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**A REVIEW OF THE SQUIRRELFISHES OF THE SUBFAMILY HOLOCENTRINAE
FROM THE WESTERN INDIAN OCEAN AND RED SEA**

by

John E. Randall and Phillip C. Heemstra

ABSTRACT

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Two genera of squirrelfishes of the subfamily Holocentrinae are found in the Indo-Pacific region: *Neoniphon* (*Flammeo* of recent authors) and *Sargocentron* (*Adioryx* of most recent authors). A total of 19 species of these two genera occur in the Indian Ocean west of the southern tip of India: *Neoniphon argenteus*, *N. aurolineatus* (*Flammeo scythrops* Jordan & Evermann and *Holocentrus anjouanae* Fourmanoir are junior synonyms), *N. opercularis*, *N. aurolineatus*, *Sargocentron caudimaculatum*, *S. diadema*, *S. ittodai* (first records for the Red Sea and western Indian Ocean), *S. macrosquamis* (recently described from the Red Sea and Amirante Group, Seychelles, the range here extended to Kenya, Mozambique, Mauritius, and the Chagos Archipelago), *S. melanospilos* (usually misidentified as *cornutum* which is known only from the Indo-Malayan region), *S. microstoma* (known in the region only from Maldiv Islands and Astove Island), *S. praslin* (usually not distinguished by authors from *S. rubrum*; *Holocentrum marginatum* Cuvier is a synonym), *S. punctatissimum* (has priority over *lacteoguttatum* due to selection by first revisor, Bleeker, 1873), *S. rubrum*, *S. seychellense* (an insular western Indian Ocean species), *S. spiniferum* (*Holocentrum melanopterus* Bleeker is a junior synonym), *S. tiere* (*Holocentrum elongatum* Steindachner is a junior synonym), *S. tiereoides* (a new western Indian Ocean record), *S. violaceum*, and a new species, *S. inaequalis* (closely allied to *macrosquamis* Golan, 1984, differing in variable spination of preopercle, modally one fewer pectoral ray, fewer average number of lateral-line scales and a more elongate body).

S. inaequalis is described from a total of 7 specimens from the Chagos Archipelago, Seychelles and Comoro Islands. *S. melanospilos* is recorded for the first time from the Red Sea where it appears to be subspecifically distinct from populations elsewhere in the Indo-Pacific region (no subspecific name proposed). *Holocentrum macropus* Günther, allegedly collected at Mauritius, is a misidentification of the Atlantic *Holocentrus ascensionis* (Osbeck).

A lectotype is selected for *S. microstoma*. Neotypes are designated for *S. praslin* and *S. rubrum*.

Colour photographs of fresh specimens of all of the species except *S. macrosquamis* are presented.

CONTENTS

Introduction.....	1	<i>S. melanospilos</i>	12
Methods and Materials.....	2	<i>S. microstoma</i>	13
Key to Genera.....	2	<i>S. praslin</i>	14
Genus <i>Neoniphon</i>	2	<i>S. punctatissimum</i>	15
Key to Species of <i>Neoniphon</i>	2	<i>S. rubrum</i>	16
<i>N. argenteus</i>	3	<i>S. seychellense</i>	18
<i>N. aurolineatus</i>	3	<i>S. spiniferum</i>	19
<i>N. opercularis</i>	4	<i>S. tiere</i>	20
<i>N. sammara</i>	4	<i>S. tiereoides</i>	20
Genus <i>Sargocentron</i>	5	<i>S. violaceum</i>	21
Key to Species of <i>Sargocentron</i>	5	Acknowledgements.....	22
<i>S. caudimaculatum</i>	7	Tables.....	22
<i>S. diadema</i>	8	Material Examined.....	24
<i>S. inaequalis</i> sp. n.....	8	References.....	26
<i>S. ittodai</i>	10	Colour Plates.....	28
<i>S. macrosquamis</i>	11		

A REVIEW OF THE SQUIRRELFISHES OF THE SUBFAMILY HOLOCENTRINAE FROM THE WESTERN INDIAN OCEAN AND RED SEA

by

John E. Randall¹ and Phillip C. Heemstra²

INTRODUCTION

The berycoid fish family Holocentridae is clearly differentiated into two subfamilies: the Holocentrinae (popularly called squirrelfishes) which contains the three recent genera *Holocentrus* (two Atlantic species), *Neoniphon* (*Flammeo* of recent authors), and *Sargocentron* (*Adioryx* of most recent authors), and the Myripristinae (known as soldierfishes) with the genera *Myripristis*, *Ostichthys*, *Pristilepis*, *Plectrypops* (one Atlantic and one Indo-Pacific species), and *Corniger* (one Atlantic species). From a study of the relationship of the swim bladder to the auditory bullae, Nelson (1955) found the Holocentrinae and Myripristinae very different but maintained them as subfamilies. Frizzell and Lamber (1961) and Hecht (1982), on the other hand, concluded from examination of recent and fossil otoliths that the two groups should be regarded as distinct families.

These two subfamilies are readily distinguished externally by the very long third anal spine and well-developed spine at the angle of the preopercle of the Holocentrinae (preopercular spine absent or short on species of Myripristinae except *Corniger*) and the more ovate shape of the Myripristinae; also the latter subfamily lacks teeth on the ectopterygoids, whereas teeth are present on the ectopterygoids of species of Myripristinae. Woods and Sonoda (1973) considered the evidence for both subfamily and family status and decided to maintain the squirrelfishes and soldierfishes as subfamilies. Zehren (1979) listed other osteological differences of the two groups but came to the same conclusion.

Woods and Sonoda (1973) reviewed the 11 western North Atlantic species of the family. The genus *Myripristis* has been revised by Greenfield (1974), and the coarse-scaled species reviewed by Randall and Guézé (1981). Randall, Shimizu, and Yamakawa (1982) revised *Ostichthys* and described a new monotypic genus, *Pristilepis*.

Beanea trivittata Steindachner (1902) was described as a new genus and species of holocentrid fish from the Red Sea. Although Woods (1955) expressed doubt that this fish belonged to the Holocentridae, Norman (1957) and others have regarded it as valid. Randall, Shimizu and Yamakawa (1982) concluded that *Beanea* is a probable earlier name for the apogonid genus *Siphamia*. A petition to the International Commission on Zoological Nomenclature is planned to suppress *Beanea*, which we regard as a *nomen dubium*.

In the present paper we recognize 19 species of the subfamily Holocentrinae from the Red Sea and western Indian Ocean, which we define as that part west of the longitude of the southern tip of India (77°E) and including the Persian Gulf. All but 3 of these species were treated by Shimizu and Yamakawa (1979) in their excellent paper on the Holocentrinae of Japan (though they could find no material of *Sargocentron microstoma*, *S. tiereoides* or *S. violaceum*, they included these species on the chance that they may eventually be found in Japanese waters). We have, therefore, been able to draw heavily on their research. In the synonymies given in the present paper, we list Shimizu and Yamakawa's names, junior synonyms that have been used as valid names in recent works, and all species that have been described from Indian Ocean specimens. For full descriptions and additional synonyms, the reader is referred to the paper of Shimizu and Yamakawa, (1979).

Matsuura and Shimizu (1982) have shown that the generic name *Sargocentron* Fowler must replace *Adioryx* Starks, thus this change is needed for Shimizu and Yamakawa, 1979. Six other nomenclatural corrections should be made to their paper.

The genus *Flammeo* Jordan and Evermann (1898), type-species *Holocentrum marianum* (Cuvier), should be replaced with *Neoniphon* Castelnau (1875), type-species *Neoniphon armatus* Castelnau = *Sciaena sammara* Forsskal.

Neoniphon aurolineatus (Liénard, 1839), described from Mauritius, is an earlier name for *Flammeo scythrops* (Jordan and Evermann).

Shimizu and Yamakawa (1979) overlooked the placement of *Holocentrum furcatum* Günther in the synonymy of the Atlantic species *Holocentrus ascensionis* (Osbeck) by Woods and Sonoda (1973). Woods and Sonoda (1973: 340) had overlooked the fact that *Holocentrum furcatum* was first described by Günther in 1859, not 1873. The excellent figure (drawn by G.H. Ford) of the holotype of *H. furcatum* was one of those to have been published in the first volume of Günther's *Catalogue of Fishes*; but the figures were not printed with this volume. This figure was later used in Günther's *Fische der Südsee* (1875: Pl. 64, Fig. A), and it was undoubtedly drawn from a specimen of *Holocentrus ascensionis*. Therefore, Günther's holotype, allegedly from the South Seas, must have been from the Atlantic. The species identified as *Adioryx furcatus* by Shimizu and Yamakawa (1979) should therefore be referred to *Sargocentron ensiferum* (Jordan and Evermann, 1904). It has been recorded only from the Hawaiian Islands, Japan, New Caledonia (Fourmanoir and Laboute, 1976), and the Paracel Islands, South China Sea (Cheng and Yang, 1979); in addition, the Bishop Museum has specimens from Pitcairn.

¹ Bernice P. Bishop Museum, Box 19000-A, Honolulu, Hawaii 96819, U.S.A.

² J.L.B. Smith Institute of Ichthyology, Private Bag 1015, Grahamstown, Republic of South Africa.

Holocentrum macropus Günther (1859) also appears to be a junior synonym of *H. ascensionis*, and the Mauritius type-locality an error. A photograph of the holotype, 234 mm SL, BMNH 1845.7.3.42, was sent to the senior author by A.C. Wheeler of the British Museum (Natural History). It is a species of *Holocentrus* (*sensu stricto*), hence would have had an Atlantic locality. Wheeler compared the type to specimens of *H. ascensionis* and could "see nothing very different". He explained that the collection of which *H. macropus* was a part came from Dr. (later Sir) Andrew Smith, founder of the South African Museum in Cape Town. In addition to *H. macropus*, it included 2 specimens from "Indian Seas", 3 or 4 from Mauritius, and many from St. Helena. It thus seems likely that the true locality for *H. macropus* was St. Helena. Sauvage (1891: Pl. 6, Fig. 3) illustrated the holotype of *H. macropus* in the belief that its Mauritius locality was valid.

METHODS AND MATERIALS

Our methods for counts and measurements generally follow Hubbs & Lagler (1964). Lateral-line scale counts are of all scales with a tube. Gillraker counts include all rudiments. The last dorsal and anal-fin rays are usually split to their base, but are counted as a single ray. Head length (HL) is from front of upper lip (with upper jaw retracted) to tip of longest opercle spine or end of opercular membrane (whichever is most posterior). Preopercular spine length is from vertical edge of preopercle (bases of the sharp serrae) at base of spine to tip of spine. Lower jaw length is from anterior end of jaw to rear end of angular bone. Interorbital width is the distance between dorsal edges of the bony orbits at a vertical through centre of eye. Caudal peduncle length is the horizontal distance between verticals at rear base of anal fin and base of caudal fin. Dorsal-fin spine lengths are measured along the leading edge of the spine, from the scaly sheath at fin base to tip of the spine. Anal-fin spines are measured from the actual base of the spine to their tips. Caudal concavity is the horizontal distance between verticals at the distal ends of the longest and shortest caudal rays. Meristic data are recorded from western Indian Ocean specimens except when insufficient material was available; counts were then taken from specimens elsewhere in the Indo-Pacific region (see Material Examined). Lengths of specimens are standard length (SL).

Material for our study is from the collections of the Academy of Natural Sciences of Philadelphia (ANSP); Australian Museum, Sydney (AMS); Bernice P. Bishop Museum, Honolulu (BPBM); British Museum (Natural History), London [BM(NH)]; California Academy of Sciences, San Francisco (SU, CAS); Field Museum of Natural History, Chicago (FMNH); Hebrew University, Jerusalem (HUJ); Museum of Comparative Zoology, Harvard University, Cambridge (MCZ); Royal Ontario Museum, Toronto (ROM); J.L.B. Smith Institute of Ichthyology, Grahamstown, (RUSI); and the U.S. National Museum of Natural History, Washington, D.C. (USNM). In addition, type-specimens are listed from the following institutions: Museum National d'Histoire Naturelle, Paris (MNHN); Rijksmuseum van Natuurlijke Historie, Leiden (RMNH); Senckenberg Museum, Frankfurt (SMF); Tel-Aviv University (TAU); and the Zoological Museum of Copenhagen (ZMC).

A distribution of "Indo-West Pacific" given below indicates a broad range from east Africa at least to French Polynesia, but not necessarily all localities within the Indo-Pacific region.

Species accounts are presented alphabetically.

KEY TO GENERA OF HOLOCENTRINAE FROM THE WESTERN INDIAN OCEAN AND RED SEA

- 1a. Last dorsal-fin spine much closer to first soft-ray than to penultimate spine; lower jaw strongly projecting (except small juveniles) *Neoniphon*
- 1b. Last dorsal-fin spine about equidistant from penultimate spine and first soft-ray; mouth terminal or with lower jaw slightly inferior (except *Sargocentron spiniferum* with lower jaw slightly projecting) *Sargocentron*

Genus *Neoniphon* Castelnau, 1875

Neoniphon Castelnau, 1875: 4 (type-species, *Neoniphon armatus* Castelnau, 1875 [= *Sciaena sammara* Forsskal], by original designation and monotypy).

Flammeo Jordan & Evermann, 1898: 2871 (type-species, *Holocentrum marianum* Cuvier, 1829 by original designation and monotypy).

Kutaflammeo Whitley, 1933: 69 (type-species, *Holocentrum tahiticum* Kner, 1864 [= *Sciaena sammara* Forsskal], by original designation; proposed as a subgenus).

DIAGNOSIS: Dorsal-fin rays XI/11-14, the last spine distinctly closer to first soft-ray than to penultimate spine; anal-fin rays IV,7-9; lower jaw of adults strongly projecting; body relatively elongate, the depth 2.9-3.7 in SL.

REMARKS: Woods and Sonoda (1973) used the genus *Flammeo* in preference to *Neoniphon* on the grounds that *Flammeo* is based on a well known species whereas *Neoniphon* is "based on a species whose status is uncertain". They were followed by Shimizu and Yamakawa (1979). The original description of *Neoniphon armatus* by Castelnau (1875: 5) is more accurate than most of his descriptions and clearly applies to the species currently recognized as "*Flammeo sammara*". The colour description alone is sufficient to recognize his species, and the other characters mentioned fit the species known as *sammara* except for 3 anal-fin spines and 9 anal soft-rays. Castelnau's count of 3 anal-fin spines was probably the result of overlooking the very small first spine. His 9 anal soft-rays (instead of 8) may be due to his counting the last divided ray as 2. The length of "nearly 17 inches" given by Castelnau for his specimen is exceptionally large for the species and probably in error.

There are 4 wide-ranging Indo-West Pacific species in the genus *Neoniphon* and one western Atlantic species.

KEY TO SPECIES OF *NEONIPHON* FROM THE WESTERN INDIAN OCEAN AND RED SEA

- 1a. Scales above lateral line to base of middle dorsal spines 3½; lateral-line scales 42-47; silvery pink with yellow stripes on body; (Indo-West Pacific and east Africa) *N. aurolineatus*
- 1b. Scales above lateral line to base of middle dorsal spines 2½; lateral-line scales 36-43; no yellow stripes on body 2
- 2a. Pectoral-fin rays usually 13; first dorsal fin without dark markings; (Indo-West Pacific except Hawaii) *N. argenteus*

- 2b. Pectoral-fin rays usually 14; spinous portion of dorsal fin with conspicuous dark markings..... 3
 3a. Anal soft-rays 8; a black spot about as large as eye from first to third dorsal-fin spines; (Indo-West Pacific and Red Sea) *N. sammara*
 3b. Anal soft-rays usually 9; a broad black median zone across entire spinous portion of dorsal fin; (Indo-West Pacific except Hawaii and Australia) *N. opercularis*

***Neoniphon argenteus* (Valenciennes, 1831)**

Plate 1, Fig. A.

Holocentrum argenteum Valenciennes, in Cuv. & Val., 1831: 502 (type-locality, New Guinea).

Holocentrum stercus muscarum Valenciennes, in Cuv. & Val., 1831: 503 (type-locality, Guam).

Holocentrum laeve Günther, 1859: 47 (type-locality, Louisiade Archipelago, Guadalcanal, and Ambon).

Holocentrus laeve: Smith, 1955a: 308; Smith & Smith, 1963: 9, Pl. 6, Fig. B.

Flammeo laeve: Burgess & Axelrod, 1973: Fig. 173.

Holocentrus laevis: Jones & Kumaran, 1980: 173, Fig. 149.

Flammeo argenteus: Shimizu & Yamakawa, 1979: 136, Fig. 20.

DIAGNOSIS: Dorsal-fin rays XI/11-13; anal-fin rays IV, 7-9; pectoral-fin rays 12-14 lateral-line scales 38-43; scales above lateral line to base of middle dorsal spines 2½; oblique rows of scales on cheek 4; gill-rakers 5-7 + 9-12; body elongate, the depth 3.0-3.7 in SL; head length 2.7-3.4 in SL; lower jaw projecting; dorsal profile of head slightly convex; margin of nasal bone smooth; nasal fossa moderately large, without spinules on margin; preopercular spine small, ¼ to ½ orbit diameter; longest dorsal spine 1.9-2.1 in HL; last dorsal spine subequal to penultimate spine, lying very close to first dorsal soft-ray; third anal spine 1.3-1.6 in HL.

Colour in life: pinkish silver dorsally, silvery on sides and ventrally, the scales often with a blackish spot in centre (except lateral-line scales which have a light red spot flanked by blackish). Spinous portion of dorsal fin translucent with an elongate white spot anteriorly on upper part of each membrane extending to tip, the first 2 membranes with some red colour below the white (but no dark pigment); remaining fins whitish except caudal lobes which are broadly red on upper and lower margins, the anterior edge of the soft portion of the dorsal fin which is red, and the fourth spine and first ray of anal fins which are red.

Maximum standard length 19 cm

REMARKS: Klausewitz and Bauchot (1967) selected MNHN A.2638, 119 mm SL, as the lectotype of *Holocentrum argenteum* from among the series of 4 Valenciennes' syntypes. They correctly showed that *Holocentrum laeve* Günther is a synonym of *H. stercus-muscarum* Valenciennes. Shimizu and Yamakawa (1979), in turn, placed *stercusmuscarum* in the synonymy of *argenteus*.

Neoniphon argenteus is known from the following Pacific localities: New Guinea, Guam, Louisiade Archipelago, Solomon Islands, New Britain, Ambon, New Hebrides (=Vanuatu), Samoa Islands, Phoenix Islands, Cook Islands, Society Islands, Gilbert Islands (Kiribati), Marshall Islands, and the Ryukyu Islands. The only records we have found from the Indian Ocean are Aldabra (Smith, 1955a), Seychelles (Smith & Smith, 1963), Maldivé Islands (Burgess & Axelrod, 1973), and the Laccadives (Lakshadweep) (Jones & Kumaran,

1980). We have examined specimens from the Seychelles, Aldabra, Chagos Archipelago, Tekomaji Island and Pinda (northern Mozambique), Mentawai Islands (Sumatera), Vanuatu, Marshall Islands, Kiribati, Line Islands, Cook Islands, Society Islands, and the Tuamotu Archipelago. It is clear from the above that this species is primarily an insular form. It is generally found hiding by day among the thickets of *Acropora* and other corals of protected shallow reefs of lagoons or bays.

Some authors such as Bleeker have confused *N. argenteus* with *N. sammara*; otherwise there would probably be more localities reported for *argenteus*. Preserved specimens of the two species are very similar in colour pattern, except for the large black blotch at the front of the first dorsal fin of *N. sammara*. Weber and de Beaufort (1929) placed *N. argenteus* (as *Holocentrum laeve*) in the synonymy of *sammara*, though they regarded it as a distinct variety.

***Neoniphon aurolineatus* (Liénard, 1839)**

Plate 1, Fig. B.

Holocentrum auro-lineatum Liénard, 1839: 32 (type-locality, Mauritius).

Flammeo scythrops Jordan & Evermann, 1903: 174 (type-locality, Honolulu); Jordan & Evermann, 1905: 157, Fig. 57, Pl. 7; Shimizu & Yamakawa, 1979: 141, Fig. 23.

Holocentrus sp. Fourmanoir, 1954: 210-211, Fig. 6 (Anjouan); Fourmanoir, 1957: 60, Fig. 53.

Holocentrus anjouanae Fourmanoir in Fourmanoir & Guézé, 1962: 7 (type-locality, Anjouan, Comoro Islands).

DIAGNOSIS: Dorsal-fin rays XI/12-14; anal-fin rays IV, 8-9 (usually 9); pectoral-fin rays 13-15; lateral-line scales 42-47; scales above lateral line to base of middle dorsal spines 3½; oblique rows of cheek scales 5; gill-rakers 5-7 + 11-13; body depth 3.9-3.3 in SL; head length 2.8-3.1 in SL; lower jaw strongly projecting; dorsal profile of snout nearly straight with a break in contour above eye to a less sloping, nearly straight profile of rest of head; anterior end of nasal bone rounded; nasal fossa large, without spinules on margin; preopercular spine short, about ⅓ orbit diameter; longest dorsal spine 1.4-1.6 in HL; last dorsal spine shortest, much closer to first soft-ray than to penultimate spine; third anal spine 1.4-1.6 in HL.

Colour when fresh: silvery pink with yellow stripes following scale rows; head silvery pink with an orange-red spot above posterior part of orbit and a broad orange-red bar passing from top of head across opercle; a faint, broad, light orange-red band from orbit to corner of preopercle. A large orange-red spot covering most of first 2 interspinous membranes of dorsal fin; tips of spinous dorsal membranes white, as well as anterior part of each membrane posterior to third spine; rest of interspinous membranes a mixture of red and yellow; remaining fins pale red.

Attains 22 cm SL.

REMARKS: The holotype of *Holocentrum auro-lineatum* was not located; it is probably not extant.

Although widespread, *N. aurolineatus* is rare in collections, and there are few records of the species in the literature. Masuda, Araga and Yoshino (1975) and Shimizu and Yamakawa (1979) reported it (as *Flammeo scythrops*) only from the Hawaiian Islands and southern Japan. Allen and Cross (1983) recorded it (also as *F. scythrops*) from the Great Barrier Reef. We add the Indian Ocean literature records (see synonymy above) of

Mauritius, Réunion, and Comoro Islands. The Bishop Museum has specimens from the Hawaiian Islands, Réunion, Ambon and Sulawesi (Indonesia), Tutuila (American Samoa), and Fatu Hiva (Marquesas Islands).

N. aurolineatus is found on deep reefs, generally at depths greater than 40 m; our deepest collection, 70 m.

***Neoniphon opercularis* (Valenciennes, 1831)**

Plate 1, Fig. C.

Holocentrum operculare Valenciennes, in Cuv. & Val., 1831: 501 (type-locality, New Ireland).

Holocentrus operculare: Smith, 1955a: 308.

Holocentrus opercularis: Smith, 1955b: 5, Pl. 1, Fig. 1; Fourmanoir, 1957: 59; Smith, 1951: 566; Smith & Smith, 1963: 9, Pl. 87, Fig. C.

Flammeo opercularis: Shimizu & Yamakawa, 1979: 140, Fig. 22.

DIAGNOSIS: Dorsal-fin rays XI/12-14; anal-fin rays IV, 8-9 (usually 9); pectoral-fin rays 14; lateral-line scales 36-41; scales above lateral line to base of middle dorsal spines 2½; oblique rows of scales on cheek 5; gill-rakers 5-8 + 11-13; body depth 2.9-3.3 in SL; head length 2.7-3.1 in SL; lower jaw strongly projecting; dorsal profile of head slightly convex; margin of nasal bone smooth; nasal fossa large, pear-shaped, without spinules on its margin; preopercular spine slightly less than ½ orbit diameter; longest dorsal spine 2.1-2.7 in HL; last dorsal spine longer than penultimate spine and much closer to first soft-ray than to penultimate spine; third anal spine 1.3-1.9 in HL.

Colour in life: silvery with iridescence, with a dark red mark on each scale (anteriorly on body on rim of scales, toward middle of body vertically elongate near base of exposed part of scales, and posteriorly nearly round); spots dorsally on body blackish; head mainly red with some silver on opercle and cheek. Spinous portion of dorsal fin black except membrane tips which are white and a broad diagonal white band near base of each membrane; remaining median fins yellowish (the rays more yellow than membranes); first 3 anal spines white with a faint red band behind; caudal lobes with a broad red band; pectoral fins light red; pelvic fins whitish with a pink cast.

The largest species of the genus; attains about 30 cm SL.

REMARKS: The holotype of *Holocentrum operculare*, MNHN A.2655, 178 mm SL, is in the Museum National d'Histoire Naturelle in Paris (Bauchot, 1970).

This species is known from French Polynesia to east Africa, although unreported from a number of localities such as the Hawaiian Islands, Australia, Maldiv Islands, Mauritius, Comoro Islands, Red Sea, and southern Africa. We have examined specimens from the Seychelles, Kenya, Zanzibar, and Mozambique (Pinda). It is far less common than *N. sammara*, though it occurs in essentially the same habitat; it is more wary and retiring than *sammara*.

N. opercularis is unusual among wide-ranging Indo-Pacific species of fishes in having no synonyms.

***Neoniphon sammara* (Forsskal, 1775)**

Plate 1, Fig. D.

Sciaena sammara Forsskal, 1775: 48 (type-locality, Jeddah, Red Sea).

