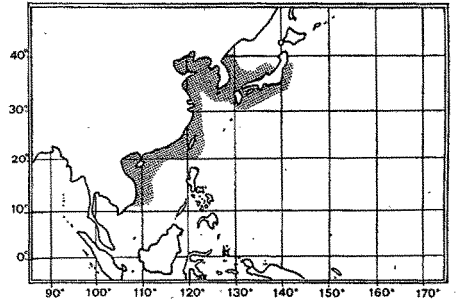


**Geographical Distribution :** Western North Pacific: Japan, the Korea's, China, (including Taiwan Island), Viet Nam.

**Habitat and Biology :** A common western Pacific temperate and tropical inshore bottom-dwelling shark, found down to at least 51 m depth.

Viviparous, with a yolk-sac placenta; number of young 5 to 16 per litter, with larger adults having larger litters of young. In Japanese waters the gestation period is 10 months, with fertilization occurring in July and birth occurring in April and May.



Probably eats bottom-dwelling invertebrates, especially crustaceans.

**Size :** Maximum at least 101 cm, adult males maturing between 62 and 71 cm and reaching at least 87 cm, females maturing at about 80 cm and reaching about 101 cm; size at birth about 28 cm.

**Interest to Fisheries :** Regularly fished off Japan, China and Taiwan Island (Province of China).

**Literature :** Fowler (1941); Heemstra (1973); Teshima, Mizue & Koga (1974).

**Remarks :** The name Mustelus kanekonis is often used for this species, but Heemstra (1973) determined that it is a synonym of M. griseus. In its western North Pacific range the only other smooth-hound is M. manazo, an ovoviviparous, white-spotted, smaller species with longer upper labial furrows and other differences.

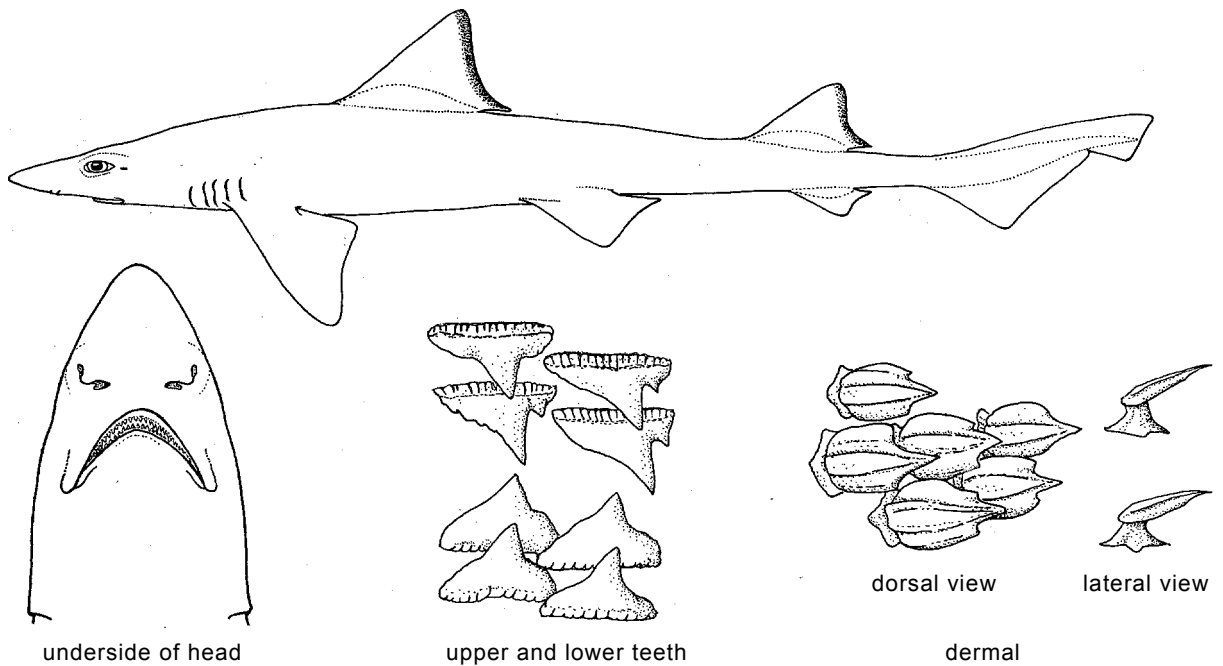
**Mustelus henlei** (Gill, 1863)

TRIAK Must 11

Rhinotriakis henlei Gill, 1863, Proc.Acad.Nat.Sci.Philad., 1862, 14:486. Holotype: U.S. National Museum of Natural History, USNM 4487, 230 mm. Type Locality: California.

**Synonymy :** None.

**Other Scientific Names Recently in Use :** Triakis henlei (Gill, 1863).

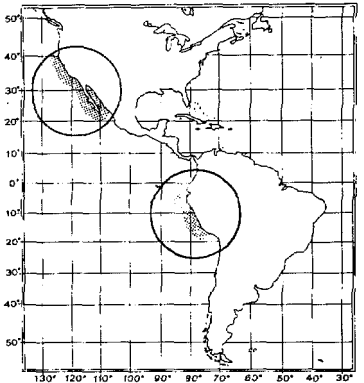


**Field Marks:** An unspotted, bronzy slender Mustelus with strongly cuspidate teeth, mostly tricuspidate denticles, long caudal peduncle, and broadly frayed posterior dorsal fin margins.

