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A REVIEW OF THE RED SEA CARDINALFISHES OF THE *APOGON BANDANENSIS* COMPLEX, WITH A DESCRIPTION OF A NEW SPECIES.

by

Thomas H. Fraser, John E. Randall, and the late Ernest A. Lachner

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A REVIEW OF THE RED SEA CARDINALFISHES OF THE *APOGON BANDANENSIS* COMPLEX,WITH A DESCRIPTION OF A NEW SPECIES

by

Thomas H. Fraser[1], John E. Randall[2] and the late Ernest A. Lachner[3]

ABSTRACT

Three species of the *Apogon bandanensis* group are found in the Red Sea, the widespread *Apogon guamensis*, the endemic *Apogon annularis*, and a new endemic species *Apogon zebrinus*. Colour patterns, number of gill-rakers, body depth, second anal spine length, pectoral-fin length, and caudal peduncle depth are important aids for identification of the Red Sea species. Two synonyms of *Apogon guamensis* were based on juvenile material: *Apogon ocellatus* from Madagascar and *Apogon spongicolus* from the Red Sea. Rüppell's, Günther's and Klausewitz's concepts of *Apogon annularis* are reviewed. *Apogon erdmani* is a synonym of *Apogon annularis*. *Apogon savayensis* and another wide spread new species were not found in any Red Sea collections we examined.

INTRODUCTION

Rüppell described *Apogon annularis* from the Red Sea in 1824, followed at a long interval by *Apogon erdmani* Lachner, 1954 and *Apogon spongicolus* Smith, 1964, both from the Red Sea. One other described species in this complex, *Apogon guamensis* Valenciennes, 1832, occurs in the Red Sea. Material of two other Indian Ocean species, *Apogon savayensis* Günther, 1871, and a new species (not known west of the Maldive Islands) have not been collected in the Red Sea despite the attention this area has received from ichthyologists.

The last revision of the "*bandanensis*" group of *Apogon* was done by Lachner in 1954. He recognized four species: *Apogon bandanensis*, *Apogon savayensis*, *Apogon nubilus* [=*Apogon guamensis*] and *Apogon erdmani* [=*Apogon annularis*]. T.H. Fraser and E.A. Lachner began working on this group in 1974, at the U.S. National Museum after an undescribed species occurring in the Red Sea was identified. J.E. Randall joined the study in 1987 with more material that he collected and photographed in the Red Sea.

A revision of this entire species group is being prepared separately by the first author. The publication of this new species description is based on the need to make this name available, given other pending regional works for the Red Sea.

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METHODS AND MATERIALS

Our methods of taking and recording meristic data and measurements are given in Fraser and Lachner (1985). Data referring to non-type specimens have been abbreviated and include the catalog number, total number of specimens (size range), pertinent locality and only the important published station numbers or specimen numbers. Oral incubation was checked by examining the mouth cavity of larger specimens with buccal enlargement; the size of specimens with eggs in their mouth is listed under the section "Remarks."

The following acronyms designate institutions and collections cited: ANSP, Academy of Natural Sciences, Philadelphia; BPBM, Bernice P. Bishop Museum, Honolulu; FMNH, Field Museum of Natural History, Chicago; RMNH, National Natuurhistorische Museum, Leiden; RUSI, J.L.B. Smith Institute of Ichthyology, Grahamstown; USNM, National Museum of Natural History, Smithsonian Institution, Washington, D.C.; UTAI, Tel Aviv University, Israel; HUJ, Hebrew University, Jerusalem; SMF Natur-Museum und Forshungs-Institut Senckenberg, Frankfurt-am-Main.

Apogon zebrinus, sp. nov.

Figs 1 & 2

HOLOTYPE: USNM 213422, (59.6); N. of Râs Burqa, Egypt, Gulf of Aqaba; 23 July 1969; 0 – 10 m.; Victor G. Springer; VGS 69-7; x-rayed.

PARATYPES: **Red Sea**: **Egypt**: BPBM 31807 was USNM 213424, 4(57-71); Gulf of Aqaba, Râs Muhammad; 0 – 10 m.; 26 Sep. 1969; VGS 69-28. USNM 341635, 4(49-73); data same as holotype. TAU 9672, (67); Gulf of Aqaba. UTAI-NS 4181, 8 Oct. 1968. **Sudan**: BPBM 19741, (38-44); Suakin Harbor, 11 Oct. 1974. BPBM 27417, (41); just N. of Port Sudan, 9 Jan. 1980. **Eritrea**: USNM 213423, (47); N. End of Isola Delemme, off Massawa; 7 Aug. 1969; VGS 69-9. **Saudi Arabia**: BPBM 30388, 4(58-74); 29 km. S. of Yanbu, 30 May 1984. **Yemen**: USNM 213421, 15(55-63); Gold Mohur Bay; 21 Dec. 1964; IIOE Cr. 9; F. Talbot Sta. 26.

