Scanning Electron Microscope Study of Some Parts of *Cyta latirostris* (Acari: Actinedida: Bdellidae)

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ABSTRACT

Female specimens of *Cyta latirostris* from Hawai'i Island were studied using the scanning electron microscope. The infrabuccal slit on the hypostome and lateral lips, presence of the paired external podocephalic canals on the laterodorsal propodosoma, details of the bristles on the tarsal claws and empodia, and structures of the female ovipositor are shown for the 1st time with SEM photomicrographs.

Cyta latirostris (Hermann 1804) appears to be a cosmopolitan species. It is also relatively well studied (Atyeo 1960; Den Heyer 1981; Grandjean 1938; Swift & Goff 1987) and yet, only Wallace and Mahon (1976) used scanning electron microscope (SEM) to study eggs and spermatophores of the species.

This paper illustrates some of the structures of *C. latirostris* as seen by SEM. Some descriptions clarify details in the photomicrographs, which were difficult to observe under light microscopy. Chaetotaxic and solenidiotaxic notations follow Lindquist (1985) and Norton (1976). Other terminologies follow various authors, as cited.

Female specimens of *C. latirostris* used in this study were collected from a transect on the east slope of Mauna Loa volcano on Hawai'i Island by F. Haramoto and L. Nakahara. All the specimens were gold coated. A Cambridge Stereoscan S–150 was used in taking photomicrographs.

DISCUSSION

Cyta latirostris (Fig. 1) is separated from other species in the genus by the presence of 1 pair of trichoboths on the legs, specifically on tibiae IV (Fig. 3). These trichoboths are characterized by having long, tactile setae inserted in deep, sclerotized sockets. The presence of an unpaired median eye between vertical setae 1 (v_1) (Fig. 1); the approximate position of vertical seta 2 (v_2) to scapular seta (sc_1) which is missing in the figure, leaving only the trichobothrial socket [Fig. 2]; and the massive chelicerae (Fig. 4) are 3 other characters that separate the genus and species from others in the subfamily Cytinae.

Gnathosoma. The gnathosoma of *C. latirostris* is quite distinctive among bdellids. Drawings (Swift 1986) of the ventral hypostome usually show the transversely striated rectangular base bearing the palpi at the anterolateral angles, a tapering buccal cone and well-developed lateral lips. A structure visible on SEM but difficult to decipher under light microscopy is the infrabuccal slit (Figs. 6, 7). This structure was reported by Grandjean (1957) on the oribatids in general and by Hammen (1968) on *Hermannia convexa*. Hammen called it the infrabuccal fissure.

