

Immatures of *Syphrea uberabensis guerini* Bechyné (Coleoptera, Chrysomelidae, Alticini)

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ABSTRACT. Immatures of *Syphrea uberabensis guerini* Bechyné (Coleoptera, Chrysomelidae, Alticini). Larva and pupa of *Syphrea uberabensis guerini* are described and illustrated for the first time and a comparison with the described immatures of other Alticini species from Neotropical region and also with *Hermaeophaga mercurialis* (Fabricius, 1792), from Palearctic region, is presented. *Tibouchina stenocarpa* (DC.) Cogn. (Melastomataceae) (quaresmeira-do-cerrado) is registered as a new host plant for this species of Alticini.

KEYWORDS. Hermaeophagina; Neotropical; Oedionychina; Pseudolampina; South America.

RESUMO. Imaturos de *Syphrea uberabensis guerini* Bechyné (Coleoptera, Chrysomelidae, Alticini). Larva e pupa de *Syphrea uberabensis guerini* são descritas e ilustradas pela primeira vez e comparadas com as formas imaturas descritas de outras espécies de Alticini da região Neotropical e também com *Hermaeophaga mercurialis* (Fabricius, 1792), da região Paleártica. *Tibouchina stenocarpa* (DC.) Cogn. (Melastomataceae) (quaresmeira-do-cerrado) é registrada como novo hospedeiro para esta espécie de Alticini.

PALAVRAS-CHAVE. América do Sul; Hermaeophagina; Neotropical; Oedionychina; Pseudolampina.

The Alticini includes approximately 500 genera and 8–10,000 species distributed worldwide (Scherer 1988). A satisfactory suprageneric classification for the tribe does not exist (Riley *et al.* 2002). Seeno & Wilcox (1982) presented an arrangement of the genera into subdivisions, leaving some of them nameless. They listed about 230 genera from Neotropical region and 33 are recorded from Brazil, but these numbers are underestimated. The genus *Syphrea* Baly, 1876 is included into the “Hermaeophagina”, together with 10 other genera, and *Hermaeophaga* Foudras 1859 (1860) is the only genus with known larva in this group.

The genus *Syphrea* includes more than 100 species and is found throughout the South and Central America (Scherer 1983). Up to now, the immatures of this genus were unknown.

Lawson (1991) characterized the Alticini larvae as having mandibles palmate with four teeth, antennae small, with 1–2 antennomeres, legs present, labrum free, with emargination from deep to slightly rounded, maxillary palpi with 3–4 palpomeres, labial palpi with 2 palpomeres, 0, 1 or 2 pairs of stemmata and abdomen with 10 segments. He also presented the illustrations and a brief description of the larvae of 12 American species of this group.

The immatures of Alticini, especially from Neotropical region are poorly known.

Four species were described from Brazil: *Alagoasa januaria* Bechyné, 1955 [Duckett & Swigonova 2002], *Walterianella bucki* Bechyné, 1956 (Oedionychina) [Duckett & Casari 2002], *Megistops vandepolli* Duvivier, 1889 (Dibolina, leaf-miner) [Linzmeier *et al.* 2007] and *Pseudolampsis darwini* (Scherer,

1964) (Pseudolampina) [Casari & Duckett 1997]. Besides these species from Brazil, the only other description of immatures from South America Alticini is that of the eggs and the first instar larva of the genus *Procalus* Clark, 1865 [Jerez 2003]. The majority of the other known immatures from Neotropical Region are from Hispaniola Island, except the last two: *Alagoasa cinctus* (Linnaeus, 1758) (Oedionychina), *Lysathia occidentalis* (Suffrian, 1868) (Alticina), *Disonycha comma* White, 1990 (first instar larva), *D. eximia* Harold, 1876 (first instar larva) and *D. spilotrachel* Blake, 1928, (Disonychina), *Megistops liturata* (Olivier, 1808) (leaf-miner) and *M. sp.* (leaf-miner) (Dibolina), *Omophoita aequinoctialis* (Linnaeus, 1758) (Aspicelina) and *Macrohaltica jamaicensis* (Fabricius, 1792) (nameless subtribe) [Takizawa 2005]; *Ptocadica tica* Duckett & Moya, 1999, from Costa Rica and Panama [Duckett & Moya 1999] and *Blepharida atripennis* Horn, 1895, from Mexico (Blepharidina) [Lee 1999].