Other Material: **Gulf of Aqaba**: TAU 9671, (27); UTAI-NS 1805, 13 Sep. 1967. HUJ 12007, 3(17-26); Elat. HUJ 11984, 2(16-25); Elat. HUJ 12859, (20); Dahab.

DIAGNOSIS: An *Apogon* of the subgenus *Ostorhinchus* with vertical bars on body, basicaudal mark below lateral-line scales in adults, caudal fin with dark margins, subocular mark broad, triangular, 13 pectoral-fin rays, total gill-rakers usually 25-28, body depth 40-47%, caudal peduncle depth 18-22%, second anal-spine length 19-23%, and pectoral-fin length 26-32% of standard length.

DESCRIPTION. For general body shape see Figures 1-2. Range of proportions (% SL) with the holotype in parentheses: greatest body depth 40-47 (45), head length 43-52 (46), eye diameter 14-18 (17), snout length 8-11 (8.5), bony interorbital width 10-14 (12), upper jaw length 20-25 (22), caudal peduncle depth 18-22 (20), caudal peduncle length 18-24 (21.5), first dorsal-fin spine length 2.5-4.1 (2.5) second dorsal-fin spine length 10-14 (11), third dorsal-fin spine length 18-23 (21), fourth dorsal-fin spine length 19-24 (20), length of spine of second dorsal fin 17-21 (18), first anal-fin spine length 2.3-7.1 (3.7),

second anal-fin spine length 19-23 (19.6), pectoral fin length 26-32 (-) pelvic fin length 24-31 (-).

Dorsal fin VII+I,9; anal fin II,8; pectoral fin usually 13-13, rarely 12-13; 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 3; circum-peduncular scale rows 12 (5+2+5); gill-rakers and rudiments 1-3+5-7 on upper limb, 17-20+0-1 lower limb, total 26-28 (holotype 27), well-developed rakers 24-27 (holotype 25). The frequency of gill-raker counts is given in Table 1.

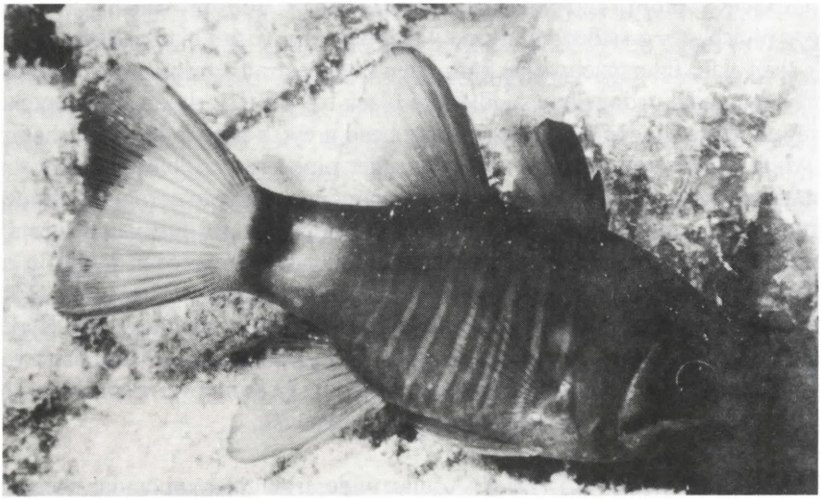

Figure 1. *Apogon zebrinus*, Red Sea, Egypt, photograph by Rudie H. Kuiter.

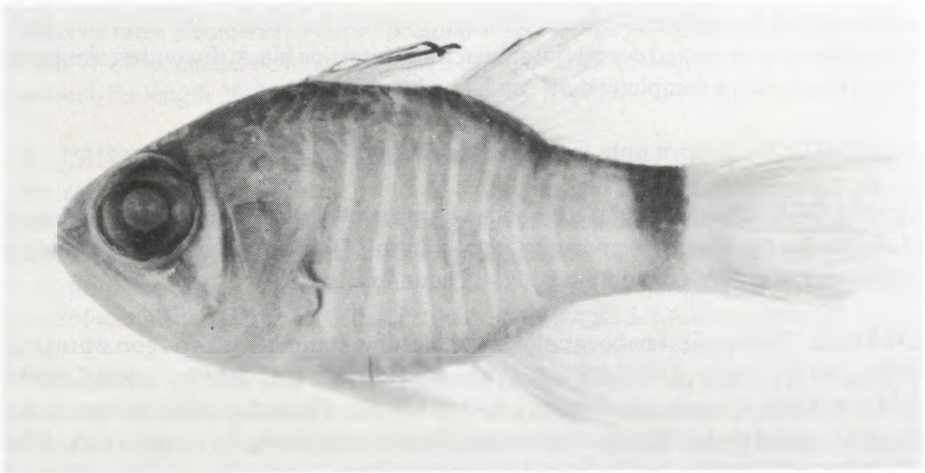

Figure 2. *Apogon zebrinus*, holotype, 59.6 mm SL, USNM 213422.

