Chaetonotus triacanthus and *Heteroxenotrichula texana*, Two New Chaetonotid Gastrotrichs from the Gulf of Mexico[1]

M. ANTONIO TODARO

Department of Zoology and Physiology, Louisiana State University, Baton Rouge, Louisiana 70803, U.S.A.

Abstract. The first paucitubulatine chaetonotid gastrotrichs are reported from the Gulf of Mexico. *Chaetonotus triacanthus* n. sp. and *Heteroxenotrichula texana* n. sp. are described from sandy sediment collected along the northern part of Padre Island, Texas, U.S.A. *C. triacanthus* is characterized by short lamella-bearing spines on the dorsal side of head and neck, three long spines on the dorsal posterior end, and a pair of three-keeled scales on the furcal base. *C. texana* belongs to the "*subterranea*"-species group, and is characterized by pedunculated scales that cover the posterior half of the ventral surface.

The gastrotrich fauna of the Gulf of Mexico is poorly known. To date, six genera, *Acanthodasy*, *Dolichodasys*, *Macrodasys*, *Neodasys*, *Tetranchyroderma*, and *Turbanella* and three species, *Dolichodasys carolinensis*, *D. elongatus*, and *Turbanella ocellata* have been reported from the region (Fox & Powell, 1986; Friauf, 1968; Meyers et al., 1987, 1988; Ruppert & Shaw, 1977).

In the spring of 1992, with the aim of assessing the gastrotrich diversity of the Gulf of Mexico, an extensive qualitative survey along the coasts of Alabama, Mississippi, Louisiana, and Texas was initiated. Herein two new paucitubulatine chaetonotids, the first being reported from the region, are described and figured. A more comprehensive account on the species encountered to date is in preparation.

MATERIALS AND METHODS

On 16 August 1992, 500 g of intertidal sand were obtained by scooping sediment from the bottom and side of a 0.5-m-deep hole dug in the beach on North Padre Island, Texas, U.S.A. (Fig. 1). Similarly, sediment was obtained on 10 March 1993 from the public beach of Port Aransas, Texas. In both cases, the tide was incoming. Within 48 h, the samples were brought to the laboratory, kept in a coldroom at 14°C, and processed within one week. Gastrotrichs were extracted daily from the sediment by the narcotization-decantation technique of Higgins & Thiel (1988), using a 7% $MgCl_2$ solution. Living, relaxed specimens were observed, using differential-interference contrast, under a Microphot-FXA Nikon microscope. At that time, gastrotrichs were photographed and/or re-

[1] I thank Dr. J. W. Fleeger for his support throughout the study. Thanks also are due Dr. W. D. Hummon for providing me with important information on gastrotrichs from Grand Isle, Louisiana. Special thanks go to Mrs. Candace Conn for bringing in the first sample of sand from North Padre Island, Texas. Drs. M. Balsamo, W. A. Evans, W. D. Hummon, P. Tongiorgi, and two anonymous reviewers have improved the manuscript with invaluable comments. Mr. Ron Bouchard helped to assemble the figures. Publication costs, in part, are being met by a grant from the Spencer-Tolles Fund of the American Microscopical Society.

TRANS. AM. MICROSC. SOC., 113(1): 15–21. 1994.

