

**GOVERNMENT OF ARUNACHAL PRADESH  
DIRECTORATE OF FISHERIES  
ITANAGAR**

No. FISH/DEV/E&M-210/2010/VOL-III Dated Itanagar, the 30<sup>th</sup> Aug' 2017

To,

The District Fishery Development Officer

Tawang/West Kameng/East Kameng/ Upper Subansiri/Lower Subansiri/  
Papum-Pare/East Siang/ Upper Siang/Lohit/Changlang/Tirap

**Sub: Developing of Fish Seed Certification and Accreditation System**

Sir,

With respect to meeting the requirement of quality fish seed in the state, developing of Fish Seed Certification and Accreditation System in Arunachal Pradesh is being initiated. To begin with the following Government and private fish farms have been identified for production of quality fish seeds and more will be brought under the system in due course.

Sl.no.	Name of the farm	District
1.	Deomali Govt. Fish Farm	Tirap (East Zone)
2.	Lathao Govt. Fish Farm	Changlang (East Zone)
3.	Dayun Govt. Fish Farm	Changlang (East Zone)
4.	Emchi Govt. Fish Farm	Papum-Pare (West Zone)
5.	Smti. Tana Jumukhi, Pvt. Fish Farm	Papum-Pare(West Zone)
6.	Pasighat Govt. Fish Farm	East Siang (West Zone)
7.	Tarin Govt. Fish Farm	Lower Subansiri (West Zone)
8.	Sri Jumdo Jini, Pvt. Fish Farm	West Siang (West Zone)
9.	Chuje GG Govt. Trout Farm	Tawang (West Zone)
10.	Nuaranang Govt. Trout Farm	Tawang (West Zone)
11.	Shergaon Govt. Trout Farm	West Kameng (West Zone)

It is pertinent to mention here that there are about 31 hatcheries (10 circular hatcheries, 3 trout hatcheries and 18 FRP hatcheries) of which hardly 2 to 3 hatcheries are producing seeds that also not to its optimum capacity. It is understood that many of the FRP carp hatcheries still remain uninstalled in spite of repeated reminders/directions which is viewed very seriously. It is now onus upon the technical officers especially the DFDO in the district to get installed all the FRP carp hatcheries within their jurisdiction latest by December 2017 and submit ATR (Action Taken Report) supported with evidence of installation for appraisal and onward action.

T. Yonggam

During last video conference with the Joint Secretary, DADF on 21<sup>st</sup> August 2017, the Joint Secretary expressed his annoyance and insisted to expeditiously complete the accreditation process and report progress to the Ministry for record and monitoring.

Further, it is informed that all the hatcheries of the concerned districts, irrespective of Govt. and private must be made operational for the impending breeding season (2018-19). Action for functionalizing the hatcheries i.e. procurement of brooders, installation/modification including maintenance etc of the hatcheries, preparation of nursery, rearing ponds etc should be done simultaneously. The farm must be readied by the onset of the breeding season for breeding operation at all cost.

As regard to certification and accreditation of hatcheries and seed rearing farms are concerned, all such farms/hatcheries should apply for the same to the Department as per the standard application form enclosed and thereafter the farms will be evaluated based on the guidelines provided for fish seed certification and accreditation system in India by DADF. Except for the 3 coldwater fish seed farms identified above all other fish seed farms must strive hard to meet the minimum requirements of certification and accreditation for which all required efforts must be initiated and the district technical officers should ensure that all criteria as per guidelines are fulfilled before applying for accreditation. A copy of the guidelines received from the Ministry is also appended herewith for your appraisal/reference and prompt action.

Failing to comply with the above direction, responsibility will be fixed and action will be initiated accordingly.

Encl: As stated above.

Yours faithfully,

(J. Taba)

Director of Fisheries  
Govt. of Arunachal Pradesh  
Itanagar

Memo. No. FISH/DEV/E&M-210/2010/VOL-II <sup>1341</sup> Dated Itanagar, the 30<sup>th</sup> Aug' 2017  
Copy to-

1. The P.A., Commissioner Fisheries Govt. of Arunachal Pradesh, Civil Secretariat, Itanagar, for kind appraisal of Commissioner Fisheries.
2. Incharge-DDF Monitoring of respective zones for information and follow-up action with a direction to ensure implementation and adherence of the order.
3. File

Director of Fisheries  
Govt. of Arunachal Pradesh  
Itanagar

## CHAPTER 3: PROCEDURE FOR ACCREDITATION OF HATCHERIES AND SEED FARMS

The following description provides general guidelines, which are applicable to all aquaculture species.

