

International Hatchery Practice

Volume 32 Number 5 (2018)

Practical information for better breeding and hatching

LIGHTING

How does it influence
broiler breeder performance?

AUTOMATION

Welfare and cost benefits
with grading and vaccination

CLEANING

Sanitation for good health
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TRAYS, TROLLEYS & TRANSPORT

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from around the world

DAY OLD CHICKS

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fertilethoughts

Responsible use of antibiotics is a phrase that is being bandied around a lot at the moment. So what is possible in this context?

The recent report on Antibiotic Stewardship, published by The British Poultry Council, is a fine example of what can be achieved.

It cites the success of a 39.36% reduction in total use of antibiotics in the last year (2016-2017) and an 82% reduction over the last six years, including a 91% reduction in the use of fluoroquinolones.

Over the same time the British poultry sector has stopped the prophylactic use of antibiotics, restricted the use of the 'highest priority, critically important' (WHO) antibiotics and banned the use of third and fourth generation cephalosporins.

As the report correctly states: "UK poultry farmers and veterinarians need antibiotics in their toolbox to preserve bird health and welfare. Delivering excellence in bird health is the foundation of responsible use of antibiotics. The British poultry meat industry stands committed to using antibiotics responsibly and 'only

when necessary' to protect the health and welfare of our birds."

The success of this stewardship programme is due to the poultry sector's commitment to only use antibiotics when necessary to treat sick birds. An openness to accept change, encourage innovation and share best practice has enabled the British to go from strength to strength.

The poultry meat sector was the first in the UK to pioneer a data collection system for antibiotic usage, which it shares with central government. It has prioritised achieving health without resorting to prophylactic antibiotics by ensuring high standards in hygiene, husbandry and stockmanship.

The statistics that best reflect this success story are that poultry provides half the meat consumed in the UK and this is achieved by using only 9.7% of the total antibiotics licensed for food animals.

Bearing in mind that antibiotic resistance is a global phenomenon, it is critical that this British success story is not a lone light and that soon similar lights will be shining from Asia, Africa the Americas and Russia! ■

Cover Picture:

A good start!
(photo courtesy of HatchTech)



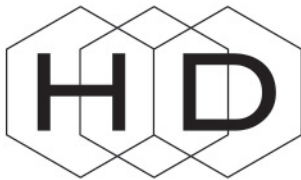
The advertisement features a photograph of a black Emika incubator with a digital display and a red emergency stop button. In the bottom left corner, there is a logo for 'tegnologic27' with the tagline 'cooling with lukewarm water'. The main logo for 'EMIKA INCUBATORS' is prominently displayed in the center-right, with the website 'www.emka-incubators.com' below it. At the bottom, the text 'trusted hatchery equipment' is written in a bold, sans-serif font.



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worldfocus

An executive summary of key international issues

California

Newcastle disease makes a return

Virulent Newcastle disease is back in the USA having been recently diagnosed in backyard chickens in Los Angeles and San Bernardino. It has not been seen in commercial poultry in the US since 2003. Virulent Newcastle disease is a contagious viral disease affecting the respiratory, nervous and digestive systems of fowl. It is spread by direct contact with the droppings or respiratory discharges of infected birds. As the virus can live for a long time in the environment and can be spread by objects such as shoes, clothing and equipment, other flocks in close proximity can quickly become infected. This highlights once again how serious diseases of poultry can suddenly appear in the most unexpected of places.

UK

Beware of backyard flocks!

The importance of maintaining scanning surveillance in backyard flocks was recently illustrated when avian leukosis virus subgroup J was identified in a chicken in the UK. The affected bird was one of six in a flock and had a clinical history of croaking respirations, abnormality of one eye and apparent paralysis. Post-mortem examination revealed tumour formation in many tissues including the pectoral muscles, sternum, ribs and internal organs. Histopathology revealed myelocytoma formation typical of ALV-J, which was confirmed by PCR testing and sequencing. This is the first time that ALV-J has been detected in a backyard bird in the UK since its eradication from the UK broiler sector over a decade ago.

USA

Are Americans eating too much of a good thing?

2018 is heading to be a record year for meat consumption in the USA. By the end of the year the average American consumer is expected to have eaten 222lb (just over 100.8kg) of red meat and poultry, which will exceed the previous record set in 2004. It is also predicted that US domestic meat production will surpass 100 billion lbs for the first time. As the demand for eggs is also reaching an all-time high, American poultry farmers should be reasonably happy with their lot. The increase has been prompted by many Americans actively shunning carbohydrates in favour of protein – even though any health benefits may be outweighed by the sheer volume of the meat, eggs and dairy being consumed!

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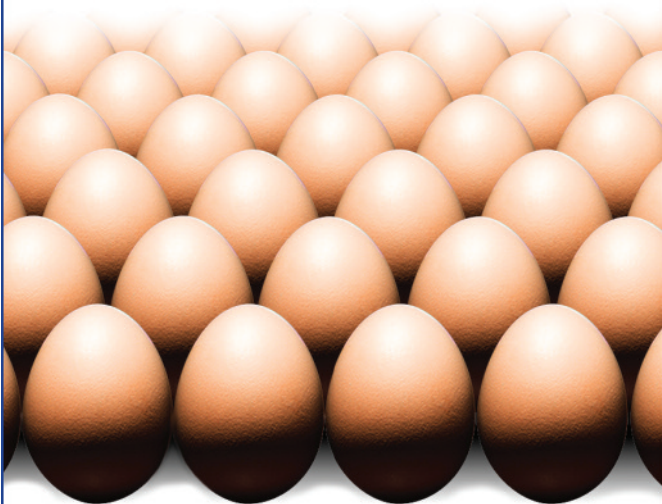


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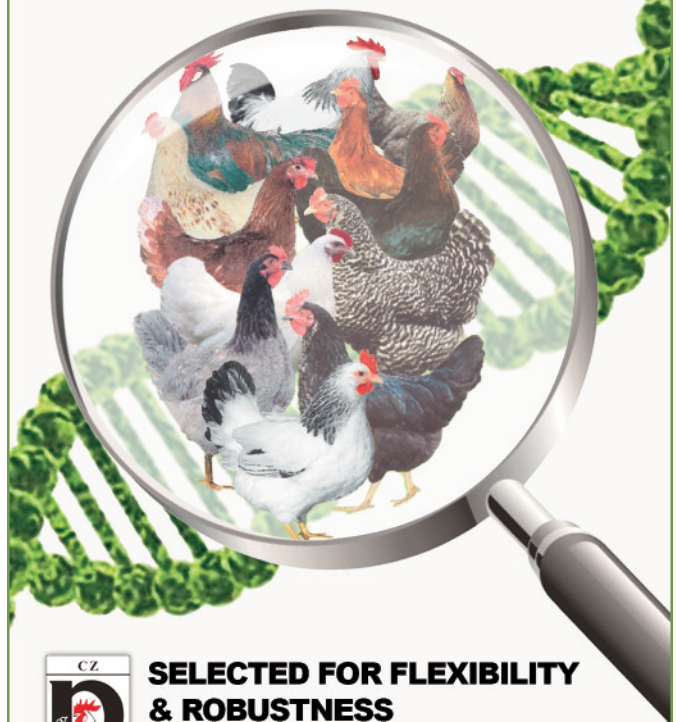
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Lighting and its influence on broiler breeder welfare and performance

The importance of good lighting is being increasingly recognised, and justifiably in our opinion. An optimal light climate has a major influence on broiler breeder welfare and performance.

by Kim Geurts,
HATO Agricultural Lighting,
The Netherlands.
www.hato.lighting

After rearing, the reproductive life of a broiler breeder is divided into three main phases. The first phase, the sexual maturation phase, lasts from photo stimulation until the first egg is laid.

The second phase starts at sexual maturity and ends at peak production. The third and final phase lasts from peak production to the end of lay.

The efficiency of production in each of these periods is greatly dependant on several key factors, one of which is light management.

Poultry vision

Poultry eyes are relatively large compared to human eyes. The position of the eyes on the side of the chicken's head gives them small binocular and wide monocular vision. In general, poultry are neither short sighted nor long sighted.

This means they can focus nearby and far

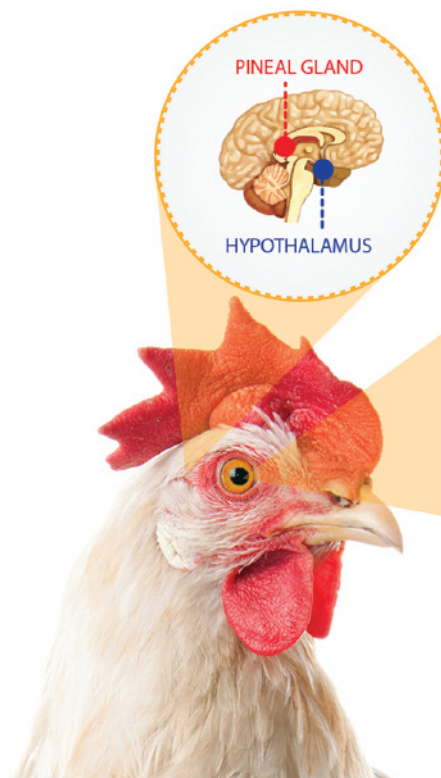


Fig. 1. The way poultry receives light.

Photoreception

Broiler breeders receive light through the eyes; this affects the photoreceptors in the retina. Light that enters the eyes affects behaviour and internal processes.

In addition, light also passes through the skull, where it affects photoreceptors in the hypothalamus, the pineal gland, the pre-optic area and the lateral septal organ. Light that reaches these 'deep-brain' photoreceptors affects the biological processes of broiler breeders.

Light also regulates the biological clock and the pituitary gland, which in turn affect the regulation of growth hormones and the broiler breeders' metabolism through the thyroid glands.

Photo stimulation

Broiler breeders are still close to nature, which means they are seasonal breeders. Seasonal breeders are hatched in a refractory state (juvenile photorefractoriness), which is the inability to be responsive to photoperiods or changes in photoperiods. In

Continued on page 8

Fig. 2. Warmwhite LED vs. human and poultry spectrum.

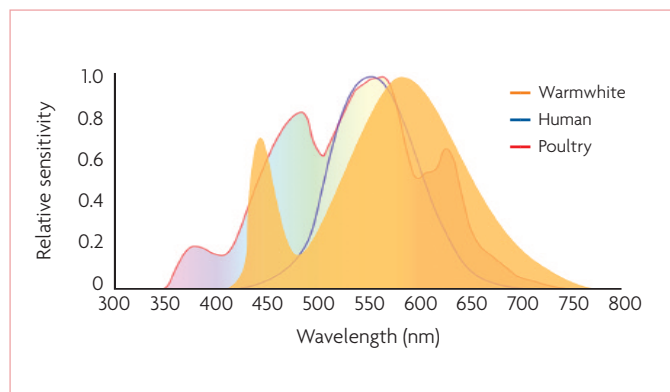
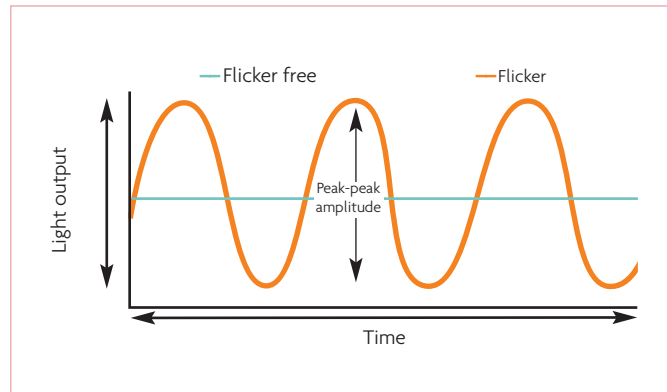


Fig. 3. Flicker vs. flicker-free lighting.



Continued from page 7
nature, it prevents broiler breeders from becoming sexually active in their first year of life. This means that the light programme has to be adjusted in a specific way to dissipate this and to properly stimulate them sexually. It is important to adjust the light programme and intensity during the different life phases of the broiler breeder.

Using high light intensities and long photoperiods is highly recommended during the first few days in the new house, either with rearing or production. This enables the chickens to explore their new environment and easily find feed and water. After that, it is best to slightly decrease the lux levels and photoperiods. Lux levels still have to be kept high to stimulate the birds to move through the house and to prevent floor eggs.

In cage housing, this is unnecessary, since the chickens do not need to be stimulated to move through the house and floor eggs are not an issue. The different aspects of lighting have various consequences for broiler breeders. The most important aspects are light distribution, light spectrum, dimmability and flicker.

Light distribution

Light distribution is important in every phase of a broiler breeder's life. During the rearing period, uniform light will ensure uniform

growth of the flock. Consequently, when moved to the production house, the chickens will be simultaneously stimulated sexually. This means that their age at the first egg will also be uniform. In the production phase, different kinds of housing systems have different needs with regard to lighting. This explains the importance of using a customised light plan.

Light spectrum

It is important to use a broad light spectrum in poultry houses. Each colour of the spectrum has its own characteristics and own influences on the chickens' welfare and performance. In broiler breeder houses, it is crucial to use warm, white light with a broad light spectrum.

Dimmability

100-0%, evenly dimmable lights are a must-have. In nature, sunset and sunrise determine the day and night rhythm of the broiler breeders. When sunset starts, they fill their crops before settling for the night.

It is important that the lighting equipment is able to simulate natural sunrise and especially sunset. If sunset is naturally simulated, the broiler breeders can settle more comfortably for the night. If the lights

are suddenly switched off, the birds will scare, leading to increased stress.

