3

Field Identification of Tunas from Indian Waters

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The Family Scombridae is one of the largest and most economically important fish family which comprises of most advanced scombroid fishes such as mackerels, tunas and bonitos with 54 valid species in 15 genera (Collette *et al*., 2001). Among them, tunas are one of the important food fishes exploited all over the world. Altogether 9 species in 6 genera are contributing to the Indian tuna fisheries. Indian tunas are classified into two categories such as (i) Coastal tuna and (ii) Oceanic tuna. *Euthynnus affinis, Auxis thazard, A. rochei,* and *Sarda orientalis* are considered as coastal tuna where as *Thunnus albacares, T. obesus, T. tonggol, Katsuwonus pelamis,* and *Gymnosarda unicolor* are mostly oceanic in nature. Among all tuna species, yellow fin and big eye tunas are growing into bigger size and having high export demand due to the superior meat quality. Identification of these tuna species are relatively easier for freshly caught specimens. The iced or frozen fishes are very difficult to identify as a result of discolouration, fin damage, skin damage, change in body shape due to handling and storage process.

In such condition the internal characteristics such as air bladder length, striation on liver and shape would be the better option to identify both the species, but it causes several practical difficulties for surface fisheries. Even though yellow fin and big eye tunas are easiest to identify in fresh condition, misidentification of both the species occurs in several cases mostly in case of juveniles and spoiled one as two species are morphologically very similar, especially < 40 cm FL. Hence, correct identification of both the species is highly essential in order to estimate the catch statistics accurately for both tuna species separately along the Indian coast.

Family: Scombridae (Tunas, Bonitos, Mackerels, Seerfishes, and Wahoo)

Diagnostic characters: Scombroid fishes having elongate and fusiform body with pointed snout. Adipose eyelid is present in some genera (*Rastrelliger* & *Scomber)*. Double dorsal fin, the first dorsal is generally short and separated from second dorsal fin. Finlets are present behind both dorsal and anal fins. Caudal fin is deeply forked with minimum 2 small keels on each side of caudal peduncle, a larger keel in between two small keels in several species (e.g. tuna, bonito, seerfish and wahoo). Inter-pelvic process is either single or double (tuna). Body either entirely covered with small to moderate sized scales (*Rastrelliger, Scomber, Scomberomorus*) or with a well-developed corselet i.e. the area behind head and around pectoral fins usually covered with moderately large and thick scales, rest of the body scale less (e.g. *Auxis, Euthynnus, Katsuwonus*) or covered with small scales (e.g. *Thunnus*).

Colour and body pattern: *Rastrelliger* species having one or two horizontal rows of spots on each side of back where as *Scomber* species having wavy bands on upper sides. *Scomberomorus* and *Acanthocybium* are blue-grey above and silvery below with dark vertical bars or spots on sides. *Sarda* has 5 to 11 dark oblique stripes on back and *Euthynnus* has a striped pattern on back and several dark spots between pectoral and pelvic fins. *Katsuwonus* has 4 to 6 conspicuous

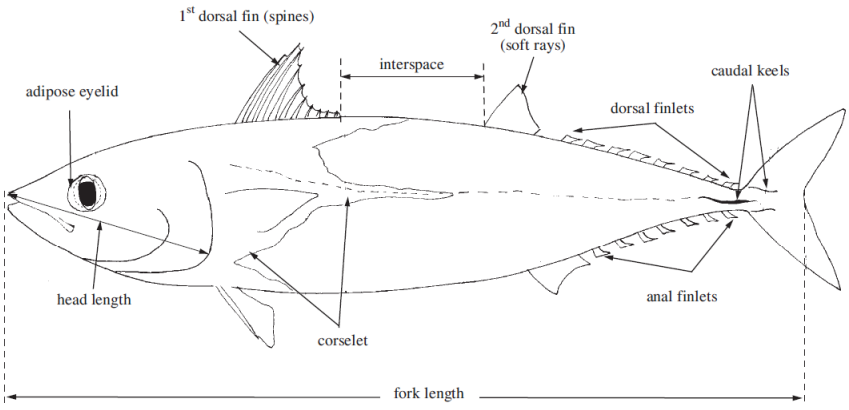


Fig.1 General features of a typical scombroid fish species

longitudinal stripes on belly. Most species of *Thunnus* have bright yellow finlets with black borders.

Key to the species of tuna occurring in the area

A simple identification key for the Indian tuna species based on the field observation and the keys given by Collette (2001) and Itano (2005).