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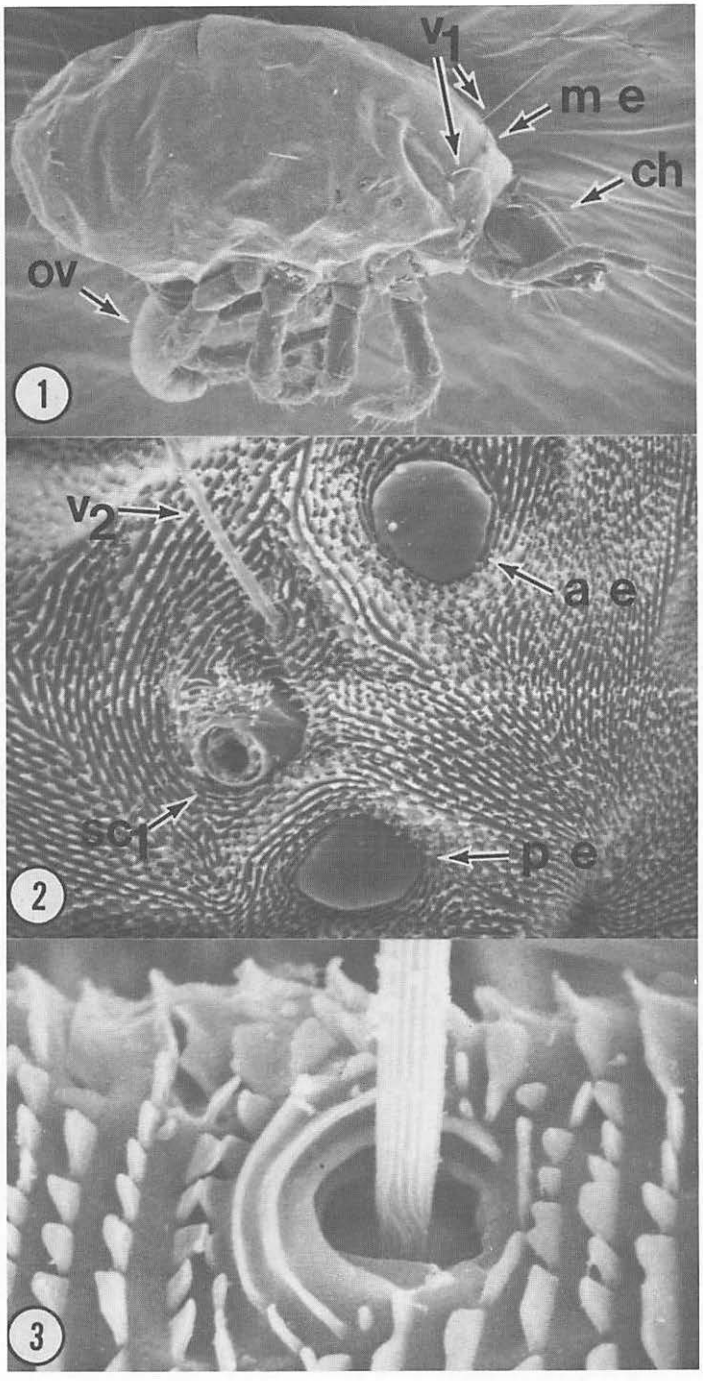