Labrus angulosus Lacepède, 1802: 430, Pl. 22, Fig. 1 (type-locality, Mauritius).

Holocentrum christianum Ehrenberg, in Cuv. & Val., 1829: 219 (type-locality, Al-Quseir, Red Sea).

Holocentrus sammara: Rüppell, 1829: 85, Pl. 22, Fig. 3.

Holocentrum samara: Klunzinger, 1870: 720.

Holocentrum platyrrhinum Klunzinger, 1870: 725 (type-locality, Red Sea).

Neoniphon armatus Castelnau, 1875: 5 (type-locality, Cape York, Australia).

Holocentrum sammara: Day, 1876: 173; Sauvage, 1891: 31.

Holocentrus sammara: Smith, 1949: 153, Pl. 9, Fig. 294; Smith 1955a: 308; Fourmanoir, 1957: 57; Arnoult et al., 1958: 57; Fourmanoir & Guézé, 1962: 6; Smith & Smith, 1963: 9, Pl. 6, Fig. A; Smith, 1964: 295; Jones & Kumaran, 1980: 172, Fig. 148.

Flammeo sammara: Shimizu & Yamakawa, 1979: 138, Fig. 21.

DIAGNOSIS: Dorsal-fin rays XI/11-13; anal-fin rays IV, 8; pectoral-fin rays 13-15; lateral-line scales 38-43; scales above lateral line to base of middle dorsal spines 2½; oblique rows of cheek scales 4 or 5 (usually 5); gill-rakers 6-8 + 10-13; body elongate; depth 3.0-3.6 in SL; head length 2.9-3.2 in SL; lower jaw projecting; dorsal profile of head slightly convex; margin of nasal bone smooth; nasal fossa without spinules on margin; preopercular spine about ⅓ orbit diameter; longest dorsal spine 1.8-2.3 in HL; last dorsal fin spine longer than penultimate spine and adherent to first soft-ray of fin; third anal spine 1.1-1.5 in HL.

Colour in life: pinkish silver dorsally, silvery on sides and below, with a narrow light red stripe following lateral line (broader and more distinct at night); each scale with a dark reddish to blackish spot, thus forming dark longitudinal lines on body. A large black spot (as large as eye) irregularly edged in dark red on first 3 membranes of spinous portion of dorsal fin (sometimes a broad band of dark red extending from this spot through middle of rest of spinous part of fin); tips of spinous dorsal membranes broadly white, and a series of white spots, one per membrane, in lower part of fin; soft dorsal, anal, and caudal fins yellowish, the dorsal with the anterior edge broadly red, the anal with a white leading edge and a red band submarginal to it, and the caudal with a broad red band on each lobe; paired fins whitish.

Fourmanoir and Laboute (1976) reported this species to a total length of 32 cm at New Caledonia. However, any specimens larger than 26 cm (21 cm SL) are exceptional.

REMARKS: The holotype of *Sciaena sammara*, a dried skin with most of the head missing, is in the Zoological Museum of Copenhagen (Klauswitz & Nielsen, 1965: 19, Fig. 31).

This squirrelfish is wide-ranging and abundant. It occurs from the Pitcairn Group, French Polynesia and the Hawaiian Islands to the Red Sea and east Africa; it ranges south on the African coast to Durban (Smith, 1949). In the western Pacific it is distributed from Australia to Japan, where the young are found as far north as southern Honshu.

Like *N. argenteus*, *N. sammara* is a shallow-water species. Its typical habitat is patch reefs in lagoons or bays with good growth of branching corals, especially *Acropora*. It is readily seen during the day hovering just outside the protective cover of the coral or a small cave to which it retires with the approach of danger. With the advent of darkness, it is among the first of the holocentrids to emerge for feeding. Randall (1972) reported its food as crabs (66.5% by volume), postlarval and transforming fishes (15%), shrimps (10.5%) and the rest crustaceans and polychaete worms.

Genus *SARGOCENTRON* Fowler, 1904

Sargocentron Fowler, 1904a: 235 (type-species, *Holocentrum leo* Cuvier, 1829 [= *Sciaena spinifera* Forsskal, 1775] by original designation; proposed as a subgenus).

Adioryx Starks, 1908: 614 (type-species, *Holocentrum suborbitale* Gill, 1864 by original designation).

Faremusca Whitley, 1933: 68 (type-species, *Holocentrum punctatissimum* Cuvier, 1829 by original designation; proposed as a subgenus).

Cephalofarer Whitley, 1933: 69 (type-species, *Holocentrum sicciferum* Cope, 1871 [= *Holocentrum vexillarium* Poey, 1860] by original designation; proposed as a subgenus).

DIAGNOSIS: Dorsal-fin rays XI/12-16; the last dorsal-fin spine shorter than penultimate spine, its base about equidistant from base of penultimate spine and first soft-ray; anal-fin rays IV,8-10; lower jaw not strongly projecting; body depth 2.3-3.5 in SL.

REMARKS: Fowler (1904a) created the subgenus *Sargocentron* for *Holocentrum leo* Cuvier (= *spiniferum*); later (1944) he elevated it to generic rank. Shimizu and Yamakawa (1979: 111) wrote, "On our examination of *A. spinifer*, we could not produce any satisfactory reasons to separate it from other species of *Adioryx*, except for 3.5 scales above lateral line. This character is shared only with *A. furcatus* [= *ensifer*] . . .".

Two other species of *Sargocentron*, however, have 3½ scales above the lateral line: *S. lepros* (Allen and Cross, 1983) and an undescribed species from the central and western Pacific (neither of which were known to Shimizu and Yamakawa). Another external character shared by *spiniferum* and *ensiferum* is the slightly protruding lower jaw. Nevertheless, we concur that *Sargocentron* should not be restricted to the species *spiniferum* and *ensiferum*. *S. caudimaculatum* and *S. violaceum* tend to link *spiniferum* and *ensiferum* to the remaining species of the genus.

Matsuura and Shimizu (1982) have argued that *S. spiniferum* and *S. suborbitale* are congeneric, and that consequently the generic name *Sargocentron* Fowler must replace *Adioryx* Starks.

Li in Li, Wang and Wu (1981) described a new genus of holocentrid fishes, *Dispinus*, on osteological characters, designating *Adioryx ruber* (Forsskal) as the type-species. For comparison, Li discussed only one species of *Adioryx*, *A. microstoma*, now classified in the genus *Sargocentron*. He should have studied the type-species of *Sargocentron*, *S. spiniferum*, as well as other species of this large diverse genus. We expect that such comparisons will result in the relegation of *Dispinus* at least to subgeneric status.

The spination (or lack of it) on the edge of the nasal fossa and medioposterior edge of the nasal bones is a useful character in separating species of *Sargocentron*; however, our examination of specimens has revealed considerable intraspecific variation in the presence or absence of these spinules for some species.

KEY TO SPECIES OF *SARGOCENTRON* FROM THE WESTERN INDIAN OCEAN AND RED SEA

- 1a. Scales above lateral line to base of middle dorsal-fin spines 3½; dorsal soft-rays usually 15; anal soft-rays usually 10; a large oval dark red spot on preopercle behind eye; spinous portion of dorsal fin uniform dark red; (Indo-West Pacific and Red Sea)..... *S. spiniferum*
- 1b. Scales above lateral line to base of middle dorsal-fin spines 2½; dorsal soft-rays usually 13 or 14; anal soft-rays usually 9; no large red spot on

opercle; spinous portion of dorsal fin not uniform dark red..... 2

- 2a. A prominent retrorse spine on nasal bone between nasal fossa and premaxillary groove; edge of premaxillary groove with a small retrorse spine (occasionally 2); maximum SL less than 80 mm; (western Indian Ocean)..... 3
- 2b. No spine on nasal bone between nasal fossa and premaxillary groove; no spine on edge of premaxillary groove (except *S. microstoma*); maximum SL 13 cm or more..... 4
- 3a. Small spines along posterior margin of preopercle gradually and uniformly diminishing in length dorsally; pectoral rays modally 15; lateral-line scales 40-45; body depth 2.3-2.5 in SL; (Red Sea, east Africa and Seychelles)..... *S. macrosquamis*
- 3b. Spines along posterior margin of preopercle of variable size, some as much as 4 times larger than adjacent spines; pectoral rays modally 14; lateral-line scales 38-41; body depth 2.5-2.7 in SL; (Chagos Archipelago, Seychelles and Comoros)..... *S. inaequalis*, new species
- 4a. Lateral-line scales 33-39..... 5
- 4b. Lateral-line scales 38-55..... 9
- 5a. Margin of nasal fossa with one or more spinules (except some Red Sea specimens of *S. melanospilos*) (Fig. 1)..... 6
- 5b. Margin of nasal fossa usually without spinules..... 7

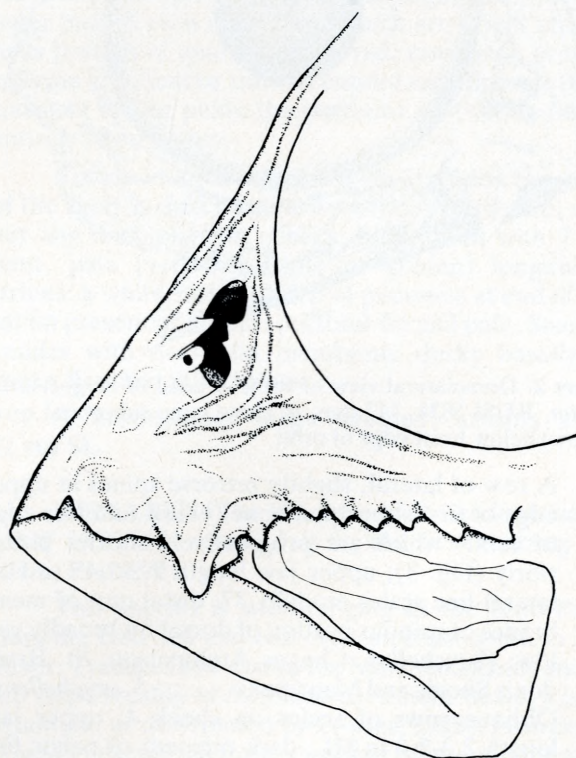


Figure 1. Snout of *Sargocentron violaceum* RUSI 7793, 133 mm, to show nasal fossa with 3 spinules on the edge.

- 6a. Dorsal-fin rays 14 (rarely 13); body depth 2.3-2.6 in SL; membranes of spinous dorsal fin not incised between spines; no blackish spot at base of median fins; body dark brownish to purplish red with a silvery white vertical line on each scale; a black spot on upper opercular membrane; (Aldabra and Seychelles to Tahiti)..... *S. violaceum*

- 6b. Dorsal-fin rays usually 13; body depth 2.6-3.0 in SL; membranes of spinous dorsal fin distinctly incised between spines; a blackish spot at base of soft dorsal, anal and caudal fins; body with alternating stripes of silvery white and orange-red; (Red Sea to western Pacific) *S. melanospilos*
- 7a. A single (sometimes 2) laterally projecting, slightly retrorse, large spine at upper edge of first suborbital bone (below anterior margin of orbit), followed by a row of spinules (Fig. 2); upper jaw length (front of upper lip to rear end of maxilla) 2.3-2.7 in HL; lateral-line scales usually 34-36; tips of membranes of spinous portion of dorsal fin white with a submarginal zone of red 8

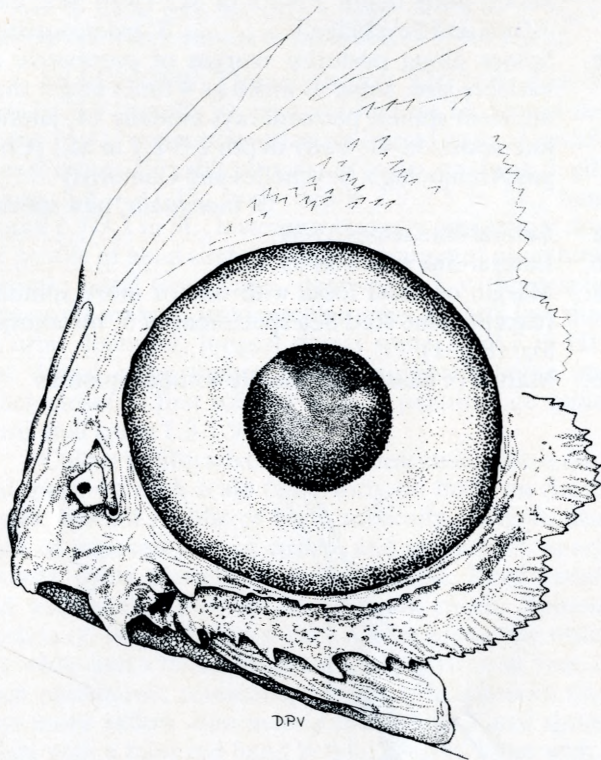


Figure 2. Dorsolateral view of front of head of *Sargocentron praslin*, RUSI 5834, 147 mm, to show large suborbital spine (arrow) below front edge of orbit.

- 7b. A row of lateral, slightly retrorse spines at upper edge of first suborbital bone (below anterior edge of orbit) which are progressively shorter posteriorly (Fig. 3); upper jaw length 2.2-2.45 in HL; lateral-line scales modally 37; distal part of membranes of spinous portion of dorsal fin broadly yellow; (Seychelles, Chagos Archipelago, St. Brandon's Shoals and Mauritius) *S. seychellense*
- 8a. Oblique rows of scales on cheek 4; upper jaw length 2.3-2.6 in HL; dark pigment of pelvic fins mainly on first soft-ray; (east Africa to French Polynesia) *S. praslin*
- 8b. Oblique rows of scales on cheek 5; upper jaw length 2.5-2.7 in HL; dark pigment of pelvic fins confined to tips of second to sixth (or fewer) soft-rays and distal ends of adjacent membranes; (Red Sea to western Pacific) *S. rubrum*
- 9a. Lateral-line scales 38-43; preopercular spine length usually more than $\frac{2}{3}$ orbit diameter 10
- 9b. Lateral-line scales 42-55; preopercular spine length less than $\frac{2}{3}$ orbit diameter (except *S. tiere*) 11

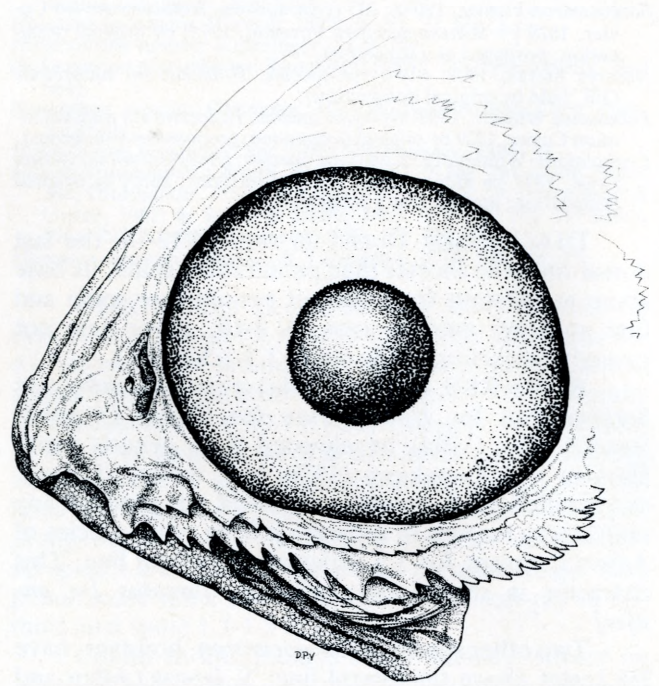


Figure 3. Dorsolateral view of front of head of *Sargocentron seychellense*, RUSI 994, 123 mm, to show the row of spines along upper edge of suborbital bones.

- 10a. Premaxillary groove not reaching or just reaching a vertical at anterior edge of orbit; oblique rows of scales on cheek 5; dorsal soft-rays usually 14; one or more spinules at edge of nasal fossa present or absent; body red without stripes, the edges of scales narrowly silver; a prominent silvery white spot anterodorsally on caudal peduncle (on some fish the entire posterior $\frac{1}{3}$ of body silvery white); (Indo-West Pacific and Red Sea) *S. caudimaculatum*
- 10b. Premaxillary groove extending distinctly posterior to a vertical at anterior edge of orbit; oblique rows of scales on cheek 4; dorsal soft-rays usually 13; no spinules at edge of nasal fossa; alternating stripes of red and silvery white on body; no silvery white spot on caudal peduncle; (Chagos Archipelago to western Pacific) *S. tiereoides*
- 11a. Preopercular spine of adults about equal to orbit diameter; dorsal spines relatively short, the longest 2.6-3.5 in HL; total gill-rakers 20-24; head and body primarily red (faint silvery stripes on body, those on lower part showing blue iridescence); attains 27 cm SL; (Mauritius and Seychelles to Hawaii and Pitcairn) *S. tiere*
- 11b. Preopercular spine of adults $\frac{1}{2}$ or less of orbit diameter; dorsal spines relatively long, the longest 1.5-2.3 in HL; total gill-rakers 16-23; body distinctly striped with red and silvery white; not exceeding 16 cm SL 12
- 12a. Medioposterior margin of nasal bone (hence edge of premaxillary groove) with 1 or 2 spinules (Fig. 4); lateral-line scales 48-55; body elongate, the depth 3.1-3.5 in SL; (Astove and Chagos Islands to French Polynesia) *S. microstoma*
- 12b. Medioposterior margin of nasal bone without spinules; lateral-line scales 41-49; body depth moderate, 2.7-3.3 in SL 13

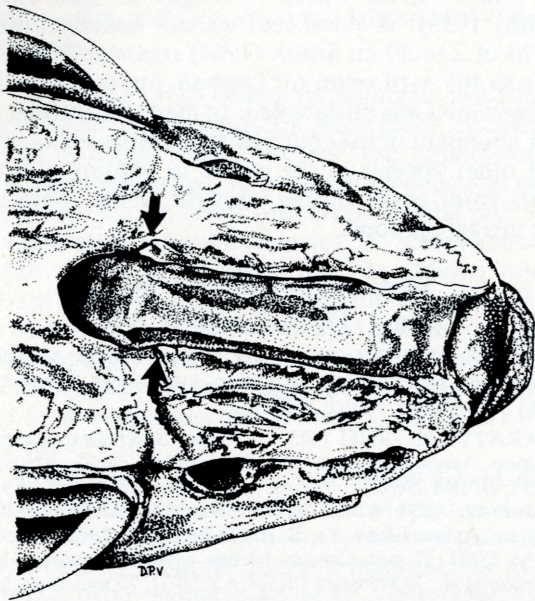


Figure 4. Dorsal view of head of *Sargocentron microstoma*, RUSI 17698, 150 mm, to show spinule on each side of premaxillary groove (arrows).

- 13a. Interorbital width greater than snout length; pelvic fins 1.5-1.75 in HL; body usually peppered with small blackish dots; (Indo-West Pacific and Red Sea).....*S. punctatissimum*
- 13b. Interorbital width about equal to or shorter than snout; pelvic fins 1.25-1.5 in HL; body without numerous small blackish dots14
- 14a. Pectoral fin rays usually 14; membranes of spinous portion of dorsal fin reddish black (except pale tips), with a disjunct longitudinal whitish band; (Indo-West Pacific and Red Sea)*S. diadema*
- 14b. Pectoral fin rays usually 15; membranes of spinous portion of dorsal fin red, the tips white, with a distinct continuous white longitudinal band in lower part; preserved specimens often with a large blackish blotch on first 1 or 2 interspinous dorsal membranes; (Indo-West Pacific and Red Sea).....*S. ittodai*

***Sargocentron caudimaculatum* (Rüppell, 1838)**

Plate 1. Fig E.

Holocentrus caudimaculatus Rüppell, 1838: 97, 103 (on *Holocentrus spinifer* [non Forsskal] Rüppell, 1829: 86, Pl. 23, Fig. 1, type-locality, Jeddah, Red Sea); Smith, 1955a: 308; Smith 1955b: 5; Fourmanoir, 1957: 60; Jones & Kumaran, 1980: 179, Fig. 154.
Holocentrum andamanense Day, 1870: 686 (type-locality, Port Blair, Andaman Islands); Day, 1876: 172, Pl. 41, Fig. 3.
Holocentrum caudimaculatum: Klunzinger, 1870: 724; Day, 1876: 172.
Holocentrum spiniferum (non Forsskal): Sauvage 1891 (in part): 30, Pl. 4, Fig. 1.
Holocentrus andamanensis: Smith, 1951: 50, Fig. 2; 1953: 515, Fig. 297b; Smith & Smith, 1963: 9, Pl. 6, Fig. D.
Holocentrus sp.: Fourmanoir, 1954: 210.
Adioryx caudimaculatus: Burgess & Axelrod, 1973: Fig. 170; 1975: Figs. 109 & 122; Shimizu & Yamakawa, 1979: 117, Fig. 8.

DIAGNOSIS: Dorsal-fin rays XI/13-15; anal-fin rays IV,8-9; (rarely 8); pectoral-fin rays 13-15; lateral-line scales 38-43; scales above lateral line to base of middle dorsal spines $2\frac{1}{2}$; cheek scales in 5 oblique rows; gill-rakers 5-8 + 11-13; body deep, the depth 2.3-2.9 in SL; head length 2.4-3.1 in SL; dorsal profile of head of adults nearly straight; mouth terminal; premaxillary groove not reaching or just reaching a vertical at anterior edge of orbit; anterior end of nasal bone with 2 short diverging spines; medioposterior edge of nasal bones without spinules; anterior edge of nasal fossa with or without 1 or 2 spinules; upper edge of preorbitals smooth or with a few small spines posteriorly; preopercular spine of adults long, subequal to orbit diameter; uppermost of 2 large spines posteriorly on opercle the longest; longest dorsal fin 1.8-2.4 in HL; membranes of spinous portion of dorsal fin strongly incised; membrane from last dorsal spine to first soft-ray distinct; third anal spine 1.4-1.7 in HL.

Colour in life: head and body red, the scales edged in silver (body more red dorsally and more silvery ventrally); a silvery white spot (often disappearing after death) dorsally on caudal peduncle at end of dorsal-fin base; upper edge of opercular membrane white; lower part of opercle adjacent to preopercular margin deep red; a small white spot at upper base of pectoral fin. Spinous portion of dorsal fin whitish mottled with light red except for spines and adjacent edges and triangular outer part of each membrane which are bright red; spinous portion of anal fin bright red; remaining fins with red rays and clear or translucent red membranes. In one transient colour phase the posterior part of the body is entirely silvery white.

Colour in alcohol: usually the anterior two-thirds of the body is dusky and the posterior third pale, without any dark pigment specks; body often with 7 or 8 faint, pale (yellowish-white or golden) longitudinal stripes; a white blotch on top of peduncle at end of dorsal fin present or absent; pectoral-fin axil pale. Small juveniles with dorsal-fin membrane dusky basally between first and third spines.

A moderately large species; attains about 21 cm SL.

REMARKS: The holotype of *S. caudimaculatum* (SMF 1335, 131 mm SL) is in the Senckenberg Museum, Frankfurt.

This species is wide-ranging in the Indo-Pacific from the Red Sea and east African coast south to Xora River, Transkei and east to the Marshall Islands and Tahiti (type-locality of *Holocentrus rubellio* Seale, a junior synonym, as determined by Fowler, 1928). However, it is as yet unreported from a number of intervening areas. Bryan and Herre (1903) reported this species from Marcus Island (= Minami Tori Shima) as *Holocentrus tieroides*. Masuda, Araga and Yoshino (1975) provided the first description of the species from Japanese waters based on material from the Ryukyu Islands; also they reported it as common in the Palau Islands (= Belau). It is abundant in the Red Sea where it may be seen on coral reefs in as little as 2 or 3 m, and it is common along the coast of northern Natal. *S. caudimaculatum* and *S. diadema* are the two most common species of *Sargocentron* in the western Indian Ocean.

***Sargocentron diadema* (Lacepède, 1801)**

Plate 1, Fig. F; Text Fig. 5.

Holocentrus diadema Lacepède, 1801: P1. 32, Fig. 3; 1802: 335, 372 (type-locality not given); Smith, 1949: 153, P1. 9, Fig. 296; Smith, 1955a: 308; Fourmanoir, 1957: 58; Arnoult et al., 1958: 57; Fourmanoir & Guézé, 1962: 7; Smith, 1964: 295.

Holocentrum diadema: Klunzinger, 1870: 723; Day, 1876: 171; Sauvage, 1891: 33, P1. 2, Fig. 5.

Holocentrus diadema: Smith & Smith, 1963: 9, P1. 6, Fig. G; Jones & Kumaran, 1980: 175, Fig. 151.

Adioryx diadema: Kyushin et al., 1977: 54, Fig. 19; Shimizu & Yamakawa, 1979: 133, Fig. 18.

DIAGNOSIS: Dorsal-fin rays XI/12-14; anal-fin rays IV, 8-9 (usually 9); pectoral-fin rays 13-15; lateral-line scales 44-49; scales above lateral line to base of middle dorsal spines $2\frac{1}{2}$; oblique rows of scales on cheek 5 or 6; gill-rakers 5-7 + 12-14; body depth 2.7-3.2 in SL; head length 2.9-3.5 in SL; anterior end of nasal bone rounded; medioposterior edge of nasal bone smooth; nasal fossa small, without spinules; preopercular spine small, its length contained 2 to 3 times in orbit diameter; longest dorsal spine 1.7-2.2 in HL; membranes of spinous portion of dorsal fin moderately incised; membrane from last dorsal spine to first soft-ray distinct; third anal spine 1.1-1.5 in HL.

