

International Hatchery Practice

Volume 30 Number 6 (2016)

Practical information for better breeding and hatching

EGG QUALITY

Increasing hatchability and enhancing performance

CHICK QUALITY

Where and how should we hatch our chicks?

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We look at options from around the world

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International Hatchery Practice (ISSN 0959 9363) is published eight times a year (January, March, April, May, July, September, October and December) by Positive Action Publications Ltd and distributed in the USA by Mail Right Int., 1637 Stelton Road, Piscataway, NJ 08854. Periodical Postage Paid at Piscataway, NJ and additional mailing offices. Postmaster: Send address changes to International Hatchery Practice, Positive Action Publications, c/o Mail Right Int., 1637 Stelton Road, Ste B4, Piscataway, NJ 08854.

fertilethoughts

Knowledge is power? No. Knowledge on its own is nothing, but the application of useful knowledge, now that is powerful.

Rob Liano

Knowledge is one of the cornerstones that your business is built on. Intelligence is not knowing everything, but knowing where to source good information and then validating its quality and how appropriate it is to your business.

Where can we source information in order to build our knowledge? Knowledge is accumulated throughout life but we occasionally top it up with new material. Most of our knowledge comes from our time at school and university. It is therefore essential that we choose the correct university and degree course to satisfy the needs of our intended future career.

But the acquisition of knowledge does not stop there – it is a lifetime's task. Today it is harder to identify sources and ascertain their quality, appropriateness and integrity. In the old days a lot of knowledge that came from universities and colleges had quality

and integrity but it sometimes lacked appropriateness. Nowadays, much knowledge comes from your industry contacts, but I will let you decide which of the attributes it has! All I will say is that industry has to sell its products!

Industrial knowledge improves its standing if several companies are singing from the same hymn sheet or if it comes from an independent source. The internet is a great source but one has the huge challenge of sorting the wheat from the chaff and confirming the quality and integrity of what you find.

Libraries and magazines can play an important role in the sourcing of information, as does your attendance at conferences. The advantage of the latter two is that they value their integrity and know that they can be challenged by you to substantiate it.

When acquiring information to build your knowledge it is beneficial to have an enquiring mind! ■

Lack of success can be attributed to one of two things: You don't know what to do, or you know what to do and you're not doing it.

Rob Liano

Cover Picture:

Producing quality chicks
(Photo courtesy of DSM)

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worldfocus

An executive summary of key international issues

Welfare

An issue clouded by subjectivity?

Defining welfare standards is often complicated by subjectivity, in that two people's interpretation of a specific situation or issue can vary. Often the consumer's view is clouded by idealism, whereas the industry's is tempered by realism. Which is right? Or is the best interpretation somewhere between the two? Are welfare standards something that we can compromise on? Should there be global standards or should standards take into account local practices, cultures and ethics? Can we apply the same standards in Sweden, the USA and Bangladesh? Who should have the ultimate say on what is right and what is wrong with a particular practice or process?

Resistance

Do we have double standards?

Look at the Thai poultry industry and you will see some superb farms supplying the export market, and in some cases the domestic market as well, that are operating to the highest international standards with tight controls on antibiotic use. Walk into a Thai pharmacy and you can buy any antibiotic, including ciprofloxacin, over the counter for personal use! Surely, we have a double standard at work here as the poultry industry is adhering to much tighter controls than those applied to man? This is even more worrying if you accept the fact that most cases of antimicrobial resistance in man arise from the use of antibiotics in man and very few from their use in agriculture. Stop putting the boot into agriculture!

Licensing

A double-edged sword?

Robust controls over the development of vaccines for veterinary use have resulted in good products coming to the market. However, is licensing today inhibiting the development of novel vaccines because the controls are too demanding, too expensive and take too long? As our industry is evolving faster and faster, surely the need for new vaccines is going to demand a shorter licensing time and a quicker coming to market for new vaccines? Is this need going to be at the price of some quality and safety issues? Licensing has been around for a long time and our birds and industry have both changed. Has the time come to see if the rules for vaccine licensing are still fit for purpose?

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A CENTURY OF PROGRESS

Improved egg quality for increased hatchability and enhanced performance

Decades of skillful breeding and selection have resulted in today's high performance breeders: hens that can produce almost 200 chicks per cycle.

Naturally, for this supreme level of performance, breeders need optimum nutrition, not only for maintaining an efficient metabolism, but also for the development of their eggs.

by Isaac Bittar, Regional Vitamins Manager, Latin America, and Jefferson Lecznieski, Technical Manager, Brazil.
dsm.com/animal-nutrition-health

The eggs they produce have to be fertile and offer a safe, secure environment for the next generation – embodied in a vital, fast-growing embryo with top hatchability, livability and massive growth potential.

Every component involved – starting with the shell, then the embryo, and ending with the growing chick – ultimately depends on the quality of the breeder feed and its ingredients.

Crucial shell strength

Shell problems in the breeding flock include cracks, breakage and unsuitable shapes. Shell faults are influenced by layer breeding, but also by the age of the hen. This is because a hen deposits approximately the same amount of calcium in every egg it lays over a cycle.

As a hen ages, its eggs become larger and this means the proportion of calcium per egg is less. The season of the year can affect

shell strength too. First of all, high ambient temperatures (over 25°C) can depress breeder appetite and result in calcium intake being less than optimal.

In addition, rapid breathing by birds in very warm weather causes a condition called respiratory alkalosis, where the blood becomes more alkaline, which leads to a series of metabolic reactions that reduces calcium supply for eggshell production and increases incidence of soft-shelled eggs.

Nutrition is crucial for shell strength and a major ingredient is calcium. For example, a chicken egg comprises up to 97% calcium carbonate.

Around 30-40% of the calcium in shells comes from the hen's medullary bone, formed at the end of growth and start of production.

Keeping this bone healthy throughout the entire reproductive phase is crucial and this relies on adequate intake of calcium, phosphorous and vitamin D3.

Calcium balance

Around 4g of calcium daily intake per layer is required for good shell quality. During shell formation, calcium is drawn from both feed and from the hen's body reserves, including the bones. To ensure skeletal integrity, it is therefore important to have enough calcium available in the hen's ration.

Each egg shell only contains around 20mg of phosphorous (egg content, on the other hand, has about six times this amount).

Any imbalance to the feed calcium: phosphorous ratio impairs absorption of calcium and or phosphorus, and of other important dietary minerals.



The carbonate source, as well as the type of limestone and grinding, is critical. At least 50% of total calcium carbonate source should be in particulate form of around 5mm.

Vitamin D3 is also vital for calcium absorption and mobilisation by the breeder layer, as well as for phosphorous utilisation. The vitamin D3 function is related to its metabolite 25 hydroxy D3 in plasma. Including this metabolite directly as dietary ingredient in feed provides a very effective way of optimising calcium and phosphorus absorption and utilisation, thus maintaining skeletal integrity of the breeder layer and increasing the number of settable eggs produced.

Improved hatchability

In a recent paper published by the University of Alberta in Canada (Saunders-Blades and Korver, 2014) 29-week breeders on a diet supplemented with 69µg/kg of Hy-D (a commercially available form of 25-OH-D3 – a metabolite and main circulating form of vitamin D3 – by DSM Nutritional Products) produced eggs with a higher percentage of shell (9.86 vs. 9.68%) when compared with breeders receiving conventional vitamin D3 as a dietary ingredient.

This increase in shell content substantially
Continued on page 9

Table 1. Egg composition by age of layers (Bertechini et al. 2005).

Age (weeks)	Egg composition (%)		
	Yolk	Albumin	Shell
30	24.0	65.0	10.0
60	29.5	61.0	9.5
74	30.1	60.8	9.1

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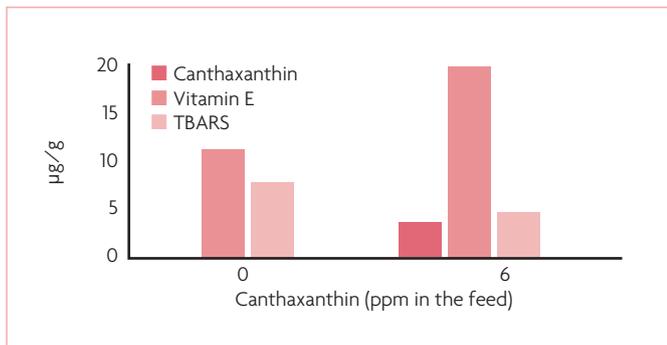


Fig. 1. Levels of canthaxanthin, vitamin E and TBARS in the liver of chicks from breeders fed with MaxiChick.

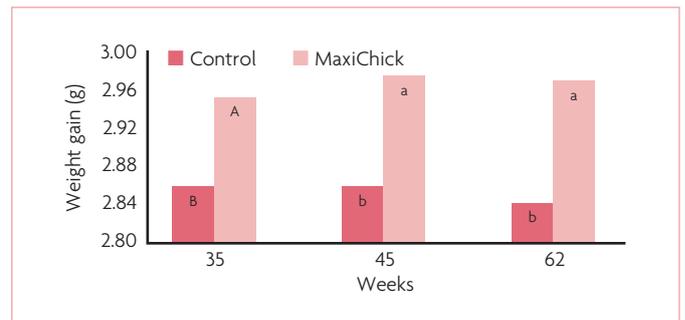


Fig. 2. Weight gain of the progeny of broiler breeders at 35, 45 or 63 weeks of age as affected by the ingestion of MaxiChick by their mothers compared with control hens (Adapted from Araujo and Araujo, 2013).

Continued from page 7

reduced early mortality of embryos (4.37 vs. 6.22%) due to the better protection given by a good shell.

A second advantage of 25-OH-D3 is that its metabolism helps the embryo incorporate egg shell calcium into its skeleton, increasing bone strength of the future chick and ensuring easier hatching. Thus shell quality has a direct effect on hatchability and chick viability.

It is also greatly affected by the age of the hens in the breeding flock.

Reducing embryo mortality

The yolk and albumen provide essential nutrients for the developing embryo. The albumen actually does much more than this, as it also protects the embryo from any bacteria that might get into the egg.

To be effective in this role, the albumen has a high pH content and contains very active antimicrobial proteins. However, these properties would also harm the embryo should it come in direct contact with the albumen.

To prevent this, the embryo is protected by the vitelline sac, formed after the first 72 hours of incubation and comprising a protein membrane strengthened by disulphur bonds. Keeping this protective membrane intact throughout embryo development in the egg is crucial to its survival.

The membrane must not become too rigid and therefore fragile. This can occur when the disulphur bonds oxidise. Boosting presence of antioxidants within the egg supports maintenance of a strong, supple

vitelline membrane, and so helps ensure embryo survival.

Carotenoids are powerful antioxidants normally available in layer diets and present in the egg yolk, giving this a typical shade of yellow to red.

In a recent paper published by Hamelin et al. (2015), it is shown that eggs from hens given feed supplemented with 6ppm of a nature identical form of the carotenoid canthaxanthin (CXN) have stronger vitelline membranes.

This could help to explain the lower embryo mortality found in eggs where layers are fed diets supplemented with CXN (see Table 2).

Rosa et al. (2012) found eggs from hens on a diet with 6ppm CXN supplementation also had lower embryo mortality during the first two days of incubation. The eggs had a higher antioxidant capacity due to the antioxidant activity of the carotenoid canthaxanthin.

Further work by Surai (2012) showed the high deposition rate of CXN, supporting its antioxidant role in eggs where, together with vitamin E, it is the only antioxidant present in the yolk.

Two advantages combined

When the feed supplements canthaxanthin (Carophyll) and Hy-D are brought together in a single product (MaxiChick by DSM) the advantages for optimising breeder production increase, according to investigations in the USA by Araujo in 2012.

These showed that adding MaxiChick to the layer diet increased chicks per hen

performance through improving fertility and hatchability and giving more settable eggs.

Better progeny performance

The advantages of the above-mentioned supplementation do not stop at more chicks per hen, however. We now know that layer nutrition optimised in this way also boosts subsequent performance of progeny.

Vitamin E is the most important nutrient to improve immunity and health status in the bird, besides its role in development and growth. So the higher the vitamin E content, the better. In this way, the use of canthaxanthin in the breeder diet helps to improve the liver vitamin E content two fold (Fig. 1). For instance, in an experiment carried out at the University of Sao Paulo it was shown that the progeny of breeders fed MaxiChick grow faster, return better feed conversion efficiency and produce a higher yield of breast meat (Fig. 2).

Thus, the comprehensive gains available from this supplement start with enhanced egg quality, in terms of optimum shell strength and nutrient content, and goes on to include healthy and vital embryo development with better hatchability.

