

**JUNAGADH AGRICULTURAL UNIVERSITY**  
**RESEARCH RECOMMENDATIONS FOR FARMERS COMMUNITY**

**VII. FISHERIES SCIENCE**

Total 31 recommendations developed by Fisheries Science disciplines are described herein.

**Year: 2004-05**

**1. Breeding season of *Mugil seheli***

It is recommended to fisherman that gravid female (length: 375 mm & above) and male (length: 341 mm & above) of *Mugil seheli* are available in coastal seawater of Okha-Mandal region during its major breeding season late August to September and minor breeding season February. To maintain the population of *Mugil seheli* in coastal seawater of Okha-Mandal region, fishermen should not catch the fish during these periods.

**2. Oyster larvae feed**

It is advisable to keep 25 ppt water salinity and 3000 lux of light intensity for getting speedy multiplication of cells of *Isochrysis galbana* - the live feed for Oyster larvae.

(Fisheries Research Station, JAU, Okha)

**3. Fish drying**

For faster drying and better nutritional values of dried fish (particularly to get lower acid insoluble ash), drying of fish in solar dryer is advisable as compared to sun drying.

(College of Fisheries Science, JAU, Veraval and Department of PFE, CAET, JAU, Junagadh)

**Year: 2006-07**

**4. Mullet fish culture**

It is recommended to incorporate *Prosopis juliflora* pod powder @ 20 % alongwith fish meal - 10 %, soyabean meal – 40 %, wheat bran – 15 % and cotton seed oil cake - 15 % in pelleted feed for higher production as well as greater survival rate in mullet fish culture.

**5. Shrimp**

It is recommended to incorporate probiotics (*Lactobacillus acidophilus*) @ 20 per cent in feed during culture of shrimp for higher production.

(Fisheries Research Station, JAU, Okha)

**Year: 2007-08**

**6. Microbial population in water at fish landing centre of Veraval**

The fishermen of Veraval coast are advised not to use sea water of the coast for washing/cleaning of fish catch as the sea water of Market hall, Jetty and Diwadandi areas contains pathogenic bacteria beyond permissible limit (>20 *E. coli* /ml).

(College of Fisheries Science, JAU, Veraval)

**Year: 2009-10**

**7. Standardization of transportation method for the fresh water mussel (*Lamellidens corrianus*)**

It is recommended to fish farmers that freshwater mussel (*Lamellidens corrianus*) in the Saurashtra-Kutch region can be transported by road using wet gunny bags upto eight hours.

(College of Fisheries Science, JAU, Veraval)

**8. Artemia (*Artemia fransiscana*) cyst production in varying salinity**

It is recommended to salt paners and aquaculturist of coastal Saurashtra to use 160 ppt salinity of sea water as a rearing medium for Artemia (*Artemia fransiscana*) to obtain higher cyst production.



(Fisheries Research Station, JAU, Okha)

**Year: 2010-11**

**9. Population growth of rotifer *Brachionus rotundiformis* Tschugunoff in varying salinity**

Finfish/crustacean hatchery entrepreneurs are recommended to use 15 to 20 ppt salinity water at 25° C to achieve higher production of rotifer, *Brachionus rotundiformis* in 10 days.



#### 10. Study of location specific growth rate in marine alga *Kappaphycus alvarezii*

It is recommended that carrageenan yielding marine alga *Kappaphycus alvarezii* can be grown profitably in Okha mandal region and fivefold growth can be achieved in 45 days from January onwards.



(Fisheries Research Station, JAU, Okha)

**Year: 2011-12**

#### 11. Foulers and borers of pearl Oyster (*Pinctada fucata*) in around Sikka area

The aqua farmers of the Gulf of Kutch are advised to take appropriate control measures as the Pearl Oysters has been found to be infested by the foulers and borers such as sponges like *Cliona vastifica*, *Cliona carpenteri*, *Cliona celata*, Coelenterate like Bryozoans and Hydroids, crustaceans like copepod, *Balanus amphrite*, pea crab, bivalves like *Crassostrea*, animals of minor phyla like isopod, amphipod and tunicates like *Ascidians* sp. and annelids like Tubicolous and Serpulid worms.

