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# Two new species of stargazers of the genus *Uranoscopus* (Teleostei: Uranoscopidae) from the western Pacific Ocean

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## Abstract

Two new species of stargazers in the *Uranoscopus albesca* species-complex of the family Uranoscopidae are described from Papua New Guinea, which shares among other characters a concave posterodorsal margin of the pectoral fin. *Uranoscopus brunneus* n. sp. is described from a single specimen from off southwestern New Britain, and is characterised by lower edge of preopercle with 8 spines; labial fimbriae poorly-developed; anterior nostril with a long tubiform valve, posterior nostril a slit-like pore; supracleithrum with a sharp spine at rear end and five small spines inside; dorsoposterior margin of pectoral fin concave; 62 oblique scale-rows along the sides of the body in adult; pectoral-fin membranes dark brown. *Uranoscopus kishimotoi* n. sp., described from a single specimen from West Sepik Province, is characterised by the lower edge of preopercle with 3 spines; no labial fimbriae; both anterior and posterior nostrils with long tubiform valves; supracleithrum with a sharp spine at rear end and one additional small spine inside; dorso-posterior margin of pectoral fin concave; 59 oblique scale-rows along the sides of the body in adult; upper pectoral-fin membranes pale, lower membranes brown. The distribution of the species in the *U. alb*esca species-complex is discussed.

**Key words:** Uranoscopidae, stargazer, New Britain, Madang, Papua New Guinea, new species, distribution

## Introduction

The stargazers of the perciform fish family Uranoscopidae are a group of benthic living fishes distributed worldwide in tropical and temperate oceans, with a few species occasionally entering brackish water or even fresh water habitats. They bury in sand or mud, leaving only the eyes and anterodorsal part of the head exposed. Members of the group are characterised by having dorsally or dorsolaterally directed eyes placed on or near the top of a large, flattened, cuboid head; an oblique to vertical mouth, with lips usually lined with cutaneous cirri; and an elongate, subcompressed body (Pietsch 1989: 253). In the family, seven genera and 53 valid species are known (Eschmeyer *et al.* 2017; Eschmeyer & Fong 2017).

The genus *Uranoscopus* is characterised by the presence of a small fourth infraorbital that covers only a relatively small portion of the sphenotic, only two extrascapular elements on each side of the posterior margin of the cranium, the posterior basibranchials unossified, an L-shaped toothplate associated with the ventral margin of the first epibranchial, and a venom gland associated with the cleithral spine (Pietsch 1989: 295). This genus is distributed in the Indo-West Pacific, in the eastern Atlantic and the Mediterranean and Black Sea. The genus comprises a total of 25 valid species (Eschmeyer *et al.* 2017), including four species from the eastern Atlantic Ocean (*Uranoscopus albesca* Regan 1915; *U. cadenati* Poll 1959; *U. polli* Cadenat 1951; *U. scaber* Linnaeus 1758), four species endemic to the Red Sea (*Uranoscopus bauchotae* Brüss 1987; *U. dahlakensis* Brüss 1987; *U. marisrubri* Brüss 1987; *U. rosette* Randall & Arnold 2012), six species restricted to the Indian Ocean (*Uranoscopus archionema* Regan 1921; *U. crassiceps* Alcock 1890; *U. dollfusi* Brüss 1987; *U. filibarbis* Cuvier in Cuvier & Valenciennes 1829; *U. guttatus* Cuvier in Cuvier & Valenciennes 1829; *U. marmoratus* Cuvier in Cuvier & Valenciennes 1829; some of these also occurring in the Red Sea), five species restricted to the western Pacific Ocean [*Uranoscopus bicinctus* Temminck & Schlegel 1843; *U. chinensis* Guichenot in Sauvage 1882; *U. fuscomaculatus* Kner 1868; *U. tosae* (Jordan & Hubbs 1925); *U. turbisquamatus* (Okamura & Kishimoto 1993)],

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and six species in the Indian Ocean and western Pacific (*Uranoscopus affinis* Cuvier in Cuvier & Valenciennes 1829; *U. cognatus* Cantor 1849; *U. japonicus* Houttuyn 1782; *U. kaianus* Günther 1880; *U. oligolepis* Bleeker 1878; *U. sulphureus* Valenciennes [ex Quoy & Gaimard] in Cuvier & Valenciennes 1832). Thus, 10 species of *Uranoscopus* are known from the western Pacific (40% of the valid species).

During the work on fishes of Papua New Guina which were collected during the PAPUA NIUGINI 2012 Biodiversity Expedition, the KAVIENG 2014 Expedition and the MADEEP Expedition, specimens of two undescribed species of *Uranoscopus* were discovered. These species are described in the present paper.

## Methods and materials

The general methods follow Kishimoto (1984, 1987). The standard length is abbreviated as SL, the head length as HL. Values of paratypes in parentheses, following those of the holotype. The head length is measured from the tip of the upper lip to the end of the opercle; in addition, a length between the snout and the gill opening is measured. Counts of fin elements follow Fricke (1983). References are cited according to standards provided by Fricke & Eschmeyer (2017a). Institutional abbreviations follow Fricke & Eschmeyer (2017b).