The benefits then conclude with improved progeny health and performance, resulting in a combined advantage for improved bird health, welfare and more profitable production.

Conclusion

It is possible to improve the number of chicks produced by improving hatchability, while at the same time improving the quality of those chicks.

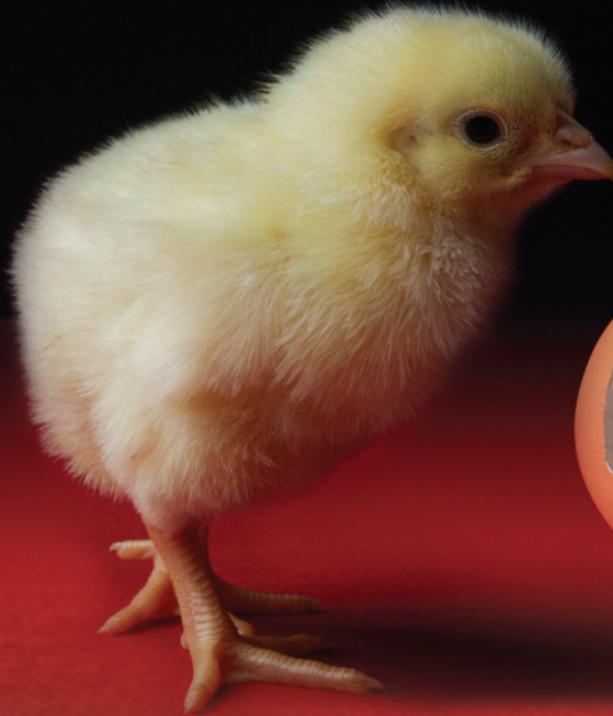
Ensuring the best quality eggs are produced via ensuring optimised dietary nutrition is included in feed allows for an increased number of day old chicks and therefore helps deliver more profitability for the chick producer, the broiler and ultimately the meat company, resulting in a benefit for all parties. ■

Table 2. Enhanced embryo performance where layer feed is supplemented with 6ppm canthaxanthin (CXN) (Adapted from Rosa 2012).

Variable	Control	Canthaxanthin	Prob.
Hatchability total (%)	83.03	86.22	0.001
Total embryonic mortality (%)	5.46	3.72	0.0029
Embryonic mortality first 48 hours (%)	1.80	1.04	0.0083
Embryonic mortality 3-7 days of incubation (%)	0.89	0.66	0.2225



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Superior chick quality: where and how should we hatch our chicks?

Incubating day-old chicks is a wonderful process, but how do you optimise the incubation process to guarantee superior chick quality?

by **Dr Inge van Rooyt-Reijrink and Carla van der Pol,**
HatchTech BV, The Netherlands.
hatchtechgroup.com

Chick quality is expressed in many ways, most important of which are the number of second grades, hatchling yolk-free body mass, chick length, navel quality, and first week growth and mortality.

During the incubation process, eggshell temperature, carbon dioxide concentration, and post hatch environment are the most important drivers of embryo development and, therefore, chick quality and subsequent performance.

Eggshell temperatures

Several studies aimed to determine the optimal eggshell temperature (EST). Lourens et al. (2005) showed that an EST lower than 37.8°C (100°F) during the first week of incubation or higher than 37.8°C during the third week of incubation resulted in a higher percentage of second grade chicks (up to 5% more) and shorter chick length (up to 5mm smaller). Molenaar et al. (2011) showed that

an EST of 38.9°C from day seven of incubation onwards increased the incidence of ascites in later life in comparison to an EST of 37.8°C.

EST in the hatcher phase also has a large impact on chick quality. Maatjens et al. (2014) applied three ESTs from day 19 of incubation onward and found higher relative heart weights at hatch for 36.7 and 37.8°C than for 38.9°C (0.69% and 0.66% vs. 0.58%, respectively).

These results suggest that it may be even better to incubate at a temperature slightly below 37.8°C than above it; yolk-free body mass of the 36.7°C incubated chicks was 0.65g higher at hatch than that of 38.9°C incubated chicks.

All these studies show the relevance of an optimal EST during incubation to obtain superior chick quality.

Incubator design

EST is influenced by embryonic heat production and heat transfer capacity of the air, which depends on air temperature, air velocity, and relative humidity. All of these are greatly dependent on incubator design.

The machine needs to have enough heating (prior to about day nine of incubation) and cooling (after day nine, when embryonic heat production increases) capacity to maintain the right temperature.

Air velocity should be uniform,



like in HatchTech's incubators with the laminar concept, to reduce variation in heat transfer capacity and, thereby, ESTs.

Relative humidity affects the air's heat transfer capacity because humid air transfers heat better than dry air. To maintain optimal ESTs throughout incubation, it would be ideal to maintain a high relative humidity during the whole incubation process.

However, this is impossible because an egg needs to lose at least 10%, but preferably around 12%, of its weight at day 18 of incubation to maximise hatchability.

Therefore, a balance must be found between heat transfer capacity created by relative humidity (to maintain uniform ESTs) and egg weight loss control.

When the design of an incubator and all its settings are correct, EST should always be close to 37.8°C or below 37.8°C after day 19 of incubation to obtain superior chick quality.

Hatcher and hatch window

Around day 18 of incubation eggs are transferred from the setter to the hatcher, so that the chicks can hatch in the hatcher baskets. It is well known that chicks do not hatch at the same time.

The time period in between the first and last hatched chick is called

the hatch window and can vary between 24 and 36 hours.

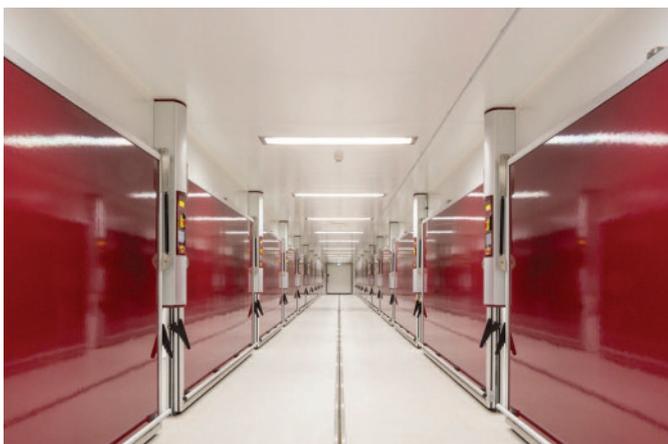
Every factor that increases the variation in embryo development before or during incubation also affects the length of the hatch window. Two factors that have a large influence on the hatch window in commercial incubation are the mix of egg batches that is made by the hatchery personnel (mix of storage durations or breeder flock ages etc), and incubator design, incubator operation, and incubation profiles or in other words: how uniform the air temperature is inside the incubator.

Nowadays, incubators become larger to reduce the cost price per egg. When incubators increase in size, the chance that batches of eggs of different breeder flock ages or storage durations are mixed increases. In addition, the design of the incubator becomes more crucial to provide uniform incubation conditions to all eggs. Due to the mix of egg batches and non-uniform incubation conditions the length of the hatch window in larger incubators can increase. An important question is: why should we be concerned about the hatch window?

In practice this question can be answered in two ways.

● A hatchery has planning for chick handling and transport. It is important to ensure that all chicks are

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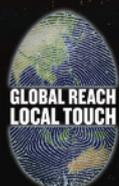
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Continued from page 11
hatched and dry when they are taken from the hatcher. A predictable and short hatch window makes it easier to take the chicks from the hatcher at the right time to have maximal hatchability.

- For the chicks, a large hatch window is detrimental because it can take up to 72 hours before chicks are placed at the farm and finally have access to feed and water. Research has shown that no access to feed and water between hatch and placement at the farm negatively affects subsequent performance.

To ensure that chicks are hatched in time to meet the hatchery planning, actions can be taken in the hatcher to shorten the hatch window. Used methods are:

- Transfer patterns in which eggs are moved from the relative cold spots in the setter to the relative warmer spots in the hatcher or vice versa.
- Increase hatcher air temperature.
- Increase hatcher CO₂ level.

Chick quality is negatively affected by these actions and the moment of first intake of feed and water is still postponed until the chicks are placed at the farm. Therefore, these actions are not beneficial for the chicks, but only for the hatchery personnel in the short term.

The reality is that there will always be a hatch window. A hatch window is part of nature. The best way to deal with a hatch window is to ensure that the rectal temperature of the hatched and dry chicks is between 40.0 and 40.6°C and to provide them with feed and water.

The benefit of feed and water in the hatcher

During the last few days of incubation, the residual yolk is retracted into the body cavity as an extension of the intestine. Post hatch, the residual yolk is the only nutrient source of the chick until exogenous feed is available.

Chicks can use the residual yolk for maintenance during the first few days post hatch. However, research has shown that development and



maturation of the gastrointestinal tract, and important immune related organs is delayed in chicks that have to rely solely on their residual yolk and have no feed and water available between hatch and placement at the farm.

A study of Noy et al. (1996) showed that the residual yolk of chicks with access to feed during 96 hours after hatch reduced more rapidly in size than in fasted birds. This can be caused by increased intestinal activity in fed chicks.

A more rapid reduction in residual yolk size indicates that valuable nutrients are earlier used for important developmental steps.

Geyra et al. (2001) showed that fasting post hatch retarded body weight increase and intestinal growth. The effects of fasting were specific to both time of fasting and the intestinal segment examined (duodenum, jejunum or ileum).

The jejunum appeared to be the most sensitive of the intestinal segments. Fasting between 0 and 48 hours post hatch decreased crypt size, the number of crypts per villus, crypt proliferation, villus area, and the rate of enterocyte (intestinal absorptive cells) migration in the duodenum and jejunum.

Geyra et al. (2001) concluded that early access to feed is important for optimal early intestinal development.

Maiorka et al. (2003) also showed that the development of the gastrointestinal tract was directly linked to feed and water intake.

They showed that relative weight and length of the jejunum and ileum increased when chicks were supplied with feed and water post hatch. In addition, intestinal mucosa development was affected by the

availability of feed and water: the number of villi per area decreased because villi size increased.

According to these findings Maiorka et al. (2003) hypothesised that the absence of physical stimuli caused by feed in the intestinal lumen and the specific need for certain nutrients, such as water, may be responsible for negative changes in the morphology of the intestinal mucosa.

Protein in the residual yolk is the source of antibodies from the hen. To be effective, it is important that maternal antibodies move from the residual yolk into the bloodstream but also to sites of vulnerability such as the mucosal surfaces where bacteria and viruses can enter the body.

Dibner et al. (1998) evaluated the effect of early feeding on the development of the immune system in broiler chickens. They showed that providing nutrients immediately post hatch resulted in heavier bursa weight, earlier appearance of biliary IgA and germinal centres (secondary lymphoid organs), and an improved resistance to a disease challenge.

In broiler chickens the first week of life is not only important for further development of the gastrointestinal tract and important immune related organs but is also an important period for muscle production.

Halevy et al. (2000) showed that the length and timing of fasting post hatch affects satellite cell activity.

Short-term fasting can enhance satellite cell number. However, long term fasting almost completely arrests cell mitosis and decreases the number of satellite cells. In the study of Halevy et al., (2000) the chicks that fasted during the first

days of life did not regain their body weight or breast muscle weight by day 41, however chicks that fasted between day four and six post hatch had full growth compensation by day 41.

Halevy et al. (2000) concluded that sufficient feed directly post hatch may be critical for later muscle development. A study of Noy and Sklan (1999) also showed that early feeding increased body weight and breast size at marketing age in chickens and poults. They showed that early feeding reduced mortality numerically.

Early feeding seems to have a positive effect on chick performance because development and maturation of important organs is not retarded post hatch, but continues.

HatchCare

To improve the environment and well being of the chicks post hatch, HatchTech developed a new hatcher, HatchCare. In HatchCare, chicks are provided with their first necessities of life; feed, water, light, and fresh air at the correct temperature. This will continue development and maturation of important organs post hatch.

In addition, HatchCare is developed to take away a few large stress moments that are present in the traditional hatching and handling situation. Chicks are used to light, the stress of seeing the first light when the hatcher is opened is taken away.

Chicks do not sit between the eggshells and have room to move around and find the feed and water. Fans produce less noise because, due to the design of HatchCare, high air velocity is not necessary to obtain uniform embryo temperatures.

Chicks will be transported in the HatchCare basket which will take away a lot of handling stress and opens up the opportunity to provide feed from hatch until placement at the farm.

Where and how should we hatch our chicks?