### 3.1 Procedures for Accreditation of Hatchery

Separate application for accreditation of hatcheries/seed farm, needs to be submitted for: (a) aquaculture species and (b) variety of aquaculture species (such as *Jayanti rohu*)

- i. The hatcheries/Seed farms shall apply with the State Fisheries department for accreditation on a prescribed application form (Annexure V) along with all necessary supporting documents.
- ii. The Accreditation Body/Agency will arrange for necessary verifications and evaluation, through certifying agencies, as per benchmarks given in subsequent chapters.
- iii. The hatcheries/seed farms, once accredited can certify that their produce complies with specific norms and use the accreditation mark, 'FISHMARK' with hologram.
- iv. Hatcheries/Seed farms shall be species-specific (including multi-species, hybrids and improved varieties), and need to be accredited separately.
- v. During the accreditation process, verification of seed and broodstock will be done for:
  - Production parameters and compliance to standards under specified norms of management
  - History of disease outbreak
  - Surveillance for pathogens and water quality for one-year period
  - Genetic introgression/hybridization levels (in case of carps and catfish)
- vi. For improved varieties and hybrids, the verification will be done in a similar manner with suitable norms
- vii. After the grant of certificate of accreditation, hatcheries will print their test certificate and sealing tags as per the approved format.
- viii. It will be mandatory for intermediary seed producers to procure initial seed material from accredited hatcheries. To ensure quality, such intermediary seed producing farms should be accredited after verification for environmental and water quality norms

### 3.2 Accreditation of the unit where the ownership changes

If the ownership of the seed production unit changes, both the original and new owners/firms need to inform the empowered agency along with documents of transfer. The new owner will apply for transfer of accreditation certificate in his favour. To obtain such transfer, the new owner

needs submit an undertaking that he will maintain all the norms of quality standards as is required for the accreditation.

### 3.3 Display of Certificate

The certificate of Accreditation should be displayed at a prominent place in the hatchery/Seed farm premises.

### 3.4 Cancellation of Accreditation

The Accreditation of unit will be cancelled under the following circumstances:

- a) The facility ceases to possess the minimum infrastructure facilities
- b) The facility is not functional for more than one year without valid reasons.
- c) Seed produced in the hatchery does not meet the quality standards prescribed by the Accreditation Body/Agency
- d) The facility fails to rectify the faults noticed and given in writing by the Empowered agency (*If the faults remain unrectified even after three consecutive visits by the Agency at monthly intervals, the accreditation cancels immediately*)
- e) The facility is found to be using prohibited feed ingredients, hormones, antibiotics or any other pharmacologically active substances
- f) The facility does not maintain the necessary infrastructure facilities in good condition
- g) The facility has obtained the certificate of accreditation by furnishing incorrect information

If the facility is found to raise, or produce seed of, a species of fish/organism that is banned for culture, not allowed for domestication or has not been introduced through the procedures laid under the law.

### 3.5 Revalidation of Accreditation

The Accreditation of hatcheries/farms is valid for a period of 5 years. At the end of validity period, the facility is required to apply afresh for obtaining revalidation of its Accreditation. The process of revalidation will involve all the necessary steps required for Accreditation of a new facility.

#### 4.3 BENCHMARKS FOR ACCREDITATION OF CARP SEED PRODUCTION UNITS

##### A. Water Supply and Quality

For Accreditation of hatcheries, an assessment of water quality will be made twice a year with one report during the period of hatchery operation and second after six months. Water quality will be tested at an appropriate interval for seed farms. The following are the water supply and quality requirements of a seed production unit:

