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A review of soles of the genus *Aseraggodes* from the South Pacific, with descriptions of seven new species and a diagnosis of *Synclidopus*.

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Abstract Randall, J.E. 2005. A review of soles of the genus *Aseraggodes* from the South Pacific, with descriptions of seven new species and a diagnosis of *Synclidopus*. *Memoirs of Museum Victoria* 62(2): 191–212

The soleid genus *Parachirus* Matsubara and Ochiai is referred to the synonymy of *Aseraggodes* Kaup. *Aseraggodes persimilis* (Günther) and *A. ocellatus* Weed are reclassified in the genus *Pardachirus* Günther. *Synclidopus macleayanus* (Ramsay) from Queensland and NSW is redescribed. A diagnosis is given for *Aseraggodes*, and a key and species accounts provided for the following 12 species of the genus from islands of Oceania in the South Pacific and the east coast of Australia: *A. auroculus*, sp. nov. from the Society Islands; *A. bahamondei* from Easter Island and Lord Howe Island; *A. cyclurus*, sp. nov. from the Society Islands; *A. lateralis*, sp. nov. from the Marquesas Islands; *A. lenisquamis*, sp. nov. from NSW; *A. magnoculus* sp. nov. from New Caledonia; *A. melanostictus* (Peters) from 73 m off Bougainville and a first record for the Great Barrier Reef from 115 m; *A. nigrocirratus*, sp. nov. from NSW; *A. normani* Chabanaud from southern Queensland and NSW; *A. pelvicus*, sp. nov. from the Great Barrier Reef; *A. ramsaii* (Ogilby) from Lord Howe Island, with a first record for New Caledonia; and *A. whitakeri* Woods as first records from the Caroline Islands, Coral Sea, New Caledonia, Fiji, American Samoa, Phoenix Islands, and Society Islands. Presumed hybrids of *A. lenisquamis* and *A. nigrocirratus* were found in two Australian Museum lots of specimens from NSW.

Keywords Taxonomy, soleid fishes, *Aseraggodes, Synclidopus macleayanus*

Introduction

With the advent of scuba diving and the use of the ichthyocide rotenone, ichthyologists have made major collections of shore fishes, particularly in the tropical and subtropical regions of the world. The coral reefs and adjacent habitats have yielded a multitude of new species of fishes. Taxonomic research tended to focus on the colourful species in well-known genera with ample material. Collections rarely resulted in more than one or two specimens of soles of any species of *Aseraggodes* Kaup. Small and usually not distinctly coloured, they have not received the scientific attention they require. As noted by Randall (1996), some specimens of *Aseraggodes* still remain on museum shelves identified only to genus or the family Soleidae.

Nevertheless, the genus *Aseraggodes* is second only to *Solea* in the number of species of the family Soleidae. Eschmeyer's *Catalog of Fishes* (updated to 14 January 2005 at web site www.calacademy.org/research/ichthyology/catalog/fishcatsearch.html) lists 26 Indo–Pacific species as valid for the genus and one, *A. herrei* Seale, from the Galápagos Islands. Of the 26 species of Eschmeyer's list, *A. filiger* Weber, with its slender body and filamentous first dorsal ray, should remain in the monotypic genus *Coryphillus* Chabanaud, 1932. *Aseraggodes persimilis* (Günther) from New Britain and *A. ocellatus* Weed from Sri Lanka, both described as having a pore at the base of most of the dorsal and anal rays, are here reclassified as synonyms of *Pardachirus pavoninus* (Lacepède). The species of *Aseraggodes* lack these distinctive externally visible pores.

Clark and George (1979) showed that basal dorsal- and anal-ray pores in species of *Pardachirus* are the release sites for a powerful toxin when these soles are threatened. Randall and Meléndez (1987) reported what seems to be a comparable skin toxin in *Aseraggodes bahamondei* at Easter Island. They found small pores beneath occasional scales toward the periphery of the body on the ocular side, which they believe elicit the toxin. Randall (2002) discovered that *A. therese* in the Hawaiian Islands is unpalatable to the jack *Caranx melampygus*. He did not examine specimens of *therese* for pores at that time, but after long searching and with the help of staining, these were later detected beneath a few scales on a large non-type specimen. Finding the pores on small specimens or old museum specimens is difficult. These pores were detected in this study only in *A. melanostictus* and one of the new species, but they are probably present in some other species as well.

Solea macleayana was described by Ramsay (1881) from NSW. Ogilby (1916) illustrated the species, described it more

fully, and reclassified it in *Aseraggodes*. He has been followed by subsequent authors. Chabanaud (1943), however, selected *Solea macleayana* as the type species of a new genus, *Synclidopus*, one of eight new soleid genera briefly described in the paper. The type species of *Synclidopus* is more fully described here.

The classification of the species *Aseraggodes* has been difficult because of the paucity of specimens, ontogenetic changes, variability in colour pattern (see Figs 3–5), and the broad range in the counts of dorsal rays, anal rays, and lateral-line scales. For example, Randall and Meléndez (1987) found a range of seven dorsal rays, eight anal rays, and 12 lateral-line scales for 27 specimens of *A. bahamondei*, and Randall, 2002 reported 29 specimens of *A. therese* with a range of eight dorsal rays, eight anal rays, and seven lateral-line scales. Nevertheless, the combination of these three counts will often be of diagnostic value to the species of the genus. The number of vertebrae also may vary within a species, though usually not more than two or three. Ochiai (1963) reported 34–37 vertebrae for 67 specimens of the Japanese species *A. kobensis* (Steindachner).

The species of *Aseraggodes* generally have a thin membranous ridge along the dorsal and anal rays, often disappearing on posterior rays, and many species have cirri along the edges of these ridges, especially on anterior rays. In old museum specimens or poorly preserved specimens, the ridges may not be apparent, and the cirri often cannot be detected. This limits the usefulness of these features as diagnostic characters.

Twelve species of *Aseraggodes* have been reported from eastern Australia and the islands of the Oceania. Peters (1877) described *A. melanostictu*s from a specimen collected in 73 m off Bougainville. Ogilby (1889) named *A. ramsaii* from one specimen from Lord Howe Island. Norman (1926) reported three specimens, 130–142 mm total length, from Queensland as *A. melanostictus*. Chabanaud (1930a) realized that these were not correctly identified and described a 135-mm one as a new species, *A. normani*. Schultz (1943) reported a small specimen of the genus from Hull Island in the Phoenix Islands. He wrote, "It may be a specimen of *Aseraggodes melanostictus* (Peters)." Woods in Schultz and collaborators (1966) described *A. whitakeri* and *A. smithi* as new species from the Marshall Islands. He identified a specimen from Kwajalein Atoll, Marshall Islands as *Aseraggodes melanostictus* "with uncertainty." Randall and Meléndez (1987) named *A. bahamondei* from Easter Island and Lord Howe Island. Randall (1996) described *A. borehami* and *A. therese*, and Randall (2002) added *A. holcomi*, all three from the Hawaiian Islands. Randall and Bartsch (2005) determined that the Marshall Islands specimen identified as *A. melanostictus* by Woods is a new species, *A. heraldi*, described *A. firmisquamis* from Palau, and reported *A. smithi* from Palau. The present paper provides the descriptions of seven new species of *Aseraggodes* from the South Pacific, as well as range extensions for *A. melanostictus, A. ramsaii*, and *A. whitakeri*.

Materials and methods. Type specimens of *Aseraggodes* have been variously deposited at the Australian Museum, Sydney (AMS); Natural History Museum, London (BMNH); Bishop Museum, Honolulu (BPBM); California Academy of Sciences, San Francisco (CAS); Museum Victoria, Melbourne (NMV); National Science Museum, Tokyo (NSMT); Royal Ontario Museum, Toronto (ROM); and US National Museum of Natural History, Washington, DC (USNM).

Standard length (SL) is measured horizontally from the front of the upper lip to the base of the caudal fin (end of hypural plate). Body depth is the maximum distance between the bases of the dorsal and anal fins. Body width is the maximum thickness midlaterally between the ocular and blind surfaces. Head length (HL) is measured from the front of the upper lip to a vertical at the posterior end of the operculum. Preorbital length is the distance from the front edge of the upper eye directly forward to the most anterior edge of the head. Snout length is taken from the front of the upper lip to the nearest edge of the upper eye. Eye diameter is the greatest diameter of the lower eye (the dark eyeball, not the surrounding cutaneous part). The interorbital width is the vertical distance between horizontal lines at the lower edge of the upper eye and upper edge of the lower eye (i.e. between the dark edges of the two eyes). Upper jaw length is measured on the blind side from the front of the upper lip to the rear edge of the maxilla (often too difficult to determine the posterior end of the maxilla on the ocular side). Caudal-peduncle depth is the least depth, or if the caudal peduncle is absent, the depth is measured at the base of the caudal fin. Caudal-peduncle length is the horizontal distance between verticals at the rear base of the anal fin and the base of the caudal fin at its ventral edge. Lengths of fin rays are measured from the ray base in a straight line to the tip. Caudal-fin and pelvic–fin measurements are the length of the longest ray.

Tables 1–3 provide the counts of the dorsal rays, anal rays, and lateral-line scales, respectively. Proportional measurements of the new species are given in Tables 4–11 as percentages of the standard length. Measurements (ratios related to SL, head length, or body depth) in the text are rounded to the nearest 0.05. Data in parentheses in the descriptions refer to paratypes.

Lateral-line scales are counted from the base of the caudal fin to the front of the straight part of the lateral line on the head (hence 5–15 scales anterior to the upper end of the gill opening). Scale counts above and below the lateral line are the maximum number of scales in an oblique row between the lateral line and the outer edge of the scaly sheath at the base of the dorsal and anal fins, respectively.

Vertebral counts for soles are often given in two parts, the abdominal vertebrae, followed by the caudal vertebrae. There are ten abdominal vertebrae in all the species of *Aseraggodes* examined (the count includes the very small first vertebra overlooked by some authors), so only the total count, which includes the urostyle, is given here. which includes the urostyle.

Ochiai (1963) used the count of the number of dorsal pterygiophores (he called these interneural spines) associated with the first three vertebrae (actually, four as he did not include the first very small vertebra) as a taxonomic character. He is followed in the use of this count.

Synclidopus Chabanaud, 1943

Synclidopus Chabanaud, 1943: 291.

Type species. Solea macleayana Ramsay, 1881.

Diagnosis. Dorsal rays 62–66; anal rays 49–53; caudal rays 18–20; pelvic rays 5, the fifth ray of ocular-side fin joined by membrane to base of first anal ray; lateral-line scales 96–113; lateral line extending forward on head to within an eye diameter of upper eye; a second lateral line branching off dorsally on head, about two eye diameters behind upper eye, angling sharply posteriorly about 8 scale rows beneath naked part of

dorsal fin, and continuing onto anterior body; body deep, the depth 2.2–2.25 in SL; head short and obtuse, its length 5.25–5.5 in SL; eyes small, 8.1–9.0 in HL; tubular anterior nostril short, not reaching lower eye when laid back; rays of median fins short; anus and genital papilla on blind side, adjacent to base of first anal ray; no pore at base of dorsal and anal rays, and no small pores detected beneath scales of ocular side; vertebrae 36–38; dorsal pterygiophores anterior to fourth neural spine 7; unique colour pattern of many narrow dark bars on ocular side of head and body.

Remarks. The type species of this monotypic genus was first described in *Solea* Cuvier. Other authors such as Ogilby (1916), Norman (1926), McCulloch (1929), Allen et al. (1976), and Grant (1987) classified it in *Aseraggodes* Kaup. It is clearly distinct at the generic level from *Aseraggodes* by having a second lateral line on the ocular side of the head that continues dorsoanteriorly on the body, the deepest body, shortest and most obtuse head, smallest eyes, anus and genital papilla on the blind side, highest number of lateral-line scales (96–113, compared to 53–96 for species of *Aseraggodes*), 7 dorsal pterygiophores anterior to fourth neural spine (species of *Aseraggodes* with 7–16; only one with 7 or 8), and the colour pattern of narrow dark bars. Ogilby (1916) reported the maximum size as 280 mm total length (largest species of *Aseraggodes*, 192 mm TL).

Synclidopus macleayanus (Ramsay, 1881)

Figure 1

Solea Macleayana Ramsay, 1881: 462.

Solea fluviatilis Ramsay, 1882: 111 (type locality, Hunter River, NSW).

Material examined. NSW: Port Jackson, AMS I.16278-01, 135 mm, syntype of *Solea macleayana*, Eight miles from North Head, Richmond River, R/V "Endeavour", BMNH 1925.7.22.72, 112 mm. Sydney, Hawkesbury River, Gentleman's Halt, AMS I.19951-003, 6: 72–105 mm. Off Sydney, 33°51'S, 151°18'E, 40–45 m, BPBM 39454, 149 mm. Lord Howe Island: AMS I.12664, 103 mm.

Type locality. Manly Beach, Port Jackson, NSW.

Remarks. Ramsay (1881) briefly described this species. He wrote, "A number were taken in the net at Manly Beach, September 11th, 1880, with *Solea microcephala*." Only one type specimen of *Solea macleayana* has been found, labeled as a syntype at the Australian Museum. A more detailed description of the species was provided by Ogilby (1916: 127, pl. 15) who had three specimens, 154–192 mm in total length. He described the colour as "Lavender grey, with from 32–36 narrow brown cross-bars, which are usually rather wider than the interspaces, and of which 6 or 7 are on the head and 1 or 2 on the base of the caudal fin; . . ." He placed *Solea fluviatilis* Ramsay, described from one 76-mm specimen from freshwater in Hunter River, in synonymy, adding that Ramsay was "possibly misled by the different character of the element in which it was found." Ogilby summarized the reproductive cycle. Adults spend the winter months in moderately deep water, gradually move to shallower water in spring. On reaching

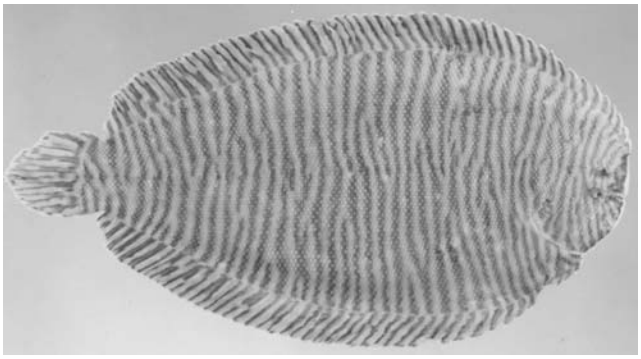

Figure 1. *Synclidopus macleayanus*, BPBM 39454, 149 mm SL, off Sydney, NSW.

maturity during summer months, they collect in the vicinity of river mouths, where they spawn. "The young fishes, as soon as the yolk-sac is absorbed, make their way into the estuaries and gradually work up these even to far beyond the limit of the tide, as we know from the Hunter River example . . ." Under the heading *Uses*, Ogilby wrote, "A delicious pan-fish, fully equal in flavor to its famous European relative, *Solea solea*."

Norman (1926) gave the distribution of this species as "Coasts of New South Wales and southern Queensland (from southern NSW to Caloundra)." Allen et al. (1976: 437) reported a specimen from Lord Howe Island.

Grant (1987) noted that this sole is adept at burrowing beneath the sand and "actually swims beneath the sand." He summarized the food habits as "shellfish and worms that live on and in the substrate."

Aseraggodes Kaup, 1858

Aseraggodes Kaup, 1858: 103.

Parachirus Matsubara and Ochiai 1963: 93 (type species, *Parachirus xenichus* Matsubara and Ochiai, 1963 opening by original designation and monotypy).

Type species. Aseraggodes guttulatus Kaup, 1858, by subsequent designation of Jordan and Evermann, 1898.