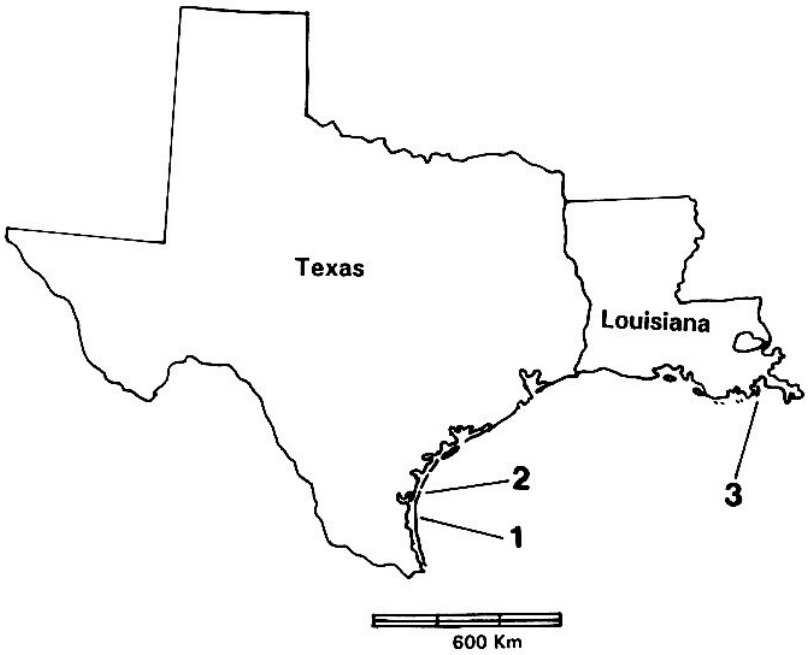

FIG. 1. Sampling sites. 1, North Padre Island; 2, Port Aransas public beach; 3, Grand Isle.

corded on S-VHS video tapes. Measurements of each specimen were obtained from photographs or from video images.

Formalin-glycerin wholemounts have been deposited as holotypes in the invertebrate collection of the Ohio University Museum, Athens, Ohio 45701, U.S.A. Negative photographs and images in S-VHS format of *Chaetonotus triacanthus* n. sp. and negative photographs of *Heteroxenotrichula texana* n. sp. also are available at the same institution.

TAXONOMIC ACCOUNT

Order Chaetonotida Rao & Clausen, 1970
Suborder Paucitubulatina d'Hondt, 1971
Family Chaetonotidae Zelinka, 1889
Genus *Chaetonotus* Ehrenberg, 1830

Chaetonotus triacanthus n. sp.
(Fig. 2)

Diagnosis. Slender *Chaetonotus* belonging to the "*maximus*" group. Total body length up to 140 μm. Head slightly three-lobed, bearing cephalion, two pleuria, and hypostomion. Neck and trunk well defined, furca with fairly long (25 μm) branches. Body covered with simple spinate scales arranged in 19–21 columns, 11–13 dorsal, and 8–10 ventrolateral. Scales shield-shaped dorsally and three-lobed ventrolaterally. Spines shorter dorsally (3.0–4.2 μm) except for

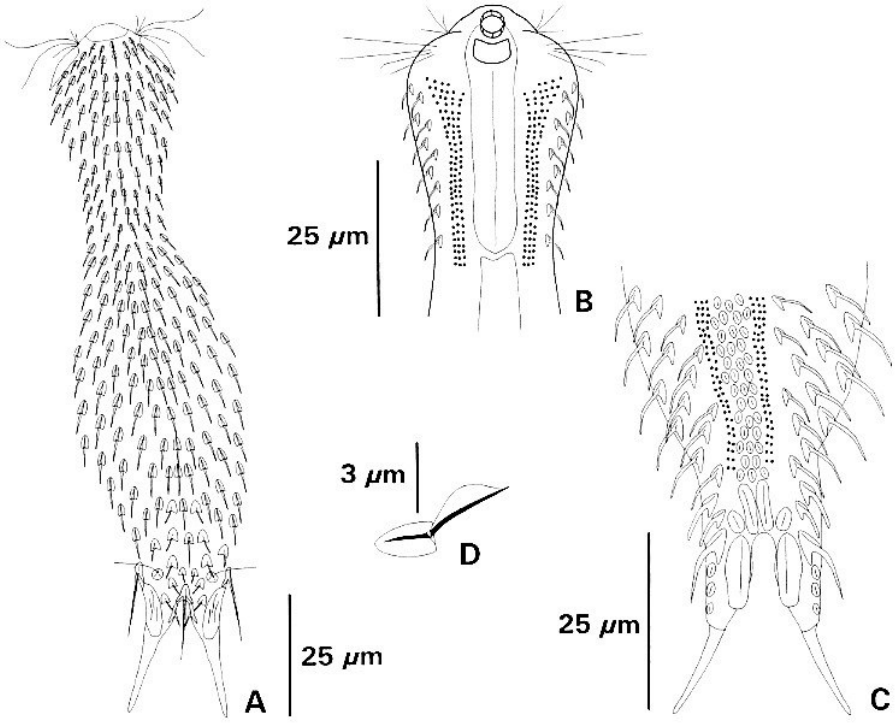

FIG. 2. *Chaetonotus triacanthus* n. sp. A, dorsal view; B, ventral view of the head; C, ventral view of the posterior end; D, scale of head and neck.

three remarkably long (16.0–17.8 μm) spines on posterior end. Head and neck spines bear lamellae. Interciliary field covered with 5–6 columns of small scales followed posteriorly by three pairs of keeled scales at base of furca. Mouth ring subterminal; pharynx about one-fourth of total body length bearing a slight bulb at each end. Intestine straight and narrower at both extremities; anus ventral.

