available. Adams and Craig (1984) compared feed intake and egg production at densities of 516, 378 and 310 cm^2 per bird in conventional laying cages. Increasing space from 310 to 378 cm^2 per bird resulted in 16.6 more eggs per bird for the cost of 1.9 g feed/hen/day. Increasing space from 387 to 516 cm^2 resulted in 7.8 more eggs/hen housed, 4.3 g per hen/day higher feed consumption and 2.8% lower mortality.

When day-old chicks are housed in floor systems, plastic foils or paper will help them to find feed and water. In cage systems, the use of extra direct light in the cages such as LED tubes (like those used for Christmas decoration), will help the chicks to find water and feed quickly.

It is absolutely essential that the chicks reach their normal body temperature of 40-41°C as fast as possible after housing. Ideally, this should be checked with an ear thermometer a couple of hours after placement. If the body temperature is below 40°C, the house temperature has to be increased by all means. Make sure that the air humidity does not drop to below 70% as a result of heating. The effect of ambient temperature on feed intake of laying hens (in ME), heat production and availability of ME for egg production is illustrated in table 2.

Table 2: Decrease of feed intake with increasing house temperature and availability of ME for egg production.

Source: Smith and Oliver (1972), cited by Balnave and Brake (2005)

Ambient temperature	ME Intake	Heat production	ME for egg production	Possible HDP of 57 g eggs[1]
(°C)	(kJ)	(kJ)	(kJ)	(%)
26.5	1216	906	310	82
29.5	1184	886	298	79
32.0	1083	821	262	70
35.0	911	711	200	53

[1]Assuming 376 kJ of ME per egg.

Lighting Program

Starting chicks on a lighting program with 4 hours light and 2 hours darkness on alternate, has shown improved uniformity and reduced mortality as compared to conventional lighting with 16 hours light and 8 hours darkness. This program can be used for the first 10 days and then changed to conventional lighting programs as recommended by the breeder, possibly with a "midnight flash" to stimulate additional activity and feed intake. Leeson, Caston and Summers (2003) conducted tests in which growing pullets received different midnight light treatments, one group grown in 8 h of light, the other in 12 h of light. The groups given a midnight light of 2 hours from 0-18 or 4-18 weeks produced the highest number of eggs to 70 weeks of age. Introducing a midnight flash late in the rearing period, however, after 12 weeks of age, resulted in pre-mature onset of lay, with the well-known risks of prolapse, cannibalism and negative effects on persistency of egg production. Practical experience, especially with Leghorns, indicates that 1 to 1.5 h light around midnight has positive effects on feed intake and weight gain (figure 1).

Extra lighting around midnight (Fig. 1) has the advantage of giving the birds additional feeding time during cooler parts of the night and does not disturb the lighting program, as long as at least 3 hours of darkness are provided before and after the extra light period. A similar program can be used during the laying period.

Heat production of the body is higher during light periods and abdominal temperature declines with reduction of light

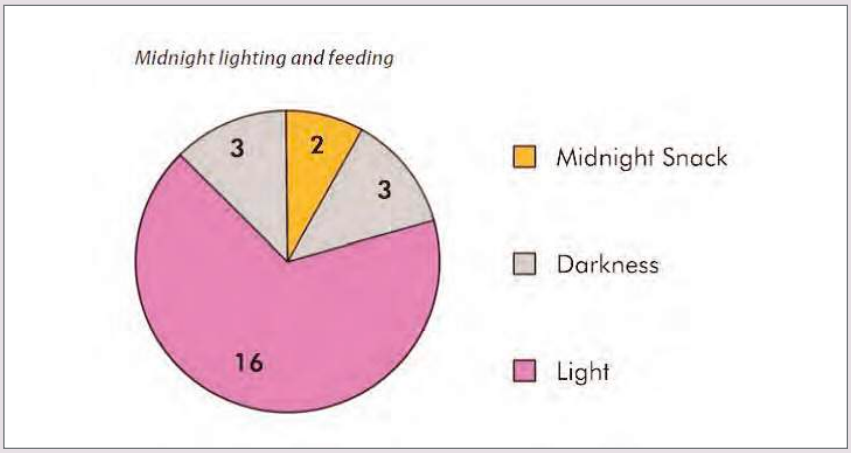


Fig. 1: Midnight snack: lighting during cool hours of the night to stimulate additional feed intake. Source: Lohmann Tierzucht Management Guide

intensity. Several recommendations for different lighting programs can be found in literature. Nishibri (1998) recommended a "reversed lighting program", with light during the cooler time from 6 p.m. to 6 a.m. instead of during the hot hours of the day, when the birds should rest to minimize heat stress. With this program, the hens produced significantly more eggs than with daytime feeding.

To apply this idea under commercial conditions would require investment in light proof houses, and the extra cost and inconvenience for staff working in night shifts as well as energy cost, have to be justified by higher egg output and enhanced bird welfare.

Purina Mills Inc. recommended "biomittent" lighting for pullets based on the idea that better body weights can be achieved due to less activity and better feed utilization.

The light program is as follows: 24hrs light during the 1st week, at 2 weeks of age the light is reduced to 8h daily and from 3-18 weeks lights are maintained at 8hrs daily with an alternating program of 15 min light/45 min darkness, except for the last hour of the day when the light pattern is 15 min light - 30 min dark – 15 min light. Ernst (1987) concluded from his tests that intermittent lighting (2 h dark – 4 h light) for pullets between 2 to 20 weeks show improved weights.

Basically the lighting program in the rearing should provide the pullets with enough light in order to achieve the target body weight and eating capacities. Heat production of the body increases with feed intake. Therefore, it is recommended to start the lights early in the morning in order to use the cooler parts of the day for feeding and avoid digestion of the feed during the hot daytime. Since light intensity also increases body temperature, the house should be kept as dark as possible to avoid heat stress for the birds.

Water

Environmental temperature is the most important factor for determining water intake, as illustrated in Fig. 2. Leghorn pullets drink at least twice as much per day at 38°C as compared to 21°C house temperature, whilst water temperatures below 21°C do not influence the water intake. Most authors agree that the optimum water temperature is about 23°C. A common challenge in hot climate areas is to provide sufficient drinking water at optimal temperature for all birds at all times. Water intake is the key to good feed intake, especially in hot climates.

The water temperature should never exceed the body temperature of the birds. Tests have shown that feed intake is reduced if water temperature exceeds 35°C, and drinking water of 35-40°C has significant detrimental effects on performance. Therefore, the farm management has to do everything possible to offer cool water to birds in rearing as well as in production. Possibilities are plenty, from regularly flushing the water lines or emptying the bell drinkers, insulating water tanks and lines (also in the house) to adding ice cubes into water tanks or even installing chillers for drinking water, depending on the sophistication of the farm.

The water systems should be the same in the rearing and production house to assure that the pullets find water immediately after transfer. If a loss in appetite and feed consumption, perhaps also increased mortality, is observed after transfer, a common reason for this is that some birds take too long to find water and therefore stop eating. Especially in this stressful transition period the birds need to maintain their appetite in order to cope with the challenge of sexual maturity and first egg production, while continuing to gain body weight.

The maximum daily water consumption is at 6-7 weeks of production which is also peak production. Stress can increase vitamin needs in hot climates, especially A, C and E. In hot and humid areas, vitamin stability is reduced. Therefore it is good practice to offer vitamins in drinking water 3 days before moving the birds and electrolytes for another 3 days after the move. Pullets should not be serviced or moved in the hot part of the day, preferably at night; 30% less pullets per crate than recommended for cool days should be placed for the transport.

In-line filters should be checked and cleaned on a regular basis and replaced often. Functional pressure gauges on both sides of the filter are an advantage and a 3-8 lb differential between incoming and outgoing water pressure should be maintained. The water pressure at the end of the line has to be checked daily to assure that also the hens at the end of the building receive sufficient water.

