
Scanning Electron Microscopy of the Gonopods of the Milliped, *Thrinaxoria lampra* (Diplopoda: Polydesmida: Xystodesmidae)

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Abstract: Although the gonopods of the xystodesmid milliped, *Thrinaxoria lampra*, have been described via light microscopy and line drawings provided, nothing is known concerning their ultrastructural detail. The gonopods and gonopodal aperture of two male specimens collected in January 2005 from Bowie County, Texas, were examined using scanning electron microscopy (SEM). Compared to previously published line drawings of *T. lampra*, finer detail was observed on the solenomeres and tibial processes using SEM. As such, we present new ultrastructural data on the gonopods of *T. lampra*.

Introduction

The xystodesmid flat-backed milliped, *Thrinaxoria lampra*, was described as *Fontaria lampra* by Chamberlin (1918) from Creston, Natchitoches Parish, Louisiana. The range of *T. lampra* comprises two allopatric populations; one has widely separated localities extending from west-central Tennessee to southwestern Alabama, and the other, which is continuous, covers an area of approximately 176 km N/S and 440 km E/W extending from the vicinity of Texarkana, Arkansas/Texas, to central Sabine Parish, Louisiana, and from Longview, Gregg County, Texas, to northern Natchitoches Parish, Louisiana (Shelley 1984; Shelley and McAllister 2006).

Detailed information on the ecology and geographic distribution of *T. lampra* is available (Chamberlin 1918; Chamberlin and Hoffman

1950; Shelley 1984, 1990; McAllister et al. 2002; Marek and Bond 2006; Shelley and McAllister 2006). Its modified male sexual organs or gonopods are specialized for copulation and are very important taxonomically by aiding in specific identification of milliped taxa. The gonopods of *T. lampra* occur around the seventh segment (body ring). In his original description, Chamberlin (1918) provided a description of the gonopods of *T. lampra* (as *F. lampra*) without providing any figures. Chamberlin (1942, his fig. 7 as *Zinaria aberrans*), Shelley (1984, his figs. 24–26), and Shelley and McAllister (2006, their figs. 7–8) included line drawings of the gonopods of specimens from Caddo County, Louisiana, and Henderson and Harrison counties, Texas. However, nothing is available of the ultrastructure of gonopods of *T. lampra*. Here, we provide, for the first time, information on the gonopods of *T. lampra* using scanning electron microscopy (SEM).