Colour in life: body with alternating stripes of red and silvery white, the red 3 times or more broader than the white; caudal peduncle whitish; head red, the operculum broadly streaked with silvery white; a long, oblique, silvery white band under eye. Spinous portion of dorsal fin deep red to black, the membrane tips white, with a white band (sometimes disjunct, the first half in lower fourth of fin and the last in outer third of fin); remaining fins red, the leading edges of anal and pelvic fins white.

Colour in alcohol: dark brown with narrow, pale, longitudinal stripes, the caudal peduncle paler; or the body may be generally pale (straw coloured) with little or no indication of the pale longitudinal stripes. The first dorsal fin is always black, with a pale stripe along the middle.

A small species, rarely exceeding 13 cm SL.

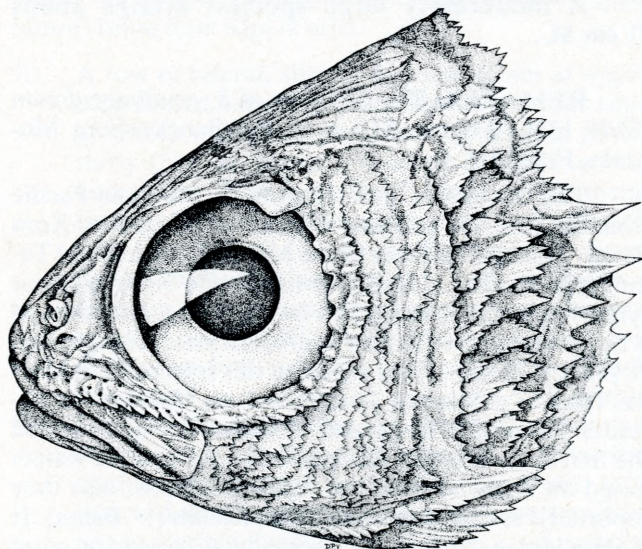


Figure 5. Head of a small juvenile of *Sargocentron diadema*, CAS 33323, 50 mm.

REMARKS: Apparently no type-specimen is in existence; none is listed by Bauchot (1970).

A widespread Indo-Pacific species distributed from the Society Islands (Randall, 1973) to the Red Sea and South Africa where it ranges to East London (Smith, 1953). A coral-reef species usually found at depths of 2 to 30 m; Smith (1964) reported a specimen taken in 405 m of water off Durban, but we suspect that this specimen was mislabelled. In many localities it is the most abundant of the squirrelfishes. More inclined than most other species of the genus to venture short distances from cover during daylight hours. Sometimes seen in aggregations.

***Sargocentron inaequalis* sp. n.**

Plate 1, Fig G; Text Figs. 6 & 7

HOLOTYPE: ROM 40371, male, 72 mm, Chagos Archipelago, Solomons, N of Isle Diabole, 6-10 m, rotenone, R. Winterbottom and A.R. Emery, March 1979.

PARATYPES: RUSI 19250, 71 mm, Seychelles, Cosmoledo Group, Assumption Island, J.L.B. and M.M. Smith, 1 November 1954; BPBM 29392, 2, 73.5-76 mm, same locality and collectors, November 1954; RUSI 19251, 75 mm, Seychelles, Cosmoledo Group, Astove Island, J.L.B. and M.M. Smith, 7 November 1954; CAS 35471, 72 mm, Comoro Islands, Grande Comore, J.E. McCosker et al., 19 February 1975; CAS 35031, 70 mm, same locality and collectors, 23 February 1975.

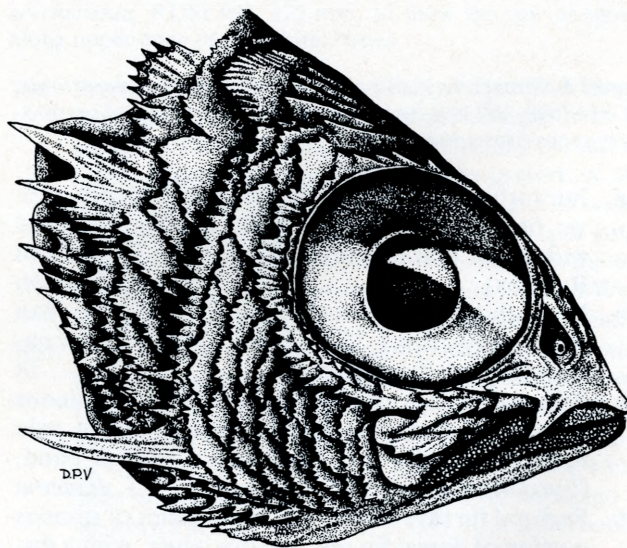


Figure 6. Head of *Sargocentron inaequalis*, holotype, 72 mm.

DIAGNOSIS: Dorsal-fin rays XI/13; anal-fin rays IV, 9; pectoral-fin rays 13 or 14 (usually 14); lateral-line scales 38-41; scales above lateral-line to base of middle dorsal spines $2\frac{1}{2}$; oblique rows of scales on cheek 4-6; gill-rakers 6-7 + 11-13; body depth 2.5-2.7 in SL; head length 2.5-2.6 in SL; anterior end of nasal bone rounded; nasal fossa moderately large, without spines; a prominent retrorse spine on nasal bone between nasal fossa and edge of premaxillary groove; a sessile retrorse spine at edge of premaxillary groove; preopercular spine 1.6-1.75 in orbit diameter; spines along vertical edge of preopercle unequal, some 3 or 4 times longer than adjacent spines; longest dorsal spine 1.85-2.15 in HL; spinous dorsal fin membranes moderately incised; membrane from last dorsal spine to first soft-ray mostly hidden by dorsal body scales; third anal spine 1.6-1.9 in HL.

Colour in alcohol: light brown with faint dark stripes on body along scale rows; fins pale. Colour when fresh: red, the edges of scales of body darker red, with narrow dark red stripes on body between scales. Pelvic fins and spinous portion of dorsal and anal fins solid red; remaining fins with red rays and translucent light red membranes.

DESCRIPTION (based on holotype; see *Diagnosis* and Tables 1-3 for data on paratypes): pectoral-fin rays 14; principal caudal rays 19, the uppermost and lowermost unbranched; upper procurent caudal rays 6, the last segmented; lower procurent caudal rays 5, the last segmented; lateral-line scales 38; scales above lateral line to origin of dorsal fin $3\frac{1}{2}$; oblique rows of scales on cheek irregular and difficult to count, about 6 rows on holotype; a vertical row of 9 scales on opercle which are progressively larger to the middle scales, then diminish slightly in size dorsally; median predorsal scales 6; circumpeduncular scales 15; gill-rakers 6+11; vertebrae 11+16.

Body depth 2.7 in SL, the width 1.8 in depth. Head length 2.6 in SL; dorsal profile of head moderately convex; snout 4.85 in HL; dorsal profile of snout forming an angle of about 60° to the horizontal axis of head and body; orbit diameter 2.8 in HL; interorbital space flat (discounting ridges), the least width (measured anteriorly) 4.85 in HL; least depth of caudal peduncle 3.6 in HL.

Mouth slightly inferior and somewhat oblique, forming an angle of about 25° to the horizontal axis of the head and body; maxilla reaching to a vertical at centre of eye (or slightly anterior or posterior to this), the upper jaw length 2.6 in HL; posterior corners of maxilla rounded, the lower more so than upper; premaxillary groove extending slightly posterior to a vertical at anterior edge of orbit, its medial length about 3.5 in head. Villiform teeth in a band in jaws, broader anteriorly, with a symphyseal gap; villiform teeth on vomer in a broad V-shaped band; villiform teeth in a band on palatines and in a small elongate patch on ectopterygoids; tongue moderately pointed, edentate.

Nasal fossa centred slightly below middle of eye, without small spines on edge; nasal bones rounded anteriorly; a well-formed retrorse spine on median edge of nasal bone (margin of premaxillary groove); a retrorse spine of about equal size to the foregoing on nasal bone between edge of nasal fossa and premaxillary groove; a lateral retrorse spine near upper edge of first suborbital bone a short distance posterior to a vertical through front margin of orbit, followed by a series of recumbent spinules along lower edge of orbit; a large, curved, ventroposterior spine anteriorly on lower edge of first suborbital bone, its tip reaching to gape, this spine followed by a series of spines (some moderately large) along lower edge of suborbital series and continuing along posterior edge of circumorbitals behind eye; a series of 4 small retrorse spines along dorsoposterior edge of orbit; a large striated flattened spine ventrally on mandible, its tip below posterior end of maxilla; spine at corner of preopercle 4.8 in HL; posterior margin of preopercle with 22 spinules of variable length, ranging from very small to $\frac{1}{3}$ length of the large spine at angle of preopercle; ventral edge of preopercle with a series of 8 small spinules of about equal length; margin of inter-

opercle with a series of 9 close-set spinules; opercle with 2 flattened spines posteriorly, the uppermost longer, about 0.4 in orbit diameter, and 2 vertical series of small spines (the anterior series with 14 spines, the posterior with 12).

Scales strongly ctenoid (a maximum of 15 ctenii on midlateral body scales); spinous portions of dorsal and anal fins naked; base of paired fins and soft portions of dorsal and anal fins with small scales, those in middle of anal fin reaching about $\frac{1}{3}$ distance to margin of fin; small scales on caudal fin extending about $\frac{3}{4}$ distance to posterior margin.

Origin of dorsal fin above second lateral-line scale; first dorsal spine 3.5 in HL; second dorsal spine 2.3 in HL; third and fourth dorsal spines subequal, the fourth 2.1 in HL; last dorsal spine very short, 1.3 in HL; spinous portion of dorsal fin completely separated from soft; third to fifth dorsal soft-rays subequal, the longest 2.1 in HL; first anal spine very small; second anal spine 5.1 in HL; third anal spine long and stout, reaching base of anal fin when depressed, its length 1.65 in HL; first anal soft-ray longest, slightly shorter than third anal spine; caudal fin forked with strongly rounded lobes, the length 1.75 in HL, the caudal concavity (horizontal distance between tips of longest and shortest principal caudal rays) 2.9 in HL; pectoral fins 1.65 in HL; pelvic fins extending distinctly posterior to pectorals but not reaching anus, their length 1.45 in HL.

Colour in alcohol: light brown (some paratypes darker) with faint dark stripes on body along scale rows; fins pale.

Colour when fresh as in species diagnosis and Plate 1, Fig. G.

REMARKS: This species is known from 7 specimens from the Chagos Archipelago, Seychelles and Comoro Islands.

We name it *Sargocentron inaequalis* from the Latin for unequal or rough, in reference to the variable lengths of the small spines on the posterior margin of the preopercle.

S. inaequalis is one of a complex of four small species of *Sargocentron*; the other 3 species of this complex are *S. lepros* (Allen & Cross, 1983), *S. macrosquamis* Golani, 1984 and an undescribed species from the central and western Pacific. This complex of species is distinguished by the following combination of characters: a retrorse spine on nasal bone between nasal fossa and median edge of nasal bone; no spinules on edge of nasal fossa; dorsal fin divided to the base between the last spine and the first soft-ray; similar meristic data, and fewer (consequently broader) ctenii on the scales (see Fig. 7). The range and median number of ctenii on 10 scales from the midlateral body region of 3 specimens of *S. lepros* (67, 74 and 77 mm SL) are 9-16 and 12; for 3 specimens of *S. inaequalis* (70, 71 and 75 mm SL) these counts are 7-16 and 11; and for 3 specimens of *S. macrosquamis* (70, 71 and 73 mm SL) the counts are 7-18 and 13. Whereas, 3 specimens of *S. praslin* (66, 76 and 77 mm SL) have midlateral scales with 15-23 ctenii and a median count of 19. In comparing numbers of scale ctenii, one must select equal-sized fish, as the number of ctenii increases with growth. In *S. punctatissimum*, for example, the range and median number of ctenii counted on 10 scales from 4 specimens are as follows: 46 mm SL, 11-14, 13; 78 mm SL, 19-25, 24; 103 mm SL, 26-36, 31; and 127 mm SL, 31-41, 36.

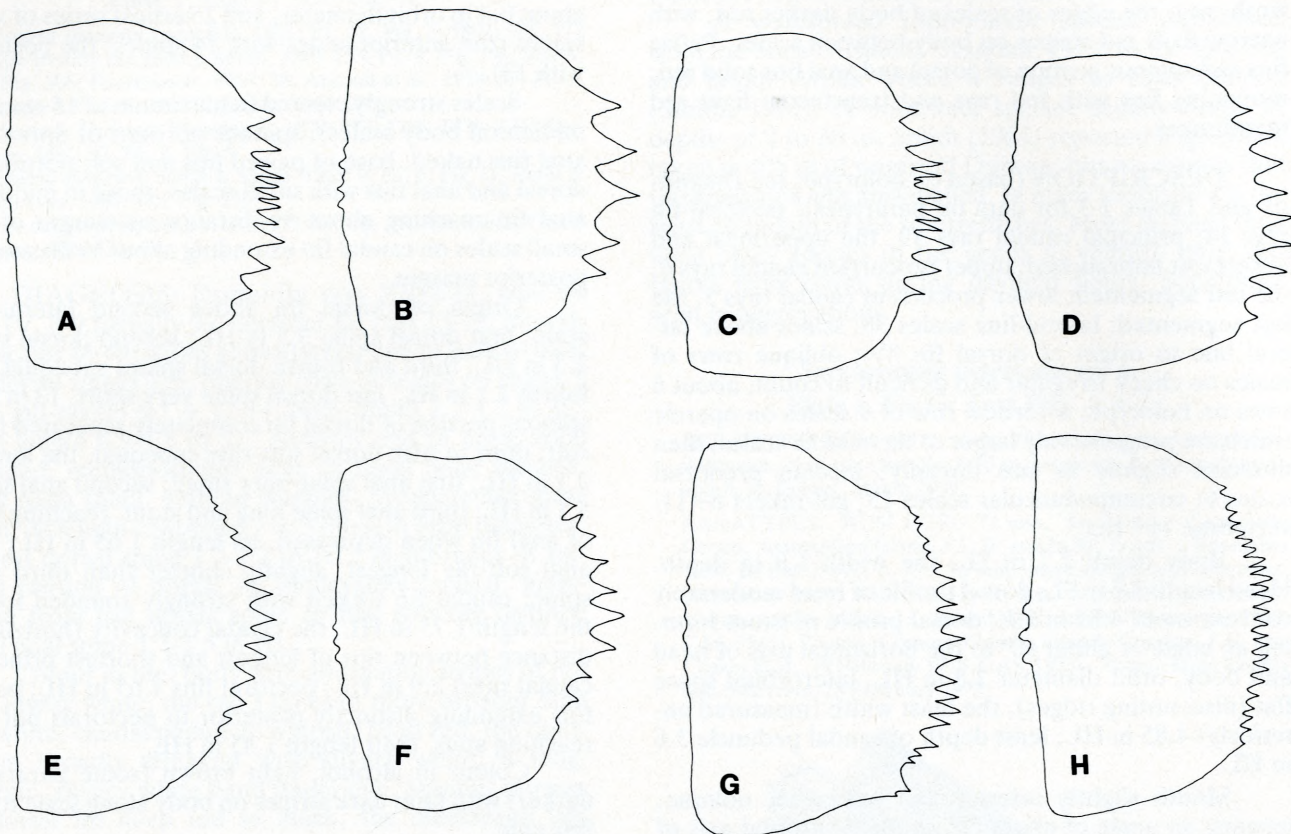


Figure 7. Camera lucida drawings of scales from midlateral region of body. (A, B & C) adjacent scales from same row of *Sargocentron inaequalis*, CAS 35031, 70 mm; (D) *S. inaequalis*, CAS 35471, 72 mm; (E) *S. macrosquamis*, RUSI 13234, 71 mm; (F) *S. lepros*, USNM 233061, 74 mm; (G) *S. praslin*, RUSI 17653, 76 mm; (H) *S. punctatissimum*, RUSI 75-9, 78 mm.

S. inaequalis is most easily confused with *S. macrosquamis*, and we admit to not distinguishing it from this species initially. It may be separated from *macrosquamis* by the uneven length of the small spines on the posterior margin of the preopercle, modally 14 (instead of 15) pectoral rays, 38-41 (versus 40-45) lateral-line scales, body depth 2.5-2.7 (versus 2.3-2.5) in SL, and longer upper jaw (2.6-2.8 versus 2.9-3.2 in HL).

S. lepros differs from *S. inaequalis* in having $3\frac{1}{2}$ scales between the lateral line and fifth dorsal spine, 44-46 lateral-line scales, usually 15 pectoral rays, and usually no small spine at the edge of the premaxillary groove.

A third close relative is an undescribed species from the central and western Pacific which is best distinguished from *inaequalis* by having $3\frac{1}{2}$ rows of scales between the lateral line and the base of the middle dorsal spines.

S. spinosissimus (Temminck & Schlegel), from southern Japan and Taiwan, is similar to *inaequalis* in having spines on the nasal bones between the nasal fossa and the premaxillary groove; but it differs in its larger size (to about 170 mm SL), 35-38 lateral-line scales, regular serrae along the vertical edge of the preopercle, membrane from last dorsal spine to first soft-ray visible in lateral view, and in colour (it has narrow whitish stripes on the body).

***Sargocentron ittodai* (Jordan & Fowler, 1903)**

Plate 1, Fig. H; Text Fig. 8.

Holocentrus ittodai Jordan & Fowler, 1903: 16, Fig. 4 (type-locality, Naha, Okinawa).

Adioryx ittodai: Shimizu & Yamakawa, 1979: 134, Fig. 19.

DIAGNOSIS: Dorsal-fin rays XI/13-14 (usually 13); anal-fin rays IV,8-10; pectoral-fin rays 14-16; lateral-line scales 43-47 (47-49 in Japan and Taiwan); scales above lateral line to base of middle dorsal spines $2\frac{1}{2}$; oblique rows of scales on cheek 5; gill-rakers 5-7 + 12-14; body depth 2.8-3.1 in SL; head length 2.8-3.1 in SL; dorsal profile of head smoothly convex; jaws short, equal; maxilla not reaching a vertical at centre of orbit, the upper jaw length 2.7-2.9 in HL; anterior end of nasal bone rounded; medioposterior edge of nasal bone smooth, nasal fossa without spinules; preopercular spine short, about $\frac{1}{3}$ orbit diameter; longest dorsal spine 1.7-2.2 in HL; membranes of spinous portion of dorsal fin moderately incised; third anal spine 1.1-1.4 in HL; pelvic fins 1.35-1.5 in HL.

Colour in life: body with alternating stripes of red and silvery white, the red stripes slightly narrower than the white (except in specimens from Japan and Taiwan where the red stripes are usually broader); head red with a long diagonal white streak just below eye and a vertical one on posterior preopercular margin. Spinous

dorsal fin dark red, conspicuously tipped with white and with a series of white spots, one per membrane, beginning near base of fin anteriorly and rising in middle and posterior half of fin nearly to mid-height (white spots almost joined to form a band); a large blackish blotch often present on first 2 membranes of dorsal fin (more evident on preserved than fresh specimens); other fins light red, the leading edge of anal and pelvic fins white with a deep red submarginal band behind; upper and lower edges of caudal fin red.

Colour in alcohol: head and body straw coloured; body with 6 or 7 faint, yellowish, longitudinal stripes which are overlaid with microscopic black specks; inner surface of pectoral-fin base with large black blotch, visible through fin; cheeks and operculum with black or brown specks; dusky spot between first two dorsal-fin spines on distal half of membrane and a fainter dusky spot between second and third spines; fins otherwise without pigment.

Largest specimen examined, BPBM 22892, 161 mm SL, from Miyakejima, Japan.

REMARKS: We have examined the holotype (SU 7746, 102 mm SL); it is in the California Academy of Sciences, San Francisco.

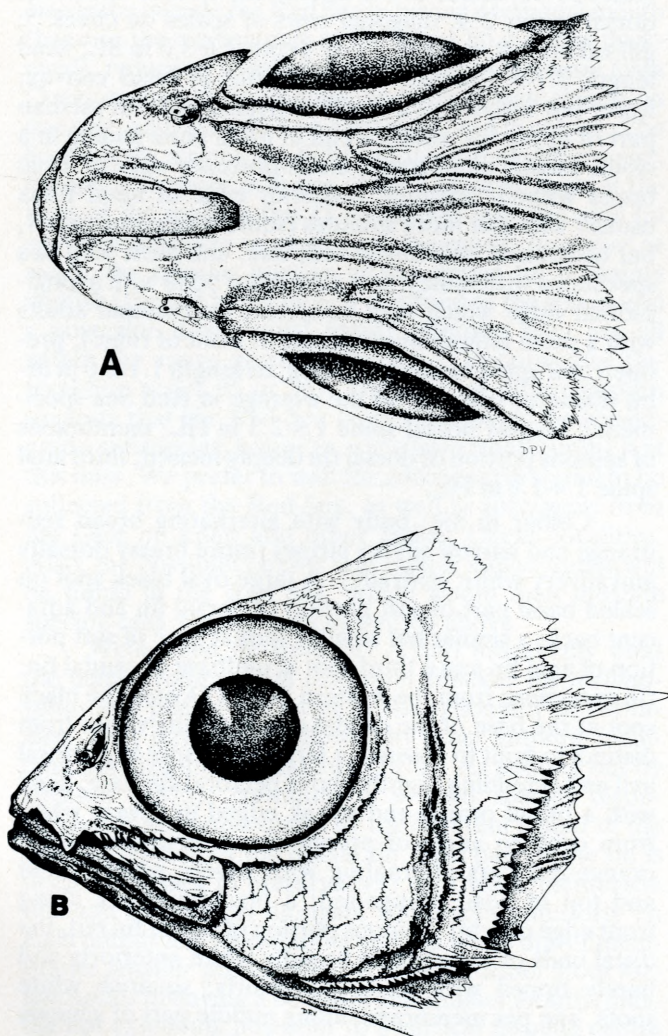


Figure 8. Dorsal (A) and lateral (B) views of head of *Sargocentron ittodai*, RUSI 7345, 97 mm.

Shimizu and Yamakawa (1979) gave the distribution of *S. ittodai* as southern Japan (Kii Peninsula southward), Taiwan and Sri Lanka. The Sri Lankan record, based on Vasiliu (1931) and Munro (1955), is doubtful due to the report of 38-40 lateral-line scales, which is too low for *S. ittodai*. Allen and Cross (1983) added records from the Great Barrier Reef and Christmas Island (Indian Ocean).

We here extend the range of *S. ittodai* to the Marquesas, Caroline and Solomon Islands, Mauritius, Réunion, Comoros, Seychelles, northern Natal, and Gulf of Aqaba, Red Sea from recent collections. Specimens were obtained from the depth range of 5-70 m, often from caves.

Burgess, Axelrod and Shen (1974: 1063) published photographs of 2 specimens of *S. ittodai*, identified as "*Adioryx* sp. (possibly *A. spinosissimus*)", from Taiwan. On the smaller (104.6 mm SL) fish, the red stripes on the body are broader than the white stripes, but on the larger (130.4 mm SL) fish, the red stripes on the ventral half of the body are equal to or distinctly narrower than the white stripes. Both specimens show the distinctively coloured spinous dorsal fin of *S. ittodai*. On page 1061 of the same book is a photograph of a fish also identified as "*Adioryx* sp. (possibly *A. spinosissimus*)"; this specimen appears to be a darkly pigmented form of *A. ittodai*. This fish is generally darker than any other specimens that we have seen, and the band of white spots in the spinous dorsal fin is barely discernible (partly obscured by reflections from the wet fin).

Specimens of *S. ittodai* from Japan and Taiwan differ from those of the other localities mentioned above in having more lateral-line scales (see Table 2) and in attaining a larger size. In view of other similarities, we do not believe the Japan/Taiwan population is distinct at the species level from that elsewhere in the Indo-Pacific. We defer formal subspecific designation until material is collected from areas such as the northern Philippines (if indeed the species occurs there) which might be intermediate in the characters mentioned.

Sargocentron macrosquamis Golani, 1984

Fig. 9.

Sargocentron macrosquamis Golani, 1984: 40, Figs. 1, 2 (type-locality, D'Arros Island, Amirante Group, Seychelles).

DIAGNOSIS: Dorsal-fin rays XI /13-14 (rarely 14); anal-fin rays IV, 9-10 (rarely 10); pectoral-fin rays 14-16; lateral-line scales 40-45; scales above lateral line to base of middle dorsal spines $2\frac{1}{2}$; oblique rows of scales on cheek 5-7 (not in even rows, hence difficult to count); gill-rakers 5-6 + 10-12; body depth 2.3-2.5 in SL; head length 2.45-2.6 in SL; anterior end of nasal bone rounded; nasal fossa without spines on its edge; a prominent retrorse spine on nasal bone between nasal fossa and edge of premaxillary groove (a second small spine may lie adjacent to this spine); a sessile spine (occasionally 2 spines) on edge of premaxillary groove; preopercular spine 1.8-2.2 in orbit diameter; spines on posterior margin of preopercle above large spine at angle gradually and uniformly diminishing in size dorsally; longest dorsal spine 1.95-2.1 in HL; spinous portion of dorsal fin barely separated from soft, the membranes moderately incised; third anal spine 1.5-1.75 in HL.

Colour in alcohol: uniformly pale with no dark markings, the fins slightly lighter than body. Life colour not known.