Villiform teeth in several rows on premaxilla; 2 rows on dentary; one row on palatines and vomer; none on ectopterygoid, entopterygoid or basihyal. Vertebrae 10 + 14; 5 free hypurals, one pair of slender uroneurals, 3 epurals, parhypural free. Three supraneurals, 2 supernumerary spines on first dorsal pterygiophore. Basisphenoid present. Supramaxilla absent. Posttemporal serrate on posterior margin. Preopercle serrate on vertical and horizontal margins, ridge smooth. Infraorbital shelf present on third infraorbital bone. Scales ctenoid. Lateral-line complete.

LIFE COLOURS. From a 120 mm slide of BPBM 27417: Body brownish grey dorsally, shading to bluish grey on sides and silvery white ventrally, with 7 blackish bars 2-3 times broader than pale interspaces, the first extending ventrally from nape and the last anteriorly on caudal peduncle; a saddle-like black bar posteriorly on caudal peduncle extending to lateral line and tapering below; head greyish brown dorsally, shading to silvery white on side and ventrally (with a lavender-pink cast); an oblique wedge-shaped black mark extending from posteroventral corner of eye nearly to corner of preopercle; an indistinct brown and blackish blotch on opercle; first dorsal fin dusky translucent with a black leading edge from origin of fin to tip of fifth dorsal spine; second dorsal fin dusky translucent, the rays faintly pink, with a blackish leading edge covering spine, first ray, and membrane between; remaining fins translucent with faint pink rays, the caudal fin with a dusky margin, and the anal fin with a little dusky pigment distally on first two soft rays; iris blackish brown. Two transparencies by Rudie H. Kuiter were similar in colour except that the caudal margins were brownish to blackish.

PRESERVED COLOUR PATTERN. Adults: wide, triangular subocular cheek mark behind upper jaw; first dorsal fin with dark membrane between spines 1-4; edges of caudal lobes dark; caudal peduncle with a nearly complete dark wide bar, connected dorsally and almost connected ventrally; pale, slightly wavy bars on body from below first dorsal fin and behind pectoral fin to just behind second dorsal-fin base and anal-fin base, the bars extend above lateral-line scales starting about the second dorsal fin; no dark saddle under first or second dorsal fin; stomach and intestine black. Juveniles: similar to adults, except with a complete, dark caudal peduncle band.

DISTRIBUTION. Known only from the Red Sea and Gulf of Aden.

ETYMOLOGY: from *zebra* the Abyssinian (Amheric) name for the striped equine of Africa and *-inus* a Latin suffix meaning 'pertaining to'. The name refers to the somewhat variable dark and light bars on the body. A noun in apposition.

REMARKS. This species has been collected at the same stations with *Apogon annularis* (BPBM 20373, 30386, USNM 212431)) in the Red Sea and Gulf of Aden (USNM 212447) and with *Apogon guamensis* (USNM 212882). The rather bold pale bars on the body and a caudal peduncle mark that is not quite complete along the anterior part of the band distinguish the new species from *Apogon annularis*. A comparison of the preserved colour patterns for the three Red Sea species is presented in Table 2.

The body depth, pectoral-fin length and second anal-spine length of *Apogon zebrinus* are similar to *Apogon annularis* (Figs 2 & 3), but the caudal peduncle depth is slightly greater in *Apogon zebrinus*. The gill-raker counts show, at best, slight modal or average differences, particularly the lower-limb rakers (Table 1). *Apogon guamensis* can be distinguished from both of these species by the narrow, oblique cheek mark below the eye, a more slender body, shorter pectoral-fin length, caudal spot well-developed in juveniles but diffuse in adults, no dark margins on caudal fin and slightly lower gill-raker counts. Colour patterns appear to be one of the important distinguishing characters in this complex, particularly changes in the caudal peduncle and cheek marks, development of pale bars on the side of the body, and development of coloured edges to the caudal fin.

Indian Ocean *Apogon savayensis* may be distinguished from *A. zebrinus* by the lack of well developed bars on the side, an incomplete caudal mark mostly above the lateral line (see Winterbottom et al. 1989, fig. 164) and a shorter second anal-spine (14-20% SL). An undescribed species occurring in the Indian Ocean as far west as the Maldives has numerous, narrow bars (see Jordan and Seale, 1906:240, fig. 33), an incomplete caudal mark mostly above the lateral line and slightly higher gill-raker counts.

The largest *Apogon zebrinus* was 74 mm SL. None of the material indicated oral brooding of eggs, but we believe that this species is an oral brooder based on positive evidence from specimens of *Apogon guamensis* and *Apogon annularis*.