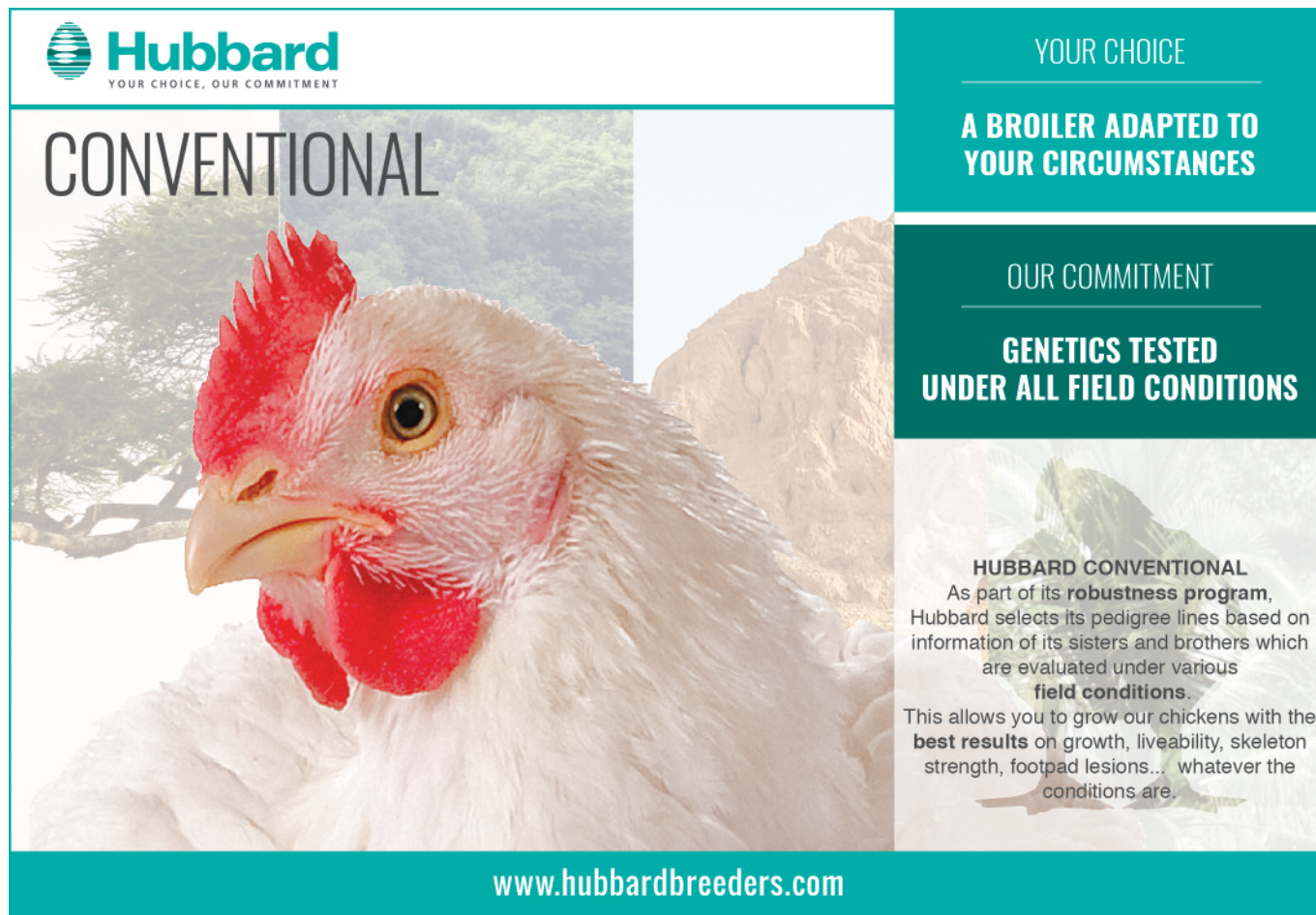
Flicker

Photometric flicker, or flicker, is the (rapid) change of the light output of a lamp.

Flicker is a major source of stress for chickens in general and thus for broiler breeders. It is therefore vital to use 100% flicker-free lighting. Chickens originally lived in the jungle, where they were prey animals. They had to be continuously on their guard. The rapid change in light output of a lamp (flicker) is presumed to give chickens the impression that a predator bird is hovering above them; this is perceived as a potential threat. This potential threat significantly increases stress levels.

Conclusion

Good lighting is of immense importance in broiler breeder housing. Sexual stimulation, uniformity and stress are just a few of the multiple factors that can be positively influenced by providing an optimal light climate. Make sure you opt for a lighting solution, a light programme and a light plan that meet the specific criteria of the house and the birds in it to increase animal welfare and performance. ■



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Welfare and cost benefits through automated grading and vaccination

One of the most important measures for the quality of poultry breeding stock is the uniformity of the flock. Even though flock uniformity does not allow for the prediction of the bird's performance, good flock uniformity can help ensure optimal flock management.

by Prof. Dr. Ludwig Theuvsen & Hauke Tergast, Georg-August-University, Göttingen, Germany & Jörg Hurlin, Agri Advanced Technologies GmbH, Visbek, Germany.
www.agri-at.com

Good uniformity allows flock managers to ensure the nutritional needs of the birds are met by way of feed increases and it also adds to the success of the photo-stimulation period thus resulting in a better overall flock performance.

It also helps to eliminate competition between birds and with this improves their welfare. In order to enable consistent development of the entire flock, dividing into different weight groups is an established and effective method to manage broiler breeders.

In practice, birds are graded various times according to their weight and

fed in a way that achieves a desired weight, leading to a more uniform population. The leading breeding companies grade birds either by visual assessment or by weighing each individual bird.

This process can be ergonomically challenging and labour-intensive. During the rearing period, many routine tasks are not automated. Another task that requires considerable manual input is vaccination.

Solution approach

To simplify the process, a specialised device was developed over a period of three years by Agri Advanced Technologies (AAT), an EW GROUP subsidiary specialising in automation. This device saves time and labour by combining the vaccination and grading processes and birds only need to be handled once.

It also contributes to higher precision during data collection. For this purpose, operations are partially automated and combined. The device weighs and grades the birds in up to three groups, and is equipped with 22 suspension cradles, in which the birds are supported at the base of their wings, ensuring comfortable handling of the birds with their heads in an upright position. Once



Five-week-old broiler grandparents on the AAT device.

applied onto the grading device, the birds can be vaccinated manually during the grading process.

The cradles are mounted to a chain moving counterclockwise around the device. Different areas are designated for vaccination, grading and placement. The yellow strips in Fig. 1. illustrate where the birds are placed on the device. Vaccinations can be performed in the green area and grading in up to three different weight groups takes place in the blue area. In front of the grading area, a weighing cell records a bird's weight with an accuracy of 98%.

Because the wings are supported in a fixed position, the chest is easily accessible. As well as grading, the device allows precision breast vaccination, as well as other types of vaccination methods – via the eye, neck or wing. All of these are undertaken in a calm manner with the bird's head in an upright position at all times.

The device is operated and controlled via a touchscreen interface. The grading data is saved on a USB and can be transferred to a computer using evaluation software compatible with Microsoft Excel. In addition to the average flock weight, the coefficient of variation (CV), uniformity and weight of every bird is collected. In doing so, the uniformity of the entire flock can be reliably determined during grading, whereas without the device, securing

uniformity is more or less based on random sampling of birds and visual assessments.

Until now there has been no scientific data to determine the hourly rate and working time requirements of manually undertaking the grading or vaccination process versus automation of the process.

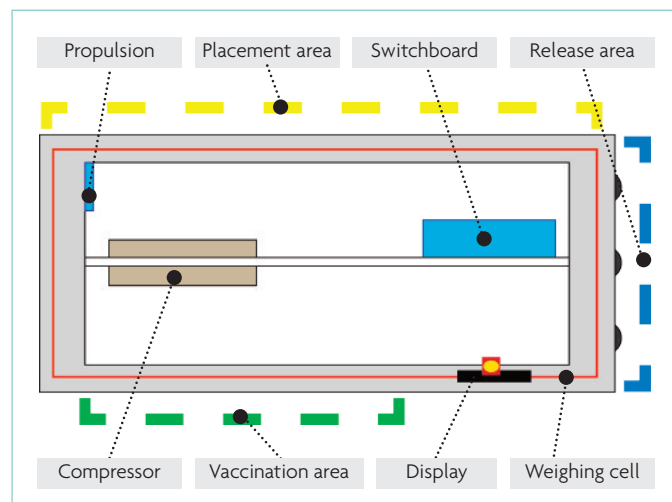
Method

A project at the University of Göttingen examined the extent to which automated vaccination and grading processes are superior to manual processes. Before comparing the different procedures, the University's Department of Agricultural Economics and Rural Development used a questionnaire to evaluate the vaccination and grading processes in different Aviagen grandparent operations throughout the world.

Wage levels and processing costs in different countries were examined for economic assessment. The results of the survey showed differences in the grading process between individual farms meaning grading processes could not be directly compared. The most comparable farms were therefore selected based on working times. Farms with faster grading and

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Fig. 1. Schematic representation (plan view) of the grading device.

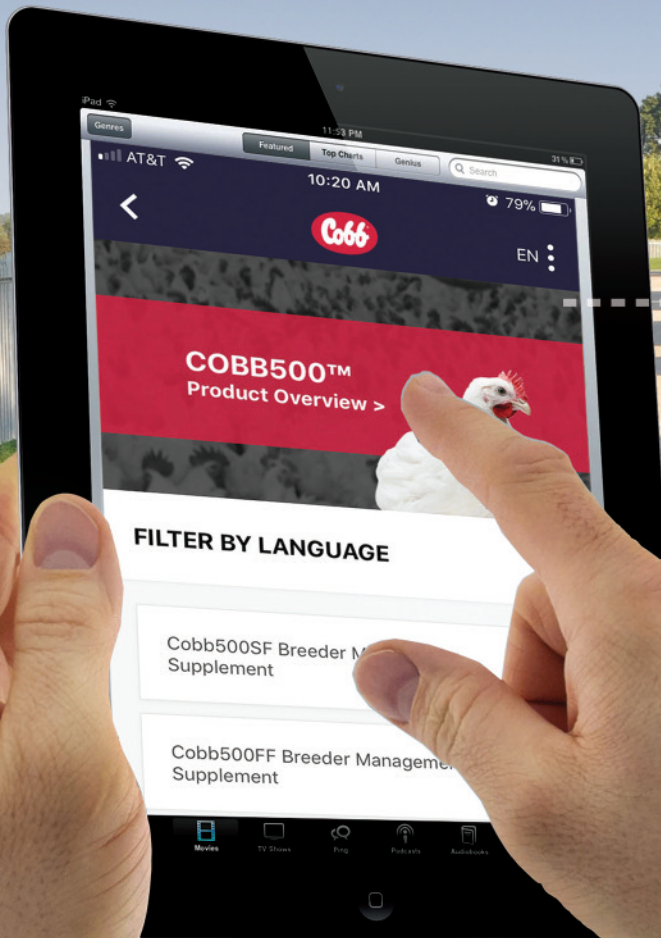


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	Device	Manual grading	Manual vaccination
Manpower (No. of employees)	5	13 1 (pre/post weighing)	8
Process cycle time (hours)	7.02	5.49 6.40 (pre/post weighing)	3.47
Total working time requirements (hours)	35.1	77.77 (including pre/post weighing)	27.76

Table 1. Working hour requirements for the evaluated procedures per average house.

Continued from page 9
vaccination processes were selected in order to set a benchmark for the device output.

For the study, working times were measured in accordance to the established REFA method (time and motion study), which breaks the process down into individual working elements, which were measured until the metrics were statistically valid.

Working elements are differentiated between cyclic and non-cyclic. For cyclic working elements, the epsilon value is applied to assess data quality. The epsilon value should lie below 15% in agricultural working time recording.

he aim is to achieve the lowest possible epsilon value. The quality of non-cyclic working elements is determined by the CV, which should lie below 35% in agricultural measurements. The lowest-possible CV is desirable.

Analysis

The survey of the operations showed that both grading and vaccination are carried out in various different ways.

The manual grading scales (as applied in the UK) and the manual vaccination (as applied in the Netherlands) were used as the basis for further research. Only vaccinations in the chest were considered.

Within the survey, work flows were classified in different working elements, and were documented from the set-up to dismantling of the necessary equipment.

Measurements were recorded from the device entering the pen until leaving the pen. Within the six month investigation period from April until September 2017, 3,461 individual measurements of different working elements were performed.

As well as working time recording of manual processes in the UK and the Netherlands, an evaluation of automated grading and vaccination in Spain took place.

The main reason for this was that Aviagen SAU had already used the first prototype of the grading and

vaccination device and thus had experience with the new device.

Results

The results of the analysis were statistically evaluated and differences were statistically tested. All epsilon values and CVs were below $P = x$, in line with the parameters provided in the literature.

In a second step, a farm was set-up with 10,473 birds, which was representative for broiler grandparent rearing houses. Working time requirements of the individual processes were extrapolated and compared. To determine flock-specific boundary weight values, the manual and automated separation test weighing was included for 10% of the bird population.

The work required for the individual processes was fundamentally different. For the average house with 10,473 birds using manual grading and vaccination, 105.5 working hours were needed, while the automated process required only 35.1 working hours. With automated processes the five employees took 7.02 hours to grade 10,473 birds. The working time was shorter with the manual method,

Chest vaccination of a bird on the AAT device.



	Device	Manual grading	Manual vaccination
Manpower (No. of employees)	5	13 1 (pre/post weighing)	8
Output per employee (birds/hour)	298	147 327 (pre/post weighing)	367
Performance (birds/hour)	1,490	1,911 327 (pre/post weighing)	2,936

Table 2. Number of vaccinated and graded birds.

however 13 additional people were required and therefore the total working time was higher. The results of the working time evaluation are illustrated in Table 1.

In the course of manual grading, for a 10% sample of the flock, both pre and post weights are required, and are carried out independently of the grading. With the automated procedure, the pre-weighing is already integrated in the process run-time. The need for post weighing is not required as the device records all individual bird weights. This fact is already taken into account in the total working time requirements.

Apart from the working time requirements, the different processes can be analysed additionally by their hourly capacities; which indicates the performance of each employee. This analysis showed that the performance per employee is twice as high for automated vaccination and grading compared to manual grading alone. Due to the high hourly output of manual vaccination, the output per employee is also higher than that of the device-based process. The results are shown in Table 2. Apart from the acquisition costs of the grading and vaccination device, knowing the hourly wage and possible number of gradings and

vaccinations per device is crucial to determine the cost-effectiveness of automation.