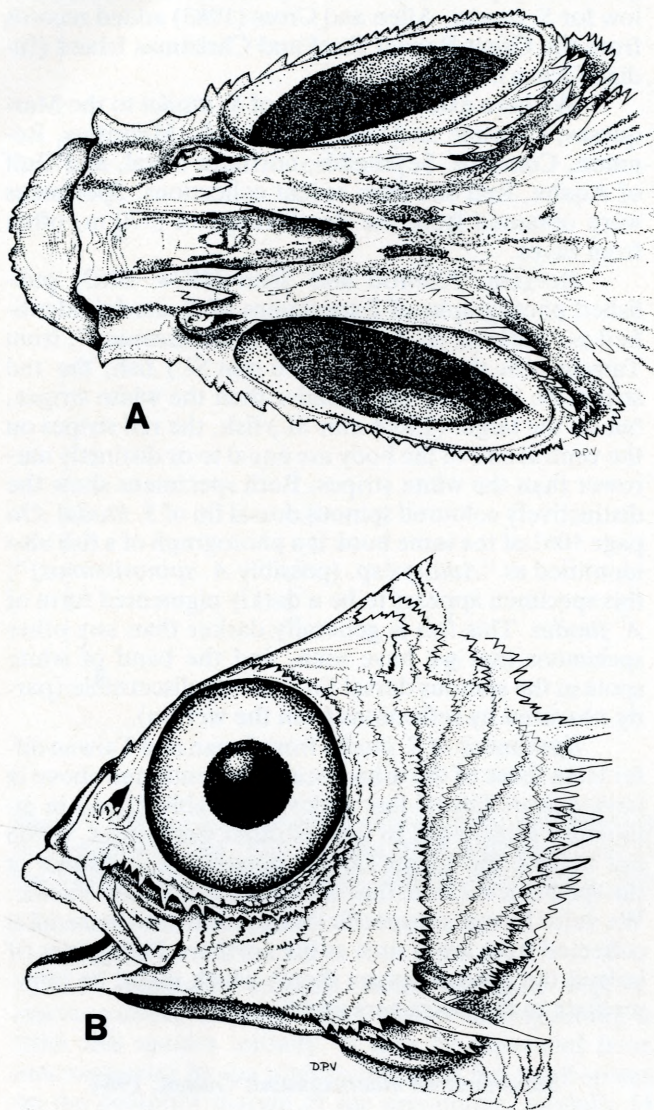


Figure 9. Dorsal (A) and lateral (B) views of head of *Sargocentron macrosquamis*, RUSI 17682, 69 mm.

REMARKS: *S. macrosquamis* was described by Golani (1984) from one specimen from the Amirante Group of the Seychelles and one from the southern end of the Sinai Peninsula, Red Sea. We here extend the range to Shimoní in southern Kenya, Zanzibar, Baixo Pinda, Mozambique Island, and Tekomaji Island, Mozambique, Mauritius, and the Chagos Archipelago.

The species was named for "the large scales on the posterior part of the operculum." (see Golani's Fig. 2 and our Fig. 9.)

One 73 mm adult male (from a lot of 4 specimens collected at Zanzibar, RUSI 13258) lacks spines on the posterior part of the nasal bones. In all other respects this specimen appears to be *S. macrosquamis*.

S. macrosquamis is the smallest described species of the genus *Sargocentron*. The largest of 22 specimens that we have examined is 75.5 mm SL. The 47-mm paratype is a maturing female.

S. macrosquamis is most closely related to *S. inaequalis*, a new species described above. See "Remarks" for *S. inaequalis* for a comparison of these two species. *S. macrosquamis* differs from *S. lepros* and the undescribed Pacific species under study by the senior author in having $2\frac{1}{2}$ rows of scales above the lateral line to the base of the middle dorsal spines instead of $3\frac{1}{2}$. It further differs from *S. lepros* in having a small spine at the edge of the premaxillary groove (usually absent in *lepros*). As noted by Golani, *macrosquamis* is also related to *S. spinosissimus* (Temminck & Schlegel) of southern Japan and Taiwan, having similar head spination and general configuration. *S. spinosissimus* differs in having fewer (35-38) lateral-line scales, larger size, and in colouration.

Sargocentron melanospilos (Bleeker, 1858)

Plate 1, Fig. I

Holocentrum melanospilos Bleeker, 1858: 2 (type-locality, Ambon).

Holocentrum melanospilus: Bleeker, 1873: 226.

Holocentrus cornutus (non Bleeker): Smith, 1955a: 308; Smith & Smith, 1963: 9, Pl. 87, Fig. B.

Adioryx cornutus (non Bleeker): Kyushin et al., 1977: 50, lower Fig.; Shimizu & Yamakawa, 1979: 121, Fig. 10.

DIAGNOSIS: Dorsal-fin rays XI /12-14; anal-fin rays IV, 9-10 (rarely 10); pectoral-fin rays 14; lateral-line scales 33-36; scales above lateral line to base of middle dorsal spines $2\frac{1}{2}$; diagonal rows of scales on cheek 5; gill-rakers 6-8 + 10-12; body depth 2.6-3.0 in SL; head length 2.7-3.1 in SL; dorsal profile of head convex; lower jaw inferior as a result of hypertrophy of median part of upper lip; anterior end of nasal bone ending in a stout, usually blunt spine; medioposterior edge of nasal bones without spinules; posterior edge of nasal fossa usually with 2 or more spinules (some specimens with 4, but occasional individuals with one, and most Red Sea specimens with none); first suborbital bone with a longitudinal ridge which may be serrate (occasional adults with a small lateral blunt spinule at front of ridge); preopercular spine moderately long, its length 1.1-2.0 in orbit diameter (shorter on the average in Red Sea specimens); longest dorsal spine 1.8-2.3 in HL; membranes of spinous portion of dorsal fin deeply incised; third anal spine 1.4-1.8 in HL.

Colour in life: body with alternating broad red-orange and narrow silvery stripes (more brassy dorsally and silvery white ventrally). A large oval black spot on scaled basal part of soft portion of dorsal fin and adjacent back; a similar but smaller spot at base of soft portion of anal fin and a third spot at midbase of caudal fin; (in specimens from the western Indian Ocean, the black spot at the base of the caudal and anal fins varies from distinct to faint to absent); a large black spot in pectoral axil and extending slightly above pectoral-fin base; head with a broad orange-red streak edged in silvery white from orbit to angle of preopercle; operculum with 3 orange-red bars alternating with silvery white; snout and top of head orange-red; a blackish streak along front edge of orbit. Spinous portion of dorsal fin red, the distal ends of membranes broadly white anteriorly and barely tipped with white posteriorly; squarish white spots, one per membrane, along middle part of spinous dorsal fin, forming a band except for interruption by the red of spines; remaining fins yellow to yellowish except upper and lower edges of caudal fin which are broadly

red, anterior edge of soft dorsal fin which is red, and anterior edges of anal and pelvic fins which are white with a submarginal red band.

Reported by Masuda, Araga and Yoshino (1975) (as *Adioryx cornutus*) to reach 200 mm SL; largest examined by Shimizu and Yamakawa (1979), misidentified as *A. cornutus*, 197 mm SL.

REMARKS: The holotype of *Holocentrum melanospilos* (RMNH 5437, 111 mm SL, 139 mm TL) is in the Rijksmuseum van Natuurlijke Historie at Leiden.

Sargocentron melanospilos is known in the literature (as *Holocentrum* or *Adioryx cornutus*) in the western Pacific from southern Japan (Masuda, Araga and Yoshino, 1975) and Taiwan (Shen, Liu and Lee, 1980) to northern Queensland (Marshall, 1964) and west to Aldabra (Smith, 1955) and Seychelles (Smith and Smith, 1963). We have examined specimens from the Red Sea, Seychelles, Zanzibar, Condor Reef in the Caroline Islands, New Caledonia, and Tutuila (American Samoa); the depth of capture varied from 5 to 90 m. All of these localities except Seychelles represent new records for the species.

The Red Sea specimens (BPBM 19761, 5: 104-123 mm) were speared by the senior author in 12-49 m from the fringing reef front about one mile north of the entrance to Port Sudan. These specimens differ from *S. melanospilos* outside the Red Sea in having a terminal mouth (because the median part of the upper lip is not as thickened), reduction in spinules at the edge of the nasal fossa (3 specimens with no spinules, one with a single spinule on one side, and one with 2 on each side), and in colour. The broad body stripes are light red instead of red-orange; there is a diminution in size of the 3 blackish spots at the base of the median fins (3 specimens lack the anal fin spot and have lost or nearly lost the caudal base spot as well); the spinous portion of the dorsal fin is mainly whitish (the red being largely confined to the spines and a posterior submarginal band). Meristic data are all within the range given above for *S. melanospilos* (lateral-line scales 35 or 36). The level of differentiation suggests that the Red Sea population might be considered a subspecies; however, we refrain from naming it at this time. We prefer to wait for additional material to be collected from the Red Sea, as well as specimens from the Gulf of Aden and other Indian Ocean localities. Also, the possibility exists that typical *melanospilos* will be found in the Red Sea, which would then indicate specific rank for the form described above.

Weber and de Beaufort (1929) mistakenly used the name *Holocentrum cornutum* Bleeker for *melanospilos* and placed the latter in the synonymy of *cornutum*. They have been followed by other authors, including Shimizu and Yamakawa (1979). As pointed out by Bleeker (1873), *cornutum* is a valid species distinguished from *melanospilos* by the different colour of the spinous portion of the dorsal fin. This part of the fin is deep red (black in preservative) with white membrane tips and a vertically elongate white spot anteriorly on each membrane (these spots and the white tips of membranes smaller posteriorly). It differs further from *melanospilos* in having a terminal and smaller mouth (maxilla not extending posterior to a vertical through centre of eye, whereas it is distinctly posterior on *melanospilos*), and in smaller size. Bleeker had 7 specimens of *cornutum* from several Indonesian localities which

ranged in total length from 95 to 132 mm. The Bishop Museum has a total of 4 specimens of this species [2 lots from Sulawesi (Celebes) and 1 from Port Moresby, New Guinea] from 101 to 112 mm in SL. The smallest is a mature female. The Australian Museum has 5 specimens from the Great Barrier Reef and New Guinea, the largest 120 mm SL. The U.S. National Museum has 56 specimens from the Philippines, Indonesia and New Guinea, the largest also 120 mm SL.

Sargocentron microstoma (Günther, 1859)

Plate 1, Fig J; Text Fig. 4

Holocentrum microstoma Günther, 1859: 34 (type-locality, Ambon); 1875: 98, Pl. 64, Fig. B.

Adioryx microstomus: Shimizu & Yamakawa, 1979: 125, Fig. 13.

DIAGNOSIS: Dorsal-fin rays XI /12-14; anal-fin rays IV, 9-10 (rarely 10); pectoral-fin rays 14-15 (usually 15); lateral-line scales 48-55; scales above lateral line to base of middle dorsal-fin spines 2½; oblique rows of scales on cheek 5; gill-rakers 6-8 + 13-15; body elongate, the depth 2.9-3.5 in SL; head length 2.8-3.4 in SL; anterior end of nasal bone rounded (without spines); medioposterior margin of nasal bone (edge of premaxillary groove) usually with 1 or 2 spinules (Fig. 4); nasal fossa small, without spinules on margin; preopercular spine short, its length 2.5-3.0 in orbit diameter; longest dorsal spine 1.5-1.8 in HL; membranes of spinous portion of dorsal fin incised; third anal spine very long, 1.1-1.2 in HL.

Colour in life: body alternately striped with bright red and silvery white, the latter of unequal width (the white stripe along lateral line narrowest); dorsal part of head red, the ventral part silvery white; an indistinct large red triangular area on cheek flecked with silver, the apex at base of preopercular spine. Spinous portion of dorsal fin whitish, the membrane tips white, with a submarginal red zone (a ventral extension from this zone on each membrane, the largest on anterior and posterior membranes); remaining fins clear, the rays varying from pale red to yellowish, except for bright red membrane between third anal-fin spine and first soft-ray and upper and lower edges of caudal fin which are broadly red.

Preserved specimens usually have a large dark blotch on first and second membranes of dorsal fin, and there may be dark pigment submarginally on more posterior membranes; no dark spot in axil of pectoral fin.

Largest specimen examined, BPBM 14226, 163 mm SL, from Christmas Island, Line Islands.

REMARKS: *S. microstoma* was originally described from 2 specimens in the British Museum (Natural History), an adult from Ambon and a half-grown fish from the "Old Collection". The adult, BM(NH) 1858.4.21.235, 136 mm SL, is here designated the lectotype; Günther's measurements were taken from this specimen and he illustrated this fish in his "Fische der Südsee" (1875: Pl. 64, Fig. B).

S. microstoma is a common shallow-reef species throughout most of Oceania and the Indo-Malayan region. It is recorded from Christmas Island in the eastern Indian Ocean (Palmer, 1950; Allen and Steene, 1979). The only other Indian Ocean record appears to be that of Shimizu and Yamakawa (1979) who reported 3 specimens from the Maldive Islands (BPBM 18919, 130-

135 mm); these were speared by the senior author at North Male Atoll in 1-1.5 m. We have also seen one specimen (RUSI 17698) collected by J.L.B. and M.M. Smith from Astove Id. in the Cosmoledo Group, and 4 specimens (ROM 41565-41568) from the Chagos Archipelago collected by A. Emery and R. Winterbottom.

Records of *S. microstoma* from the Hawaiian Islands (Günther, 1875; Jenkins, 1903; Jordan and Evermann, 1905; Fowler, 1928) may be in error. Neither Gosline and Brock (1960) nor the present authors have been able to find any Hawaiian material of this species. None are in the collections of the Bishop Museum, Academy of Natural Sciences of Philadelphia, or National Museum of Natural History. Previous records have been mis-identifications, mainly of the common Hawaiian endemic *S. xantherythrum* (Jordan & Evermann). Gosline and Brock (1960) have shown that this species is readily distinguished from *S. microstoma* by the shorter third anal spine, narrower interorbital space, fewer lateral-line scales (44-48) and presence of dark pigment in the pectoral axil.

***Sargocentron praslin* (Lacepède, 1802)**

Plate 2, Fig. A; Text Fig. 2.

Perca praslin Lacepède, 1802: 397, 418 (type-locality, Port Praslin, New Britain).

Holocentrum marginatum Cuvier in Cuv. & Val., 1829: 216 (type-locality, Indian Ocean).

Holocentrus rubrum (non Forsskal): Smith, 1949: 153, Fig. 295; Smith, 1955a: 308.

Holocentrus ruber (non Forsskal): Smith & Smith, 1963: 9, Pl. 87, Fig. A.

Adioryx ruber: Shimizu & Yamakawa, 1979 (in part): 126, Fig. 14.

DIAGNOSIS: Dorsal-fin rays XI/12-13 (rarely 12); anal-fin rays IV,8-9 (rarely 8); pectoral-fin rays 13-15; principal caudal rays 19 (median 17 branched); upper procurent caudal rays 6, the last segmented; lower procurent caudal rays 5, the last segmented; lateral-line scales 33-36; scales above lateral line to base of middle dorsal-fin spines $2\frac{1}{2}$; diagonal rows of scales on cheek 4; a single vertical row of 8 or 9 scales on opercle (progressively smaller ventrally); gill-rakers 6-8 + 10-12; body depth 2.6-2.8 in SL; head length 2.65-2.9 in SL; dorsal profile of head strongly convex; snout short, 4.6-5.1 in head; mouth terminal; maxilla usually extending to a vertical at centre of eye (exceptionally to rear edge of pupil), the upper jaw length 2.4-2.5 in HL; anterior end of nasal bone ending in a short spine (may be blunt); medioposterior edge of nasal bones without spinules; edge of nasal fossa usually without spinules (of the 76 specimens examined, only the 3 largest fish from Guam and the largest from Fiji have a single spinule on the anterior edge of the fossa); upper edge of first suborbital bone with a prominent, slightly retrorse, lateral spine a short distance posterior to a vertical at front edge of eye, followed by a ridge of recumbent spinules (see Fig. 2A); preopercular spine of adults 3.7-5.8 in HL, $\frac{1}{2}$ to $\frac{2}{3}$ orbit diameter; longest dorsal spine of adults 1.95-2.2 in HL; membranes of spinous portion of dorsal fin deeply incised; third anal spine 1.25-1.5 in HL.

Colour in life: dorsal part of body with dark brown stripes, those of the side and ventral part brownish red, alternating with silvery white stripes of about the same width (white stripes dorsally on body with violet and orange-red reflections); narrow first dark stripe (at base of dorsal fin) and second stripe ending in an elongate

dark brown blotch below soft portion of dorsal fin; third stripe broadening as it passes onto upper caudal peduncle, terminating slightly above centre of caudal-fin base; fourth stripe converging with third anteriorly on caudal peduncle; fifth and sixth stripes converging as they pass onto lower caudal peduncle, ending at ventral part of caudal-fin base; seventh to ninth stripes ending in reddish brown scaled basal part of anal fin; head reddish brown with a silvery white streak along vertical margin of preopercle and a diagonal lavender white streak from above upper lip to cheek; chin and ventral part of head whitish, tinged with lavender. Spinous portion of dorsal fin with membrane tips white, then a submarginal band of dark red, a broad zone of whitish suffused with red, and dark red at base (except first membrane which is deep red with white at distal end and base); soft portion of dorsal fin with clear membranes and reddish-yellow rays; first 3 spines of anal fin whitish, the spinous membranes, fourth spine, and first ray dark reddish-brown; soft portion of anal fin with clear membranes and reddish-yellow rays; caudal fin like soft dorsal and anal fins except for broad upper and lower dark reddish-brown margins; pectoral fins pale reddish; pelvic fins with anteriolateral edge whitish, the first ray and membrane behind spine dark reddish brown, the rest with reddish-yellow rays and clear membranes.

Colour in alcohol: body pale with 8 or 9 dark brown to blackish stripes which are progressively darker dorsally on body (on some specimens only the upper 4 stripes are clearly dark). Spinous portion of dorsal fin with a large submarginal blackish area on each membrane; spinous membranes and first soft-ray of anal fin blackish; upper and lower edges of caudal fin broadly dusky to blackish; a narrow dusky to blackish band in pelvic fins centred on first soft-ray (some dark pigment generally present on medial part of spine and lateral and distal part of second soft-ray); axil of pectoral fins blackish.

NEOTYPE: BPBM 29203, 134 mm SL, Solomon Islands, Savo, rocky shore in 0-1 m, rotenone, J.E. Randall and B. and L. Goldman, 18 July 1973.

DESCRIPTION OF NEOTYPE: Dorsal-fin rays XII/13 (aberrant in having XII spines); anal-fin rays IV,9; pectoral-fin rays IV,9; lateral-line scales 35; scales above lateral line to origin of dorsal fin $2\frac{1}{2}$; scales below lateral line to origin of anal fin 6; diagonal rows of scales on cheek 4; median predorsal scales 6; circumpeduncular scales 12; principal caudal rays 19, the uppermost and lowermost unbranched; spiniform procurent caudal rays 5; gill-rakers 6 + 10; vertebrae 11 + 16.

Body depth 2.8 in SL; body width behind gill opening 1.7 in depth; head length (to end of uppermost opercular spine) 2.8 in SL; dorsal profile of head strongly convex, with a break in the contour anterodorsal to eye; snout length 4.7 in HL, 1.8 in orbit; dorsal profile of snout forming an angle of 65° to the horizontal axis of head and body; orbit diameter 2.65 in HL; least width of interorbital space (measured anteriorly) 4.2 in HL; least depth of caudal peduncle 3.7 in HL; length of caudal peduncle (measured horizontally from rear base of anal fin) 2.8 in HL; predorsal length 2.65 in SL; preanal length 1.35 in SL; prepelvic length 2.7 in SL.

Mouth slightly inferior, somewhat oblique (forming an angle of about 25° to the horizontal); maxilla

reaching posterior to centre of orbit (but not to rear edge of pupil), the upper jaw length 2.4 in HL; upper posterior corner of maxilla angular, the lower rounded; premaxillary groove extending to a vertical at front edge of orbit, its medial length 3.9 in HL. Villiform teeth in a band in jaws, broader anteriorly; villiform teeth on vomer in a broad V-shape; villiform teeth in a band on palatines; tongue moderately pointed, edentate.

Nasal fossa centred slightly below middle of eyes, without spinules on its edge; nasal bones ending anteriorly in a blunt spine which curves laterally; no spinule along median edge of nasal bone (margin of premaxillary groove); upper edge of first suborbital bone with a lateral, slightly retrorse spine a short distance posterior to a vertical through front margin of orbit, followed by a ridge of recumbent spinules; lower edge of nasal and suborbital bones with a series of retrorse spines, the first largest and broad-based, set below anterior edge of nasal fossa; a large striated flattened spine ventrally on mandible, its tip below distal end of maxilla; spine at corner of preopercle 4.0 in head, 1.4 in orbit; vertical margin of preopercle with 53 serrae, the ventral margin with 11, the most posterior on the left side enlarged; margin of interopercle with 9 stout serrae; opercle with 2 broad flattened spines, the uppermost slightly larger, and 2 vertical series of stout serrae, the anterior series with 30 serrae, the posterior with 11 (those in lower middle zone indistinct).

Scales strongly ctenoid, with as many as 40 ctenii along margin; spinous portion of dorsal and anal fins naked; base of paired fins and soft portions of dorsal and anal fins with small scales, those in middle of anal fin reaching about $\frac{1}{4}$ distance to margin of fin; very small scales on caudal fin extending about $\frac{3}{4}$ distance to posterior margin.

Origin of dorsal fin above posterior edge of first lateral-line scale; first dorsal spine 3.25 in HL; second dorsal spine 2.25 in HL; third dorsal spine longest, 2.1 in HL; last dorsal spine 6.5 in HL; second dorsal soft-ray longest, 1.7 in HL; first anal spine minute; second anal spine 4.5 in HL; third anal spine very long and stout, 1.25 in HL; first anal soft-ray longest, 1.5 in HL; caudal fin (measured horizontally) 1.6 in HL; caudal fin forked, the caudal concavity (measured horizontally between tips of longest and shortest rays) 3.5 in HL; pectoral fins 1.45 in HL; pelvic fins 1.5 in HL.

Colour in alcohol: body brown with 9 dark brown stripes (disregarding a median dorsal one on nape and a midventral one) which are darker dorsally; head dark brown except vertical margin of preopercle, preopercular spine, posterior opercle, a streak across upper edge of maxilla and cheek, and ventral part of head which are pale to slightly dusky. Spinous portion of dorsal fin with a dark brown margin (except tips of membranes which are paler), broadest on first 2 membranes; rest of fin clear in upper outer part, dusky basally; remaining fins with dusky rays and pale membranes except for dorsal and ventral margins of caudal fin, spinous membranes of anal fin, and first soft-ray of pelvic fins which are dark brown; axil of pectoral fins dark brown.

Colour when fresh as in species diagnosis and Plate 2, Fig. A.

Largest specimen examined, RUSI 9282, 206 mm SL, from Kenya.

REMARKS: Lacepède described *S. praslin* from the manuscript of Commerson who took notes on the species at New Britain in July, 1768 during the voyage of Bougainville. No mention was made of collecting a specimen, and none from the voyage exists at the Muséum National d'Histoire Naturelle in Paris; therefore, a neotype is described. Since no material of this species is available from New Britain, the neotype was selected from 2 specimens collected at nearby Savo Island in the Solomon Islands.

Jordan and Seale (1906: 225, Fig. 26) correctly identified *S. praslin* from the Samoa Islands and illustrated it well. Woods in Schultz and collaborators (1953) is the only recent author to have properly distinguished *S. praslin* and *S. rubrum*, though he based his separation only on colour. *S. praslin* is a much more melanistic fish, the stripes dark reddish brown and persisting almost black in preservative, the outer part of the dorsal fin dark reddish brown to almost black (except white membrane tips); the entire first soft-ray of the pelvic fin is dark brown (in contrast to the dark tips of all the rays of *rubrum*). There are 2 meristic differences: *S. praslin* has 4 diagonal rows of scales on the cheek while *rubrum* has 5; there are modally 2 more lateral-line scales in *rubrum* (see Table 2).

Several features of Lacepède's description of *praslin* have led us to adopt this name for the present species: 13 dorsal soft-rays, 9 anal soft-rays, 14 alternating brown and whitish stripes (for *rubrum* one would be more apt to describe the darker stripes as red), the first dorsal fin bordered with purple, becoming red toward the base, a purple spot marking the anal fin (referring to the base), a total length of 3 decimeters (probably longer than attained by *praslin*, but this magnitude of length alone eliminates most species of the genus), and finally the habitat of madreporarian coral (more typical of *praslin* than *rubrum*).

Most literature records of either *S. praslin* or *S. rubrum* are difficult to confirm due to lack of diagnostic information. We have examined specimens of *praslin* from the following localities: Kenya, Mozambique, Aldabra, Comoro Islands, Chesterfield Islands (Madagascar), Indonesia, New Guinea, Solomon Islands, Fiji, Vanuatu, Palau Islands, Philippines, Ryukyu Islands, Mariana Islands, Marshall Islands, Samoa Islands, and Society Islands.

The holotype of *Holocentrum marginatum* Cuvier (MNHN 4047, 43.5 mm SL), described from the Indian Ocean, was examined; it is a juvenile of *S. praslin*.

Sargocentron punctatissimum (Cuvier, 1829)

Plate 2, Fig. B; Text Fig. 10.

