Understanding the basics

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by Dr Hermann Klein-Hessling, Director Tech Service and GP Operations, ISA BV (hermann.klein.hessling@hendrix-genetics.com)

The rearing phase in commercial layer production is the 'investment phase' for the layer operation. With a focus on exceptional rearing a foundation is laid for increasing the chances to have a smooth and successful flock later in production.

Many management guides identify key areas of concern throughout the rearing process to which the grower should conform with appropriate steps in husbandry.

This helps to ensure that the normal expected growth and development targets of the pullet are obtained.

Furthermore, all cornerstones of a management guide have some form of a physiological and anatomical basis that impact on the performance potential of the pullet. It is part of the basics in pullet live production to have a clear and thorough understanding of the developmental stages of a pullet from the time of placement to the onset of production.

Fig. 1 shows the important developmental stages of a brown layer. Essentially the same concept applies to any white bird just at a different bodyweight (BW) scale.

Fundamentally, flocks must benefit from a good start at placement. Extra effort and energy must go into providing optimal environmental conditions that stimulate good levels of bird activity that translate into appropriate levels of feed and water intake. This is crucial for the correct development of essential 'supply organs' like the lungs, heart, liver, respiratory and digestive system including the vital immune system.

A lot of emphasis is always placed on achieving the desired early BW and uniformity targets. The reason is that a higher five week BW is positively linked with rapid frame size development (85% by 5-7 weeks of age (WOA)).

The relative rate of bone growth is especially high early in rearing and outpaces the rate of muscle/protein deposition during this time (Fig. 2).

Deficiencies in frame size development early in rearing cannot be fully recuperated later in rearing. This often leads to reduced feed intake capacities and higher propensities for prolapses especially when the pullets become fat at the end of rearing or during the early transition period into lay.

Would we not apply a light restriction program based on a decreasing photoperiod the pullets would naturally start to begin the first steps towards sexual maturity at 9-10 WOA (Fig. 1).

This physiological development is blocked by light proofing the building and the use of time clocks that control the day length.

Typically, the pullets remain on a non-stimulatory lighting schedule until roughly 16 WOA (or target BW).

The last third of the rearing period should always be used to develop the gut and feed intake capacity. This can be done through nutrition or specialised feeding techniques. Essentially, birds should learn to consume the majority of their daily feed allowance (60-70%) in one main meal in the late afternoon. Rearing quality influences the moulting response. The moult should be complete and highly uniform between birds.

Vaccination schedules should be limited to locally essential treatments only. Upon light stimulation, pullets quickly start to develop their reproductive system (Fig. 2).

The liver and the abdominal fat pad increase in size. There is a concurrent stimulation of the medullary bone system providing Ca to the daily shell formation process.

By 23/24 WOA the layer should have obtained approximately 90% of its final mature BW. Feed intake has to increase by 40-50% and BW by 350g/bird from 18-28 WOA.

Well managed ISA pullets will financially reward the ISA producer with rapidly increasing egg production, high peaks, exceptional persistency and shell quality as well as superior egg mass production. ■

Fig. 1. The key developmental stages of a brown layer.

