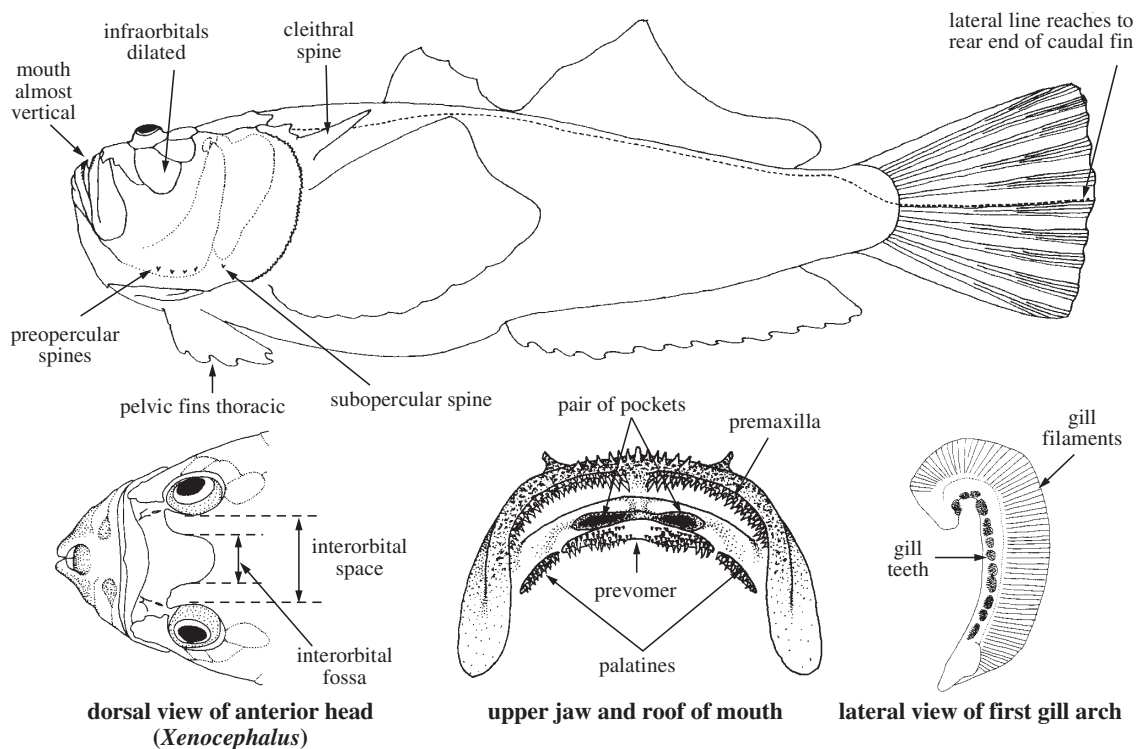


URANOSCOPIDAE

Stargazers

by H. Kishimoto

Diagnostic characters: Body moderately elongate (size to about 65 cm), depressed anteriorly or compressed. Head massive, nearly cube-shaped, **flattened dorsally**, rounded anteriorly; dorsal and lateral surfaces of head almost **entirely encased in sculptured bones**. Eyes directed dorsally or dorsolaterally, **placed on or near top of head. Infraorbital bones dilated**. Interorbital space noticeably broad, **anterodorsal part of skull deeply scooped backward (interorbital fossa)**. Mouth large, protractile, **almost vertical**; jaws, prevomer, and palatines toothed; **a pair of pockets on anterior roof of mouth** (between premaxillae and prevomer). **A peculiar dermal appendage present at central tip of respiratory valve inside lower jaw** in *Uranoscopus* and young of *Genyagnus*. Branchiostegal rays 6. **First gill arch with gill teeth** instead of typical gill rakers; pseudobranchiae present. Membranes of anal, pelvic, and pectoral fins fleshy and thickened. Dorsal fin single with 0 to IV rudimentary spines and 12 to 20 soft rays or divided with IV or V weak spines and 13 or 14 (rarely 12) soft rays; anal fin with 13 to 19 soft rays; caudal fin subtruncate, with 5+5 branched rays (i.e. 5 rays in upper portion, 5 rays in lower portion), 6+5 or 6+6 in *Pleuroscopus* (not known from the area); pectoral fins broad, "spear-shaped", or knife-shaped, with 13 to 25 rays; **pelvic fins** close together, situated on throat and in advance of pectoral fins, **with I non-visible weak spine** and 5 segmented rays. Body naked or covered with adherent, cycloid scales almost embedded under the skin; lateral line complete, reaching to almost end of caudal fin even in naked species, in which **tubular scales entirely embedded under skin. Colour:** generally brownish dark with dark or pale spots or mottling on body.