1. Two small keels and a large median keel between them on either side of caudal peduncle (Fig. 2); 7 to 10 dorsal and 7 to 10 anal finlets; adipose eyelids absent; teeth in jaws slender, conical, hardly compressed; corselet of scales well developed

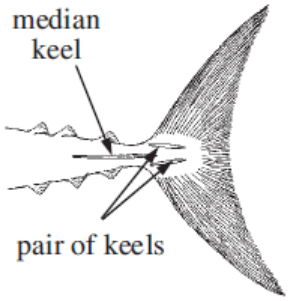


Fig.2 caudal keel

2a. Upper surface of tongue without cartilaginous ridges (Fig.3a) 3

2b. Upper surface of tongue with cartilaginous ridges (Fig.3b) 4

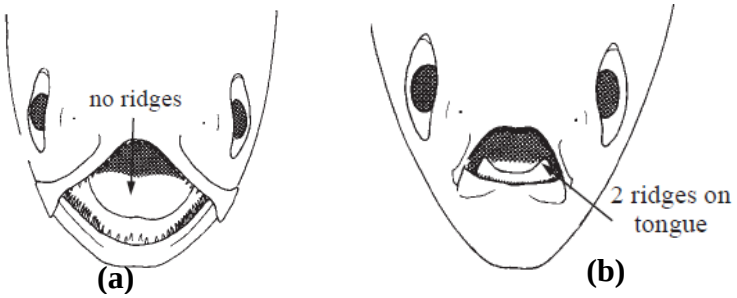


Fig.3 Anterior view of head

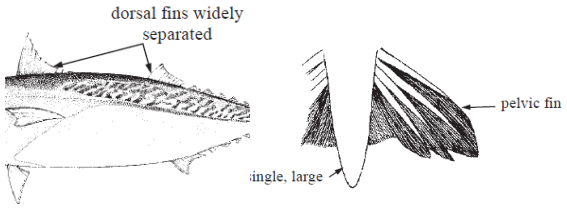
3a. Five to eleven narrow, dark longitudinal stripes on upper part of the body (Fig. 4), no teeth on tongue .....*Sarda orientalis*

Fig.4 *Sarda orientalis*

3b. Body without stripes or dark spots above lateral line (Fig.5)..... .....*Gymnosarda unicolor*

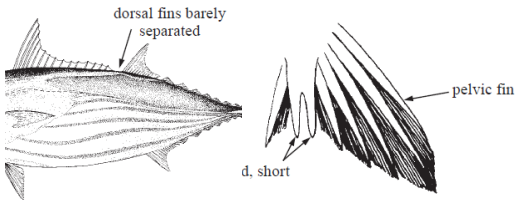
Fig.5 *Gymnosarda unicolor*

4a. First and second dorsal fins are widely separated (Fig. 6a), first dorsal fin spine X to XII; interpelvic process single and large (Fig. 6b) .....(*Auxis*) 5



a) **(b)**

Fig. 6



(a) **(b)**

Fig. 7

4b First and second dorsal fin base not separated (Fig. 7a), first dorsal fin spine first dorsal fin spine XII to XVI; interpelvic process bifid and short (Fig. 7b) .....*Katsuwonus*, *Euthynnus*, Thunnus.....6

5a. Body slightly compressed laterally; Posterior extension of corselet narrow; dorsal naked area extends anterior to tips of pectoral fins; gill rakers 36 to 42 on first gill arch; 15 or more nearly horizontal oblique dark comparatively narrow wavy lines in scale less area (Fig. 8) .....*Auxis thazard*

Fig. 8 *Auxis thazard*

5b. Body rounded; Posterior extension of corselet wide; dorsal naked area does not extend anterior to tips of pectoral fins; gill rakers 43 to 48 on first gill arch; 15 or more nearly vertical dark bar in scale less area (Fig. 9) .....*Auxis rochei*

Fig. 9 *Auxis rochei*

6a. Four to six dark longitudinal stripes on belly (Fig. 10); gill rakers on first gill arch 53-63.....*Katsuwonus pelamis*

Fig. 10 *Katsuwonus pelamis*

6b. No dark longitudinal stripes on belly; gill rakers on first gill arch 19-45.....*Euthynnus*, *Thunnus*.....7

7a. Body naked behind corselet, several black blotches present between pectoral and pelvic fin base fin base (Fig. 11); a number of blue-black broken wavy lines directed backwards and upwards behind the corselet; pectoral fin rays 25-29 .....*Euthynnus affinis*

Fig. 11 *Euthynnus affinis*

7b. Body covered with small scales behind the corselet, no black blotches on body (Fig. 12), pectoral rays 30-36..... (*Thunnus*)..... 8

