Focus on optimal starting conditions for day-old chicks

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Introduction

Legal guidelines of the European Community (EU) and national laws reflect the demand of consumers for safe food from healthy animals. Concern that the use of antibiotics in animal and poultry production may contribute to drug resistance in humans has resulted in efforts to reduce and eventually eliminate antibiotic treatments in poultry meat and egg production. In the following outline, we will focus on basic principles of chick management and call attention to mistakes which are still observed in practice. Understanding the needs of young chicks better and eliminating management mistakes can help to reduce the need for any drug treatments.

The principles are well known and explained in detail in every management program for meat-type and egg-type parent stock, but their importance is often forgotten in practice when tight working schedules dictate action. Even without consumer and legislative pressure to eliminate antibiotics from poultry feed, it is in the best interest of farm management to give day-old chicks a good start, and the principles discussed below apply anywhere in the world, especially where the climate includes cold periods. Investment in optimal starting conditions for day-old chicks is in the interest in terms of poultry welfare, minimal disease risk, low feed cost, environmental protection, sustainable use of resources and of economic interest to the farmer.

Chick management should start with fine-tuning procedures before the chicks arrive on the rearing farm. Optimal preparations for the arrival of the next batch of chicks will take more time and may be more costly, but it should pay for itself in terms of better results and reduced risk. Between placements is the best time to study mortality statistics from past flocks with chicks from the same hatchery, if possible across different farms, and to ask: what can be done to get even better results next time? The service staff of the hatchery will be happy to offer advice at this time instead of defending the hatchery and chick truck driver who probably did their job as close to perfection as possible.

The service staff should know the genetic potential of the birds from the results of well managed farms and can share information with those who are willing to learn and improve their own routine. Lessons from mistakes are a necessary part of “learning by doing”. With modern communication, it should be possible to identify and reduce the frequency of common mistakes. The following outline will address mistakes still seen too often on broiler farms.

Brooding – the first 10 to 12 days are critical

The first 10 to 12 days in the life of broilers are critical. If they are grown to a final live weight of about 2 kg, as is commonly the case in Germany, the brooding period represents a third of the growing period. Any stress during this early period, e.g. due to delayed placement after long transport, inadequate control of temperature and humidity, or access to feed and water, will make them more susceptible to infections, reduce growth and feed efficiency. Increased mortality is a reliable indicator of stress, but may be noticed too late to correct its cause. Stress will reduce the absorption of the yolk sack and maternal antibodies from the yolk. As a result, the development of the immune system will be delayed, and the full genetic potential for rapid weight gain and efficient feed conversion cannot be expressed.

A cold floor – the most common mistake

The favorite on our negative list is a cold floor. If we ask farm managers for data, we usually get figures for room temperature, measured anywhere above chick height, but seldom on the floor. Concrete floors are quite difficult to warm up, and the insulating effect of litter material needs to be taken into account. To guarantee a floor temperature of 30°C at housing, we recommend heating the

house without any litter until the concrete floor reaches at least 26-27°C before a thin layer of litter is added.

Successful broiler growers try to combine the physical properties of concrete with the biological properties of young chicks into a strategy which resembles “floor heating”: concrete can absorb and dissipate heat slowly, while young chicks depend entirely on ambient temperature and lose heat easily through their legs if kept on a floor with suboptimal temperature. The schedule for the different jobs between terminating one flock and housing the next chicks must allow adequate time for the concrete floor to warm up to the level chicks experience as comfortable.

How to measure temperature

Experienced stockmen used to be able to tell from the behavior of the chicks and their sound whether the floor temperature is acceptable. Today’s managers may prefer to use fancy equipment to get exact temperature readings with a decimal point. But are they aware of the fact that an infra-red thermometer, held at a convenient height of 1.2 m above the chicks, measuring a floor temperature of 30°C, may be off by 3-5°C? We recommend taking at least three measurements, diagonally spaced through the house and directly on the floor.

During the winter months, the thermometer may take some time to warm up before the readings are accurate, and batteries should be changed before they are low and give inaccurate readings. If you don’t trust the readings of your thermometer, take off your boots and walk the floor in your plastic overshoes: if your feet feel warm, the chicks are also likely to feel comfortable too.

Getting the chicks quickly on to the feed and water

To keep up with the development of labor saving technology in hatcheries and processing plants, the size of broiler operations have been growing over the years. New farms may have a capacity of 250,000 broilers, which are housed and depleted in a single day. If all goes well, a single person should be able to manage the farm throughout most of the growing period, and additional labor is only hired for peak demand at housing and at the end of each flock. Any additional personnel costs money, and qualified people may be difficult to get for a few hours, but the goal should be to house all chicks within 2-3 hours, ensuring the farm manager or the poultry specialist is always present. This can be organized with two chick trucks, the second leaving the hatchery one hour after the first truck, if 5-6 people are available for unloading and releasing the chicks into their new environment, where they can start to look for water and feed. Everybody understands that delayed access to feed and water is important with the short growing period for fast growing broilers. Seldom appreciated is that the air quality in the transport crates may not be perfectly controlled, and the chicks may either get cold or too hot. Any departure from the optimal temperature means potential stress, which must be minimized.