Water	Requirement
1. Water Supply	<b>Adequate and from a regular and dependable source</b>
2. Type of Water Source	<p>Direct ground water <i>(to be collected in open pond before pumping)</i></p> <p>Open water body such as rivers/streams/ lakes, etc <i>(to be allowed only if found to be free from any kind of pollution)</i></p>
3. Water quality	<p>Free from algal blooms</p> <p>Conforming to the parameters given in Annexure III <i>(Test Report generated through standard test procedures need to be enclosed)</i></p> <p>Free from pesticide and heavy metal contamination <i>(Analysis report is mandatory).</i></p> <p>Free from pathogens <i>(Negative report for pathogens listed in Annexure IV is necessary. Test report generated through standard test procedures needs to be enclosed)</i></p>

##### B. Infrastructure facilities for hatchery and seed raising ponds

1. The infrastructure facilities for hatchery and seed raising units, as given below, are indicative and not exhaustive. Needs vary for different seed production facilities.
2. The appropriate levels of flexibility can be allowed, with respect to the construction and lay out of the physical facilities at the time of verification, depending upon the local

circumstances, provided the specified capacities, water quality, seed and broodstock assessment reports are compliant to the norms.

- Components such as soil and water testing facility, office, store room, staff quarters and security system are optional and should be built as per requirement and convenience.

Physical facilities		Capacity (spawn in millions)		
		~10	10-50	50-100
1.	Hatchery Overhead water tank	10,000	30,000	50,000
2.	Hatchery Spawning pool diameter (m) (Masonry/FRP structure- one unit each)	4.5	4.5	6.0
3.	Hatchery incubation pool (Masonry / FRP structure)	2 (2.5 m dia x 1.2m height)	2 (2.5 m dia x 1.2m height)	4 (2.5 m dia x 1.2m height)
4.	Hatchery Spawn collection chamber (Masonry / FRP structure)	1 (3.0 m x 1.5 m x 1.5 m)	1 (3.0 m x 1.5 m x 1.5 m)	1 (3.0 m x 2.5 m x 1.5 m)
<p><i>Breeding and hatching hapas can be allowed as alternative to spawning pool, incubation pool, spawn collection chamber in hatcheries with less than 10 million spawn capacity or as a means to supplement production in higher capacities. Hatcheries producing spawn alone may be allowed to exist without nursery ponds/cement cistern.</i></p>				
5.	Hatchery Brood fish pond (Water area in ha)	0.2 (depth 1.5-2.5m)	Minimum 0.5 (Each pond not less than 0.2 ha & depth 1.5-2.5m)	Minimum. 1.0 (Each pond not less than 0.2 ha & depth 1.5-2.5m)

6.	Nursery ponds	10 (20m x 20m x 2m)	20 (20m x 20m x 2m) (Ten)	20 (20m x 20m x 2m)
7.	Land requirement	1 ha	1 ha	2 ha
8.	Qualified / Experienced person	1	1	1
9.	Quarantine facility/pond for new introduction	1	1	1

### C. Competence of Hatchery Manager/Farm manager/Operator/ Owner

Practising farmer in fish seed production for two years/Qualified Professional from a recognized SAU/Fisheries College or equivalent

### D. Assessment of Broodstock

1. For accreditation of hatcheries, an assessment of broodstock is done during the breeding season at least for three batches of the brooders.
2. General assessment is also done through random experimental netting of broodstock ponds
3. The following conditions need to be met in respect of broodstock

General health (Through visual examination )	<ol style="list-style-type: none"> <li>1. Appear healthy</li> <li>2. Color and morphology- Species specific</li> <li>3. Actively swimming</li> <li>4. Should not have rashes, ectoparasites or symptoms of pathogenic infection.</li> </ol>
Size	Not less than 2.0 kg in case of IMCs.
Stocking Density in broodstock Pond	1000-3000 kg/ha.

Other conditions	<ol style="list-style-type: none"> <li>1. Hybrid fish not used as broodstock (<i>This is ensured through visual examination of morphological characters</i>).</li> <li>2. Mixed breeding not be practised. (<i>This is verified through observation and genetic testing of seed. No F-1 hybrids or introgressed individuals should be present</i>)</li> <li>3. In case, genetic testing of seed reports indicates inter-specific introgression or hybridization, the accreditation will be given only after screening and weeding of hybrid broodstock or complete replacement of broodstock.</li> </ol>
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### E. Assessment of Fish Seed

1. For the accreditation of seed farms, an assessment of seed is done for at least three batches of production at the spawn, fry and fingerling stage separately.
2. Fry and fingerling mixed in one pond should be considered as one batch.
3. The following standards are followed for determining the seed stages:

	Spawn (mm)	Early Fry (mm)	Fry (mm)	Advanced Fry (mm)	Fingerling (mm)
Indian Major Carps	Up to 8 1 ml spawn volume count is less than 600	9 - 25	26 to 50	51 - 100	>100

Gross examination for health assessment

<p>Screening for swimming and food acceptability</p>	<p>Inactive seed should be less than 5% ✓</p> <p><u>Active</u></p> <p><i>Actively swimming in the water column</i></p> <p><i>Non-directional movement</i></p> <p><i>Ready acceptability/ Immediate gulping of natural or artificial feed</i></p> <p><u>Inactive</u></p> <p><i>Surface and sluggish swimming</i></p> <p><i>Circular, range bound motion</i></p> <p><i>No inclination for feeding</i></p>
<p>Screening for structural abnormality</p>	<p>Structurally abnormal seed should be less than 1% ✓</p> <p><u>Normal</u></p> <p><i>Straight curvature, distinctly differentiated into head, trunk and tail</i></p> <p><u>Abnormal</u></p> <p><i>Bend trunk and tail</i></p>
<p>Screening for diseases</p>	<p>No external sign of infection ✓</p> <p>Negative test report for pathogens listed in Annexure IV. (Test to be conducted as per standard procedure laid and the test report needs to be enclosed) ✓</p>
<p>Screening for genetic introgression and hybrids ✓</p>	<p>Negative report in visual examination of morphological features (From fingerlings stage onwards)</p> <p>Negative report in genetic testing to be conducted as per standard procedure laid and the test report need to be enclosed</p>

## F. Operations and Record Maintenance of the Hatchery /Seed Farm

5. The assessments that are done during accreditation process must continue at the seed production unit after the accreditation is granted.
6. Proper record should be maintained to facilitate the claim that the seed produced from the hatchery is compliant to the norms of accreditation.
7. The seed production unit should document standard operating procedures and all the workers should be aware of the contents.
8. A Seed production unit should maintain the following records as applicable:
  - a. History of broodstock and replacement of broodstock done from time to time
  - b. Breeding programme and production levels at spawn, fry and fingerling levels
  - c. Details of daily hatchery/farm activities (Test reports of water quality to be done twice a year, for the parameters including pathogens as given above).
  - d. Assessment of parameters for seed quality (visual examination) as given above
  - e. Details of disease occurrence and mortality
  - f. Details of husbandry and management practices like feed, treatments etc.
  - g. Seed shipment details

## CHAPTER 5: CHALLENGES TO IMPLEMENT PROCEDURES OF QUALITY SEED PRODUCTION AND ACCREDITATION OF SEED PRODUCTION UNITS

The main challenges that accreditation process could face are as follows:

1. Seed production units in the country not very sensitive to the value of quality seed and the implications of not using quality seed on the industry and environment
2. Genetic contamination due the practice of mixed spawning of Indian Major Carps in hatcheries. (This can be prohibited, but still the practice may continue due to limitations of time and space in hatcheries)
3. Difficulties in monitoring the history of broodstock, due to inadequate knowledge even in large farms
4. Difficulties in identifying the indirect checkpoints to monitor the flow of uncertified seed
5. Difficulty in checking the seed production activity of backyard type, which are known to use contaminated water source. *(Stopping this will affect seasonal livelihood of small producers. Alternates need be found through providing financial assistance to upgrade the small hatcheries' quality standards. This means encouraging the small producers to follow the norms or to allow them to develop group/cooperative hatcheries that can be accredited)*
6. Inability of producers who involve in seed production only as seasonal ventures to get accreditation as they have no broodstock in their farm for evaluation. *(Broodstock sources at regional level can be established/recognized. State owned aquaculture farms can also be certified for the purpose. Such farms can maintain pure line foundation broodstock that can be used to produce certified broodstock and also to be provided to the users. Milt bank facility can be created to obviate the need to raise large brood stock. This will also safeguard domesticated elite germplasm which can provide sperm source if adequate milt is not available at some farms).*
7. The prescribed requirement will enhance the costs of the seed production in the accredited seed production centres. This, coupled with the possible slow uptake of the certified seed and competition from uncertified seed, might adversely impact the profit of accredited units, at least in the first few years, leading to low operating margins or even losses. *(Availability of easy insurance cover to the accredited seed/broodstock centers will encourage seed producer to come forward for accreditation. Subsidies/ financial loans, whenever given can should be limited to the farms that use certified seed)*

