# AQUACULTURE BIOSECURITY

## FOMITES: EQUIPMENT AND VEHICLES

## HOW VEHICLES AND EQUIPMENT CAN SPREAD PATHOGENS ON YOUR FARM

Equipment or vehicles can be a source of disease-causing organisms (pathogens) for aquaculture farms and hatcheries. When these objects come into contact with infected animals or contaminated water sources, they are called fomites and can potentially spread disease. Any item used during the transport, stocking, handling, or harvesting of aquatic animals can be a potential fomite. Examples include nets, buckets, weigh scales, siphon hoses, aerators, vehicles (e.g., transport trucks, ATVs, boats), and footwear or waders. This handout describes actions to reduce pathogen transfer by contaminated equipment and vehicles.

## HOW TO MANAGE AND PREVENT PATHOGEN INTRODUCTION

**Limit and Control Vehicle Access**

- Limit the number of vehicle entry points to your farm for better traffic control and monitoring.
- Limit or restrict the entry of vehicles, including watercraft, into aquatic animal areas.
- Determine designated drive paths for vehicles accessing your farm. For example, have feed deliveries occur outside of animal production areas. [An aerial map of your farm can help determine paths.]
- Post signs at entry points with biosecurity information (e.g., contact the farm manager, location of designated drive paths).
- Keep records of all vehicles entering the farm.

**Vehicles**

- Use farm-dedicated vehicles when possible.
- Avoid sharing vehicles, machinery, or equipment between farm sites.
    - If vehicles must be shared between sites, clean and disinfect them before use in animal areas.
- Set up wash station areas on-site for easy use and access. Ensure these are located away from animal areas.
    - Vehicle cleaning should include wheel wells, tires, and undercarriage.
- Clean, disinfect, and thoroughly dry vehicles and hauling tanks between uses.

### Aquaculture Facilities

- Regularly remove uneaten food, dead animals, and waste products to prevent the buildup of pathogens.
- Use tank covers, barriers, or distancing between production units to minimize aerosol transmission.
- Clean and disinfect production units (e.g., tanks, raceways) between lots of animals.
  - Don't forget to clean and disinfect tank parts (e.g., inflow and outflow pipes, aerators, spray bars) and other equipment inside the tanks.
- Avoid the use of porous materials and surfaces, such as wood or concrete. The tiny holes or "pores" of these items can make cleaning and disinfection difficult.
  - Concrete surfaces in contact with production water should be painted or sealed.
  - Smooth, non-porous materials and surfaces (e.g., metal, plastic) are easier to clean and disinfect.
- Design and construct intensive systems to include redundant piping to allow for cleaning of one set while the other is in operation.

### Equipment

- Clean, disinfect, and dry any equipment used with aquatic animals, especially sick or dead animals. Don't forget sumps, filters, and tank walls.
- Keep nets off the floor to avoid contact with pathogens. Place disinfectant dip tanks in convenient locations to encourage use by employees.
- Use dedicated equipment (e.g., nets, buckets, weigh scales, siphon hoses) for each production unit, especially in quarantine and isolation areas.
- Backwash filter beds or mechanical filters to reduce buildup or the introduction of potential pathogens.

### Footwear

- Place footwear cleaning areas or foot baths near the entry/exit points of animal areas. This can help to improve compliance.

- Clean and disinfect footwear before entering and after leaving animal areas. Remove dirt and debris from boots or shoes before using the footbath.
- Footbaths that are not maintained or used correctly can give a false sense of security and result in pathogen spread. Do not use footbaths as the only disinfection process.
  - Change disinfectant solutions daily, and more frequently when solutions are visibly soiled or when foot traffic is high.
  - Keep footbath solutions out of direct sunlight to avoid deactivation.
  - Ensure footwear surfaces remain in contact with the disinfectant solution for the required contact time. This is often overlooked.

### Cleaning and Disinfection

Cleaning and disinfection are essential in the battle against disease-causing organisms. When performed appropriately, these efforts effectively reduce or destroy pathogens, which protects animal health. Clean and disinfect all vehicles and equipment before use in animal areas.

- **Clean first!** Empty any residual water, including bilge water from boats. Remove any visible contamination (e.g., algae, uneaten feed, waste products, mucus) from surfaces. Wash surfaces with detergent, then rinse thoroughly.
  - Cleaning first is important since organic matter and detergents can inactivate or reduce the effectiveness of some disinfectant products.
- **Disinfect!** This process can inactivate or destroy most pathogens on surfaces. Always read and follow label instructions and check to be sure the disinfectant is effective against the pathogen of concern.
  - Select the correct concentration needed to kill pathogens. Be aware that temperature, pH, and salinity can affect the action of some chemical disinfectants.
  - Apply the solution and let the disinfectant “sit” and work (contact time). Items or areas must remain “wet” with the disinfectant for the full contact time to kill pathogens. This step is often overlooked and is very important.
  - Rinse or neutralize (e.g., sodium thiosulfate for chlorine or chloramine products) surfaces before discharge to the environment or restocking animals.

