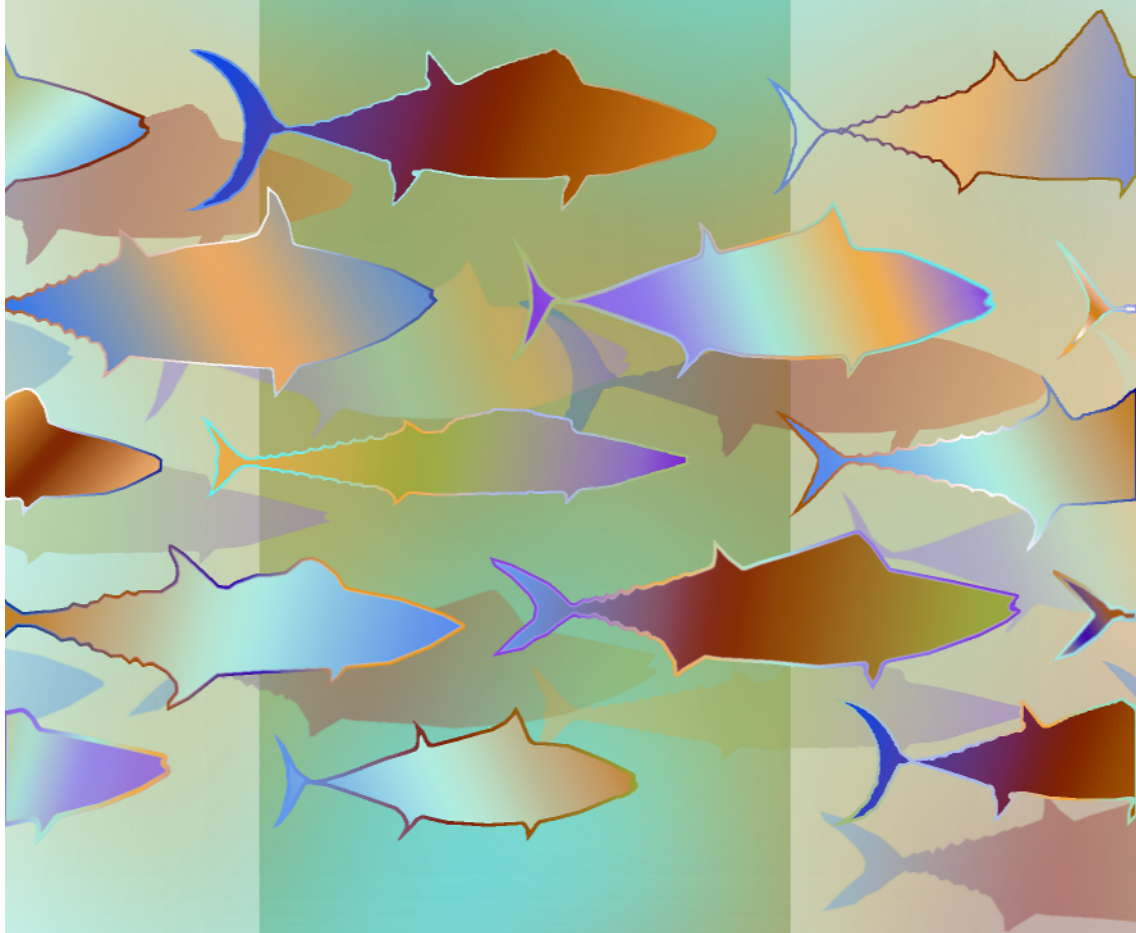


Status of Exploited
Marine Fishery
Resources of India



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RESOURCES OF INDIA**

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Perches

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1. Introduction

Perches are generally large sized Perciform fishes belonging to the families Serranidae, Lutjanidae and Lethrinidae; commonly called rock cods, snappers and pigface breams respectively. Perches occur all along the Indian coast. Most of the species belonging to this group inhabit the rocky grounds and the coral reef areas, while a few prefer the seagrass beds and muddy and sandy bottoms. They are particularly abundant in the rocky and coral grounds off Kerala, off Tamil Nadu, Gulf of Mannar, Gulf of Kutch, off Paradeep and in the Andaman Seas. These larger perches constitute roughly 2% of the total marine fish production in the country, with an average annual landing of 28,800 t during 1990-2000 period. As per the estimates by the Government of India, the potential of all perches within the 50m-depth zone is about 1,14,000 t and that beyond 50m is 1,25,000t. Most of the fishing grounds being not amenable to trawling operations, the major perches are exploited mainly by other gears like hooks and lines, traps and the drift net.

