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CLARIFICATION OF THE CARDINALFISHES (APOGONIDAE) PREVIOUSLY CONFUSED WITH *APOGON MOLUCCENSIS* VALENCIENNES, WITH A DESCRIPTION OF A RELATED NEW SPECIES

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ABSTRACT. - *Apogon moluccensis* Valenciennes, 1832, is redescribed and its range noted as Indonesia, Papua New Guinea, Philippines, and the Solomon Islands. Geographic variation of gill rakers and rudiments on the first gill arch is noted among three populations. *Apogon chrysosoma* Bleeker, 1852, *A. monochrous* Bleeker, 1856, and *A. ventrifasciatus* Allen, Kuiter & Randall, 1994, are regarded as junior synonyms. Lectotypes of *A. chrysosoma* and *A. monochrous* are designated and described. *Apogon monospilus,* previously misidentified as *A. moluccensis*, is described as a new species. It is distinguished from *A. moluccensis* by having 25-28 gill rakers plus rudiments and darkly pigmented roof of mouth including some of the gill arches versus 21-25 gill rakers with pale roof of mouth and gill arches. The new species was frequently collected in depths greater than 20 meters. New records from India and the Maldives are reported for *Apogon oxina*, a related species.

KEY WORDS. - Perciformes, Cardinalfish, Apogonidae, new species, *Apogon.*

INTRODUCTION

Apogon moluccensis was briefly described by Valenciennes (1832) from a single specimen from Ambon and deposited at the Museum National d'Histoire Naturelle in Paris. He gave the color as uniformly reddish without any spots or bars; however he failed to report the presence of a small whitish spot at the rear base of the second dorsal fin which is still evident on the holotype (Gon, 1987, and examinations by authors).

Bleeker (1852) described *Apogon chrysosoma* (original spelling, *chrijsosoma*) from three specimens, 52 to 55 mm total length (TL), from Seram (Ceram) in the Molucca Islands and later (1856) described *Apogon monochrous* from 11 specimens, 72 to 87 mm TL from Manado, Sulawesi (Celebes). Bleeker (1874, 1876) considered his two species as synonyms of *Apogon moluccensis* and apparently had combined the type material of his species along with other non-type specimens. The status of Bleeker's type material was briefly discussed by Weber & de Beaufort (1929: 324) and Gon (1987) agreed with their observations. Fowler & Bean (1930), however, placed *A. moluccensis* in the synonymy of *Amia fusca* (Quoy & Gaimard) and recognized *Apogon monochrous* as a valid species, *Amia monochroa.*

Allen et al., (1994) described *Apogon ventrifasciatus,* a species with a distinct white spot posteriorly at the base of the second dorsal fin, from 19 specimens

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collected at Madang, Papua New Guinea (type locality), Lombok, Flores, and Ambon. It was distinguished from specimens they believed to be *A. moluccensis* by having white stripes on the head, faint brownish bars on the lower side, and 15-17 gill rakers on the lower arch versus no white stripes on the head, no bars on the lower side, and 20-21gill rakers for the alleged *moluccensis*. Hayashi & Yano (1996) reporting on a new record from the Ryukyu Islands followed Allen et al., (1994). As a result of Gon's (1987) report of 18 gill rakers on the lower arch and Fraser's (1999) description of *Apogon oxina*, in which some of these differences were discussed, it was realized that *A. ventrifasciatus* may be a synonym of *A. moluccensis*. This has led to an investigation of the identity of the species with 19-21 lower-limb gill rakers and the need to determine the status of Bleeker's *A. chrysosoma* and *A. monochrous*.

MATERIALS AND METHODS

Methods of taking and recording meristic data and measurements are given in Fraser & Lachner (1985). The museum acronyms follow Eschmeyer (1998) and Leviton et al. (1985): (BPBM) Bernice P. Bishop Museum, Honolulu; (CAS) California Academy of Sciences which has the Stanford University (SU) material, San Francisco; (MNHN) Muséum National d'Histoire Naturelle, Paris; (RMNH) Nationaal Natuurhistorische Museum, Leiden; (SMF) Forschungsinstitut und Naturmuseum Senckenberg, Frankfurt am Main; (USNM) collections of the former United States National Museum, deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C. Type specimens of the new species are deposited in BPBM, CAS and USNM.

SYSTEMATICS

Apogon moluccensis Valenciennes, 1832

(Figs. 1E-G, 2; Tables 1, 2)

Apogon moluccensis Valenciennes, 1832: 54 (type locality, Ambon, Indonesia).

Apogon chrijsosoma (for *chrysosoma*) Bleeker, 1852: 256 (type locality, Wahai, Ceram = Seram).

Apogon monochrous Bleeker, 1856: 34 (type locality, Manado, Celebes = Sulawesi).

Apogon ventrifasciatus Allen, Kuiter, & Randall, 1994: 35, fig. 7 (type locality, Madang, Papua New Guinea).

Material examined - *Apogon moluccensis* - Holotype - MNHN 8707, 60.3 mm SL, 76 mm TL, Amboina, coll. Quoy & Gaimard.