Larvae of the following flea beetles are known from regions other than Neotropical: Grandi (1932) described immatures of *Phyllotreta nemorum* (Linnaeus, 1758) from Germany and *Sphaeroderma rubidum* (Graëlls, 1858) from Italy; Bryant & Gressitt (1957), *Febra insularis* Bryant, 1925, from Fiji; Zaitsevi (1988), *Podontia affinis* (Gröndal, 1808) and *P. lutea* (Olivier, 1790) from Vietnam; Welch (1972), *Hermaeophaga mercurialis* (Fabricius, 1792), from England; Zaitsev & Muravitsky (1989), *Derocrepis rufipes* (Linnaeus, 1758) and *Epithrix pubescens* (Koch, 1803) from Soviet Union; Kato (1991), *Schenklingia sauteri* (Chen, 1934) from Japan; Lawson (1991), *Altica chalybea* Illiger, 1807, *A. corni*

Woods, 1918, *Blepharida rhois* Forster, 1771, *Dibolia borealis* Chevrolat, 1844, *Disonycha spilotrachela alternata* (Illiger, 1807), *D. triangularis* (Say, 1824), *D. xanthomelas* (Dalman, 1823), *Epitrix cucumeris* (Harris, 1851), *Kuschelina gibbitarsa* (Say, 1824), *Macrohaltica ambiens* LeConte, 1859, *Mantura chrysanthemi floridana* Crotch, 1873 and *Systema blanda* (Melsheimer, 1847) from United States of America; Lee (1992), *Altica caerulescens* (Baly, 1874), *A. cirsicola* Ohno, 1960, *Argopistes biplagiatus* Motschulsky 1860, and *A. coccinelliformis* Csiki, 1940, from Japan; Kimoto & Takazawa (1997), *Altica birmanensis* (Jacoby, 1896), *A. caerulescens* (Baly, 1874), *A. cyanea* (Weber, 1801), *A. cirsicola* Ohno, 1960, *A. cerulea* (Olivier, 1791) and *A. japonica* Ohno, 1960, from China and *A. himalayensis* (Chen, 1936) from Taiwan; Casari & Duckett (1997), *Pseudolampsis guttata* (LeConte, 1884) from United States of America; Kimoto & Takizawa (1997), *Ophrida scaphoides* (Baly, 1865) from Taiwan; Cox (1997), *Mniophila muscorum* (Koch, 1803) from United Kingdom; Cox (1998), *Psylliodes chrysocephala* (Linnaeus, 1758), *P. cuprea* (Koch, 1803), *P. laticollis* Kutschera, 1864, *P. luridipennis* Kutschera, 1864, *P. marcida* (Illiger, 1807) and *P. napi* (Fabricius, 1792), from United Kingdom; Lee *et al.* (1998), *Systema blanda* (Melsheimer), 1847, from Canada; Lee (1999), *Blepharida rhois* Forster, 1771, from United States of America and *B. scara* (Weise, 1897), from Israel; Furth & Lee (2000), *Blepharida atripennis* Horn, 1895 and *Euplectroscelis xanti* Crotch, 1873 from Mexico, *B. rhois* (Forster, 1771, from United States of America, *B. sacra* (Weise, 1897) from Israel, *Diamphidia* sp., from South Africa, *Ophrida marmorea* (Wiedemann, 1819) from India and *Podontia affinis* (Gröndal, 1808), *P. lutea* (Olivier, 1790) and *P. dalmani* Baly, 1865, from Vietnam; Lee & Furth (2000), *Altica bicarinata* (Kutschera, 1860), from Israel and *A. marevagans* Horn, 1889, from North America; Park & Lee (2001), *Ophrida spectabilis* (Baly, 1862) from Korea; LeSage & Zmudzinska-Krzesinska (2004) *Altica chalybea* Illiger, 1807 and *A. woodsi* Isely, 1920, from Canada and United States of America; Yong *et al.* (2007), *Altica fragariae* (Nakane, 1955) from China; and Li-Jie & Xing-Ke (2008), *Ophrida xanthospilota* (Baly, 1881) from China.

Herein, larva and pupa of *Syphrea uberabensis guerini* Bechyné (1956) are described, illustrated and compared with immatures of other Alticini species from Neotropical region (Tables I, II) and also with *Hermaeophaga mercurialis* (Fabricius, 1792) from England.

MATERIAL AND METHODS

Twenty six larvae and 28 adults were collected feeding on leaves of *Tibouchina stenocarpa* (DC.) Cogn. (Melastomataceae) (quaresmeira-do-cerrado), a common cerrado species. The material was collected on April, 18th and 20th and October, 31st, 2000, in Souzas (left margin of Atibaia river), a district of Campinas, state of São Paulo, Brazil, by José Eduardo de Arruda Bertoni.

Some larvae were kept in laboratory until pupating. Some pupae were preserved for studying and some were kept in laboratory to obtain the adults. During this period, three larvae died.

The material is housed at “Museu de Zoologia da Universidade de São Paulo, São Paulo, Brasil” (MZSP) (17 larvae, 2 pupae, 6 adults), “Instituto Agrônômico de Campinas, Campinas, São Paulo” (IACC) (18 adults), National Museum of Natural History Smithsonian Institution, Washington DC (USNM) (4 adults) and “Instituto de Zoologia Agrícola, Aragua, Venezuela” (IZAV) (4 adults). The adults of IACC and IZAV are labeled under number 7372.

The general terminology follows Lawson (1991).

