



Discovery of the male *Cryptolestes obesus* Thomas, 2002 (Coleoptera: Laemophloeidae) highlights key taxonomic traits and strong sexual dimorphism

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Abstract. *Cryptolestes obesus* Thomas, 2002 (Coleoptera: Laemophloeidae) was described based on a single female specimen collected in Rondônia state, Brazil. As previously hypothesized, the robust body shape and the presence of complete secondary sublateral lines on the pronotum are diagnostic for *C. obesus* and fundamental traits for male association. Here we associate and describe the conspecific male, with a new record of this species for Santa Catarina state, Brazil. The habitus, antennal scape, and genitalia of the male are illustrated.

Keywords: Brazil; Flat beetles; Morphology; Neotropical region; Taxonomy.

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The lined flat bark beetle genus *Cryptolestes* Ganglbauer, 1899 (Coleoptera: Laemophloeidae) is a relatively diverse group of laemophloeids, including several important stored product pests (Howe & Lefkovitch 1957). The genus has been taxonomically revised by Thomas (1988, 2002) and Lefkovitch (1958, 1959, 1962, 1964) and is currently composed of more than 50 species worldwide. Although the species-level taxonomy of *Cryptolestes* is primarily based on males, especially for sexually dimorphic species, Thomas (2002) described *Cryptolestes obesus* Thomas, 2002 (Coleoptera: Laemophloeidae) based on a single female specimen from Brazil. Despite expressing hesitation in describing it, he stated: "it [the female of *C. obesus*] is so distinctive that it should be fairly simple to associate the male when it is collected" (Thomas 2002). In this paper, the discovery of the male of *C. obesus* reveals a strong sexual dimorphism in this species and confirms the significance of diagnostic features for sex association, as previously hypothesized. The male is described and illustrated, and the known geographic distribution of this species is expanded.

The female holotype and the additional male specimen of *C. obesus* examined in this study are deposited in the Museu de Zoologia da Universidade de São Paulo, São Paulo, Brazil (MZSP; Sônia Aparecida Casari).

Morphological terminology follows Beutel & Lawrence (2005) for the general morphology. Total body length was measured from the anterior margin of clypeus to the elytral apex, and body width was measured at mid-elytra. The pubescence is considered inconspicuous if the length of setae is less than 0.015 mm and conspicuous if more than 0.015 mm. Regarding the conspicuous pubescence, setae are moderate if 0.015–0.030 mm and long if more than 0.030 mm in length (Bento & Fonseca 2023).

Photographs were taken using a Leica DFC295 camera attached to a Leica M205C stereomicroscope, and a Leica DFC290HD camera attached to a Leica DM5500B slide microscope. All produced images were processed using the Leica Application Suite (LAS) version 4.1 and Helicon Focus (HeliconSoft) software. Labels are quoted verbatim with the following format: '/' indicates the start and end of an individual label, and '/' indicates a line break.

Adult of *Cryptolestes obesus* Thomas, 2002 (Figures 1-8)

Material type examined. Holotype female (deposited in MZUSP; Figure 6) with following data: "BRAZIL: Rondonia, 63°P km. SW Ariquemes, nrH / Fzda. Rancho Grande 20-VII-1992 U. Schmitz / blacklight trap".

Material examined. Male (abdomen dissected) deposited at MZUSP, labeled: "Brasilien, Nova Teutonia, -27.185556; -52.383333 (300-500) iv.1952, Fritz Plaumann // "MZUSP 62108" // *Cryptolestes obesus* (handwritten) Matheus Bento, Det. 2024".

Diagnosis. Body stout and robust, with dorsal surface covered with conspicuous pubescence (Figure 1). Head acutely projected in front of eyes in both sexes. Frons strongly depressed anteriorly (Figure 3). Male antennal scape with three digitiform inner projections (Figure 5). Secondary sublateral lines of pronotum complete and equally distant from the primary

sublateral lines and lateral margins (Figure 3).

