

A Detailed Species Re-description and Taxonomy of Oxeye Scad *Selarboops* (Cuvier, 1833) from the EEZ of the Andaman Islands

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Abstract

Identity of a species depends mainly on the original and subsequent descriptions of types as well as further reinforcements through re-descriptions. The present study re-describes *Selarboops* (Family Carangidae) from Andaman and Nicobar Islands during April 2022 using detailed morphological characters. Five specimens caught by gillnet operated from a motorized fishing craft from Shoal bay and landed in the Junglighat landing centre were used for biometric analysis. The identification was carried out based on standard identification keys. The morphometric measurements and meristic counts were compiled and compared with the same species from different geographical locations and other three species of the same Family. It was found that the morphometric and meristic characters of *S. boops* were in agreement with the *S. boops* reported from Philippines. A resemblance in morphometric characters were also found with *S. crumenophthalmus* and least similarity found with other genera of the family Carangidae. This study provides the first detailed description of morphometrics of *S. boops* from Andaman waters.

Key words: *Carangidae*, *Selarboops*, *morphometrics*, *Andaman and Nicobar Islands*, *Taxonomy*, *meristics*

Introduction

The Family Carangidae are diverse group of spiny-rayed fishes (Actinopterygii). Before, this family was placed under the Order Perciformes but after several molecular diagnostic snow it is classified under the Order Carangiformes (Betancur-Ret al. 2013 & Nelson et al. 2016). Fishes such as Amberjacks, Scads, Pompanos, Pilot fish, Rainbow runners are included in this family. They are one of the most economically important fishes in commercially, recreational, and culture fisheries. Globally 147 species of Carangidae belonging to 32 genera have been reported so far (Laroche et al. 1984 & Nelson et al. 2016). In Indian seas, there are a total of 66 species (Gopi & Mishra, 2015), although only 20 genera and 47 species (Mishra, 2013) are found along the east coast (Wakiya, 1924, Barman et al. 2007). Carangids are distributed throughout the Western Indian and Western Pacific Oceans (Fischer & Bianchi, 1984, Smith-Vaniz, 1984, Nelson, 2006). They are pelagic fishes and are found in all tropical and subtropical marine waters, some also occur in temperate regions (Honebrink, 2000)

Carangids constituted more diverse group of species of small in size and faster in growth (Kagwade,

1971, Sreenivasan, 1978, Reuben et al. 1992, Kasim & Hamsa, 1994, Kasim, 1999 a & b). The carangids are mostly schooling fishes and young ones are largely continental in distribution and occur primarily in brackish environment while others are oceanic pelagic (*Elagatis* and *Naucrates*). Most carangids are piscivorous (McConnell & Lowe-McConnell, 1987), but may display a variety of feeding behaviors, such as scale eating (Sazima, 1984), ambushing hunting behavior (Sancho, 2000), ram suspension-feeding (Sanderson et al. 1996, Sazima, 1998), and following behavior (Baird, 1993). Most *Caranx* species are diurnal predators, eats mainly fish and crustaceans from coastal waters (Randall, 1967, Potts, 1980, Sazima, 1986, Laprise & Blaber 1992, Brewer et al. 1994 & Sancho, 2000).

Carangids are exploited using different types and sizes of mechanized, motorized and non-motorized vessels ranging from dugout canoes to large trawlers, including catamarans, plank-built boats and many sorts of canoes with or without inboard or outboard engines. Fishing gears such as the trawl nets, gillnet, hooks & line, boat seine, shore seine, ring seine and purse seine are used for exploitation. For smaller and medium-sized species

most effective gears are pelagic trawl, shrimp trawl, ring-seine, and purse-seine, and for larger species drift gillnets and hooks & line are the most popular ones. Carangids are also caught in smaller quantities in the traditional gears like boat-seine and shore-seine (Nair,2000).

Carangids are widely distributed along both east and west coast of India mainly concentrated in rocky and coral beds representing 60 species having complex morphological and meristic characters, which makes their identification difficult. They contribute 9.17% of the total

annual marine fish landings in India (CMFRI, 2019). High commercial and ornamental value makes this group very important in marine fisheries (Abdussamad et al. 2007).

