



# Fry Health Management





## INTRODUCTION

While quality fish feed and effective management measures are keys to maximising the harvest and profit of fish farming, it is equally important to ensure that only healthy fry are stocked. Good fry management means less fish diseases, higher survival rate, better growth and greater yield. Effective fry management begins with the sourcing of fry, their transportation and the way they are cultured.

# 1

## How to purchase quality fry

### Tips for sourcing quality fry:

#### 1.1 Purchase captive-bred species

There are wild fish fry (e.g. purple amberjack, Russell's snapper and mangrove snapper) and captive-bred fry (e.g. green grouper, giant grouper and white blotched snapper). As captive-bred fry are more stable in supply and quality and have less surface pathogens, they are more and more popular among fish farmers. Sustainable development of Hong Kong's fisheries can be achieved by using captive-bred fish fry because it helps to cut down wild fry fishing, which in turn minimises the degradation of marine ecology and maintains bio-diversity.



## common captive-bred species



Green grouper



Giant grouper



Pompano



Red snapper



White blotched snapper

## common wild species



Purple amberjack



Russell's snapper



Seabream



Brown Spotted grouper



Mangrove snapper





## 1.2 Choose reputable suppliers and pay site visits to fish nurseries

- Sourcing from reputable suppliers can ensure both the quality and availability of fry. A hygienic nursery with good water quality and effective routine culture practices can rear better fry. The survival rate of these fry is higher both during delivery and after they are stocked into the fish farm.





### 1.3 Fish fry should be of good quality and healthy

- Choose fry that are uniform in size, healthy, active, strong and with scales and fins intact. They should be free of diseases or wounds and with shining lustre. Fry with a health quarantine certificate issued by the authority of the place of origin can ensure that they do not contain any substances which are hazardous to human (e.g. heavy metals, hormones, and malachite green).



- Delayed growth because of malnutrition.  
Loss of appetite because of chronic nervous system damage





## 2 Tips for fry delivery

The survival rate of fry during delivery has a direct impact on the harvest and economic effectiveness of fish farming. The following procedures can increase the survival rate of fry.

### 2.1 Make adequate preparations before the journey

- Stop feeding one to two days before delivery so that the fry may have sufficient time to excrete and reduce body surface mucus. This can prevent water quality from deteriorating during delivery.

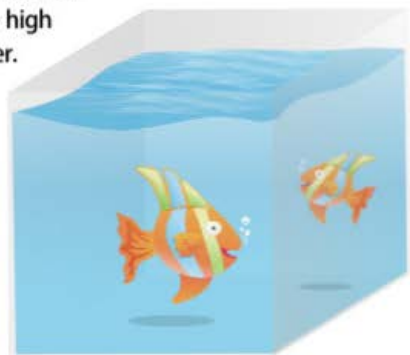


- Make up a detailed plan and make good transport arrangements. Delayed delivery will incur mortality and losses during transit.



## 2.2 Transport fry in good water

- Water must be clean and clear with low organic matters and plankton levels. Dissolved oxygen should be high and no toxic substances should be found in water.
- Add drugs or anti-bacterial agents that fully meet safety standards to the water to inhibit waterborne bacterial activities. This can prevent fish diseases and water quality deterioration during transit.



## 2.3 Ensure sufficient supply of dissolved oxygen in water

- Fry are often transported in aerated plastic bags. In most cases the oxygen inside the bag is enough to maintain dissolved oxygen at an adequate level.





## 2.4 Appropriate transport water temperature

- Transport water temperature should be maintained between 10°C and 20°C (but never lower than the tolerable temperature range of the species concerned). This helps reduce the fry's metabolic rate, oxygen consumption and tension. In hot summer months, put iced water bottles in the fry bags to lower water temperature.





## 2.5 Proper loading density

- Loading density test should be carried out before departure to find out the proper loading density. Generally speaking, for gentle and small species which require less oxygen at low temperature over a short distance, loading density can be set high. Otherwise, loading density should be low.



## 2.6 Transport tips

- Mechanical injuries and hyper-excitement caused by transport and handling will reduce the fry's resistance to diseases. Wounds are vulnerable to infection again.