The experimental and exploratory fishing carried out by various agencies like the Central Marine Fisheries Research Institute, the Fishery Survey of India and the erstwhile Indo-Norwegian Project provided valuable information on the abundance and distribution of the major perches in the Indian EEZ. Almost the entire array of species are excellent food fishes and in great demand in the export market, both in the live and frozen form. Of late, these are gaining importance for commercial mariculture in various countries including India.

2. Production trends

From the many surveys, perches were found available at depths 23 to 250 m in the Indian seas. Fairly high catch rate of 144 kg hr⁻¹ was obtained from the Andaman

Sea. The average catch rate from southwest region was 193 kg hr^{-1} . At many stations on the Wadge Bank and off Quilon, the entire catch was constituted by perches. The northeastern part was found to be the richest ground with the peak period of abundance during January-February. On the Wadge Bank, their abundance decreased with increasing depth.

Half a dozen species of *Epinephelus* occur regularly in the catch at Mumbai as by-catch in shrimp trawls, of which *E. diacanthus* is the most dominant. Off Karnataka, fairly dense concentration of 300 kg hour^{-1} of perches was obtained from depth upto 100 m. Since 1956, the erstwhile Indo-Norwegian project conducted several fishing trips for the survey of Kalava grounds along the rocky patches lying in 70-150 m depth zone on the continental shelf from Trivandrum to Canannore. The area between latitude 8° and 13° N at depths of 60-150 m is called "Kalava grounds". Here the bottom is uneven with rocky outcrops and the coralline areas form extensive ridges reaching a height of 5m from ground level. The area is rich in rock cods, snappers and pigface breams. These grounds cover nearly 14000 sq. km in the 75-100m depth range off the southwest coast of India, and the handline operation trials here have yielded upto $200\text{-}300 \text{ kg}/100 \text{ hooks}/\text{hour}^{-1}$. Maximum catch and catch rates were obtained during January. The species caught were *Epinephelus chlorostigma*, *E. diacanthus*, *E. areolatus*, *E. tauvina*, *E. morrhua*, *Pristipomoides typus*, *E. bleekeri*, *Lutjanus gibbus*, *L. rivulatus* and *L. lutjanus*. The region between off Canannore to southwest off Quilon yielded a catch rate of 68 kg hour^{-1} of *E. areolatus*, *E. chlorostigma*, *E. diacanthus* and *P. typus*. Highest catch rates were obtained during February. In the experimental fishing conducted using traps, the area between off Alleppey and Ponnani was found to be the richest ground for rock cods and snappers.

In the Gulf of Mannar, perches contributed to 21% of the catches, snappers being the most dominant, followed by rock cods and pigface breams. The most productive areas for perches here were at depths up to 50m and this resource was fairly abundant during the first half of the year at depth upto 50m. Fairly dense populations of perches were available during April-September period in the 51-100m-depth zone. From the northeastern region, 91% of the total perches caught were from the 51-100m. Stations with dense populations of perches were located in the depth zone 51-100m off Gopalpur and Paradeep.

The average annual production of major perches in the country during 1990-2000 period has been estimated as 28,789t forming roughly 2% of the total fish production in the country. Mainly trawl net, hooks and lines, gill net and the perch traps exploit the perches. There is no target fishing for these resources except by the hooks and line fisheries in vogue along Kerala and Tamil Nadu coasts and recently in Karnataka. A perusal of the annual production statistics of major perches in the country during 1990-2000 shows that the catch is steadily on the increase from a minimum of 11,319 t in 1990 to a maximum of 42,256 t in 2000.

Statewise contribution

Statewise, the highest share was from Tamil Nadu (49.5%), followed by Kerala (19.7%), Gujarat (11.3%), Maharashtra (7.5%), Karnataka 6.4%) and Andhra Pradesh (5.3%). Along the coasts of Orissa and West Bengal the fishery for these resources is very negligible (Fig 1.). There is an organised fishery for major perches in Tamil Nadu, along the Gulf of Mannar and the Wadge Bank. Both mechanised, as well as non-motorised traditional units in operation employ gears such as hooks and lines, long lines, gill net and trawl. The annual catch of major perches here varied from 5,114 t to 17,863t during the years 1990-2000. The catch consisted of pigface breams (63%), rock cods (23.8%) and snappers (12.3%) in the order of abundance (Fig.2). Peak production of perches along the Tamil Nadu coast is from December to April, although good landings are recorded throughout the year.

