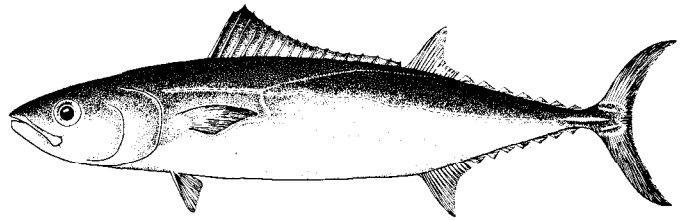


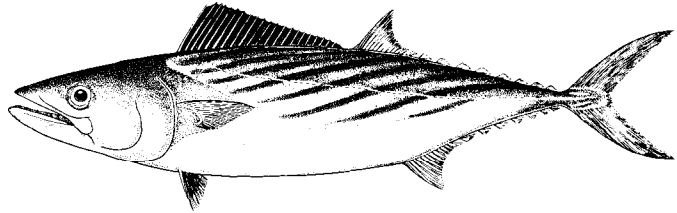
30 a. Jaw teeth tiny, 40 to 55 on each side of upper and lower jaws; gillrakers fine and numerous, total of 70 to 80 on first arch; body elongate; distance from snout to second dorsal fin 61 to 65.4% of fork length; maxilla short, 35.4 to 37.9% of head length (Fig. 56)



Allothunnus fallai
Circumglobal in southern temperate waters

Allothunnus fallai Fig. 56

30 b. Jaw teeth larger and more prominent, 10 to 30 on each side of upper and lower jaws; total gillrakers on first arch 8 to 27; body less elongate; distance from snout to second dorsal fin 48.1 to 61% of fork length; maxilla longer, 43.1 to 55.7% of head length



Sarda sarda Fig. 57

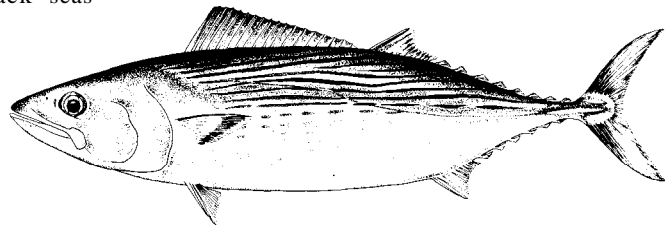
31 a. Five to 10 narrow, dark longitudinal stripes on upper part of body (Figs 57 to 60); no teeth on the tongue; spleen prominent in posterior third of body cavity in ventral view

Sarda

32 a. Spines in first dorsal fin 20 to 23; total vertebrae 50 to 55 (Fig. 57)

Sarda sarda
Atlantic, Mediterranean and Black seas

32 b. Spines in first dorsal fin 17 to 19; total vertebrae 43 to 46



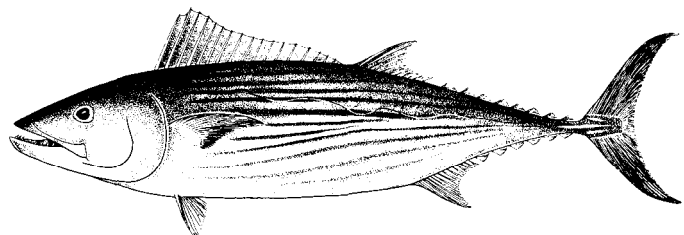
Sarda orientalis Fig. 58

33 a. Total gillrakers on first arch 8 to 13; supra-maxilla narrow (Fig. 58)

Sarda orientalis
Indian and Pacific oceans

33 b. Total gillrakers on first arch 19 to 27; supra-maxilla wider

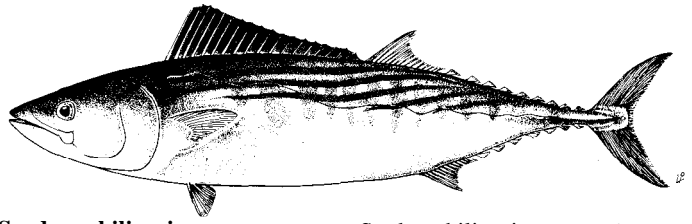
34 a. Total gillrakers on first arch 19 to 21; pectoral rays 25 to 27, modally 26; teeth sometimes present on vomer; length of first dorsal fin base 31.5 to 34.3% of fork length; maxilla 50.3 to 53.9% of head length (Fig. 59).....