Air quality

You may remember old sayings like “more people freeze to death than are killed by poor ventilation”, and some old-fashioned poultry managers still believe that chickens grow better under “hot house” conditions. Modern broiler growers should know better, but we find CO2 concentrations of 4.000-5.000 ppm, about twice the recommended upper limit. Trying to absorb rising energy costs by reducing ventilation rates would be “penny-wise, but pound-foolish”. Apathetic chicks may be the result of inadequate oxygen supply, which may remind us of meetings in a crowded and poorly ventilated room, where we get sleepy and need a break. The chicks have to cope with given air quality 24 hours a day, and if they don’t get enough oxygen, they will not eat enough and grow normally, and their immune system may be compromised for the rest of their life. Basic physics tells us that CO2 is heavier than oxygen, and excess CO2 at chick level means that there cannot be sufficient O2 to meet the chick’s metabolic needs for optimal development. Investment in modern systems of renewable energy production and daily monitoring of air quality is becoming standard on modern broiler farms.

Innovative technology can be a trap

Several broiler growers who invested in biogas production to minimize heating cost complained about poor chick quality, “non-starters” with slow growth to 7 days of age and susceptibility to infections. Detailed on-farm analysis of a specific example on a farm identified the problem: since energy from biogas was very cheap, it was generously used to heat the concrete floor to the recommended 31°C; the room temperature was more than high enough at 35°C, and the CO2 concentration far below 2.000 ppm. Everything seemed “perfect” – except the humidity, which was only about 20%, far below the minimum of 35% recommended for chicks during the brooding period. With this low humidity, the chicks were dehydrated, appeared to feel cold despite the high temperature, many had obviously reduced feed intake, and the dry air had damaged their respiratory tracts. As an additional negative effect of the low humidity, the starter pellets had become hard and unattractive for the chicks.

Installing a spray cooling systems can correct this situation on such a specific problem farm, where the humidity was increased to 50-55%. Computer programs for modern cooling systems offer an option for „dust binding“. Provided they are properly managed, they offer a simple and very effective method to optimize humidity. Since an increase in humidity will lower the temperature, care must be taken to set narrow limits for the desired temperature and to avoid excess humidity. First week results at that particular farm after installing the spray cooling system confirmed the predicted improvements: strong chicks with negligible mortality, excellent weight gain and uniformity resulting in a naturally healthy flock.

Risk of infections from contaminated litter

Day-old chicks can be susceptible to infections soon after hatch. Although every good hatchery will do its best to produce chicks with “healed navels”, it would be a mistake to assume that chicks with dry navels can no longer be infected at the farm and we must remember chicks will arrive with a certain number of naturally occurring bacteria. The naval tissue is a sensitive area for some time after housing, and there is no way to prevent contact with the litter. In case the litter is dirty and contaminated with molds or any kind of bacteria, the chicks are likely to get navel or yolk sac infections. In some countries it is common to grow several flocks on the same litter, apparently with acceptable results after treating the litter for at least two weeks. For parent farms anywhere in the world and broiler growers in Europe we strongly recommend (1) final fumigation of all houses on the farm after thorough cleaning and disinfection to minimize the risk of carry-over infections between flocks and (2) starting each flock on fresh, soft, clean, dry and odorless litter to prevent infections from the contaminated litter. Straw may not always be available in desirable quality and other litter material like wood shavings significantly more expensive, but if an organization is determined to produce eggs or poultry meat without any antibiotic treatment, a higher price paid for good litter may be a good investment.

Summary

Theory and practice of early chick husbandry are discussed in the context of increasing public pressure to minimize and eventually eliminate the use of antibiotics in poultry production. Commonly observed mistakes are (1) floor temperatures below the recommended optimum at the time of chick placement; (2) monitoring house temperature high above chick level; (3) low humidity as a result of excessive temperature; (4) insufficient ventilation to save energy; and (5) yolk infections from contaminated litter. Broiler growers are encouraged to use a check-list to monitor the actual husbandry conditions in order to achieve the best possible results with minimal medication.

Zusammenfassung

Im Fokus: optimale Startbedingungen für Eintagsküken

Theorie und Praxis der Aufzucht von Küken in den entscheidenden ersten 10 Tagen wird mit Blick auf optimale Ergebnisse der Broilermast mit minimalem Einsatz von Antibiotika präsentiert. Als häufig in der Praxis anzutreffende Fehler wird besonders auf folgende kritischen Punkte eingegangen: (1) zu niedrige Fußbodentemperatur beim Einstallen; (2) Temperaturmessungen in einer für den Menschen bequemen Höhe statt am Boden; (3) zu niedrige Luftfeuchtigkeit, besonders durch überhöhte Raumtemperatur im Falle betriebseigener Produktion preiswerter Bioenergie; (4) apathische Küken infolge ungenügender Lüftung; und (5) Infektionen aus kontaminierter Einstreu. COBB Germany bietet Broilermästern einen Leitfaden für das Management an, der die obengenannten kritischen Punkte in einer „Checkliste für den Farmer“ praxisorientiert unter die Lupe nimmt.

Literature:

Müller, H. (2013): Gesunde Tiere sind kein Zufall. In: Ulmer (Ed.) Geflügeljahrbuch 2013, Schwerpunkt: Tiergesundheit, pp 25-32.

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