



Poultry and Game Bird Hatchery Sanitation and Biosecurity

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This fact sheet is particularly directed to smaller scale commercial poultry and game bird hatcheries and serves as a guide for procedures that will help hatchery operators maintain optimum sanitation and biosecurity standards.

General biosecurity guidelines

1. The hatchery should be thoroughly cleaned and disinfected well before the start of the incubation season. It is imperative to have clean surfaces before applying disinfectants.
2. Ideally, there should be separate areas for:
 - a. egg receiving and storage,
 - b. incubation,
 - c. hatching and chick processing, and
 - d. equipment clean up and wash down.
3. Traffic pattern flow should always be from clean areas (i.e., washed eggs and incubators) to increasingly “dirtier” areas (e.g., hatchery room, chick servicing, and hatch debris).

Figure 1. Hatchery traffic pattern and airflow.

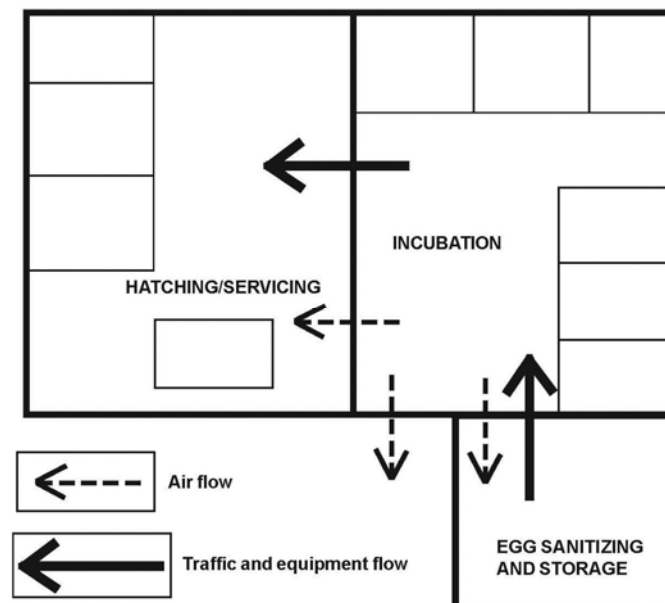


Figure 2. Location of incubators is defined as the “clean” side of the hatchery.



Figure 3. Hatchers, hatcher trays, and hatch debris are the “dirty” area.



4. Airflow – Optimally, each area of the hatchery should be ventilated separately. If this is not possible, the incubation room should be under positive pressure to minimize potentially contaminated air from dirty side of hatchery from spilling over into the incubation end. Appropriate airflow can be accomplished by using air vents, positive pressure fans (i.e., fans blowing into the building), and exhaust fans (i.e., fans blowing out of the building). The air pressure can be monitored with a manometer that measures inches of water column.
 - a. Incubator room should be under positive pressure.
 - b. Hatcher and dirty side may be under negative or positive pressure (*negative* pressure if attached directly to incubation area.)
5. Wash hands with soap and water before handling eggs and chicks.
6. Use dedicated outer wear and boots in hatchery.
7. Keep an ongoing effective rodent and insect control program in place.

Personnel

Ideally, everyone working in the hatchery should have no other responsibilities or have other employment. This is rarely the case; however, the following practices will minimize biosecurity breaches leading to serious disease outbreak.

Minimum employment qualifications. Hatchery workers should: 1) not own private birds at home, 2) not be employed at another poultry or game bird enterprise, 3) be able and willing to abide by biosecurity rules whether or not someone is watching.

Entrance requirements. Workers should come to work freshly showered and wearing recently laundered clothing that has not had previous contact with poultry. Shoes or boots should be changed for hatchery-dedicated footwear at the entrance. Appropriate smocks or coveralls should be worn while in the hatchery. Hands should be thoroughly washed and sanitized before beginning work.

Egg collection and transport

1. Nest sanitation is the first and most important step in the process of obtaining clean eggs. Fresh clean straw or other suitable materials in the nests will minimize exposure of eggs to dirt and excessive moisture.
2. Gather eggs frequently to avoid prolonged periods of exposure to nest and ground conditions.

Figure 4. Communal nests in a pheasant breeding flock.



3. Use cleaned and disinfected flats for egg gathering.
4. Dirty eggs should not be used for hatching. Sanding and buffing are not recommended. Eggs should be gathered and put in a clean environment as soon as possible. Studies have shown that the longer the egg is exposed to contaminated debris, the more likely it will become internally contaminated with microorganisms.
5. Clean and disinfect transport vehicle (e.g., pickup truck) after each use.
6. Store unwashed eggs in a separate location from washed and sanitized eggs.
7. Clean and washed eggs may be sanitized in a solution of quaternary ammonium at a concentration of 250 ppm. Maintain wash water temperature at 110 to 120°F.
8. Place sanitized eggs in clean and disinfected egg flats while awaiting incubation.

