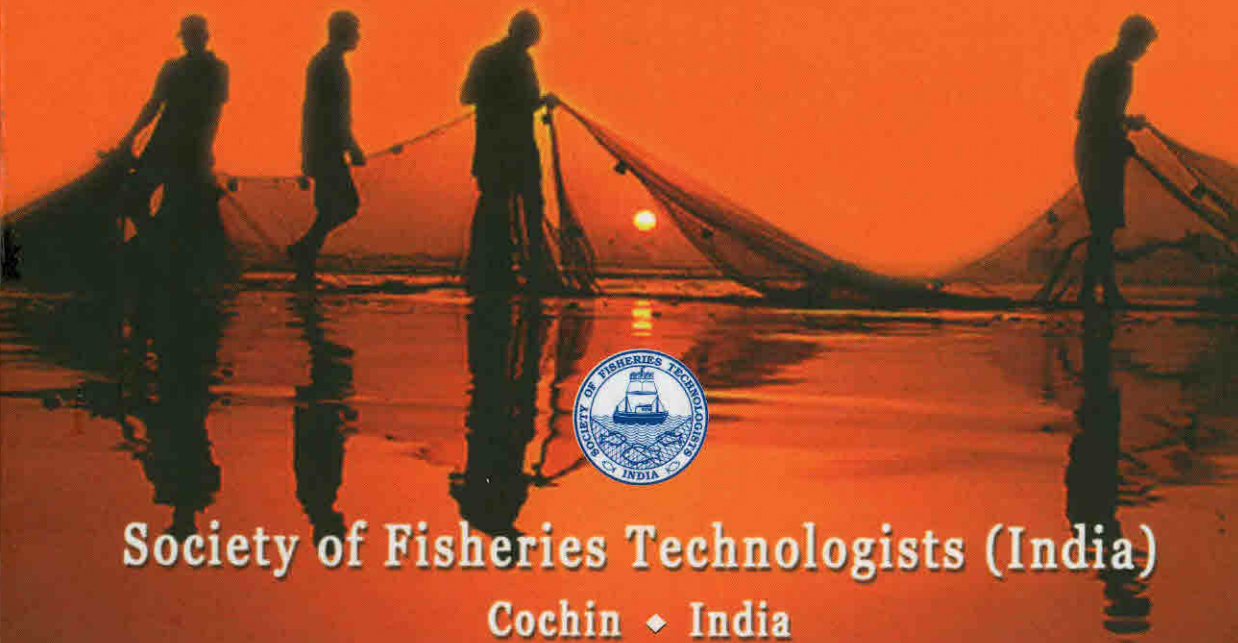
Coastal Fishery Resources of India

Conservation and Sustainable Utilisation



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Trawl Codend Selectivity in respect of Razorbelly Scad

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Introduction

Tropical shrimp trawl fisheries produce large amounts of bycatch containing various aquatic organisms including juveniles of fish and shellfish of which a substantial quantity is discarded in dead condition. Bycatch is a serious conservation problem because valuable biological resources are wasted, population of rare and endangered species are threatened, stocks that are already heavily exploited are further impacted and may result in changes in the structure of ecosystem (Harrington *et al.*, 2005). Increasing operational expenditure coupled with a dearth of quality fishes in the catch compel the fishermen to maximize the catch by any means. Responsible fishing regime requires that fishing gears should preferentially catch the adult fish at a particular age, which would maximize yield while permitting the juveniles and sub-adults to escape and also minimize the catch of non targeted and protected organisms (Boopendranath and Pravin, 2005). In this context, codend selectivity studies in bottom trawls for maximum number of species is necessary to arrive at an optimum mesh size which will allow juveniles of maximum number of species to escape from a multi species fishery. Moreover, the concept of ecolabelling or "certification" of seafood that do not contribute to overfishing may become mandatory in the near future.

Selectivity is a tool used by the gear technologist world over to determine the appropriate mesh size for a gear to selectively harvest the target fish of a particular size which would have spawned at least once to ensure long term sustainability of the fishery resources. Trawl selectivity has been reviewed by Boopendranath and Pravin (2005). Selectivity characteristics of trawl codends in respect of *Metapenaeus dobsoni, Parapenaeopsis stylifera, Caranx para, Dussumieria acuta, Lactarius lactarius, Photopectoralis bindus, Nemipterus japonicus, Saurida tumbil, Thryssa purava* and *Upeneus vittatus* have been reported by Kunjipalu

et al. (1994), Varghese *et al.* (1996), Kunjipalu *et al.* (2001) and Prakash *et al.* (2008).

