

FACTS THAT FIGURE

Management tools to influence egg weight in commercial layers

Introduction

Numerous non-genetic factors will influence the ability of pullets or layers of the same variety to achieve the goals specified by the breeding company. These factors include body weight and frame development, nutrition, bird density in cages or floor housing systems, feeder and water space, lighting programs, housing and climate conditions, beak treatment procedures, vaccination schedules and diseases. This article will focus on factors, which can be manipulated by farm management to optimize egg weight during a full laying cycle.

Genetics and environment

Today's breeding companies and their multipliers offer a broad range of commercial layer varieties which differ mainly in shell color, egg numbers and egg weight. If the demand of a given egg market is predictable on a long-term basis, the egg producers can choose a variety closest to market needs. Depending on these targets, the frequency of eggs in dif-

ferent grades can be optimized by choosing a commercial layer fitting to this demand.

Despite the rather high heritability of egg weight, it is also affected by major environmental effects. The egg weight curve in Figure 1 documents field records with differences up to 5 to 8 g between commercial flocks with the same genetic potential, originated from a single GP flock.

Development of bodyweight, frame size and appetite

The first need of laying hens is proper brooding management. Adequate climate in the brooder house and suitable equipment to meet the chicks' demands ensure a good start into their life. How to set up a brooding shed for layer chicks is described in all management guides for the different commercial varieties. The focus in rearing has to be on bodyweight development. After the chicks arrive and perhaps rest a bit after long travel,

they should immediately start to drink and eat. A dense starter feed, high in energy and protein (with appropriate amounts of lysine and threonine), highly digestible for young chicks, is essential to reach target bodyweight. The high energy content of a starter diet should never be achieved by adding fat or oil containing saturated fatty acids, because young chicks cannot digest them. Vegetable oils with high amounts of unsaturated fatty acids as soybean or sunflower oil are the first choice.

The change from starter to grower feed should be decided on target bodyweight, not at a fixed age. The grower feed is not as dense as the starter diet, but contains enough energy and protein to support further growth. The starter and the grower diets are fed ad libitum. Chicks have to be stimulated to eat as much as they can. Under normal conditions, they will easily reach their target weight. When they are 8 weeks old, a third diet, the so-called developer feed, will be supplied. It contains a lower protein density, must have a good structure and 5 to 6 % crude fibre content. At this age, pullets should learn to empty the feeders: preferably every day, but at least, several times a week. A balanced intake of coarse and fine feed particles and a short gap before one of the feedings will increase appetite and feed intake. The ability to consume large amounts of feed learnt during this phase will be crucial for the pullets after moving to the laying house, when feed intake has to increase sharply. Many people still think that bodyweight at start of lay is the most important factor in relation to later egg weight. Our experience at H&N International tells us that a much higher

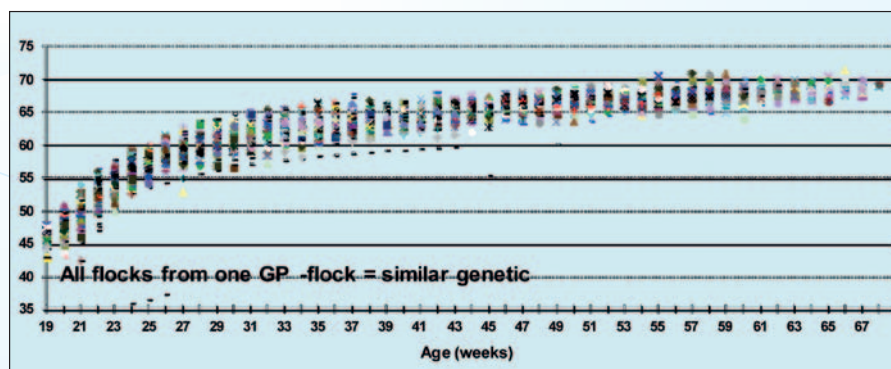


Figure 1: Variation in weekly egg weight between commercial brown-egg flocks with the same genetic potential (Preisinger, 2002)

correlation exists between frame size development, i.e. bodyweight at 12 to 13 weeks of age, and later egg weight. At the age of 12 to 13 weeks nearly 95 % of the body frame is developed. A reduced frame size with corresponding underweight at this stage of development will have a lasting negative effect on egg weight.

