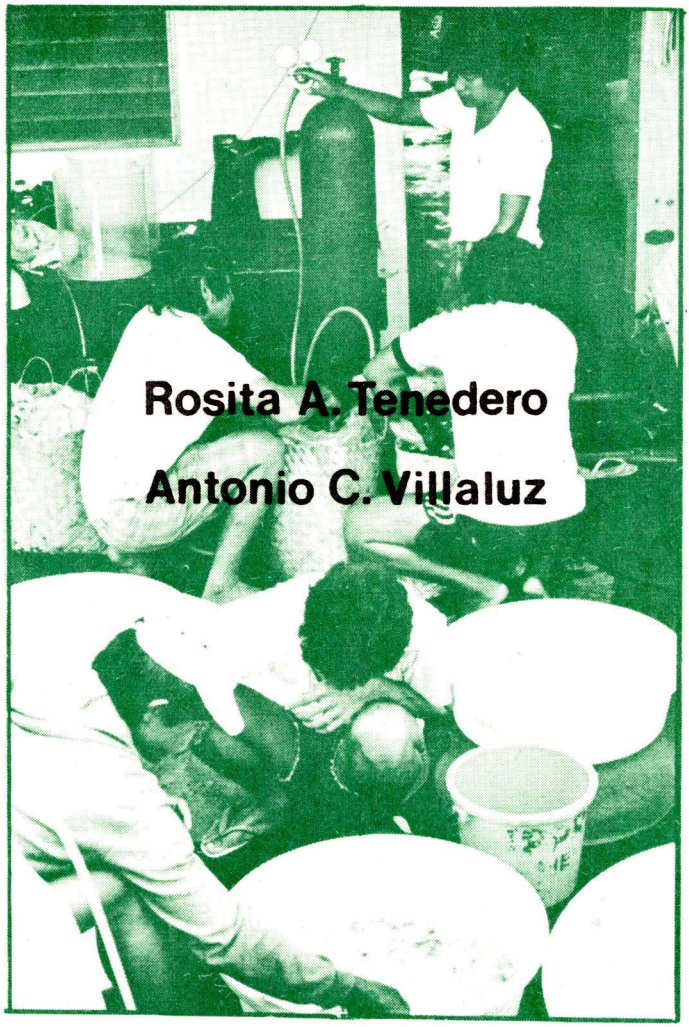
AQUACULTURE TECHNOLOGY Series 2 ISSN 0116-0044

HOW TO TRANSPORT AND ACCLIMATE PRAWN FRY



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Southeast Asian Fisheries Development Center
Tigbauan, Iloilo, Philippines
1985

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HOW TO TRANSPORT AND ACCLIMATE PRAWN FRY

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C O N T E N T S

FOREWORD

Prawn culture is a profitable industry. Demands for prawns both in the local and foreign markets are increasing. More than ever, the technical requisites of the industry have become more urgent. Responding to this need, SEAFDEC Aquaculture Department (AQD) has generated, verified, and refined appropriate technologies for increased prawn production.

AQUACULTURE TECHNOLOGY Series 2 is intended to aid fishfarmers in attaining higher production levels. The techniques it describes had been tested at AQD's experimental ponds and selected government and private cooperators' ponds. This extension module itself had been pre-tested among practitioners in Iloilo, Capiz, Aklan, Quezon, and Lanao del Norte. The comments and suggestions of pond owners and those of the Department's research specialists have been incorporated in this module.

The publication of this extension material was made possible through the combined efforts of Ms. Rosita A. Tenedero, one of the Department's extension specialists, and Antonio C. Villaluz, a senior researcher and Project Leader of the AQD Prawn Hatchery. This is intended as a contribution to the development of the prawn industry in the region particularly the Philippines.

ALFREDO C. SANTIAGO, JR., Ph.D.
Chief
SEAFDEC Aquaculture Department

1 April 1985

PREFACE

The importance of prawn culture has been recognized throughout the world and the demand for this commodity in the world market is growing everyday. The Philippine is one of the pioneer countries engaged in research and development of prawn culture. Although production of prawns has been considerably increased during the last decade, the industry still suffers from several complaints — the most important of which being the scarcity of prawn fry for the grow-out ponds. It has been possible to produce seed of prawns artificially and rear these in hatcheries in addition to collection of fry from the natural waters. However, very often, heavy mortality occurs during their transport from the natural collection centers or hatcheries to the nurseries and also immediately after their introduction into the ponds. This is because prawn fry are very sensitive to sudden change of environmental conditions. SEAFDEC AQD researchers have been endeavoring for the past several years to improve the technique of fry transport. They have also realized the necessity for proper acclimation of the tender prawn fry before introducing them to the pond environment.

In this Aquaculture Technology series, an attempt has been made by the authors to disseminate the verified results of research on the improved methods of fry transport and acclimation in a very simple language and comprehensive manner for the easy understanding of prawn farmers. The basic methods and procedural steps are carefully illustrated as instructional guide for the readers.

At the back of this module, an evaluation sheet has been incorporated to assess the reader's understanding of the technology discussed here, based on the learning objectives defined on page 1. The questionnaire also serves as a feedback mechanism for the readers, thus, it should be filled out properly and be sent back at the earliest time possible to the Aquaculture Department.

It is hoped that this module will be helpful not only to prawn farmers and cooperators engaged in the industry, but also to students of fisheries, extension workers and others interested in the culture of this valuable commodity.

