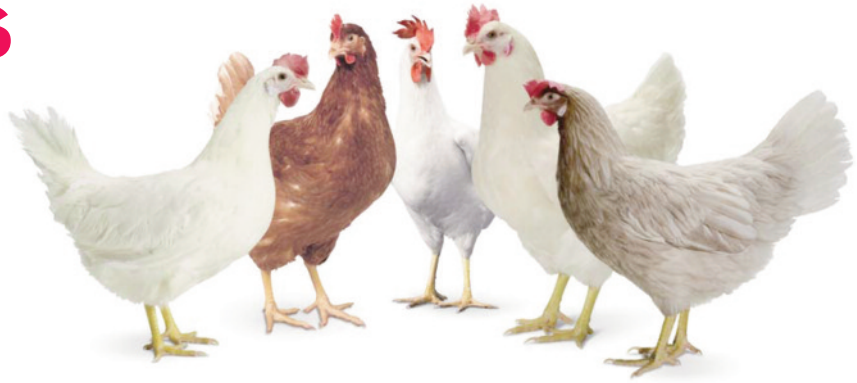
Management of commercial layers in the tropics



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Productive and profitable layers begin with good quality pullets. Having the correct body weight and skeletal development at the start of egg production will enable layers to achieve their genetic potential. In the tropics, high environmental temperatures and high humidity can make achieving this goal more difficult.

Problems that develop during the growing period cannot be corrected after egg production begins. This article highlights the components of a good pullet development program.

Shed preparation

The brooder shed should be cleaned and disinfected well in advance of chick delivery. A minimum of three weeks down-time or resting period between flocks should be scheduled for shed preparation. Before cleaning and disinfection, all manure and feed should be removed and a rodent control program implemented (or preferably the ongoing program should be continued). This is the time to make necessary repairs to the shed and equipment.

The shed should be cleaned with a high-pressure wet wash with detergent to remove all organic matter.

Washing should move from the ceiling downwards through the cages to the floor and finally, manure pit. After thorough cleaning, the shed needs to be sprayed with a suitable pesticide for control of mites, termites and spiders.

Later, all contents and the shed should be foamed with an approved disinfectant. Increasing the temperature inside the shed will improve the effectiveness of the disinfectant.

Additionally, fumigating the shed within five days before chick delivery will help ensure sanitary conditions. The effectiveness of the cleaning, disinfection and fumigation should be checked by environmental testing of the shed surfaces for coliform and salmonella bacteria.

Drinking water systems should be checked and maintained at this time. Water tanks and water pipe lines should be cleaned, ideally using a disinfectant to remove the biofilms and scales. Later flush with fresh water to remove the residual disinfectant.

Before chicks arrive

The shed preparation should be completed 48 hours before delivery of the chicks. Be aware that air temperature rises faster than the temperature of concrete floors, feeders, cages and water in the shed.

Set the light clocks to 22-23 hours of light at 30-60 lux of intensity at the level of the chicks. Lights in the red-orange wavelength (warm fluorescent) are appropriate for growing and laying birds.

Feeders should be filled to the highest level with fresh, good quality starter feed, preferably in the form of a crumble. Adjust the feed guards. Ensure that all drinkers/nipples are working properly. Adjust the drinkers to the proper height to facilitate drinking by the newly arrived chicks. The birds' drinking water should contain vitamins and electrolytes to reduce stress and replace losses during delivery. Feed should be placed on the cage paper before chick arrival or immediately after they are placed in the cages.

In the beginning

Layer pullet chicks must be sourced from breeder flocks that are healthy and free of vertically transmitted diseases important for bird and human health.

Chicks should possess adequate levels of maternally derived antibodies for early protection against challenges of Gumboro or IBD, Ranikhet disease,infectious bronchitis and other diseases.

The chick should be of adequate body weight with a well-healed navel (umbilicus) and free of physical defects. All chicks should be vaccinated against Marek's disease with HVT and Rispens strains from a reliable vaccine manufacturer.

The transportation time of the chick delivery from hatchery to farm should be kept to a minimum. Preferably the trucks used for transportation of day old chicks should be closed and environment-controlled to give the chicks optimum comfort during transport.

Getting off to a good start

Pullet chicks arriving on the farm from the hatchery should be alert and active. Chicks must be vigorous enough to explore their new environment and quickly find feed and water.

Eating feed and drinking water quickly will speed the development of healthy intestinal microflora and build resistance to enteric pathogens such as salmonella and E. coli.

During the first week of life, chicks must be provided with constant attention by the manager to ensure optimised temperature, humidity, lights, feed and water availability.

The first two weeks of life are when the most significant problems for proper chick development can occur. The newly hatched chick is unable to regulate body temperature and must be provided with the proper environmental conditions.

Relative humidity during the first week should be above 40% to prevent dehydration, drying of mucus membranes and vent pasting.