One side

8. The present diagnostic indices and norms with respect to germplasm quality, disease and environment parameters are inaccurate
9. Possible litigation when certified seed does not perform as expected (*Many times poor performance are due to reasons other than seed quality such as lack of specified management conditions at the farm of grow-out culturist. The optimum performance of certified seed will be ensured only under specified conditions*)
10. The present considerations are applicable only to those species for which aquaculture practices have been established. Thus, certification process needs to adopt a futuristic view with options open for new species, both indigenous and introduced. Some of the species for which accreditation process may be required in the near future are Sea bass (*Lates calcarifer*), pearl spot (*Etroplus suratensis*), Sea cucumber (*Holothuria scabra*), Edible oyster (*Crassostrea madrasensis*), Pearl oyster (*Pinctada fucata*), Pearl mussel (*Lamellidens marginalis*), Indian Featherback *Chitala chitala*, and Indian and exotic trouts.
11. The exotic species/strains introduced without passing through the official channels will be a critical risk to the entire certification process.

## FISH SEED CERTIFICATION AND ACCREDITATION CONCEPT

### 2.1 Purpose

For setting quality standards for fish/finfish seed in India and ensuring and their production process conforms to norms of environmental sustainability and social equity.

### 2.2 Scope

The Accreditation and Certification systems will be applicable to all hatcheries and seed production units in India- under both private or public sector- that undertake breeding of fish and finfish and nursery rearing and transport of spawn, fry, fingerlings, nauplii and post larvae.

### 2.3 Principles

The proposed Body/Agency and its activities will be guided by a set of principles as described below. The process will be:

- based on best scientific evidence available
- consistent with the national policies on environmental sustainability and social equity
- based on minimum substantive requirements, criteria and procedures that will be outlined in the guidelines
- transparent including balanced and fair participation by all stakeholders involved
- non-discriminatory and not creating any unnecessary obstacles for free trade and enterprise
- establishing clear accountability for owners of hatcheries/seed production units as well as the certifying/accrediting authorities
- incorporating reliable independent auditing and verification procedures

### 2.4 Definitions

Accreditation: A procedure by which a competent authority gives formal recognition that a qualified firm/facility is competent to carry out a specific task (s)

Certification: A procedure by which a body/an organization recognized by the accrediting agency gives written assurance that a product/process/facility/service of a hatchery/farm/facility conforms to specific requirement. Certification may be based on range of inspection activities, including if needed, a continuous inspection in the production system.

*(The Authorized Accreditation Agency can engage/authorize a or several Certification agencies as required or can have its own certification machinery)*

Hatcheries: Hatchery is a production unit that produces seed material at the earliest stage of life cycle such as spawn, eyed ova (finfish) and nauplii (shrimps and prawns) or equivalent stage, specific to a species through breeding or incubation of berried female; or any other established method of producing progeny of a species.

Seed farms: Farms that raise fry and fingerling (finfish) and post-larvae (shrimps and prawns) to stock aquaculture farms (Initial seed material ought to be procured from accredited hatcheries).

(A "Seed production unit" can be a Hatchery, a Seed farm or a unit with both the components)

Certified seed Certified seed is the progeny of the broodstock, produced by an accredited hatchery or fry raised by an accredited seed farm and certified by the producer that their produce (seed) is compliant with the specified norms. The certified seed shall be used only for culture as table fish/shellfish and not for raising broodstock.

## 2.5 Qualities required for an Accreditation body/Agency

Independence, impartiality and transparency The Accreditation body/Agency should be independent and impartial. In order to be impartial and independent, the accreditation body should:

- be transparent about its organizational structure and the financial and other kinds of support it receives from public or private entities
- be independent from vested interests together with its senior executive and staff
- be free from any commercial financial and other pressures which might influence the results of the accreditation process
- ensure that decision on accreditation is taken by person (s) who has (ve) not participated in the assessment
- not delegate authority for granting maintaining extending reducing suspending or withdrawing accreditation to an outside person or body.

