Impact of hygiene on hatchery performance

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Poor standards of hatchery hygiene lead ultimately to an explosion of pathogenic organisms resulting in severe economic loss.

The hatchery plays a vital role in poultry breeding. Because every fertile egg must pass through a hatchery it follows that the hatchery offers an opportunity to either prevent or encourage the growth of micro-organisms.

Conditions which we create inside incubators encourage the growth of bacteria and moulds as well as embryos.

Sources of contamination can include:

- Eggs.
- Air.
- Water.
- People.
- Rodents.
- Birds.
- Equipment.

Eggs

Eggs which look clean carry thousands of bacteria both on and in the shell. Those on the shell we can deal with fairly easily but those which have penetrated the shell we can do very little about. The emphasis must be on prevention and this means producing clean eggs on the farm.

We must keep floor eggs to a minimum. It is the floor eggs which are the most heavily contaminated, hatch badly (anything from 5-15% worse than clean nest eggs) and produce the most rots and bangers in the incubators.

	Temp (°C)	Humidity (% RH)
Embryos	37. 5	54
Bacteria	37. 0	95
Moulds	37. 0	80

Table 1. Environmental requirements.

In short, about 10% of the eggs produce 90% of the contamination. So we need to concentrate our minds on clean egg production. If the farms reduce floor eggs by 1% the hatchery contamination would drop by 10%.

This would improve chick quality and livability significantly. We have very efficient machines for sanitising hatching eggs. Maybe they are too efficient; they can clean up floor eggs so they can be disguised as nest clean eggs and sent to the hatchery as such. Eighteen days later we know which are the floor eggs! One rotten egg which explodes in the setter or hatcher has the capacity to contaminate many other eggs or chicks, trays, tray carriers, trollies, fans – in short, the entire incubator.

In summary contaminated eggs will:

- Lower the hatch.
- Produce higher contamination.
- Higher labour costs.
- Higher disinfectant costs.
- Poor chick livability.
- Poor chick growth.

Air

The air supply can introduce micro-organisms to the hatchery. Particularly if the hatchery is near a feed mill or arable land. Both present a real risk of mould spores carried on dust.

Sometimes a hatchery recycles its own waste air which is heavily contaminated with chick fluff. Siting and design of the hatchery are obviously very important and a degree of control can be achieved with air filters. However, filters need to be changed regularly, washed or replaced.

Within the hatchery air is usually distributed through metal ducts to each room. These are rarely cleaned and collect a wide variety of of debris over the years.

The most cost effective and hygienic method of distributing air is a washable or totally disposable transparent polythene duct and, therefore, any build-up of dust and debris is highly visible.

The hatchery air supply needs to be designed to prevent recontamination of eggs in the clean areas of the hatchery by contaminated air from the dirty or hatching area. The solution is to provide the correct quantities of air at the right pressure to dilute the bacterial load and move it in the right direction.

The solution to pollution is dilution when we consider hatchery ventilation.

FARM HYGIENE – KEY FEATURES

- Litter
- Nests
- Collections
- Handling
- Sanitation
- Personal hygiene
- Storage
- Rodent control

HATCHERY HYGIENE – KEY FEATURES

- Storage of eggs
- Handling
- Sanitation
- Setter hygiene
- Hatcher hygiene
- Hatchery design and construction
- Chemicals
- Tray and box washing

Water

Where water sprays are used to provide humidity the bacteriological quality of the water is important. Cases where pseudomonas infection in chicks have been traced to contaminated hatchery water supplies are documented.

Humidity systems which use water troughs with paddles or rotating discs are potential source of infection and this needs to be controlled by using a disinfectant in the water trough.

Only small quantities of water are used for humidity and provision should be made to sterilise this water either by steam, chemical disinfection or ultra-violet light.

People

Employees and visitors can introduce infection to a hatchery from farms, other hatcheries, other poultry and other livestock. So this risk needs to be assessed and protocols established. Hatcheries need to provide appropriate protective clothing and management needs to ensure that it is used.

Equipment

If we adopt elaborate and expensive means to sanitise eggs, then we must also ensure that trays and trollies are also subjected to a similar hygiene programme. Similar comments apply to

Continued on page 13

Continued from page 11
chick boxes. They need to be washed and disinfected in a way that does not compromise the hatchery hygiene programme. Somewhere in most setters will be a water leak or condensation from a cooling pipe which allows water to drip onto the eggs. This is guaranteed to produce rots.

Bent or damaged tray carriers, turning angles too steep leading to broken eggs provide a ready food supply for bacteria and moulds.

Rodents and birds

All hatcheries should have a pest control programme to control rats and mice in and around the hatchery. Many hatcheries store cleaned farm trays and chick baskets outside simply due to lack of space.

Rodents are a problem on farms and it is not unknown to find mice amongst trollies of eggs in the egg store after fumigation. Similar comments apply to wild birds as well. All are documented carriers of salmonella.

Consequences of contamination

The consequences of contamination are numerous and very costly leading to:

- Lowered hatchability.
- Poor chick quality and customer complaints.
- Poor growth rates.
- High plate counts.
- High disinfectant costs.
- High labour costs.

The first signs will be complaints from customers about mortality, chick quality and dead on arrivals. The hatchery should have been alerted as the plate counts will be high and the transfer team will probably be complaining about rots and bangers.

How is it controlled?

Both breeder farms and hatchery should have a hygiene programme that is designed to keep micro-organisms at very low levels. This is an attempt to identify the risk areas in the production system and apply suitable and cost effective cleaning and disinfectant techniques to prevent the build-up of bacteria and moulds.

Just as there is a cost penalty for failing to meet the hygiene standards, so there will be costs involved in labour and disinfectants in an effective hygiene programme. Management must recognise this. As far as chick production is concerned we must devise a hygiene programme for both farm and hatchery which is both technically efficient and commercially viable.

Why do control measures fail?

Failures can be attributed to the following:

- Extremely high levels of contamination on the egg.
- Inadequate cleaning and disinfection.
- Wrong chemicals or poor quality chemicals.
- Chemicals used incorrectly.
- Poor design features in the hatchery.
- Poor egg handling.
- The human element.

What can we do about it?

Nature has provided the embryo with a high degree of security against attack by micro-organisms and we should ensure that our production systems recognise this.

For example we know that the cuticle has a positive role to play in the microbial defences of the egg so we should not use sanitising methods which damage, destroy or remove it.

We need to concentrate on producing clean eggs. This is probably a combination of house design, environment and nest design. Labour costs are forcing people to consider automated egg collection systems.

These have been shown to be very successful in reducing floor eggs and provided they are managed correctly, nest eggs will be of a high quality too.

Egg sanitation needs to be carried out by people who are competent to do it. They must understand the objectives and know what can go wrong.

When we build new hatcheries or replace incubators in existing hatcheries we should ask questions about machine design, construction and ease of cleaning. Fixed rack setters may give excellent hatchability but are impossible to clean properly. Plenum chambers and exhaust ducting need to have access for cleaning. Hatchers need to be simple, durable and easy to clean.

Air ducts must be accessible to a power hose and fluff should be directed to a fluff corridor or plenum and not allowed to settle like a blanket on tops of hatchers. Manufacturers are beginning to get the message and building cables into the structure of the machines to leave the outside free of clutter, for example.

Single stage setters offer the best means of controlling the build up of contamination. If hygiene is the number one priority then single stage incubation is the answer. ■