**Comparative material**. ***Uranoscopus affinis***: MNHN 0000-5263 (holotype), Indian Ocean; MNHN 0000-5262, Vietnam, Hue, J. F. T. Eydoux & F. A. Souleyet, 1837; MNHN 1941-0192 (1), China, Fuzhou, 1941; MNHN 1975−0323 (2), Philippines, Luzon Island, Manila, P. Fourmanoir, 1975; NTUM 12069 (1, 80.7 mm SL), St. CP 4335-17, Papua New Guinea, West New Britain Province, 06°04.42'S 149°18.65'E−06°05.15'S 149°17.70'E, 240–250 m depth, R/V Alis, 4 Aug. 2014; NTUM 12146 (1), Taiwan, Dashi, W.-J. Chen, 13 Mar. 2014. ***U. albesca***: MNHN 1967-0871 (4), Congo, Pointe-Noire, 70 m depth, A. Crosnier, 12 Aug. 1966. ***U. archionema***: MNHN 1988-1587 (1), Madagascar, northwest of Nosy Mitsio, 12°43'58.8"S 48°25'01.2" E, 73 m depth, R/V Vauban, Aug. 1973; MNHN 1975−0718 (1), Réunion; MNHN 1988-1862 (1), Réunion, P. Guézé, 1966; MNHN 1996-0080 (2), Réunion. ***U. bauchotae***: MNHN 1966-0678 (holotype), Red Sea, R.-P. Dollfus, 1928; MNHN B−3021 (1 paratype), Red Sea, R.-P. Dollfus, 1928. ***U. bicinctus***: NTUM 12147 (1), Taiwan, Kaohsiung, W.-J. Chen, 2011; NTUM 12148 (1), China, Hainan Island, W.-J. Chen, 19 Nov. 2014; USNM 296630 (1), Japan, Suruga Bay, 24 Aug. 1979; USNM 435722 (1), Philippines, Mindoro Island, Puerto Galera, 12−15 m depth, J. T. Williams et al., 28 Mar. 2015. ***U. cadenati***: MNHN 1961−0968 (1), Senegal, Dakar, J. Cadenat, 1958. ***U. chinensis***: MNHN A-3108 (lectotype of Pietsch & Kishimoto 1989), China, Dabry de Thiersant; CMFRI GB-31.155.5.8 (17), off southwestern India; MNHN 0000-5427 (1 paralectotype), China, Macao; MNHN 1986-0332 (1 paratype of *U. flavipinnis* Kishimoto 1987), Japan, Suruga Bay, H. Kishimoto, 1979; SMNS 24714 (1), Taiwan, Kueishan Island, 50−200 m depth, R. Fricke, 21 May 2005. ***U. cognatus***: BMNH 1860.3.19.397a (probably the holotype), Malaysia, Sea of Penang. ***U. crassiceps***: MNHN 1890-0324-0326 (3 syntypes), India, Tamil Nadu, Madras, 179–186 m, A. W. Alcock; OMMSFC 1086, (1), Oman, south of Masirah Island, 20°03’55.44’’N−59°08’19.53’’E, 180 m depth; SMF 34725 (3), Oman, vicinity of Salalah City, 16°18’17.98’’N−54°34’59.61’’ E, 185 m depth. ***U. dahlakensis***: USNM 375308 (1), Red Sea, Ethiopia, Massawa, 40.4 m depth, L. W. Knapp, 21 Sept. 1971. ***U. dollfusi***: MNHN 1966-0680 (holotype), Red Sea, Egypt, Gulf of Suez, 28°04'N 33°29'E−28°08'N 33°34'E, 60−73 m depth, R.-P. Dollfus, 1928; MNHN B-3022-B-3023 (2 paratypes), Red Sea, Egypt, Gulf of Suez, 28°04'N 33°29'E−28°08'N 33°34'E, 60–73 m depth, R.-P. Dollfus, 1928; MNHN 1966-0679 (1 paratype), Red Sea, Egypt, Gulf of Suez, 60−70 m depth, R.-P. Dollfus, 1928. ***U. filibarbis***: MNHN A-3098 (holotype), Indian Ocean. ***U. fuscomaculatus***: MNHN 2008-1281 (1), Vanuatu, western Malo Island, 366−389 m depth, 17 Sept. 2006. ***U. guttatus***: MNHN A-3097 (holotype), India, Pondicherry, Leschenault; MNHN 1982-0016 (1), Seychelles, 4°52'58.8"S 56°01'01.2"E, 50–55 m depth, 3 Sept. 1980. ***U. japonicus***: MNHN 1941−0193 (2), China, Fuzhou, 1941; NTUM 12421 (2), Taiwan, Dashi, W.-J. Chen, 13 Mar. 2014; NTUM 12422 (1), Taiwan, Dashi, W.-J. Chen, 12 Mar. 2015; NTUM 12423 (1), Taiwan, Dashi; USNM 49461 (1), Japan, Tokyo, R/V Albatross; USNM 192572 (5), Taiwan, Penghu Islands, R. E. Kuntz & W. H. Wells, 11 Oct. 1961; SMNS 3135 (1), Japan, Tokyo, L. H. P. Döderlein, Apr. 1883; SMNS 24715 (1), Taiwan, Kueishan Island, R. Fricke, 50−200 m depth, 21 May 2005. ***U. kaianus***: NTUM 11345 (1, 232.0 mm SL), St. DW4496-15, Papua New Guinea, northwest of New Hanover, 2º24.14’S 149º55.66’E−2º24’97’S 149º54.42’E, 274−269 m depth, R/V Alis, 6 Sept. 2014; NTUM 12424(1, 87.6 mm SL), St. CP 4048L, Papua New Guinea, East Sepik Province, 03°20'S 143°28'E, 325–345 m depth, R/V Alis, 19 Dec. 2012. ***U. marisrubri***: SMF 16476 (holotype), Red Sea, Saudi Arabia, Mismaris trough, 21°22'N 39°04'E, 363−383

