

Effective biosecurity on the breeder farm and in the hatchery

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Disease challenge by viruses, bacteria, fungi and coccidia presents a major threat to profitable poultry production. Biosecurity, in other words reducing the number of infectious organisms in the environment, is the most effective form of protection.

Biosecurity is a set of management practices which reduce the potential for the introduction and spread of disease causing organisms onto and between sites.

Biosecurity procedures, particularly disinfection and sanitation, should be combined with vaccination and strategic treatments to either eradicate or reduce these pathogens to non-infectious levels.

The mode of disease transmission between birds or between sites, differs depending on the type of infection. For example, respiratory disease viruses replicate in the respiratory tract.

Subsequent sneezing and coughing releases virus particles causing spread by aerosol transmission. Enteric (gut) diseases cause diarrhoea and infectious agents are spread through the droppings. Air sac and oviduct infections lead to egg contamination, and thus, transmission via the hatchery.

Other diseases persist on sites through the contamination of equipment and litter by resistant organisms.

Many organisms can persist outside the host and coccidia, salmonella, histomonas,

aspergillus and many viruses can survive in this way for a considerable time, especially in organic material, as can pasteurella and mycoplasmas.

Respiratory viruses tend to be fairly fragile once outside the host, although they may be able to travel at least 8km in the air if conditions are favourable.

Breeder farm and hatchery biosecurity have to always be considered as one.

The production of top grade and healthy chicks from the hatchery is dependent on careful attention to detail from the arrival of the breeding stock on the farm, the collection and dispatch of hatching eggs to the delivery of the resulting chicks.

Breeder farm biosecurity

Infection may be harboured and spread in a variety of ways. In relation to poultry, these may include vermin (mainly wild birds, rats and mice), in feed and droppings, by wind, inadvertent human intervention and on equipment or litter. These factors all influence the planning of a biosecurity programme.

Ideally, sites should be located away from other poultry and breeding units should best be sited at least 8km from any commercial farms, to avoid aerosol spread of disease. This is frequently impracticable, so some air borne respiratory viral challenge will often be a feature of the disease load.

However, disease avoidance measures can be undertaken elsewhere.

For example, avoid building sites near waterways, ponds or lakes utilised by migratory water fowl and choose well drained areas to avoid standing water. Birds on range will be susceptible to contamination from wild birds and will attract vermin (the spread of H5N1 avian influenza has been shown in a large part to be due to contact between farm stock and feral birds, the source of the virus).

Wherever possible, houses should also be located away from major roads that handle high volumes of poultry vehicles.

Effective waste disposal and removal of used litter from the site is essential. Areas around houses should be constructed of materials and surfaces that can be cleansed and disinfected, to reduce transmission of organic material on vehicle, tyres and boots. Use a heavy duty broad spectrum virucidal and bactericidal disinfectant which will be capable of dealing with gross organic challenge.

People are one of the most important factors and this includes employees, service-men, lorry drivers, vaccination crews, catching gangs and veterinarians. Staff movements should be as limited as possible, particularly when there is a disease situation on a particular site.

Control site traffic, keep it to a minimum and exclude all unauthorised persons. All visitors should enter on foot. Use regularly refilled foot dips, charged with a suitable heavy duty disinfectant.

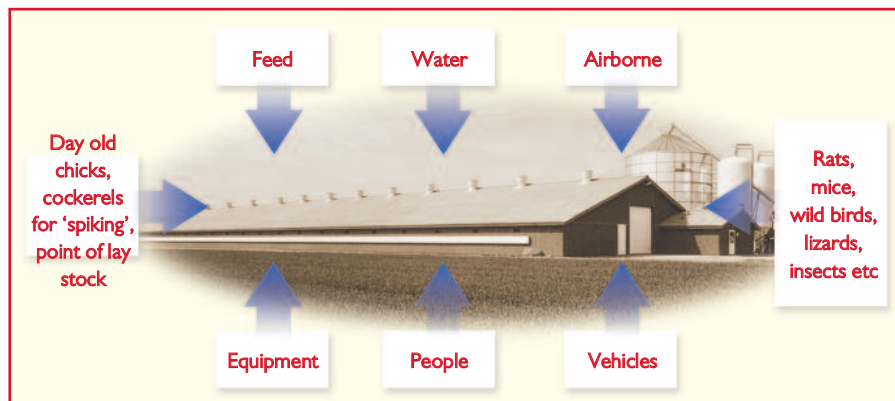
All possible vehicles should be excluded from the site. Vehicles that must enter should be subject at the site entrance to spray disinfection of wheels and wheel arches. All visitors should observe standard operating procedures on vehicle cleansing and protective clothing should be used by drivers.