Description. Individuals up to 140 μm in total body length with a slender silhouette (Fig. 2A). Head three-lobed bearing a weak cephalion frontally and one small pleurion on each side (Fig. 2B). Paired tufts of sensory cilia arise dorsally between the cephalion and pleura. Two additional tufts inserted more ventrally at the posterior edge of the pleuria. Mouth ring, 4.0 μm in diameter, opening subterminally; adjacent and posterior to it is a small hypostomium, 5.4 × 4.8 μm.

Body with neck, trunk, and caudal base well defined; widths of head, neck, trunk, and caudal base 27, 19.5, 28, 15.2 μm, respectively. Furcal appendages 23–25 μm long, of which adhesive tubes occupy 12–15 μm.

Body cuticle made up of simple spinate scales that never overlap and are arranged in 19–21 columns, 11–13 dorsally, and 4–5 on each side ventrolaterally

(Fig. 2A). Dorsal scales shield-shaped; ventrolateral scales three-lobed. Scales toward head slightly smaller (3.0 μm) than those toward trunk (4.0 μm). On posterior end of trunk, some scales differ in size as well as in shape from the surrounding ones. Among those, three are three-lobed and twice the size of the others. Two scales are located on the body margin; one, slightly posterior, is part of central column. Each of three scales carries an oversized spine 16.0–17.8 μm long. Two scales (8.0 × 4.0 μm) without spines, bearing instead three keels each covering part of the furcal base and furcal branches (Fig. 2A).

Elsewhere scales carry spines, length 3.0–4.2 μm on trunk, 3.4–9.2 μm on ventrolateral side. Spines on head and neck regions bear lamellae.

Ventral locomotor cilia long but sparse, arranged in two longitudinal rows that remain separated throughout their length.

Interciliary field covered with 5–6 alternating columns of small (1.0–2.0 μm) scales (Fig. 2C). Midventral scales round in pharyngeal region, becoming more elliptical posteriorly where they form a weak keel. Three pairs of larger keeled scales covering the posterior ventral end; first pair (8.0 × 2.0 μm) located just anterior to anus; second pair (10.2 × 4.0 μm) lies in part under furcal base and extends partially onto furcal branches; third pair (4.0 × 3.5 μm) lies laterally between the other two (Fig. 2C).

Digestive tract comprised of subterminal mouth, pharynx 32.0-35.0 μm long, measured from rear of mouth to pharyngointestinal junction; with swellings and straight intestine that begins and ends with a narrower lumen. All specimens parthenogenic.

Localities. North Padre Island, Texas (27°28′N; 97°16′W, type locality) 16 August 1992 in fine sand with detritus, 10 specimens; Port Aransas Public Beach, 10 March 1993, in fine sand with detritus, one specimen. Additional location: Grand Isle, Louisiana, 7 October 1992 in fine sand with little detritus, two specimens (W. D. Hummon, personal communication).

Type specimen. Ohio University Museum, Ref. GM-93-035.

Etymology. The name refers to the three longer spines on the dorsal posterior end (*tri*, L. three; *acanthus*, L. spine).

Remarks. The general body shape and the short dorsal spines align *C. triacanthus* most closely with *Chaetonotus aegilonensis* Balsamo, Todaro & Tongiorgi, 1992 and with *Chaetonotus apechochaetus* Hummon, Balsamo & Todaro, 1992. However, spines with lamellae on the head and neck and the three long spines on the posterior end are features that distinguish the new species.

