Chapter V: Biosecurity

THE FARMED SALMONID HEALTH HANDBOOK

CHAPTER V: BIOSECURITY

IFA Aquaculture

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Biosecurity

Appropriate and effective biosecurity measures must be in place to minimize the introduction of new infections into the farm. A *Biosecurity Plan* is a requirement for any site wishing to obtain a *Fish Health Authorisation* under the current legislation.

Biosecurity is the mechanism through which the risks of introducing and transferring disease on and off site can be controlled. External barriers are those that are designed to prevent entry on and off the farm and internal barriers are those which prevent the spread of disease within a farm. Disease pathogens can be spread by introducing fish directly or by vectors of transmission such as fish material, staff and equipment (from hand nets to wellboats). In addition, fish stocks on site can be infected by pathogens from the surrounding environment.

5.1 Control Measures

There are three components of biosecurity control measures:

i) Sourcing stock carefully and ensuring its ongoing fish health and welfare.
ii) External barriers: Preventing the entry of pathogens.
iii) Internal barriers: Minimizing disease spread within a site.

5.1.1 Ensuring fish health & welfare

An optimal level of fish health and welfare should be achieved by following the guidelines outlined in this handbook.

5.1.2 External barriers

1. A risk based approach to the hazards or vectors of disease transmission should be carried out.

2. In some instances, a risk assessment may conclude that the movement of certain items/stocks should be restricted and not taken from one site to another e.g. equipment used in the recovery and handling of mortalities, stocks of cleaner fish without a testing history etc.

3. Risk assessment should be disease specific and scientific in approach - using methods of disinfection known to kill or inactivate the pathogen or choosing to avoid the pathogen altogether by not moving certain stocks.

4. Visitor logs should be used with declarations of contact with fish in the previous 24 hours. A specific biosecurity protocol must be established visitors.

5. Divers must adhere to strict biosecurity and disinfection protocols.

6. Footbaths should be positioned at the entrance of all sites. These should be protected against dilution from rain and changed regularly.

5.1.3 Internal barriers

1. Specific disinfection points should be set up at the entry/exit to all sites and should be adequate to ensure the hygienic movement of staff and equipment, including service vehicles.

2. Access to each location should be restricted to individual site personnel as much as possible.

3. Visitor numbers should be kept to a minimum.

4. Footbaths between the various zones which comprise an individual site should be protected against dilution from rain and changed regularly.

5. Protective clothing should be site specific. Ideally, protective clothing should also be available between the various zones on an individual site.

6. Personnel should not travel between sites if possible but, if essential, cleaning and disinfection of equipment should take place between sites.

7. Boat movement from site to site should be kept to a minimum and only after cleaning and disinfection of decks and equipment that has been in contact with fish stocks.

8. Special biosecurity arrangements for mortality handling and removal should be devised.

9. If possible, the broodstock holding, stripping and fertilisation unit should be separate to the hatchery/fresh water on-growing unit.

10. All equipment, trays, filters etc, should be thoroughly cleaned, disinfected and fallowed prior to use.

5.2 Disinfection and Cleaning

A disinfectant can be defined as a substance which neutralises or inhibits the growth of a disease causing organism. Detergents are chemical compounds used for cleaning. When equipment is to be disinfected it is important that it is thoroughly cleaned first.

1. Cleaning and disinfection procedures should form part of the *Veterinary Health Plan*.

2. Equipment should be kept clean at all times.

3. The manager is responsible for ensuring that there is sufficient disinfectant material in stock at all times.

4. Care should be taken in disposal of liquids from the cleaning and disinfection process to ensure that the surrounding environment and wild aquatic animal populations are not exposed to infectious or toxic material

5. The decision on which disinfectant to use should be based upon their biocidal efficacy, their safety for aquatic animals and the environment.

6. The manufacturer's instructions for effective use of a disinfectant under aquaculture conditions should be followed.

7. The efficacy of disinfection is affected by a variety of factors: disinfection occurs faster at higher temperatures; many disinfectants work within an optimum pH range; organic material and grease can reduce the efficacy of a disinfectant, so surfaces should be cleaned beforehand.

8. Disinfection of equipment should only be carried out after all visible organic matter has been removed with detergent. The disinfection should be in contact with all surfaces and left for the recommended time period.

9. Disinfectants should be stored in a self contained storage area, in suitable containers and clearly labelled. This area should be a restricted access area and locked at all times.

10. All used disinfectant, organic matter washings and rinse water should be disposed of appropriately.

11. Records should be kept of all disinfection procedures, documenting the disinfectant used.

Table VIII

A list of suitable disinfectants, dose rates and appropriate applications[1].

DISINFECTANT	EXAMPLE	DOSE	COMMENTS
Chloramine T	Halamid	1% (w/v), 5 minutes	Reported effective against ISAv (1% for 30 minutes vs. IPNv). www.halamid.com
Iodophor	FAM30, Virudine Vandodine	100ppm, 10 minutes	Reported effective against ISAv and IPNv. Loss of brown colour indicates loss of efficacy. Iodine requires neutralisation before discharge. Stains and is corrosive.
Peroxy compounds	Virkon Aquatic Virasure	1% (w/v), 10 min (IPNv) 0.5% (w/v), 30 min (ISAv)	Reported effective against fish pathogenic bacteria and viruses (BKD, furunculosis, ERM, ISA, IPN, rhabdoviruses). www.antecint.co.uk
Calcium oxide (quicklime)		0.5kg/m^2 for 4 weeks	For earth ponds (dried). Dangerous substance.
Chlorine dioxide	Cidox	1-1.5ppm ClO_2	Water treatment for processing plants

[1] Fraser,D.I., Munro,P.D. & Smail, D.A., 2006. Disinfection guide version IV. Practical steps to prevent the introduction and minimise the transmission of diseases in fish. Fisheries Research Services Internal Report 13/06, Aberdeen, UK.

Citric acid		2g/l (0.2%) w/v for 30 minutes	Clothing
Hydrogen peroxide	Hyperox	1:100 (1%), 30 minutes	Reported effective vs. ISAv
Sodium hypochlorite		100ppm, 10 mins 1000ppm, 10 mins 1000ppm, 6 hours	Boats, pens, tanks, hand nets, harvest equipment. Processing plant effluent. Nets. Leave to inactivate for a few days or neutralise with sodium thiosulphate after 3 hours. Not effective if organic material present.
Sodium hydroxide	Biosolve Plus	1:100 (1%), 500mls/m^2	Degreasing & cleaning of wellboats, work boats, equipment, processing equipment & utensils
UV		122mJ/cm^2/sec (IPNv) 290mJ/cm^2/sec (noda)	Freshwater intake. Efficacy compromised by organic loading. May be combined with ozone for treating processing effluent.
Heat		70°C, 2 hours – IPNv 60°C, 2 mins – ISAv 37°C, 4 days - noda	Nets
Formic acid			Ensiling
Ozone		8mg/l/min, 3 mins (redox 600 – 750mV)	Water intake & effluent. Costly and toxic to fish and humans.
Peracetic acid, hydrogen peroxide and acetic acid mix	Proxitane, Kickstart	0.4% (v/v), 5 minutes	Reported effective against ISAv