(Fisheries Research Station, JAU, Sikka)

**Year: 2012-13**

#### 12. Survey for cultivable brackish water fish seeds along coast of Okha mandal to Harshad creek

The fish farmers of Saurashtra are recommended to collect the fry of cultivable mullet species *Mugill cephalus* are available abundantly, during February at Rupen and Harshad creeks; *Mugill seheli* during October-November at Khatumba and *Mugill parsia* during August-September at Rupen and Harshad creeks.

(Fisheries Research Station, JAU, Okha)

**Year: 2013-14**

#### 13. Evaluation of stocking density of carp fry in rearing pond

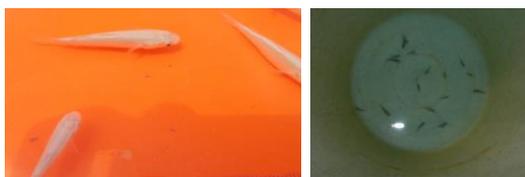
Fish farmers of Saurashtra region are recommended to stock rohu fry @1.00 lakh per hectare in rearing ponds for obtaining better growth and survival rate.



(College of Fisheries Science, JAU, Veraval)

#### 14. Effect of different levels of protein diet on the growth and survival of *Mugil cephalus* (Linnaeus) fry

Fish farmers of Saurashtra are recommended to feed gray mullet *Mugil cephalus* fry reared in seawater with 35% protein incorporated diet in first 45 days for obtaining higher growth and survival.



(Fisheries Research Station, JAU, Okha)

#### 15. Effect of different salinities on density of *Chaetoceros calcitrans*

Hatchery owners of Saurashtra region are recommended to use 30 PPT saline water to grow *Chaetoceros calcitrans* for higher yield.

## 16. Effect of monospecies and mixed species' diet on growth and survival of pearl oyster (*Pinctada fucata*)

Hatchery entrepreneurs of Saurashtra region are recommended to use 50% *Isochrysis galbana* and 50% *Chaetoceros calcitrans* as a feed for pearl oyster rearing for better growth and profit.



(Fisheries Research Station, JAU, Sikka)

Year: 2014-15

## 17. Growth, mortality and stock assessment of Soldier cat fish *Osteogeneiosus militaris* of Veraval coast

The present level of fishing of the Soldier cat fish confirmed that the stock is over exploited in Veraval. Hence, it is recommended to fishermen of Veraval not to increase the fishing efforts.



## 18. Study the effect of some natural cryoprotectants on quality of Japanese threadfin breams (*Nemipterus japonicus*) surimi during frozen storage

Surimi processors and exporters are recommended to use 1 % shrimp chitosan as natural cryoprotectant in Japanese threadfin bream surimi to get better gel strength and good water holding capacity instead of commercially used cryoprotectants (sugar, sorbitol, polyphosphate) upto 240 days under frozen storage at  $-18^{\circ}\text{C}$ .

(College of Fisheries Science, JAU, Veraval)

## 19. Effect of salinity on survival rate of *Penaeus monodon* larvae

It is recommended to hatchery entrepreneurs to use 15 ppt salinity water for larval (zoea and mysis) rearing and 20 ppt salinity water for post-larval (PL1 to PL20) rearing of *Penaeus monodon* for higher survival.

(Fisheries Research Station, JAU, Okha)

Year: 2015-16

## 20. Study of density dependent growth and survival of *Macrobrachium rosenbergii* (scampi)

Fish farmers are recommended to stock freshwater prawn *Macrobrachium rosenbergii* (Scampi) seeds @ 20,000 per hectare in grow-out ponds for obtaining better growth, survival rate and economic returns.

(Inland Fisheries Research Station, JAU, Junagadh)

## 21. Aspects of biology and fishery of *Scylla serrata* and *Portunus pelagicus* in and around Sikka

Fishermen community engaged in crab fishing are advised to avoid capture of berried female crabs having orange, greenish, brownish or blackish eggs for sustainable crab resource.