Realising maximum chick quality is largely dependent on incubator design. An incubator should provide the right circumstances for optimal, uniform ESTs, allow for embryonic respiration, and continue post hatch development by providing the chicks with correct body temperatures and feed and water access. When all of these are guaranteed, superior chick will arrive at the broiler farms every day. ■

References are available from the authors on request



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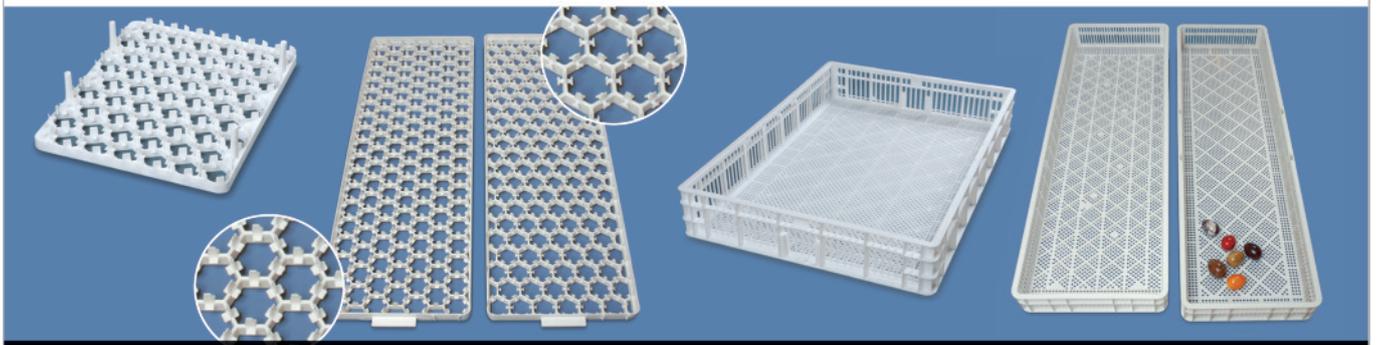


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Effect of breeders and incubation on broiler performance

The breeder industry is well aware that management and nutrition of parent stock play a key role in achieving the maximum number of strong chicks with good vitality.

by Mohamad Kallas,
Cobb, Lebanon.
cobb-vantress.com

Important aspects of parent stock management can influence chick quality, such as:

- Uniformity of female frame and egg weight.
- Female condition (fleshing and fat reserves) at moment of light stimulation (MOL).
- Vaccination program to cover local disease challenges.
- Quality of the hatching eggs sent to the hatchery.

In the first eight weeks frame uniformity is achieved and from 16 weeks fleshing and fat uniformity is important for good sexual uniformity of the hens. The hens should be as close as possible in size and development throughout rearing.

In Fig. 1, an average uniformity is observed for the Cobb500 FF breeder tracking the average egg packer and uniformity over an egg packer so that all the hatching eggs of a flock are being traced.

As can be seen, the average uniformity is just below 90% and on average 88% with $\pm 10\%$ spread.

This means that chicks hatched from these eggs should have uniformity above 80% at hatch, which is a good number for starting chicks on a broiler farm.

At 25 weeks of age the hatching

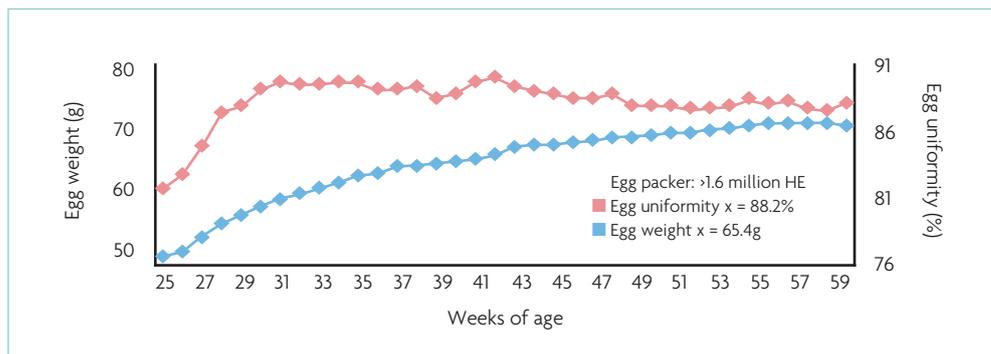


Fig. 1. Egg weight and uniformity for the Cobb 500 FF.

eggs over 50g already reach uniformity above 80% and then climb fast to 89% to stabilise.

Female condition at light stimulation

In large integrations it is seen that there is a positive correlation between total feed amount consumed or bodyweight condition of the parent females at the end of rearing (147 days of age) and broiler livability at seven days of age from young breeders.

Parent flocks with not enough nutrient intake or the wrong body condition show the highest first week mortality in broiler chicks in the first six weeks of the young parent stock with a negative impact on final broiler results.

Table 1 is an example of how feed intake (female nutrient intake) can show its effect on mortality in the first seven days of age not to mention the impact on uniformity and final results (body weight and feed

conversion). Breeder companies improve broiler feed conversion in the broilers by enhancing growth rate, selecting for larger portions of breast muscle and reducing total body fat. This body fat is a key component at first light stimulation to obtain:

- Good sexual synchronisation of the females.
- High peak production and persistency.
- High early hatchability, and good chick quality and vitality.
- Reduced mortality in females going to peak production.
- Low percentage of floor eggs.

Cobb conducted trials in conjunction with Lagerwey Hatchery in the Netherlands and Hatchtech, using 2 x 4800 egg capacity setters and 1 x commercial setters (57,600 eggs) to determine the effects of temperature in incubators. Cobb then followed these chicks from different temperature profiles to two broiler trial facilities.

Cobb 500 eggs were used in three separate trials with eggshell temperatures being maintained at 100.0°F for the first seven days of incubation in all trial groups and until transfer for the commercial setter. One of the small setters was reduced from 100.0°F at day seven to 98.5°F by day 10 and the other small setter was increased in temperature from 100.0°F at day 7 to 101.5°F/102.0°F by day 10 until transfer at 18 days of incubation, as seen in Fig. 1. Probes were attached to designated eggs in positions in the trolley for each setter to record

eggshell temperatures every nine minutes during the first 18 days of incubation.

Results

● Hatchability

The low temperature (98.5°F) eggs were adversely affected with over 10% lower hatchability and over 1.0% higher cull rates.

● Hatch window

Hatching time is influenced by temperature. Measuring eggshell temperatures and hatch windows can help to avoid chicks hatching too early and reduce risk of dehydration.

● Chick length

A direct correlation of chick length to hatching times could be seen. Chick length (cm) was greater on the early hatching chicks, which we assume, is related to growth from the absorption of the nutrients from the yolk.

● Organs

Samples from each trial group were saved and a post mortem conducted to analyse the differences in organs. The organs were weighed and calculated as a percentage of the chick weight. The heart showed no difference for the low and normal temperature groups, but the high temperature group showed adverse growth. Residual yolk weights showed higher levels for

Continued on page 16

Table 1. Impact of feed intake on mortality.

Period 26-32 weeks of age	Total farms	Farms with	Parent stock accumulated
At light stimulation	Average mortality 0-7 days	Highest mortality 0-7 days	Feed intake 0-25 weeks
Under conditioned females	1.30%	2.33%	$\pm 12.7\text{kg}$
In condition females	0.75%	1.15%	$\pm 13.6\text{kg}$

Temperature (°F)	Day 7	Day 14	Day 21	Day 29	Day 36
98.5	186	510	1005	1610	2136
100	194	532	1034	1681	2177
102	193	521	1014	1587	2119

Table 2. As hatched – Trial Farm 2.

Continued from page 15 the low temperature groups due to the chicks hatching later and reduced absorption levels. The high temperature group showed negative yolk absorption to the normal group, even with the chicks hatching earlier.

Growth of the liver is linked to nutrient absorption but best optimum growth of the liver can be seen from the normal temperature group of 100.0°F.

● Chick yield percent

Chick yield percent is a measurement of chick weight divided by initial egg weight. In our trials and experience in the field we have seen a direct correlation with chick yield to seven day mortality and seven day weights.

Historically, with multi-stage incubators the old rule of thumb was chick weight equalled two-thirds of egg weight with a weight loss at 18 days of incubation of 12-14%.

Today with many single-stage machines it is not uncommon to see a weight loss at transfer of only 9-10% of initial egg weight due to the damper being closed for up to nine days of age.

The closed damper aids the uniformity of temperature in the setter and development of the chorion-allantoic membranes with the increase in CO₂, but the higher

humidity levels result in lower weight loss. Do we compensate for this in the hatchery?

More often than not we do not, hence why higher chick yield percentages are seen.

If this is the case then the preference is to start opening up the damper in the setter at say day five or six rather than nine to achieve weight loss levels of at least 11.0% in the first 18 days of incubation. This period for oxygen supply is essential when certain organ development is critical ie. heart, lungs.

Broiler results

The chicks from these trials were placed on two trial farms. One was a small pen facility with many replications to better measure differences in performance (238 pens x 10-15 birds/pen) and the other with large pens to mimic real world commercial conditions (12 pens x 950 birds at 20 birds/m²).

● Bodyweights

In all trials, the normal temperature groups (100.0°F) gave the best weekly bodyweights. The low temperature groups gave the lowest bodyweights in the first 21 days of the cycle, whereas in general the high temperature groups had the poorest weight gain post 21 days.

Temperature (°F)	Day 7	Day 14	Day 21	Day 34	Day 38	Day 34-38
98.5	173	485	1005	2395	2807	412
100	181	504	1029	2432	2843	411
102	179	488	1009	2347	2737	390

Table 3. Males – Trial Farm 1.

● Mortality

Once again the normal temperature gave the best results whilst the low temperature gave the highest mortality in the early stages. The high temperature gave the highest mortality in the latter stages of the broiler cycle.

● Feed conversion ratio

An incubation temperature of 100.0°F gave the lowest feed conversion ratio at 37 days of age, with the difference being one point adverse for low incubation temperatures of 98.5°F and four points adverse for high incubation temperatures of 102.0°F.

Summary

● Maintain eggshell temperatures between 100.0°F minimum and 101.0°F maximum at transfer stage (18-19 days of incubation).

● Low eggshell temperatures affect hatchability and cull rates the greatest.

● Eggshell temperature influences hatching time and potentially chick weights by yolk absorption.

● 100.0°F eggshell temperature gave optimum development of the organs and broiler bodyweights, FCR and mortality levels.

● Low eggshell temperatures (98.5°F) gave lowest broiler bodyweights for first 21 days and highest seven day mortality levels.

● High eggshell temperatures (102.0°F) gave lower bodyweight gains and higher broiler mortality levels post 21 days of age, more heart attack losses due to reduced development of the heart and higher FCR for males at 2.1kg and 2.8kg.

● Chick yield can be used as a good indicator of correct incubation environment to attain optimum chick quality. ■

Table 4. Mortality.

Temperature (°F)	Day 7	Day 14	Day 21	Day 29	Day 36	Days 21-36
98.5	1.84	2.72	3.39	4.70	6.60	3.21
100	0.56	1.14	1.42	2.33	3.72	2.30
102	0.81	1.28	1.75	3.54	6.18	4.43

Forthcoming conferences from



Avian influenza 2016

Date: 14th November 2016
Venue: Hannover (Day before EuroTier)

This conference precedes the European high risk period for HPAI. It will feature several leading global authorities on HPAI. After considering recent experiences in Southeast Asia, North America, France and the UK this conference will look at what can be done to protect European flocks from HPAI in the 2016-17 'flu season'.

Immunosuppression 2017

Date: 14th March 2017
Venue: Bangkok (Day before VIV Asia)

Diseases in modern poultry production are becoming more complex and a key factor in the aetiology of many is immunosuppression. This conference will consider the various facets and causes of immunosuppression in poultry production before looking at what can be done to counter it in an Asian context.

Incubation 2017

Date: 14th March 2017
Venue: Bangkok (Day before VIV Asia)

This established Asian conference will take hatchery biosecurity as its theme. The hatchery is the central hub of poultry integrations and, if something goes wrong, the consequences can be serious. Weak spots in a hatchery's biosecurity will be highlighted and ways to further improve your hatchery's biosecurity will be considered.