There are currently two recognized species in this genus: *Selarboops* and *S. crumenophthalmus*. The main difference between these two species is *S. crumenophthalmus* has less developed scutes (Joshi, 2011&Honebrink, 2000).The present study provides the first detailed morphometric description of *S. boops* from Andaman Islands.

Materials and methods

Study Area

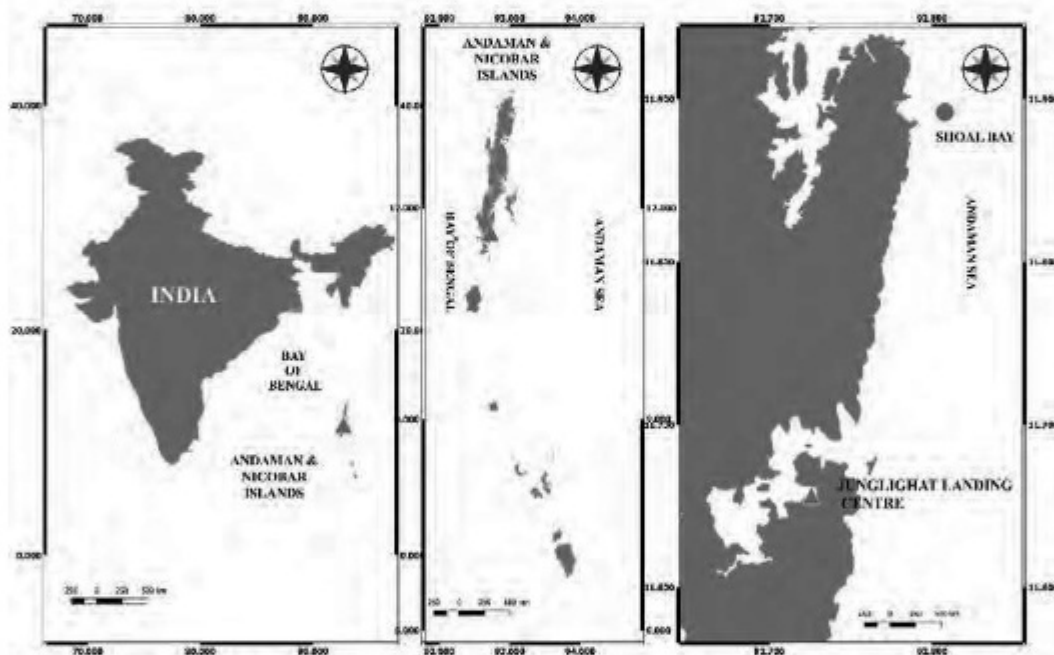


Fig 1: Shoal Bay, Andaman and Nicobar Islands

The present study was conducted from April to May 2022. Five specimens of *Selar boops* (length 154.7mm, 158.5mm, 259.8mm, 93.92mm & 153.94mm) were used for detailed analysis. The specimen were captured from Shoal bay off shore using a Trawl net in a mechanized fishing boat and landed at Junglighat fish landing center, Andaman and Nicobar Islands. The specimen were collected early in the morning from the landing centre and brought to laboratory. Clear photographs were taken

using high-resolution camera and identification was done by following the standard identification keys (Munro, 2000, Fischer & Bianchi 1984). The length and weight of the specimen were carried out by using a digital verniercaliper (model no: CD-6"ASX) and electronic weighing balance with an accuracy of 0.1mm and 0.1g. The morphometric measurements and meristic counts were recorded following the classical morphometric measurements described in Snoeks (2004).

The fin clip of the fish was transferred into ethanol for future molecular studies. Later the specimens were transferred for preservation. Specimens were fixed as soon as they were collected. A wide-mouthed glass container filled with a 10% formalin was used to fix the specimen. Preservation requires the use of buckets with tight lids. The specimen were kept as natural as possible. To facilitate penetration and preservation of internal organs, the formalin was injected into the body cavity.

