

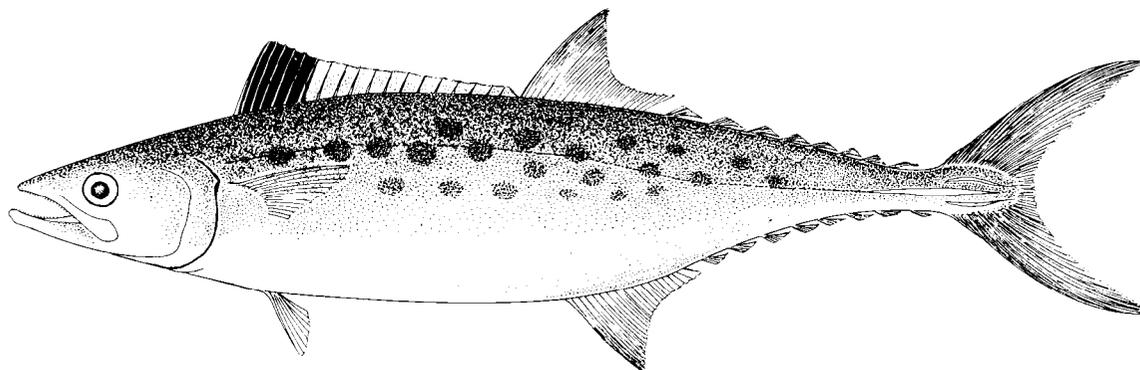
***Scomberomorus maculatus*** (Mitchill, 1815)

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*Scomber maculatus* Mitchill, 1815, *Trans.Lit.Phil.Soc.New York*, 1:426-427, pl. 6 (fig. 8) (New York)

**Synonymy** : *Cybium maculatum* - Cuvier, 1829; *Scomberomorus maculatus* - Jordan & Gilbert, 1882.

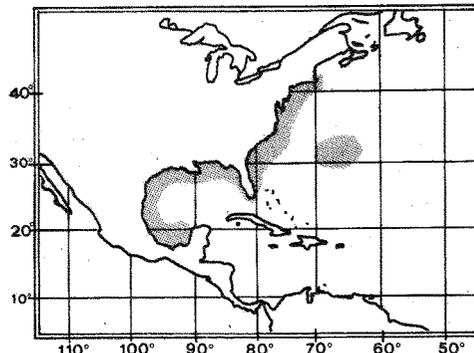
**FAO Names** : En - Atlantic Spanish mackerel; Fr - Thazard atlantique; Sp - Carite atlántico.



**Diagnostic Features** : Gillrakers on first arch moderate: 1 to 4 on upper limb; 8 to 13 on lower limb, usually 10 or 11; 10 to 16 total. First dorsal fin with 17 to 19 spines; second dorsal with 17 to 20 rays, usually 18 or more, followed by 7 to 9 finlets anal fin with 17 to 20 rays, followed by 7 to 10 finlets; pectoral fin rays 20 to 23, modally 21. Lateral line gradually curving down toward caudal peduncle pelvic fins relatively long, 4.6 to 5.8% of fork length, compared to *S. brasiliensis* (3.6 to 5.9%). Vertebrae 21 or 22 precaudal plus 30 or 31 caudal, total 51 to 53. Intestine with 2 folds and 3 limbs. Colour: sides silvery marked with about three rows of round to elliptical dark spots (orange in life); first dorsal fin black anteriorly and at distal margin posteriorly, basal part of posterior membranes white.

**Geographical Distribution** : Seasonal along Atlantic coast of the United States from Cape Cod to Miami and Gulf of Mexico coast from Florida to Yucatan.

**Habitat and Biology** : An epipelagic, neritic species known to migrate in large schools over great distances along the shore. With increasing water temperatures, Atlantic Spanish mackerel move northward, from Florida along the Atlantic coast of the USA to Narraganset Bay, Rhode Island, between late February and July, and back in fall. It overwinters off Florida. There are also schools migrating westwards in early spring, reaching Texas in late March. North-south movements along the Mexican coast occur between August and November and back in March and April.



*S. maculatus* spawn in batches from May to September in waters of less than 50 m depth over the inner continental shelf of Texas, from July to September (or as early as April in some years) off Florida, starting in April off the Carolinas, and from late August to late September in the northernmost part of its range. Larvae have been encountered in surface waters with temperature ranging between 19.6° and 29.8°C and salinities of 28.3 to 37.4‰ S (McEachran, Finucane & Hall, 1980).

As with other members of the genus, food consists mainly of small fishes with lesser quantities of penaeoid shrimps and cephalopods. Clupeoids such as menhaden, alewives, thread herring (*Opisthonema*), and anchovies (*Anchoa*) are particularly important forage in North Carolina, Florida, Texas, and Veracruz. The percentage of anchovies consumed is higher for juveniles than for adults.

**Size** : Maximum size is about 77 cm fork length and 4.8 kg weight (Beardsley & Richards, 1970). Females grow larger than males. The all-tackle angling records is a 4.02 kg fish with a fork length of 83 cm taken at Kitty Hawk, North Carolina in June 1982. In Florida, females attain sexual maturity between 25 and 37 cm fork length, males between 28 and 34 cm (Klima, 1959).

**Interest to Fisheries** : The Atlantic Spanish mackerel is a valued fish to recreational or commercial fisheries throughout its range. The fisheries along the Atlantic US coast north of southern Florida, and in the Gulf of Mexico are seasonal between spring and late summer or fall, depending on species migrations, while in southern Florida operations are concentrated in the winter months, from October to February or March (Klima 1959). Since 1950, over 92% of the total US catch has been landed in Florida (Trent & Anthony, 1979). The species is second in volume among Mexico's Gulf of Mexico fisheries with an average annual production of 4 900 metric tons in the period from 1968 to 1976 (Doi & Mendizabal, 1979), most of which is landed in the state of Veracruz (80%).

Catches from Campeche amounted to 15% and those from Yucatan to 5% of the Mexican total. After subtracting the catches reported as S. maculatus that should be attributed to S. brasiliensis, S. cavalla, and S. regalis (in the case of catches reported by Cuba and the Dominican Republic), the world catch of Atlantic Spanish mackerel ranged between about 15 000 metric tons in 1975 and 14 000 metric tons in 1981 (FAO, 1983).

The early fishery in the USA utilized trolling lines, gillnets, and pound nets (Earll, 1883). Fish taken by the commercial gillnet fishery in Florida range between 30 and 65 cm fork length, larger than hook-and-line caught-fish (21 to 69 cm fork length). The minimum acceptable fork length in those days was 30 cm. Gillnet catches comprised predominantly 3 year old fish from 36 to 41 cm fork length (Klima, 1959). Larger vessels now entering the fishery have power-rollers to mechanically retrieve the nets which are mostly made of nylon; airplane spotter pilots locate the fish (Trent & Anthony, 1979). Recreational anglers catch Spanish mackerel from boats while trolling or drifting and from boats, piers, jetties, and beaches by casting, livebait fishing, jigging, and drift fishing (Trent & Anthony, 1979). Fishermen in Veracruz employ beach seines (chinchorros playeros), gillnets (redes agalleras) trolling lures (curricanes) and trap nets (almadrabas).