Description of male (Figures 1-2). Length from anterior margin of clypeus to elytral apex 1.4 mm, width at mid-elytra 0.56 mm. **Coloration.** Head, venter and pronotum dark reddish brown; elytra light brown. **Head** (Figure 3) large, somewhat pentagonal, 1.25x wider than long and medially as long as pronotum, with dorsal and ventral surface conspicuously pubescent, with moderate, decumbent pale setae inserted in deep punctures. Frons very wide, with anterior half depressed; punctures smaller than an eye facet, separated from each other by one puncture diameter; surface smooth between punctures; interocular width 8.6x transverse eye diameter. Clypeus with anterior margin broadly emarginated, with emargination as wide as labrum. **Antennae** slightly longer than half the body length. Scape elongate, slightly smaller than pronotum, with the apex expanded, strongly concave internally, pubescent, with three digitiform inner projections separated from each other by deep incisions: ventral projection short, frontal long and dorsal smaller than frontal projection (Figure 5). Pedicel

globose, not projected, slightly larger than flagellomeres 3-8. Flagellomeres 9-11 larger than preceding flagellomeres and forming a loose club, each slightly longer than wide (Figure 1). **Prothorax** (Figure 3) subrectangular, slightly wider than long; surface moderately setose, with conspicuous, long pale setae. Secondary sublateral line strongly defined between sublateral line and lateral margin, equally distant from sublateral line and lateral margin. Anterior and posterior angles obtuse. **Elytra** (Figure 1) 2.8x longer than wide, with sides strongly declivous; pubescence similar to pronotum and head, with longitudinal rows of long setae. **Thoracic venter.** Procoxal cavities posteriorly closed. Prosternal process broad, twice wider than long, with apical margin slightly curved. **Abdomen.** Intercostal process of ventrite 1 broad, as wide as metacoxa, with apical margin slightly curved. **Genitalia** (Figure 7). Tegmen broadly rounded at base; apex with a few setigerous punctures at each side. Parameres acute, moderately setose at apical margin, setae thick. Endophallus symmetrical, with an inverted, V-shaped sclerite connected with two hooked sclerites, two sclerites parallels, curved inward, a median raspula composed of small spine-like asperities (Figure 8).



Figure 1-2. *Cryptolestes obesus* Thomas, 2002 male: Habitus in (1) dorsal view; (2) ventral view. Scale bars: 1-2 0.4 mm.

