NATIONAL BIORESOURCE DEVELOPMENT BOARD
Dept. of Biotechnology
Government of India, New Delhi

For office use:

MARINE BIORESOURCES

FORMS DATA ENTRY**:** Form- 1(general**)**

Fauna: √	Flora	Microorganisms

General Category: Vertebrata (Zooplankton) Fish larvae

Scientific name &Authority: *Rastrelliger kanangurta* (Cuvier) 1817 - Adult
Common Name (if available): Indian mackerel Language: English

Synonyms:	Author(s)	Status
Rastrelliger	Jorden and Starks	1908
Scomber canangurta	Cuvier	1829

Classification:

Phylum: Vertebrata	Sub-Phylum:	
Super class: Pisces	Class: Osteichthyes	Sub- Class: Actinopterygii
Super order: Teleostei	Order: Perciformes	Sub Order: Scombroidei
Super Family:	Family: Scombridae	Sub-Family: Scombrinae
Genus: *Rastrelliger*	Species: *kanangurta*	

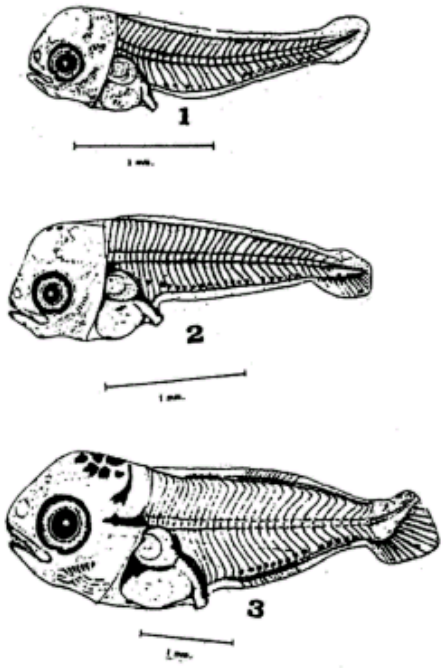
Authority: *Rastrelliger kanangurta* (Cuvier) 1817
Reference No.:
Cuiver, G. 1817. *Regene Animal*, **2**: 313.

Peter, K.J. (1967) Larvae of *Rastrelliger (*mackerel) from the Indian Ocean. *Bull. Nat. Inst. Sci. India,* 38,854-863.

Geographical Location: Tropical Indo – Pacific Coastal waters.
Latitude: Place:
Longitude: State:

Environment			
Freshwater:	Yes/ No	Habitat:	Salinity:
Brackish:	Yes/No	Migrations:	Temperature:
Salt Water:	Yes	Depth range :	

Picture (scanned images or photographs of larval stages)



Figs. 1-3. Larvae of *Rastrelliger* (Peter, 1967).
Fig. 1. 2.7 mm. larva. Fig.2. 3.1 mm. Fig 3. 5.3 mm. larva

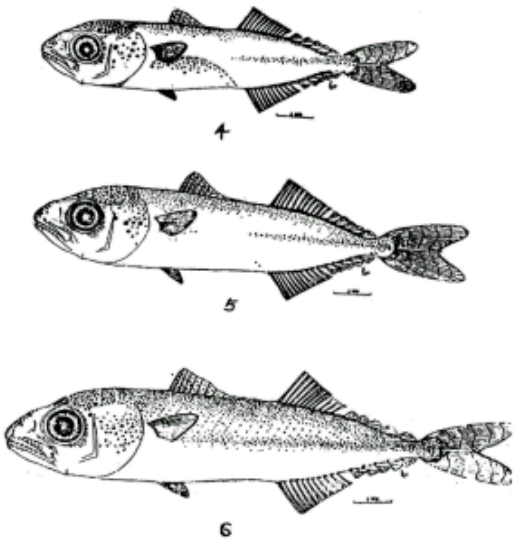


Fig.4-6. Juveniles of *Rastrelliger* (Balakrishnan and Rao 1971)
Fig.4. 16.9 mm. Fig. 5. 19.3 mm. Fig. 6. 22.4 mm.