Nearly all the catch is consumed fresh, frozen, or smoked (Lyles, 1969). A few attempts have been made at canning Atlantic Spanish mackerel but the product has not been widely accepted (Lyles, 1969). Frozen fish begin to show signs of rancidity after as little as three months time in frozen storage. Therefore, they are now being treated with antioxidants and EDTA (Farragut, 1972; Hale, 1979).

**Local Names :** COLOMBIA: Sierra; CUBA: Sierra; GERMAN DM RP: Gefleckte Königsmakrele; MEXICO: Carite, Pintada; POLAND: Makrela hiszpanska; SOUTH AFRICA: Spaanse makriel, Spanish mackerel; USA: Spanish mackerel; USSR: Ispanskaya makrel, Korolevskaya pyatnistaya makrel, Pyatnistaya makrel; VENEZUELA: Carite, Sierra pintada.

**Literature :** Earll (1883); Klima (1959, Florida); Mendoza (1968, Mexico); Alcantara (1972); Marquez (1973, Mexico); Powell (1975, Florida); Berrien & Finan (1977a); Collette (1978, Species Identification Sheets, Western Central Atlantic); Fritzsche (1978, on larvae and juveniles).

**Remarks :** Three other species have been confused with S. maculatus by some workers, S. tritor in the eastern Atlantic, S. sierra in the eastern Pacific, and S. brasiliensis along the Caribbean and Atlantic coasts of Middle and South America.

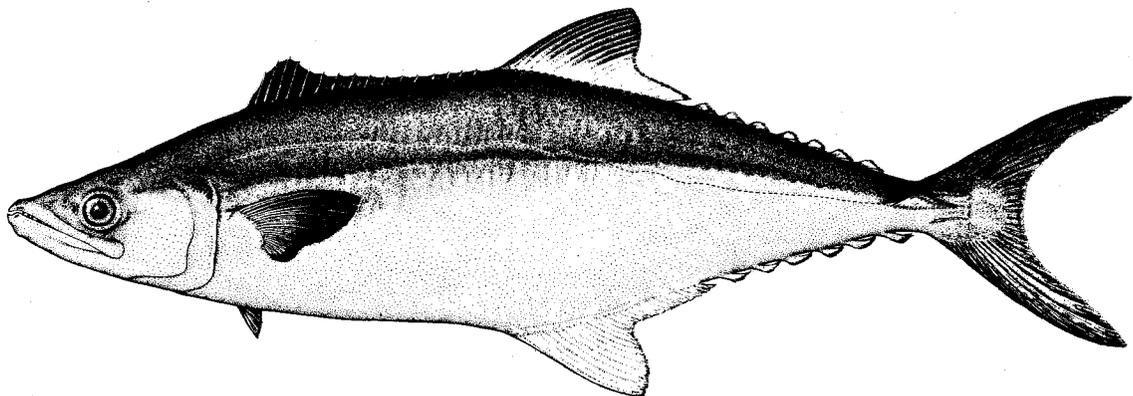
**Scomberomorus multiradiatus** Munro, 1964

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Scomberomorus multiradiatus Munro, 1964, Papua New Guinea Agricult.J., 16(4):168-169, fig. 12 (off mouth of Fly River, Gulf of Papua).

**Synonymy :** None.

**FAO Names :** En - Papuan seerfish; Fr - Thazard papou; Sp - Carite papuense.



**Diagnostic Features :** Gillrakers on first arch few: none on upper limb; 1 to 4 on lower limb; 1 to 4 total. First dorsal fin with 16 to 19 spines, usually 18; second dorsal fin with 21 to 25 rays, followed by 7 to 9 finlets; anal fin with 25 to 29 rays, the highest number in the genus, followed by 6 to 9 finlets, usually 6; pectoral fin rays 20 to 23. Lateral line gradually curving down toward caudal peduncle. The most vertebrae in the genus, 20 or 21 precaudal plus 34 to 36 caudal total 54 to 56. Intestine with 2 folds and 3 limbs. Colour: sides silvery without spots, blotches, or bars; first dorsal fin black anteriorly and along distal edge posteriorly with some white at posterior base of fin.

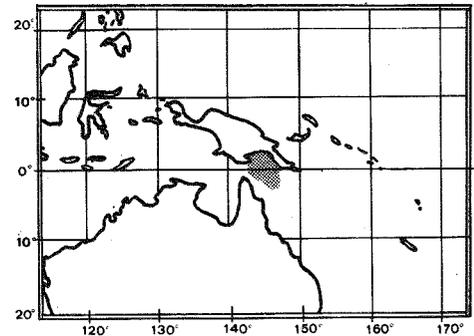
**Geographical Distribution :** Restricted to the Gulf of Papua off the mouth of the Fly River.

**Habitat and Biology :** An epipelagic, neritic species found in turbid waters. Nothing is known about its biology.

**Size :** Maximum fork length is 35 cm, weight 0.5 kg, the smallest species in the genus. Sexual maturity is attained at much less than 30 cm fork length.

**Interest to Fisheries :** Papuan seerfish is trawled in the Gulf of Papua but lacks commercial significance.

**Literature :** Lewis (1981).



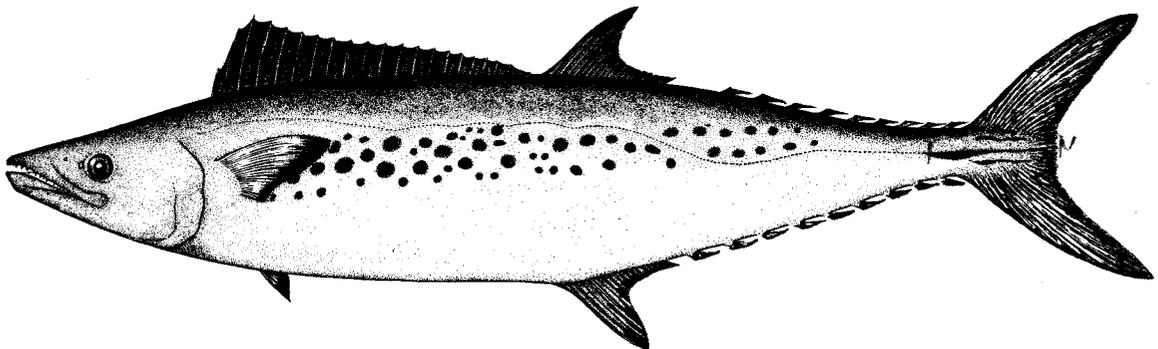
**Scomberomorus munroi** Collette & Russo, 1980

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Scomberomorus munroi Collette & Russo, 1980, Austral.J.Mar.Freshwater Res., 31:241-248, fig. 1a (Queensland, Australia).