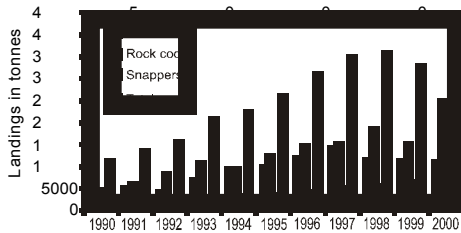
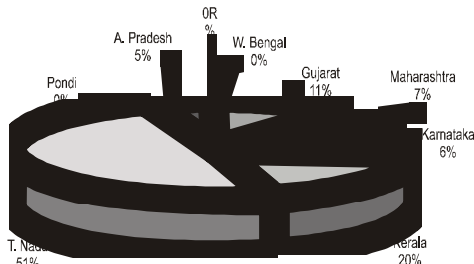


Fig. 2. Landings of major perches in India during 1990-2000

Kerala ranked second in the landings of major perches during 1990-2000. Non-mechanised gears, especially, the hooks and lines are used in the exploitation of large perches from the well-known perch grounds off Kerala. The deep sea trawlers as well as the commercial trawlers land perches from the fishing grounds off Ponnani, Cochin and Alleppey, the Quilon Bank, Trivandrum and the Wadge Bank in the south, and off Cannannore in the north. Perch fishery exploited by traditional gears in Kerala is mainly seasonal in nature, commencing from October and extending to April. Rock cods constitute the most dominant group (76.7%), followed by snappers (12%) and the pigface breams (10%). Nearly 75% of the annual catch was recorded during January- March, 20% during October -December whereas May to September was the lean period.

Annual average landing of perches from Gujarat during 1990-98 was 2,703 t (11.3%), followed by Maharashtra (7.5%). Rock cods were the major component in the fishery in Gujarat and the fishing season extended from October to March. Along the Maharashtra coast, the trawlers are the main gear used for the exploitation of major perches. Rock cods formed 65% of the catch, followed by snappers (28%) and the pigface breams constituted a very negligible quantity. The major season for perch fishery in Maharashtra was from October to December. Karnataka contributed 6.4 % of the total perch catch in the country with an average annual landing of 1,536 t. Peak season extends from October to March, rock cods form the

major component in the catch. Andhra Pradesh contributed 5.3% of the total perch catch, with an average annual catch of 1,253 t. The season of peak abundance was during January to March; the snappers formed 85% and rock cods contributed 9.3% of the fishery.

Fishery at Tuticorin

Tuticorin is one of the important centres where perches are exploited from the Gulf of Mannar by both mechanised as well as traditional crafts. During 1998, the estimated total catch of major perches from this centre was 5,055 t. They are exploited from the nearshore rocky areas and islands or paars at depth extending to 50m. Perches form about 10.9% of the total marine fish landings by traditional gear at Tuticorin. Except during November and December when turbulent conditions prevailed due to northeast monsoon, fairly good catch of perches was recorded in all other months. Hooks and lines are the most important traditional gear, operated for fishing large sized perches, which constitute 45-50% of the total fish catch of this gear. Hooks and lines are ideally suited for fishing the perches distributed over wide areas. Long line units popularly known as Ayiramkal thoondil accounted for over 45.8% of larger perches. Nearly 75% of the perch catch landed here is from the mechanised trawlers. Though there is a clear cut seasonal preponderance of perches at Tuticorin, the peak abundance is from December to April. Pigface breams or *Lethrinus* spp. contribute 62% of the total perches from all the gears put together, followed by rockcods 14.7% and snappers 9%.

A seasonal hooks and line fishery for perches at Pamban has also been reported. During December-March, the Tuticorin fishermen migrate to Pamban and operate hooks and lines in areas of coral reefs off Dhanushkodi at depths 18-25m. *Lethrinus* spp. (34.%), *Lutjanus* spp.(23%), *Epinephelus* spp.(6.9%), *Pristipomoides* spp.(4.7%), *Plectorhynchus* spp. (4.7%) were the important perches landed along with sharks (9.6%) and rays (8.4%).

Seasonal fishery for perches using hooks and line off Kerala

Along the Kerala coast, seasonal fishery for perches is in vogue from the rocky grounds off Varkala, Trivandrum, Pulluvila, etc. during December to April. A seasonal fishery for perches using hooks and lines exists at Cochin during November–April period. The fishermen, using the pablo type, mechanised boats of OAL upto 9.4m, carrying sufficient number of hooks and lines carry out fishing in the rocky grounds off Ponnani, Cochin and Alleppey. Perches formed the most important component of the catch constituting over 90% followed by elasmobranchs (4.4%), tunas (2.8%), *Coryphaena* spp. (0.6%), catfishes (0.3%) and barracudas (0.6%).