Underground water supplies are very common in many countries in the hot regions of the world. Water from the well often has inferior quality compared to city water and can have negative effects on

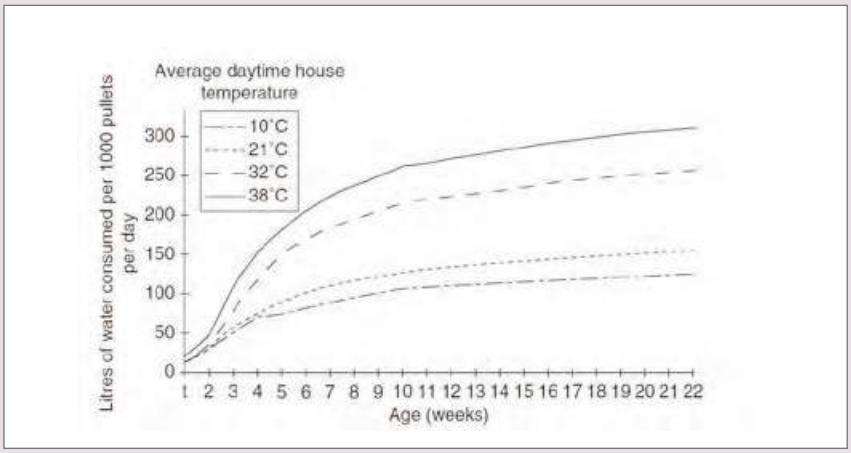


Figure 2: Water consumption of growing pullets as a function of house temperature
Source: Daghir (2008)

the performance of growing pullets and laying hens. Well water must therefore be checked regularly in a competent laboratory for bacteria and internal quality. Saline water may be a contributing factor if shell quality, especially of older hens, persistency of egg performance, feed intake and/or egg weight are below the breeder's standard. In this case, the feed formulation must be adjusted, with a lower salt level in the feed according to the saline level of the water.

Different additives in water have shown positive effects to reduce heat stress of layers. For example, birds given carbonated water at times of temperatures around 35°C were able to maintain shell quality much better than the control (Daghir 2008). Vitamin C improves performance in hot weather, with only 100 ppm ascorbic acid. Best results were achieved with protected ascorbic acid (e.g. Cuxavit C50) and the phosphate ester. Flocks receiving extra vitamins and electrolyte water additives during heat periods had a smaller drop in production and recovered sooner. Sodium zeolite in water can also be beneficial in reducing effects of heat stress in layers. Why it is successful is not fully understood; perhaps it acts as a buffer in the gut and reduces alkalosis associated with panting.

Feed intake and adjusted composition

House temperature is the most important factor in feed consumption of layers. Maintenance requirement in Leghorn and Brown birds is reduced by 30 kcal/day when the ambient temperature rises from 21 to 38°C. It reaches a low at 28°C and increases with rising environmental temperature due to the cooling energy required by the hen. Above 28°C feed intake decreases. The average loss in energy intake is 1.6% per 1°C as environmental temperatures increase above 20°C. As such, the bird might easily run into a nutrient deficit resulting in low performance. The maximum energy available for production is at 23°C for brown birds and 24°C for White Leghorns.

It is essential to monitor feed consumption on a daily base so that energy levels as well as feed density can be adjusted to daily feed intake. Alternatively, stimulation for feed intake has to be intensified with a reduction of energy and density of the feed such as turning of the feed chain or shaking of the feeders can. Tadtiyanant et al. (1991) concluded from several tests with wet feed that birds had 38% more dry matter intake compared with dry feed at 33°C. Sprayers can be installed on top of feed chains or water can be added and mixed with feed manually, depending on the level of the management.

Use of high energy layer rations is recommended in hot climates. Fat adds energy to the diet and stimulates feed intake and therefore, ME intake. Many feed mills in hot climates have a problem providing good feed structure and often end up producing fine and dusty feed. Adding oil improves the palatability of the feed and making it easier for the hen to eat enough. Oil also has less heat increment produced during digestion which reduces the heat stress on the bird. Adding 5% fat does not only improve feed intake but also egg weight and shell thickness. In tests conducted in Malaysia it was shown, that when free to choose, hens tend to consume more feed with supplemental fat than oil free feed. Sohail et al. (2002) observed that maximum profits were obtained when fat is added to the highest protein diet (19.8%) from 21 to 37 weeks of age, but special care has to be taken to avoid oxidation.

Feed intake decreases not only when temperatures rise but also when energy is increased in the feed. Peguri and Coon (1991) found that feed intake was 5-9 g lower when ME was increased from 2645 to 2976 kcal/kg and was 217 g lower when temperatures were increased from 16 to 31.1°C. Egg weight increased when feed energy was increased from 2645 to 2976 kcal/kg and decreased when temperatures increased from 16.1 to 31.1°C. More expensive feed can, in the end, save money due to lower feed quantities.

Protein requirement is not affected by

Table 3: Recommended Structure of Calcium in Different Types of Layer Feed.
Source:Lohmann Tierzucht Management Guide

Calcium Supply / Recommended relation in Feed

Feed type	Fine Limestone 0–0.5 mm	Coarse Limestone * 1.5–3.5 mm
Pre-Lay + Phase 1	35 %	65 %
Phase 2	30 %	70 %
Phase 3	25 %	75 %

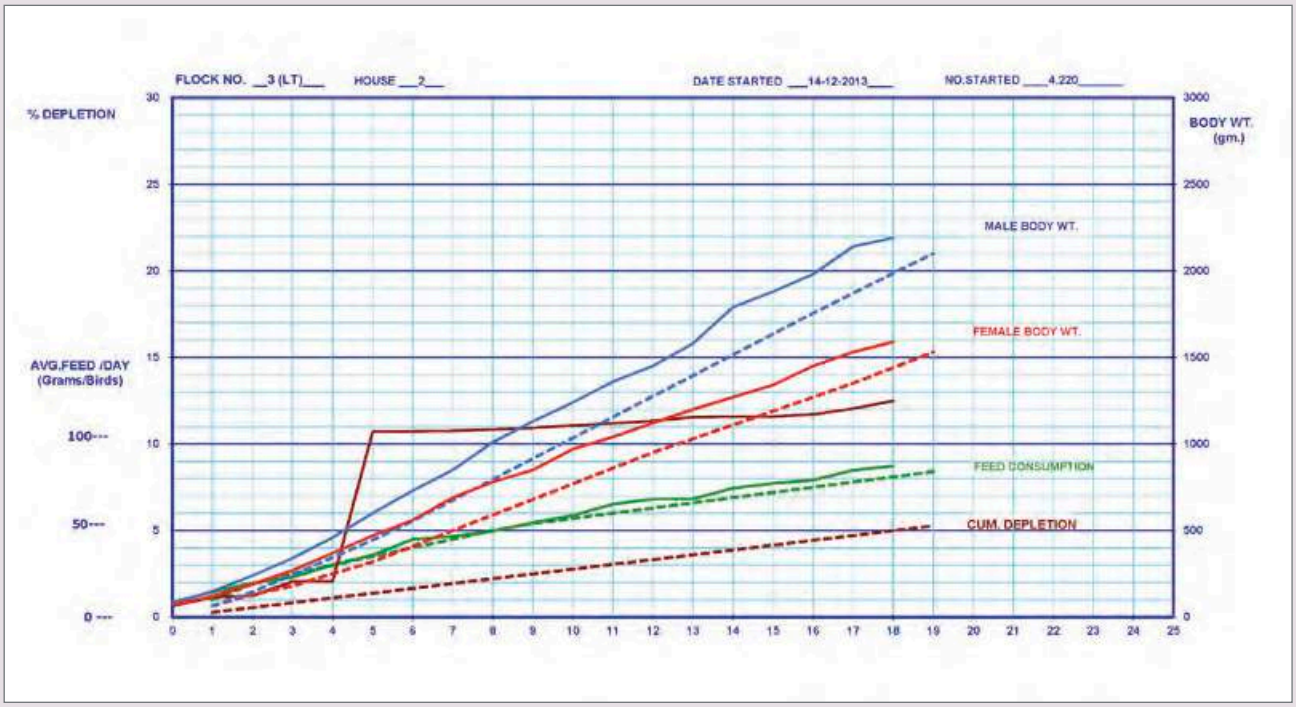


Figure 3: Growing summary of LOHMANN BROWN PS flock in tanzania open houses, hot climate

temperature, but it is common knowledge nowadays that protein and amino acid rich diets are essential in hot climates to ensure the same daily intake of these nutrients as would be consumed at 21°C. De Andrande et al. (1977) fed laying hens under heat stress, a diet containing 25% more of all nutrients except energy, which was only increased by 10%. He observed that with this kind of feed, the hen overcame most of the detrimental effects of high temperature on percentage, egg production and egg weight. A daily intake of 360 mg of methionine should be obtained because small eggs can be a result of low energy intake but also low amino acid intake. The decrease of egg weight for every 1°C rise in temperature has been estimated between 0.07 to 0.98 g per egg. Daily linoleic acid intake should be at least 2g per bird, best to be achieved by fat. High temperatures increase respiratory rate, resulting in respiratory alkalosis, which alters acid-base balance and blood pH. Adding sodium bicarbonate to feed and carbonated water can help.