Accountability and reporting The accreditation agency should be a legal entity and should have clear and effective procedures for handling applications for accreditation procedures. In particular, the accreditation body should maintain and provide to the applicants:

- a detailed description of the assessment and accreditation procedure
- the documents containing the requirements for accreditation
- the documents describing the rights and duties of accredited and accreting bodies should conduct periodic audits

Resolution of complaints The accreditation body should have a written policy and procedures for dealing with any complaints in relation to any aspect of the accreditation, de-accreditation or certifying process. It should keep a record of all complaints and remedial actions relative to accreditation

## 2.6 Seed Certification Process Through Accreditation of Hatcheries

A seed used in any aquaculture system is an early life form of the organism, actively swimming and growing. Barring a few exceptions such as *Artemia*, there are no dormant stages as in agriculture crops. Therefore, testing every batch of seed produced at the hatcheries is not feasible. Accreditation of hatcheries to produce certified seed would be a more practical approach. In other words, process certification i.e. certification of hatchery management practices is considered a better way than the product certification alone.

Testing of seed for compliance to the norms would be part of the hatchery accreditation procedures.

### 2.7 Requirements

The following are the three basic requirements for initiating the process of fish seed certification and accreditation process in India

- Identification of fish species/varieties used in aquaculture with hatchery-bred seed
- Appropriate guidelines for accreditation of hatcheries and seed farms
- Empowered agency/authority for accreditation of hatcheries and seed farms, equipped with required technical manpower, diagnostic and analytical capabilities.

## DEFINITIONS

### 1. CARPS

**Definition:** Fish species belonging to the family Cyprinidae. They are of five categories:

Category I (domesticated): Indian major carps (IMCs), *Catla catla*, *Labeo rohita*, *Labeo calbasu*, and *Cirrhinus mrigala*. Minor carp: *Labeo bata*, Chinese carps: *Cyprinus carpio*, *Ctenopharyngodon idella*, *Hypophthalmichthys molitrix*. *P. gonionotus*

Category II (not yet domesticated): *Labeo gonius*, *Labeo fimbriatus*, *Labeo dero*, *Labeo dyocheilus*, *Labeo dussumieri*, *Puntius sarana*, *P. pulchellus*, *Cirrhinus cirrhosa*, *Cirrhinus reba*, *Barbodes carnaticus*, *Gonoproktopterus curmuca* or any other commercially important carps that might be considered in future, when their aquaculture protocols are established

Category III (Hybrids): Female catla x male rohu (Nadan) or any other hybrid developed through captive breeding of the parents between two different taxonomic entities and released as hybrid variety for aquaculture purposes

Category IV (Improved Variety/Imported strains) Genetically improved variety, developed through breeding programme from parents of the same species and released for commercial culture (example 'Jayanti' rohu developed by selective breeding at CIFA)

Category V (IMC Seed): Spawn- up to 8 mm (yolk sac completely absorbed); Early fry 9-25 mm, Fry 26-50 mm; Advanced fry 51-100 mm; Fingerling > 100 mm

### 2. CATFISHES

**Definition:** Fish species belonging to the order Siluriformes.

#### Species Cultured in India

At present two air breathing catfishes are cultured in India on commercial basis. They are: *Clarias batrachus* (*magur*; family Clariidae) and *Heteropneustes fossilis* (*singhi*; Family Heteropneustidae).

Seed size: 15-20 mm (fry)

*Pangasius pangasius*, *Ompok* sp., and *Horabagrus brachysoma* are prospective cat fish species that might be considered for culture in future, when their aquaculture protocols are established.

### 3. FRESHWATER PRAWNS

**Definition:** All decapod crustaceans under the family Palaemonidae.

#### Species Cultured in India

*Macrobrachium rosenbergii* is the freshwater prawn cultured widely in India.

Seed size: > 30 mm

*M. gangeticum* and *M. malcolmsonii* are the other prospective freshwater prawns that might be considered for culture in future when their aquaculture protocols are established.