**Synonymy :** None.

**FAO Names :** En - Australian spotted mackerel; Fr - Thazard australien; Sp - Carite australiano.

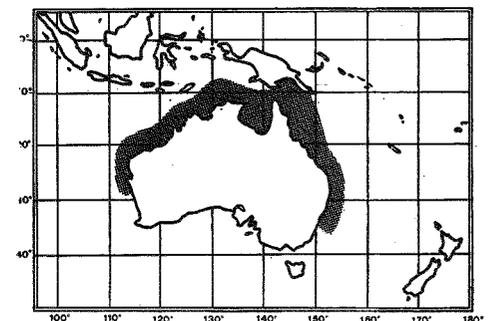


**Diagnostic Features :** Gillrakers on first arch moderate: 2 on upper limb; 8 to 10 on lower limb; 10 to 12 total. First dorsal fin with 20 to 22 spines; second dorsal with 17 to 20 rays, followed by 9 or 10 finlets; anal fin with 17 to 19 rays, followed by 8 to 10 finlets; pectoral fin rays 21 to 23. Lateral line gradually curving down toward caudal peduncle. Vertebrae 21 or 22 precaudal plus 28 to 30 caudal, total 50 to 52. Intestine with 2 folds and 3 limbs. Colour: sides with several poorly defined rows of round spots, larger than pupil but smaller than diameter of eye (S. niphonius has more numerous smaller spots, usually about size of pupil); inner surface of pectoral fin dark blue, cheeks and belly silvery white, anal fin light silvery grey, and anal finlets silvery grey; first dorsal fin black (bright steely blue in fresh specimens) with blotches of white toward bases of more posterior membranes in some specimens; membranes entirely black in some specimens. Most other species of Scomberomorus have more extensive white areas on posterior half or middle third of dorsal fin.

**Geographical Distribution :** Restricted to the northern coast of Australia from the Abrolhos Islands region of Western Australia to Coffs Harbour and Kempsey in central New South Wales and the southern coast of Papua New Guinea from Kerema to Port Moresby (Collette & Russo 1980:fig. 3).

**Habitat and Biology :** An epipelagic, neritic species that forms large schools, which move close inshore along the coast of Queensland, commonly taken between December and April or May (Grant, 1982). Other biological information on this species was not available to the authors.

**Size :** Maximum size is 100 cm fork length and approximately 8 kg in weight, more commonly 50 to 80 cm and 4.5 kg weight (Lewis, 1981). Fork length at first maturity ranges between 50 and 55 cm (A.D. Lewis, pers.comm.).



**Interest to Fisheries :** Four species of Scomberomorus, including S. munroi, and Grammatorcynus form Queensland's second most important fin fishery with an annual production of about 1 000 metric tons of whole and filleted fish. The best catches are made by drifting or anchoring over inshore Queensland reefs and fishing with lines baited with small fish on a gang of 3 or 4 linked hooks (Grant, 1982). Australian spotted mackerel is also taken by trawlers in the Gulf of Papua.

**Local Names :** AUSTRALIA: Queensland: Spotted mackerel.

**Literature :** Munro (1943, as S. niphonius); Grant (1978); Collette & Russo (1980); Lewis (1981); Grant (1982).

**Remarks :** Previous to its description in 1980 the species was confused with S. niphonius.

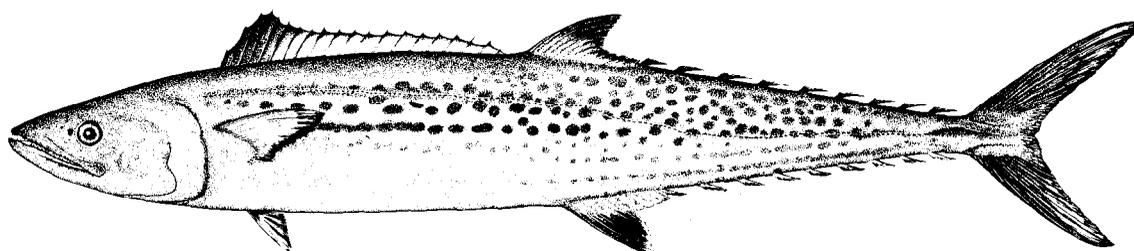
**Scomberomorus niphonius** (Cuvier, 1831)

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Cybiium niphonium Cuvier in Cuvier & Valenciennes, 1831, Histoire Naturelle des Poissons, 8:180-181 (Japan).

**Synonymy :** Cybiium gracile Günther, 1873; Scomberomorus niphonius - Jordan, Tanaka & Snyder, 1913; Sawara niphonina - Jordan & Hubbs, 1925.

**FAO Names :** En - Japanese Spanish mackerel; Fr -Thazard oriental; Sp - Carite oriental.

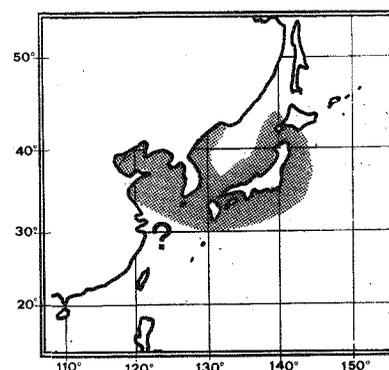


**Diagnostic Features :** Gillrakers on first arch moderate: 2 or 3 on upper limb; 9 to 12 on lower limb; 11 to 15 total. First dorsal fin with 19 to 21 spines; second dorsal with 15 to 19 rays, followed by 7 to 9 finlets; anal fin with 16 to 20 rays, followed by 6 to 9 finlets; pectoral fin rays 21 to 23. Lateral line gradually curving down toward caudal peduncle. Vertebrae 21 to 23 precaudal plus 27 or 28 caudal, total 48 to 50, usually 49. The only species in the genus with a straight intestine. Colour: sides with 7 or more rows of longitudinal spots on the sides; some spots connected together; spots more numerous and smaller than in S. munroi, about pupil size; anterior quarter of first dorsal fin and a narrow distal margin of the rest of the dorsal fin black, most of basal membranes of posterior three quarters of fin white.

**Geographical Distribution :** Confined to the subtropical and temperate waters of China, the Yellow Sea and Sea of Japan north to Vladivostok, USSR (Collette & Russo, 1980:fig. 3).

**Habitat and Biology :** S. niphonius is an epipelagic, neritic species, carrying out a spawning migration in spring (March to June) and a feeding migration in fall (September to November) in the Inland Sea of Japan (Hamada & Iwai, 1967). Spawning extends from April to May with medium-sized fish producing some 550 000 to 870 000 eggs (Kishinouye, 1923). No detailed food studies are available, but the species is known to prey on small fishes.

**Size :** Maximum size is 100 cm fork length and approximately 4.5 kg in weight.



**Interest to Fisheries :** Japanese Spanish mackerel is taken throughout its range, but is the most important Scomberomorus species in Japan. The world catch reported by China, Japan and the Republic of Korea fluctuated between 42 800 metric tons in 1975 and 68 300 metric tons in 1981 (FAO, 1983). Drift gillnets and set nets are the major fishing gears in the seasonal fishery in the Inland Sea of Japan operational from March to June and from September to November. The fish are primarily marketed fresh, and are especially tasty in winter.

**Local Names :** AUSTRALIA: Japanese Spanish mackerel, Spotted Spanish mackerel; JAPAN: Sagoshi, Sawara; USSR: Melkopyatnistaya makrel, Yaponskaya korolevskaya makrel; VIET NAM: Cá thu áu Cham xanh.

**Literature** : Kishinouye (1923); Hamada & Iwai (1967, age and growth studies); Kim (1970), Liu, Zhang & Yang (1982); Wang (1982).

**Remarks** : The Spanish mackerel found along the northern coast of Australia and the southern coast of Papua New Guinea that has been considered as S. niphonius actually represents a distinct species, S. munroi, as shown by Collette & Russo (1980).

