



Note

Indiscriminate destruction of juveniles of spiny cheek grouper *Epinephelus diacanthus* (Valenciennes) off Quilon, Kerala

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Abstract

An incidence of juvenile capture of *Epinephelus diacanthus* (Val.) (Family: Serranidae) off Quilon, South west Coast of India is reported. They formed 65% of the discards landed on 13-10-2005 with an estimated catch of 2,610kg. The juveniles were in the size range of 88-140mm (mean size = 110mm) with the modes at 106-110mm and at 116-120mm. They fed on crabs (*Charybdis* sp.), mysids, *Acetes* sp., and alima larvae of *Squilla*. Length-weight relationship of these small fishes was worked out as $\text{Log}W = -5.421865 + 3.26 \text{Log}L$ ($r = 0.9193$). It is estimated that the juveniles with an average calculated weight of 17.2g, if allowed to grow would have yielded a biomass of 76t with each individual attaining a total weight of 504g at the end of first year. Necessary management measures such as establishing Marine Protected Areas (MPAs) are necessary for protecting their nursery/spawning grounds.

Groupers or rockcods (Family Serranidae) are large sized demersal finfishes of commercial value which inhabit rocky grounds and coral reef areas along Kerala, Tamil Nadu, Gulf of Mannar, Gulf of Kutch, off Paradeep and Andaman seas. Off Kerala, the area between 8°-13°N latitude at depth 60-150m where the bottom is uneven with rocky outcrops and coralline areas, are rich in rock cods and hence are known as "Kalava grounds" (Silas, 1969). Major species of serranids caught off Kerala are *Epinephelus diacanthus*, *E.malabaricus*, *E.tauvina*, *E.chlorostigma* and *E.bleekeri* (Mathew, 2003). Of these *E.diacanthus* is the major species landed along Kerala coast (Tessy, 1994; Manoj Kumar, 2005).

Groupers along with other perches are exploited by trawl, hooks and line and traps. While large and adult fishes are caught in hooks and line through selective fishing, the juveniles form a by-catch in shrimp trawlers. Capture of these undersized fishes including juveniles using smaller mesh sizes at the cod end of trawlers is detrimental to the sustainability of the fishery. Silas (1969) had reported the capture of juveniles of *E.diacanthus* in experimental trawling off southwest coast of India. Tessy (1994) and Premalatha (1989) had noticed the availability of juveniles of *E.diacanthus* off southwest coast of India during September-October. Zacharia *et al.* (1995) had reported the exploitation of juveniles of this species by multi-day trawlers along Dakshina Kannada Coast. Chavan and Somasundaram (MS) have reported landings of juveniles of groupers such as *E.diacanthus* and *E.chlorostigma* in dol net off Mumbai. In this paper, an attempt is made to elucidate the probable reasons for capture of juveniles of these economically important fishes thus causing loss in the harvestable biomass.

Materials and methods

The juveniles of *E.diacanthus* collected from the discards landed by shrimp trawlers at Neendakara Fisheries Harbour, Quilon, Kerala during October 2005 formed the basis for this study. Sub-samples of discards collected from randomly selected boats were sorted out and the percentage of different components noted. From the average percentage of *E.diacanthus* juveniles, its catch (kg) was calculated from the average catch of discards in each boat, which was then raised to the day's total effort. Catch data obtained from FRA Division, CMFRI., Kochi was utilized for estimating the total effort input (units of boats) and other fishery details during the period. Length-weight relationship of *E.diacanthus* juveniles was estimated using the Least Square method (Le Cren, 1951).

Results and discussion

During October 2005, large quantities of juvenile of *E.diacanthus* to the tune of 77t were caught as by-catch in commercial trawlers off Neendakara, Quilon, south west coast of India from a depth range of 20m. They formed 65% (2.6t) of the discards landed in shrimp trawlers on 13-10-2005 (Fig. 1). They were caught during day trawling between 5 am and 13 pm, the cod end mesh size of the trawlers was 20mm. The juveniles were in the size range of 88-140mm with dominant mode at 106-110mm and at 116-120mm (mean size= 110mm) (Figs.2&3). They were found to feed on crabs (*Charybdis* sp.), mysids, *Acetes* sp. and Alima larva of *Squilla*.