Further details and full programmes to be published shortly

The relationship between yolk-free body mass and subsequent performance

The goal of every hatchery is to produce poults of excellent quality. Poults quality is reflected in low mortality after placement and ideal production performance. Several studies have shown a positive relation between yolk-free body mass and subsequent performance of the bird after placement.

by Dr Juan Lopez,
Hatchery Specialist, Hybrid Turkeys.
hybridturkeys.com

A small yolk sac at pulling time is preferred as this indicates ideal environmental conditions in the incubators and hatchers. It also reflects the ability of the embryo to utilise the yolk components to form muscle and bone. The procedure to measure the yolk-free body mass is as follows:

- Select at least 15 saleable poults per flock.
- Euthanise poults humanely (based on approved regional and corporate methods).
- Weigh the euthanised poults individually and record their weights.
- Carefully remove the entire yolk sac from the body cavity using standard necropsy technique:
 - Place the body of the euthanised poult on its back with its feet facing you.
 - Reflect the wings back.
 - Cut through the skin, between the legs and the breast, so the legs can be fully abducted and lie flat against the table.
 - Remove the skin from the ventral surface of the poult by cutting across at the caudal edge of the keel, and then pulling skin cranially and caudally. You will see the muscular body wall (1).



Acceptable yolk sac: the poult in this example was incubated at a low temperature with shell temperature readings below 100°F (37.8°C). After hatch, the rectal temperature of the poults measured inside the hatcher, was 103°F (38.4°C). The yolk sac to body weight ratio was 8%.

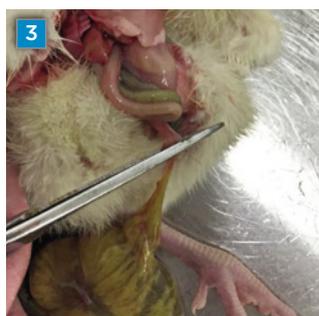


Unacceptable yolk sac: the poult in this example came from eggs, that after the second week of incubation, were exposed to temperatures over 101°F (38.3°C). The internal temperature of the poults at time of pull was 106°F (41.1°C). The yolk sac to body weight ratio was 25%.

- Cut into the body cavity, using scissors behind the breast bone, then pull the abdominal muscle caudally to expose some abdominal viscera (2).
- Remove the yolk sac by incising the yolk stalk. The yolk stalk is a narrow tube-like tissue that attaches the yolk sac membrane to the jejunum-ileum junction (3).
- Weigh each yolk sac individually (4).
- Calculate the yolk sac to body weight ratio by taking the weight of the yolk sac and dividing it by the weight of the poult.
- Multiply the total by 100 in order to determine the ratio as a percentage:
 - An acceptable yolk sac to body weight percentage is 11% or less. ■

Key notes

- Monitor egg shell temperature frequently. GOAL: Egg shell temperature below 100°F (37.8°C).
- Monitor hatch window 36 hours before pull time. GOAL: Maximum 1-2% of poults hatched at this time.
- Monitor internal temperature of the poults after hatch. GOAL: Internal temperature of 103-104°F (39.4-40.0°C).
- Monitor poult activity once placed at the farm. GOAL: Poults are alert and active, and seek out food and water.



Options for

User-friendly design for easy management

Chore-Time breeder nest systems have a user-friendly design for easy management, increased hatching eggs and easier shipping and assembly.

choretime.com

Chore-Time's side-belt nests feature an automated lid-operation system which permits nest lids to be opened or closed automatically using a whole house control or through manual operation using a winch.

Producers will appreciate how the system's hinged nest tops facilitate training hens to use the nests, while its hinged egg belt covers make it possible to collect eggs during power outages.



Wide 305mm (12 inch) holes are offered to accommodate today's larger hens more comfortably. Also available are 241mm (9.5 inch) width nest holes along with a variety of nest pad options.

The nests fit on existing 3.7m (12ft) or wider slats. Nest sections can be installed in single, double or triple combinations along with six different passageway lengths to optimise the producer's desired hens-per-hole ratio.

The nest body features common panels and fewer fasteners and hardware components for less on-site sorting and faster, easier assembly.

Chore-Time's centre-belt nests build on the success of their proven side-belt model with many features in common.

Chore-Time offers its Clean Sweep collector table in models for side- or centre-belt systems. The table's construction provides an adjustable working deck height and optional add-on shelves and decks.

Chore-Time collector tables feature a DC gear motor and electronic control which deliver a variable belt speed and quiet, vibration-free operation. A self-adjusting belt tensioning system maintains consistent belt travel. Belt direction (forward and reverse) can be changed easily for egg belt service.

The tables are designed for easy cleaning with large, easy-to-remove litter pans at the drive rollers and a one-piece plastic tabletop deck that is easily removed. Suspension points and hardware are included for table winching.



Laying nests offer excellent technical results

For the poultry industry, Van Gent laying nests and slats (hardwood and plastic) are known for their high quality and durability.

vangentnl.com

The products are fully designed in order to balance efficiency of use with promoting the natural behaviour of the birds. This approach is visibly rewarded in the excellent production results achieved.

The structure of the laying nests is simple. They are stable as well as easy to clean and, because of the design, they have an easy and modular assembly system.

Features of the Van Gent Standard nest include:

- Film faced plywood ensures easy cleaning and guarantees a long lifespan. The nest is characterised as user friendly and easy and quick to assemble.
- The expulsion system removes the hens from the nests and closes them off at the end of the day. This

prevents broody hens and soiled nests, and the benefit is clean eggs. With the unique two part expulsion fence, the entire nest surface can be used, which results in a familiar and comfortable place to lay eggs.

- Open Astro-Turf mat ensures that the nests stay free of dust and droppings.
- Two separate egg belts of 25cm makes the roll distance as short as possible and limits cracked shells to a minimum. The nests are available with woven or perforated egg belts.
- The roof of the laying nest is partly hinged for nest inspection. Another portion of the roof can be lifted off for inspection of the egg belt.

- The egg belt cover prevents air draughts in the laying nest as well as dust soiling the belt and eggs.

Van Gent automatic roll away laying nests are a successful concept from a company with over 45 years of practical experience.

The nests are available in different configurations.

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The perfect solution for broiler breeders

Relax, Big Dutchman's group laying nest, has been developed especially for broiler breeders. It has a high hygienic standard and a short roll-off distance of the eggs from the nest to the longitudinal egg belt. Another feature is the automatic and reliable nest-closing system for the night, which keeps the hens from sleeping and brooding inside the nest and therefore from soiling it.

bigdutchman.de

The divided roof with anti-roost rocker permits optimal monitoring of the nest and the egg belt. The special nest insert made of plastic has a comfortable surface and is well-accepted by the hens.

With its Relax nest Big Dutchman provides optimum conditions for a high share of hatchable eggs and thus successful broiler breeder production.

Additional advantages include:

- Use of high quality materials and

a perforated nest insert made of plastic for high nest acceptance.

- Excellent egg quality. Low percentage of cracked and hair-cracked eggs.

● Clever, wood-free nest design for optimal hygiene and cleaning.

- Nest depth of 47cm. Eggs have a short rolling off distance and are transported gently.

● Divided and very light nest roof for optimal monitoring of nest and egg belt.

- Easy to clean with minimal labour requirements.

● Egg channel is available in two widths: 400 or 500mm or with divided egg belt (2 x 200mm).

- Simple nest-closing system offers high functional reliability and low maintenance requirements.

● Simple plug-in design for quick and easy assembly.

- Solid nest legs made of plastic so no danger of corrosion.

● Manure pit with plastic slats for healthy feet, good manure penetration and thorough cleaning.

Automatic nest systems provide a more hygienic environment

Tavsan automatic nest systems in breeder houses provide a more hygienic environment and ensure that efficiency is increased and maintenance costs are decreased.

tavsan.com.tr

There is no suffocation due to high temperatures or crowded nests. They have plastic dividing walls and all the nests are made of first class plywood. It is easy to clean the nest as it is made of strong materials.

Accordingly, birds nest comfortably in a relaxed atmosphere.

Thanks to the specific design the breeders can not reach the eggs after they are laid, thus damage to the eggs is avoided. Due to the mat that is used for the nest, the eggs are transported in a safe and reliable way.

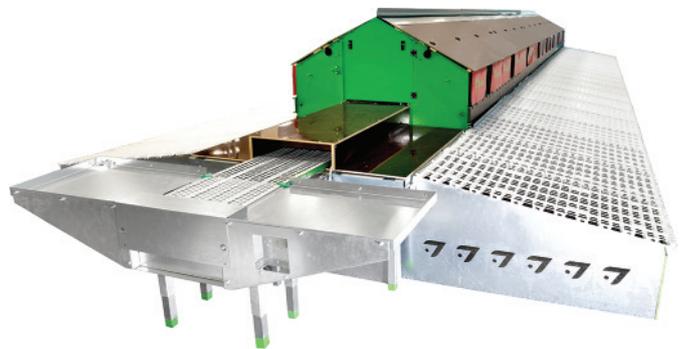
It is important that the slatted area has the following feature in order to improve the performance

of the breeders: the quality of the plastic should be first class. Birds have maximum grip due to its construction. It gives ultimate support while mating and prevents leg troubles.

Advantages of the Tavsan automatic nest system include the following features:

- Up to 50% labour saving.
- Improved hygiene.
- Cracked egg numbers are kept to a minimum.
- Specially selected shape and colour for less floor eggs.
- High litter quality.
- Eggs can be collected any time during the day.
- The expel system prevents the birds sleeping in the nest during the night. This offers more clean eggs.
- The nest top is hinged so that the user can open and check inside the nest at any time.

Innovation, experience and product diversity makes Tavsan an ideal supplier.





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Options for

Premium nest for maximum egg production

The Premium+ laying nest from Jansen Poultry Equipment is designed for premium results. The high amount of quality hatching eggs enables excellent production results.

The hatchability rate is high thanks to the preserved quality of the egg shell. The amount of floor eggs is also reduced to a minimum because of the high nest acceptance among birds.

jpe.org

The Premium+ laying nest is well accepted among birds by offering them a comfortable and shielded place to lay eggs.

The nest environment remains in perfect condition, even with a high bird density and high temperatures. Single-walled partitions make the nest unattractive for lice and mites.

The quality of the egg shell determines the hatchability rate. Eggs must stay clean and without cracks



after being laid in order to avoid bacteria entering the egg.

Nest mats in the Premium+ laying nest have an open structure and rounded design which enables eggs to stay clean. The takeover of nest mat to egg belt runs very gently which keeps the egg shell intact.

On the egg belt, the eggs are transported safely to one side of the house.

Benefits of the system include:

- Maximum number of hatching eggs.
- Less floor eggs.
- Optimal hygiene.
- Maintenance and user friendly.

In order to optimise the performance of your breeders, it is essential that first class material is being used in the slatted area. The Jansen Premium slats are designed in such a way that the birds have optimum grip. This is not only important to avoid leg problems but also gives optimum support during mating. After all, fertility is what counts.

Jansen Poultry Equipment systems are known for their good quality. Not only the quality of the system itself but also the acceptance of the system by the birds.

Mr and Mrs De Klein, breeder farmers in Holland, can confirm this. "Our production is great. The nests from 1995 are still in perfect condition and the slats have a good manure passage. We have just a very low amount of floor eggs and the nests are well accepted by the hens. Last year we performed extraordinarily well. The quality of the hatching eggs is very good and we have a very high hatching rate."



Profitable results through improved well-being in the nests

Innovations to improve the well-being of breeder hens and get the most profitable results for a farmer are the most talked about subjects today. Volito have designed and successfully brought to the market Valego RDE – the nest with an innovative expulsion system.

volito.com

The unique feature of the nest is its expulsion fence which is designed with a focus on:

- A strong rack driven expulsion fence.
- The fence following the slope of the nest floor.
- Ensuring that there are no dead birds left in the nest, keeping it hygienically clean throughout the breeding cycle.
- Remaining eggs within the nest box easily roll down between the expulsion fence rods on the egg belt.

The cleaner the nest the more comfortable it feels and the more attractive it becomes to the hens to lay eggs – reducing the number of floor eggs to an acceptable minimum and bringing profit to the farmer. Additionally, the convenience of the nest is defined by its materials and features:

- Fair space accommodates a suitable number of birds – 2.35m² (49cm deep).
- Nests pads are made of AstroTurf to simulate the natural feeling of grass.
- Promoting hygiene in the nest by using openings in the pads where the possible dirt falls through.
- Plywood nest walls and ceilings reduce the noise through the house.
- Plywood nest entrances care for the injury-free legs and breasts.
- Nests bottoms and egg belt covers prevent the nest from draughty conditions creating a comfortable nest in any climate.
- Robust nest platforms are made of galvanised steel with stainless steel posts ensuring the stability of the nests no matter the length of the nest row.
- Click and fix assembly system saves on transport costs and allows for easy installation and maintenance.
- Manufactured using durable materials of high quality.

The available nest product lines of Volito: Valego RDE and Valego TDE, suit different house requirements and dimensions. To complete the furnishing of the breeder friendly house, Volito offer its wooden slats and polypropylene plastic slats.