Others - Philippines: CAS 29392; 3 ex.(46-57); Agusan Prov., Mindanao I., Nasipit, FBS 14-IV-73B, 14 Apr.1973; CAS 84074; 1 ex.(50), Agusan Prov., Mindanao I., Nasipit, FBS 15-IV-73, 15 Apr.1973; CAS 127464 1 ex.(23), Negros Oriental, Negros I., Dumaguete, AWH 9-VI-31, coll. A.W. Herre, 9 Jun.1931; CAS 127387, 2 ex.(63-64), Negros Oriental, Dumaguete, AWH 9-VI-31, coll. A.W. Herre, 9 Jun. 1931; SU 27465, 1 ex.(42), Quezon Prov., Alabat I., AWH 20-VIII-31B, coll. A.W. Herre, 20 Aug.1931; CAS 29392, 1 ex.(46-57), Mindanao I., 14 Apr.1973. CAS 127464, 1 ex.(23), Negros Oriental, Dumaguete, Jun./Jul.1931, USNM 345018, 1 ex.(60), Palawan, Puerto Princessa Bay, 40', coll. R.E. Schroeder sta 2, 14 Nov.1979; USNM 349183, 1 ex.(64.3), Luzon, Sorosogon Bay, 29-30 Apr.1976; USNM 169640, 3 ex.(44-63), Luzon, Batangas Market, 7 Jun.1908, x-ray; USNM 169641, 2 ex.(47-55), Mindoro, 4 Jun.1908, x-ray; Indonesia: RMNH 23965 30 ex.(45-55), coll. P. Bleeker; USNM 211085, 5 ex.(40-46), Ceram, VGS. SU 29480 2 ex.(38-38), Sulawesi, Lembeh Straits, 21 Jun.1929; CAS 139939, 4 ex.(23-32), Irian Jaya, Numfoor, Schouten Islands, BGT X-44, coll. T. D. White, Oct.1944; BPBM 37338, 1 ex.(22), Flores I., coll. J. E. Randall, 18 Nov.1996, 6 m; BPBM 19221, 3 ex.(53-57), Ambon Bay, Ambon I., 16 Jan.1975, 15m; BPBM 38705, 3 ex.(31-43), Ambon Bay, Ambon I., 6 Feb.1975, 2-3m; WAM P. 28044-004, 1 ex.(54), Jimbaran, Bali; New Guinea: USNM 328265, 1 ex.(45), D'Entrecasteau Is., 10°08'48"S 151°09'00"E, 16 Dec.1993, 8 m; New Britain: USNM 213380, 71 ex.(24.3-52.8), Rabaul, 4°13'14"S 152°9'6"E, TeVega Cr. 6, Sta 236, 28 Feb.1965; Solomon Islands: BPBM 15982, 2 ex.(42-43), Honiara, Guadacanal I., 5 Jul.1973, 10m., color & bw photos; BPBM 26422, 5 ex.(37-45), Honiara, Guadacanal I., 1 Aug.1973, 5m; *Apogon ventrifasciatus* - Holotype - WAM P. 30351-001, 48.7 mm SL, Papua New Guinea, Madang, coll. G. Allen, 25 Oct.1991; Paratypes - Indonesia: BPBM 30132, 2 ex.(39-55), Lombok, Sorongjunkung, coll. J. Randall, 21 Feb.1984; BPBM 34136 5 ex.(38-49), Flores I., Maumere Bay, 8 m., coll. J. E. Randall, 19 Sep.1988; BPBM 34085 5 ex.(27-41), Flores I., Maumere Bay, 3-4m., coll. J. E. Randall, 17 Sep.1988; WAM P.25244-011, 1 ex.(47), Molucca Islands, Ambon, 3-4 m., coll. G. Allen & J. Randall, 6 Feb.1975; WAM P. 30351-002, 1 ex.(40), collected with holotype.

Comparative material - *Apogon oxina* - Holotype - CAS 33959, 55.9 mm SL, India, Madras, in 15-22 meters coll. K. V. Rama Rao, Apr.-Jun.1975, India; CAS 98101, 7 ex.(43-71), data same as holotype; BPBM 27662, 6 ex.(41-54) Kerala State, Kovalam, 10-11 Feb.1980, 0-7 m; Sri Lanka; USNM 213364 55 ex.(44-58), Trincomalee, 10m., PCH 69-277, coll. Phillip C. Heemstra, 29 Sep.1969; USNM 213345 2 ex.(43-44), PCH 69-279 coll. Phillip C. Heemstra, 30 Sep.1969; USNM 213346 4 ex.(19-28), Trincomalee, CCK 69-135, 10-20m., coll. Christopher C. Koenig, 4 Apr.1970, Maldive Islands; SMF 19841, 1 ex.(37.1), Rasdu Atoll, 13 Mar.1958.

Diagnosis - A species of *Apogon* in the subgenus *Ostorhinchus* with 21-25 rudiments plus gill rakers, 14-17 lower arch developed gill rakers; roof of mouth and portions of gill arches pale; a whitish spot behind posterior base of second dorsal fin.

Description - Proportions as percentages of standard length, other material in parentheses: greatest body depth 32.5(32-40); head length 40.6(37-42); eye diameter (12-18); snout length (8-10); upper jaw length 17.2(17-20); caudal peduncle depth 14.8(14-17); caudal peduncle length 21.7(22-26); first dorsal spine length 2.6(2-5); second dorsal spine length 6.6(7-10); third dorsal spine length 15.6(16-21); fourth dorsal spine length 15.9(16-20); second dorsal fin spine 11.6(12-15); first anal spine length 1.6(2-4); second anal spine length 9.9(10-14); pectoral fin length 21.9(22-26); pelvic fin length 19.4(19-24).

