Automatic laying nests require good management

by Martin 'Tiny' Barten, senior hatchery specialist, Pas Reform Hatchery Technologies, Royal Pas Reform Integrated Hatchery Solutions

In these coronavirus-restricted times, Royal Pas Reform has had to pivot away from attending traditional live trade fairs and exhibitions. Instead, we have come to appreciate the value of virtual events as a 'new' – although we all trust temporary – way to reach out to clients, colleagues and friends.

These still give us the opportunity to 'meet' and discuss the latest trends and thinking in our industry – albeit online, rather than face-to-face.

At one such digital event recently I chatted with someone from a poultry housing equipment company. He asked my opinion on the trend for more and more modern houses to be equipped with automatic laying nests, suggesting that litter nests with manual egg collection seemed destined to become a thing of the past.

Automatic laying nests can, I agreed, assure clean hatching eggs of good quality, and on this basis I believe that they do represent efficiency and progress in poultry production.

However, in my experience, I continued, the incidence of fertility problems, measured by the number of clears removed during candling, seems to be increasing. Often, upon opening a sample, the majority of these clears show that an embryo died in the very early stage. In countries with a moderate climate especially, a breakout of un-incubated eggs from the storage room frequently reveals fertile eggs with an underdeveloped embryo.

In warm countries like Indonesia, a fresh egg breakout usually reveals the classic doughnut-shaped-embryo, and in these countries hatchery results are often higher. In my opinion, this phenomenon of underdeveloped embryos could be attributed to the eggs cooling too quickly while lying on the egg belt of the automatic laying nests, especially where there is a draught directly over the eggs. Good climate control and well-constructed and positioned nests will prevent this. Eggs in a traditional litter nest naturally cool down at a much slower pace, without any cooling draught.

Another observation I shared was an increased incidence of hairline cracks. Of course, this has a lot to do with shell quality, but the way the automatic laying nests are managed is also a relevant factor. Hens prefer to lay their eggs in the corners of the nests. Yet in automatic laying nests, the number of corners available in each nest is restricted, because they are not designed for single-occupation. Eggs are therefore concentrated in groups along the length of the egg belt.

If eggs are only collected twice a day, simply moving the belt half the length of a nest unit between the two egg collection times will prevent newly laid eggs from bumping into the eggs already on the belt and thus also reduce the occurrence of hair cracks.

The shift to automatic laying nests is a step forward in increasing the efficiency of poultry production, I concluded, as long as we bear in mind that good management practices are also essential.

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Big problem – simple solution

by Dr Marleen Boerjan, retired hatchery specialist, Royal Pas Reform Integrated Hatchery Solutions

A hatchery got in touch with me recently about a worrying problem: 3-5% of the newly delivered chicks were dying during their first 3-5 days on the farm. As I arrived on site, chick boxes were being loaded onto a truck and even before entering the hatchery the noise was deafening.

The hatchery manager showed me around the hatchery, which was well organised and clean; and the route to the processing room was straightforward and logical. I noticed, however, that most of the doors were open, whereas I would have expected them to be closed. The chick processing room was separated from the room where the chicks were counted, boxed and spray vaccinated.

I stayed a while in the chick processing room observing the chicken take-off and selection: the smell was fresh, the chicks looked good and they were quiet. I also noticed that the shells were clean, an indication that pulling time was correct. The first class, saleable chicks that had been selected were placed on a conveyor belt, which moved the chicks through to the next room where they were counted, and spray vaccinated.

After leaving the processing room, where the conditions (temperature and humidity) felt comfortable, entering the 'boxing' room was a shock. My immediate reaction was 'something is wrong here'. First, there was the overwhelming noise made by the chicks in the transport boxes stacked on the trolley, waiting to be transferred to the holding room next door. On closer inspection I could see that these recently vaccinated chicks were soaking wet, all huddled together, and their feet felt really cold. To make matters worse, the trolley was standing right in a cold draught caused by a big fan in the corner of the vaccination room. And in the holding room, the temperature was also too low for the chicks still wet from vaccination. No wonder the chicks were not happy and were making so much noise!

It didn't take me long to work out what was wrong in this hatchery. The high levels of early mortality during their first week on the farm were due to the vaccination spray being too heavy, and the wet and undercooled chicks then being exposed to cold draughts from fans and open doors.

Fortunately, the hatchery technician realised the vaccination error himself, saying "It'll only take me a few minutes to change the nozzle for one with a finer spray." He also reduced the fluid pressure so that the droplets wouldn't be too fine and to reduce the amount of water sprayed per chick box. Now the chicks were just damp after spraying instead of being soaking wet.

In the quiet of the canteen we evaluated the early mortality issue. The hatchery manager concluded that early mortality had become a serious problem after the recent annual check of the vaccination equipment, when the spraying nozzles had been exchanged and not checked afterwards. Since the check, nobody had noticed that the chicks were soaking wet and their body temperature had dropped too low. Despite the noisy protests by the chicks the dramatic change in viability had come as a surprise.

The hatchery manager realised that everyone had been so busy following protocols as accurately and efficiently as possibly that they had forgotten the other golden rule: look, smell and listen – and take immediate action if you see, smell or hear something abnormal.