Conclusion

The newly developed automated vaccination and grading process is superior to the manual process when it comes to working time requirements. The total run time of 7.02 hours enables the vaccination and grading of an average farm with five employees within a working day. Due to the device's support and the integration of vaccination and grading processes, the working time requirements are reduced by simultaneously increasing efficiency and accuracy.

The automated process is preferable to manual grading and vaccination as seen in the results of this study. However the advantage of the automated process is that it reduces the labour requirement.

Furthermore, when using the device, it is recommended that vaccination and grading are to be carried out at the same time. By combining the grading and vaccination process it promotes animal welfare by reducing the number of times the birds are handled and also because the bird's head stays in an upright position.

With regards to workplace efficiency, automated processes offer additional benefits apart from ergonomic advantages. The digital collection of the flock's individual bird weights enables optimal flock management and a record can be maintained and referred back to.

Special attention was paid to the biosecurity and hygiene of the device during the design process.

The risk is minimised by having one device per site, a multi-stage cleaning and disinfection program, and rest periods between grading and vaccinations.

The reduced need for personnel when using automated grading and vaccination also improves biosecurity because fewer external workers are needed. ■

References are available from
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Hatchery cleaning and sanitation for good health and zoonotic freedom: II

Cleaning and disinfection have always been important for optimum hatchery performance. Effective cleaning and disinfection must prevent biofilm from establishing by removing all organic and inorganic residues, foreign bodies and micro-organisms, from surfaces.

by **Aline Kuntze Ferreira,**
Incubation Specialist, Aviagen.
www.aviagen.com

Cleaning and disinfection are two separate and distinct steps in the hatchery sanitation process.

Cleaning

The cleaning process removes around 90% of the total microbial load from a surface. The aim of cleaning is to remove organic matter so disinfectants, which are inactive in the presence of organic matter, can be applied successfully.

Cleaning must be completed in the egg, setter and hatcher rooms; setter and hatcher interiors; hallways; washing rooms; trays, boxes and baskets; chick processing and holding areas; laboratory and vaccination equipment; all ventilation system components – ducts, plenums, inlets, outlets, filters, air handling units; water plumbing, humidification system; and egg and chick transport trucks.

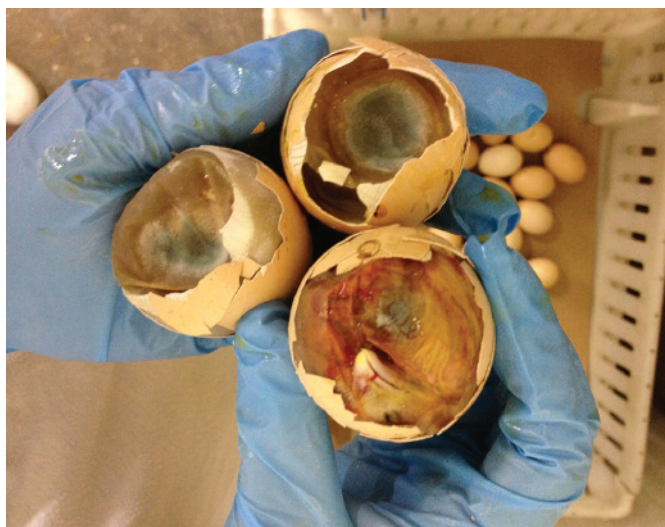
If any of these areas is omitted, any microbes present in that area will proliferate and cross-contaminate clean areas.

The cleaning process can be divided into dry and wet cleaning.

Dry cleaning

Dry cleaning is the simple mechanical removal of the dust, dirt, spider webs, chick fluff, egg shells and organic matter (blood, meconium) that may neutralise the disinfectant.

This stage prepares surfaces and equipment for wet cleaning, and consists of sweeping, scraping or



Inoculation site presenting fungus halo in old embryos – cross contamination due to a failure in disinfection procedures.

vacuuming to remove all visible organic matter. It is important to include ventilation systems in routine dry cleaning to avoid the accumulation of debris, dust and fluff inside the ducts or onto fan blades, which may affect their operation and be sources of *Aspergillus* sp. contamination to the incoming air.

Wet cleaning

During this second stage of the cleaning process, applying water alone without completing an initial dry clean is not efficient. Wet cleaning involves a wash down with water, foam cleaning or detergent application, rinsing and drying.

The initial wash-down with water should be done with pressurised water to soften and remove any remaining organic matter. Water temperature must be below 50°C (122°F) to prevent protein coagulation.

The efficacy of the detergent used will depend on adhesion time and consistency of the foam carrier. Dirtier areas and material such as hatcher and hatch baskets will require more powerful detergents and longer contact time to degrade

organic material. The choice of detergent will depend on the residues being removed. Grease and protein residues, most common in hatcheries, require alkaline detergents, while mineral residues, present on some hatchery equipment, require acid detergents. Neutral detergents are used for general cleaning.

When incubation equipment is excessively dirty (egg trays after transferring, hatch baskets after hatch, chick boxes after placement), with organic matter crusts on the surface, it should be soaked in warm water to allow the residues to soften before proceeding to the cleaning and disinfection procedures.

When using automatic washers, keep an eye on the detergent tank to ensure it correctly refills throughout the day, and to check belt speeds. Belt speeds that are too fast will result in insufficient contact time and ineffective removal of dirt.

Following wet cleaning, rinsing and drying must occur.

Rinsing

The rinsing step is mandatory, as the pH of some detergents can affect the action of disinfectants or may be

incompatible with the disinfectant being used.

Drying

Drying is a crucial stage before starting any disinfection step, since excess water can dilute the disinfectant and affect its performance. Most hatcheries skip this step and as a result can have trouble with sanitising efficacy.

It is often recommended if drying has not been completed to increase the concentration of the disinfectant being used. Unfortunately, this often results in excessive use of disinfectant without assuring its efficacy. For this reason it is worth getting surfaces dry before applying any disinfectant.

Disinfection

After ensuring all organic material and other residues have been removed from the surfaces, disinfection can occur.

Disinfection may appear to be a simple procedure after all the cleaning, but it is susceptible to minor mistakes that can significantly affect the efficiency of the whole process.

- Always follow the manufacturer's recommendations on product dilution rates.
- Make sure that equipment is dry before trying to disinfect it.
- Keep disinfectant containers well sealed to maintain product concentration and quality.
- Always follow the contact time recommended by the manufacturer.
- Do not mix too much disinfectant at one time. It is common for hatcheries to prepare a big volume of disinfectant that is used over the whole week, but some disinfectants lose effectiveness quickly after being mixed with water and must be applied straight after dilution in order to work.

Continued on page 14

Continued from page 13

● When using an automatic washer, it is important to refill the disinfectant container throughout the day.

Disinfectants can be compounds of ammonia, phenols, halogens, acids, alcohols, iodine, and aldehydes among others.

Whatever type of disinfectant is chosen it must be effective against the pathogens that are actually present in the hatchery or that are most common in the region.

In order to avoid resistance it is necessary to rotate the use of disinfectants with different active ingredients.

Process practices to reduce contamination levels

● Management of bangers and potential exploders

It is important to remove bangers and potential exploders from the setters, registering the quantity during candling and residue break outs.

Bangers are the result of bacterial gas production inside the eggs causing an explosion which will spread bacterial contamination throughout the setters/hatchers.

The most common gas producing bacteria are *Pseudomonas* sp.

● Egg transfer management.

How to avoid cross contamination
At day 18-19 of incubation eggs are transferred from setters to hatchers. Transfer is a critical management point, as all the eggs from a number of different flocks will pass through the same area.

It is strongly recommended to transfer floor eggs and eggs laid by old flocks at the end of the process to avoid contaminating nest eggs laid by younger flocks.

When in ovo vaccinating, it is important to check that the injector disinfection is operating correctly and with the correct concentration of disinfectant.

Inefficient needle disinfection will allow fungi/bacteria to cross infect eggs vaccinated later.

The photograph on the previous page shows eggs that were contaminated with fungus during in ovo vaccination.

This can happen due to inefficient needle disinfection or because the hatcher environment was dirty when transferring, allowing spores to penetrate the inoculation hole.

Before transferring eggs it is crucial to make sure that the hatchers are clean and disinfected. Never transfer eggs to hatchers that are still wet or

have not been disinfected. The environment where the chicks are hatching can directly affect their quality and first week mortality.

This includes the hatch baskets which need to dry after being cleaned and disinfected. Automatic washers are commonly used to clean and disinfect hatcher and chick baskets, but many do not remove organic material from the previous hatch effectively, which means disinfection cannot be efficient.

● Keeping pathogen levels low after hatch

One important management tool to control microbial numbers around the time of hatch is fumigating chicks inside hatchers during the hatch process to reduce contamination levels from the environment and yolk sac.

The most effective practice is formalin fumigation, but due to restrictions in some countries, alternative disinfection methods are being increasingly used.

Regardless of the method and disinfectant applied, it is important to make sure dosing rates are correct and timing optimal. Disinfection must reduce the pathogen number without harming the chicks.

Once hatched, chicks can still be exposed to contamination sources through sexers, the hands of other

staff, dirty chick boxes and dirty/wet conveyor belts.

After hatch, chick navels are still healing; placing chicks in chick boxes that are dirty or are lined with poor quality or non-disinfected paper, can allow bacteria to penetrate the yolk sac and cause omphalitis.

It is important to ensure that the chick box paper quality is high and that chick boxes and belts are dried and disinfected before processing the chicks.

Conclusion

It is possible to produce good quality and healthy chicks without using antibiotics within the hatchery. It is essential to reduce pathogen levels in all areas of the hatchery. Choosing the best procedures, detergents, disinfectants and application methods is essential.

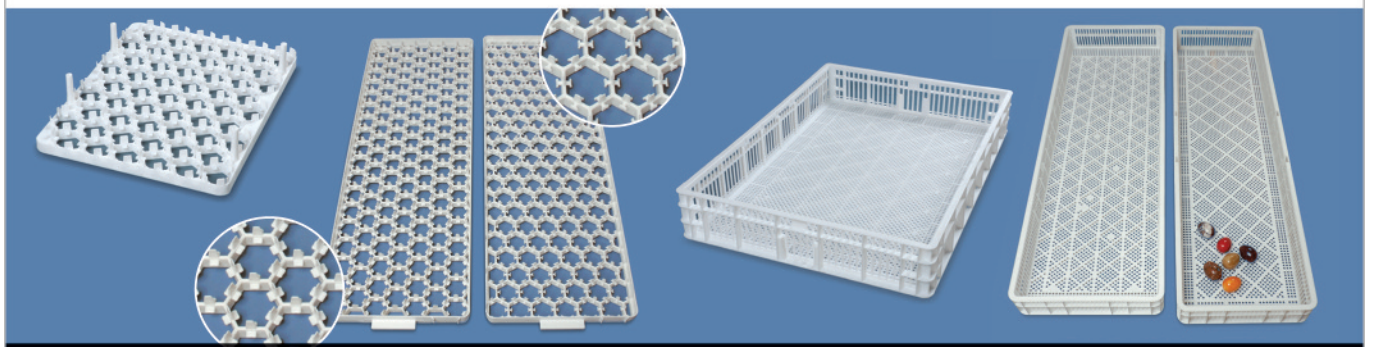
The efficacy of the cleaning and disinfection process must be evaluated routinely through microbiological monitoring. All process areas should be sampled for bacteria and fungus and ideally for viruses.

Ensuring contamination entering the hatchery is low through good biosecurity and processes to reduce contamination levels during the hatch process are key. ■



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4. Employee and animal welfare during turkey AI

by IMV Technologies, France. www.imv-technologies.com

Commercial turkey production has significantly increased over the past 10 years. Along with the increase of the number of turkeys produced, the number of welfare issues has also increased. In recent years, various methods to improve both employee and animal welfare in the turkey industry have been developed.

Different techniques are currently used around the world to artificially inseminate turkeys: group pen breeding and open barn breeding with a chair.

PEN BREEDING

This technique is primarily used when groups of turkey hens are housed together in pens.

The inseminator and the catcher must move around the barn from pen to pen. The catcher picks up the hen from the ground and positions her so she is supported between his legs.

The inseminator, who carries the semen doses, bends over to inseminate the hen as the catcher continues to hold her. Using this technique, a team of five people can inseminate around 800 turkeys per hour.

Employees are exposed to three risk factors that can contribute to musculoskeletal disorders (MSDs) when inseminating with this technique:

- **Repetition:** both the catcher and the inseminator repeatedly bend over; the catcher to pick up turkeys and the inseminator to inseminate.
- **Awkward postures:** the hens are free to walk around in their pen; putting the catcher in awkward positions.
- **Forceful exertion:** after 2,400

inseminations, the catcher has lifted over 7.0 tons.

In the turkey industry, MSDs are responsible for a considerable number of employee injuries and periods of sick leave. Therefore, improving staff welfare is a key concern for many managers in the industry. Using more ergonomic processes and techniques could greatly reduce the number and severity of MSD cases.

The use of an AI chair in conjunction with a pit or ramp are two techniques which have been implemented on some turkey farms to improve employees' working conditions.

HOW USING AN AI CHAIR HELPS IMPROVE COMFORT

This method of artificial insemination is used in systems where turkeys are not housed in group pens. The catcher and inseminator do not move between pens, instead the hens are guided to a centrally located area where the catcher and inseminator are positioned. In some production settings, when comparing pen breeding to this method, a slight decrease in productivity (600 inseminations per hour) was noted.

There are two ways to inseminate using an AI chair:

- **Pit:** The catcher is in a pit with

access to the hens on one side and the inseminator in a chair on the other side. This setup requires the catcher to repeatedly pass the hens from one side to the other.

● **Ramp:** The catcher stands next to the inseminator's chair and passes the turkeys as they are guided up a ramp. This setup requires the catcher to repeatedly rotate his upper torso and bear some of the weight of the hen during the transfer from the ramp to the chair.

Although both methods eliminate the catcher's need to bend down to pick up the hens and hold them between his knees; the catcher is still exposed to some MSD risk factors. With both methods there is still a need to repeatedly twist from one side to the other. And with the ramp method, the catcher must also support some of the hen's weight during the transfer.