Sarda australis Fig. 59

Sarda australis
SE. Australia and new Zealand

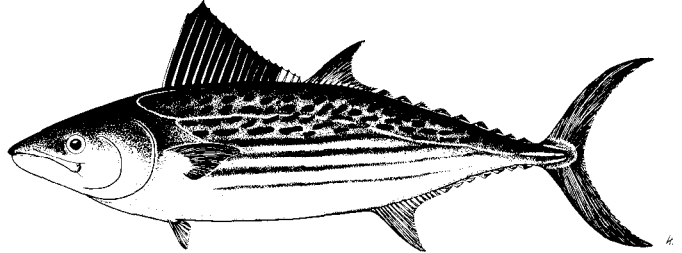
34 b. Total gillrakers on first arch 23 to 27; pectoral rays 22 to 26, modally 24 or 25; teeth never present on vomer, length of first dorsal base 26.7 to 31.4% of fork length; maxilla 46 to 50.3% of head length (Fig. 60)



Sarda chiliensis
Temperate E. Pacific

Sarda chiliensis Fig. 60

31 b. Body either without stripes or with dark spots above lateral line and longitudinal dark stripes below (Figs 61,62,63); two patches of teeth present on tongue; spleen either concealed or located in anterior third of body cavity in ventral view

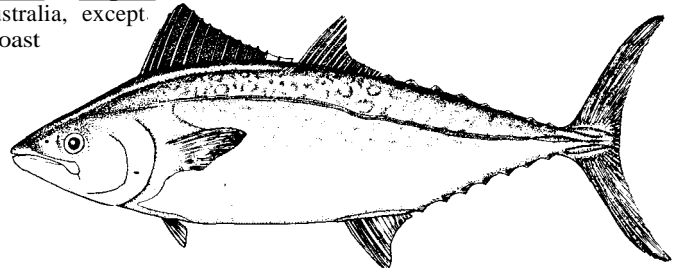


Cybiosarda elegans Fig. 61

35 a. Body with dark spots above lateral line and dark longitudinal stripes below; spines in first dorsal fin 16 to 18 (Fig. 61)

Cybiosarda elegans
Around Australia, except southern coast

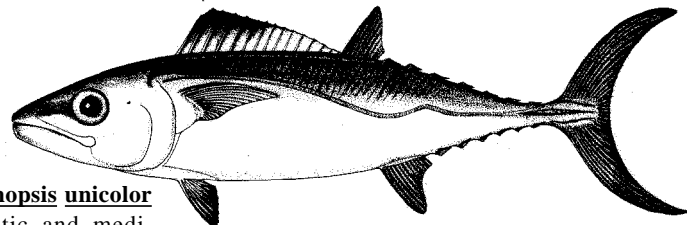
35 b. Body without a prominent pattern of stripes or spots; spines in first dorsal fin 12 to 15 (Figs 62,63)



Orcynopsis unicolor Fig. 62

36 a. Pectoral fin rays 21 to 23; small conical teeth in jaws; total gillrakers on first arch usually 14 or more; interpelvic process bifid (Fig. 33b); spleen not visible in ventral view; laminae in olfactory rosette 25 to 28; interorbital width 23.9 to 31% of head length (Fig. 62)

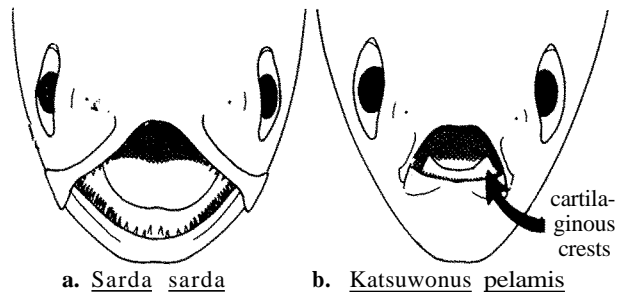
Orcynopsis unicolor
NE. Atlantic and mediterranean