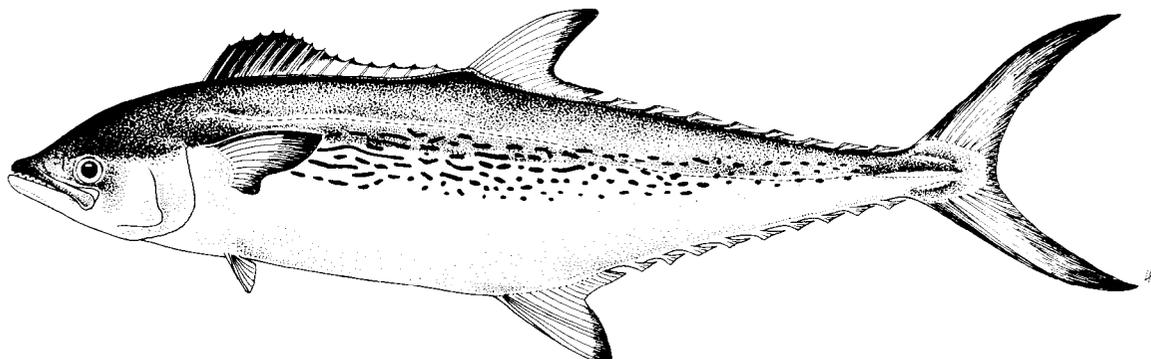
**Scomberomorus plurilineatus** Fourmanoir, 1966

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Scomberomorus plurilineatus Fourmanoir, 1966, Bull.Mus.Nat.Hist.Nat., ser. 2, 38(3):223-226, fig. 1 (Madagascar).

**Synonymy** : None.

**FAO Names** : En - Kanadi kingfish; Fr - Thazard Kanadi; Sp - Carite canadí.

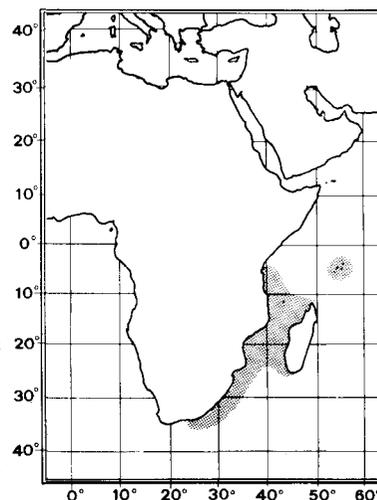


**Diagnostic Features** : Gillrakers on first arch moderate: 2 or 3 on limb; upper 9 to 13 on lower limb, usually 10 to 12; 12 to 15 total. First dorsal fin with 15 to 17 spines; second dorsal with 19 to 21 rays, followed by 8 to 10 finlets; anal fin with 19 to 22 rays, followed by 7 to 10 finlets; many pectoral fin rays 21 to 26, modally 23. Lateral line without auxiliary branches anteriorly, gradually curving down toward caudal peduncle. Vertebrae 19 or 20 precaudal plus 25 to 27 caudal, total 45 or 46, usually 20 plus 26 total 46. Intestine with 2 folds and 3 limbs. Colour: sides silvery with a series of about 6 to 8 interrupted horizontal black lines, much narrower than interspaces. Anteriorly, usually only one of these lines above lateral line; replaced posteriorly by a number of short oblique black lines becoming somewhat confused, and only 2 or 3 continue through to caudal peduncle. Horizontal black lines on body interrupted to varying degrees, beginning almost intact in places, but broken up into a series of small rectangular "spots" in others. Juveniles have spots but develop adult pattern of interrupted lines by the time they reach a length of 40 cm. Upper areas of caudal peduncle and median keel black, lower areas dusky. First dorsal fin black except lower areas of membrane that may be pale posteriorly. Second dorsal fin with leading edge and tips of rays dusky, rest silver to pale; finlets dusky with a silver area at center. Anal fin, leading edges and tips of rays dusky, rest silvery; finlets white with a dusky central area. Pectoral fins black inside, as is axil; dusky outside with edges black; pelvic fins pale whitish with outside of mid-rays dusky, groove on body a little dusky.

**Geographical Distribution** : Confined to the western Indian Ocean along the coast of East Africa from Kenya and Zanzibar to Algoa Bay, Natal and along the west coast of Madagascar (Collette & Russo, 1979:fig. 11). Also found in the Seychelles.

**Habitat and Biology** : An epipelagic, neritic species present in large schools in the Zanzibar Channel from March or April until August or September (average weights between 3.2 and 3.5 kg) (Williams, 1960). Angling statistics point to a peak abundance in Natal, South Africa during May (Van der Elst, 1981). Spawning probably takes place in August and September in the Zanzibar Channel (Williams, 1964). Kanadi kingfish feed mainly on anchovies (Anchoviella sp.), clupeids (Amblygaster sp., Sardinella fimbriata, S. perforata), other small fishes, squids, and mantis shrimps (Williams, 1964; Merret & Thorp, 1965; Van der Elst, 1981).

**Size** : Maximum fork length is 120 cm. The South African angling record is a 10.0 kg fish. Sexual maturity is attained at about 80 cm fork length (Van der Elst, 1981).



**Interest to Fisheries** : Kanadi kingfish is one of the Tanzanian staple food fishes during the fishing season extending from March or April until August or September in the Zanzibar Channel, where large schools are present. It is caught mostly in gill or set nets, but also on handlines baited with live sardines and by trolling. In the Malindi area of Kenya, Kanadi kingfish continues to be taken mainly by trolling lines and handlines. The species is also important on both sides of the Mozambique Channel south to Durban, and is a popular gamefish of the ski-boat fishermen and spearfishermen in Natal (Van der Elst, 1981).

**Local Names** : MADAGASCAR: NW coast: Tefo; SOUTH AFRICA: Queen mackerel, Spotted mackerel; Natal: Natal snoek.

**Literature** : Williams (1960, under the name of S. lineolatus); Van der Elst (1981).

**Remarks** : This species has been confused with S. lineolatus and with S. guttatus (both under this name and one of its junior synonyms, S. leopardus).

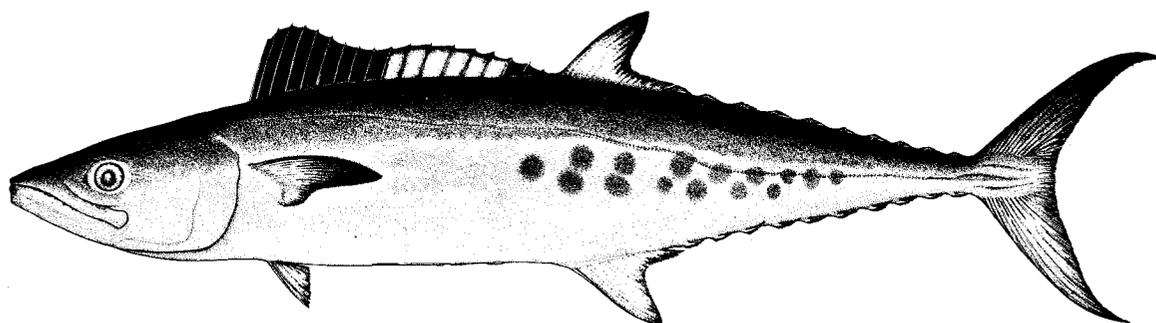
**Scomberomorus queenslandicus** Munro, 1943

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Scomberomorus (Cybium) queenslandicus Munro, 1943, Mem. Queensland Mus. 12(2):82-86, pl. 7 (fig. B), (Cape Cleveland, N. Queensland).