Family Xenotrichulidae Remane, 1936
Subfamily Xenotrichulinae Ruppert, 1979
Genus *Heteroxenotrichula* Wilke, 1954
Heteroxenotrichula texana n. sp.
(Figs. 3, 4)

Diagnosis. Total body length 105 μm. Dorsal side covered with pedunculate scales arranged in 17 columns. Twelve flat scales on the head. Ventral side bearing locomotor cirri in the first half and fully covered with pedunculate scales from the trunk to the furcal base. Furca up to 30 μm, U-shaped, covered

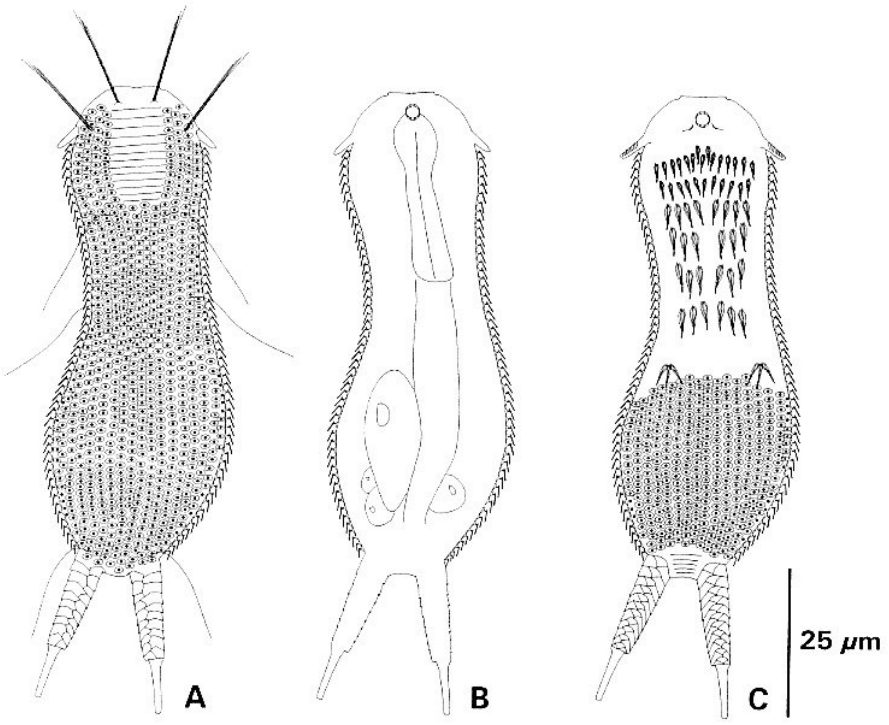

FIG. 3. *Heteroxenotrichula texana* n. sp. A–C, dorsal, medial, and ventral views, respectively.

with 10–12 overlapping flat scales. Pharynx about one-third of the total body length and bearing a strong bulb at the anterior end.

Description. Small and stumpy species, 105 μm in total body length (Fig. 3A). Head bearing a tiny cephalion anteriorly, two pairs of sensory cirri dorsally, and a pair of tentacles laterally. A somewhat oval area, 18.5 × 10.0 μm, made up of 12–13 flat scales on the head, contrasts with rest of dorsal covering made up of pedunculate scales. Scales all of same size (ca. 2.0 μm), arranged on trunk in 17 columns overlapping each other; overlapping of scales obscured partially by robust peduncles with attachment of peduncles to the underlying cuticle appearing as bright point under microscope; consequently, habitus markedly multi-faceted (Fig. 4). Locomotor apparatus covering most of anterior part of ventral surface; made up of cirri of two different sizes, the anteriormost shorter (4.0 vs. 10.0 μm) and two groups of three cirri each (10.0 μm long) located at the origin of ventral trunk region. Remainder of the ventral surface fully covered by pedunculate scales similar in shape and size to the dorsal ones. Furca U-shaped 30 μm long (Fig. 3A, C); proximal portion of each branch covered with 9–10 overlapping flat scales attaining length of 18 μm; distal part being the naked adhesive tubes 12.0 μm long. Mouth ring narrow and subterminal (Fig. 3B). Pharynx (32.0 μm long) bearing strong bulb (8.0 μm wide) at