**Diagnostic Features** : Body fairly slender. Head short, prepectoral length 19 to 22% of total length; snout moderately long and bluntly to sharply angular in lateral view, preoral snout 6.4 to 8% of total length, preorbital snout 6.6 to 8.4% of total length; internarial space broad, 2.6 to 3.4% of total length; eyes large, eye length 1.9 to 2.9 times in preorbital snout and 2.6 to 3.7% of total length; interorbital space fairly narrow, 3.9 to 5.3% of total length; mouth moderately long, subequal to eye length and 2.7 to 3.8% of total length; upper labial furrows longer than lowers, upper furrows 1.6 to 2.4% of total length; teeth cuspidate and asymmetric, with a rather strong primary cusp and usually cusplets present at all ages; buccopharyngeal denticles confined to anterior third of palate and surface of tongue. Interdorsal space 19 to 24% of total length; trailing edges of dorsal fins, and occasionally anal and caudal fins, naked with a broad, conspicuous dark band of bare ceratotrichia; first dorsal broadly triangular, with posteroventrally sloping posterior margin, its midbase closer to pelvic bases than to pectorals; pectoral fins moderately large, length of anterior margins 13 to 16% of total length, width of posterior margin 8.1 to 13% of total length; pelvic fins moderate-sized, anterior margin length 6.2 to 7.9% of total length; anal height 2.7 to 3.8% of total length; anal-caudal space greater than second dorsal height and 6.9 to 8.6% of total length; ventral caudal lobe more or less falcate in adults. Crowns of lateral trunk denticles more or less tricuspidate, with longitudinal ridges extending their entire length. Skeleton not hypercalcified in adults; palatoquadrate not subdivided; monospondylous precaudal centra 39 to 45, diplospondylous precaudal centra 54 to 65, precaudal centra 97 to 106. Colour usually iridescent bronzy-brown above, occasionally greyish, white below; no white spots or dark spots or dark bars. Development viviparous. Size moderate, adults 52 to 90 cm.

**Geographical Distribution** : Eastern Pacific: Northern California to Gulf of California; Ecuador and Peru.

**Habitat and Biology** : An abundant inshore to offshore, cold-temperate to warm-temperate or subtropical bottom-dwelling shark of the eastern Pacific continental shelves, found from the intertidal region to at least 200 m depth, and very common an enclosed, shallow, muddy bays. Of the three smooth-hounds found in Californian waters this is the most cold-tolerant, being apparently resident in cold-temperate northern California. In contrast, in normal years without an 'el Niño' or warm-water influx, *M. californicus* is a regular summer visitor to north-central California (Elkhorn Slough) and resident in warm-temperate southern California, although it was originally described from San Francisco Bay where it is normally absent (unlike *M. henlei*); while the more tropical *M. lunulatus* may not occur in Californian waters except in the summers of warm-water years. However, all three species were collected by the writer in the Gulf of California during the summer at Guaymas, Sonora, Mexico. In San Francisco Bay this is apparently the most abundant local shark. One tagged individual migrated about 160 km in 3 months. The nature of the local movements of this shark is uncertain, but the writer suspects that in San Francisco Bay during wintertime, it may move out of the bay mouth into the ocean from its usual spring to autumn haunts in the shallows as the salinity drops with rainfall and increased influx of fresh water from the Sacramento-San Joaquin River system.



The microdistribution and population structure of this species may be very localized and spotty: centres of abundance in north-central California are apparently enclosed bays such as Humboldt, Tamales and San Francisco Bays, while it is uncommon in Monterey Bay and Elkhorn Slough.

Healthy individuals kept in captivity in a large circular tank at the US National Marine Fisheries Service Tiburon Laboratory proved to be active bottom-dwelling swimmers, resting on the substrate but often actively patrolling with their undersides only a few millimetres above the substrate, although sometimes swimming in midwater or at the surface. The broad pectoral and pelvic fins and relatively flat undersurface of this and other smooth-hounds may allow them to ride on a ground effect close to the substrate, making for more efficient quartering of the bottom in search of prey. Brown smooth-hounds were found to be amazingly agile as they swam close to the bottom; they were observed to swim with considerable speed straight up to the vertical wall of the tank, but instead of flitting, they made high-speed 90 degree transitions and continued to swim vertically upward with their undersides close to the tank wall, and would often turn and swim horizontally with their body axis rotated 90 degrees and their ventral surfaces still riding just off the tank wall. This species is readily kept in large aquaria if not badly traumatized during capture.

Viviparous with a yolk-sac placenta; 3 to 5 young per litter.

Eats crabs and shrimp, ghost shrimps, manis shrimp, isopods, squid, polychaete worms, tunicates, and small bony fishes, including anchovies, surf perch, gobies and flatfish, as well as topsmelt eggs. Crustaceans, especially drabs, shrimp and isopods are the most important prey of these sharks, followed by polychaete worms and fish. Small grapsid crabs are more frequent prey items to smaller sharks below 60 cm while cancrid crabs, ghost shrimp, fish and squid are more readily taken by larger sharks 80 cm and above. The presence of shore (grapsid) crabs (*Hemigrapsus oregonensis*) in the diet suggests that this shark readily feeds in the intertidal, and is agile enough to readily capture these small, active crabs. When attacking large cancrid crabs in captivity the brown smooth-hound was observed to rush in and grab, the defending crab by a cheliped, shaking it vigorously and usually causing its appendage to autotomize.

This shark is broadly sympatric in its northern range with another houndshark, the leopard shark, Triakis semifasciata, which occurs in similar microhabitats. The leopard shark differs noticeably in its diet, eating possibly less shrimp, more and larger fish, more fish eggs and considerable numbers of innkeeper worms (Urechis) and clam siphons.

**Size:** Maximum about 95 cm, males maturing between 52 and 66 cm and reaching over 67 cm, females maturing between 51 and 63 cm and reaching over 89 cm; size at birth between 19 and 21 cm.

**Interest to Fisheries :** An abundant inshore shark, fished commercially in the Gulf of California and utilized fresh or fresh-frozen for human consumption; commonly taken by sports anglers in California.

**Literature :** Roedel & Ripley (1950); Herald & Ripley (1951); Kato, Springer & Wagner (1967); Heemstra (1973); Russo (1975); de Wit (1975); Talent (1982); L.J.V. Compagno, unpub.observ. D. Ebert (pers. comm.).

**Remarks :** For details of the taxonomic history of the brown smooth-hound see Compagno (1970, 1979) and Heemstra (1973), who also recorded it for the first time from the Southern Hemisphere (Ecuador and Peru). Heemstra also noted that Bigelow & Schroeder (1948) described a specimen in the Harvard collection as M. schmitti, labelled as coming from Rio Grande do Sul, Brazil, which is actually M. henlei. With no other evidence on the occurrence of henlei in the Atlantic, Heemstra was inclined to regard the record as questionable (and possibly a result of mislabelling), which the writer concurs on.

