

CHAPTER 16



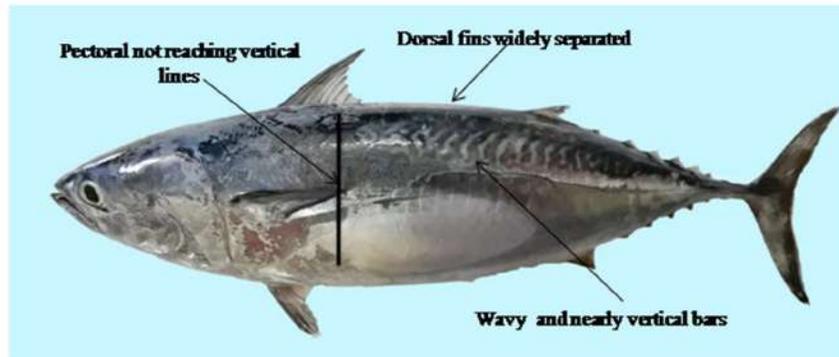
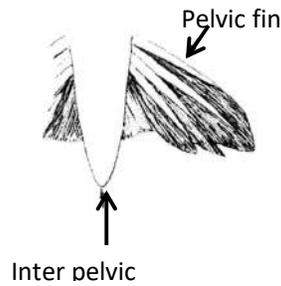
Taxonomy of Tunas, Seerfish, Barracudas, Cobia and Dolphinfish

Tunas

Tunas belonging to the family Scombridae are known for their cosmopolitan distribution, occurring both in temperate and tropical waters. In Indian waters, they are represented by nine species belonging to six genera. Among these, five species, Kawakawa (*Euthynnus affinis*), frigate tuna (*Auxis thazard*), bullet tunas (*Auxis rochei*), longtail tuna (*Thunnus tonggol*) and bonito (*Sarda orientalis*) occur in coastal/neritic waters. Oceanic species in the Indian waters are represented by yellowfin tuna (*Thunnus albacares*), skipjack tuna (*Katsuwonus pelamis*), dogtooth tuna (*Gymnosarda unicolor*) and bigeye tuna (*Thunnus obesus*). They are distributed all along the mainland and Island territories of India. Coastal tunas have been exploited both as an incidental by-catch and also as a targeted resource. Oceanic tunas are being exploited as a targeted fishery in some parts of the country and as an incidental catch in several coastal states. They are mainly exploited by gillnets, longlines, handlines, pole and lines, troll lines, purse seines, ring seines and trawls based on the fishing ground and targeted species.

Auxis rochei (Risso, 1810), Bullet tuna

It is a small sized coastal species usually available in the size range of 15-25 cm in commercial catches. It has 9-12 dorsal spines (total from both the dorsal fins) and 10-13 dorsal soft rays (total). Anal fins have 12-14 soft rays, without spines. The body colouration is black bluish with deep purple or almost black on head and a white belly. Upper part of the body is bluish in colour and devoid of scales with 15 or more fairly broad nearly vertical dark wavy bars. Two dorsal fins are widely separated from each other. Pectoral fins short, not reaching vertical line from anterior margin of scaleless area above corselet. Long tapering and wide corselet of scales present in 6 rows below second dorsal fin. A large, single-pointed flap (interpelvic process) present between pelvic fins. A strong central keel on each side of caudal-fin base between 2 smaller keels.

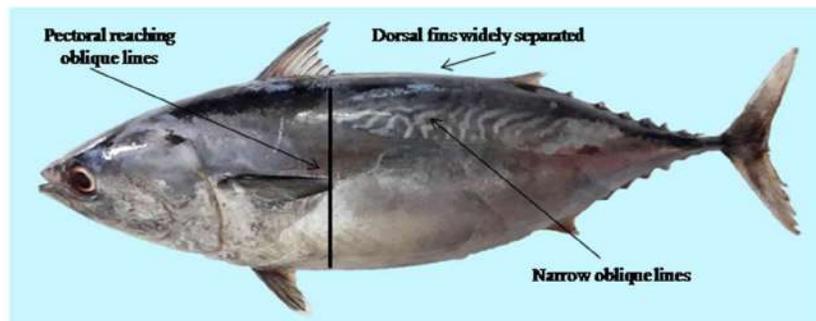


* Source: Manas, H. M., Scientist, ICAR-CMFRI, Visakhapatnam

Fig. 1. *Auxis rochei* (Bullet tuna)

***Auxis thazard* (Lacepede, 1800), Frigate tuna**

It is a medium sized coastal tuna having robust body usually available in the size range of 20-40 cm. It has 10-12 dorsal spines (total from both the dorsal fins) and 10-13 dorsal soft rays (total). Anal fin having 10-14 soft rays, without spines. Pectoral fins short, but reaching past vertical line from anterior margin of scaleless area above corselet. A large single-pointed flap (interpelvic process) present between pelvic fins. Body naked except 4-5 rows of scales on body confined to corselet. A strong central keel on each side of caudal-fin base between 2 smaller keels. A pattern of 15 or more, narrow oblique to almost horizontal dark wavy lines exists in scaleless area above the lateral line.