Gymnosarda unicolor Fig. 63

36 b. Pectoral rays 25 to 28; jaw teeth very large and conspicuous; total gillrakers on first arch usually 13 or fewer; interpelvic process single (Fig. 33a); spleen visible on right side of body cavity in ventral view; laminae in olfactory rosette 48 to 56; interorbital width 32.1 to 40% of head length (Fig. 63)

Gymnosarda unicolor
Red Sea, Indian Ocean, W. and C. Pacific



a. Sarda sarda

b. Katsuwonus pelamis

cartilaginous crests

Fig. 64

29 b. Upper surface of tongue with 2 longitudinal ridges (Fig. 64b)

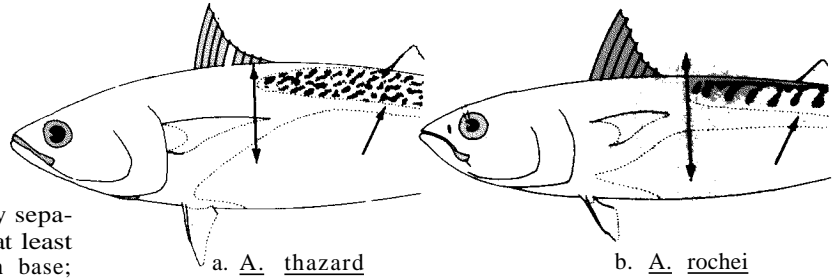
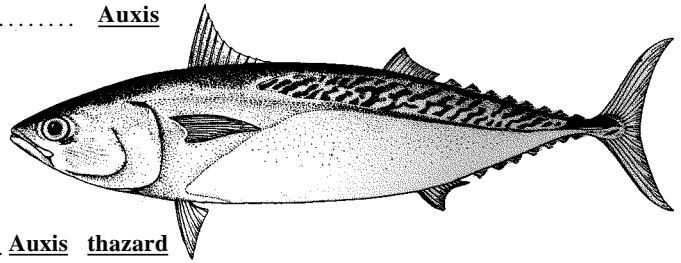


Fig. 65

37 a. First and second dorsal fins widely separated, the space between them at least equal to length of first dorsal fin base; 10 to 12 spines in first dorsal fin (Figs 65,66,67); interpelvic process single and long, at least as long as longest pelvic fin ray

Auxis

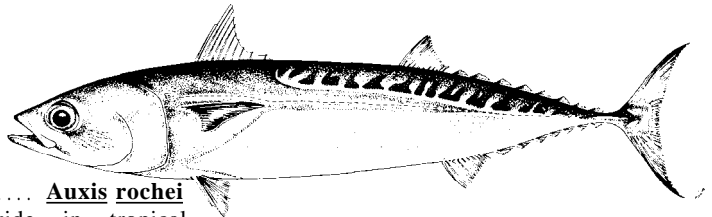
38 a. Posterior extension of corselet narrow, only 1 to 5 scales wide under origin of second dorsal fin; pectoral fin extends back beyond a vertical with the anterior margin of dorsal scaleless area (Figs 65a, 66)



Auxis thazard
Worldwide in tropical and temperate waters

Auxis thazard Fig. 66

38 b. Posterior extension of corselet much wider, usually 10 to 15 scales wide under origin of second dorsal fin; pectoral fin does not reach as far as dorsal scaleless area (Fig. 65b,67)



Auxis rochei
Worldwide in tropical and temperate waters

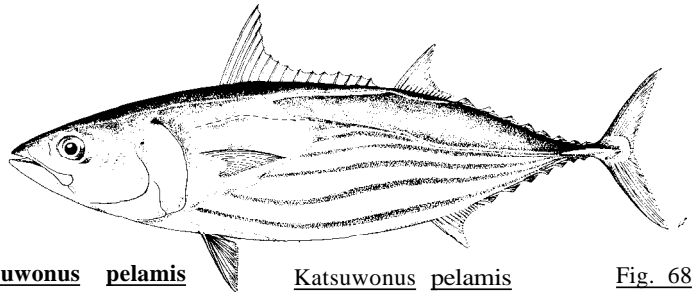
Auxis rochei Fig. 67

37 b. First and second dorsal fins barely separated, at most by a space equal to eye diameter; 12 to 16 spines in first dorsal fin; interpelvic process bifid and short, much shorter than pelvic fin rays (Fig. 33b)

39 a. Three to five prominent dark longitudinal stripes on belly (Fig. 68); total gillrakers on first arch 53 to 63; total vertebrae 41.....

