

Fry Health Management

Agriculture, Fisheries and Conservation Department
Aquaculture Fisheries Division

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漁農自然護理署
Agriculture, Fisheries and
Conservation Department

Introduction

To maximise the harvest and profits of fish farming, it is extremely important for fish farmers to ensure stocking of healthy fish fry, in addition to the selection of high-quality feed and adoption of effective management measures. Good fry management can promote the growth of fry, improve the survival rate of cultured fish, reduce their risk of developing diseases, and hence increase the productivity. Good fry management should start from three areas, namely selection, transportation and stocking.



1 Points to Note When Selecting Fish Fry

Pay attention to the following points when selecting high-quality fish fry:

1.1 Select captive-bred species

Fish fry can generally be categorised into two types: wild fry (such as amberjack, Russell's snapper and mangrove snapper) and captive-bred fry (such as green grouper, giant grouper and white blotched snapper). Since the supply and quality of captive-bred fry are more stable and they are normally less likely to carry pathogens, they are becoming more popular among fish farmers. In addition, using captive-bred fry can reduce the capture of wild fry, minimise the damage to marine ecology, help maintain biodiversity and as a result achieve the goal of sustainable development of the fisheries industry.

Common captive-bred species



Green grouper



Giant grouper



Pompano



Red snapper



White blotched snapper

Common wild species



Amberjack



Russell's snapper



Seabream



Brown-spotted grouper



Mangrove snapper

1.2 Select reputable suppliers and visit fry nurseries

Purchasing fish fry from reputable suppliers can ensure the quality and supply of fry. In general, fry nurseries with proper management, good water quality and satisfactory hygienic conditions can produce fry of better quality. The selection of quality fry can ensure higher survival rate of the fry during transportation and after stocking.



1.3 Pay attention to the quality and health of fish fry

- Fish fry must be accompanied with a health quarantine certificate from their place of origin to ensure that they do not carry any pathogen.
- Fish fry must be of similar sizes, strong, healthy and active, with intact scales and fins and a bright, lustrous body colour. They should be free from diseases and wounds.



Pay attention to the quality of fish fry

2

Points to Note When Transporting Fish Fry

During the transportation process, fish fry often die for various reasons, causing direct economic losses to fish farmers. The following preventive measures can help improve the survival rate of fish fry during the transportation process:

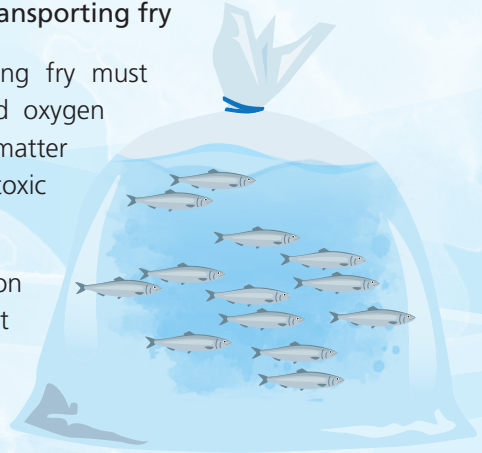
2.1 Preparation beforehand

- Stop feeding the fish fry one or two days before transportation to reduce faeces discharge and mucus secretion from them during transit.
- Devise a comprehensive and detailed transportation plan/traffic arrangements.



2.2 Use of good quality water for transporting fry

- The water used for transporting fry must be clear, with a high dissolved oxygen level, low contents of organic matter and plankton, and free from toxic substances.
- Fish farmers may add prescription medications or antibiotics that meet safety standards to the water after consulting a registered veterinary surgeon in order to inhibit bacterial growth in water and improve the survival rate of the fish fry.



2.3 Maintain the dissolved oxygen level in water

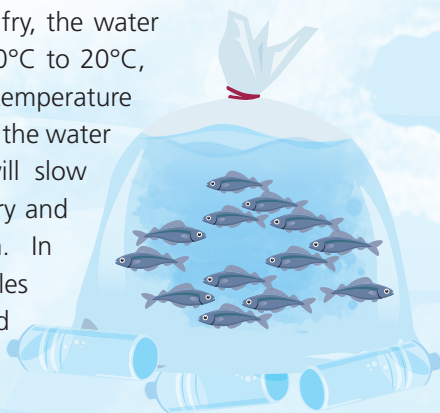
- Transport the fish fry by packing them in aerated plastic bags. Seal the plastic bags to ensure the oxygen inside is sufficient to maintain an optimal dissolved oxygen level during the transportation process.