m depth. ***U. marmoratus***: MNHN 0000-5254 (holotype), India. ***U. oligolepis***: NTUM 11224 (2, 35.3−39.8 mm SL), St. CP4457-09-10, northeast of Bangatang Island, Kavieng District, 2º34.80'S 150º39.99'E−2º33.41'S 150º41.34'E, 133–178 m depth, R/V Alis, 2 Sept. 2014; NTUM 11276 (1, 32.3 mm SL), St. DW4474-8, southeast of Bauddisson Island, Kavieng District, Bismarck Sea, 2º42.57'S 150º35.91'E−2º43.06'S 150º36.13'E, 90−185 m depth, R/V Alis, 4 Sept. 2014); NTUM 11320 (1, 38.4 mm SL), St. CP4490-21, off northwest side of New Hanover, 2º24.64'S 149º58.74'E−2º25.32'S 149º57.79'E, 155−120 m depth, R/V Alis, 2 Sept. 2014; NTUM 12070 (1, 72.4 mm SL), St. CP 4337-12, Papua New Guinea, West New Britain Province, 06°05.09'S 149°18.53'E−06°06.658'S 149°17.068'E, 287−447 m depth, R/V Alis, 7 May 2014. ***U. polli***: MNHN 1961-0967 (1 syntype), Senegal, Dakar, R/V Gerard Treca, 1958; MNHN 1962-1282 (1), Congo, Pointe-Noire. ***U. rosette***: USNM 375416 (1 paratype), Red Sea, Gulf of Aqaba, Israel, Eilat, V. G. Springer, 8 July 1969. ***U. scaber***: MNHN A-5751 (holotype of *U. bufo* Valenciennes 1843), Canary Islands, Lanzarote, S. Berthelot; MNHN 0000-8927 (1), Mediterranean Sea, France, Marseille, Marion, 1875; MNHN 1961-0877 (2), Mediterranean Sea, Monaco, 200 m depth; SMNS 730 (2), France, Nice, von Elsässer, Nov. 1859; SMNS 8676 (1), Mediterranean Sea, Baleares Islands, Mallorca, Cala Bona Bay, R. Fricke, 21 July 1981; SMNS 8702 (1), Mediterranean Sea, Baleares Islands, Mallorca, Cala Bona Bay, R. Fricke, 22 July 1981; SMNS 8743 (1), Mediterranean Sea, Baleares Islands, Mallorca, Cala Bona Bay, R. Fricke, 24 July 1981; SMNS 9403 (1), Mediterranean Sea, Baleares Islands, Menorca, R. Fricke, 12 Sept. 1989; SMNS 9582 (1), Mediterranean Sea, Greece, Varkisa, A. Kodakos, 3 Nov. 1989; SMNS 9601 (1), Mediterranean Sea, Greece, Aiyina, A. Kodakos, 8 Nov. 1989; SMNS 10050 (1), Italy, Porto Santo Stefano, I. Koch, 17 Mar. 1990; SMNS 11530 (1), Turkey, Bodrum, 15 Aug. 1990; SMNS 25933 (1), Spain, Alicante, von Weissweiler, 1869. ***U. sulphureus***: MNHN 0000-5152 (holotype), Tonga, Tongatapu Islands, J. R. C. Quoy & J. P. Gaimard, 1829; MNHN 1977-1047 (1), Red Sea, Israel, Eilat, Friedman, 2 May 1977. ***U. tosae***: NTUM 12425 (1), Macclesfield Bank, South China Sea, 16°07'N 114°20'E−16°07'N 114°23'E, 162−165 m depth, R/V OR1, 26 July 2015; USNM 296631 (1), Japan, Suruga Bay, 5 Sept. 1979. ***U. turbisquamatus***: NMNZ P 27134 (1), New Zealand, Wanganella Bank, 110−117 m depth, 22 Dec. 1976.

### *Uranoscopus brunneus,* new species

Dark-finned stargazer

(Figures 1, 2 A–B, 3; Table 1)

ZooBank: urn:lsid:zoobank.org:act:BD717215-DEC9-40A1-9FBB-546ADC551BBA

*Uranoscopus* sp. 2: Kishimoto 2001: 3529.

**Material.** Holotype: NTUM 12716, 125.8 mm SL, Solomon Sea, Papua New Guinea, West New Britain Province, off southwestern New Britain, 6º06.08'S 149º12.209'E−6º07.639'S 149º12.107'E, 315−625 m depth, St. CP 4330-26, MADEEP Expedition , R/V Alis, 6 May 2014.

**Diagnosis.** A moderately-sized species of *Uranoscopus* with a moderately large head (head length 3.2 in SL); lower edge of preopercle with 8 spines; labial fimbriae poorly-developed; anterior nostril with a long tubiform valve, posterior nostril a slit-like pore; supracleithrum with a sharp spine at rear end and five small spines inside; dorsoposterior margin of pectoral fin concave; 62 oblique scale-rows along the sides of the body in adult; pectoral-fin membranes dark brown.

**Description**. Morphometric and meristic data are presented in Table 1.

Dorsal fin V + ii,11; anal fin i,11; pectoral fin i,10,vi (total 17); pelvic fin I,5; caudal fin (iii),i,9,ii,(iii). Vertebrae 11 + 14.

Head moderate, anterior part of body moderately broad, depressed, body tapering and becoming compressed posteriorly. Body scales arranged in 62 oblique rows. Head, breast and belly naked. Anterodorsal area between lateral lines densely covered with scales just behind skull. Tubiform scales embedded along lateral line. Lateral line positioned dorsally, slightly bending down on caudal peduncle to continue in an extension on the sixth branched caudal-fin ray (counted from above), extending along the basal half of that ray. Spines 1–4 in first dorsal fin well developed, connected by membranes; rudimentary 5th element covered by skin. First two elements of second dorsal fin segmented and unbranched. Membranes of anal and paired fins fleshy and thickened. Pectoral fin broad, dorsoposterior margin concave, forming an angle of about 30° between upper edge and middle ray, remainder of

distal margin nearly straight, 11th ray longest (Fig. 2 A). Soft dorsal and anal-fin bases long, height of soft dorsal-fin 3.0 in second dorsal-fin base length, height of anal fin 3.4 in anal-fin base length. Caudal fin distally slightly convex. Pelvic fins situated on isthmus; distance between pelvic fin bases about one pelvic-fin base length. Pelvic spine feeble, closely connected to 1st soft-ray by connective tissue.