Katsuwonus pelamis

Worldwide in tropical and warm temperate waters



Katsuwonus pelamis Fig. 68

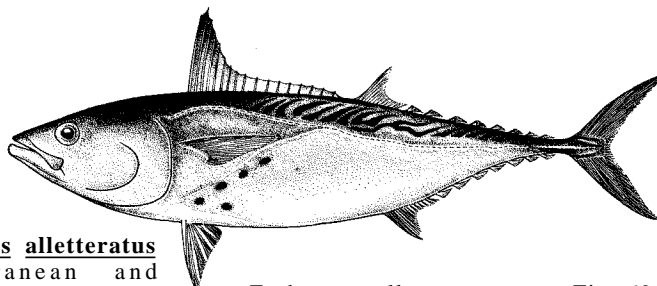
39 b. No dark longitudinal stripes on belly; total gillrakers on first arch 19 to 45; total vertebrae 37 to 39

40 a. Body naked behind corselet of enlarged and thickened scales; several black spots usually present between pectoral- and pelvic-fin bases; back dark blue-green with a complex striped pattern under dorsal fin bases; pectoral fin rays 25 to 29 (Figs 69,70,71)

Euthynnus

41 a. Vomerine teeth absent; total gillrakers on first arch 37 to 45 (Fig. 69)

Euthynnus alletteratus
Mediterranean and Black seas, E. and W.C. Atlantic

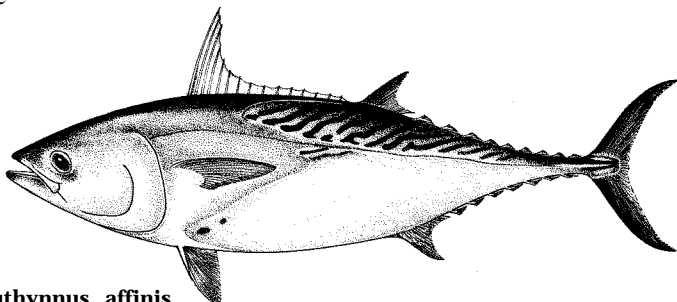


Euthynnus alletteratus Fig. 69

41 b. Vomerine teeth present; total gillrakers on first arch 29 to 39

42 a. Total gillrakers on first arch 29 to 33; total vertebrae 39; bony caudal keels on vertebrae 33 and 34; no trace of vertebral protuberances (Fig. 70)

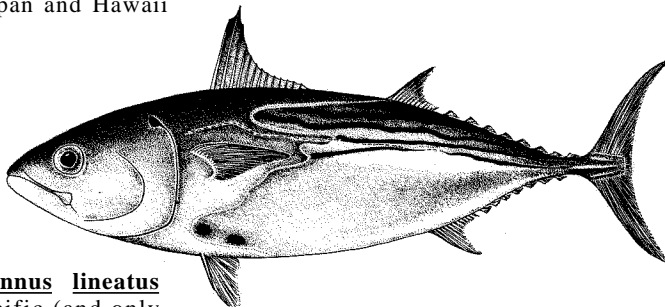
Euthynnus affinis
Red Sea, W. Indian Otean, Indo-West Pacific to Japan and Hawaii



Euthynnus affinis Fig. 70

42 b. Total gillrakers on first arch 33 to 39; total vertebrae 37; bony caudal keels on vertebrae 31 and 32; 4 conspicuous protuberances on 31st and 32nd vertebrae (Fig. 71)

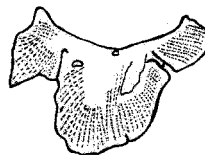
Euthynnus lineatus
E.C. Pacific (and only accidentally to Hawaii)



Euthynnus lineatus Fig. 71

40 b. Body covered with very small scales behind corselet; no black spots on body; back dark blue without any striped pattern; pectoral fin rays 30 to 36