If a pullet is too small at this age, it cannot really catch up with bodyweight development. To gain bodyweight in the second half of rearing, some pullet growers push flocks with high feed densities. These birds will gain weight, but stay small and deposit more fat compared to properly reared birds. Pullets grown on high energy developer diets often exhibit poor feed consumption at the onset of lay (Elliot, 2002). They are not properly prepared for the laying period, because they are unable to eat enough at start of lay, often fail to reach the breeder's standard for egg production and sometimes show problems like obesity and prolapse.

If chicks are housed in floor systems or under hot climate conditions, they sometimes struggle to grow. In the first case, they are "wasting" feed energy for the higher activity; in the second case, they are not eating enough, because it is too hot. In both situations the chicks should be fed with higher feed densities until they reach their target weights. Prolonging the period feeding a starter or grower diet will help to achieve the target bodyweight. The period of supplying a less dense feed – the developer – will then be shorter than normal, but should still be used to develop the feed intake capacity as well.

Lighting program

The lighting program (day length and light intensity) for pullets and laying hens is a key factor in determining the onset of sexual maturity and egg production. Lighting programs for pullets in windowless houses can be designed to achieve optimal growth and efficient preparation for the laying period, largely independent of the season.

In case of difficulties to reach the target frame size of the pullets and target body weights, a longer constant day can help. Any step-up procedure or increase in day length from an age of 14 to 15 weeks will stimulate the birds' sexual maturation. A quick step-up procedure will induce an early onset of egg production with high egg numbers and slightly lower egg weights. A slow step-up will delay the onset of lay and increase egg weight. The

combination of the quick step-down and quick step-up procedure is recommended for early production and, vice versa, a slow step-down and slow step-up will delay it. If you want early egg production, high egg number and moderate egg weight, use the quick step-down/step-up variant; for larger egg size at the expense of numbers, a slow step-down/step-up variant should be chosen.

Feeding and adjusting the nutrient intake in lay

Nutritionists formulate optimal diets for the changing needs of modern commercial layers, taking the genetic potential for egg numbers, egg weight and the cost of available feed components into account. The computer program assures that adequate contents for energy, calcium, available phosphorus, sodium, chloride and choline, digestible lysine, arginine, methionine, methionine plus cysteine, tryptophan, threonine, isoleucine and valine are used for feed production. In practice, all diets have to be adjusted to the actual or expected daily egg mass production of a flock as well as daily feed intake. This requires fine-tuned phase feeding programs with at least three or more phases directed to a specific production profile (egg numbers and egg weight) to avoid wastage of expensive components and minimize feed cost.

The genetic potential of commercial layers continues to increase and is much higher today than a few decades ago, especially at peak production. This offers a challenge for farm managers and nutritionists to fully utilize the potential. Sufficient nutrient intake at this time is of utmost importance. At peak daily egg mass production, laying hens are at risk to run into a nutrient deficiency and will not be able to utilize their full genetic potential. Neither egg number nor egg weight will reach the breeders' standard. High density layer diets

will help to overcome this situation, but need to be combined with adequate appetite.

By about 30 to 35 weeks of age, all hens should have learned to eat enough, and insufficient nutrient intake is less frequent. From this time onwards fine-tuned phase feeding programs are the main tool to maintain high egg production at minimal feed cost. Nutritionists can help to achieve the desired egg weight development with feed ingredients, especially the sulphur amino acids and linoleic acid content of a diet. Especially the digestible amino acid profile of a layer diet has to be balanced. Recent publications of research results by Joly (2007), Bregendahl et al. (2008) and Lemme (2009) should be consulted regarding the needs of today's highly productive layers.

Reduced digestible amino acids and linoleic acid content, combined with adjusted calcium and phosphorus levels towards the end of production help to maintain shell stability and limit the increase of egg weight. The optimal age to switch from one phase to the next phase or layer diet depends on daily egg mass production. The most productive flocks will produce on a high daily egg mass level for many weeks. They should not be switched too early to the next diet-quality. The maintenance of a desired egg weight profile requires early reaction (Elliot, 2002). Adjusting the feed quality too late will not help to control egg weight. Egg producers interested in more large and extra-large eggs will switch later to diets containing a lower amino acid and linoleic acid density. They should be aware of the fact that the efficiency of calcium metabolism in the medullary bones declines with age and supply older hens with higher amounts of calcium. Added calcium will have positive effects on shell strength, bone strength, overall health and bird welfare.