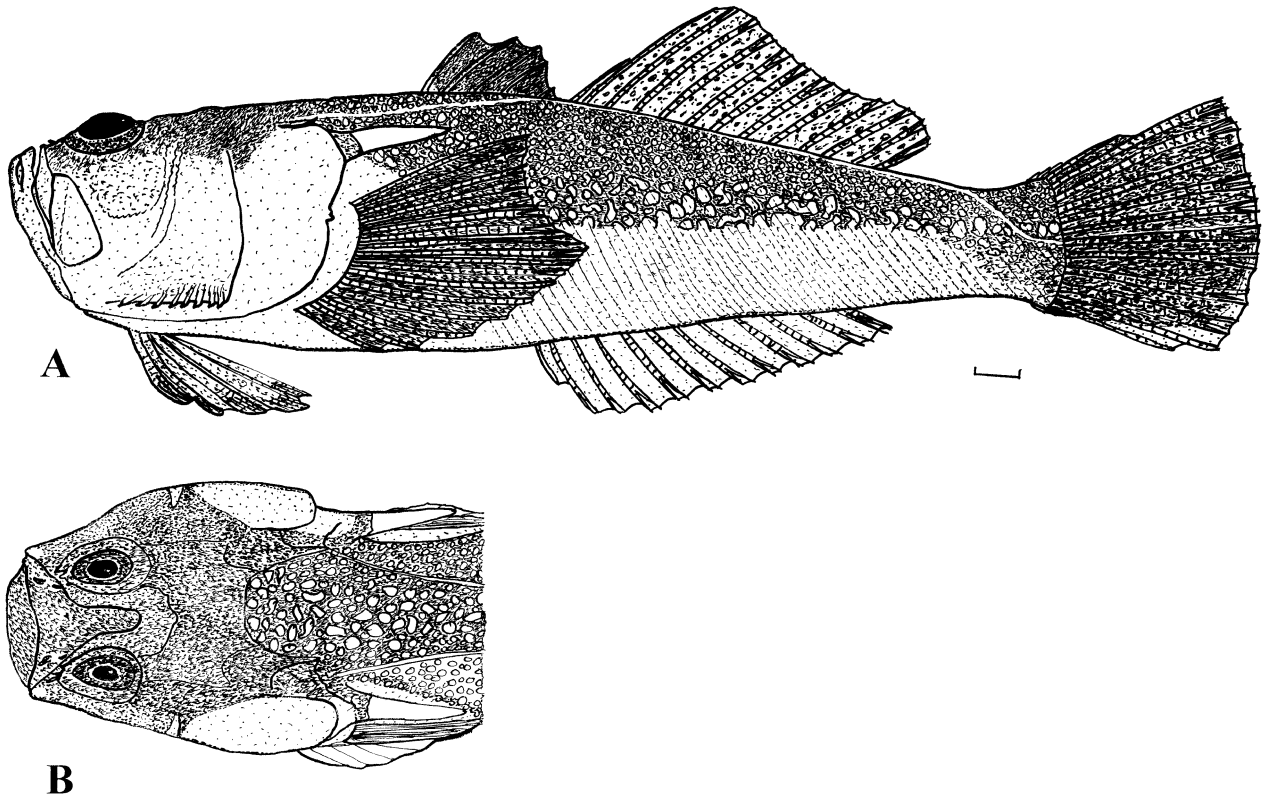


**FIGURE 1.** *Uranoscopus brunneus* **n. sp.**, NTUM 12716, holotype, 125.8 mm SL, Solomon Sea, Papua New Guinea, West New Britain Province, off southwestern New Britain. **A** Lateral view. **B** Head, dorsal view. Scale 5 mm.

Head flattened dorsolaterally, dorsal and lateral surfaces almost entirely encased in minutely sculptured bones. Externally apparent bones of head very slightly concave along mid-dorsal line. Preorbital spines 3, the uppermost spine forming a knob near anterior margin of orbit (Fig. 2 B). Single pair of basipterygial processes widely separated. Joints of head bone elements marked by narrow grooves. Post-interorbital knobs absent from frontal bone. Two parietal lobes developed. Preopercular limb not joined with opercle over most of its length, but contacts opercle posteriorly. Eye moderate, positioned dorsally, not telescopic, without membranous tentacle or grainy row. Interorbital fossa semi-oval, longer than broad, including anterior three-fifths of interorbital space, reaching to level of posterior end of pupil. Supracleithrum with a sharp spine at rear end and five small spines inside. Nasal bone weakly ossified, not exposed, covered by skin of snout. Frontal bones not forming a supraorbital tubercule. Anterior nostril with a wide, rounded flap, posterior nostril a slit-like pore (Fig. 2 B). No chin barbel or cirri on branchiostegal membrane. Prelingual filament reduced to a triangular velum. Opercle distinctly shorter than deep; subopercle without ventral thickening. Preopercle with a slight horizontal, oblique, ventro-lateral thickening. Lower edge of preopercle with 8 spines. Respiratory valve rudimentary. Dentary without a ventromedial flange. Teeth in jaws small, conical, in two series; one series of widely separated caniniform teeth on premaxillary and dentary; labial fimbriae poorly-developed, barely recognisable.

*Colour in life* (see Fig. 3). Dorsal parts of head and body dark brown, back scattered with irregular small rosy blotches. Sides of head and body dark brown, with irregular slightly larger rosy blotches. Belly and thorax rose, pectoral-fin base dark grey. Eye greenish. First dorsal fin black, base of first and second spines pale. Rays of second dorsal and anal fins grey, membranes spotted. Caudal-fin rays and membranes dark reddish brown. Pectoral fin black, distal margin reddish. Pelvic fin rose.

