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Description of two lesser known jacks of the genus, *Seriola* (Family: Carangidae) from Indian waters and their comparison with a closely related species, *Seriolina nigrofasciata* (Ruppell, 1829)

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Abstract

Two species of jacks, Almaco jack (*Seriola rivoliana*) and greater amber jack (*Seriola dumerili*) were collected from the landings by hooks and line operating in oceanic waters off Tuticorin beyond 70-100 m depth. The former species appeared in the catch in stray numbers recently while six specimens of the latter were landed only once in August 2007. Morphological and meristic studies of both species were made. Since another closely resembling species, the banded trevally (*Seriolina nigrofasciata*), occur regularly in the catch, a brief description of that species is also given for comparison.

Keywords: Jacks, banded trevally, carangid

Introduction

Fishes of the family Carangidae are widely distributed in the Indian waters, with large concentrations in coral and rocky beds. Members of this family are characterised with unique presence of two separate dorsal fins, lateral line scutes and two detached anal spines; but with wide variation in body shape, size, scale pattern and colouration (Smith-Vaniz, 1984). In jacks, the detached anal spines are externally visible only during their young stages. In adults they become resorbed or embedded under the skin. Lateral line scutes are also absent, but caudal peduncle is with dorsal and ventral fossae. Almaco jack (*Seriola rivoliana*) was reported to be present around India, including the Indian side of Gulf of Mannar. However, greater amber jack (*Seriola dumerili*) was reported to be available along the African coast. But Shameem and Dutt (1986) reported two specimens of *S. rivoliana* and one *S. dumerili* from Waltair fish market. But there is no mention in their report about the fishing area. This is for the first time that greater amber jack was observed in the catches off Tuticorin. This report provides the taxonomic and morphologic description of the two species.

Materials and methods

Catch and species composition of jacks and the related species, banded trevally landed at Tuticorin by different gears were monitored at weekly intervals during 2003-2007. Morphometric and meristic characters of 11 specimens of *S. rivoliana* and one specimen of *S. dumerili* and 32 specimens of banded trevally (*Seriolina nigrofasciata*) were studied following Hubbs and Lagler (1947) and Smith-Vaniz and Staiger (1973). Colourations of the specimens were recorded in fresh condition as far as possible. Based on the present data and other published information (Smith-Vaniz 1984; Shameem and Dutt, 1986), field identification keys for these species were developed. Data on the depth and nature of fishing grounds were collected by enquiry from the crew members of the fishing boats, which landed these species.

Results

Habitat, abundance and fishery of the species:

Seriola rivoliana Valenciennes 1833: Almaco jacks (Fig. 1) were landed regularly by multi-day hooks and line units operating in waters beyond

Fig. 1. *Seriola rivoliana* Valenciennes 1833

70 m depth. They were not observed in the catches from waters shallower than 70 m. Occasional landing of a few specimens of the species, when compared to the landings of other fishes by the same unit, indicated that they are only sparsely distributed in these grounds.

Seriola dumerili (Risso, 1810): Only six specimens of greater amber jacks (Fig. 2) were landed by multi-day hooks and line units which operated at depth beyond 100 m.

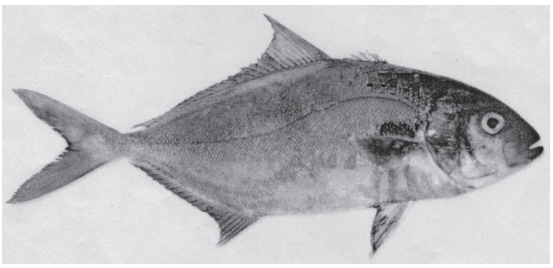

Fig. 2. *Seriola dumerili* (Risso, 1810)

Seriolina nigrofasciata (Ruppell, 1829): Banded trevally (Fig. 3) form a regular fishery by trawls operating in 30-70 m depth zone. They are also caught in gillnets, but in relatively small numbers. The annual landings by trawls at Tuticorin

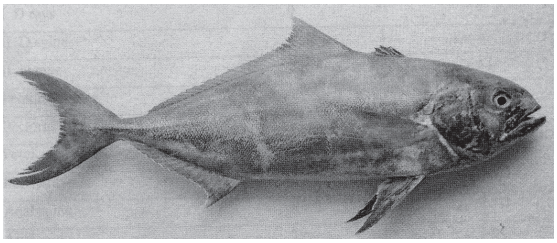

Fig. 3. *Seriolina nigrofasciata* (Ruppell, 1829)

varied between 9 and 21 tonnes with a mean of 14 t during 2000-'06. The annual landing by gillnet was about one tonne. The catch statistics indicated that a good stock of the species is available off Tuticorin.