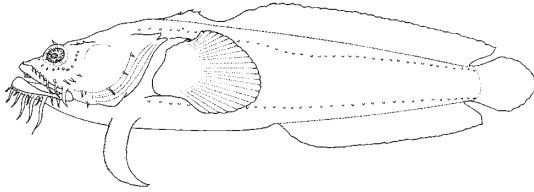
Habitat, biology, and fisheries: Members of this family are circumtropical in distribution and occur in warm and temperate waters from estuaries to the deep sea. They are nocturnal and during the day bury their body into sand or mud, with only the eyes and mouth cleft protruding from the substrate. Therefore, they are rarely taken by beach seines during daytime but are often fished by gill nets at night. They suck in and swallow small fishes which come close to the mouth cleft, and even react to small objects such as pebbles, plastic trash, or twigs. For European species of *Uranoscopus* it is known that they use the appendage of the respiratory valve in the mouth as a "bait" by moving it like a worm. The writer observed Japanese species of *Uranoscopus* thrusting out and pulling in the filamentous appendage a few times per second when small fishes approached the mouth cleft. There is doubt about the very old description of a venom apparatus in *Uranoscopus* spp. by Bottard (1889) which is often cited, although no further report on such an apparatus

is known in literature. Contact with the cleithral spine of Japanese species of *Uranoscopus* does not cause any venomous pain, even when one's finger is pricked by the spine.

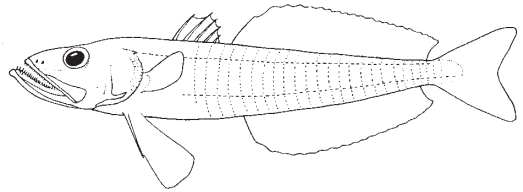
Similar families occurring in the area

Batrachoididae: gill openings small, restricted to sides of body (gill openings wide in Uranoscopidae); pelvic fins with I distinct spine and 5 soft rays (with I non-visible weak spine and 5 soft rays in Uranoscopidae).

Champsodontidae: body smaller, more compressed; caudal fin forked.



Batrachoididae



Champsodontidae

Identification note

In the genus *Uranoscopus*, the most speciose group in this family, interspecific differences are minor and species identification can become difficult. The shape of the dermal appendage of the lower respiratory valve is very useful for identification of some species, but the appendage is often damaged or lost while swallowing prey.

Key to the species of Uranoscopidae occurring in the area

1a. Lateral line not running close to dorsal-fin base (Fig. 1a); eyes large, non-telescopic, located on dorsolateral edges of head (Fig. 2a); both lips smooth (Fig. 2a); dentary of lower jaw projecting with growth, forming a plate-like dilatation (Fig. 2a); dorsal-fin rays 12 to 14; pectoral-fin rays 21 to 25 (*Xenocephalus*) → 2

1b. Lateral line running close to soft dorsal-fin base (Fig. 1b); eyes small, telescopic, located on top of head (Fig. 2b, c); both lips with labial fimbriae or fimbriate ridges (Fig. 2b, c); dentary of normal shape; total dorsal-fin rays 17 to 21; pectoral-fin rays 13 to 20 → 3