* Source: Manas, H. M., Scientist, ICAR-CMFRI, Visakhapatnam

Fig. 2. *Auxis thazard* (Frigate tuna)

***Euthynnus affinis* (Cantor, 1849), kawakawa/ little tunny**

A medium-sized fish with a robust, elongate and fusiform body occurs in coastal waters usually landed in the size range of 40 – 60 cm. Two dorsal fins separated by only a narrow inter-space (not wider than eye). First dorsal with 11 to 14 spines, anterior spines of first much higher than

those mid-way, giving the fin a strongly concave outline; second dorsal fin much lower than first and followed by 8 to 10 finlets. Pectoral fins short and not reaching the inter-space between the dorsal fins. Two flaps present between pelvic fins as interpelvic processes. Anal fin followed by 6 to 8 finlets. Body naked and scales present only in corselet and lateral line. A very slender caudal peduncle with a prominent lateral keel between two small keels at the base of caudal fin. Several black blotches present between pectoral and pelvic fin base. Numerous blue-black broken wavy lines directed backwards and upwards behind the corselet.

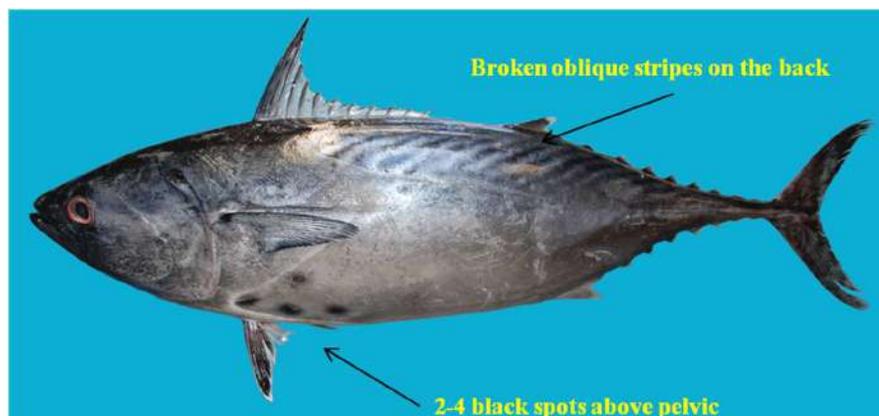
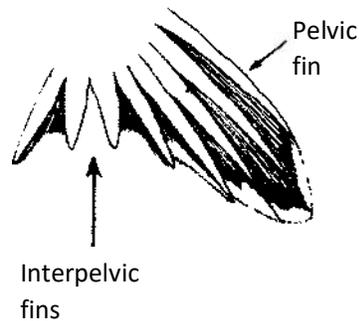


Fig. 3 *Euthynnus affinis* (Kawakawa/Little tunny)

***Katsuwonus pelamis* (Linnaeus, 1758), Skipjack tuna**

It is an Oceanic species having robust body normally landed in the length range of 50-60 cm. Two dorsal fins separated by a small interspace (not larger than eye), with 14 to 16 spines in the first dorsal fin. 7 to 9 finlets present after second dorsal fin. Pectoral fins short, with 26 or 27 rays. 2 flaps (interpelvic process) present between pelvic fins. Anal fin followed by 7 or 8 finlets. Strong keel between 2 smaller keels present on each side of the base of caudal fin. Four to six dusky to black conspicuous longitudinal bands are there on each side of the body.

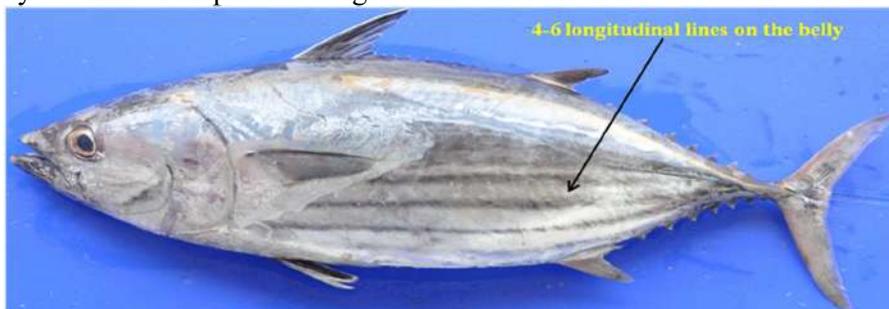


Fig. 4. *Katsowonus pelamis* (Skipjack tuna)

***Sarda orientalis* (Temminck & Schlegel, 1844), Oriental bonito**

It is a small and slender bodied coastal tuna landed in the size range of 30 - 50 cm along the Indian coast. Mouth wide with the upper jaw reaching beyond the hind margin of eye. Dorsal fins close together with the first spine very long, (17 to 19 spines) and straight. Only 7 to 9 dorsal and 6 or 7 anal finlets present. Pectoral fins short; pelvic fins separated by 2 flaps (interpelvic process). Lateral line is conspicuously and wavy. Body entirely covered with small minute scales except on well developed corselet. Caudal peduncle slender, with a prominent lateral keel between two smaller keels on each side. Five to eleven dark slightly oblique stripes running forward and downward.



* Source: Abdul Azeez, P., Scientist, ICAR-CMFRI, Veraval.