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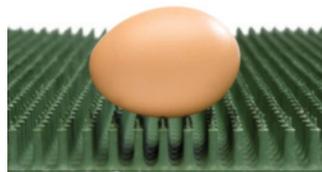
A commercially produced egg travels a long journey from the very first moment it is laid until it reaches its final destination. On this journey it faces numerous impacts and possible contamination sources. Vencomatic Group focuses on perfecting every detail of this journey starting with the laying nest.

vencomaticgroup.com

A comfortable and clean nest that fits the natural behaviour of a hen is essential. Vencomatic's Grando Nest is based on this principle and uses their innovations like the Vencomat, tipping floor and egg belt ensuring a clean nest and outstanding egg quality. The Vencoslat in front of the nest, has an open structure for better hygiene. The tipping floor mechanism pushes out

the birds to prevent broodiness and soiling of the nest. It also makes dust and dirt fall down leaving a clean nesting area.

The floor angle, in combination with the Vencomat, ensures a smooth roll of the eggs onto the egg belt. This automatically transports the eggs to a central collection area where a Prinzen packer can continue the journey. These components protect the eggs so that breeder managers can be sure that the valuable hatching eggs preserve their perfect condition after lay.



Superior design to boost the performance of your birds

The VDL EggXcellent nest is specially designed to achieve a high level of comfort for your birds. Together with an ideal breeder house design the nest will give the best conditions to boost the performance of your birds.

vdlagrotech.com

An automatic expel system with time clock opens the nests only during the laying period. The rest of the day the nests will be closed and birds will have no access. This will keep the nests and eggs clean.

Laid eggs will directly roll away on the central egg belt; they are unreachable for the birds and clean



quality eggs are therefore guaranteed.

Choosing VDL's EggXcellent system gives you the highest quantity of eggs. The design ensures the lowest percentage of floor eggs. The nest allows easy and fast egg collection without the risk of damaging eggs. The egg belt is equipped with a variable speed drive unit to optimise egg collection performance or the transport to a central packer. Automatic egg counters are also available to monitor daily bird performance.

Easy inspection and cleaning and a very low percentage of floor eggs are important issues in modern farming. Manual collection of floor eggs will belong more and more to the past, saving up to 50% on labour. Less floor eggs, less cleaning of eggs and less labour requirements are guaranteed. This means there is more time left for monitoring your birds.

VDL Agrotech specialise in turnkey breeder projects. With the EggXcellent system, egg quantity and quality are guaranteed.

A natural environment where birds feel comfortable will lead to more hatching eggs, lower costs and more profit.



Maximum production of high quality hatching eggs

The Agromax automatic nest is constructed of high quality components made from plywood and metal, ensuring it is hard wearing.

agromax.nl

This robust nest is quick and easy to install and offers easy cleaning between cycles. A triple section lid permits the egg belt to be checked without disturbing the birds and a gentle sloping nest bottom ensures

that the eggs roll away quickly to the egg belt. Eggs are collected by a perforated plastic egg belt which is controlled by a user friendly panel with an adjustable speed controller.

The nest offers the following advantages:

- Maximum production of high quality hatching eggs.
- Minimum crack and hair crack eggs.
- Minimum floor eggs.
- More than 50% labour saving.

Nesting system offers superior comfort and bird welfare

The Koozii nesting system from Roxell offers superior comfort and animal welfare along with careful egg handling and a bird friendly expulsion system.

roxell.com

- The spacious, oxygen-rich nest box guarantees maximum nest acceptance by commercial layers and parent stock.
- The perforated AstroTurf nest pads optimise air circulation and give the hens a natural feeling.
- There is no accumulation of droppings at the nest entrance.

- A protected solid wood nest entrance avoids leg and breast injuries.
- The AstroTurf nest pads prevent cracks and soiled eggs.
- The perforations in the egg belt keep the eggs from rolling and bumping into each other and optimise the temperatures in the egg channel.
- A smooth open transition between the egg belt and the cross conveyor or collecting table avoids hair cracks and removes any dirt, droppings or feathers.
- Expulsion with movable back or tilting floor.



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Duck meat production: breeding Pekin ducks for the world market

The global production of duck meat was roughly 4.3 million tons in 2012. It represents a valuable source for human consumption especially in Asian countries. Most of this duck meat is produced by growing Pekin ducks.

by Dr Hans-Heinrich Thiele, Consultant Geneticist, Gourmaud Selection (Group Orvia). orvia.fr

To improve the efficiency of this business, breeding companies have been selecting for superior performance in all traits of economic importance. Selection is focused on daily gain, meatiness and feed efficiency of broiler ducks, without neglecting the number of ducklings per female housed.

Using more precise data recording tools, as for instance RFID based data recording and more powerful IT technology to estimate genetic parameters and breeding values, the performance has been much improved over the last 20 years.

The production of duck meat increased remarkably during the last 20 years, up to about 4.3 million tons in 2012. The main producer is China, producing more than 80% of all worldwide duck meat. According to information of Guémené et al. (2011) roughly 90% of it is based on fattened Pekin ducks. Only 4% of it is produced by Muscovy ducks and 6%

of it is available as a by-product from Mule ducks, used for the fatty liver production. Ducks have been very popular in Asia since historical times and they remain popular today. The Chinese not only like the high nutritive value and tastiness of the duck meat, but also utilise their feet, tongues and other by-products for human consumption and appreciate the high quality of the feathers. The duck varieties, especially the Pekin ducks, are very robust and can be kept under various climatic conditions, often in very simple housing. Several breeding companies are selecting ducks for meat production. Although most of them are based outside of Asia, their market share in Asian countries is high and their breeding work has to consider market demands in Asia. This article will focus on the selection of Pekin ducks for meat production.

Relevant traits and performance testing

Similar to meat type chicken breeding programs, Pekin ducks are selected in specialised male and female lines, which are combined at the grandparent and parent level to produce commercial broiler ducks.

In the male lines, the main focus of selection is on growth rate, feed efficiency, carcass yield and meat quality, while the female lines are also selected for egg production and hatchability.

Male lines	Female lines
Bodyweight	Bodyweight
Feed efficiency	Feed efficiency
Muscle growth	Muscle growth
Liveability	Liveability
Fertility	Laying performance/persistency
	Egg weight
	Shell strength
	Hatchability
	Fertility

Table 1. Selection traits of meat type Pekin ducks.

At 40-45 days, the broiler performance of all progeny of all pure lines and their crossbred offspring are tested. The data recorded by the selection crews are incorporated directly into the data bases. Since this is done very precisely with modern recording devices, the data are immediately available for parameter and breeding value estimation.

Improvement of feed efficiency by selection

Feed efficiency has become more and more important for all kinds of animal production, in response to rising feed cost and awareness of limited resources and environmental issues. Therefore, individual feed intake of the birds is measured and

used in selection programs. In the past, individual feed intake of meat type poultry has been recorded in single cage systems, but this system is unfavourable for the ducks and may not reflect feeding behaviour under commercial floor conditions.

The modern RFID technology enables the breeding companies nowadays to record even small meals of individuals under nearly practical housing conditions. In these testing units not only the amount of feed consumed can be recorded, it opens the possibility to observe also the feeding behaviour of the ducks, with the frequency of meals and the size of a single meal.

The availability and utilisation of these 'feeding stations' accelerates the genetic progress in feed efficiency. Companies which invested

Continued on page 25

Left, checking bodyweight on a scale, centre, measuring breast thickness with an ultrasonic probe and, right, testing feed efficiency in an Orvia feeding station.



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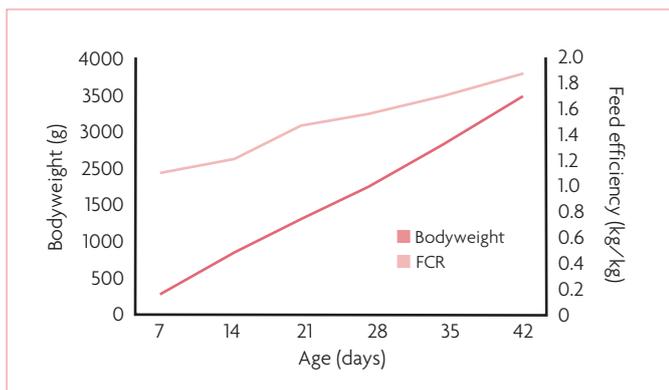


Fig. 1. Field results for the Orvia ST5 Heavy in Indonesia.

Continued from page 23 in this technology several years ago have already gained a huge advantage, while further developing their pure line breeding stock.

Records of daily feed intake can be used to improve feed efficiency in combination with weight gain during the testing period as the commonly known FCR or, independent from metabolic body weight and weight gain, as Residual Feed Intake (RFI).

further improvement. Residual feed intake is (by definition) independent from body weight and a useful parameter to judge the conversion of feed to body mass.

As in other poultry species, liveability has also limited genetic variation in Pekin ducks and will be a preferential candidate for genomic selection.

With the exception of egg weight and shell density, the reproductive traits have a lower heritability

$$\text{Residual Feed Intake (RFI)} = \text{FI} - [\text{a} + \text{b}_1 * \text{BW}^{0.75} + \text{b}_2 * \text{BWG}]$$

FI = feed intake BW = bodyweight BWG = bodyweight gain

The laying performance is usually tested over a period of 45 production weeks. Traditionally laying birds are kept in single cage systems. Orvia is developing a fully automatic nest system to replace single cages in future. With the new nests the laying performance can be recorded in floor pens.

During the testing period, time wise information about egg weight, shell strength, fertility and hatchability are recorded. Sperm quality is analysed before males are used for pedigree reproduction. For testing the fertility and hatchability of females, the use of pooled sperm is preferred.

Estimates of heritabilities and correlations among traits are summarised in Table 3. All selection criteria except liveability have a sufficiently high heritability to predict

compared to the broiler performance traits, but sufficient variation to make future progress possible.

Genetic parameters and breeding values

In these days very powerful IT technology and software tools are available which enable the geneticists to estimate the breeding values.

A quick and precise data recording combined with those possibilities enables the specialists to select the progeny of each pure line. Based on line-specific indices, the quality of males and females is judged to select and mate ducks for the next pure line pedigree generation.

All economically relevant traits have to be combined in such a way, that the strategic importance of

Table 2. Genetic parameters of broiler performance traits (Male line Orvia breeding program; n = 16,900).

	H ²	Genetic correlations				
		BW	AUS	CONF	RFI	LIV
Phenotypic correlations	BW	0.49	0.50	0.55	0.01	0.55
	AUS	0.65	0.32	0.95	0.07	-0.29
	CONF	0.57	0.81	0.30	0.09	-0.04
	RFI	0.03	-0.02	-0.01	0.39	-0.02
	LIV	-0.03	-0.07	0.02	-0.02	0.02



Single cages are used to test laying performance.

each line and its position in the crossbreeding program is taken into consideration. The main target is to improve the performance of the final product, while maintaining or improving the performance in the parent stock as well.

Results

The parent performance of the heavy package is around 230-240 ducklings in 52 weeks of production. Heavy hybrids have an outstanding broiler performance. They grow in six weeks of age to a bodyweight of 3300-3500g. Depending on the nutrient density of the supplied feed; the feed conversion is below 2kg feed per kg bodyweight.

Concerning meat quality, those broiler ducks produce 32-35% of muscles (skin included) of their live bodyweight and have at slaughter 72-75% yield.

The annual selection progress for heavy packages can be predicted

with 50-70g higher bodyweight at six weeks, 30-50g less feed for 1kg gain and about one more egg per parent.

Summary

Pekin ducks contribute substantially to the production of food for human consumption, especially in Asian countries. The breeding activities can enhance the effectiveness of that special part of poultry production. Comparable to other poultry species the genetics are concentrated in only a few but highly specialised companies. Duck specific performance testing and breeding value estimation is done with sophisticated tools and will be constantly further developed. Genetic progress will continue in all economically important traits. ■

References are available from the author on request

Table 3. Genetic parameters of broiler and laying performance traits. (Female line Orvia breeding program; n = 20,220). BW = body weight; AUS = breast thickness; CONF = conformation; RFI = residual feed intake; LP = laying performance; PERS = persistency; EW = egg weight; LIV = liveability; FERT = fertility.

