

NEW RECORDS OF THE TROGLOBITIC MYSID GENUS
STYGIOMYSIS: *S. CLARKEI*, NEW SPECIES,
FROM THE CAICOS ISLANDS, AND
S. HOLTHUISI (GORDON) FROM GRAND BAHAMA
ISLAND (CRUSTACEA: MYSIDACEA)

Thomas E. Bowman, Thomas M. Iliffe, and Jill Yager

Abstract.—*Stygiomysis clarkei*, is described from Conch Bar Cave, Middle Caicos Island, and Snake Cave, Providenciales Island. *Stygiomysis holthuisi*, previously reported from the Antilles (St. Martin, Anguilla, Puerto Rico), is recorded from Lucayan Caverns, Grand Bahama Island, including a female with four fully developed oostegites, a number unique among the Mysidacea.

The species of *Stygiomysis*, the only genus in the family Stygiomysidae, are blind, troglobitic mysidaceans characterized by a rather vermiform body, a reduced carapace, endopods of thoracopods 2-4 (=pereopods 1-3) prehensile, and protopod of uropod produced into a long distomedial process. The known species are *S. hydruntina* Caroli, 1937, from the Salentine Peninsula, Italy; *S. holthuisi* (Gordon, 1958) from St. Martin, Puerto Rico (Bowman 1976), and Anguilla (Botosaneanu 1980); *S. major* Bowman, 1976, from Jamaica, and *Stygiomysis*, sp. Pesce, 1975, from the Salentine Peninsula, Italy. We describe herein a new species from the Caicos Islands and extend the known range of *S. holthuisi* to Grand Bahama Island.

Stygiomysis clarkei, new species
Figs. 1-3

Material.—Turks and Caicos Islands: Middle Caicos Island, Conch Bar Cave, 28 Oct 1982, leg. Jill Yager and Thomas M. Iliffe, female holotype 6.2 mm (USNM 204900) and female paratype 4.8 mm (USNM 204901) collected by hand from very small pools, about 1.5 m in diameter, in a totally dark section of the cave; Providenciales Island, Snake Cave, 31 Oct 1982, leg. Thomas M. Iliffe, fragments of paratype (length and sex uncertain-USNM 204902) were collected from depths to several meters using a suction bottle while free diving.

Distribution.—Known only from anchialine habitats of inland caves on the Caicos Bank, Turks and Caicos Islands.

Habitat.—The Turks and Caicos Islands are geologically and geographically a southeastward extension of the Bahamas. Two shallow water platforms, the Caicos and the Turks banks are separated by a 35 km wide deep water channel, the Turks banks are separated by a 35 km wide deep water channel, the Turks Island Passage. The major islands consist of a broad expanse of low lying flat land facing the interior of the platform, while a range or series of ranges of eolian carbonate hills 20 to 40 m in elevation front the seaward margin, parallel to the long axis of the islands. The youngest hills closest to the seashore are unconsolidated dunes con-

sisting of reef-derived carbonate sand washed ashore and then blown inland by the prevailing trade winds. Those hills further inland are older, probably Pleistocene in age, and have been lithified into a hard eolian limestone. Caves are situated within these lithified dunes, while "Blue Holes," large circular collapse shafts, are found in shallow waters of the interior platform.

Conch Bar Cave, reportedly in excess of 2.5 km long (Gregor 1981), is the largest and most significant cave in the Turks and Caicos group. The cave is developed in a coastal dune-derived hill (Conch Bar Hill) located 500 m inland and consists of multiple levels, the lowest of which is flooded with tidal brackish waters 10 or more meters deep. Our specimens of *Stygiomysis clarkei* were collected from a small shallow pool about 5 cm deep also containing large numbers of juvenile *Barbouria cubensis*. These animals appear to have been stranded in the pool by receding, probably tidal, water levels. The pools are in the main room of the cave system but far enough from the entrance to be in almost complete darkness. Considerable amounts of organic detritus including leaves, twigs, and land snail shells were observed in the sediments in all parts of the cave. Surface water salinity was 23‰. Other animals found in the cave include the amphipod *Spelaeonicippe provo*, the shrimp *Typhlatya garciai*, a new species of polychaete being described by Marian Pettibone, and several copepods now under study.