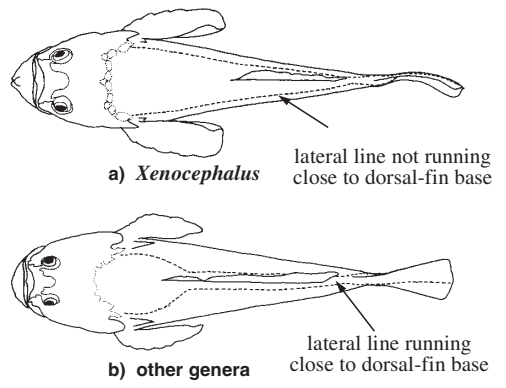
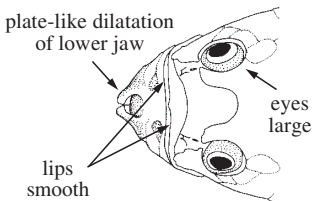
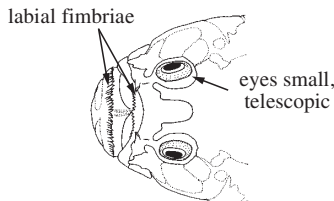


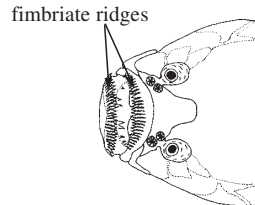
Fig. 1 dorsal view



a) *Xenocephalus*



b) *Genyagnus, Uranoscopus*



c) *Ichthyscopus*

Fig. 2 dorsal view of head

2a. Anal fin with 15 or 16 (usually 16) soft rays; width of interorbital fossa 6 to 8% of standard length; body covered with irregular pattern of dark angular "rings", large in young, minute in adults; vertebrae 27 *Xenocephalus cribratus*

2b. Anal fin usually with 17 soft rays; width of interorbital fossa 4 to 6% of standard length; body scattered with small round black spots; vertebrae 28 . . . *Xenocephalus elongatus australiensis*

- 3a.** Two dorsal fins, the first fin black with white area at base and with IV or V weak spines (last spine usually almost hidden under skin but sometimes distinct as last spine of first dorsal fin or as first spine of second dorsal fin), the second dorsal fin with 13 or 14 soft rays; anal-fin rays 12 to 15; respiratory valve inside lower jaw with flat and elongate (Fig. 3a) or flat and wide (Fig. 3b) dermal appendage, sometimes having many additional filaments (Fig. 3c); upper margins of nasal valves smooth, often with a simple or branched flap only anteriorly (Fig. 4a-c); dorsal tip of cleithrum ending in a long stout conical spine, covered by thin skin (skin usually damaged in specimens caught with nets), free from body; basipterygial process single (rarely 2), embedded in thick skin (skin sometimes damaged in specimens caught with nets); preopercle with 3 or more visible spines on lower edge; internal nares absent (*Uranoscopus*) → 8
- 3b.** Dorsal fin single, with 0 to IV rudimentary spines and 16 to 20 soft rays; anal-fin rays 15 to 19; respiratory valve inside lower jaw without dermal appendage except for young of *Genyagnus* (Fig. 3d); upper margins of nasal valves fringed (Fig. 4d, e); dorsal tip of cleithrum ending in a minute spine free from body or in a triangular bony plate not free from body; preopercle with or without non-visible spine; basipterygium not visible; internal nares present → 4