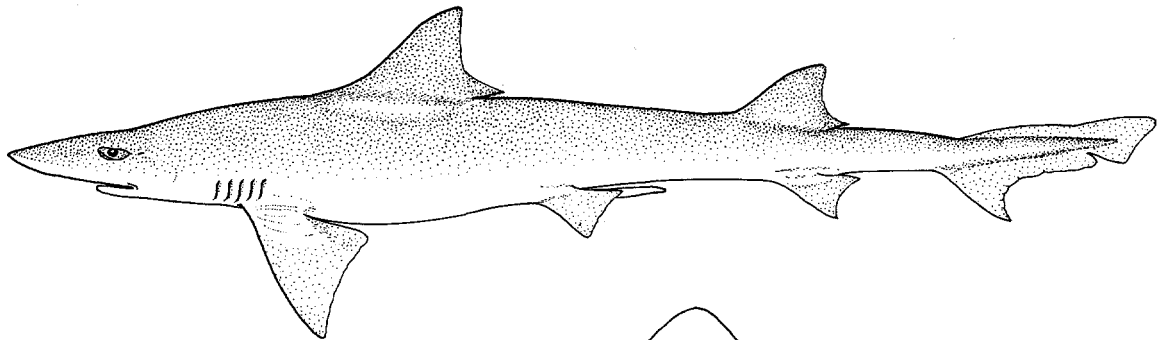
**Mustelus higmani** Springer & Lowe, 1963

TRIAK Must 12

Mustelus higmani Springer & Lowe, 1963, Copeia, 1963, (2):245, fig. 1. Holotype: U.S. National Museum of Natural History, USNM 156930, 480 mm adult male. Type Locality: Northeast of Parimaribo, Surinam, 22 m depth.

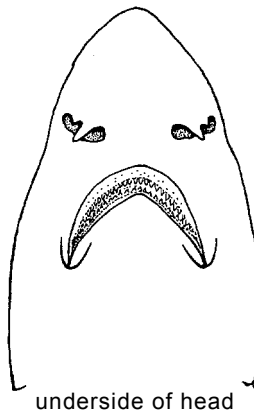
**Synonymy :** None.

**FAO Names:** En - Smalleye smooth-hound; Fr - Emissole tiyeux; Sp - Musola amarilla.

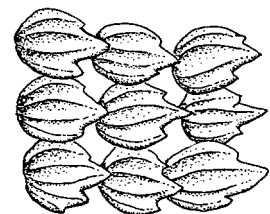


**Field Marks:** A small, plain Mustelus with fairly low-cusped teeth, a long, acutely pointed snout, very small eyes, broad interorbital space, mostly tricuspidate lateral trunk denticles, and unfringed dorsal fins.

**Diagnostic Features :** Body fairly slender. Head moderately long, prepectoral length 19 to 24% of total length; snout long and sharply angular in lateral view, preoral snout 6.9 to 10.3% of total length, preorbital snout 6.9 to 9.9% of total length; internarial space broad, 2.7 to 3.8% of total length; eyes small, eye length 2.8 to 3.4 times in preorbital snout and 2.2 to 3.4 of total length; interorbital space very broad, 4.5 to 6.3% of total length; mouth moderately long, slightly longer than eye length, 2.3 to 3.6% of total length; upper labial furrows about as long as lowers, upper furrows 0.8 to 1.8% of total length; teeth molariform and asymmetric, with cusp low and blunt or pointed; buccopharyngeal denticles covering anterior half of palate and mouth floor. Interdorsal space 17 to 23% of total length; trailing edges of dorsal fins denticulate, without bare ceratotrichia; first dorsal fairly falcate, its posterior margin nearly vertical from apex, its midbase about equidistant between pectoral and pelvic bases or slightly closer to pectorals; pectoral fins fairly small, length of anterior margins 11 to 14% of total length, width of posterior margin 6.7 to 10% of total length; pelvic fins



underside of head



dermal denticles

moderately large, anterior margin length 6.7 to 10% of total length; anal height 2.9 to 4.6% of total length; anal-caudal space greater than second dorsal height, 6 to 9.2% of total length; ventral caudal lobe more or less falcate in adults. Crowns of lateral trunk denticles mostly strongly tricuspidate, with longitudinal ridges extending their entire length. Skeleton not hypercalcified in adults; palatoquadrates not subdivided; monospondylous precaudal centra 34 to 39, diplospondylous precaudal centra 43 to 50, precaudal centra 80 to 90. Colour uniform grey or grey-brown, above, light below, no white or dark spots or dark bars. Development viviparous. Size small, adults 43 to 64 cm.

**Geographical Distribution** : Western Atlantic: Venezuela to southern Brazil.

**Habitat and Biology** : An abundant but localized tropical bottom-dwelling shark of the South American Atlantic continental shelf, occurring close inshore to well offshore, to 101 m depth, on mud, sand and shell bottoms. Occurs in shallow brackish water at the Orinoco River mouth, but not known to penetrate fresh water. There is at least partial sexual segregation, as catches have been made of considerable numbers of adults all of one sex.

Viviparous, with a yolk-sac placenta, number of young 1 to 7 per litter, most commonly 3 to 5, with sex ratio approximately equal for over 200 embryos sexed. In collections of embryos reported by Springer & Lowe (1963) both small and large embryos occurred during the months of June to September each month, with only a few large embryos taken in November; no seasonality is apparent from available data.

Feeds primarily on crustacea, with occasional individuals taking bony fish, squid, and coelenterates. Manis shrimp were the commonest crustaceans reported by Springer & Lowe (1963), followed by brachyuran crabs, hermit crabs, and shrimp.

**Size** : Maximum 64 cm, males maturing at about 43 cm and reaching at least 49 cm, females maturing at about 48 cm and reaching over 58 cm; size at birth between 21 and 24 cm.