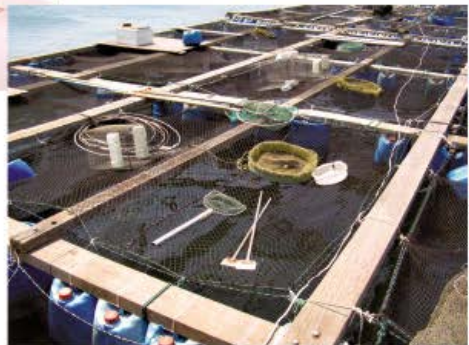


### 3 Tips for taking delivery and stocking of new fry

Fry are weak after the long journey. They should be given time to adapt to the new environment. Attention should be given to the following:

#### 3.1 Disinfect the fish farm and culture gear

Before stocking new fry, disinfect the fish farm and all culture gear to eliminate all harmful organisms and pathogens. Use sterilising agents like quick lime, formaldehyde and bleach, or disinfect with steam. Read the “**Good Aquaculture Practices Series 4 Prevention and Treatment of Fish Diseases**” booklet to learn more about disinfection methods.

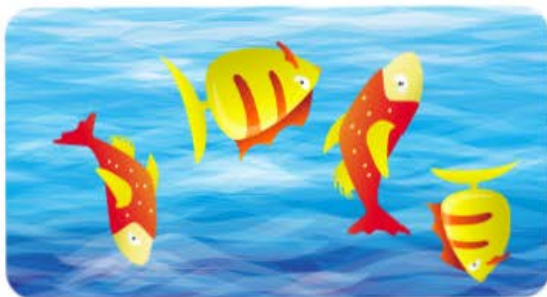


## 3.2 Quarantine

New fry should be isolated and monitored for a couple of days to find out their state of health and see whether they have any abnormal behaviour (e.g. poor appetite or strange swimming pattern). If there is any abnormal changes in body colour (such as darkening), parasites, hemorrhage and ulcers, isolate the fry and disinfect immediately to avoid major disease outbreak. Some fish diseases are hard to detect visually, employ a microscope to check if necessary.

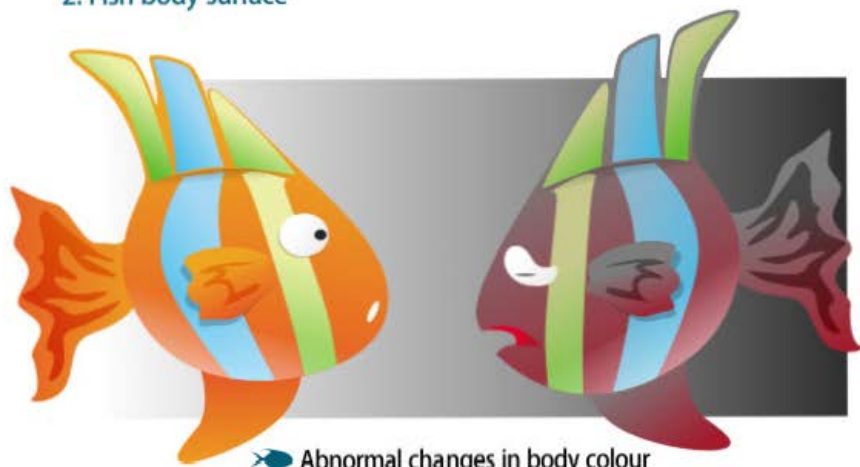
### 1. Abnormal behaviour

- Too feeble to feed or poor appetite



- Strange swimming pattern

## 2. Fish body surface



➤ Abnormal changes in body colour (darkening)



➤ hemorrhage and ulcers



### 3.3 Testing of water before stocking and keeping new fry well fed (for fishpond only)

- Test the pond water one day before stocking new fry. Check if the water is completely free of toxic residue of the sterilising agent, and if the water quality is regulated to a suitable state. Fill a large container with pond water or erect a temporary purse-seine in the fishpond before putting in a few dozen fry. If they act normally after nearly a day, it indicates that the water is not toxic and the water quality is satisfactory. Fry can be stocked into the pond.
- To improve survival rate, make sure you feed the fry well before stocking. Place the fry kept in the aerated plastic bags gently in the temporary pond. Give them feed and allow them to resume normal activities before releasing them into the pond.



### 3.4 Regulate water temperature before stocking

- If there is a great difference between the temperature of pond / sea water to that of the fry container, the fry may twitch and die suddenly. Remove the iced water bottles from the shipping plastic bags, then open the plastic bags and put them slowly into the pre-prepared net cages in the fish farm. When inside and outside water temperature is uniform (about half an hour later), slowly release the fry and water into the net cage.

### 3.5 Tips on stocking density, time, place and method

- Stocking density should not be too high or too low. Only a single species of fry should be kept in one pond or fish cage. The fry should be uniform in size and the whole batch should be introduced at the same time to avoid larger fish dominating or preying on smaller fish in the future.