Transportation of fish fry

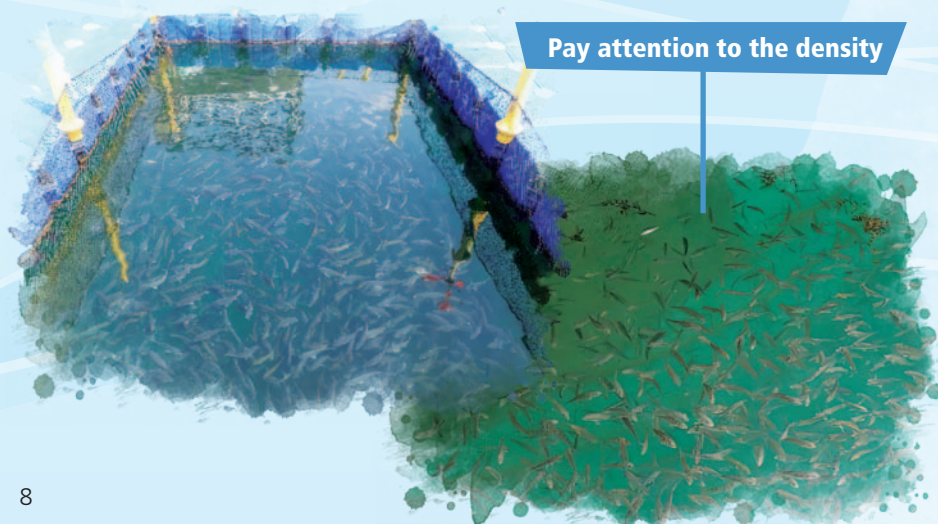
2.4 Maintain the appropriate water temperature

- During the transportation of fish fry, the water temperature should be kept at 10°C to 20°C, but not lower than the optimal temperature range of the fish species. Keeping the water at such a temperature range will slow down the metabolic rate of the fry and reduce their oxygen consumption. In hot summer, plastic water bottles filled with ice water can be placed around the fry bag to achieve cooling effect.



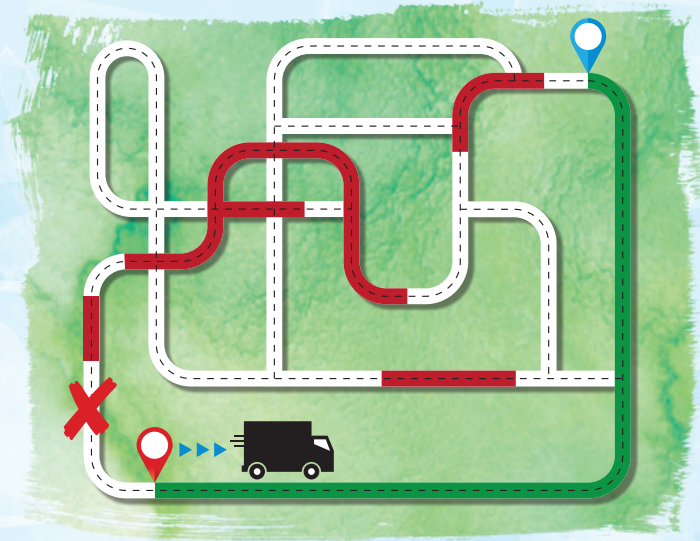
2.5 Ensure the appropriate loading density

- The loading density is determined by various factors. In general, when the temperature is low, the transportation time is short, the fry are small in size with a gentle temperament and have low oxygen consumption, the loading density can be slightly relaxed; if the opposite occurs, it should be tightened. A loading test can be performed if necessary to assess the appropriate density.



2.6 Transportation plan/ traffic arrangements

- The process of transportation can easily irritate the fish fry, making them more susceptible to the risk of injury and bacterial infection.
- Choose the most convenient route and avoid busy road sections and peak hours to minimise the risk of fry death during transportation due to traffic congestion.



3 Points to Notice for Stocking New Fry

Fish fry may become weak after going through the transportation process. They should be allowed to adapt to the new environment first during stocking and the following points should be noted:

3.1 Disinfect the fish farm and culture gear

- Thoroughly disinfect the fish farm and culture gear to eliminate pathogens by using lime, formalin, bleach or steam. Please refer to the booklet “Good Aquaculture Practices Series 4 – Prevention and Treatment of Fish Diseases” for details.



