GOOD AQUACULTURE PRACTICES FOR HATCHERY (BGAqP)

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Department of Fisheries
Ministry of Primary Resources and Tourism Brunei Darussalam

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Aquaculture and the production of food fish for local market and international trade has seen rapid growth in Brunei Darussalam. Aquaculture has been tapped as the sector that can grow exponentially not only in its contribution to food security but also contribute to economic growth of the country and its GDP. Hatcheries and its supply of fish fingerlings is at the core of aquaculture in ensuring sustainable aquaculture industry. The Department of Fisheries has developed a series of Good Aquaculture Practice guidelines that provides clear fundamental guides on codes of conduct so as to help mitigate the risk of economic losses due to disease outbreaks arising from cross-contamination and malpractices at hatchery or farm-level. The BGAqP ensures a healthy and safe environment for both fish and workers and ensuring the aquaculture product complies with national food safety requirements as well as fulfilling buyers' and importing countries' safety and quality specifications.

The ASEAN Good Aquaculture Practices (ASEAN GAqP) for Food Fish and the FAO Technical Guidelines are used as reference in developing all BGAqP Guidelines.

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Disclaimer:
This document may be subjected to review from time to time by the Department of Fisheries, Ministry of Primary Resources and Tourism, Brunei Darussalam.

Legal documents supporting BGAqP

i. Fisheries Order 2009.
ii. The Fisheries Regulations, 2002.

Good Aquaculture Practice Guidelines for Hatchery

This Brunei Good Aquaculture Practice for Hatchery (BGAqP) is a guideline developed by the Department of Fisheries (DOF), Ministry of Primary Resources and Tourism, Brunei Darussalam that provides the fundamental guides on codes of conduct and specification that hatchery operators can use to ensure that their operation presents a healthy and safe environment for both their fish and workers. It therefore provides specific guides on the following key areas:

- Hatchery layout and management
- Water supply, management and treatment
- Hatchery management
- Farming and packaging practices
- Fish health management
- Farm environment
- Human health and safety at work

The hatchery manager and all personnel are expected to familiarize themselves with this guideline, and behave in a manner consistent with the codes contained therein. They are also expected to incorporate the guidance and codes into their individual hatchery's Standard Operating Procedures (SOP) and company's policies. The standard operating procedures and farm policies serves as guidance for all personnel and workers to be able to distinguish between acceptable and unacceptable conduct in a variety of situations.

In order to raise awareness and compliance with the SOP by personnel and workers, specific training should also be conducted. The company should also consider, as appropriate, adopting a process/ system by which their managers/ technicians/ supervisors periodically attest to the supervision of their workers, with respect to compliance with the hatchery's standard operating procedures and policies. The BGAqP and the hatchery's SOP and policies shall be the basis for farm audits that will be performed by Department of Fisheries, as well as be that basis for the approval for the award of a Certificate of BGAqP Compliance.

Good Aquaculture Practice for Hatchery

1. Hatchery design and layout

1.1 Structure of hatchery must be of materials that do not pose risks to the workers, the public and the environment.

1.2 The materials used for construction should be selected based on suitability, durability, robustness, and lifespan, and able to withstand exposure to weather elements and environment close to the sea.

1.3 Proper hatchery design and layout including well-partitioned areas such that prevents cross contamination

1.4 Hatcheries should be biosecure, with physical barriers to keep out wild and domestic animals that may lead to contamination

1.5 The hatchery must comply with the terms and conditions of the Fisheries (Hatchery) License.

2. Water supply, management and treatment

2.1 Proper planning and layout of water piping system

2.2 Construction of reservoir of suitable size dependent on area and water requirements to ensure water consistency

2.3 For hatchery culturing marine species require proper seawater supply system

2.4 Proper construction of seawater intake system taking into accounts both technical (site condition and required water flow) and economical aspects (cost of structure and number of pumps required)

2.5 Proper water treatment by installation of appropriate filtration system such as but not limited to: sand filters, bio-filters, ozone treatment and UV filters to improve water quality by removing sediments and organic load in the water

2.6 Routine monitoring and servicing of all water pumps and filtration systems including back-wash to ensure its running efficiently and effectively

3. Hatchery Management

3.1 Hatchery manager or supervisor must be identified to ensure the compliance of the BGAqP is effectively supervised.

3.2 All hatchery activities related to culture, source and fry production, culture period, survival rate, size and density of stocking, feeding, should be documented and trackable.

3.3 Hatchery Standards Operational Procedures (SOP), log records, instruction manuals, laboratory tests and other information must be kept up to date.