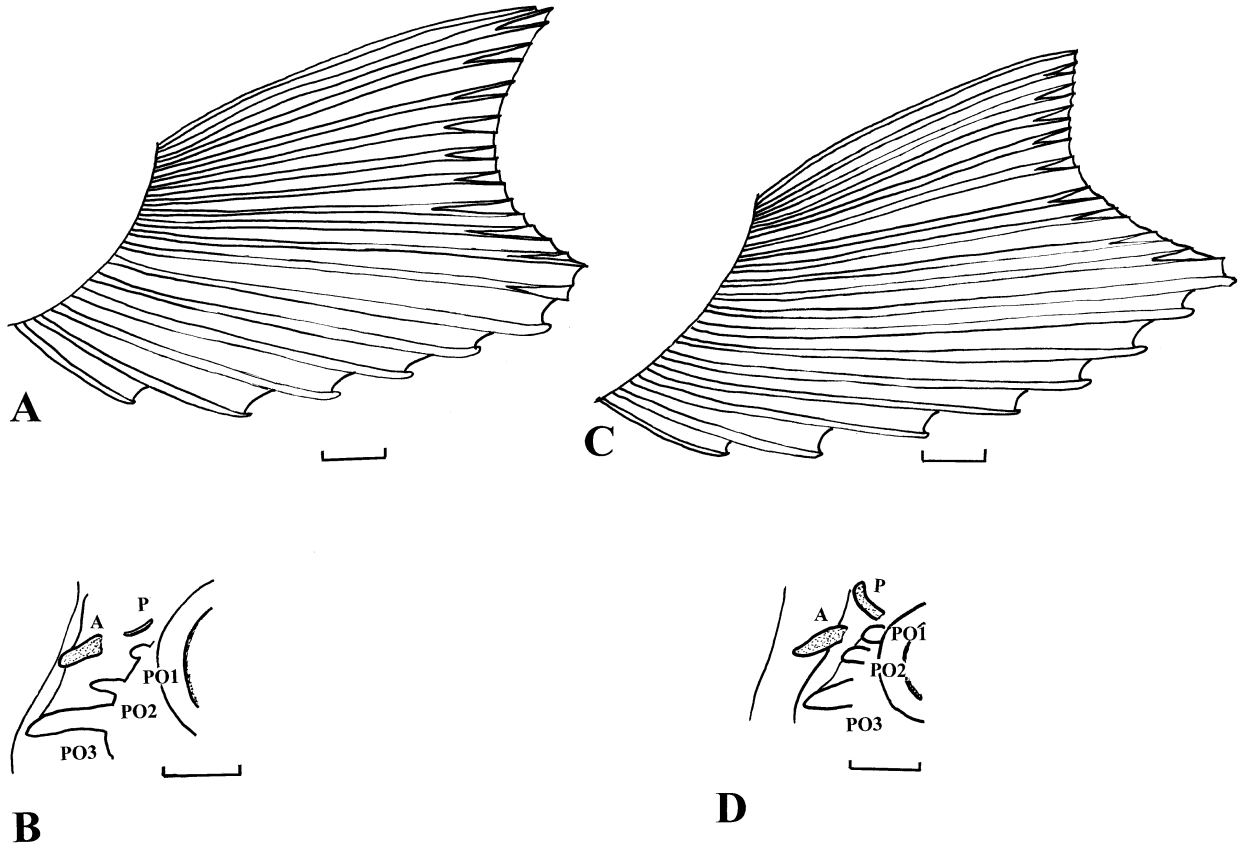


**FIGURE 2.** Pectoral-fin shapes and nostril shapes of *Uranoscopus brunneus* **n. sp.** and *U. kishimotoi* **n. sp. A** Left pectoral fin of *U. brunneus* **n. sp.**; scale indicates 4 mm. **B** Nostrils and preorbital spines of *U. brunneus* **n. sp.**; scale indicates 3 mm. **C** Left pectoral fin of *U. kishimotoi* **n. sp.**; scale indicates 3 mm. **D** Nostrils and preorbital spines of *U. kishimotoi* **n. sp.**; scale indicates 2 mm. [A anterior nostril; P posterior nostril; PO1 preorbital spine 1; PO2 preorbital spine 2; PO3 preorbital spine 3.]

*Colour in preservative*. Head brown; upper half of body dark brown, with numerous, closely set, pale blotches; ventral half of body yellowish, belly rose. Eyes dark grey. First dorsal fin jet black; second dorsal fin pale, rays spotted with brown. Anal fin yellowish. Caudal-fin rays yellow, spotted with brown, membranes pale. Pectoral-fin rays yellow, spotted with brown, membranes dark brown, tips of lower rays pale yellow. Pelvic fins dark grey, distal one-third of rays and membranes yellow.

**Etymology**. "Brunneus" (Latin) means brown; the name refers to the overall brown colouration of the species, and especially to its brown pectoral fin membranes.

**Distribution.** Papua New Guinea (New Britain), Philippines, Indonesia (see Kishimoto 2001: 3529; updated). Found on soft bottoms of lower continental shelf; known depth range 315−625 m.

**Comparisons.** This new species is a member of a species group which is characterised by a supracleithrum with a sharp spine at rear end and one or more spines inside, and the dorsoposterior margin of the pectoral fin distinctly concave (forming an angle of about 30–40° between upper edge and middle ray). The group is here named *Uranoscopus albesca* species-group; other species in this group are *U. albesca*, *U. bauchotae*, *U. dollfusi* and *U. kishimotoi* **n. sp.**, which are compared in Tab. 2. *Uranoscopus brunneus* **n. sp.** exclusively possesses within the group a total of 12 anal-fin rays (other species 13–14), a very high number of 62 oblique scale rows along the sides of the body (other species 47–59), 8 spines on the lower margin of the preopercle (other species 3–6), and dark brown pectoral-fin membranes (other species: pale to light brown).

**Remarks.** This species was briefly described from the Philippines and Indonesia by Kishimoto (2001: 3529) as *Uranoscopus* sp. 2.

*Uranoscopus brunneus* **n. sp.** lives relatively deep, at a known depth range of 315−625 metres. Kishimoto (2001) reports a maximum total length of 26 cm, which would equal a maximum standard length of about 20 cm. The new species is close to *U. kishimotoi* **n. sp.** in having a high number of lateral scale rows and a very long cleithral spine.

**FIGURE 3.** *Uranoscopus brunneus* **n. sp.**, NTUM 12716, holotype, 125.8 mm SL, Solomon Sea, Papua New Guinea, West New Britain Province, off southwestern New Britain. Lateral view. Colouration immediately after collection. (Photograph: J.-N. Chen).

**TABLE 1.** Morphometric and meristic data of *Uranoscopus brunneus* **n. sp.** from New Britain, Papua New Guinea, and *U. kishimotoi* **n. sp.** from Madang, Papua New Guinea.

| | *Uranoscopus brunneus* **n. sp.** | *Uranoscopus kishimotoi* **n. sp.** |
|---|---|---|
| Proportion | Holotype, NTUM 12716, 125.8 mm SL (39.2 mm HL) | Holotype, NTUM 12420, 92.4 mm SL (30.0 mm HL) |
| Head length in SL (% of SL) | 3.2 (31.2) | 3.1 (32.5) |
| Head width in SL (% of SL) | 3.8 (26.4) | 4.4 (22.7) |
| Head width in HL | 1.2 | 1.4 |
| Length between snout and gill opening in SL (% of SL) | 4.0 (25.0) | 3.7 (27.2) |
| Length of longest anal-fin soft-ray in SL (% of SL) | 8.9 (11.2) | 8.7 (11.5) |
| Pelvic-fin length in SL (% of SL) | 5.4 (18.4) | 3.9 (25.5) |
| Length of postorbital part of head in HL (% of SL) | 1.4 (21.9) | 1.5 (22.3) |
| Orbit diameter in HL (% of SL) | 4.6 (6.8) | 5.2 (6.3) |
| Upper jaw length in HL (% of SL) | 2.0 (15.8) | 2.1 (15.3) |
| Caudal peduncle depth in HL (% of SL) | 3.4 (9.2) | 2.8 (11.5) |
| Caudal-fin length in HL (% of SL) | 1.2 (25.7) | 1.2 (26.4) |
| Cleithral-spine length in HL (% of SL) | 2.5 (12.4) | 2.3 (13.8) |
| Distance between bases of basipterygial processes in HL (% of SL) | 6.3 (4.9) | 6.2 (5.2) |
| Opercular width in HL (% of SL) | 3.4 (9.3) | 1.4 (22.9) |
| Interorbital width in orbit diameter (% of SL) | 1.2 (5.2) | 1.1 (6.0) |
| Length of interorbital fossa in orbit diameter (% of SL) | 1.3 (4.4) | 1.1 (5.8) |
| Orbit diameter in width of interorbital fossa | 0.4 | 0.4 |
| Greatest infraorbital depth in orbit diameter (% of SL) | 1.0 (7.0) | 0.8 (8.4) |
| Length of basipterygial process in distance between basipterygial processes | 0.6 | 0.6 |
| Longest dorsal soft-ray length in longest anal soft-ray length | 0.8 | 0.6 |
| Pectoral-fin length in cleithral-spine length (% of SL) | 0.6 (12.3) | 0.5 (26.1) |

***Uranoscopus kishimotoi* new species**
Tube-nosed stargazer
(Figures 2 C–D, 5, 6; Table 1)
ZooBank: urn:lsid:zoobank.org:act:E5FCF8C0-51F6-4454-9A5B-9DB24D19081F

*Uranoscopus* sp. 1: Kishimoto 2001: 3529.