Results

Taxonomy of *Selarboops*

Kingdom: Animalia (Linnaeus 1758)

Phylum: Chordata (Haeckel 1874)

Class: Actinopterygii (Klein 1885)

Order: Carangiformes (Betancur-R *et al.* 2013, Nelson *et al.* 2016)

Family: Carangidae (Bleeker 1851)

Genus: *Selar* (Bleeker 1851)

Species: *Selarboops* (Cuvier 1833)

Materials examined

Five specimens of *Selarboops* were collected (Length- 154.7 mm, 158.5 mm, 259.8 mm, 93.92 mm, 153.94 mm, Weight- 39 gm, 41 gm, 214 gm, 20 gm, 38 gm) from Junglighatfish landing centre.

Description

Body slender. Size varies. Dorsal side blue-green to green, ventral side silvery to silver-gold, stripe, yellow from gill opening upper end to caudal peduncle upper part, spot, black on opercle edge. Eyes very large (13% in SL), shorter than snout length (7.5% in SL), adipose eyelid well developed. Two nostrils. Body elongated and compressed moderately, dorsal less convex than ventral. Breast fully scaled. Scales are cycloid. Lateral line curved part longer than straight part, Lateral line scales only on curved part, none on straight part, lateral line scutes 43-46, large, strong. Pectoral fins falcate, anal fins first two spines detached. 7-8 1st dorsal fin spines, 2nd dorsal fin 25-26, Pectoral fin rays 17-20, Pelvic fin rays 5.



Fig 2 : A) Specimen *Selar boops*

Table 2. The morphometrics of *Selarboops* from Junglighat fish landing centre, Port Blair (% in SL)

| Morphometric measurements | Mean \pm SD (5 Nos.) |
|--|------------------------|
| Standard length (mm) | 100 \pm 0.00 |
| Fork length (mm) | 114 \pm 0.11 |
| Head length (ratio % of SL) | 36.3 \pm 0.57 |
| Head depth (ratio % of SL) | 29.5 \pm 0.84 |
| Snout length (ratio % of SL) | 7.5 \pm 0.98 |
| Upper jaw (ratio % of SL) | 16.6 \pm 0.58 |
| Lower jaw (ratio % of SL) | 20.4 \pm 0.83 |
| Pre -orbital length (ratio % of SL) | 9.3 \pm 0.87 |
| Inter orbital length (ratio % of SL) | 9.5 \pm 0.67 |
| Post orbital length (ratio % of SL) | 25.4 \pm 0.83 |
| Eye diameter (ratio % of SL) | 13.0 \pm 0.78 |
| Body depth (ratio % of SL) | 33.3 \pm 0.67 |
| pelvic fin base (ratio % of SL) | 6.9 \pm 0.48 |
| pelvic fin length (ratio % of SL) | 16.3 \pm 0.17 |
| Pre pelvic fin length (ratio % of SL) | 42.1 \pm 0.96 |
| Pectoral fin length (ratio % of SL) | 30.6 \pm 0.43 |
| Pre pectoral fin length (ratio % of SL) | 35.9 \pm 0.48 |
| Pectoral fin base (ratio % of SL) | 5.2 \pm 0.62 |
| 1st Pre dorsal length (ratio % of SL) | 44.9 \pm 0.55 |
| 2nd Predorsal length (ratio % of SL) | 64.2 \pm 0.94 |
| 2nd dorsal fin (ratio % of SL) | 18.3 \pm 0.54 |
| 1st dorsal fin base length (ratio % of SL) | 16.4 \pm 0.35 |
| 2nd dorsal fin base length (ratio % of SL) | 43.2 \pm 0.44 |
| inter dorsal space (ratio % of SL) | 4.2 \pm 0.90 |
| Caudal peduncle length (ratio % of SL) | 8.4 \pm 0.09 |
| Caudal peduncle depth (ratio % of SL) | 5.8 \pm 0.65 |
| Anal fin base (ratio % of SL) | 37.8 \pm 0.88 |
| Anal fin length (ratio % of SL) | 16.0 \pm 0.40 |
| Pre anal fin length (ratio % of SL) | 70.3 \pm 0.90 |
| Caudal fin length (ratio % of SL) | 34.1 \pm 0.35 |

