Papéis Avulsos de Zoologia

Museu de Zoologia da Universidade de São Paulo

Volume 56(13):159-162, 2016 **www.mz.usp.br/publicacoes** **ISSN impresso: 0031-1049**
www.revistas.usp.br/paz **ISSN *on-line:* 1807-0205**

Pupal case description of *Systropus (Systropus) fumipennis* Westwood, 1842 (Diptera: Bombyliidae: Toxophorinae: Systropodini)

Leandro Silva Barbosa[1,2,3]
Barbara Proença[1,4]
André Mallemont Cunha[1,5]

ABSTRACT

The pupal case of Systropus (Systropus) fumipennis *is described, illustrated and photographed for the first time. A pupae was found inside an unidentified Limacodidae coocon (Insecta: Lepidoptera), and a male adult emerged, allowing the species identification.*

Key-Words: Morphology; Atlantic Forest; parasitoid.

INTRODUCTION

The Bombyliidae, known as bee flies, is one of the largest families of Diptera. These flies are found on all continents, except Antarctica. The biology of these insects is poorly known, except for the immature parasitoid or predator habits (Evenhuis & Greathead, 2015; Metcalf & Flint, 1984).

The species belonging to genus *Systropus* Wiedemann, 1820 (Toxophorinae, Systropodini) show a remarkable resemblance to certain vespoid and sphecoid wasps (Hull, 1973) and are reported as being parasitoids of Limacodidae larvae (Lepidoptera) (Adams & Yanega, 1991). Limacodidae is the only known host so far for *Systropus,* which suggests a specificity host-parasitoid relationship (Yeates & Greathead, 1997). The *Systropus* immature apparently develop as internal parasites of limacodid larvae, emerging from the host cocoons (Greathead, 1987).

Little is still known and there are few references in the literature about the immature stages of the subgenus *Systropus* Wiedemann, of the 161 known species (Evenhuis & Greathead, 2015) only four species have a description of a pupal case available: *Systropus (Systropus) barnardi* Hesse, 1938 and *S. (S.) crudelis* Westwood, 1876, *S. (S.) macer* Loew, 1863 and *S. (S.) nitidus* Wiedemann, 1830 (Westwood, 1876; Hesse, 1938; Brooks, 1952; Rodrigues & Lamas, 2009).

Systropus (Systropus) fumipennis Westwood, 1842 is restricted to Brazil (Paraná, Rio de Janeiro, Santa Catarina, and São Paulo) (Evenhuis & Greathead, 2015). This species was recorded parasitizing a Limacodidae moth's larva by Bezzi (1912), pointed later as *Miresa clarissa* (Stoll, 1790) (Lepidoptera, Limacodidae) by Costa Lima (1945) as *Systropus "jumipennis",* Gonçalves (1946) corroborated this ecological interaction.

[1.] Universidade Federal do Rio de Janeiro, Museu Nacional.
Quinta da Boa Vista, s/nº, São Cristóvão, CEP 20940-040, Rio de Janeiro, RJ, Brasil.
[2.] Fundação de Amparo à Pesquisa do Estado do Rio de Janeiro (FAPERJ), Programa de Apoio ao Pós-Doutorado (PAPD).
[3.] E-mail: leanbarbosa@gmail.com
[4.] E-mail: bproenca@mn.ufrj.br
[5.] E-mail: a_mcunha@yahoo.com.br
http://dx.doi.org/10.11606/0031-1049.2016.56.13

The main objective was to describe the pupal case of *Systropus (Systropus) fumipennis* Westwood, 1842, the second description of a pupal case belonging to a Brazilian Systropodini parasitizing a Limacodidae moth larvae.