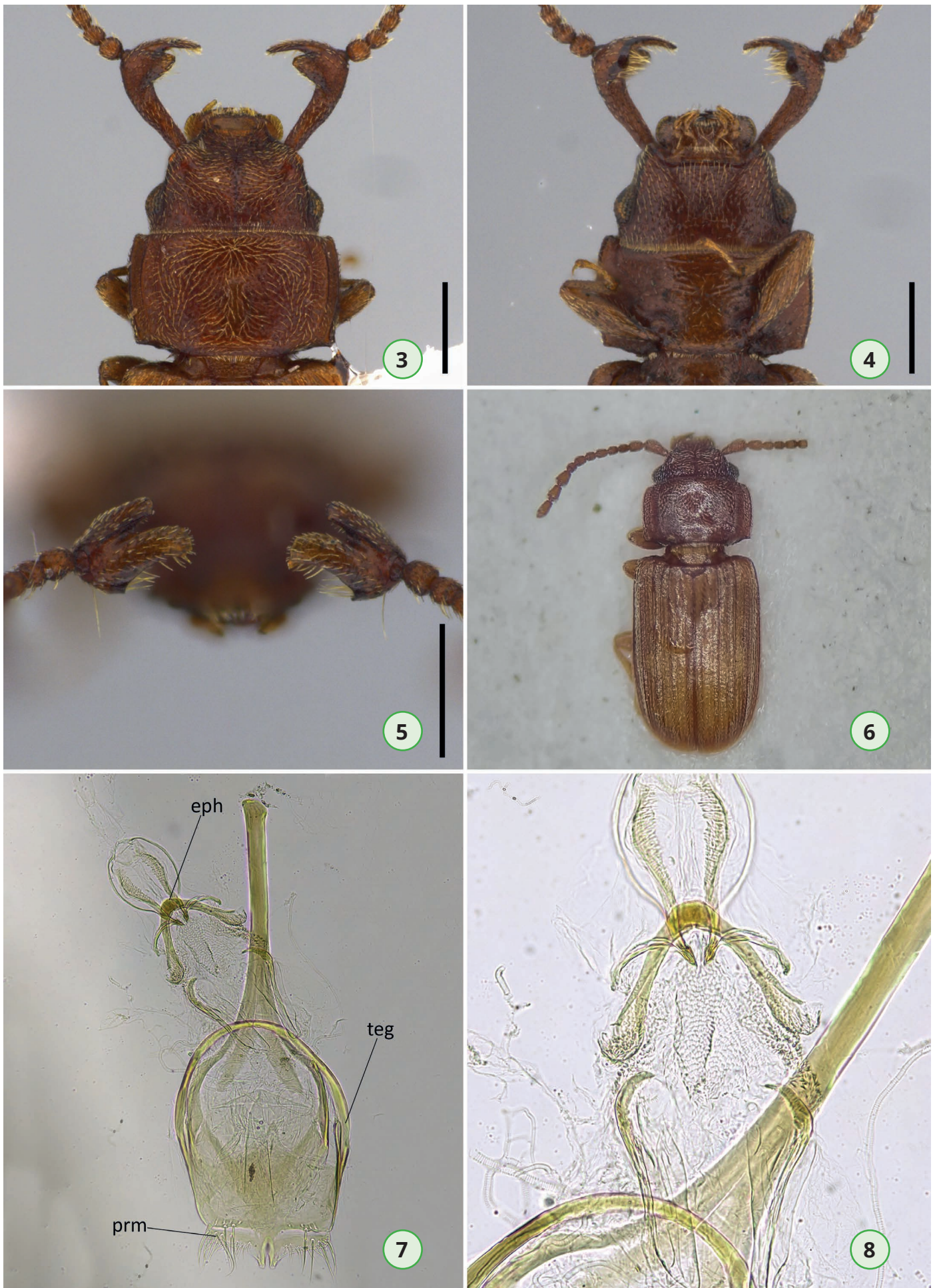


Figure 3-8. *Cryptolestes obesus* Thomas, 2002, male (3-5, 7-8), holotype female (6): (3) Head and prothorax in dorsal view; (4) Head and prothorax in ventral view; (5) Scape in frontal view; (6) Habitus in dorsal view; (7) Male genitalia; (8) Endophallus. Scale bars: 3-5 = 0.2 mm. Abbreviations: eph = endophallus; teg = tegmen; prm = parameres. Holotype female provided by Gabriel Biffi (MZUSP).

Distribution. BRAZIL. Rondônia: Ariquemes; Santa Catarina: Nova Teutônia (**new state record**).

Remarks. Thomas (2002) described *C. obesus* based on a single female specimen from Rondônia state, Brazil. In the original description, he stated: "I have hesitated to describe this species, based as it is on a single female specimen. However, it is so distinctive that it should be fairly simple to associate the male when it is collected". Although uncommon for species-level taxonomy of *Cryptolestes*, which is based primarily on males, this female specimen described by Thomas (2002) was very different from all the other species in the genus by the body extremely stout and robust, secondary sublateral lines of pronotum complete and equidistant from the primary lines and lateral margins, and the procoxal cavities closed behind. Although a strong sexual dimorphism could also be expected for *C. obesus*, Thomas (2002) was right when hypothesizing an easy association with the male in this species as its diagnostic characters were not based on primary or secondary sexual features. The male of *C. obesus* described herein possesses all the aforementioned diagnostic traits given by Thomas (2002), by which it was easily associated with the female. However, the discovery revealed a strong sexual dimorphism in which the male presents an extremely modified antennal scape, with the apex expanded, strongly concave internally, and bearing three digitiform inner projections separated from each other by deep incisions (Figure 5). The shape of the male scape of *C. obesus* and the endophallic sclerites diagnose this species and represent unique features among males of all the other *Cryptolestes* species.

TAXONOMIC AUTHORITIES

Cryptolestes obesus Thomas, 2002 [original description] in Thomas (2002).

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AUTHORS CONTRIBUTION

LZ: Writing – preparation of original draft, Formal analysis, methodology, visualization; MB: Conceptualization, Investigation, Supervision, Revision and writing – review & editing.

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CONFLICT OF INTEREST STATEMENT

Authors declare there are no conflicts of interest.

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