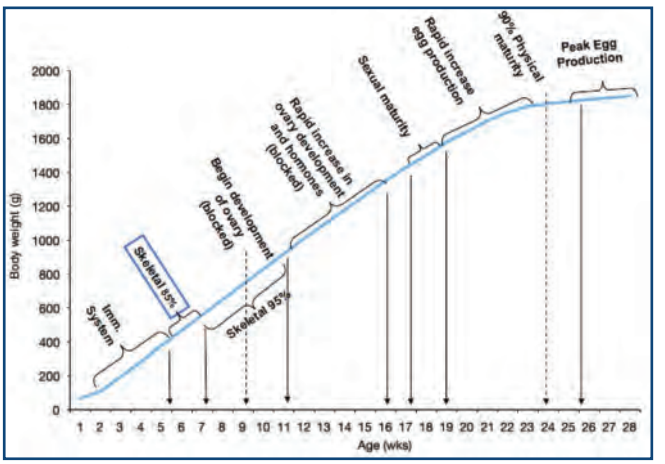
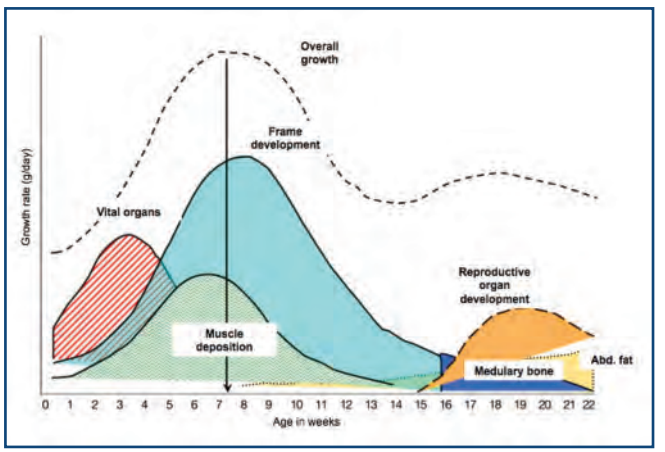


Fig. 2. Timeline in growth changes and body components of



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Never lower your guard!

1

by Rafael Lera, Veterinarian and Technical Specialist, ISA BV (rafael.lera@hendrix-genetics.com)

Biosecurity is a key management tool and an essential part of any successful poultry production system: it can be defined as planning and putting into practice a set of measures to protect poultry flocks from introduction of unwanted organisms.

Why is biosecurity important?

- Economic reasons: pathogens affect birds' health, welfare and technical performance.
- Public health reasons: assuring poultry products are safe for human consumption.
- Legal reasons: complying with compulsory local regulations.

Identifying the potential pathways for the introduction of a disease is the first step that should allow people involved to make a risk assessment and then implement a suitable biosecurity program. Major routes for pathogen spread are:

- Airborne transmission.
- Feed and water supply.
- Transmission by contact.
- Direct contact: bird to bird.
- Indirect contact: through equipment, material and vehicles or by live vectors, like animals (wild birds, other livestock, pets, rodents, insects) and people (farm workers, maintenance personnel, visitors).

Farms must be designed to facilitate biosecurity: the objective is to limit access to poultry production areas by people and to prevent access by other animals.

Some of the key points are:

- Perimeter fencing with a single access gate that is always kept locked and displaying signs for not trespassing unless authorised.
- A spraying station for vehicles entering the farm including a disinfecting basin. Only essential traffic should have access to the site. Other vehicles must be parked outside the biosecure area. Ideally, feed bins should be located near the perimeter fence to reduce risks linked to feed trucks.
- A 2m wide band of concrete, gravel or short-mowed grass along the poultry houses – always kept clear of debris, weeds, trash or unused equipment – will reduce hiding places for vermin and will discourage rodent populations around the barn.
- Poultry houses should be bird- and rodent proof and properly maintained: special attention should be paid to risky areas, like air inlets, exhausting fans, egg conveyors, litter pits, drains, etc.
- Maintenance of an adequate drainage system to prevent accumulation of water that could attract water fowl.
- All building materials should be chosen in order to allow an effective cleaning and disinfection.
- All waste from the farm should be disposed of in a suitable manner: dead birds should be stored in freezers or water-, rodent- and wild animal proof containers and any further disposal method must conform to applicable environmental compliance requirements.
- Drinking water for poultry as well as cooling water used in the houses should be of good sanitary quality. It is recommended to have an efficient system of water treatment to ensure that the appropriate standards are met. Water tanks should always be kept closed.
- Pathogens can also be carried in the feed through contaminated raw materials but also through cross-contamination after being produced or during transport. Feed mills should follow good manufacturing practices. Different types of treatments (chemical or heat treatment) are available to minimise the risk of introducing a disease via the feed. To prevent further contamination of feed by rodents or wild birds, silos should always be kept closed and any feed spills should be immediately cleaned up.
- The design of a control program for rodents, wild birds and pests (including flies, mites and dark beetles) is a must. Bait stations should be installed along the side of the barns and in any area where high rodent activity is observed. Stations should be checked weekly and fresh bait should be laid out when required. Detailed records should be kept for observed vermin activity after every inspection, applied procedures and chemicals used. ■

Never lower your guard!