Dorsal fin VI-I,9; anal fin II,8; pectoral fin 14-14 (rarely 14-13); pelvic fin I,5; principal caudal rays 9 + 8; pored lateral line scales 24; transverse scale rows above lateral line 2; transverse scale rows below lateral line 6; median predorsal scales 4(3-4); circumpeduncular scale rows 12 (5+2+5); gill rakers 2+4(1-3+3-4) upper arch, 16+1(15-17+0-2) lower arch, total gill rakers 23(21-25), well developed 20(17-21), second arch with shorter gill rakers 2+14.

Villiform teeth in band on the premaxilla; villiform band on the dentary; one row on the palatine and vomer (vomer missing in holotype); none on ectopterygoid, endopterygoid or basihyal.

Vertebrae 10 + 14. Five free hypurals, one pair of slender uroneurals, three epurals, a free parhypural. Three supraneurals, two supernumerary spines on first dorsal pterygiophore. Basisphenoid present. Supramaxilla absent. Posttemporal serrate on posterior margin. Preopercle ridge smooth, edges serrate on vertical and horizontal margins. Scales head, breast, nape and body ctenoid. Pore on lateral line scale complex above with multiple openings, simple below with one or two openings.

Colour in life - Adult colouration changes between day (Fig. 1E) and night (Fig. 1F). Allen et al. (1994: Fig. 1C), Hayashi & Yano (1996: figs. 1-4) and Kuiter & Kozawa (1999: 43) have a series of underwater photographs that are consistent our concept of this species. At night (Fig. 1E) with two dark lines, one on upper lip, the other on snout, neither extend behind or below eye; a bluish line above snout stripe, extending behind eye; body a pale reddish with white spot behind posterior end of second dorsal fin; first dorsal fin with distal two-thirds of the membranes between second and fourth spines a dark reddish; other fins uniformly light reddish except for bluish edging on pelvic fins. During the day (Fig. 1F), head with alternating whitish and brownish stripes; a narrow whitish stripe starting near posterior edge of upper lip extending to near angle of peopercle; wide brownish stripe from lower lip onto upper lip extending under eye and onto opercle, narrow whitish stripe from edge of upper lip on snout through ventral portion of iris onto mid portion of opercle; brownish stripe beginning on anterior side of snout extending through iris and onto upper portion of opercle; narrow whitish stripe from anterior edge of snout through upper iris onto upper side of head below posttemporal; brownish stripe on side of anterior nape extending through very upper iris onto side of head and variably onto body fading out before origin of second dorsal fin; narrow mid-line stripe on top of snout from tip of lower lip fading out on posterior nape; light orangish-brown cast to most of body with variably present faint darkish bars extending from below lateral-line scales onto abdomen; fins uniformly pale. A juvenile photographed at night (not illustrated) by J. E. Randall at Flores, Indonesia has the following colour pattern: A whitish spot just posterior to the second dorsal fin; stripes present on head and body, nape and dorsum dark brownish past white spot; narrow whitish stripe from interorbit over eye on to shoulder fading out about origin of second dorsal; dark brownish stripe from snout over and through upper half of iris fading out prior to second dorsal; whitish stripe from snout through lower half of iris becoming slightly broader reaching to caudal fin; brownish stripe from upper lip and snout through mid-portion of eye, about width of cornea, extending onto caudal fin; narrow whitish stripe from lower side of snout though iris just below cornea, fading out near pectoral-fin base; lower lip dark brownish continuing as an ill-defined stripe to pectoral fin.

Colour in alcohol - Body and fins of holotype uniform, without any obvious patterns; lower lips with blackish pigment; a small pale spot at posterior base of second dorsal fin. Other specimens variable, sometimes with faint vertical bars on side or with uniform color pattern (Fig. 1G); lacking dark stripes above midline on body; with or without a pale spot at posterior base of second dorsal fin; lower lips darkish; roof of mouth, upper and lower gill arches pale. Peritoneum silvery, stomach and intestine black.