**Interest to Fisheries** : Probably regularly fished in its range, being very common in some areas; caught mainly with bottom longlines, beam trawls and shrimp seines, and utilized fresh and dried salted for human consumption.

**Literature** : Springer & Lowe (1963); Cervigon (1966); Heemstra (1973).

**Remarks** : The biology of this species is discussed in Springer & Lowe (1963). This small, broad-headed species is one of the smallest of its genus; it resembles the eastern Pacific *M. dorsalis*, but differs in its generally lower-cusped teeth, more falcate fins, tricuspidate denticles, and less numerous vertebral centra.

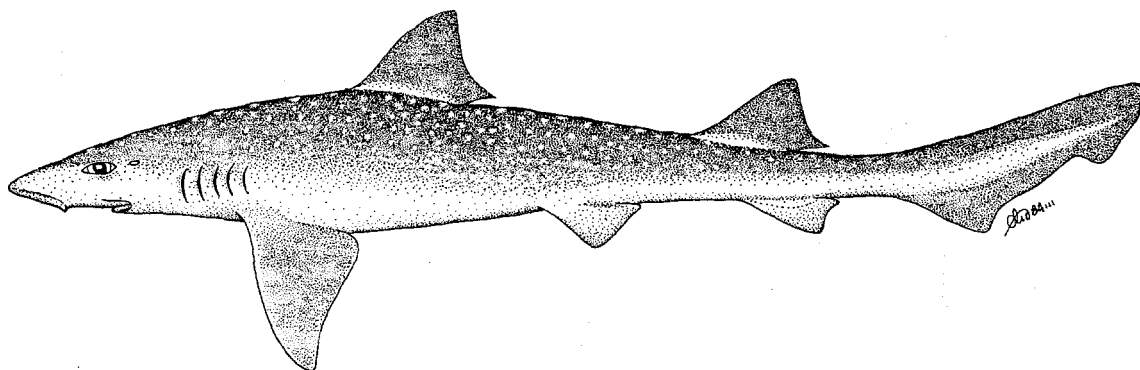
**Mustelus lenticulatus** Phillipps, 1932

TRIAK Must 13

*Mustelus lenticulatus* Phillipps, 1932, *New Zealand J.Sci.Tech.*, 13(4):226. Holotype: National Museum of New Zealand (Dominion Museum). Type locality: Wellington Harbor, Wellington, New Zealand.

**Synonymy** : None.

**FAO Names** : En - Spotted estuary smooth-hound; Fr - Emissole grivelée; Sp - *Musola manchada*.



**Field Marks** : A white-spotted *Mustelus* with a broad internarial space, long upper labial furrows, dorsal fin margins not frayed, relatively large pectoral and pelvic fins, buccopharyngeal denticles confined to anterior end of mouth, and 87 to 95 precaudal centra. It is the only species of *Mustelus* in New Zealand waters.

**Diagnostic Features** : Body fairly slender. Head short, prepectoral length 17 to 21% of total length; snout moderately long and bluntly angular in lateral view, preoral snout 5.9 to 7.3% of total length, preorbital snout 6.6 to 8.2% of total length; internarial space moderate, 2.4 to 2.9% of total length; eyes fairly large, eye length 1.8 to 3.2 times in preorbital snout and 2.4 to 4.4% of total length; interorbital space fairly broad, 4.1 to 5.2% of total length; mouth short, subequal to eye length and 2.6 to 3.5% of total length; upper labial furrows considerably longer than lowers, upper furrows 1.9 to 2.9% of total length; teeth molariform and asymmetric, with cusp reduced to a low point; condition of buccopharyngeal denticles unknown. Interdorsal space 18 to 24% of total length; trailing edges of dorsal fins denticulate, without bare ceratotrichia; first dorsal broadly triangular, with posteroventrally sloping posterior margin, its midbase closer to pelvic bases than to pectorals; pectoral fins fairly large and broad, length of anterior margins 12 to 16% of total length, width of posterior margin 8.7 to 17% of total length; pelvic fins moderately large, anterior margin length 7.2 to 8.7% of total length; anal height 2.7 to 4.3% of total length; anal-caudal space somewhat greater than second dorsal height, 6.5 to 8.7% of total length; ventral caudal lobe not strongly falcate in adults. Crowns of lateral trunk denticles lanceolate, with longitudinal ridges possibly extending their entire length. Skeleton not hypercalcified in adults; palatoquadrates not subdivided; monospondylous precaudal centra 35 to 41, diplospondylous precaudal centra 50 to 56, precaudal centra 87 to 95. Colour grey or grey-brown, above, light below, usually with numerous white spots but lacking dark spots or dark bars. Development ovoviparous. Size large, adults 78 to 137 cm.

**Geographical Distribution** : Western South Pacific: New Zealand.

**Habitat and Biology** : A common, temperate bottom-dwelling shark of the New Zealand insular shelves, often found close inshore but ranging to 220 m depth. It has seasonal inshore-offshore movements, retreating into deeper water in winter, as well as shorewise movements. A schooling species, with separation by size and sex: immatures form schools separate from the largely unisexual schools of adults. On the fishing grounds sex ratios of adults change as the fishing season, from September to April, progresses.

Ovoviparous, without a placenta, number of young 2 to 23 per litter, with larger females having larger numbers of young. The sex ratio of embryos is virtually 1:1. The gestation period is about 11 months, and the period of ovulation may exceed six months. Birth is thought to occur offshore, in summer, after which time females come inshore to mate, and travel to summer feeding grounds where adults and juveniles feed heavily on bottom crustaceans. In autumn, these sharks begin to migrate back into deeper water. This may be a fast-growing species, maturing between two to four years after birth (Francis, 1981), but this needs to be confirmed by direct ageing methods such as calibrating vertebral rings.