Apogon annularis Rüppell, 1828
(Fig. 4)

Apogon annularis Rüppell, 1828: 48 (Et Tur, Sinai Coast, Egypt, Gulf of Suez)
Apogon erdmani Lachner, 1951: 595, pl.18 (Fig. A). (Red Sea, Saudi Arabia, Jiddah)

DIAGNOSIS. An *Apogon* of the subgenus *Ostorhinchus* with no bars on body, circum-peduncular basicaudal mark in juveniles and adults, caudal fin with dark margins, subocular mark broad, triangular, 13 pectoral-fin rays, total gill-rakers usually 26-29, body depth 41-50%, caudal peduncle depth 15-20%, second anal-spine length 18-22%, and pectoral-fin length 26-31% of standard length.

DESCRIPTION. For general body shape see Figure 4. Range of proportions (as % SL): greatest body depth 41-50, head length 41-46, eye length 16-18, snout length 8-10, bony interorbital width 10-11, upper jaw length 21, caudal peduncle depth 15-19, caudal peduncle length 19-23, first dorsal-fin spine length 2.5-5.3 second dorsal-fin spine length 9-12, third dorsal-fin spine length 17-21, fourth dorsal-fin spine length 18-21, length of spine of second dorsal fin 17-20, first anal-fin spine length 3.4-5.4; second anal-fin spine length 18-22; pectoral-fin length 26-31; pelvic-fin length 25-28.

Dorsal fin VII+I,9; anal fin II,8; pectoral fin usually 13-13, rarely 12-13 or 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 3; circum-peduncular scale rows 12 (5 +2+5); gill-rakers and rudiments 0-3+5-6

on upper limb, 19-21+0-2 lower limb, total 25-30, usually 26-29 well-developed rakers. The frequency of gill-raker counts is given in Table 1.

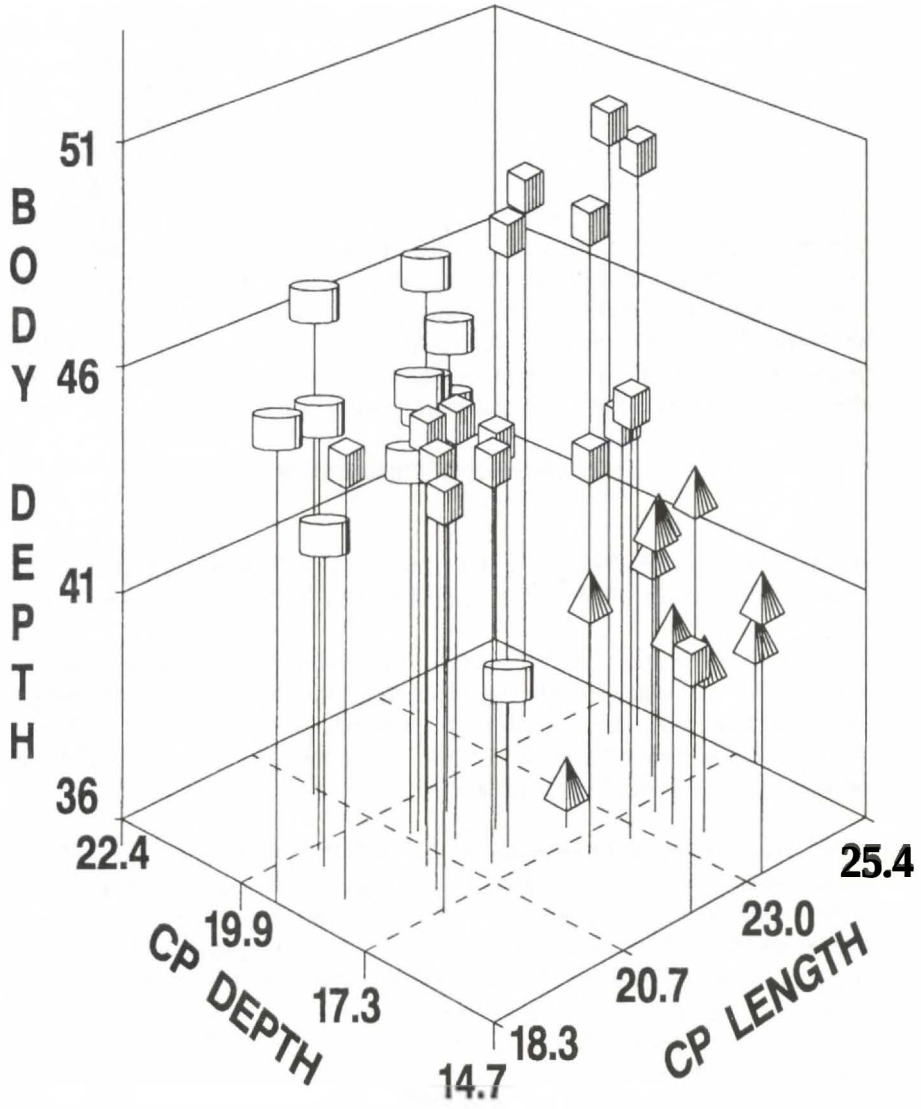

Figure 3. Body depth, caudal peduncle depth and caudal peduncle length in % SL for *Apogon zebrinus* (cylinder), *Apogon annularis* (cube), *Apogon guamensis* (pyramid).