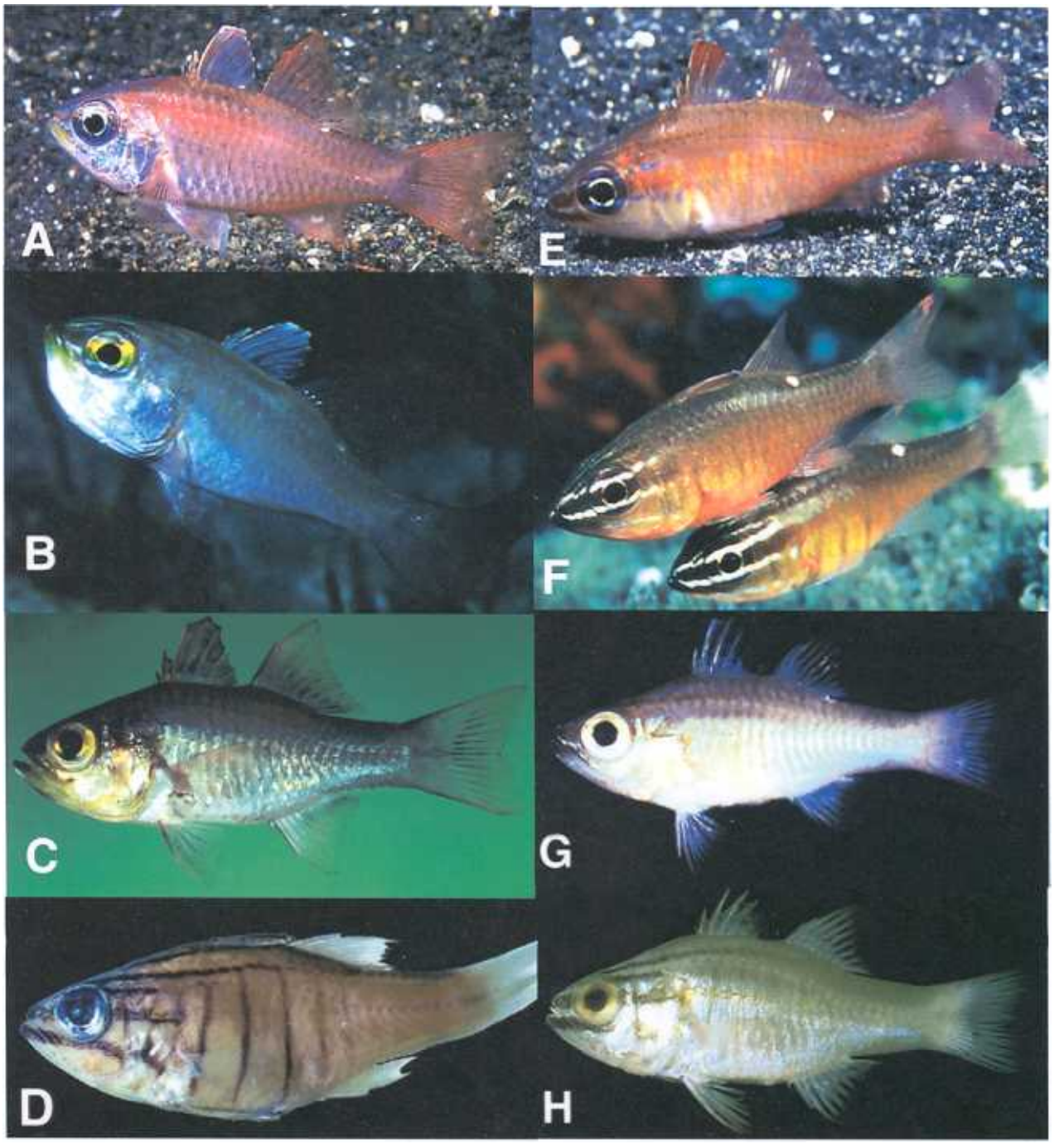

Fig. 1. A. *Apogon monospilus* at night, 80mm TL, N.E. Sulawesi, Indonesia, J. E. Randall. B. *Apogon monospilus* during daylight, 60mm TL, day, Ambon, Indonesia, J. E. Randall. C. *Apogon monospilus* Holotype USNM 357485, ex BPBM 22140, 60 mm SL, Negros Oriental, Philippines, J. Randall. D. *Apogon oxina* Holotype CAS 33959, 56mm SL, Madras, India. E. *Apogon moluccensis* at night, 55mm TL, N. E. Sulawesi, Indonesia, J. E. Randall. F. *Apogon moluccensis* during daylight, 65 mm TL, Sangihe Islands, Indonesia, J. E. Randall. G. *Apogon moluccensis* BPBM 34136, 49 mm SL, Flores, Indonesia, J. E. Randall. H. *Apogon oxina* BPBM 27662 67 mm SL, Kovalam, India, J. E. Randall.

Distribution - This species is known to have a West Pacific Ocean distribution (Fig. 2).

Remarks - Measurements of eye diameter, snout length and bony interorbital of the holotype width were not taken because the head is damaged (also noted by E. A. Lachner in 1956). Valenciennes (1832) describes the type as having stripes on the nape, blackish lips, first dorsal fin with blackish tip and a reddish body lacking any marks or spots on or near the caudal fin. Gon (1987) examined the type and noted a white spot at the posterior base of the second dorsal fin. This small marking is also evident in a photograph of the type taken in 1972 by the senior author.

One characteristic, the relatively short spines in the dorsal and anal fins of the type was not mentioned by Valenciennes. These proportions of the type are at the limits of variation reported here. Weber & de Beaufort (1929) discuss Bleeker's material identified as *Apogon moluccensis,* noting that *Apogon apogonides* was also present. No material of *Apogon apogonides* was present among the 47 Bleeker specimens (discussed in the following treatment of *Apogon chrysosoma* and *Apogon monochrous*) examined by T. H. Fraser in 1972. Bleeker (1874, 1876) considered his *Apogon moluccensis* material close to *Apogon hoevenii* and correctly identified the difference in the pectoral fin-ray counts.

Gill rakers and rudiments on the lower limb of the first gill arch were about one less in the Indonesia material compared with Philippine material (Table 1). Material from New Guinea and Solomon Islands was intermediate. More material may clarify whether the difference is real. No specific colour differences were noted.

Apogon oxina (Figs. 1D, H) has a total count of about one more gill raker and rudiment on the lower limb of the first gill arch than the Indonesian material of *A.*