H. CHAUDHURI, Ph.D.
Senior Technical Adviser
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1 April 1985

HOW TO TRANSPORT AND ACCLIMATE PRAWN FRY

INTRODUCTION

The intensification, expansion and diversification of the prawn industry made prawn fry supply the top priority among prawn growers. A number of prawn hatcheries have been established all over the country, and fry grounds have been exploited to cope with the increasing demand for prawn fry. As a result, price of fry has gone up, thus affecting the total operating cost for prawn culture. To ensure high survival of fry from the wild or from the hatchery, they should be carefully handled before they are stocked in ponds.

Rationale

Fry are sensitive to sudden changes of environment especially to temperature and salinity. To minimize stress, reduce mortality and unnecessary expense, you should exercise great care in transporting and acclimating fry before releasing them in the ponds. The correct procedures and techniques both for short and long duration transport are discussed in this booklet.

Learning Objectives

After reading this module, you should be able to transport prawn fry with ease and confidence. Specifically, you should be able to:

1. estimate fry density by the comparison method;
2. lower temperature of transport water;
3. pack fry in plastic bags;
4. transport fry both for short and long duration transport; and
5. observe the prescribed guidelines in handling wet shipment when transporting by commercial plane.

TRANSPORT OF FRY

In transporting prawn fry from the hatchery or collecting site to your pond, consider the (1) distance or travel time (2) fry size and density in the container, and (3) kind of transport facility used.

Travel time should be your main consideration. Some basic considerations in short and long duration transport are discussed here.

1. Short Duration Transport

For short periods from 1 to 6 hours, the fry may be transported in oxygenated plastic bags packed in "pandan" bag made of palm leaves; or in a hydro-tank.

1.1 *Transporting in Oxygenated Plastic Bags*

a. Wash the plastic bag with clean, fresh seawater to remove chemicals or foreign matter. A 50 x 90 cm size double-seamed polyethylene bag is commonly used (Fig. 1).

Fig. 1. A double-seamed polyethelene bag.

b. Double-line by inserting one plastic bag into another as a precaution against any leakage and to ensure safety of fry transport (Fig. 2).

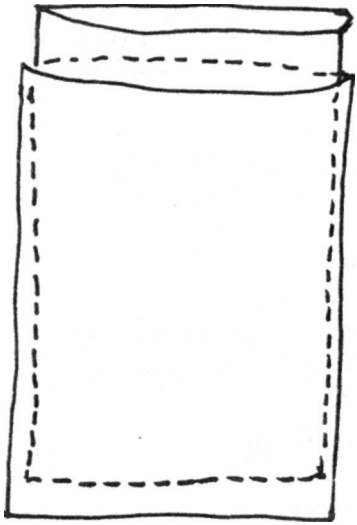

Fig. 2. Insert one plastic bag into another.

c. Count 5,000 fry (15- to 20-day-old postlarvae) in a clean, white basin (about 60 cm diameter) filled with 6-8 liters seawater (Fig. 3). For older fry such as 30-day-old postlarvae, count only 2,000 to 4,000 or an average of 3,000/basin.

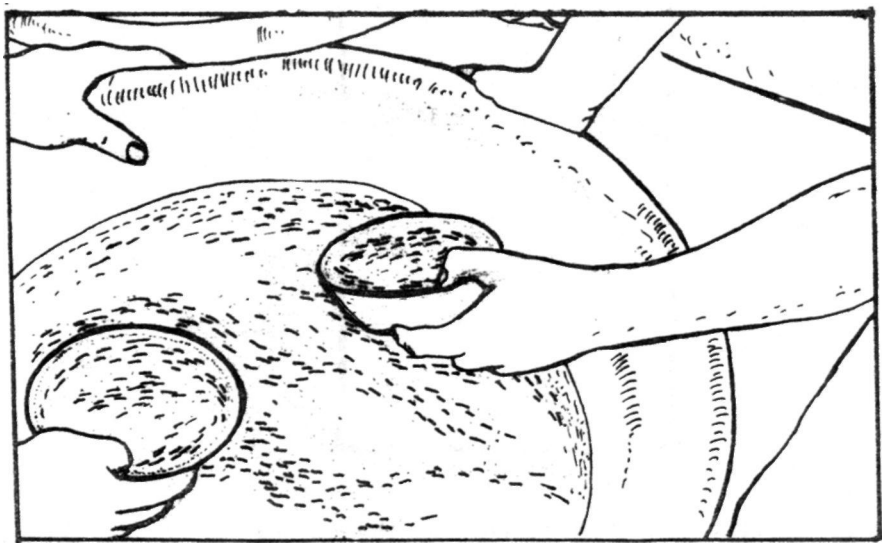

Fig. 3. Counting of fry.

TRANSPORT OF FRY

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Fig. 1. A double-seamed polyethelene bag.

g. Hold the first-layer bag just above the water level and squeeze out the air from inside the bag.

h. Inflate the bag with oxygen gas until about 2/3 of the bag (including the transport water and fry level) is expanded but allowing enough room for twisting and for tying the bag (Fig. 6).