The inseminator's working conditions are improved. He no longer needs to stand, bend over or carry the semen doses during the insemination. However, with this method the inseminator must hold the hen between his legs during the insemination, exposing him to injuries caused by the flapping of wings from the hen.

NEW EQUIPMENT FOR OPTIMUM COMFORT

Inseminators and ergonomic specialists have developed new equipment to improve both human and animal welfare during insemination. The most recent system is Gallicomfort, a bench, which allows the insemination team to work at lifting height. The turkeys are guided up a ramp to the insemination bench. The catchers then transfer the hens, one at a time, at lifting height, to the inseminator by sliding them across the bench's table. Because the catcher can slide the hens across the table, instead of lifting them, the amount of weight lifted after 2,400 inseminations is reduced to 3.5 tons, compared to 7 tons when hens are picked up off the ground.

The design of the bench's table also provides adequate room for the catcher to reposition his feet when sliding the hen across the table. This leads to a reduction in the amount of twisting that occurs

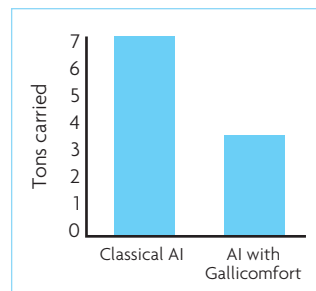


Fig. 1. Results of a study carried out on a turkey farm in Brittany with 2,400 inseminations.

during the transfer when compared to AI using a chair in both a pit and ramp setup. The bench also improves the inseminator's working conditions. The addition of an adjustable stool allows the height of the workstation to be adjusted to the employee carrying out the insemination. The stool reduces the inseminator's exposure to prolonged periods of standing, which are often associated with back pain. Furthermore, the incorporation of an ergonomic armrest places the inseminator's hand at the correct height, reducing strain on the shoulder.

It also allows him to easily guide his arm from the straw filler to the hen for insemination.

By incorporating this system, turkey farms can maintain or improve their productivity levels; a team of five should be able to inseminate 700 turkeys per hour.

Improving employee welfare and maintaining high productivity levels are not the only factors of production that improve. This system also helps improve the turkeys' welfare.

Housing turkeys in small group pens is no longer needed; they are able to move around freely. The handling of the hens is also more controlled. They are slid across a smooth table and placed directly in front of the inseminator. After insemination, they are released to an exit ramp positioned below the bench.

Human and animal welfare are key concerns for today's turkey industry. Equipment and tools are already available to help improve breeders' working conditions, but room is always available for new and enhanced solutions. ■

Gallicomfort optimises both human and animal welfare during insemination.



Leading the way with their self stacking transport system

Jamesway has been leading the industry with efficient egg to machine systems for many years. A case in point is the remarkable SST (self stacking transport system) which makes it easy for farms to transport eggs to the hatchery without the labour intensive job of retraying the eggs.

jamesway.com

The SST is a time and labour saving system which also allows operators to double the amount of eggs transported with farm racks.

The empty trays 'nest' together reducing the space required to transport them back to the egg supplier. With nesting racks, it requires only one truck to transport the empty racks of two and a half loaded trucks.

Constructed from resilient polypropylene material, the SST flat cushions eggs to protect against breakage. It is highly intolerant to micro-organisms, and easy to clean and disinfect, reducing the potential for disease. Each flat holds 84 eggs and can be used in all Jamesway incubator racks and there is also a system developed for Chickmaster flats. With the SST there is no need

to purchase and dispose of traditionally used cardboard boxes.

Fewer trucks, reduced transportation cost and less breakage add up to increased profit. The SST has been used by satisfied customers for many years and, like all Jamesway products, it is designed to last.



The latest studies have also shown improved hatch results when eggs in storage are turned.

Jamesway racks allow this to be accomplished easily, with systems you already possess. Each rack has its own air cylinder operated turning system which has always been great in the hatchers because a turn failure on one rack does not mean that the entire room is affected.

That same innovative design allows you to easily connect the racks to an air supply in the storage room, implement turning and, when it is time to move to the incubator, just unplug the air supply and reconnect inside the machine.

Protecting your eggs, saving money and increasing productivity is all part of Jamesway's 'Worry Free Hatchery'.



Trays, baskets and trolleys for optimum hatchery efficiency

Good trays, baskets and trolleys are a major prerequisite for an efficient hatchery workflow. They are subject to frequent, rough handling and need to be robust and easy to handle and clean. Petersime offers a complete range of trays, baskets, trolleys and a solution for egg transport.

petersime.com

● Trays

The Petersime setter trays are compatible with all Petersime incubators. The standard setter tray holds 150 chicken eggs. Models for turkey and duck eggs are also available, with capacities of 126 or 63 eggs. All Petersime setter trays hold both small and large eggs.

For larger turkey eggs, Petersime recently introduced the new 60XL tray with larger egg pockets due to the honeycomb structure. The tray offers a capacity of 60 turkey (or duck) eggs and is available in a standard and a stackable version.

The High Density tray for 84 chicken eggs also benefits from the honeycomb structure and can hold 12% more eggs on the same surface. These trays are to be used with the BioStreamer HD incubators, especially engineered for this higher capacity.

They are also available in a standard and a stackable version.

● Hatcher baskets and chick boxes

Petersime's baskets and boxes allow maximum air flow, even when stacked. The choice of materials makes them extremely suitable for industrial washing machines, with rounded ventilation holes for easy cleaning. The depth of the stacked baskets provides maximum chick comfort.

Petersime's universal chick

basket serves both as a hatcher basket and as a transportation box.

Therefore, only one washing lane is required, which saves substantial space and lowers the investment cost.

● Setter, hatcher and farm trolleys

Trolleys are subject to rough handling. Petersime have equipped their trolleys with a solidly welded frame and a protective anti-corrosion coating, so they last a lifetime.

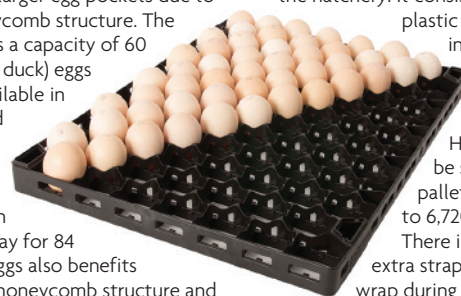
The trolleys are solid, yet ergonomic and easy to manoeuvre. They are mounted on four large wheels, two of which are swivel wheels with brakes.

● Egg transport

Petersime offers a system for egg transport from the breeder farms to the hatchery. It consists of a plastic pallet and intermediate connectors on which Petersime HD trays can be stacked. One pallet can hold up to 6,720 eggs.

There is no need for extra straps or shrink wrap during transport because the system is already solid and stable.

Because the collection of the eggs is immediately done on the setter trays, there is no need for transport of heavy setter and farm trolleys from and to the farms.



Vital innovations in day-old chick transport

Only vital day-old chicks can deliver good results. Hatcheries aim for a maximum number of high-quality day-old chicks with strict biosecurity. They should be delivered to the farms without hidden losses during transport. Compromised transport, which results in reduced welfare and chick quality, is not necessary since Heering offers optimal transport of hatching eggs and day-old chicks worldwide.

heeringholland.com

Heering specialises in the development of technologies for innovative and sustainable transport of day-old chicks. They understand that every chick, in every crate or box, must be transported comfortably at the correct temperature and climate under a uniform air velocity. To establish an optimal climate, Heering has various air distribution designs, which automatically and efficiently regulate ventilation (CO₂ controlled), heating, and cooling.

The latest development is the patented and award winning V-airflow variant (VIV Asia innovation award 2017). This design features enhanced air distribution, uniform airflow and optimum energy efficiency. This airflow variant is often selected for medium sized

day-old chick vehicles, specifically in tropical climates. The energy efficient conditioned air is supplied by a 24-volt ventilation to an overpressure chamber to secure an even climate. The V-airflow guarantees an identical volume and equal low-air speed per chick box. The trolleys and rails ensure excellent fixation of chick boxes, and after easy removal the truck is ready for hatching egg transport.

Furthermore, biosecurity is ensured by the design, which includes a smooth floor that makes it easy to clean and disinfect.

On board disinfection and easy to clean stainless steel filters further improve hygiene.

Trucks can be followed by Heering Link that enables real-time climate monitoring. In addition to observing temperature, relative humidity, and CO₂, Heering Link provides insights into geographical and technical parameters. Heering trained users are optimally prepared for their work and supported by real-time diagnosis of the installation to ensure an optimal journey.

Customers can use the obtained data to optimise their day-old chick transportation, and further improve their supply chain. The next step is the data exchange within the poultry chain – allowing hatcheries, transport, and farms to perform even better together.

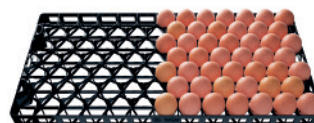


Tray and basket combination for stronger and healthier chicks

HatchTech's new HT88 setter tray is specially designed to maximise the surface area of the egg that is exposed to the airflow.

hatchtech.nl

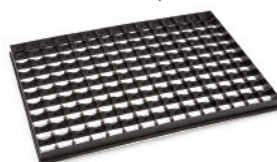
In the HT88 setter tray, the egg is cradled by three support points which hold the eggs higher in the tray. Together with the four curved sides of the housing, this exposes the maximum egg surface to airflow. The result is that transfer of heating and cooling to the eggs is more efficient, and the embryo temperature is perfectly controlled.



The unique, patented honeycomb structure of the grid makes it possible to house 4,725 eggs per m² – more than any other tray on the market today. The tray is made out of durable and high-quality material, is perfect for automation and can be used for hatching eggs of all sizes.

● HatchTech 150 setter tray

Are you tired of breaking 150 setter trays? The strong and flexible design of the HatchTech 150 setter tray makes it the most qualitative and



unbreakable choice on the market. It is also able to replace any brand of 150 tray.

● HatchCare tray and basket

For improved living conditions and more animal-friendly production HatchTech offer their HatchCare tray and basket.

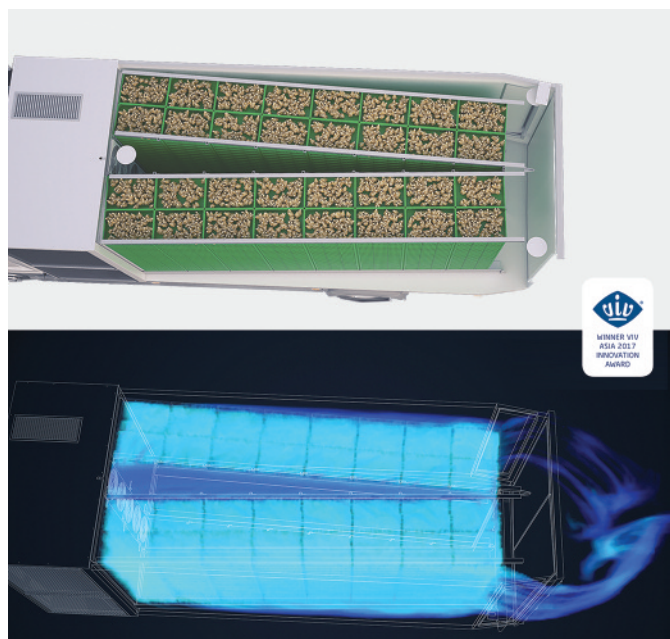
Chicks that are hatched in HatchCare are completely supplied with the basic necessities of life – light, water and feed. But the system also delivers other advantages that improve the chicks' living conditions in early life, which benefit them in a variety of ways: the HatchCare tray/basket combination.

In HatchCare, newly hatched chicks enter a separate HatchCare basket via one of the open spaces in the HatchCare Tray. Immediately after hatch the chicks have ad-lib access to feed and water from the HatchCare basket and will be exposed to gentle illumination.

In addition, they will enjoy 40% more space and freedom of movement compared to traditional systems, since they will no longer be surrounded by eggshells.

Chicks stay in the HatchCare basket they have hatched in until they arrive at the farm. Separators and chick counters are no longer required.

All these advantages result in a quiet, more peaceful environment and leads to healthier and stronger chicks. This fits well with modern demands for more animal-welfare-friendly production with a lower mortality rate and a reduced need for antibiotics throughout their lifetime.





Transport more chicks thanks to lightweight materials

The Ultralight from Veit is a new 3.5-ton van for transporting day-old chicks that has been built exclusively with lightweight materials. The overall design, together with every part of the van, has been redesigned to reduce the weight. Thanks to this, it can transport 45% more chicks than the previous model or common vans.

veit.cz

Common 3.5-ton vans offer a maximum payload of 750kg. Adding the driver and fuel makes the payload even lower, so the use is very limited. In comparison, the Ultralight can load up to 1,000kg, so approximately 16,000 chicks can be

transported (driver and fuel included). This makes it perfect not only for small hatcheries, but also for the big ones that need to transport small batches between two hatcheries or more chicks than one big truck can load.

The key benefits include:

- Transporting 16,000 chicks makes the 3.5-ton suitable for small and big hatcheries.
- Small van below 3.5 tons can be driven by every driver.
- Transport of chicks in the Ultralight is faster without mandatory breaks, so the chicks are less stressed.
- Powerful 3D airflow coming from big trucks ensures perfect quality of the chicks.

Table 1. Payload without driver

Model	Payload (kg)
Common van	750
Veit Ultralight	1,000

The latest 150-egg tray innovation offers excellent results

With many installations now to date, EmTech equipment has shown consistently excellent results, especially from eggs set from younger and older flocks.

emtech-systems.com

Through progression and innovation, EmTech has recently launched a new product range, utilising the 150-style egg tray that has been offered by its competitors within Europe for many years.

With the recent launch of the EuroTech product range, many more customers can now benefit from the 'EmTech Effect'.

The new EuroTech product range, as well as the 150-egg tray system, can also facilitate the half size tray systems such as the honeycomb 84 egg tray, offering even greater flexibility and egg density with these tray types.

The EuroTech trolleys have been designed to take all sizes of the European 150 and half tray size for total hatchery automation and compatibility.

EmTech has now one of the most diverse product ranges of all suppliers with its ability to supply hatchery equipment for all the most widely used tray types throughout the world.