#### 4. ORNAMENTAL FISHES

**Definition:** Aquatic species that have commercial value as a live display or exhibition item.

Their value could be due to appearance, color, shape or any other morphological and behavioral trait. They include a number of finfishes and other aquatic organisms, which are kept as pets or displayed and are not typically used as a food source for human or livestock. Ornamental fishes are of fresh water, brackishwater or marine origin.

#### 5. SHRIMPS

**Definition:** Decapod crustaceans belonging to the family Penaeidae.

##### Species Cultured in India

The main cultivable species of penaeid shrimps are the giant tiger shrimp, *Penaeus monodon*, the Indian white shrimp, *Fenneropenaeus indicus*, the banana shrimp, *F. merguensis* and *Penaeus semisulcatus*.

##### Seed

**Nauplii:** In shrimps, the eggs hatch out into nauplii, which have three pairs of appendages. There is no mouth and the nauplii thrive on the nutrients stored in the egg.

**Postlarvae (PL):** The nauplii pass through intermediary larval stages of Zoea and Mysis and reach Postlarval stages in 9-10 days. The postlarvae of shrimp have all the morphological characteristics of the adult. Postlarvae are designated based on the number of days spent as PL. PL<sub>15</sub> means PL of 15 days old. PL<sub>15</sub> to PL<sub>20</sub> are suitable for stocking in farms.

## OPTIMUM WATER QUALITY PARAMETERS

## 1. For Carps/Air-Breathing Fishes/Ornamental Fishes

Parameters	Optimal levels
Water temperature ( $^{\circ}\text{C}$ )	= 24.0-29.0
pH	= 7.6-8.4
DO (mg/l)	= >5
CO <sub>2</sub> (mg/l)	= <16.0
Total alkalinity (mg/l)	= 80.0-110.0
Hardness (mg/l)	= 70-100
Ammonia-N (mg/l)	= <0.2
Potassium (mg/l)	= >1.0
Calcium (mg/l)	= 24.0-28.0
Sodium (mg/l)	= 7.9-9.0
Iron (mg/l)	= <0.2
Traces of Pesticide	= As per CPCB standards for bathing water
Heavy metals	= As per CPCB standards for bathing water H <sub>2</sub> S
	= <1.0
Chloride	= <10 mg / litre

*(Note: Direct use of ground water may not be suitable. It is to be drawn first to earthen intake ponds before use in hatchery complex for breeding / incubation purpose, using appropriate filter.)*

## 2. For freshwater prawn

Parameters	Optimal levels
Water temperature ( $^{\circ}\text{C}$ )	= 27.0-31.0
pH	= 7.6-8.4
DO (mg/l)	= >5
Ammonia-N (mg/l)	= <0.1
Nitrite-N (mg/l)	= <0.01
Iron (mg/l)	= <0.2
Salinity	= 12-14 ppt
Pesticide Traces	= As per CPCB standards for bathing water
Heavy metals	= As per CPCB standards for bathing water
H <sub>2</sub> S	= <1.0
Chloride	= <10 mg / litre

## 3. For Shrimp

Parameters	Optimal levels
Temperature ( $^{\circ}\text{C}$ )	= 28 - 32
Salinity (ppt)	= 30 - 34
pH	= 8.0 - 8.4
Dissolved oxygen (mg/l)	= > 4.0
Pesticide Traces	= As per CPCB standards for bathing water
Heavy metals	= As per CPCB-standards for bathing water
Ammonia - N (mg/l)	= < 0.01

Nitrite - N (mg/l) = Upto 0.1

*ANNEXURE IV*

**SCREENING FOR PATHOGENS AND DISEASES**

**1. Carps**

**1.1 Bacterial pathogens**

*Aeromonas hydrophila*, *Aeromonas sorbia* and other *Aeromonas* sp., *Edwardsiella tarda*, *Pseudomonas* sp., *Flexibacter* sp., *Streptococcus* sp. and other pathogens reported from the region concerned.

**1.2 Parasitic pathogens**

*Argulus*, *Lernea*, Ciliate protozoans and myxosporideans, flukes

**1.3 Fungal pathogens**

*Saprolegnia* sp.

**2. Catfish**

**2.1 Bacterial pathogens**

*Aeromonas hydrophila*, *Flexibacter columnaris*, *Edwardsiella* sp., *Pseudomonas* sp.