Diagnosis. Dorsal rays 58–79; anal rays 39–61; caudal rays typically 18 (usually 14–16 branched in adults); no pectoral fins; pelvic rays normally 5; lateral-line scales 39–96 (including those extending onto head); no gill rakers; abdominal vertebrae 10 (including the first vertebra, not counted by some authors, very narrow, the neural spine slender and short, not extending above cranium); total vertebrae 33–40; first two dorsal pterygiophores joined to a thicker bone (termed the erisma and counted as the first pterygiophore, though branched distally to support the first two dorsal rays), its origin between second neural spine and cranium, 7–16 dorsal pterygiophores anterior to fourth neural spine; body an elongate oval, the depth 2.0–2.8 in SL, and very thin; eyes on right side, elevated, separated by a narrow scaled space; upper eye in advance of lower eye (rarely directly above); caudal peduncle, if present, very short; scales small, ctenoid (except cycloid lateral-line scales); a straight lateral line midlaterally on both sides, with a short anterodorsal branch on blind side; no prominent pore at base of dorsal and anal rays; gill membranes united, free from isthmus,

the lower part of head scaled over from ocular to blind side; mouth ventral and small; jaws strongly curved; a band of villiform teeth on blind side of jaws; two nostrils on each side, the anterior nostril of ocular side tubular, but not longer than eye diameter; posterior nostril of ocular side a narrow opening in labial groove before lower eye; dorsal fin originating anteriorly on snout, the first ray not prolonged; caudal fin rounded to slightly pointed, not broadly connected by membrane to dorsal and anal fins; pelvic fins on ventral edge of body, close together anteriorly, adjacent or with ocular-side fin slightly anterior; anus anterior or ventroanterior to first anal ray. Sciatic part of urohyal forming an angle of about 60–85° to horizontal main part of bone.

Remarks. Kaup (1858: 103) briefly described *Aseraggodes guttulatus* as a new genus and species, but gave no locality for the holotype, as noted by Günther (1862: 477). Chabanaud (1930b) revised the 15 species of the genus then known. He mistakenly placed *A. kaianus* (Günther) in the synonymy of *A. guttulatus* and gave two localities, Kei Islands (Günther's type locality of *kaianus*) and the Maldive Islands. Desoutter et al. (2001) resolved the locality problem by finding the holotype in the Muséum National d'Histoire Naturelle (MNHN 1246, 79.0 mm SL). Kaup's original label indicated the specimen as the type and the collection locality as Bourbon (= Réunion).

Kaup wrote in his description of *Aseraggodes guttulatus* that the height of the body is half the total length. Günther (1862: 477) questioned this in a footnote. Martine Desoutter (pers. comm.) measured the height of the body of the holotype as 3.1 in total length. She confirmed Kaup's counts of the dorsal and anal rays as 64 and 42, respectively. She also provided the lateral-line scale count of 84 and an x-ray, which indicates a vertebral count of 34, and 14 dorsal pterygiophores before the fourth neural spine.

Matsubara and Ochiai (1963) described *Parachirus xenicus* as a new genus and species of sole from Japan. In a review of the Soleidae and Cynoglossidae of Japanese waters, Ochiai (1963) separated *Parachirus* from *Aseraggodes* by having the dorsal, anal, and pelvic fins slightly branched (as opposed to not branched in *Aseraggodes*), the tubular anterior nostril reaching the edge of the lower eye (not reaching in *Aseraggodes*), vertebrae 32–33, revised in this paper to 33–34 because the tiny first vertebra is now included in the vertebral count (vs 37–39 vertebrae in *Aseraggodes*), about 15 interneural spines (= dorsal pterygiophores) associated with the anterior 4 neural spines, and the pelvic fins attached by membrane to the genital papilla. In a generally favorable review of Ochiai's publication, Hubbs (1967) pointed out its limitation from dealing mainly with Japanese species. Chapleau (1989) made a study of the anterior dorsal pterygiophores, erisma, and neural spines of 41 species of 26 genera of soleid fishes. He recognized *Parachirus* as a valid genus; however, he included only four species of *Aseraggodes* in his study.

This study of *Aseraggodes* has shown that the dorsal, anal and pelvic fins may be simple or branched (the young of those with branched rays have unbranched rays); the tubular anterior nostril often reaches the edge of the lower eye; the vertebrae vary from 33 to 40; the dorsal pterygiophores anterior to the fourth neural spine vary from 7 to 15; and the pelvic fins may be attached by membrane to the genital papilla (as in *A. normani*). Therefore, *Parachirus* is a synonym of *Aseraggodes*.

Key to species of *Aseraggodes* of the South Pacific

1. Caudal peduncle present, though very short (7.2–10.8 in HL) 2
— No caudal peduncle (rear base of anal fin below or posterior to base of lowermost caudal ray) 5
2. Dorsal and anal rays short, the longest dorsal ray 1.9–2.15 in HL; dorsal and anal rays unbranched (young to adults); vertebrae 39–40; dorsal pterygiophores (including erisma) anterior to fourth neural spine 7–8; maximum size 156 mm SL (Easter Island and Lord Howe Island) .*A. bahamondei*
— Dorsal and anal rays not short, the longest dorsal ray 1.25–1.8 in HL; dorsal and anal rays of adults branched; vertebrae 36–38; dorsal pterygiophores anterior to fourth neural spine 13–15; largest specimen, 67.5 mm 3
3. Head large, its length 4.1–4.35 in SL; body slender, the depth 2.55–2.75 in SL; largest specimen, 43 mm SL (Micronesia and New Caledonia to Society Islands) . . . . . *A. whitakeri*
— Head not large, its length 4.45–4.75 in SL; body not slender, the depth 2.4–2.6 in SL; attains at least 63 mm SL 4
4. Longest dorsal ray 1.25 in HL; length of caudal fin 3.4 in SL; HL 4.75 in SL; pelvic fins long, 1.6 in HL; lateral-line scales 81; edge of membranous ridge of anterior dorsal rays with a row of small tubercle-like papillae, many ending in a tiny cirrus (one specimen, 67.5 mm SL, Swain Reefs, Great Barrier Reef) . . . . . *A. pelvicus*
— Longest dorsal ray 1.65–1.7 in HL; length of caudal fin 3.85–3.95 in SL; HL 4.45–4.5 in SL; pelvic fins not long, 2.3–2.35 in HL; lateral-line scales 86–88; edge of membranous ridge of anterior dorsal rays without a row of papillae or cirri (Lord Howe Island and New Caledonia) . . . . . *A. ramsaii*
5. Lateral line of ocular side with 3 branches on head; membrane from last rays of pelvic fins joined to genital papilla (NSW and southern Queensland) . . . . . .*A. normani*
— Lateral line of ocular side without branches on head; no membrane linking last ray of pelvic fins to genital papilla 6
6. Dorsal, anal, and pelvic rays unbranched; lateral-line scales 78–79 (2 specimens, 74–86.5 mm SL, Bougainville and Great Barrier Reef, 73–115 m) . . . . *A. melanostictus*
— Dorsal, anal, and pelvic rays of adults branched; lateral-line scales 61–73 7
7. Lateral-line scales 61–68; dorsal rays 62–70; anal rays 46–52; dorsal pterygiophores anterior to fourth neural spine 8–9 8
— Lateral-line scales 69–73; dorsal rays 67–77; anal rays 49–57; dorsal pterygiophores before fourth neural spine 10–12 9
8. Surface of scales smooth, the posterior edge somewhat pointed, with only the tips of cteni visible; snout length 2.45–2.5 in HL; caudal-peduncle depth 1.25–1.45 in HL;

caudal-fin length 4.6–5.05 in SL (NSW) . *A. lenisquamis*

— Surface of scales with texture, the posterior edge rounded, the cteni strongly projecting; snout length 2.8–3.0 in HL; caudal-peduncle depth 1.45–1.75 in HL; caudal-fin length 3.95–4.8 in SL (NSW) . . . . . *A. nigrocirratus*

9. Eye large, 3.95–4.2 in HL; caudal fin long, 3.9–3.95 in SL; longest dorsal ray 1.4 in HL (New Caledonia) . . . . . *A. magnoculus*

— Eye not as large, 4.55–7.0 in HL; caudal fin not long, 4.4–5.3 in SL; longest dorsal ray 1.45–1.8 in HL 10

10. Anal rays 58–59; dorsal rays 78–83; longest dorsal ray 1.8 in HL; caudal fin short, 4.7–5.3 in SL (3 specimens, Marquesas Islands) . . . . . *A. lateralis*

— Anal rays 53–57; dorsal rays 68–77; longest dorsal ray 1.45–1.7 in HL; caudal fin not short, 4.4–4.8 in SL . . 11

11. Dorsal rays 74–77; anal rays 56–57; head large, the length 3.85–3.95 in SL; body depth 2.45–2.55 in SL; caudal fin 4.4–4.45 in SL (Society Islands) . . . . . *A. auroculus*

— Dorsal rays 68–71; anal rays 53; head not large, the length 4.65–4.95 in SL; body depth 2.25–2.4 in SL; caudal fin 4.7–4.8 in SL (Society Islands) . . . . . *A. cyclurus*

Aseraggodes auroculus sp. nov.

Figure 2, Tables 1–4

Holotype. ROM 61358, 35.5 mm, Society Islands, Moorea, off NW coast, 17°31'0"S, 149°55'30"E, reef slope of coral rubble, with some live coral (including a few large heads of *Porites*), 18–24 m, rotenone, R. Winterbottom and R. Mooi, 10 Dec 1989.

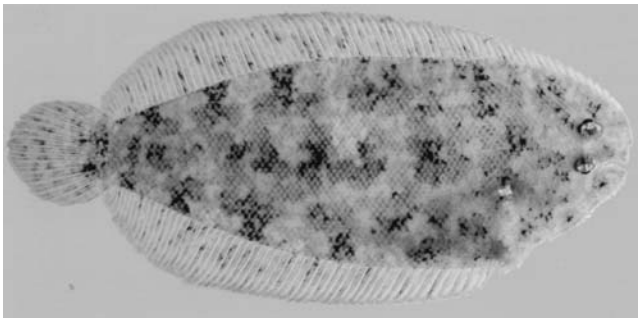

Figure 2. Holotype of *Aseraggodes auroculus*, ROM 61358, 35.5 mm, Moorea, Society Islands (R. Winterbottom).

Paratypes. ROM 61357, 34.0 mm, Society Islands, Moorea, W side of pass off Maharepa about middle of its length, 17°29'24"S, 149°48'0"W, 15–18 m, steep slope with coral rubble, sand, and a 3-m wall, rotenone, R. Winterbottom and R. Mooi, 5 Dec 1989; BPBM 39690, 30.4 mm and USNM 381623, 29.8 mm, same data as holotype.

Diagnosis. Dorsal rays 74–77; anal rays 56–57; most dorsal and anal rays double branched; lateral-line scales 69–73, including 6–7 anterior to a vertical at upper end of gill opening; vertebrae 37–38; dorsal pterygiophores anterior to fourth neural spine 12; body depth 2.45–2.6 in SL; HL 3.85–3.95 in SL; eye diameter 4.55–4.9 in HL; upper eye overlapping a anterior two-thirds to three-fourths of lower eye; interorbital

Table 1. Dorsal Rays of South Pacific Species of *Aseraggodes*

	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78
A. auroculus													1	1	1	1	
A. bahamondei				2	3	4	7	6	5	3							
A. cyclurus							1		1	1							
A. lateralis																1	2
A. lenisquamis	1	1		4	4	1		1	1								
A. magnoculus						1			1		1						
A. melanostictus													1	1			
A. nigrocirratus		2	1	1	2	1	2										
A. normani			1		1		1	2		2							
A. pelvicus										1							
A. ramsaii								1		1	1						
A. whitakeri										3	3	1	1	3	1		1

Table 2. Anal rays of South Pacific species of *Aseraggodes*

	46	47	48	49	50	51	52	53	54	55	56	57	58	59
A. auroculus											3	1		
A. bahamondei					1	2	8	10	5	3	1			
A. cyclurus								3						
A. lateralis													2	1
A. lenisquamis	2	2		1	2	5	1							
A. magnoculus						1	1	1						
A. melanostictus								1	1					
A. nigrocirratus		2	2	1	2		1	1						
A. normani					3	2	2							
A. pelvicus				1										
A. ramsaii		1		1	1									
A. whitakeri			1	1	2	2	5	2						

Table 3. Lateral-line scales of South Pacific species of *Aseraggodes*

	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88
A. auroculus											1		2		1															
A. bahamondei																	2	1	2	3	4	3	5	1	4	3	1	1		
A. cyclurus												1		1	1															
A. lateralis																				1	1				1					
A. lenisquamis				2	2	1	2	1	3	2																				
A. magnoculus													1	1				1												
A. melanostictus																				1	1									
A. nigrocirratus			1	2		1	2	1	2																					
A. normani										1		2	3		1															
A. pelvicus																							1							
A. ramsaii																												1	1	1
A. whitakeri																			1	1	2	3	1	1	2	1		1		

Table 4. Proportional measurements of type specimens of *Aseraggodes auroculus* as percentages of standard length

	Holotype	Paratypes		
	ROM 61358	USNM 381623	BPBM 39690	ROM 61357
Standard Length (mm)	35.5	29.8	30.4	34.0
Body depth	38.1	40.7	39.6	39.3
Body width	7.1	7.1	8.4	7.3
Head length	25.3	25.4	26.0	25.8
Snout length	8.6	9.2	8.2	8.8
Preorbital length	7.1	7.6	7.5	7.8
Eye diameter	5.5	5.6	5.3	5.7
Interorbital width	1.4	1.5	1.0	1.1
Upper-jaw length	8.7	8.8	8.9	8.8
Caudal-base depth	13.4	14.1	13.2	13.8
Predorsal length	6.2	6.1	6.3	5.9
Preanal length	30.6	29.4	29.6	30.0
Prepelvic length	23.8	23.8	23.2	24.1
First dorsal ray	6.7	6.9	6.8	6.5
Longest dorsal ray	15.2	16.4	15.8	15.0
First anal ray	7.0	6.4	6.7	6.6
Longest anal ray	15.4	16.7	broken	15.1
Caudal-fin length	22.6	broken	22.7	22.6
Pelvic-fin length	10.2	10.6	9.7	9.5

space narrow, the vertical distance separating eyes about one-fourth to one-sixth eye diameter; no caudal peduncle; short fleshy cirri on ventral edge of head; lateral line aligned with ventral part of upper eye; longest dorsal ray 1.55–1.7 in HL; caudal fin rounded, its length 4.4–4.55 in SL; pelvic fins 2.4–2.7 in HL, the tip of longest ray reaching base of second or third anal ray; colour of ocular side in alcohol pale yellowish brown with 3 rows of large irregular blackish blotches, one dorsal, one ventral, and one midlateral; a few small dark spots on fin rays; blind side of body pale yellowish, the dark spots on rays faint.

Description. Dorsal rays 75 (74–77); anal rays 56 (56–57); dorsal rays branched except first 9 dorsal rays of holotype and first 19 of smallest paratype; anal rays branched; caudal rays 18, the middle 16 of holotype double-branched (middle 12–14 of paratypes double-branched); pelvic rays 5, branched except first; lateral-line scales 69 (71–73), including 6–7 anterior to a vertical at upper end of gill opening; scales above lateral line on ocular side to dorsal-fin base about 22; scales below lateral line to anal-fin base about 24; vertebrae 37 (37–38); erisma (counted as the first dorsal pterygiophore) about twice as thick as remaining pterygiophores, its inner half narrowly branched; next 2 pterygiophores before tip of second neural spine; space between second and third neural spines with 6 pterygiophores; space between third and fourth neural spines with 3 pterygiophores; total of 12 dorsal pterygiophores anterior to fourth neural spine; ventroanterior margin of urohyal forming an angle of about 80°, the corner broadly rounded.

Body depth 2.6 (2.45–2.55) in SL; body width (thickness) 5.3 (4.7–5.75) in body depth; ventral profile of head posterior to mouth slightly convex; HL 3.95 (3.85–3.95) in SL; snout length 2.7 (2.6) in HL; eye diameter 4.6 (4.55–4.9) in HL; upper eye overlapping anterior two-thirds to three-fourths of lower eye; least vertical interorbital width 3.55 (2.75–3.35) in HL; upper end of gill opening on a horizontal passing about one-half eye diameter ventral to lower eye; no caudal peduncle (base of last two or three anal rays posterior to base of lowermost caudal ray); depth at base of caudal fin 1.9 (1.8–1.95) in HL.

Maxilla extending to below front edge of pupil, the upper-jaw length (measured on blind side) 2.9 (2.9–2.95) in HL; blind side of upper and lower jaws with a dense band of villiform teeth (difficult to see because just medial to a labial fold); no teeth on ocular side of jaws; tubular anterior nostril of ocular side membranous, just above upper lip, anterior to upper edge of lower eye, slightly tapering, reaching a little posterior to front edge of eye when laid back, its length about three-fourths eye diameter; posterior nostril an oblique slit in labial groove directly in front of dorsal half of lower eye; anterior nostril of blind side a more slender, slightly tapering, membranous tube above about middle of upper lip; posterior nostril of blind side a shorter, broader membranous tube posterior and slightly dorsal to anterior nostril (internarial distance about three-fourths eye diameter).