The terminology for tubercular patterns for Alticini larvae follows Takizawa (2005), who defines tubercles “as small chitinized plates around the bases of primary setae on the body surface”. According to him, the dorsal region bears the tubercle “dorsal” (D), here divided into “dorsal anterior” (Da), “dorsal posterior” (DP), “dorsal posterior interior” (DPi) and “dorsal posterior exterior” (DPe). The “dorso-lateral” region has a tubercle (DL), “epipleural” region has a tubercle (EP), “pleural” has a tubercle (P) and “sternal” region, three tubercles, “parasternal” (PS), “sternellar” (SS) and “eusternal” (ES). Here, PS is fused to SS.

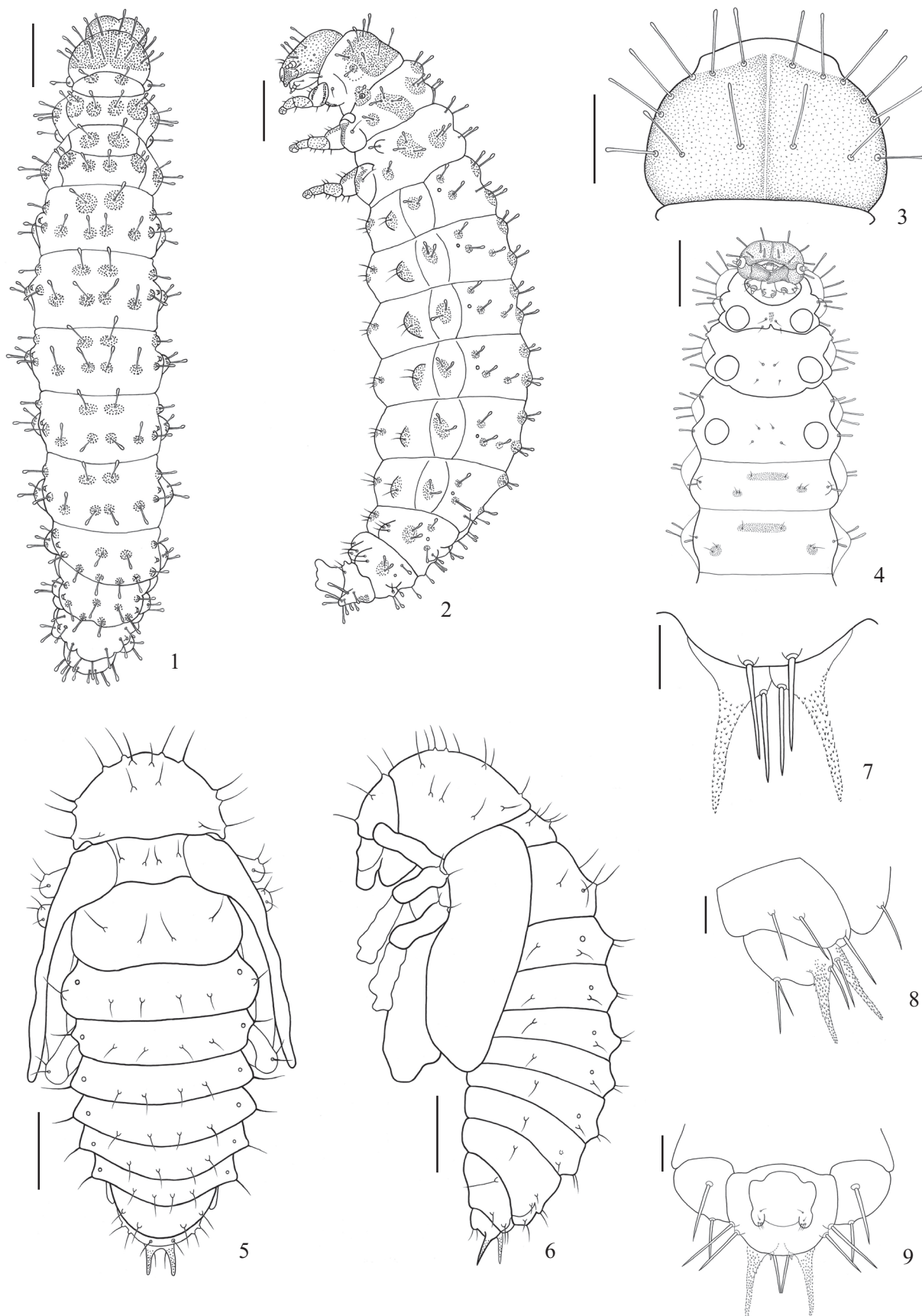
As the immatures of only one species of “Hermaeophagina”, *Hermaeophaga mercurialis* are known and this species is not recorded from Neotropical region, the mature larva and pupa of *S. uberabensis guerini* are here also compared with those of the Alticini described from Neotropical region (except for *Megistops liturata* and *M. vandepolli*, leaf-miners). Leaf-miners are not comparable because exploring a singular niche and the larvae present some particular adaptations related to this kind of life.