Excessive calcium can have negative effects on feed intake due to physiological effect of appetite and reduced palpability of the feed. Feed intake of laying hens may decrease as a result of excessive levels of fine calcium in the diet. Devegowda (1992) reported that in India, feeding calcium separately with a diet of only 2% calcium improves feed intake, egg production and shell quality. Since the calcium requirement of a layer in peak production is about 4.1 g and increases to 4.5 g with age, the missing 1.9-2.2% calcium should be offered ad lib as coarse calcium on top of the feed for cage management or in extra containers for floor and aviary systems, so each hen can consume it according to her needs (table 3). Main demand for calcium is in the afternoon and evening hours. If separate calcium feeding is not possible, at least 50% of the calcium in a ration should be given in coarse particles rather than all the calcium in powder form. This ensures that the calcium is not completely digested before the early hours of the morning when the hen needs it for egg shell production. A "midnight snack" not only improves feed intake but also reduces stress on the hens due to an extra calcium intake at the time the organism requires the supply.

Phase feeding

It is recommended to supply feed twice a day, with 1/3 of the feed in the morning and 2/3 in the afternoon, leaving the feeders empty for a max. of 1 hour a day during the hottest hours. This stimulates feed intake, ensures that also the fine parts of the feed are consumed and prevents molding of the feed. Pre-layer feed is a must and should be offered 2-3 weeks before egg production when liver and reproductive organs are increasing in size and at the same time calcium reserves are built up to meet demands of shell production. It should be given for about 10 days and not more than 1kg per bird. The hens can get adjusted to the higher amount of calcium of the feed and will not lose their appetite when given layer phase one feed containing normally 3.9% calcium. Early introduction of high calcium levels in layer diets have often shown to increase wet manure, and the use of pre-layer feed should also help to minimize this problem.

Studies have shown that laying hens are able to survive heat stress periods better if they have been exposed to a daily, intermittent heat-stress situation. Therefore,

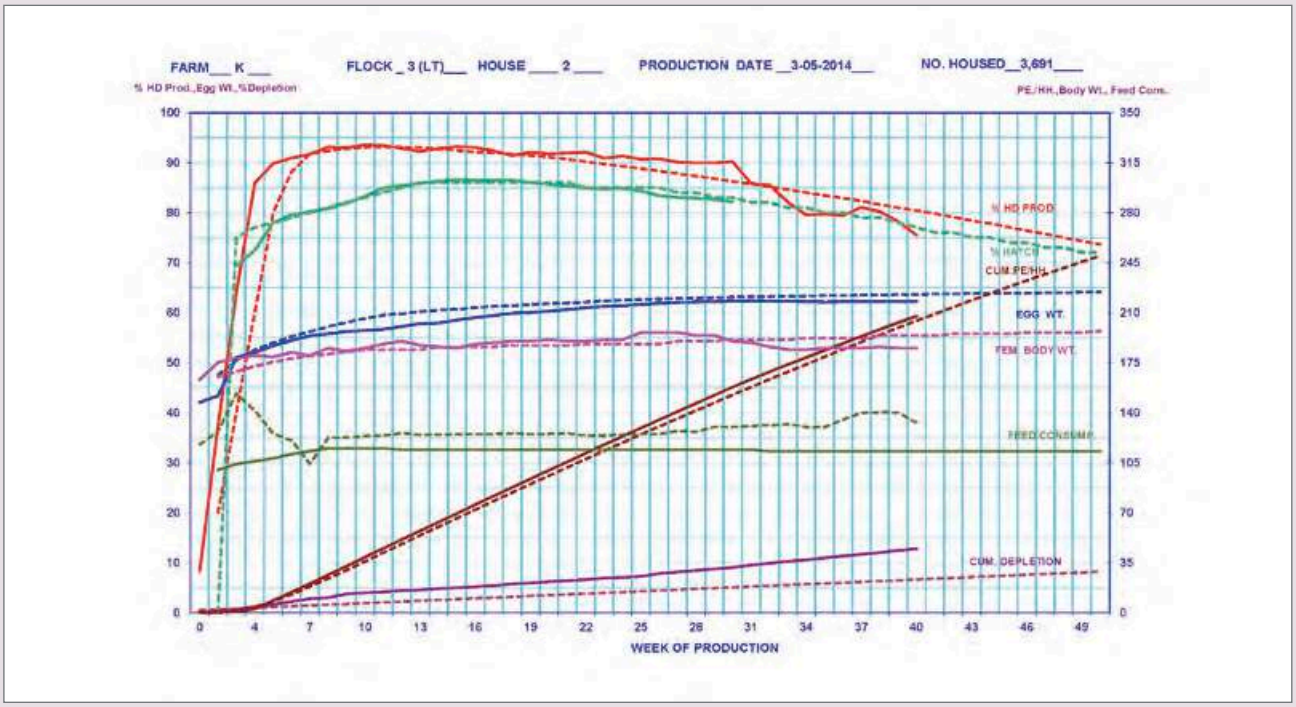


Figure 4: Production summary of LOHMANN BROWN PS flock in tanzania open houses, hot climate

it may be considered to allow rearing birds to be exposed to temperatures of 29-33°C before laying period even if it would be possible to keep the environmental temperature below this level with the help of the house system. White Leghorns are not necessarily more heat-tolerant than brown strains, as assumed many years ago. It is recommended not to remove combs and wattles as these organs are used to help cool the body. Birds can also wet them with the offered drinking water, either in bell drinkers or nipple drinkers which should be equipped with cups.

Wet droppings can be a problem in hot climates due to the increased water intake. Layers drink more in cages than on the floor and water intake increases with production. High levels of protein and salt have shown to increase wet droppings. Sodium levels in the diet should be kept at 0.18-0.16 g/day per bird. The use of high amount of barley and crumbled feed might also cause wet droppings.

Field results in Tanzania

Paying special attention to the needs of the birds in hot climates pays off, as illustrated in figures 3 and 4. This brown-egg parent flock suffered from a bacterial infection at 3-4 weeks of age, which unfortunately is not infrequent in open houses. However, after treatment, the survivors developed well. Perhaps they benefited from the lower density and performed similar as would be expected in moderate climates. Obviously commercial chickens and parent stock of modern strains are adaptable to tropical climate and can cope well with conditions in open houses with only natural ventilation, at temperatures of up to 40°C and a humidity of 60-70%.

Summary and Conclusion

Egg production in hot climates is a challenge for every producer, but excellent results can be achieved without investing in expensive environment control, i.e. if good management is applied throughout the life of a flock, based on the results of poultry research and experience in practice. Layers in hot climates need more space in rearing and in production. Different lighting programs can help to achieve the standard body weight even in heat stress. A midnight snack enables the birds to consume feed in the cool parts of the day and will provide them with calcium for the shell production in the early morning hours. Feeding coarse calcium separately to a low calcium feed will increase the feed intake and also will reduce the risk of early mortality due to cage layer fatigue. Cool water will allow the hens to reduce their body temperature and maintain their appetite. Adding oil and fat to the feed will make it more palatable and therefore easier to consume as well as provide the correct amount of energy even with reduced feed intake. Hens like humid feed, wetting the feed will help to increase feed intake in hot climates. Birds can get adjusted to hot climates and can be trained via intermittent hot periods in the rearing to withstand heat stress better during rearing.

Viola Holik

Feeding the modern long laying hen – 2016 and beyond

Genetic progress will continue

Modern layer hybrids nowadays already show an amazing performance level under good management conditions. Nevertheless, the genetic progress will continue as the industry demands even more prolific layers for an increased profitability in overall egg production. Therefore, the mayor breeding aims will continue to be of an outstanding importance in the breeding index. Those are increased laying persistence and longer viability with the aim of more saleable eggs per hen housed. Today we are speaking about the 500-egg-laying-hen or using hens up to 100 weeks. Maybe we see higher numbers in rate of lay and working lifetime-period very soon. New selection tools like genomic selection will support this progress. So the industry needs to catch up with the genetic potential which is already in place and will challenge all players in our industry furthermore.