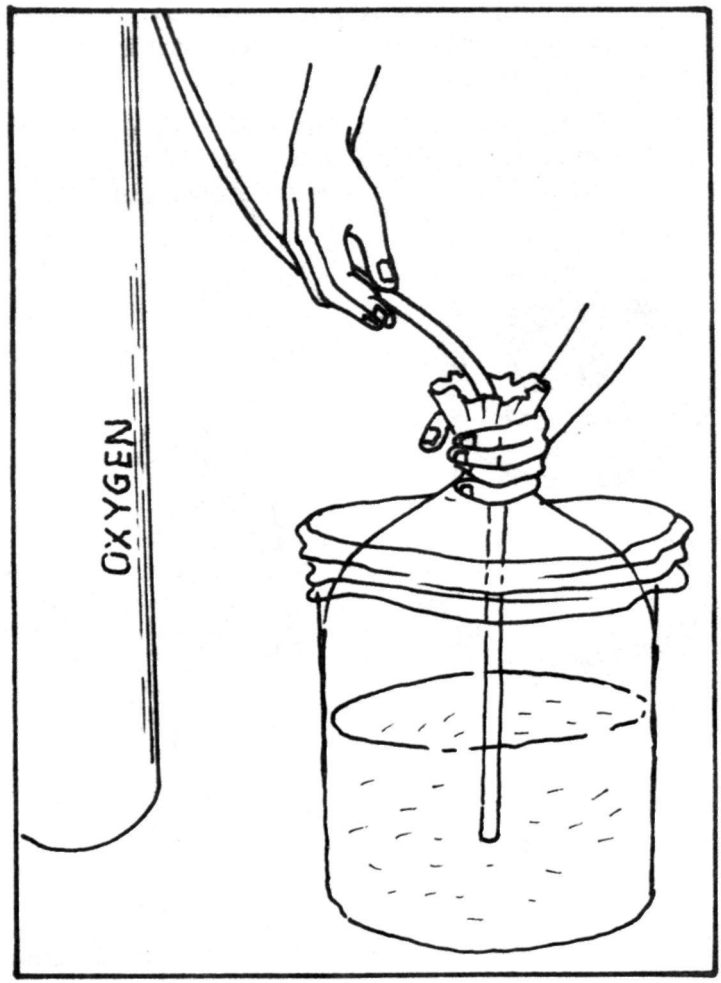


Fig. 6. Oxygenating the transport water in plastic bag.

i. Close the first-layer bag quickly to trap the oxygen by twisting the mouth of the bag and tying it securely with 2 to 3 strong rubber bands (Fig. 7).

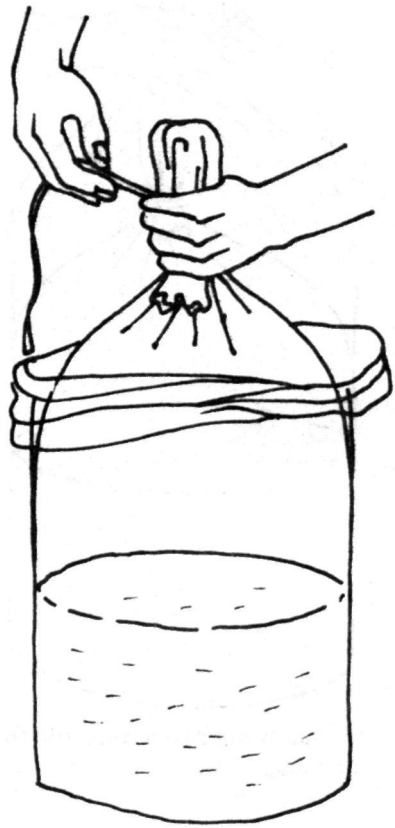


Fig. 7. Twist and tie securely the first layer bag.

j. After tying the first-layer bag, twist the second-layer bag and tie with 2 to 3 rubber bands (Fig. 8).

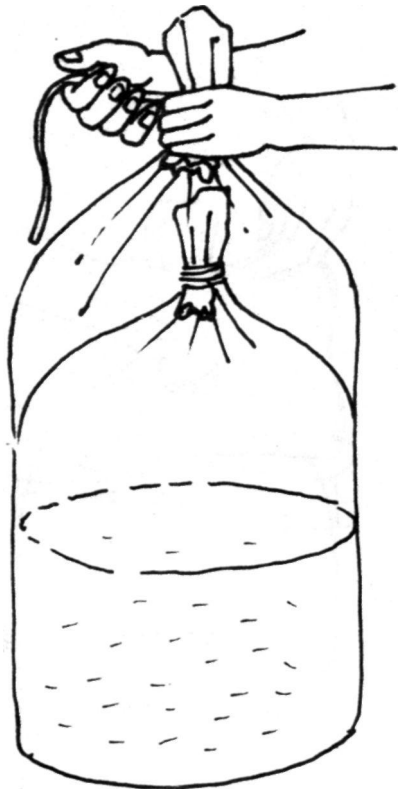


Fig. 8. Repeat tying procedure for the second layer bag.

k. Put the plastic bag with fry into a "pandan" bag with the latter's half end folded inward to facilitate packing (Fig. 9).

Fig. 9. Pack the plastic bag with fry in a *pandan* bag with end folded inwardly.

Unfold the "pandan" bag into normal position after packing the fry (Fig. 10). You are now ready to transport the fry.