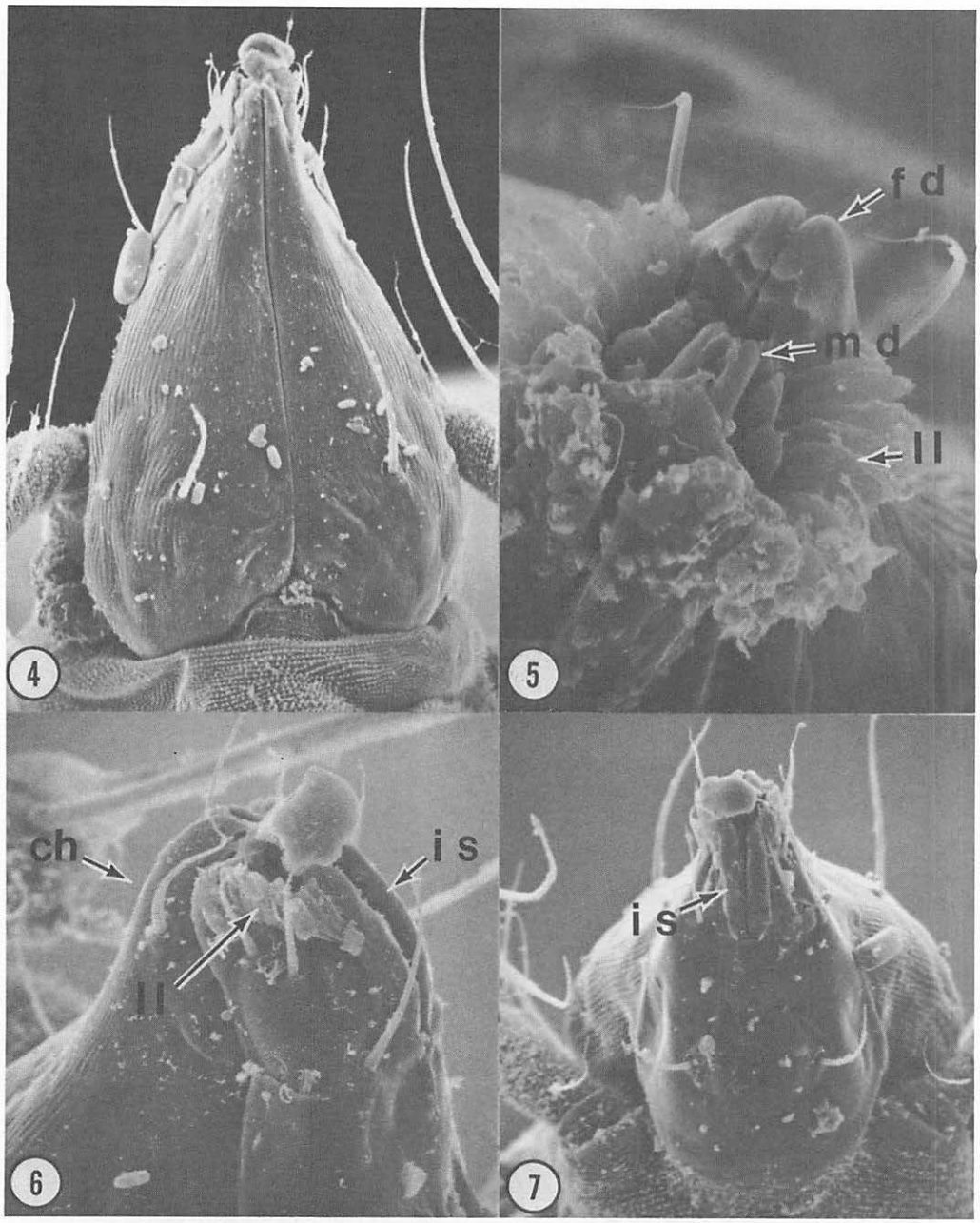
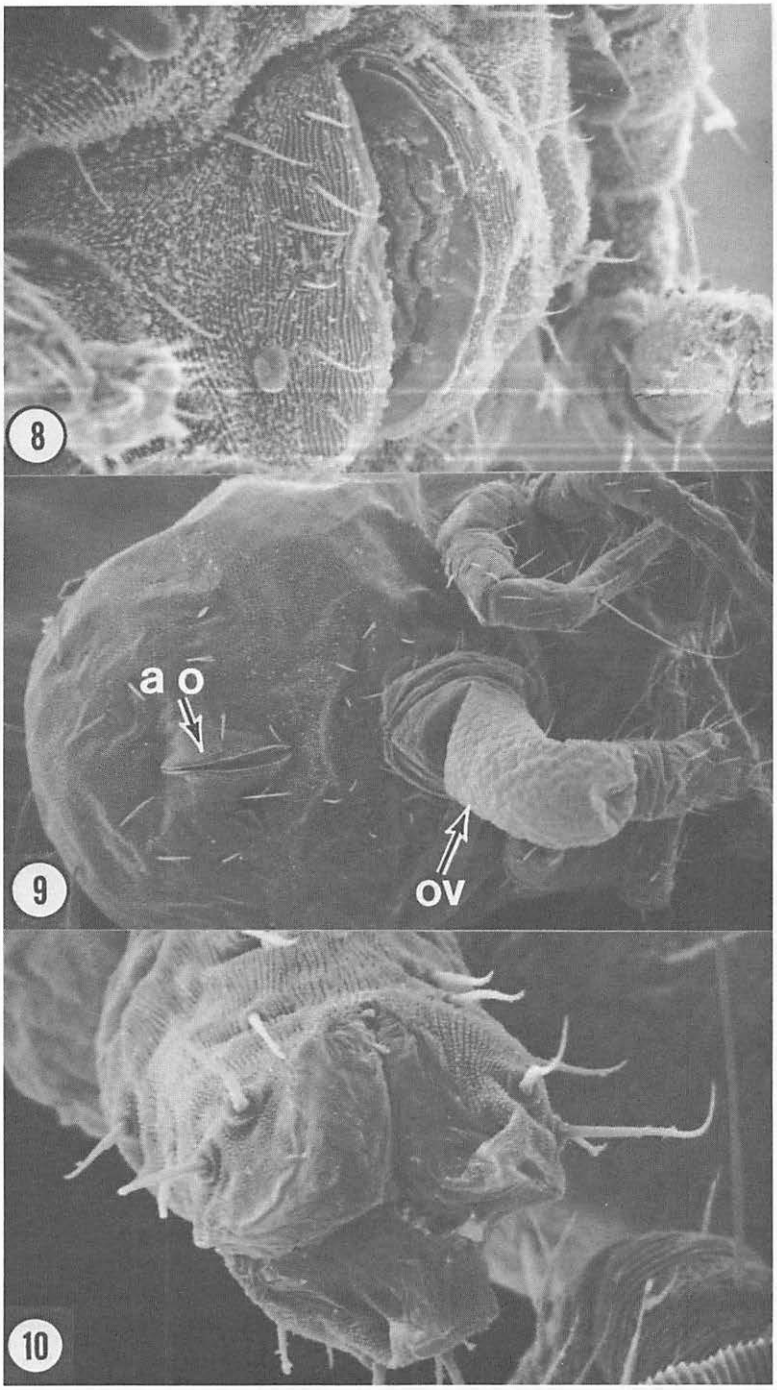