**Material.** Holotype: NTUM 12420, 92.4 mm SL, western Pacific, Papua New Guinea, West Sepik Province, 21.7

km northwest of Tadji, 03°03'S 142°19'E, 300–308 m depth, St. CP 4053K, "Our Planet Reviewed" PAPUA NIUGINI 2012 Biodiversity Expedition, R/V Alis, 20 Dec. 2012.

**Diagnosis**. A small species of *Uranoscopus* with a moderately large head (head length 3.1 in SL); lower edge of preopercle with 3 spines; no labial fimbriae; both anterior and posterior nostrils with long tubiform valves; supracleithrum with a sharp spine at rear end and one additional small spine inside; dorso-posterior margin of pectoral fin concave; 59 oblique scale-rows along the sides of the body in adult; upper pectoral-fin membranes pale, lower membranes brown.

**Description.** Morphometric and meristic data are presented in Table 1.

Dorsal fin V + i,14; anal fin i,12; pectoral fin i,9,viii (totally 18); pelvic fin I,5; caudal fin (iii),i,10,i,(iii). Vertebrae 11 + 14.

Head moderate, anterior part of body relatively narrow, slightly compressed, body tapering and becoming strongly compressed posteriorly. Body scales arranged in 59 oblique rows. Head, breast and belly naked. Nape with embedded scales which are barely visible. Tubiform scales embedded along lateral line. Lateral line positioned dorsally, slightly bending down on caudal peduncle to continue in an extension on the fifth branched caudal-fin ray (counted from above), extending along the basal one third of that ray. Spines 1–4 in first dorsal fin well developed, connected by membranes; rudimentary 5th element covered by skin. First element of second dorsal fin segmented and unbranched. Membranes of anal and paired fins fleshy and thickened. Pectoral fin broad, dorsoposterior margin concave, forming an angle of about 40° between upper edge and middle ray, remainder of distal margin straight, 10th ray longest (Fig. 2 C). Soft dorsal and anal-fin bases moderately long, height of soft dorsal-fin 1.9 in second dorsal-fin base length, height of anal fin 3.4 in anal-fin base length. Caudal fin distally convex. Pelvic fins situated on isthmus; distance between pelvic fin bases about half a pelvic-fin base length. Pelvic spine feeble, closely connected to 1st soft-ray by connective tissue.

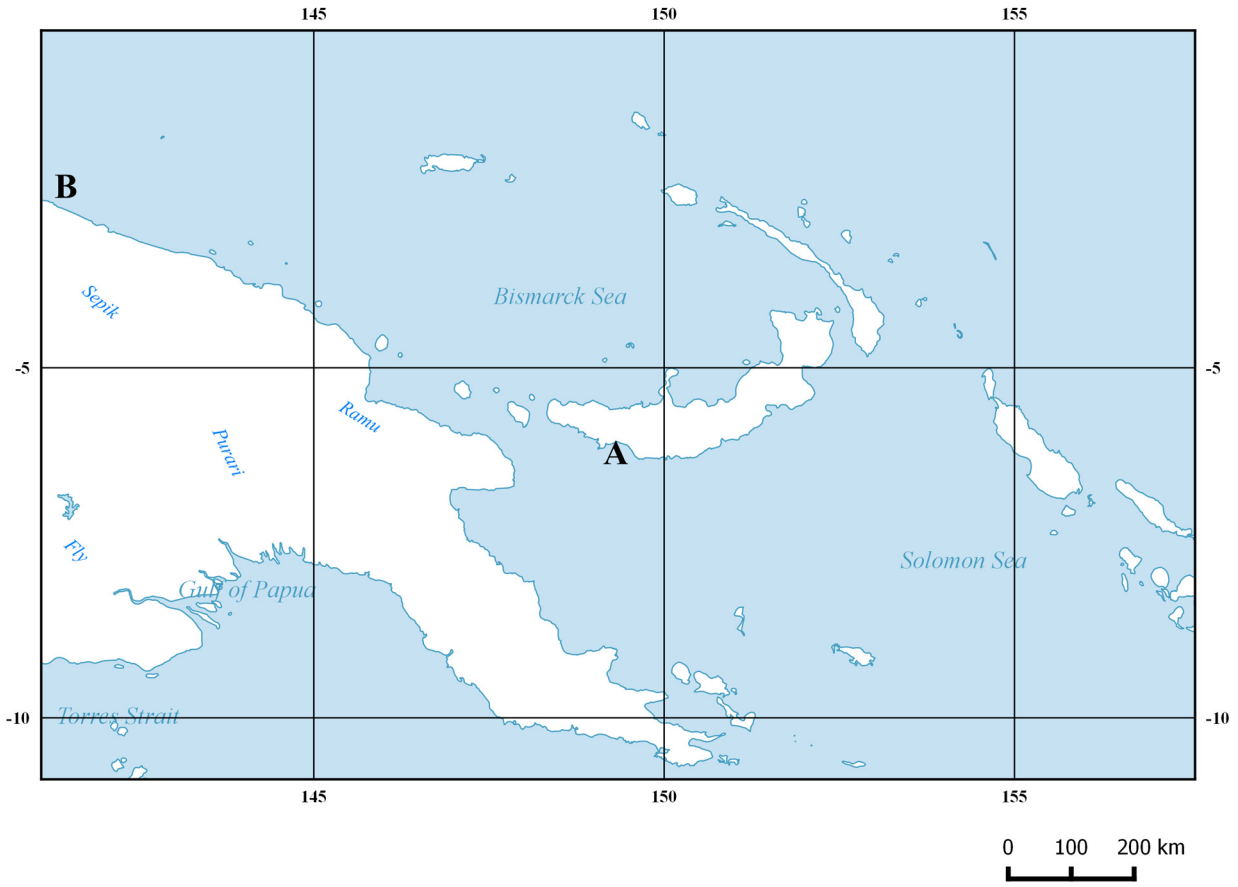


**FIGURE 4.** Type localities of *Uranoscopus brunneus* **n. sp. (A)** and *U. kishimotoi* **n. sp.** (**B**) in Papua New Guinean seas.