Better understanding of rearing as a basic investment

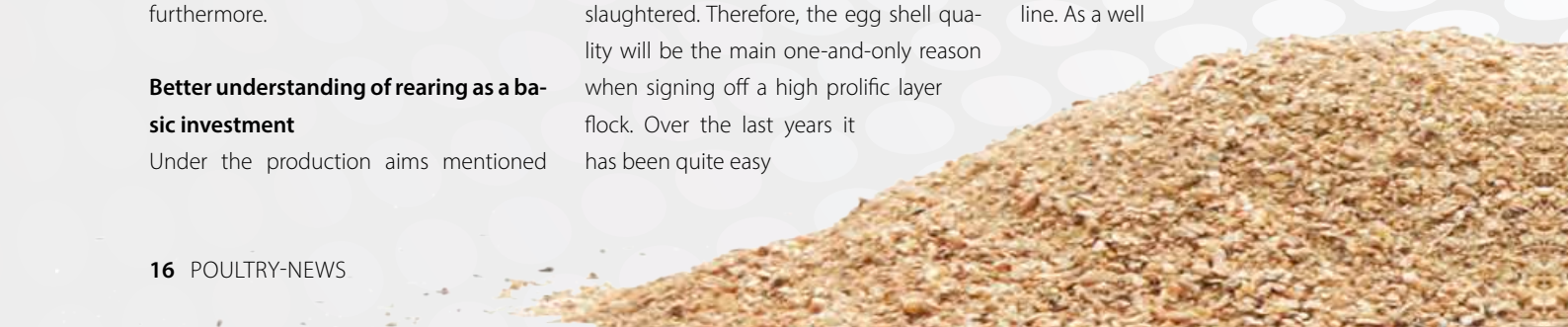
Under the production aims mentioned before the rearing period of modern layers needs to be understood as the overall basic investment in the following production period. Even with better or more expensive rearing the rearing costs per egg will decrease along with an increased production during lay. Nowadays, rearing quite often is supposed to be a time of wasting money. Good understanding of rearing pullets needs to be based on the biologically given growth profile. Optimal body weight development during early stage of growth and adopted growth intensity in the second half of the rearing period are crucial requests. This means that either underweight or overweight at the end of rearing need to be avoided. High emphasis needs to be laid on an optimal nutrition and management during the transition period. The high importance of managing the "pre lay period" in terms of nutrition and farm management cannot get enough focus – as there is the basic rule: good start – good performance during the rest of hens' life.

Continuous focus on egg shell quality in late lay

Based on continuous ovulation, hens will produce an egg until they might be slaughtered. Therefore, the egg shell quality will be the main one-and-only reason when signing off a high prolific layer flock. Over the last years it has been quite easy to achieve a sufficient egg shell quality in a one-year-production-circle, which means approximately up to 72 weeks of age. If laying farmers nowadays and in the future will try to utilize the full genetic potential of the hen, they are immediately faced with the topic of how to support egg shell quality in an aging flock. The most important request is the basic support of calcium as 'nutrient' for the egg shell. Additionally, there are a lot of other very creative tools available to support the hen basically when aging and as powerful feed additives. Some of these might be costly but will easily be cost effective when more saleable eggs with good egg shell quality can be achieved.

Nutrition – achieving more with less?

Modern layer nutrition needs to focus on the best efficiency because feed basically will not be really cheap in the future. The world economy is facing an increased demand for raw materials for feed- and food-production. This leads to high volatility and shortage of raw materials periodically. Reduction of crude protein together with more emphasis on digestible amino acids will be one of the mayor aspects. Furthermore, the use of feed enzymes offers great opportunities to gain more nutrients out of the common raw materials. So NSP-enzymes gain more nutrients out of our nowadays´ common raw materials already – it can be expected that new products with this mode of action are already in the pipeline. As a well



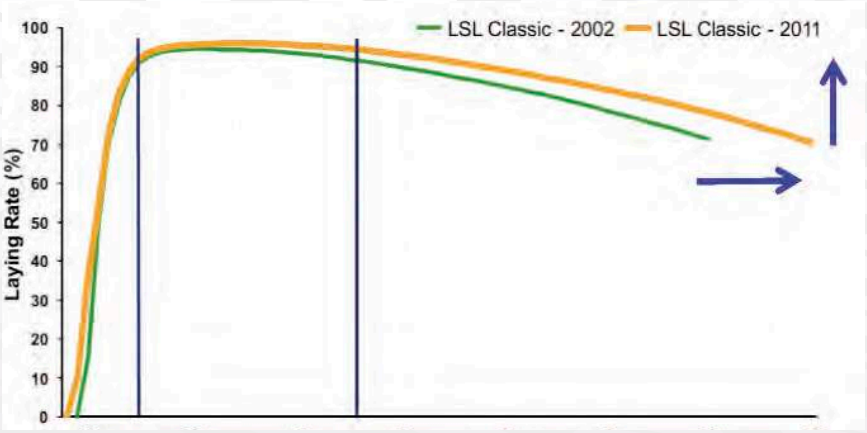


Figure 1: Ongoing genetic progress with Lohmann layers

accepted and prominent example phytase as feed additive needs to be mentioned, it has reduced the necessity of adding phosphates as raw material into the diets to a high extent already. It can be expected that quite soon a new phosphorus evaluation system will be introduced in poultry nutrition with generally lower levels of phosphorus in our diets than today. New knowledge and better products with regard to phytases will support this progress. Feeding on gut health with aiming for better nutrient absorption will support the headline of this chapter additionally – which even promotes the utilisation of new feed additives of non-antibiotic activity.

Economic of high dense feed versus lower dense feed

Having a worldwide view on layer nutrition we are facing a high variability in the raw material composition and nutrient density of the diets. Nevertheless the performance of nowadays´ layer birds is quite the same all over the world – as long as the birds are able to adjust their daily feed intake in order to fulfil their daily nutrient demand. Quite often the birds are not getting the permission and will suffer from nutritional deficiencies under lower dense feed. The cost efficiency of a high dense or lower dense feed will mainly be based on the raw material availability and production aims. Even with most layers being fed with so called corn-soy-diets it is possible to feed the hens without any corn and even without any soy. Those diets might show less nutrient density. Nevertheless, the hens are able to show excellent performance as long as they are able to and they are getting the permission to adjust the daily feed intake to the nutritional demand. Those diets might even be more cost efficient if corn and soy are very rare to purchase.

Raw material availability and new raw materials?

As already mentioned it is not normal at all times to have sufficient raw materials in terms of quantity and quality available for feed production. Hence, diets might not be as constant as they had been in the past, which can even offer opportunities to widen the raw material basis and experience with this in formulating layer diets. Additionally we see an increased interest in really new raw materials which might be insects, larvae and algae from the sea. Scientifically based trials are published more and more showing good opportunities of using these really new raw materials. This strategy in addition offers the chance to reduce the inclusion of probably costly raw materials like soya or fish meal for instance.

Clean food from clean feed

Consumer health is an important topic when it comes to feeding our world population. In the so called developed countries healthy food and health claims are of high priority when creating the daily meal. This demands healthy and safe raw materials to produce that food, which are eggs, meat and milk basically. In order to produce these native products animals need to be fed with safe and clean feed. This topic might cover contamination with bacteria like salmonella or not wanted contaminants. This basic request will set big pressure on the feed industry and especially on home-mixed feed to fulfil those demands. Thus feed hygienisation will become a new or increasing challenge. Those procedures are already quite often used in feed production for breeder flocks and show good practicability – if one really wants to use them.

Influence from animal welfare thoughts and retailers on egg production

Animal husbandry in general and egg production as well are of high interest from an animal welfare point of view. This already has a big impact on production procedures of milk, meat and eggs for instance in a lot of countries. In addition retailers and supermarkets have their own thoughts to promote sales of food with animal welfare claims. In terms of poultry feed this quite often starts with the ban of feed additives with antibiotic activity. With regard to layers the most common topic is the idea to move away from the well established cage housing to different alternative housing system. As an extreme version we see the organic production in a lot of countries based on free range systems and sometimes strange nutritional rules. Some European countries are actually facing the challenge that any kind of beak treatment will not be permitted any longer in the very near future.

Robert Pottgueter

12 Years of Weihenstephan Funnel Nest Box

There is a long wish list where the various characteristics of layers are concerned. Regardless of varying environmental effects and market demands, laying hen farmers expect a high number of eggs per hen to secure their sources of income. Moreover, in non-cage systems, it is of big importance that layers show a good nest acceptance to prevent floor eggs. This requires a certain amount of activity, which, on the other hand, should not be too much as this will result in the observance of a relationship between intensified activity and atypical behaviour patterns.