Linoleic acid content					
Age (weeks)	1.4 %		2.4 %		Difference
	Hen day production	Egg weight	Hen day production	Egg weight	
20	15 %	40.8 g	13 %	42.5 g	+1.7 g
25	93 %	52.7 g	95 %	54.6 g	+1.9 g
30	93 %	58.0 g	94 %	59.7 g	+1.7 g
35	94 %	61.3 g	96 %	62.8 g	+1.5 g
40	95 %	62.1 g	96 %	63.8 g	+1.7 g
44	95 %	62.1 g	95 %	64.2 g	+2.1 g

Table 1: Influence of linoleic acid on egg weight of white layers fed different diets* with different linoleic acid contents (Pottgüter, 2008)

*isocaloric diets and similar feed intake of trial and control group

Summary

Genetic and non-genetic factors influence egg weight of commercial layers and should be controlled by farm management before production of a flock starts: the genetic profile of a strain cross with regard to egg weight

and correlated traits, the light stimulation during rearing and the bodyweight or frame size development of the pullets. Once a flock is in production, the nutrient intake, especially the early feed intake, has a major effect on the egg weight curve. Modern layer nutrition is

focused on meeting the demands of the birds at all times by adjusting the supply of nutrients according to daily egg mass production and daily feed intake. Precision supply of nutrients influencing egg size is a tool to adjust the egg weight on mid or short-term basis.

Dr. Hans-Heinrich Thiele

For more information regarding this topic please contact us at: info@hn-int.com

Feeding in late growing and early production cycles to achieve optimum performance

Today's layers from H&N have a sometimes incredible high performance when they start to produce eggs with a steady increased persistence and life time production period. The preconditions to achieve this high performance level are good feeding and management during the whole rearing period, which starts with an optimal brooding period for instance. An additional challenge of high importance to serve as a basis for the optimal performance in lay is the period just before, during and after transfer of the pullets from the rearing farm/house to the laying farm/house.

Feeding in rearing can roughly be divided in two parts, the basic body development until around 8 to 10 weeks of age, followed by the second period of maturation with decreased daily weight gain. During this time the pullets biologically have a decreased growth rate, which offers the change to decrease feeding costs and coordinate training the pullets for good and sufficient feed intake. Nevertheless, pullet growers have to take care, that the pullets are grown according to breeders' body weight profile. If this might not be the case, special attention has to be implemented to support growth, which is possible by nutrition and/or management.

When the pullets reach around 17 weeks of age preparation for transfer starts, which will be light stimulation and farmers should – or better must – have an idea how to provide the proper nutrition during this period. A typical developer feed will be less dense in crude protein and amino acids with normal content of the main minerals. Once the pullets mature to a layer bird, they immediately need much more calcium to produce the egg shell and an overall increased nutrient density of the feed, which basically means: the birds are switched from rearing feed to layer feed within a very few days – this the birds mostly do not like. Those birds being a little bit ahead of the average immediately need and want the high calcium intake, those being a little bit behind do not want the high calcium support and even may refuse feed with the high calcium load. This is the time to use the benefits of a pre-lay feed, which from a nutritional point of view is a kind of compromise feed between two highly different feed types.

With optimal use of a pre-lay feed, meaning 800 g to max. 1 kg per bird for a period of around 10 days, the pullets are getting a smooth transition between the two highly different feed types. Together with hopefully the same raw material basis and the same

good mash feed structure the birds realize a smooth transition and will not drop in daily feed intake – which very often is the biggest problem during the transfer period. Everything in terms of management and feeding/nutrition has to be done to support and maintain daily feed intake during and just after transfer. This will be the most important precondition for an optimal start of the laying period together with an optimal early egg size.

When the flock is increasing laying percentage to 30 % and more, they need immediately a highly dense feed, to ensure the high nutrient and calcium demand. The H&N technical staff knows the daily nutrient demand has to be achieved by a varying amount of daily feed intake or a more or less dense feed. One of the most important management tools is to know the daily feed intake during this critical period, when the flocks rapidly increase in both laying percentage and egg weight. The feed formula must be adjusted according to daily feed intake of the flock, to achieve the daily nutrient intake. In addition to increase production the hens must gain body weight during early production. This is a "MUST"; as any flock which does not reach this target will not achieve satisfactory production performance. Once the flock has realized good daily feed intake and optimal body weight after the challenging period of transfer, start of lay and first weeks of production, they will show wonderful performance and persistency for a very long life time thus providing profitable performance to every egg producer.