Fig. 5. *Sarda orientalis* (Oriental bonito)

***Gymnosarda unicolor* (Ruppell, 1838), Dogtooth tuna**

Body slender and elongate without any spots or stripes. It is landed in the size range of 40-60 cm along the Indian Coast. Dorsal fins close together, the first (spiny) long (13 to 15 spines) and its border almost straight. Second dorsal fin and anal fin followed by 6 or 7 and 6 finlets respectively. Pectoral fins with 25 to 28 rays. Interpelvic process large and single. Lateral line strongly undulating, a well developed lateral keel between 2 smaller keels on each side.



Fig. 6. *Gymnosarda unicolor*, Dogtooth tuna

***Thunnus albacares* (Bonnatere, 1788), Yellowfin tuna**

Body fusiform and elongated with metallic blue or blue black coloration on upper part. Belly portion with about 20 broken almost vertical pale lines. Entire body covered with very minute scales. Two dorsal fins, separated only by a narrow interspace, the second followed by 8 to 10 finlets; anal fin followed by 7 to 10 finlets; 2 flaps (interpelvic process) between pelvic fins. large specimens have very long second dorsal and anal fins, becoming well over 20% of fork length; pectoral fins moderately long, usually reaching beyond second dorsal fin origin but not beyond end of its base. Caudal peduncle very slender, bearing on each side a strong lateral keel between 2 smaller keels.

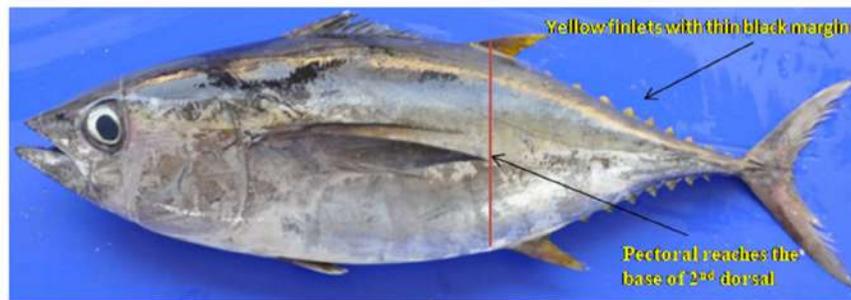
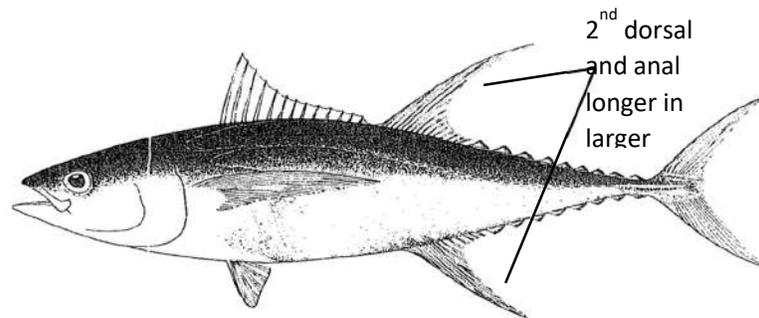
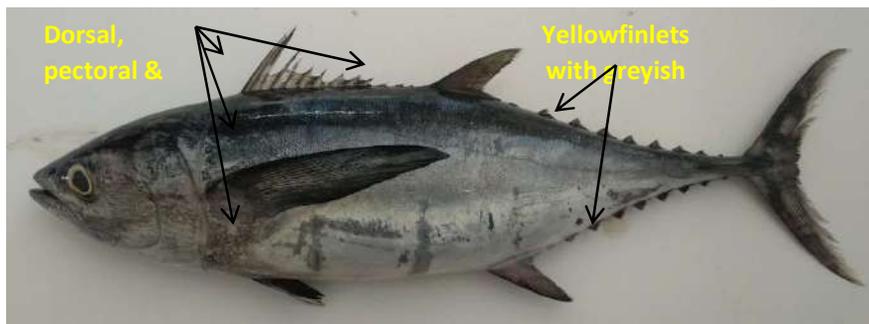


Fig. 7. *Thunnus Albacares*, Yellowfin tuna

***Thunnus tonggol* (Blecker, 1851), Longtail tuna**

Body fusiform with very minute scales, upper part with bluish black and lower part of belly with pale streaks or spots. Tips of second dorsal and anal fin faintly tinged with yellow. Two dorsal fins, separated only by a narrow interspace, the second higher than the first and followed by 9 finlets; anal fin followed by 8 finlets 2 flaps (interpelvic process) between pelvic fins.



*Source: Abdul Azeez, P., Scientist, ICAR-CMFRI, Veraval.

Fig. 8. *Thunnus tonggol*, Longtail tuna

***Thunnus obesus* (Lowe, 1839), Bigeye tuna**

A large oceanic tuna slightly compressed laterally with very broad and robust body covered with scales. Upper part of the body black to greenish blue with silvery white colouration on sides and belly. Two dorsal fins, separated only by a narrow interspace, the second followed by 8 to 10 finlets. Pectoral fins moderately long in large specimens but very long in smaller specimens. 2 flaps (interpelvic process) present between pelvic fins. Anal fin followed by 7 to 10 finlets. Caudal peduncle very slender, with a strong lateral keel between 2 smaller keels.