**2.2 Parasites**

Ciliate Protozoans and Myxosporideans

**3. Freshwater Prawn**

**3.1 Viral Pathogens**

*Macrobrachium rosenbergii* nodavirus and extra small virus

### **3.2 Bacterial pathogens**

*Leucothrix*, *Vibrio* spp., *Aeromonas* spp., *Enterococcus* and *Lactobacillus* spp.

### **3.3 Fungal pathogens**

*Lagenidium*, *Saprolegnia*, *Fusarium*

## **4 Ornamental finfish diseases**

### **4.1 Viral diseases**

Goldfish haematopoietic necrosis (GFHN), Iridoviruses of ornamental finfish, Spring viraemia of carp (SVC), Koi herpesvirus, Infectious pancreatic necrosis (IPN), Viral encephalopathy and retinopathy (VER).

### **4.2 Bacterial pathogens**

*Aeromonas salmonicida*, *Edwardsiella ictaluri*, *Photobacterium damsela piscicida*, *Pseudomonas anguilliseptica*, *Yersinia ruckeri*, *Mycobacterium* sp *Pathogenic Vibrio cholerae*

## **5. Shrimp**

**5.1** White Spot Syndrome Virus (WSSV), Monodon baculovirus (MBV), Yellowhead virus (YHV), Taura syndrome virus (TSV), Infectious hypodermal and hematopoietic necrosis virus (IHHNV), Hepatopancreatic virus (HPV)

## STANDARD APPLICATION FORMAT

### APPLICATION FOR ACCREDITATION OF A HATCHERY/SEED FARM

Name and address of the hatchery/Seed farm :

Phone No. :

Fax :

E-mail :

Ownership :

A. Govt./ Society/ Individual/Private Limited Company/Corporate House

B. Commercial registration (Regn. No. & Date)

Year of establishment: :

Location of the hatchery/Farm :

Village

Taluk

Nearest Police Station

Nearest Railway Station

District and State

Farm details

A. Total Land Area (ha) :

B. Total water area (ha) :

C. Land (ha): (Own/On lease/Others- specify) :

D. Rearing space

(i) Broodstock ponds (No./area) :

(ii) Nursery ponds (No./area) :

E. Hatchery infrastructure ✓

(i) No./size of breeding pool (m<sup>3</sup>) ✓ :

(ii) No./size of incubation pool (m<sup>3</sup>) ✓ :

(iii) Brood fish maintained for the last five years ✓ :

Sl. No	Year	Sex	Number	Average weight	Source

F. Is the Hatchery/Farm located in Flood Prone Area?

If Yes, last known Flood Year in the area

Source of water :

(Borewell/Reservoir/Irrigation canal/Dugwell)

Source of energy (Electric/Diesel or any other) :

Seed sale; species-wise for the last five years

	Year	Number
Spawn		
Fry		
Fingerlings		
Nauplii		
Postlarvae		

History of Broodstock

A. Origin of First Broodstock

- i. Source; (River/Open Water Body (wild collection)/ Hatchery/ Aquaculture farm)
- ii. Place and Year of Collection
- iii. Size range and Number of stocking

B. History of Replenishment

- i. Source ; (River/Open Water Body (wild collection)/ Hatchery/ Aquaculture) farm
- ii. Place and Year of Collection
- iii. Size range and Number of stocking

C. Own Brooder raising program (Year wise for the last 5 years)

Year	No.
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Educational qualifications and Experience of the Proprietor/ Hatchery Manager

11. History of Disease Outbreak, if any

Year	Disease	Description/Remarks	Cause	Treatment/preventive measures adopted

Date:

Signature of Applicant

Recommendation:

Certified that the above information is correct to the best of my knowledge.

Signature:

Date: Designation & Seal of the District Level Fishery Officer

**Documents to be enclosed**

- 1) Identity proof of the Owner/Manager/Applicant
- 2) Land ownership documents
- 3) Ownership/ Lease document of hatchery (minimum five years)
- 4) Layout of the hatchery and/or farm
- 5) Copy of commercial registration, if any
- 6) Income Tax clearance Certificate
- 7) Registration with Labour Office
- 8) Proof of financing, If hypothecated to financial institution

- 9) Necessary permission for water source, if farm depends on external resources
- 10) Demand Draft/Cheque (Fee)