DATA ENTRY FORM: Form –2 (Fish/ Shell fish/ Others) Ref. No.: (Please answer only relevant fields; add additional fields if you require) Form- 1 Ref. No.:
IMPORTANCE Landing statistics (t/y): from to Place: Ref . No.: Main source of landing: Yes/ No Coast: east/ west Importance to fisheries: Main catching method: Used for aquaculture: yes/ never/ rarely Used as bait: yes/no/ occasionally Aquarium fish: yes/ no/ rarely Game fish: yes/ no Dangerous fish: poisonous/ harmful/ harmless Bioactivity: locally known/ reported/ not known Details: Period of availability: Throughout the year – yes/ no If no, months:
SALIENT FEATURES: Morphological: Diagnostic characteristics:
Sex attributes: Descriptive characters:

Meristic characteristics:
Feeding habit:
Main food:
Feeding type:
Additional remarks:
Size and age:
Maximum length (cm) (male/ female/ unsexed) Ref. No.:
Average length (cm) (male/female/unsexed) Ref. No.:
Maximum weight: (g) (male/female/unsexed) Ref. No.:
Average weight: (g) (male/female/unsexed) Ref. No
Longevity (y) (wild): (captivity) Ref. No
Length/ weight relation ships:

Eggs and larvae: Eggs are pelagic, transparent, 0.7mm to 0.9mm in diameter, with single oil globule.

Larvae of Rastrelliger has fairly stubby body with thirty myomeres, big eyes, wide mouth, coiled intestine and a large head devoid of opercular spines. Pigmentation is less in very early larvae.

The earliest record of larvae from the Arabian sea and Bay of Bengal (1967) comprisied of only three larvae measuring 2.7mm, 3.1mm and 5.3mm (Figs 1-3). The 2.7mm larva has thirty well-defined myomeres, of which seven are abdominal and twenty-three are caudal. The alimentary canal is short and single coiled, the coiling being through the right side. The length of head measures 0.6mm, and height 0.6mm. The depth of the body at the region of the stomach is 0.7mm. The mandibles, maxillae, cleithra and opercula are ossified to a greater degree than the rest of the skeletal elements. The notochord is straight, and partly ossified. Mouth is rather wide, and the inner corner of mouth extending up to the base of the middle eye. The diameter of eye measures 0.3mm. The eyes are pigmented. The dorsal and anal fins are represented by the long finfold that extends through out the length of the body. The pectoral fins are represented by two flattened membraneous finfolds one on either side. The caudal has a symmetrical appearance with the tip of notochord passing through the centre. The dorsal part of the larva is quite unpigmented, whereas ventral part exhibits certain definite pattern of pigmentation. There are two pigment spots just below the stomach. Located at the anterior and posterior margins of the anal opening two pigment spots are noticeable. Posterior to the anal opening, a row of melanopores numbering up to fifteen is seen on the ventrolateral margin of the myomeres. They extend from 8^{th} to 29^{th} myomeres. But the 14^{th}, 15th,18^{th} and 30^{th} myomeres lack this pigmentation.

The 3.1 mm larva has a more stubby bodied appearance. The length of the head measures 1.5mm and the height, 1.6mm. The myomeres could be separated into 7 abdominal and 23 caudals. Some of the anterior myomeres have developed a zigzag pattern. The processes of branchiostegal rays and gill arches are noticeable. The eyes also show proportional increase in size, having a diameter of 0.4mm. The mouth lacks teeth at this stage. The notochord is still straight. The pectorals show a certain degree of advancement in their growth. They measure 0.3mm in length and are very conspicuous. At this stage the larva might be capable of swimming fast. The dorsal parts of stomach and alimentary canal are well pigmented. The pigmentation in the gut region is confined to the peritoneal cavity. On the top of the head are noticed two small pigment spots. The stomach and intestine retain the same pattern of pigmentation. Posterior to the anal opening as many as eighteen pigment spots could be counted. In the caudal region one pigment spot is noticed at the base of the hyural plates and another at the distal margin of the caudal rays.