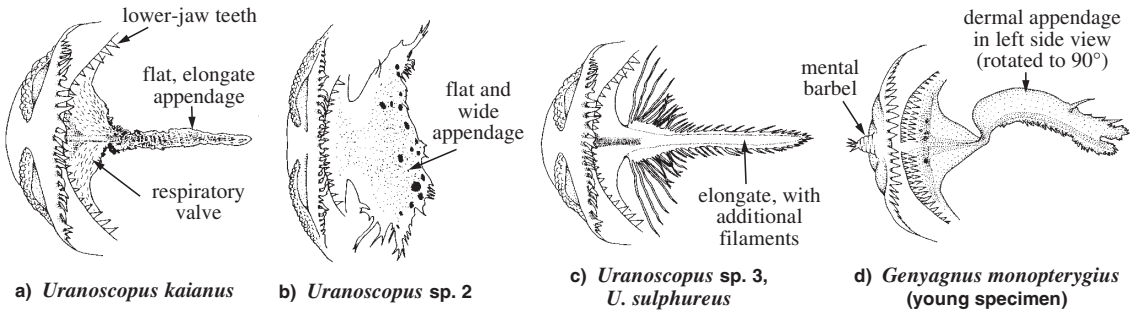


Fig. 3 dorsal view of lower jaw and floor of mouth

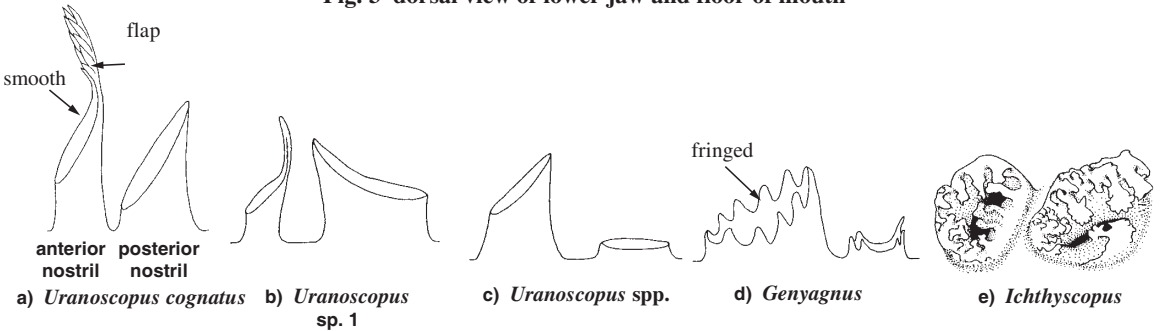


Fig. 4 nasal valves of anterior and posterior nostrils

- 4a.** Head and anterior body depressed; body scales minute, randomly arranged; pectoral fins with “squarish” appearance, dorsoposterior margin straight, middle ray longest (Fig. 5a); a mental barbel present on chin (Fig. 3d); respiratory valve inside lower jaw with a dermal appendage expanded vertically in young (Fig. 3d), without appendage in adults; both lips with labial fimbriae (Fig. 2b); lower portion of body without dermal folds originating from anal-fin rays *Genyagnus monoptyergius*
- 4b.** Head and body compressed; body scales arranged in regular oblique rows; pectoral fins knife-shaped, upper rays longer than middle ray (Fig. 5c); no mental barbel on chin (2 in a western Australian species); respiratory valve inside lower jaw without dermal appendage; both lips with fimbriate ridges (Fig. 2c); lower portion of body with several dermal folds, originating from basis of each anal-fin ray (Fig. 6b); dorsoposterior end of gill flap with dermal fringed papillae; upper part of cleithrum bordered ventrally by dermal fringed flaps (Fig. 6) (*Ichthyscopus*) → 5

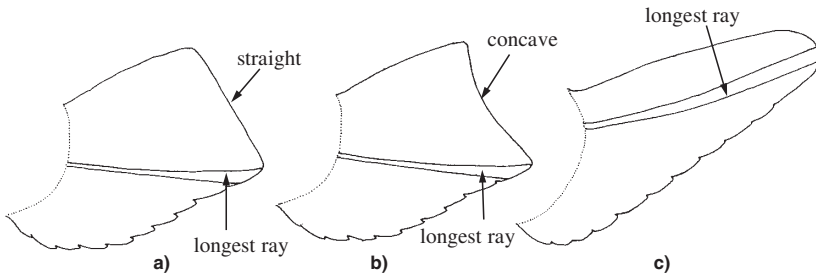


Fig. 5 pectoral fin

5a. Posterior edge of skull arching backward; upper part of cleithrum completely exposed, not concealed with fleshy appendage (Fig. 6a); no respiratory groove between upper part of cleithrum and pectoral fin; a dermal fold absent on midventral margin of belly (Fig. 6a); body with 5 dark transverse bands *Ichthyoscopus fasciatus*