**Synonymy** : None.

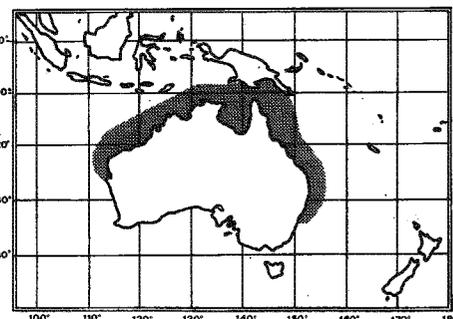
**FAO Names** : En - Queensland school mackerel; Fr - Thazard du Queensland; Sp - Carite de Queensland.



**Diagnostic Features** : Gillrakers on first arch few: 0 to 2 on upper limb; 3 to 8 on lower limb; 3 to 9 total; usually 7 or fewer. First dorsal fin with 16 to 18 spines, usually 17; second dorsal with 17 to 19 rays, followed by 9 to 11 finlets; anal fin with 16 to 20 rays, followed by 9 to 11 finlets; pectoral fin rays 21 to 23. Lateral line gradually curving down toward caudal peduncle. Vertebrae 19 or 20 precaudal plus 28 or 29 caudal, total 48 or 49, usually 20 plus 28 total 48. Intestine with 2 folds and 3 limbs. Colour: sides of adults marked with about three indefinite rows of indistinct bronze-grey blotches, each a little larger than orbit; membrane of first dorsal fin jet black with large contrasting areas of intense white between sixth and last spine; second dorsal fin, finlets, and caudal fin pearly grey with darker margins; pelvic fins, anal fin, and anal finlets white; pectoral fins greyish, darkest on inner surface. Characteristic blotches absent in a 9.5 cm juvenile.

**Geographical Distribution** : Largely confined to inshore coastal waters of southern Papua New Guinea and northern and eastern Australia, from Shark Bay and Onslow, western Australia to Sydney, New South Wales (Collette & Russo, 1979:fig. 10).

**Habitat and Biology** : An epipelagic, neritic schooling species moving into inshore waters, bays and estuaries of Queensland during the southern midwinter and early spring (Grant, 1982). It is seasonally migratory in the Gulf of Carpentaria (Rainer & Munro, 1982) and forms mixed schools with S. commerson over shallow reefs offshore of Queensland. Information on spawning, food and feeding habits is lacking.



**Size** : Maximum size is 100 cm fork length and 8 kg in weight, commonly between 50 and 80 cm (Lewis, 1981).

**Interest to Fisheries** : Four species of Scomberomorus, including S. queenslandicus and Grammatorcynus form Queensland's second most important fin-fishery with an annual production of about 1 000 tons of whole and filleted fish. Queensland school mackerel is caught by recreational and commercial line-fishermen trolling with lures including metal spoons, and cut bait. The species is also trawled in the Gulf of Papua.

**Local Names** : AUSTRALIA: Blotched mackerel, Doggie mackerel, Queensland mackerel, School mackerel; USSR: Korolevskaya makrel, Kvinslenskaya makrel.

**Literature** : Munro (1943); Grant (1982).

**Remarks** : Prior to its description, this species was confused with S. guttatus.

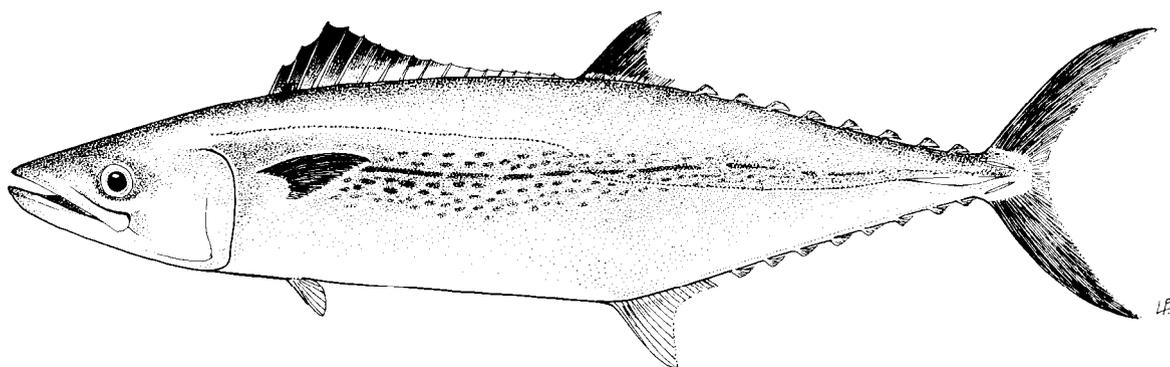
**Scomberomorus regalis** (Bloch, 1793)

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Scomber regalis Bloch, 1793, Naturgeschichte der ausländischen Fische, 7:38-43, pl. 333 (Martinique).

**Synonymy** : Scomberomorus plumierii Lacepède, 1803; Cybium regale - Cuvier, 1829; Scomberomorus regalis - Jordan & Gilbert, 1882.

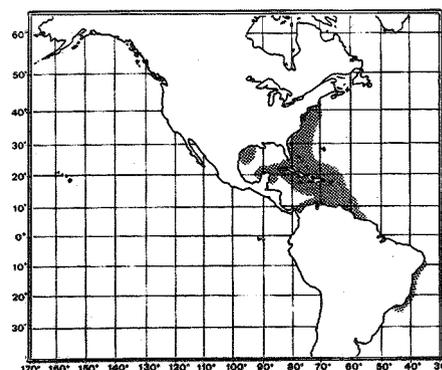
**FAO Names** : En - Cero; Fr - Thazard franc; Sp - Carite chinigua.



**Diagnostic Features** : Gillrakers on first arch moderate: 2 to 4 on upper limb; 10 to 14 on lower limb; total 12 to 18, usually 15 or 16. First dorsal fin with 16 to 18 spines, usually 17; second dorsal with 16 to 19 rays, followed by 7 to 9 finlets; anal fin with 15 to 20 rays, usually 18 or 19, followed by 7 to 10 finlets, usually 8; pectoral fin covered with small scales; pectoral fin rays 20 to 24, usually 21 or 22; pelvic fins relatively long, 4.4 to 6.3% of fork length, compared to S. brasiliensis (3.6 to 5.9%). Lateral line gradually curving down toward caudal peduncle. Vertebrae 19 or 20 precaudal plus 28 or 29 caudal, total 47 or 48. Intestine with 2 folds and 3 limbs. Colour: sides silvery with one long mid-lateral stripe and with several rows of yellow-orange streaks of variable length and small yellow spots above and below the stripe; anterior third of first dorsal fin black, posterior white.

**Geographical Distribution** : Tropical and subtropical waters of the western Atlantic from Massachusetts to Brazil, particularly in the Bahamas and West Indies (Collette & Russo, 1979:fig. 8).

**Habitat and Biology** : An epipelagic species that is most abundant in the clear waters around coral reefs. Around Puerto Rico, spawning takes place virtually all year (Erdman, 1977), but is restricted to the period from April to October on California Bank, south of Jamaica (Cooper, 1982). Fecundity varies from about 160 000 to 2.23 million eggs in females ranging between 38 and 80 cm fork length (Finucane & Collins, in prep.). In the West Indies, 96% of its food consists of small schooling fishes, particularly clupeoids (Harengula, Jenkinsia, and Opisthonema) and atherinids (Allanetta), but includes also squids and shrimps (Randall, 1967).