Scales ctenoid on both sides (except those of lateral line partially embedded); scales of ocular side of body with 6–9 cteni; about 2 rows of scales in interorbital space, with about another 5 rows extending onto medial and anterior part of each eye; scales on ocular side of head progressively smaller anteriorly and ventrally with fewer cteni, replaced on snout by fleshy papillae; scales on blind side of head anterior to a demarcation just posterior to end of jaws replaced by a dense zone of fleshy papillae that are progressively longer anteriorly, about 15 visible on ventral edge of head posterior to mouth (long for papillae, but too stout and short to call cirri). Lateral line straight on both sides along middle of body, projecting on ocular side toward ventral edge of upper eye; lateral line of blind side replaced by a row of sensory papillae on head (differentiated from surrounding papillae by a narrow papilla-free zone on each side), which curves ventrally at front of head; supratemporal branch of lateral line on blind side of head clearly visible as a similar row of low sensory papillae just below basal

sheath of scales, becoming faint at end of about anterior third of body.

Each dorsal and anal ray with a thin lengthwise membranous ridge, narrowing distally; ridges progressively less developed posteriorly; small scales and papillae extending out on ridges of both sides of about first 20 dorsal rays, making edges of membranous ridges jagged; about basal fourth of caudal fin with progressively smaller scales on both sides to at least three-fourths length of fin.

Origin of dorsal fin anterior to lower edge of upper eye, the predorsal length 4.1 (4.15–4.4) in HL; first dorsal ray (only the tip free) 3.8 (3.7–3.95) in HL; longest dorsal ray 1.65 (1.55–1.7) in HL; origin of anal fin below base of 20th dorsal ray, slightly posterior to a vertical at end of opercular membrane, the preanal length 3.3 (3.35–3.4) in SL; length of first anal ray 3.6 (3.9–3.95) in HL; longest anal ray 1.65 (1.5–1.7) in HL; caudal fin rounded, 4.45 (4.4–4.45) in SL; pelvic fin bases adjacent on ventral edge of body, third and fourth pelvic rays longest, reaching to base of second or third anal ray, 2.5 (2.4–2.7) in HL; anus anterior to first anal ray; genital papilla dorsoposterior to anus, not connected by membrane to ocular-side pelvic fin.

Colour of ocular side of holotype when fresh: brownish yellow with numerous whitish blotches about half eye diameter in size, many interconnected; three rows of very irregular, large, blackish blotches, the dark pigment on scale edges, or isolated scales entirely black; a small squarish white spot behind upper end of gill opening; eyes golden with faint blackish bands, partly rimmed in black; fins with translucent membranes and brownish yellow rays, some with 1 or 2 blackish spots; scaly basal part of caudal fin coloured like body.

Colour of ocular side of holotype in alcohol: pale yellowish brown with 3 rows of large irregular blackish blotches, one dorsal, one ventral, and one midlateral; a few small dark spots on fin rays; blind side of body pale yellowish, the dark spots faint.

Etymology. The species name *auroculus* is from the Latin *aurum* for gold and *oculus* for eye, in reference to the bright golden colour of the eyes.

Remarks. The four specimens of this species were collected in 1989 off Moorea in two rotenone stations from steep sloping bottoms dominated by coral rubble at depths of 15–24 m. They were deposited in the Royal Ontario Museum with a tentative identification of *Aseraggodes melanostictus* (Peters), the name often given to specimens of soles of this genus with an ocular-side colour pattern of large blackish blotches. Although sharing the same number of dorsal rays, vertebrae, and dorsal pterygiophores with *A. melanostictus, A. auroculus* is easily distinguished by a higher count of anal rays, fewer lateral-line scales (Tables 2 and 3), and having branched instead of unbranched dorsal and anal fin rays. It also appears to be a much smaller species. The two known specimens of *A. melanostictus* measure 74 and 86.5 mm SL.

Aseraggodes auroculus is more closely related to *A. cyclurus*, also collected from the Society Islands. One rotenone station resulted in a specimen of both species. The two are separated by dorsal- and anal-ray counts and differences in body depth, eye size, and length of the caudal fin (see Key). Also, *A. cyclurus* seems to be a larger species. The three Society Islands specimen range from 61.5 to 73.3 mm SL, compared to 29.8–35.5 mm for the four type specimens of *auroculus*. The 34.0 mm paratype of *A. auroculus* is a fully mature female.

The photograph taken of the holotype of *Aseraggodes auroculus* (Fig. 2), shows a broad interorbital space, about three-fourths the diameter of the lower eye. The interorbital width of the preserved specimen is only one-fourth the eye diameter. The same shrinkage of the interorbital space was noted for one specimen of *A. lenisquamis* (see description below).

Aseraggodes bahamondei Randall and Meléndez, 1987

Figures 3–5, Tables 1–3

Aseraggodes bahamondei Randall and Meléndez, 1987: 99, figs 1–3.

Material examined. See Randall and Meléndez (1987).

Type locality. Easter Island.

Diagnosis. Dorsal rays 65–71; anal rays 50–56; dorsal and anal rays branched, except in juveniles; lateral-line scales 75–86; 1–4 pores beneath many scales peripherally on ocular side of

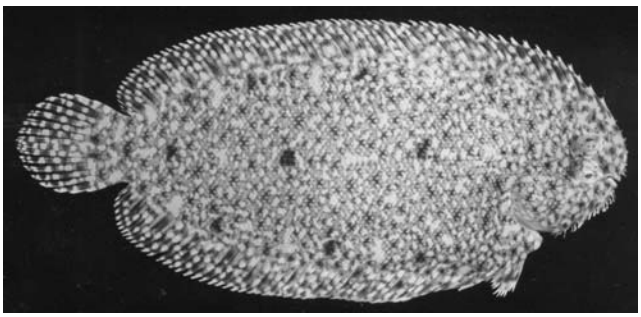

Figure 4. Paratype of *Aseraggodes bahamondei*, BPBM 14790, 68.3 mm SL, Lord Howe Island.

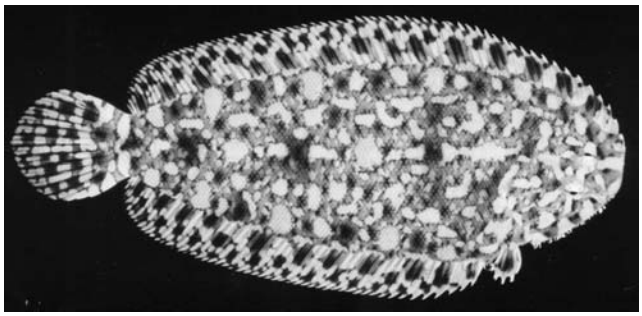

Figure 3. Paratype of *Aseraggodes bahamondei*, BPBM 30851, 46.9 mm SL, Easter Island.

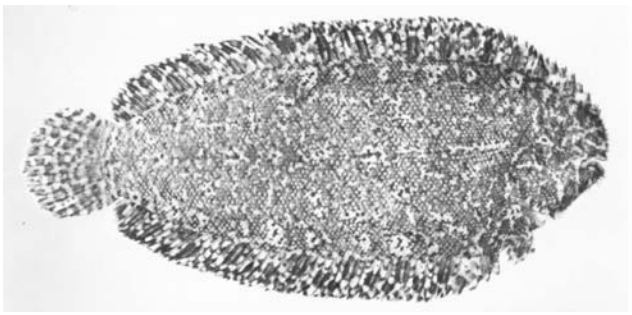

Figure 5. Holotype of *Aseraggodes bahamondei*, BPBM 6610, 149.3 mm SL, Easter Island.

body; vertebrae 39–40; dorsal pterygiophores anterior to fourth neural spine 7–8; body depth 2.3–2.5 in SL; HL 3.8–4.55 in SL (relatively longer in small individuals); upper lip not overlapping lower lip when mouth closed; eye diameter 5.8–6.8 in HL; upper eye varying from slightly anterior to one-half eye diameter before lower eye; interorbital space 6.5–9.55 in HL; tubular anterior nostril of ocular side not reaching edge of lower eye when laid back; prominent lappet–like cirri on ventral edge of head; caudal peduncle present, its length 11.0–15.5 in HL; lateral line aligned with ventral half of upper eye; dorsal and anal rays short, the longest dorsal ray 1.9–2.15 in HL; small scales extending out on membranous ridge of dorsal and anal rays, but no cirri at free edge of ridges; caudal fin rounded, 4.0–5.1 in SL; origin of ocular-side pelvic ray slightly anterior to blind-side fin; third pelvic ray longest, reaching to or a little beyond base of second anal ray, 2.8–3.2 in HL; pale brown with dark–edged white spots and 3 rows of black spots, these markings relatively smaller and more irregular, in general, with growth. Largest specimen, 156 mm SL.

Remarks. Currently known only from Easter Island and Lord Howe Island, but is likely to occur at some intermediate southern subtropical islands such as Pitcairn, Rapa, Kermadec Islands, or Norfolk Island. Collected from sand at depths of 2–25 m. This species is unique in having the highest vertebral count and lowest number of anterior dorsal pterygiophores. It also seems to reach the largest size of species of the genus. Randall and Meléndez demonstrated the toxicity of the milky secretion exuded by this species when threatened, presumably from the small pores beneath scales near the edge of the ocular side of the body.

Aseraggodes cyclurus sp. nov.

Figure 6, Tables 1–3, 5

Holotype. BPBM 8105, 73.3 mm, Society Islands, Tahiti, Papara, Teavaraa Pass, SE side, sand at entrance to cave, 27.5 m, rotenone, J.E. Randall, 21 Sep 1967.

Paratypes: USNM 379462, 70.2 mm, same data as holotype; ROM 61359, 61.5 mm SL, Society Islands, Moorea, W side of pass off Maharepa about middle of its length, 17°29'24"S, 149°48'0"W, 15–18 m, steep slope with coral rubble, sand, and 3-m wall, rotenone, R. Winterbottom and R. Mooi, 5 Dec 1989.

Diagnosis. Dorsal rays 68–71; anal rays 53; most dorsal and anal rays double branched; lateral-line scales 70–73 (including 6–7 anterior to a vertical at upper end of gill opening); vertebrae 36–37; dorsal pterygiophores anterior to fourth neural spine 10–11; body depth 2.25–2.4 in SL; HL 4.65 (4.7–4.95) in SL; eye diameter 4.65–4.9 in HL; upper eye overlapping about anterior half of lower eye; interorbital space narrow, the vertical distance separating eyes about three-fourths eye diameter; no caudal peduncle; no prominent cirri on ventral edge of head; lateral line aligned with ventral edge of upper eye; longest dorsal ray 1.45–1.6 in HL; caudal fin rounded, its length 4.7–4.8 in SL; pelvic fins 2.2–2.4 in HL, the tip of longest ray reaching base of third anal ray; ocular side mottled brown, the scale edges dark brown to black; large irregular blackish blotches, the most prominent comprising 4 below base of dorsal fin, 3 on lateral line, and 2 above posterior half of anal fin.

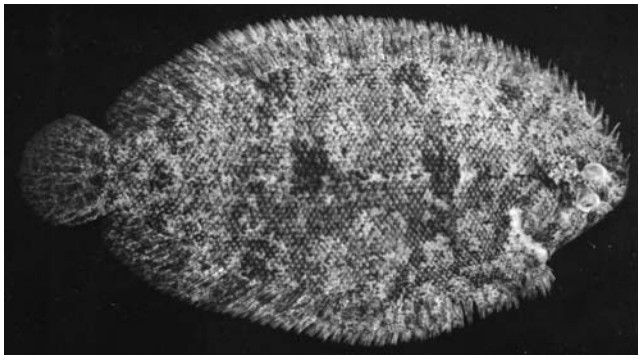

Figure 6. Holotype of *Aseraggodes cyclurus*, BPBM 8105, 73.3 mm SL, Tahiti, Society Islands.

Description. Dorsal rays 71 (68–70); anal rays 53; dorsal rays double-branched except first 19 (first 21 and 25 of paratypes); anal rays double-branched except first 5 and 9 rays of paratypes; caudal rays 18, all branched, the middle 16 double-branched; pelvic rays 5, all branched; lateral-line scales on ocular side 73 (70–72), including 6–7 anterior to a vertical at upper end of gill opening; scales above lateral line on ocular side to dorsal-fin base about 24; scales below lateral line to anal-fin base about 27; vertebrae 37 (36–37); erisma (counted as the first dorsal pterygiophore) about twice as thick as remaining pterygiophores, its inner half narrowly branched; next 2 pterygiophores before tip of second neural spine; space between second and third neural spines with 5 pterygiophores; space between third and fourth neural spines with 2 (2–3) pterygiophores; total of 10 (10–11) dorsal pterygio-phores anterior to fourth neural spine; ventroanterioir margin of urohyal forming an angle of about 80°, the corner well-rounded.

Body depth 2.25 (2.25–2.4) in SL; body width (thickness) 5.65 (4.6–6.0) in body depth; ventral profile of head posterior to mouth nearly straight; HL 4.65 (4.7–4.95) in SL; snout length 2.7 (2.6) in HL; eye diameter 4.9 (4.65–4.7) in HL; least vertical interorbital width 8.0

Table 5. Proportional measurements of type specimens of *Aseraggodes cyclurus* as percentages of standard length

	Holotype	Paratype	Paratype
	BPBM 8105	ROM 61359	USNM 379462
Standard Length (mm)	73.3	61.5	70.2
Body depth	44.7	44.6	42.1
Body width	7.9	9.7	7.0
Head length	21.6	21.4	20.2
Snout length	8.0	8.3	7.8
Preorbital length	7.8	7.5	7.7
Eye diameter	4.4	4.6	4.3
Interorbital width	2.7	2.7	2.8
Upper-jaw length	8.2	8.1	8.1
Caudal-base depth	13.8	14.6	14.3
Predorsal length	5.3	5.5	5.4
Preanal length	25.3	24.1	25.7
Prepelvic length	19.3	18.2	18.5
First dorsal ray	3.9	4.4	4.2
Longest dorsal ray	14.4	15.4	14.6
First anal ray	6.6	6.4	6.7
Longest anal ray	15.0	15.6	15.7
Caudal-fin length	21.2	22.7	22.6
Pelvic-fin length	9.6	9.5	9.7

(7.2–7.95) in HL; a vertical at posterior edge of upper eye (edge of dark eyeball) passing approximately through middle of lower eye; upper end of gill opening on a horizontal passing about one-half eye diameter ventral to lower eye; no caudal peduncle (base of lowermost caudal ray ending above base of last anal ray); depth of body at base of caudal fin 1.55 (1.4–1.45) in HL.

Snout not overlapping lower jaw when mouth closed; maxilla extending slightly posterior to a vertical at front edge of lower eye, the upper jaw length (blind side) 3.65 (2.5–2.65) in HL; blind side of upper and lower jaws with a dense band of slender, inward-projecting, slightly curved teeth up to about 7 rows; no teeth on ocular side of jaws; anterior nostril a tapering membranous tube anterior to upper edge of lower eye, just reaching anterior edge of eyeball when laid back, its length nearly equal to eye diameter; posterior nostril an oblique slit in labial groove directly in front of ventral part of lower eye; anterior nostril of blind side a short tapering membranous tube just above anterior third of upper lip; aperture of posterior nostril of blind side dorsoposterior to anterior nostril (internarial distance about equal to eye diameter), covered anteriorly with a flattened papilla.

Scales ctenoid on both sides (except those of lateral line partially embedded); scales of ocular side of body with 10–13 cteni; 3 rows of scales in interorbital space, with about another 6 rows extending onto medial half of each eye; scales on ocular side of head progressively smaller anteriorly and ventrally, the very small scales at front of snout without cteni; scales on blind side of head replaced anteriorly by small slender stout papillae on front of snout; a dense zone of small fleshy papillae ventral and adjacent to lower jaw on blind side and another adjacent to upper jaw, the latter not much broader than jaw width; anterior edge of snout and ventral edge of head with very fine cirri, none along edge of operculum at gill opening on either side. Lateral line straight on both sides along middle of body, projecting on ocular side toward ventral edge of lower eye; lateral-line of blind side obscure on head in zone of papillae where it curves well dorsal to upper jaw to tip of snout; a supratemporal branch of lateral line on blind side of head faintly visible, beginning at front of snout, and continuing along base of dorsal fin to anterior body.

