

JUNAGADH AGRICULTURAL UNIVERSITY

RESEARCH RECOMMENDATIONS FOR SCIENTIFIC COMMUNITY

VII. FISHERIES SCIENCE

Total 27 scientific recommendations developed by fisheries science disciplines are described below.

Year: 2005-06

1. Heavy metal Sea

The sea-water surrounding ship breaking yard of *Alang* in Bhavnagar district has been found contaminated with trace and heavy metals viz., Fe, Mn, Zn, Cu, Cd, Co, Ni, Cr and Pb due to ship breaking activities. The contamination of the seawater with all the heavy metals was above the permissible limits prescribed by BIS and NEERI.

(College of Fisheries Science, JAU, Veraval)

Year: 2007-08

2. Seasonal variations in population densities of important Diatoms on Zaleswar coast of Veraval

Study on seasonal abundance of prominent seven diatom species indicates that the species were highest in winter at Chorwad and Zaleswar coasts. The density was higher at Chorwad coasts in all the seasons as compared to Zaleswar.

(College of Fisheries Science, JAU, Veraval)

Year: 2009-10

3. Qualitative analysis of phytoplankton in freshwater culture pond

It is recommended to the scientific community that seven genera of phytoplankton viz., *Chlorella*, *Scenedesmus*, *Microcystis*, *Navicula*, *Volvox*, *Oedogonium* and *Spirogyra* are commonly observed in freshwater fish culture pond of the Saurashtra region.

(College of Fisheries Science, JAU, Veraval)

Year: 2010-11

4. Study on seasonal variation in iodine content of promising iodine yielding red sea-weeds of Gulf of Kutch

Among the available red seaweed (*Rhodophyceae*) species of Gulf of Kutch, maximum iodine content is found in *Asperogopsis entestinalis* (555 mg/100g DW) followed by *Rhodomenia australis* (151 mg/100g DW).

(Fisheries Research Station, JAU, Okha)

Year: 2011-12

5. Preparation and evaluation of edible fish powder prepared from small sized croaker *Otolithes ruber* (Block & Schneider, 1801) landed at Veraval harbor

Fishery entrepreneurs and processors are advised to use small sized croaker *Otolithes ruber* along with their bones for the production of heat sterile protein and mineral rich edible fish powder having a shelf life of seven months.

(College of Fisheries Science, JAU, Veraval)

6. Qualitative studies of zooplankton in Meghal River at Chorwad

The Meghal River system, located in South Saurashtra region harbours Zooplanktons belonging to seven genera viz., *Cyclops*, *Daphnia*, *Filinia*, *Brachionus*, *Bosmina*, *Moina* and *Keratella* during monsoon and winter months.

(College of Fisheries Science, JAU, Veraval)

7. Identification and quantification of rotifer fauna of Okhamandal region

Thirteen species of rotifers are found in Okhamandal region. The rotifers are found in higher diversity and density in Surajkaradi pond and Gomati creek than seacoast areas in Okhamandal region in monsoon and post monsoon seasons. They are more abundant in lower salinity.

(Fisheries Research Station, JAU, Okha)

8. Cycle Evaluation for fish landing at Veraval of Veraval coast

The entrepreneurs and financial institutions are advised to consider an aggregate, profit making time span of seven years as the cycle period for fish landing centre, Veraval.

Year: 2012-2013

9. Determination of suitable protein level for growth enhancement in *Labeo rohita*

In South Saurashtra Agro-climatic Zone better bio-mass can be obtained by providing fish feed containing 30 % protein to fish *Labeo rohita*.

(College of Fisheries Science, JAU, Veraval)

10. The effect of air and water transport on stress and survival of Rock oyster (*Saccostrea cucullata*)

The rock oyster (*Saccostrea cucullata*) can be transported by road for nine hours in wet gunny bag or water filled plastic bag (30 cm (W) x 38 cm (L)) at the density of 30 oyster per bag without any mortality.