All site visitors should be provided with adequate protective clothing, and should wash their hands prior to visiting birds. Use an effective hand hygiene system. A shower in, shower out facility should also be seriously considered on breeding farms.

The birds themselves can also be a cause of disease spread. Incoming poultry should, therefore, be from high health status sources and there should be a well defined

Continued on page 9

Fig. 1. Routes by which disease causing agents can enter a site.



Continued from page 7

health monitoring and audit procedure for breeder supply flocks. This should extend to hatchery hygiene procedures with regular microbiological monitoring. Avoid the potential spread of infection by diseased carcasses by on-site incineration.

Effective cleaning and disinfection reduces pathogen numbers and the weight of disease challenge and enhances any biosecurity programme.

It can only be achieved with sufficient down time to allow removal of all litter and to satisfy required contact times for the disinfection products used prior to restocking. Cleaning and disinfection should include houses, equipment and surroundings.

Use potable drinking water with a low total viable count.

Maintain a closed water system with covers on all header tanks. At turnaround, clean and disinfect the water system with a non-tainting product to remove the greasy biofilm that will harbour and protect pathogens.

Feed delivered to the site must be of high health status and vermin protected. Finished feed and stored raw materials should be sampled regularly for salmonella. 'High risk' raw materials or sources should not be used.

Check biosecurity procedures regularly. Use only biosecurity products with proven broad spectrum efficacy against all viral and bacterial pathogens and use them according to manufacturers' instructions.

Maintain an effective, audited rodent and wild bird control programme and prevent the entry to poultry houses by vermin through good house design and repair.

Biosecurity checklist

- Properly implemented biosecurity measures will limit the spread of disease causing organisms.
- When these are combined with disinfection and sanitation, vaccination and strategic treatments, many pathogens can be reduced to non-infectious levels.
- Remember, different infectious agents spread by different methods, so use appropriate measures against each type.
- Site location and design and density of poultry in a given geographical area are vital. When planning a new site, there is the opportunity for very effective biosecurity to be implemented at the design stage. However, biosecurity practices must concern themselves with practicalities, rather than a theoretical set up.
- All sites must have traffic, including personnel, feed, stock, and equipment but this should be kept to an absolute minimum.
- Use protective clothing to prevent pathogen spread.
- Priority should be given to biosecurity measures on breeding sites since errors here are magnified greatly at the commercial level.

- Similar priority should be given at the hatchery level.
- Only essential vehicles should have access to a site and these should be sanitised where possible on arrival.
- Site decontamination, turnaround times and a well audited and structured cleansing and disinfection procedure should be in place for all sites.
- Effective vermin control must be maintained.
- Only disinfectants with proven broad spectrum efficacy against all viral and bacterial pathogens should be used and then at manufacturers' stated dilutions and directions.

Terminal disinfection

Before a new breeder flock is introduced to the farm it is vital to ensure that the premises undergo a thorough terminal disinfection to prevent the carryover of pathogenic organisms. This can be divided into five stages as follows:

- Stage 1. Removal of equipment and dry cleaning.
- Stage 2. Water system.
- Stage 3. Cleaning and sanitising buildings and equipment.
- Stage 4. Disinfection.
- Stage 5. Set-up.
- **Source of breeding stock:**

Having achieved a high standard from the terminal disinfection, it is important that the new stock introduced comes from a reliable source which is trusted to be disease free. If not, all the work carried out with the cleaning procedures will be in vain.

Continuous biosecurity

Having achieved a high standard of terminal disinfection and placed healthy stock on the farm, this status has to be maintained throughout the growing and production stages of the flock.

There are many opportunities to prevent introduction of infection or cross infection to stock on the farm. Continuous biosecurity routines take into account the different disease problems which occur at different stages of production.

The following will help to prevent the introduction, incidence and spread of disease.

Site security

To avoid introduction of infection onto a farm or transfer from house to house, the following precautions should be observed:

- **Foot dips:**
All personnel should use foot dips on entering the site or a house.
- **Wheel dips/vehicle sprays/mobile equipment:**
Any vehicle entering the site must pass

through a wheel dip or vehicle spray. Top up regularly to avoid dilution or contamination. Wash and disinfect all equipment brought onto the site from other units. Rinse thoroughly after use.

- **Hand washing:**

Dirty or unwashed hands transfer infection. All visitors to the site should be required to wash their hands before entering. All staff should wash their hands before starting work, after breaks and when changing work activities.

- **Visitors:**

Allow no non-essential visitors onto the site or into the houses. Essential visitors should be provided with full protective clothing. Pay special attention to cleaning teams, catching gangs and engineers. They are frequently the cause of spread of infection.