The EmTech Effect is a phenomenon that has been spreading throughout the poultry industry. The success of EmTech

equipment is all about the temperature uniformity within the egg mass.

This unique single stage incubator benefits from the air only having to pass through one trolley depth. This not only means that there are no obstructions but also negates any risk of hot or cold micro-climates forming within the egg mass.

To a wider or lesser extent, incubation systems will have many micro-climates within the egg mass. Therefore, the key to producing the best performance is to ensure that these temperature differentials

are as minimal as possible.

EmTech systems provide a temperature bandwidth of no greater than 0.6°C within the egg mass. The benefit being that all developing embryos experience the same environmental conditions meaning they all hatch within a very short hatch window – this is the EmTech Effect.

The EuroTech setter product range offers many features such as the individual trolley 24v IP66 actuator turning for consistent turning angles, individual trolley identification and turning failure notification as a major advantage over mechanical communal turning systems.

The new EuroTech setter trolley is lightweight, possessing a robust, aluminium frame with stainless bearings and bushes.



Hatching eggs day old chicks



1, Parc d'activité - 50160 Guilberville - France
 Off +33 (0)2 33 05 59 49 / Mobil +33 (0)6 03 90 69 05
pierre.hubertsa@orange.fr

www.couvoirhubert.com

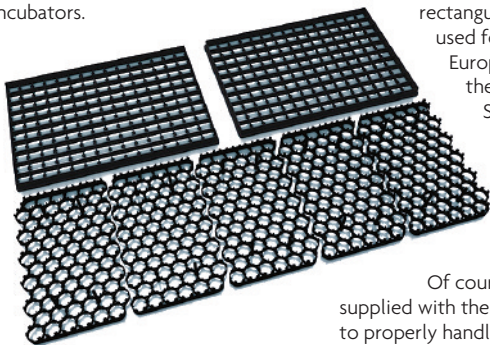
Incubators with more tray capacity with the same great hatchability

The financial advantages are self-evident. Being able to incubate more eggs on a smaller incubator space or footprint means that the total building land surface needed is significantly reduced. The initial investment per incubated egg is less than that with a standard incubator.

emka-incubators.com

Furthermore, the energy requirement per incubated egg is further reduced when using the Teggnologic27 free cooling option (available in climates where the outside temperature is often below 24°C; day or night).

The Teggnologic27 is the famous 'Dry Hatch' that allows the hatcher to be dry and free from condensation. It reduces chiller energy requirement through the use of natural cooling by using a Dry Cooler unique to EMKA Incubators.



Moreover, mould, fungal and bacteriological growth are significantly reduced with the Dry Hatch. The condensation-free hatcher accelerates the newly born chicks drying time. Faster drying chicks mean faster closed navels, which in turn means healthier chicks.

EMKA Incubators introduced the 72 egg tray a while back. The Super Compact Tray (SCT) allows the trays to be slotted one into the other, five trays per level and 16 levels high. It gives the reinforced trolley a new capacity of 5,760 eggs per trolley.

The capacity of the setter has now increased from 115,200 eggs to 138,240. This brings the single-stage capacity to

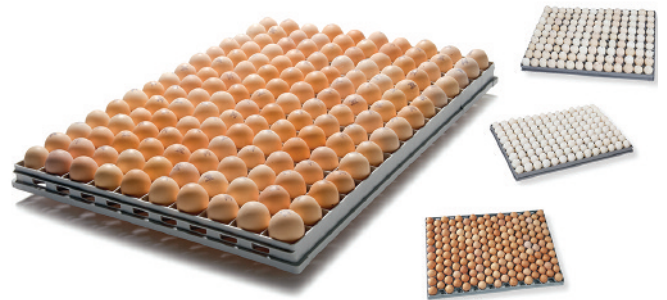
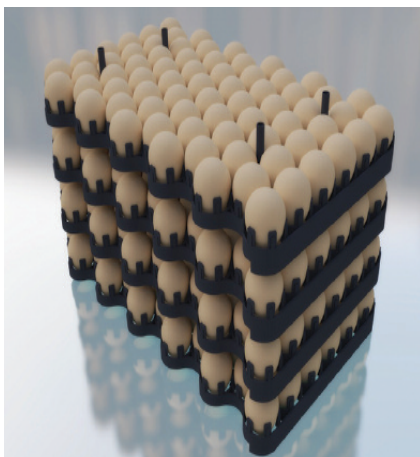
one of the highest on the market today while still keeping quality of incubation.

The SCT is now stackable and the advantages are numerous.

- The eggs can easily be collected on the farm.
- The full trays are easily manipulated by the staff.
- The trays can be stacked onto a pallet for easy transport to the hatchery.
- They are easily loaded on farm trolleys or setter trolleys even by smaller people.
- Fumigation of the eggs can be done either on the farm or upon reception of the eggs in the hatchery. The biosecurity is therefore increased significantly because the eggs do not need to be handled in the hatchery prior to them going into the coldstore.
- Can be fully automated.

Contrary to large rectangular trays often used for compact trays in Europe, the weight of the EMKA Incubators SCT-72 stackable tray is such that it requires no effort to carry the trays and place them on the farm trolley.

Of course the incubators supplied with the SCT are adapted to properly handle the trays. They come with strengthened trolleys and castors, a reinforced turning system, extra heating for the setters and adapted cooling tubes for the increase in the hatching eggs' heat production.



Creating uniform airflow for enhanced embryo growth

Genetic selection for high post-natal growth has altered the patterns of development and rates of biosynthesis in modern embryos. In the egg, this results in ever higher levels of metabolic heat production, which needs careful management in the setter to deliver optimum hatching results.

pasreform.com

Pas Reform's SmartTray setter trays offer unrivalled performance in the modern hatchery. Designed to cradle hatching eggs of any size safely, the open construction is proven to deliver uniform airflow during incubation.

This creates an optimal environment for the growing embryo, to promote day old chicks, turkey poults or ducklings of the highest quality.

There are 10 good reasons to choose SmartTray over 'traditional' trays:

- One size fits all. The innovative design provides maximum protection for hatching eggs of all sizes with specially shaped support points at two levels. This prevents hairline cracks, which is ideal for farm traying.
- The open, spacious grid prevents the development of 'dead spots' and promotes the free movement of air for the uniform distribution of heat and humidity.
- It is the only setter tray to

incorporate Microban antibacterial technology (optional). This remains active on every surface, even after washing, to provide continuous antibacterial protection during storage and in use.

Independent test results show that Microban active technologies in SmartTray kill up to 99.9% of *Escherichia coli*, *Salmonella enterica* and *Staphylococcus aureus*, for the most effective means of combating cross-contamination.

- Suitable for the highly automated hatchery: superior construction, material stiffness and high impact resistance withstand temperature changes and weight load for the lifetime of the tray.
- Stable and self-centre egg positioning. This provides stability and security and is ideal for accurate in-ovo vaccination.
- Safe, secure stacking. The blind-find bottom design means it easily finds its secure locking position for fast, stable stacking.
- Ergonomic design with a lightweight, smooth finish for comfortable, easy handling.
- HACCP compliant. The completely smooth finish prevents the accumulation of dirt for easy, thorough cleaning.
- Space saving honeycomb design for improved cost per hatch. The range of capacities includes SmartTray 162, for the highest number of hatching hen eggs/m² in the setter.

Optionsfor

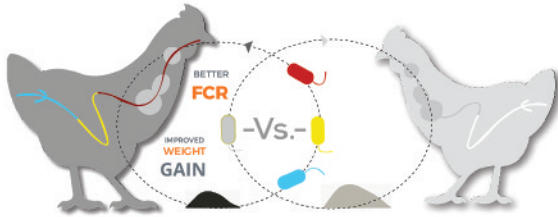
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WWW.VIV.NET



Selection criteria in turkey breeding to meet the needs of the consumer

The turkey industry supply chain flows from the breeders through a number of multiplication phases which culminate in commercial birds being grown and processed and finally sold to the consumer. Primary breeders are at the start of this process.

by Dr John H. Ralph,
Aviagen Turkeys Ltd.
www.aviagenturkeys.com

Delivery of genetic progress from the breeding programme to the end-consumer typically takes around four years. This means the challenges of the industry today had to be anticipated by the primary breeders at least four years ago and the challenges for the future consumers need to be anticipated now.

Turkey primary breeders provide breeding stock free of a number of major diseases. The mainstream market requirement for breed types is principally divided into two segments: the heavy sector where males are typically grown to 19.5-22kg and the medium sector where birds are grown up to 18.5kg. Typical breeds used in Europe include the BUT6 and Nicholas Select for the Heavy sector and the BUT Premium in the Medium sector.

There are a number of smaller, speciality segments across Europe supplying high value birds to meet specific consumer needs. Standard, coloured and slow growing breeds from the mainstream breeders as well as speciality breeders such as Hockenhull Turkeys satisfy the diverse needs of these market segments.

Determinants of criteria

Turkey breeders receive direction from many sources directly and indirectly through a complex web of communication. The job of breeders is to disentangle these messages to distil them into practical selection criteria. The consumer, as the end

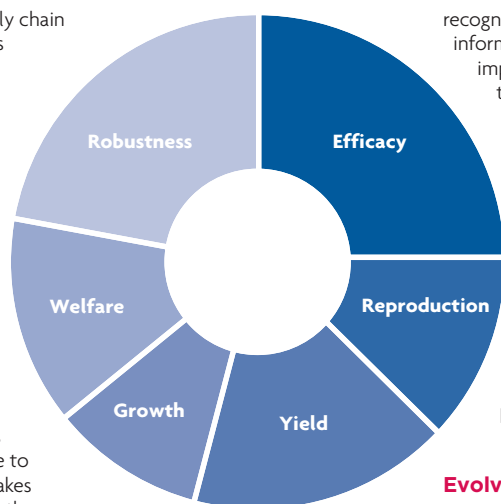


Fig. 1. Example of the balance of selection pressure in different trait criteria in a pedigree turkey line.

purchaser, is the core driver, forming their opinions from a range of sources and these are typically reflected in their purchasing habits which in turn affect the retailers, producer and ultimately the breeders.

Consumer preference research indicates that, alongside the traditional drivers such as price, there is an increasing emphasis on evolving drivers such as health and wellness, safety and social impact. Transparency is increasing in importance as consumers want to know more about their food and how it is produced.

Within the primary breeding operations, many of the consumer preferences have been incorporated as selection criteria for their genetic lines, as breeding companies have moved from a focus on productivity related traits towards multi-dimensional breeding goals. Whilst economic efficiency remains hugely important, there is increasing emphasis on traits related to welfare, sustainability and robustness (Fig. 1).

Historically, primary breeders were cautious about releasing details of their breeding criteria as this is their source of competitive advantage. However, this is changing as breeders

recognise the role they have in informing society of the improvements being made through selective breeding.

Examples of activities now undertaken by the primary breeders include open days for industry stakeholders, publication of results of breeding research, sharing information at conferences and participation in a range of research programmes and working groups developing policies on turkey production.

Evolving needs

Integrating expanding consumer needs into the breeding programme requires the primary breeders to continuously search for more accurate ways to collect data, and analyse data for different purposes and for new traits. Some selected examples of these challenges are: progress in sustainability, improving gut health and robustness and application of genomics.

Sustainability is an evolving need of increasing importance to the consumer. Sustainable resource utilisation is a by-product of growth, FCR, poul production and liveability traits, which have been incorporated into the breeding programme for many years and whose selection has evolved with the adaptation of new technology and analysis techniques.

As an example, the turkey of today compared to the bird of 1993 is 3.9kg heavier at 20 weeks and 48 points more efficient in FCR to 21kg (BUT6 performance objectives).

These improvements have direct effects on sustainability as less feed is required to produce the world's annual requirement of 5.4 million tonnes of turkey meat. The reduction in feed means fewer road trips to collect raw materials and deliver feed and the valuable land resource requirement to grow cereal crops is reduced.

Furthermore, the use of life cycle analysis modelling highlighted the importance of feed efficiency in reducing the environmental impact

of turkey production. Use of animal medicines in agriculture have come under increased scrutiny due to concerns about antimicrobial resistance and the lack of new antibiotics being approved for human use. Turkey producers are being required by government intervention to dramatically reduce their usage of these treatments, much of which can be done through improved management.

As an example, antibiotic use in the German turkey industry has declined by 40% since an antibiotic use and improvement system was introduced in 2014 by the Federal Office of Consumer Protection and Food Safety. This has largely been through improvements in bird management but breeders also contribute to reduced antibiotic use through the selection of birds which are generally more robust i.e. birds which have good overall fitness and vitality across a wide range of production environments. Gut health, skeletal strength and immune function are key components.

Water consumption

Water consumption is an indicator of gut health and functionality and has the benefit of improving litter conditions and footpad health. Birds are responsible for most of the moisture found in the barn.

Whilst most birds consume on average around 1.65 litres/kg liveweight at market age, some birds consume considerably more. Around 20% of water consumed is assimilated; the rest is exhaled or excreted.

Selection against excessive water consuming birds has resulted in around a five litre per bird reduction in consumption since we began the work in 2012. This reduces the amount of water consumed by an average 8,000 bird flock by around 41 tonnes with consequential benefits on footpad health and litter use.

Leg health is assessed through a combination of traits such as gait scoring, x-raying with the lixoscope to identify clinical and subclinical tibial dyschondroplasia, scoring of

Continued on page 23



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Continued from page 21
angular leg deformities and footpad health.

Multi-environment selection is used to overcome the breeder's dilemma of needing to ensure biosecurity of pedigree birds whilst addressing the need to identify birds which underperform in more challenging environments.

This is done by placing pedigree siblings in a separate farming system where they are grown in conditions seen in commercial farming environments.

Measurements are made in both environments and the data is used in the genetic evaluation and selection. This allows the identification of birds with the capability to do well, regardless of environment.

The development of genomic selection in turkeys has progressed rapidly since the publication of the turkey genome in 2010.

Lessons from the commercial application of genomic selection in broiler breeding have paved the way for rapid implementation in turkey breeding. In 2016-17, the era of genomic selection in commercial turkey breeding began.