2

by Rafael Lera, Veterinarian and Technical Specialist, ISA BV (rafael.lera@hendrix-genetics.com)

Transferring equipment between facilities is often one of the major routes to introduce or spread a disease: each farm should be self sufficient in moveable equipment (for example weighing scales).

If moving material between barns is unavoidable, it should be thoroughly cleaned and disinfected before entering the poultry house.

Only the equipment needed for regular activity should be kept in the service room, always tidy to minimise possible hiding and breeding places for rodents.

People are the most common animate factor involved in disease transmission, including farm employees, veterinarians, truck drivers, vaccination and catching crews, repair and maintenance contractors.

Visits should be kept to a minimum, only if they are strictly necessary and all unauthorised persons must be excluded.

The poultry house should have a single access and be equipped with a hygienic lock designed following the 'dirty and clean' area concept: a physical barrier should provide a clear separation between both areas:

- Dirty area should contain a coat rack for clothes used outside the poultry house and a wash basin with bactericidal soap for sanitising hands.
- Clean area should contain a wardrobe with clean clothes (overalls and caps) for use only in the poultry house and a foot bath containing disinfectant. Clean boots for exclusive use in the house should be available.

Improperly managed foot baths can become a source of contamination: they must be cleaned daily and filled with fresh disinfectant.

Soles of footwear are also an excellent site for pathogens to multiply: they must be scraped before disinfecting in the foot bath and cleaned and scrubbed after every visit.

Farm personnel should not have contact with any other poultry or wild birds and follow the set rules regarding use of clean overalls and boots. They should wash and sanitise hands before starting daily work, after every break (for example lunch), and especially after using the toilets and whenever hands are not clean.

Hands, hair and clothing can be contaminated with dust containing micro-organisms responsible for spreading diseases farm to farm. Visits should always be made from younger and healthy flocks to older flocks or areas with lower standards of biosecurity.

The hygienic lock should be equipped with a shower to be used by visitors. Farm employees should also take a full shower if they have been exposed to risky situations (for example emergency visits after contact with flocks of uncertain health condition).

If a visitor poses an unacceptable risk to the health of the flock, access to the poultry facilities should be denied and the visit rescheduled.

Visitors and service personnel must sign a visitor's log before entering the farm. Keeping detailed records of people traffic in the farm can be helpful for investigating disease challenge and also allows the farm owner to warn recent visitors if a disease has been confirmed.

At the end of every batch of poultry, effective cleaning and disinfection is essential to reduce pathogen numbers and the risk of disease challenge prior to restocking.

This is a key part of any biosecurity program and should include houses, equipment and surroundings, keeping always in mind that proper disinfection of a barn is only possible if meticulous removal of organic matter is done first. Procedures to be followed should be established, detailing every step of the process.

Implementing a successful and effective biosecurity program means that all measures should be simple, well understandable, agreed upon and monitored.

A biosecurity plan is often described as a chain: it can be the most cost effective way to keep poultry farms free of diseases but all the links must be in good condition! ■

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Management in hot conditions 3

by Dr Paul Grignon Dumoulin, Veterinarian and Technical Specialist, ISA BV (paul.grignon-dumoulin@hendrix-genetics.com)

Hot conditions significantly affect the performance of layers, particularly in temperatures higher than 30°C.

Getting good technical results requires some adjustments in the management of layer flocks. The main impact of hot temperature is on the daily feed intake, affecting growth during the rearing period and egg production during the production period.

General management

Ambient conditions must be optimum in terms of density, ventilation, access to water and feed (density on the floor must not be more than six birds/m² in hot conditions). Fans can be added to increase air speed inside the house (an increase of 0.2m/s reduces the temperature felt by the birds by 1°C). In the case of an open house system, curtains should be added to the side of the house in order to reduce light intensity.