From the breeder's point of view, these wishes can only be considered if an applicable data recording system exists. Ideally, this has to be a highly accurate hen-specific observation of distinctive traits that can be practically applied on a certain number of birds. Direct observations in non-cage systems are too labour-intensive and time consuming and can therefore be ruled out. Instead, automatic data recording systems that capture data information from each individual hen are desired.

In groups of several hundred layers, Lohmann layers are tested with different electronic data systems, hen-specifically. Since 2004, a few years after the first prototype of an "automatic nest" was tested, Lohmann Tierzucht had been testing their layers in 48 Weihenstephan Funnel Nest Boxes. Since then, the technicians have fine-tuned the mechanism, electronic and software. Four years later, 72 modified Weihenstephan Funnel nest boxes were available to capture the data of individual egg numbers of each single hen in a group housing system with an accuracy of 97 %. Each laid egg can be assigned to the respective hen at the end of the production day. This allocation allows hen-specific egg quality measurements for breeding purposes too. Aside from the exact egg numbers of Lohmann layers in group housing, it is possible to capture data on other important traits such as egg weight, eggshell stability and other egg quality related traits for every single hen.

Furthermore, we always get new and relevant information about the nesting behaviour of individual hens which is of importance for nest acceptance and the required nest space in a group housing system. The relationship between the laying performance and the free-range behaviour of individual birds is of special interest. Presently, this question can only be answered with data that is captured on Lohmann layers at the experimental station of the Technical University in Munich. An adjacent winter garden that can be reached by the layers via electronic pop holes, records the frequency of free-range passages and the time spent outside for every hen.

With the use of single nest boxes (Weihenstephan Funnel Nest Box) and Single Pop Holes, there are constant requests for more practical relevance in terms of the design of commercial nests and pop holes. The result is a second test compart-

Figure 1: Hen specific performance testing in Weihenstephan Funnel Nest Boxes and Single Pop Holes

Low frequency transponder

Figure 2: Hen specific performance testing in Family Nests and Wide Electronic Pop Holes

High frequency transponder

ment with modified family nests and Wide Electronic Pop Holes that can be used by several hens at the very same time. With the aid of high frequency transponders, each single hen can be recorded individually. With this technology, we are getting new information from the nesting and free-range behaviour of Lohmann layers on a daily basis.

Differences in the duration of nest occupancy are shown between brown and white layers. In general, every laying hen visits the Weihenstephan Funnel Nest Box once per day, whereas the same layer is occupying the family nest several times during the day. Several short visits are often followed by one longer nest visit. Therefore, the average time of nest occupancy is around 30 minutes per day for brown layers and just over an hour for white layers. In a family nest, a single nest visit is slightly shorter as compared to a visit in the Weihenstephan Funnel Nest Box, when the hen is laying an egg. Nest visits without oviposition are mainly observed at the beginning of production and do not take longer than nest visits with oviposition (table 1). As soon as the hen enters her continuous laying cycle, in which she lays on a very high production level, she will go into the Weihenstephan Funnel Nest Box to lay an egg only once per day.

Similar to the results from single and family nests, there are differences observed between the usage of Single and Wide Electronic Pop Holes.

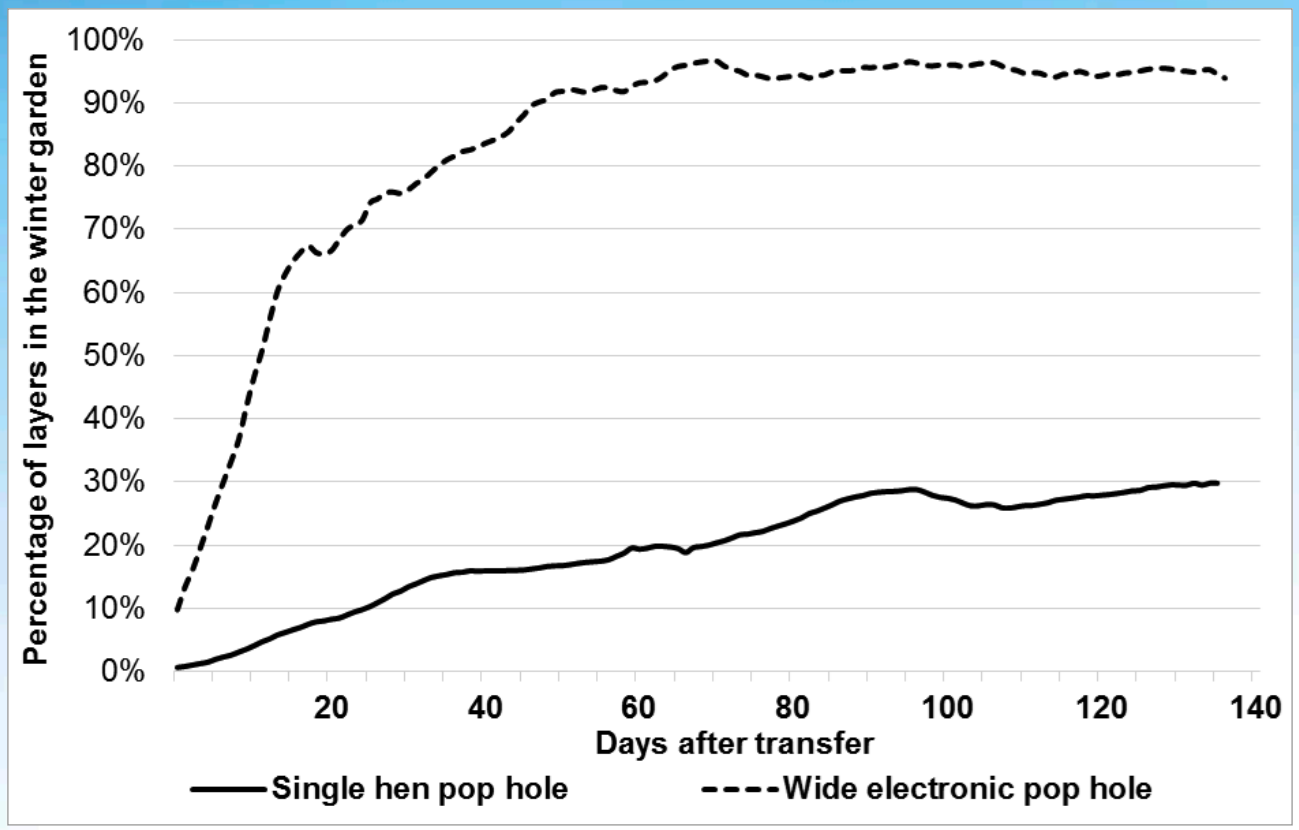
If the adjacent winter garden can be reached via Wide Electronic Pop Holes, nearly every layer will visit the outside run at least once per day. Compared to the Single Pop Hole, a maximum of 30 % of the layers is using the winter garden during the observation period. An important statement on figure 3 is that the layers never visit the winter garden at the same time. During the day, at least 50 % of the hens are resting inside. At midday, an increased number of layers will visit the winter garden, an observation which is similar for both pop hole designs. With the use of Single Pop Holes, a maximum of 10 % of the layers from one flock will use the winter garden at the same time.

The information which are captured from these systems such as hen-specific egg numbers and their egg quality values as well as the nest and free-range behaviour can be used for breeding purposes. Pedigree layers that are tested next to their single cage performances to such

Table1: Average values for the duration of nest occupancy in single and family nests according to brown and white layers

	Single Nest Box (FNB)		Family Nest (HFGN)	
	with oviposition	*without oviposition*	*per nest visit*	*per day*
brown layers	30 minutes	10 minutes	25 minutes	30 minutes
white layers	45 minutes	30 minutes	40 minutes	65 minutes

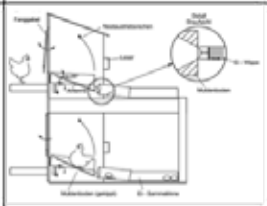
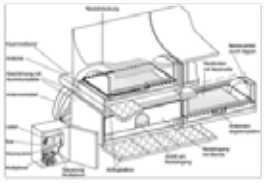
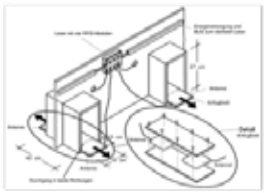
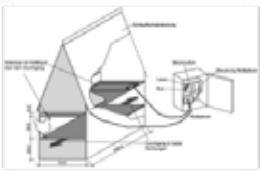
Figure 3: Free-range usage of layers with different Pop Hole designs



a high extent in group housing systems can be selected in terms of an improved nest acceptance and a minimum of floor eggs. One of the main advantages is the knowledge about the individual laying performance of the hens and their activities. Only with the knowledge of this relationship, the breeder has a tool to consider these selection traits when choosing the qualified hens for the next generation.