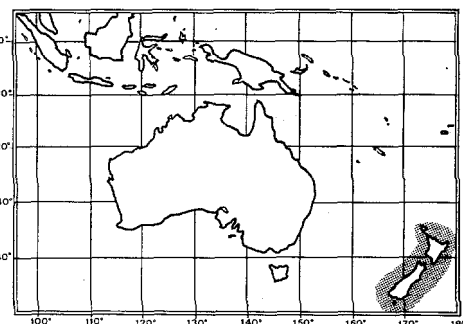
Eats crustaceans, especially crabs.

**Size** : Maximum about 137 cm; males maturing at about 78 to 89 cm and reaching about 115 cm; females maturing at about 79 to 113 cm and reaching 137 cm; size at birth about 30 to 32 cm.

**Interest to Fisheries** : A shark of considerable commercial importance, comprising nearly 5% by weight of New Zealand fish landings in 1978. Commercial fisheries currently catch most of their "rig" (a South Island name for this shark) with gillnets and trawls. Utilized fresh for human consumption. Commonly taken by sports anglers with rod and reel.

**Literature** : Fowler (1948); Heemstra (1973); Francis & Mace (1980); Francis (1981).

**Remarks** : Heemstra (1973) determined that all New Zealand smooth-hounds belong to one ovoviparous species. This is particularly close to the Australian *M. antarcticus*, but differs in having more precaudal vertebrae and slightly larger pelvic fins.



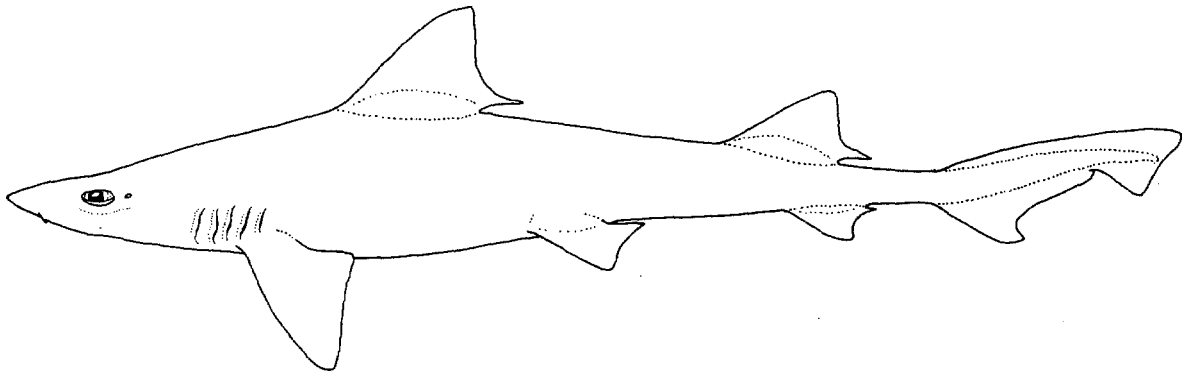
**Mustelus lunulatus** Jordan & Gilbert, 1883

TRIAK Must 14

*Mustelus lunulatus* Jordan & Gilbert, 1883, *Proc.U.S.Nat.Mus.*, 5:108. Syntype: U.S. National Museum of Natural History, USNM 29211, 620 mm. Type Locality: Mazatlan, Mexico.

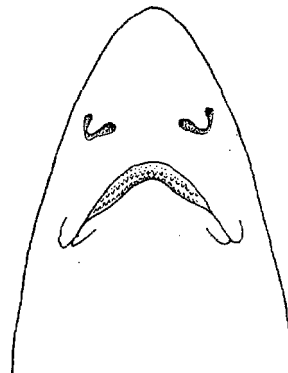
**Synonymy** : None.

**FAO Names**: En - Sicklefins smooth-hound; Fr - Emissole mamon; Sp - Musola segadora.

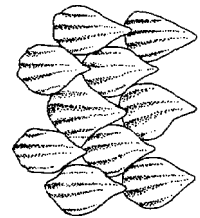


**Field Marks:** An unspotted Mustelus with a short head, broad internarial space, relatively small eyes, narrow head, long mouth, upper labial furrows shorter than lowers, strongly falcate fins and 74 to 82 precaudal vertebral centra.

**Diagnostic Features :** Body fairly slender. Head short, prepectoral length 19 to 21% of total length; snout moderately long and bluntly angular in lateral view, preoral snout 5.6 to 6.7% of total length, preorbital snout 6.3 to 8.1% of total length; internarial space broad, 2.3 to 3.3% of total length; eyes fairly large, eye length 2.9 to 3.7 times in preorbital snout and 2.2 to 3% of total length; interorbital space fairly broad, 4.3 to 4.9% of total length; mouth very long, greater than eye length and 3.4 to 3.9% of total length; upper labial furrows shorter than lowers, upper furrows 0.8 to 1.2% of total length; teeth molariform and asymmetric, with cusp reduced to a low point, cusplets absent except in very young sharks; condition of buccopharyngeal denticles unknown. Interdorsal space 18 to 22% of total length; trailing edges of dorsal fins denticulate, without bare ceratotrichia; first dorsal falcate with posterior margin vertical from apex, midbase closer to pectoral bases than to pelvics; pectoral fins fairly small, length of anterior margins 13 to 16% of total length, width of posterior margin 10 to 13% of total length; pelvic fins moderate-sized, anterior margin length 7.4 to 9.1% of total length; anal height 3.1 to 3.9% of total length; anal-caudal space greater than second dorsal height, 5.9 to 7.4% of total length; ventral caudal lobe strongly falcate in adults. Crowns of lateral trunk denticles lanceolate, with longitudinal ridges extending about 2/3 of crown length. Skeleton not hypercalcified in adults; palatoquadrate not subdivided; monospondylous precaudal centra 28 to 34, diplospondylous precaudal centra 43 to 51, precaudal centra 74 to 82. Colour uniform grey or grey-brown, above, light below, without white or dark spots or dark bars. Development uncertain. Size large, adults 70 to 110+ cm.