RESULTS

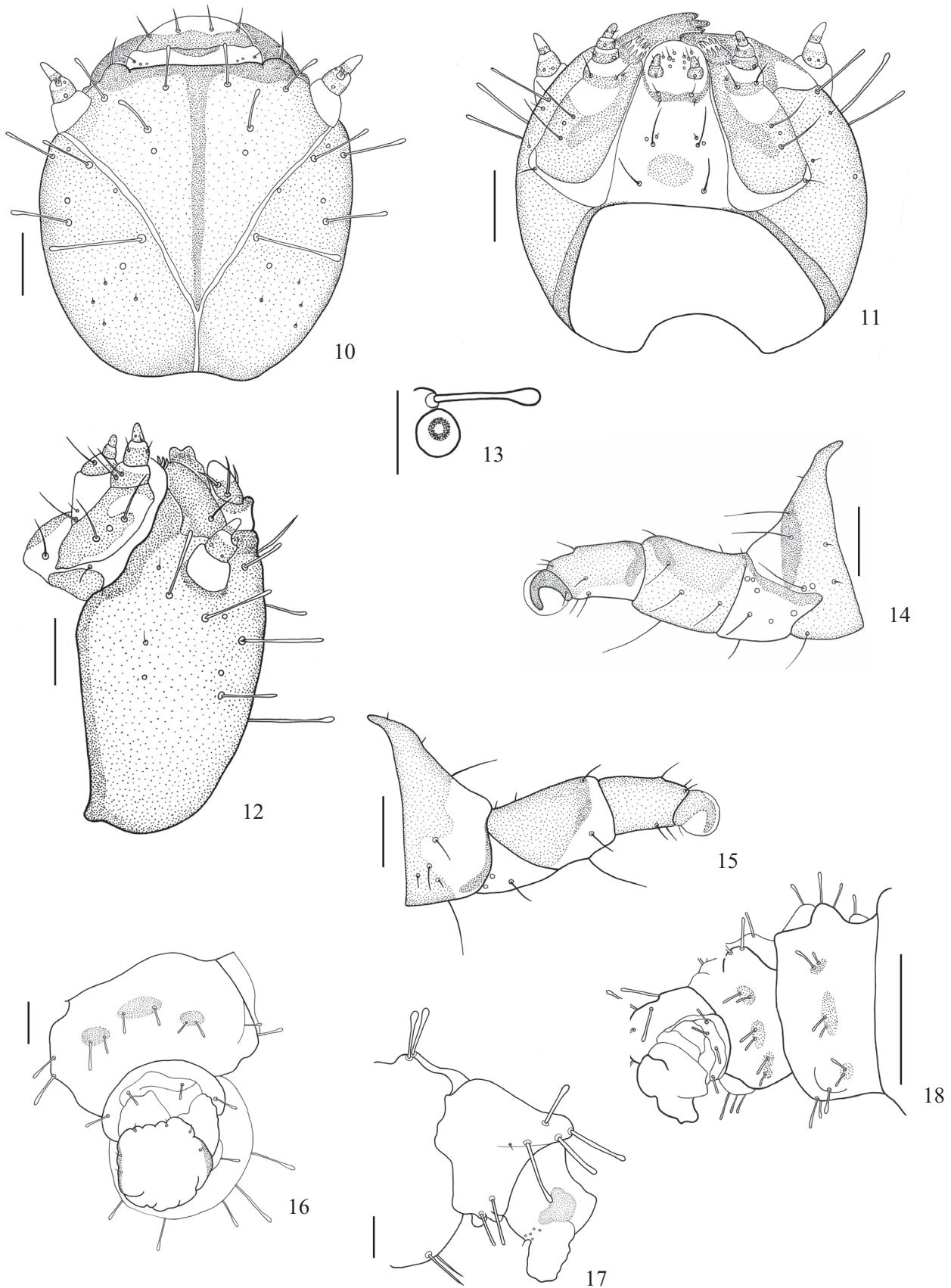
Mature larva. Length: 4.4–6.30 mm; width of pronotum: 0.75–1.41 mm.

Eruciform, moderately curved after fixation (Figs. 1, 2). General integument cream in preserved specimens with head brown; antennae, maxillae and legs partially membranous; thorax and abdomen with setous sclerotized plates or setous sclerotized tubercles (= tubercles of Takizawa, 2005), brown or yellowish-brown, clearer to apex direction; ventral tubercles clearer than dorsal. Segments separated by transverse grooves forming plicae. Setae club-like, whitish, wide with widened apex; ventral setae narrower than dorsal.