Table 3. Morphometric measurement (% in HL)

| Morphometric measurements | Mean \pm SD (5 Nos.) |
|--------------------------------------|------------------------|
| Head length (mm) | 100 \pm 0.00 |
| Head depth (ratio % of HL) | 82.0 \pm 5.23 |
| Snout length (ratio % of HL) | 20.8 \pm 4.61 |
| Upper jaw (ratio % of HL) | 45.8 \pm 0.95 |
| Lower jaw (ratio % of HL) | 56.0 \pm 2.33 |
| Pre orbital length (ratio % of HL) | 25.7 \pm 1.12 |
| Inter orbital length (ratio % of HL) | 26.4 \pm 2.58 |
| Postorbital length(ratio % of HL) | 69.8 \pm 1.56 |
| Eye diameter (ratio % of HL) | 35.8 \pm 1.79 |

Table 4: The meristic of *Selarboops* from Junglighat fish landing centre, Port Blair

| Sl.no | Meristics | SEBO-1 | SEBO-2 | SEBO-3 | SEBO-4 | SEBO-5 |
|-------|--|--------|--------|--------|--------|--------|
| 1 | 1st Dorsal fin spines | 8 | 8 | 8 | 7 | 8 |
| 2 | 2nd Dorsal fin rays | 26 | 25 | 26 | 25 | 26 |
| 3 | Pectoral fin rays | 20 | 18 | 18 | 14 | 18 |
| 4 | Pelvic fin rays | 5 | 5 | 5 | 5 | 5 |
| 5 | Anal fin rays | 21 | 20 | 21 | 21 | 21 |
| 6 | Scutes | 70 | 65 | 70 | 68 | 66 |
| 7 | Gill rakers lower | 25 | 25 | 25 | 23 | 25 |
| 8 | Gill rakers upper | 11 | 9 | 9 | 12 | 11 |
| 9 | Scales on curved portion of lateral line | 25 | 22 | 22 | 22 | 21 |
| 10 | Scales on straight portion of lateral line | 45 | 43 | 48 | 46 | 45 |

Discussion

The study of morphometric and meristic characteristics in fishes is important because they are used for the differentiation of taxonomic units and are able to spot differences between fish populations (Aisyah & Syarif,

2019). The morphometric description on *Selarboops* is scarce and the information available is in www.fishbase.org describes only few characters. The morphometric and meristic characters of *Selarboops* were recorded and compared with the same species, same genus, and same family from different geographical locations. It

was found that the morphometric measurements were in agreement with the specimen from Philippines (Froese & Pauly, 2022). But percentage of head length and pre-anal fin length were observed with minor differences in value shown in the Table 6. The morphometric and meristic value of *Selarboops* and *Selarcrum enophthalmus* were similar

since they are from the same genus (Table 5 & 6). Major differences in values were found in the morphometric comparisons with *Alepesvari* from the coast of Pakistan (Masood, 2022) and *Selaroides leptolepis* from the coast of North Jakarta (Sawalman, 2020) since the species is from a different genus (Table. 7).

Table 6: Comparison of Morphometrics characters of the genus *Selar*

| Measurement | <i>Selarboops</i> | <i>Selarboops</i> | <i>Selarcrumrnophthalmus</i> |
|-----------------------------------|-------------------------|-----------------------|------------------------------|
| | (% TL) Present study | (% TL) Philippines | (% TL) Philippines |
| Fork length | 86.9 | 88.2 | 89.8 |
| Standard length | 76.1 | 83.5 | 86 |
| Head length | 27.1 | 22.5 | 24.4 |
| Pre orbital length (% HL) | 25.7 | 18.8 | 25 |
| Eye diameter (% HL) | 35.8 | 39.1 | 33.1 |
| Body depth | 23.9 | 26 | 23.8 |
| Pre pelvic fin length | 28.3 | 26 | 28.8 |
| Pre pectoral fin length | 24.4 | 23.2 | 25.1 |
| 1 st Pre dorsal length | 30.8 | 28.8 | 30.9 |
| Pre anal fin length | 48.9 | 42.9 | 48.5 |