Seerfish

Seerfishes comes under the family Scombridae, Four species belonging to two genera are distributed in Indian waters; *Scomberomorus commerson* (Narrow-barred Spanish mackerel), *Scomberomorus guttatus* (Indo-Pacific mackerel), *Scomberomorus lineolatus* (Streaked Spanish mackerel) and *Acanthocybium solandri* (Wahoo). Among these, *S. commerson* and *S. guttatus* forms major fishery in Indian waters whereas, *A. wahoo* is landed sparsely in small quantities. *Scomberomorus lineolatus* supported the fishery mainly along the southern coast of Tamil Nadu.

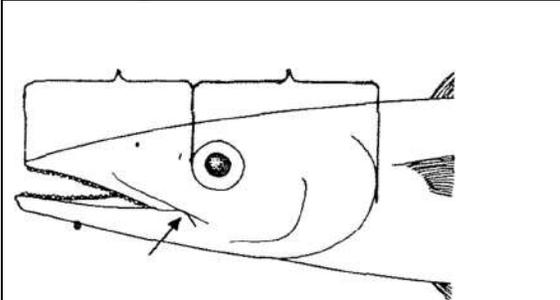
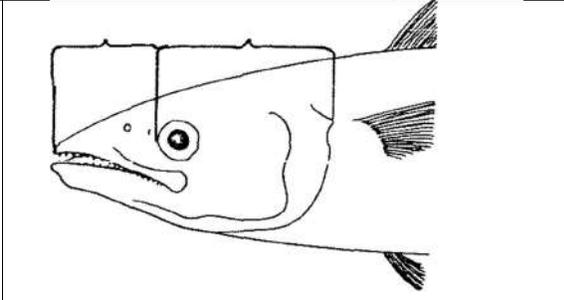
<i>Acanthocybium</i> Snout larger, maxilla concealed	<i>Scomberomorus</i> Snout much shorter, maxilla exposed
	

Fig. 9. Distinguishing characters between the genera *Acanthocybium* and *Scomberomorus*

***Acanthocybium solandri* (Cuvier, 1831), Wahoo**

Body very elongate and only slightly compressed. Mouth large, with snout about as long as rest of the head. Posterior part of maxilla completely concealed under pre-orbital bone. Two dorsal fins, the first with 23 to 27 spines, second with 12 to 16 rays followed by 8 or 9 finlets and anal fin with 12 to 14 rays followed by 9 finlets. Interpelvic process small and bifid. Lateral line single, abruptly curving downward under first dorsal fin. Body covered with small scales; no anterior corselet developed; caudal peduncle slender, with a well defined lateral keel between the two small ones on each side. Body colour with back iridescent bluish green, sides silvery with 24 to 30 cobalt-blue vertical bars which extend to below lateral line.

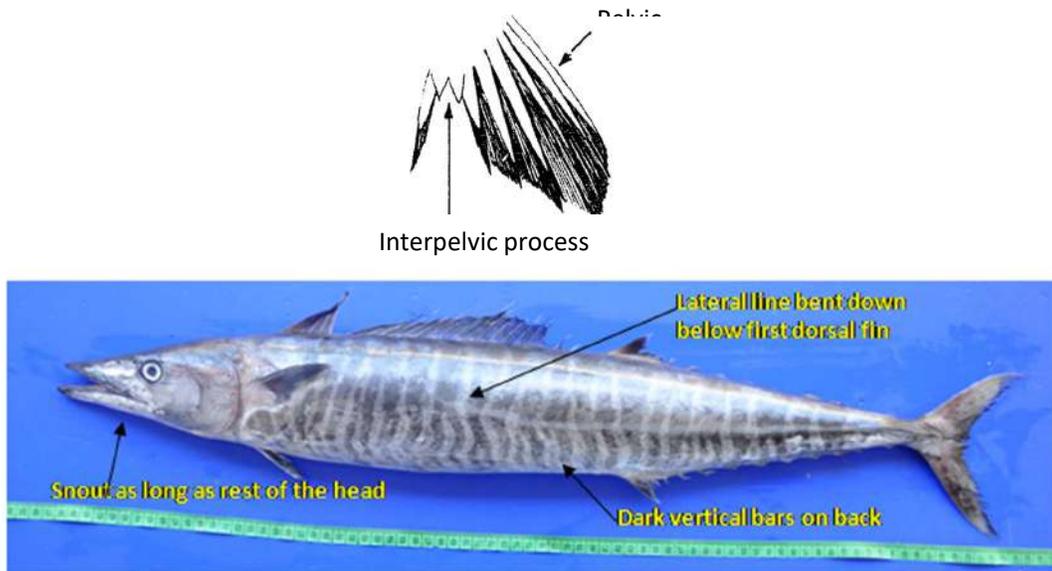


Fig. 10. *Acanthocybium solandri* (Wahoo)

***Scomberomorus commerson* (Lacepède, 1801), Narrow-barred Spanish mackerel**

Body elongate, rather strongly compressed, upper jaw reaching to posterior margin of eye or slightly beyond. Gillrakers on upper limb; 1 to 8, on lower limb; 1 to 8 (total). First dorsal fin with 15 to 18 spines, usually 16 or 17; second dorsal with 15 to 20 rays, usually 17 or 18, followed by 8 to 10 finlets; anal fin with 16 to 21 rays, usually 18 or 19 followed by 7 to 12 finlets. pectoral fin rays 21 to 24. Lateral line abruptly bent downward below end of second dorsal fin. Sides of the body silvery grey with transverse vertical bars - slightly wavy and sometimes breaking into spots. Number of bars vary between 40 to 50 in adults but are usually fewer than 20 in juveniles up to 45 cm fork length.