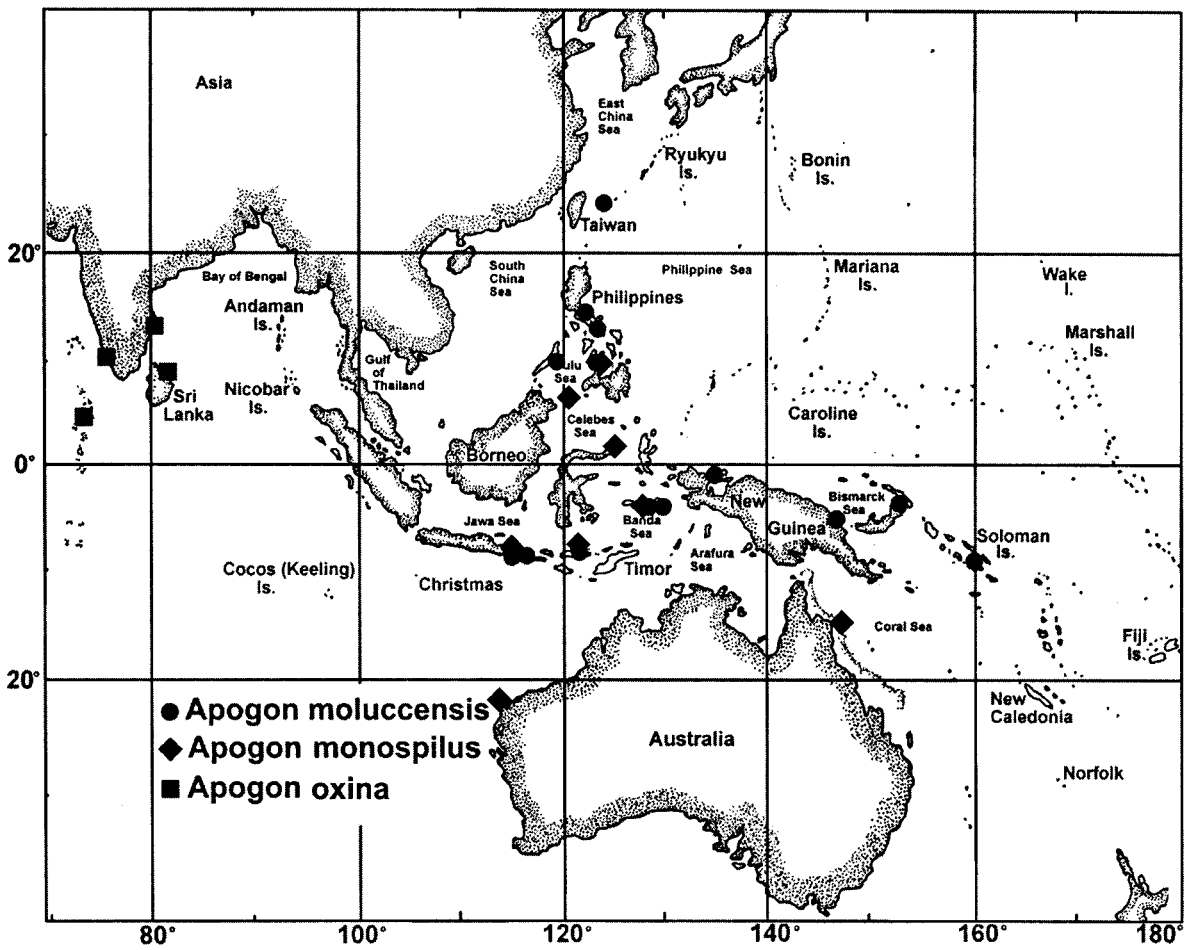

Fig. 2. Distribution of the collections sites for *Apogon moluccensis, Apogon monospilus,* and *Apogon oxina.*

Table 1. Total gill raker and rudiment counts for four species of *Apogon*.

	Total									Upper Arch					Lower Arch							
	21	22	23	24	25	26	27	28	Ave.	5	6	7	8	Ave.	15	16	17	18	19	20	21	Ave.
Apogon moluccensis																						
Philippines	1	-	8	5	-	-	-	-	23.2	2	8	4	-	6.14	-	1	11	2	-	-	-	17.1
New Guinea / Solomons		6	7	-	-	-	-	-	22.5	-	12	1	-	6.07	-	7	6	-	-	-	-	16.5
Indonesia	6	37	18	1	1	-	-	-	22.3	3	58	2	-	5.98	3	41	17	2	-	-	-	16.3
TOTAL	7	43	33	6	1	-	-	-	22.4	5	78	7	-	6.02	3	49	34	4	-	-	-	16.4
Apogon oxina	1	1	13	11	1	-	-	-	23.5	-	20	6	-	6.23	-	1	18	7	-	-	-	17.2
Apogon monospilus	-	-	-	-	3	14	25	5	26.7	-	11	35	1	6.78	-	-	-	-	9	34	4	19.9
Apogon atrogaster	-	-	-	-	-	1	-	-		-	-	1	-		-	-	-	-	1	-	-	

Table 2. The relative length of the fourth dorsal spine compared with the third dorsal spine.

	Shorter	Equal	Longer
Apogon moluccensis	7	2	7
Apogon monospilus	3	1	6
Apogon oxina	7	-	5

moluccensis, dark stripes (with bars in preserved material) and a tendency to be collected in deeper water. Jones & Kumaran (1965, 1980) and Jones (1969) reported specimens of *Apogon moluccensis* from the Laccadive Archipelago. However, they gave no gill raker counts and their color description is not consistent with *Apogon oxina.* Gon (1987: 7, fig. 6) identified a specimen of *Apogon moluccensis* from the Maldives at Rasdu Atoll. He described the specimen as having 6-7 vertical rows of spots on the sides and a white spot at the posterior base of the second dorsal fin, with 21 well developed gill rakers and a total count of 6+18. Examination of this specimen, now much faded, has little indication of dark bars or stripes, but agrees with our concept of *Apogon oxina* based on the higher gill raker count. It is possible that the specimens reported from the Maldive and Laccadive Islands represent another species. Specimens reported from the Red Sea by Klunzinger (1870) as *Apogon monochrous* are *Apogon guamensis* or *Apogon zebrinus* (personal comm., Ofer Gon).