(College of Fisheries Science, JAU, Veraval)

Year: 2013-14

11. Qualitative and quantitative analysis of phytoplankton of Sikka region

The Sikka coast, located in Gulf of Kachchh, Gujarat harbours 36 genera/species of phytoplankton, among which, *Amphora* spp., *Bacillaria paradoxa*, *Biddulphia mobilensis*, *Chaetoceros calcitrans*, *Chaetoceros curvisetus*, *Coscinodiscus granii*, *Ditylum sol*, *Gyrosigma* spp., *Nitzschia closterium*, *Pleurosigma* spp. and *Rhizosolenia* spp. were found abundant. Hence, it is recommended to scientific community to target these species for further biodiversity studies.



(Fisheries Research Station, JAU, Sikka)

12. Diversity and distribution of brachyuran crab at off shore Sikka

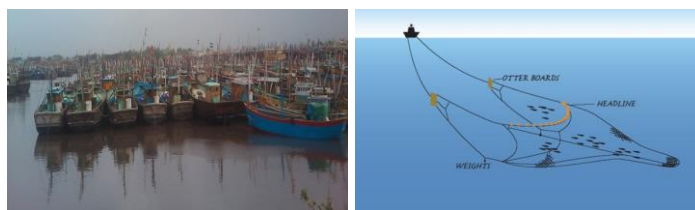
The Sikka Coast, located in Gulf of Kachchh, Guajrat harbours 22 species of Brachyuran crab, among which, *Pilumnus vespertilio*, *Atergatis integerrimus*, *Scylla serrata*, *Charybdis acutifrons*, *Parasesarma pictum*, *Menippe rumphii*, *Ocypode ceratophthalmus* and *Portunus pelagicus* were found abundant. Hence, it is recommended to scientific community to target these species for further biodiversity studies.



(Fisheries Research Station, JAU, Sikka)

13. Study of catch composition of trawl net operated along the Veraval coast, Gujarat

A total of 90 marine species (70 finfish and 20 shell fish) were recorded in the trawl net fishery. Ribbon fish, thread fin bream, squid, lizard fish and cuttle fish forms a major proportion of catch. Hence, it is recommended to scientific community to consider these species for further catch spectrum analysis.

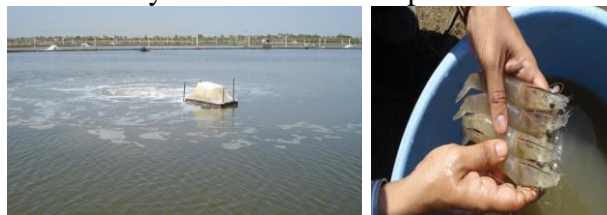


(College of Fisheries Science, JAU, Veraval)

14. Analysis of plankton in brackish water shrimp culture pond

Ten genera of phytoplankton viz., *Chaetoceros*, *Skeletonema*, *Pleurosigma*, *Gyrosigma*, *Scenedesmus*, *Oscillatoria*, *Navicula*, *Nitzschia*, *Coscinodiscus* and *Chlamydomonas* and four

genera of zooplankton viz., *Moina*, *Brachionus*, *Keratella* and *Pseudodiaptomus* are commonly observed in brackish water shrimp culture ponds of the Saurashtra region. Hence, it is recommended to scientific community to consider these species as feed in shrimp culture.



(College of Fisheries Science, JAU, Veraval)

15. Survey for cultivable sea water shrimps seed along Jafrabad and Mahuva coast

The fisheries scientists are recommended that cultivable shrimp seeds of *Metapenaeus kutchensis*, *Fenneropenaeus merguensis*, *Fenneropenaeus indicus* and *Penaeus monodon* are available during month of September to January at Mahuva, while at Jafrabad coast during April to May for shrimp farming purpose.



(Agricultural Research Station (Fruit Crop), JAU, Mahuva)

Year: 2014-15

16. Record of marine finfishes commonly landed at Veraval fishing harbor

Seventy finfish species of different genera were recorded during the period of October 2010 to May 2014 at Veraval fish landing centre. The major groups of finfish available are sharks and rays, pomfrets, crockers, groupers, threadfins, ribbonfish, clupeids, lizard fish, sea catfishes, leather jackets, bull's eye. Fishes like *Rachycentron canadum*, *Mene maculate*, *Pomadasys maculates*, *Lethrinus ramark*, *Upenus sp.*, *Cypselury obligolepis*, *Remora remora*, *Therapon jarbua*, *Therapon theraps*, *Harpodon nehereus*, *Plotosus conius*, *Coryphaena hippurus* are available in very less proportion at Veraval fish landing center.



