

Hatchery Cleaning and Disinfection

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Definition

- Good cleaning and disinfection (C&D) procedures within the hatchery are necessary to reduce and continually minimise the level of microbiological contamination, and subsequently the risk of microbiological contamination in the building, machinery, eggs and poults.

Objectives

- To minimise as far as practicable the numbers of micro-organisms, especially pathogens if present.
- To reduce cross contamination between clean and dirty areas of the building and between batches of eggs in incubation and poults.
- To minimise the build-up of bacterial flora in the environment of the building.
- This advice sheet will discuss the following topics:
 - Hatchery design and management to minimise problems of cross-contamination and to ease cleaning.
 - Principles and techniques for cleaning and disinfection.
 - Monitoring the success of hatchery cleaning and disinfection.

Procedures

General Principles

- The most likely route for microbiological contamination to enter the hatchery is with the eggs. Therefore it is important that the laying farms produce clean eggs that have been properly sanitised (figure.1). The biggest risk of introducing a large microbial load into the hatchery comes from dirty eggs or eggs laid on the pen floor rather than in a clean nest box.



Figure 1. Cleaning and sanitising eggs on the laying farm

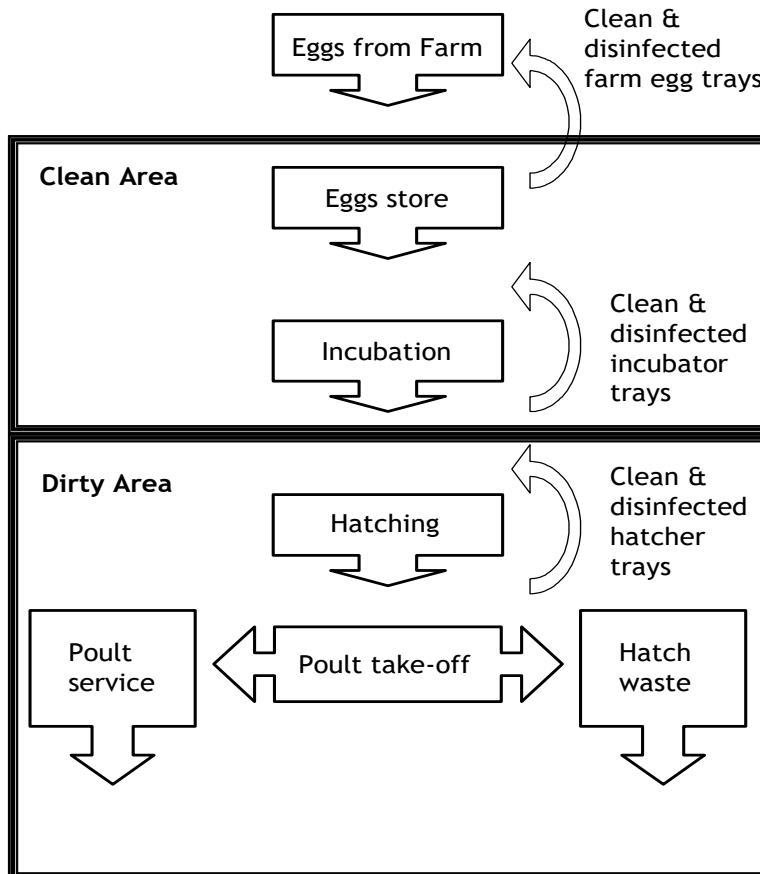
- Once the egg arrives in the hatchery the eggshell provides a barrier to prevent further contamination. The main contamination risks during egg storage and incubation are from eggs becoming wet or coming into direct contact with contaminated material. In either case microorganisms may cross the shell barrier.
- Once the poults start to hatch, hatching fluff, meconium and microorganisms present within the egg are released into the hatching environment. An important part of maintaining a clean hatchery is to minimise the spread of contamination from the hatching and poult handling area to the rest of the hatchery.
- Other possible routes of infection into the hatchery are personnel, water supply, vermin and air.
- Cleaning is as important as disinfecting as it is very difficult to kill micro-organisms on dirty or soiled surfaces.
- The C&D process must end with the waste it produces being removed from the building preferably via a drain.

Hatchery Design and Management

- Good design and management will assist in maintaining a clean hatchery.
- Ensure that there is good separation between clean hatchery areas (e.g. egg store and incubation rooms) from dirty hatchery areas (e.g. hatcher rooms, take-off and poult handling areas, hatchery waste disposal areas and hatcher tray washing room). Figure 2 shows a typical work-flow diagram for a hatchery.
- Ideally, the hatchery layout will be such that personnel, eggs and equipment do not have to move from dirty to clean areas. In large hatcheries, the use of different personnel to work in hatching and incubation areas is a good method of reducing traffic between the clean and dirty areas. Each work team would have a separate entry into the hatchery, canteen/rest rooms and toilets so that they would not have to cross into the other area of the hatchery. The use of different coloured work clothing can also help demarcate clean and dirty area personnel.
- A compulsory shower before entry to the hatchery and the provision of company work clothes and footwear can reduce the risk of hatchery personnel bringing contamination into the hatchery.
- The hatchery ventilation system should be designed so that the air moves from clean areas of the hatchery to dirty areas. The air pressure in clean rooms should be slightly higher than the dirty rooms so that the likelihood of ingress of micro-organisms is reduced.
- The hatchery building should be designed to make cleaning easy. Floors, walls and ceilings should be smooth and waterproof to allow easy cleaning and light coloured to show up dirt. Joints between vertical and horizontal surfaces should have a “coving”, where the right angle joint is replaced with a radiused curve joining both surfaces. This facilitates cleaning and disinfection. All spaces and voids in the hatchery should have access points large enough to allow easy cleaning and disinfecting. Ideally, this would include the inside of ventilation ducts and drainage channels.