Dorsal and anal fins with a basal sheath of 2 to 3 rows of scales; small scales continuing out on rays and adjacent membrane on first 25 rays of dorsal fin of ocular side of holotype, those on rays on a thin membranous ridge basally on each ray; only a few scales basally on first 7 rays of ocular side of anal fin; scales basally on rays of blind side except for last 19 rays of dorsal fin and last 17 of anal fin; small cirri projecting from edge of membranous ridge of anterior dorsal and anal rays of ROM paratype (but not apparent on Bishop Museum specimens); about basal third of caudal fin with scales on both sides; tiny, well-spaced, isolated scales still with cteni, on each side of rays posteriorly to within outer fourth of fin.

Origin of dorsal fin anterior to lower edge of upper eye, the predorsal length 4.85 (4.6) in HL; first dorsal ray (only the tip free) 6.55 (4.9) in HL; longest dorsal ray 1.75 (1.7) in HL; origin of anal fin below base of 20th dorsal ray and in line with posterior end of opercular membrane, the preanal length 3.95 (3.9) in SL; length of first anal ray 3.9 (3.7) in HL; longest anal ray 1.7 (1.6) in HL; caudal fin rounded, 4.8 (4.7) in SL; ocular-side pelvic fin on ventral edge of body, blind-side fin adjacent, both covered anteriorly by a basal band of small scales; third pelvic ray of each fin longest, reaching to base of third anal ray, 2.65 (2.55) in HL; anus ventroanterior to first anal ray; genital papilla on ocular side of base of first anal ray.

Colour of ocular side of holotype in alcohol pale tan, fins with pale yellowish rays and transparent membranes; no dark markings apparent.

Colour of holotype when fresh light brown, edges of the scales dark brown to black, with scattered small irregular pale blotches and smaller dark brown spots; large irregular blackish blotches in 3 rows: upper row of 4 blackish blotches along dorsal contour of body, middle row of four blotches on lateral line, the first at origin of lateral line, the 2 middle blotches clearly largest on body; lower row of 4 blotches below base of anal fin, less distinct than other blotches; blind side of body whitish; opercular membrane pale; fin rays mottled brown to dark brown, the membranes pale.

Etymology. Named *cyclurus* from the Greek for the nearly circular caudal fin.

Remarks. This species is described from three specimens, two from sand at the entrance to a cave in Tahiti at a depth of 27.5 m, and the third on a steep rubble and sand slope in 15–18 m in a pass at Moorea.

A fourth specimen, BPBM 20864, 56.6 mm, collected at Budd Reef, Ringgold Isles, Fiji, in 11–26 m with rotenone by B.A. Carlson and M. Gawel on 14 Apr 1973, is provisionally identified as *Aseraggodes cyclurus*. The head and body were preserved in a curve, so it is difficult to make accurate proportional measurements, no photograph or colour notes were taken, and the colour has largely faded. The specimen has 70 dorsal rays, those posterior to 18th ray double-branched; 52 anal rays, those posterior to third ray double-branched, 74 lateral-line scales, 36 vertebrae, and 11 dorsal pterygiophores anterior to the fourth neural spine.

Aseraggodes cyclurus seems most closely related to *A. heraldi* Randall and Bartsch, described from two specimens, 38.5 and 47 mm SL, from the Marshall Islands. The two species share the following characters: no caudal peduncle, same vertebral count, lack of prominent cirri along the ventral edge of the head, scales extending onto anterior dorsal and anal rays beyond the basal scaly sheath, and many double-branched rays of the dorsal and anal fins. They differ slightly in the number of dorsal rays (70–73 for *A. cyclurus* vs 75 for *A. heraldi*) and anal rays (51 and 52 for *A. cyclurus* vs 57 and 58 for *A. heraldi*) and the number of dorsal pterygiophores before the fourth neural spine, 10 for *A. cyclurus* (11 for the non-type from Fiji), compared to 12 for *A. heraldi*. The difference in snout length is the only difference in proportional measurements that seems great enough to be beyond individual variation, given the difference in size of the specimens under comparison. The snout length of *A. heraldi* is longer, 8.1–8.2 in SL, compared to 6.8–6.9 for *A. cyclurus*. Also significant is the more extensive area of papillae anteriorly on the blind side of the snout of *A. heraldi*; the entire snout dorsal to the straight anterior part of the upper jaw is densely covered with small papillae. In *A. cyclurus* there is only a zone of papillae adjacent to the jaw that is not much wider than the jaw. There is also a difference in the basic colour pattern of the two species. The dark blotches in the three basic rows on the body are more numerous, and their relative size smaller in *A. heraldi*.

Aseraggodes lateralis sp. nov.

Figures 7, 8, Tables 1–3, 6

Holotype. BPBM 10992, 64.2 mm, Marquesas Islands, Ua Huka, W side, small bay 0.4 miles NE of Motu Takatai, N side of bay in 4.5–9 m, rotenone, J.E. Randall, J.R. Haywood, and R.M. McNair, 7 May 1971.

Paratypes. BPBM 12757, 27.8 mm, Marquesas Islands, Nuku Hiva, Sentinelle de l'Est, W side, steep rocky slope with no visible sand, 23 m, quinaldine, J.E. Randall and D.B. Cannoy, 17 May 1971; USNM

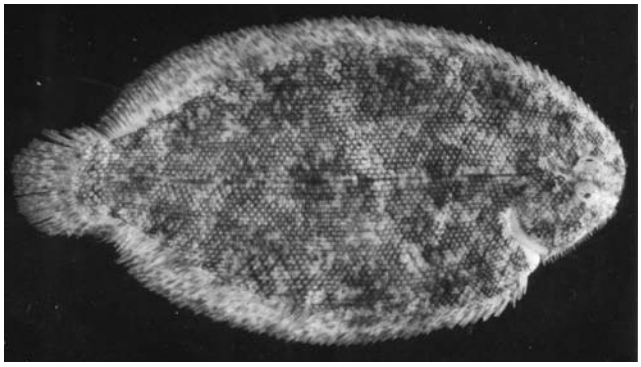

Figure 7. Holotype of *Aseraggodes lateralis*, BPBM 10992, 64.2 mm SL, Ua Huka, Marquesas Islands.

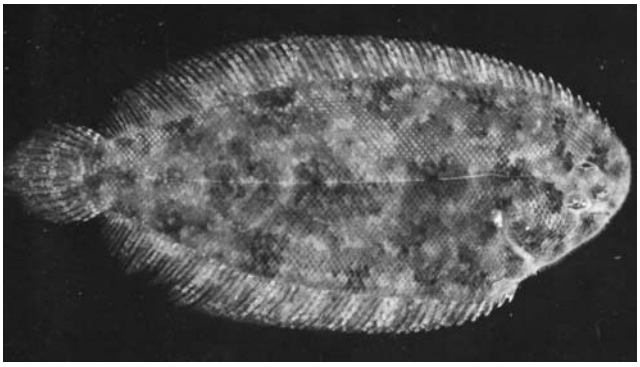

Figure 8. Paratype of *Aseraggodes lateralis*, BPBM 12757, 27.8 mm SL, Nuku Hiva, Marquesas Islands.

Table 6. Proportional measurements of the type specimens of *Aseraggodes lateralis* as percentages of standard length

	Holotype BPBM 10992	Paratype BPBM 12757	Paratype U S N M 382053
Standard Length (mm)	64.2	27.8	37.7
Body depth	50.2	41.6	42.0
Body width	8.1	7.2	7.9
Head length	22.2	22.4	23.8
Snout length	7.5	7.5	7.4
Preorbital length	6.5	6.4	6.6
Eye diameter	3.8	4.2	3.9
Interorbital width	2.9	2.1	2.0
Upper-jaw length	7.0	7.1	6.7
Caudal-base depth	15.3	13.9	12.3
Predorsal length	4.5	4.2	4.9
Preanal length	29.7	28.6	29.2
Prepelvic length	25.2	24.1	24.6
First dorsal ray	4.6	4.3	5.3
Longest dorsal ray	13.3	14.0	14.3
First anal ray	7.3	6.8	7.4
Longest anal ray	13.7	14.3	14.4
Caudal-fin length	19.0	21.4	20.9
Pelvic-fin length	7.8	8.0	7.9

392053, 37.7 mm, Marquesas Islands, Fatu Hiva, Hanavave Bay, N side, 20 m, rotenone, J.L. Earle, L.A. Rocha, and W. Robbins, 23 Aug 2003.

Diagnosis. Dorsal rays 77–78; anal rays 58–59; lateral-line scales 78–83; vertebrae 37–38; dorsal pterygiophores anterior to fourth neural spine 12; body depth 2.0–2.4 in SL; HL 3.9–4.15 in SL; eye diameter 6.1–6.35 in HL; upper eye from directly above lower eye to overlapping anterior two-thirds of lower eye; interorbital space equal to one-half to three-fourths eye diameter; no caudal peduncle; upper lip not overhanging lower jaw when mouth closed; very fine cirri on ventral edge of head; lateral line aligned with ventral third of upper eye; longest dorsal ray 1.8 in HL; caudal fin rounded to slightly pointed, its length 4.7–5.25 in SL; longest pelvic ray 3.1–3.2 in HL, the tip reaching base of second anal ray; ocular side mottled brown; scale edges dark brown to black; large irregular blackish blotches, the most prominent comprising 4 below base of dorsal fin, 3 on lateral line, and 2 above posterior half of anal fin; lateral line as a broken black line.

Description. Dorsal rays 77, the first 15 branched, remaining rays double-branched; anal rays 58 (59), all double branched; caudal rays 18 (uppermost and lowermost rays branched, the middle 16 double branched; pelvic rays 5, all branched; lateral-line scales 78 (79–83), including 7–8 anterior to a vertical at upper end of gill opening; scales above lateral line on ocular side to dorsal-fin base about 28; scales below lateral line to anal-fin base about 29; vertebrae 37 (38); erisma (counted as the first dorsal pterygiophore) nearly 3 times thicker than remaining pterygiophores, its inner three-fourths narrowly branched; next 2 pterygiophores before tip of second neural spine; space between second and third neural spines with 6 pterygiophores; space between third and fourth neural spines with 3 pterygiophores (total of 12 dorsal pterygiophores anterior to fourth neural spine); ventro-anterior margin of urohyal forming angle of about 80°, the corner strongly rounded.

Body oval and deep for genus, the depth 2.0 (2.35–2.4) in SL; body thin, the width 6.2 (5.7–5.8) in body depth; ventral profile of head posterior to mouth slightly convex; HL 4.5 (4.45–4.6) in SL; snout length 2.95 (2.95–3.0) in HL; eyes small, the eye diameter 5.85 (5.35–5.6) in HL; upper eye of holotype directly above lower (overlapping about anterior two-thirds of lower eye in paratypes); least vertical interorbital space 7.65 (10.7–10.9) in HL; upper end of gill opening at level of ventral edge of lower eye; no caudal peduncle (base of lowermost caudal ray ending above base of last anal ray); depth of body at base of caudal fin 1.45 (1.6–1.75) in HL.

Front of upper lip not overlapping lower jaw when mouth closed; maxilla extending to a vertical at anterior fourth of lower eye, the upper jaw length (blind side) 3.2 (3.15–3.25) in HL; blind side of jaws with a dense band of slender, inward-projecting, slightly curved teeth nearly the full length of each jaw, up to about 6 rows at broadest place; anterior nostril a tapering tube before upper edge of lower eye, reaching anterior edge of eye when laid back, its length about three-fourths eye diameter; posterior nostril an oblique slit in labial groove directly in front of ventral part of lower eye; anterior nostril of blind side a short tapering membranous tube just above anterior third of upper jaw; posterior nostril of blind side dorsoposterior to anterior nostril; internarial distance about equal to eye diameter.

Scales of both sides ctenoid (except cycloid on lateral line and partially embedded), usually with 10 cteni (a few with 11 or 12); 4 rows of scales in interorbital space, with small scales extending broadly onto median and anterior edge of eyes (apparently lost in some); scales progressively shorter anteriorly on head and with fewer cteni (front of snout with very small scales without cteni, but not in the form of little papillae or tubercles); anterior edge of snout and ventral edge of head with a row very fine cirri (especially fine anteriorly on

snout); no cirri along edge of operculum; opercular membrane in form of a short triangle near upper end of gill opening. Lateral line straight on both sides along middle of body, on ocular side aligned with ventral third of upper eye; an indistinct supratemporal branch of lateral line on blind side of head, continuing faintly aanteriorly on body along base of dorsal fin.

Dorsal and anal fins with a basal sheath of 2 to 3 rows of scales; ocular side with small scales continuing a short distance out on rays and adjacent membrane on first 31 rays of dorsal fin of ocular side of holotype, and on the first 8 rays of ocular side of anal fin; scales extending out on rays of dorsal and anal rays of blind side except for last 21 rays of dorsal fin and last 33 of anal fin; a thin lengthwise membranous scaly ridge basally on anterior dorsal and anal rays of both sides, progressively shorter posteriorly; about basal third of caudal fin with scales on both sides, and well-spaced tiny scales, still with cteni, continuing on each side of rays about half way out in fin.

Origin of dorsal fin anterior to lower edge of upper eye, the predorsal length 4.95 (4.45–4.65) in HL; first dorsal ray 4.85 (4.15–5.2) in HL; longest dorsal ray 1.65 (1.5–1.55) in HL; origin of anal fin below base of 20th dorsal ray and in line with posterior end of operculum, the preanal length 3.35 (3.45–3.5) in SL; anus anterior to first anal ray; genital papilla dorsoposterior to anus; first anal ray 3.05 (2.95–3.3) in HL; longest anal ray 1.6 (1.5–1.55) in HL; caudal fin rounded to slightly pointed, 5.25 (4.7–4.8) in SL; pelvic fins close together anteriorly on ventral edge of body, their origins adjacent; third pelvic ray of each fin longest, reaching base of third anal ray, 2.85 (2.75–2.8) in HL.

Colour of ocular side in alcohol light yellowish brown with scattered irregular brown blotches of variable size, the most conspicuous in 3 rows: one below base of dorsal fin, one following lateral line, and one just above anal fin; blind side uniform light yellowish brown; fins pale with a few faint small brown spots basally in dorsal and anal fins.

Colour of ocular side of holotype when fresh: light brown with small irregular pale and dark brown blotches; scale edges dark brown to black; large irregular blackish blotches containing small pale spots in 3 rows, dorsal, ventral, and along lateral line; lateral line clearly evident as a broken black line; posterior edge of operculum broadly white; eyes pale with radiating dark lines on dorsal half of iris; scaled basal part of fins coloured like body; remaining part of fins pale with small dark blotches and a few larger ones along base.

Etymology. Named *lateralis* from the Latin word with the same meaning in English, in reference to the distinct pigmented lateral line in life.

Remarks. The holotype was collected from rock and sand bottom of a protected bay, but the habitat of the smallest paratype was unexpected. It was taken from a steep rocky slope with no obvious sand during the day. Species of *Aseraggodes* are typically found on sedimentary bottoms, at least by day, and they are usually buried during daylight hours.

The smallest paratype of *Aseraggodes lateralis* is in poor condition with the fins badly eroded, a result of long retention in isopropanol of insufficient concentration. A comparison of the figures of the holotypes of *Aseraggodes lateralis* and *A. cyclurus* reveals similarity in body and fin morphology and in colour pattern. Both species have 37 vertebrae and nearly the same structure of the fins. *Aseraggodes cyclurus* differs in having higher dorsal, anal, and lateral-line scale counts (see Tables 1–3), extremely small cirri on the ventral edge of the head, and small slender tubercles instead of scales anteriorly on the blind side of the head.

The 37.7-mm paratype is a mature female. An x-ray revealed that it had eaten two gastropods with intact shells 1.7 and 1.9 mm long.

Aseraggodes lenisquamis sp. nov.