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Disclosure statement

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Table 7: Comparison of Morphometric characters of the family Carangidae

| Parameters | <i>Selarboops</i> (Oxeye scad) | <i>Selaroidesleptolepid</i> (yellowstripscad) | <i>Alepesvari</i> (Herring scad) |
|--|-----------------------------------|--|-------------------------------------|
| Total length (mm) | | 11.76 ± 0.73 | 258.9±42.4 |
| Standard length (mm) | 100 ± 0.00 | 9.93 ± 0.76 | 184.3±32.1 |
| Fork length (mm) | 114 ± 0.11 | * | 224.3 ±36.8 |
| Head length (ratio % of SL) | 36.3 ± 0.57 | 2.26 ± 0.33 | 51.5 ±8.1 |
| Head depth (ratio % of SL) | 29.5 ± 0.84 | 2.28 ± 0.21 | * |
| Snout length (ratio % of SL) | 7.5 ± 0.98 | * | * |
| Upper jaw (ratio % of SL) | 16.6 ± 0.58 | * | * |
| Lower jaw (ratio % of SL) | 20.4 ± 0.83 | * | * |
| Pre -orbital length (ratio % of SL) | 9.3 ± 0.87 | * | * |
| Inter orbital length (ratio % of SL) | 9.5 ± 0.67 | * | * |
| Post orbital length (ratio % of SL) | 25.4 ± 0.83 | * | * |
| Eye diameter (ratio % of SL) | 13.0 ± 0.78 | 0.82 ± 0.22 | * |
| Body depth (ratio % of SL) | 33.3 ± 0.67 | 3.26 ± 0.16 | 77.6 ±11.6 |
| pelvic fin base (ratio % of SL) | 6.9 ± 0.48 | * | 7.5 ±1.7 |
| pelvic fin length (ratio % of SL) | 16.3 ± 0.17 | * | 23.2 ±5.6 |
| Pre pelvic fin length (ratio % of SL) | 42.1 ± 0.96 | 3.58 ± 0.55 | * |
| Pectoral fin length (ratio % of SL) | 30.6 ± 0.43 | * | 13.4 ±4.7 |
| Pre pectoral fin length (ratio % of SL) | 35.9 ± 0.48 | * | * |
| Pectoral fin base (ratio % of SL) | 5.2 ± 0.62 | 2.57 ± 0.43 | 63.8±12.5 |
| 1st Pre dorsal length (ratio % of SL) | 44.9 ± 0.55 | | 72.3 ±11.6 |
| 2nd Predorsal length (ratio % of SL) | 64.2 ± 0.94 | * | * |
| 2nd dorsal fin (ratio % of SL) | 18.3 ± 0.54 | * | * |
| 1st dorsal fin base length (ratio % of SL) | 16.4 ± 0.35 | * | 29.0±4.9 |
| 2nd dorsal fin base length (ratio % of SL) | 43.2 ± 0.44 | * | * |
| inter dorsal space (ratio % of SL) | 4.2 ± 0.90 | * | * |
| Caudal peduncle length (ratio % of SL) | 8.4 ± 0.09 | * | * |
| Caudal peduncle depth (ratio % of SL) | 5.8 ± 0.65 | 0.41± 0.08 | * |
| Anal fin base (ratio % of SL) | 37.8 ± 0.88 | 1.89 ± 0.44 | 79.8±12.7 |
| Anal fin length (ratio % of SL) | 16.0 ± 0.40 | * | 25.8 ±4.3 |
| Pre anal fin length (ratio % of SL) | 70.3 ± 0.90 | * | * |
| Caudal fin length (ratio % of SL) | 34.1 ± 0.35 | * | * |

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