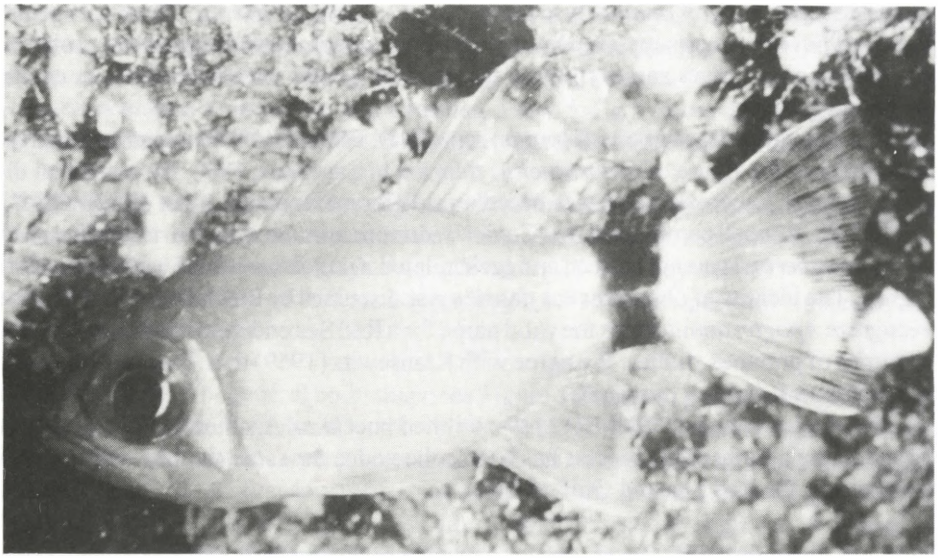

Figure 4. *Apogon annularis*, Sudan, Red Sea, photograph by John E. Randall.

Villiform teeth in several rows on premaxilla; 2 rows on dentary; one row on palatines and vomer; none on ectopterygoid, entopterygoid or basihyal. Vertebrae 10 + 14; 5 free hypurals, one pair of slender uroneurals, 3 epurals, parhypural free. Three supraneurals, 2 supernumerary spines on first dorsal pterygiophore. Basisphenoid present. Supramaxilla absent. Posttemporal serrate on posterior margin. Preopercle serrate on vertical and horizontal margins, ridge smooth. Infraorbital shelf present on third infraorbital bone. Scales ctenoid. Lateral line complete.

LIFE COLOURS. From a 35 mm Kodachrome of specimen shown in Figure 4: body pale bluish to about the midline, pinkish blue below midline; caudal peduncle with a complete black band within whitish area on each side; broad brownish triangular cheek mark from eye to edge of preopercular ridge; anterior edges of dorsal fins, caudal fin, anal fin and pelvic fins bluish white, rest of fins pale, pectoral fins pale; no other marks on head, body or fins; iris blackish brown.

PRESERVED COLOUR PATTERN. Adults: wide, triangular subocular cheek mark behind upper jaw; first dorsal-fin membranes dark between spines 1-4; edges of caudal lobes dark; caudal peduncle dark bar continuous dorsally and ventrally; body uniform, without pale bars or dark saddle under dorsal fins; stomach and intestine black. Juveniles: similar to the adults.

DISTRIBUTION. Known only from the Red Sea and Gulf of Aden.

REMARKS. See species comparison under Remarks for *Apogon zebrinus*. Günther (1859) used the combination *Apogon annularis* var. *roseipinnis*. Klausewitz (1959) suggested that *Apogon annularis* is a subspecies of *Apogon aureus*. These subspecies concepts have not been supported by any subsequent work, but do suggest the problems of relating appropriate names in these two species groups with differences in caudal peduncle banding.

In the original description of *Apogon annularis*, Rüppell (1828) directly related his specimens to the figure of *Ostorhinchus fleurieu* in Lacépède, 1801. He noted that the description in Lacépède's text was based on a different kind of fish [an oplegnathid?]. In 1835-38, Rüppell commented that Cuvier's identification as *Apogon rex mullorum* (= *Apogon imberbis*) was not correct, and again related *Apogon annularis* with Lacépède's figure. The identity of *Ostorhinchus fleurieu* was discussed by Randall et al. (1990). We recognize *Apogon annularis* as the valid name for a Red Sea endemic consistent with the majority of previous studies. We agree with Klausewitz (1959) that *Apogon erdmani* is a synonym of *Apogon annularis*.