Snake Cave is located about 1.5 km inland and 1.1 km north of the new airport runway on Providenciales Island. The cave is a long but narrow fissure, mostly water-filled, that forms one margin of a larger collapse sink. Parts of the cave pool are dimly illuminated although the back section remains in near total darkness. Maximum observed water depth was 8 m. In addition to *Stygiomysis clarkei*, the pool also contains the amphipod *Spelaeonicippe provo*, an uncollected shrimp, probably *Typhlatya garciai*, and an undetermined hadziid amphipod now under study by John Holsinger.

Description.—In general appearance very similar to *S. holthuisi* and *S. major* but smaller; largest specimen (holotype) 6.2 mm, *S. holthuisi* up to 10 mm, *S. major* up to 20.8 mm. Telson length and width subequal; posterior margin armed as in *S. holthuisi*, having central group of 3 long spines with middle spine longest flanked by group of 3 short subequal spines and lateral group of 3 long spines with inner spine shortest.

Antenna 1 about as long as carapace; outer flagellum slightly longer than inner, 17–19 segmented, all segments except first and last with single very long esthete; inner flagellum 10-segmented. Antenna 2 with small oval scale armed with 1 apical and 2 medial setae; flagellum about as long as antenna 1 inner flagellum, 13-segmented.

Labrium triangular, with very shallow emargination on posterior border. Left mandible with 3-cusped incisor and lacinia; spine-row with 5 spines. Right mandible with 4-cusped incisor plus accessory cusp (fixed lacinia of Gordon 1960); spine-row with 5 spines. Maxilla 1 inner lobe with 4 subequal slender spines; outer lobe with strong spine flanked by pair of slender spines and medially by 7 spines. Maxilla 2 proximal endite with 8 setae; distal endite divided into lobes with 6 and 3 setae; proximal, middle, and distal segments of endopod with 2, 2, and 1 setae; exopod with 7 plumose marginal setae, none of them on medial margin. Maxilliped (first thoracopod) with sparse setation; propus and dactyl relatively short.



Fig. 1. *Stygiomysis clarkei*: a, Anterior end, dorsal; b, Antenna 1, distal segments; c, Antenna 1, apical process of 3rd segment of peduncle; d, Antenna 2 scale; e, Labrum and mandibles in situ; f, Right mandible; g, Left mandible, apex of palp; h, i, Left mandible; j, Right maxilla 1.