Dr. Wiebke Icken

Table 2: An overview about the hen specific performance testing on Lohmann layers in group housing systems

System	Weihenstephan Funnel Nest Box (FNB)	High Frequency-Group Nest (HFGN)	Single electronic Pop Hole (ESL)	Wide Electronic Pop Hole (BESL)
Figure				
Characteristics / Dimensions	Single Nest 29 cm width x 35 cm depth Assignment „egg to hen" possible	Family Nest 90 cm width x 40 cm depth	Single Pop Hole 27 cm high x 16 cm width x 43 cm depth Passage of one hen at the same time	Wide Pop Hole 35 cm high x 70 cm width x 100 cm depth Passage of several hens at the same time
Recorded traits	Laying performance Nesting Behaviour Egg quality	Nesting behaviour	Free-range behaviour	Free-range behaviour
Differences	• Mainly one nest visit per day • Hen specific egg quality tests	• Several nest visits per day • Significantly longer nest occupation • Better nest acceptance	• Hen specific relationship between egg number and free-range behaviour	• higher acceptance of the free-range area

Huat Lai Resources

Malaysia is a country located in South East Asia that has borders with Thailand in West Malaysia, Indonesia and Brunei in East Malaysia.

It's one of the mega diverse countries that has a very rich biodiversity. It's main attractions include the world's oldest lush tropical rainforest, beautiful white sandy beaches and rare animals like the Orang Utan.

A former British colony, Malaysia gained it's independence on 31st August 1957 and since then it has undergone rapid growth and industrialization to become a modern state it is today.

Home to almost 30 million citizens of multi religious and cultural background , it has one of the highest per capita egg consumption in the south-east asian region, with 300 eggs per person.

The egg industry in Malaysia has grown exponentially over the years after the country experienced an economic boom in the 80's, and the egg industry has transited from backyard poultry farming into the modern production system it is today.

The Malaysian egg market is made up of 97% brown eggs and about 3% tinted eggs. The consumers and producers here prefer dark uniform egg shell colours with a good egg shell quality. Lohmann Tierzucht is proud to be a part of the Malaysian egg market growth and, since 1997, Huat Lai Resources Berhad is our longstanding, loyal customer and distributor of Lohmann Brown commercial layer day old chicks. Lohmann's market share in the Malaysian market started at 3% in 1997. Currently, it's at 31%, an increase of more than 10 fold in the period of 20 years.

The table shows the production figure of table eggs in Peninsular Malaysia from the year 2004 to year 2015. It can be concluded that egg production has increased steadily for the past 10 years and reached the 9 billion egg mark in 2012. By 2015, the egg output reached 10 billion eggs per year and continue to be very progressive .

Huat Lai Resources Berhad is a public listed company that was incorporated on 12th November 1994. Since then, Huat Lai has made a lot of strategic investments in upgrading their production systems. Beginning as a small traditional commercial layer operation with a daily production of 170,000 eggs during it's establishment, Huat Lai Resources now has a daily production of approximately 4 million eggs per day and has since become one of the biggest poultry integrators in Malaysia. The daily target egg production for the coming 2 years is to reach 5 million eggs.

Today, Huat Lai Resources Berhad has it's own feedmill, layer parent stock farm, commercial layer farms and it's own grading and packing center. It's subsidiary companies are Green Friend Fertilizer Sdn Bhd, Huat Lai Products, Linggi Agriculture, Chuan Hong Poultry Sdn . Bhd, TPC Plus Berhad and their subsidiary, PT Lestari Agribisnis in Indonesia and another HLRB Food Pte Ltd incorporated in Singapore.

Mr Lim Yeow Her, the Managing Director of Huat Lai has a positive outlook for the future of layer industry in Malaysia and he believes that there will be more growth in the next few years to come. He is supported by a group of very dedicated professionals that are crucial to the success of Huat Lai Resources and the expansion of the company. The partnership of Lohmann Tierzucht and Huat Lai Resources has flourished throughout the years. We sincerely thank everyone at Huat Lai Resources, especially Mr Lim Yeow Her for his continuous support.

Dr. Ling Ling Chuah

OUTPUT OF BROILERS, CHICKEN EGGS AND MEAT DUCK IN PENINSULAR MALAYSIA
2004-2015

YEAR	BROILER (birds)	CHICKEN EGGS (unit)	MEAT DUCK (birds)
2004	414,350,008	6,871,061,160	34,507,657
2005	437,054,987	7,420,599,487	32,862,376
2006	427,225,469	7,237,692,613	24,372,905
2007	513,799,017	7,772,670,290	23,259,746
2008	491,413,930	7,516,050,893	27,188,967
2009	516,231,809	7,628,783,615	28,147,299
2010	524,035,048	8,564,601,148	30,959,175
2011	614,496,996	8,920,899,949	30,669,202
2012	636,997,602	9,103,145,498	20,937,569
2013	657,095,678	11,123,141,506	24,431,714
2014	724,695,581	10,307,045,418	
2015	745,771,746 (projection)	10,464,643,196 (projection)	(projection)

Source: DVS Industry Report 2014/2015

Howie Surgener Cup presented to Mr. David Scott, Lohmann GB

The Howie Surgener Cup was awarded during the 20th annual Poultry Club of Scotland Celebratory dinner which has meanwhile become an annual tradition. This year's recipient of the prestigious Howie and Surgenor Cup for outstanding contribution to the Scottish Poultry industry, Mr. David Scott, has had a major impact in the development of the layer sector in Scotland and the UK and Ireland. Throughout his long and illustrious career, he has demonstrated excellence and perfection. Without his drive, energy and enthusiasm he could never have achieved his success and recognition in the poultry industry. By having such an extensive knowledge of many aspects of the poultry sector, he has used his skills to develop a nationally respected and market leading brand.

Personal Background

Born and raised in Edinburgh, he was educated at George Heriots School. His first job was at Auchincruive agricultural college , completing a detailed research project about broilers. It involved him assessing the amount of meat on the bird's carcass, stripping flesh off and weighing it – not for the faint of heart.

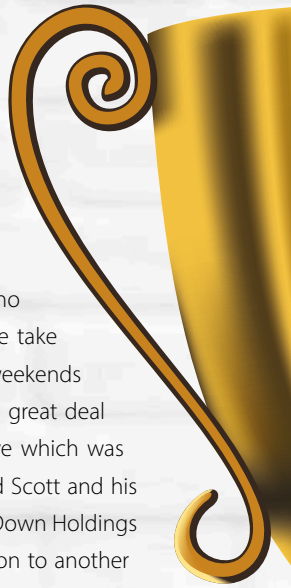
In 1986 Ross Poultry based in Inverurie approached Auchincruive looking for a farm manager and highly recommended him for the position which he was offered and accepted. During his time with Ross Poultry, Robin Johnson and Norrie Semple played a key role in his development and his understanding of poultry and the poultry business. For the next few years he continued to work hard for Ross Poultry and by 1992 he had been promoted to area farms manager. He then went on to co-ordinate a project building a packing station in Inverurie. At this time Lohmann Tierzucht were on the lookout for a franchise company to sell their Lohmann Brown bird and so Ross Poultry took this on. They then required someone to manage the laying farms and hatchery based in Worcestershire.

He was given the opportunity to relocate to Worcester to manage the laying farms and the hatchery at Martin Hussingtree. Robin Johnson who was MD of Ross Poultry at this time suggested he take his family down to Worcestershire for a couple of weekends to see if the family really wanted to locate. After a great deal of soul searching, they decided to make the move which was a long way from home. So in October 1992 David Scott and his family relocated south of the border. In 2004, Hills Down Holdings who owned Ross Poultry moved their layers division to another company within their holdings. The managing directors of Ross Poultry at the time, Steve Donson and John Sabberton bought out and formed a new company called Poultry First. David put all his savings he had into the business and Lohmann GB was created in 2001.

In 2008, Steve and John retired from Lohmann GB and David became managing director forming a partnership with the Wesjohann group, owners of Lohmann Tierzucht. In the same year, David completed a charity bike ride across the Bealach Moore and also developed a keen interest in sailing around the Scottish islands.

In October 2012 Lohmann GB sold their landmark 100 millionth day old chick – a tremendous achievement to be very proud of.