5b. Posterior edge of skull straight laterally; upper part of cleithrum entirely concealed with fleshy appendage (Fig. 6b); a respiratory groove present between upper part of cleithrum and pectoral fin, continuing to gill opening; a dermal fold along midventral margin of belly (Fig. 6b); body with several pale spots → **6**

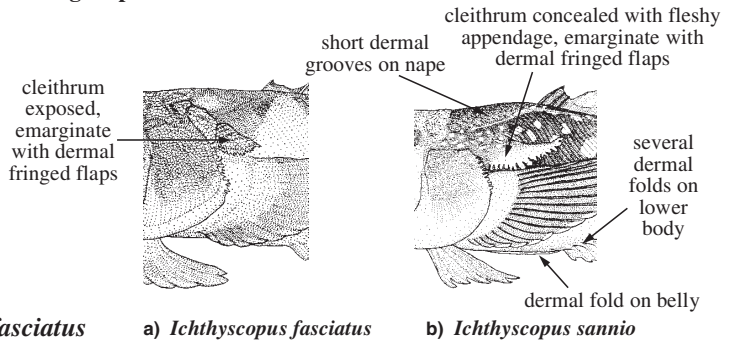


Fig. 6 lateral view of thoracic region

6a. Dorsal-fin spines III; nape covered with short dermal grooves between lateral lines (Fig. 6b); posterior nostril roundish, equal to or slightly larger than anterior one in size (Fig. 4e); body with 2 indistinct dark blotches *Ichthyoscopus sannio*

6b. Dorsal-fin spines II; nape between lateral lines naked or covered with a few scales; posterior nostril oval, about twice as long as anterior one; body without dark blotches → **7**

7a. Posterior nostril diagonally or longitudinally elongated (Fig. 7a); anal-fin rays 17 or 18; vertebrae 26 *Ichthyoscopus lebeck*

7b. Posterior nostril transversely elongated (Fig. 7b); anal-fin rays 19; vertebrae 27 *Ichthyoscopus malacopterus*

8a. Supracleithrum not forming distinct spine at rear end (Fig. 8a) → **9**

8b. Supracleithrum with a sharp spine at rear end and 1 or more spines inside (Fig. 8b) → **10**

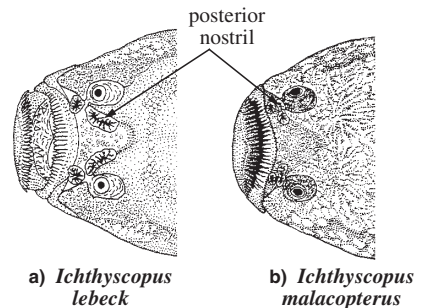


Fig. 7

9a. Upper edge of opercle descending backward (Fig. 8a); both nasal valves long and tubular (Fig. 4a); first dorsal fin with IV (rarely III) spines; 2 basipterygial processes (Fig. 9a); a short black cirrus on eye; respiratory valve inside lower jaw with a thread-like, pale appendage; body without distinctive colour marks *Uranoscopus cognatus*

9b. Upper edge of opercle ascending backward (Fig. 8b); posterior nostril a slit-like pore or with a very low tubular valve (Fig. 4c); first dorsal fin with V spines (last one rudimentary); only 1 basipterygial process (Fig. 9b); no cirrus on eye; respiratory valve inside lower jaw with a thread-like brownish appendage and several long filaments around its base (Fig. 3c); body with distinctive black spots *Uranoscopus sulphureus*