With genomic selection, phenotypic measurements are combined with information at the DNA level to improve the accuracy of predicting the birds with the best genetic potential.

In a proof of concept, genomics results in a 40% improvement in accuracy for feed efficiency through a better prediction for non-phenotyped individuals.

Future selection criteria

In many ways, future challenges will likely be an extension of what we have seen in recent years. An increasing global population will put further pressure on natural resources and so efficient production will remain key.

The drive for reduced medicine use will continue, as will the preference for improved animal welfare.

Particularly challenging areas may emerge for novel traits required to overcome alterations to production systems as a result of legislative changes, for example the banning of infra-red beak treatment.

Novel traits and recording technologies present new breeding opportunities. One example is the use of 3D imaging technology to predict breast meat yield and product quality. This technology has been implemented for broiler breeding and its feasibility in turkeys is being evaluated.

Novel behavioural traits are under evaluation. For example, a by-product of individual feed and water intake evaluations has been the collection of associated behaviour measurements. Whilst these behavioural traits have shown useful heritabilities, their utility needs further exploration.

Breed development

Volatility and uncertainty in the marketplace is becoming the new norm. Climate change, feed price volatility, health challenges and political unpredictability etc have knock-on effects in trade and investment and also on consumer confidence and attitudes.

As breeders, altering breeding direction to meet changed needs takes a long time due to the lag between the breeding operations impacting the commercial birds. Breeders therefore need to be geared to deal with the uncertain times the future market holds. This is handled through development of existing breeds and new breed crosses (Fig. 2).

The current breeds offered by breeding companies cater not only for the existing markets but also new markets. These breeds are improved using broad breeding goals to cover many traits simultaneously and with a strong emphasis on building robustness to deal with a range of current and also emerging production systems or markets.

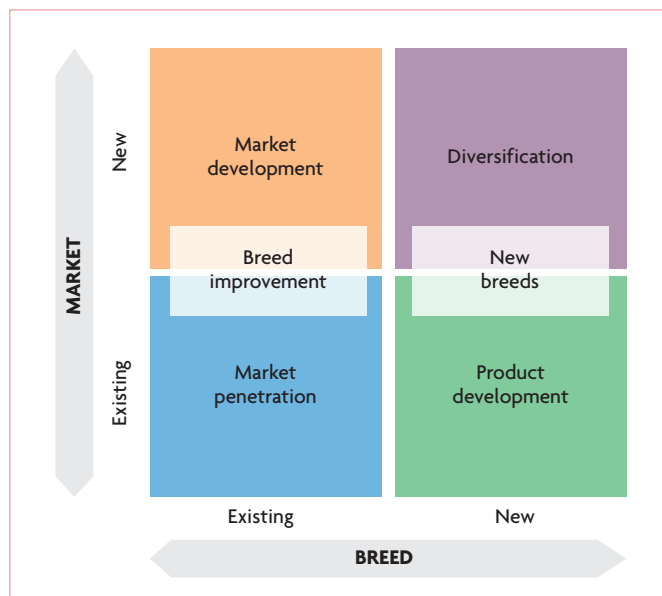


Fig. 2. Breed development strategies.

Testing new breed crosses is performed on a continual basis to see if these are a better fit for existing market needs or suitable for new market segments. To do this, breeders hold additional lines in the breeding programme which are their security to meet future market needs.

Testing of new breed crosses takes many years, starting with predictions based on pedigree line performance followed by small scale testing. If this is successful, larger scale field testing is conducted to fully understand the breed characteristics and develop accurate performance objectives. If all this meets customer needs with sufficient demand from the market then the new breed is launched.

Conclusion

Turkey meat is in direct competition with other protein sources. The future success of turkey meat will rely upon adapting the breeding goals and developing current or new

breeds to meet the developing needs of the consumer.

Through increased transparency and factual communication, the breeder also has a role in shaping consumer preferences.

The future will likely be driven by an expansion of the general challenge to deliver more progress in more traits. These will principally be economic drivers and evolving demands such as sustainability, welfare and robustness.

Some of the future challenges will require investment in innovative breeding solutions. Breeders will also need to adopt breeding strategies to cater for rapid changes in market needs.

To meet the future challenges for a successful turkey industry, there will be an ongoing need to increase investment in turkey breeding and a requirement to recoup part of the additional value generated from the supply chain. ■

References are available from the author on request

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What is the real issue with early feeding of chicks?

Getting day old chicks on feed and water as quickly as possible after they are removed from the hatchers is an area of research that has been very well covered, and has been discussed for decades.

by Dr Keith Bramwell,
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This topic continues to arise in an effort to emphasise the importance of getting an entire group of chicks off to a positive start with proper feeding and brooding of day old chicks. This is usually considered an area of brooding that has been addressed to further emphasise the importance of producers getting the houses ready for the birds prior to the time of their arrival.

Having the proper floor and house temperature is critical to make sure the birds all begin food and water consumption as soon as possible after they are placed in the brooding facility. At this point in time, this is well known and well accepted in the commercial poultry industry. However, there are situations where feed and water are not immediately available to the chicks, such as long transportation from the hatchery to the brooding facility.

In these cases, feed supplements are offered to all the chicks while in the transportation boxes to sustain them until they are all ready to be placed in the houses. However, these

situations are unavoidable, and all chicks are treated uniformly to keep them hydrated and ready to respond when they reach their destination.

Although it has been shown repeatedly that chick growth and development is delayed in relation to the timing of their access to feed and water, there are certainly other factors to consider when discussing when the newly hatched chicks should begin eating and drinking.

Chicks hatching in nature

The day old chick is a precocial chick, meaning that at the time of hatch they are mobile and covered in down so they are able to keep their bodies reasonably warm.

In nature, precocial chicks will attempt to synchronise their time of hatch through a process called 'clicking', where in the last few days prior to actually hatching, the chicks begin communicating with each other through the shell. The attempt is for them to hatch together, as a group, with most precocial chicks hatching within 24 hours or less of each other.

At the time the chicks hatch under the mother hen, each of them is 'equipped' with yolk material to sustain them until ALL the chicks are hatched and ready to begin foraging for food as a group, or clutch.

Although the chicks hatch mobile and ready to forage, they must have internal reservoirs of resources at their disposal while they wait until the mother hen takes all the chicks from the nest to begin foraging for

food. The modern single-stage incubation equipment has provided an environment where chicks are able to hatch within that 24 hour window that occurs under the mother hen (Fig. 1).

The single-stage incubation system and profile is designed to mimic the environment they require at each stage of incubation and development. Therefore, when an artificial incubation system is operating properly, the chicks will hatch within a window similar to what happens in nature.

Commercial production

One of the major focuses of the poultry industry is to attain uniformity to ease management practices. In commercial production systems, producers are managing incredibly large numbers of birds (eggs for hatcheries), and decisions are made based on the average of the group of birds, or eggs.

Average body weight, frame size or other development is NOT the same as uniformity (Fig. 2). It is of critical importance to maintain uniformity in parent stock breeders at every stage of their production. Management programs that are specific to breeders are in place to improve uniformity of the birds such as floor space, feeder and water space, feed allotment, restricting excess light etc. These programs are in place to maximise the uniformity of the young breeders at the onset of

reproduction as well as throughout their productive life. When a larger percentage of birds in a population are closer in fleshing, size and weight to the group average (with fewer outliers), the management programs that are set to cater to the 'average' bird in a flock, will result in increased egg production, more uniform egg size, etc for the entire flock.

Likewise, broiler production systems attempt to rear broilers that are as uniform as possible so a larger number of birds will fit the predetermined bird size and weight at the time of processing.

Excess chick size variation at the time of hatch and placement is always a concern for broiler producers when trying to maximise their performance both early in life and as they are moved to the processing plant.

Customer demands can be very specific for size and weight of the birds and the parts after processing and cutup. Therefore, broiler uniformity at the time of processing is very important, and can be influenced by the uniformity of the chicks at placement.

Feeding of day old chicks: pros and cons

When discussing this topic, maybe the real questions should be focused both on what is natural and what are the real results of early feeding?

In nature, newly hatched chicks do NOT have access to food and water until all the chicks are hatched and

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Fig. 1. Expression of a 24 hour hatch window in single stage incubation.

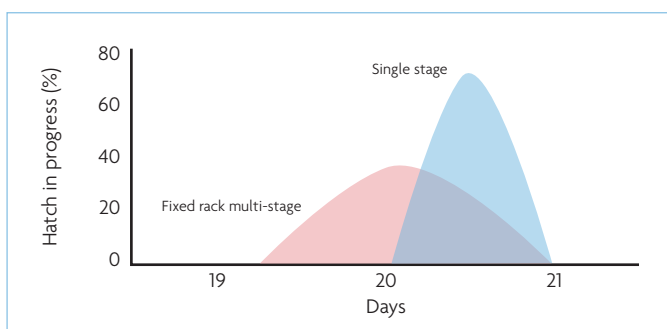
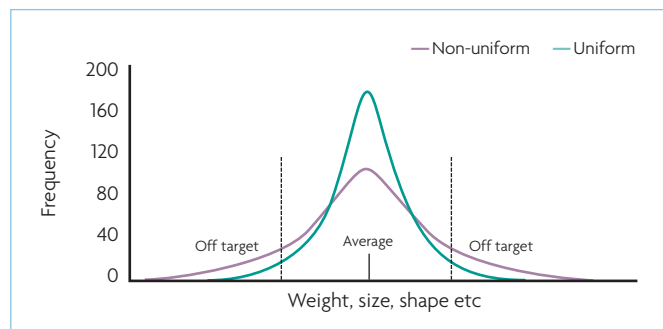


Fig. 2. Comparison of a flock or group 'average' vs 'uniformity'.



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 ready to leave the nest with their mother. At the time the chicks leave the nest, some will have been hatched for more than 24 hours, while some will have been hatched for just a few hours, long enough to dry off and rest.

In commercial, or artificial, incubation systems, the goal is to create a hatch window of close to 24 hours, therefore when the hatch is pulled ALL the chicks can begin their growth phase simultaneously, as they do in nature.

Creating this hatch window helps to keep the hatched chicks as uniform in size and weight as possible. Once the hatch is pulled it is ideal to move the hatched chicks to the brooding farm in a timely manner so they can have access to feed and water as a collective group.

Published research about the effects of delayed feeding are innumerable and all come to the same conclusion, that the time or onset of a chick's access to feed and water will have long lasting consequences. In other words, if birds are withheld access to feed for periods of time their growth trajectory will also be delayed throughout their growth phase in the production facility (Fig. 3).

Likewise, if the earliest chicks to hatch start on feed and water 24

hours or more prior to the last chicks to hatch, the growth trajectory would likely be the same as if chicks are withheld feed.

In an effort to better understand the effects of the timing of when chicks, within a hatch group, begin the consumption of food and water, an initial study was designed.

Early results indicate that when the first chicks to hatch are provided food and water immediately after hatch, they have a higher chick placement weight as opposed to those that did not gain access to nutrients until placement in the brooding facility.

This was expected as the chicks that began food consumption would have food and water in their guts at placement. Additionally, this increased body weight by the first chicks hatched was carried out through three weeks of age, as compared to the control chicks, or those not fed until placement.

Although at 42 days of age the difference in body weight was still numerically higher in the birds that began feeding in the hatchers, it was no longer significantly different. So the birds that had access to food immediately after hatch did not perform better than the control group. Unfortunately, at the time of writing we did not have the data formalised to a point we can

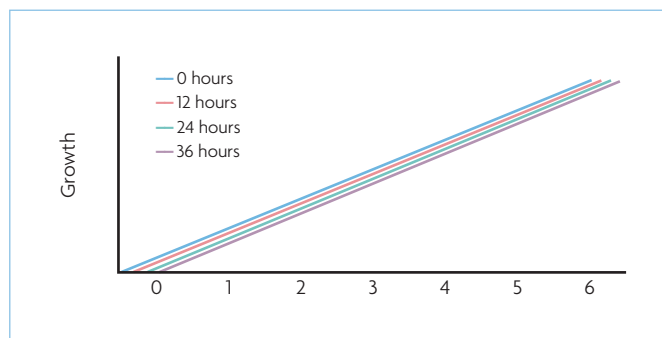


Fig. 3. Growth trajectory when birds are started on feed and water at intervals from 0-36 hours post hatch.

accurately evaluate the differences in uniformity.

Therefore, it stands to reason that considering that each chick was provided with access to feed and water in the hatcher, at the specific time they hatched, that the hatched group of birds would contain a wide range of chicks and time of feed intake.

Some chicks would have been eating food for more than 24 hours, while some chicks only had access to feed for as little as a couple of hours prior to placement. This would create a group of chicks that have variation in weight and activity level before they are even taken to the brooding facility.

As data suggests, this would result in not only an initial variation in chick weights, but potential variation in performance thereafter.

Summary

There is more research on this topic underway, but in the meantime, the potential benefits of feeding chicks immediately after hatch must be compared to the potential negative impacts. However, from our preliminary research, it does not appear that there was any benefit to the practice, with only potential negative impacts on uniformity of bird growth performance. ■

Heat production of chicks with and without access to feed and water

In current practice, chicks are provided with feed and water directly post-hatch more often. When feed and water are available directly post-hatch, heat production of day-old chicks is expected to be increased in comparison to withheld chicks.

by Dr Inge van
Roover-Reijrink, et al,
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To ensure a comfortable environment (combination of air temperature, relative humidity, and air velocity) for fed chicks post-hatch, it is crucial to know how the intake of feed and water affects heat production in the perinatal period.

In a trial described below we investigated the effect of feed and water access directly post-hatch on heat production between hatching and pulling.

Chicks had access to feed and water (early fed) or were withheld from feed and water (withheld) between hatching and pulling.

In two consecutive batches, 120 eggs with a viable embryo were set in one of two climate respiration chambers (CRCs) at embryonic day (E) 18.5 (N=30 per batch per treatment). Eggs of a Ross 308 parent flock of 45 weeks of age were used.

Between batches, treatment was switched between climate chambers to exclude the

effect of CRC. The median of five eggshell temperatures (ESTs) sensors was maintained at 37.8°C until the first chick hatched, whereafter the air temperature was kept constant and EST was allowed to increase. O₂ consumption and CO₂ production were measured per CRC with a nine minute interval and were used to calculate heat production (mW/chick).