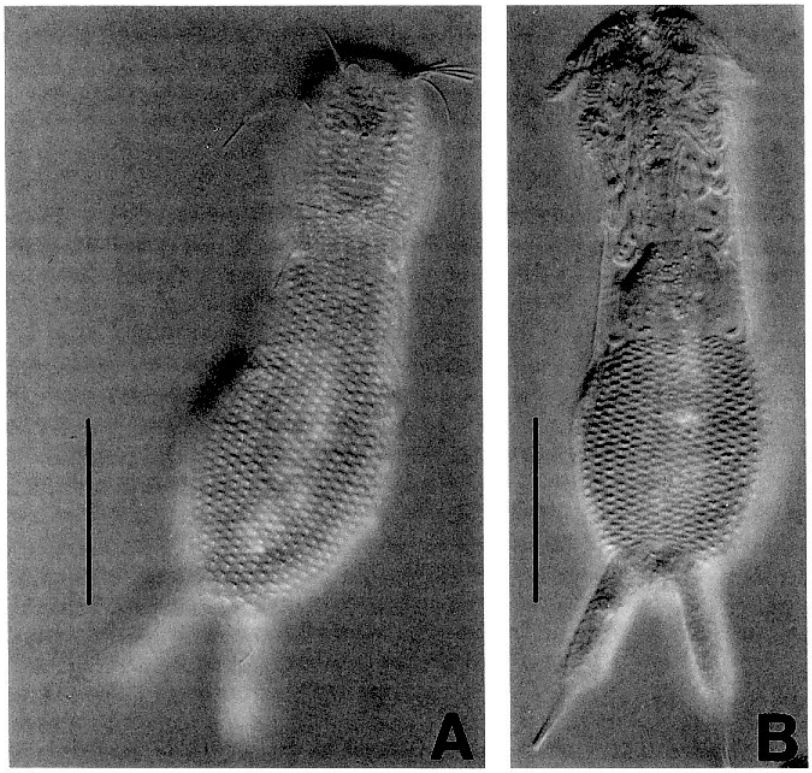

FIG. 4. *Heteroxenotrichula texana* n. sp. A, dorsal view; B, ventral view. Scale bars each represent 25 μm.

anterior end; empties in a straight intestine that narrows posteriorly (Fig. 3B). Anus ventral and opening just anterior to the furcal indentation. The single specimen with maturing eggs dorsal and lateral to intestine; sperm not observed.

Locality. North Padre Island, Texas (27°28′N; 97°16′W, type locality) 16 August 1992 in fine sand with detritus, one specimen.

Type specimen. Ohio University Museum, Ref. GM-93-36.

Etymology. After the state where the species was found.

Remarks. Among all of the species belonging to this genus, three, *Heteroxenotrichula affinis*, *H. subterranea*, and *H. transatlantica*, have been described as bearing flat scales on the head and pedunculate *subterranea*-type scales elsewhere on the dorsal side of the body. They constitute the *Heteroxenotrichula subterranea* species group (Ruppert, 1979). *H. texana* also falls into this group. The new species differs from the three others in having a ventral covering made up entirely of pedunculated scales. By contrast, *H. affinis* has a combination of pedunculated and flat scales on the same side of the body, but the ventral surfaces of *H. subterranea* and *H. transatlantica* are each covered with flat scales.

LITERATURE CITED

FOX, C. & POWELL, E. N. 1986. Meiofauna and the sulfide system: the effects of oxygen and the sulfide on the adenylate pool of three turbellarians and a gastrotrich. *Comp. Biochem. Physiol.*, 85: 37–44.

FRIAUF, J. J. 1968. Psammolittoral Gastrotricha (Macrodasyoidea) of the Mississippi Sound area. (Abstr.) *Assoc. Southern Biol. Bull.*, 15: 38.

HIGGINS, R. P. & THIEL, H., eds. 1988. *Introduction to the Study of Meiofauna*. Smithsonian Institution Press, Washington, D.C. 488 pp.

MEYERS, M. B., FOSSING, H. & POWELL, E. N. 1987. Microdistribution of interstitial meiofauna, oxygen and sulfide gradient, and the tubes of macrofauna. *Mar. Ecol. Prog. Ser.*, 35: 223–241.

MEYERS, M. B., POWELL, E. N. & FOSSING, H. 1988. Movement of oxybiotic and thiobiotic meiofauna in response to changes in pore-water oxygen and sulfide gradients around macroinfaunal tubes. *Mar. Biol.*, 98: 395–414.

RUPPERT, E. E. 1979. Morphology and systematics of the Xenotrichulidae (Gastrotricha, Chaetonotida). *Mikrofauna Meeresb.*, 76: 1–56.

RUPPERT, E. E. & SHAW, K. 1977. The reproductive system of gastrotrichs. I. Introduction with morphological data for two new *Dolichodasys* species. *Zool. Scr.*, 6: 185–195.