**Size** : Maximum size is 83.5 cm fork length and a weight of 4.9 kg (Beardsley & Richards, 1970). Males mature between 32.5 and 34.9 cm fork length, females at about 38 cm (Finucane & Collins, in prep.).

**Interest to Fisheries** : Cero are commercially caught with gillnets and on lines in the West Indies and the Bahamas, and are also valued sportsfish taken by trolling with cut bait in Florida. Only about 100 metric tons identified as S. regalis were reported from Fishing Area 31 in the period between 1975 and 1981, all from the Dominican Republic (FAO, 1983), but the actual catch is higher because up to 1 000 additional metric tons of unidentified Scomberomorus also reported for this area are believed to be mostly S. regalis and S. cavalla. It is also suspected that some of the catches reported as S. maculatus by Cuba and the Dominican Republic are in fact attributable to Cero.

**Local Names** : BRAZIL: Cavala-branca; COLOMBIA: Carite; CUBA: Pintada; DOMINICAN REPUBLIC: Sierra; GERMAN DM RP: Konigsmakrele; MARTINIQUE: Thazard franc; MEXICO: Sierra; PUERTO RICO: Sierra; ROMANIA: Cero; USA: Cero; USSR: Zapadnoatlanticheskaya korolevskaya makrel, Zapadnoatlanticheskaya makrel; VENEZUELA: Carite chinigua.

**Literature** : Collette (1978, Species Identification Sheets, Western Central Atlantic); Cooper (1982).

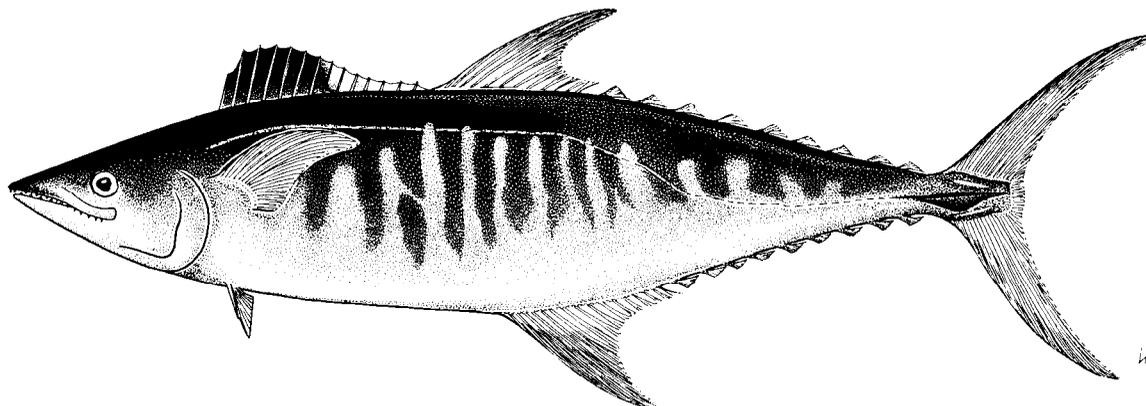
**Scomberomorus semifasciatus** (Macleay, 1884)

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Cybium semifasciatum Macleay, 1884, Proc. Linn. Soc. New South Wales, 8:205-206 (Burdekin River, Queensland).

**Synonymy** : Cybium tigris De Vis, 1884; Scomberomorus semifasciatum - McCulloch & Whitley, 1925; Scomberomorus tigris - McCulloch & Whitley, 1925; Scomberomorus semifasciatus - McCulloch, 1929; Indocybium semifasciatum - Whitley, 1947.

**FAO Names** : En - Broadbarred king mackerel; Fr - Thazard tigre; Sp - Carite tigre.

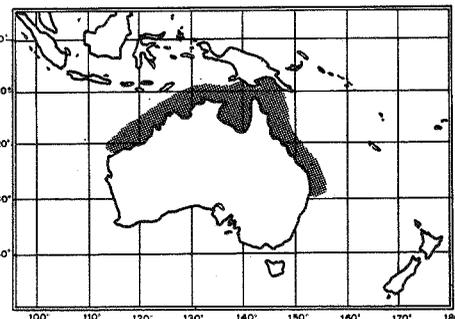


**Diagnostic Features** : Gillrakers on first arch moderate: 1 or 2 on upper limb; 5 to 11 on lower limb, usually 7 to 9; 6 to 13 total, usually 11 or fewer. First dorsal fin with 13 to 15 spines; second dorsal with 19 to 22 rays, usually 20 or more, followed by 8 to 10 finlets, usually 9; anal fin with 19 to 22 rays, usually 21 or 22, followed by 7 to 10 finlets; many pectoral fin rays, 22 to 25, usually 23 or 24. Lateral line gradually curving down toward caudal peduncle. Vertebrae 18 or 19 precaudal plus 25 to 27 caudal, total 44 to 46, usually 45. Intestine with 2 folds and 3 limbs. Colour: juveniles (less than 10 cm) marked with 12 to 20 broad vertical dark grey bands; bars confined to region of body above lateral line, number increasing with age; cheeks and belly silver white; snout dark slate grey, patch of green above orbit; first dorsal fin jet black with contrasting areas of white in central region; second dorsal fin cream with yellow anteriorly; anal fin and finlets transparent white; caudal flukes creamy white at margins and dusky or blackish near hypural; pectoral fins dusky. With increase in size the bronze-green coloration of the back turns greenish blue. The vertical bands on the back are most marked in specimens less than 50 cm and in larger fish there is a tendency for these markings to become less distinct, break into spots or fade out more or less completely. Above 70 cm, dead fish assume a drab greyish-yellow blotchy appearance with little or no evidence of markings.

**Geographical Distribution** : Confined to southern Papua New Guinea and to northern Australia, from Shark Bay, western Australia to northern New South Wales (Collette & Russo, 1979: fig. 10).

**Habitat and Biology** : The biology of this epipelagic, neritic species is virtually unknown. Juveniles ranging between 4.5 and 10 cm in length are commonly encountered during November along the beaches in the vicinity of Townsville, Queensland and grow to twice this size by January (Munro, 1943).

**Size** : Maximum size is 120 cm fork length and a weight of 10 kg (Lewis, 1981), usually 1.3 to 2.7 kg.



**Interest to Fisheries** : Four species of Scomberomorus, including S. semifasciatus, and Grammatocygnus form Queensland's second most important fin-fishery with an annual production of about 1 000 tons of whole and filleted fish. Fish of 60 to 90 cm fork length are caught on fishing grounds north of Yeppoon, Queensland, in November, while smaller size groups are taken in estuaries north of Moreton Bay. Fishing gear includes set nets and lines. Popularly, anglers operating from small outboard powered boats troll with small lures or cut bait (Grant, 1982). Broadbarred king mackerels are also taken by trawlers in the Gulf of Papua.

**Local Names:** AUSTRALIA: Broad-barred mackerel, Broadbanded mackerel, Brownie; Queensland: Grey mackerel (for large individuals).

**Literature :** Munro (1943); Lewis (1981).

**Remarks :** Uniform grey colour of dead fish apparently accounts for the vernacular name "grey mackerel". Queensland fishermen use for adult fish. Report of *S. semifasciatus* from Thailand and Malaysia are based on misidentifications.