Information on the fishing grounds provided by fishers indicated that jacks are present in deep rocky areas and banded trevally in shallow sandy and muddy bottom.

Distinguishing characters of the genera Seriola and Seriolina: The two genera are characterised by the presence of two separate dorsal fin, first one being relatively short, grooves on caudal peduncle and total absence of lateral line scutes. Genus *Seriolina* can be distinguished by elongate, relatively shallow and sub-cylindrical body, narrow upper jaw with broadly rounded end terminating below the posterior margin of the eye, presence of lateral cutaneous keel on caudal peduncle and longer pelvic fin than II D lobe. Genus *Seriola* is characterised with moderately deep and compressed body, truncate upper jaw with broad end terminating below at or before the anterior margin of the pupil, lack of cutaneous keel and short pelvic than II D lobe.

***Morphometric and meristic equations*:**

Seriola rivoliana

Fin formula: D_1 VII, D_2 I + 28, Anal II + I + 17, Pectoral I + 21(Table 1, 2). Lobe of second dorsal fin and anal longer than pectoral length, anal lobe however shorter than dorsal lobe, dorsal base long, 1.7-1.8 times of the anal base.

Gill formula: Upper lobe of first gill arch with 7 gillrakers and lower lobe with 19 (Total 26).

Branchial formula: Brancheostegal rays 6.

Body colour: Colouration highly variable, back grayish to blue green or olivaceous, flanks and belly paler, nape with a dark bar spread around the eye, a conspicuous dark line extending right from the upper jaw across the eyes to the origin of first dorsal, and then along the dorsal margin to the tip of second dorsal fin lobe on the anterior margin.

Pelvic spine and distal margin of anal fin whitish.

Seriola dumerili

Fin formula: D_1 VIII, D_2 I + 28, Anal II + I + 19 (detached spines embedded in the skin and apparently not visible externally), Pectoral, I + 21 (Table 1, 2). Dorsal lobe equal to pectoral length, anal lobe shorter than pectoral length, dorsal base long, 1.5 times of the anal base.

Gill formula: Upper lobe of first gill arch with 8 gill rakers and lower lobe with 17 (Total 25). Upper lobe of second gill arch with 3 rudimentary gill rakers and lower lobe with 13 (Total 16).

Branchial formula: Brancheostegal rays 7.

Colouration: Dark grey to olivaceous green above, lighter below, no conspicuous pigmentation on the body, fins dusky with dark margins.

Seriolina nigrofasciata

Fin formula: D_1 VI, D_2 I + 32, Anal II + I + 16, (detached spines embedded in the skin and apparently not visible externally), Pectoral I + 16 (Table 1, 2). Lobe of second dorsal fin longer than pectoral length, anal lobe shorter than pectoral length, pelvic conspicuously longer than second dorsal lobe, dorsal base long, and 2.1-2.2 times of the anal base.

Table 1. Meristic counts of two species of jack and one species of banded trevally

Meristic parameters	Meristic count (mean)		
	Seriola dumerili	*Seriola rivoliana*	*Seriolina nigrofasciata*
I D spine	8	7	6
I D rays	0	0	0
II D spine	1	1	1
II D rays	28	28	32
Pectoral spines	1	1	1
Pectoral rays	21	21	16
Pelvic spines	1	1	1
Pelvic rays	4	4	4
Anal spine	0 + 1	2 +1	2 + 1
Anal rays	19	17	16
Brancheostegal rays	7	6	6
Gillrakers on the upper limb of I gill arch	8	7	1 (rudiment)
Gillrakers on the lower limb of I gill arch	17	19	3 (rudiment)
Total gillrakers on I gill arch	25	26	4 (rudiment)
Gillrakers on the upper limb of II gill arch	3	0	0
Gillrakers on the lower limb of II gill arch	13	0	0

Gill formula: Upper lobe of first gill arch with one rudimentary gillraker and 3 on the lower lobe (Total 4 rudiment).