	H ²	Genetic correlations								
		BW	AUS	CONF	RFI	LP	PERS	EW	LIV	FERT
Phenotypic correlations	BW	0.66	0.55	0.58	-0.07	-0.31	-0.34	0.57	0.13	-0.31
	AUS	0.56	0.49	0.91	0.06	-0.10	-0.12	0.23	0.12	0.05
	CONF	0.49	0.74	0.38	0.112	-0.13	-0.14	0.24	0.15	-0.04
	RFI	-0.03	0.07	0.05	0.33	0.05	0.01	-0.40	0.37	0.11
	LP	-0.19	-0.08	-0.08	-0.01	0.29	0.92	-0.26	-0.02	0.69
	PERS	-0.18	-0.05	-0.07	-0.06	0.78	0.28	-0.24	-0.08	0.67
	EW	0.37	0.13	0.12	-0.19	-0.09	-0.09	0.68	-0.05	-0.35
	LIV	0.00	0.01	0.01	0.53	-0.02	-0.01	-0.03	0.05	-0.13
	FERT	-0.10	-0.01	-0.04	0.00	0.26	0.21	-0.10	0.01	0.12

4 – How does it occur?

In simple terms, in any population of bacteria there are likely to be some resistant ones. When the animal is treated with an antibiotic many bacteria, including those causing the disease (pathogenic bacteria) and good bacteria which protect the body from infection, are killed. This leaves the door open for antibiotic resistant bacteria to grow and multiply and become the dominant bacteria and take over. If the antibiotic resistant bacteria are pathogenic, the antibiotic will not kill them and the animal succumbs to the disease and can die.

How do antibiotic resistant bacteria arise in the first place? All genetic material occasionally and spontaneously randomly mutates. On many occasions this is of no consequence but very rarely it will throw up a genetic change of consequence to the bacterium such as the conferring of antibiotic resistance, enhancing virulence or, as probably occurred with *Salmonella enteritidis* in poultry, make it more invasive. Mutation is a relatively rare event but it appears to occur more frequently in bacteria because of their relatively short generation gap. Mutation occurs when the bacteria are replicating and one mutation occurs every 100,000,000 replications.

The antibiotic resistance becomes encoded in the bacterium's genes and is passed down to the bacteria's progeny bacteria who are then also resistant. Occasionally a bacterium can reproduce by conjugating (mating) with another of a closely related bacterial species. When this happens the bacterium receiving the genetic material often only incorporates a few genes of the donated genetic material into its genetic material and if those genes contain one for antibiotic resistance then the resulting progeny will be an antibiotic strain of the same type as the 'mother' bacterium. This might occur with the result that a non-pathogenic bacterium with an antibiotic resistance gene passes that gene on to a pathogenic bacterium such as salmonella.

Sometimes bacteria become resistant to more than one antibiotic. This phenomenon is known as multidrug resistance and bacteria with it are sometimes referred to as superbugs. Occasionally a particular combination of pathogen and bacterium give rise to a more frequently arising resistance. Examples of this include methicillin resistant *Staphylococcus aureus*, which is commonly referred to as MRSA.

Occasionally antibiotic resistant bacteria are transmitted from animals to man by the consumption of products derived from animals, by close or direct contact with animals or through the environment. The evidence supporting transfer of macrolide resistant bacteria from animals to man is very scant and most of the evidence shows that pathogens of concern to man arise in man and remain there.

There are four main mechanisms by which bacteria exhibit resistance to bacteria. These are:

1. Drug inactivation or modification.
2. Alteration of the target site on/in the bacterium for the antibiotic.
3. Alteration of a metabolic pathway in the bacterium.
4. Reduced antibiotic accumulation in the bacterium.

These four mechanisms will be considered further in the next issue.

Vitamin A and reproduction

This Chinese study (*Poult. Sci.* 95 30-40) looked at the effect of dietary vitamin A supplementation (0, 5,400, 10,800 or 21,600 IU per kg feed) on reproductive performance in Chinese yellow feathered broiler breeders.

The supplementation improved laying rate, egg:feed ratio, and hatch weight of offspring. Hepatic retinyl palmitate in broiler breeders and hatchlings increased with increasing vitamin A supplementation.

Supplementation also increased insulin-like growth factor 1 (IGF-1) receptor transcripts in the walls of white and yellow follicles, follicle stimulating (FSH) receptor expression in the walls of yellow follicles and luteinising hormone (LH) and growth hormone (GH) receptor transcripts in the walls of yellow follicles.

Caspase-3 and Fas mRNA levels in the ovarian stroma, and walls of white and yellow follicles decreased with vitamin A supplementation. The relative expression of retinol dehydrogenase 10 in the walls of white follicles increased with 5,400 IU vitamin A per kilogram supplementation, whereas supplementation at the highest level increased cytochrome P450 26A1 (CYP26A1) transcripts in the ovarian stroma and the walls of yellow follicles.

It was concluded that vitamin A supplementation improved reproductive performance and hepatic storage of vitamin A and that this was linked to the regulation of ovarian receptor expression and suppression of apoptosis gene transcripts through its active metabolite retinoic acid.

The optimal level of dietary vitamin A for Chinese yellow feathered broiler breeders at 46 to 54 weeks of age was found to be 10,800 IU per kg feed.

Genomic sequencing of *Mycoplasma gallisepticum*

This paper (*Genome Ann.* 3 e00712-15) reports on the isolation of *Mycoplasma gallisepticum* strain B2096 8B from domestic chickens.

Its 845,307-bp full genome was sequenced, assembled and annotated.

Plumage development in young turkeys

This Polish study (*Euro. Poult. Sci.* 79 100) looks at the effect of increasing dietary levels of methionine (4.49, 4.96, 5.95, 6.38 and 7.06g methionine per kg feed in weeks 1-4 and 3.96, 4.37, 5.05, 5.65 and 5.74g per kg in weeks 5-8) on feather growth and plumage in young turkeys reared under normal commercial conditions.

The quality of feathers collected from the dorsal and thigh regions was assessed for 14 female birds per group. No significant differences in growth performance were seen in the first period but in the second period birds receiving more than 5.05g methionine per kg feed grew faster.

In the first period birds in the group receiving the most methionine had fewer feathers but a significant increase in pin feathers. Similar differences were noted in the second period. It was found that increasing methionine to 5.95 and 5.05mg per kg feed in the first and

second months respectively increased growth rate but it did not increase the number of feathers nor accelerate plumage development or maturation.

Effects of chitosan on egg quality

This Chinese evaluation (*Chin. J. of An. Sci.* 51 60-63) looked at the effects of dietary supplementation with chitosan (0, 250, 500, 1000 and 2,000mg per kg) on egg quality and yolk antioxidative function.

With increasing levels of chitosan albumen height and Haugh units rose. The total superoxide dismutase activity in the yolk also rose significantly and MDA levels were reduced.

Palmitoleate and rooster semen

This Iranian study (*An. Reprod. Sci.* 165 38-45) evaluated the effect of palmitoleic acid on the quality of rooster semen stored at 4°C.

It was found that the enrichment of rooster semen with small doses of palmitoleate had beneficial effects on semen quality during cold storage.

Breed genetic polymorphism

In this Indian study (*Ind. J. of An. Res.* 49 1-7) groups of birds from five breeds (Hill Fowl, Rhode Island Red,

	HF	RIR	K	WL	WC
Observed heterozygosity in polymorphic microsatellites	0.441	0.415	0.287	0.296	0.376
Expected heterozygosity	0.435	0.443	0.387	0.384	0.442
Estimated polymorphic information content	0.346	0.342	0.305	0.297	0.330

Kadaknath, White Leghorn and White Cornish) were genotyped using 25 microsatellite markers.

Out of the 25 microsatellite loci 17 (68%) were found to be polymorphic among the breeds.

Across the breeds, the total number of alleles ranged from two to three at polymorphic locus and average number of alleles per locus was 2.41.

Their observations are in the table above.

Sepiolite and egg quality

This Turkish study (*Vet. Fak. Dergisi* 63 25-29) was undertaken to assess the effects of dietary sepiolite (0, 0.5 and 1.0%) on performance, egg quality, egg yolk cholesterol content and certain blood parameters in laying hens for 22 weeks from 38 weeks of lay.

Dietary sepiolite supplementation did not significantly affect feed intake, egg production, egg weight and FCR. The values for egg breaking strength and egg shell thickness were increased and egg yolk cholesterol was decreased at the 1.0% inclusion level.

Dietary treatments did not significantly affect egg shape index, egg albumen index, egg yolk index and Haugh units.

At the 1.0% level sepiolite reduced serum cholesterol and triglyceride but increased total serum protein levels.

Gene expression profiles in the pituitary

This Chinese work (*Genetics and Mol. Res.* 14 12636-12645) studied the profiles of genes in the pituitary glands of geese during pre-lay and lay.

Some 54 upregulated and 84 downregulated genes were identified and they related primarily to biosynthetic processes.

Of these, 11 genes were selected for further analysis and levels of gonadotrophin-releasing hormone, gonadotrophin-inhibitory hormone, vasoactive intestinal peptide and its receptor, follistatin, oestrogen receptor β and the progesterone receptor were differentially over-expressed during pre-lay when compared to lay.

These results provide a solid foundation for elucidating the molecular mechanism of egg laying performance.

Cooling times of fertile chicken eggs

This Canadian work (*J. of Thermal Biol.* 55 7-13) asked whether or not the thermal characteristics of fertile avian eggs changed during incubation.

It was concluded that until the onset of thermogenesis the thermal behaviour of a fertile egg is very similar to that of a water filled egg with an air volume equivalent to that of the air cell and it is possible to estimate the cooling down time constant of avian eggs of different avian species from their weight and incubation time.

Bacterial peptide protein

This Chinese work (*Chin. J. of An. Nut.* 27 3878-3886) looked at the effects of bacterial peptide protein (2, 4, 6 and 8%) on laying performance, egg quality, serum biochemistry and intestinal bacterial flora in 74-85 week old Jinghong laying hens.

Compared to the control group bacterial peptide protein significantly increased laying rate, albumen height, Haugh units and eggshell thickness. When it came to the gut flora, bacterial peptide protein significantly increased the numbers of caecal *Lactobacillus* Spp. and *Bacillus subtilis* and significantly reduced *E. coli* numbers.

Phylogenetic vs. selection effects

This German study (*Euro. Poult. Sci.* 79 89) was undertaken to assess performance traits of chicken lines with different performance levels and phylogenetic origins.

The investigated performance traits were affected by genotype, age and their interaction (see Table 1). Differences with regards to egg quality are shown in Table 2.

In conclusion, clear differences in performance of layers were apparent.

Table 1.

Bird type	Laying intensity (%)	Daily egg mass (g/hen/day)	Feed:egg mass
High performer	85-90	50	2.1-2.3
Low performer	52-56	26-31	3.0

Table 2.

Bird type	Albumen (%)	Yolk (%)	Bird type	Eggshell (%)
High performer	57.1-62.4	26.8-29.8	White layers	10.8-13.6
Low performer	55.3-57.4	30.3-33.5	Brown layers	10.3-12.9



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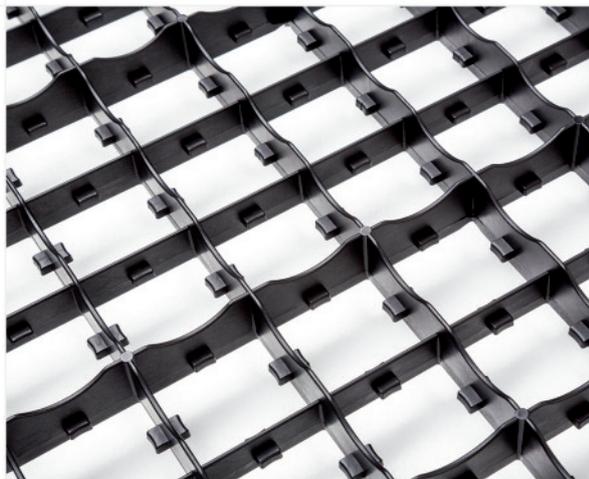
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Genetic tools and welfare

 The role of genetic improvement in animal welfare was the focus of Hendrix Genetics' senior geneticist Jeroen Visscher at the 14th Annual Egg Congress in São Paulo, Brazil.

More than 500 professionals representing multiple areas of egg production attended the event to learn about the latest trends in the layer industry.

Jeroen highlighted that there is an increasing focus on animal welfare worldwide. Animal breeding companies are at the forefront – working from the very base of genetics to increase social behaviour and increase lifespan.

The growing demand for cage-free and free-range, even 'old' bird diseases are reappearing. Genetic companies are also taking into account the antibiotic-free movement. Breeding companies have changed their breeding goals and the setup of their breeding programs successfully in order to continue to breed for the best performing birds under these changing environments.

The breeding goal for 2020 of Hendrix Genetics is to develop a robust bird that produces 500 eggs up to 100 weeks. Now, with more genetic tools available, such as genomic testing, geneticists are able to look at individual DNA-markers or even genes of each bird and make a more accurate selection.

With the help of genetic tools, in the near future, animals will be more healthy, live longer, experience better well-being and produce more animal protein for human consumption than they have ever done before, using less environmental resources.