The business has gone from strength to strength under the excellent leadership and strategic direction of David Scott. As well as a leading supplier of day old chicks, Lohmann also can credit themselves with providing hens for the flu vaccine and recently developing the broiler breeder aspect.



Pieter-Jan Luykx with the friendly assistance of Lohmann GB

La Calera, a giant with a tender heart.

History

The layer business of this big company which, by the way, also produces and exports different kinds of fruits like tangerines, grapes and avocados, started during the military government in the 70's. This was at the time when part of its land was expropriated and the owner was forced to look for new productive activities with lesser land than before: layers.

After 35 years, La Calera now produces around 4 million eggs per day and is the market leader in egg production in Perú. The latter has 98% of the total market shares in the supermarkets of the capital, Lima, and also has its big trucks delivering to every corner of the country.

The present

With more than 4.5 million layers in production and around 1 million pullets in rearing, La Calera has based its growth on providing consumers with fresh eggs of the highest quality thereby generating more than 2,000 direct jobs, including at Ovosur, the processing plant that delivers egg products to the local food industry and also for export.

The egg production is concentrated in the main farm in Chincha in which LB Lite breeders are also housed and their eggs hatched. The control of the vertical integration of the business is the key to success. La Calera manages the whole production and distribution chains of the eggs. On top of that, the main activity of the company complements and contributes to other parts of the business by processing the chicken manure to produce biogas for the layer business and fertilizer for an extremely efficient fruit production.

The mision

"To contribute to the development of society by offering nutritive and healthy products in an agile and efficient way, through a culture of social and environmental responsibility".

La Calera provides social services for all of its employees. These include: child care units, lunch at the farm, sport facilities, social assistance, transport and medical care.

The future

For two years now, La Calera has been involved in a technification and automation process that started with the new feed mill, followed by the rearing units for the pullets until 14 weeks of age, and continued by the production houses in a 100%-controlled environment.

This company, that also houses a small amount of LSL Lite breeders, has helped us to dramatically increase our presence in the Peruvian market.

LOHMANN TIERZUCHT wishes La Calera great success in this modernisation process and hopes to continue our fruitful and friendly relationship.

Dr. Luciano Cousinet

Couvoir Ovo, Boire's New Layer Hatchery

More than 40 years of hatching experience went into the design of Ovo, remarked Mr. Claude Boire, President and co-owner of Boire & Frerès at the inauguration ceremony held on Oct. 9. While not the biggest hatchery in the Boire & Frerès portfolio, as the company operates the largest broiler hatchery in Canada, Couvoir Ovo is the newest layer hatchery in the country.

The layer hatchery business in Canada is well established with a long history, the last hatchery built before OVO was more then 18 years ago. The Boire family are amongst the pioneers in the poultry hatching business, the entrprise was started by the father Gérard in 1930, when hatching layer chicks was a seasonal affair. Gérard Boire helped change it into a year-round activity.

Lohmann layer distribution

Lohmann is proud of its association of Boire & Frerès and appreciates their contribution to the success of Lohmann layers in Canada. This was clear by the level represent-ation at the inauguration event, lead by Michael Seidel and Thomas Abdo Calil.

Boire & Frerès have been the distributors of Lohmann layer chicks since 2001, and have succeeded in becoming the market leaders in Quebec and the french speaking Eastern Ontario. Their market approach is focused on chick quality, under the leadership of Claude Boire, who is probably the most passionate hatchery men in Canada. The company is also renouned for its exemplary customer service, as reflected by the performance records of layer flocks of their customers, which rank amongst the top Lohmann records world-wide.

Technical aspects of the hatchery:

Couvoir Ovo is located in Acton Vale, 20 km away from the headquarters in Wickham, far enough to maintain adequate bio-security. It ia also centrally located at half an hour drive from the parent stock barns that supply the hatching eggs. The setting capacity of the hatchery is 1.3 million eggs in 24 setters (PT60 & PT40 from Jamesay), in 3 separate setter rooms. There are 12 hatchers in 2 hatcher rooms to compliment the setters.

The emphsis in the design is on the flow of work and traffic, making it efficient and bio-secure. Special attention was given to the use of quality construction materials, the design of the ventillation system, and the safety and comfort of the employees. Precision of controls and data collection is another focus of attention, and automation allows the operator to access controls and alarms at all times thru their mobile phone.

At Lohmann we believe this project will enable Boire & Frerès to continue to produce the quality layer chicks that truly reflect the genetic potential of Lohmann layers. It will also facilitate the achievement of the company goals of supplying quality products that faithfully meet the needs of their customers, while maintaining their commitments to social responsibility and the humane treatment of animals.

In commemoration, Lohmann presented Boire & Frerès a "Certificate of Excellence" as a token of appreciation of their contribution to the layer business in Quebec and Canada. *Khalil Arar*

9th OMMAT SCHOOL

Arab Poultry Breeders held its 9th OMMAT School for its customers in the Gulf region at the Holiday Inn Jeddah Gate hotel. The four-day event started on the 23rd of November and lasted until the 26th of November 2015.

This year's event was sponsored by the Ministry of Agriculture, represented by Eng. Khalid Al-Ghamdi (General Manager of Agricultural Affairs in Mecca.)

The annual event, which was organized successfully by OMMAT in close cooperation with Lohmann Tierzucht for the 9th year running, has many purposes. It's not unusual for OMMAT and Lohmann Tierzucht who believe in the advantages of breeding goals and its role in improving the same, to spread the word on their current achievements in the field in order to further enhance the table egg industry in the Gulf region. One of the main goals of this event was to reach out personally to the industry and deliver our messages though our speakers who interact with different people from different cultures including decision makers, investors, managers, engineers, consultants, vets and technical staff.

Successful Start

The event began with a recitation of the Holy Quran followed by a welcoming speech by the Chairman of the Board, Eng. Hussein Bahri. Mr. Moyassar Bahri, the General Manager, then took over the microphone to warmly welcome members of the audience who came from various countries in the Gulf region before commencing with the lecture programme.

The programme contained a wide variety of topics. There were 17 lectures altogether and these were thoroughly discussed throughout the 4-day programme. 9 of these lectures covered issues on the most important poultry diseases and methods of disease prevention (i.e. of Newcastle, IB, Avian Influenza, Fowl POX, IBD, Mycoplasma and Coccidiosis), and ways to control and vaccinate the birds (including the application of vector vaccines). In addition, the subject of the Avian immune system and poultry vaccination plus a detailed lecture that covered the Eliza (serological) monitoring test programmes and techniques, were also included in the programme. The two topics of Bio-security and Basic Concepts in Poultry Feed in the Kingdom of Saudi Arabia (KSA) were discussed in two of the 17 lectures. There were two speeches on ventilation; one covered the design of layer complexes in hot climates and other was on modern ventilation techniques in poultry houses. An introduction to the modern technology for egg collection, "Moba" was also included. The significant contribution by the Lohmann team was noticeable with the discussions made by Mr. Ron Eek and Dr. Maher Al-Azab regarding the management of layers to achieve top performance & the nutrition of Lohmann layers and pullets, respectively.

On the second day, the Muslim attendees were given the unique opportunity to perform Umrah. This was part of the programme and was well-organised in advance by OMMAT's chairman and staff.

The guests were treated to a fun-filled rejuvenating beach trip to the Red Sea on day three that included lunch and dinner. The scientific programme was concluded on the fourth day.

Eng. Ekrimeh Mahasneh, who returned back to the company as a CEO after 10 years of being away, gave a speech in which he highlighted the objectives of the group from now on. The group will continue to focus on quality and in addition to that, also more on customers and employees with the introduction and implementation of an online training programme. All of these are the most important key factors for the success of the company.

Conclusion and Award Ceremony

Eng. Hussein Bahri concluded the 4-day seminar with words of wisdom in his closing speech in which he stressed on the importance of continuing the concept of such events. The next OMMAT event will be renamed to "OMMAT Academy". The academy should also include lectures on improving personal, managerial, marketing, financial and HR-related issues & skills in order to improve the quality of daily work. Aside from this, it is equally as important to maximize the adaptation of the complete quality system, especially in light of the huge challenges the industry in KSA are currently being confronted with. This can and should be achieved by reducing the subsidies on energy sources and feed, in addition to the increased pressures of diseases in the area and the continuous increase of labour costs. All these factors have led & will continue to lead to more significant increases in production costs that need to be more on the decline by optimizing performances & supportive functions.