Seasonal fishery for perches off Karnataka

In Karnataka, large scale landing of rock cods during the post monsoon month of September has been reported from 1994 onwards, with catch rate varying from 183g to 300kg unit⁻¹. The catch consisted of five species namely, *Epinephelus diacanthus* (82.6%), *E.epistictus* (7.7%), *E.malabaricus* (4.6%), *E.latifasciatus* (3.2%) and *E. chlorostigma* (1.9%).

Species composition of major perches

Important species contributing to the fishery mainly belong to: (1) Family Serranidae (Rock cods or groupers), the dominant sizes in the fishery range from 250-670 mm, (2); Family Lethrinidae (pigface brems), fishery is supported by fishes in size ranging from 220-750 mm; and (3) Family Lutjanidae (snappers), fishes in the length range 220-700mm constitute the fishery.

Family Serranidae includes *Epinephelus malabaricus* (Malabar grouper) (Fig.3), *E. tauvina* (Greasy grouper), *E. bleekeri* (Dusky-tail grouper), *E. areolatus* (Areolate grouper), *E. diacanthus* (Spring cheek grouper/ six-banded reef cod), *E. epistictus* (Broken-line grouper), *E. fasciatus* (Red banded grouper), *E. flavocaeruleus* (Blue and yellow reef cod), *E. latifasciatus* (Banded grouper), *E. morrhua* (Banded cheek reef cod), *E. undulosus* (Brown-lined reef cod), *E. merra* (Wire netting reef cod), *E. fuscoguttatus* (Brown marbled grouper), *E. chlorostigma* (Brown spotted grouper), *Cephalopholis sonnerati* (Red coral cod) and *C. boenack* (Blue-lined seabass)

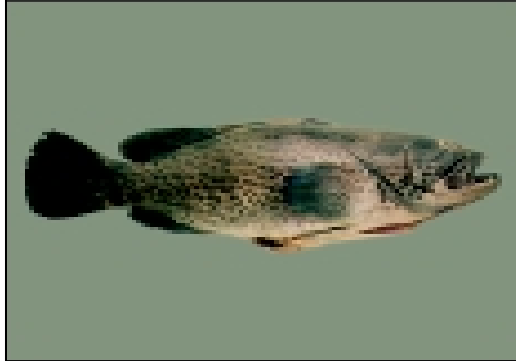


Fig. 3. *Epinephelus malabaricus*

Under the Family Lethrinidae (Pigface brems) the species available in India are *Lethrinus nebulosus* (Starry emperor bream), *L. ramak* (Yellow-banded emperor bream), *L. elongatus* (Long face pigface bream) and *Lethrinella miniatus* (long nosed emperor bream).

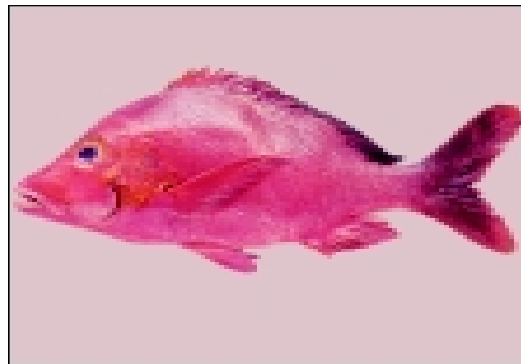


Fig. 4. *Lutjanus gibbus*

The representatives of the family Lutjanidae are *Lutjanus argentimaculatus* (Mangrove red snapper), *L. gibbus* (Hunched snapper) (Fig.4), *L. bohar* (Two spot snapper) (Fig.5), *L. rivulatus* (Blue-lined snapper), *L. bengalensis* (Bengal snapper),

L. lutjanus (Bigeye snapper), *L. fulviflammus* (Black snapper), *L. johni* (John's snapper), *L. kasmira* (Blue and yellow snapper), *L. sebae* (Emperor snapper), *L. sanguineus* (Red snapper), *L. russelli* (Russel's snapper), *L. malabaricus* (Malabar snapper) and *Pristipomoides typus* (Sharp-tooth snapper)

3. Biology

Information on the biology of perches is scanty. Though a large number of species have been reported to occur, only a few sustain the commercial catches. A few reports available on the biology of perches are based on preliminary investigations. They are predatory fishes feeding on crabs, prawns and other fishes such as *Therapon* spp., *Ambassis*