Head (Figs. 10–12) hypognathous, rounded, narrower than pronotum, moderately pigmented and well sclerotized; frontal arms V-shaped, epicranial stem short; median endocarina long, extending from base of clypeus to epicranial stem. Frons bearing three pairs of setae and one pair of campaniform sensilla. Vertex highly convex; each epicranial half bearing dorsally, four long setae, four campaniform sensilla and four minute setae, and ventrally, one long seta (at antenna base) and two short setae and one campaniform



Figs. 1–9. *Syphrea uberabensis guerini* Bechyné. Mature larva: 1, dorsal; 2, lateral; 3, pronotum; 4, head, thorax and abdominal segments I-II (ventral, legs removed). Pupa: 5, dorsal; 6, lateral; 7–9, apex of abdomen (dorsal, lateral, ventral). Bars = 5mm, except figs. 7–9 = 1 mm.



Figs. 10–18. *Syphrea uberabensis guerini* Bechné. Mature larva: 10–12, head (dorsal, ventral, lateral); 13, thoracic spiracle with one club-like seta; 14, 15, leg (external, internal); 16, segments VIII-X (ventral); 17, distal part of segment VIII and segments IX-X (lateral); 18, segments VIII-X (ventrolateral). Bars = 1 mm, except fig. 18 = 5 mm.

sensilla. Stemmata absent. Antennifer membranous longer than basal antennomere, inserted at base of frontal arms. Antenna (Figs. 21, 22) with two antennomeres: antennomere basal slightly longer than wide, narrowed on distal half, partially membranous, bearing dorsally, near apex, one sensorial appendix with three (right antenna) or four (left antenna) stout setae at apex, and two campaniform sensilla: one at middle near base and other anteriorly near laterointernal margin; ventrally, bearing two campaniform sensilla near base; distal antennomere cupuliform, narrow, membranous with basal band sclerotized, bearing dorsally two campaniform sensilla laterally (one each side) on sclerotized band and ventrally one tiny seta near base. Clypeus (Fig. 19) membranous, band-like with transverse sclerite near anterior margin; anterior margin sinuous; lateral margins rounded; each side bearing one seta and two campaniform sensilla. Labrum (Fig. 19) transverse, narrow anteriorly; membranous with transverse sclerotized band on basal third, not reaching lateral margins; lateral margin rounded; anterior margin rounded and prominent at middle, forming three weak lobes; bearing four long setae disposed in a row near base and two campaniform sensilla, near base of median setae. Epipharynx (Fig. 20) membranous spiny medioanteriorly; each side of anterior margin bearing five or six wide setae (two basal on each side, larger); median basal region with two elongate sclerites (left side shorter), each with three groups of sensilla. Mandibles symmetrical and palmate (Figs. 23, 24); apex with four small irregular rounded teeth; one tooth slightly bilobed; external face bearing near middle one long dorsal seta, at middle near base one short seta and one campaniform sensillum and near ventral base one campaniform sensillum; penicillus formed by stout setae. Maxilla (Figs. 25–27): cardo transverse, triangular bearing one seta lateroexternally; stipes elongate, partially membranous, bearing laterally two long setae and one campaniform sensillum between setae; mala rounded, bearing distally eight stout setae disposed like a circle, with two setae at middle of circle (one pedunculate), and three wider setae near internal margin; palpiger bearing two long and one short setae on sclerotized area; palpi with three palpomeres: basal palpomere wider than long, bearing ventrally, one short seta near external margin and one campaniform sensillum near internal margin; median palpomere wider than long bearing ventrally, one seta near internal margin and one campaniform sensillum near middle and dorsally, one short seta; distal palpomere elongate, bearing ventrally, near middle, one short seta near internal margin and one campaniform sensillum near external margin. Labium almost totally membranous (Fig. 25): prementum with one median semi-elliptical sclerotized band bearing two pairs of setae: one very long at anterior margin of dark band and one minute at posterior margin of dark band; labial palpi short, with two palpomeres: palpomere basal wider than long bearing one minute median basal seta; palpomere distal elongate, narrowed to apex, bearing one seta and one campaniform sensillum near external margin; three pairs of short setae (one longer) and two pairs of

campaniform sensilla between palpi; ligula wide with distal margin slightly notched at middle and each lateral margin with one sclerotized elongate band; postmentum membranous with a small rounded weakly sclerotized median area, bearing anteriorly, one pair of minute setae, one pair of campaniform sensilla followed by one pair of long setae anteriorly dark area and one pair of long setae posteriorly dark area.