Figure 9, Tables 1–3, 7

Aseraggodes sp.-–—Kuiter, 1993: 391, upper fig. (central to south-

Table 7. Proportional measurements of type specimens of *Aseraggodes lenisquamis* as percentages of standard length

	Holotype	Paratypes					
	NMV A 19646	NMV A 25543	NSMT P 70086	AMS I.27047	BMNH 4.10.26.4	CAS 221846	BPBM 39610	NMV A 25543
Standard Length (mm)	102.0	64.5	69.0	73.0	77.5	78.0	82.0	82.5
Body depth	39.4	38.6	40.6	37.8	41.1	41.3	41.2	39.9
Body width	7.2	7.4	7.5	7.8	7.8	7.5	7.8	7.3
Head length	20.3	19.9	20.6	20.4	20.8	20.3	21.1	20.9
Snout length	8.0	8.1	8.3	8.2	8.4	8.3	8.6	8.3
Preorbital length	6.4	6.4	6.5	6.4	6.7	6.4	6.2	6.1
Eye diameter	4.1	4.0	4.5	4.2	3.9	4.1	3.7	3.8
Interorbital width	2.0	1.9	1.5	2.8	2.6	2.5	2.4	2.7
Upper-jaw length	5.9	6.2	6.3	5.9	6.4	6.3	6.1	6.5
Caudal-base depth	14.9	15.5	16.2	15.3	15.2	14.9	14.5	15.6
Predorsal length	4.5	5.0	4.4	4.5	4.9	5.0	5.1	4.7
Preanal length	26.1	25.2	24.7	26.2	25.7	25.6	26.2	26.4
Prepelvic length	17.8	18.3	18.3	18.7	18.7	17.7	19.4	19.0
First dorsal ray	6.7	5.6	6.1	5.8	6.4	6.5	6.7	6.3
Longest dorsal ray	11.8	11.9	12.0	12.3	11.7	11.5	11.6	11.8
First anal ray	7.3	7.6	7.0	8.2	8.1	7.8	7.2	7.4
Longest anal ray	12.1	11.9	11.6	12.6	11.6	11.5	11.7	11.8
Caudal-fin length	21.8	21.9	21.0	21.6	20.8	19.8	19.9	20.9
Pelvic-fin length	9.8	10.9	9.9	11.1	10.7	10.2	10.5	10.5

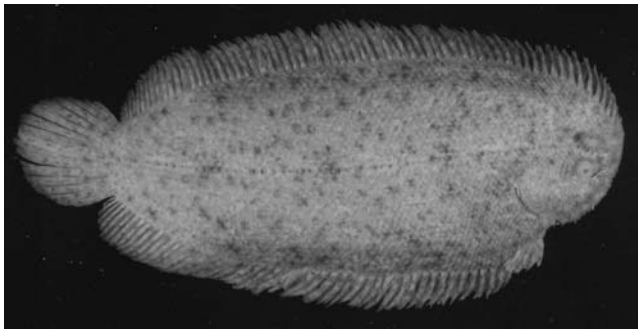

Figure 9. Holotype of *Aseraggodes lenisquamis*, NMV A 19646, 102 mm, NSW.

ern NSW).

Holotype. NMV A 19646, 102 mm, Australia, NSW, Sydney Harbor, Camp Cove (33°50'S, 151°17'E), 4 m, hand net, R.H. Kuiter, 17 Jan 1985.

Paratypes. NMV A 3607, 65 mm, Australia, NSW, Bermagui, Horseshoe Bay, 36°25'S, 150°4'E, 10 m, hand net, R.H. Kuiter, 24 Jan 1984; NMV A 5827, 88 mm, same locality as preceding, 4–10 m, hand net, R.H. Kuiter, 30 Jan 1984; NMV A 25543-002, 2: 64.5–82.5 mm, BPBM 39610, 82 mm, CAS 221846, 78 mm, NSMT P 70086, 69 mm, BMNH 2004.10.26.4, 77.5 mm, USNM 380210, 68 mm, all with same data as holotype; AMS I.27047-001, 73 mm, NSW, Jervis Bay, Hare Bay, 35°3'S, 150°44'E, 6 m, beam trawl, F.R.I. Jervis Bay study, 28 Oct 1986; AMS 27063-013, 65 mm, NSW, Jervis Bay, Hare Bay, 35°0'S, 150°45'E, 2–7 m, J. Bell (State Fisheries), Dec 1986; AMS I.28514-002, 79 mm, NSW, Jervis Bay, Darling Road, 35°3'S, 150°44'E, 5 m, beam trawl, J. Bell and party, 28 Sep 1988.

Diagnosis. Dorsal rays 62–70; anal rays 46–52; dorsal and anal rays branched; lateral-line scales 62–68, including 8–9 anterior to a vertical at upper end of gill opening; vertebrae 36–38; dorsal pterygiophores anterior to fourth neural spine 8–9; body depth 2.4–2.65 in SL; head short, its length 4.75–5.05 in SL; eye diameter 4.6–5.7 in HL; upper eye overlapping about anterior one-third to one-half of lower eye; interorbital space variable in width, the vertical distance separating eyes 7.3–13.7 in HL; no caudal peduncle; lappet–like cirri on ventral edge of head, but not on front of snout; numerous cirri on opercular edge of gill opening on both sides; dense cirri over much of ventral part of head; exposed surface of scales overlaid with soft tissue; only tips of cirri visible at scale margins, capped with soft tissue; lateral-line scales with fleshy cirri, often one above and one below pore (cirri better developed on ocular than blind side); scattered other scales with a slender fleshy cirrus, often one from each corner of scale; membranous ridges of both sides of dorsal and anal rays with a conspicuous fringe of cirri, some of which are bifid; lateral line aligned with upper eye; longest dorsal ray 1.65–1.8 in HL; caudal fin rounded, its length 4.6–5.05 in SL; pelvic fins short, 1.8–2.2 in HL, the tip of longest ray reaching base of second anal ray; ocular side light brown, with scattered small dark brown blotches; rays of fins with small dark brown spots. Largest specimen, 102 mm SL.

Description. Dorsal rays 69 (62–70); anal rays 51 (46–52); dorsal and anal rays branched, most double-branched in large specimens; caudal rays 18, branched, the middle 16 double-branched; pelvic rays 5, double-branched; lateral-line scales on ocular side 67 (62–68), including 8–9 anterior to a vertical at upper end of gill opening; scales above lateral line on ocular side to dorsal-fin base about 21; scales below lateral line to anal-fin base about 23; vertebrae 37 (five paratypes with 37, two with 36, and one with 38); dorsal pterygiophores anterior to fourth neural spine 9 (8–9); only the erisma (counted as the first dorsal pterygiophore before tip of second neural spine) about twice as thick as remaining pterygiophores, its inner third narrowly branched; next 5 (5–6) pterygiophores in space between second and third neural spines; space between third and fourth neural spines with 3 (2–3) pterygiophores; total pterygiophores before fourth neural spine 9 (five paratypes with 9, and four with 8); ventroanterior margin of urohyal forming an angle of about 55°, the corner only slightly rounded.

Body depth 2.55 (2.4–2.65) in SL; body width 5.45 (4.85–5.45) in body depth; ventral profile of head posterior to mouth nearly straight; head short, its length 4.85 (4.75–5.05) in SL; snout length 2.55 (2.45–2.5) in HL; eye diameter 4.95 (4.6–5.7) in HL; least vertical interorbital width 10.2 (7.3–13.7) in HL; upper eye overlapping anterior one-third to one-half of lower eye; upper end of gill opening on a horizontal passing about an eye diameter ventral to lower eye; no caudal peduncle (base of lowermost caudal ray ending above base of last anal ray); depth of body at base of caudal fin 1.35 (1.25–1.45) in HL.

Front of upper lip not overlapping lower lip when mouth closed; maxilla extending to below anterior margin of pupil, the upper jaw length (blind side) 3.45 (3.25–3.45) in HL; blind side of upper and lower jaws with a dense band of slender, inward-projecting, slightly curved teeth in a maximum of about 8 rows; no teeth on ocular side of jaws; anterior nostril a short membranous tube, tapering very little, anterior to upper edge of lower eye, and not reaching edge of eye when laid back; posterior nostril a slit in labial groove in front of upper half of lower eye; anterior nostril of blind side a membranous tube above anterior third of upper lip; posterior nostril of blind side dorsoposterior to anterior nostril; internarial distance about two-thirds eye diameter.

Surface of scales smooth, the ridges of cteni covered with cutaneous tissue; free margin of scales angular (though posterior end not acutely pointed); only tips of cteni of scales visible at scale margin (up to 14 on holotype), each covered with soft tissue; 2 (2–4) rows of scales in interorbital space, with another 2–3 rows extending medially and anteriorly onto eyes; no pores detected beneath scales on ocular side of body; scales on ocular side of head progressively smaller anteriorly, replaced at front of snout and ventrally on head with band of dense cirri nearly eye diameter in width; cirri at front edge of snout very small, those of ventral edge of head longer and more lappet–like, the longest nearly pupil diameter in length, a few branched at tips; a broader band of dense cirri anteriorly on blind side of head, around mouth, and extending in a zone along supratemporal branch of lateral line, which continues, progressively less distinct, onto about anterior half of body; band of cirri at edge of operculum on both sides, a dense fringe along gill opening; lateral-line scales with cirri, usually one above and one below the pore; scattered other scales with cirri, generally one at each corner; dorsal end of gill opening on a horizontal line passing about an eye diameter below lower eye. Lateral line straight midlaterally on both sides, projecting on ocular side toward upper eye.

Dorsal and anal fins with a basal sheath of 2 rows of scales; dorsal and anal rays on both sides with a fleshy lengthwise ridge bearing a fringe of prominent cirri; ridges on rays less developed posteriorly and with fewer cirri, especially on blind side; scales on basal half of caudal fin progressively smaller distally.

Origin of dorsal fin anterior to upper eye, the predorsal length 4.5 (4.0–4.65) in HL; first dorsal ray 3.0 (3.1–3.55) in HL; longest dorsal ray 1.7 (1.65–1.8) in HL; origin of anal fin below base of seventeenth

dorsal ray and slightly posterior to end of opercular membrane, the preanal length 3.85 (3.8–4.05) in SL; length of first anal ray 2.8 (2.5–2.95) in HL; longest anal ray 1.7 (1.6–1.8) in HL; caudal fin rounded, 4.6 (4.6–5.05) in SL; anus directly before first anal ray, preceded by fan–like semicircle of plicate tissue; genital papilla on ocular side of anus, its length nearly three-fourths eye diameter in holotype; bases of pelvic fins adjacent anteriorly, diverging posteriorly, the ocular-side fin a little before blind-side fin; pelvic fins not joined by membrane or to genital papilla; third pelvic ray of each fin longest, reaching to base of second anal ray, 2.05 (1.85–2.0) in HL.

Colour of ocular side of holotype in alcohol light brown with many small dark brown blotches, some stellate or cross-shaped; fins pale yellowish with small dark brown spots along rays, most spots coinciding with one or a clump of cirri (see below).

Etymology. This species is named *lenisquamis* from the Latin *lenis* for soft or smooth and *squama* for scale, in reference to the distinctive scale structure. The cteni of the scales are nearly covered by soft epidermal tissue, with only the tips exposed at the scale margin.

Remarks. Kuiter (1993: 391) figured two specimens as *Aseraggodes* sp., his upper figure labelled as the estuarine form, and the lower as coastal form. Upper figure (NMV A 25543–002, 82.5 mm SL) is included here as a paratype. When fresh, it was orangish brown with diffuse blackish blotches, the three along lateral line and one above the first blotch the largest; head and body with numerous, small, very irregular, dark-edged whitish spots; fin rays grey-brown with small dark-edged whitish spots, the ray tips white. The colour of the lower figure is very different, mottled lighter brown, likely to have been collected from a paler sand bottom.

This species was collected from sand in bays in NSW from depths of 4–10 m. It is among the most distinctive of the genus because of its angular and smoother scales and the profusion of fleshy cirri, in particular those on most of the lateral-line scales.

The covering of the ctenii of the scales by soft tissue except the small tips is also found in *A. normani*, but its scales have a rounded posterior margin instead of an angular one. It is easily distinguished from *lenisquamis* in other characters such as the branching of its lateral line on the ocular side of the head, its unbranched dorsal and anal rays, and the pelvic fins joined to the base of the genital papilla.

Aseraggodes lenisquamis is most similar to *A. nigrocirratus*, described below (see Remarks for the latter species).

The lower figure of this species in Kuiter (1993) mentioned above, was not identified initially as *A. lenisquamis* because of the broad interorbital space and the upper eye being almost directly over the interorbital space. However, the specimen was found as NMV A5827, 88 mm SL, from its shape, details of colour, and a distinct small tear in the caudal fin. The interorbital of the preserved specimen is much narrower, and the upper eye is more forward. A similar shrinkage of the interorbital with preservation was found in the holotype of *A. auroculus*.

Aseraggodes magnoculus sp. nov.

Figure 10, Tables 1–3, 8

Holotype. ROM 64830, 39.8 mm, New Caledonia, Isle Ua, E side, 22°42'40"S, 166°48'50"E, steep slope of fringing reef, with coral rock, rubble, and sand at base, 9–18 m, rotenone, R. Winterbottom and P. Tirard, 13 Sep 1991.

Paratypes. ROM 76686, 29.2 mm, New Caledonia, just inside barrier reef (Recif Mbere) NW of Dumbéa Pass, 22°20'30"S, 166°14'5"E, large *Porites* coral head surrounded by sand, 3–6.5 m, rotenone, R. Winterbottom, G. Klassen and P. Tirard, 11 Sep l991; BPBM 39691, 31.3 mm, same data as holotype.

Diagnosis. Dorsal rays 67–72; anal rays 51–53; dorsal rays branched except anterior 16–24 rays; anal rays branched; lateral-line scales 71–76, including 7–8 anterior to a vertical at upper end of gill opening; vertebrae 36; dorsal pterygiophores anterior to fourth neural spine 10; body depth 2.45–2.5 in SL; HL 4.15–4.3 in SL; eye diameter 3.95–4.2 in HL; upper eye overlapping about anterior one-third to one-half of lower eye; interorbital space narrow, the vertical distance separating eyes about one-third to one-sixth eye diameter; no caudal peduncle; very fine cirri on ventral edge of head; lateral line aligned with ventral edge of upper eye; longest dorsal ray 1.4–1.45 in HL; caudal fin rounded, its length 3.9–3.95 in SL; pelvic fins

Table 8. Proportional measurements of type specimens of *Aseraggodes magnoculus* as percentages of standard length

	Holotype	Paratype	Paratype
	ROM 64830	ROM 76686	B P B M 39691
Standard Length (mm)	39.8	29.2	31.3
Body depth	40.9	39.7	40.2
Body width	7.9	7.8	7.6
Head length	23.2	24.0	24.1
Snout length	8.9	9.3	9.2
Preorbital length	7.7	7.5	8.8
Eye diameter	5.5	5.8	6.1
Interorbital width	1.0	1.0	1.9
Upper-jaw length	7.5	7.5	7.4
Caudal-base depth	13.8	14.3	13.3
Predorsal length	6.3	6.2	6.1
Preanal length	26.6	27.5	26.9
Prepelvic length	20.6	21.0	21.8
First dorsal ray	7.3	7.5	7.0
Longest dorsal ray	16.8	16.6	17.2
First anal ray	8.8	8.7	8.9
Longest anal ray	15.8	15.8	16.6
Caudal-fin length	25.2	25.7	broken
Pelvic-fin length	12.8	12.6	12.6

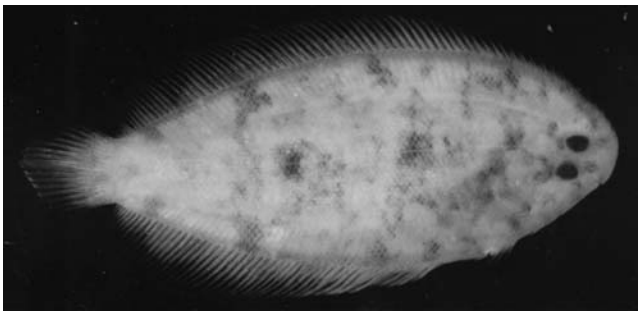

Figure 10. Holotype of *Aseraggodes magnoculus*, ROM 64830, 39.8 mm, New Caledonia.

1.8–2.0 in HL, the tip of longest ray reaching base of second or third anal ray; colour of ocular side in alcohol light yellowish brown with 3 rows of dark brown blotches, one row below base of dorsal fin, one above base of anal and pelvic fins, and one with two largest blotches well-spaced on lateral line; other brown markings mainly vertically elongate, some enclosing small irregular areas of ground colour; fins pale yellowish except for faint dark blotches along base.

Description. Dorsal rays 72 (67–70); anal rays 53 (51–52); dorsal rays branched except first 16 (first 23–24 of paratypes); anal rays branched; caudal rays 18, the middle 16 branched, but not double-branched; pelvic rays 5, branched; rays of fins slender, the branches not broadly separated; lateral-line scales 71 (72–76), including 7–8 anterior to a vertical at upper end of gill opening; scales above lateral line on ocular side to dorsal-fin base 21–22; scales below lateral line to anal-fin base 23–24; vertebrae 36; erisma (counted as the first dorsal pterygiophore) about twice as thick as remaining pterygiophores, its inner half narrowly branched; next pterygiophore before tip of second neural spine; space between second and third neural spines with 5 pterygiophores; space between third and fourth neural spines with 3 pterygiophores (total of 10 dorsal pterygiophores anterior to fourth neural spine); ventroanterior margin of urohyal strongly curved, the two limbs, if projected, forming an angle of about 60°.