Moment of hatch was determined through video observations. Chicks were removed from the CRC after 22 days of incubation (528 hours of incubation), and individual body weight and feed intake per CRC were measured.

From O₂ consumption and CO₂ production, heat production (mW/chick) was calculated. O₂ consumption and CO₂ production did not differ between early fed and withheld chicks until E20.3.

At that moment 80% of the chicks had

hatched. Heat production increased for all chicks as the hatching process progressed until E20.3.

The early fed chicks continued increasing heat production, whilst the withheld chicks plateaued at approximately 340 mW/chick.

Heat production of the early fed chicks was 390 mW/chick at E21, 521 mW/chick at E21.5, and 634 mW/chick at E22.

By pulling time at E22, body weight of the early fed chicks averaged 57.0g, while it averaged 42.7g for the withheld chicks.

In conclusion, heat production of early fed chicks increased with 86% at pulling in comparison to withheld chicks.

The increased heat production of early fed chicks emphasises that it is important to pay attention to environmental conditions in the hatcher, but also during chick handling, chick storage, transport, and after placement in the broiler house. ■

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In ovo feeding of broiler chicks

This Chinese study (*Liv. Sci.* 206 59-64) investigated the effects of in ovo feeding of creatine pyruvate on growth performance, muscle growth and meat quality in broilers.

Some 960 hatching eggs were placed into one of three groups – non-injected control, 0.6ml sterile saline and 0. ml sterile saline + creatine pyruvate – and the eggs were treated on day 17.5 of incubation.

No differences were seen in hatchability between the three groups but the hatching weight, body weight gain and feed intake were greater in the creatine group.

On the farm, the creatine treated broilers had greater total and relative weights, myofibre diameters and cross sectional area of pectoral muscle on days 21 and 42. However, differences were seen in creatine and phosphocreatine levels of pectoral muscles at days 21 and 42 as well as in meat quality between the groups.

In conclusion, it was found that in ovo feeding with creatine pyruvate improved hatching weight, growth performance and pectoral muscle (breast meat) weight of broilers but it did not affect breast meat quality.

Mannan oligosaccharide

This Turkish study (*W. P. S. J.* 73 831-834) reviews the use of mannan oligosaccharide in boiler diets and gives an overview of the underlying mechanisms involved in its functioning.

Mannan oligosaccharide decreases the load of pathogenic bacteria in the gut by:

- Binding bacterial type-1 fimbriae.
- Increasing the number of goblet cells which produce bactericidal mucin.
- Providing a favourable environment for the growth of beneficial bacteria leading to competitive exclusion of harmful ones.

The balance between harmful and beneficial bacteria causes an increase in villus height and a decrease in crypt depth, which are the biomarkers for gut morphological improvement.

As structure equates to function, improvements in morphology increases the activity of digestive enzymes and ultimately improves digestion.

Mannan oligosaccharide's immunomodulatory effect activates macrophages associated with lymphoid tissue and this results in improved cellular, humoral and surface immunity. Mannan oligosaccharide also increases the production of butyric acid and decreases intestinal pH.

It is through these combined mechanisms the mannan oligosaccharide improves growth rate and broiler performance.

Insects as poultry feed

Increasing demand for soybeans is forcing industries to look for alternative sources of protein and environmental concerns over the huge amounts of poultry manure is making the poultry industry think about more sustainable production systems.

This Brazilian review (*W. P. S. J.* 73 928-937) looks at the processing of insect meal as an

alternative protein source to feed broilers. The five desirable features in the selection of candidate insect species proposed by the FAO show that the productivity of biomass, feed conversion efficiency and the organic waste conversion capacity from poultry farms is aided by the use of larvae from housefly and black soldier fly species.

Brazilian production of such insects is favoured by climatic and environmental conditions and has the potential to supply at least part of that country's protein requirement for its poultry industry by using the organic waste from poultry farms as a substrate for fly production. This would also mitigate some of the environmental issues as well as generate income for small farmers.

Vanadium

Vanadium is an essential element in poultry nutrition and this is considered in this Serbian review (*Arhiv Vet. Med.* 10 85-92). It is essential at very low levels of less than 10µg per kg feed.

Excessive vanadium has been shown to be detrimental to egg production, interior egg quality (albumen height), body weight and feed consumption. Excessive dietary vanadium can be linked to phosphorus source.

A recent Serbian survey is reported in which all the vanadium in feed levels were above the minimum requirement but below the maximum tolerable levels.

Amino acids intake for broiler breeder hens

This Brazilian study (*An. Feed Sci. and Tech.* 238 29-38) assessed the optimum digestible valine, isoleucine and tryptophan intake of broiler



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breeder hens by using three concurrent assays. The additional response seen with supplementation of crystalline amino acid confirmed valine, isoleucine and tryptophan were the first limiting amino acids.

The values estimated by the model for utilisation efficiency were 70, 66 and 55%. The available amino acid intakes estimated by the model at 30 weeks were 803, 708 and 232mg per day for valine, isoleucine and tryptophan.

Dietary butyrate and heat stressed layer cockerels

In this Jordanian study (*J. of An. Physiol. and An. Nut.* 101 1115-1121) 360 Lohmann LSL-Classic layer cockerels were used to evaluate the effect of butyrate on heat stress induced intestinal injuries and integrity.

The heat stressed positive control birds showed the highest villi injury scores and levels of serum endotoxin. Inclusion of the dietary butyrate increased intestinal and mucosal weights, villus height, villus surface area, absorptive epithelial cell area and beneficial intestinal bacterial counts. It also reduced heat stress injury to the intestinal epithelia and intestinal permeability to endotoxin.

In conclusion, dietary butyrate exerted positive effects against intestinal damage induced by heat stress and improved intestinal health and integrity.

Optimum in feed amino acid ratio for broiler breeder hens

An ideal amino acid ratio is needed for maximum nitrogen retention, taking into account nitrogen deposition in the body, the feathers and egg mass to improve dietary protein efficiency. The aim of this Brazilian study (*J. of An. Physiol. and An. Nut.* 101 1194-1204) was to use the depletion method to derive the ideal amino acid ratio for broiler breeder hens.

The ideal amino acid ratio was 100:86:23:80:113:90:91:133:108:94:95 for Lys:Met+Cys:Trp:Thr:Arg:Val:Ile:Leu:Phe+Tyr:Gly+Ser and this was in line with literature recommendations, thereby validating the depletion method, which has advantages over other methods in terms of cost and time to perform.

In ovo exposure to omega-3 fatty acids

The content of omega-3 long chain polyunsaturated fatty acids (Ω -3LCPUFAs) in chicken meat can be boosted by feeding broilers a diet containing α -linoleic acid from flaxseed oil, some of which is converted by hepatic enzymes to Ω -3LCPUFAs.

However, most of the accumulated n-3 polyunsaturated fatty acid in meat tissues is in the form of α -linoleic acid. Despite this, broiler diets are being enhanced by including vegetable and marine sources of omega-3 fats.

This Australian study (*J. of Devel. Origins of Health and Dis.* 8 520-528) was undertaken to investigate whether the capacity of chickens for Ω -3LCPUFAs accumulation could be enhanced or

inhibited by an exposure to an increased supply of α -linoleic acid or Ω -3LCPUFAs in ovo.

Breeder hens were fed flax seed oil, fish oil or tallow based diets. The newly hatched chicks were fed the flax seed oil or low tallow (n-3PUFA) control diets.

It was found that the n-3PUFA content of the egg yolk and day old chick meat closely matched the n-3PUFA content of the maternal diet,

whereas the n-3PUFA composition of breast and leg meat in 42 day old broilers closely matched that of the broiler feed.

There was an inhibition of Ω -3LCPUFA accumulation of meat of broilers from the maternal fish oil group that were fed post hatch on the high α -linoleic acid and an accumulation in the meat of broilers from the maternally fed fish oil group.



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Sample size for egg break-out 87

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by Lotte Hebbink, Incubation Specialist, Pas Reform Academy

Egg break-outs are often part of the routine of a hatchery. As the procedure for these is time consuming, the findings are usually based on a limited sample size.

Suppose that a hatchery manager wants to test a new incubation program intended to reduce the percentage of externally pipped but not hatched embryos – called dead-in-shell embryos. The eggs are placed on a 150-egg tray and transferred to one hatcher basket after candling. During chick pulling, three hatcher baskets are randomly picked from a hatcher and the number of externally pipped eggs is counted. The sample size in this example would be 450 eggs (150x3). Suppose that the hatchery manager counts a total of nine dead-in-shell embryos during the break-out, which amounts to 2% of this sample. How sure can one be that this 2% within the sample is a reliable estimator for the whole hatcher?

Table 1 provides an overview of different sample sizes, showing the prevalence of a certain parameter of interest and the corresponding confidence intervals. Confidence intervals express the accuracy of the average that you obtain from your sample.

From the table you can see that using a sample size of three baskets with 2% prevalence of dead-in-shell gives a confidence interval of between 0.9% and 3.8%. If the hatchery manager wants to reduce the dead-in-shells by 1 or 2%, it becomes clear that a confidence

interval from 0.9% to 3.8% is quite large in this case. If the sample size is 12 baskets, the interval will be reduced to between 1.4% and 2.8%, which provides a more certain indication that the real average of the whole batch is 2%.

Of course, before doing the break-out we do not know what the prevalence of the parameter of interest will be. Let us assume that the worst-case scenario is 5% (which amounts to 7.5 eggs per basket). Define your acceptable level of uncertainty in advance, for example $\pm 1\%$. Read in the table how many baskets you need; in this case it will be 12 baskets as this gives a confidence interval of 4.0-6.1%. If the prevalence turns out to be lower than 5% (for example 1%), then the confidence interval will improve to between 0.6% and 1.6%.

To conclude, the larger your sample size, the more confident you can be that your break-out data reflects reality. Bear in mind that the calculations in Table 1 are only an approximation of reality. The calculated confidence intervals do not take into account large biological variation for example.

Advice

- If possible increase the number of baskets used for the break-outs. This will increase the value of the data.
- Do not take all the baskets from just one hatcher dolly. If possible, try to sample from the whole hatcher.

Table 1. 95% confidence interval (Clopper-Pearson exact method). The calculations are based on 150-egg trays, which are transferred into 150-egg baskets. The homogeneity of samples was assumed, although this is not completely accurate because there is always a certain amount of biological variation.

Sample size	1% prevalence	2% prevalence	5% prevalence
3 baskets	(0.4;2.6)	(0.9;3.8)	(3.3;7.6)
6 baskets	(0.5;1.9)	(1.2;3.1)	(3.7;6.6)
12 baskets	(0.6;1.6)	(1.4;2.8)	(4.0;6.1)
24 baskets	(0.7;1.4)	(1.6;2.5)	(4.3;5.8)
48 baskets	(0.8;1.3)	(1.7;2.4)	(4.5;5.5)

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internationalnews



The Miamys Poultry Company in Tunisia will be purchasing Jamesway multi-stage machines for their upcoming hatchery project. The contract was recently signed at the Canadian Embassy in Tunisia with Canadian Trade Commissioner, Philippe Armengau, in attendance. Jamesway is proud to be adding another country to their list of over 180 international clients. The large Tunisian company has been involved with breeder, turkey and layer production and will be expanding with this new hatchery. The decision to use Jamesway was solidified after a successful visit to Poland where the Miamys Team was able to tour the Cedrob Hatchery, the largest hatchery in the world and an enthusiastic Jamesway client. Along with a complete line of setters and hatchers, the Tunisian operation will also feature some of Jamesway's automatic hatchery equipment and Hatchcom Data Retrieval System.

jamesway.com

Hatchery Production Management School



Aviagen recently hosted its 2018 Hatchery and Incubation Management Module of the Production Management School for Europe, Middle East and Africa (EMEA) in Budapest, Hungary.

Combining theory with hands-on learning, the module's curriculum was designed to provide attendees with the knowledge and insight needed to achieve optimum hatchery performance.

While this is Aviagen's sixth Hatchery and Incubation Module, 2018 marked the school's third consecutive year in Hungary, a country with a strong poultry industry.

Aviagen Incubation Specialist Eddy van Lierde kicked off the school with an introduction followed by an interactive incubator-building exercise, which was a major highlight for students.

During the exercise (shown right), students built a makeshift incubator, in which they placed fertile eggs to care for and monitor for the duration of the course.

Other important agenda items for the module included:

- Fertility and hatching egg care.
- Science of incubation.
- Ventilation, calibration hatchers.
- Incubation, chick quality and growth.
- Biosecurity and problem solving.

The sessions were presented by highly qualified experts in their field specialising in incubation, hatcheries, customer service and flock husbandry from Aviagen, academia and the wider poultry industry.

Outside the sessions, students enjoyed the opportunities to learn from one another, exchanging ideas and experiences and fostering valuable professional relationships.

aviagen.com





Solutions for South India

 Leading Indian agricultural company Royal Agro Farm is expanding into poultry production for the first time and has chosen integrated hatchery solutions specialist Pas Reform to equip its hatchery with SmartPro technologies.

The state-of-the-art facility, at a 400-acre site in Udumalpet, Tamil Nadu, is a key part of the new poultry business, which also includes breeder growing facilities and breeding farms.

"Pas Reform's reputation locally made it easy for us to decide on SmartPro equipment for this project," Royal Agro Farm Managing Partner, Mr M. S. Sunther, told International Hatchery Practice.

"We knew about the engineering capability of the Pas Reform group and we have been in close contact with them to plan the hatchery layout and make technical project calculations, to ensure we can both optimise incubation conditions and maximise chick quality."

The project comprises a first phase of 400,000 day-old broilers per week divided over four hatches. It entails 12 SmartSetPro setters, each with a capacity of 124,416 hatching eggs, and 12 SmartHatchPro hatchers, each with a capacity of 20,736 hatching eggs.