Control of bodyweight is very important as good bodyweight is one of the key factors to achieve optimum performance. Any deviation must be detected quickly in order to adapt management as soon as possible and limit the impact on production. A weekly measurement until the end of the growth period (0-30 weeks) is necessary.

Lighting program

A slow step down lighting program must be applied during the rearing period in order to improve bodyweight at the end of the rearing period. Additional lighting hours must be given in the morning in order to allow the birds to eat at the coolest period of the day. Giving a midnight lighting (1.5 hours three to four hours after lights off) may help to improve feed intake in the hot season. By giving additional feed during shell formation, midnight light helps to reduce second choice eggs at the end of the rearing period by 20-30%.

Feeding

Feed presentation must be good in order to optimise feed consumption and get the best possible growth and production. Do not hesitate to maintain starter feed (crumble feed presentation is recommended for the starter feed) until six weeks of age if growth is not good enough in the first weeks. We recommend allowing the birds to empty the feeders in the hot period of the day to guard against selective feeding and to give the last feeding three hours before lights off. The feed formula (protein level in particular) must be adjusted to compensate for lower feed intake levels seen during higher temperature periods.

Importance of drinking water

Water quality can deteriorate more quickly than in temperate countries. Therefore, water must be treated to be of good quality. Chlorination is the easiest way to treat the drinking water. Residual chlorine levels must be checked in the end of the drinking system once per week to ensure that this is effective.

Water temperature is also a key point as it influences the feed intake. The water tank must not be exposed to direct sunlight and temperatures should be kept as cool as practical. Flushing the pipes can help to maintain fresh water in the pipes and avoid stagnant water whose bacteriological quality may decrease.

Biosecurity

We often see open house systems in hot conditions. This increases the risk of introduction of contaminants in the flock. Strict biosecurity rules must be applied: houses must be bird-proof and rodent baiting stations must be installed around the house. Ideally, farms should not be placed close to another poultry house. Single age farms are also desirable.

Overheating of birds

In case of overheating, electrolytes (KCl) and antioxidant products (C or E vitamins) can be used in the drinking water to reduce stress induced by high temperatures (oxidative stress and respiratory alkalosis). ■

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E. coli mortality in layers

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by Dr Bart Stokvis, Veterinarian and Technical Specialist, ISA BV (bart.stokvis@hendrix-genetics.com)

In layers we see two main types of mortality which involve peritonitis with deposits of fibrin, namely egg yolk peritonitis and E. coli peritonitis.

With both types you find dead birds with a pale comb with blue points. When you culture from the liver and spleen of these dead birds you always find E. coli.

Egg yolk peritonitis.

That is the reason why these two different types are often both diagnosed as E. coli mortality.

You should not take samples from the liver or the spleen. You should culture from the bone narrow to find out whether the reason for the mortality is E. coli or not.

There are more differences. Birds with egg yolk peritonitis are not usually dying acute. The peritonitis is sterile and not complicated by bacterial infection.

The birds die because they stop eating and drinking. These birds can be recognised in the flock because they look sick.

On post mortem, these birds are dehydrated and you find pericarditis, perihepatitis and peritonitis with a lot of debris, which can be recognised as solid egg yolk.

E. coli peritonitis is (per)acute mortality. The flock looks healthy and is performing well. You do not see any sick birds. The only problem is increased mortality. When you open these birds, it can be quite difficult to see the pathological signs.

The follicles are always hyperaemic; sometimes this is the only visible pathological sign.

Sometimes only traces of fibrin are seen between the follicles, sometimes fibrin is present all over the abdomen, but the birds seem to die before pericarditis and perihepatitis is formed.

An important difference between egg yolk peritonitis and E. coli peritonitis is the smell when opening the dead bird.

Egg yolk peritonitis birds smell like boiled eggs. E. coli peritonitis birds have a very bad, rotten smell. ■

E. coli peritonitis.

Photographs courtesy of Dierenartsenpraktijk Ell.

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Is bodyweight control a waste of time?