Body depth 2.45 (2.5) in SL; body width (thickness) 5.2 (5.1–5.3) in body depth; ventral profile of head posterior to mouth very slightly convex; HL 4.3 (4.15) in SL; snout length 2.6 in HL; eyes large, 4.2 (3.95–4.15) in HL; interorbital space very narrow, the least vertical interorbital width 23.2 (12.7–24.0) in HL; upper eye overlapping anterior one-fourth to one-third of lower eye; upper end of gill opening on a horizontal passing slightly ventral to lower eye; no caudal peduncle (base of last anal ray posterior to base of lowermost caudal ray); depth of body at base of caudal fin 1.7 (1.7–1.8) in HL.

Snout slightly overhanging lower jaw; maxilla nearly reaching to below center of eye, the upper jaw length (blind side) 3.1 (3.2–3.25) in HL; blind side of upper and lower jaws with a dense band of villiform teeth, obscured laterally because of a labial fold; no teeth on ocular side of jaws; tapering tubular anterior nostril of ocular side membranous, before upper edge of eye just above upper lip, nearly reaching anterior edge of pupil when laid back, its length equal to eye diameter; posterior nostril a slit in labial groove in front of lower eye; anterior nostril of blind side a slender tube only about twice as long as surrounding papillae, just above middle of upper lip; posterior nostril of blind side an opening covered by a triangular papilla-like structure, dorsoposterior to anterior nostril; internarial distance nearly equal to eye diameter.

Scales ctenoid on both sides (except partially embedded scales of lateral line); scales of ocular side of body with up to 10 cteni; only 1 or 2 rows of scales in interorbital space, with about another 5 rows extending onto medial and anterior part of each eye; scales on ocular side of head smaller anteriorly, replaced on snout by longitudinal rows of small fleshy papillae; scales on blind side of head anterior to a transverse demarcation just posterior to end of jaws replaced by a dense zone of fleshy papillae, largest above posterior half of upper lip; only fine cirri at front edge of snout and along ventral part of head. Lateral line straight midlaterally on both sides, projecting on ocular side toward middle of upper eye; lateral line of blind side altering to a row of sensory papillae on head (separated from surrounding papillae by a narrow papilla-free zone on ventral side that curves on head to tip of snout; supratemporal branch of lateral line on blind side of head clearly visible as a similar row of low sensory papillae just below basal sheath of scales on dorsal fin, less obvious on body posterior to head.

Dorsal and anal rays each with a lengthwise thin membranous ridge, narrowing distally, less developed posteriorly; membranous ridges without cirri; small scales basally on ocular side of dorsal fin before about 15th ray, progressively fewer scales approaching 15th ray; anterior part of dorsal fin on blind side with small papillae, progressively fewer posteriorly, and absent after about the 24th ray.

Origin of dorsal fin anterior to upper eye, the predorsal length 3.7 (3.9–3.95) in HL; first dorsal ray (tip not free; tips of next few rays visible) 3.8 (3.7–3.95) in HL; longest dorsal ray 1.45 (1.4) in HL; origin of anal fin below base of seventeenth dorsal ray, slightly posterior to end of opercular membrane, the preanal length 3.75 (3.65–3.7) in SL; length of first anal ray 3.75 (3.65) in HL; longest anal ray 1.45 (1.45–1.5) in HL; caudal fin rounded, 3.95 (3.9) in SL; pelvic fins adjacent on ventral edge of body, third and fourth pelvic rays longest, reaching to base of third anal rays, 1.8 (1.9) in HL; anus anterior to first anal ray; genital papilla short, dorsoposterior to anus, and not connected by membrane to ocular-side pelvic fin.

Colour of holotype in alcohol: ocular side light yellowish brown with 3 rows of dark brown blotches, one below base of dorsal fin, one above base of anal and pelvic fins, and one midlateral, the two largest blotches well-spaced on lateral line; other lighter brown markings irregular, mainly transversely elongate, some enclosing small areas of lighter ground colour; fins pale yellowish except for faint dark blotches along base; blind side uniform pale yellowish.

Etymology. This species is named *magnoculus* from the Latin *magnus* for large and *oculus* for eye, in reference to its having the largest eyes, relative to the head length, of any species of the genus examined.

Remarks. *Aseraggodes magnoculus* is described from three small specimens collected in two stations from sand and rubble in coral-reef areas of New Caledonia within the depth range of 3–18 m. No gonad was detected in the largest specimen, so it may be immature. *Aseraggodes auroculus*, described above, appears to be the most similar species to *A. magnoculus*. The two share the same body depth, large eyes, and number of vertebrae, dorsal pterygiophores anterior to the fourth neural spine, dorsal rays, and lateral-line scales. *A. auroculus* differs in having a higher count of anal rays (56 or 57, compared to 51–53 for *magnoculus*), a larger head (hence the eye size relative to the head is smaller than that of *magnoculus*), and in having shorter fins.

Aseraggodes melanostictus (Peters, 1877)

Figure 11, Tables 1–3

Solea melanosticta Peters, 1877: 845
Aseraggodes melanostictus.—Randall and Bartsch, 2005: figs. 3–5

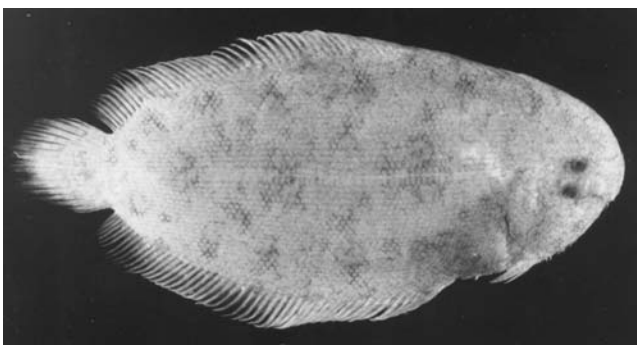

Figure 11. *Aseraggodes melanostictus*, AMS I.24499–003, 86.5 mm, North Reef, Great Barrier Reef.

(of holotype).

Type locality. Bougainville

Diagnosis. Dorsal rays 74–75, unbranched; anal rays 53–54, unbranched; caudal rays 18 (uppermost and lowermost 2 rays simple, middle 12 double-branched); pelvic rays 5, unbranched; lateral-line scales on ocular side 78–79, including 9 anterior to a vertical at upper end of gill opening; scales of ocular side of body with 12–16 cteni; scales anteriorly on head progressively shorter, with fewer cteni, modified to small flattened papillae, each with a small flat brown cirrus in zone anteriorly on snout; no broad lappet–like cirri at front of snout or on ventral edge of head, instead cylindrical cirri of variable size, the longest less than pupil diameter; well-spaced slender cirri on opercular edge of gill opening on both sides; vertebrae 38; dorsal pterygiophores anterior to fourth neural spine 11–13; body depth 2.3–2.35 in SL; HL 4.35–4.5 in SL; snout slightly overhanging lower lip when mouth closed; lateral line directed anteriorly toward dorsal edge of upper eye; eye diameter 6.4–6.8 in HL; upper eye overlapping anterior one-half to three-fourths of lower eye; least vertical interorbital space 8.3–8.6 in HL; upper end of gill opening at level of ventral edge of lower eye; no caudal-peduncle; depth at base of caudal fin 1.5–1.65 in HL; longest dorsal ray 1.45 in HL; caudal fin rounded, 5.1–5.8 in SL; ocular-side pelvic fin on ventral edge of body, its base slightly anterior to that of fin of blind side; third pelvic ray longest, 2.0–2.8 in HL, the tip reaching base of second anal ray; lengthwise membranous ridge on dorsal rays of both sides, progressively reduced posteriorly; small scales on about basal half of membranous ridge of anterior dorsal rays of ocular side; edge of membranous ridge of about first 15 blind-side dorsal rays with prominent cirri; colour of ocular side in alcohol light brown, the scale edges darker than centers, with faint irregular dark–edged pale markings over head and body, and very irregular dark brown blotches, most much larger than eye, the two largest on lateral line to either side of middle of body; fins with dark dots. Largest of two known specimens, 86.5 mm SL.

Remarks. Randall and Bartsch (2005) described a specimen from Kwajalein Atoll, Marshall Islands identified as *Aseraggodes melanostictus* by Woods in Schultz and collaborators (1966) from Kwajalein Atoll, Marshall Islands as a new species, *A. heraldi*. They illustrated an x-ray and two photographs of the holotype of *melanostictus* from the Museum für Naturkunde in Berlin (ZMB 9814, 74 mm SL) and listed differences from *A. heraldi*, notably its having unbranched dorsal and anal rays.

The holotype of *A. melanostictus* was collected in 73 m off the island of Bougainville. A second specimen, AMS I.24499-003, 86.5 mm, sent on loan from the Australian Museum, is provisionally identified as this species. It was dredged in 115 m NE of North Reef of the Great Barrier Reef (23°8'S, 152°12'E) by W. Ponder et al. on 14 Dec 1977. It differs in having 13 instead of 11 dorsal pterygiophores anterior to the fourth neural spine, and in some proportional measurements, but none clearly beyond expected infraspecific variation.

Aseraggodes nigrocirratus sp nov.

Figure 12, Tables 1–3, 9

Holotype. AMS I.26535-001, female, 79.0 mm, Australia, NSW, SE of Evans Head, off Iluka, 29°20'S, 153°29'E, 40–51 m, trawl, FRV "Kapala", 24 May 1986.

Paratypes. AMS I.321, 89.4 mm, Australia, NSW, Sydney, Port Jackson, 33°51'S, 151°16'E, 1886; AMS I.636, mature female, 68.8 mm SL, Australia, NSW, Sydney, Port Jackson, 33°51'S, 151°16'E, J.

Table 9. Proportional measurements of type specimens of *Aseraggodes nigrocirratus* as percentages of standard length

	Holotype		Paratypes			
	AMS I.26535	BPBM 39610	AMS IA.5449	AMS IA.5449	AMS I.636	AMS I.321
Standard Length (mm)	79.0	52.3	55.0	56.8	68.8	89.4
Body depth	41.0	38.2	39.7	40.7	42.5	42.7
Body width	8.1	7.6	7.1	7.2	7.6	7.7
Head length	21.7	21.0	21.4	21.3	20.8	21.3
Snout length	7.4	7.5	7.2	7.3	7.3	7.2
Preorbital length	6.2	6.1	5.9	6.0	5.9	5.8
Eye diameter	3.7	4.0	3.8	3.7	3.7	3.4
Interorbital width	2.0	1.9	2.1	2.1	2.2	2.2
Upper-jaw length	6.3	6.0	6.4	6.3	6.1	6.4
Caudal-base depth	13.9	12.8	13.2	14.1	14.7	14.6
Predorsal length	5.7	6.1	5.7	5.8	5.7	5.6
Preanal length	26.6	25.7	26.5	26.8	24.8	25.6
Prepelvic length	19.2	20.3	19.8	19.3	19.9	19.4
First dorsal ray	7.8	7.1	7.5	8.1	8.0	7.6
Longest dorsal ray	12.7	13.3	13.5	13.2	13.2	12.0
First anal ray	7.7	7.9	8.0	8.5	7.8	7.3
Longest anal ray	12.6	13.3	13.7	13.1	13.2	12.1
Caudal-fin length	21.4	23.0	23.2	broken	23.1	20.8
Pelvic-fin length	10.7	11.2	11.6	11.4	10.9	10.5

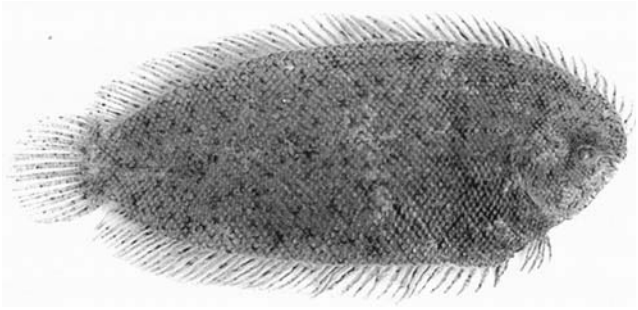

Figure 12. Holotype of *Aseraggodes nigrocirratus*, AMS I.26535–001, 79.0 mm SL, off Iluka, NSW (K.J. Graham).

Hunt, 1886; AMS IA.5449, 2: 55.0–56.8 mm, NSW, Pittwater, 33°38'S, 151°18'E, dredge, M. Ward, 1932; NMV A 21382, 61 mm, Sydney, Coogee Beach, 33°55'S, 151°15'E, R.H. Kuiter, 26 Jan 1980; AMS I.26535-008, 2: 65.5–82 mm, and ROM 77681, 67 mm, same data as holotype.

Diagnosis. Dorsal rays 63–68; anal rays 47–53; most dorsal and anal rays branched; lateral-line scales 61–67, including 8–9 anterior to a vertical at upper end of gill opening; one to three pores beneath some scales on ocular side of body near base of dorsal and anal fins; vertebrae 36–38; dorsal pterygiophores anterior to fourth neural spine 8–9; body depth 2.35–2.65 in SL; head short, length 4.7–4.85 in SL; upper lip not overlapping lower lip when mouth closed; no prominent cirri on ventral edge of head; lateral line aligned with dorsal third of upper eye; eye diameter 4.6–6.25 in HL; upper eye overlapping anterior half to two-thirds of lower eye; interorbital space narrow, the vertical distance separating eyes about half eye diameter; no caudal peduncle; longest dorsal ray 1.5–1.75 in HL; caudal fin slightly pointed, its length 3.95–4.8 in SL; pelvic fins 1.8–2.0 in HL, the tip of longest ray reaching base of third anal ray; ocular side light brown with numerous small variable dark brown spots of variable size, some in form of a small cross; cirri on lengthwise membranous ridge of rays of dorsal and anal fins dark brown (appearing as small dark spots without magnification).

Description. Dorsal rays 64 (63–68); anal rays 49 (47–53); dorsal and anal rays unbranched (none double-branched), except unbranched first 9 dorsal and anal rays (first 19 dorsal and anal rays and last few rays of 43.6-mm paratype); caudal rays 18, branched, middle 16 double-branched; pelvic rays 5, branched; lateral-line scales on ocular side 65 (61–67), including 8–9 anterior to a vertical at upper end of gill openingl scales above lateral line to dorsal-fin base on ocular side about 20; scales below lateral line to anal-fin base about 24 (23–24); vertebrae 37 (two paratypes with 36, five with 37, and two with 38); erisma (counted as the first dorsal pterygiophore) about twice as thick as remaining pterygiophores, its inner two-thirds branched; only erisma before the second neural spine; space between second and third neural spines with 5 pterygiophores; space between third and fourth neural spines with 3 (2–3) pterygiophores, total 9 (8–9) dorsal pterygiophores anterior to fourth neural spine; ventroanterior margin of urohyal forming an angle of about 80° (65–80°), the corner slightly rounded.

Body depth 2.45 (2.35–2.65) in SL; body width 5.05 (5.05–5.85) in body depth; dorsal profile of head slightly more convex than ventral; HL 4.6 (4.7–4.85) in SL; snout length 2.95 (2.7–3.0) in HL; preorbital length 3.5 (3.3–3.75) in HL; eye diameter 5.85 (4.6–6.25) in HL; least vertical interorbital width 10.8 (8.9–11.1) in HL; upper eye overlapping anterior one-half to four–fifths of lower eye; upper end of gill opening on a level one-half to one eye diameter below ventral edge of lower eye; no caudal peduncle (base of lowermost caudal ray above or slightly anterior to base of last anal ray); depth of body at base of caudal fin 1.55 (1.4–1.75) in HL.

Front of upper lip not overlapping lower lip when mouth closed; maxilla extending slightly posterior to a vertical at front edge of lower eye, the upper jaw length (measured on blind side) 3.45 (3.3–3.6) in HL; blind side of upper and lower jaws with a dense band (broader posteriorly) of slender, inward-projecting, slightly curved teeth, up to about 7 rows in lower jaw and 5 or 6 in upper jaw (teeth on upper jaw beneath a thin labial fold, hence difficult to see); anterior nostril a tapering membranous tube anterior to upper edge of lower eye, just reaching fleshy base of orbit when laid back (reaching to edge of eyeball in smaller paratypes), its length in holotype about three-fourths eye diameter; posterior nostril an oblique slit in labial groove in front of base of lower eye; anterior nostril of blind side a slender membranous tube just above anterior third of upper lip; posterior nostril of blind side a short strongly tapering membranous tube dorsoposterior to anterior nostril; internarial distance on blind side about three-fourths eye diameter.