Head flattened dorsolaterally, dorsal and lateral surfaces almost entirely encased in minutely sculptured bones. Externally apparent bones of head not concave but flattened along mid-dorsal line. Preorbital spines 3, the upper

two spines forming small knobs near anterior margin of orbit (Fig. 2 D). Single pair of basipterygial processes widely separated. Joints of head bone elements not marked by grooves. Post-interorbital knobs absent from frontal bone. Parietal bone not separated into lobes. Eye small, positioned dorsally, slightly telescopic, without membranous tentacle or grainy row. Interorbital fossa semi-oval, longer than broad including most of interorbital space, nearly reaching to level of posterior end of orbit (Fig. 5 B). Supracleithrum with a sharp spine at rear end and one additional small spine inside. Nasal bone weakly ossified, not exposed, covered by skin of snout. Frontal bones not forming a supraorbital tubercule. Both anterior and posterior nostrils with long tubiform valves (Fig. 2 D). No chin barbel or cirri on branchiostegal membrane. Prelingual filament reduced to a barely distinguishable triangular velum. Opercle distinctly shorter than deep; subopercle without ventral thickening, not overlapping opercle. Preopercle without a ventro-lateral thickening. Lower edge of preopercle with 3 large spines. Respiratory valves well developed. Dentary without a ventromedial flange. Teeth in jaws small, conical, in two series; one series of widely separated caniniform teeth on dentary, no caniniform but small villiform teeth on premaxillary; no labial fimbriae.

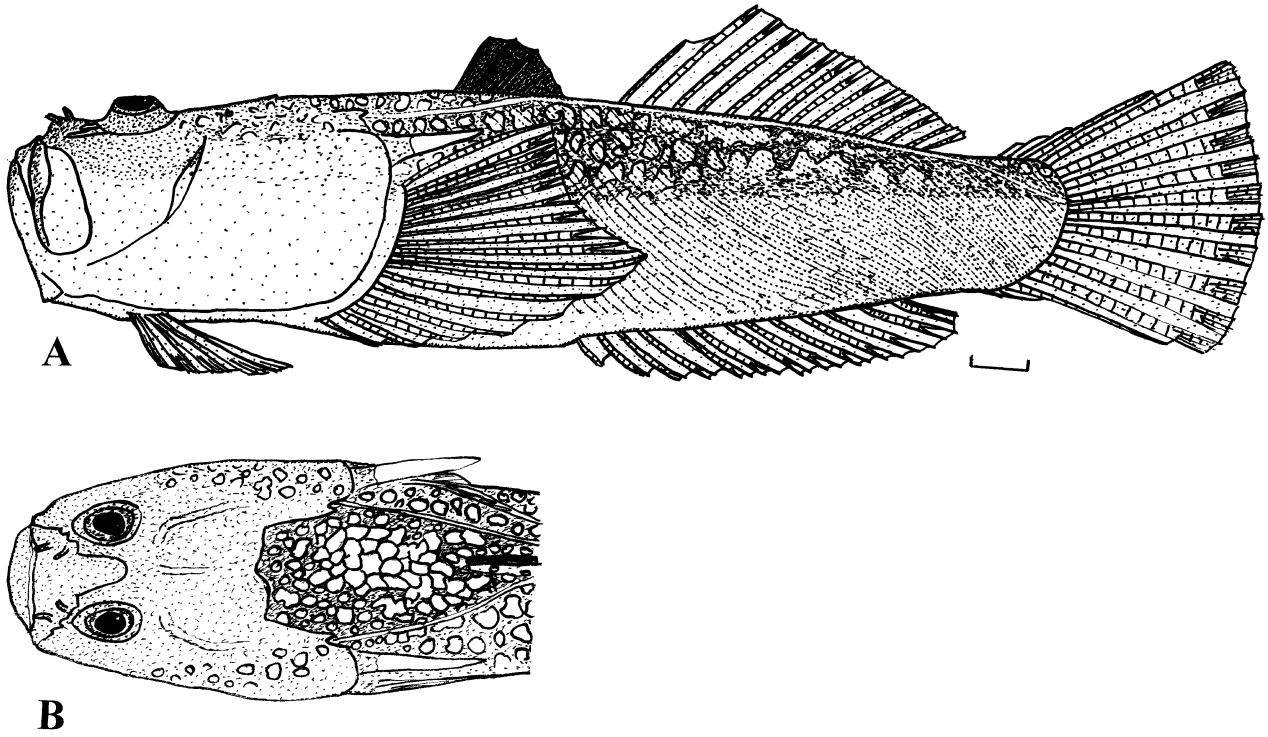


**FIGURE 5.** *Uranoscopus kishimotoi* **n. sp.**, NTUM 12420, holotype, 92.4 mm SL, western Pacific, Papua New Guinea, West Sepik Province. **A** Lateral view. **B** Head, dorsal view. Scale 5 mm.

**FIGURE 6.** *Uranoscopus kishimotoi* **n. sp.**, NTUM 12420, holotype, 92.4 mm SL, western Pacific, Papua New Guinea, West Sepik Province. Dorsolateral view. Colouration immediately after collection. (Photograph: J.-N. Chen).

*Colour in life* (see Fig. 6). Dorsal parts of head brown, and of body dark brown, with irregular large yellowish blotches, turning to oblique yellowish to rose streaks on the sides of the body. Belly, thorax and pectoral-fin base

rose. Eye dark brown. First dorsal-fin black. Second dorsal, anal and caudal fin rose. Pectoral fins red. Pelvic fins rose.

*Colour in preservative*. Head yellowish; upper half of body brown, with numerous, closely set, pale blotches; ventral half of body yellowish, belly whitish. Eyes dark grey. First dorsal fin jet black; second dorsal fin pale, rays light grey. Anal fin yellowish, membranes whitish. Caudal-fin rays yellow, distally grey, membranes translucent. Pectoral-fin rays yellow, spotted with brown, upper membranes pale, lower membranes brown, tips of lower rays and membranes pale yellow. Pelvic fins yellow.