Two males in the lot USNM 212429 exhibited buccal enlargement, but no eggs were found in the mouths. This species has been collected at the same stations with *Apogon zebrinus* in the Red Sea and Gulf of Aden.

MATERIAL EXAMINED. Types: *Apogon annularis* Lectotype; SMF 1774 (60.9); Red Sea, Et Tur, Sinai coast, Egypt, Gulf of Suez.; E. Rüppell, 1827. *Apogon erdmani* Holotype; USNM 147518 (59.5); Saudi Arabia, Jiddah, Sams Pier, 2 July 1948, D.S. Erdman Coll; x-rayed.

COMPARATIVE MATERIAL. *Apogon annularis*: **Red Sea: Egypt**: Gulf of Aqaba: USNM 212429, 24(39-53); Bay at El Himeira; 16 July 1969; VGS 69-2. BPBM 21513, 3(34-45); El Himeira; 12m.; 25 Apr. 1977. USNM 212430, 16(36-59); N. of Râs Burqa; 23 July 1969; VGS 69-7. USNM 212432; 5(40-52); Marsa Muqabila; 17 July 1969; VGS 69-3. USNM 212438, 8(42-50); One mi. N. of Râs Burqa; 21 July 1969; VGS 69-6. USNM 212441, (40); Between Marset Mahashel Ala & Marset Abu Samra; 2 Sept. 1969; VGS 69-18. USNM 212443, 3(14-36); Bay between marsa Mokrakh and El Himeira; 15 July 1969; VGS 69-1. Strait of Gûbâl: USNM 212428, 61(45-59); Râs Muhammad; 26 Sept. 1969; VGS 69-28. USNM 212439, (31,50); 2 Jan. 1965. USNM 212442, 21(25-52); 7 Jan. 1965. USNM 212444, (26); 6 Jan. 1965. Gulf of Suez: USNM 212436, 9(26-30); 4 Jan. 1950. USNM 212437, 30(32-55); 30 Dec. 1964. USNM 212440, 3(28-57); El-Tur, Sinai Peninsula; 27 Sept. 1969; VGS 69-29. USNM 212446, 72(24-58); 10 Jan. 1965. **Saudi Arabia**: ANSP 163226, (52-53); Khor Obhour; SV-RS-77; 15 Apr 1977. RMNH 12892, (61-66); Jiddah; 1880; J. A. Vragt. BPBM 30386, 4(14-18); 29 km. S. of Yanbu; 30 May 1984. Sudan: BPBM 20373; 3(34-45); Suakin Harbor; 11 Oct. 1974. **Eritrea**: USNM 212431, 29(27-55); North end of Isola Delemme, off Massawa,; 7 Aug. 1969; VGS 69-9. USNM 212433, 47(24-53); Massawa; 12 Aug. 1969; VGS 69-12. USNM 212434, 7(17-29); Difnein I., South shore; 15 Aug., 1969; VGS 69-15. USNM 212435, (31, 35); Melita Bay; 13 Aug. 1969; VGS 69-13. USNM 212445; (28); Eritrea; Aug. 1969; VGS 69-14. **Yemen**: Red Sea: BPBM 35701, 4(18-22); Jaz 'ir as Zubayr, 15° 6.8' N., 42° 35.9' E.; 15 May 1993. Gulf of Aden: USNM 212447, 20(20-62); Gold Mohur Bay; 21 Dec. 1964; IIOE Cr. 9, F. Talbot - 26.

Apogon guamensis Valenciennes, 1832
Fig. 5

Apogon guamensis Valenciennes, 1832: 54 (Guam, Mariana Ids.).
Apogon nubilus Garman, 1903: 229, pl.1, fig 1 (Fiji, Suva reef).
Apogon ocellatus Fourmanoir and Crosnier, 1964: 5, fig 3 (Nosy-Bé, Madagascar).
Apogon spongicolus Smith, 1964: 529, fig 1. (Red Sea; Ethiopia [Eritrea]).

DIAGNOSIS. An *Apogon* of the subgenus *Ostorhinchus* usually with no bars on body, basicaudal spot diffuse in adults, caudal fin without dark margins, subocular mark narrow, linear, usually 13 pectoral-fin rays, total gill-rakers 24-28, body depth 37-42%, caudal peduncle depth 15-18%, second anal-spine length 15-17%, and pectoral-fin length 24-26% of standard length.

DESCRIPTION. For general body shape see Figure 5. Range of proportions (as % SL): greatest body depth 37-42, head length 40-44, eye length 14-18, snout length 8-9, bony interorbital width 10-12, upper jaw length 20-22, caudal peduncle depth 15-18, caudal peduncle length 22-26, first dorsal-fin spine length 2.1-4.2, second dorsal-fin spine length 8-11, third dorsal-fin spine length 17-22, fourth dorsal-fin spine length 16-19, length of spine of second dorsal fin 15-19, first anal-fin spine length 2.6-5.1, second anal-fin spine length 15-17, pectoral-fin length 24-26; pelvic-fin length 21-25.