Holocentrum lacteo-guttatum Cuvier, in Cuv. & Val., 1829: 214 (Indian Ocean); Weber & de Beaufort, 1929: 240; Klausewitz & Bauchot, 1967: 121, Fig. 1.

Holocentrum punctatissimum Cuvier, in Cuv. & Val., 1829: 215 (Strong Island, Caroline Islands); Bleeker, 1873: 215; Klausewitz & Bauchot, 1967: 122, Fig. 2.

Holocentrum argenteum (non Valenciennes) Klunzinger, 1870: 721.

Holocentrus lacteoguttatus: Smith, 1955a: 308; Smith & Smith, 1963: 9, Pl. 6, Fig. F; Jones & Kumaran, 1980: 176, Figs. 152a, b.

Adioryx lacteoguttatus: Burgess & Axelrod, 1973: Fig. 172; Shimizu & Yamakawa, 1979: 130, Fig. 16.

DIAGNOSIS: Dorsal-fin rays XI,12-13 (usually

13); anal-fin rays IV,9; pectoral-fin rays 14-16; lateral-line scales 41-47; scales above lateral line to base of middle dorsal spines $2\frac{1}{2}$; oblique rows of scales on cheek 5; gill-rakers 5-7 + 10-12; body depth 2.7-3.1 in SL; head length 3.0-3.5 in SL; dorsal profile of head smoothly convex; anterior end of nasal bone rounded; interorbital shelf present on anterodorsal edge of orbit (Fig. 10); medioposterior edge of nasal bones without spinules; nasal fossa without spinules on its edge; preopercular spine about $\frac{1}{2}$ orbit diameter; longest dorsal spine 1.7-2.2 in HL; membranes of spinous portion of dorsal fin moderately incised; third anal spine 1.2-1.5 in HL; pelvic fins 1.5-1.75 in HL.

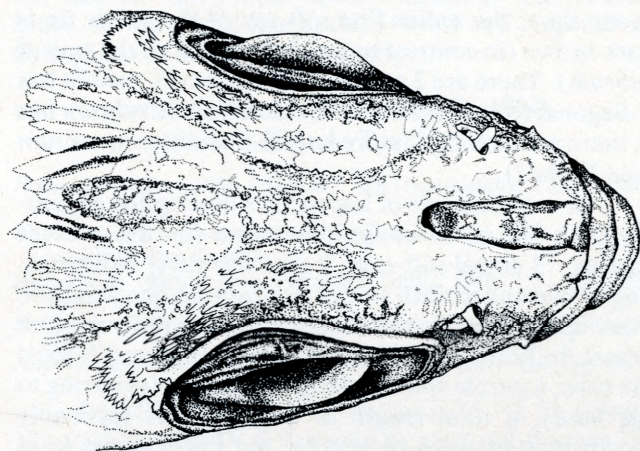


Figure 10. Dorsal view of head of *Sargocentron punctatissimum*, RUSI 9168, 91 mm.

Colour in life: silvery red (back with a bluish silver iridescence), the red tending to concentrate into stripes which are narrower than the silvery interspaces; most individuals with scales very finely dotted with blackish; a red band from upper end of gill opening to axil and upper base of pectoral fin; dorsal part of head red; a diagonal red streak from eye to above base of preopercular spine; posterior margin of preopercle red. Outer part of spinous portion of dorsal fin broadly red (membranes sometimes barely tipped with white); below this a large whitish blotch on each membrane; caudal fin red.

Colour in alcohol: body and head usually profusely covered with dark brown or black specks giving the fish an overall dusky appearance. On some specimens the dark specks are much less evident and the fish is generally pale, the dorsal scales on the body often with a pale bluish-green iridescence. Basal $\frac{2}{3}$ of dorsal fin dusky, with a blackish blotch behind each spine along middle of fin; distal part of dorsal membranes pale with a tiny dusky spot behind tip of each spine (except in last 2 or 3).

Largest specimen examined, RUSI 13823, 138 mm SL, from Ponta Zavora, Mozambique.

REMARKS: The type of *Holocentrum punctatissimum* Cuvier (MNHN 107, 98 mm SL) is in the Muséum National d'Histoire Naturelle in Paris; this specimen was designated as the lectotype from among a syntypic series of 5 specimens by Klausewitz and Bauchot (1967: 122). These authors and others have regarded this name as a junior synonym of *Holocentrum lacteoguttatum* Cuvier, which has page priority over *H. punctatissimum*. On the other hand, Bleeker (1853a) and Günther (1859) both placed *lacteoguttatum* in the synonymy of *punctatissimum*, though in each case with a question mark. Their indecision indicated by this mark would rule them out as first revisors; however, Bleeker (1873), in his major revision of Indo-Archipelagique *Holocentrum*, placed *lacteoguttatum* in the synonymy of *punctatissimum* with no expression of doubt. His decision takes precedence over the page priority in Cuvier; therefore *punctatissimum* must replace *lacteoguttatum*.

Judging from the description given by Günther (1859) of 2 specimens from the Sea of Batavia that he identified as *Holocentrum laticeps* Cuvier and Valenciennes, these are *S. punctatissimum*. *H. laticeps* has been regarded (Bauchot, 1970: 35) as a junior synonym of *S. rubrum*, though there is little that is diagnostic for any species of *Sargocentron* in Cuvier's (1829: 211) brief original description, and the type is not extant. Its size of 8 inches would rule out an identification as *S. punctatissimum*. Two specimens (MNHN A.2629 from Batavia and MNHN A.2680 from Vanicolo) which Valenciennes (1831: 500) later identified as *H. laticeps* were sent on loan by M.L. Bauchot; as indicated by Bauchot (1970: 40), they are *S. rubrum*.

S. punctatissimum is wide-ranging throughout the Indo-Pacific region from the Red Sea to the Hawaiian Islands and Easter Island. On the east coast of Africa it occurs as far south as Algoa Bay (RUSI 17657). It is abundant on rocky shores or reef fronts exposed to wave action, and is found in shallower water than any other holocentrid; occasionally it is taken in deeper water. The senior author collected a specimen from 18 m off Oahu; it lacked the typical profusion of dark dots on the head and body. This species is generally hidden from daylight hours but emerges to feed at night.

Sargocentron rubrum (Forsskal, 1775)

Plate 2, Fig. C.

- Sciaena rubra* Forsskal, 1775: 48 (type-locality, Red Sea).
Holocentrus ruber: Rüppell, 1829: 83, Pl. 22, Fig. 1.
Holocentrum orientale Cuvier, in Cuv. & Val., 1829: 147 [type-locality, Pondicherry, India (as restricted by Bauchot, 1970: 17)].
Holocentrum rubrum: Klunzinger, 1870: 722; Day, 1876: 172, Pl. 41, Fig. 4.
Holocentrus aureoruber Fowler, 1904b: 504, Pl. 10, upper Fig. (type-locality, Padang, Sumatra).
Adioryx ruber: Kyushin et al., 1977: 50, upper Fig.; Shimizu & Yamakawa, 1979 (in part): 126, Fig. 14.

DIAGNOSIS: Dorsal-fin rays XI /12-14; anal-fin rays IV,8-10; pectoral-fin rays 13-15; lateral-line scales 34-38; scales above lateral line to base of middle dorsal-fin spines $2\frac{1}{2}$; diagonal rows of scales on cheek 5; gill-rakers 6-8 + 9-12; body depth 2.4-2.8 in SL; head length 2.65-2.85 in SL; dorsal profile of head strongly convex; snout 4.25-4.7 in HL; mouth terminal; maxilla usually extending to a vertical at centre of eye (exceptionally to end of pupil), the upper jaw length 2.5-2.7 in

HL; anterior end of nasal bone rounded or ending in a blunt spine; medioposterior edge of nasal bones without spinules; edge of nasal fossa without spinules (except 2 of 3 Bishop Museum Red Sea specimens with a single spinule on rear margin of one side); upper edge of first suborbital bone with a prominent, slightly retrorse, lateral spine a short distance behind a vertical at front edge of orbit (see Fig. 2A), followed by a ridge of recumbent spinules; preopercular spine 3.2-5.5 in HL, generally about $\frac{2}{3}$ orbit diameter in fish more than 10 cm SL but may be as large as orbit on large specimens; longest dorsal spine 1.9-2.3 in HL; membranes of spinous portion of dorsal fin deeply incised; third anal spine 1.35-1.6 in HL.

Colour in life: body with alternating stripes of brownish red and silvery white of about equal width, the third and fourth and the fifth and sixth red stripes converging posteriorly on body; second red stripe ending beneath base of soft portion of dorsal fin; third red stripe angling downward to end slightly above midbase of caudal fin; seventh stripe (at level of lower edge of pectoral-fin base) broadening as it ends above base of soft portion of anal fin; a triangular brownish-red band flanked by silvery white on cheek from orbit to base of preopercular spine; edge of upper preopercular margin silvery white. Spinous portion of dorsal fin dark red, the membrane tips white except posteriorly, a large quadrangular whitish blotch in middle of each membrane (except the first) forming a median band; spinous portion and first ray of anal fin dark brownish red except first 3 spines which are largely white; soft portion of dorsal and anal fins clear with yellowish rays, the dorsal with an anterior red margin; caudal fin with yellowish rays and clear membranes, the upper and lower edges narrowly whitish with a broad submarginal dark brownish-red band; pectoral membranes clear, the rays light red; pelvic fins with the spine and membranes white, the rays reddish brown, darker near tips.

Only the dark stripes dorsally on the body persist in alcohol, and even these are absent on some preserved specimens; scaled basal region of opercle dusky; usually an elongate dark blotch on basal scaled soft portion of dorsal fin and a smaller blotch at base of anal and caudal fins; a dusky streak over fourth spine and first soft-rays of anal fin; upper and lower edges of caudal fin broadly dusky; tips of second to sixth soft-rays of pelvic fins and distal ends of adjacent membranes dusky to blackish (dark pigment on pelvics of some specimens confined to extreme tips of second and third rays, and it may be wanting on faded specimens); axil of pectoral fins pale to slightly dusky.

Largest specimen examined, AMS IB.7419, 233 mm SL, from Townsville, Queensland.

NEOTYPE: BPBM 28183, 115.5 mm SL, Red Sea, Sudan, Port Sudan harbour, off Customs dock, dead reef and silt, 3-4 m, spear, J.E. Randall, 4 October 1975.

DESCRIPTION OF NEOTYPE: Dorsal-fin rays XI/13; anal-fin rays IV,9; pectoral-fin ray 13 (15 on other side; lower rays on both sides aberrant); principal caudal rays 19, the uppermost and lowermost unbranched; upper procurent caudal rays 6, the last segmented; lower procurent caudal rays 5, the last segmented; lateral-line scales 36; scales above lateral line to origin of dorsal fin $2\frac{1}{2}$; scales below lateral line to ori-

gin of anal fin 6; diagonal rows of scales on cheek 5; a vertical row of 8-9 scales on opercle; median predorsal scales 6; circumpeduncular scales 14; gill-rakers 7 + 11; vertebrae 11 + 16.

Body depth 2.7 in SL; body width behind gill opening 1.8 in depth; head length (to end of opercular spine) 2.75 in SL; dorsal profile of head strongly convex; snout length 4.4 in HL, 1.7 in orbit; profile of snout forming an angle of about 60° to horizontal axis of head and body; orbit diameter 2.65 in HL; least width of interorbital space (measured anteriorly) 4.7 in HL; least depth of caudal peduncle 4.1 in HL; length of caudal peduncle 2.9 in HL; predorsal length 2.55 in SL; preanal length 1.35 in SL; prepelvic length 2.65 in SL.

Mouth terminal, somewhat oblique (forming an angle of about 25° to the horizontal); maxilla reaching slightly posterior to centre of orbit, the upper jaw length 2.5 in HL; posterior end of maxilla slightly emarginate; premaxillary groove extending slightly posterior to a vertical at front of orbit, its medial length 4.25 in head. Villiform teeth in a band in jaws, broader anteriorly; villiform teeth on vomer in a broad V-shaped patch, the anterior edges concave and the posterior convex, with a rounded projection on each side from posterior edge; villiform teeth on palatines in a broad band; tongue moderately pointed, edentate.

Nasal fossa centred slightly below level of middle of eye, with a single spinule on posterior edge on one side and none on the other (in the original description, Forsskal [1775: 48] stated that there are 2 incurved spinules on the front of the nasal fossa: "... *fossula frontis duabis spinis incurvis*"); nasal bone ending in a blunt spine which projects more laterally than anteriorly; no spinule along median edge of nasal bone (margin of premaxillary groove); upper edge of first suborbital bone with a lateral, slightly retrorse spine a short distance posterior to a vertical through front margin of orbit, followed by a ridge of recumbent spinules; lower edge of nasal and suborbital bones with a series of small retrorse spines, the first largest, broad-based, set below anterior edge of nasal fossa; a large, flattened, striated, sessile spine ventrally on mandible, the tip lying below end of maxilla; spine at corner of preopercle 5.5 in HL, 1.85 in orbit; vertical margin of preopercle with 51 stout serrae, the ventral margin with 11; margin of interopercle with 7 stout serrae, progressively longer posteriorly; opercle with 2 broad, flattened, ridged spines, the upper one about twice as large as the lower; opercle with 2 series of stout serrae (the ends of long ridges), the anterior row with 33 serrae, the posterior with 17.

Scales strongly ctenoid, with as many as 28 ctenii on margin; spinous portion of dorsal and anal fins naked; base of soft portions of dorsal and anal fins and of paired fins with small scales, those in middle of anal fin reaching about $\frac{1}{3}$ distance to margin of fin; very small scales on caudal fin extending about $\frac{1}{3}$ distance to posterior margin.

Origin of dorsal fin above posterior edge of first lateral-line scale; first dorsal spine 3.5 in HL; second spine 2.5 in HL; third spine longest, 2.35 in HL; last dorsal spine 7 in HL; third dorsal soft-ray longest, 1.8 in HL; first anal spine minute; second anal spine 4.4 in HL; third anal spine very long and stout, 1.35 in HL; fourth anal spine 2.15 in HL; first and second anal soft-rays longest, 1.7 in HL; caudal fin (measured horizontally) 1.7 in HL, forked, the caudal concavity (measured horizontally between tips of longest and shortest caudal

rays) 3.7 in HL; pectoral fins 1.6 in HL; pelvic fins 1.6 in HL.

Colour in alcohol: body light brown with brown stripes (dark brown dorsally and barely discernible ventrally), the narrow uppermost stripe running from nape, along base of dorsal fin, and disappearing below posterior spines; second body stripe ending in an expanded area beneath soft portion of dorsal fin; third stripe following upper edge of lateral line, ending slightly above midbase of caudal fin; fourth stripe parallel to lower edge of lateral line, converging on second stripe below posterior end of dorsal fin (these 3 stripes distinctly broader than pale interspaces); remaining stripes about equal in width to pale interspaces, the fifth and sixth converging along lower edge of caudal peduncle, the seventh ending in an expanded sector at base of soft portion of anal fin; head dark brown dorsally, light brown ventrally, with a broad triangular brown band from edge of orbit to corner of preopercle and a vertically elongate dark brown spot on basal half of opercle. Spinous portion of dorsal fin blackish with a broad median pale band and pale membrane tips; remaining fins pale except upper and lower margins of caudal fin which are broadly blackish, the fourth anal spine, first ray and adjacent membranes which are blackish, and anterior edge of soft portion of dorsal fin and pelvic fin tips which are dusky; axil of pectoral fins pale to slightly dusky.

Colour when fresh as in Plate 2, Figure C.

REMARKS: A neotype is described above for *Sargocentron rubrum* because the holotype is not extant (Klausewitz & Nielsen, 1965). The original description of *S. rubrum* (as "*Sciaena rubra*") by Forsskål (1775:48) is reasonably accurate:

51. *Sciaena rubra*.

Description. Body dark red, 8 longitudinal white-red bands on each side: dark red dorsally. Ventral surface white. Top of head with retrorse spines. Teeth bristle-like, short, dense. Upper lip protrusile. Front of nasal fossa with two incurved spines. Iris bright red, pupil black. Scales spiny. Lateral line near the dorsal surface. Caudal fin ascending. Preopercle completely spiny; with a strong spine at the base. Opercle with three spines posteriorly. Inter and subopercle small, spiny near the branchiostegal rays. Bony orbit serrate-spinous, with two spines at the front. Dorsal fins connected: the first white with two longitudinal red bands, lying in a groove. The other shorter, with a scaly base. First two anal-fin spines short, third very thick and large. Caudal fin with 5 spiny rays on each side, shorter than the other rays; middle of fin yellowish. Outer margin of pelvic fins white, the tips black. Rays: Branchiostegals 8. Dorsal fin $\overline{1,7}$. Pectoral fin 19. Pelvic fin $\overline{1,6}$. Anal fin 14. Caudal fin 15.

The colour pattern described by Forsskål fits the species we here recognize as *Sargocentron rubrum* and precludes most other holocentrids. The mention of 2 spines on the front edge of the nasal fossa eliminates *S. diadema*. The fin-ray formulae for the dorsal, pectoral and anal fins were apparently copied incorrectly, as they are wrong for any species of holocentrid.

Forsskål probably obtained the species at Jeddah on the eastern shore of the Red Sea. The neotype was collected on the western shore, but only 300 km away.

S. rubrum ranges from the Red Sea to the western Pacific. Because it has been confused with the closely re-

lated *S. praslin*, many literature records cannot be determined as one species or the other, and the exact distributions of both require further investigation. We have examined specimens of *S. rubrum* from the Red Sea, Gulf of Aden, Gulf of Oman, India, Sri Lanka, Andaman Sea (off Thailand), Indonesia, Malaysia, Great Barrier Reef, and New Caledonia. Plate 31B (as *Adioryx ruber*) in Masuda, Araga and Yoshino (1975) confirms its presence in southern Japan. Kyushin et al. (1977) recorded it from the Andaman Islands. It is among those fishes that have passed through the Suez Canal and become established in the Mediterranean Sea (Haas & Steinitz, 1947; Ben-Tuvia, 1966).

S. seychellense (Smith & Smith) is also closely related to *S. rubrum* (see following account of *seychellense* for differences between these two species). It appears to be allopatric with *S. rubrum*. Smith and Smith (1963) included "*Holocentrus ruber*" in their "Fishes of Seychelles", based on the record of Playfair (1867:855), but no specimens from these islands are in the J.L.B. Smith Institute of Ichthyology, and the specimen illustrated (Pl. 87, Fig. 1) was from Zanzibar (M.M. Smith, pers. comm.). Baissac (1976) recorded *rubrum* from Mauritius; however, a specimen from this island identified as *rubrum* by him (RUSI 1258, 212 mm) is *seychellensis*. The senior author has collected fishes extensively in both Mauritius and Seychelles and has not seen *S. rubrum* at either locality.

Playfair and Günther (1867) erred in placing *Holocentrum melanospilos* Bleeker in the synonymy of *rubrum*. It is a valid, though closely related, species, as discussed above.

S. rubrum has also been confused with *S. cornutum* (Bleeker). The latter is known at the present time only from the Philippines, Indonesia and New Guinea. It differs in having 13 instead of 14 pectoral-fin rays, 4 instead of 5 diagonal rows of cheek scales, and a smaller mouth (the maxilla not reaching a vertical at centre of eye, the upper jaw 2.75-2.9 HL, compared to 2.3-2.6 in HL for *rubrum*). *S. cornutum* has a prominent blackish spot at the base of the soft portion of the dorsal and anal fins and midbase of caudal fin much like *melanospilos*; it has broader red bands on the side of the body (as seen in *S. diadema*).

M.L. Bauchot examined the lectotype of *Holocentrum orientale* Cuvier (MNHN A.5516, 172.5 mm SL) from Pondicherry, India for us and confirmed that it is *S. rubrum*.

S. rubrum is typically found on reef or rocky areas of protected inshore waters such as harbours or lagoons. It can occur in silty dead reef areas where the water is turbid. The habitat of *S. seychellense*, on the other hand, is well-developed coral reefs with clear water.

***Sargocentron seychellense* (Smith & Smith, 1963)**

Plate 2, Fig. D; Text Fig. 3.

Holocentrus seychellensis Smith & Smith, 1963: 9, Pl. 87 E (type-locality, Mahé, Seychelles); Smith, 1963: 33.

DIAGNOSIS: Dorsal-fin rays XI /12 or 13 (rarely 12); anal-fin rays IV, 8-10; pectoral-fin rays 13-15; lateral-line scales 35-39; scales above lateral line to base of middle dorsal spines 2½; diagonal rows of scales on cheek 5; gill-rakers 6-7 + 10-12; body depth 2.4-2.65 in SL; head length 2.55-2.9 in SL; dorsal profile of head strongly convex; snout 4.15-4.6 in HL; mouth terminal; maxilla generally reaching posterior to centre of eye (on some specimens nearly to a vertical at posterior edge of pupil), the upper jaw length 2.2-2.45 in HL; anterior end of nasal bone ending in a blunt spine; medioposte-

rior edge of nasal bones without spinules; edge of nasal fossa without spinules; upper edge of preorbital with a series of small, lateral, slightly retrorse spines, the most anterior largest (located slightly posterior to a vertical through front edge of orbit: see Fig. 2 B); preopercular spine 4.0-5.7 in HL, usually slightly more than $\frac{1}{2}$ orbit diameter; longest dorsal spine 1.75-2.15 in HL; membranes of spinous portion of dorsal fin deeply notched; third anal spine 1.3-1.55 in HL.

Colour in life: body with alternating stripes of brownish red (darker dorsally) and silvery white of about equal width; first stripe narrow, from nape along base of spinous portion of dorsal fin; second red stripe ending beneath rear base of dorsal fin; third stripe extending to midbase of caudal fin; fourth stripe ending near third stripe below rear base of dorsal fin; fifth and sixth stripes converging on ventroposterior part of caudal peduncle; seventh stripe ending in an expansion at base of soft portion of anal fin; dorsal part of head, snout, and upper lip red; a brownish red streak edged in silvery white from orbit to corner of preopercle; a vertical brownish red band on preopercle and a second broader one basally on opercle, flanked by bands of silvery white; base of pectoral fin brownish red, the axil dark brown. Spinous portion of dorsal fin with spines light red, the membranes with outer incised portion yellow, the broad middle part white, the basal part red (except base of first 2 membranes which are whitish); remaining fins mostly pale yellowish except for upper and lower edges of caudal fin, which are red, and the anterior edge of anal and pelvic fins which are white.

In alcohol, *S. seychellense* is paler than *S. rubrum*, and there are no blackish markings on the fins.

Largest specimen, RUSI 1258, 212 mm SL, from Mauritius.

REMARKS: The holotype of *S. seychellense*, RUSI 994, 123 mm SL, is at the J.L.B. Smith Institute of Ichthyology.

This squirrelfish is known only from the Seychelles, Madagascar, Mauritius, St. Brandon's Shoals and Chagos Archipelago. M.M. Smith's (1980) report of "*Adioryx seychellensis*" from Maputaland (from Kosi Bay, 27°S to Cape St. Lucia, 18°30'S) is erroneous. *S. seychellense* is a shallow-water species of coral reefs and rocky shores. As mentioned above, it does not appear to coexist with *S. rubrum*.

S. seychellense is one of a complex of 5 closely related species; the other 4 are *S. rubrum*, *S. praslin*, *S. melanospilos*, and *S. cornutum*, the last-mentioned apparently restricted to the Indo-Malayan region. *S. seychellensis* differs from *melanospilos* in lacking spinules at the edge of the nasal fossa and in having a series of small lateral spines at the upper edge of the first suborbital bone. It has been confused most often with *rubrum* and *praslin* from which it differs by the spination of the first suborbital (compare Figs. 2 and 3); a larger mouth (the upper jaw length 2.2-2.45 in HL, compared to 2.35-2.6 for *rubrum* and *praslin*); a higher average number of lateral-line scales, and in having yellow on the outer part of the spinous portion of the dorsal fin instead of red with white tips.

Sargocentron spiniferum (Forsskal, 1775)

Plate 2, Fig. E; Text Fig. 11.

Sciaena spinifera Forsskal, 1775: 49 (type-locality, Jeddah, Red Sea).

Holocentrus spinifer: Rüppell, 1838: 97, Pl. 25, Fig. 1; Jones & Ku-
maran, 1980: 174, Fig. 150.

Holocentrum melanopterus Bleeker, 1855: 302 (type-locality, Man-
ado, Celebes).

Holocentrum spiniferum: Klunzinger, 1870: 725; Sauvage, 1891 (in
part): 30.

Holocentrus spiniferus: Smith, 1951: 49, Fig. 1; 1953: 515, Fig. 297a;
Smith, 1955a: 308; Fourmanoir, 1957: 58, Fig. 42; Smith, 1958:
123; Arnoult et al., 1958: 57; Fourmanoir & Guézé, 1962: 6; Smith
& Smith, 1963: 9, Pl. 87, Fig. D.

Adioryx spinifer: Burgess & Axelrod, 1973: Figs. 167, 168 & 171; Kyu-
shin et al., 1977: 52, Fig. 18; Shimizu & Yamakawa, 1979: 115, Fig.
7.