**TABLE 2.** Comparison of the species of the *Uranoscopus albesca* species complex.

| | *U. albesca* (n = 4) | *U. bauchotae* (n = 2) | *U. brunneus* **n. sp.** (n = 1) | *U. dollfusi* (n = 4) | *U. kishimotoi* **n. sp.** (n = 1) |
|---|---|---|---|---|---|
| Total anal-fin rays | 13–14 | 13–14 | 12 | 13–14 | 13 |
| Total pectoral-fin rays | 14 | 17 | 17 | 17–19 | 18 |
| Oblique scale rows | 50–55 | 49–51 | 62 | 47–54 | 59 |
| Head profile | as broad as deep | depressed | depressed | depressed | compressed |
| Cleithral-spine length in HL | 2.4–3.0 | 3.4 | 2.5 | 2.9–3.1 | 2.3 |
| Spines on lower edge of preopercle | 5 | 5–6 | 8 | 4–6 | 3 |
| Spines on supracleithrum (main spine + small spines inside) | 1 + 5 | 1 + 2 | 1 + 5 | 1 + 3 | 1 + 1 |
| Labial fimbriae | none | well developed | poorly developed | well developed | none |
| Prelingual filament | present, large | present | reduced | present | very much reduced |
| Posterior nostril | slit-like pore | slit-like pore | slit-like pore | slit-like pore | with long tubiform valve |
| Pectoral fin membranes | pale | creamy white | dark brown | light brown | upper pale, lower brown |

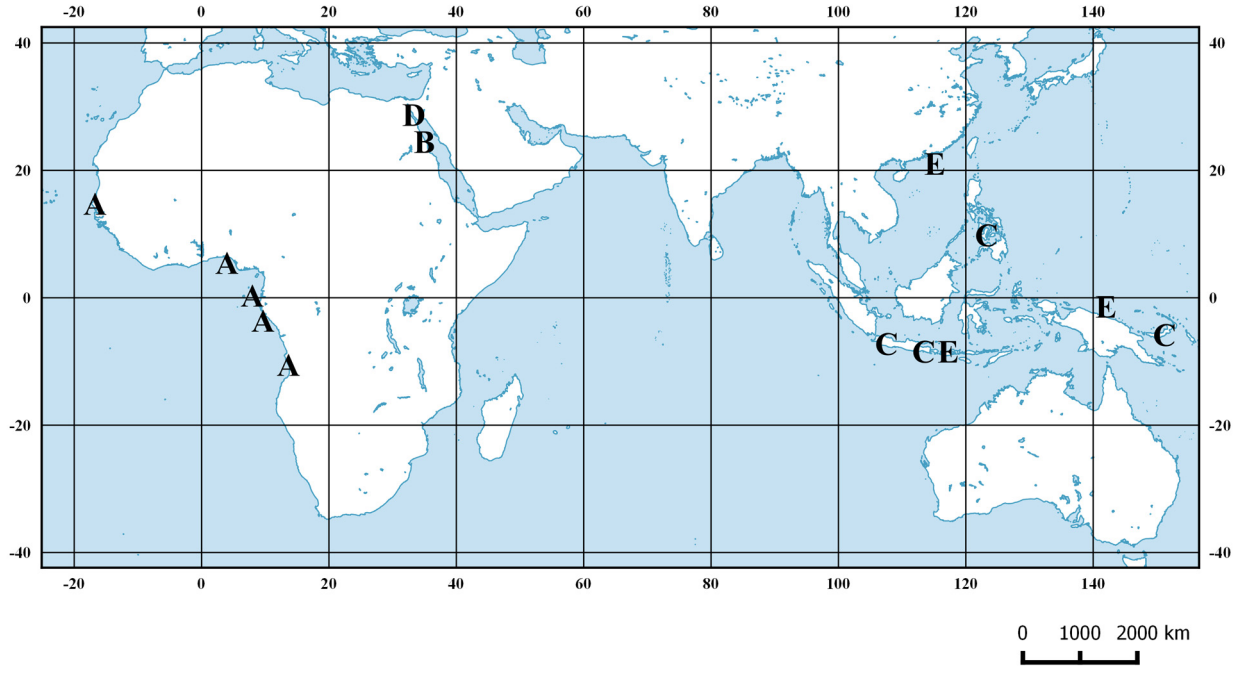


**FIGURE 7.** Distribution of the *Uranoscopus albesca* species complex in the eastern Atlantic and Indo-West Pacific. **A** *U. albesca*; **B** *U. bauchotae*; **C** *U. brunneus* **n. sp.**; **D** *U. dollfusi*; **E** *U. kishimotoi* **n. sp.**

**Etymology.** The new species is named in honour of Hirokazu Kishimoto, appreciating his important research on uranoscopids; he already recognised the existence of the two new species which are described in the present paper.

**Distribution.** Papua New Guinea (West Sepik), Indonesia (Lombok), Hong Kong (see Kishimoto 2001: 3529; updated). Found on soft bottoms of lower continental shelf; known depth range 300−308 m.

**Comparisons.** This new species is a member of the *Uranoscopus albesca* species-group (comparison of the species of this group see Tab. 2). *Uranoscopus kishimotoi* **n. sp.** exclusively possesses within the group a compressed head (other species depressed or as broad as deep), 3 spines on the lower margin of the preopercle (other species 4–8), a single small additional spine on the inner side of the supracleithrun (other species 2–5), and a long, tubiform valve on the posterior nostril (other species with a slit-like pore, without a valve).

**Remarks.** This species was briefly described from Hong Kong and Lombok (Indonesia) by Kishimoto (2001: 3529) as *Uranoscopus* sp. 1.

*Uranoscopus kishimotoi* **n. sp.** lives relatively deep, at a known depth range of 300–308 metres. Kishimoto (2001) reports a maximum total length of 18 cm, which would equal a maximum standard length of about 14 cm. The new species is close to *U. brunneus* **n. sp.** in having a high number of lateral scale rows and a very long cleithral spine.

## Discussion

The species of the *Uranoscopus albesca* species-complex, which share (among other characters) a concave dorsoposterior margin of the pectoral fins, have disjunct distributions in the eastern Atlantic and the Indo-West Pacific (Fig. 7). A single species (*U. albesca*) is found in the eastern Atlantic from Senegal to Angola; two species occur in the northern Red Sea (*U. bauchotae* and *U. dollfusi*), and the remaining two are widespread in the East Asian Archipelago (*U. brunneus* **n. sp.** and *U. kishimotoi* **n. sp.**). The absence in most parts of the Indian Ocean is apparently due to a relict distribution pattern of the *U. albesca* complex, as the highest number of species in the genus *Uranoscopus* is found in the Indian Ocean (Fricke *et al.* 2013), and this is probably where most of the evolution of specialised species has been recently going on. Such newly evolved species may have driven species in the *U. albesca* complex towards the margins of the general distribution range of the genus.

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