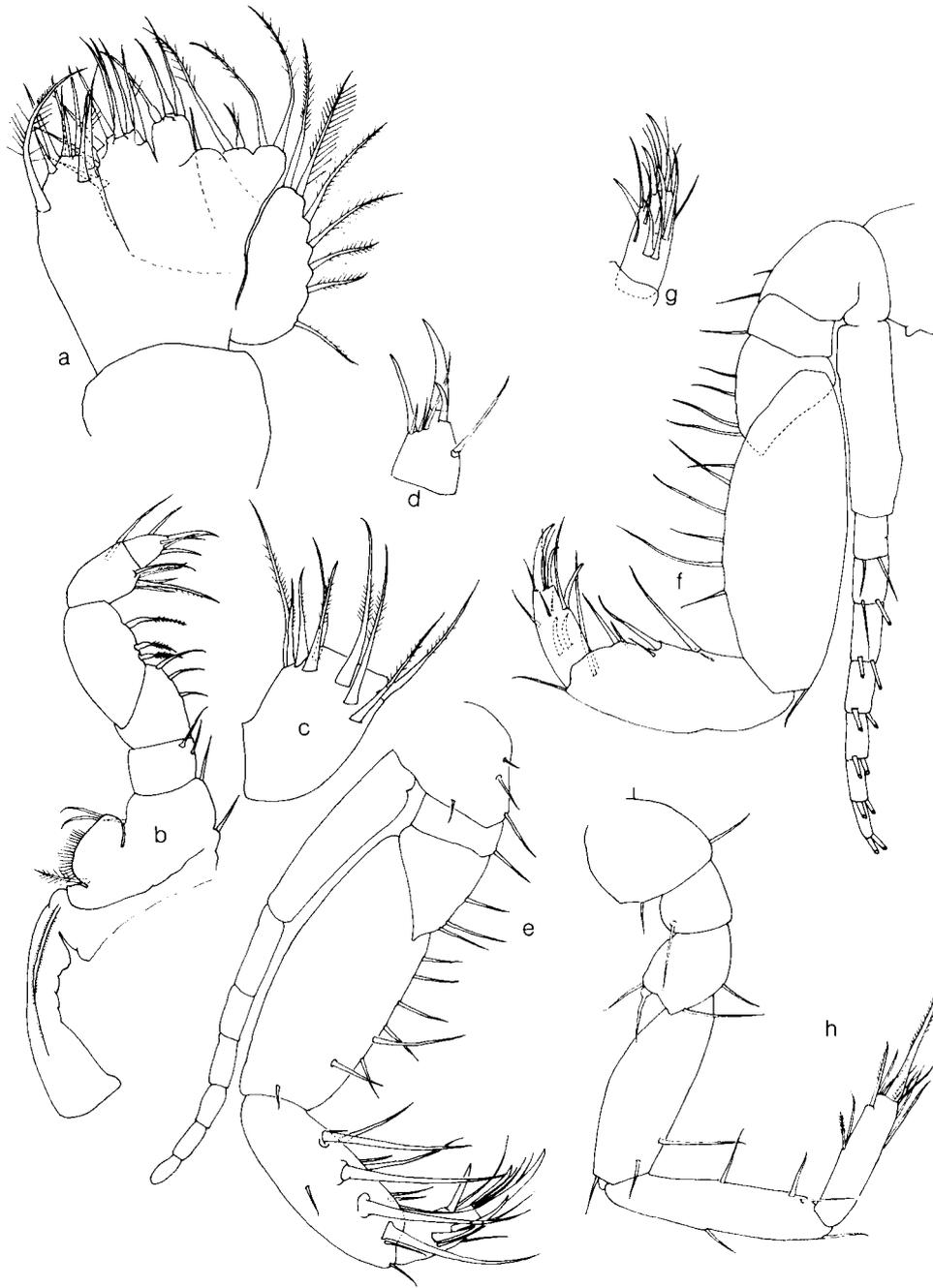


Fig. 2. *Stygiomysis clarkii*: a, Right maxilla 2; b, Right maxilliped; c, Same, penultimate segment of palp; d, Same, apical segment of palp; e, Right pereopod 1; f, Right pereopod 2, g, Same, dactyl; h, Right pereopod 4.



Fig. 3. *Stygiomysis clarkei*: a, Right pereopod 3; b, Pereopod 7; c-g, Pleopods 1-5; h, Protopodal process of uropod, Snake Cave specimen; i, Same, Conch Bar Cave specimen; j, Uropod, Snake Cave specimen; k, Telson, Snake Cave specimen; l, Telson, Conch Bar Cave specimen.

Pereopod 1 (thoracopod 2), apical claw and body of dactyl subequal in length; accessory claw about 0.6 length of apical claw. Pereopod 2, apical claw about 0.7 length of body of dactyl; accessory claw about 0.6 length of apical claw. Pereopod 3, apical claw nearly half length of body of dactyl; 2 accessory claws 0.75 length of apical claw.

Pleopods with 1-segmented endopods and 3-segmented exopods, with setation as in Fig. 3c–g.

Protopodal process of uropod with lateral apical seta and 5 apical spines separated from 1–2 medial spines by 1–4 spinules; medial spine(s) followed proximally by 6–8 spinules. Exopod and endopod relatively short and broad.

Etymology.—Named for the late William D. Clarke, in recognition of his contributions to the study of Mysidacea, and for composing and mailing to fellow specialists between 1962 and 1971 15 issues of the useful newsletter "Mysidacea."

Comparisons.—*Stygiomysis clarkei* is easily distinguished from *S. holthuisi* and *S. major* by the proportions of the telson, which is slightly wider than long in *S. clarkei* and longer than wide in *S. holthuisi* and *S. major*. The rami of the uropods are also shorter in relation to their length in *S. clarkei*. Ratios of length to width in the exopod are *clarkei* 1.7, *sp. 1.7*, *holthuisi* 2.4, *major* 2.6. In the endopod ratios are *clarkei* 2.0, *sp. 2.0*, *holthuisi* 2.4, *major* 2.7.

