

How to give chicks the best start in the brooding period

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The brooding period – the first 14 days of the broiler's life – is the most sensitive period because the bird is changing from an immature thermo regulation system to a mature one.

One common mistake is to think only of maintaining the proper temperature. We need to take care of other issues, too. A way to define these other issues is the 80-20 rule (Pareto's Law), which means that 80% of the consequences come from 20% of the causes. We should always think in our brooding about temperature, air quality, water and feed. Proper management of these areas will be the key factor to uniformity, which results in good performance.

We will assume that we receive good quality chicks from the hatchery, which means that the day-old chicks are active with bright eyes wide open, with strong and shiny shins, navels healed, without physical defects, no pathogens and with good maternal immunity.

The first week corresponds to 23% of the life of the 1.75g broiler, according to the latest Cobb Weight Supplement (April 2012). This first week represented 11% of the entire life in 1978 to achieve the same weight. So the proper commitment to a good start is very important for the broiler, and each good point achieved will be rewarded in good performance.

In many countries, some producers think that by the second week the birds are adults already and stop giving them external help to maintain good conditions. This could lead to one of the worst situations in the brooding period.

Temperature

Litter temperature is the most important because day-old chicks are extremely dependent on floor contact to help regulate the changing temperatures. The ratio of body surface to body mass is large in the day-old chick and it decreases with age, so the young chick will therefore lose heat faster than an adult bird.

The young chick's body is covered in

down which has a poor insulating value, so if temperature is not controlled it will lose heat rapidly through radiation and conduction. We suggest having the litter preheated and stabilised 24 hours before placement which means preheating of 48 hours in many broods, depending on the season, region and outside temperature.

A comfortable chick will breathe through its nostrils and lose 1-2g of moisture in the first 24 hours. The yolk contains this amount of moisture – they will lose weight but not become dehydrated.



If the birds are exposed to cold temperature, they will try to save or make heat by huddling or by burning feed to keep warm, which affects feed conversion ratio and this is the most expensive way.

If the ambient temperature is 26°C (78.8°F), the same moisture loss (1-2g) in the yolk will last the chick three days. This is why, in practical terms, when we see large yolks we can say that the bird was cooled in the first few days. In the opposite case, with temperature too high, the birds will try to remove heat or avoid producing heat, pant to lose heat (losing FCR) and stop eating.

If chicks start panting they can lose 5-10g of moisture in the first 24 hours and then dehydration will occur. The correct temperature will also influence the bird health and immunity because immune system development and stress is costing energy and when the birds are not comfortable during this development they will be more sensitive to infections and less immune competent.

The chick's internal temperature (cloaca measurement) should be maintained between 40.4-40.6°C (104.7-105.1°F); below 40°C (104.0°F) is cold and above 41°C (105.8°F) will lead to panting.

According to Muchacka and Herbut (2007), reduced and elevated air tempera-

ture during the first period of rearing reduced the rate of growth, with clear differences observed in the group of birds reared at lower temperature. Baarendse, et al. (2006) reported that rearing chicks during the first five days of life at 28°C (82.5°F) has a long term negative effect on further growth and development. Ideal would be 32°C (89.6°F) with 30-50% relative humidity (RH) in the litter at placement.

For the first two weeks the chicken house should feel too warm for the caretaker – if not, the temperature is likely to be too low for the chicks. We suggest the air temperature in the brooding area at placement, with 30-50% RH, begin at 33°C (91.4°F); at seven days, with 40-60% RH, 30°C (86°F); and at 14 days, same RH, 27°C (80.6°F).

If the humidity is less than above, increase the temperature by 0.5-1.0°C (1°F). If relative humidity is greater than above, reduce the house temperature by 0.5-1.0°C (1°F). Always use bird behaviour and effective temperature as the ultimate guide to determine the correct temperature for the birds.

Chicks from smaller eggs (younger breeder flocks) require higher brooding temperatures because they produce less heat (about 1°C) for the first seven days.

According to the seasonal climate it is very important to have tools to heat and cool the air, and options to provide correct air flow and distribution. Do not forget that the broilers in a brooding phase do not need air velocity more than 0.3m/s at floor level.

Air quality

Ventilation distributes heat throughout the house and maintains good air quality in the brooding area. An ideal for birds is oxygen 19.5%, carbon dioxide less than 3000ppm, carbon monoxide and ammonia (NH₃) less than 10ppm and dust levels less than 3.4mg/m³.

There are different levels of oxygen availability at different heights (above sea level), with the highest farm having the lowest availability.