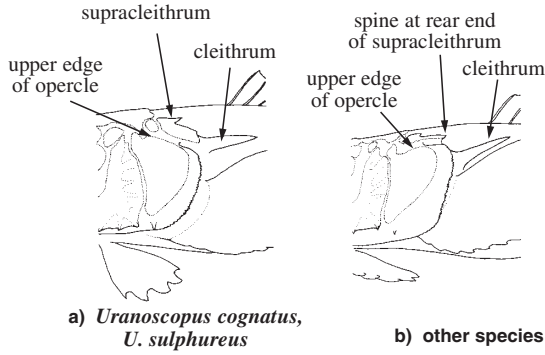


Fig. 8 lateral view of thoracic region

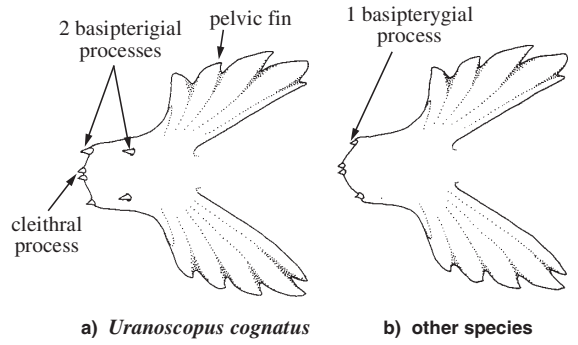


Fig. 9 ventral view of pelvic-fin region

- 10a. Both nasal valves long and tubular (Fig. 4b); preopercular spines 3 *Uranoscopus* sp. 1
- 10b. Posterior nostril a slit-like pore; preopercular spines 4 or more → 11

- 11a. Dorsoposterior edge of pectoral fins concave when expanded, forming an angle of about 30° between upper edge and middle ray (Fig. 5b) *Uranoscopus* sp. 2
- 11b. Dorsoposterior edge of pectoral fins straight when expanded (Fig. 5a) → 12

- 12a. Anterodorsal area between both lateral lines completely scaly (Fig. 10a) → 13
- 12b. Anterodorsal area between both lateral lines naked or with some scales only (Fig. 10b) → 14

- 13a. Body yellowish brown, without distinctive colour markings *Uranoscopus affinis*
- 13b. Body reddish brown, usually scattered with pale spots, but rarely with minute reticulations in adults *Uranoscopus kaianus*

- 14a. Body without distinctive colour markings *Uranoscopus oligolepis*
- 14b. Body with distinctive colour markings → 15

- 15a. Body dark brown with 3 distinct broad black bands; respiratory valve inside lower jaw with a thick orange tentacle *Uranoscopus bicinctus*
- 15b. Body greenish brown with 3 obscure greyish brown bands and scattered with minute black spots; respiratory valve inside lower jaw with a long, dark appendage and several long filaments around its base (Fig. 3c) *Uranoscopus* sp. 3

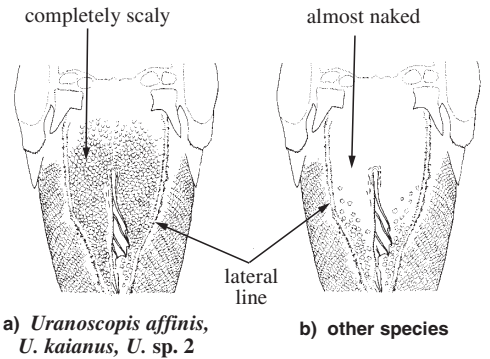


Fig. 10 part of head and body in dorsal view

List of species occurring in the area

The symbol is given when species accounts are included.

- Genyagnus monoptyerygius* (Schneider in Bloch and Schneider, 1801)
- Ichthyoscopus fasciatus* Haysom, 1957
- Ichthyoscopus lebeck* (Schneider in Bloch and Schneider, 1801)
- Ichthyoscopus malacopterus* (Bennett, 1839)
- Ichthyoscopus sannio* Whitley, 1936

- *Uranoscopus affinis* Cuvier in Cuvier and Valenciennes, 1829
 - = *Uranoscopus terraereginae* Ogilby, 1910
 - = *Uranoscopus tosae* Jordan and Hubbs, 1925
 - = *Uranoscopus* sp. 3 [Gloerfelt-Tarp and Kailola, 1984]
 - = *Uranoscopus* sp. 2 [Sainsbury, Kailola, and Leyland, 1985]
- *Uranoscopus bicinctus* Temminck and Schlegel, 1843
- *Uranoscopus cognatus* Cantor, 1849
- *Uranoscopus kaianus* Günther, 1880
- *Uranoscopus oligolepis* Bleeker, 1878
- *Uranoscopus sulphureus* Valenciennes in Cuvier and Valenciennes, 1831
- *Uranoscopus* sp. 1
- *Uranoscopus* sp. 2
- *Uranoscopus* sp. 3