- **Allow items to dry before reuse!** Drying, especially in direct sunlight, can destroy many pathogens. Allow items to fully dry before reuse with animals or at different locations.
- Keep records on vehicles and other items that are cleaned and disinfected, as well as the disinfectant products and concentrations used.
- **Disinfect safely!** Many disinfectants can be hazardous to personnel, animals, and the environment.
  - When mixing or applying disinfectants, personnel should wear appropriate personal protective equipment (e.g., gloves, masks, and goggles).
  - Irritation or injury to the eyes, skin, and respiratory tract can occur.
  - Product labels will provide safety instructions.
- Train employees to use, store, and dispose of chemical products in accordance with the product labeling.

**Find more information on cleaning and disinfection, including a *Disinfection 101* resource on the CFSPH Disinfection website.**

## BIOSECURITY ASSESSMENT CHECKLIST

Use the following checklists to identify biosecurity actions you currently use or can use to manage and reduce disease introduction risks from vehicles and equipment with access to your farm and animals.

**Limit and Control Vehicle Access**

| YES | NO | BIOSECURITY QUESTION |
|---|---|---|
| Y | N | Do you have a limited number of vehicle entry points to your operation? |
| Y | N | Do you limit or restrict the entry of vehicles, including watercraft, into animal areas? |
| Y | N | Do you have designated drive paths for vehicles accessing your farm? |
| Y | N | Are signs posted at entry points to inform vehicles entering of biosecurity procedures? |
| Y | N | Are records kept of all vehicles entering the farm? |
| Y | N | Do you avoid or limit the sharing of vehicles, machinery, and equipment between sites? |
| Y | N | Are vehicle wash stations provided on-site and located away from animal areas? |
| Y | N | Are shared vehicles/equipment drained, cleaned, and disinfected before use on your farm? |
| Y | N | Are hauling tanks cleaned, disinfected, and thoroughly dried between uses? |

**Aquaculture Facilities**

| YES | NO | BIOSECURITY QUESTION |
|---|---|---|
| Y | N | Are uneaten food, dead animals, and waste products routinely removed to prevent buildup? |
| Y | N | Are tank covers, barriers, or distancing between production units used to minimize aerosol transmission? |
| Y | N | Are production units (e.g., tanks, raceways, aquaria, earthen ponds) cleaned and disinfected (and fallowed) between lots of animals? |
| Y | N | Are tank components (e.g., inflow and outflow pipes, aerators, spray bars) and any other equipment inside the tank/production area cleaned and disinfected at this same time? |
| Y | N | Do you avoid using porous materials or surfaces, like wood or concrete, to allow for better disinfection? |
| Y | N | Are concrete or wood surfaces in contact with production water painted or sealed? |

**Equipment and Footwear**

| YES | NO | BIOSECURITY QUESTION |
|---|---|---|
| Y | N | Is all equipment in contact with aquatic animals or culture/system water cleaned, disinfected, and dried before use with aquatic animals? |
| Y | N | Is equipment used in animal areas, such as nets, kept off the floor? |
| Y | N | Are dip tanks placed in convenient locations to encourage compliance? |
| Y | N | Are dip tanks maintained appropriately (correct disinfectant, concentration, contact time)? |
| Y | N | Is farm-dedicated equipment used whenever possible for animal-rearing areas? |
| Y | N | Are filter beds or mechanical filters frequently backwashed to reduce buildup or pathogen introduction? |

| YES | NO | BIOSECURITY QUESTION |
|---|---|---|
| Y | N | Is footwear cleaned and disinfected before entering and after leaving animal areas? |
| Y | N | Are footwear cleaning areas or footbaths placed near entry and exit points? |
| Y | N | Are foot baths maintained and used correctly (e.g., disinfectant solution changed frequently, solutions kept out of sunlight, required contact time is used)? |

**Cleaning and Disinfection**

| YES | NO | BIOSECURITY QUESTION |
|---|---|---|
| Y | N | Do you remove dirt, debris, and residual water and wash all surfaces before applying a disinfectant? |
| Y | N | Are disinfectants used according to product label instructions (e.g., concentration, rinsing, or neutralization)? |
| Y | N | Do you always allow disinfection solution the recommended contact time to “sit” and work? |
| Y | N | Are safety measures (e.g., avoid runoff, wear safety equipment) taken during C&D procedures? |
| Y | N | Are employees trained to use, store, and dispose of chemical products according to the product labeling? |

## FOR MORE INFORMATION

Find additional resources on the Aquaculture Farm Biosecurity website, including disease transmission pathway tip sheets, videos, biosecurity assessment questions, a biosecurity plan template, and farm biosecurity signs.

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