

# SANDFISH

## ATTRIBUTES

- Sandfish is an Echinoderm.
- There are more than 1000 species of sea cucumber known to exist.
- The sea cucumber *Holothuria scabra* has an elongated body with leathery skin whose color ranges from gray to black.
- They live in sandy-muddy substrate and feeds on organic matter which is mainly composed of mud or sand, bacteria and benthic algae.
- Males and females are not distinguishable unless they have spawned.
- At least 100 species are found in the Philippines, 25-30 species are commercially traded.
- They can be found throughout the shallow tropical waters of the Indo-Pacific region.



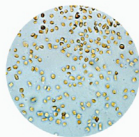
## WHY VENTURE INTO SEA CUCUMBER FARMING?

- Stock enhancement is one major reason of farming.
- Bech-de-mer, trepang or dried sea cucumbers are being exported to Asian markets due to its pharmaceutical, nutraceutical and culinary uses.
- It is being sold at price ranging from 1000 to 6000 pesos per kilogram.

# THE HATCHERY

## 1 NATURAL FOOD | Phytoplankton Culture

Phytoplankton species commonly cultured:  
*Chaetoceros gracilis*  
*Chaetoceros calcitrans*  
*Isochrysis galbana*  
*Navicula ramosissima*



### Mass culture of Microalgae

- Prepare 180 Liters UV filtered sea water in clean containers.
- Fertilize with: 200ml manusol, 200 ml Algafer and 200 ml sodium silicate.
- Pour 20L of inoculants into the fertilized sea water.
- Harvest cultured microalgae during its peak exponential growth when cells are of good quality which is 3 days after culturing.

## 2 BROODSTOCKS | Collection and Selection

Sea cucumber broodstock may be bought from local dealers or collected from the wild. It should weigh 200 to 500 grams. Broodstock should be healthy, undamaged and with no visible skin lesion.



### Management and Maintenance

- Sea cucumbers can be held in tanks, sea pens or ponds.
- The stocking density should be <math>< 500\text{g}/\text{m}^2</math>.
- Blended shrimp starter feed is used at 1-1.5g/m<sup>3</sup>.
- Broodstock held in pens, ponds or tanks for several months are easier to spawn than the ones taken directly from the wild.

## 3 SPAWNING | Induction Method

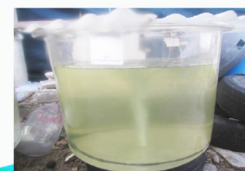
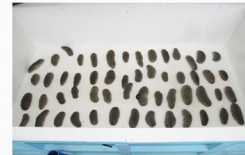
Spawning is usually done 3 to 2 days before full moon or new moon of the month. The hatchery uses the combined effect of dry treatment (dessication) and food shock technique using *Spirulina*.

### Dry Treatment

- Broodstock are placed in a tank without water and left to dry for 45 minutes.

### Spirulina Bath

- After dry treatment, the tank (or basin) is filled with sea water and broodstocks are immersed.
- Blended *Spirulina* powder (15 grams) is then added.
- Allow 45 minutes of bathing.





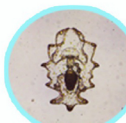
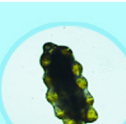


### Spawning & Egg Collection

- Broodstocks are allowed to spawn in tanks.
- Spawning usually takes an hour or more.
- Sperms appear whitish while eggs appear in orange.
- Collect eggs separately in a large container and sperms are added to fertilize them.
- Study eggs under a microscope to determine if fertilization has already occurred.

## 4 LARVAL REARING

Sandfish transforms into different stages as it develops. Below is a table showing the different stages and the appropriate management techniques to be applied during a specific larval stage.

Larval tanks with sand-filtered seawater and aeration system, and natural food are basic requirements in larval rearing.

No. of Days	Stage	Feeding	Water Management
0	 Fertilized egg	Non-feeding stage	No water exchange.
2-5	 Early Auricularia	After 2 days, larvae are fed with microalgae (Cgr-Cc) with concentration of 20,000 cells/ml.	50% water exchange is done every 2 days.
7-13	 Late Auricularia	Microalgal feed (Cgr-Cc) concentration is increased to 40,000 cells/ml	50% water exchange is done every 2 days.
13-18	 Doliolaria	Doliolaria larvae are non-feeding stage. However, feeding is maintained since larvae do not metamorphose evenly.	50% water exchange is done every 2 days. Tanks are provided with corrugated plastic plates smeared with <i>Spirulina</i> .
18-25	 Pentactula	Pentactula larvae are fed with Cgr-Cc combined feed.	50% water exchange is done every 2 days.
25-30	 Juvenile	Juvenile sandfish are fed with extracts of seaweeds such as <i>Sargassum</i> sp., <i>Gracilaria</i> sp. or <i>Laurencia</i> sp.	Juveniles are transferred into tanks with flow-through system where water is actively replenished.

# 5 JUVENILE REARING

When juveniles reach 1-2mm (23 - 35 days after fertilization) they are transferred from larval tanks to floating hapa nets. Growth and survival of juveniles are very density-dependent and thus grazing area is an important consideration in nursery rearing.

## Primary Nursery

- Juveniles are carefully harvested and detached from the larval tanks by siphoning them or individual picking.
- Stocking density: 1000 first stage juveniles per hapa net.
- Juveniles are regularly monitored.



## Secondary Nursery

- After a month in primary nursery, the juveniles are thinned-out and transferred in the secondary nursery hapa/ floating hapa.
- Stocking density: 500 second stage juveniles per hapa net.
- Floating hapas are regularly monitored and cleaned.

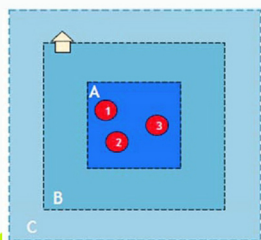


- From ocean nurseries/ floating hapa, juveniles (20 mm or >1g) are harvested after two months and transferred to sand-conditioned tanks in the hatchery.
- Muddy-sandy substrate collected from sites that supported wild sandfish population is used in sand conditioning.

## GROW-OUT CULTURE

After sand-conditioning, juveniles are transferred for grow-out culture in a sea ranch. Sea cucumbers are allowed to grow for several months until they reach at least 300 g for harvest.

The ranch has the following zones and dimensions as suggested by the UP MSI:



- Zone A is 50 x 50 m with 3 100 sq. m. circular monitoring pens.
- Zone B is 1-hectare nursery area. This is for sea cucumber monitoring only.
- Zone C is a 5-hectare buffer area. No-take area for sea cucumbers.

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This information is made for you by the



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NATIONAL MARINE FISHERIES RESEARCH  
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# SEA CUCUMBER CULTURE

Hatchery Techniques and Protocols of the Seed Production of the Sea Cucumber *Holothuria scabra* at GMFDC, Guiuan Eastern Samar.