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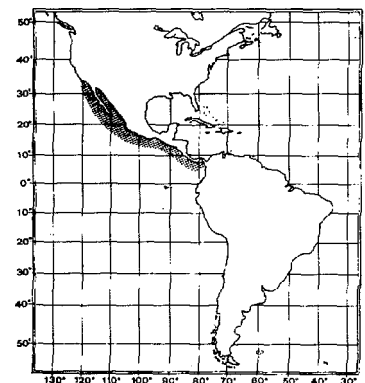
dermal denticles

**Geographical Distribution :** Eastern North Pacific: Southern California to Panama.

**Habitat and Biology :** An abundant but little-known warm-temperate to tropical bottom-dwelling shark of the eastern Pacific continental shelves, close inshore to well offshore. Mode of reproduction uncertain; presumably viviparous.

**Size :** Maximum possibly 170 cm, males mature between 70 and 83 cm, and reaching 110+ cm; adult female 97 cm; size at birth between 32 and 35 cm.

**Interest to Fisheries :** An abundant inshore species in warm-temperate to tropical waters in the eastern Pacific, commonly taken by longline in the Gulf of California, and utilized for human consumption.



**Literature :** Beebe & Tee-Van (1941); Kato, Springer & Wagner (1967); Heemstra (1973).

**Remarks :** Kato, Springer & Wagner (1967) called attention to the existence of "at least two unidentified smooth-hounds with fins similar to those of the sicklefin smooth-hound" in the eastern Pacific. Heemstra (1973) studied the matter further and indicated that these are undescribed tropical species ranging from the Gulf of California south to Ecuador and the Galapagos Islands, and plans to describe them in a revision of his 1973 Ph.D. thesis (P.C. Heemstra, pers. comm.).

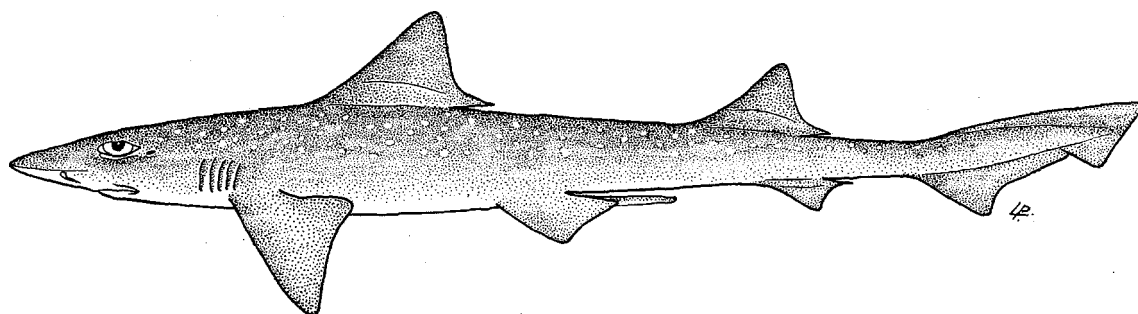
**Mustelus manazo** Bleeker, 1854

TRIAK Must 6

Mustelus manazo Bleeker, 1854, Nat.Tijdschr.Nederland.-Indeë, 6:422. Syntypes: Rijksmuseum van Natuurlijke Historie, RMNH 7396, 350 to 460 mm. Type Locality: Nagasaki Market, Japan.

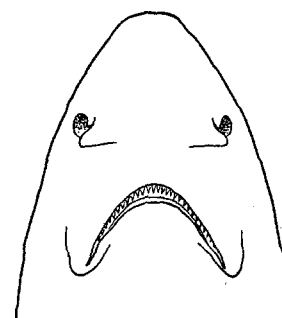
**Synonymy** : None.

**FAO Names** : En - Starspotted smooth-hound; Fr - Emissole étoilée; Sp - Musola celestial.



**Field Marks** : A moderate-sized, white-spotted Mustelus with relatively narrow internarial space, buccopharyngeal denticles covering almost entire oral cavity, unfringed dorsal fins, relatively small pectoral and pelvic fins, and 71 to 91 precaudal centra. It is the only white-spotted smooth-hound in the Indian Ocean and western North Pacific.

**Diagnostic Features:** Body fairly slender. Head short, prepectoral length 17 to 21% of total length; snout moderately long and bluntly angular in lateral view, preoral snout 5.7 to 7.5% of total length, preorbital snout 6 to 7.8% of total length; internarial space fairly narrow, 2 to 2.9% of total length; eyes large, eye length 1.7 to 2.5 times in preorbital snout and 2.4 to 4.1% of total length; interorbital space narrow, 3.7 to 4.5% of total length; mouth fairly short, about equal to eye length and 2.5 to 3.7% of total length; upper labial furrows considerably longer than lowers and 1.9 to 2.5% of total length; teeth molariform and asymmetric, with cusp reduced to a low point; buccopharyngeal denticles covering almost entire palate and floor of mouth. Interdorsal space 19 to 23% of total length; trailing edges of dorsal fins denticulate, without bare ceratotrichia; first dorsal broadly triangular, with posteroventrally sloping posterior margin, its midbase closer to pelvic bases than to pectorals; pectoral fins moderate-sized, length of anterior margins 11 to 15% of total length, width of posterior margins 7.5 to 14% of total length; pelvic fins moderate-sized, anterior margin length 5.4 to 8.2% of total length; anal height 2.2 to 3.4% of total length; anal caudal space greater than second dorsal height, and 6.5 to 9% of total length; ventral caudal lobe not falcate in adults. Crowns of lateral trunk denticles lanceolate, with longitudinal ridges extending their entire length. Skeleton not hypercalcified in adults; palatoquadrates not subdivided; monospondylous precaudal centra 33 to 41, diplospondylous precaudal centra 35 to 54, precaudal centra 71 to 91. Colour uniform grey or grey-brown, above, light below, usually with numerous white spots but no dark spots or dark bars. Development ovoviviparous. Size moderate, adults 55 to 117 cm.