With the transition from egg production in conventional cages to cage-free and free-range, even 'old' bird diseases are reappearing. Genetic companies are also taking into account the antibiotic-free movement. Breeding companies have changed their breeding goals and the setup of their breeding programs successfully in order to continue to breed for the best performing birds under these changing environments.

hendrix-genetics.com

Lohmann layers in Brazil



Planalto Postura, the most traditional day-old layer distributor in Brazil, located in the city of Uberlândia, Minas Gerais State, has announced a partnership with Lohmann Tierzucht to distribute the commercial layers Lohmann LSL and Lohmann Brown within the Brazilian market. This will be in addition to Lohmann do Brasil, based in São José do Rio Preto, São Paulo. The first deliveries will take place from July 2016 onwards.

ltz.de

Compartment status for Cobb in the UK



The UK farm and hatchery facilities which export Cobb broiler breeding stock globally have been granted 'GB enhanced compartment' status – the most stringent requirements for any such operation.

With the agreement of an importing country, the high standards of biosecurity within a compartment allow breeding stock to be supplied to customers when outbreaks of

avian influenza or Newcastle disease in a particular country would normally restrict exports.

The approval by the UK Animal and Plant Health Agency (APHA) covers the great grandparent and grandparent stock farms of Cobb Europe which extend across East Anglia and the East Midlands and the grandparent hatchery in Norfolk. They supply breeding stock not only across the Cobb Europe region, which also serves the Middle East and Africa, but to customers worldwide.

cobb-vantress.com

Flock performance database manager



Hy-Line International has appointed Ken Kerr as international flock performance database manager. His responsibilities include entering, analysing and reporting flock performance data from Hy-Line's flocks and those of its customers worldwide. He will be based out of Hy-Line's corporate office in West Des Moines, Iowa, USA.

"Ken's expertise will bolster our efforts to benchmark Hy-Line layer performance throughout the world,"

veit.cz



The second Cobb grandparent hatchery roundtable recently brought together more than 30 Cobb technical managers from Brazil, Europe and the US in Gainesville, Georgia. The three-day event gave them the opportunity to discuss maximising efficiencies within the company's grandparent and great grandparent hatcheries. "This roundtable provides a one-of-a-kind experience for our hatchery managers to focus on the challenges of producing grandparent chicks," Ben Green, Hatchery Specialist for the Cobb World Technical Support Team, told International Hatchery Practice. "The most important topic discussed was managing temperature and humidity profiles in the setters to achieve consistent results." The attendees spent two days in classroom discussions and one visiting a Cobb hatchery. During the hatchery trip, they observed hatching equipment, participated in chick grading, and watched the truck loading process. The visit allowed time for managers to share their own experience with the whole group and to compare operational procedures.

cobb-vantress.com

Thomas Dixon, international sales and marketing director for Hy-Line International, told International Hatchery Practice. "The data will allow our technical services veterinarians to recommend targeted approaches to assist our end customers to maximise our varieties' genetic potential."

hyline.com

Veit Electronics extends its facility



Veit Electronics, the producer of vehicles for day-old chick transport and poultry equipment, has expanded rapidly in the last few years. With penetrating new markets and increasing production, the Veit factory in Moravany, Czech Republic, was no longer sufficient.

Work on larger premises was initiated in the middle of 2015 and the production area and the research centre have now been extended by half to manage all new orders and to intensify the focus on innovations.





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Designing a hatchery's electrical system

72

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by Emiel Fielt, Electronics Manager, Pas Reform Academy

Uninterrupted electrical energy is critical to optimising incubation and other hatchery processes.

Protecting supply

Should power from the grid be interrupted or fail, a back-up generator with Automatic Voltage Regulator and auto switch-over will protect normal hatchery operations.

Generators typically load up to 80% of their capacity for continuous operation. However if there is a risk of frequent power failures, a second standby generator is recommended. Keep generators close to the main power supply and fuel storage area.

Stability of supply is also important. Voltage should not exceed $\pm 10\%$ variation and frequency not more than $\pm 2\%$ of nominal value.

Individual Uninterrupted Power Supply (UPS) is recommended, particularly for incubator controllers, ethernet switches, automation controls, computers, alarms and other key electrical functions, as this protects all the hatchery's electronics in the event of a system-wide failure.

Finally in terms of protecting your supply, make sure your system is grounded. This not only protects users, but also ensures that electronics operate reliably.

Calculating system load

Total connected electric load is expressed as 'Installed Value'. The hatchery may consume up to its total connected load, or Installed Value, either completely or in part during operation, but this load cannot be exceeded. Cables and fuses should be selected based on Installed Value.

Because electrical consumption varies, average consumption will be lower than the Installed Value. Incubators may, for example, use heating or cooling, but not both, depending on the age of the embryos. And not all motors in the hatchery, for example on hatchery automation, will run 24/7.

Total Electrical Load is calculated by adding all duty equipment (excluding standby-equipment) plus a contingency for spare or unforeseen load requirements. Depending on the accuracy of the electrical system's design, this could in practice mean an additional 10-20% spare capacity.

Safety and compliance

Follow local electricity board regulations when choosing power distribution panels, design and cable type/sizes. Note that Variable Frequency Drives require shielded cables to avoid interference with signalling cables. Using separate power and signal cable trays will also help to avoid interference.

Electronic equipment is sensitive. Take care to protect against lightning strikes and surges and if possible, provide surge arresters in distribution panels, to protect equipment from voltage spikes. Try to balance the load to all phases, for example by connecting respective incubators 123, 312, 231 etc.

The presence of water in hatcheries, eg. for washing, circulation and from condensation, requires electrical installations to be water resistant (IP66). Using 'clean' cable design above false ceilings can help, by creating fewer places for dirt to collect and by keeping electrical cabling away from sources of water.

It is important that electrical installations comply with local regulations and are carried out by suitably qualified, certified personnel. Incorrect installation increases the risk of injury to staff and can create a significant fire hazard.

Advice

- Ensure that a certified electrical supplier checks and approves your system during installation and carries out regular testing.
- Incorporate 'clean' design where possible, eg. running cables above false ceilings.
- Check the power supply backup system regularly: make sure it will work if needed.
- Provide automatically fused control boxes for each item of equipment in the power distribution panel to prevent interruption in case of tripping.
- Select hatchery equipment with energy-saving features wherever possible, including intelligent frequency drives for incubators and effective climate control systems, to significantly reduce energy consumption and lower the total cost of constructing the hatchery's electrical systems.
- Ensure that your system has sufficient capacity for future expansion.

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Continued growth in Nepal



Cobb Nepal recently hosted 120 customers for a one-day seminar in Kathmandu, Nepal, where good results are being achieved with the Cobb breed in sometimes challenging conditions.

Members of the Cobb World Technical Support Team gave presentations on many important topics including ventilation, male and female management, hatchery and most importantly, biosecurity and disease control management.

"Although there are few houses with modern environmental controls in Nepal, many of the older style open-sided houses can still be

managed to get good performance and benefit from the Cobb genetic potential," Mohammad Ismail, sales director for Cobb Asia-Pacific, told International Hatchery Practice.

"We are a global company that supports our customers and their markets, and we are really pleased to see that our customers are confident and happy with our product. Some participants travelled more than six hours to attend this seminar. It was valuable for us to meet with many of our long-time friends and learn more about their business needs, challenges and success stories."

Cobb-vantress.com

Celebrating 25 years of cooperation



Aviagen EPI recently celebrated 25 years of cooperation with Farm Waaijer VOF in the Netherlands – the longest active grandparent (GP) contract farmer within the region.

The farm consists of one house for approximately 3,200 females and had its first Aviagen GP flock placed in February 1991.

Owned and run by Gerrit Waaijer and Marian Waaijer-Schoneveld, the farm is based in Geesteren, eastern Netherlands. While Marian takes care of the daily farm operation, Gerrit is responsible for the overall management of the farm and also works part-time for a Dutch feed mill.

aviagen.com

New commercial director for Anitox



Anitox has announced the appointment of Dr Alan Doyle as Commercial Director of its fast-growing Asia Pacific operation.

He will lead the team responsible for delivering high-value Finio and Termin-8 pathogen control and Maxi-Mil feed milling efficiency

programs to breeder, layer, broiler and feed milling operations throughout the region.

Alan is a qualified veterinarian and graduate of Glasgow Veterinary School in the UK. He has been associated with the animal health industry for more than 30 years, serving market-leading operations including Beecham, Pfizer (Zoetis) and Ceva.

He has an impressive track record driving profitable growth in senior commercial and business leadership roles, and returns to Anitox where he held a commercial management role in its EMEA team from 2009 and 2012.

anitox.com

Senior appointment for Pas Reform



Gregory Vanputte has joined Pas Reform, with responsibility for driving growth and development for their Hatchery Automation Systems (HAS) division. As Director Sales and Business Development HAS, he will play a key role in the company's strategic development, from 'machine manufacturer' to globally recognised supplier of fully integrated hatchery solutions

pasreform.com

Unparalleled sustainability



Two years since commissioning a new state-of-the-art parent stock hatchery from Pas Reform for its ISA Layers Business Unit in The Netherlands, Hendrix Genetics says the Boxmeer facility is delivering sustainable results and substantial savings from the very start of the egg value chain.

The new facility is a cornerstone in Hendrix Genetics' Sustainability Program. Comprised of three key building blocks – Animals, People and Planet – the program focuses on improving sustainability in operation, with clear, actionable plans to deliver returns in terms of environmental impact, the responsible use of antibiotics and the efficient use of resources.

Innovation, says Ron Jöerissen, Production Director of Hendrix Genetics' Layers Business Unit, lies at the heart of achieving the program's aims. "With a unique combination of innovations, our new hatchery is achieving unparalleled levels of sustainability, with energy savings of 35%."

Key features of the new facility include a fully integrated building management system, with more than 700 contact points to monitor temperature, air pressure, airflow, humidity and CO₂ levels, controlled

by a bespoke climate control system, that maintains and optimises air conditions in every room, as well as pre-conditioning incoming fresh air.

An advanced heat recovery system re-uses heat recovered from apparatus and cooling water to warm incoming air, provide floor heating and heat tap water. Heat recovered from the incubation process is used to heat the entire attic area of the 4,080m² facility, which has the capacity to produce 4.5 million layer parent stock each year. Further innovations have been incorporated to save energy during the incubation process.

Mark Cornelissen, Global Hatchery Specialist ISA, confirms that the new unit has already delivered substantial energy savings, enhanced biosecurity and improved product flow and processing within its first year of operation.

"We are seeing 30% reductions in terms of cost of sale and operating expenditure per chick," he says. "In its first year of operation, the hatchery is already demonstrating unparalleled sustainability and a significant ROI, both for the environment and for our producers, which we regard as the only way forward."

pasreform.com

Jamesway supplies new Polish hatchery



Cedrob president Andrzej Gozdzikowski and Jamesway president Chris Omiecinski recently signed a deal for a new hatchery in the village of Kossobudy.

The project will see Jamesway supplying 120 Platinum 2.0 incubators and 72 Platinum 2.0 hatchers for an operation in east-central Poland, which will have a capacity for 5.1 million eggs a week. It will be built in one stage and will be fully operational by early 2018.

This endeavour represents the fourth Cedrob-Jamesway project since Cedrob first purchased Jamesway equipment in 2004. They have since invested in equipment for a single-stage hatchery in 2010 and later increased the capacity of that facility in 2014 to an annual output of 165,000,000 eggs.

Cedrob is a multi-family owned business based in Ciechanow and is

one of the largest poultry producers in Poland. The project reflects their confidence in the Jamesway brand and enhances Jamesway's position as one of the foremost suppliers of industrial hatcheries in the world.

jamesway.com

Turkey hatchery acquisition



Hendrix Genetics has concluded its agreement to purchase 100% of turkey distributor Coolen Hatchery, the largest turkey hatchery in the Netherlands.

Henk Coolen will continue on with Hendrix Genetics for the coming years in support of Hendrix Genetics Turkeys' activities in the Netherlands. Future plans for the hatchery include the development of the traditional and bronze turkey markets.

hendrix-genetics.com



03 | BIOSECURITY: AGRO-FOOD DESIGN

The issues surrounding effective biosecurity measures remain one of the key concerns for modern hatcheries today. In an industry which involves many elements of machinery processing large volumes of eggs and chicks, cross contamination is the main threat to safe and hygienic working practices. This hazard can present itself either between products i.e. egg-to-egg or chick-to-chick, or through hatchery machinery itself, with contaminative material remaining in areas which are difficult to clean efficiently.