Last but not certainly not least, Eng. Khalid AL-Ghamdi gave his speech on behalf of the Ministry of Agriculture of KSA in which he thanked and showed his appreciation towards the efforts done by OMMAT in developing the food and table egg industry in the region.

The participants were then awarded with certificates of successful participation and a group photo was taken. Everyone returned back to their respective hotels happily and the 9th OMMAT school was successfully concluded.

Al-Azab

Lohmann Seminar faisalabad Pakistan

Pakistan is one of the very important countries in Asia where commercial layer farming is concerned. With a population of about 200 million people, Pakistan is the 7th most populous country in the world. Its economy is based primarily on agriculture. The majority of the population is poor and about 70% of the people are living in the rural areas of the country.

The egg is the cheapest source of animal protein available to the people. Although the per capita egg consumption is around 70 eggs per person, which is very low according to WHO standards, people are becoming more aware about the benefits of eggs consumption, particularly the middle class population. It also shows that Pakistan has a huge potential in egg consumption.

In the last decade, commercial layer farming in Pakistan has been changing very rapidly from deep litter systems to modern cage housing. Day by day, more investors are coming very rapidly from the textile industry and other industries to invest hugely in modern commercial layer cage farming as well as in prefabricated houses and egg branding machines, thereby indicating intentions towards the export of eggs to the markets in the Middle East and central Asia.

LSL Lite & LSL Ultra Lite

LSL-Lite is a very famous breed throughout the country. This is due to its laying persistency, its good adaptability to cage environment, lesser feed intake and docile nature. The total market share of LSL-Lite in the Pakistani market is 40%.

With the introduction of LSL-Ultra Lite to the Pakistani market, people are becoming more interested in buying the new breed due to its lesser feed intake and slightly higher number of eggs with an acceptable egg size.

Seminar Summary

On 25th of February 2016, Lohmann jointly organized a seminar with its two major Pakistani customers, Samundri Chicks and Bahoo Chicks. The seminar was attended by almost 250 commercial layer farmers and poultry consultants from all across the Punjab province. The guests of honours of the occasion were Dr. Muhammad Sadiq of Sadiq Poultry (the biggest integrator and layer farmer with 1.2 million commercial layers) and Mr. Mian Qaiser of Shabir group of companies with (0.6 million commercial layers).

The seminar started at 3:00 o clock in the afternoon. Various national and international speakers presented their valuable presentations on different topics with practical approaches for trouble shooting in the commercial layer farming business. There were also presentations from our customers Bahoo Chicks and Samundri Chicks. The latter presented their history and their future plans. The seminar began with a presentation by Mr. Muhammad Anees of Samundri Chicks. He introduced his company and elaborated on their future expansion plans. Dr. Muhammad Hafeez Malik of Bahoo Chicks then followed with an introduction of his company and its future intentions.

Dr. Sohail Habib Syed, Sales & Service Manager at Lohmann Tierzucht GmbH (LTZ) Germany, introduced the company and provided information on its variety of breeds across the globe. He also presented LTZ's shares in the global market.

Mr. Ron Eek, Regional Area Manager for the Asia Pacific Region at LTZ, held a presentation on "Genetics at Lohmann and the continuous improvement of the breed, Lohmann LSL". He also introduced the LSL-Ultra Lite breed to Pakistan since the Pakistani market demands hens which lay eggs that are medium in size and weight, produce a higher number of eggs per hen housed and have less feed intake – an important advantage considering the high feed prices in the country.

Dr. Muhammad Akram of Mico Labs in Karachi and an ex-consultant Ommat Poultry in Saudi Arabia gave a presentation on the "Immune system and vaccination of poultry".

Dr. Maqsood Jafri, Senior Layer Consultant shared his presentation on "Commercial layer rearing management and diseases which effects the layer production".

Professor Dr. AD Anjum, Senior Poultry Consultant, then elaborated on "Bio-security in poultry farms".

After these informative presentations, one of the speakers, Dr. Muhammad Sadiq of Sadiq Poultry PVT Ltd., also addressed the audience and thanked all speakers with his valuable comments on taking active roles to increase the awareness of egg consumption in the country and to end the current crisis of overproduction.

Mr. Muhammad Sharif Malik of Bahoo Chicks and Breeding Farms, expressed his gratitude at the end of the seminar.

All the participants were treated to a lavish dinner at the end of seminar.

Dr. Sohail Habib Syed


Seminar 2016


LOHMANN
Welcome you to

53rd Lohmann Tierzucht Franchise Distributor Meeting in Istanbul

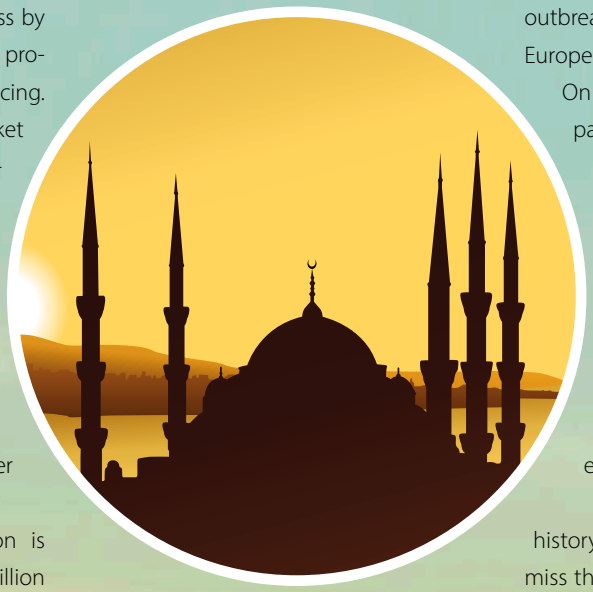
Last year, more than 200 people from 98 companies and 42 different countries accepted our invitation and joined LOHMANN TIERZUCHT as we hosted our 53rd Franchise Distributor Meeting in Istanbul from September 28 th – 30th 2015. The participants were treated to three interesting days filled with updates on current topics in the layer industry as well as discussions and lively exchange of experiences.

To kick-off the lecture programme, a variety of presentations were held on the first day. We were introduced to the Turkish Layer business by "HasTavuk" and learnt more about the problems the host country is currently facing. Turkey is very keen in acquiring market shares in other countries such as Japan and China in order to not be entirely dependent on the European market for their exports.

Prof. Dr. Preisinger gave an update on 'What's new in Genetics?' thereby emphasizing that 'Selection must not focus on current market and customer needs alone, but rather on global market needs of the future.'

By 2050, the world's population is expected to increase to about 9 billion and urbanization will increase from 50% to 70%. André Brand of "Nutreco's Trouw Nutrition" began his presentation by describing potential problems. He then presented innovative solutions to tackle the same, e.g. precision feeding.

Customers from other parts of the world such as "Boire & Freres" of Canada, "Schropper" of Austria, "Bounty Fresh" of the Philippines, "Incubandina S.A." of Ecuador and "Wadi Poultry" of Egypt, also had the opportunity to present their companies and to show the differences of egg production in their respective regions.



Peter van Horne, "LEI Wageningen", took to the podium and held a speech on "Avian Influenza: economic impact on the layer industry". He pointed at strong evidence that suggest that the virus is introduced by wild birds. Van Horne then went through the economic impact the outbreaks have on trade and egg prices in Europe as well as in the US.

On the last day, the attendees took part in a brand new concept of the lecture programme, i.e. interactive workshops covering the three major topics in today's operations: Hatchery, Economics and Health. These workshops, which were chaired by our experts, provided the opportunity for passionate discussions and a fruitful exchange of experiences.

Being a fascinating city filled of history and culture, we certainly did not miss the unique opportunity to also tour the major highlights of Istanbul and visit historical landmarks such as the Sultan-Ahmed-Mosque.

We hope all our guests enjoyed their stay in Istanbul together with our Lohmann Team as much as we did and we are looking forward to seeing you in Kyoto, Japan!

Imke Stegemann












53rd Franchise Distributor Meeting in Istanbul









ANNOUNCEMENTS

1. **Lohmann School Cuxhaven**
   23.–27.05.2016
2. **Lohmann School Canada**
   30.05.–01.06.2016
3. **Lohmann Hatchery Course**
   05.–09.09.2016
4. **Lohmann Franchise Distributor Meeting Kyoto, Japan**
   26.–28.09.2016

Imprint

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GOTOMEDIA WERBE- UND MEDIENAGENTUR

BREEDING FOR SUCCESS … TOGETHER

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