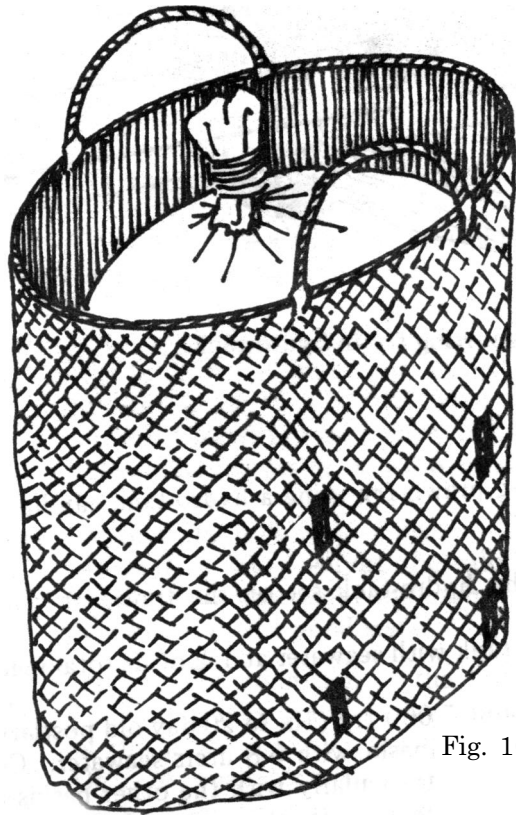


Fig. 10. Fry ready for transport.

1.2 *Transporting in Hydro-Tank*

The use of hydro-tank in transporting fry is gaining interest among fishfarmers because it can accommodate fry at a higher density (Fig. 11). A hydro-tank is available at any water tank trading enterprise. For transporting fry, a hydro-tank made of fiberglass material is recommended. Provide the tank with battery-operated aerators or use oxygen gas from pressure tank. Oxygenating the tank is expensive but gives excellent survival.

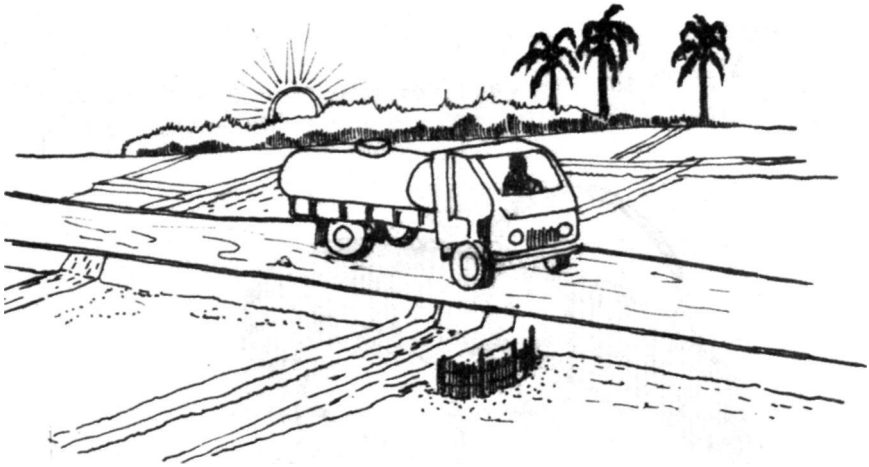


Fig. 11. Transporting fry in hydro-tank.

Transporting prawn fry using a hydro-tank can be done this way:

1. Wash the hydro-tank set on the transport vehicle.

2. Fill the tank with seawater at 1/2 of its total volume.

3. Head count 5,000 fry (15- to 20-day-old postlarvae) into a white basin with 6-8 liters seawater. Compare fry density ocularly with the other basins and adjust until density is approximately the same.

4. Pour the prawn fry gently into the tank until the density reaches 200-300 fry per liter. A 250-liter capacity hydro-tank filled with 125 liters water (1/2 of total volume) should carry 25,000-37,500 fry. For easy loading, transfer fry from the basin to a plastic pail. The pail serves as container for carrying fry into the tank.

5. Install at least one unit portable battery-operated aerator (12 volts) in the tank.

6. Cover the tank.

7. Transport fry to the fishpond site. It is advisable to transport fry in the early morning or late afternoon while the temperature is low.

2. Long Duration Transport

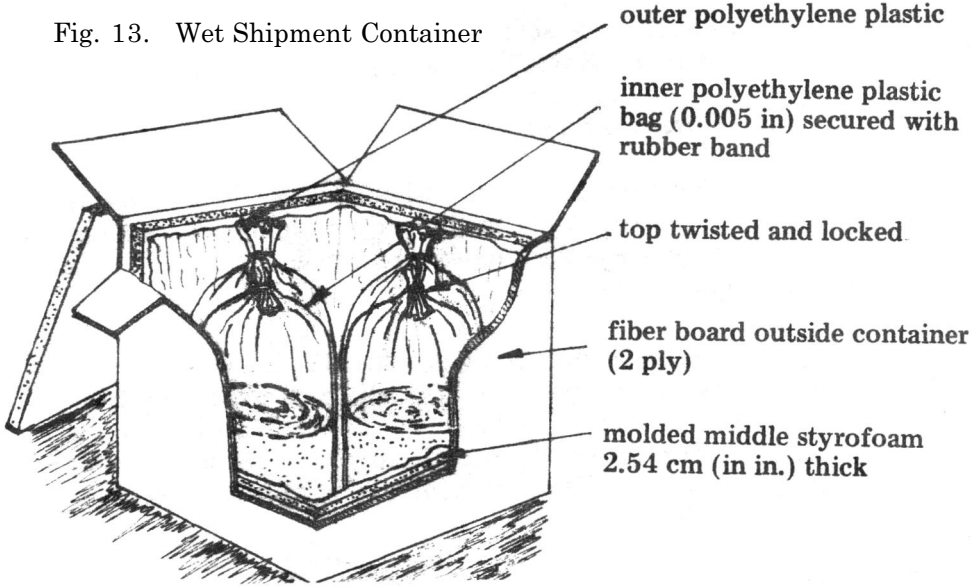
For transport duration from 7 to 12 hours or more by plane or other means, pack fry in plastic bags and put in styrofoam boxes. Follow procedures (b) to (k) of short duration transport. For longer duration transport, instead of using "pandan" bags, pack two bags in one styrofoam box lined with plastic (Fig. 12).