Brooding chicks in cages requires strict management of temperature and humidity as the chicks cannot migrate to an area of comfort like chicks grown on the floor. Chicks started in cages should be placed on paper for 5-10 days.

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Beak trimming

The pullet should be beak trimmed at 10-14 days of age with a precision beak trimmer using a template with guide holes appropriate for different sized chicks, and providing two seconds cauterisation time.

Good immunity against Marek's, infectious bursal disease, Raniket, bronchitis, pox and AE is required for all laying flocks.

Depending on the local disease challenge additional vaccinations against infectious laryngotracheitis, mycoplasma, fowl cholera and infectious coryza may also be needed. Tropical climates typically have significant disease challenges from velogenic Newcastle disease, highly pathogenic avian influenza, highly pathogenic infectious bursal disease, infectious coryza, mycoplasmas, and fowl pox. These intense vaccination programs have to be carefully designed to prevent growth suppression in pullet flocks.

Ensuring biosecurity of flocks in the tropics is more difficult due to the presence of local poultry, employee contact with local poultry, live bird markets and proximity to other livestock and wild bird reservoirs. Consult with local veterinarians for the best vaccination program for your pullet flocks.

Pullet development and weight

The pullet develops according to a well orchestrated sequence of physiologic events.

Pullets reaching or exceeding breed body weight targets during these developmental phases have the best chance to perform to genetic potential as layers.

Interrupted growth during any of these developmental phases will result in hens lacking the body reserves and organ function to sustain high production as adult layers.

The growing period can be divided into the following periods:

0-6 weeks of age:
During this period, the organs of the digestive tract (supply organs) and the immune system undergo much of their development. Problems during this period could have permanent negative effects on the function of these systems.

Key management practices:

- Good start for chicks in the brooding period.
- Maintain ideal brooding temperature and humidity. Adjust the brooding set up based on seasonal and climatic variation.
- Good quality feed – crumbs and free of toxins.
- Single time, perfect beak trimming.
- Follow the recommended nutritional specification in the breed manual.
- Implement water sanitation program to ensure clean water for birds.
- Follow the lighting schedule.
- Avoid over-crowding.
- Timely shifting is necessary from brooding cages to growing cages.
- Monitor feed intake and weekly body weight gain closely. Take immediate action if either feed intake or body weight are less than standards.

6-12 weeks of age:
This period of rapid growth is when the pullet attains most of the adult structural components (muscles, bones and feathers). The skeleton is 95% developed by the end of the 13th week of life. At this time the growth plates of the long bones calcify and no further increases in bone size can occur. Any compensatory growth occurring after this period will not increase the size of the skeleton. The amount of mineral reserve available for egg shell formation is directly related to the hen's skeleton size. Poor growth during this period will prevent the pullet from attaining sufficient bone and muscle reserves needed to sustain a high level of egg production and maintain good shell quality.

Reactive vaccinations, beak trimming, bird handling, high environmental temperatures and other stressful management practices can delay development during this period of rapid growth.

Key management practices:

- Provide adequate cage space and feeder space.
- Monitor feed consumption and adjust nutrient intake wherever required.
- Follow recommended lighting schedule.
- It is preferable to have the same drinking system in brooding and growing sheds which enables the birds to settle easily upon shifting to the sheds.

12-18 weeks of age:
During this period, the growth rate slows and the reproductive tract matures and prepares for egg production. Development of muscle continues and proliferation of fat cells occurs in this period.

Excessive body weight gain during this period can result in pullets with an excessive amount of fat pad. Low body weights and stressful events during this time can delay the onset of egg production.

Start feeding Pre-Lay Diet with 2.5% calcium level 7-10 days prior to laying of the first egg to increase the medullary bone within the cavities of long bones.

Key management practices:

- Pullets need to be moved to the production shed before 16 weeks of age.
- Avoid overcrowding and provide adequate cage space and feeding space.
- Regularly check the nutrient intake of birds during this period. Any reduced consumption of vital nutrients like protein, amino acids, vitamins and minerals may affect the future production performance of the flock.
- Complete the entire vaccine schedule three weeks before onset of production.
- Do not start Pre-Lay Diet before 15 weeks of age.
- Production sheds need to have higher light intensity than growing sheds.
- Provide light stimulation when the target body weight is attained.
- Grading of flocks – separation of small birds must be done regularly.

Breast muscle development

Pullets should be examined for breast muscle development as a good indicator of proper pullet development and a predictor of future layer productivity.

Muscle contains glycogen, a rapidly available source of energy used for egg production. Pullets coming into egg production with insufficient muscle will not have sufficient energy available to sustain high egg production.

Body weight monitoring

A weight monitoring program should begin when the flock is one week old. During the first four weeks when the birds are still small, bulk weigh random samples of 20 birds. After four weeks of age, individual bird body weights should taken weekly from at least 100 birds.

Continue weighing weekly until mature body size is reached at 32 weeks, then at least every two weeks during the remainder of the production period.