Scales ctenoid on both sides (cycloid on lateral line and partially embedded); scales of ocular side of body usually with 8–10 cteni (up to 12 in largest paratype); one to three pores beneath somc scales on ocular side of body near base of dorsal and anal fins; 3 rows of scales in interorbital space, with about another 3 rows extending onto medial and anterior part of each eye; scales on ocular side of head progressively smaller anteriorly and ventrally, the most anterior at front of snout very small and without cteni; fleshy front of snout with small short cirri on edge; scales on blind side of head gradually replaced anteriorly by papillae, ending with small slender papillae on edge of snout; broad zone of small fleshy papillae on blind side dorsal to upper jaw; ventral edge of head with cirri as long as half eye diameter; no cirri along edge of operculum at gill opening on either side. Lateral line straight midlaterally on both sides of body, directed on ocular side toward dorsal third of upper eye; supratemporal branch of lateral line on blind side of head faintly visible, continuing dorsally 2 to 3 scale rows below dorsal fin, persisting to about middle of body.

Dorsal and anal fins with a basal sheath of 2 to 3 rows of scales; lengthwise thin membranous ridge basally on dorsal and anal rays with well-spaced dark brown cirri on free edges except posterior rays; small scales basally on membranous ridges of anterior dorsal rays on both sides (first 19 rays of holotype), the height of the scale bands progressively shorter posteriorly; about basal third of caudal fin with scales on both sides, with small, well-spaced, isolated scales, with a few prominent cteni on each side of rays to within outer third of fin.

Origin of dorsal fin anterior to lower fourth of upper eye, the predorsal length 3.8 (3.25–3.8) in HL; first dorsal ray 2.8 (2.6–2.95) in HL; longest dorsal ray 1.7 (1.5–1.75) in HL; origin of anal fin below base of fifteenth or sixteenth dorsal ray and about one-half eye diameter behind posterior end of operculum, the preanal length 3.8 (3.75–4.15) in SL; length of first anal ray 2.8 (2.5–2.9) in HL; longest anal ray 1.7 (1.5–1.75) in HL; caudal fin slightly pointed, relatively shorter with growth, 4.7 (3.95–4.8) in SL; ocular-side pelvic fin on ventral edge of body; base of blind-side fin adjacent anteriorly, its origin slightly posterior to ocular-side fin; third pelvic ray of each fin longest, reaching to base of third anal ray, 2.0 (1.8–2.0) in HL; anus directly before base of first anal ray at end of short semicircular column of ridged fleshy tissue, an upper anterior triangular part covering opening; genital papilla on ocular side of base of first anal ray, very large, its length equal to orbit diameter; membrane from near base of last pelvic ray of ocular side joined to extreme base of genital papilla.

Colour of holotype in alcohol: ocular side light grey-brown with numerous small dark brown spots on head, body, and basal scaly part

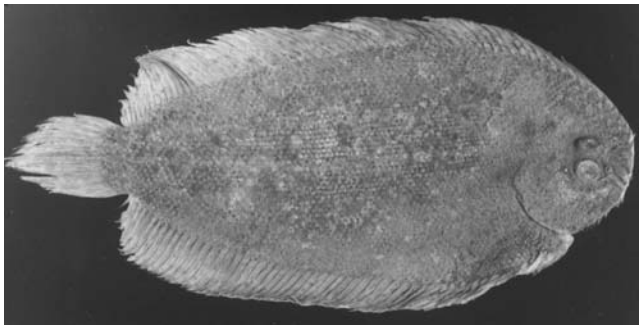

Figure 13. Holotype of *Aseraggodes normani*, BMNH 1925.7.22.73, 109 mm SL, Queensland.

of caudal fin, some as small dark crosses from dark edges of adjacent scales; dorsal and anal fins with translucent membranes, the rays light yellowish brown, most with 1–3 small dark brown spots associated with a fleshy cirrus; naked part of caudal fin like dorsal and anal fins, but small dark spots on the rays without a cirrus; blind side of body pale yellowish, slightly dusky in a broad peripheral zone. Figure 12 taken of a fresh specimen, very similar to colour in preservative; pale spots on figure from missing scales.

Etymology. Named *nigrocirratus* from the Latin, in reference to the black cirri on the dorsal and anal rays of the ocular side of this species.

Remarks. Aseraggodes nigrocirratus is presently known only from NSW from latitudes 29°20'S to 33°55'S, from inshore to about 50 m.

Randall and Meléndez (1987) mentioned this species in their description of *Aseraggodes bahamondei* as probably undescribed, noting that it also has pores under some scales of the ocular side near the base of the dorsal and anal fins. They attributed the presence of these pores in *bahamondei* to the production of a strong skin toxin, probably comparable to that of the species of *Pardachirus* (Clark and George, 1979).

Although *Aseraggodes bahamondei* is similar in its colouration, general morphology, and the low number of dorsal pterygiophores anterior to the fourth neural spine to *A. nigrocirratus*, it is readily distinguished by having a caudal peduncle (though this difference is actually very slight), 39 to 40 vertebrae, 75–86 lateral-line scales, and by attaining a significantly larger maximum size of at least 156 mm SL.

Of the known species of the genus, *A. nigrocirratus* is most similar to *A. lenisquamis*, described above. The two have the same vertebral count (36–38), the same number of dorsal pterygiophores anterior to the fourth neural spine (8–9), and nearly the same number of dorsal and anal rays and lateral-line scales (see Tables 1–3). They differ mainly in the structure of the scales. Those of *nigrocirratus* are typical of most species of the genus, with prominent cteni that project well beyond the posterior margin of the scales, and the exposed surface of the scales with a pattern like miniature scales. The scales of *lenisquamis* are generally more pointed posteriorly and are covered with soft cutaneous tissue, such that only the tips of the cteni project beyond the scale margins (each capped with soft tissue). Also the lateral-line scales and scattered other scales of *lenisquamis* have small fleshy cirri. Three different proportional measurements of the two species are evident in Tables 7 and 9. *A. lenisquamis* has a longer snout, broader caudal-fin base, and is broader, and shorter caudal fin.

Six specimens of AMS I.24035-003, 42.0–52.3 mm SL, collected in 1 m at Wagstaff Point, Brisbane Waters, NSW, 33°28'S, 151°21'W, in 1982 include four provisionally identified as *A. nigrocirratus* and two of about 45 mm SL that appear to be hybrids of *A. lenisquamis* and *A. nigrocirratus*. The latter two specimens have scales of both types, though mainly those typical of *A. lenisquamis*, and only a few short cirri on lateral-line scales near the middle of the body. Both specimens are misshapen and difficult to measure. The four specimens identified as *A. nigrocirratus* are excluded from the type series.

Similarly, the two specimens of AMS I.38279-001, 79.4–83.0 mm, collected by trawl in 48 m off the Clarence River, NSW at 29°19.5'S, 153°24'E, include one of *A. lenisquamis* (the larger) and one that is regarded as a hybrid of *A. nigrocirratus* and *A. lenisquamis*. This lot is also undivided, and the specimen of *lenisquamis* is not designated as a paratype. The presumed hybrid has scales characteristic of each of the species, and it is intermediate in the three proportional measurements that are diagnostic.

Aseraggodes normani Chabanaud

Figure 13, Tables 1–3

Aseraggodes melanostictus.—Norman, 1926: 290, fig. 12 (off Gladstone, Queensland) (non Peters)

Aseraggodes normani Chabanaud, 1930: 241.

Material examined. Queensland: BMNH 1925.7.22.73, 109 mm, holotype of *Aseraggodes normani*. WSW of Townsend Island, 22°21.5'S, 150°25'E, AMS I.34377-005, 83 mm. 2 km NE of Cape Clinton, 22°32'S, 150°48'E, AMS I.34399-032, 93.5 mm. 2 km NE of Cliff Point, 22°35'S, 150°49'E, AMS I.34361-024, 3: 74.5–89 mm. Off Gladstone, AMS IA.2993, 104.5 mm. Off Bustard Head, 24°1'S, 151°46'E, AMS IB.1105, 97.5 mm. Moreton Bay, AMS I.484, 116 mm.

Type locality. Coast of Queensland.

Diagnosis. Dorsal rays 64–71, anal rays 50–52; dorsal and anal rays unbranched (Chabanaud incorrect in reporting bifid tips); pelvic rays 5; caudal rays 18, 14 branched; lateral-line scales 68–73 (counted to origin of dorsoanterior branch on head); only tips of cteni projecting beyond posterior edge of scales, with at most 8 cteni tips posteriorly on body, fewer anteriorly); eyes separated by 3 rows of scales at narrowest place, with an additional row medially and anteriorly on each eye; vertebrae 35–36 (usually 35); dorsal pterygiophores anterior to fourth neural spine 10–11; body depth 2.3–2.55 in SL; HL 4.4–4.8 in SL; snout length 2.3–2.5 in HL; scales anteriorly on head replaced by slender cirri, progressively longer, those at ventral edge of head and front of snout up to three-fourths eye diameter in length; lateral line aligned with dorsal edge of upper eye, ending with a dorsoanterior branch of 7–9 pored scales, straight branch of 4–6 scales, and ventral branch of 7–9 scales; no pores detected beneath scales on ocular side of body; eye diameter 5.0–6.5 in HL; upper eye overlapping anterior one-half to three-fourths of lower eye; narrowest vertical interorbital space 8.2–9.0 in HL; upper end of gill opening at level of

ventral fleshy edge of lower eye; tubular anterior nostril broad, not reaching fleshy base of lower eye when laid back; no caudal peduncle; depth at base of caudal fin 1.55–1.8 in HL; caudal fin rounded, its length 4.1–4.5 in SL; longest dorsal ray 1.35–1.5 in HL; blind side of dorsal and anal rays with a lengthwise thin membranous ridge, broad at base and narrowing as it extends up to three-fourths ray length anteriorly, progressively shorter and narrower posteriorly; edge of membrane on anterior rays of blind side of dorsal fin with cirri; pelvic fins 1.9–2.05 in HL, the tip of longest ray extending to base of second or third anal ray; ocular-side pelvic fin distinctly anterior and larger than fin of blind side; both fins broadly joined by membrane from their fifth rays and jointly to the large genital papilla about one-half length above its base; colour in alcohol light brown, densely dotted with black and short black scale edges; scattered roundish pale spots smaller than eye variously present, some free of black dots; median fins with black dots, but fewer than on body; one specimen with a few large dark blotches on lateral line and on either side of lateral line. Largest specimen examined, 116 mm SL.

Remarks. Known only from off the coast of Queensland from 22.5° to 27° S, taken by trawls at depths of 15 to 27 m. Norman (1926) reported three specimens, 130–142 mm total length, collected off Queensland during the experimental cruises of R/V "Endeavour", 1909–1914, as *Aseraggodes melanostictus* Peters, previously known from a single specimen taken in 73 m off New Britain. Chabanaud (1930a) found one of Norman's three specimens at the Natural History Museum, London (BMNH). Recognizing it as misidentified, he named it in honour of J.R. Norman. An additional (non-type) "Endeavour" specimen in the Australian Museum was collected off Gladstone, 23°S 151°E on 9 Jul 1910.

Chabanaud (1943) established the valid genus *Synclidopus* for the species *Solea macleayanus*, but he erred in placing *Aseraggodes normani* as a second species of this genus.

Aseraggodes pelvicus sp. nov.

Figure 14, Tables 1–3, 10

Holotype. AMS IB.6134, 67.5 mm, Australia, Queensland, Great Barrier Reef, Swain Reefs, Gilette Cay, rotenone, Australian Museum Expedition, October 1962.

Diagnosis. Dorsal rays 71; anal rays 49; lateral-line scales 81; vertebrae 36; dorsal pterygiophores anterior to fourth neural spine 14; body depth 2.45 in SL; HL 4.75 in SL; eye diameter 6.4 in HL; upper eye overlapping anterior half of lower eye; interorbital space narrow, 12.0 in HL; caudal peduncle present, its depth 1.45 in HL, its length 10.0 in HL; prominent lappet-like cirri on front of snout and ventral edge of head; lateral line aligned with dorsal edge of upper eye; longest dorsal ray 1.25 in HL; membranous edges of anterior dorsal rays with a row of tubercle-like papillae, many with cirri, a few darkly pigmented; caudal fin rounded and moderately long, 3.4 in SL; pelvic fins long, 1.6 in HL, the tip of longest ray reaching base of fifth anal ray; colour of ocular side in alcohol pale yellowish brown with numerous irregular pale spots, none as large as eye, and many smaller brown blotches and dots, the most conspicuous along middle of lateral line.

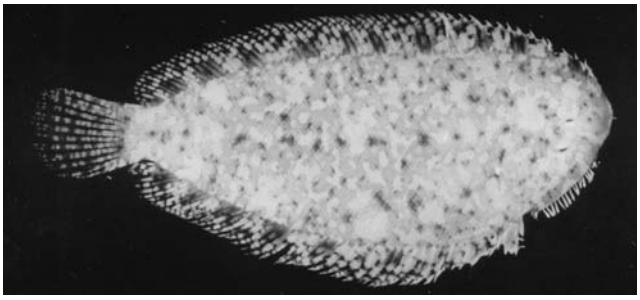

Figure 14. Holotype of *Aseraggodes pelvicus*, AMS IB.6134, 67.5 mm, Swains Reefs, Great Barrier Reef.

Table 10. Proportional measurements of holotype of *Aseraggodes pelvicus* as percentages of standard length

Standard Length (mm)	67.5
Body depth	41.2
Body width	7.8
Head length	21.0
Snout length	7.6
Preorbital length	8.1
Eye diameter	3.3
Interorbital width	2.1
Upper-jaw length	6.7
Caudal-peduncle depth	14.2
Caudal-peduncle length	1.7
Predorsal length	6.5
Preanal length	25.2
Prepelvic length	20.3
First dorsal ray	7.5
Longest dorsal ray	16.5
First anal ray	10.3
Longest anal ray	16.6
Caudal-fin length	29.5
Pelvic-fin length	10.2

Description. Dorsal rays 71, branched except first 9, the tips broadly free; anal rays 49, branched except first; caudal rays 18, the uppermost and lowermost unbranched, the middle 14 double-branched; pelvic rays 5, branched except last ray of blind side; lateral-line scales 81, including 11 anterior to a vertical at upper end of gill opening; scales on ocular side above lateral line to dorsal-fin base 27; scales below lateral line to anal-fin base about 33; vertebrae 37; erisma (counted as the first dorsal pterygiophore) about twice as thick as remaining pterygiophores, its inner three-fourths narrowly branched; next 2 pterygiophores before tip of second neural spine; space between second and third neural spines with 7 pterygiophores; space between third and fourth neural spines with 3 pterygiophores (total of 13 dorsal pterygiophores anterior to fourth neural spine); ventro-anterior margin of urohyal forming an angle of about 80°, the corner slightly rounded.

Body depth 2.45 in SL; body width 5.3 in body depth; HL 4.75 in SL; ventral profile of head below mouth nearly straight; eye diameter 6.4 in HL; least vertical interorbital width 10.0 in HL; a vertical at posterior edge of upper eye (edge of dark eyeball) passing through middle of lower eye; ventral edge of lower eye one-half eye diameter above level of upper end of gill opening; caudal-peduncle depth 1.45 in HL; caudal-peduncle length 10.0 in HL.

Snout not overhanging lower lip when mouth closed; maxilla extending to below middle of lower eye, the upper jaw length (blind side) 3.15 in HL; jaws too firmly closed to obtain details of dentition; anterior nostril a tapering membranous tube anterior to upper edge of lower eye, reaching anterior edge of eye ball when laid back, its length equal to eye diameter; posterior nostril an oblique slit in labial groove directly in front of ventral third of lower eye; anterior nostril of blind side a very slender membranous tube nearly an eye diameter in length just above anterior third of upper lip; posterior nostril of blind side an eye diameter dorsoposterior to anterior nostril, covered by a broadly curved pointed flap on ventral side.