Fig. 12. Pack plastic bags in styrofoam boxes with ice to maintain the low temperature of transport water.

To keep water temperature in the plastic bag low during transport, put 0.5 kg of ice packed in double-lined small plastic bags at the side of the bags inside the box hull.

Pack the styrofoam boxes in cartons according to guidelines prescribed for carriage of wet shipment (Fig. 13), time and weight limits, and inspection procedures of the carrier. Those of the Philippine Airlines Domestic flights, are given on p. 12.

Fig. 13. Wet Shipment Container



Maximum gross wt.: 20 kilograms
Maximum container dimensions:

Length: 55.42 cm (23 in)
Width: 43.18 cm (17 in)
Height: 43.18 cm (17 in)

Payment:

6 — 5 kg	—	P4.39/kg
51 — 250 kg	—	3.89/kg
251 — 1000 kg	—	3.46/kg

Volumetric — L X W X H in cm ÷ 3,500 = wt.
Volumetric charge — .60/P1.00

(From Philippine Airlines as of June 1, 1984, Iloilo City)

Experienced fry dealers have been able to increase fry density from 10,000 to 15,000 per bag of 15- to 20-day-old postlarvae in the same (6-8 liters) volume of water, with the same packing materials and procedure just described. But this needs precise and careful planning especially for connecting flights. Fry dealers usually charter private planes when transporting a large volume of fry.

REGULATIONS OF THE PHILIPPINE AIRLINES REGARDING ACCEPTANCE AND HANDLING OF WET SHIPMENT

(As of June 1984, Iloilo City)

Origin Station

A. *STATION HEAD*

The branch manager or freight sales officer (FSO) will advise the potential shipper about freight, shipment allocation and loading priority of wet shipments on PAL domestic flights.

B. *SHIPPER*

1. Coordinate with the branch manager or FSO regarding your plan to send wet shipment (WS) on any Philippine Airlines Domestic flight (PALDF).

2. Present to the Aviation Security Command (AVSECOM) the WS together with the request documents, e.g. shipping permit, auxiliary invoice and a duly accomplished shipper certificate of contents (F-0773). These required documents are acquired from any nearest regional office of the Bureau of Fisheries and Aquatic Resources (BFAR) or from its representatives detailed at the airport terminal.

Pursuant to the fishery bureau's 1983 *Rules and Regulations Governing the Payment of Fees and Other Charges for Shells and Other Aquatic Products or Animals* (FAO No. 145, S 1983), the transport rate for prawn fry is P2.00 per pot or 3,000 fry.

3. Present the prescribed container for inspection by PAL at the cargo section not later than two hours before the expected time of departure (ETD).

4. Be sure that the coordination of the shipment when brought to the cargo section should allow unconstrained inspection of the container and the packing documents by the cargo clerk.

5. After the leak test, present also required packing components for inspection by the cargo clerk.

6. Using the inspected and accepted container and packing materials, proceed with the packing of the shipment in the presence of the cargo clerk.

7. Close and seal the container also in the presence of the cargo clerk.

8. Remain at the airport until flight departure to anticipate the possibility that the wet shipment is off-loaded in the event of leakage before or during loading.

ACCLIMATION OF FRY

Prawn fry are sensitive to any sudden change in their surroundings. Sudden change of water conditions such as from the transport water in the bag to pond water should therefore be avoided. To prevent this sudden change, it is necessary to acclimate the fry to pond conditions before stocking.

Upon arrival at the final destination, the prawn fry, regardless of source, should be acclimated to the salinity and temperature of the water before they are released into the ponds. The method of acclimation depends on how the fry is transported such as in oxygenated plastic bag or in aerated tanks.

1. Acclimating Fry Transported in Oxygenated Plastic Bag

Prawn fry transported in oxygenated plastic bags can be acclimated in the following manner:

First, determine the temperature and salinity readings of both the transport water and the pond water. Here's how to do it:

a. Dip a thermometer into the pond water for about 5-10 minutes (Fig. 14). Get the highest alcohol level while the thermometer is under the water. It is expressed in degree celsius (°C). Record your reading.

Fig. 14. Take the temperature reading of pond water.

Compare the pond water temperature to that of the transport water (Fig. 15).