Disinfect the culture gear



3.2 Quarantine for the fish fry

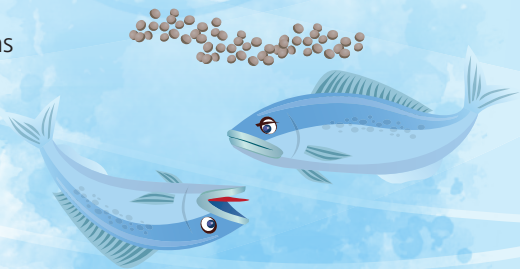
- Isolate new fry in a temporary pond/net cage for a few days to observe their health conditions, such as whether they have any abnormal behaviour including poor appetite and unusual swimming patterns. If any abnormality on the fry body surface is detected, such as darkened colour, or parasites, haemorrhage or ulceration on the body, fins and gills, immediately isolate and disinfect the fry and seek help from the AFCD or a registered veterinary surgeon.



Quarantine for the fish fry

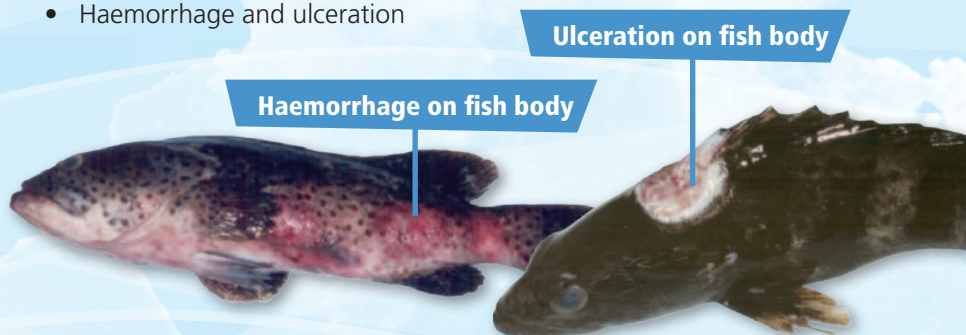
1. Abnormal behaviour

- Less feed intake or poor appetite
- Unusual swimming patterns



2. Fish body surface

- Abnormal body colour, such as darkening
- Haemorrhage and ulceration



3.3 Water testing and keeping fry well-fed before stocking (for fish ponds and fish farms only)

- Before stocking, the quality of the aquaculture water, including the level of disinfectants, pH value and dissolved oxygen level, should be tested, to ensure that it is suitable for the growth of fry. Fish farmers can fill large containers with water for aquaculture or set up temporary net cages in fish ponds/ fish farms, and then add in a few dozens of fry to test the water quality. If no abnormal behaviour of the fry is noted after more than half a day, it means that the water quality is suitable for stocking.
- Feed the quarantined fry in the temporary culture pond/ net cage with an appropriate amount of feed to allow them to regain strength before stocking. By doing so, their survival rate can be improved.



3.4 Regulate the water temperature

A big temperature difference between the water in which the fry are kept before and after stocking may cause twitching and convulsion in the fry, or they may even die. After the arrival of the fry, first take out the air-filled plastic bag containing the fry, and slowly submerge it in the temporary culture pond/net cage set up beforehand. Then, unseal the bag, and leave it idle for about half an hour until the water temperatures inside and outside the plastic bag gradually become the same. After that, slowly release the fry together with the water in the plastic bag into the temporary culture pond/net cage.

3.5 Stocking density, time, location and skills

- The stocking density should be neither too high nor too low. In each water body, a batch of fry of the same species and of a similar size should be kept at the same time to avoid fighting, competition or bullying among fish of the same and different species.

Competition among fish of the same and different species

- Different fish species have different behaviours and some will prey on other fish species
- Even if they belong to the same fish species, when there is a significant size difference, the big fish may prey on the small fish



- The higher water temperature and relatively sufficient level of dissolved oxygen at noon or in the afternoon on sunny days provide favourable conditions for the fish fry to quickly resume normal activity after release. Therefore, avoid releasing fish fry at night or when it is windy and raining heavily.
- When releasing the fish fry, the container should be slightly tilted and slowly placed into the water body, ensuring that the edge of the container is just below the water surface. Move the container slowly backward or allow the fish fry to swim out of the container on their own. Never pour the fry forcefully into the pond or fish raft so as to prevent the fry from dying due to excessive impact.
- When releasing the fish fry into a pond, attention should also be paid to the wind direction. Try as far as possible to release the fry close to the water surface slowly downwind in deep water area, so as to prevent the fry from dying due to excessive impact or even their bumping onto the pond bottom or seabed.