Thunnus



a.



b.

liver

43 a. Ventral surface of liver with prominent striations; center lobe of liver equal to or longer than left or right lobes (Fig. 72a)

T. thynnus, T. maccoyii,
T. alalunga, T. obesus

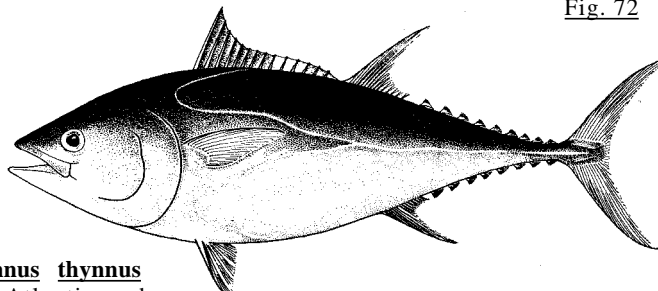
T. albacares, T. tonggol,
T. atlanticus

Fig. 72

44 a. Total gillrakers on first arch 31 to 43; pectoral fin short, less than 80% of head length

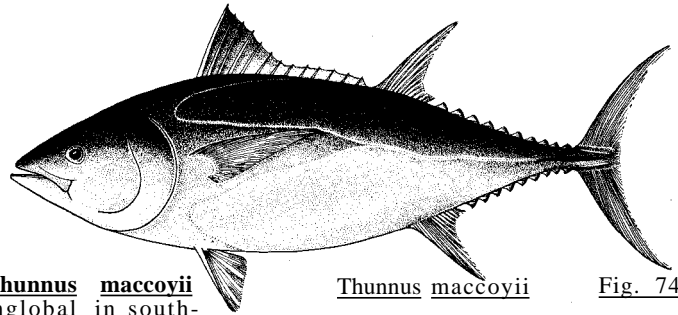
45 a. Pectoral fin 16.8 to 21.7% of fork length; median caudal keel dark (Fig. 73); first ventrally directed parapophysis on 8th vertebra

Thunnus thynnus
N. and C. Atlantic and Mediterranean, NE. and NW. Pacific



Thunnus thynnus Fig. 73

45 b. Pectoral fin 20.2 to 23% of fork length; median caudal keel yellow (Fig. 74); first ventrally directed parapophysis on 9th vertebra

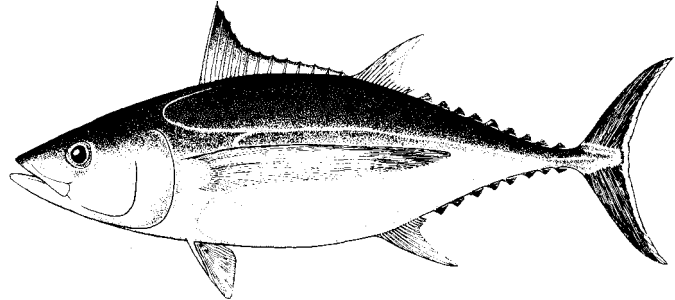


Thunnus maccovii
Circumglobal in southern temperate waters

Thunnus maccovii Fig. 74

44 b. Total gillrakers on first arch 23 to 31; pectoral fin moderate or long, greater than 80% of head length

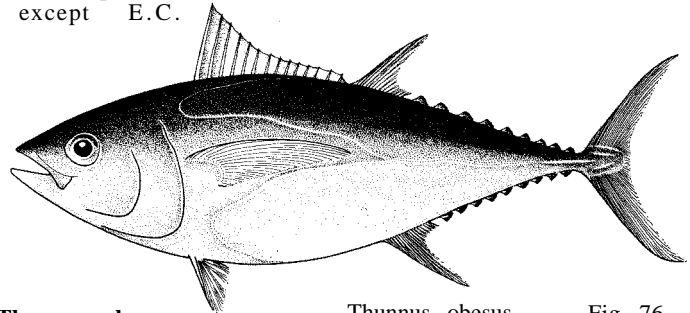
46 a. Caudal fin with a narrow white posterior margin; pectoral fin very long, reaching well past end of second dorsal in base; greatest body depth at or slightly before level of second dorsal fin (Fig. 75)



Thunnus alalunga
Worldwide in tropical and warm temperate waters except E.C.