- *Xenocephalus cribratus* (Kishimoto, 1989)
- *Xenocephalus elongatus australiensis* (Kishimoto, 1989)

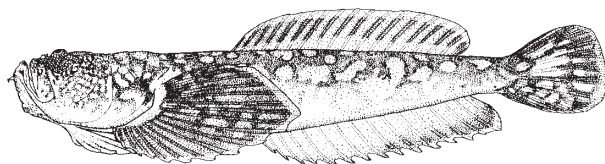
References

- Allen, G.R. and R. Swainston. 1988. *A field guide for anglers and divers - the marine fishes of north-western Australia*. Perth, Western Australian Museum, 201 p.
- Bottard, L.A. 1889. *Les Poissons Venimeux Contribution à l' Hygiène Navale*. Octave Doin, Paris, Editeur, 198 p.
- Gloerfelt-Tarp, T. and P.J. Kailola. 1984. *Trawled fishes of southern Indonesia and northwestern Australia*. Jakarta, Dir. Gen. Fish. (Indonesia), German Tech. Coop., Aust. Dev. Assoc. Bur., 406 p.
- Grant, E.M. 1982. *Guide to fishes*. Brisbane, The Department of Harbours and Marine, 896 p.
- Kishimoto, H. 1984. Redescription and lectotype designation of the stargazer, *Uranoscopus kaianus* Günther. *Copeia*, 1984(4):1009-1011.
- Kishimoto, H. 1989. A new species and a new subspecies of the stargazer genus *Gnathanus* from northwestern Australia. *Japan. J. Ichthyol.*, 36(3):303-314.
- Mees, G.F. 1960. The Uranoscopidae of western Australia (Pisces, Perciformes). *J. Roy. Soc. W. Austr.*, 43:46-58.
- Sainsbury, K.J., P.J. Kailola, and G.G. Leyland. 1985. *Continental shelf fishes of northern and north-western Australia*. Canberra, Glouston and Hall and Peter Pownall Fisheries Information Service, 375 p.
- Springer, V.G. and M.-L. Bauchot. 1994. Identification of the taxa Xenocephalidae, *Xenocephalus* and *X. armatus* (Osteichthyes: Uranoscopidae). *Proc. Biol. Soc. Wash.*, 107(1):79-89.

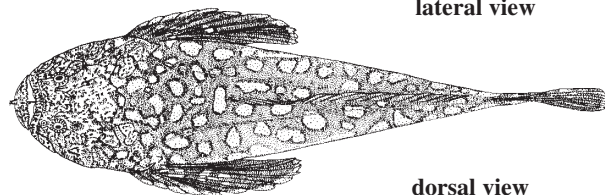
***Genyagnus monopterygius* (Schneider in Bloch and Schneider, 1801)**

En - Spotted stargazer.

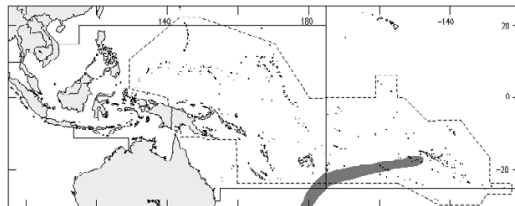
Maximum total length about 45 cm. Green-brown to grey with large oval pale spots above. Estuaries to continental shelf, at depths of around 100 m. Feeds on bottom-living fishes. Taken by gill nets or trawls. In the area, only known from Tahiti and Tonga; common in New Zealand.



lateral view



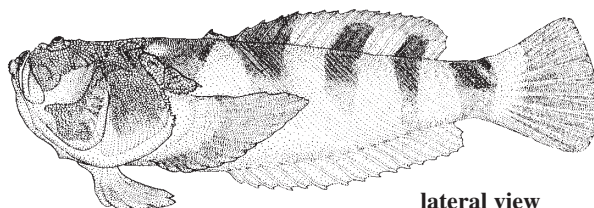
dorsal view



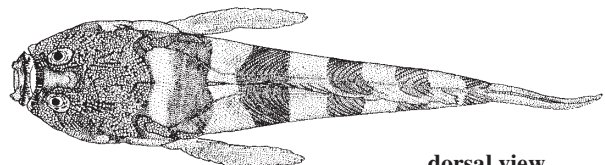
***Ichthyscopus fasciatus* Haysom, 1957**

En - Banded stargazer.