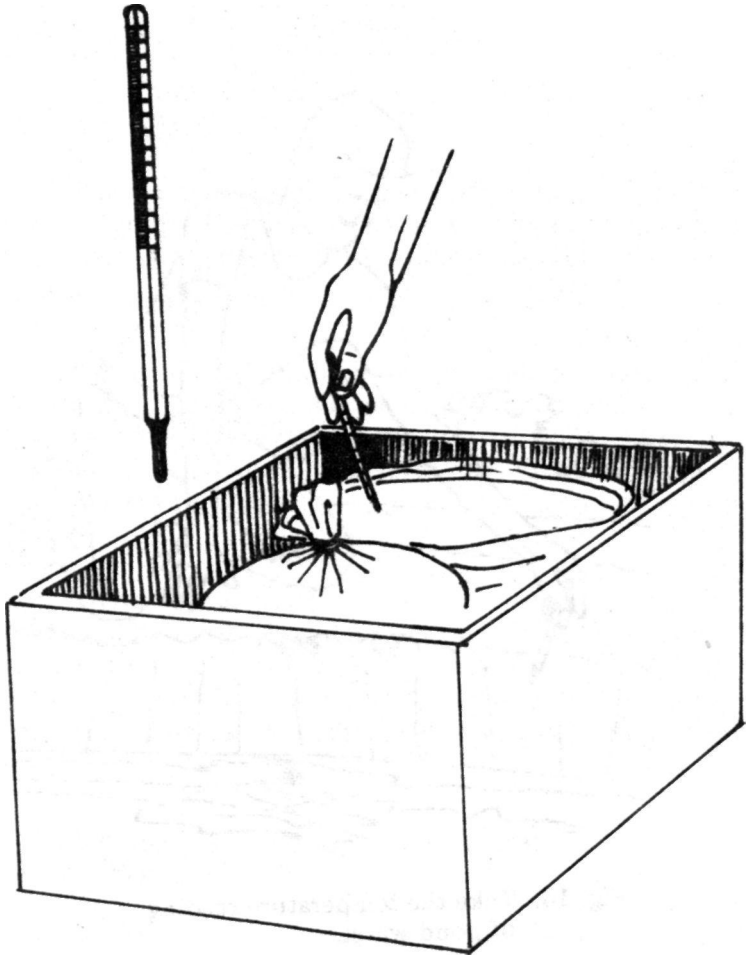


Fig. 15. Take also the temperature reading of transport water in plastic bag.

b. The salinity of water can be measured directly with a refractometer or represented by specific gravity. Take the salinity of the transport water and of the pond water with a refractometer (Fig. 16) or a hydrometer (Fig. 17), respectively. Record your reading.

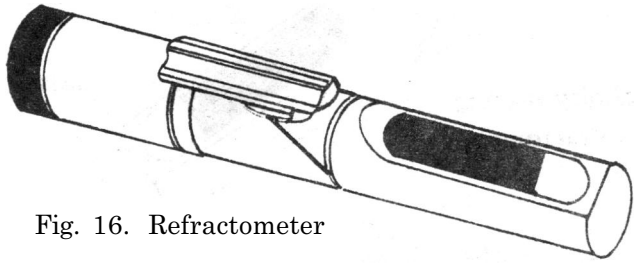


Fig. 16. Refractometer

Fig. 17. Hydrometer

How to determine the salinity of sea water

Get the salinity reading by placing the coverplate over the body of the refractometer and, with the use of a medicine dropper, place a small amount of sample water into the measuring prism. Hold the refractometer and keep the coverplate in contact with the prism (Fig. 18).

Point the instrument towards the source of light. Make the reading at the point where the dividing line between light and dark crosses. (Fig. 19).

How to determine the specific gravity of seawater

The specific gravity of seawater can be approximately determined with the use of a hydrometer. This is how to get the reading:

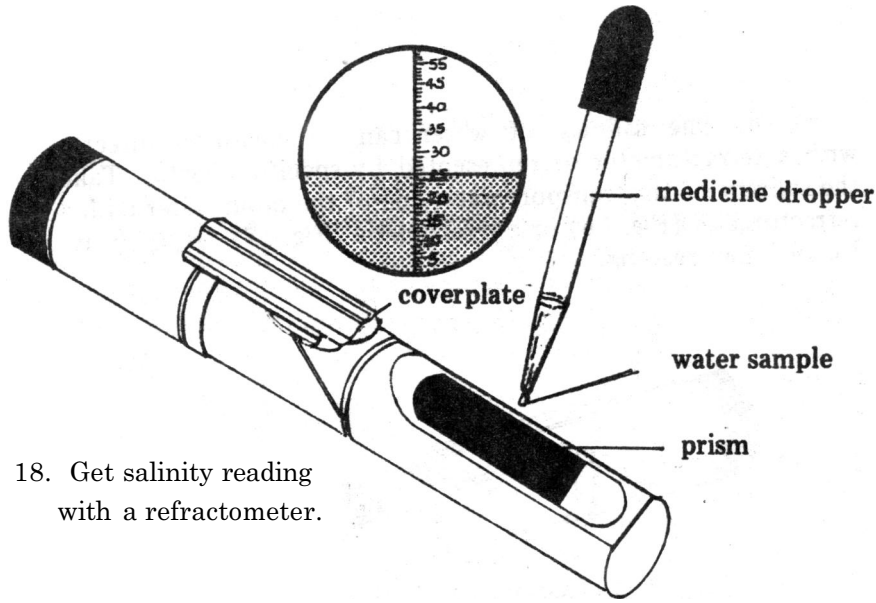


Fig. 18. Get salinity reading with a refractometer.

- Fill the cylinder with sample water (transport water or pond water);

a Insert the hydrometer into the cylinder;

- Get the specific gravity reading of the hydrometer at the lowest level or miniscus of the sample water as shown in Fig. 19.