Prothorax (Figs. 1–4) with one dorsal large sclerotized plate (fusion of D and DL), divided at mid-line with eight pairs of setae: five in a row near anterior margin of plate and three near middle; one seta inserted in a small rounded tubercle externally (EP), each side of dorsal plate. Meso- and metathorax, both with a transverse median groove forming two plicae and identical arrangement of tubercles; first plica with two tubercles (Da), each with one seta; second plica with four tubercles: two (DPi) smaller, each bearing one seta and two (DPe) each bearing two setae. Dorsolaterally, each side with one large tubercle (DL) each bearing three setae. Pleura with two smaller tubercles (EP) each bearing one seta; anterior tubercle of mesothorax includes spiracle. Ventrally (Fig. 4), between coxae, each thoracic segment with four short setae. Intersegmental area of pleura, between pro- and mesothorax with one well developed annuliform spiracle on each side (Figs. 2, 13). Legs (Figs. 14, 15) moderately long, increasing in size from anterior to posterior; partially sclerotized; inserted separately ventro-laterally; 5-segmented and setose; coxa elongate bearing 4 long and two tiny setae and one campaniform sensilla at internal side, four moderately long setae at external side and two short setae dorsally near base; trochanter membranous, sclerotized only at base of internal side, bearing one long setae and seven campaniform sensilla at internal side and one setae and two campaniform sensilla at external side; femur, elongate, partially membranous, bearing three long setae at internal side, two at external side, one very long ventral and three short dorsal setae; tibia slightly narrower than femur, elongate, partially membranous at internal side, bearing three setae at internal side, two at external side and one dorsal; tarsungulus sclerotized and wide, curved, bearing one seta at base and well developed pulvillus.

Abdominal segments I–VIII, divided dorsally by a transverse groove forming two plicae; anterior plica with two larger tubercles (Da) (sometimes fused) and two smaller (DL), each bearing one seta; second plica with four slightly smaller tubercles (Dp) and two (DL), each with one setae; each side with one tubercle (EP) and one (P) each bearing two setae; ventrally with three tubercles: one elliptical medioanterior (ES) with two setae and one each side (PS + SS) each with two setae; segments I–VIII with one annuliform spiracle between DL tubercles. Segment IX (Figs. 16–18) with eight dorsal and four ventral setae. Segment X (Figs. 16–18) not visible in dorsal view, in form of flesh pygopod with three apical lobes and one lateral sclerite each side; apex bearing six short setae: two anterior and two each side; one tiny seta and five campaniform sensilla each side at base of anterior



Figs. 19–27. *Syphrea uberabensis guerini* Bechyné. Mature larva: 19, clypeus and labrum; 20, epipharynx; 21, 22, antenna (dorsal, ventral); 23, 24, mandible (external, internal); 25, maxilla and labium; 26, 27, apex of maxilla (dorsal, ventral). Bars = 0.5 mm, except figs. 23, 24 = 1 mm.

lobe.

Pupa (Figs 5–9). Length: 4.49 mm.

Cream bearing long brownish setae inserted in small tubercles; setae darker apicad. Head not visible dorsally, with three pairs of setae. Pronotum transverse, dorsally rounded anteriorly, bearing eight pairs of setae: two pairs medioanteriorly near anterior margin, three pairs near lateral margins on basal third, two pairs dorsally at middle of anterior half and one pair innely hind angles, near base. Mesonotum shorter than metanotum, each with two pairs of setae. Abdomen narrowed apicad; segments I–VII band-like each bearing two pairs of dorsal setae and one pair lateral; segments I–VI bearing one dorsolateral rounded spiracle each side (last vestigial). Segment IX (Figs. 7–9) shorter with two distal microspined projections (urogomphi), each with one long and one tiny seta near base of internal margin; one pair of long setae each lateral margin; ventrally bearing one median lobe with distal margin with one small rounded projection each side, each projection with five short setae. Femora with two setae near apex.

DISCUSSION

Syphrea uberabensis, a South American flea beetle, has been used as a potential agent of biological control for the invasive weed *Tibouchina herbacea* (DC) Cogn. (Melastomataceae) in Hawaii. This ornamental plant was introduced in the Hawaiian archipelago and in the absence of the natural enemies and presence of favorable conditions like soil and climate, has been spread in many native forests and humid regions of the main Hawaiian Islands (Wilker & Souza 2005; Raboin *et al.* 2008). Johnson & Denslow (2005) studied the use of *S. uberabensis* for control of *T. herbacea* (cane tibouchina) in Hawaii and assured: “has been identified as the most promising of several potential agents. Larvae and adults of this species eat the leaves, and heavy feeding has been shown to kill tibouchina plants in the field”.

This species was never used as agent of biological con-

trol in Brazil. It was observed that, after the attack of larvae and adults of *S. uberabensis guerini* on leaves of *Tibouchina stenocarpa*, the plant gets a dried up aspect.

The larva of *S. uberabensis guerini* agrees with the Lawson (1991) characterization of Alticini larvae. Based on the larva of this species and the descriptions of the known Neotropical Alticini larvae (except leaf-miner) (Table I) it is possible verify that: the integument is variable but usually presents tubercles and/or projections; head hypognathous and frontal arms V- or U-shaped in all species; median endocarina usually long (except *Pseudolampsis darwini* and *Macrohaltica jamaicensis*); frons usually with three pairs of setae (except *Lysanthia occidentalis* and *Ptocadica tica*); stemmata usually absent (except *Pseudolampsis darwini* and *Ptocadica tica*); clypeus always distinct, setous or glabrous; labrum usually with two pairs of setae (except *Blepharida atripennis* and *Lysanthia occidentalis*); mandibles palmate and 3–5-toothed [4-toothed for Lawson, 1991] and penicillus present (formed by different kinds of setae) or absent; gula absent; antennae with two antennomeres; usually pronotum bears 8 pairs of setae, except four species with 0, 4, 7, 11 pairs of setae; spiracles annuliform; legs 5-segmented (except *Pseudolampsis darwini*). The only species with glandular openings is *Pseudolampsis darwini*.

