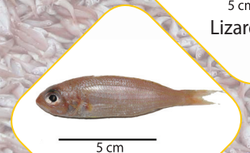
Juveniles of commercially important fishes in trawl nets

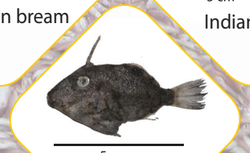

5 cm
Torpedo scad


5 cm
Bull's eye


5 cm
Lizard fish


5 cm
Threadfin bream


5 cm
Indian scad


5 cm
File fish

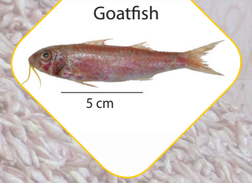

5 cm
Flat fish


5 cm
Flying gurnard


5 cm
Puffer fish

By-catch species of importance in marine food web


5 cm
Eel


5 cm
Goatfish

Address for communication:

Director
Central Marine Fisheries Research Institute
(Indian Council of Agricultural Research)
Post Box No.1603; Ernakulam North P.O.
Cochin- 682 018; Kerala
Phone: 0484 - 2394867
Telegram : CADALMIN, ERNAKULAM
Fax : 0091-0484-2394909
E-mail : director@cmfri.org.in
website: www.cmfri.org.in

Prepared by:
U. Ganga, P.T. Jinesh, D. Prakasan
E.M. Abdussamad and Prathibha Rohit
Pelagic Fisheries Division, CMFRI.

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Dr. A. Gopalakrishnan
Director
Central Marine Fisheries Research Institute

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The bane of juvenile fish catches

Central Marine Fisheries Research Institute
(*Indian Council of Agricultural Research*)
Ernakulam North P.O., P. B. No. 1603
Cochin – 682 018, Kerala, India
www.cmfri.org.in

Juvenile fishes are defined as immature fishes that have not yet had the opportunity to replenish the fish population by spawning. The length at which 50% of the fishes of any particular species mature varies among species and is called its Length at First Maturity (Lm). When juveniles are caught in large numbers there is an economic loss as fishermen get very low prices for the small sized young fish as compared to the larger adults. Also, the natural replenishment in the fishing grounds through their maturation and spawning processes get disturbed which is called growth overfishing. This can cause a decline in fish catches and may lead to the collapse of certain vulnerable fishery resources having biological traits such as slow growth, low fecundity, restricted distribution etc.

Juvenile fish losses which mainly occur when they are caught as non-targeted species in trawls, include small sized fishes as well as juveniles of large growing, commercially important species that are classified as low value by-catch (LVB). About 25 species of finfishes, 15 species of molluscs and 16 species of crustaceans are commonly recorded as LVB in India. Species such as the puffer fishes, flying gurnards, eels, goatfishes and crustaceans like *Squilla* commonly occurring in the LVB are important diet items of large, high value fishes like tunas, seerfishes, sharks, billfishes, perches etc. When large numbers of these prey fishes that maintain the flow of energy in the food chain are removed, the energy chain is disrupted which adversely affects the fishery resources and thereby the livelihoods of fishermen. There is always demand for juvenile fishes and LVB from fishmeal processing centres which has facilitated its entry to the market chain. While by-catch of juveniles in trawls cannot be totally eliminated it can be reduced to a large extent by adoption of sustainable fishing practices (Fig. 1). However, while fishing with seine nets, juvenile fish shoals can be easily identified and thus voluntarily avoided by fishermen.

The Code of Conduct for Responsible Fisheries (CCRF) spells out that while the aim of maximizing returns are pursued by the fishermen it should be done without adversely affecting the self-sustaining nature of the fishery resources and with least impact on the ecosystem. The Central Marine Fisheries Research Institute (CMFRI) and Central Institute of Fisheries Technology (CIFT) have suggested following ecofriendly approaches to ensure long term sustainability of the fishery sector:

- Use square meshed trawl nets with 35 mm codend which minimizes juvenile fish catch.
- Avoid use of engines with high HP (> 250 HP) and restrict maximum engine power in trawls as per craft dimensions (crafts upto 15 m OAL- 140 HP, 15 – 17.5 m OAL - 200 HP and 17.5 - 20 m OAL - 250 HP).
- Adopt Juvenile Fish Excluder cum Shrimp Sorting Device (JFE-SSD) in trawls (Fig. 2) which has an *in situ* sorting effect (by-catch reduction upto 43%, and shrimp retention of 95% with capacity to exclude jellyfish).
- Use only >22 mm mesh seine nets for pelagic fishes like oil sardine and mackerel.
- Voluntarily avoid catching of juvenile fish shoals during fishing activity using seine nets.

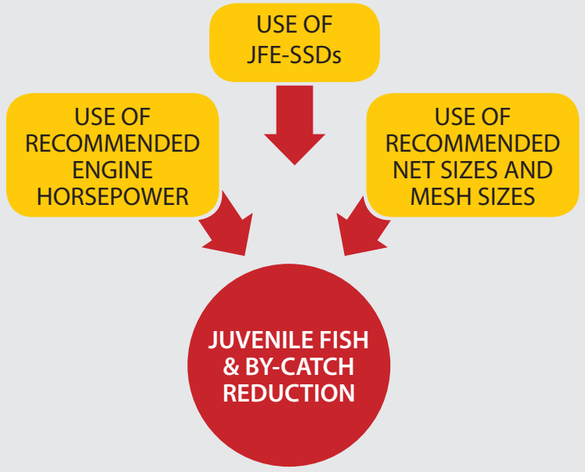
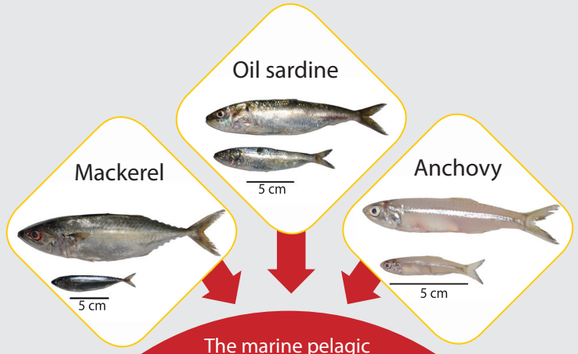


Fig. 1. Sustainable fishing practices to reduce juvenile fish and by-catch issues in trawls



The marine pelagic fishes such as oil sardine, mackerel and anchovies have a breeding peak during May to August and the newly hatched larvae feed intensively on plankton available in plenty as a result of higher productivity in the sea caused by the southwest monsoon. If the young fish are not caught during this short period of rapid growth and allowed to grow, it ensures much larger sized fish commanding higher prices for the fishermen. It also ensures healthy fish stocks by allowing the fishes to breed at least once and successfully compensate fishing losses.

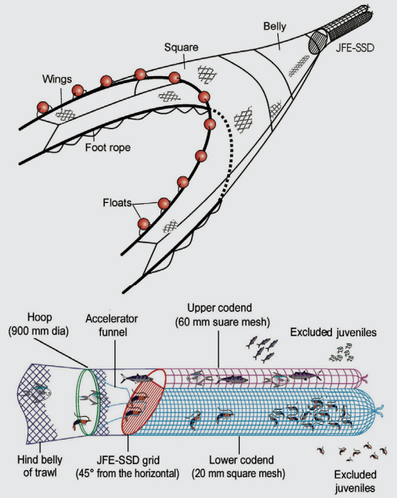


Fig.2. Juvenile Fish Excluder cum Shrimp Sorting Device (JFE-SSD) in trawls

Source: Central Institute of Fisheries Technology, Cochin.