(Department of Fisheries Resource Management, College of Fisheries Science, JAU, Veraval)

17. Antibacterial activity of some available seaweeds from Veraval coast

Seaweeds extract of *Gracilaria edulis*, *Sargassum weightii* and *Hypniamus ciformis* collected from Veraval coast contains antibacterial activity against *Aeromonas hydrophila*, *Pseudomonas aeruginosa* and *Vibrio alginolyticus*, respectively.

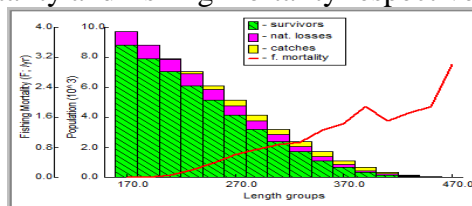


(Department of Aquaculture, College of Fisheries Science, JAU, Veraval)

18. Growth, mortality and stock assessment of Soldier catfish *Osteogeneiosus militaris* (Linnaeus, 1758) off Veraval coast

The present level of fishing on the Soldier catfish, *Osteogeneiosus militaris*, confirmed that the stock is being overexploited. Estimated growth parameters for *O. militaris* were 523 mm and 0.62

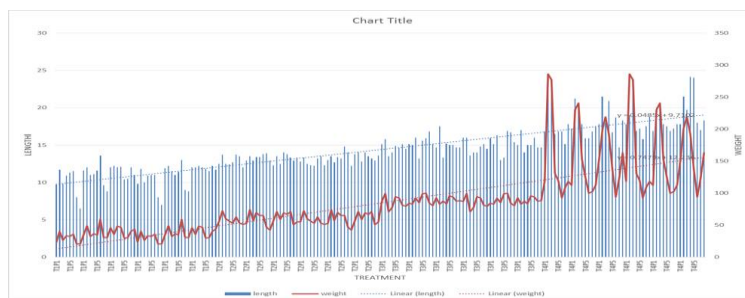
for L_{∞} & K respectively. Estimated mortality parameters for *O. militaris* were 1.09, 3.67 and 2.58 for natural mortality, total mortality and fishing mortality respectively.



(Department of Fisheries Resource Management, College of Fisheries Science, JAU, Veraval)

19. Length-weight relationship and stomach content analysis of Japanese threadfin bream (Pink Perch), *Nemipterus japonicus*

The size and weight of Threadfin bream, *Nemipterus japonicus* available at Gujarat coast ranged from 6.5-24.1 cm and 20.5-277 g respectively with the length-weight relationship equation $\text{Log } W = -2.2520 + 2.4669 \text{ Log } L$. The major food composition of *N. japonicus* constituted of crustaceans (54.35%), finfishes (30.24%), molluscs (7.80%), and unidentified and semi-digested materials (5.80%).



(Department of Fisheries Resource Management, College of Fisheries Science, JAU, Veraval)

20. Study on biodiversity of shellfishes in rocky intertidal zone of Veraval coast

The most abundant and year round species found at Veraval are *Patella radiate* followed by *Turbo intercostalis*, *Chiton granoradiatus*, *Rinoclavis sinensis* and *Cerithium* spp. of molluscs and *Balanus amphitrite* among the crustaceans.



(Department of Fisheries Resource Management, College of Fisheries Science, JAU, Veraval)

Year: 2015-16

21. Impact of insectivorous birds on fish drying grounds at Veraval

Fishes dried on open grounds during the fishing season are infested with maggots and adults of technids fly attracting of several insectivorous birds especially cattle egret, which play an important role in the natural control of the infested pests.

(Fisheries Resource Management, College of Fisheries, JAU, Veraval)

22. Study of seaweed diversity at selected intertidal areas of Saurashtra and Diu (UT)

In the coastal belt of Saurashtra and Diu, 117 seaweed species are available (Intertidal and drifted), of which 38 Chlorophyceae, 34 Phaeophyceae and 45 species of Rhodophyceae are found during September to April. The economically important species from Chlorophyceae group are 14, Phaeophyceae group 07 and Rhodophyceae group 15.