#### Cannibalism

- Different fish species have different habits. Some are cannibals that kill and feed on members of their own species.
- When there is great difference in size amongst fish of the same species, the large ones may prey on the smaller ones.



- It is best to introduce new fry to the fishpond or net cage at noon or in the afternoon on a fine day when both the water temperature and dissolved oxygen level are high. The fry can resume normal activities very quickly under such a condition. Avoid stocking fry on rainy or windy days or during the night.
- When stocking fry into the pond on a windy day, release them in a downwind and deep water section of the pond. If fry are released in an upwind location, they stand a chance of being blown to the pond edges or pressed down to the pond bottom. This may result in serious fish kill.
- When releasing fry, tilt the container gently in the water, keep it just under the water surface or pull it gently away from the back, so as to allow the fry to swim out slowly. Do not plunge the fry abruptly into the fishpond or fish cage.

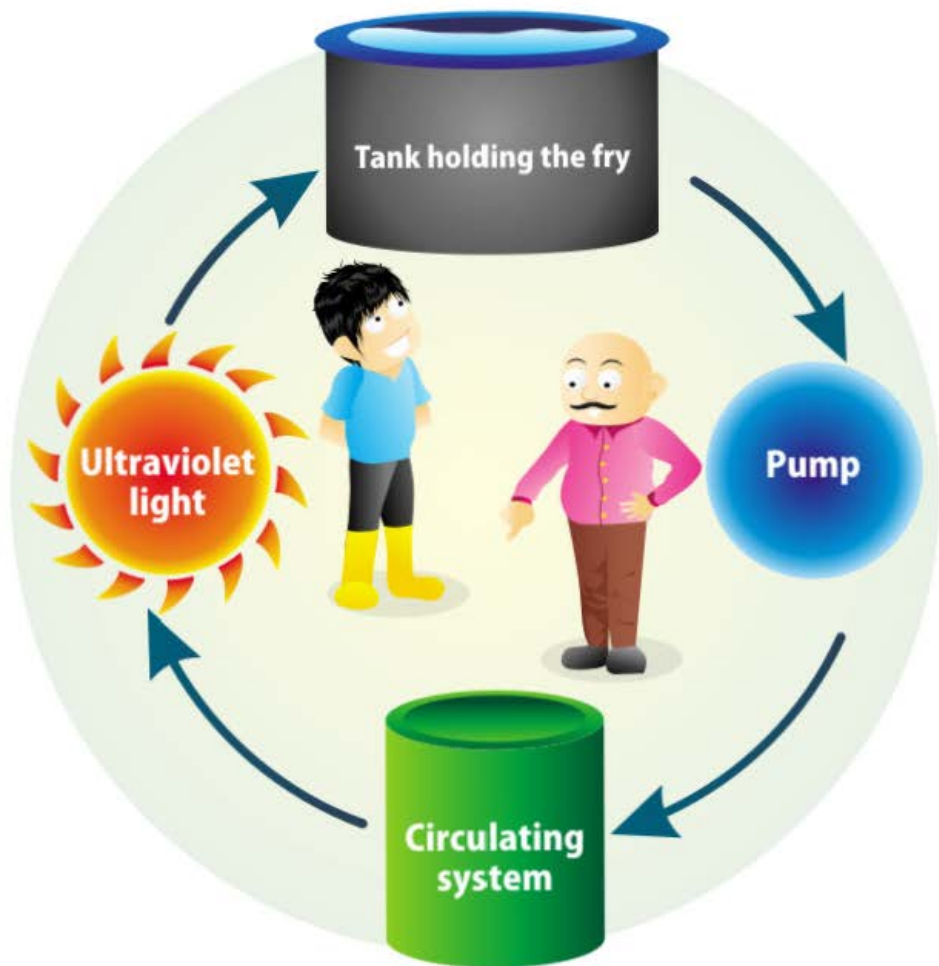


### 3.6 Enclosed nursery system

- An enclosed circulating system can keep the fry and the natural water bodies apart to minimise disease attacks and improve survival rate. This kind of system usually circulates and filters seawater or freshwater with filter foam, sand, activated charcoal and biospheres. Filtered water is disinfected by an ultraviolet C radiation (UVC) lamp (wavelength range: 100 - 245nm). The filtering materials should be cleaned every week and replaced every month.