3.6 Enclosed nursery system for fry

- The enclosed circulation system separates fish fry from the aquaculture water body. Typically, sponges, sand grains, activated charcoal, protein skimmers and bio balls are used for recirculatory filtration of seawater or freshwater. In addition, UV-C light (with a wavelength between 100 nm and 280 nm) is employed for disinfection, in order to reduce the risk of infection induced by pathogens and improve the survival rate of the fish fry. The aquaculture water body should pass through the circulation system at least once every 30 minutes and be replaced regularly while the filtering materials should be cleaned weekly and replaced on a monthly basis, and the disinfection devices should be regularly cleaned, replaced and maintained.

4 Daily Management of Fish Fry Rearing

Proper daily management of fish fry rearing can reduce the risk of fry death caused by changes in the culture environment or weather conditions, and thus enhance the production effectiveness. Some points to note regarding the daily management of fish fry are provided below. Please refer to the booklets “Good Aquaculture Practices Series 2 – Environmental Management of Mariculture” and “Good Aquaculture Practices Series 3 – Environmental Management of Pond fish Culture” for details.



魚塘管理紀錄

此表格為魚塘日常運作之紀錄，適用於所有魚類。請填寫，以便日後參考。此表格可分為兩部分：日常運作紀錄及特別事件紀錄。請在表格上方填寫日期及時間，並在表格下方填寫相關數據。

日期		時間		天氣		水溫		pH值		溶氧量		氨氮		亞硝酸		硝酸盐		其他	
月	日	時	分	晴	雨	攝氏	華氏	值	值	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
19/11	10:00	晴	10	25	77	2.5	77	7.5	7.5	5.0	5.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
19/11	11:00	晴	11	25	77	2.5	77	7.5	7.5	5.0	5.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
19/11	12:00	晴	12	25	77	2.5	77	7.5	7.5	5.0	5.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
19/11	13:00	晴	13	25	77	2.5	77	7.5	7.5	5.0	5.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
19/11	14:00	晴	14	25	77	2.5	77	7.5	7.5	5.0	5.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
19/11	15:00	晴	15	25	77	2.5	77	7.5	7.5	5.0	5.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
19/11	16:00	晴	16	25	77	2.5	77	7.5	7.5	5.0	5.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
19/11	17:00	晴	17	25	77	2.5	77	7.5	7.5	5.0	5.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
19/11	18:00	晴	18	25	77	2.5	77	7.5	7.5	5.0	5.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
19/11	19:00	晴	19	25	77	2.5	77	7.5	7.5	5.0	5.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
19/11	20:00	晴	20	25	77	2.5	77	7.5	7.5	5.0	5.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
19/11	21:00	晴	21	25	77	2.5	77	7.5	7.5	5.0	5.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
19/11	22:00	晴	22	25	77	2.5	77	7.5	7.5	5.0	5.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
19/11	23:00	晴	23	25	77	2.5	77	7.5	7.5	5.0	5.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

Fish Farm Daily Management Records

4.1 Inspection of fish farms and fish ponds

- It is recommended to conduct regular inspections once every morning, afternoon and evening to observe the condition of the fish fry and changes in the water quality. If any abnormalities are detected, appropriate measures should be taken immediately.

4.2 Water quality management

- Ensure an adequate level of dissolved oxygen in the water. If the dissolved oxygen level is too low (below 4 mg/L), immediately turn on the aerator. For the stocking of fry in a fish pond, fill the pond halfway first and then add water once every three days to one week. This will increase the level of dissolved oxygen in the water, improve the water quality and provide more space for fry movement. While filling the pond with water, apply fertilisers and a suitable amount of fish feed at the same time to ensure the balance between nutrients and plankton in the water.
- Abrupt environmental changes (such as a sharp increase of plankton leading to an excessively low dissolved oxygen level)