Fig. 11. *Scomberomorus commerson* (Narrow-barred Spanish mackerel)

***Scomberomorus guttatus* (Bloch & Schneider, 1801), Indo-Pacific king mackerel**

Body elongate and strongly compressed with pointed head. Length of the head almost equal to depth of body, upper jaw almost reaching to below hind margin of eye. First dorsal fin with 15 to 18 spines, usually 16 or more; second dorsal with 18 to 24 rays, usually 20 to 22, followed by 7 to 10 finlets; anal fin with 19 to 23 rays; followed by 7 to 10 finlets, usually 8; pectoral fin rays few, 20 to 23, modally 21. Lateral line, with many fine branches anteriorly almost straight to below middle of second dorsal fin, and gently bent downward to middle of caudal peduncle. Sides silvery white with several longitudinal rows of round dark brownish spots (smaller than eye diameter) scattered in about 3 irregular rows along lateral line. First dorsal fin membrane

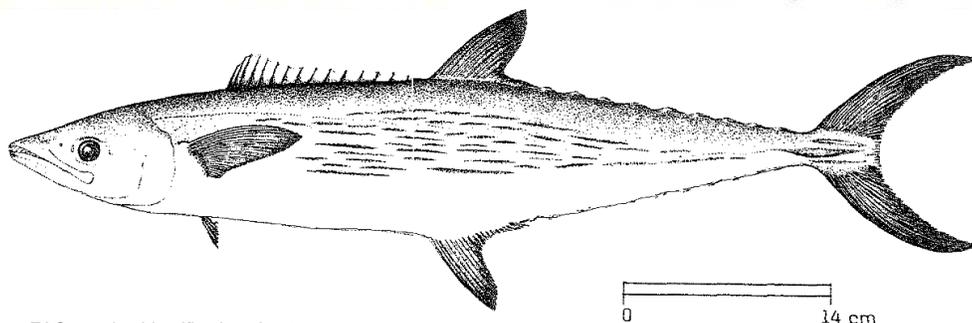
black (up to the 8th spine) white posteriorly, with the distal margin black; pectoral, second dorsal and caudal fins dark brown.



Fig. 12. *Scomberomorus guttatus* (Indo-Pacific king mackerel)

***Scomberomorus lineolatus* (Cuvier, 1831), Streaked seerfish**

Body elongate, strongly compressed, upper jaw reaching to below hind margin of eye; Gillrakers on first arch moderate: 1 or 2 on upper limb; 6 to 11 on lower limb, usually 8 to 10; 7 to 13 total. First dorsal fin with 15 to 18 spines, usually 16 or 17; second dorsal with 15 to 19 rays, rarely 21 or 22, usually 17 or 18, followed by 7 to 10 finlets, usually 9; anal fin with 17 to 22 rays, usually 20, followed by 7 to 10 finlets; pectoral fin rays 20 to 24, modally 23. Lateral line without auxiliary branches anteriorly, running almost straight below second dorsal finlet, then slightly bent downward toward keel of caudal peduncle. Sides silvery marked with series of irregular, horizontal, narrow black lines. First dorsal fin black anteriorly, white posteriorly.



*Source: FAO species identification sheet

Fig. 13. *Scomberomorus lineolatus* (Streaked seerfish)

Barracudas

The barracudas are pelagic predatory fishes, distributed in tropical and subtropical oceans and enjoys important position in the marine food web as apex predators. Twenty nine valid species represented the family globally and only ten species have been reported from Indian waters. The barracudas (Sphyraenidae: Perciformes) are marine pelagic predatory fishes, distributed in tropical and subtropical oceans (Williams, 1959; Blaber, 1982) and enjoys important position in the marine food web as apex predators (de Sylva, 1963; 1973; Friedlander and de Martini, 2002). Thirty species represented the family globally and only ten species have been reported from Indian waters viz., *Sphyraena acutipinnis*, *S. barracuda*, *S. jello*, *S. putnamae*, *S. genie*,

S. forsteri, *S. obtusata*, *S. flavicauda*, *S. chrysotaenia*, *S. helleri* and *S. arabiansis*. Among these, only six species viz., *S. barracuda*, *S. jello*, *S. putnamae*, *S. forsteri*, *S. obtusata* and *S. arabiansis* are regularly available along Indian waters.