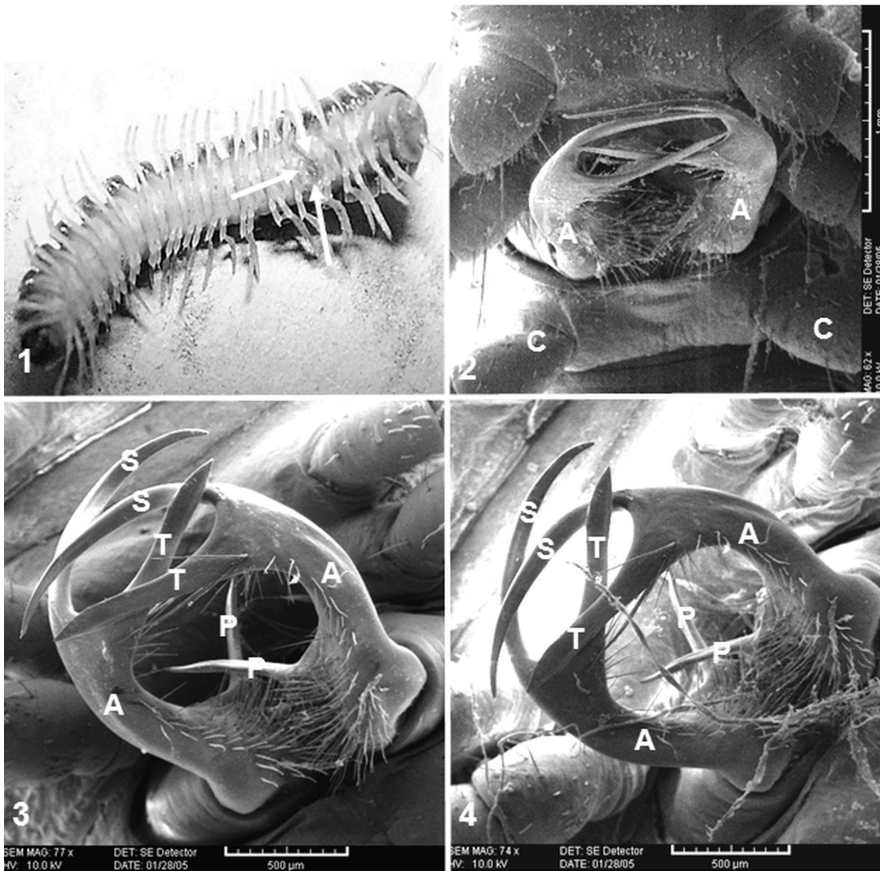
Methods

Two adult male *T. lampra* (total length = 35–36 mm) were collected by hand in January 2005 from decaying hardwood logs in deciduous forest habitat along county road 1370 in Bowie County, Texas (33°22'30.1512"N, -94°04'44.8206"W). Specimens were preserved in 10% neutral-buffered formalin and processed for SEM. They were dehydrated in a graded series of ethanols (70–100% [v/v]), transferred to amyl acetate transition solvent, critically point dried with a Autosamdri®–815 critical point drier (Tousimis Research Corporation, Rockville, MD; 31°C, 1072 psi, ventilation rate ~100 psi/min), coated with a gold-palladium with a Cressington sputter coater (Cressington

Scientific Instruments Ltd, Watford, UK), and viewed with a Vega TS 5136XM digital scanning SEM (Tescan USA Inc., Cranberry Township, PA) at an accelerating voltage of 20 kV. Voucher specimens are deposited in the North Carolina State Museum (NCSM), Raleigh, North Carolina.

Results and Discussion

In *T. lampra*, the modified legs on the seventh segment (body ring) are withdrawn into a pouch on the body (Fig. 1) and as such, the specimen appears to be lacking legs on the seventh ring. Ultrastructural characters of the gonopods and gonopodal aperture (Figs. 2–4) are as



Figures 1-4. *Thrinaxoria lampra*. 1. Stereoscopic view of venter showing location of gonopods in situ on body ring seven (arrows). 2. Ventral view of SEM of gonopods in situ; scale bar = 1 mm. 3. Higher magnification SEM of left and right gonopods; scale bar = 500 µm. 4. Another SEM view of left and right gonopods; scale bar = 500 µm. Abbreviations: A (acropodite), C (coxa), P (prefemoral process), S (solenomere), T (tibial process).

follows: gonopodal aperture ovoidal without anteriolateral depressions; the acropodites project anteriorly and bending medially overlapping in mid-length; the tips project just beyond the anterior margin of the aperture; solenomere and tibial process arising from acropodite, directed and curving keenly caudad; solenomere pointed and acutely sharp; tibial process pointed but not as sharp, and the prefemoral process is short but thin and spikey; scattered hairs distributed from base of acropodites to near the base of the telopodite.

In comparison, Shelley and McAllister (2006) provided information via light microscopy on the morphology of the left gonopod of *T. lampra* as follows: the solenomere and tibial process arise from the acropodite, directed or curving caudad; the acropodite is deeply cleft apically; and hairs extend from the base of the acropodite to the beginning of the tibial process. In our SEMs (figs. 3–4), finer detail is observed on the solenomeres and tibial processes. The line drawings of Shelley and McAllister (2006) reveal solenomeres and tibial processes that come to more of a broader blunt, rather unsharpened appearing point.

In summary, SEM micrographs of *T. lampra* are provided for the first time. Comparison with descriptions from light microscopy and line drawings show some important differences vs. the current SEMs. We suggest using caution in taxonomic descriptions and especially use of gonopod line drawings if SEM showing their ultrastructure is not readily available.

Acknowledgments

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