One of the most effective ways to enhance biosecurity within hatcheries is through the use of equipment which has been meticulously designed to address contamination risk factors. ECAT and iD Projects utilises this 'agro-food' design standard in its hatchery equipment to protect from the risk of contaminants while maintaining high levels of performance. Crucial factors for effective agro-food design, include:

- The nature and quality of the materials used – mostly stainless steel, plastic, anodised aluminium and PEHD.
- Maximum water drainage coupled with non-accumulation/retention areas to avoid deposits that might lead to cross-contamination.
- Robustness for use in a tough environment which includes washing, detergent, high speed of operation and a humid operating environment.
- Mindfulness of animal welfare and the subsequent application of constraint in factors such as drop height to prevent any injury.

An example of agro-food design can be seen in iD Projects' conveyors, which are designed with open sides, allowing for ease of cleaning under the belts. The conveyor frame has also been created so there is no retention of water on the corners and cross-sections. Other design issues for consideration include:



- Operator safety – the equipment must not create new risks for its operators.
- Ergonomic work stations – through the provision of low sound level, user friendly machinery including the use of IHM touch screens.
- Scalability – including the flexibility to adapt to potential hatchery evolutions and respond to market requirements.

iD projects



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On track to hit targets



DanHatch Poland is on track to meet production targets of 115 million day-old-chicks each year by 2016, since expanding its hatchery operations with advanced SmartPro single stage incubation technologies from Pas Reform.

The company, formerly Hama Plus, has commissioned four generations of Pas Reform incubators since its formation in 1998. Through a regular program of upgrades over the years, every generation of machine is still fully operational, compatible and optimised by Pas Reform's recent innovation, the SmartCenterPro hatchery information system.

With SmartCenterPro, effectively an 'Internet of Things' approach for the hatcheries, every device or system at every level of DanHatch Poland's extensive hatchery operations can be seamlessly connected and data enabled. Using advanced, web-based technologies, this produces the most detailed monitoring, management, analysis and batch reporting for every hatch cycle, with comprehensive Track and Trace capabilities despite minimal data entry. Combined with the significant savings being realised through innovative energy-saving features in the

hatchery's incubation, ventilation and heat recovery systems, and the high level technical collaboration between DanHatch Poland and Pas Reform Academy, the long-standing partnership between the two companies is, says the company's co-founder and member of the supervisory board Marek Krzysztoszek, a powerful alliance.

Pas Reform's sales director Erwin Prinzen has worked closely with Hama Plus, then DanHatch, over the past three years. "In its 18th Anniversary year, DanHatch Poland will realise more than 500% growth, from 20 million to 115 million day old chicks per year," Erwin told International Hatchery Practice.

"Pas Reform was committed to supporting Hama Plus as it built its leading position in Poland. We remain equally dedicated to our partnership in the future, as DanHatch further extends the company's influence and profile across Europe. This is an ambitious project. DanHatch is committed to achieving market leadership through quality at every level of its operations – and Pas Reform looks forward to contributing to the company's continuing growth in Poland."

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CALIBRATE CO2 SENSORS REGULARLY

Most modern single-stage setters and hatchers are fitted with carbon dioxide (CO₂) sensors, automating adjustment of the machine dampers according to the CO₂ accumulated from the developing embryos. This can work well, but only if the CO₂ sensors are accurate. Sensors which under or over record will result in the machine being incorrectly ventilated. When this happens, it can lead to gradually declining chick quality and hatchability.

The first step is to make sure that the CO₂ sensors are all reading correctly. Prolonged exposure to high humidity levels during sealed incubation, and to chick fluff and humidity during hatching or even washing water can all affect the sensor or sensor protection cap leading to inaccurate readings. The sensors must be calibrated regularly.

Ideally, the sensors should be calibrated at low, mid and high CO₂ levels, proving that they are reading correctly across the desired range. A simple calibration can be done using an electronic meter (which is itself regularly calibrated against known standards) to check that both machine and calibration sensor are giving the same reading at room CO₂ levels. This will usually be higher than the 400ppm (0.04%) normal for fresh air; both people and chick embryos will be producing CO₂ in the building which will drive the concentration up. However, mid- and high-end values can be checked during incubation only if your calibration instrument sensor can be inserted into the incubator next to the machine probe without opening doors or air vents.

Alternatively, higher CO₂ levels can be calibrated using a CO₂ gas mixture with a known, certified CO₂ concentration while the machine is empty. These are used to fill a cap or bottle sealed around the sensor unit. Mixtures with certified CO₂ concentrations of 5,000 and 8,000ppm (0.5 and 0.8%) are readily available on the market.

Having calibrated the sensors, you must then make sure that the machine is still able to support higher levels of CO₂. Levels can only rise if the incubator is well sealed against air leakage. Check that the seals around doors and dampers are not worn, and make sure that both can be closed tightly. The calibration on damper opening should also be checked. An easy way to check that the machine can be properly sealed is to stand inside the empty, powered down incubator with the doors and dampers closed. If you can see any light, the machine will not seal properly.

High CO₂ levels will not of themselves improve hatchability or chick quality. However, measuring CO₂ build up can be a useful tool to show when a machine needs fresh air. For this to work consistently the sensors need to be calibrated accurately and the rate that CO₂ accumulates in the machine must be predictable. If either of these fail, then ventilation rates will be incorrect.



The photograph above shows typical CO₂ sensors in a setter, protected by sensor protection caps. If the caps become clogged with dust or condensation, the sensor will give an artificially high reading.

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www.viv.net

AIPEX

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www.aipex-africa.com

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www.sapoultry.co.za

11th International Symposium on Marek's Disease and Avian Herpesviruses

6-9th July
Tours, France
<https://colloque.inra.fr/marek-symposium-tours2016>

Indo Livestock

27-29th July
Jakarta, Indonesia
www.indolivestock.com

World Poultry Congress

5-9th September
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www.wpc2016.cn

VIV China

6-8th September
Beijing, China
www.vivchina.nl

SPACE

13-16th September
Rennes, France
www.space.fr

Agrena

6-8th October
Cairo, Egypt
www.agrena.net

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19-21st October
Ho Chi Minh City, Vietnam
www.vietstock.org

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20-21st October
Manila, Philippines
www.wvpa.net

internationalnews

New hatchery in Zambia



Hybrid Poultry Farm, the Cobb franchise distributor in Zambia, has opened a new parent hatchery on its farm at Kabwe.

The company has invested more than US\$12 million in the fully environment controlled facility on a 5,000 acre block of land bought solely for the parent operation. It is situated in an isolated farming area and provides a high degree of biosecurity. The hatchery has the latest technology with the incubation systems remotely monitored and controlled through a satellite interface.

Managing director Richard Keeley was delighted with the quality of the initial hatch of Cobb500 parents for placement on Hybrid Poultry farms.

"It was our intention to ensure that we developed a world-class facility that would not compromise on any aspects of technology or standards, and I am delighted to say that the first hatches to come through our new facility have shown marked improvement in hatchability and chick quality," Richard told International Hatchery Practice.

"The facility will provide for our

future growth not only for our Hybrid integration in Zambia but our associated companies in Kenya and Tanzania in supplying Cobb products to meet regional demands."



Pieter Oosthuysen, key accounts and regional technical manager for Cobb in Africa, added: "I'm very happy to see this new investment in Zambia as the market is expanding and Hybrid is ideally positioned to supply quality chicks to other Cobb customers in the region like Zamhatch.

"The sister operations Kenchic and Tanbreed will receive imported flock placements as they have large parent flocks, which is a huge benefit for improved uniformity and better chick production."

cobb-vantress.com

Conference success in Asia



Poultry Focus Asia 2016 was recently held in Bangkok, Thailand. Feedback from a technical manager in a pan-Asian livestock company says it all.



"Thank you so much for giving us the opportunity to attend this wonderful conference. The keynotes and other presentations that we attended were all of high quality and also the chance to interact face-to-face with luminaries in this field was truly an honour.

"The conference was very well organised. I really enjoyed all the insightful talks given by the speakers especially the ones by Prof. Chris Morrow on 'Practical mycoplasma control for Asia' and Prof. Khaled Hussein on 'Valuable interventions for mycoplasma and ORT disease'.

"I think the conference was a huge success in integrating the research ideas from leading scientists across

the globe to our farms. We are looking forward to another successful conference organised by your team in the near future!"

The next Poultry Focus Asia will be held in Bangkok in 2018.

positiveaction.co.uk

Appointment in New Zealand



The Bromley Park Group has appointed Dr Tugrul Durali to the role of Group Production Manager based at Tuakau, New Zealand.

Tugrul graduated as a Doctor of Veterinary Medicine from the University of Istanbul and worked for Banvit AS, a leading integrated poultry operation in Turkey and Eastern Europe, before moving to Australia. He spent seven years in various technical management roles with Red Lea Chickens in New South Wales before taking up his most recent position as Poultry Technical Manager for Alltech Biotechnology.

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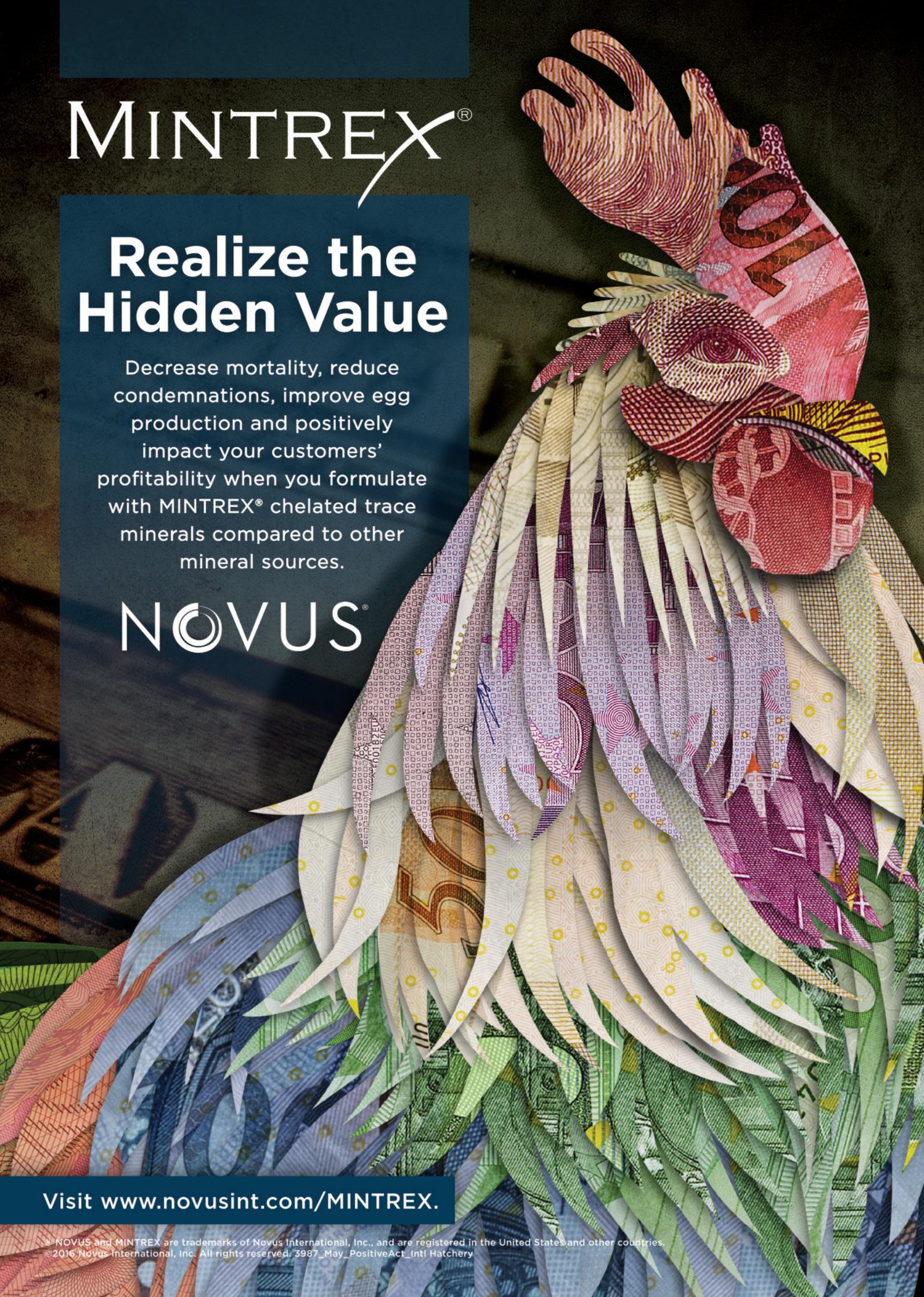


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