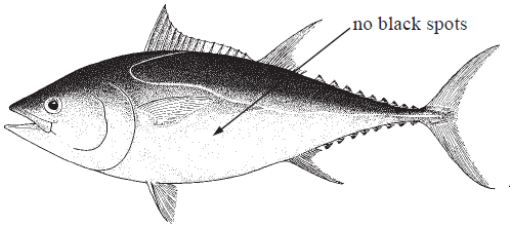


Fig. 12 *Thunnus*

8a. Belly silvery white with rows of oval shaped pale spots/streaks arranged horizontally; finlets yellow with grey margin (Fig. 13); Second dorsal and anal fins never greatly elongate, less than 20% of fork length at all sizes; caudal region comparatively long and slender .....*Thunnus tonggol*

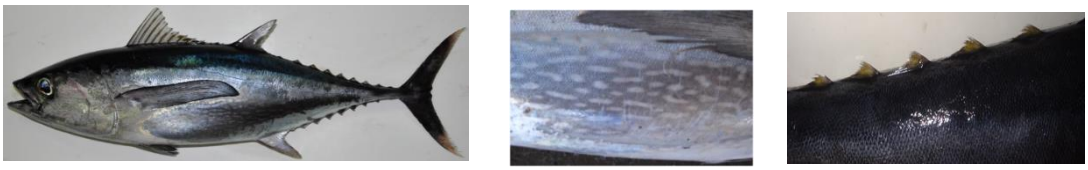


Fig. 13 *Thunnus tonggol*

8b. Body with vertical lines or marks; finlets yellow with black margin in fresh condition (Fig. 14) 9

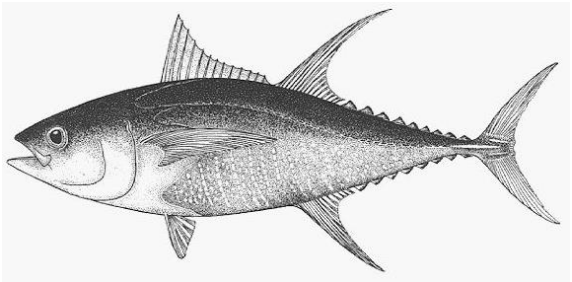


Fig. 14

9a. Three rounded lobes of equal size and ventral surface striated; swim bladder large, occupies entire body cavity; widely spaced white lines or marks in fresh condition; finlets with thick black margin; large head and eye as compared to yellowfin tuna of same FL; Second dorsal and anal fin short in adult; central portion of fork region forms a flat or slightly crescent shaped area (Fig. 15).....*Thunnus obesus*

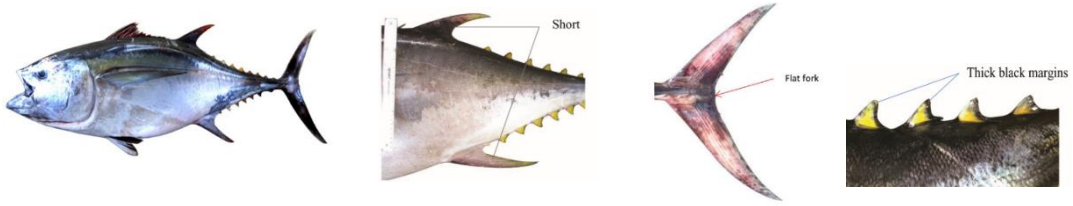


Fig. 15 *Thunnus obesus*

9b. Right lobe longer and thinner than the rounded medial and left lobes, lobe without striations; swim bladder small and occupies only anterior half of body cavity; closely spaced silvery lines; finlets with very thin or no black margin; small head and eye as compared to bigeye tuna of same FL; second dorsal and anal fin greatly elongated in adults; central portion of fork region forms "V" or "M" notch distinct notch in adult (Fig. 16).....*Thunnus albacares*

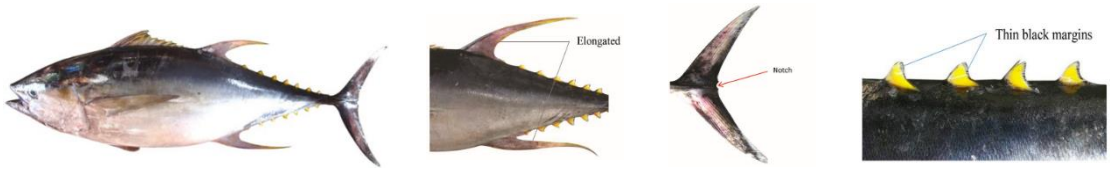


Fig. 16 ***Thunnus albacares***