DIAGNOSIS: Dorsal-fin rays XI/14-16; anal-fin rays IV, 9 or 10 (usually 10); pectoral-fin rays 14-16; lateral-line scales 41-46; scales above lateral line to base of middle dorsal-fin spines $3\frac{1}{2}$; cheek scales in 5 oblique rows; gill-rakers 6-7 + 12-14; body deep and compressed, the depth 2.4-2.6 in SL; head length 2.5-3.1 in SL; dorsal profile of head nearly straight; lower jaw projecting when mouth closed; eye of adults not large, the orbit smaller than snout length; anterior end of nasal bone truncate or with 2 very short blunt spines (one at each corner); nasal fossa margin without spinules; no short spines or spinules on medioposterior edge of nasal bones; preopercular spine usually greater than orbit diameter in specimens larger than 20 cm SL; opercle with 2 nearly subequal posterior spines; longest dorsal spine 1.7-2.3 in HL; third anal spine 1.7-2.3 in HL; membranes of spinous portion of dorsal fin not incised.

Colour in life: head and body red, the edges of the scales silvery white; a large ovate (long axis vertical) crimson spot on upper preopercle behind eye edged anteriorly and posteriorly by narrow white bands which continue ventrally to outline patch of scales on cheek; a large crimson spot divided by a conspicuous white bar (cf. Burgess & Axelrod, 1973, Figs. 167 & 171) in axil of pectoral fin and extending slightly above; a whitish spot sometimes evident dorsally on caudal peduncle behind base of dorsal fin (white spot clearly visible at night). Spinous portion of dorsal fin uniform crimson; remaining fins primarily orange-yellow.

Colour in alcohol: head and body generally brownish, paler ventrally and posteriorly; belly silvery white. The crimson blotch behind the eye and in the axil of the pectoral fin (in life) are blackish-brown; a silvery or dusky blotch often visible on top of peduncle at end of dorsal-fin base; scaly area of cheek with a silvery-white border along posteroventral edge of orbit and as a submarginal line along vertical and ventral edges of preopercle. In specimens less than 10 cm SL, there is a small blackish spot between the first 2 dorsal-fin spines at the fin base.

The largest of the squirrelfishes; largest Bishop Museum specimen, BPBM 19902, 360 mm SL, from Lisianski, Hawaiian Islands.

REMARKS: Forsskal's holotype of *Sciaena spinifera*, a dried half skin 148 mm SL, is at the Zoological Museum of Copenhagen (Klauswitz & Nielsen, 1965: 19, Pl. 16, Fig. 32).

M.L. Bauchot examined the holotype of *Holocentrum binotatum* Quoy and Gaimard (MNHN A.2636, 79.8 mm SL) for us and confirmed that it is a juvenile of *S. spiniferum*.

We accept the synonymy for this species that was given by Shimizu and Yamakawa (1979: 115-116), except that the Rüppell reference should be added (as shown above). Also we include *Holocentrum melanopterus* Bleeker in the synonymy of *spiniferum* based

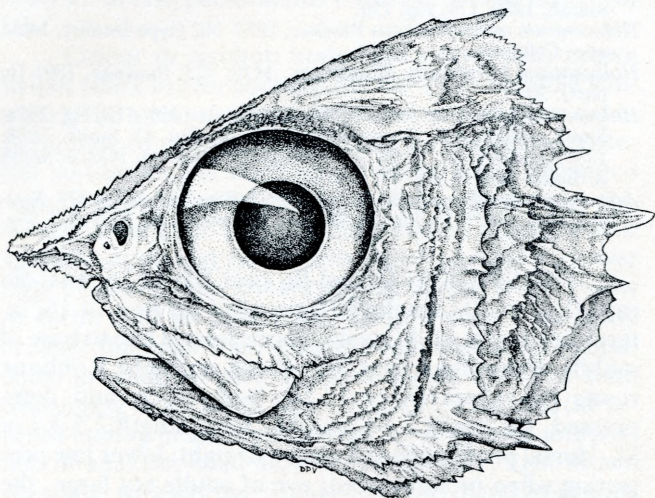


Figure 11. Head of post-larva of *Sargocentron spiniferum*, RUSI 10611, 35 mm.

on the examination of syntypes and the selection herein of RMNH 29396, 39 mm SL, as the lectotype.

S. spiniferum occurs throughout the Indo-Pacific region from the Red Sea and coast of east Africa to French Polynesia and the Pitcairn Group. On the African coast it ranges south to Natal (28°S) (M.M. Smith, 1980). It is generally found in caves in well-developed coral reefs. A nocturnal predator, it feeds mainly on crustaceans, especially crabs (Randall, 1980). The preopercular spine is venomous (personal observation, J.E.R.).

S. spiniferum is closely related to *S. ensiferum* (= *Adioryx furcatus* [non Günther, 1859] of Shimizu & Yamakawa, 1979). Both species have $3\frac{1}{2}$ scales between the lateral line and the middle dorsal-fin spines; and, contrary to Shimizu and Yamakawa (1979), both species have the spinous dorsal-fin membrane not (or only slightly) incised between the spines (a condition also seen in *S. violaceum*). Shimizu and Yamakawa (1979) stated that *S. spiniferum* differs from *S. ensiferum* (their "*Adioryx furcatus*") in lacking spinules on the edge of the nasal fossa and in having the spinous dorsal-fin membrane incised. However, in their illustration of *A. spinifer* (their Fig. 7) the spinous dorsal membrane is shown only slightly incised (similar to their Fig. 11 of *A. violaceus*). If the spinous dorsal fin of preserved specimens was not originally fixed in an erect position, the membrane is likely to be torn away from the spine tips when the fin is erected after preservation. This may account for the discrepancy in the illustration of Shimizu and Yamakawa (1979: Fig. 7) and their assertion in the diagnosis for "*Adioryx spinifer*" that the spinous dorsal-fin membranes are "well incised". The illustrations of *S. spiniferum* published by Woods (1953: P1. 20, Fig. A), Jones and Kumaran (1980: Fig. 150) and Randall, (1980: Fig. 10) show the spinous dorsal-fin membrane not incised.

In addition to lacking spines on the edge of the nasal fossae, *S. spiniferum* differs from *S. ensiferum* in having a deeper body (depth 2.4-2.6 versus 2.5-2.8 in SL), longer preopercular spine (usually greater than orbit diameter, versus less than orbit in specimens more than 20 cm SL), first dorsal spine distinctly shorter than second spine (versus first dorsal spine subequal to second spine), and in colour pattern (cf. Masuda et al., 1975: P1. 31, Figs. D & J).

Sargocentron tiere (Cuvier, 1829)

Plate 2, Fig. F.

Holocentrum tiere Cuvier, in Cuv. & Val., 1829: 202 (type-locality, Tahiti).

Holocentrum elongatum Steindachner, in Bliss, 1883: 52 (type-locality, Mauritius).

Adioryx tiere: Shimizu & Yamakawa, 1979: 131, Fig. 17.

DIAGNOSIS: Dorsal-fin rays XI /13-15; anal-fin rays IV,9; pectoral-fin rays 13-15; lateral-line scales 46-52; scales above lateral line to base of middle dorsal-fin spines $2\frac{1}{2}$; oblique rows of scales on cheek 5; gill-rakers 7-9 + 13-16; body depth 2.7-3.0 in SL; head length 2.9-3.3 in SL; dorsal profile of head straight to slightly convex; mouth terminal; anterior end of nasal bone with 2, short, diverging spines; medioposterior edge of nasal bones smooth; nasal fossa without spinules; upper edge of preorbital bone smooth; preopercular spine nearly as long as orbit diameter in adults; longest dorsal spine 2.6-3.4 in HL; membranes of spinous portion of dorsal fin slightly incised; third anal spine 1.4-1.9 in HL.

Colour in life: red dorsally, the sides and ventral part of body red with silvery red stripes overlaid with blue iridescence (particularly the ventral stripes). Fins red except the triangular white tip of each interspinous membrane of dorsal fin, a white spot on each spinous membrane (near base on first few membranes, in middle on most), and white leading edges of the anal and pelvic fins.

Largest specimen examined, a syntype of *Holocentrum elongatum* Steindachner, MCZ 5925, 270 mm SL, 333 mm TL.

REMARKS: The holotype of *Holocentrum tiere*, MNHN A.2628, 149 mm SL, was examined in the Muséum National d'Histoire Naturelle in Paris.

This species ranges from the Pitcairn Group and the Hawaiian Islands to Mauritius, Chagos Archipelago, Aldabra and the Seychelles. It is more prevalent at oceanic islands than continental waters. It is not yet recorded from the Red Sea, east coast of Africa, Australia, Indonesia, or the Philippines, but it is found in the Ryukyu Islands (Masuda, Araga & Yoshino, 1975; Shimizu & Yamakawa, 1979: 131). Bleeker (1873) reported it (as *Holocentron poecilopterus*) only from the Cocos-Keeling Islands. Günther (1859) described it (as *Holocentrum erythraeum*) from the Solomon Islands.

S. tiere occurs more on exposed than sheltered reefs; it may be seen in as little as 1-2 m, or to depths of at least 20 m. Feeds at night, mainly on crabs. At night it displays 2 prominent white bars on the red body, one beneath the posterior dorsal-fin spines and a short one on the caudal peduncle.

Gudger (1929) discussed the paintings of the fishes of Mauritius by Nicolas Pike. We have seen a colour transparency of the colour painting that is presumed to be of the holotype of *H. elongatum*.

Sargocentron tiereoides (Bleeker, 1853)

Plate 2, Fig. G; Text Fig. 2.

Holocentrum tiereoides Bleeker, 1853b: 334 type-locality, Ambon).

Adioryx tiereoides: Shimizu & Yamakawa, 1979: 128, Fig. 15.

DIAGNOSIS: Dorsal-fin rays XI /12-14; anal-fin rays IV,9-10 (rarely 10); pectoral-fin rays 13 or 14 (usually 14); lateral-line scales 39-44; scales above lateral line to base of middle dorsal spines $2\frac{1}{2}$; oblique rows of

cheek scales 4; gill-rakers 6-8 + 12-14; body depth 2.7-3.0 in SL; head length 2.7-3.0 in SL; dorsal profile of head nearly straight: premaxillary groove reaching distinctly posterior to a vertical at anterior edge of orbit; anterior end of nasal bone with 2 short diverging spines; medioposterior edge of nasal bones without spinules; nasal fossa without spinules; preopercular spine length about $\frac{2}{3}$ orbit diameter; longest dorsal spine 2.3-2.5 in HL; membranes of spinous portion of dorsal fin moderately incised; third anal spine 1.4-1.6 in HL.

Colour in life: body silvery pink with red stripes of about equal width to interspaces; head red with silvery reflections on cheek and opercle. Spinous portion of dorsal fin light red, the membranes tipped with white, with a broad submarginal deep red band; remaining fins light red to yellowish red, the upper and lower edges of the caudal fin darker red; leading edges of anal and pelvic fins white with a submarginal darker red band; base of pectoral fins red.

Largest specimen examined, BPBM 11557, 140 mm SL, from the Society Islands.

REMARKS: The holotype of *Holocentrum tie-reoides* was not located. The Rijksmuseum van Natuurlijke Historie at Leiden has 3 Bleeker specimens of this species under RMNH 5429: 38, 88, and 121 mm SL (46, 105, and 145 mm TL). Bleeker gave the total length of his type specimen as 115 mm, so none of the above could be the holotype unless 115 was a misprint for 105 or 145.

S. tie-reoides is not a common species, and valid literature records are few. Bleeker (1873) had specimens only from Celebes (now Sulawesi), Ternate and Ambon. Seale (1901) reported a specimen from Guam as "*Holocentrus binolatum*" Quoy and Gaimard (misspelling for *binotatum*) which has been regarded (incorrectly) by several authors as a synonym of *S. tie-reoides*; his specimen is not extant for confirmation, but the Bishop Museum has 2 other specimens from Guam (BPBM 8552). Seale (1906) listed *tie-reoides* from the New Hebrides, Solomon Islands,

and Tahiti. Again, his specimens have been lost, but the Bishop Museum has material of this species collected in recent years from the islands of Guadalcanal and Florida in the Solomons (reported by Shimizu & Yamakawa, 1979) and from Tahiti. Kendall and Goldsborough (1911) recorded the species from Tahiti and Jaluit in the Marshall Islands; Woods (*in* Schultz and collaborators, 1953) reported a specimen from Bikini. Weber and de Beaufort (1929) added a few Indonesian records and New Guinea. Shimizu and Yamakawa (1979) also listed a specimen from New Guinea and indicated that previous records of *S. tie-reoides* from Japan are doubtful.

Palmer (1950) had a specimen from Christmas Island in the eastern Indian Ocean. We know of no other literature records from the Indian Ocean. We here record it for the first time from the western Indian Ocean from a specimen collected at Mozambique Island in 1951 by J.L.B. and M.M. Smith (RUSI 17683), a specimen from the Comoro Islands (FMNH 86814) and 3 collected during an ichthyological expedition of the Royal Ontario Museum to the Chagos Archipelago in 1979 by R. Winterbottom and A.R. Emery. Two of these Chagos specimens (ROM 40372-73) are juveniles, 37.5 and 40 mm SL; the smaller of the 2 is illustrated herein as Fig. 12. The adult specimen from Chagos (ROM 41366, 110 mm) is illustrated on Plate 2.

Bishop Museum specimens have been collected in coral reefs, both in lagoon and exposed locations, at depths ranging from 15 to 36 m.

***Sargocentron violaceum* (Bleeker, 1853)**

Plate 2, Fig. H; Text Fig. 1.

Holocentrum violaceum Bleeker, 1853b: 335 (type-locality, Ambon).

Holocentrus violaceus: Smith, 1955a, 308; Smith & Smith, 1963: 9, Pl. 87, Fig. F; Jones & Kumaran, 1980: 178, Fig. 153.

Adioryx violaceus: Shimizu & Yamakawa, 1979: 122, Fig. 11.

DIAGNOSIS: Dorsal-fin rays XI /13-14 (usually 14); anal-fin rays IV,9; pectoral-fin rays 13-14 (usually 14); lateral-line scales 33-37; scales above lateral line to base of

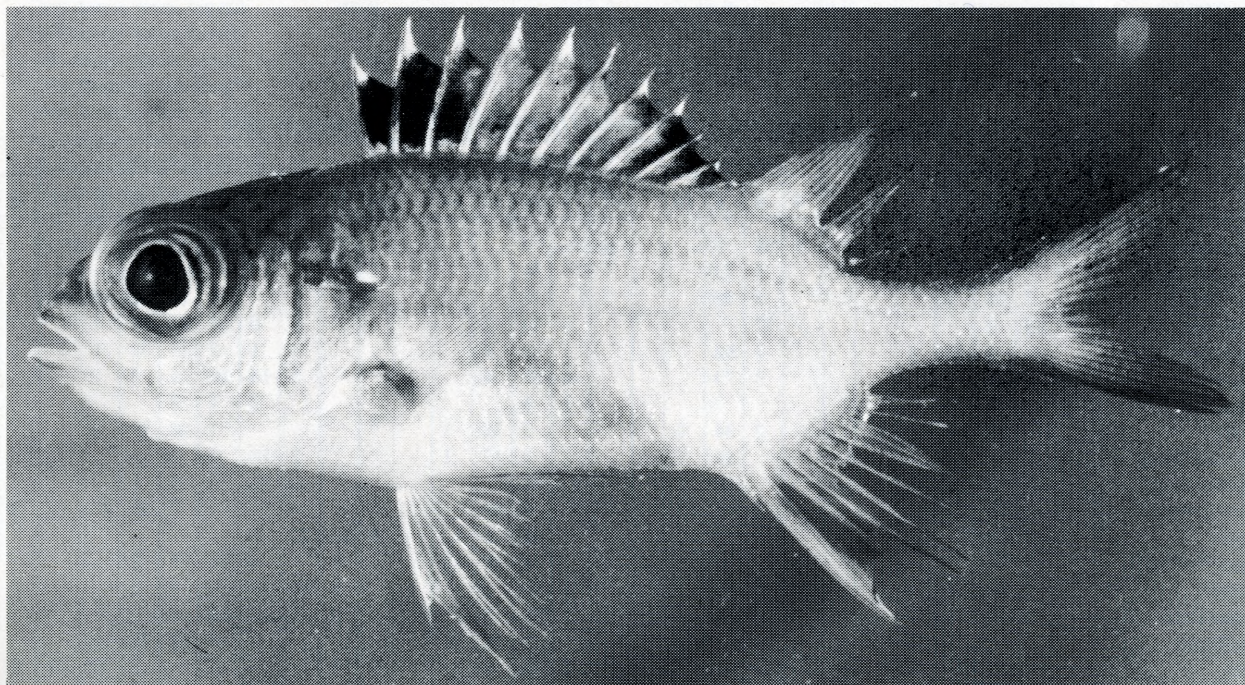


Figure 12. Juvenile of *Sargocentron tie-reoides*, ROM 40373, 37.5 mm.

middle dorsal-fin spines 2½; cheek scales in 4 or 5 oblique rows; gill-rakers 6-8 + 12-13; body deep, the depth 2.3-2.6 in SL; head length 2.6-3.0 in SL; dorsal profile of head slightly convex; anterior end of nasal bone with 2 short diverging spines; medioposterior edge of nasal bones without spinules (minute spinule present on each side of RUSI 7819, 206 mm SL); anterior and posterior margins of nasal fossa with 1-3 spinules (rarely absent on posterior margin); preopercular spine subequal to orbit diameter; longest dorsal spine 2.4-2.8 in HL; membranes of spinous portion of dorsal fin not incised; third anal spine 1.6-2.0 in HL.

Colour in life: body brownish to purplish red, each scale with a vertical silvery white line; a triangular red spot above base of pectoral fin; head primarily red, the membrane along dorsoposterior edge of opercle blackish. Spinous portion of dorsal fin light red, the membrane tips white, with a submarginal scarlet line; remaining fins pale red, the membranes of spinous portion of anal fin and upper and lower edges of caudal fin bright red.

Largest specimen examined, BPBM 7551, 208 mm, from Fanning Island, Line Islands.

REMARKS: A specimen of *S. violaceum* in the Rijksmuseum van Natuurlijke Historie in Leiden (RMNH 5432, 99 mm SL, 124 mm TL) is probably the holotype. Bleeker gave the total length of his type as 125 mm.

This species is widespread in the Indo-Pacific region. Fowler (1928) reported specimens from Tahiti, Solomon Islands, and Samoa and cited earlier references to records from New Guinea and Fiji. Weber and de Beaufort (1929) added further Indonesian records and North Australia. Montilla (1938) reported specimens from Philippine localities. Schultz (1943) obtained a specimen from Canton, Phoenix Islands. Randall (1955) collected 2 from Onotoa, Gilbert Islands and noted that they were from

coral-rich areas. Burgess and Axelrod (1975) published colour photos of fresh specimens from the Solomon Islands and an underwater photo taken by Allan Power in the New Hebrides. Shimizu and Yamakawa (1979) added records from the Marshall Islands and Palau Islands (Belau), and Cheng and Yang (1979) from the Paracel Islands, South China Sea. The only Indian Ocean records appear to be those of Smith (1955) from Aldabra, Smith and Smith (1963) from the Seychelles and Jones and Kumaran (1980) from the Laccadive Archipelago (Lakshadweep).

We have examined one specimen of *S. violaceum* (RUSI 13240, 167 mm SL) collected at Tekomaji Island off the coast of northern Mozambique by J.L.B. and M.M. Smith, 3 lots from the Royal Ontario Museum taken in the Chagos Archipelago, and 5 lots at the Field Museum of Natural History collected in the Maldiv Islands; thus the species appears to be widespread in the Indian Ocean, at least in insular regions. This species apparently does not occur in the Red Sea.

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David Voorvelt has drawn most of the figures. We thank A.R. Emery and R. Winterbottom for allowing us to use their colour slides for this paper.

Table 1: Frequency Distributions of Meristic Data for Species of Holocentrinae.

	Dorsal fin rays						Anal fin rays				Pectoral fin rays					Total gill-rakers										
	11	12	13	14	15	16	7	8	9	10	12	13	14	15	16	14	15	16	17	18	19	20	21	22	23	24
<i>N. argenteus</i>	3	40	1				3	39	2		1	41	2			1	2	4	24	10	3					
<i>N. aurolineatus</i>		1	26	1				5	23			1	26	1			1		7	14	4	2				
<i>N. opercularis</i>		2	24	1				5	22				27						4	8	12	2	1			
<i>N. sammara</i>	1	53	3					57				5	50	2				4	6	23	21	2	1			
<i>S. caudimaculatum</i>			5	57	1			1	62			1	58	4				1	1	8	15	32	6			
<i>S. diadema</i>		2	67	7				3	73			4	67	4				1	15	29	25	3	2			
<i>S. inaequalis</i>			7						7			1	6						2	3	2					
<i>S. ittodai</i>			34	4				2	34	2			3	32	3					2	20	10	6			
<i>S. macrosquamis</i>			17	3					19	1			2	17	1			2	10	8						
<i>S. melanospilos</i>		2	17	1					19	1			20					2	10	6	1	1				
<i>S. microstoma</i>		1	41	5					46	1			6	41							7	21	17	1	1	
<i>S. prasin</i>		3	53					1	55			1	50	5		8	21	22	5							
<i>S. punctatissimum</i>		4	52						56				5	49	2				4	24	25	3				
<i>S. rubrum</i>		7	46	3				5	50	1		1	50	5			1	11	19	19	4	2				
<i>S. seychellense</i>		2	53	1				1	54	1		1	53	2			2	7	17	24	6					
<i>S. spiniferum</i>				1	39	4			1	43			2	41	1				5	14	22	3				
<i>S. tiere</i>			2	43	2				47			2	42	3							3	11	24	8	1	
<i>S. tiereoides</i>		2	31	4					36	1		6	31						1	5	18	12	1			
<i>S. violaceum</i>		1	2	45					48			1	47					1	3	16	19	9				

Table 2: Frequency Distributions of Lateral-line Scales for Species of Holocentrinae.

	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55
<i>N. argenteus</i>						1	9	20	10	3	1												
<i>N. aurolineatus</i>										1	6	11	4	5	1								
<i>N. opercularis</i>				1	2	8	9	6	1														
<i>N. sammara</i>						2	11	17	21	5	1												
<i>S. caudimaculatum</i>						1	5	25	19	11	2												
<i>S. diadema</i>												5	9	28	24	7	2						
<i>S. inaequalis</i>						2	3	1	1														
<i>S. ittodai</i>																							
Japan, Taiwan																3	4	3					
Other localities											1	7	10	6	4								
<i>S. macrosquamis</i>								2	2	1	8	6	1										
<i>S. melanospilos</i>	1	10	6	3																			
<i>S. microstoma</i>																	1	8	14	14	4	4	1
<i>S. praslin</i>	3	31	19	3																			1
<i>S. punctatissimum</i>									1	3	12	19	12	8	1								
<i>S. rubrum</i>		8	17	21	8	1																	
<i>S. seychellense</i>			6	18	22	7	3																
<i>S. spiniferum</i>									4	7	9	16	7	1									
<i>S. tiere</i>														6	9	11	15	4	1	1			
<i>S. tiereoides</i>							1	12	13	9		2											
<i>S. violaceum</i>	1	9	20	15	3																		

Table 3: Measurements of Type-Specimens of *Sargocentron inaequalis* in Percentage of Standard Length.