Scales ctenoid on both sides (except those of lateral line, partially embedded); scales of ocular side with 11–14 cteni; 3 rows of scales in interorbital space, with about another 4 or 5 rows extending onto medial and anterior part of each eye; scales on both sides of head progressively smaller anteriorly and ventrally, with fewer cteni, replaced more anteriorly with isolated papillae and at front of snout by cirri; 15 large lappet-like cirri along ventral edge of head below mouth, and several at front of snout; slender well-spaced cirri along edge of opercle at the gill opening on both sides. Lateral line straight midlaterally on both sides, directed on ocular side toward dorsal edge of upper eye; supratemporal branch of lateral line curving at front of head on blind side, continuing posteriorly onto body 2 to 3 scale rows below dorsal fin, becoming obscure posterior to base of about 23rd dorsal ray.

Dorsal and anal fins with a basal sheath of 2 to 3 rows of scales; a thin membranous lengthwise ridge on dorsal and anal rays of both sides, progressively smaller posteriorly; front of dorsal fin on ocular side densely covered with papillae to base of about fourth ray; edge of membranous ridge on rays of about anterior third of dorsal fin with a row of small tubercle-like papillae, most ending in a slender cirrus; rows of similar papillae on anterior dorsal rays of blind side, but without cirri; small scales extending out on anterior dorsal rays, progressively reduced posteriorly, and absent beyond 25th dorsal ray; small tubercle-like papillae on basal part of rays of anal fin on ocular side, disappearing posterior to 20th ray.

Origin of dorsal fin anterior to lower edge of upper eye, the predorsal length 3.25 in HL; first dorsal ray 2.8 in HL; first 5 dorsal rays free of membrane at tips; longest dorsal ray 1.25 in HL; origin of anal fin below base of 22nd dorsal ray and slightly behind posterior end of opercular membrane, the preanal length 4.0 in SL; length of first anal ray 2.05 in HL; longest anal ray 1.25 in HL; caudal fin rounded and moderately long, 3.4 in SL; pelvic fins adjacent on ventral edge of body; ocular-side pelvic fin slightly longer, the second and third pelvic rays longest, reaching to base of fifth anal ray, 2.05 in HL; anus anterior to first anal ray; genital papilla on ocular side of anus, about equal in length to pupil diameter.

Colour of ocular side in alcohol pale yellowish brown with numerous irregular pale spots (probably near-white in life), some approaching eye size; many brown blotches and brown dots (mainly from dark posterior edge of scales) scattered on head and body, the middle three or four of about ten along lateral line the most conspicuous (each covering 4 or 5 lateral-line scales); dorsal, anal, and pelvic fins with pale yellowish rays and translucent membranes; a few isolated cirri of dorsal fin brown; scaled basal part of caudal fin coloured like body, the rest of fin with pale yellowish rays and transparent membranes, except for small scales on rays that are brown; blind side of body pale yellowish brown with no markings.

Etymology. Named *pelvicus* from the Latin *pelvis*, in reference to the long pelvic fins, the longest for species of the genus.

Remarks. This species is known only from the holotype from the Swain Reefs of the Great Barrier Reef of Australia. It appears to be most closely related to *Aseraggodes ramsaii* from Lord Howe Island and New Caledonia and to *A. whitakeri*, wide-ranging in islands of the Pacific. It shares the same counts of vertebrae, dorsal pterygiophores, dorsal rays, and anal rays with these two species. It differs from both in its smaller head, smaller eye, and longer dorsal and pelvic fins. *Aseraggodes ramsaii* has a higher number of lateral-line scales, 86–88, compared to 81 for *pelvicus*, but additional specimens are needed to confirm this difference. The series of small tubercle-like papillae at the edge of the membranous ridges of the dorsal and anal rays, many with a small cirrus, and the long pelvic fins appear to be unique to *A. pelvicus.*

Aseraggodes ramsaii (Ogilby, 1889)

Figure 15, Tables 1–3

Solea ramsaii Ogilby, 1889: 70, pl. 3 fig. 4.
Aseraggodes haackeanus ramsaii — Munro, 1957: 73.
Aseraggodes haackeanus. — Hoese in Allen et al., 1976: 437.
Aseraggodes ramsaii.—Randall and Meléndez, 1987: 105.

Material examined. Lord Howe Island: AMS I.1951, 57 mm, holotype of *Solea ramsaii*; AMS I.5387, 63.5 mm; BPBM 34265, 41.7 mm. New Caledonia: lagoon near SE end of St Vincent Pass (22°2'6"S, 165°57'48"E).

Type locality. Lord Howe Island.

Diagnosis. Dorsal rays 69–72, branched except first 14–22 rays; anal rays 47–50, all but branched; caudal rays 18 (uppermost and lowermost two rays simple, middle 12–14 double-branched); pelvic rays 5; lateral-line scales on ocular side 86–88, including 12 anterior to a vertical at upper end of gill opening; scales with 10–14 cteni; scales progressively shorter anteriorly on head and with fewer cteni; 2 rows of scales in narrowest interorbital space, with small scales in 4 or 5 rows extending onto median and anterior edges of eyes; broad lappet–like cirri on ventral margin of head; vertebrae 36; dorsal pterygiophores anterior to fourth neural spine 13–14 (14 in holotype); body depth 2.4–2.6 in SL; HL 4.45–4.5 in SL; upper lip slightly overhanging lower lip when mouth closed; eye diameter 4.05–4.65 in HL; posterior edge of upper eye over middle of lower eye; interorbital space narrow, the least vertical distance separating eyes 12.3–13.3 in HL; lateral line angling upward anteriorly, directed toward dorsal edge of upper eye; ventral edge of lower eye about one-half eye diameter

Figure 15. *Aseraggodes ramsaii*, BPBM 34265, 41.7 mm, New Caledonia.

above upper end of gill opening; caudal peduncle present, its length 8.1–10.8 in HL; longest dorsal ray 1.65–1.7 in HL; caudal fin rounded, 3.85–3.95 in SL; ocular-side pelvic fin on ventral edge of body and slightly anterior to fin of blind side, the second or third ray longest, 2.3–2.35 in HL, the tip reaching to base of second or third anal rays; small scales extending nearly to dorsal-fin margin anteriorly on both sides, the scale coverage gradually reduced to fifteenth to 20th ray, and absent posteriorly; a thin membranous lengthwise ridge basally on dorsal and anal rays, disappearing posteriorly; a dark brown cirrus occasional on membranous ridges of dorsal rays on ocular side. Colour of holotype in alcohol "pale yellow with many small black spots and short wavy lines on head and body, which on the lateral line take the form of streaks extending from two to five scales" (Ogilby, 1889). Largest of 3 specimens examined, 63.5 mm SL.

Remarks. Munro (1957) regarded *Aseraggodes ramsaii* as a subspecies of *A. haackeanus* (Steindachner). He was followed by Hoese in Allen et al. (1976), who reported two specimens from Lord Howe Island collected from sand outside the lagoon in 5–25 m (specimens not found). Randall and Meléndez (1987) showed that *A. ramsaii* and *A. haackeanus* are readily separated by counts of dorsal rays, anal rays, and lateral-line scales. There is also a consistent difference in the number of dorsal pterygiophores before the fourth neural spine, 14–15 for *ramsaii* and 7–9 for *A. haackeanus*.

Aseraggodes ramsaii is otherwise known from the holotype in the Australian Museum, one other AMS specimen from Lord Howe Island, and one reported here from New Caledonia collected by Michel Kulbicki and the author in 2–4 m. The New Caledonia specimen was first believed to be *Aseraggodes holcomi* Randall, described from five specimens from the Hawaiian Islands. It was reidentified as *A. ramsaii* after comparison with the Lord Howe Island specimens. The two species are very similar, differing in *A. holcomi* having a broader interorbital space (6.8–10.9 in HL, compared to 12.2–13.2 for *ramsaii*), longer pelvic fins (1.85–2.1 in HL, compared to 2.3–2.35 for *ramsaii*), and a higher average count of lateral-line scales (87–96, compared to 86–88 for *ramsaii*).

Aseraggodes whitakeri Woods

Figures 16, 17, Tables 1–3

Aseraggodes melanostictus.—Schultz, 1943: 60 (Hull Island, Phoenix Islands) (non *Aseraggodes melanostictus* Peters).

Aseraggodes whitakeri Woods in Schultz et al., 1966: 71, fig. 150.

Aseraggodes sp.—Wass, 1984: 31 (Taema Bank, Tutuila, American Samoa).

Material examined. Marshall Islands: Rongelap Atoll, USNM 141765, 38 mm (holotype). Caroline Islands: Kapingamarangi Atoll, CAS 205944, 28 mm. Coral Sea: Chesterfield Bank, BPBM 33731, 22 mm. New Caledonia, ROM 64828, 42 mm; ROM 64829, 37 mm; ROM 64831, 21.5 mm. Fiji: Ringgold Islands, BPBM 20863, 32 mm. American Samoa: Tutuila, Taema Bank, BPBM 24113, 43.0 mm; BPBM 24130, 2: 25–25.5 mm. Phoenix Islands: Hull Island, USNM 115223, 34 mm. Society Islands: Moorea, ROM 61360, 14 mm; ROM 61361, 23 mm.

Type locality. Rongelap Atoll, Marshall Islands.

Diagnosis. Dorsal rays 71–78; anal rays 48–53; pelvic rays 5 (3 in one side on one aberrant specimen); caudal rays 18, 14 branched (17 rays, 13 branched in one specimen); lateral-line scales 77–86, including 10–12 anterior to a vertical at upper end of gill opening); most scales of ocular side of body with 8–10 cteni (up to 11 on largest specimens); narrowest interorbital space with 2 scales; eyes with only 1 or 2 scales extending onto medial edge, and only about 3 rows anteriorly; vertebrae 36–38; dorsal pterygiophores anterior to fourth neural spine 14–15; body depth 2.55–2.75 in SL; HL 4.1–4.35 in SL; an overhanging fleshy snout, the lower edge of upper lip usually extending ventral to lower lip and jutting anterior to profile of head below mouth (more evident in smaller specimens); eye diameter 4.7–5.55 in HL; upper eye varying from one-half to full eye diameter anterior to lower eye; interorbital space very narrow, the vertical distance separating eyes less than half eye diameter; caudal peduncle present, its length 7.2–10.0 in HL; ventral edge of head posterior to mouth with 10–19 lappet–like cirri; edge of operculum at gill opening with slender well-spaced cirri on both sides; edge of lengthwise membranous ridges of dorsal and anal rays of ocular side with cirri, reduced and disappearing on about posterior half of fins; cirri also present on rays of blind side, but fewer and restricted to more anterior rays; lateral line aligned with dorsal edge of upper eye; upper end of gill opening in line with ventral fleshy edge of lower eye; anterior nostril reaching fleshy base of lower eye when laid back; caudal fin slightly pointed, its length 3.05–3.65 in SL; longest dorsal ray 1.4–1.8 in HL; anal rays and all but anterior dorsal rays of larger specimens branched

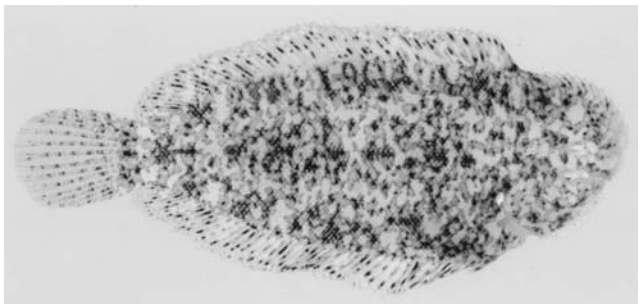

Figure 16. *Aseraggodes whitakeri*, BPBM 24113, 43.0 mm SL, Tutuila, American Samoa.

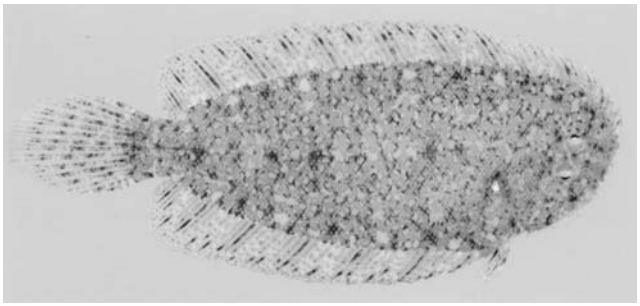

Figure 17. *Aseraggodes whitakeri*, ROM 64828, 42.0 mm SL, New Caledonia (R. Winterbottom)

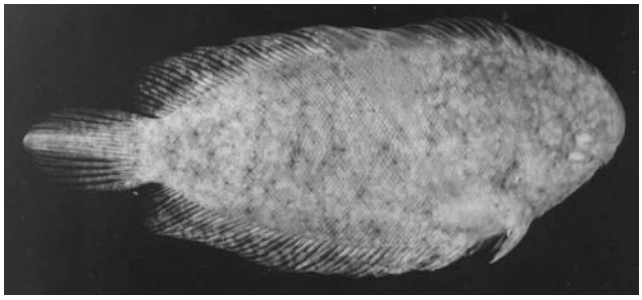

Figure 18. *Aseraggodes diringeri*, ROM 56917, 43.4 mm SL, Mayotte, Comoro Islands (R. Winterbottom).

distally; pelvic fins long, 1.65 –1.85 in HL, the tip of longest ray extending to base of third or fourth anal ray; colour in alcohol of ocular side of most specimens pale tan without any dark markings; specimens from American Samoa with faint dark blotches in 3 rows on the ocular side, one row below base of dorsal fin, one along lateral line, and one above base of anal fin. Yellowish tan with many irregular pale markings partially outlined with dusky brown; fins pale with dusky specks

Remarks. Richard C. Wass recorded the brief colour note (above) on the label of the largest of three specimens, 43 mm SL, that he collected in American Samoa. A photograph of his specimen after 20 years in alcohol is presented as Figure 16. Figure 17 is a photograph of a fresh 42-mm specimen from New Caledonia taken by Richard Winterbottom. Most specimens of this species have an overhanging snout, the tip of the upper lip anterior and ventral to the lower lip, as shown in somewhat exaggerated form in the drawing of the holotype (Woods in Schultz et al., 1966: fig. 150). Unfortunately, Woods placed *Aseraggodes whitakeri* in the couplet of his key beginning with "snout not overlapping tip of the lower jaw", and he wrote in his description, "snout not hooked over lower jaw." He evidently confused this part of his description with that of *A. smithi* Woods. The dorsal-ray count of Woods is corrected from 72 to 76, and the anal-ray count from 51 to 52.

The drawing of the holotype is in error in the relative position of the eyes. The upper eye should overlap only about the anterior tenth of the lower eye. Also the dark blotches of the drawing are in the wrong positions. Those along the dorsal edge of the body should be 5 or 6 dorsal rays anterior to the position depicted. The largest dark blotch on the lateral line is also placed too posteriorly. It should be below the base of the fiftieth dorsal ray.

Wass (1984) reported three specimens from American Samoa. The largest, BPBM 24113, collected on the Taema Bank in 21.5 m, has only 3 rays in the right pelvic fin, a shorter base, and the left fin is shorter than normal. The other two specimens, BPBM 24130, from the same bank, but in 35 m, have normal pelvic fins.

The first specimen of this species was reported by Schultz (1943) from a channel at Hull Island, an atoll in the Phoenix Islands. He wrote, "it may be a specimen of *Aseraggodes melanostictus* (Peters)." The holotype was collected in 6 m from a lagoon coral head at Rongelap Atoll, Marshall Islands by V.E. Brock and E.S. Herald in 1946. A second specimen from Micronesia was taken on a reef flat at Kapingamarangi Atoll in the Caroline Islands. The remaining specimens from the South Pacific are from the Chesterfield Bank in the Coral Sea and New Caledonia to the Society Islands. Depths of capture ranged from a tidepool at low tide in less than 0.2 m on the Chesterfield Bank to 37 m on the Taema Bank, American Samoa.

Aseraggodes diringeri Quéro, 1997 from the western Indian Ocean (type locality Réunion) has the same counts of fin-rays, lateral-line scales, vertebrae, and dorsal pterygiophores as *A. whitakeri*. It differs from *whitakeri* in its larger size. The holotype of *diringiri* measures 104 mm SL, and the one paratype is 59 mm in SL. Of 23 specimens of *diringeri* examined by the author, ten are larger than the largest *whitakeri* (43 mm SL). Judging from a single colour photograph of each species, the white markings of the body of *whitakeri* are nearly all vermiculate, as shown in Figure 17, whereas they are nearly all as discrete spots in *diringeri* (Fig. 18).

As noted in the two species accounts above, *A. whitakeri* is also similar to *A. pelvicus* and *A. ramsaii*.

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