3.4 All records relating to fish stock must be filed and are up-to-date

3.5 Records of harvesting and traceability such as date of harvesting, amount harvested, etc. must be kept for at least two years.

3.6 Farm staff must be trained on BGAqP and SOP. Such training should be recorded and updated.

4. Farming and operational practices

Management of Fish Stock

- Fish stocks must be in a good health, free from OIE-listed diseases (Refer url: http://www.oie.int)

4.1 The broodstock of which it originates from must be of known reliable source and approved origin. The invoice should be kept for at least two years.

4.2 New fish broodstock should be quarantined and separated from the other standing fish stock, not less than a period of two weeks or any other time period as directed by DOF.

4.3 For newly imported fry for the purpose of nursing, it must be from a known source with proper documents of its history and health certificate to certify it is free from known diseases.

4.4 Samples of the imported fry are to be subjected for additional testing by the department's health laboratory.

4.5 Stocking schedule, stock transfer and harvesting must be properly documented.

4.6 It is recommended that tanks/raceways to be properly labelled with stocking date, quantity to facilitate identification of batch/family.

Feed Management

4.7 All fish should be fed with adequate quantities of feed both live and processed feeds, that meets their nutritional requirements.

4.8 Avoid over-feeding to prevent detrimental water quality.

4.9 Feeding regimes should follow hatchery protocol or SOP and must be recorded and based off size and quantity of fish

4.10 Feeds must be properly stored in a designated area to prevent spoilage/decomposition/contamination

4.11 Expiry dates or Production dates of fish feed must be clearly stated on the storage containers/bags and expired feeds should be disposed of in appropriate manner and, approved location/ site as directed by DOF.

4.12 Records of fish feed purchases (suppliers, dates, etc.) must be kept properly.

4.13 Feeds used must be of the brand/ type or from sources/ suppliers that are approved and authorized by DOF.

Use of veterinary drugs, chemicals and additives

4.14 Veterinary drugs, chemicals and additives used, must be approved by DOF.

4.15 Application of veterinary drugs, chemicals and additives, must be as advised by DOF and must adhere to the manufacturer's instructions.

4.16 Veterinary drugs, chemical and additives must always be labelled and stored properly at the appropriate temperature and away from fish feeds, fertilizers and other farm utensils.

4.17 Unused veterinary drugs, chemicals and additives must be safely and properly disposed. Do not recycle empty containers for other uses.

4.18 Records of purchase, application (log records, procedures, or instruction manual) of the veterinary drugs, chemicals and additives must be kept and produced during farm audit.

4.19 Withdrawal periods of the veterinary drugs, chemicals and additives prior to harvest must be strictly observed and recorded.

Harvesting and Packing

4.20 Only healthy fish fingerlings can be harvested for sale.

4.21 Fish should not be fed before harvesting for a minimum period necessary to clear the gut.

4.22 Use clean containers, boxes and/or tanks and clean ice for the transport of fish.

4.23 Fish to be packed/transported must be packed with sufficient ice to maintain low temperatures (21°C to 25°C).

4.24 Packing area in the farm should be clean, organized and well maintained. Schedules for cleaning and procedures to be in place and performed regularly.

4.25 Appropriate harvesting and partial harvest handling, of aquaculture products within the farm should be practiced to minimize contamination and physical damage.

Materials and Facilities

4.26 Materials and facilities used at the hatchery must be well maintained, disinfected (if necessary) and kept in proper storage.

4.27 Aquaculture facilities should be designed, operated and maintained in ways that prevent contamination from workers, sewage/toilets, domestic animals, machinery oil/fuel and other possible sources in order to maintain hygienic conditions.

5. Fish health management

5.1. Farm staff must be trained to recognize common fish diseases. Daily observation of fish condition must be carried out and farmers must notify DOF if they encounter any abnormal mortality patterns.

5.2. Proper disinfection procedures should be in placed upon entry to the hatchery premises. This includes tyre bath at the gate, footbath at the entrance and disinfectant or hand wash area prior to entering hatchery.

5.3. Mortalities and/or tanks discarded must be recorded

5.4. Preventive measures and disease treatment regimes, must be documented as part of health management record.

5.5. Hatcheries must have their own, approved, Hatchery Standard Operating Procedures (SOP) in fish health management.

5.6. Equipment or apparatus such as beakers should be designated for each larval/nursery/juvenile tanks and not shared to minimize tank to tank contamination.

5.7. Equipment/utensils/materials including scoopnets used in handling sick/dead fish must be properly cleaned and disinfected with chlorine or iodine after use.