	Holotype	Paratypes					
	ROM 40371	CAS 35031	RUSI 19250	CAS 35471	BPBM 29392	RUSI 19251	BPBM 29392
Standard length (mm)	72 mm	70 mm	71 mm	72 mm	73.5 mm	75 mm	76 mm
Body depth	37.0	37.7	37.3	38.5	38.4	40.3	37.9
Head length	38.8	38.4	40.0	39.3	39.0	39.6	39.5
Snout length	8.0	7.7	8.0	8.6	8.7	8.8	8.6
Orbit diameter	13.8	13.6	13.7	14.2	12.9	12.9	13.7
Interorbital width	8.0	7.6	6.6	7.9	7.3	7.1	7.9
Upper jaw length	14.9	14.4	14.4	14.6	14.8	14.3	13.9
Lower jaw length	18.1	17.7	18.3	18.5	18.2	17.6	18.2
Preopercular spine length	8.1	8.6	7.9	8.3	7.0	7.3	8.2
Caudal peduncle depth	10.8	10.0	10.1	10.8	10.2	10.4	10.1
1st dorsal spine length	11.4	13	12.1	14.0	10.9	8.4	9.2
2nd dorsal spine length	16.8	17.3	16.9	19.0	15.8	13.9	broken
3rd dorsal spine length	18.4	19	19.3	21.1	17.7	15.7	16.4
4th dorsal spine length	18.4	20.1	20.1	20.8	18.8	18.4	18.2
10th dorsal spine length	5.8	6.9	6.9	6.8	6.8	6.4	7.9
11th dorsal spine length	3.0	3.1	4.1	3.0	2.4	2.7	3.0
Longest dorsal ray length	18.5	16.6	18.3	18.1	17.6	17.3	17.1
2nd anal spine length	7.7	7.7	7.5	7.1	6.8	6.8	7.0
3rd anal spine length	23.2	23.9	23.5	24.6	22.5	21.3	20.7
4th anal spine length	14.6	15.7	15.9	16.7	14.7	14.7	13.8
Pectoral fin length	23.4	22.6	22.5	23.6	23.1	22.7	23.3
Pelvic spine length	18.5	17.9	18.5	17.9	17.3	17.3	16.4
Pelvic fin length	26.5	25.7	25.4	26.0	25.7	25.3	25.0

MATERIAL EXAMINED

- Neoniphon argenteus* – **MOZAMBIQUE**: RUSI 17690 (95 mm); RUSI 17691 (4, 91-113 mm). **ALDABRA**: RUSI 17692 (116 mm). **SEYCHELLES**: RUSI 17693 (2, 169-185 mm). **CHAGOS ARCHIPELAGO**: ROM 41633 (124 mm); ROM 41634 (79 mm); ROM 41635 (10, 89-118 mm). **MENTAWAI ISLANDS, SUMATRA**: FMNH 86915 (2, 125-127.5 mm). **AMBON**: BM(NH) 1858.4.21 (101 mm) – syntype of *Holocentrum laeue* Günther. **SOLOMON ISLANDS**: FMNH 17923 (2, 113-146 mm). **VANUATU (NEW HEBRIDES)**: BPBM 1006 (131 mm); BPBM 1008 (95 mm). **GILBERT ISLANDS (KIRIBATI)**: BPBM 15115 (132 mm). **MARSHALL ISLANDS**: BPBM 6332 (7, 112-140 mm); BPBM 8050 (102.5 mm). **LINE ISLANDS**: BPBM 11229 (2, 129-160 mm). **COOK ISLANDS**: FMNH 16214 (173 mm). **SOCIETY ISLANDS**: BPBM 10279 (2, 139-140 mm). **TUAMOTU ARCHIPELAGO**: BPBM 10247 (138 mm); BPBM 25217 (2, 98-107 mm).
- Neoniphon aurolineatus* – **RÉUNION**: BPBM 20027 (177 mm). **SULAWESI (CELEBES)**: BPBM 26604 (158 mm). **AMBON**: BPBM 19331 (2, 148-164 mm). **SAMOA ISLANDS**: BPBM 28182 (64 mm). **HAWAIIAN ISLANDS**: ANSP 86437 (149 mm); BPBM 415 (148 mm); BPBM 603 (174 mm); BPBM 1691 (150 mm); BPBM 1831 (173 mm); BPBM 3741 (154 mm); BPBM 3745 (157 mm); BPBM 3746 (2, 112-164 mm); BPBM 6461 (6, 107-159 mm); BPBM 15104 (174 mm); BPBM 21044 (122 mm); BPBM 24925 (132 mm); FMNH 3967 (172 mm) – paratype of *Flammeo scythrops* Jordan and Evermann; MCZ 28893 (177 mm) – paratype of *F. scythrops*. **MARQUESAS ISLANDS**: BPBM 11876 (2, 101-105 mm); BPBM 11884 (93 mm).
- Neoniphon opercularis* – **MOZAMBIQUE**: RUSI 7328 (177 mm); RUSI 13268 (91 mm). **KENYA**: RUSI 7321 (204 mm). **ZANZIBAR**: RUSI 7327 (77 mm). **SEYCHELLES**: RUSI 7381 (188 mm). **CHAGOS ARCHIPELAGO**: ROM 41636-42 (7, 88-223 mm). **MALDIVES ISLANDS**: FMNH 73817 (153 mm); FMNH 73818 (2, 156-206 mm). **SAMOA ISLANDS**: BPBM 5148 (102 mm); BPBM 6041 (178 mm); BPBM 27943 (2, 140-184 mm). **COOK ISLANDS**: BPBM 5687 (175 mm). **SOCIETY ISLANDS**: BPBM 2456 (210 mm). **TUAMOTU ARCHIPELAGO**: BPBM 10108 (165 mm); BPBM 10230 (2, 87-146 mm). **MARSHALL ISLANDS**: BPBM 6080 (197 mm); BPBM 29029 (190 mm). **WAKE ISLAND**: BPBM 3752 (206 mm). No data: RUSI 7329 (204 mm).
- Neoniphon sammara* – **RED SEA**: BPBM 18202 (28 mm); MCZ 3671 (2, 135-150 mm); USNM 259029 (7, 79-105 mm). **GULF OF ADEN**: FMNH 86881 (3, 86-118 mm). **ZANZIBAR**: RUSI 17678 (2, 47.7-55 mm). **KENYA**: RUSI 17674 (3, 85-164 mm); RUSI 17686 (2, 126-160 mm). **MOZAMBIQUE**: RUSI 13275 (48 mm); RUSI 17675 (102 mm); RUSI 17676 (3, 64-76 mm); RUSI 17677 (75 mm); RUSI 17688 (8, 34-157 mm); RUSI 17689 (2, 98-128 mm); RUSI 13269 (3, 43.5-68 mm). **ALDABRA**: RUSI 17687 (20 mm); USNM 259028 (2, 124-146 mm). **SEYCHELLES**: FMNH 86748 (4, 142-159 mm); RUSI 17679 (81 mm). **MAURITIUS**: MCZ 6037 (4, 175-188 mm); RUSI 74-310 (62 mm); RUSI 74-312 (3, 35-37 mm). **MALDIVES ISLANDS**: FMNH 86871 (2, 136-143 mm). **HAWAIIAN ISLANDS**: BPBM 7970 (149 mm).
- Sargocentron caudimaculatum* – **RED SEA**: BPBM 20422 (3, 162-168 mm); BPBM 19751 (2, 33-35 mm); USNM 239471 (2, 65-163 mm). **KENYA**: RUSI 13239 (4, 97-156 mm). **TANZANIA**: BPBM 17634 (167 mm). **MOZAMBIQUE**: RUSI 76-10 (2, 124-175 mm); RUSI 13235 (88 mm); RUSI 13236 (131 mm); RUSI 17644 (2, 93-97 mm); RUSI 17650 (174 mm). **SOUTH AFRICA**: RUSI 9076 (5, 77.3-172 mm); RUSI 9468 (2, 64.6-76 mm); RUSI 9745 (2, 166-204 mm); RUSI 9772 (2, 77-182 mm); RUSI 9907 (211 mm); RUSI 9970 (2, 153-166 mm); RUSI 10063 (3, 79.5-181 mm); RUSI 16018 (6, 108-199 mm). **ALDABRA**: MNHN 54-146 (2, 127-144 mm); USNM 259026 (5, 55-179 mm). **COMORO ISLANDS**: CAS 33222 (89 mm); FMNH 86815 (2, 121-133 mm). **AGALEGA ISLANDS**: USNM 259026 (186 mm). **ST. BRANDON'S SHOALS**: USNM 259071 (3, 143-167 mm). **MAURITIUS**: MCZ 3668 (2, 143-148 mm). **CHAGOS ARCHIPELAGO**: USNM 259125 (134 mm). **MALDIVES ISLANDS**: FMNH 73800 (2, 92-118 mm). **SR LANKA**: FMNH 58942 (189 mm). **PHILIPPINES**: USNM 259011 (124 mm). **BALI**: BPBM 27992 (140 mm). **BELAU (PALAU ISLANDS)**: BPBM 6539 (5, 103-117 mm). **MARSHALL ISLANDS**: BPBM 28768 (98 mm). **SOCIETY ISLANDS**: BPBM 1395 (162 mm) – holotype of *Holocentrus rubellio* Seale.
- Sargocentron diadema* – **RED SEA**: MCZ 3667 (3, 112-122 mm); RUSI 17670 (2, 39-117 mm); USNM 259341 (21, 39-121 mm). **KENYA**: FMNH 86807 (104 mm). **MOZAMBIQUE**: RUSI 74-90 (2, 92-96 mm); RUSI 7309 (3, 83-109 mm); RUSI 13237 (152 mm); RUSI 13260 (2, 56.5-65 mm); RUSI 13278 (56.6 mm). **SOUTH AFRICA**: RUSI 8850 (97.4 mm); RUSI 9106 (96.9 mm); RUSI 9208 (60.3 mm); RUSI 9973 (15, 78-134 mm); RUSI 10015 (4, 92.7-138 mm). **MADAGASCAR**: FMNH 86802 (2, 91-95 mm). **COMORO ISLANDS**: CAS 35032 (55 mm). **FARQUHAR ISLANDS**: FMNH 86838 (4, 73-85 mm). **MAURITIUS**: BPBM 21781 (58 mm); FMNH 86925 (92 mm); MCZ 6038 (3, 117-125 mm); RUSI 74-310 (2, 49-55 mm). **ST. BRANDON'S SHOALS**: USNM 259039 (2, 79-90 mm); USNM 259068 (25, 47-108 mm). **CHAGOS ARCHIPELAGO**: USNM 259027 (6, 57-99 mm); ROM 41374 (18, 54.2-94.5 mm). **MALDIVES ISLANDS**: CAS 35348 (5, 87-96 mm); FMNH 73810 (100 mm).
- Sargocentron inaequalis* – see listing of type material in species account.
- Sargocentron ittodai* – **RED SEA**: BPBM 13380 (69 mm); BPBM 18163 (4, 81-98 mm). **SOUTH AFRICA**: RUSI 9282 (98 mm). **SEYCHELLES**: RUSI 19252 (92 mm). **COMORO ISLANDS**: CAS 33387 (95 mm). **RÉUNION**: BPBM 20026 (140 mm); BPBM 20063 (3, 101-127 mm). **MAURITIUS**: BPBM 20227 (111 mm); BPBM 21782 (8, 93-132 mm); RUSI 7345 (99 mm). **GREAT BARRIER REEF**: AMS I.22632-001 (99 mm). **SOLOMON ISLANDS**: BPBM 16070 (62 mm). **CAROLINE ISLANDS**: BPBM 24878 (2, 77-86 mm). **TAIWAN**: BPBM 23376 (3, 121-152 mm); USNM 146021 (142 mm). **RYUKYU ISLANDS**: SU 7746 (102 mm) – holotype of *Holocentrus ittodai* Jordan & Fowler; BPBM 7258 (3, 109-128 mm). **IZU ISLANDS, JAPAN**: BPBM 19004 (123 mm); BPBM 22892 (2, 158.5-161 mm). **MARQUESAS ISLANDS**: BPBM 12635 (2, 112-114 mm).
- Sargocentron macrosquamis* – **RED SEA**: TAU 7830 (47 mm) – paratype of *Sargocentron macrosquamis* Golani. **KENYA**: RUSI 13277 (63 mm). **ZANZIBAR**: RUSI 13258 (4, 63-73 mm). **MOZAMBIQUE**: BPBM 29364 (3, 63-69); BM(NH) 1983.10.12.1 (65 mm); RUSI 13257 (2, 59-63 mm); RUSI 13234 (4, 58-71 mm); RUSI 13259 (58 mm); RUSI 17682 (2, 64-69 mm); RUSI 19259 (63 mm). **AMIRANTES, SEYCHELLES**: FMNH 86961 (60 mm) – holotype of *S. macrosquamis*; FMNH 86770 (66 mm). **MAURITIUS**: FMNH 86734 (57 mm). **CHAGOS ARCHIPELAGO**: ROM 41400 (65 mm).
- Sargocentron melanospilos* – **RED SEA**: BPBM 19761 (5, 104-123 mm). **ZANZIBAR**: RUSI 17915 (3, 113-169 mm). **ALDABRA**: RUSI 17685 (106 mm). **SEYCHELLES**: BPBM 21684 (170 mm); FMNH 86740 (2, 82-142 mm); RUSI 17684 (107 mm). **SOLOMON ISLANDS**: AMS I.17487-013 (106 mm). **VANUATU (NEW HEBRIDES)**: AMS I.17476-033 (103 mm). **GREAT BARRIER REEF**: AMS I.20583-005 (147 mm). **NEW CALEDONIA**: BPBM 11462 (3, 61-106 mm). **SAMOA ISLANDS**: BPBM 27764 (162 mm). **CAROLINE ISLANDS**: BPBM 24877 (173 mm). **MARSHALL ISLANDS**: BPBM 28788 (118 mm). **PHILIPPINES**: USNM 169345 (122 mm).
- Sargocentron microstoma* – **ASTOVE ISLAND, COSMOLEDO GROUP**: RUSI 17698 (150 mm). **CHAGOS ARCHIPELAGO**: ROM 41565-68 (4, 92-143 mm). **MALDIVES ISLANDS**: BPBM 18919 (3, 127-132 mm); FMNH 73783 (91.5 mm). **CHRISTMAS ISLAND (INDIAN OCEAN)**: AMS I.20442-002 (94 mm). **AMBON**: BM(NH) 1858.4.21.235 (137 mm) – syntype of *Holocentrum microstoma* Günther. **NINIGO ISLAND, NEW GUINEA**: USNM 259013 (104 mm); USNM 259015 (113 mm). **SOLOMON ISLANDS**: BPBM 5941 (2, 125-126 mm). **VANUATU (NEW HEBRIDES)**: BPBM 5689 (130 mm). **GREAT BARRIER REEF**: AMS I.20775-104 (135 mm). **FIJI**: USNM 259917 (3, 57.5-105 mm). **SAMOA ISLANDS**: BPBM 25600 (107 mm); BPBM 25604 (3, 57-59 mm). **PHOENIX ISLANDS**: BPBM 15111 (7, 110-142 mm). **LINE ISLANDS**: BPBM 14116 (134 mm). **COOK ISLANDS**: BPBM 5692 (6, 82-88 mm); ROM 38099 (107 mm). **SOCIETY ISLANDS**: BPBM 1528 (159 mm); BPBM 6035 (6, 116-124 mm). **WAKE ISLAND**: CAS uncat. (148 mm). **NO LOCALITY**: BM(NH) unregistered (112 mm), from old collection – syntype of *Holocentrum microstoma* Günther.
- Sargocentron praslin* – **KENYA**: RUSI 9281 (90.5 mm); RUSI 9282 (206 mm); RUSI 17655 (182 mm). **MOZAMBIQUE**: RUSI 3852 (84.5 mm); RUSI 5834 (150 mm); RUSI 9260 (101 mm); RUSI 17651 (80 mm); RUSI 17652 (79 mm); RUSI 17653 (5, 62-76 mm); RUSI 17654 (163 mm). **INDIAN OCEAN**: MNHN 4047 (43.5 mm) – holotype of *Holocentrum marginatum* Cuvier. **COMORO ISLANDS**: FMNH 86741 (89 mm). **CHESTERFIELD ISLANDS, MADAGASCAR**: FMNH 79501 (7, 138-151 mm). **ALDABRA**: RUSI 7314 (66 mm). **SUMATRA**: USNM 87973 (140 mm). **BALI**: BPBM 20887 (86 mm). **NINIGO ISLANDS**,

- NEW GUINEA:** USNM 259008 (5, 34-82 mm). **SOLOMON ISLANDS:** BPBM 5944 (72 mm); BPBM 16127 (129 mm); BPBM 29203 (135 mm) – neotype of *S. praslin*. **PALAU ISLANDS:** FMNH 47238 (3, 52-114 mm). **VANUATU (NEW HEBRIDES):** BPBM 1005 (55 mm). **FIJI:** BPBM 5913 (4, 104-158 mm); BPBM 5948 (23, 76-134 mm). **SAMOA ISLANDS:** BPBM 5156 (82 mm); BPBM 6158 (113 mm). **SOCIETY ISLANDS:** CAS uncat. (147 mm). **CAROLINE ISLANDS:** USNM 231660 (66 mm). **MARIANA ISLANDS:** BPBM 8523 (3, 152-171 mm); USNM 14336 (13, 39-163 mm). **RYUKYU ISLANDS:** BPBM 19206 (2, 85-98 mm).
- Sargocentron punctatissimum* – **RED SEA:** BPBM 18347 (41 mm); BPBM 19729 (78 mm); BM(NH) 1871.7.15.32 (100 mm); USNM 191690 (83 mm); USNM 259116 (2, 45-48 mm). **INDIAN OCEAN:** MNHN 2634 (43.5 mm) – lectotype of *Holocentrum lacteo-guttatum* Cuvier. **MOZAMBIQUE:** RUSI 5832 (2, 105.5-117 mm); RUSI 13823 (138 mm). **SOUTH AFRICA:** BPBM 21773 (4, 62-66 mm); RUSI 76-21 (5, 106.4-119.2 mm); RUSI 77-20 (16, 56-73.2 mm); RUSI 17657 (127 mm). **COMORO ISLANDS:** CAS 33029 (2, 95-122 mm); CAS 33222 (11, 37-89 mm). **ALDABRA:** MNHN 54-124 (2, 53.2-58 mm). **ST. BRANDON'S SHOALS:** USNM 259037 (5, 99-122 mm); USNM 259038 (4, 125-131 mm). **MAURITIUS:** MCZ 3670 (3, 85-94 mm). **CHAGOS ARCHIPELAGO:** USNM 259030 (8, 63.5-110 mm). **CAROLINE ISLANDS:** MNHN 107 (54 mm) – lectotype of *Holocentrum punctatissimum* Cuvier. **SAMOA ISLANDS:** BM(NH) 1871.9.13.123 and 214 (2, 71-119 mm) – syntypes of *Holocentrum diploxiphus* Günther. **RAPA:** BPBM 13000 (2, 55-135 mm). **EASTER ISLAND:** BPBM 6601 (2, 76-80 mm).
- Sargocentron rubrum* – **RED SEA:** BPBM 20736 (2, 112.5-115 mm); BPBM 28183 (115.5 mm) – neotype of *S. rubrum*; USNM 259124 (95 mm); USNM 259337 (8, 108-124 mm). **LEBANON:** FMNH 77403 (125 mm); USNM 196325 (145 mm). **GULF OF ADEN:** FMNH 86803 (4, 83-100 mm). **GULF OF OMAN:** BPBM 21322 (187.5 mm); BPBM 21468 (102 mm). **SW INDIA:** BPBM 27664 (4, 38-66 mm); FMNH 73793 (3, 97-111 mm); FMNH 86865 (6, 63-83 mm); MNHN A.5516 (170 mm) – lectotype of *Holocentrum orientale*. **SRI LANKA:** FMNH 58943 (189 mm); USNM 259100 (140 mm); USNM 259101 (2, 87-116 mm); USNM 259102 (141 mm); USNM 259104 (124 mm); USNM 259107 (128 mm); USNM 259108 (183 mm); USNM 259109 (160 mm). **ANDAMAN SEA:** FMNH 79503 (214 mm); FMNH 86729 (2, 61-75 mm). **JAVA:** MNHN A.2629 (2, 146-147 mm). **SULAWESI (CELEBES):** BPBM 26734 (64 mm). **QUEENSLAND:** BPBM 6404 (116 mm); AMS IB.7419 (231 mm). **NEW CALEDONIA:** BPBM 11461 (2, 114-151 mm). **MALAYSIA:** BPBM 21912 (2, 79-86 mm). **JAPAN:** USNM 57779 (149 mm); USNM 75655 (147 mm).
- Sargocentron seychellense* – **SEYCHELLES:** BPBM 21576 (2, 124-136 mm); BPBM 21590 (8, 28-30 mm); BPBM 22935 (2, 109-128.5 mm); CAS 35354 (19, 47-146 mm); FMNH 86735 (101 mm); FMNH 86737 (5, 89.5-130 mm); FMNH 86739 (2, 102.5-130 mm); FMNH 86946 (6, 94.5-134 mm); FMNH 86968 (73 mm); RUSI 955 (9, 61.5-130.5); RUSI 994 (123 mm) – holotype of *Holocentrus seychellensis* Smith & Smith; RUSI 7313 (3, 41-65 mm); RUSI 7317 (53.5 mm); RUSI 7318 (59 mm); RUSI 17634 (47 mm); RUSI 17635 (47.5 mm); RUSI 17636 (70 mm); RUSI 17637 (4, 66-129 mm). **CHAGOS ARCHIPELAGO:** ROM uncat. (72 mm). **ST. BRANDON'S SHOALS:** RUSI 74-304 (70 mm); USNM 259031 (3, 60-99 mm); USNM 259039 (2, 110-152 mm); USNM 259070 (120 mm); USNM 259322 (135 mm). **MAURITIUS:** MCZ 5680 (149 mm); RUSI 1258 (212 mm). No data: RUSI 7316 (56 mm).
- Sargocentron spiniferum* – **MOZAMBIQUE:** RUSI 17680 (280 mm); RUSI 17681 (126 mm). **SOUTH AFRICA:** RUSI 10140 (337 mm). **CHESTERFIELD ISLANDS, MADAGASCAR:** FMNH 86730 (156 mm). **ALDABRA:** USNM 259033 (157 mm). **FARQUHAR ISLANDS:** FMNH 86785 (190 mm). **SEYCHELLES:** FMNH 86795 (6, 124-280 mm). **MAURITIUS:** RUSI 1249 (2, 129-153 mm); MCZ 5674 (195 mm); MCZ 5926 (230 mm). **ST. BRANDON'S SHOALS:** RUSI 74-303 (95.6 mm); USNM 259034 (3, 121-179 mm); USNM 259036 (135 mm); USNM 259072 (159 mm). **SULAWESI (CELEBES):** RMNH 29396 (39 mm) – lectotype of *Holocentrum melanopterus* Bleeker. **MARIANA ISLANDS:** BPBM 72 (104 mm). **SOLOMON ISLANDS:** BPBM 1248 (151 mm); BM(NH) 1871.3.29.2 (123 mm) – syntype of *Holocentrum unipunctatum* Günther. **VANUATU (NEW HEBRIDES):** BPBM 5658 (101 mm). **MARSHALL ISLANDS:** BPBM 6292 (5, 145-246 mm); RUSI 74-65 (2, 86-100 mm). **WAKE ISLAND:** BPBM 15375 (2, 66-106 mm). **SAMOA ISLANDS:** BPBM 25689 (2, 238-268 mm). **PHOENIX ISLANDS:** BPBM 15113 (163 mm). **LINE ISLANDS:** BPBM 14115 (140 mm). **HAWAIIAN ISLANDS:** BPBM 19902 (2, 355-360 mm). **MARQUESAS ISLANDS:** BPBM 10315 (2, 79-83 mm). **SOCIETY ISLANDS:** MNHN 9523 (232 mm) – lectotype of *Holocentrum leo* Cuvier. **PITCAIRN GROUP:** BPBM 17139 (325 mm).
- Sargocentron tiere* – **ALDABRA:** MNHN 54-146 (176 mm). **MAURITIUS:** MCZ 5673 (267 mm); MCZ 5925 (270 mm) – syntypes of *Holocentrum elongatum* Bliss; USNM 153565 (219 mm) – syntype of *H. elongatum* Bliss. **CHAGOS ARCHIPELAGO:** ROM 41360 (221 mm); ROM 41362 (176 mm); ROM 41369 (202 mm). **CHRISTMAS ISLAND (INDIAN OCEAN):** AMS I.20446-003 (168 mm). **GREAT BARRIER REEF:** AMS I.19455-002 (152 mm). **SOLOMON ISLANDS:** BM(NH) 1852.9.13.120 (159 mm) – syntype of *Holocentrum erythraeum* Günther. **VANUATU (NEW HEBRIDES):** AMS I.17473-015 (161 mm). **FIJI:** AMS I.18354-107 (192 mm). **CAROLINE ISLANDS:** USNM 224149 (2, 56-167 mm); BPBM 28265 (2, 48-100 mm); BPBM 28298 (43 mm). **MINAMI TORI SHIMA (MARCUS ISLAND):** BPBM 7036 (232 mm). **MARSHALL ISLANDS:** BPBM 6327 (157 mm); BPBM 8131 (8, 107-205 mm); BPBM 29031 (7, 99-195 mm). **KIRIBATI (GILBERT ISLANDS):** AMS I.18056-005 (166 mm). **HAWAIIAN ISLANDS:** USNM 52670 (235 mm). **COOK ISLANDS:** BPBM 13922 (73 mm). **SOCIETY ISLANDS:** BPBM 6311 (5, 128-153 mm); MNHN A.2628 (149 mm) – holotype of *Holocentrum tiere* Cuvier. **MARQUESAS ISLANDS:** BPBM 12411 (217 mm); BPBM 12817 (102 mm). **PITCAIRN GROUP:** BPBM 16659 (3, 181-198 mm).
- Sargocentron tiereoides* – **MOZAMBIQUE:** RUSI 17683 (80 mm). **COMORO ISLANDS:** FMNH 86814 (99 mm). **CHAGOS ARCHIPELAGO:** ROM 41366 (110 mm); ROM 40372-73 (2, 37.5-40 mm). **PHILIPPINES:** USNM 259011 (2, 106-109 mm); USNM 259326 (4, 78-128 mm). **SERAM, INDONESIA:** USNM 210045 (2, 107-113 mm). **NINIGO ISLANDS, NEW GUINEA:** USNM 259325 (2, 77.5-110 mm). **HERMIT ISLANDS, NEW GUINEA:** USNM 259017 (2, 110-117 mm); USNM 259122 (109 mm). **SOLOMON ISLANDS:** BPBM 16243 (2, 113-118 mm); BPBM 17373 (108 mm). **CAROLINE ISLANDS:** CAS 53603 (97 mm); USNM 224136 (110 mm). **MARIANA ISLANDS:** BPBM 7284 (122 mm); BPBM 8552 (2, 108-111 mm). **MARSHALL ISLANDS:** BPBM 8053 (97 mm). **FIJI:** BPBM 14565 (121 mm). **SAMOA ISLANDS:** BPBM 3703 (83 mm); BPBM 17489 (2, 81-88 mm). **SOCIETY ISLANDS:** BPBM 5898 (4, 40-85 mm); BPBM 5899 (2, 114-119 mm); BPBM 11557 (140 mm); MCZ 29499 (99 mm).
- Sargocentron violaceum* – **MOZAMBIQUE:** RUSI 7793 (133 mm); RUSI 13240 (167 mm). **SEYCHELLES:** RUSI 7819 (206 mm). **CHAGOS ARCHIPELAGO:** ROM 41545 (2, 81.5-134 mm); ROM 41546 (146 mm); ROM 41547 (125 mm). **MALDIVES ISLANDS:** FMNH 86738 (188 mm); FMNH 86742 (172 mm); FMNH 86754 (3, 89-123 mm); FMNH 86875 (4, 145-157 mm); FMNH 86878 (2, 113-136 mm). **PHILIPPINES:** USNM 259012 (135.5 mm). **HERMIT ISLANDS, NEW GUINEA:** USNM 259020 (4, 121-152 mm); USNM 259119 (135 mm). **NEW GUINEA:** AMS IB.1511 (133 mm); BPBM 6309 (3, 137-154 mm); USNM 259323 (162 mm). **TROBRIAND ISLANDS, NEW GUINEA:** AMS I.17097-016 (116 mm). **AMBON:** RMNH 5432 (101 mm) – holotype of *Holocentrum violaceum* Bleeker; BM(NH) 1880.4.21.16 (129 mm). **GREAT BARRIER REEF:** AMS I.19108-037 (154 mm); AMS I.19445-055 (181 mm); AMS I.19453-046 (185 mm). **BELAU (PALAU ISLANDS):** BPBM 6545 (160 mm). **CAROLINE ISLANDS:** BPBM 28215 (140 mm); USNM 223969 (85 mm). **MARSHALL ISLANDS:** BPBM 6325 (112 mm). **FIJI:** USNM 243359 (168 mm). **SAMOA ISLANDS:** AMS I.7265 (110 mm); AMS I.7934 (98 mm); AMS I.7935 (80 mm); AMS I.7956 (72.5 mm); BPBM 27942 (5, 106-132 mm).