Dorsal fin VII+I,9; anal fin II,8; pectoral fin usually 13-13, 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 5-6; median predorsal scales 3-4; circum-peduncular scale rows 12 (5+2+5); gill-rakers and rudiments 1-3+4-6 on upper limb, 17-20+0-1 lower limb, total 24-28, usually 25-28 well-developed rakers. The frequency of gill-raker counts is given in Table 1.

Villiform teeth in several rows on premaxilla; 2 rows on dentary; one row on palatines and vomer; none on ectopterygoid, entopterygoid or basihyal. Vertebrae 10 + 14; 5 free hypurals, one pair of slender uroneurals, 3 epurals, parhypural free. Three supraneurals, 2 supernumerary spines on first dorsal pterygiophore. Basisphenoid present. Supramaxilla absent. Post-temporal serrate on posterior margin. Preopercle serrate on vertical and horizontal margins, ridge smooth. Infraorbital shelf present on third infraorbital bone. Scales ctenoid. Lateral line complete.

LIFE COLOURS. From two transparencies of Red Sea specimens by Rudie H. Kuiter: Body more or less uniform bluish brown, darker dorsally under dorsal fins, may have 3-4 poorly-developed, pale vertical bars on side behind pectoral fin; a diffuse dark, offset basicaudal spot; a narrow cheek mark from below eye to preopercle ridge and another dark line on vertical edge of preopercle; first dorsal fin dark from first to fourth spines and upper half of membrane between fourth and fifth spines, rest of fin pale, translucent; second dorsal fin, anal, caudal, pelvic and pectoral fins all pale and translucent, without any marks; iris blackish brown.

PRESERVED COLOUR PATTERN. Adults with narrow, dark cheek mark from lower edge of eye towards corner of preopercle; first dorsal fin with dark membrane between spines 1-4; caudal fin unmarked; caudal peduncle with a diffuse dark spot or saddle of variable intensity; 3 or 4 pale bars sometimes present on body from below first dorsal fin and behind pectoral fin to just behind second dorsal and anal-fin bases, bars extend above lateral-line scales below second dorsal fin; no dark saddle under dorsal fins; stomach and intestine black. Juveniles with basicaudal spot restricted to a round, mid-lateral spot, which (like the dark cheek mark) may be inconspicuous in faded specimens.

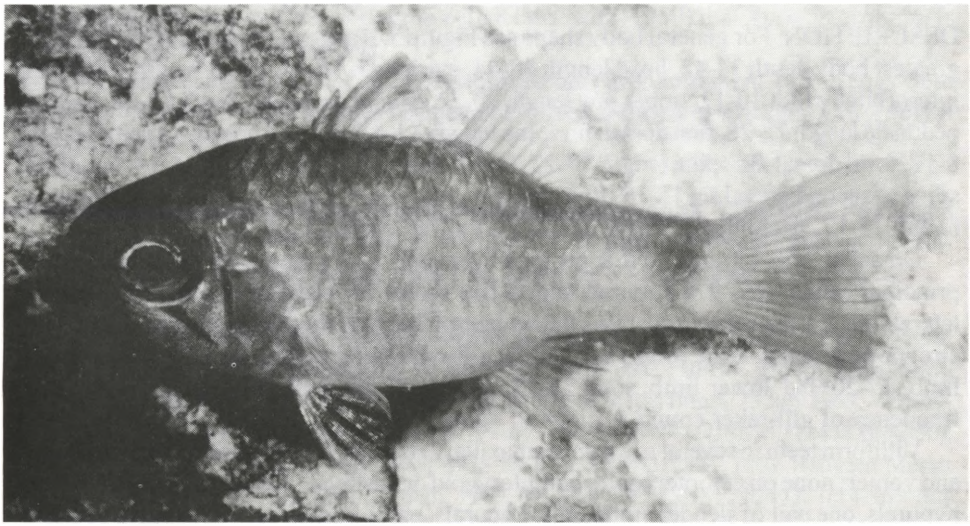

Figure 5. *Apogon guamensis*, adult, Red Sea, Egypt, photograph by Rudie H. Kuiter.

DISTRIBUTION. Known from the Red Sea, Indian Ocean and western Pacific to the Tonga, Samoa, Phoenix and Marshall Islands.

REMARKS. See species comparison under Remarks for *Apogon zebrinus*. Several specimens were found with buccal enlargement (USNM 112046 and 147524) but no eggs.