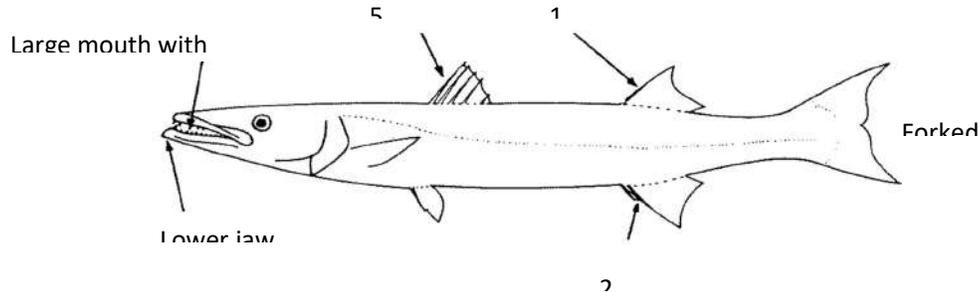


Fig. 14. General characteristics of the family Sphyraenidae

***Sphyraena barracuda* (Walbaum, 1792), Great barracuda**

Body elongate and slightly compressed with large head having long pointed snout. Mouth large, maxilla (upper jaw) reaching to or a little beyond anterior margin of eye. Lower jaw projecting. No gillrakers on first arch; upper and lower gill arch platelets rough, but without distinct spines. Origin of first (spinous) dorsal fin slightly behind pelvic fin origin; anterior dorsal and anal fin rays reaching beyond tips of posterior rays when fin depressed; pectoral fin tip reaching beyond pelvic fin base. Body colouration varies from deep green to steel grey above, sometimes with a purplish tinge, sides mostly silvery, becoming abruptly white on ventral surface. Small individuals with 18 to 22 oblique dark bars on back but faint to absent in adults. Adult specimens have many scattered inky blotches on hind part of body below lateral line. Second dorsal, anal and caudal fins violet to blackish with whitish tips.

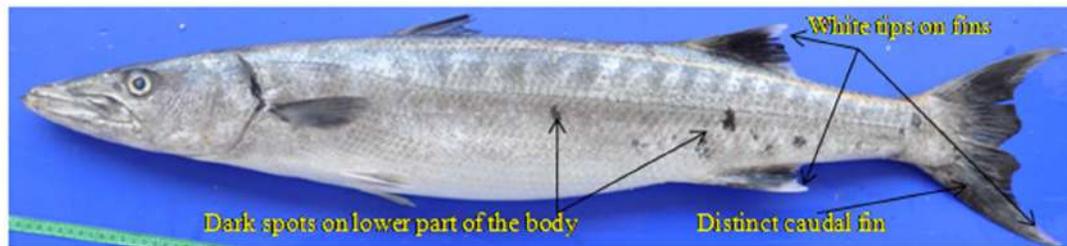


Fig. 15. *Sphyraena barracuda*, Great barracuda

***Sphyraena arabiansis* sp. nov. Abdussamad and Retheesh 2015, Arabian barracuda**

Body elongate and slightly compressed with large head having long snout. Lateral line curved before the origin of first dorsal fin. Branchiostegal membrane in the opercular region white. No black spots on the body. Maxilla broad, rounded and spoon shaped posteriorly, reaching to anterior margin of the eye in vertical or slightly before. Caudal fin tetra-lobed with prominently pointed central lobes. Dark bluish colour dorsally and silvery below. 20-22 distended forward arrow shaped dark bars on the body crossing the lateral line. First dorsal fin membrane black. Second dorsal and anal fin black with white tips for first and last rays. Pelvic fin membrane black with white rays. Caudal fin dark with lobe tips white.

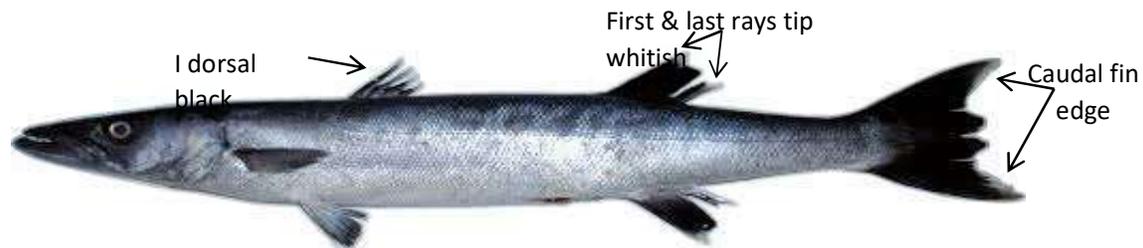


Fig. 16. *Sphyraena arabiansis*, Arabian barracuda

***Sphyraena jello* Cuvier, 1829, Pickhandle barracuda**

Body elongate and somewhat round with large head having long, pointed snout. mouth large, maxilla (upper jaw) almost reaching to anterior margin of eye, lower jaw projecting; strong, pointed, flattened teeth in both jaws, large in front, smaller behind and a few triangular, flattened teeth on roof of mouth (palatines). No gillrakers on first arch; upper and lower gill arch platelets rough, but without distinct spines. Origin of first (spinous) dorsal fin slightly behind pelvic fin origin; anterior dorsal and anal fin rays not reaching beyond tips of posterior rays anal fin depressed; pectoral fin tip reaching beyond pelvic fin base. Blue/black or brown coloured above, sides silvery, with a dark pattern of serpentine bars reaching a little below lateral line, but no inky spots on hind part of body below lateral line (bars very distinct in young). Caudal fin with yellowish tinge.