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by Peter Arts, Product Manager, ISA BV
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The importance of recording bodyweight development of layers, especially in rearing, is clear to all poultry managers. Many articles are published which discuss all kind of influences on bodyweight development, but unfortunately, it is still not common everywhere to check bodyweight development in a regular way. Recording just for the sake of records is not enough.

First of all, the way of recording body weights is important. The following questions should be raised.

- How often?
- How many birds?
- Individual weighing or in small groups?
- How do you take a good sample?

These are all important questions which have to be answered before starting body weight measurements to avoid wasting time collecting useless data.

Many hatcheries like to know the chick bodyweight before sending the chicks to the customer. As chicks will lose bodyweight before they are housed on the rearing farm, the conditions of storage and transport are very important to minimise this weight loss. In general, we can say that after 24 hours the weight loss is approximately 8%. Checking the average chick weight on arrival is a good way to have any idea about the starting point of the flock.

After that we advise starting with regular bodyweight measurements at 3-4 weeks of age with individual control and to repeat this weekly, until the birds are approximately 26 weeks old. From 26-35 weeks bodyweight control every two weeks is enough. After this age we advise maintaining control with a check every four weeks.

How many birds to check?

If no automatic system is used and birds have to be weighed manually, it is important to know how many birds have to be checked to get a reliable result.

In our ISA management guides we advise weighing 100 birds. This number is based on the accuracy of 99% and with a standard deviation of ±5% of the average. The flock size does not influence the sample size. Weighing less than 100 birds does influence the accuracy and the bodyweight development curve will show much more ups and downs.

These measurement errors can cause wrong conclusions to be drawn and wrong actions taken.

Weighing more than 100 birds is not needed to get reliable results.

Individual bodyweights are needed when we need to calculate the uniformity of a flock, which is especially important at the end of the rearing period.

The bodyweight at the beginning of the growing period and the uniformity at the end are the two most important objectives in rearing. We can do without uniformity data at the beginning of the growing period, but we do not like to get surprised by too low uniformities at 16 weeks of age. For that reason, we advise measuring uniformity from 10 weeks onwards.

Collected data about bodyweight has to be reliable. For that reason we need to take the right number of samples as discussed above. However, the way we take the samples is also important.

Some rules:

- The time of weighing should be fixed and preferably in the afternoon.
- In floor houses surround a group of birds in the middle of the house and weigh them all. In big houses the weighing should be done at two or three places. The total number of birds should not be below 100.
- In cage houses one should weigh all birds from 5-6 cages in different parts of the house. Identify the cages to weigh the same cages every time.
- Use proper weighing scales with the right scale range (50g-5kg).

In conclusion, bodyweight control is a good and necessary management tool, but ensure that weighing is done correctly to avoid wasting time. ■

A safe arrival at final destination 7

by Ron Jöerissen, production director, ISA BV (ron.joerissen@hendrix-genetics.com)

It is common practice in the poultry business and especially if primary breeding companies are involved, that day-old chicks are travelling before they reach water and feed at their final destination.

For that reason it is useful to have some background information about the challenges that may occur during transportation of day-old chicks.

In today's layer breeds the chick's bodyweight at hatch is around 38-40g. During transport and under normal ambient conditions this bodyweight will drop by 0.25-0.30% per hour during holding or transportation.

The above will happen if the chicks are kept in their thermo neutral zone which can be measured by a chick's body temperature of 40-40.5°C. This can normally be seen if the air temperature inside the chick box or crate is about 32°C at an optimum.

A range from 28-36°C inside the chick box will still create a micro climate that keeps the chicks within their thermo neutral zone and where general well being and normal respiration will be the result.

However, if the temperature inside the chick box increases due to lack of ventilation the chick's body temperature will increase and chicks will start to pant as they try to lose heat from their body by evaporation of water. This automatically means extra loss of body fluids and, as a result, the body weight loss will accelerate far over the normal 0.25-0.30% per hour.

If this condition stays for too long a period, chicks will be dehydrated at arrival on the farm.

Elevated chick mortality

As biological distribution in chick weights is normal, the smallest chicks in the flock can arrive at a point where their body weight at arrival will be too low to safeguard a good start during the first days after placement with elevated levels of chick mortality during the first week as a result.