This fully integrated hatchery

project also includes climate control and automation systems. The heating, ventilation and air conditioning (HVAC) system has been tailored to specification by Pas Reform engineers, and it includes air handling units, air ducting, pressure controls and temperature controls. Royal Agro Farm has also chosen to significantly automate the incubation process, with automatic candling and transfer systems and an automated chick-counting system.

Pas Reform's SmartCenterPro hatchery management system will deliver precision process control and provide detailed hatchery management information, analysis and reporting.

Venkitakrishnan Natarajan, head of Pas Reform's sales and service centre in Tamil Nadu, says: "The poultry market in India was difficult for several years, resulting in lower than average company returns. More recently, however, the market has recovered as poultry consumption has increased – particularly in Tamil Nadu and nearby Kerala. Tamil Nadu's producers now have an excellent opportunity to grow their business. Kasturi Poultry Farms, associates of VH Group, also showed particular interest in Pas Reform's integrated hatchery solutions."

The whole project will be operational in August 2018.

pasreform.com

Jamesway's online parts website



Jamesway has recently launched an online parts website. A large team of Jamesway staff has spent many hours imagining and implementing an on-line solution to the complicated process of quoting and ordering parts. Now hundreds of parts are on-line and can be easily accessed from a computer, handheld device or tablet.

The site offers all Jamesway's clients product information and graphics, a quote request tool, and access to 'My Account' with value added features such as saving a favourites list, viewing quote request history and more.

Search for products by part number, keyword or use their machine category tree to narrow it down. It is currently available in English and Spanish.

jameswayparts.com

HOW TO CALIBRATE AND USE TEMPERATURE READINGS

Over the last 20 years, the importance of controlling embryo temperature, as indicated by egg surface temperatures (EST), has become well understood. It is now very simple to record EST, using miniature data loggers with an external flexible thermistor probe, such as Tinytag made by Gemini Data Loggers (www.gemindataloggers.com).

Temperature loggers will save records of EST within a setter, the data can be analysed and displayed in different ways and the record can cover the entire time eggs are in the setter. Their unit cost is low enough that several can be set up in a machine to assess temperature variability.

Their main disadvantages are that the loggers cannot be read in real time (newer models can be read in real time through a wifi or radio link, but they are more expensive), the records are accurate only to 0.5°C and the probes cannot be recalibrated by the user. However, there is a way to check a batch of loggers so that differences between loggers can be identified and corrected as necessary.

Checking between-logger variability

Tinytags do not have a calibration option. However it is possible to check the variability of readings obtained within a batch of loggers, and correct the temperatures recorded using a simple excel calculation. For this purpose:

- Identify each thermistor/logger with a number.
- Hold all the thermistors together using adhesive tape and place them into a setter containing 2-4 day eggs for at least an hour (as shown in the picture below).



- Download and export the data from all the loggers into Excel.
- Calculate the average temperature readings of the last 30 minutes for each logger.
- Take one logger as the reference (the one closest to the average) and calculate how much each of the others loggers differ from this reference probe.
- Install the loggers in a setter for a full run.
- After completing the run, apply corrections to each logger before any further analysis.

Once corrected, the EST values can be plotted versus time, to show where hot and cool spots lie within the machine, and also how temperatures change and become more variable during incubation.

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Polish hatchery agreement



An official signing ceremony took place during the recent VIV exhibition in Utrecht for the construction of what will soon be the largest independent hatchery in Poland: ModernHatch.

Six years ago, HatchTech and ModernHatch both signed their first agreement related to a turnkey hatchery with a capacity of 65 million day old chicks per year.

Due to the increasing demand for high quality day old chicks in the Polish poultry market an expansion was required. After several research visits in Holland, Germany, and Canada, ModernHatch became fully convinced of HatchTech – HatchCare, the hatcher with feed, fresh water and light.

The priority is to receive the best quality day old chicks, which matches perfectly with the companies' vision to produce the best possible day old chicks



available. For the production of the perfect day old chick, you need the best breeder flocks, hatchery staff who work with passion, dedication and enthusiasm and, early feeding and drinking via the HatchCare system.

"The project is state of the art. We will be installing the best setters in the world, in combination with HatchCare. And we do not stop there. Even during transport the birds will still have light and feed available," Patrick van Maanen of HatchTech told International Hatchery Practice.

After construction of the expansion, the new hatchery will have final capacity of 165 million eggs per year. The hatchery will at final stage use 84 HatchTech MicroClimer Setters 126720, 18 MicoClimer Hatchers (traditional) and eight HatchCare.

In addition, ModernHatch has chosen to install a HatchCare Chick Storage room that will provide the birds with feed and fresh water during the waiting period between processing and departing for transport. Last but not least, HatchTech supplies its new HatchTraveller – which includes the fresh air on chick level, and the LED lights at chick level.

hatchtech.nl

Cobb Germany: 20 years and counting



More than 80 international guests recently met in Munich to celebrate the 20th anniversary of Cobb Germany, which today distributes the Cobb breed across 21 countries of Central and Eastern Europe.

In 1998, Cobb Germany began to distribute Cobb500 parent stock in Germany, Austria and Switzerland and within a few months hatched its first chicks produced from just four grandparent farms.

Now, you can multiply the number of farms by 10 as the company has grown to supply European and international markets.

Executives from around the world – Joel Sappenfield, president of Cobb Vantress; Roy Mutimer, vice president for Europe, Middle East, Africa and Asia-Pacific; Mark Sams, Cobb Europe general manager; Rafael Gil, Cobb Spain general

manager, and Konstantin Tishenkov, managing director of Cobb Russia – were invited by the Cobb Germany founders and owners Gerhard and Ulrich Wagner and managing director Leopold Graf von Drechsel.

Many Cobb Germany team members, old companions and partners who have played a role in the growth of the business joined this special event.

With hatcheries near Leipzig and Budapest, the company now produces more than 14 million chicks a year.

cobb-europe.com



World-class hatchery



On a greenfield site near Warwick in Queensland, Australia, a truly world class hatchery recently opened its doors. Less than a year after the kick-off of the project, Allora hatchery is now all set to deliver the best results yet achieved in the history of the Darwalla Group.

Darwalla is a fully integrated poultry producer comprising feed mills, hatcheries, parent farms, broiler farms and logistics.

Although the business started small back in 1933 by the Benfer family, the company nowadays grows more than 25 million birds a year in a still expanding market.

After 83 years of business, Darwalla

continues to be a key player as one of the largest Australian privately owned poultry producers. To ensure their continuous growth, they decided to replace their 50-year old Mt Cotton hatchery by building a brand new facility at Allora.

"At peak production we can produce 800,000 chicks per week in the Allora operation," David Bray, Development Manager at Darwalla, told International Hatchery Practice. "Our Petersime BioStreamer High Density incubators with Operational Excellence Technology are a good fit for Darwalla. We are convinced that we got the right plan and products for a highly automated operation.

"The Petersime BioStreamer™ High Density setters ensure precise control of embryo temperatures and this feature ensures that the correct temperatures are maintained for all age of donors, thus improving hatchability and liability, whilst reducing energy use and improving the cleaning and overall maintenance of the machines," David added.

petersime.com



For 25 years, Aviagen has enjoyed a highly successful relationship with Wadi Group, the Ross distributor in Egypt. Wadi Group is a leading Egyptian agribusiness company and celebrated its alliance with the Ross brand by holding a Wadi Poultry Forum in Cairo. Aviagen executives attended the forum, along with Wadi Group's senior management team and key Egyptian parent stock and broiler customers. "We were delighted to be invited to this significant event," Tom Exley, president Turkey, Middle East and Africa (TMEA), told International Hatchery Practice. "Our long-term distributor relationship with Wadi Group is an important part of the Ross strategy in Egypt, and we are very grateful to them for their ongoing confidence in the Ross 308." Tom also praised Wadi Group's hard work and dedication to securing excellent Ross performance in Egypt: "We are impressed with the massive growth of the Ross brand in Egypt over the years and delighted with Wadi's ongoing expansions, particularly in the state-of-the-art grandparent facilities in the far south of Egypt, away from all the poultry populations of the country to ensure the highest biosecurity standards."

aviagen.com

First hatch for Fakieh Farms



Jamesway and Fakieh Farms, one of Saudi Arabia's largest poultry producers, are very pleased with the first hatch from a newly expanded project in Makkeh City – the Shaddad Hatchery.

This expansion to one of their original hatcheries involved 10 Platinum P120 single-stage incubators and six Platinum P40 hatchers.

The expansion increased the company's total output to one million chicks per day. The first hatch had an impressive 'hatch of fertile' rate of 92%.

For over 40 years Fakieh Farms has entrusted their hatching requirements to Jamesway Incubator Company and all five hatcheries use Jamesway equipment exclusively.

Fakieh will be sending staff for special training in Canada this September to prepare for their next project, the biggest hatchery in the Middle East, which is now in the planning stages.

It will hatch 250 million eggs per year from one facility.

jamesway.com

MSD Animal Health partners with Vinovo



MSD Animal Health has announced a partnership agreement with Vinovo BV, a division of the leading hatchery automation company, Viscon Hatchery Automation.

This synergistic partnership, which was announced during a signing ceremony at the VIV Europe World Expo, will bring together MSD Animal Health's unique broad vaccine product line and Vinovo's novel vaccine delivery system to provide a new standard in safe and effective in ovo vaccination, thereby improving bird welfare, reducing vaccine reactions and providing greater protection for chickens.

"This is a true partnership, bringing together our broad vaccine portfolio which protects poultry against highly infectious diseases with Vinovo's top-of-the-line novel delivery system technology to help poultry growers around the world," Taylor Barbosa, Executive Director, Global Poultry Marketing, MSD Animal Health told International Hatchery Practice.

msd-animal-health.com



Jamesway has announced a deal with CAAP in Saudi Arabia for a new hatchery expansion in the Southern Province of King Dam. The project will ultimately hatch 80 million broiler eggs each year and represents an expansion of the company's original Jamesway equipment, which was installed at the launch of the hatchery seven years ago. The operation is located at 500m above sea level in very humid conditions so the continued use of Jamesway machines is a reflection of the confidence in the versatility and reliability of Platinum machines shared by hatchery owner, Dr Abdulla Ben Kedman and hatchery manager, Mahmoud Abd El Salaam. Jamesway has provided equipment to many hatcheries in geographically demanding locations, including the Amazon jungle, the Cordillera mountain range, the high Rocky Mountains and the Mongolian steppe. Platinum Single-Stage machines are extremely versatile and easy to program so they adapt well to a variety of extreme weather conditions. The first hatch will be expected in August 2018.

jamesway.com



2nd International Conference on Necrotic Enteritis

11-12th July
Denver, Colorado, USA
www.aaap.info

SPACE

11-14th September
Rennes, France
www.space.fr

VIV China

17-19th September
Nanjing, China
www.vivchina.nl

European Poultry Conference

17-21st September
Dubrovnik, Croatia
www.epc2018.com

Bangla Livestock

20-22nd September
Dhaka, Bangladesh
www.banglalivestock.com

WVPA Asia Meeting

1-2nd October
Kuala Lumpur, Malaysia
www.wvpaasia2018.com

Vietstock

17-19th October
Ho Chi Minh City, Vietnam
www.vietstock.org

Agrena

25-27th October
Cairo, Egypt
www.agrena.net

Eurotier

13-16th November
Hannover, Germany
www.eurotier.com

Poultry India

28-30th November
Hyderabad, India
www.poultryindia.co.in

Expansion in Kazakhstan



Kazakhstan's Makinskaya Poultry Farm is expanding with a major new greenfield hatchery equipped with SmartPro integrated poultry solutions from Pas Reform.

The technologically advanced facility, located in Makinsk in the Akmolinsk region, will bring the company's total incubation capacity up to 32 million eggs per year.

At present, Makinskaya operates a hatchery, eight broiler farms and a processing plant, but its target is to achieve 50-60% share of the domestic market. The new hatchery layout has been fully designed and project managed by Pas Reform Russia's project team and it will feature Pas Reform's SmartPro setters and hatchers, together with a package of hatchery automation and climate control systems.

The SmartSetPro setters will incorporate AMF to fine-tune the incubation environment to the needs of the growing embryo. The SmartHatchPro hatchers will be equipped with SmartWatch to monitor and adjust the hatching process automatically – from transfer through to the hatch of the last chicks in each cycle.

With SmartCenterPro every device and system at every level in Makinskaya's hatchery will be

seamlessly connected and data enabled. Using advanced, web-based technologies, this produces highly detailed monitoring, management, analysis and batch reporting for every hatch cycle. Pas Reform Academy specialists will provide ongoing technical support to optimise performance.

Specialists from Makinskaya recently visited Pas Reform's headquarters in Zeddam, The Netherlands, to participate in a hatchery management training programme at Pas Reform Academy.

The course provided a focused opportunity for delegates to share their own experiences and insights, while at the same time learning more about the very latest developments in embryology and incubation.

Alexey Shevchenko, Makinskaya's General Director told International Hatchery Practice: "We thoroughly investigated the market to identify a single industry partner that could provide us with a fully integrated approach for the development of our new facility. Producing high-quality, competitive produce, our expanded poultry farm will both ensure the regular supply of poultry meat to the capital and increase our export capacity."

pasreform.com

Petersime in Vietnam



Bel Ga JSC is fully owned by BDH Azie BV, a private joint venture between Belgabroed (Belgium) and De Heus (the Netherlands), and has been present in Vietnam since 2014.

Bel Ga hatches superior quality broiler and layer day-old-chicks for the Vietnamese market and for exports. The hatchery is located in the Bao Loc City of Lam Dong Province and accommodates the most modern of Petersime BioStreamer incubation systems, with plans to double the capacity this year.

The BioStreamer is Petersime's top incubator model and creates the optimal environment for hatching eggs into high quality day-old broiler and layer chicks.

All parameters impacting the hatching processes are 24/365 monitored and controlled by 'Eagle

petersime.com



Petersime has now developed a new 60XL tray for turkey eggs designed to perfectly fit in BioStreamer, AirStreamerPlus and conventional setters. The tray is available in two versions: standard and stackable. Due to the larger egg pockets, the standard 60XL tray provides an ideal positioning for small, large and extra-large eggs and enables an optimal air flow in the setter.

petersime.com

APPOINTMENTS

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