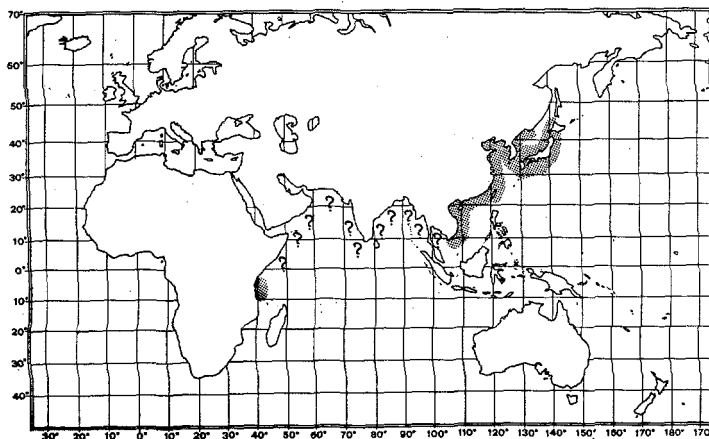


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**Geographical Distribution** : Western North Pacific: Southern Siberia, Japan, the Koreas, China, including Taiwan Island, Viet Nam. Western Indian Ocean: Kenya (P.C. Heemstra, pers. comm.).

**Habitat and Biology** : An abundant, wide-ranging temperate and tropical bottom-dwelling shark of continental waters, in the intertidal and subtidal regions, commonly close inshore, especially on mud and sand bottoms.

Ovoviviparous, without a yolk-sac placenta; number of young 1 to 22, mostly 2 to 6, average about 5, increasing markedly with size of mother. Gestation period about 10 months, with young born in spring. Adults mate in summer (June and July). Apparently fairly



fastgrowing (based on growth curves, length-frequency data and growth rings and size increase of vertebrae) with maturity occurring between three and four years after birth (Taniuchi, Kuroda & Nose, 1983).

Eats mostly bottom invertebrates, with crustacea in about 85% of 412 individuals examined by Taniuchi, Kuroda & Nose (1983), fish 23%, polichaetes 18%, and sipunculoid worms 13%. Crustacean prey primarily brachuran crabs, including cancrids and portuhids, but also anomuran crabs, ghost shrimp, true shrimp, and manis shrimp; fish include jacks, herring, filefish, morids and mackeral; eggs (of fish?) and bivalve molluscs are also eaten.

**Size:** Maximum about 117 cm; males maturing at about 62 to 70 cm and reaching about 96 cm, females maturing between 62 and 70 cm, and reaching 117 cm; size at birth about 30 cm.

**Interest to Fisheries :** An important species off Japan, fished with longlines and probably other gear; meat utilized for human consumption. Also fished off China, including Taiwan Island and the Koreas, and probably elsewhere where it occurs.

**Literature :** Fowler (1941); Okada (1955); Lindberg & Legeza (1959); Teshima, Yoshimura & Mizue (1971); Heemstra (1973); Teshima, Mizue & Koga (1974); Masuda, Araga & Yoshino (1975); Francis (1981); Taniuchi, Kuroda & Nose (1983).

**Remarks :** Until recently Red Sea, Indian Ocean and western North Pacific smooth-hounds were mostly referred to this species (cf. Fowler, 1941), but Or P.C. Heemstra (1973 and pers. comm.) found that most valid records of the species were from the western North Pacific, from Japan, the Koreas and the Soviet Union to Viet-Nam; an exception is material collected off Kenya, to be reported by Or Heemstra. Red Sea and Indo-Pakistani-Sri-Lankan Mustelus are referable to M. mosis

Mustelus manazo is very close to other white-spotted Eastern Hemisphere smooth-hounds (all of which are allopatric to M. manazo), but differs from them in its smaller size. It additionally differs from M. asterias in having fewer vertebrae, from M. palumbes in having smaller fins, and from M. antarcticus and M. lenticulatus in having a narrower internarial, more extensive buccopharyngeal denticles, and less falcate caudal fin.

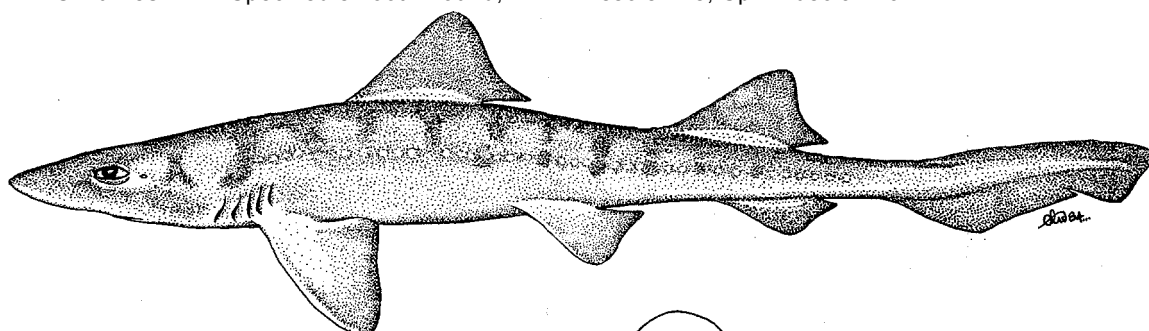
**Mustelus mento** Cope, 1877

TRIAK Must 15

Mustelus mento Cope, 1877, Proc.American Philos.Soc., 17:47. Holotype: Academy of Natural Sciences of Philadelphia, ANSP 21104, 300 mm. Type Locality: Peru.

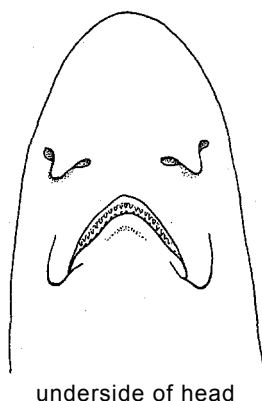
**Synonymy :** Mustelus edulis Perez Canto, in Philippi, 1887; Mustelus abbotti Evermann & Radcliffe, 1917.

**FAO Names:** En - Speckled smooth-hound; Fr - Emissole fine; Sp - Musola fina.

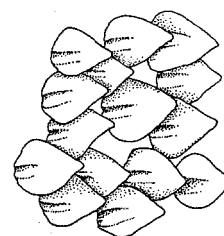


**Field Marks :** A white-spotted thickset Mustelus with a bluntly angular, short snout, short caudal peduncle, and broadly rounded, acuspitate teeth.