Pupae of flea beetles are generally similar (Table II), differing in the chaetotaxia. Head usually with three pairs of setae, except two species with one and 6 pairs; pronotum usually with 8 pairs of setae, except three species with 4, 7, 12 pairs; meso- and metanotum usually with two pairs each one, except two species with one pair; abdominal segments varying from 2–8 pairs of setae. All species present one pair of spiniform projections at apex of segment IX (microspined in *Syphrea*).

Comparing the larvae of *S. uberabensis guerini* (from Brazil), collected on *Tibouchia stenocarpa* with *Hermaeophaga mercurialis* (from England), collected on *Mercurialis perennis* L., both belonging to “Hermaeophagina” group, it was verified that both species present head rounded or oval, frontal

Table I. Morphological comparison of known mature larvae of Neotropical Alticini.

Species	Integument (tubercles/setae)	Head	Frontal arms	Epicranial stem	Endocarina	Frons (long setae)	Stemma
<i>Syphrea uberabensis guerini</i>	Sclerotized tubercles with club-like setae	Hypognathous	V-shaped	Present	Long	3 pairs	Absent
<i>Alagoasa januaria</i>	Setous small tubercles and lateral projections	Hypognathous	V-shaped	Present	Long	3 pairs	Absent
<i>Pseudolampsis darwini</i>	Densely asperate; setous sclerites	Hypognathous	V-shaped	Present	Short	3 pairs	One pair (pigmented)
<i>Walterianella bucki</i>	Prominent tubercles with club-like setae	Hypognathous	V-shaped	Present	Long	3 pairs	Absent
<i>Alagoasa cinctus</i>	Setous small tubercles and lateral projections	Hypognathous	V-shaped	–	Long	3 pairs	Absent
<i>Blepharida atripennis</i>	Without tubercles with short and sparse setae	Hypognathous	V-shaped	Present	Long	3 pairs	One pair
<i>Disonycha spilotrachelata</i>	Conical setous projections	Hypognathous	V-shaped	Present	Long	3 pairs	One pair
<i>Lysanthia occidentalis</i>	Setous sclerotized tubercles	Hypognathous	U-shaped	Present	Long	5 pairs	Absent
<i>Macrohaltica jamaicensis</i>	Setous sclerotized tubercles	Hypognathous	V-shaped	Present	Absent	3 pairs	Absent
<i>Omophoita aequinoctialis</i>	Dorsal tubercles and dorsolateral and lateral projections with minute setae	Hypognathous	V-shaped	Present	Long	3 pairs	Absent
<i>Ptocadica tica</i>	Asetose tubercles	–	V-shaped	Present	Long	4 pairs (?)	One pair

Continue

Table I. Continued.

Species	Clypeus	Labrum	Mandible	Penicillus	Gula	Antennomere distal
<i>Syphrea uberabensis guerini</i>	Distinct (1 pair setae, 2 pairs sensilla)	2 pairs setae, 1 pair sensilla	Palmate, 4-toothed	Stout setae	Absent	Cupuliform
<i>Alagoasa januarua</i>	Distinct (3 pairs sensilla, 1 pair microsetae)	2 pairs of setae, 2 pairs of sensoria	Palmate, 5-toothed	Stout setae	Absent	Cupuliform
<i>Pseudolampsis darwini</i>	Distinct (2 pairs setae)	2 pairs of setae, 1 pair sensilla	Palmate, 5-toothed	Ramified setae	Absent	Cupuliform
<i>Walterianella bucki</i>	Distinct (2 pairs sensilla, 2 pairs microsetae)	2 pairs of setae, 1 pair sensilla	Palmate, 5-toothed	Stout setae	Absent	Cupuliform
<i>Alagoasa cinctus</i>	Distinct (glabrous?)	2 pairs of setae	Palmate, 5-toothed	Minute setae	–	–
<i>Blepharida atripennis</i>	Distinct (2 pairs of setae, 1 pair of sensilla)	4 pairs of setae and 1 pair of sensilla	Palmate, 5-toothed	Absent	–	One large conical sensory
<i>Disonycha spilotrachela</i>	Distinct (1 pair of setae ?)	2 pairs of setae	Palmate, 4-toothed	One simple seta	–	–
<i>Lysanthia occidentalis</i>	Distinct (1 pair of setae ?)	1 pair of setae	Palmate, 5-toothed	Absent	–	Conical with acute accessory process
<i>Macrohaltica jamaicensis</i>	Distinct (2 pairs of setae)	2 pairs of setae	Palmate, 4-toothed	Absent	–	Conical
<i>Omophoita aequinoctialis</i>	Distinct (glabrous)	2 pairs of setae	Palmate, 5-toothed	Stout setae	–	–
<i>Ptocadica tica</i>	Distinct (glabrous)	2 pairs of setae	Palmate, 3-toothed	One short seta on small tubercle	–	–

Continue

Table I. Continued.

