The first seven days of a broiler's life – starting off in a high care facility

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The first seven days of a broiler's life are of utmost importance for realising optimum results towards the end of the growing period. In their management guides, breeder companies state that the importance of optimum management in the brooding period can not be over emphasised.

Nevertheless, in commercial practice, providing optimum conditions in this first critical period appears to be a major challenge.

In this article, the significance of the early post hatch period is discussed, and we will focus on the possibilities of Vencomatic's new housing system for broilers, the Patio, to deal with some problems commonly observed in the brooding phase in current hatching and housing systems.

The Patio housing system offers optimum conditions for young broiler chicks.

The start of a broiler's life

For a chick, hatching involves several dramatic physiological changes. In the first place, the hatchling has to change from reliance on nutrients obtained from the lipid and protein rich yolk, to external solid carbohydrate rich feed.

Next, the chick has to switch from respiration via the yolk sac to using its lungs. Also, while being inside the egg, the embryo temperature entirely depends on the climate conditions provided in the hatcher cabinet. After hatch the chick gradually has to change to maintaining its body at the right temperature by itself.

As a precocial species, chickens are relatively mature and mobile at the moment of hatching. In the opposite developmental strategy (altricial, for instance the blackbird), the young are born helpless. Precocial birds have offspring that hatch with well developed skeletons, with good sight, and covered with down.

They are ready to leave the nest shortly after hatch. Although sometimes governed by their parents, precocial birds should quickly be able to find their own food. This precociality seems one of the fundamental prerequisites in the current poultry industry, in which birds are raised exclusively without parental care.

However, although relatively independent in terms of foraging behaviour, precocial birds, including broiler chicks, are not self-reliant in thermoregulation (the ability to regulate their own body temperatures).

They depend on the attending parent to provide sufficient warmth by brooding them with body heat for the first period after hatch.

Chicks are efficiently housed on multiple levels.

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The thermoregulatory system of a broiler chick is only fully developed after about 10-14 days, meaning that in this period, too low environmental temperatures will lead to lower body temperatures, chick huddling and reduced feed and water intake.

Optimum conditions

In the absence of parental care in broiler production, it is the producer's job to provide conditions matching the needs of the chicks as close as possible.

Although it is generally known that any deviation from optimum climatic conditions will result in losses of growth, feed efficiency or eventually death of the chick, recent research on commercial broiler farms revealed that the majority of broiler operators in the UK and Denmark are not capable of maintaining temperature and humidity within limits recommended by the breeder company.

Both temperature and relative humidity in the first week of life tended to be lower than the recommended levels, affecting flock health later in the growing period.

'Day'-olds?

It is important to realise that the broiler's life does not start at the moment it is placed in the broiler house.

There is a natural variation in the moment of hatch between 24 and 40 hours, but in addition, the moment of hatch is influenced by many factors such as pre-incubational storage time, parental age, egg size and incubation temperature.

Hatchery managers have to collect the maximum numbers of chicks from every batch of eggs, and chick removal from the hatcher usually takes place after 21.5 days or 516 hours of incubation. As the first chicks start to hatch at about 465 hours of incubation, these chicks are about 50 hours old at the moment they are removed from the hatcher.

Just hatched chicks can directly start to eat and drink in the Patio system.

This means that an early hatched chick will spend the first two days of its life inside the hatcher cabinet, where the temperature is about 38-39°C, relative humidity peaks at 90% and the carbon dioxide level goes up to about 1%.

Furthermore, additional time needed for preparing the chicks for shipment and the actual transport time, implies that the chicks will be several days old before being placed in the broiler house – and having feed and water access for the first time.

Now most chicks will survive a period of maximum 100 hours without feed and water, because they can use nutrients from the remaining yolk sac in their abdominal cavity, which makes up 5-20% of their body weight at hatching. Nonetheless, it is known that in the early post-hatch period, broilers lose about 8% of their initial weight in 24 hours.

In addition, recent studies indicate that the immune system, intestinal development and the thermoregulatory processes are also impaired by delaying the moment of first feed and water intake.

Patio – a high care facility

The Patio system is a multi-level housing system for broilers in which the brooding and hatching system are combined. The hatching eggs, which are incubated for 18 days in common incubators, are transported to the housing system instead of chicks. Hence, hatching takes place in the same environment where the birds will stay and grow.

Climate conditions during hatching in the Patio greatly differ from those commonly observed in hatcher cabinets: air temperature in the Patio is about 35°C and the litter temperature is about 33°C, with a relative humidity of 40% and a carbon dioxide level which does not exceed 0.2%.

Another important difference with the conditions in a hatcher is that the air volume per chick is more than 30 times higher in Patio and air speed is lower than 0.2 m/s, which can be considered stand-still air.

This latter aspect is especially critical, since young birds are highly susceptible to draughts. In short, we can conclude that the climatic conditions provided in Patio from the moment of hatching closely match conditions recommended for early brooding by large breeding companies that supply the broilers. After hatch, chicks can access feed and water immediately.

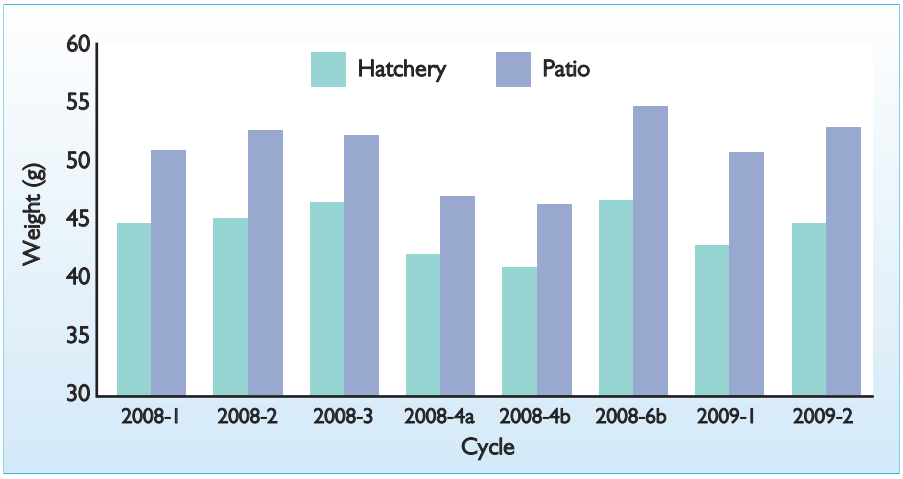

Fig. 1. Weights of chicks hatched in the Patio system compared to the hatchery.

Production results

During eight production cycles, we measured the weights of chicks obtained from the same breeder flock and either hatched in the hatchery and placed in the broiler house, or broilers hatched in the Patio.

At day 0 post hatch, the mean weight difference was about 6.6g or 15%, favouring the Patio birds (Fig. 1).

Naturally, this difference in weight is not entirely due to a difference in actual body mass, but can partly be explained by the water and feed present in the digestive tract of the chick's body.

Chicks that hatch in the hatchery and are placed in the broiler house, immediately start to eat and drink after arrival. First measurements indicate that the difference in seven day weight between Patio and hatchery birds obtained from the same flock is about 10%.

Chick weight at seven days is correlated to processing weight. However, the start in a high care facility such as the Patio system will not only result in higher chick weights, but chicks will be more robust, have a more matured immune system and well developed intestines and thermoregulatory system.

This then forms a good basis for achieving optimum health and technical results in the remainder of the growing period. ■