Stygiomysis hydruntina is incompletely described, but differs from all other species in that the long spines on the dactyl of pereopod 1 exceed the claw in length.

Pesce's *Stygiomysis* sp. most closely resembles *S. clarkei*, but the scale on antenna 2 is hemispherical in shape, and the telson has two rather than three short spines on either side of the central group of three spines.

Stygiomysis holthuisi (Gordon)

Fig. 4

Rhopalonurus holthuisi Gordon, 1958:1552.

Stygiomysis holthuisi.—Gordon, 1960:287–299, figs. 1–18, 23–24, pl. 3.—Bowman, 1976:372–373, figs. 31–37.—Botosaneanu, 1980:128–132, figs. 32–37.

Stygiomysis sp.—Yager, 1981:328.

Material examined.—Bahama Islands: Grand Bahama Island, Lucayan Caverns, Nov 1980, leg. Jill Yager, USNM 204919: female with fully developed oostegites, 7.0 mm; female without oostegites, 4.8 mm; female? in 2 pieces, about 9.2 mm; female? lacking pereonites 6–7, pleon, and telson, estimated complete body length 4.1 mm. (Estimated length derived from proportional measurements of 7.0 mm female).

Habitat.—The Bahama Islands consist of shallow water banks with islands similar in topography to those from the geologically and geographically related Turks and Caicos islands described previously. Grand Bahama Island is situated at the northern end of the Bahamas on the Little Bahama Bank and is separated by the deep-water Northeast Providence Channel from the central and southern Bahamas. Lucayan Caverns is the world's longest known underwater cave with more than 10 km of surveyed passages. The main entrance is inland, about 1 km from the sea. A surface lens of fresh water about 14 m in depth is found in rooms and passages throughout the cave. *Stygiomysis holthuisi* was observed crawling

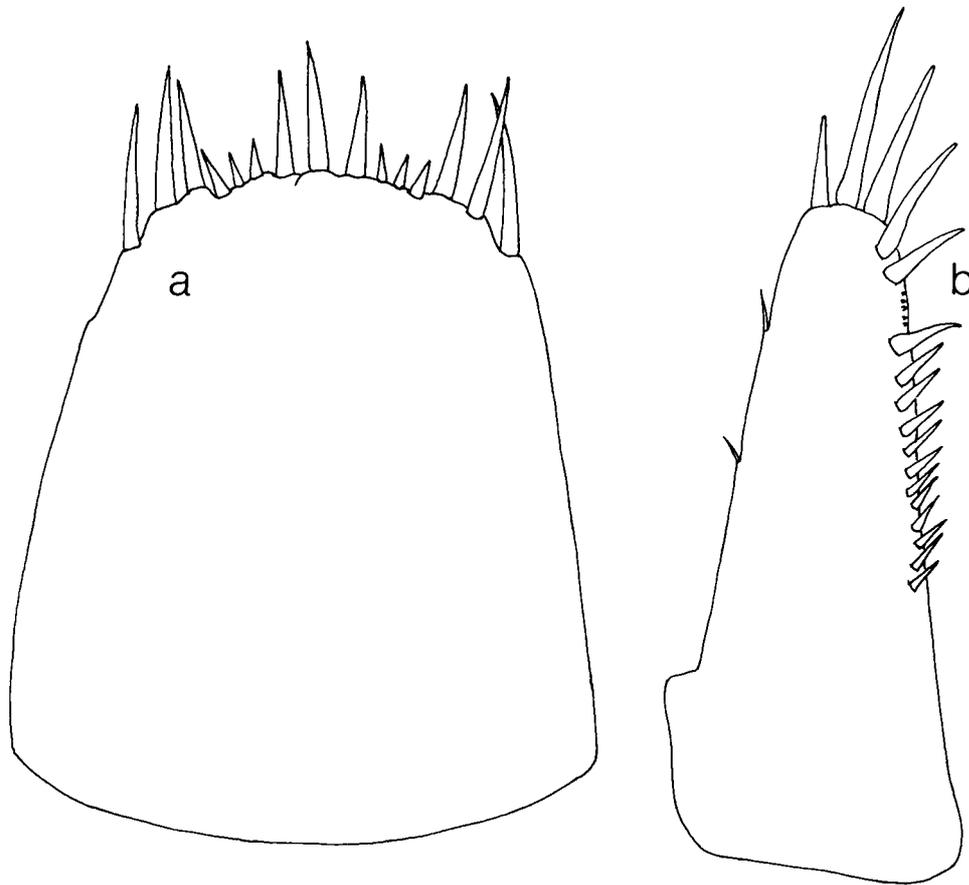


Fig. 4. *Stygiomysis holthuisi*: a, Telson; b, Protopodal process of uropod.

along the rock rubble on the floor of a freshwater passage at a depth of about 4 m.