Robert Pottgüter

Feeding during and after transfer:

Age at transfer		Feeding program		
		Developer feed	Followed by	Pre-lay feed
week	days	kg feed	→	kg feed
15	105	1,0	→	1,0
16	112	0,5	→	1,0
17	119	-	→	1,0
18	126	-	→	0,5
after 18	after 126	immediately start to lay feed or layer phase 1 feed		

New exclusive H&N distributor in the Netherlands



Agromix Hatchery and Rearing Integration appointed as new H&N International distributor

On October 4, 2012 the new hatchery of Agromix Hatchery and Rearing Integration (Agromix Broederij en Opfokintegratie in the Netherlands) commenced operations.

The new hatchery enables Agromix to provide the Dutch layer poultry industry and

customers of its sister company Pluriton with vital and high quality day old chicks. The modern and compact hatchery, equipped with the latest technology, has a capacity of ten million commercial day old layer chicks.

Agromix Hatchery and Rearing Integration is now the exclusive distributor of H&N International in the Netherlands, supplying both "Brown Nick" day old chicks and pullets. The long-term agreement with location and hatchery manager

Jip van den Broek emphasizes the commitment that ensures Agromix and its customers continuity of poultry management expertise and experience.

Agromix has opted for sustainable investments also taking into consideration the welfare of humans and animals. To save energy the hatchery is equipped among other things with a heat recovery system and LED lighting.

Ines Borchert with contribution of Hans Groot Koerkamp

H&N Brown Layers – Now available in Spain and Portugal



Following the strategic development plan in Europe, H&N International has started supplying its products in Spain and Portugal through a new company named H&N Peninsular. The company, located in Ourense in the northwest of Spain, began supplying the H&N "Brown Nick" day old chicks in September, 2012. H&N "Brown Nick" is a brown egg layer that has proven excellent production records in all markets where it is present. "Brown Nick" layers exhibit the following performance traits:

- Strong production persistency
- Uniform dark color
- "The brownest egg you can buy"
- Outstanding shell strength and
- Top feed conversion

This makes the "Brown Nick" perfectly adapted to alternative ways of production like enriched cages.

H&N Peninsular was founded with a clear focus on servicing the poultrymen of Spain and Portugal. Therefore, they have developed an innovative online selling

system where the poultrymen may perform any commercial transaction such as buying day old chicks. In addition other types of contacts such as access to any documentation may be done through the company web site www.hnpeninsular.com at any time.

In this way, H&N Peninsular is aiming to offer a product with the best genetic and sanitary quality as well as technical advice and support to its costumers to help them reach their production targets.

Jorge Sargardia



Come meet us at EuroTier from 13 to 16 November 2012 in Hanover



From 13 to 16 November 2012, the international exhibition EuroTier is taking place in Hanover, Germany. The EuroTier show has gained a reputation as Europe's meeting place for poultry professionals from around the world. Over 2,100 exhibitors from 50 countries will participate, many of whom will

present the newest innovations in poultry husbandry as well as egg processing and packaging.

For the very first time H&N will exhibit at this year's show with its own stand. H&N's exhibit will be located in

hall 09, stand E31. The highly qualified team of H&N is looking forward to welcoming you in Hanover.

Ines Borchert



H&N International and Prodavi: A successful partnership in Switzerland

In this issue of Facts that Figure we are pleased to highlight the partnership of H&N with PRODAVI SA, its long time business partner in Switzerland. Over the years, Prodavi has earned a reputation for consistently delivering H&N layer chicks of prime quality on time to their customers. To meet the varying needs of the Swiss market, Prodavi maintains parent stock flocks of H&N "Brown Nick", "Nick Chick" and "Super Nick". Through their painstaking efforts, Prodavi has established a prominent position for H&N layers in the Swiss market. Following is an informative article based on Prodavi's own information.



The Prodavi Sales Team

Front Row, left to right: Mr. Eric Rapin; Sales Manager, Western Switzerland | Mr. Andre Hodel; Chief Sales Officer & Sales Manager, Central Switzerland

Back Row, left to right: Mr. Beat Burger; Rearing Farm Manager | Mr. Franz Hodel; Chairman & CEO | Mr. Hanspeter Faeh; Hatchery, Breeder Flocks and Quality Control Manager | Mr. Erich Hug; Sales Manager, Eastern Switzerland

Prodavi SA

A successful concept for poultry producers from the chicken to the retail shelves.

With the philosophy, "It's been said that we have more wit", PRODAVI SA offers a timely and high quality range of products for poultry and egg producers alike in Switzerland.

