

A novel approach to brooding for robustness

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Modern poultry farming is asking for a tremendous performance of the broiler. Genetic selection has resulted in faster growing broilers, with more efficient calorie conversion.

Although the birds have changed and so has an increased demand for perfect rearing conditions, our production methods to hatch and rear birds has hardly changed over the years.

This article looks at Patio – a new revolutionary system to hatch and house broilers. To understand the system, let us first outline current hatchery and rearing practice to explain the challenges faced with the development of Patio.

Current challenges

Hatching eggs are commonly incubated for 18 days in incubators, after which they are candled and transferred to the hatcher cabinets for the last three days of incubation.

Chicks hatch over a time window of approximately 36-48 hours and are removed from the hatchers only when the majority of the chicks has hatched. Here the first challenge is noticed, as the first hatched need to wait for the last chicks to hatch in a suboptimal environment.

In particular, the climate with high air speeds and delayed access to feed and water causes a decrease in chick quality for every hour the just hatched chick spends in the hatcher machines.



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

After chick collection from the hatcher, further hatchery procedures, such as sexing, vaccination, packaging, and transportation, increase the time by up to 50 hours or more until placement in the broiler house and thus first feed and water intake for part of the flock is delayed. If long transportation is involved, this period may be increased up to 72 hours.

The brooding period, which comprises the first few days of the chicks' life, is known to be the most important phase in the produc-

tion of robust broilers, which affects later performance in the flock.

In relation to this, the second challenge comprises the on farm circumstances during this brooding phase.

In cold climates it is difficult to achieve an even climate in the broiler house, with the correct temperature and air quality.

Also later in the cycle, the correct climate continues to be a challenge for poultry managers, as the demand of the chicks keeps changing with their age. Next to this, outside conditions affect the incoming air quality, and thus the in-house climate.

The third large challenge for poultry meat producers has no direct relation to the chicks, but comprises the external factors that have an effect on the performance of the business conditions of the company.

First of all, we see in the market that it is getting more difficult to find skilled labour for the work on-farm. Companies therefore look for efficient tools to maximise the number of chicks that one worker can handle. Another point is to be noticed in the use of resources, like energy, feed and land.

The world population is still growing and it can therefore be expected that the prices for resources will continue to rise, and companies are trying to maximise the use of these resources, as this will give them sustainable competitive advantages.

Patio system concept

The Patio is designed by Vencomatic to hatch and house broilers on farm. Instead of receiving day old chicks, 18 days incubated eggs are now transported from the hatchery to the broiler house.

The eggs remain on the setter trays and are transferred into a multi tiered system. When a chick hatches, it has direct access to feed and water, while its brothers and sisters are still hatching. The environment for hatching is completely different, compared to traditional hatcher machines.

Hatching in Patio occurs in a large air volume (34 litres of air per egg), with almost stand still air speed. The optimum hatching temperature and humidity appears to be lower, compared to traditional hatchers.

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Table 1. Hatchability benefits from the Patio system.

Farm	No. of trials	No. of eggs	Breed	Hatchability Patio (%)	Hatchability control (%)	Difference (%)
Spelderholt	9	415,82	Ross 308 507/708	96.07	94.62	+1.44
Sint Annaland	28	505,205	Ross 308	97.24	95.52	+1.72
KempenKip	21	463,708	Ross 308/ Cobb 500	95.04	92.95	+2.09
Total	58	1,384,733		96.11	94.36	+1.75

*Hatchability is calculated after removal of bad quality chicks

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The Patio system is set up in insulated compartments, with two system rows per compartment. Each row consists of six identical levels on top of each other. The bottom of each level consists of a synthetic moveable belt, on which the chicks are housed.

The rows are separated by a central corridor and two corridors at each other side of the rows. Fresh air is delivered to the outer corridors and moves through the system due to the pressure that is created with the fans in the central corridor.

Climate control in the Patio takes place on bird level and is entirely under the control of the manager. The sophisticated climate design distributes fresh air to all the birds, with the right temperature and air speed.

The live belts on which the birds are housed are also used for automatically loading of the broilers in the end of the production cycle. In this way, there is minimum contact between broilers and farm workers, and labour is kept to a minimum.

This results in a robust production system, with less dependency on factors like climate or labour.

Results with the Patio

As the Patio opens a completely new vision on broiler housing, many questions arise. In order to get answers to most generic questions and in order to support customers with funded advice on the management of birds, which are housed in this system, Vencomatic has initiated practical research in several locations.

First of all, experience was gained from a test unit that has been set up in cooperation with Wageningen University, on their test location Spelderholt. After this, the first commercial poultry farmer in the

	Traditional house		Patio system	
Fertile hatching eggs	100,000		100,000	
Day old chicks	94,550	94.5% hatch	96,170	96.2% hatch
Broilers at catching	89,823	5% mortality	92,323	4% mortality
Less DOA	89,553	0.3% DOA	92,138	0.2% DOA
Less rejects	88,299	1.4% rejection	91,862	0.3% rejection

Table 2. The benefits obtained at broiler level from the Patio system.

Netherlands started to work with the system. The third location, where statistical data and experience is gained from is Kempenkip, Vencomatic's own facility in the Netherlands.

Data was collected from 60 rearing cycles, where 1.44 million chicks were hatched and reared in the Patio system. Every cycle was carefully compared to a traditional hatchery setup. The comparison was made with eggs from the same breeder flock that had been in the same setter machine.

Most surprisingly was the fact that the average hatch of fertile in the Patio appeared to be 1.7% higher, compared to the control hatch in the hatchery.

One reason for this higher hatch lies in the fact that there is no selection of chicks before counting, as happens in the hatchery.

The number of hatchlings in the Patio is determined by deriving the number of non-hatched from the total number of hatching eggs that are put in the system. In Patio the selected chicks are noticed in the mortality.

When looking at seven day mortality, which is 1.1% average during the cycles, it is also lower compared to the Dutch average of 1.5%.

Due to the perfect start in the Patio and the sophisticated climate system that offers the right conditions to birds during the

whole cycle, typically birds are 70-90g heavier in the end of the cycle with low mortality rates.

Additionally, it should be mentioned that no antibiotics were used in the Patio during the collection of data.

The loading of broilers at the end of the cycle is optimised to the birds welfare. Randomly followed cycles show 0.1% lower dead on arrivals and 1.1% lower rejection rates in the slaughterhouse.

When comparing all the results of the collected data with Patio it can be concluded that the system delivers 3.1% more delivered chicks from 18 days incubated and fertile eggs.

Conclusions

When looking at investments for new broiler production facilities, companies should take the Patio into consideration if they wish to increase efficiency.

The system opens up complete different perspectives to broiler production, but needs a rigorous change in mindset.

Some companies have already decided to start using the Patio system and 18 million birds places have been sold and the first large scale operations are in production. ■