Razorbelly scad *Alepes kleinii,* belonging to the Family Carangidae, is a small fish with a maximum size of 160 mm. Its juveniles and sub-adults are commonly represented in the bottom trawl landings as bycatch along the Indian coast. It is similar to other scads in the same genus, but is readily identified by its unique teeth, dark vertical bands present on the body above the lateral line and a large black spot present on the upper operculum and surrounding shoulder region. Razorbelly scads are predatory fish, feeding on a variety of small crustaceans, particularly copepods, and small fishes and prawns. January to September is the usual spawning season. Though it is a low value fish, it is marketed as fresh or dried and salted.

Fig. 1 *Alepes kleinii* landings

Materials and Methods

Selectivity studies using covered codend method (Pope *et al.*, 1975) were carried out onboard Research Vessels MFV Sagar Sakthi (L_{OA} 15.24; 223 hp) and MFB Matsyakumari (L_{OA} 17.5 m; 278 hp) off Cochin during 2007- 2008 using 18 m semi-pelagic trawl fitted with 40 mm diamond mesh codend. The codend was provided with a cover made of 30 mm mesh size polyamide netting, which is approximately 1.5 times the size of the codend as suggested by Stewart and Robertson (1985). During the

selectivity experiments, 45 hauls of 1 h duration each were carried out in the depth range of 10-25 m, at a trawling speed of 2.3-3 kn. Samples were drawn from the codend and cover and length frequency data were recorded for the selected species. The logistic model commonly used to describe trawl selection ogive (Sparre *et al.,* 1989) was adopted for the study.

Results and Discussions

Fishing gear selectivity is defined as the ability to target and capture fish by species, size or sex during harvesting operations allowing all non target groups to escape unharmed. The selectivity curve of *Alepes kleinii* is given as Fig. 2. It is known that selection curve for trawls giving proportion retained for each length class, normally assumes a sigmoid form.

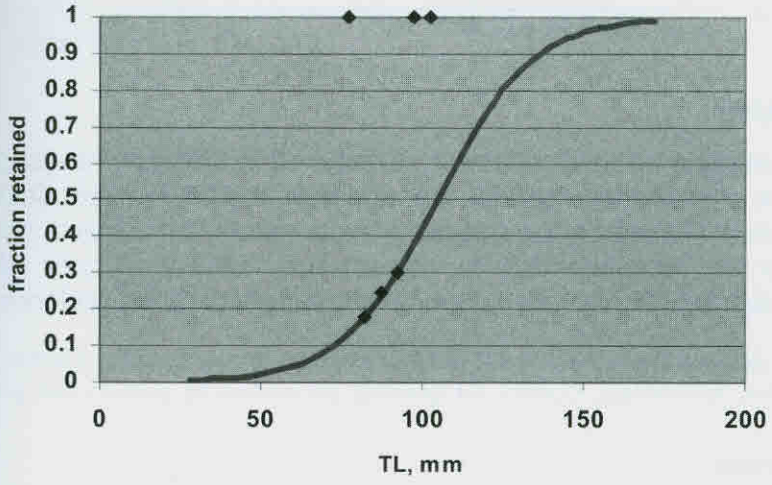

Fig. 2 Selectivity curve in respect of *Alepes kleinii*

The results of trawl selectivity experiments are presented in terms of three parameters, viz., mean selection length, selection range and selection factor. Selection range can be defined as the difference in length between the fish that have retention probability of 25% and those fish that have a retention probability of 75%. Selectivity parameters of *Alepes kleinii* are shown in Table 1. The L_{25}, L_{50} and L_{75} were determined as 88 mm, 104 mm and 120 mm respectively. Selection range was 32 mm and selection factor (ratio between mean selection length and mesh size) was

2.98. The mean selection length is generally proportional to the mesh size of the codend over a certain range. Length at first maturity of female *Alepes kleinii* is 129 mm (Reuben *et al.*, 1992).

Table 1: Selectivity parameters of *Alepes kleinii*

Selectivity parameters	Value
L_{25} (TL, mm)	88
L_{50} (TL, mm)	104
L_{75} (TL, mm)	120
Selection range (mm)	32
Selection factor	2.98
Length at first maturity* (TL, mm)	129
Recommended codend mesh size (mm)	43

* Reuben *et al.* (1992)

Conclusion

Information on trawl selectivity is required in biological investigations, fish stock assessment, fisheries management and fishing gear design and development. Based on the selectivity experiments, the codend mesh size that can be recommended to harvest the matured *Alepes kleinii* is determined as 43 mm, for conventional diamond mesh codends.

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