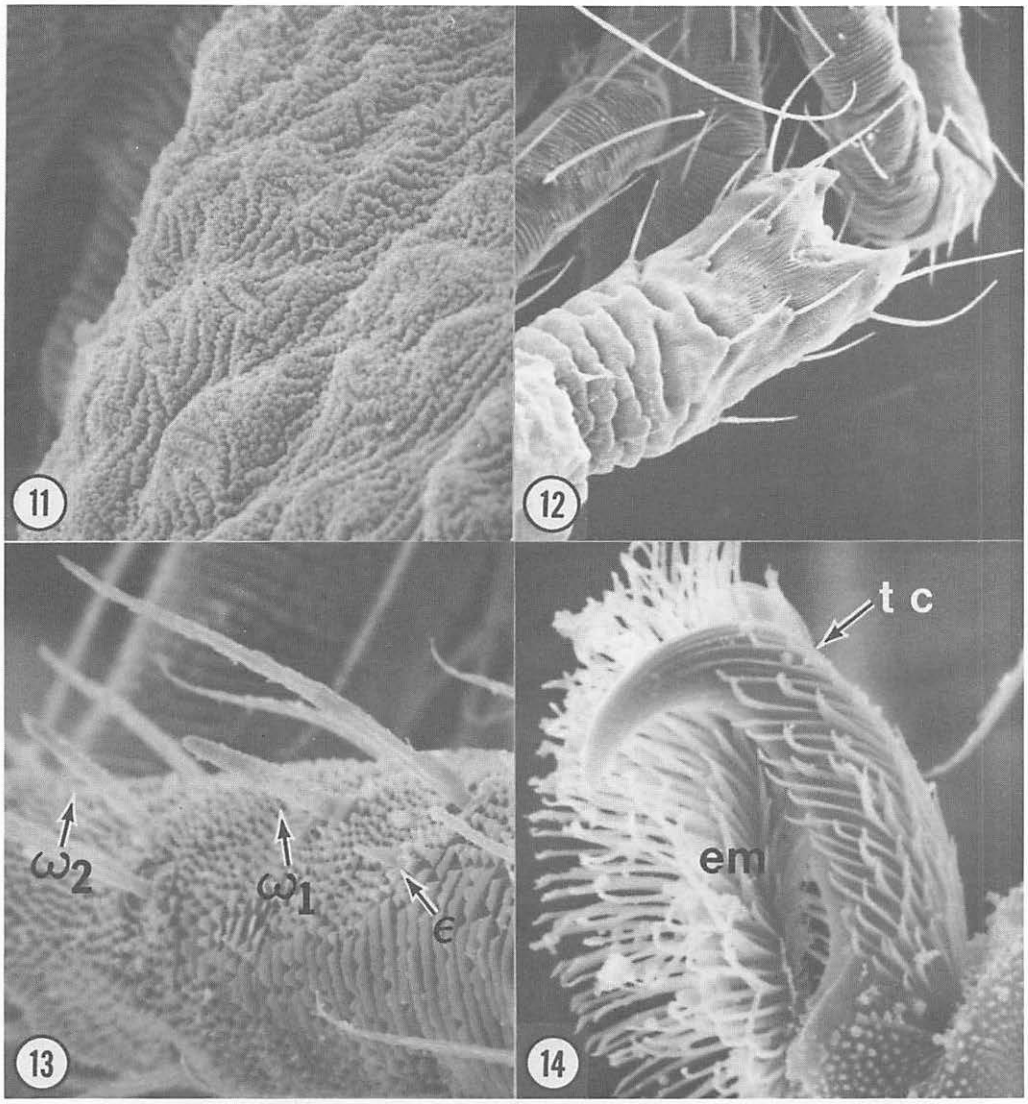
Figs. 1–3. **1,** *Cyta latirostris* adult female, ×110; **2,** eyes on lateral propodosoma, trichobothrial socket (seta missing), ×1050; **3,** trichobothrium on tibia IV and surrounding leg integument, ×5375. Abbreviations: a e = anterior eye; ch = chelicerae; m e = median eye; ov = ovipositor; p e = posterior eye; sc_1 = scapular seta 1; v_1 = vertical setae 1; v_2 = vertical seta 2.