The holotype of *Apogon moluccensis* does not agree with the gill raker counts for the material reported by Allen et al. (1994) as *Apogon moluccensis.* Their concept of *Apogon moluccensis* was limited to the new species described herein (see Table 1).

Either the third or fourth dorsal fin spine may be the longest (Table 2). The third spine is slightly stronger based on the relative thickness of this spine compared with the fourth spine. There appear to be a size relationship with the smaller specimens having a longer third dorsal spine and larger specimens having a longer fourth dorsal spine. These observations suggest that having the fourth spine as the longest in the first dorsal fin is not restricted the subgenus *Jaydia* as recognized by Gon (1996) and may require a closer examination of spine growth with increasing size for this character.

Status of *Apogon chrysosoma* and *Apogon monochrous*

These two species described by Bleeker in 1852 and later in 1856 from Seram and Manado in Indonesia have been considered junior synonyms of *A. moluccensis.* The history and number of putative types and Bleeker's habit of mixing of type material necessitate the designation of lectotypes for the seldom-used names *Apogon monochrous* and *Apogon chrysosoma* to clarify the species names with regard to *Apogon moluccensis, Apogon ventrifasciatus* and the new species.

The auction catalogue (see Lamme, 1973) lists specimens as 55/2/2/2/2 and Bleeker (1874, 1876) listed 63 specimens for *A. moluccensis.* De Beaufort & Weber (1929:324) reported many specimens did not belong to this species. RMNH 10822, with 26 specimens, is identified as *Apogon apogonides* which was part of the Bleeker material reported by Weber & de Beaufort (1929). Various specimens have been were removed from RMNH 5567 prior to and after 1956. Forty-seven specimens were noted as present in RMNH 5567 when E.A. Lachner examined the material in 1956 (then listed as *Apogon moluccensis* but now split as follows: RMNH 23964 with 8 specimens which includes three putative syntypes of *Apogon chrysosoma,* RMNH 5567 with 9 of the 11 specimens representing the putative syntypes of *A. monochrous,* RMNH 23965 with 30 specimens as non type material of both names).

Some time during or after 1956, eight specimens were removed to RMNH 23964, possibly by M. Boeseman or perhaps indicated by E.A. Lachner (as containing the putative syntypes of *Apogon chrysosoma*) and 30 specimens were removed to RMNH 23965 under the name *Apogon moluccensis* (not part of either type series). All of the material in RMNH 23965 are too small to be part of the type series of *A. monochrous* except for one specimen (~90.3 mmTL) which belongs to another unidentified species with a higher pectoral fin-ray count (15), lower gill-raker count (2+4-13+1), villiform band of dentary and premaxillary teeth, smooth preopercle ridge and serrated preopercle margins. Thirteen specimens in RMNH 23965 are less than 52mm TL and the other 17 specimens are too large to be part of the *A. chrysosoma* type series. Sixteen of the 63 listed specimens are unaccounted for this analysis and may be represented by specimens of *Apogon apogonides* in RMNH 10822.

The lectotypes for each name are described below, based on data taken by T. H. Fraser. If these two lectotypes are determined not to be part of their original type series and no other syntypes can be identified, then we recommend that each respective lectotype be designated as a neotype to maintain nomenclatural stability.

Apogon chrysosoma Bleeker, 1852

Material examined - Lectotype - RMNH 23964, 42.0 mm SL. Wahai, Ceram.

Paralectotype - RMNH 34749, 43.1, mm SL, same data, ex RMNH 5567; RMNH 34750 6 ex.(40.7-43.1 mm SL, ~51.0-54.8 mm TL), Wahai, Ceram, ex RMNH 5567.

Description of lectotype - Range of proportions (as percentage of standard length): greatest body depth 31.9; head length 38.6; eye diameter 13.1; snout length 8.6; bony interorbital width 7.4; upper jaw length 17.4; caudal peduncle depth 14.3; caudal peduncle length 23.3; first dorsal spine length 3.8; second dorsal spine length 8.3; third dorsal spine length 20.9; fourth dorsal spine length 18.6; second dorsal fin spine length 13.3; first anal spine length 2.6; second anal spine length 11.7; pectoral fin length 22.4; pelvic fin length 21.7.

Dorsal fin VI-I,9; anal fin II,8; pectoral fin 14-14; pelvic fin I,5; principal caudal rays 9 + 8; most scales missing; gill rakers 2+4 upper arch, 16+1 lower arch, total gill rakers 23, well developed 20.

Villiform teeth in a band on premaxilla; villiform band on dentary; one row on palatine and vomer; none on ectopterygoid, endopterygoid or basihyal.

Supramaxilla absent. Posttemporal serrate on posterior margin. Preopercle serrate on vertical and horizontal margins. Scales ctenoid.

Colour in alcohol - Body, head and fins uniform, without any pigment patterns. A white spot just behind the posterior base of the second dorsal fin.

Remarks - Bleeker (1852) described *Apogon chrysosoma,* originally spelled as *chrijsosoma,* the 'ij' in Dutch is equivalent to 'y' in Latin, (see Eschmeyer et al., 1998: 374) from three specimens, 52-55 mm TL, but subsequently he (1874, 1876) considered it to be a synonym of *Apogon moluccensis.* The auction catalogue (published when Bleeker's material was advertised for sale and reprinted in Lamme, 1973) indicates eight specimens of *Apogon chrysosoma.* All eight putative specimens in RMNH 23964 belong to the same species and are within the size range of the original three syntypes. None of this material is more specifically identified as to type status. The specimen (42.0 mm SL, 52.0 mm TL) in the best condition was used to take data and is designated the lectotype. A single paralectotype, the largest specimen (43.1 mm SL, 54.8 mm TL), is identified. All other material is in relatively similar condition and identification of a second paralectoype has no rational basis.