- **Water sanitising:**

Drinking water can be a potent source and spread of infection. Header tanks and pipelines need to be regularly cleaned and disinfected with a non-tainting disinfectant.

- **Aerial disinfection:**

Spraying a fine disinfectant mist or fog over birds can help reduce cross infection and secondary infection during outbreaks of respiratory and other diseases. It is particularly of value in preventing secondary bacterial infection (for example, *E. coli* septicaemia) following a virus challenge such as infectious bronchitis or turkey rhinotracheitis.

- **Litter treatment:**

Problems of Aspergillosis and other litter-borne contamination can develop rapidly when climatic conditions change. Disinfection of litter by spraying with a safe disinfectant at the rate of one litre per 10m² has been found beneficial in reducing the incidence and severity of these problems.

- **Rodent control:**

Rats and mice can be responsible for the spread of a number of serious diseases on breeder farms including salmonella infections. Ensure that feed spillages are removed as quickly as possible and that houses are secure from vermin. Use an effective rodenticide and baiting programme for control of rats and mice.

Egg management

The vital product of the breeder farm, the hatching egg, must be treated with care from egg collection up to dispatch to the hatchery.

Where eggs are collected manually, the staff concerned should only commence the job after thoroughly washing their hands.

The egg storage room should have been thoroughly cleaned and disinfected before laying commences and again at any stage that the room is emptied. The fogging or misting of a suitable disinfectant periodically is an advantage particularly if eggs are stored on the farm for a number of days.

- **Hatching egg transport:**

Before departing from the hatchery for egg
Continued on page 11

Continued from page 9

collection the vehicle should have been thoroughly cleaned and disinfected, inside and out. On arrival at a farm, the driver should observe any hygiene regulations in place concerning entry of the vehicle to the farm. This is of particular importance when the vehicle is calling on more than one farm on a trip. An ideal situation is to have an access to the egg store from the outside of the farm perimeter, removing the need for the vehicle to enter the farm.

● **Hatchery biosecurity:**

Careful staff training and supervision is essential to maintain the necessary standards of biosecurity within the hatchery. Ideally, a hatchery should have well defined working areas and where possible the staff should be specific to those areas.

Basically the operational areas of the hatchery can be divided into a 'clean' and a 'dirty' area.

'Clean' being from egg reception to setting and 'dirty' from hatching to dispatch. Where it is possible to separate staff working in these areas they should wear different coloured uniforms.

The cleaning and disinfection requirements in each area will differ, not only in procedures but also in frequency. In many areas there may be the need for a daily, weekly and even monthly set of procedures.

These should be clearly tabulated and documented for the staff, making clear the fre-

quency of the required task and the methods to be observed.

The correct use and dilution of chemicals used also needs to be laid down clearly. The staff should always wear full protective clothing, including face visor and gloves when mixing and spraying chemicals.

The health and safety data sheets for all products in use should be readily available.

Apart from the detailed attention requirements of specific areas of the hatchery, general attention has to be given to personal hygiene and site security. All personnel working within the hatchery should change into suitable protective clothing provided by the hatchery on arrival for work. Adequate changing and washing facilities should be provided. Before starting work, after breaks and when changing work activities, staff should wash their hands thoroughly.

As far as site security is concerned, it should be ensured that no visitor is admitted to the hatchery without first registering in the visitor's book, putting on full protective clothing provided and washing his or her hands. Ensure that the wheels of all vehicles entering the site are sprayed with disinfectant with the equipment provided.

Foot dips or pads should be provided at the entrances to the hatchery and at strategic points inside the hatchery.

Clean foot dip containers and fill with fresh disinfection solution and place at each point. Change the disinfectant solution at least

twice weekly. Ensure that a foot dip instruction sign is clearly visible near to each foot dip.

● **Chick delivery:**

The chick delivery vehicle is an extension of the hatchery and should be treated as such in respect of cleaning and disinfection. On returning from farm deliveries, the vehicle should be thoroughly cleaned and disinfected, inside and out at a suitable point, preferably away from the main hatchery building. This done, it should be closed and secured in readiness for the next delivery.

Conclusion

It only requires one loophole in these complicated procedures to be overlooked, for the system to fall down. The key is to consider it as a whole and not a separate breeding and hatchery operation.

The key to success lies in adequate and thorough training of the staff in carrying out the procedures and where necessary adequate documentation of all of the steps required. In addition to this, much can be gained by effective monitoring of the results of the overall programmes in place.

This is of particular importance in the hatchery itself where regular checks on surface and air contamination can prevent an eventual breakdown in the system before it affects chick quality. ■