A week later I received a short message and a picture of happy chicks on the farm: 'problem solved'.

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Getting to the bottom of sex-related first week mortality

by Lenise I. de Souza, Incubation Specialist, Pas Reform Academy, Royal Pas Reform Integrated Hatchery Solutions

"Why are so many chicks dying in their first week?" I could hear the worry in his voice when I received a call from the manager of a single-stage broiler hatchery in southern Brazil. It was a cold winter (yes, even in this tropical country temperatures can go below 10˚C) and he was getting reports of 3-5 of chicks dying in their first week, and in some cases even 10.

Wanting to get to the bottom of this alarmingly high first-week mortality, I went to visit the plant, where I learned there was no relationship between setter/hatcher room or breeder flock/line. Stranger still: either males or females were dying, but not both sexes from the same hatch day. Naturally, my first reaction was that something might be going wrong after the chicks had been sexed. Or perhaps transport was the problem? But the manager said they'd looked at these too and could find no correlation.

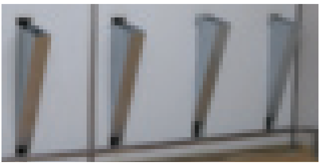
After tracking and tracing all chick handling procedures after sexing, we realised that the worst cases were when chicks hatched on the Friday but were not delivered until Saturday – so they had stayed overnight at the hatchery. But the records from the chick delivery room showed nothing unusual: temperature and humidity were fine.

It was time to take a look inside the chick delivery room. Once again, the record sheet showed normal environment data. But, when I stood close to the wall where air was entering the room, I could feel the cold on my bare arms. The chicks on that side were huddled together in their boxes. Measuring their rectal temperature (it was 101-102˚F) confirmed that they were suffering from hypothermia. The temperature around these boxes, which contained male chicks, was only 19°C.

The female chicks from the same breeder flock had been placed in the centre of the room. Their rectal temperature was normal (104-105˚F) and the temperature around their box was 25˚C. Clearly the two sexes had been placed in very different conditions during the time they were waiting to be put on transport, and this time it was the males that were the unlucky ones.

The sensor to keep the temperature at 25˚C was located in the centre of the room. As a delivery room fills up, more and more cooling is needed, and the room was getting too cold where the air was entering. In fact, the cold air was streaming directly into the chick boxes close to the air inlets. We set up a makeshift trial using cardboard funnels to direct the cool air upwards, avoiding direct air flow over the chicks. A few hours later, when we measured the temperature of the air around the chick boxes near the air entrance, conditions had improved, and this was confirmed by the chicks' more normal rectal temperatures.

The hatchery manager has now devised a more permanent solution (see right): aluminium air conductors have been fitted. And even in winter there have been no more complaints of chicks dying from the cold.



We have learned some valuable lessons from this story. It is important to check the temperature in different parts of the chick delivery room, and chicks must not be exposed to cold draughts. If necessary, direct inlet air upwards away from the chicks so that it warms up first. It is not worth destroying all the effort that has gone into incubation by careless handling of newly hatched chicks.

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Managing CO_2 to optimise hatchability

by Martin 'Tiny' Barten,
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Last year I was invited to a layer hatchery that was reporting slightly lower hatchability than its sister hatcheries, despite using eggs from the same flocks with the same pre-setting treatment.

The hatchery was using several generations of incubators, from very old to relatively new machines. Hatchabilities had not been assigned to machine type, which complicated my investigation. However one common issue was that all the setters at the end of the cycle were unable to achieve unrealistically high humidity set points. This was partially due to very dry inlet air, which forced the setters' humidifiers to work constantly and created cold spots that extended the hatch window.

On day two of my visit there was a hatch. While I was very pleased with the chick quality, a breakout of unhatched eggs from various machines revealed too many embryos dying just before internal pipping. Air cells were large enough and the embryos had a normal, dry appearance, so this was not due to insufficient weight loss. What then was the cause?

Studying climate graphs from recent hatcher cycles revealed that although the newest hatchers were equipped with CO_2 sensors, these were not being used to automatically control the fresh air supply. Instead, these modern hatchers were being managed traditionally, using stepped increases in set point to position the air valve.

The CO_2 line in the climate graph showed much higher values than recommended, ranging from 0.8% right after transfer to over 1% – and at times, even higher values than the sensor could measure (>1.3%). When I shared these findings with the hatchery manager, we agreed that these high CO_2 levels were the most likely cause of late embryo mortality and I suggested two remedial options, either:

- Fine-tune valve set points on measured CO_2 values: aim for 0.5% immediately after transfer, to a maximum of 0.8% at the onset of hatch and reducing again when the hatch is complete. For older hatchers without CO_2 sensors, my advice was to increase valve positions to create a similar profile from transfer to the completion of hatch.

- As an alternative, I advised using CO_2 set points to automatically control valve positions.

The hatchery manager chose the first option, which felt more familiar to him. But some months later, he called to tell me that my second suggestion, using automatic valve control in the newest hatchers, was much easier and more importantly hatchability was now consistently 'very good'.

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