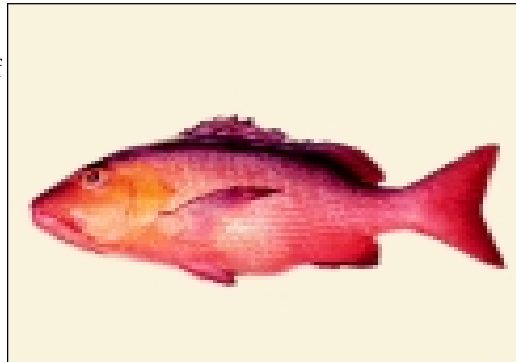


Fig. 5. *Lutjanus bohar*

spp., etc. Among major perches, the rock cods or groupers are protogynous hermaphrodites, initially maturing as females then reverting to males as they grow in age and size. Studies on the food and feeding habits of *Pristipomoides typus* based on samples taken off Kerala indicated that fish, cumaceans, mysids, crabs, stomatopods and cephalopods formed the important food items, but 62% of the fishes examined indicated everted stomachs.

Length-weight relationship for *P. typus* ranging in length from 21.5-34.9 cm is $\log W = -5.1002 + 3.0303 \log L$.

Another estimate of the length - weight relationship for females of same species ranging in length from 35-60 cm is $\log W = -1.4959 + 2.7063 \log L$.

The spawning season was determined to be February –June. The estimated growth and mortality parameters for *E. diacanthus* based on length frequency data collected from commercial trawlers at Mumbai was $L_{\infty} = 502$ mm, $K = 0.16/\text{year}$, $M = 1.15 \text{ year}^{-1}$ and $F = 0.79 \text{ year}^{-1}$. The length-weight relationship is $\log W = -1.3056 + 2.6117 \log L$, based on specimens ranging from 20 cm to 55 cm. The spawning period was determined as May-June.

The spawning season for *E. areolatus*, along the Kerala coast was determined as June to July. The length-weight relationship is $\log W = -1.2521 + 2.55772 \log L$ for females and $\log W = -0.8994 + 2.3287 \log L$ for males.

Length-weight relationship of the brown spotted serranid *E. chlorostigma* is estimated as $\log W = -2.7115 + 3.0425 \log L$ in the case of females and $\log W = -1.7501 + 2.8497 \log L$ for males.

The spawning season for this species was found to be during June-July. The length-weight relationship for the blue-lined snapper *Lutjanus rivulatus* is $\log W = -4.682 + 2.9562 \log L$ ($r = 0.9620$) which exhibited an isometric growth. The relative condition factor K_n indicated that older specimens measuring above 420 mm were more healthy and robust than the younger ones. *L. kasmira* has been found to spawn only once during November-March. Length at first maturity was estimated as 20 cm and fecundity ranged from 42,100 to 3,32,620.

The length-weight relationship of *L. nebulosus* has been estimated as $\log W = -4.5364 + 2.9078 \log L$.

Yet another study described the length-weight relationship of the same species by the equation $\log W = -2.0830 + 3.1901 \log L$ from Mandapam waters.

In *E. tauvina*, fishes of 45-50 cm mature as females while those above 74 cm and weighing 11kg become males having ripe testes. In specimens of 66-72 cm length, the transitional gonads contain male as well as female tissues. Studies on the growth of juveniles of *E. tauvina* reared in coastal cages in the Gulf of Mannar, starting with juveniles of size 4-25 cm for different periods have indicated good results. Some observations have also been made on the morphometric and meristic characteristics and also on the fecundity and spawning habits of this species in the wild. Other studies include aspects on the sex inversion and natural spawning of this species in the onshore culture system. Good growth of 775g in 7 months was achieved in *E. malabaricus* of size 10 to 15 cm in onshore culture under controlled conditions.

4. Management

In view of the wide gap between estimates of potential yield and current yield of perches from the Indian waters, there is considerable scope for scaling up the exploitation. Perch grounds have been mainly located along the southern or peninsular regions of the Indian coast. Efforts have to be made to locate similar perch grounds along northwest and northeast regions, and effectively exploit them. Efforts also should be taken to develop and design suitable fishing gears and techniques to exploit these from the uneven non-trawlable grounds where they abound. But a few species like *Pristipomoides typus*, and *Epinephelus diacanthus* exploited from off Cochin and the bream *Lethrinus nebulosus*, exploited by different gears off Tuticorin, are facing high fishing pressure, and therefore need to be protected.

5. Suggested reading

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