Thunnus alalunga Fig. 75

46 b. Caudal fin without white posterior margin; pectoral fin short or moderate in length, not reaching end of second dorsal fin base (except in small individuals); greatest body depth about middle of body, near middle of first dorsal fin (Fig. 76)

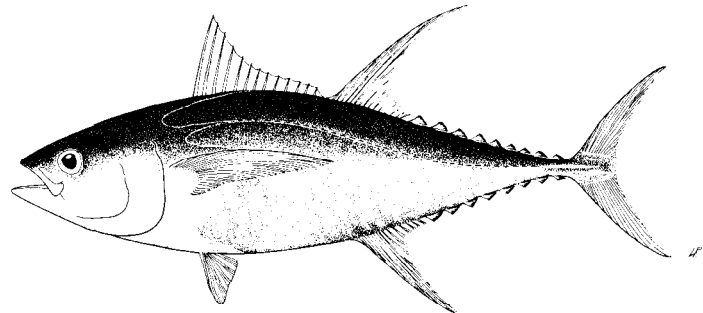


Thunnus obesus
Worldwide in tropical and warm temperate waters

Thunnus obesus Fig. 76

43 b. Ventral surface of liver without striations; right lobe of liver much longer than left or central lobes (Fig. 72b)

47 a. Total gillrakers on first arch 26 to 34, usually 27 or more; second dorsal and anal fins of larger specimens (120 cm fork length or larger) elongate, more than 20% of fork length; maximum size is over 200 cm fork length (Fig. 77)

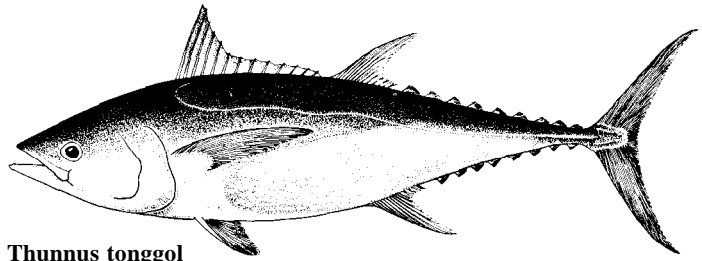


Thunnus albacares
Worldwide in tropical and warm temperate waters

Thunnus albacares Fig. 77

47 b. Total gillrakers on first arch 19 to 28, usually 26 or fewer; second dorsal and anal fins never greatly elongate, less than 20% of fork length at all sizes; maximum size less than 110 cm fork length

48 a. Lower sides of body with a pattern of pale streaks and spots either horizontally oriented or without obvious orientation (Fig. 78); swimbladder absent or rudimentary; vertebrae 18 plus 21 = 39.....

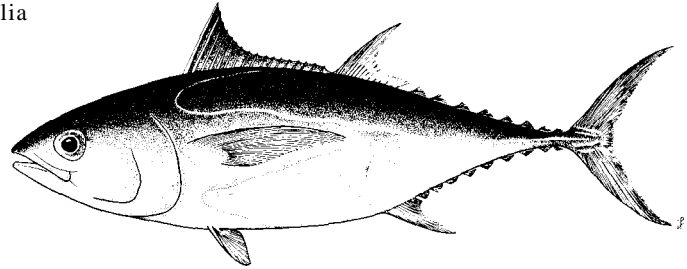


Thunnus tonggol
Red Sea, N. Indian Ocean, Indo-West Pacific to Japan and SE. Australia

Thunnus tonggol

Fig.78

48 b. Lower sides lacking pale streaks and spots, or with such markings at least partly in vertical rows (Fig. 79); swimbladder present; vertebrae 19 plus 20 = 39.....