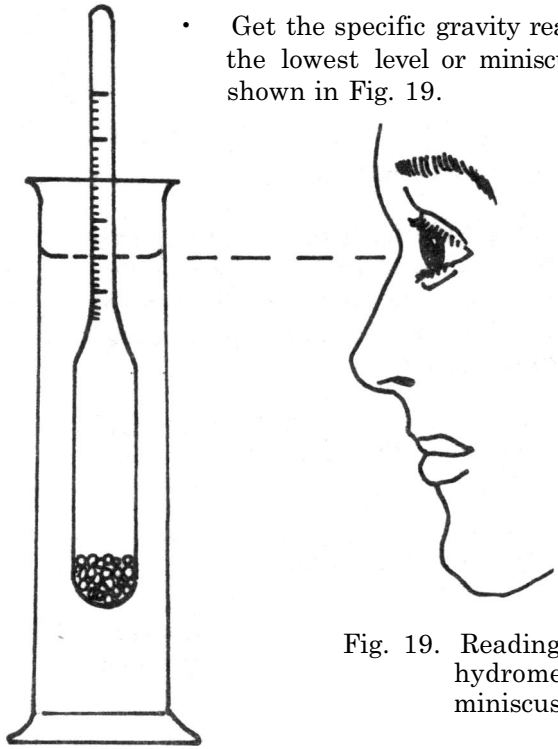


Fig. 19. Reading the specific gravity of the hydrometer at the lowest water miniscus

c. After taking the salinity and temperature levels, allow the plastic bags to float in the pond when there is a difference of more than 2°C between the two temperature readings (Fig. 20). Float the bags for about 30 minutes or more until the temperature in the plastic bag approximates that of the pond water.

Fig. 20. Float the bags in pond water.

If,upon arrival at the pond site, the temperature of the transport water is the same as that of the pond, open the bag immediately and adjust only the salinity level.

d. Adjust the salinity of the transport water little by little in the following manner:

- After adjusting the temperature, open the bag and add pond water gradually into the bag until the salinity equals that of the pond water. You can confirm this with your refractometer or hydrometer. Release the fry gently into the pond.

- Another method is to transfer the fry to plastic basins (Fig. 21). Adjust the salinity by gradually adding pond water into the basins until the salinity equals that of the pond water.

  Observe the condition of the fry. Fry that are healthy usually swim actively against the movement of the water in the basin when one whirls it around. Dead or weak fry concentrate at the center of the basin and do not move.

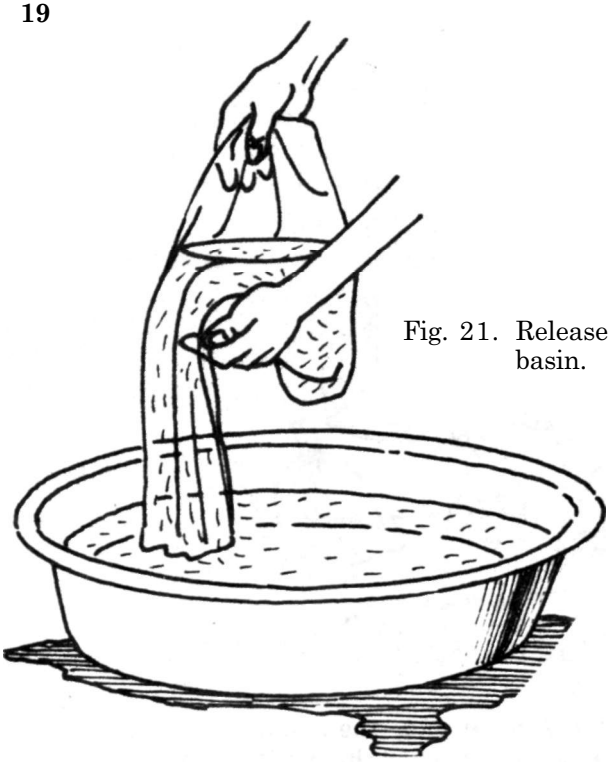


Fig. 21. Release fry into a plastic basin.

After equalizing the salinity levels, stock the fry in the pond. For convenience, especially when the ponds are far from the acclimation area, transfer the fry gently into a pail. The pail serves as a container to transport the fry from the acclimation area to the pond. Stock the fry into the pond by first dipping the pail in the water and then gently tilting it to let the contents flow out.

- Another way is to adjust the salinity of the transport water during packing. This is done when the stocked is known. Upon arrival in the pond site, adjust the temperature and immediately release the fry into the pond.

  There are times when transport is delayed so that the dissolved oxygen in the bag is mostly used up. This causes stress on the fry. When fry are stressed, they become weak and immobile. This can be remedied by immediately opening the plastic bag and releasing fry into a basin and then aerating it with portable battery-operated aerators, or oxygenating by using a rubber or plastic tubing from the

oxygen tank and letting oxygen flow directly into the water. Keep the fry in this condition for about 30 minutes to 1 hour until the fry recover and become active again.

Acclimating Fry Transported in Hydro-tank

Prawn fry transported in a hydro-tank may be acclimated this way:

a. Siphon about half of the volume of the transport water in the tank with the use of a plastic or rubber hose. Provide the hose with a strainer at the intake end to prevent fry from going with the water (Fig. 22). Gradually add pond water into the tank with the use of a pail until the salinity and temperature equal that of the pond. Scoop the fry from the tank by using a scoop net into a basin or pail filled with water from the hydro-tank. Release the fry into the pond.