Apogon chrysosoma is treated as a synonym of *Apogon moluccensis* in agreement with Bleeker's opinion based on the gill raker counts and the small white spot just behind the second dorsal fin. However, the dorsal and anal spines of this specimen

are longer than those of the holotype of *Apogon moluccensis.*

Apogon monochrous Bleeker, 1856

Material examined - Lectotype - RMNH 5567, 65.0 mm SL, 81.9 mm TL, Celebes, Manado, coll. P. Bleeker.

Paralectotypes - RMNH 34751; 7 ex.(55.5-59.4); same data as lectotype, ex 5567.

Description of lectotype - Range of proportions (as percentage of standard length): greatest body depth 33.7; head length 36.9; eye diameter 12.9; snout length 7.5; bony interorbital width 6.9; upper jaw length 18.1; caudal peduncle depth 16.6; caudal peduncle length 22.1; first dorsal spine length 2.9; second dorsal spine length broken; third dorsal spine length 19.2; fourth dorsal spine length 19.1; second dorsal fin spine 15.1; first anal spine length 2.8; second anal spine length 12.8; pectoral fin length 22.3; pelvic fin length 25.2.

Dorsal fin VI-I,9; anal fin II,8; pectoral fin usually 14-14; pelvic fin I,5; principal caudal rays 9 + 8; pored lateral line scales ~25; transverse scale rows above lateral line 2; transverse scale rows below lateral line missing; median predorsal scales ~4; circumpeduncular scale rows 12 (5+2+5); gill rakers 3+4 upper arch, 15+1 lower arch, 22 total, 18 well developed.

Villiform teeth in a band on premaxilla; villiform band on dentary; one row on palatine; one-two rows on the vomer; none on ectopterygoid, endopterygoid or basihyal.

Supramaxilla absent. Posttemporal serrate on posterior margin. Preopercle serrate on vertical and horizontal margins. Scales ctenoid.

Color in alcohol - Head, body and fins uniform, no pigment patterns remain. A white spot just behind the posterior base of the second dorsal fin.

Remarks - Bleeker (1874, 1876) considered his *Apogon monochrous* a synonym of *Apogon moluccensis.* The original description listed 11 specimens, 72-87 mm TL, and all nine of the putative specimens are within this size range in RMNH 5567. All specimens are the same species with a white spot just behind the second dorsal fin. One of the specimens, 65.0 mm SL, 81.9 mm TL, is designated the lectotype. *Apogon monochrous* is treated as synonym of *Apogon moluccensis* in agreement with Bleeker's opinion. The dorsal and anal spines of this specimen are longer than those of the holotype of *Apogon moluccensis* even though the size is about the same.

Apogon monospilus, new species

(Figs. 1A-C, 2, Tables 1, 2)

Material examined - Holotype - USNM 357485 ex. BPBM 22140, 73 mm SL, Negros Oriental, Dumaguete City, 27 Aug.1977, 20 m.

Paratypes - USNM 169638, 4 ex.(64-70), Philippines, Jolo, Albatross D. 5136, 14 Feb.1908, 41 m., x-ray; SU 69804, 1 ex.(67), Negros Oriental, Dumaguete, AWH 9-VI-31, coll. A.W. Herre, 9 Jun.1931; BPBM 28538, 5 ex.(74-78), Negros Oriental, Dumaguete City, 3 Jun.1981, 21m.

Others - Philippines: USNM 169638, 4 ex.(64-74), Jolo, D. 5136, 14 Feb.1908, 41 m., x-ray; USNM 169639, 3 ex.(40-57), Jolo Light, D.5174, 5 Mar.1908, 37 m; USNM 171119, 5 ex.(55-60), Sulade I., 5°41'40"N 120°48'50"E, D.5146, 44 m., 16 Feb.1908, x-ray, 1 ex.(52) stained and cleared; USNM 171121, 2 ex.(53-56), Sulade I., 5°41'40"N 120°47'10"E, D.5147, 16 Feb.1908, 39 m., x-ray; USNM 56183, 1 ex.(72), Bulan, x-ray; USNM 349183, 1 ex.(64), Sorsogon market, 29-30 Apr.1976; Indonesia: BPBM 36519, 1 ex.(50), Sulawesi, Tandu Rusa, 1°27'30"N. 125°13'22"E., 30 Sep.1994, 18 m; BPBM 32329, 3 ex.(21-31), Molucca Is., Ambon I., 4 Oct.1987, 20 m; BPBM 19424, 8 ex.(63-73), Molucca Is., Ambon I.: J. E. Randal 1 Feb.1985, 5 m., color, bw photos; BPBM 19464, 2 ex.(64-64), Ambon Bay, Ambon I., 6 Feb.1975, 2-3m, color, bw photos; USNM 213379, 1 ex.(47), Moluccas, Ambon I., VGS 74-17, 16 Mar. 1974, 3 m; BPBM 38632, ex. BPBM 34136, ex.(36-37), Flores I., Maumere Bay, 8 m., 19 Sep.1988; SU 29468, 2 ex.(38-39), Sulawesi, Lembeh St. coll. A.W. Herre, 20 Jan.1929; WAM P.28051-001, 1 ex.(51), Bali, Lombok Strait, Jul.1976; Papua New Guinea: BPBM 32531, 1 ex.(44), Wongat I. coll. J. E. Randall, 20-28 m; Australia: WAM P.27599-013, 3 ex.(52-53), North West Cape, Western Australia, May.1976; WAM P.24733-001, 2 ex.(39-41), Lizard I., Queensland, 9 May.1976.