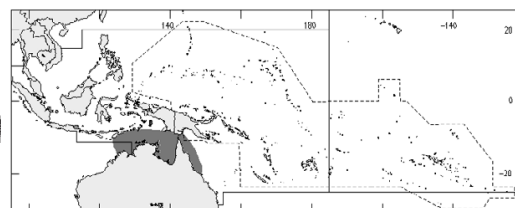
Maximum total length about 25 cm. Body fawn above, white below; 5 or 6 broad brown bands across back to midside extending onto dorsal fin; caudal, pectoral, and pelvic fins bright yellow with white bases and margins. Voracious carnivores. Found at low tide at depths to 10 m; occasionally captured by northern inshore prawn trawlers. Northern Australia.



lateral view



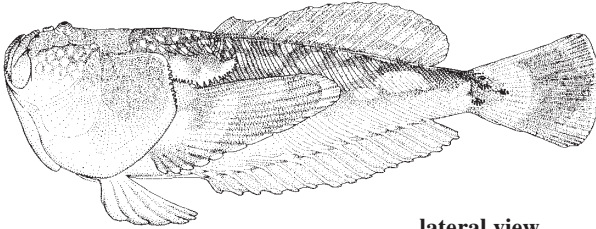
dorsal view



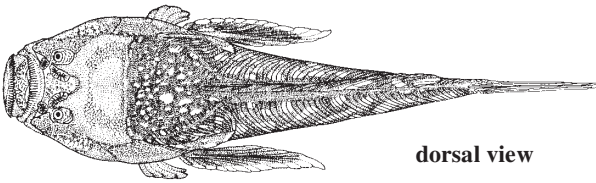
***Ichthyscopus lebeck* (Schneider in Bloch and Schneider, 1801)**

En - Longnosed stargazer.

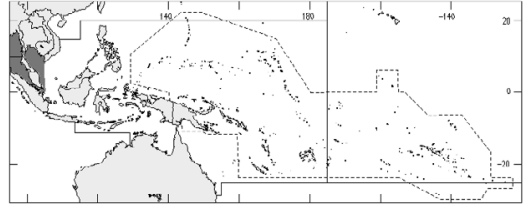
Maximum total length about 60 cm. Body canary yellow, with buffer brown markings along sides, enclosing pure white round or oval spots; some spots of same white colour also on pectoral and dorsal fins. A dark bar across caudal and pectoral fins. Mostly recorded from southern coasts of India; a single specimen from Singapore.



lateral view



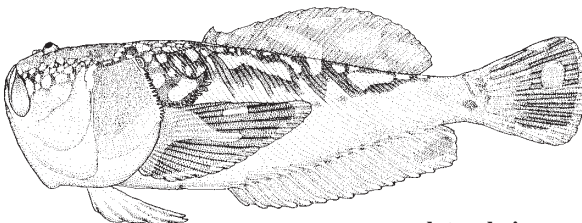
dorsal view



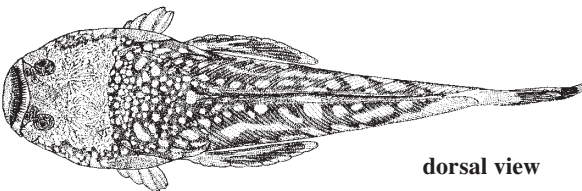
***Ichthyscopus malacopterus* (Bennett, 1839)**

En - Mottled stargazer.

Maximum total length at least 20 cm. Body light brown with large oval or round pale spots above in preserved specimens; coloration of fresh specimens unknown. Only known from the type locality (Sumatra) and a single specimen collected in Kuching, East Malaysia.



lateral view



dorsal view