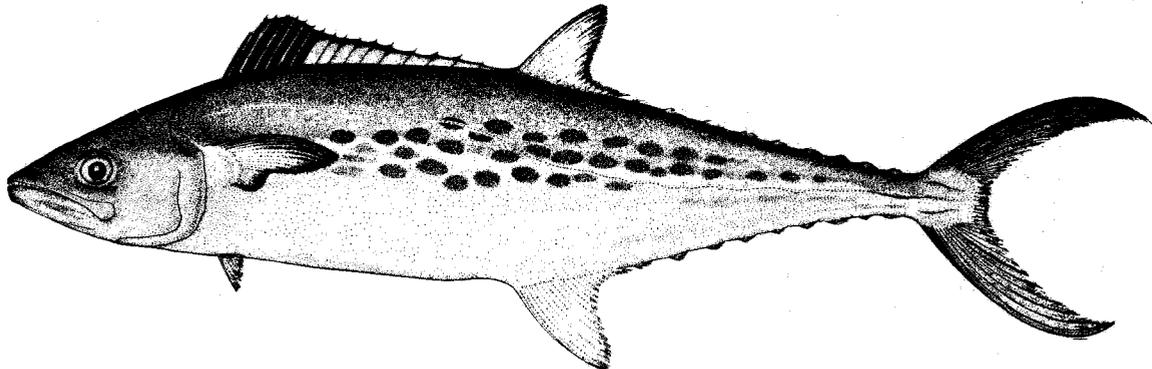
**Scomberomorus sierra** Jordan & Starks, 1895

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*Scomberomorus sierra* Jordan & Starks in Jordan, 1895, *Proc. Calif. Acad. Sci.*, ser.2, 5:428-429 (Mazatlan, Mexico).

**Synonymy :** None.

**FAO Names :** En - Pacific sierra; Fr - Thazard sierra (Pacifique) Sp - Carite sierra.



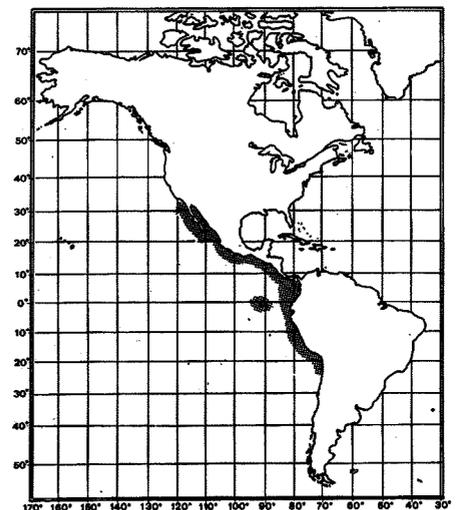
**Diagnostic Features :** Gillrakers on first arch moderate: 2 to 4 on upper limb; 9 to 14 on lower limb, usually 12 or 13; 12 to 17 total, usually 14 to 16. First dorsal fin with 15 to 18 spines; second dorsal with 16 to 19 rays, followed by 7 to 10 finlets; anal fin with 16 to 21 rays, followed by 7 to 10 finlets; pectoral fin rays few, 20 to 24, modally 21; pelvic fins relatively long, 4.7 to 6.4% of fork length, compared to *S. brasiliensis* (3.6 to 5.9% of fork length). Lateral line gradually curving down toward caudal peduncle. Vertebrae 19 to 21 precaudal plus 26 to 29 caudal, total 46 to 49, usually 48. Intestine with 2 folds and 3 limbs. Colour: sides silvery with numerous round brownish (orange in life) spots, three rows below lateral line, one above; first dorsal fin black distally, white at base; second dorsal fin tinged with yellowish, margins black; anal fin white.

**Geographical Distribution :** Eastern tropical Pacific from La Jolla in southern California south to the Galapagos Islands and Paita, Peru (Collette & RUSSO, 1979:fig. 8). Recently reported from Antofagasta, Chile (Kong, 1978).

**Habitat and Biology :** A schooling, epipelagic, neritic species believed to spawn close to the coast over most of its range (Klawe, 1966). Off Mexico, the spawning season extends from July to September, in the Gulf of Nicoya, Costa Rica, from late August to the end of November, and in Colombia from November to April with a peak from February to April. Adults feed on small fishes, particularly anchovies (*Anchoa* and *Cetengraulis*) and clupeids (*Odontognatus* and *Opisthonema*).

**Size :** Maximum size is about 97 cm fork length and a weight of 5.4 kg or more, commonly to 60 cm. Fork length at first maturity ranges between 26 and 32 cm in Colombia (Artunduaga, 1972).

**Interest to Fisheries :** According to Walford (1937), *S. sierra* seems to be the most abundant game fish along the Pacific coasts of Mexico and Central America. It is an excellent food fish frequently taken by anglers and abundant enough to support a commercial fishery (Eckles, 1949). Statistics are reported for Fishing Areas 77 and 87, but the bulk of the catch is reported by Mexico, ranging between 3 644 metric tons in 1978 and 5 675 metric tons in 1981 (FAO, 1983). In Colombia, there is no commercial fishery directed at *S. sierra*, but it is taken by the shrimp fleet and by artisanal fishermen for a total catch of 127 tons in 1971 (Artunduaga, 1972).



**Local Names** : COLOMBIA: Sierra; COSTA RICA: Macarela, Sierra; ECUADOR: Sierra; MEXICO: Serrucho, Sierra; PANAMA: Sierra; PERU: Sierra, Verle; USA: Pacific sierra; USSR: Peruanskaya makrel.

**Literature** : Artunduaga (1972, gives also length-weight regression).

**Remarks** : Numerous authors have erroneously considered this species to be a synonym of S. maculatus, or a subspecies of it.

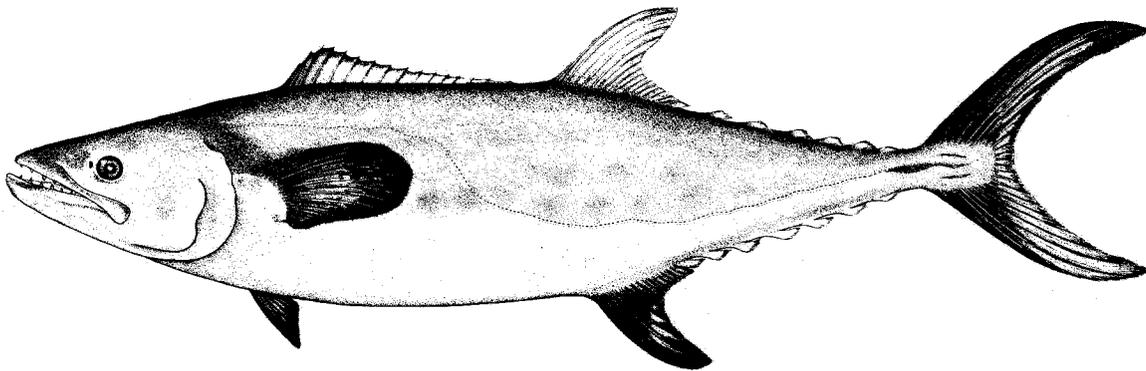
**Scomberomorus sinensis** (Lacepède, 1800)

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Scomber sinensis Lacepède, 1800, Histoire Naturelle des Poissons, 2:599 (based on Chinese drawing).