Figs. 4–7. **4,** Chelicerae, dorsal, ×550; **5,** gnathosoma, distal, ×1000; **6,** gnathosoma, lateroventral, ×1150; **7,** gnathosoma, ventral, ×600. Abbreviations: ch = chelicera; f d = fixed digit; i s = infrabuccal slit; l l = lateral lips; m d = movable digit.



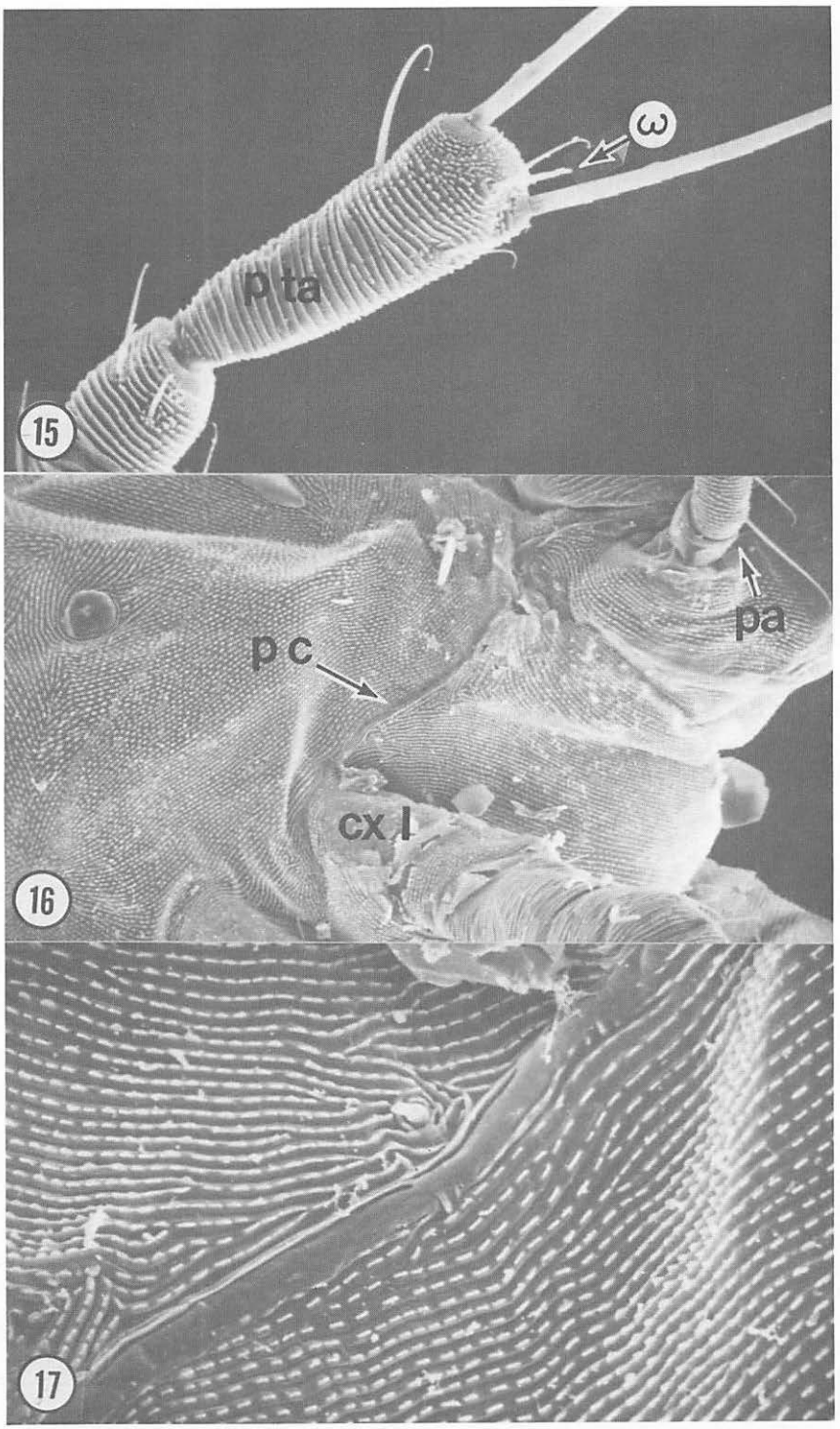
Figs. 8–10. **8,** Genital opening before ovipositor extrusion, ×650; **9,** genitoanal region, ×210; **10,** ovipositor, distal, showing lobes with eugenital setae, ×950. Abbreviations: a o = anal opening; ov = ovipositor.