5.8. In the event of detected fish or shrimp diseases, affected animals shall be properly disinfected and discarded in line with the hatchery's SOP.

6. Hatchery environment

6.1. Technicians shall monitor water quality parameters, from water intake to treated water in tanks on a regular basis with proper record keeping.

6.2. Proper water filtration and/or treatment system should be in placed and regular scheduled maintenance

6.3. Waste materials must be disposed of properly and the method of disposal must be documented in the farm Standard Operating Procedures (SOP).

7. Human health and safety at work

7.1 Hatchery personnel must have knowledge on first aid and firefighting.

7.2 Hatchery must have appropriate protection equipment for farm staff when dealing with emergency cases such as fire and other identified hazards.

7.3 Hatchery should have a designated assembly area in the event of emergency evacuation

8. List of Required BGAqP Records

8.1 Records of water quality parameter

8.2 Inventory of veterinary drugs, chemicals and additives (supplier and expiry dates).

8.3 Records of broodstock fecundity, hatching rate, stocking of fish fry/fingerlings/juvenile, period of culture, source of fry, size and density of stocking, feeding rate, feed used, survival rate, sampling and grading and harvesting.

8.4 Inventory of fish feeds used (supplier and expiry dates)

8.5 Record of production and sales

9. Staff Training

9.1. Implementation of Farm Standard Operating Procedures (SOP)

9.2. Fish Health Management including knowledge of known fish or shrimp diseases

9.3. Knowledge on BGAqP Guidelines

Annex 1

List of Fish Diseases

- **VIRAL NERVOUS NECROSIS DISEASES**

  - Type of Disease: Virus
  - Other names : Viral encephalopathy and retinopathy (VER)
  - Causative agent: Nodavirus
  - Fish susceptible: Marine fish species e.g. seabass, grouper and others
  - Symptoms : Infected fish shows signs of poor appetite and swims in circles. They appeared weak and stays near surface of the water
  - Treatment : No treatment available. Prevention should be practiced
  - Prevention and Control: Keep infected fish separate and not to stock fishes in infected areas/cages
  - Mortality : High (30% - 60%) if disease control is not practiced or managed well

- **IRIDOVIROSIS / IRIDO**

  - Type of Disease: Virus
  - Other names : *Iridovirus* Infectious Disease; Systemic Iridovirus Disease
  - Causative agent: Iridovirus sp.
  - Fish susceptible : Marine fish species e.g. seabass, grouper and others
  - Symptoms : The body and gills are pale in color. Organs like the liver and spleen is swollen and dark in coloration. Swollen cells can be observed on various parts of its organs such as the liver, spleen, heart, stomach, gills and head region
  - Treatment : No known treatment. During disease outbreak, diseased fish should be separated from healthy fishes. Mortalities should be promptly removed and discarded
  - Prevention and Control: Removal of dead or weak fishes from the cage. Disinfection of cage and equipment's used. Maintain optimal water quality and observe good and proper management
  - Mortality : High and can reach 100% for small fry and under 100% for fish juveniles and fingerlings

- **PARASITIC DISEASES**

  - Type of Disease: Parasites
  - Major parasites : Protozoans, Flatworms, Roundworms, Crustaceans, Leeches
  - Symptoms : Fish becomes weak, display low appetite or dies
  - Causes : Poor cage and farm management; less than optimal water quality
  - Treatment : Manually removing parasites from the body by using wet towel or gloves. Bath fish by dipping into formalin of 50-100ppm in concentration for 1h with strong aeration. Remove infected fishes to a clean and new cage, free of parasite. Parasites that were removed should be dried out, and properly disposed of on land or buried underground to prevent repeat occurrences.

(Reference: 'HUSBANDRY & HEALTH MANAGEMENT OF GROUPER'- SEAFDEC, ph. for APEC, 2001)

Annex 2

List of shrimp diseases

Crustacean diseases

- Acute hepatopancreatic necrosis disease
- Infection with *Aphanomyces astaci* (crayfish plague)
- Infection with *Hepatobacter penaei* (necrotising hepatopancreatitis)
- Infection with infectious hypodermal and haematopoietic necrosis virus
- Infection with infectious myonecrosis virus
- Infection with Macrobrachium rosenbergii nodavirus (white tail disease)
- Infection with Taura syndrome virus
- Infection with white spot syndrome virus
- Infection with yellow head virus genotype 1

(Reference OIE World Organisation for Animal Health, http://www.oie.int/animal-health-in-the-world/oie-listed-diseases-2018/)