Apogon ocellatus and *A. spongicolus* are juvenile specimens of *Apogon guamensis*. Figure 5, an adult Red Sea *Apogon guamensis*, shows the faint basicaudal spot and cheek mark. Smith (1964) compared *Apogon spongicolus* with *Apogon nubilus* [= *guamensis*] and believed his species to be new, because it lacked the dark cheek mark. The largest (22 mm SL) paratype of *Apogon spongicolus*, RUSI 774, from Kenya is *Apogon fleurieu* based on the pectoral ray count (14-14) and a low total gill-raker count of 23 (2+4 & 15+2). Randall *et al.*, (1990: Fig. 6) illustrated a 33 mm *A. fleurieu* from the Red Sea

with an intense basicaudal spot and no cheek mark. The holotype and other paratypes of *Apogon spongicolus* have 13 pectoral rays and 17 well developed lower gill-rakers. Both character states, individually, are rare for *Apogon fleurieu*. These smaller specimens, 15.7-17.0 mm SL better represent material of *Apogon guamensis* even though the cheek mark is not present.

Fourmanoir and Crosnier (1964) gave a very brief colour description of *Apogon ocellatus* without any other information. In addition to the diagnostic colour pattern, the syntypes have pectoral-fin counts of 13-13 and total gill-raker counts of 24 and 26, all consistent with *Apogon guamensis*. Their name is a primary homonym of *Apogon ocellatus* Weber, 1911 and a secondary homonym of *Apogon ocellatus* (von Bonde, 1923).

MATERIAL EXAMINED. Types: *Apogon guamensis* Syntypes; MNHN 8767, 4(22-56); Guam; Quoy and Gaimard; 1826-1829. *Apogon nubilus* Holotype; MCZ 28315, (54); Fiji, Suva reef; 12 Dec. 1897. *Apogon ocellatus* Syntypes; MNHN 1973-41, 2(20-20); Madagascar, Nosy-Bé, Ambatoloaka; x-rayed. *Apogon spongicolus* Holotype; RUSI 354, (17); Red Sea; Eritrea; x-rayed. Paratypes: RUSI 441, 2(15.7-17.0); Red Sea; Eritrea; x-rayed. RUSI 774, (22); [= *Apogon fleurieu*] Kenya, Shimoni; Nov.1952; x-rayed.

COMPARATIVE MATERIAL. *Apogon guamensis*: **Red Sea**: **Israel**: Gulf of Aqaba: RUSI 3278, (57); x-rayed; USNM 212876, 5(64-75); USNM 212875, 5(47-63); USNM 212874, 3(52-64); USNM 212878, 7(59-71); USNM 191707, 4(21-28). Elat: USNM 212873, (67). **Egypt**: USNM 212877, 12(16-66); Muqabila: USNM 212883, 10(39-69); Strait of Jubal, 0-5m. USNM 212884, (31); Strait of Jubal, S. end of Sinai Peninsula. BPBM 18346, (33); Râs Muhammad. USNM 213617, 57(32-71); 27°18'50"N, 033°47'35"E; 0-5m. USNM 212879, 6(23-66); USNM 212880, 46(33-68); USNM 212884, (31), Harghada. USNM 212885, (32), Ghardaqe. USNM 147519, 28(53-68) NW edge Shaib Al Zanadir Reef. **Saudi Arabia**: Jiddah. USNM 191658, 3(48-55); USNM 147523, 15(12-66); USNM 112046, 12(33-65); USNM 212886, 3(40-65); USNM 163808, (11); USNM 147524, 7(37-60). **Eritrea**: Sharm Ubhar: USNM 212881, 9(49-60); Isola Delemme. USNM 212882, (49); naval base, Massawa.

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TABLE 1. Frequency distribution of gill-raker counts (including rudiments) for *Apogon* species.

	Total							Upper Limb			Lower Limb					
	24	25	26	27	28	29	30	6	7	8	17	18	19	20	21	22
Apogon annularis		1	2	15	11	2	1	3	23	6			3	17	10	2
Apogon zebrinus	1	5	14	10	9			13	22	4	1	7	16	15		
Apogon guamensis	1	5	19	13	4			5	28	11		6	25	11	2	
Apogon savayensis		7	9	13	21	9		16	41			8	7	25	9	
Apogon sp.			7	29	41	24	12	3	63	40		1	9	30	53	13

TABLE 2. Preserved colour pattern characteristics of certain *Apogon* species.

Characteristic	*annularis*	*guamensis*	*zebrinus*	*savayensis*	*Apogon* sp
Pale bars on body	none	0-4	many	0 to few, faint	many
Edges of caudal fin	dark	pale	dark	dark	dark
Basicaudal mark					
Juvenile	complete band	diffuse spot	complete band	partial band	partial band
Adult	complete band	diffuse spot or saddle	incomplete, band below LL	incomplete, band above LL	incomplete, band above LL
Cheek mark	wide, triangular	narrow line	wide, triangular	wide, triangular	wide, triangular

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