Figs. 11–14. **11,** Ovipositor integument, proximal, ×3100; **12,** ovipositor, distolateral, showing lobes and long eugenital setae, ×525; **13,** tarsus I, laterodorsal, ×2100; **14,** tarsal claws and empodium, lateral, ×5000. Abbreviations: em = empodium; ϵ = famulus epsilon; t c = tarsal claw; ω_1, ω_2 = solenidia, omega 1 and 2.

The frontal view of the distal end of the gnathosoma (Fig. 5) shows the 2 teeth of the dorsal fixed digits and tips of the movable digits. The lateral lips are paired lateroventral protruberances that are prolongations of the laterodistal wall of the hypostome and the pharynx (Hammen 1980). The flattened prolongations seem pliable enough to move synchronously inward or outward with the infrabuccal slit and chelicerae in holding live prey during feeding or to hold haemolymph from being lost. Alberti (1976) and Wallace and Mahon (1976) reported that *C. latirostris* prefers feeding on oribatids.

Tarsal claws and empodia. Tarsal claws of *Cyta* are usually described as follows: Claws each with 1 row of minute rays, lateral rays wanting (Atyeo 1960), or pretarsus terminating in a pair



Figs. 15–17. **15,** Palpus, ×950; **16,** propodosoma, laterodorsal, ×475; **17,** podocephalic canal, ×1900. Abbreviations: cx I = coxa I; pa = palpus; p c = podocephalic canal; p ta = palp tarsus; ω = solenidion omega.

of claws with a single row of minute lateral rays and a padlike, rayed empodium (Swift 1986). The SEM photomicrographs show that the claws have randomly arranged bristles arising from their dorsal surface, instead of in a lateral row (Fig. 14). The bristle length varies, longer ventrally, shorter dorsally. The empodium is well padded with subequal bristles except on the dorsal surface, where they are shorter.

Tarsus I solenidiotaxy and palpus. Figure 13 shows the 2 solenidia (omega 1 and omega 2) arranged linearly and the single famulus (epsilon) proximal to omega 1. Leg striations run horizontal to the leg axis. The palpus of *C. latirostris* is composed of trochanter, basi-and telofemur, genu, and tibiotarsus. Figure 15 shows solenidion omega, the bases of the 2 end setae, which are bothridial in origin, and 4 tactile setae on the tibiotarsus.

Podocephalic canals (Figs. 16, 17). Grandjean (1938) called the paired canals that run from the base of the chelicerae to the acetabula of legs I the podocephalic canals. In *C. latirostris*, the canal is external (i.e., found on the surface of the laterodorsal propodosoma, rather than being internal as in other bdellid mites and in some members of Actinedida and Oribatida).

Ovipositor. Figure 1 shows an adult female *C. latirostris* with an extruded ovipositor almost as long as the legs. This chitinous telescoping tube is usually retracted inside the genital flaps (Fig. 8), each flap ornamented with 8 tactile setae. The distal tip (Fig. 10) is composed of 3 relatively elongated valves, each valve ornamented with a pair of long eugenital setae. These setae probably function in locating and picking up male spermatophores and in locating and depositing eggs in safe and shielded niches. Alberti (1974) noted in his study of bdellid species that the ovipositor of *C. latirostris* lacks the receptaculum seminis and has the longest ovipositor for the group. Extrusion of the ovipositor is accomplished by egg and body fluid pressure (Woodring & Cook 1962). According to Lindquist (1984), the presence of eversible ovipositor among adult female acariform mites is characteristic of early derivative taxa. The Opiliocarida and the Opiliones are other groups that have similar eversible ovipositors.

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