**Synonymy** : Cybium chinense Cuvier in Cuvier & Valenciennes, 1831; Scomberomorus sinensis - Jordan & Snyder, 1900; Scomberomorus chinensis - Jordan, Tanaka & Snyder, 1913; Cybium cambodgiense Durand, 1940; Scomberomorus chinense - Richards & Klawe, 1972; Scomberomorus cambodgiense - Orsi, 1974.

**FAO Names** : En - Chinese seerfish; Fr - Thazard nébuleux; Sp - Carite indochino.



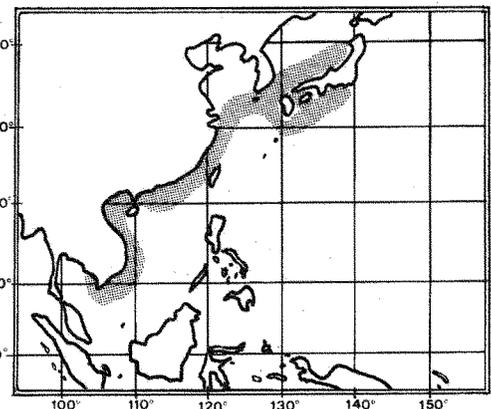
**Diagnostic Features** : Gillrakers on first arch moderate: 1 to 3 on upper limb, usually 2; 9 to 12 on lower limb; 10 to 15 total. First dorsal fin with 15 to 17 spines; second dorsal with 15 to 17 rays, followed by only 6 or 7 finlets; anal fin with 16 to 19 rays, followed by only 5 to 7 finlets; pectoral fin rays 21 to 23. Lateral line abruptly curving down below first dorsal fin. Vertebrae few, 19 or 20 precaudal plus 21 or 22 caudal, total 41 or 42. Intestine with 2 folds and 3 limbs. Colour: sides silvery with large (larger than the diameter of the eye), round, indistinct spots in two poorly defined rows in adults; juveniles with saddlelike blotches extending down to about middle of body; fins mostly blackish; pelvic and anal fins with blackish margins, anal finlets colourless.

**Geographical Distribution** : Western Pacific from Akita, Honshu, Sea of Japan, Yellow Sea and China south to Viet Nam and Kampuchea where it enters the Mekong River.

**Habitat and Biology** : An epipelagic, neritic and estuarine species known to move 300 km up the Mekong River, above Phnom Penh but believed to reproduce only in marine waters. No information on the biology of Chinese seerfish was available to the authors.

**Size** : Maximum size is 200 cm fork length and 80 kg in weight.

**Interest to Fisheries**: No catches of S. sinensis were reported to FAO for the period between 1978 and 1981. However, it is a prized food fish in Japan and probably in China as well. It is caught in the Mekong River of Kampuchea and commanded a high price in the Phnom Penh market in 1964 (Aubenton & Blanc, 1965:242).



**Local Names** : JAPAN: Ushisawara; USSR: Kitajskaya makrel, Krupnopyatnistaya makrel; VIET NAM: Cá thu trung-hoa.

**Literature** : Kishinouye (1923); Aubenton & Blanc (1965, give also a length-weight graph).

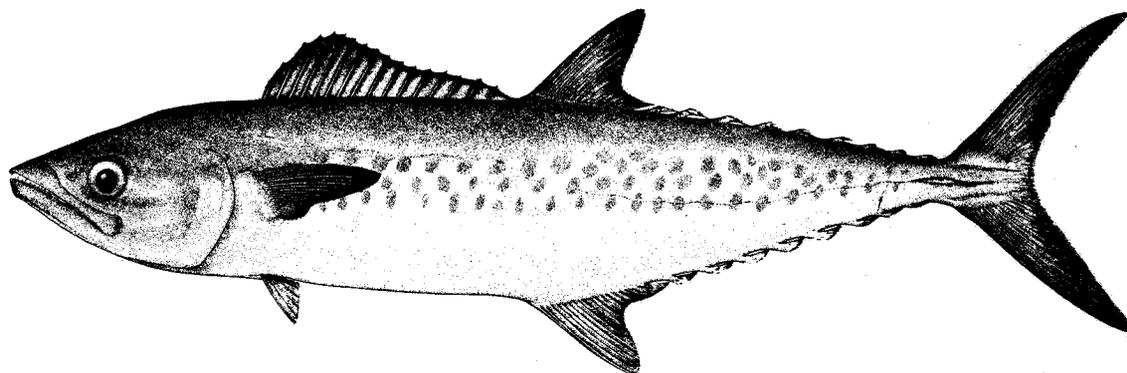
**Scomberomorus tritor** (Cuvier, 1831)

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Cybium tritor Cuvier in Cuvier & Valenciennes, 1831, Histoire Naturelle des Poissons, 8:176-177, pl. 218 (Gorée, Senegal).

**Synonymy** : Apolectus immunis Bennett, 1831; Scomberomorus argyreus Fowler, 1905; Scomberomorus tritor - Munro, 1943.

**FAO Names** : En - West African Spanish mackerel; Fr - Thazard blanc; Sp - Carite lusitánico.



**Diagnostic Features** : Gillrakers on first arch moderate: 1 to 3 on upper limb, usually 2; 10 to 13 on lower limb; 12 to 15 total. First dorsal fin with 15 to 18 spines, usually 16 or more; second dorsal with 16 to 19 rays, usually 17, followed by only 7 to 9 finlets; anal fin with 17 to 20 rays, followed by 7 to 9 finlets; pectoral fin rays 20 to 22. Lateral line gradually curving down toward caudal peduncle. Vertebrae 18 or 19 precaudal plus 27 or 28 caudal, total 46 or 47, usually 19 plus 27, total 46. Intestine with 2 folds and 3 limbs. Colour: sides silvery with about three rows of vertically elongated spots, some large individuals with thin vertical bars; anterior half of first dorsal fin and margin of posterior half of first fin black, base of posterior half white.

**Geographical Distribution** : Eastern Atlantic, concentrated in the Gulf of Guinea from the Canary Islands and Dakar south to Baía dos Tigres, southern Angola. Also found, rarely, in the northern Mediterranean Sea, along the coasts of France and Italy (Collette & Russo, 1979:fig. 8).

**Habitat and Biology** : An epipelagic, neritic species penetrating into coastal lagoons. The spawning season is believed to extend from April to October in Senegal. Approximately 1 million eggs were estimated in a 95 cm long female (Postel, 1955). In Lagos lagoon the species feeds on clupeids, particularly Ethmalosa fimbriata (Fagade & Olaniyan, 1973).

**Size** : Maximum fork length is at least 98 cm in females, and 84 cm in males; commonly ranging between 50 and 70 cm. Fork length at first maturity is 45 cm for both sexes (Postel, 1955).

**Interest to Fisheries** : The species is taken throughout the Gulf of Guinea but catches are reported only by Ghana (accounting for almost the entire catch: about 700 metric tons per year up to 1978) and Angola. In recent years world catches increased considerably, reaching 4 412 metric tons in 1980, but collapsing to 2 051 metric tons in 1981 (FAO, 1983).

**Local Names**: FRANCE: Maquereau bonite; SENEGAL: Dioun (Lebou), Maquereau-bonite, Ndiounde (Ouoloff), Tazart; USSR: Ehapadnoafrikanskaya makrel.

**Literature** : Postel (1955); Collette (1981, Species Identification Sheets, Eastern Central Atlantic).

**Remarks** : This species has erroneously been considered as a synonym of the western Atlantic S. maculatus by many authors.