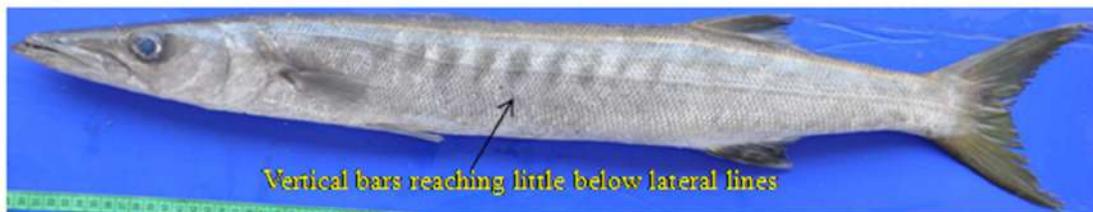


Fig. 17. *Sphyraena jello*, Pickhandle barracuda

***Sphyraena putnamae* Jordan & Seale, 1905, Sawtooth barracuda**

Dorsal spines (total): 6; Dorsal soft rays (total): 9; Anal spines: 2; Anal soft rays: 7 - 9. A silvery-grey barracuda fading to silvery-white below, with many dark bars along the side that cross the lateral line, each bar oblique in upper half and almost vertical on the lower, and a mostly blackish caudal fin without white tips. No gill rakers on first arch, upper and lower gill arch with rough platelets, each platelet not bearing distinct spine.



Fig. 18. *Sphyraena putnamae*, Sawtooth barracuda

***Sphyraena obtusata* Cuvier, 1829, Obtuse barracuda**

Body elongate and slightly compressed with large head having long pointed snout. Mouth large, maxilla (upper jaw) reaching to anterior margin of eye, lower jaw projecting. Two gillrakers on first arch; upper and lower gill arch platelets rough, but without distinct spines. Origin of first (spinous) dorsal fin slightly behind pelvic fin origin; pectoral fin tip reaching first dorsal fin origin. Body grey/brown with greenish tinge above, sides silvery white without dark bars or chevrons; inside of mouth bright yellow/orange. Second dorsal, anal and caudal fins yellowish.



* Source: Abdussamad, E. M., Principal Scientist, ICAR-CMFRI, Kochi

Fig. 19. *Sphyraena obtusata*, Obtuse barracuda

***Sphyraena forsteri* Cuvier, 1829, Big eye barracuda**

Body elongate and slightly compressed. Head large, with a long, pointed snout; eye very large, mouth large, maxilla (upper jaw) reaching to anterior margin of eye, lower jaw projecting. No gillrakers on first arch; upper gill arch platelets rough, lower platelets with distinct spines. Origin of first (spinous) dorsal fin slightly behind pelvic fin origin; pectoral fin tip reaching beyond pelvic fin base. Body colour blue/black above, sides silvery, without dark bars or chevrons; a dark blotch in axil of pectoral fin. Inside of mouth dark grey. Tips of second dorsal and anal fins white.



* Source: Vinothkumar, Scientist, ICAR-CMFRI, Mandapam

Fig. 20. *Sphyraena forsteri*, Bigeye barracuda

Cobia

Cobia (*Rachycentron canadum*) a monotypic member of the family Rachycentridae is a migratory pelagic species that occurs worldwide in tropical, subtropical and warm temperate seas except in the central and eastern Pacific Ocean. In India the fish occurs along both the coasts forming an incidental catch in trawls, gillnets, trolls and handlines. Fast growth rate and high market value both in domestic and export market has made *R. canadum* an ideal candidate species for mariculture.

***Rachycentron canadum* (Linnaeus, 1766), Cobia**

Body elongate, sub-cylindrical; head broad and depressed. Mouth large, terminal, with projecting lower jaw. First dorsal fin with 7 to 9 (usually 8) short but strong isolated spines, not

connected by a membrane. Second dorsal fin long, anterior rays somewhat elevated in adults. pectoral fins pointed, becoming more falcate with age; anal fin similar to dorsal, but shorter; caudal fin lunate in adults, upper lobe longer than lower (caudal fin rounded in young, the central rays much prolonged). Scales small, embedded in thick skin; lateral line slightly wavy anteriorly.

Back and sides dark brown, with 2 sharply defined narrow light bands, belly yellowish.

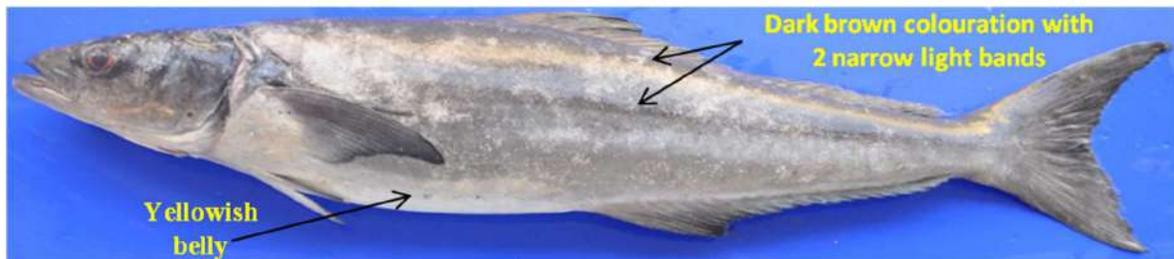
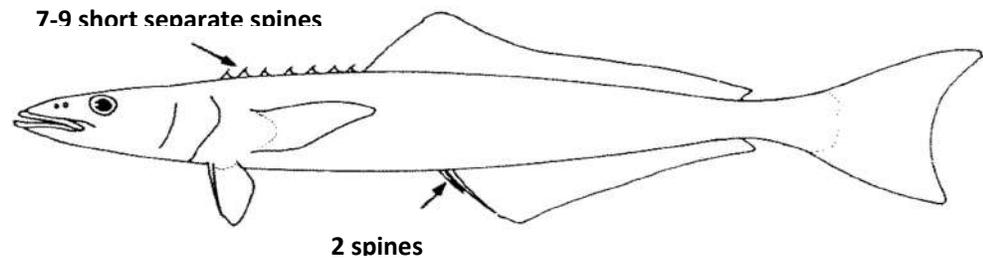