The highest levels of carbon monoxide are caused by the incomplete burning of fossil fuels, but the major problem is a combina-

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tion of concentration and exposure time. Birds can tolerate levels of 600ppm for 30 minutes, but 3000ppm is lethal in two hours.

The normal air carbon dioxide concentration is 400ppm. In winter when we see chicks sitting near the outside wall, we think first of high temperature, but the problem can be carbon dioxide. This is because the level of carbon dioxide is too high inside this house, mainly because of the low air rate exchange rate.

The pressure in the house is too low, and with leaks and cooler air falling near the sidewall, the chicks will migrate to where more oxygen is available near these leaks. However, the litter is cold there, with draughts on the chicks and no feed/water present.

High ammonia levels in the house are detrimental for the birds. This is a colourless gas, soluble in water, with a pronounced odour and toxic to the animal's cells. Water is needed to transform broiler faeces to ammonia, so it is important to reduce the RH levels in the litter to reduce ammonia emissions.

The main purpose of minimum ventilation is to provide good air quality without air velocity at bird level. Inadequate minimum ventilation and the resulting poor air quality can cause increased levels of NH_3 , CO_2 , and moisture levels and an increase in production related syndromes such as ascites.



The chicks in this picture are too cool and are huddling to keep warm.

It is important to always evaluate NH_3 levels at bird height. The negative effects of NH_3 include foot pad burns, eye burns, breast blisters/skin irritations, decreased weights, poor uniformity, disease susceptibility and blindness.

Often producers argue why can we not control temperature while we change the air properly? The answer is because we do not control the air velocity of the air that we are changing. Proper inlets are a great help in this issue. Another tool is having a pre-warm chamber in a tunnel ventilation house without inlets. The use of double curtain also helps in maintaining good brooding conditions.

Water and feed management

We can call water an 'invisible' player in brooding – it can be both enemy and friend! Many times we see this component forgot-



ten by the broiler industry and farmers. Water is an essential nutrient that impacts virtually all physiological functions.

According to Viola et al. (2003), a 40% water restriction decreases the feed intake (542-338g), body weight (471-295g) and FCR (1.28-1.37) at 14 days. We need to guarantee 24ml of water per bird in the first 24 hours.

Watkins, 2011, showed the importance of cleaning and disinfecting the water lines. The use of 40-50 micron water filters is always suggested to maintain good water quality.

The oxi-reduction potential (ORP) of 650-750mv is a good goal; more than this can result in equipment corrosion, less than this will not disinfect the water properly. The flushing procedure is also a good tool to maintain proper water temperature for the birds.

We suggest using paper in 50% of the brooding area and the amount of feed should be 50g/bird in the period that the paper is in good condition. Use newspaper (47-55g/m² weight with 55-68% brightness), and not tissue paper, to ensure adequate time for feeding before the paper breaks down. It should be good enough to last five days.

Correct stimulation of activity during the first 5-7 days of age is necessary for optimal feed consumption, digestive and immune system development.

It is recommended that a light intensity of 25 lux in the darkest part of the house, measured at chick height, be used during brooding to encourage early weight gains.

Optimum light intensity at floor level should not vary by more than 20%. Another good tool is having a 100 Watt bulb hung over demand pans at the end of the line.

At seven days (standard weight) we need to start regulating darkness. The amount of dark hours will vary according to the market specifications for weight. The seven day weight is a good tool, but more crucial is uniformity.

The best way to improve flock performance is not by increasing seven day weight of the faster starting chicks, but by decreasing the number of slower starters! A good coefficient of variation is 8-10%.

A good tool to do is the Chick Check evaluation! It consists of having 100 birds evaluated by looking at the crop consistency.

The crop is palpated after six hours (chick-check 1) and again at 24 hours post-placement (chick-check 2). A good goal is getting 95% of birds with water and feed in the crop. We should not forget that birds are the best sensor in a house.

Some chicks should be eating, some drinking, some resting, some playing, with all the birds evenly spread throughout the house.

In the first 24 hours after placement a chick needs to consume 20-25% of its own body weight in feed and 40-50% in water. These are important goals; and remember that intake of water and feed are linked together. The objective is to achieve 4-5 times the day-old weight at seven days and the breed standard at 14 days.

The maximum seven day mortality should not exceed 1% cumulative.

Summary

Good brooding management will always result in better flock uniformity. Uniformity is the key to good and consistent results and cannot be achieved after doing a bad brooding job in the first 14 days. The critical factors are temperature, air quality, water and feed. When these are correct, 80% of your success will be achieved.

Always remember never to sacrifice temperature for ventilation and never to sacrifice ventilation for temperature. ■