Branchial formula: Brancheostegal rays 6.

Body Colour: Back dark grey to black, belly paler. Young ones with 5-7 dark oblique bands more prominent dorsally, they disappear gradually with growth.

Field identification characters for the species

1. Body elongate, slightly compressed, moderately deep, upper jaw broad at end, terminate below the eye before the anterior margin of the

Table 2. Morphometric measurements and equation of two species of jack and one species of banded trevally

Morphological parameters	Measurements (mean in mm)			Ratio to Total length		
	S. dumerili	*S. rivoliana*	*S. nigrofasciata*	*S. dumerili*	*S. rivoliana*	*S. nigrofasciata*
Total length	489	509	361	-	-	-
Fork length	419	435	318	0.86	0.85	0.78
Standard length	371	394	281	0.76	0.77	0.78
Head length	104	118	72	0.21	0.23	0.20
Snout length	40.5	41	23	0.08	0.08	0.06
Eye diameter	21	21.5	13.5	0.04	0.04	0.04
Inter orbital width	36	48	33	0.07	0.09	0.09
Upper jaw length	44.5	47	32	0.09	0.09	0.09
Depth at caudal peduncle	22	20	10	0.04	0.04	0.03
,, ,, I D origin	121	123	75	0.25	0.24	0.21
,, ,, II D origin	131	131	81	0.27	0.26	0.23
,, ,, anal origin	114	111	68	0.23	0.22	0.19
Maximum body depth	131	131	82	0.27	0.26	0.23
Length- Snout to I D	139	144	91	0.28	0.28	0.25
Length- Snout to II D	185	189	127	0.38	0.37	0.35
Length- between I D and II D	5	9.5	53	0.01	0.02	0.01
Length- Snout to pelvic	116	127	92	0.24	0.25	0.26
Length- Snout to pectoral	101	115	84	0.21	0.23	0.23
Length- Snout to anal	244	246	197	0.50	0.48	0.30
Length- pelvic to anal	124	118	107	0.25	0.23	0.30
Length I D base	48	41	23	0.10	0.08	0.06
Length II D base	175	186	138	0.36	0.36	0.38
Length anal base	115	106	65	0.24	0.21	0.18
Dorsal height	77	93	60	0.16	0.18	0.17
Anal height	60	76	38	0.12	0.15	0.10
Pectoral length	77	67	54	0.16	0.13	0.15
Pelvic length	72	79	68	0.15	0.15	0.19
No. of specimens studied	1	11	32	1	11	32

pupil, height of second dorsal, 1.4 times and anal lobes 1.1-1.2 times of the pectoral length. A band on the nape extends around the eye; a conspicuous dark line extends backward from the upper jaw across the eye to the tip of the second dorsal lobe along the anterior margin. First gill arch with well developed gillrakers. Pelvic white ventrally, margin of anal fin fringed white.

Seriola rivoliana

2. Body elongate, slightly compressed, moderately deep, upper jaw broad at end, terminate below the eye before the anterior margin of the pupil, height of second dorsal equal to pectoral length, and anal lobe shorter 0.8 times of the

pectoral length. First gill arch with well developed gillrakers**.** Dark grey to olivaceous green above, lighter below, no conspicuous pigmentation on the body and fin.

Seriola dumerili

3. Body elongate, sub-cylindrical and shallow, upper jaw narrow rounded at end, terminates below before the posterior margin of the eye. First gill arch is with only rudimentary gillrakers. Body dark grey to black, belly paler. Young ones with 5-7 dark oblique bands on the body, more prominent dorsally, lobe tips of anal and second dorsal white.

S. nigrofasciata

Conclusion

Several species identification catalogues report occurrence of many species of carangids in the Indian waters. But many were not represented in the fishery till recent past. Due to the recent expansion of fishing operation to previously unexploited grounds, some of them are appearing now in the landings in varying quantities. *S. rivoliana* was reported as available along the Gulf of Mannar coast (Smith-Vaniz 1984); but has not been reported in the fishery. *S. dumerili* were reported along the South African coast only. Recently, *S. rivoliana* is entering the fishery along the Tuticorin coast in small numbers, and *S. dumerili* as a stray catch. Such appearances of previously less reported or new species in the catch can be attributed mainly to the extension of fishing operations to the new and deeper waters.

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