- A tidy hatchery is much easier to clean and so it is important to provide rooms for storing equipment and supplies away from areas that require frequent cleaning.

Figure 2: Hatchery workflow



Cleaning and Disinfection

- An example programme for cleaning and disinfection is shown in Table 1; this should be modified to meet the requirements of a particular hatchery.
- All operators should be aware of any health and safety considerations when operating equipment and using chemicals for C&D. Consult your H&S advisor.
- There are a large number of detergents and disinfectants to choose from. Ideally knowledge of the sensitivity of your hatchery's environmental and potentially pathogenic microflora to the active compound in the disinfectant is required. The efficacy of the product will be directly related to this.
- Whichever detergent and disinfection chemicals are chosen, ensure that manufacturer's instructions for use are followed. Pay particular attention to the required contact time for the product and the in-use concentration: if the detergent or disinfectant is washed off too soon after application or it is too dilute it will not be effective.
- The use of high pressure washing systems is not recommended, as they will tend to form aerosols containing dirt and microbes when the jet of water bounces off the surface being cleaned. The use of buckets, cloths and brushes will be appropriate for certain locations in the building.
- Chemicals can be applied as foams via foam lances (figure.3), however, the concentrations of chemicals achieved by the automatic dosing control on the foam lances should be checked regularly to ensure compliance with requirements.

- Foam detergent can be applied directly to the soiled surface (figure.3). Sweeping up poult dust in hatching areas tends to spread the dust and debris about, whereas foaming it traps the debris in a suspension in detergent that can be washed down a drain.



Figure 3. Applying foam detergent directly to soiled surfaces

- Do not rinse soiled surfaces before cleaning as this may compromise the adherence of any foam used and, unless it is left to dry, will dilute any chemicals applied subsequently.
- The detergent product should be applied to the surface to be cleaned from the top down, at the manufacturer's recommended dilution. Start with the surfaces that are highest up e.g. ceilings in hatchers and work down. Although the floor will be wet by the time you get to it, it is the surface which is the most contaminated and requires a thorough treatment of its own. The detergent should be left on the surface for the manufacturer's recommended contact time before rinsing off, from the top down, with clean water.
- Check that the surfaces are clean of all dirt and deposits, particularly in areas that are not visible.
- Allow cleaned surfaces to dry before applying disinfectant to avoid diluting.
- Apply the disinfectant as recommended by the manufacturer. The surface should be sprayed from the top down. The disinfectant should either be left to dry or allowed to remain on the surface for the time recommended by the manufacturer.
- Incubators and hatchers should be dry before eggs are placed in the machines.

Table 1. An example of hatchery cleaning and disinfection programme.	
Item / area	C&D frequency
Egg store	After traying eggs.
Single-stage incubators	After each incubation.
Multi-stage incubators	Trolley loading machines – monthly. Fixed-rack machines – clean floors with brush weekly. Empty machines annually for complete clean.
Incubator trolleys and trays	After every hatch.
Hatchers, trolleys, baskets and rooms	After every hatch.
Poult take-off & servicing equipment and rooms	After every hatch.
Incubation rooms	Wash Floors after fertility testing and transfers. Whole room every month.
Transfer room and equipment	After every transfer.
Wash rooms and hatchery waste disposal	After every hatch. Hatch waste storage systems should be cleaned after emptying.
Poult holding rooms	After dispatch
Corridors	Weekly
Ventilation ducting, room spaces.	Quarterly

- Automatic tray washers are available for washing incubator trays, hatcher baskets and poult boxes. This equipment should be used according to the manufacturer’s recommendations. Ensure that your choices of detergent and disinfectant used in such machines are appropriate and effective. It is important to monitor chemical concentrations to ensure compliance with requirements.
- Water pipes that supply humidifiers or washing systems that are not use for a period of time can contain stagnant water that may result in the build-up of bacteria. This may occur when an incubator, hatcher or room is taken out of service for a time. It is good practice to thoroughly flush waste water pipes that have not been used for more than a month and then disinfect the area. The use of continuously circulating ring-mains pipe-work can reduce the risk of stagnant water in pipes. Any dead-end spur pipes or “dead legs” must be very short to prevent water stagnating within them. Spur pipes may not benefit from continuous circulation and may require flushing.

Monitoring Hatchery Hygiene

- It is advisable that the personnel responsible for monitoring the success of the C&D process are different to those actually carrying out the tasks.
- While a clean hatchery may not be free of microbiological contamination, it is certainly more likely to have a lower contamination level than a dirty hatchery. Therefore a simple visual inspection of areas and equipment after cleaning to look for obvious soiling is an important part of the monitoring process. Pay attention to hidden areas that are difficult to access during cleaning. If soiling is found the area should be cleaned and disinfected again.
- Swabs can be taken following the C&D process to look for microbiological contamination. The swabs can then be sent to a microbiological laboratory for culture. The disadvantage of microbiological culture is that there is a time delay of several days between taking the sample and determining the level of contamination. Such data is viewed

as useful by some hatcheries as a reflection of their microbial status but being several days after the sampling it does not allow any action to be taken to address high counts of bacteria.

- A more rapid technique for evaluating the efficacy of C&D is taking swabs for ATP analysis. This methodology detects the presence of any organic material and can be done instantly, either in the hatchery or a nearby laboratory. If any organic material is present, then the cleaning has not been correctly completed. If poult debris (e.g. feathers, meconium, etc) is present then a high count will be obtained. Another example of when a high count occurs is if an otherwise clean surface has a high bacterial count. So the system detects both cleanliness and disinfectant efficacy. The advantage of this methodology is that it can be carried out immediately after disinfection and if a positive result is found there is the opportunity to re-clean and disinfect before the equipment or room is used again.

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