Fig. 21. *Rachycentron canadum*, Cobia

Dolphinfish

The genus *Coryphaena* under the monogeneric family Coryphaenidae comprises two species viz., *Coryphaena hippurus* Linnaeus, 1758 and *Coryphaena equiselis* Linnaeus, 1758. *C. hippurus* commonly called as dolphinfish or mahi mahi while *C. equiselis* is called as pompano dolphinfish. Dolphinfish is a highly migratory epipelagic fish found all over the world in tropical, subtropical and temperate waters. Among the two species, *Coryphaena hippurus* is landed all along the Indian coast while, *Coryphaena equiselis* is restricted to Kerala Coast and part of Tamil Nadu Coast.

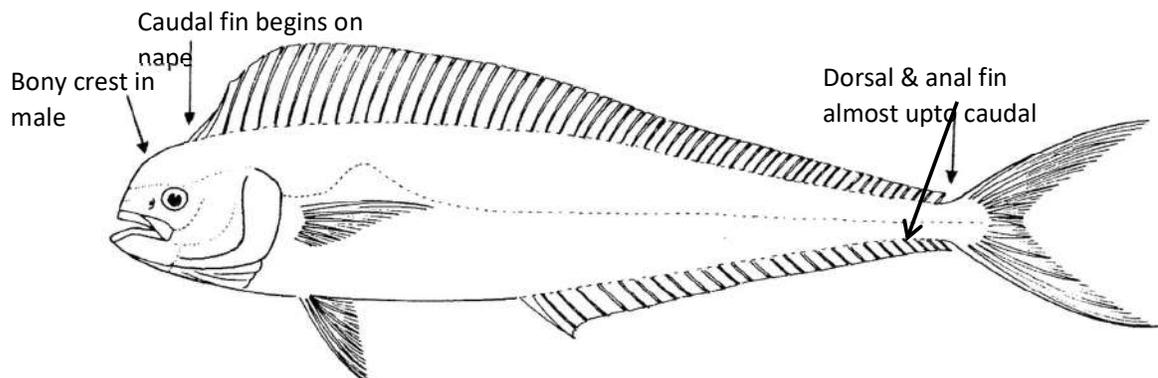


Fig. 22. General features of the family Coryphaenidae

***Coryphaena hippurus* Linnaeus, 1758**

Body elongate and compressed, with head profile slightly convex. In larger males, (30 to 200 cm) the head profile becomes vertical with development of a bony crest. A single dorsal fin extending from above eye almost up to caudal fin, with 58 to 66 rays. Anal fin extending from anus almost up to caudal fin. Pectoral fin more than half of head length and caudal fin deeply forked. Back brilliant metallic blue/green in live condition, after death fading to grey with a green tinge, sides silvery with a golden sheen, and 1 row of dark spots or golden blotches running below dorsal fin and 1, 2 or more rows on and below lateral line, some scattered irregularly. Dorsal and anal fins black, the latter with a white edge. Caudal fin silvery with a golden sheen.

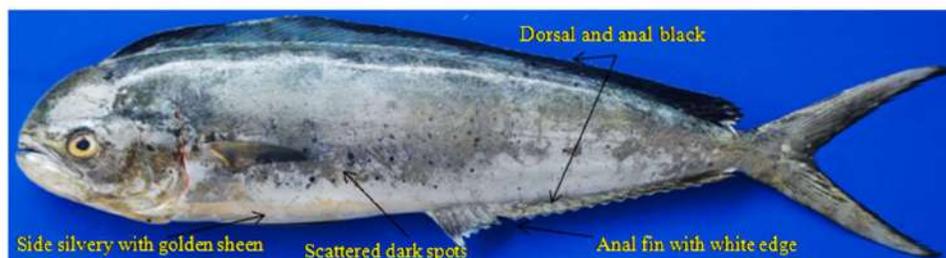


Fig. 23. *Coryphaena hippurus*, Dolphinfish/Mahi mahi

***Coryphaena equiselis* Linnaeus, 1758, Pompano dolphinfish**

Body elongate and compressed with single dorsal fin extending from just behind eye to almost caudal fin, with 52 to 59 rays. A convex anal fin extending from anus almost to caudal fin and pectoral fin about half of head length. Caudal fin deeply forked. Back brilliant metallic blue/green in live specimen and fading rapidly after death to grey with a green tinge, sides silvery with a golden sheen and numerous black spots. Dorsal fin dark. In juveniles, entire margin of caudal fin white; pelvic fins not pigmented.

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