For pullet flocks raised in cages, a selection of cages from all levels and positions within the shed should be marked.

All the birds in these cages should be weighed separately with the birds from the same cages weighed every week. Select cages at the beginning and end of feed lines, as well as from upper and lower levels.

Weekly monitoring of body weights is preferable as the producer can identify growth problems quickly. It might be possible to associate the growth problem with a change of feed or a stressful management practice, allowing corrective action to be taken. Weigh birds prior to a scheduled change in feed formulation, such as from starter to grower feed. Scheduled changes in feed formulations should always be based on achieving target body weights and not the age of the flock.

Underweight pullet flocks or flocks with poor uniformity should be retained on the more nutrient rich formulation (starter feed). Flocks scheduled to receive a harsh vaccination involving handling the birds for injection should be placed back on more concentrated feed formulations to compensate for loss of appetite.

Body weight uniformity

Uniformity of pullet body weights within a flock is an important predictor of future layer performance.

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Uniformity of 85% is the goal during the growing period (85% of the individual bird weights are within 10% of the average). Good pullet body weight uniformity simplifies proper feeding of the flock, both in growing and laying periods.

Uniform pullet flocks come into egg production at the same time which maximises peak egg production and minimises the number of pullet eggs (eggs <45g).

Managing birds in the tropics

- During periods of high temperature, the flock has a high demand for drinking water. The water to feed ratio is normally 2:1 at 21°C, but increases to 8:1 at 38°C.
- Cooling the drinking water by flushing water lines with fresh cooler water has been shown to increase feed consumption and egg production in heat-stressed birds. Unfortunately, the plastic water pipes rapidly equilibrate with the environmental (air) temperature, making it difficult to keep the water temperature below the air temperature, particularly at the end of long water lines.
- Do not disturb the birds during the hottest time of the day (afternoon and early evening). Adjust work schedules and lighting programs so that routine work is done early in the morning or at night.
- Postpone routine management practices which require bird handling, such as beak trimming, eyedrop or wing-web vaccinations, or do them at night.
- Adjust the amounts of medications and volumes of water used for water vaccinations to reflect the increased water consumption of the flock during hot weather.
- Do not withhold drinking water from the flocks when water vaccinating. Flock thirst is already high and denying drinking water is not advised.
- Use vitamin and electrolyte supplements in the drinking water. Shifts in the acid/base balance in the flock of heat-stressed birds cause the loss of sodium, chloride, potassium, and bicarbonate in the urine. The use of electrolyte solutions in the drinking water may help to replenish these minerals and correct the acid/base balance.
- Using roof sprinklers or spraying the roof with cool water during times of extremely high temperature. Be sure that the water system can accommodate the water demands for both this and increased bird consumption. Be sure to never compromise the availability of drinking water to a heat-stressed flock.
- Lower fan thermostats so all fans run continuously during the night and early morning hours. Night cooling of the house will prolong the period of moderate temperature the next morning.
- Transport birds at night, place fewer birds per coop and leave a few empty pallets to increase the ventilation around the birds.
- Avoid overstocking cages.
- Insulated roofs reduce the conduction of heat from outside.
- Orient the house in an east-west axis to minimise solar heating.
- Roof overhangs should be sufficient to prevent the sunlight from shining into the house (open houses).
- Grow grass around the house to cool incoming air and reduce the reflection of heat into open houses. Bare ground can reflect a large amount of heat into the house.
- Use roofs made of reflective material such as shiny metal or white wash. Open-ridged roofs allow the bird heat to escape. In dry climates, apply stalking material such as straw or grass (at least 8cm thick) on the roof for insulation from solar heat.
- Place water sprinklers on the roof ridge to remove heat from the roof.
- Drinking water stored in overhead water tanks can get very hot. These tanks should be a reflective colour, insulated, and covered to avoid direct sunlight.

Lighting program

The hours of light are gradually decreased over the first seven weeks. This provides the young growing flock additional hours of feeding time to promote growth.

In open housing, the artificial lighting programs must complement the natural day length.

After the initial step-down in lights over the first seven weeks, the artificial lights are set to the longest natural day length the flock will experience during the growing period.

This change will negate the influence that changes in natural day length would have on pullet development and the age of the first egg.

Key management practices:

- Do not give continuous light for chicks during the brooding and growing period.
- Regularly clean the bulbs and replace worn out bulbs.
- Maintain uniform light intensity in the shed and avoid dark pockets.
- The light intensity in the brooding and growing sheds must be kept lower than the light intensity in laying sheds.
- Light stimulate the birds when they reach target body weight of 1250g rather than stimulating based on age.

Conclusion

Careful attention to the principles of pullet management is fundamental for success and profits in laying flocks. Growing a pullet flock of the correct weight and body conformation will usually ensure success in the laying period.

Problems such as low egg numbers and poor egg shell quality during lay can often be traced back to problems occurring in the growing period. ■