This includes

- 25,000 H&N layer parent stock
- Fully adequate capacities of label/free-range rearing facilities
- Our own hatchery with high hatching capacities (2 x 24,000 layer chicks per week)
- H&N "Brown Nick", "Nick Chick" and "Super Nick" day old chicks and pullets
- Diversified services for rearing facilities for Swiss egg producers as well as egg distribution companies

The complete chain of production adheres to strict stipulations and its quality, which is in accordance with the ISO certificate 9001-2000, is therefore assured.

History

Prodavi SA, founded in 1999, consists of a well established team of specialists, who have been working successfully in the poultry business for many years. The parent company, located in Oberkirch, Lucerne is supported by sales offices in the Eastern as well as French part of Switzerland.

Our own Rearing Facilities

While planning rearing periods, special attention is paid to the right choice of the rearing system in consideration of the future laying facility.

Regardless of label or free-range rearing, PRODAVI SA is able to rear pullets, which are suitable for all forms of production and/or housing systems.

Several farmers are responsible for pullet rearing in close cooperation with the Prodavi advisory service. There are rearing facilities known as "all-in all-out" facilities spread across Switzerland from Geneva to Romanshorn. These farms are equipped according to the needs of the customers and the demands of the label requirements. The impeccable health status of the day old chicks is therefore maintained.

Flock sizes are between 4,000 and 20,000 in terms of rearing places. This allows laying facilities from the same rearing barn to accommodate every requested quantity. Seen from a sanitary point of view, that is imperative.

Advisory Service for Poultry Producers

One of the market advantages Prodavi offers is the in-depth knowledge that starts with a business plan and ends with the egg on the retail shelf. Not only growers but also producers can benefit from 25 years of experiences.

The comprehensive spectrum of consulting and services ranges from parent stock, hatching of chicks, rearing period and pullets of high quality to production and sales planning.

In detail, this includes the preparation of operational concepts, plans for new poultry houses or remodeling existing ones as well as the brokering of second hand material.

Naturally, our advisory service covers all questions related to animal health, vaccination of the poultry flocks as well as conceptual support beginning at the construction of poultry houses all the way to sales planning.

We at Prodavi are also able to take care of the transportation of live chicks thanks to our own logistics and our own fleet of transportation vehicles.

Rich Wall with contribution of Prodavi

Bastos, Brazil: An Egg Production Powerhouse

The town of Bastos located in Sao Paulo State, Brazil can truly be characterized as an egg production powerhouse. Although Bastos has a human population of just 20,000, the surrounding area is home to an enormous 21 million commercial layers or approximately 25 % of the entire Brazilian layer flock. To express it differently, if Bastos was a state in the USA it would rank fifth among all states in egg production!



Entering Bastos is a sculpture reflecting the Japanese-Brazilian flavor of the town and the shape of its main product

The mild climate, which is comfortable for humans and chickens combined with ready access to feed grains and huge markets such as the cities of Rio de Janeiro and Sao Paulo make Bastos an ideal location in which to base table egg production. In fact, eggs produced in Bastos are distributed throughout the huge country of Brazil, an area which is comparable in size to Western Europe and the continental United States.

In addition, Bastos and many of its egg producers can boast a unique cultural heritage. Many of the approximately 60 egg production companies based in Bastos were founded and are owned by Brazilians of Japanese heritage. The influence of and the respect accorded to these Japanese-Brazilian entrepreneurs is acknowledged throughout the entire Brazilian egg industry. Thus it is encouraging that the performance of H&N "Nick Chick" is receiving an enthusiastic response among the egg producers of Bastos.

Rich Wall



Diraceu Sakata (left) and Mario Nihei (right) of H&N Avicultura at a familiar Bastos landmark

New Area Manager for CIS Countries



Pavel Bogatkin

H&N International is pleased to announce the appointment of Mr. Pavel Bogatkin as the new Area Manager for the CIS countries.

Mr. Bogatkin is a graduate of the Saint Petersburg State University of Engineering & Economics where he earned a degree in Economics. This was followed by eight years of experience as an area sales manager with a competitive poultry genetics firm. In addition to solid credentials in the poultry genetics field Mr. Bogatkin also brings to

his new position fluency in both the English and Russian languages. His responsibilities as Area Manager include expanding the presence of the H&N brand, for example in Ukraine and Uzbekistan as well as the Russian Federation. Close market observation and establishing new business contacts with key players in the local market are included among his main objectives. We hope you will join us in wishing Mr. Bogatkin great success in his new and important position with H&N International.

Rich Wall

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