When chicks are freshly hatched, a ready to use lunchbox is provided to them by means of the residual yolk sac which gives them enough energy and moisture to easily overcome a period of 72 hours without feed and water.

The ability to make use of this lunchbox is however limited if chick body temperatures cannot be kept to the optimum of 40-40.5°C.

As the yolk sac also provides important antibodies to protect the chicks from any bacterial challenge they may be exposed to during their young life, it is crucial that temperatures inside and outside the chick boxes during transportation are managed correctly.

If we can manage a temperature inside the chick box of 28-36°C, the chicks will be able to manage their own body temperature with the limited ability they have at that time of their life.

Crucial measurement tool

Temperature in the chick's environment is the crucial factor to be followed because day-old chicks are not yet able to keep up their own body temperature and they rely on ambient conditions around them.

Much is being discussed about the best criteria to measure the chick's comfort during transport. Sometimes oxygen levels, humidity and even carbon dioxide levels are mentioned as criteria to be measured to check for optimal conditions. However, most of the above are highly correlated to temperature and as this is the easiest factor to be measured, with low costs involved, this is still the preferred measurement.

It is easy to wish 'goede reis', 'bon voyage', 'gute Reise' or a safe trip to the traveller but we also need to consider the well being of our day-old chicks during their journey to the final destination.

They represent highly potential breeding stock which secures human food production that they generate more efficiently year after year. ■

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Good brooding conditions 8

by Paul Grignon Dumoulin, Institut Sélection Animale BV (paul.grignon-dumoulin@hendrix-genetics.com)

Optimisation of brooding conditions for day-old chicks is the key for successful performances during rearing and also later during the productive life of the bird.

The impact of early bodyweight on laying performance is well known and farmers must pay particular attention to the housing conditions when they receive the day-old chicks.

House preparation must be done properly. Good cleaning and disinfection must be applied to avoid any early disease challenge to the young chicks.

Before arrival of the chicks, actions must be taken to provide the best environment to comfort the chicks after transportation.

Floor and litter

- Litter quality is very important: it can be a source of contamination of the birds, in particular with salmonella and aspergillus.
- The house must be heated before the chicks arrive in order to let the house temperature rise at an optimum level.
- If chicks are raised on a concrete floor, the floor temperature should be at 28°C (82°F) before the litter is placed on the floor.

If the floor temperature is not high enough, the chicks will not get comfortable and will often get cold feet, which will prevent them from looking for water and feed.

- Litter coverage with 1cm of good quality wood shavings is enough to start the chicks. Deep litter will not necessarily help to comfort the chicks as it is difficult to keep the floor warm underneath it.

Distribution of litter on the floor should not be done too early before the arrival of the chicks to avoid loss of temperature of the pre-heated floor.

- The temperature of the litter itself should be at 30°C (86°F) minimum at chick placement.
- Litter and floor temperature can easily be checked by an infrared thermometer.

Chick body temperature

Young chicks cannot regulate their own body temperature, so ambient conditions surrounding them have a strong influence on their well being.

- Chick body temperature can be checked with an infrared ear thermometer.
- The optimal chick temperature is 40°C (104°F). A minimum of 20 chicks throughout the house must be controlled to have a good picture of the situation.

Air temperature

The chick body temperature can be used as an indicator to optimise brooding conditions.

Chick temperature must be checked every hour after delivery and air temperature settings must be adjusted accordingly. For example, if chick temperature is 38°C (i.e. 2° below normal chick temperature), air temperature setting must be increased by 2°. Adjustments must be done until the 40°C target is reached.

Around five days of age, the chicks will be able to control their own body temperature better, which can be seen by an automatic increase of body temperature to 41°C (106°F).

The air temperature set point in the house can then be gradually reduced by 0.5° per day from then onwards.

In order to help customers improve their brooding conditions, ISA have developed a poster outlining the main recommendations to optimise brooding of chicks. This poster can be downloaded from their website at the following address:

http://www.isapoultry.com/Support/Downloads.aspx

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