## 4 Routine Fry Rearing Practices

Good rearing practices can minimise kills caused by unfavourable environment or weather changes. It is a rule of thumb for optimising yield and effectiveness. The following are important daily management measures for rearing fry. Please refer to “Good Aquaculture Practices Series 2 Environmental Management of Mariculture” and “Good Aquaculture Practices Series 3 Environmental Management of Pond Fish Culture” booklets for details.



## 4.1 Fish farm and fishpond inspection

- It is advisable to observe fry activities and water quality variations three times daily (morning, noon and evening) so that appropriate measures can be taken promptly should any problem arise. Such inspection can also help you determine the right fish feed and fertiliser doses.



## 4.2 Water quality management

- Maintain an adequate level of dissolved oxygen and water transparency. When dissolved oxygen falls below 3mg/L, turn on the aerator promptly. In the case of pond fish culture, fill the pond half full initially, then top up every three days or within a week thereafter to boost dissolved oxygen, improve water quality and provide more space for the fish stock. While filling up the pond with water, apply fertilisers and fish feed accordingly so the nutrients and phytoplankton in the water are consistently balanced.

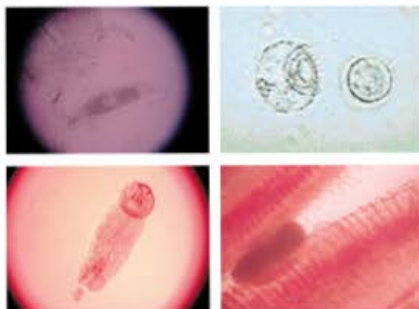
### Unable to adapt:

- Sudden environmental changes (such as anoxia due to sharp increase in phytoplankton)



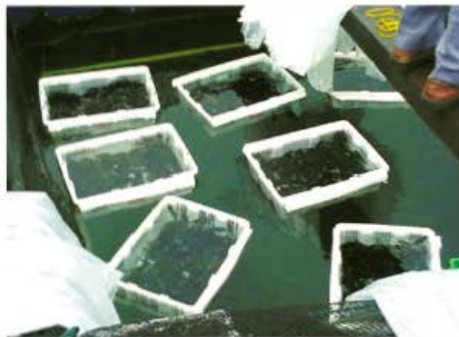
### 4.3 Prevention and treatment of fish diseases

- Fry are most vulnerable to parasitic infection and saprolegniasis. Thus, disease prevention is of utmost importance. When abnormalities, such as an isolated fish, darkening bodies, or slow / rapid movement of fish along the edges of pond or cage, are detected, find out the reasons immediately and take appropriate measures to stop fish diseases from spreading.



## 4.4 Timely reduction of stocking density

- Fry grow at different rates. It is advisable to reduce stocking density by rearing them in separate ponds or cages according to their sizes. This is an effective way to minimise diseases, enhance growth and improve survival rate of fry.



## 4.5 Maintenance of farm management records

- Keeping record of weather, quantities of feed and fertilizers, measures such as filling in and pumping out of water, as well as fry activities helps to identify correct solutions when problems arise.





Date	Feed Quantities (daily) (catty / kilogrammes)	Water Temperature	Level of Dissolved Oxygen (mg / Litre)	pH value	Mortality Rate	Others (such as disease treatment and no. of dead fish)

# 5

## Fry Health Inspection Programme

**New fry with pathogens may contaminate a fish farm and result in disease outbreaks and major fish kill, while harmful substances inside fry will give rise to food safety concerns as they pose health threats to consumers.**



- To reduce fish diseases and other risks caused by harmful substances, and to safeguard income from fish farming, fish farmers should obtain health certificates from fry suppliers and make sure all new fry are quarantined and disinfected after arrival. Fish farmers can also enlist in the AFCD's Fry Health Inspection Programme and submit samples to the department for free tests on harmful substances (e.g. heavy metals, malachite green) and pathogens before placing orders for new fry.




For programme details, please contact the AFCD's Aquaculture Fisheries Division (Pond culture : 2471 9142; Mariculture: 2150 7083).



## Technical Support

Fish farmers are welcome to telephone the AFCD for free information and technical advice:

Prevention and Treatment of Fish Diseases	:	2150 7083
Pond Fish Culture	:	2471 9142
Mariculture	:	2150 7081
Red Tide and Water Quality	:	2150 7085
Aquaculture Management	:	2873 8337



For further details of fry health management,  
contact the Aquaculture Fisheries Division of AFCD on  
2150 7083 or email us at [mailbox@afcd.gov.hk](mailto:mailbox@afcd.gov.hk)