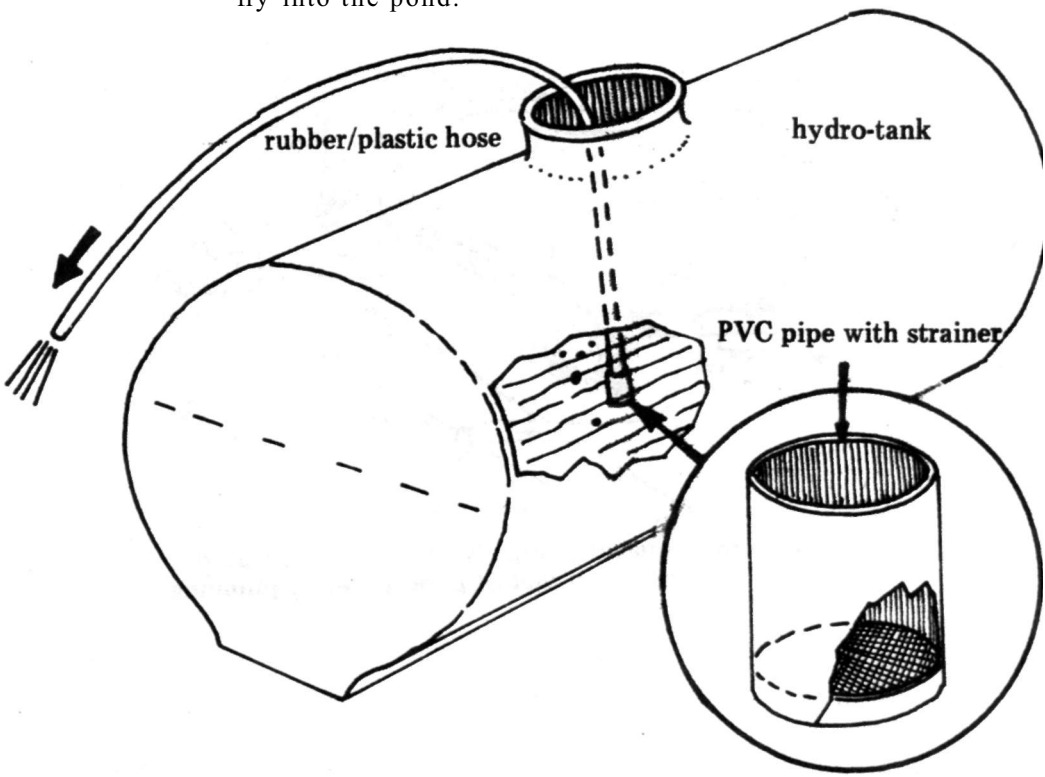


Fig. 22. Release fry from hydro-tank using plastic or rubber hose with strainer.

b. Release the water from the hydro-tank while adding pond water gradually until the salinity in the tank equals that of the pond (Fig. 23). Drain the fry from the tank into the pond using a drain pipe. The acclimation time needed is about 5 ppt salinity per hour dilution. The total acclimation time depends, however, on the salinity of pond water. Transfer the fry from the hydro-tank to a fiberglass tank or to clean, white plastic basins where they are held overnight (Fig. 24). Eight hundred to 1,000 fry at 21 days old (PL_{21}) can be placed in a basin. This may not need an aerator when held overnight only. After 6 hours, the salinity of the transport water is adjusted by taking out 1/2 of the volume of water in the basin but adding the same amount of pond water into the basin. This process is done repeatedly every 4 hours until the salinity of the basin water is equal to that of the pond water. Stock the fry the next morning.

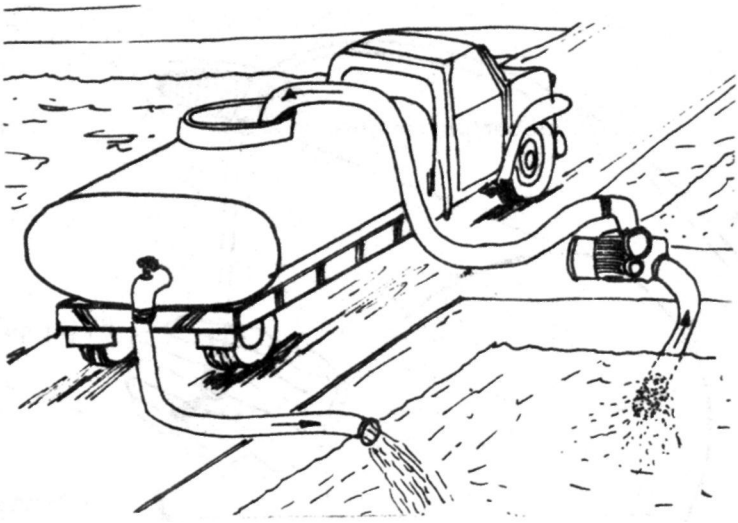


Fig. 23. Equalize gradually the salinity of transport water and that of pond water by pumping.

If a big fiberglass tank is used, put 20,000 to 25,000 fry/ton of water which should be aerated. Adjust the salinity of the transport water following the same procedure mentioned above. Fry may be held in basin or tank for a maximum of 12 hours only.

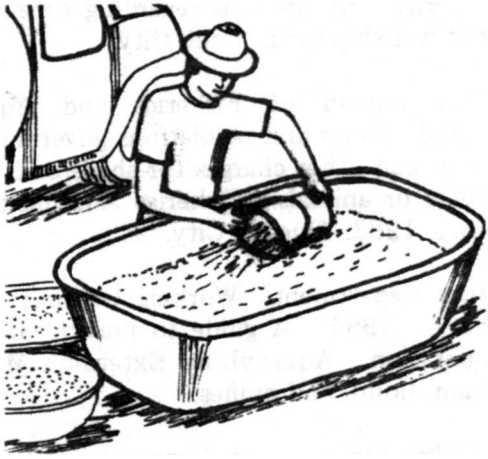


Fig. 24. Acclimate fry by transferring them from hydro-tank to a fiberglass tank or white plastic basins.

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