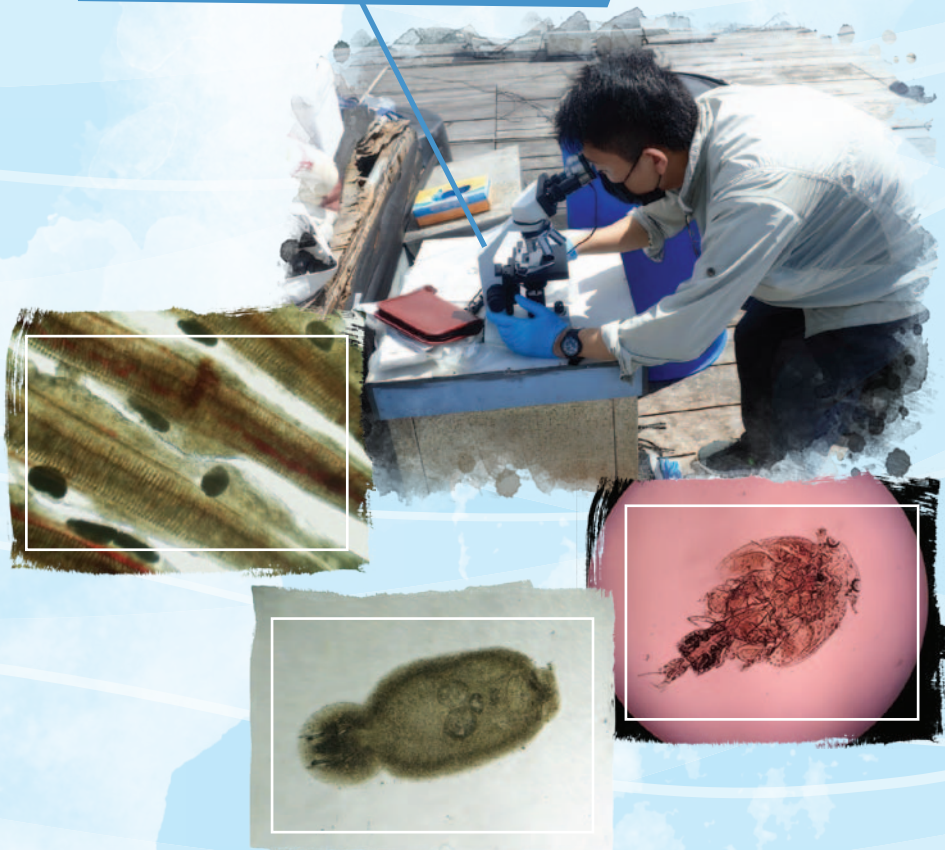


Abrupt environmental changes such as red tide

4.3 Strengthen prevention and treatment of fish diseases

- Given that fish fry are vulnerable to parasitic infections and saprolegniasis, precautions should be taken. In case of any abnormalities of the fry, such as swimming away from the stock, darkening bodies, and slow or rapid movements along the edges of the fish pond/fish farm or net cage, fish farmers should find out the causes and take appropriate measures immediately. Where necessary, seek help from the AFCD or a registered veterinary surgeon to prevent the spread of fish diseases.

Prevention and treatment of fish diseases



4.4 Reduce the stocking density as appropriate

- Since the growth rates of fish fry differ, they should be kept in separate ponds or cages as appropriate according to their sizes in order to reduce the stocking density and prevent injuries from bumping against each other or cannibalism. This can also reduce the occurrence of fish diseases, promote the growth of fry and improve their survival rate.



4.5 Maintain daily management records

- Record the weather conditions, the amounts of fertilisers and feed used and water filled and drained, as well as the conditions of the fry. These records serve as a reference for identification of appropriate measures to address problems that may arise in future.

Fish Farm Management Record

Fish farm number: _____ Address: _____

Area and depth of fish farm: _____

Cultured fish species: _____ Stocking date: _____

Origin of fry: _____ Stocking quantity: _____

Length /weight of fry: _____

Types of feed: _____

[illegible]

5 Fry Health Inspection Programme

- Newly stocked fish fry may carry pathogens from the waters that they originally came from and bring the pathogens into the fish farm, leading to the spread of fish diseases and massive death of the cultured fish. Besides, if the fry contain harmful substances inside their bodies, this can also give rise to food safety issues and threaten the health of humans.
- To minimise the risks of aquaculture caused by fish diseases and harmful substances so that fish farmers' returns can be guaranteed, fish farmers should request a health certificate of the fish fry from the supplier, and carry out quarantine and disinfection for the fish fry. In addition, fish farmers may participate in the Fry Health Inspection Programme run by the AFCD, which accepts submissions of fish fry samples for free testing of harmful substances (such as heavy metals and malachite green) and pathogens before the stocking of new fry.



For details of the programme, please contact the Aquaculture Fisheries Division of the AFCD.

Pond fish culture : 2471 9142

Mariculture : 2150 7088

Technical Support

Fish farmers are welcome to contact the AFCD for free information and technical support services:

Aquaculture Technology :

2471 9142 (pond fish) / 2150 7083 (marine fish)

Fish Health and Disease Prevention :

2471 9142 (pond fish) / 2150 7088 (marine fish)

Red Tide and Water Quality Environment :

2150 7124

Antimicrobial Resistance :

3426 2284