Thunnus atlanticus
NW. Atlantic South to Rio de Janeiro, Brazil

Thunnus atlanticus

Fig. 79

Note The distribution patterns of red and white muscle in the body of scombrids show characteristic variations by species or groups of species and may be used as an additional aid to species identification, especially in the case of damaged specimens (see Fig. 80)

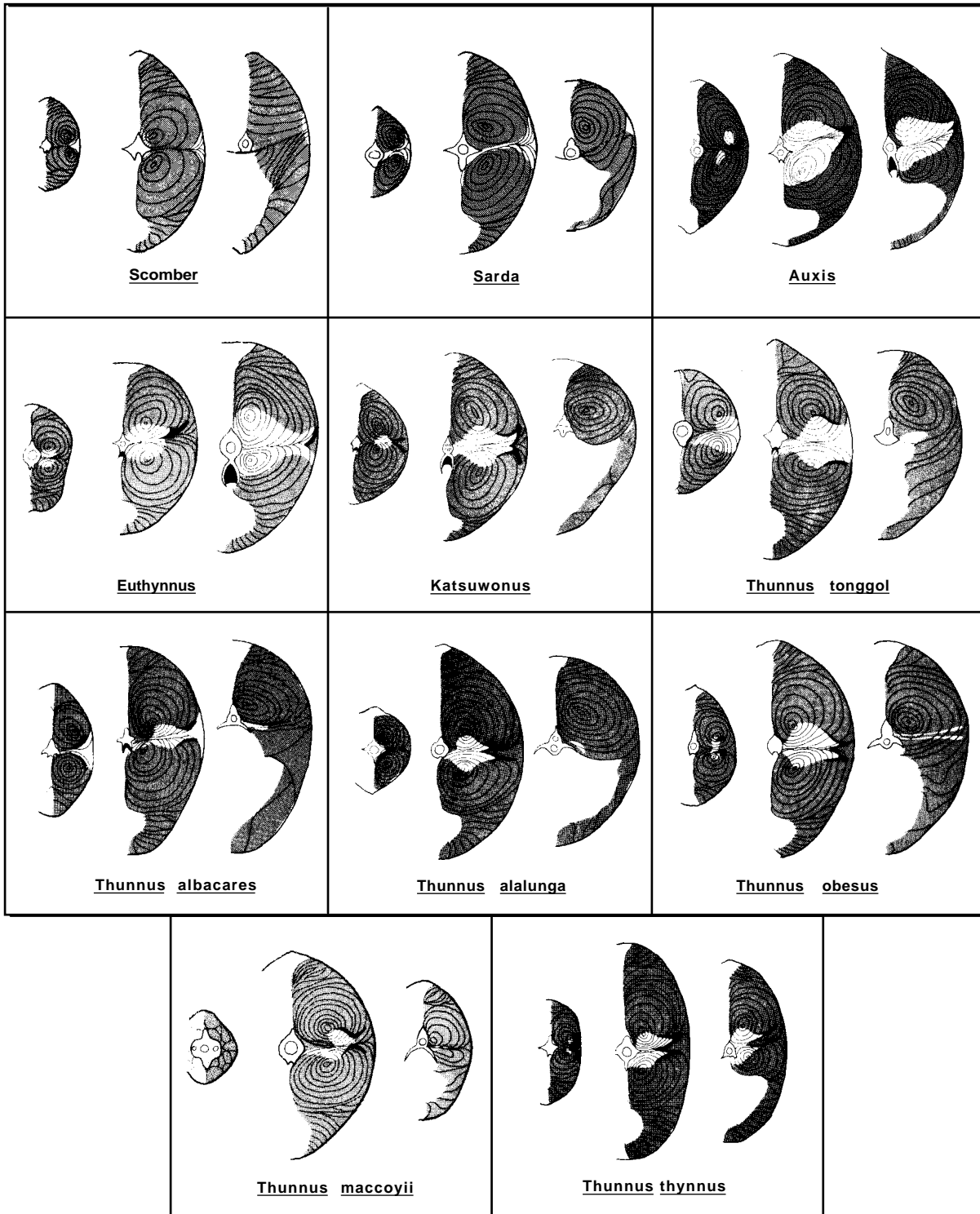


Fig. 80 Distribution of red muscle (white areas) and white muscle (grey areas) in eleven scombrid species. The three illustrations shown for each species correspond, from left to right, to cross sections at the following levels: (i) anterior end of the caudal keels, (ii) midpoint of body, and (iii) posterior edge of gill cover; black areas indicate location of the heat exchanger system. Adapted and redrawn after Sharp & Dizon, 1978.