The 5.3mm long larva is very deep bodied and short. In relation to the greater size of the head, the eyes also show a proportional increase in size (0.7mm in diameter). A lengthening of the intestine is also observed at this stage. The myomeres appear very compact and exhibit a high degree of zig zagging, indicating further advancement in the muscle differentiation towards the adult condition. Nine abdominal and twenty-one caudal myomeres could be demarcated. Ossification of principal caudal rays is already noticed. The vertebral column and urostyle are almost completely ossified. The second dorsal, though appearing like a memberanous finfold, shows signs of ossification of rays especially at the positions of the basals. Even though the entire finfold uniformly, exhibits a thickened margin towards the base through out its length,

the future position of the second dorsal is clearly indicated. On close examination as many as 12 thickened basals and an equal number of very thin supporting rays could be noticed. Even though the first dorsal is not yet formed, its future site is demarcated by the thickening noticed just anterior to the second dorsal. The anal also is almost in the same stage of development as the second dorsal. It is located just opposite to the second dorsal, having about 12 thickenned basals. The dorsal and anal finlets are not developed at this stage The caudal has under gone a higher degree of ossification than the dorsal and anal up to 15 caudal rays could be counted. The tip of the urostyle is curved upwards. Of all the fins, the pectorals are the most conspicuous with a high degree of muscular support. The total length of the fin including the stalk measures. 6mm. Six teeth are noticed in the upper jaw and four in the lower. Gill rakers are better developed. Four branchiostegal rays are clearly visible. The dorsal side of the head and the tip of the snout are pigmented. Pigmentation is also seen all over the stomach, especially in the peritoneal cavity. Pigment spots present at he anterior and posterior margins of the anal opening as in the previous stages are noticed in this stage too, but they appear to be darker. Two other pigment spots are also noticed just below the stomach. The ventro lateral row of pigment spots start from the 13th myomere is found to be unpigmented. On the caudal region three conspicuous pigment spots are present on the caudal fin also, of which two are below the hypurals and one towards the distal end of the fin rays. The melanophores on the occipital region and top of head form a more or less circular pattern. The number of ventral pigment spots is limited to14, and they exhibit some degree of fading.

The post larval and early juvenile stages (Figs. 4-6 Balakrishnan and Rao) resemble the adult in general appearance, with the comparatively long head, deep body and big eyes. In the 8.7 mm stage, the eyes are completely pigmented, jaw with few teeth and pre-opercle umarmed. All fins except 1st dorsal are well developed with full complements of rays. The first dorsal is low and has only 5 spines. There are 6 dorsal and anal finlets. Pectoral is fan shaped. Pelvic is small and thoracic in position. Finlets are interconnected by a membrane.

Pigmentation is localized characteristically to the tip of the snout, mid brain region, sides of the body adjacent to the visceral cavity and the base of vertical fins. In addition there are chromatophores, one on the tip of the lower jaw, 2 on the fore-brain, two to three on the hind-brain region and four on the operculum. Similarly 4 chromatophores in a row on the mid-lateral side of the caudal region and a single one in the middle of the fluke of caudal fin are present.

The 11.4 mm post larva has 6 teeth on the upper and seven on the lower jaw. Six spines are discernible in the first dorsal. Further increase in the pigmentation on the tip of the snout, dorsal side of head and opercle is recognizable. Four chromatophores have developed on the upper jaw. A single chromatophores in the preorbital area and a row of four in the post orbital are present. Interspinous membrane of the first dorsal is pigmented. The deep bodied and chubby early post larvae assumes a fusiform shape and increases in the density and pattern of pigmentation especially on the dorsal half as it grows (Figs. 1-6).

Ref. No.

Characteristics:

Abundance:

Biochemical aspects:

Proximate analysis: moisture/ fat/ protein/ carbohydrate/ash Ref. No.

Electrophoresis: Ref. No.

SPAWNING INFORMATION:

Locality: Main Ref.

Larvae are collected from the coastal waters of Arabian Sea, Bay of Bengal and Gulf of Thailand.

Season: Larval records coincide with the monsoon seasons.

Fecundity:

Comment:

MAJOR PUBLICATIONS (INDIAN):
(Include review articles, monographs, books etc.)

Peter, K. J. (1967) Larvae of *Rastrelliger* (Mackerel) from the Indian Ocean. *Bull. Nat. Inst. Sci. India*. **38**, 854- 863.

Balakrishnan V. and K.V. Narayana Rao (1971). Some post larval and juvenile stages of Indian mackarel *Rastrelliger kanangurta* (Cuvier) with notes on the changes in the body. *Indian J. Fish*., **14**, 97-114 (1971)

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ACKNOWLEDGEMENT:
(List of persons who contributed, modified or checked information)