Comparative material - *Amia atrogaster* - Holotype, USNM 70249, 46.8 mm SL, Western Luzon, D.5442, 11 May.1909, x-ray.

Diagnosis - A species of *Apogon* in the subgenus *Ostorhinchus* with 26-28 rudiments plus gill rakers, 19-21 lower arch developed gill rakers; roof of mouth and portions of gill arches darkish; a whitish spot behind posterior base of second dorsal fin.

Description - For general body shape see Figs. 1A-C, paratypes and other material in parentheses. Range of proportions (as percentage of standard

length): greatest body depth 40.1(32-41); head length 36.7(37-41); eye diameter 12.6(12-16); snout length 8.2(8-10); bony interorbital width 8.6(8-9); upper jaw length 17.6(17-20); caudal peduncle depth 17.3(15-18); caudal peduncle length 22.7(22-25); first dorsal-fin spine length 3.7(3-5); second dorsal-fin spine length 8.5(8-10); third dorsal-fin spine length 18.2(17-20); fourth dorsal-fin spine length 18.7(16-21); spine in second dorsal fin 12.9(13-16); first anal-fin spine length 1.7(2-4); second anal-fin spine length 10.5(10-15); pectoral fin length 23.5(23-27); pelvic fin length 22.4(20-25).

Dorsal fin VII-I,9; anal fin II,8; pectoral fin rays 14-14; pelvic fin I,5; principal caudal rays 9 + 8; pored lateral line scales 24 ; transverse scale rows above lateral line 2; transverse scale rows below lateral line 6; median predorsal scales 3-4; circumpeduncular scale rows 12-13 (5+2+5) . The frequency of certain counts is given in Table 1.

Villiform teeth in band on premaxilla; villiform teeth in band becoming two rows posteriorly on the dentary; one to two rows on vomer; one row on palatine; none on ectopterygoid, endopterygoid or basihyal. Vertebrae 10 + 14. Five free hypurals, one pair of slender uroneurals, three epurals, a free parhypural. Three supraneurals, two supernumerary spines on first dorsal pterygiophore. Basisphenoid present. Supramaxilla absent. Posttemporal serrate on posterior margin. Preopercle ridge smooth, edges serrate on vertical and horizontal margins. Infraorbital edge smooth.

Scales on head, breast, nape and body ctenoid, pored lateral line scales from posttemporal to base of hypural. Pore on lateral-line scale complex above with multiple openings, simple below with one or two openings.

Colour in alcohol - Whitish spot behind posterior base of second dorsal fin variably present or absent; body uniformly brownish (Fig. 1C) or with faint wide stripe; head uniform without marks; first dorsal fin dusky, second dorsal fin and anal fin without stripes, caudal fin uniform or with a faint midline stripe; roof of mouth, upper arch and portion of lower arch dark with melanophores. Peritoneum silvery, stomach and intestine black.

Colour in Life - From colour transparencies (Figs. 1A, night & B, day) by J. E. Randall: whitish or yellowish white spot behind posterior base of second dorsal fin; darkish brown stripe, about pupil width beginning on upper part of lower lip extending through snout, parts of iris, expanding slightly posteriorly on opercle, becoming broader on mid-side of body, reaching onto caudal fin; two narrow whitish stripes above and below midline stripe on head through iris from upper lip and snout to edge of opercle; iris yellowish between whitish stripes; narrow pale and brown nape stripes over eye, brown stripe onto body fading before origin of first dorsal fin; lower cheek and abdomen silvery. Allen (1985: Fig. 182), Allen and Swainston (1988: Fig. 394) provided photographs of this species. Kuiter and Kozawa (1999: 44, Figs. A-H) have a series of underwater photographs, identified as *A. monochrous,* that are consistent with our concept of this species

Distribution - Known from Indonesia, the Philippines and New Guinea (Fig. 2). Most specimens have been collected in deeper water.

Etymology - *Monospilus,* from the Greek words *mono* (one) and *spilos* (spot), referring to single white spot present in life, treated as a noun in apposition.

Remarks - A 76 mm SL specimen in BPBM 28538 has eggs in its mouth. This species was collected at the same stations with *Apogon moluccensis* (BPBM 34136 and SU 69804). Depending on fixing and preservation techniques the white spot at the base of the second dorsal fin may or may not be visibly white. The lack of dark bars in juveniles and adults, dark pigmented roof of mouth, upper and portions of the lower gill arches and the higher gill-raker counts (Table 1) distinguishes *Apogon monospilus* from *Apogon oxina* and *Apogon moluccensis.* All three species share silvery peritoneum silvery with blackish stomachs and intestines. The holotype of *Apogon atrogaster* (Smith & Radcliffe in Radcliffe, 1912), another species with a blackish stomach and intestine, taken by the Albatross with a dredge, has similar total gill raker counts (1+6-19+0) but has a single row of premaxilla teeth, two-three rows of dentary teeth narrowing to one row laterally, no palatine teeth, fewer serrations on the ventral and posterior edges of the preopercle, no serrations on the posttemporal, and a slender body (29% of SL versus 35-38% for similar sized individuals).

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