(Fisheries Research Station, JAU, Sikka)

Year: 2016-17

## 22. Effects of Pro-biotics on survival, growth and biochemical changes in *Labeo rohita* fry

Fish farmers are recommended to incorporate three Probiotics *Lactobacillus subtilis* ( $15 \times 10^7$  cfu/g), *Bacillus subtilis* ( $10 \times 10^7$  cfu/g) and *Saccharomyces cerevisiae* ( $10 \times 10^7$  cfu/g) in the ratio of 4:3:4 @ 3 % in fish feed to obtain higher growth, nutritive value and survival rate of *Labeo rohita* in rearing pond.



(Inland Fisheries Research Station, JAU, Junagadh)

### 23. Effect of dressing on quality and shelf life of dried bombay duck (*Harpodon nehereus*) during storage

It is recommended to fish processors that removal of gill and gut in bombay duck (*Harpodon nehereus*) before sun drying may be adopted for better quality and storage period up to six months.



(Department of Fish Processing Tech., College of Fisheries Sci., JAU, Veraval)

### 24. Effects of different salinities on growth and survival of juvenile Pacific white shrimp, *Litopenaeus vannamei* (Boone, 1931)

Shrimp farmers are recommended to use 30 ppt salinity water or select areas having such salinity water for higher growth and survival of shrimp *Litopenaeus vannamei*.



### 25. Effects of gamma irradiation on the quality of sun-dried croaker (*Johnius dussumieri*)

The dry fish processors/exporters are recommended to apply dose of 5 kGy gamma irradiation to dry salted croaker (*Johnius dussumieri*) fish for better quality and nine months shelf-life.



(Fisheries Research Station, JAU, Okha)

### 26. Effect of bottom sediments on moulting to *Fenneropenaeus merguensis* in circular cement tank

Shrimp farmers are recommended to culture *Fenneropenaeus merguensis* (Banana shrimp) with pond bottom of sea sand + mud (50:50) mixture of 6 inch sediment thickness, for better growth and survival rate.



(Fisheries Research & Training Centre, JAU, Mahuva)

**Year: 2017-18**

### 27. Effects of hurdle technology on biochemical, microbiological, and sensory quality of frozen cut crabs, *Portunus pelagicus*

Frozen cut crabs processors are recommended to apply hurdle technique of pasteurization process at 85 °C for 10 minutes prior to freezing of cut crabs at -40 °C for reduction of bacterial load, lowering drip loss, improvement of sensory quality attributes and shelf life expansion up-to 210 days under frozen storage at  $-18 \pm 2$  °C.

(College of Fisheries Science, JAU, Veraval)

### 28. Effect of stocking density on growth and survival of juvenile Pacific white shrimp, *Litopenaeus vannamei* (Boone, 1931)

The brackish water shrimp growing farmers are recommended to stock *Litopenaeus vannamei* shrimp seeds @ 25 pc/m<sup>2</sup> to obtain better survival, growth and economical return.



**29. Effect of Aloe vera treatment on quality parameters of Indian mackerel (*Rastrelliger kanagurta*, Cuvier-1816) during chill storage**

The fisherman/suppliers are recommended to give 20 % *Aloe vera* gel extract dip treatment for 30 minutes before chill storage of Indian mackerel (*Rastrelliger kanagurta*) for better quality up to 15 days shelf-life.



(Fisheries Research Station, JAU, Okha)

**Year: 2018-19**

**30. Utilization of duckweed (*Lemna minor*) meal as partial supplementation in the diet of *Catla catla* fry**

Fish Farmers are recommended to incorporate 15 % of duckweed (*Lemna minor*) leaf meal in the feed of *Catla catla* to obtain better growth rate, survival rate and economic return in freshwater rearing pond.

(College of Fisheries Science, JAU, Veraval)

**Year: 2019-20**

**31. Effect of shrimp (*Litopenaeus vannamei*) pond sludge on growth of Tilapia (*Oreochromis mosambicus*) in cemented circular tank**

Fish farmers culturing Tilapia (*Oreochromis mosambicus*) are recommended to utilize dried shrimp sludge as feed @ 10 % of fish body weight along with 5 % self-formulated shrimp feed (SFSF) of 30 % protein content to obtain better growth and survival rate.



(Fisheries Research and Training Center, JAU, Mahuva)