**Diagnostic Features :** Body stocky. Head fairly short, prepectoral length 18 to 23% of total length; snout moderately long and bluntly angular in lateral view, preoral snout 6 to 7.9% of total length, preorbital snout 6.9 to 9% of total length; internarial space broad, 2.4 to 3% of total length; eyes fairly small, eye length 2.2 to 3.9 times in preorbital snout and 1.7 to 3.5% of total



underside of head



dermal denticles



length; interorbital space moderately broad, 4.5 to 5.6% of total length; mouth short, subequal to eye length and 2.5 to 3.5% of total length; upper labial furrows usually slightly longer than lowers and 2.2 to 2.9% of total length; teeth molariform and symmetrical, with cusp absent and crown broadly rounded; buccopharyngeal denticles covering almost all of palate and mouth floor. Interdorsal space 17 to 22% of total length; trailing edges of dorsal fins denticulate, without bare ceratotrichia; pectoral fins fairly large, anterior margin length 12 to 17% of total length, width of posterior margins 8.5 to 14% of total length; pelvic fins fairly large, anterior margin length 7.6 to 9.7% of total length; anal height 2.8 to 3.9% of total length; anal caudal space somewhat less than second dorsal height, and 5.7 to 7.5% of total length; ventral caudal lobe more or less falcate in adults. Crowns of lateral trunk denticles lanceolate, with longitudinal ridges, when present, extending only on their anterior halves. Skeleton not hypercalcified in adults; palatine processes of palatoquadrates subdivided at symphysis with a short separate medial segment on each side; monospondylous precaudal centra 30 to 41, diplospondylous precaudal centra 28 to 52, precaudal centra 71 to 91. Colour uniform grey or grey-brown above, light below, with numerous white spots but no dark spots; dark bars present in young below 35 cm. Development ovoviviparous. Size large, adults 65 to 130 cm.

**Geographical Distribution** : Eastern South Pacific: Galapagos Islands, Peru, Chile, Juan Fernandez Island. Western South Atlantic: Argentina.

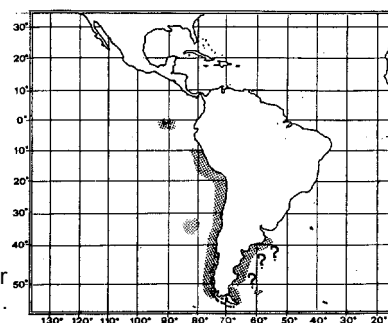
**Habitat and Biology** : A temperate bottom-dwelling shark of continental and insular shelves, found inshore and offshore, at depths of 16 to 50 m. Ovoviviparous, number of young 7 per litter.

**Size** : Maximum recorded 130 cm, males maturing between 65 and 76 cm, females maturing between 86 and 90 cm; size at birth about 30 cm.

**Interest to Fisheries** : Regularly taken in its area along with other species of "tollo" (Mustelus), for human consumption (N. Chirichigno, pers. comm.).

**Literature** : Bigelow & Schroeder (1948); Hildebrand (1949); Kato, Springer & Wagner (1967); Heemstra (1973).

**Remarks** : Bigelow & Schroeder (1948) summarized nominal South Atlantic, Argentinian records for this species, which may possibly be based on other species, perhaps M. schmitti or M. fasciatus. The rounded teeth of this species are shared by M. fasciatus, but other species of Mustelus have weakly to strongly cuspidate teeth.



**Mustelus mosis** Hemprich & Ehrenberg, 1899

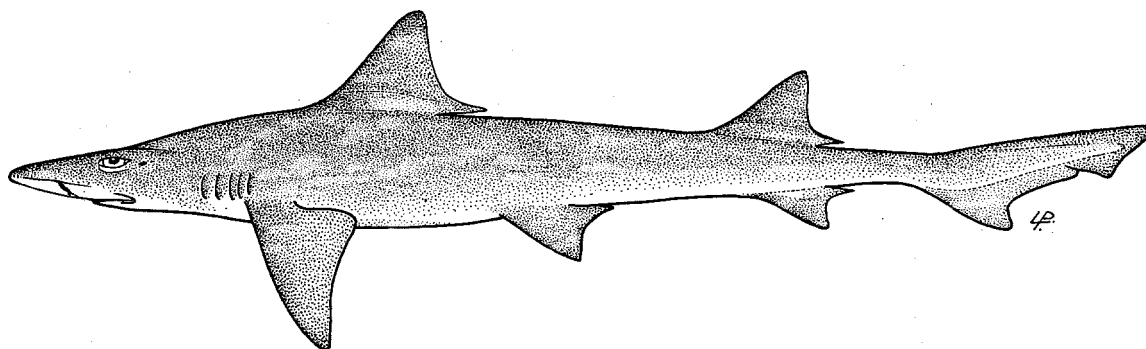
TRIAK Must 7

Mustelus mosis Hemprich & Ehrenberg, 1899, Symbol. Physic. Icones Ined., Zool., pl. 7, fig. 3. Holotype: Zoologisches Museum, Humboldt Universität, Berlin, ZMB 4501, stuffed specimen. Type Locality: Red Sea.

**Synonymy**: None.

**Other Scientific Names Recently in**: Mustelus manazo (not Bleeker, 1854)

**FAO Names** : En - Arabian smooth-hound; Fr - Emissole d'Arabie; Sp - Musola arábiga.



**Field Marks**: A unspotted, large Mustelus with a short head and snout, broad internarial space, large eyes, narrow interorbital space, upper labial furrows about equal to lowers, low-crowned teeth with weak cusps, buccopharyngeal denticles covering anterior half or entire buccal cavity, lateral trunk denticles usually lanceolate and with complete ridges, unfringed dorsal fins, a semifalcate ventral caudal lobe, 59 to 81 precaudal centra, and heavily hypercalcified head and other cartilages. This is the only species of Mustelus in most areas where it occurs.