Figure 5. Cleaned and sanitized pheasant eggs racked and in place within an incubator.



Chick distribution

1. After processing (e.g., sexing-), chicks should be placed in new boxes containing unused chick papers or chick pads.
2. All equipment and vehicles used for transporting chicks for distribution should be cleaned and disinfected after each use.

Cleanup of incubators, hatchers and hatchery rooms, and equipment

1. Each area of the hatchery should be thoroughly cleaned after every hatch. A buildup of debris and bacterial load tends to occur with each subsequent delivery of eggs. The most critical part of the cleaning and disinfecting process is the *cleaning*. Diligent removal of organic debris is the only way to keep the microbial load to a minimum.
2. Use only agents registered by EPA. A number of classes of disinfectants are available to choose from including halogens (hypochlorite, iodine), aldehydes (glutaraldehyde, formaldehyde), quaternary ammonium, alcohols, and phenols. Check local and state regulations to determine if the intended chemical can be legally used. Read and follow label directions and understand all precautions listed on the Material Safety Data Sheet associated with each product. Wear protective clothing and protect against inhalation and skin and eye contact.
 - a. Be aware that certain cleaners and/or disinfectants should not be used together because they may either neutralize each other or create an undesirable effect. For example, strong bleach in contact with an acid may produce toxic gases, as will mixing bleach with ammonia. Please refer to the Center for Food Security & Public Health website for the spectrum of action and characteristics of commonly used disinfectants. (<http://www.cfsph.iastate.edu/Disinfection/index.php>)
 - b. Strictly follow manufacturer's directions for use.
 - c. Keep all MSDS sheets on file and readily available for reference.

Figure 6. Example of common disinfectants used in the hatchery.



3. Procedure:

- a. Remove loose debris (via scrubbing, scraping, high pressure water (e.g., 200 psi and ≥ 10 gallons/minute), etc.
- b. Remove trays, controls, and fans – clean separately.
- c. Vacuum out as much loose debris as possible.
- d. Use at least 140°F water for cleaning trays and equipment.
- e. Wet walls and ceiling and scrub with a bristle brush to remove organic debris using a cleaner that can penetrate protein and fat (good quality livestock building soap).
- f. Let soak for at least 10 minutes before rinsing off.
- g. Remove residual water with squeegee or absorbent material.
- h. Clean fans and other equipment in a similar way. Replace.
- i. Spray with an approved disinfectant.

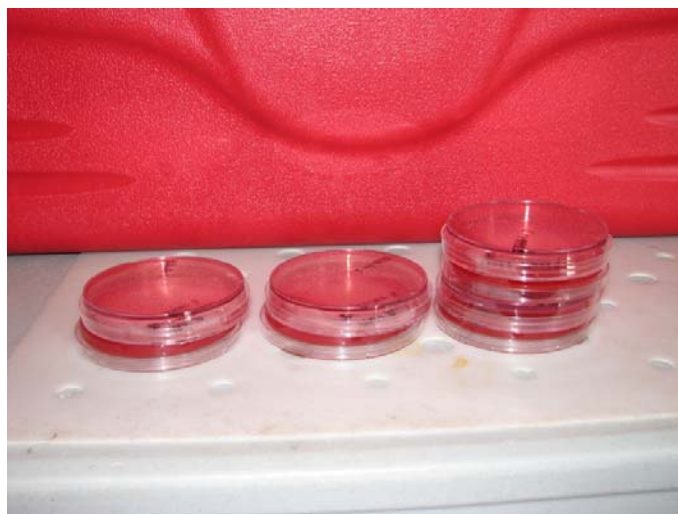
Figure 7. Cleaned and disinfected egg transfer equipment. Note the new lining used in the hatching tray.



Quality control

In order to do the best job possible and produce the highest quality chicks, it will be necessary to monitor the microbial status of the hatchery. Various methods are used to monitor bacterial and fungal levels. A cost-effective method to monitor for these is 10-minute air exposure using trypticase soy agar (or blood agar) and MacConkey agar plates in the incubators and hatchers. Drag swabs using 4"x4" sterile gauze pads soaked in sterile double strength skim milk are also useful for *Salmonella* monitoring of surfaces. Consult reference (Ernst, et al.) and a specialized poultry veterinarian for specific protocols.

Figure 8. Petri dishes containing agar – used for air monitoring of incubators.



References

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