Species	Apex of basal antennomere	Pronotum (setae)	Abdomen (dorsal setae)	Spiracles	Legs	Claw	Glandular openings
<i>Syphrea uberabensis guerini</i>	1 sensorial appendix with three (right antenna) or four (left antenna) stout setae	8 pairs	12-14	Annuliform	5-segmented	One seta and pulvillus	Absent
<i>Alagoasa januarua</i>	5 peg-like sensilla, 5 sensory pores	8 pairs	8	Annuliform	5-segmented	One seta and pulvillus	Absent
<i>Pseudolampsis darwini</i>	2 small coniform sensoria	7 pairs	10-12	Annuliform	4-segmented	One seta and pulvillus	Present
<i>Walterianella bucki</i>	1 small coniform sensorium and 6 pedunculate setae and 2 sensilla	8 pairs	6	Annuliform	5-segmented	One seta	Absent
<i>Alagoasa cinctus</i>	–	4 pairs	8	Annuliform	–	Pulvillus ?	–
<i>Blepharida atripennis</i>	With 1 antennomere	13 pairs	Three folds	Circular	–	One seta and pulvillus	Absent
<i>Disonycha spilotrachela</i>	–	11 pairs	6	Annuliform	–	Pulvillus	Absent
<i>Lysanthia occidentalis</i>	–	8 pairs	16	Annuliform	–	One seta and pulvillus	Absent
<i>Macrohaltica jamaicensis</i>	–	8 pairs	16	Annuliform	–	One seta and pulvillus	Absent
<i>Omophoita aequinoctialis</i>	–	8 pairs	10	Annuliform	–	Glabrous, without pulvillus	Absent
<i>Ptocadica tica</i>	–	Absent	Absent	Annuliform	5-segmented	With pulvillus	Absent

Table II. Morphological comparison of known pupae of Neotropical Alticini.

Species	Head (setae)	Pronotum (setae)	Meso-metanotum seta (setae each one)	Spiracle	Abdomen (setae)	Segment IX
<i>Syphrea uberabensis guerini</i>	3 pairs	8 pairs	2 pairs	6 pairs	3 pairs	One pair of spiny and moderately long projections
<i>Alagoasa januarua</i>	3 pairs	8 pairs	2 pairs	5 pairs	3 pairs	One pair of short projections
<i>Pseudolampsis darwini</i>	6 pairs	7 pairs	2 pairs	6 pairs (last vestigial)	4 pairs	One pair of short apical projections
<i>Walterianella bucki</i>	–	–	–	–	–	–
<i>Alagoasa cinctus</i>	–	–	–	–	–	–
<i>Blepharida atripennis</i>	–	–	–	–	–	–
<i>Disonycha spilotrachela</i>	3 pairs	12 pairs	1 pair	6 pairs	4 pairs	One pair of projections
<i>Lysanthia occidentalis</i>	3 pairs	8 pairs	2 pairs	5 pairs	6 pairs	One pair of projections
<i>Macrohaltica jamaicensis</i>	3 pairs	8 pairs	2 pairs	5 pairs	6-8 pairs	One pair of projections
<i>Omophoita aequinoctialis</i>	–	–	–	–	–	–
<i>Ptocadica tica</i>	One pair	4 pairs	One pair	–	2 pairs	One pair of projections

arms V-shaped, stemmata absent, antennae with two antennomeres, mandibles with penicillus, stipes and palpiger, each with two setae, mala rounded, mentum and submentum fused with two pairs of long and one pair of short setae, ligula with three pairs of short setae, pronotum with five pairs of setae near anterior margin and three pairs near middle, meso- and metanotum forming two plicae with sclerotized stout tubercles, legs 5-segmented, tarsungulus with one seta and pulvillus present. *S. uberabensis guerini* differs from *M. perennis* (parenthesized) especially by: basal antennomere with sensorial appendix with 3–4 apical setae (with one sclerite with setae); clypeus with one pair of setae and two pairs of campaniform sensilla (3 pairs of setae); labrum with four pairs of setae and one pair of campaniform sensillum (two pairs of setae); mandibles 4-toothed (5-toothed); cardo with one seta (one pair of setae); mala with 11 setae (13 setae).

Comparing the pupae of these species it was observed that *S. uberabensis guerini* presents head and abdomen, each with three pairs of setae, while *M. perennis* presents five pairs. Both species present pronotum with 8 pairs of setae, meso- and metanotum, each with two pairs, spiracles on segments I–VI (last vestigial) and apex of abdomen with paired spines.

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