Remarks.—Only the 7.0 mm female is well preserved. The pattern of posterior marginal spines on the telson agrees with previous accounts, but the 4.8 mm female has three small spines to the right and four to the left of the central three spines. The protopodal process of the uropod has more spines proximal to the small spines than previously reported.

The 7.0 mm female is the first *Stygiomysis* found with fully developed oostegites. The oostegites are large, with marginal setae, and occur on pereopods 3–6. Caroli (1937) and Gordon (1960) also found four pairs of developing oostegites on the same pereopods of *S. hydruntina* and *S. holthuisi* respectively, but were uncertain as to how many oostegites would be present on fully differentiated adults. Caroli believed that a full complement of seven would be found as in the Lophogastrida, Lepidomysidae, Petalophthalmidae, and Boreomysinae; Gordon thought there would prove to be at least five pairs. Our female confirms that the number is four, unique among the Mysidacea, and is further evidence for the distinctiveness of the Stygiomysidae.

Stygiomysis holthuisi is known to occur on the West Indian islands of St. Martin (Gordon 1960), Anguilla (Botosaneanu 1980), and Puerto Rico (Bowman 1976). The discovery of the Grand Bahama specimens extends the known range by about 1500 km.

Acknowledgments

Collection of specimens from caves in the Turks and Caicos islands was supported in part by a National Science Foundation Grant (BSR 8215672) to Thomas M. Iliffe. We especially thank Paul and Shirley Hobbs for arranging accommodations and helping us with cave location and collections and Dennis Williams for flying us to various islands as well as also assisting with field collections. This paper is contribution number 989 of the Bermuda Biological Station for Research, Inc.

Literature Cited

- Botosaneanu, L. 1980. *Stygiomysis holthuisi* found on Anguilla (Crustacea: Mysidacea).—Studies on the Fauna of Curaçao and other Caribbean Islands 61(190):128–132.
- Bowman, Thomas E. 1976. *Stygiomysis major*, a new troglobitic mysid from Jamaica, and extension of the range of *S. holthuisi* to Puerto Rico (Crustacea: Mysidacea: Stygiomysidae).—International Journal of Speleology 8:365–373.
- Caroli, E. 1937. *Stygiomysis hydruntina* n. g., n. sp., misidaceo cavernicolo di Terra d'Otranto, rappresentante di una nuova famiglia.—Bollettino di Zoologia, Torino 8(5–6):219–227.
- Gordon, Isabella. 1958. A new subterranean crustacean from the West Indies.—Nature 181:1552–1553.
- . 1960. On a *Stygiomysis* from the West Indies, with a note on *Spelaeogriphus* (Crustacea, Peracarida).—Bulletin of the British Museum (Natural History), Zoology 6(5):285–324, pls. 3–4.
- Gregor, V. A. 1981. Karst and caves in the Turks and Caicos Islands, B.W.I.—Proceedings of the Eighth International Congress of Speleology, Bowling Green, Kentucky, U.S.A.:805–807.
- Pesce, Giuseppe L. 1976. On a *Stygiomysis* (Crustacea, Mysidacea) from the Southern Italy.—Bollettino del Museo Civico di Storia Naturale, Verona 2:439–443.
- Yager, Jill. 1981. Remipedia, a new class of Crustacea from a marine cave in the Bahamas.—Journal of Crustacean Biology 1(3):328–333.

(TEB) Department of Invertebrate Zoology (Crustacea), NHB 163, Smithsonian Institution, Washington, D.C. 20560; (TMI) Bermuda Biological Station for Research, Ferry Reach 1-15, Bermuda; (JY) P.O. Box F-931, Freeport, Bahamas.