Length weight relationship: A total of 39 specimens of juveniles of length ranging from 110-140mm and

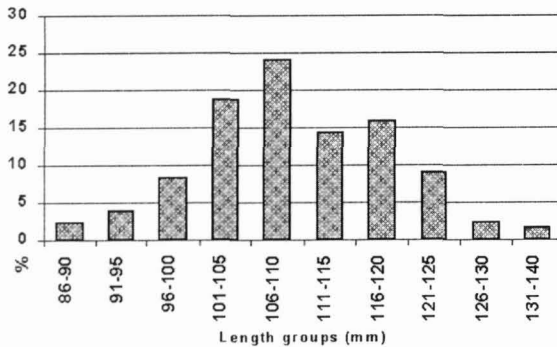


Fig.2. Length frequency distribution of *E. diacanthus* in the by-catch of trawls operating off Quilon



Fig.1. Juveniles of *Epinephelus diacanthus* landed in shrimp trawlers at Neendakara Fisheries Harbour, Quilon, Kerala.

weight varying from 15-43g were used. The length weight relationship was estimated as $\text{Log } W = -5.421865 + 3.26 \text{ Log } L$ ($r = 0.9193$).

From the length-weight relationship estimated in the present study, the calculated weight of the juvenile *E. diacanthus* of mean size of 110mm was estimated as 17.2g. Manoj Kumar (2005) using VBG Formula, had estimated a growth of 244mm during the first year of its life span off Calicut along Malabar coast while Chakraborty (1994) had estimated a growth of 229mm for the same period from Bombay. Tessa (1994) had observed that *E. diacanthus* in the size group of 231-250mm had 43% of the individuals in the transitional stage. Therefore, applying the pooled fit of length-weight relationship for males and females of $\text{Log } W = -4.03 + 2.82 \text{ Log } L$ (Manoj Kumar, 2005) for the species off Malabar coast, the calculated weight of the fish at 244mm (TL) is 504g. Thus it may be concluded that an estimated biomass of

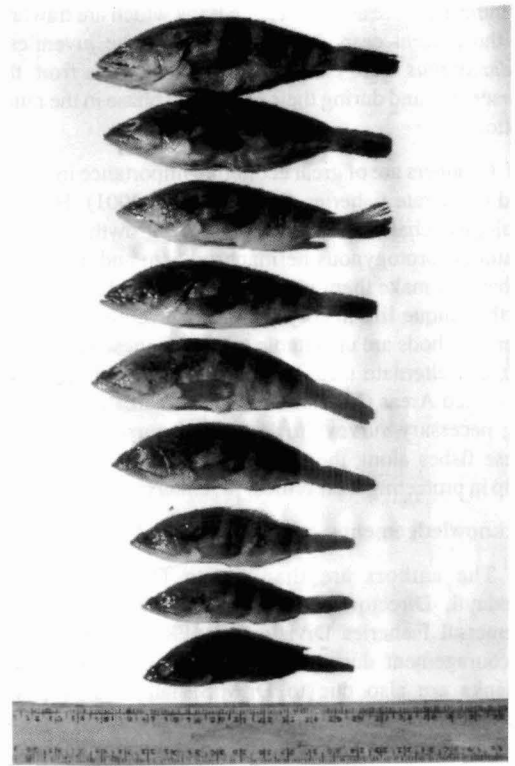


Fig. 3. Different size groups of *E. diacanthus* juveniles landed at Neendakara fisheries harbour, Quilon.

76t of fish could have been obtained at the end of the 1st year if all the 151744 individuals (2610Kg/17.2g) were allowed to grow which would fetch a price of Rs.25-30/kg.

Silas (1969) while reporting the capture of juveniles of *E. diacanthus* to the tune of 10kg (average length of 21.8cm) in experimental trawling conducted off $9^{\circ}33' \text{N} - 75^{\circ}41' \text{E}$ had emphasized the need to study the behavior of *Kalava*. According to Zacharia *et al.* (1996), since the juveniles of *E. diacanthus* are caught from 30-60 m depth, the young ones abound in the muddy bottom for feeding purpose and stay in fishing ground for 8 months after which they migrate to deeper waters for further growth and breeding. Castro and Huber (2000) opined that groupers being reef fishes have a complex life history consisting of a planktonic larval and benthic juvenile and adult stage. While the planktonic larvae drift with the current, the juveniles settle in shallow areas where they find hiding places and as they increase in size they move to deeper waters (Tucker, 1999). According to Silas (1969), the grounds seen around 8°N off southwest coast

of India are more akin to Wadge Bank which are trawlable. In the present case, it is possible that the juveniles of *E. diacanthus* were caught in shrimp trawlers from their nursery ground during their settlement phase in the muddy bottom.

Groupers are of great economic importance in tropical and temperate fisheries (Marino *et al.*, 2001). However, biological characteristics such as slow growth, late age of maturity, protogynous hermaphroditism and aggregating behaviour make them vulnerable to overfishing. Because of the unique life history pattern, conventional management methods are unsuitable to protect these species. It is felt that alternate measures such as establishing Marine Protected Areas (MPAs) are to be demarcated after making necessary surveys to locate the nursery grounds of these fishes along the west coast of India. This would help in protecting their critical juvenile/spawning habitats.

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