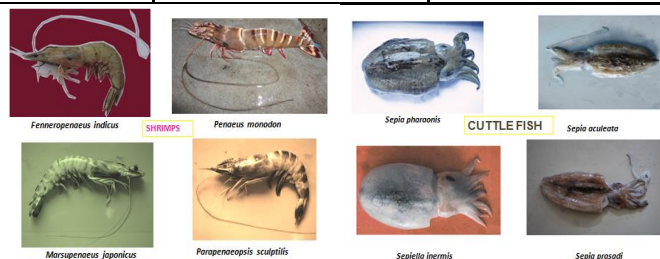
(Fisheries Research Station, JAU, Okha)

Year: 2016-17

23. Documentation and seasonal availability of commercially important shellfish species at Veraval fishing harbor

Twenty two shellfish species including shrimps, crabs, lobsters, squids, cuttlefish and octopus of different genera were recorded during October 2012 to May 2016 at fishing harbor of Veraval, Gujarat.

Group	Availability			
	2012-13	2013-14	2014-15	2015-16
Shrimps	Throughout the year. Less number in January and May.	September to February. Less number in March to May.	September to mid-December. Less number in January to May.	Less number throughout the year except November, December and March.
Crabs	Throughout the year except December.	Throughout the year except November, December and March.	Throughout the year.	Throughout the year except December and May.
Lobsters	Throughout the year.	Throughout the year.	Throughout the year.	Throughout the year.
Cephalopods (Cuttle fish, Octopus and Squid)	Throughout the year except May.	Throughout the year except after mid-April.	Throughout the year except May.	Throughout the year.



(Department of Fish Resource Mgmt., College of Fisheries Science, JAU, Veraval)

Year: 2017-18

24. Comparison of EPA (Eicosapentaenoic Acid) and DHA (Docosahexaenoic acid) content of four marine micro algae culture

Isochrysis galbanais recorded to have 14 % eicosapentaenoic acid while *Chaetoceros* species is recorded to have 3.65 % eicosapentaenoic acid and 11 % docosahexaenoic acid. Hence, scientific community is informed to promote the marine microalgae culture for omega 3 fatty acid.

(Fisheries Research Station, JAU, Sikka)

Year: 2018-19

25. Study of copepod diversity in coastal region of Okhamandal and its culture potential as live feed

Nineteen copepod species were recorded from coastal areas of Okhamandal, i.e. eight species of calanoid copepods mainly *Eucalanus elongatus*, *Calanus minor* and *Paracalanus parvus*; five species of harpacticoid copepods mainly *Longipedia weberi*, *Microsetella norvegica* and six species of cyclopoid copepods mainly *Oncea venusta* and *Oithona similis* were recorded. Higher copepod diversity was found in Okha area followed by Mithapur and Dwarka, higher diversity during monsoon season followed by winter and least in summer. *Macrosetella gracilis* and *Oithana brevicornis* have culture potential.



(Fisheries Research Station, JAU, Okha)

26. Estimation of agar and alginic acid from the seaweeds available at coast of Okha

The highest % agar yield 17.98 ± 1.87 was observed in *Gracilaria corticata* among the Rhodophyceae species available at Okha coast. The highest gel strength ($63.46 \pm 2.66 \text{ g/cm}^2$) of agar was observed in *Gracilaria corticata* among Rhodophyceae species available at Okha coast.

At Okha coast, higher % of agar yield 17.98 ± 1.87 was observed in *Gracilaria corticata* among the Rhodophyceae species. The higher gel strength (63.46 ± 2.66 g/cm²) of agar was observed in *Gracilaria verucosa* among Rhodophyceae species. Among the phaeophycean species available, higher percent (40.21 ± 1.95) alginic acid content was observed in *Sargassum wightii*.

(Fisheries Research Station, JAU, Okha)

27. Estimation of in vitro antioxidant potential of the seaweeds available at coast of Okha

Amongst the seaweeds available at Okha coast, the highest *in vitro* antioxidant potential was observed in *Sargassum johnstonii* with the value of 1.72 ± 0.22 DPPH (2, 2, Diphenyl-1-Picrylhydrazyl) activity Eq. mM Ascorbic acid/g FW.

(Fisheries Research Station, JAU, Okha)