REFERENCES

- ALLEN, G.R. & N.J. CROSS. 1983. A new species and two new records of squirrelfishes (Holocentridae) from the eastern Indian Ocean and Australia. *Rev. Franc. Aquariol.*, **10**(1): 5-8.
- ALLEN, G.R. & R.C. STEENE. 1979. The fishes of Christmas Island, Indian Ocean. *Austral. Natl. Parks Wildl. Serv. Spec. Publ.*, 2: 1-81.
- ARNOULT, J., M.L. BAUCHOT-BOUTIN & R. ROUX-ESTÈVE. 1958. Les poissons de l'île Aldabra. Campagne Océanographique de la *Calypso* (Mai-Juin 1954). *Ann. Inst. Océanogr.*, Paris N.S., 34: 47-90.
- BAISSAC, J. DE B. 1976. Poissons de mer des eaux de l'île Maurice. *Proc. Roy. Soc. Arts Sci. Mauritius*, **3** (2): 191-226.
- BAUCHOT, M.L. 1970. Catalogue critique des types de poissons du Muséum National d'Histoire Naturelle. *Pub. Divers. Mus. Natn. Hist. Nat.*, (24): 1-55.
- BEN-TUVIA, A. 1966. Red Sea fishes recently found in the Mediterranean. *Copeia*, 1966(2): 254-275.
- BLEEKER, P. 1853a. Diagnostische beschrijvingen van nieuwe of weinig bekende vischsoorten van Sumatra. Tiental V-X. *Natuurk. Tijdschr. Ned.-Indië*, **4**: 243-302.
- 1853b. Vierde bijdrage tot de kennis der ichthyologische fauna van Amboina. *Natuurk. Tijdschr. Ned.-Indië*, **5**: 317-352.
- 1858. Negende bijdrage tot de kennis der vischfauna van Amboina. *Acta Soc. Sci. Indo-Neerl.*, **3**: 1-6.
- 1873. Révision des especes indo-archipélagiques du genre *Holocentrum*. *Ned. Tijdschr. Dierk.*, **4**: 198-232.
- BLISS, R. 1883. Descriptions of new species of Mauritian fishes. *Trans. Roy. Soc. Mauritius*, **13**: 45-63.
- BRYAN, W.A. & A.W. HEERE. 1903. Annotated list of the Marcus Island fishes. *Occ. Pap. Bishop Mus.*, **2**(1): 126-139.
- BURGESS, W.E. & H.R. AXELROD. 1973. *Pacific Marine Fishes. Book 3. Fishes of Sri Lanka (Ceylon), the Maldives Islands and Mombasa*. T.F.H. Publications, Neptune City, N.J.; pp. 561-839.
- 1975. *Pacific Marine Fishes. Book 6. Fishes of Melanesia*. T.F.H. Publications, Neptune City, N.J. pp. 1387-1654.
- CASTELNAU, F. DE. 1875. Researches on the fishes of Australia. *Intercolonial Exhib. Essays*, 1875-6 (Melbourne), no. 2: 1-52.
- CHENG, C.T. & J.J. YANG. 1979. *The Fishes of the Islands in the South China Sea*. Science Press, Beijing; xxv + 613 pp.
- COPE, E.D. 1871. Contribution to the ichthyology of the Lesser Antilles. *Trans. Amer. Philos. Soc.* **14**: 445-483.
- CUVIER, G. & A. VALENCIENNES. 1829. *Histoire Naturelle des Poissons*, Vol. 3. F.G. Leurault, Paris; 500 pp.
- 1831. *Histoire Naturelle des Poissons*, Vol. 7. F.G. Leurault, Paris; 531 pp.
- DAY, F. 1870. On the fishes of the Andaman Islands. *Proc. Zool. Soc. London*: 677-705.
- 1875-1878. *The Fishes of India*, Vols. 1-2. B. Quaritch, London xx + 778 pp.
- FORSSKÅL, P. 1775. *Descriptiones animalium avium, amphibiorum, piscium, insectorum, vermium; quae in itinere orientali observavit* (ed. C. Neibuhr). Mölleri, Hauniae; 19 + xxxiv + 164 pp.
- FOURMANOIR, P. 1954. Ichthyologie et pêche aux Comores. *Mém. Inst. Sci. Madagascar*, sér. A, **9**: 187-238.
- 1957. Poissons téléostéens des eaux malgaches du Canal de Mozambique. *Mém. Inst. Sci. Madagascar*, sér. F, **1**: 1-316.
- FOURMANOIR, P. & P. GUÉZÉ. 1962. Les poissons de la Réunion. V. Famille des Bothidés, Soleidés, . . . Holocentridés, . . . Apogonidés. *ORSTOM, Inst. Rech. Sci. Madagascar, Océanog.* 1-14.
- FOURMANOIR, P. & P. LABOUTE. 1976. *Poissons de Nouvelle Calédonie et des Nouvelles Hébrides*. Les Éditions du Pacifique, Paapeete; 376 pp.
- FOWLER, H.W. 1904a. New, little known and typical berycoid fishes. *Proc. Acad. nat. Sci. Phila.*, **56**: 222-238.
- 1904b. A collection of fishes from Sumatra. *J. Acad. nat. Sci. Phila.*, ser. 2, **12**: 497-560.
- 1928. The fishes of Oceania. *Mem. B.P. Bishop Mus.*, (10): iii + 540 pp.
- 1944. Fishes obtained in the New Hebrides by Dr. Edward L. Jackson. *Proc. Acad. nat. Sci. Phila.*, **96**: 155-199.
- FRIZZELL, D.L. & C.K. LAMBER. 1961. New genera and species of myripristid fishes in the Gulf Coast Cenozoic, known from otoliths (Pisces, Beryciformes). *Univ. Missouri School Mines & Metallurgy (Tech. Ser.)*, *Bull.*, (100) 1-25.
- GILL, T. 1864. Catalogue of the fishes of lower California in Smithsonian Institution, collected by Mr. J. Xantus. *Proc. Acad. nat. Sci. Phila.*, (1863), **15**: 80-88.
- GOLANI, D. 1984. *Sargocentron macrosquamis*: a new squirrelfish from the Amirante Islands and the Red Sea (Holocentridae, Pisces). *Cybiurn* **8**(2): 39-43.
- GOSLINE, W.A. & V.E. BROCK. 1960. *Handbook of Hawaiian Fishes*. Univ. of Hawaii Press, Honolulu; 372 pp.
- GREENFIELD, D.W. 1974. A revision of the squirrelfish genus *Myripristis* Cuvier (Pisces: Holocentridae). *Nat. Hist. Mus. Los Angeles County, Sci. Bull.* (19): 1-54.
- GUDDER, E.W. 1929. Nicolas Pike and his unpublished paintings of the fishes of Mauritius, Western Indian Ocean, with an index to the fishes. *Bull. Amer. Mus. nat. Hist.*, **58**: 489-530.
- GÜNTHER, A. 1859. *Catalogue of the Acanthopterygian Fishes in the Collection of the British Museum*, 1: Taylor & Francis, London; xxxi + 524 pp.
- 1875. Andrew Garrett's Fische der Südsee, *J. Mus. Godeffroy*, **9**(4): 97-128.
- HAAS, G. & H. STEINITZ. 1947. Erythrean fishes on the Mediterranean coast of Palestine. *Nature*, London, **160**: 28.
- HECHT, T. 1982. On the enigmatic sagittal otoliths and the systematic position of the teleostean genera *Adioryx*, *Holocentrus* and *Flammeo* (Beryciformes: Holocentridae). *Israel J. Zool.*, **31**: 39-46.
- HUBBS, C.L. & K.F. LAGLER. 1947. *Fishes of the Great Lakes Region*. Univ. Michigan Press, Ann Arbor, 213 pp.
- JENKINS, O.P. 1903. Report on collections of fishes made in the Hawaiian Islands, with descriptions of new species. *Bull. U.S. Fish Comm.*, (22): 417-511.
- JONES, S. & M. KUMARAN. 1980. *Fishes of the Laccadive Archipelago*. Nature Conservation and Aquatic Sciences Service, Trivandrum, xii + 760 pp.
- JORDAN, D.S. & B.W. EVERMANN. 1898. The fishes of North and Middle America, Part III. *Bull. U.S. natl. Mus.*, **47**: i-xxiv + 2183-3136.
- 1903. Descriptions of new genera and species of fishes from the Hawaiian Islands. *Bull. U.S. Fish Comm.*, **22** (1902): 161-210.
- 1905. The aquatic resources of the Hawaiian Islands. Part I. – The shore fishes. *Bull. U.S. Fish Comm.*, **23** (1903): xxviii + 574 pp.
- JORDAN, D.S. & H.W. FOWLER. 1903. A review of the berycoid fishes of Japan. *Proc. U.S. natl. Mus.*, **26** (1306): 1-21.
- JORDAN, D.S. & A. SEALE. 1906. The fishes of Samoa. *Bull. Bur. Fish.*, **25**: 173-488.
- KENDALL, W.C. & E.L. GOLDSBOROUGH. 1911. Reports on the scientific results of the expedition to the tropical Pacific, . . . XIII. The shore fishes. *Mem. Mus. comp. Zool.*, **26**(7): 241-343.
- KLAUSEWITZ, W. & M.L. BAUCHOT. 1967. Remarques sur quelques types d'*Holocentrum* des collections du Muséum National d'Histoire Naturelle de Paris (Pisces, Beryciformes, Holocentridae). *Bull. Mus. natl. Hist. nat.*, sér. 2, **39**: 121-126.
- KLAUSEWITZ, W. & J.G. NIELSEN. 1965. On Forsskål's collection of fishes in the Zoological Museum of Copenhagen. *Skrift. Univ. zool. Mus. København*, **22**: 1-29.
- KLUNZINGER, C.B. 1870. Synopsis der Fische des Rothen Meeres. I. Percoiden-Mugiloiden. *Verh. Zool.-Bot. Ges.*, Wien, **20**: 669-834.
- KNER, R. 1864. Specielles Verzeichniss der Während der Reise der Kaiserlichen Fregatte "Novara" gesammelten Fische. *Sitzb. Akad. Wiss. Wien*, **49**(1): 481-486.
- KYUSHIN, K., K. AMAOKA, K. NAKAYA & H. IDA. 1977. *Fishes of Indian Ocean*. Japan Marine Fishery Resources Center, Tokyo; 392 pp.
- LACEPÈDE, B.G.E. 1801. *Histoire Naturelle des Poissons*, **3**: Chez Plassan, Paris; 558 pp.
- 1802. *Histoire naturelle des Poissons*, **4**: Chez Plassan, Paris; xlv + 728 pp.
- LIENARD, E. 1839. Poissons, pp. 31-34 in Bouton, Louis, *Dixième rapport annuel sur les travaux de la Société d'Histoire naturel de l'île Maurice*, Bull. S. Mauritius.
- LI, S., H. WANG & Y. WU. 1981. A systematic review and tentative hierarchy of the Chinese beryciform fishes. *Zool. Res. Academia Sinica* (Beijing), **4**(1): 65-70; (in Chinese).
- MARSHALL, T.C. 1964. *Fishes of the Great Barrier Reef*. Angus and Robertson, Sydney; 566 pp.
- MASUDA, H., C. ARAGA & T. YOSHINO. 1975. *Coastal Fishes of Southern Japan*. Tokai University Press, Tokyo; 382 pp.
- MATSUURA, K. & T. SHIMIZU. 1982. The squirrelfish genus *Adioryx*, a junior synonym of *Sargocentron*. *Jap. J. Ichthyol.*, **29**(1): 93-94.
- MONTILLA, J.R. 1938. A review of Philippine Holocentridae. *Philip. J. Sci.*, **67**(2): 207-227.
- MUNRO, I.S.R. 1955. *The Marine and Fresh Water Fishes of Ceylon*. Dept. External Affairs, Canberra; xvi + 351 pp.
- NELSON, E.M. 1955. The morphology of the swim bladder and auditory bulla in the Holocentridae. *Fieldiana: Zool.*, **37**: 121-130.
- NORMAN, J.R. 1957. *A Draft Synopsis of the Orders, Families and Genera of Recent Fishes and Fish-like Vertebrates*. British Museum (Natural History), London; 649 pp.
- PALMER, G. 1950. Additions to the fish fauna of Christmas Island, Indian Ocean. *Bull. Raffles Mus.*, **23**: 200-205.
- PLAYFAIR, R.L. & A.C.L.G. GÜNTHER. 1867. *The Fishes of Zanzibar*. John Van Voorst, London; xiv + 153 pp.
- POEY, F. 1860. Poissons de Cuba. *Mem. Hist. nat. Isla de Cuba* **2**(2): 117-220.

- RANDALL, J.E. 1955. Fishes of the Gilbert Islands. *Atoll Res. Bull.* (47): xi + 243 pp.
- 1972. The spotfin squirrelfish (*Flammeo sammara*). *Skin Diver*, 22(11): 50-51.
- 1973. Tahitian fish names and a preliminary checklist of the fishes of the Society Islands. *Occ. Pap. Bishop Mus.*, 24(11): 167-214.
- 1980. A survey of ciguatera at Enewetak and Bikini, Marshall Islands, with notes on the systematics and food habits of ciguatoxic fishes. *Fishery Bull.*, 78(2): 201-249.
- RANDALL, J.E., & P. GUÉZÉ. 1981. The holocentrid fishes of the genus *Myripristis* of the Red Sea, with clarification of the *murdjan* and *hexagonus* complexes. *Contr. Sci. Nat. Hist. Mus. Los Angeles County*, (334): 1-16.
- RANDALL, J.E., T. SHIMIZU & T. YAMAKAWA. 1982. A revision of the holocentrid fish genus *Ostichthys*, with descriptions of four new species and a related new genus. *Jap. J. Ichthyol.*, 29(1): 1-26.
- RÜPPELL, E. 1828-1830. *Atlas zu der Reise im nördlichen Afrika. Fische des rothen Meers*. Heinr. Ludw. Brönnner, Frankfurt am Main; 141 pp.
- 1835-1838. *Neue Wirbelthiere zu der Fauna von Abyssinien gehörig. Fische des rothen Meeres*. Siegmund Schmerber, Frankfurt am Main; 148 pp.
- SAUVAGE, H.E. 1891. *Histoire Physique, Naturelle et Politique de Madagascar*. 16. *Histoire Naturelle des Poissons*. L'Imprimerie Nationale, Paris; 543 pp.
- SCHULTZ, L.P. 1943. Fishes of the Phoenix and Samoan Islands. *Bull. U.S. natl. Mus.*, 180: x + 316 pp.
- SCHULTZ, L.P. & COLLABORATORS. 1953. Fishes of the Marshall and Marianas Islands. *Bull. U.S. natl. Mus.*, 202(1): xxxii + 685 pp.
- SEALE, A. 1901. Report of a mission to Guam. Part II. --Fishes. *Occ. Pap. Bishop Mus.*, 1: 61-128.
- 1906. Fishes of the South Pacific. *Occ. Pap. Bishop Mus.*, 4(1): 1-89.
- SHEN, S.-C., F.C.-C. LIU & C.-H. LEE. 1980. A revision on squirrelfishes (Holocentridae) from the adjacent waters of Taiwan, with the description of six new records. *Quart. Jour. Taiwan Mus.* 33(3, 4): 231-241.
- SHIMIZU, T. & T. YAMAKAWA. 1979. Review of the squirrelfishes (subfamily Holocentrinae: order Beryciformes) of Japan, with a description of a new species. *Jap. J. Ichthyol.*, 26(2): 109-147.
- SMITH, J.L.B. 1949, 1953, 1961. *The Sea Fishes of Southern Africa*. Central News Agency, Cape Town; xvi + 550 pp. plus Appendices 1953 and 1961.
- SMITH, J.L.B. 1951. Thirteen noteworthy additions to the South-East African marine fauna. *Ann. Mag. nat. Hist.*, ser. 12, 4: 49-66.
- 1955a. The fishes of Aldabra. – Part I. *Ann. Mag. nat. Hist.*, ser. 12, 8: 304-312.
- 1955b. New species and new records of fishes from Mozambique. Part I. *Mem. Mus. Dr. Alvaro de Castro*, (3): 1-27.
- 1958. New and rare fishes from South Africa. *S. Afr. J. Sci.*, 54(5): 123-129.
- 1963. New species and new records of fishes from the western Indian Ocean. *Ann. Mag. nat. Hist.*, ser. 13, 6: 33-37.
- 1964. Fishes collected by Dr. Th. Mortensen off the coast of South Africa in 1929, with an account of the genus *Cruriraja* Bigelow & Schroeder, 1954 in South Africa. *Vidensk. Medd. fra Dansk. naturh. Foren.*, 126: 283-300.
- SMITH, J.L.B. & M.M. SMITH. 1963. *The Fishes of Seychelles*. Dept. Ichthyology, Rhodes University, Grahamstown; 215 pp.
- SMITH, M.M. 1980. Marine fishes of Maputaland, pp. 164-187 in Bruton, M.N. and K.H. Cooper, *Studies on the Ecology of Maputaland*, Rhodes University, Grahamstown, and the Wildlife Society, Durban.
- STARKS, E.C. 1908. On a communication between the air-bladder and the ear in certain spiny-rayed fishes. *Science*, N.S., 28: 613-614.
- STEINDACHNER, F. 1902. Über zwei Fischarten aus dem Rothen Meere. *Anz. Akad. Wiss. Wien*, 39: 336-338.
- VASILIU, G.D. 1931. Beschreibung der Ceylon-Fische aus der Sammalung Plate. *Jena. Z. Natur.*, 65: 319-360.
- WEBER, M. & L.F. DE BEAUFORT. 1929. *The Fishes of the Indo-Australian Archipelago*, 5. E.J. Brill, Leiden; xiv + 458 pp.
- WHITLEY, G.P. 1933. Studies in ichthyology. No. 7. *Rec. Austral. Mus.*, 19(1): 60-112.
- WOODS, L.P. 1955. Western Atlantic species of the genus *Holocentrus*. *Fieldiana: Zool.*, 37: 91-119.
- WOODS, L.P., & P.M. SONODA. 1973. Order Berycomorphi (Beryciformes) in *Fishes of the Western North Atlantic*. *Mem. Sears Found. Mar. Res.*, 1(6): 263-396.
- ZEHREN, S.J. 1979. The comparative osteology and phylogeny of the Beryciformes (Pisces: Teleostei). *Evolutionary Monogr.*, 1: 1-389.

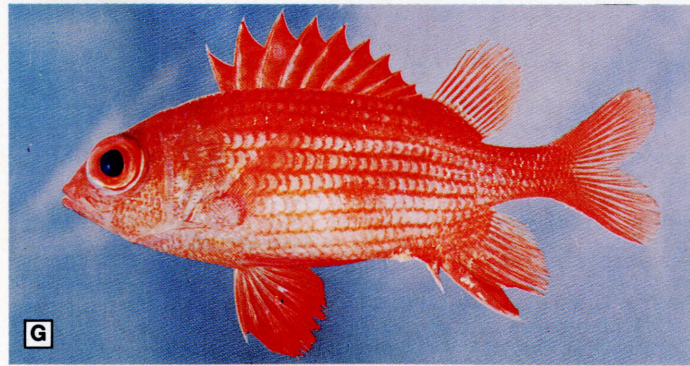
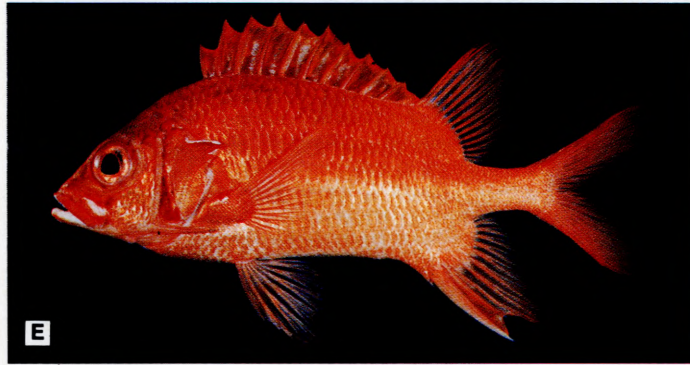
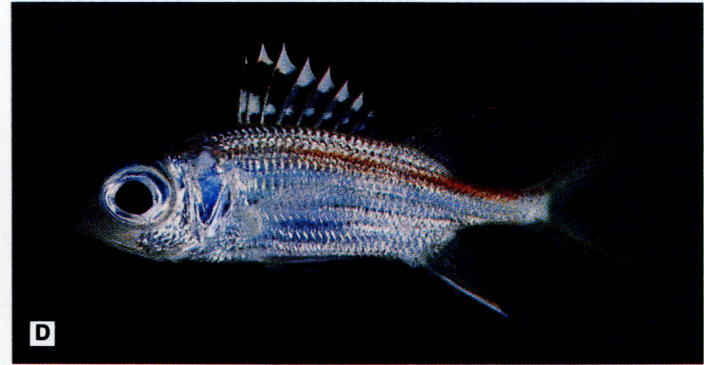


Plate 1. (A) *Neoniphon argenteus*, BPBM 6332, 129 mm, Marshall Ids.; (B) *N. aurolineatus*, BPBM 6461, 152 mm, Hawaiian Ids.; (C) *N. opercularis*, ROM 41636, 161 mm, Chagos Ids.; (D) *N. sammara*, ROM 41551, 49 mm, Chagos Ids.; (E) *Sargocentron caudimaculatum*, BPBM 20422, 174 mm, Red Sea; (F) *S. diadema*, BPBM 20070, 112 mm, Réunion; (G) *S. inaequalis*, holotype, ROM 40371, 72 mm, Chagos Ids.; (H) *S. ittodai*, BPBM 20063, 127 mm, Réunion; (I) *S. melanospilos*, BPBM 11462, 106 mm, New Caledonia; (J) *S. microstoma*, BPBM 18919, 132 mm, Maldives. Photographs by J.E. Randall, except (C, D & G) which are by A. Emery and R. Winterbottom.

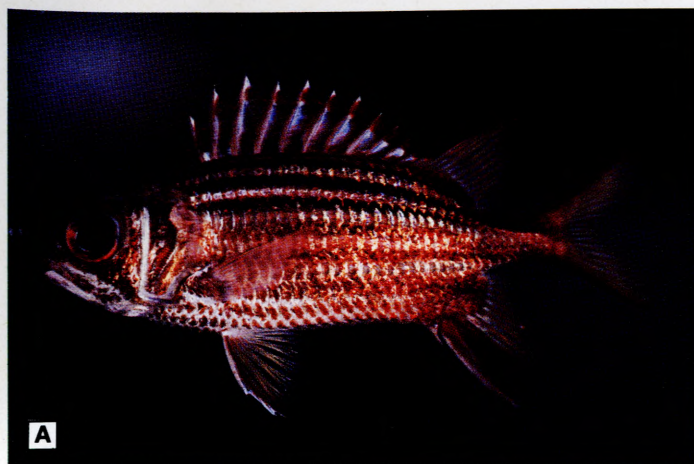


Plate 2. (A) *Sargocentron prasinum*, neotype, BPBM 29203, 135 mm, Savo, Solomon Ids.; (B) *S. punctatissimum*, ROM 41644, 93 mm, Chagos Ids.; (C) *S. rubrum*, neotype, BPBM 28183, 116 mm, Sudan, Red Sea; (D) *S. seychellense*, BPBM 21576, 142 mm, Seychelles; (E) *S. spiniferum*, RUSI 10140, 340 mm, South Africa; (F) *S. tierre*, ROM 41360, 222 mm, Chagos Ids.; (G) *S. tie-reoides*, ROM 41366, 110 mm, (H) *S. violaceum*, ROM 41545, 132 mm, Chagos Ids.. Photographs (A–D) by J.E. Randall, (E) by P.C. Heemstra and (F–H) by A. Emery and R. Winterbottom.