MATERIAL AND METHODS

The survey was conducted in Parque Natural Municipal do Açude de Concórdia, located in Valença city (State of Rio Janeiro, Brazil) on February 2013. The cocoon was found on the stem surface of a non-identified plant, packed in plastic bag and tagged for transport. In the laboratory of Diptera of Museu Nacional/UFRJ the sample was dissected using a stereoscopic (LEICA), the pupal case found was removed and stored in a plastic pot and kept in a climate-controled environmental chamber with a temperature of 25°C by day, 24°C by night and humidity of 70% (± 10%). The emerged adult was sacrificed with ethyl acetate, pinned, identified, photographed and deposited, with the pupal case and cocoon, in the collection of Museu Nacional/UFRJ. The pupal case was also photographed and measured using the Syncroscopy® Auto-montage software.

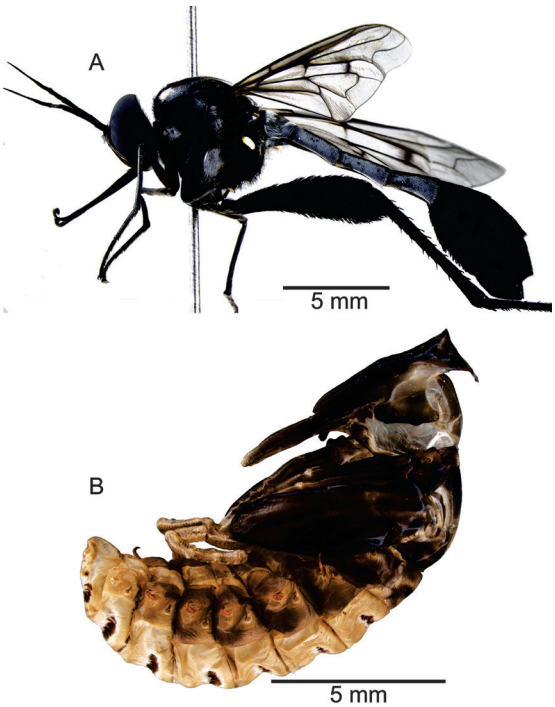

FIGURE 1: Adult male of *Systropus (Systropus) fumipennis* Westwood, 1842. **(A)** Habitus lateral of adult male, collected in Valença (Rio de Janeiro/Brazil): **(B)** Pupal case.

RESULTS

Systropus (Systropus) fumipennis Westwood, 1842 (Fig. 01A-B and 02 A-E)

Pupal case: (Fig. 01B; 02A and B) Total length: 17.52 mm. Head length: 2.8 mm. Thorax Length: 5.5 mm. Abdominal width: 4.43 mm, tapering to 1.03 mm at width of anal segment.

Coloration: Predominantly light brown.

Head: Without cephalic spines, tubercles or setae; small rounded process on base of antenna sheaths; rounded process on lateral sides of head in dorsal view (Fig. 02C); antenna sheaths dark brown almost reaching apex of labrum; proboscis long, reaching base of tergite II (Fig. 02 A, B).

Thorax: Dark-brown, with humpbacked shape; no setae or spines; prothoracic spiracles light brown, raised above surface and located posterior to the head; wing sheaths reaching the middle of tergite III (Fig. 02A).

Abdomen: Tergite I a little darker than other tergites, with a central longitudinal dark brown stripe formed by undeveloped chitinous rods; tergites II-VIII depressed medially, with central row of chitinous rods in the depression, light brown with dark brown tip; chitinous rods vary slightly in size with no uniform distribution; tergite VIII with the chitinous rods upturned at the apex; anal segment light brown, without spines, tubercles or setae. Pleura I-VI dark brown; pleura II-VII with curved brown spines with dark brown tip at center and small light brown spiracles placed on anterior margin of pleura; spines of pleura VII dark brown on apical half; pleura VIII with dark brown spiracles (Fig. 01B; Fig. 02E).

Host: Lepidoptera (Limacodidae).

Examined material: BRAZIL: Rio de Janeiro, Valença, Parque Natural Municipal do Açude da Concórdia (Toca da onça), 02.II.2013, Proença, B. col., puparium, male adult and cocoon deposited at Museu Nacional/UFRJ (MNRJ), Rio de Janeiro, Brazil.

DISCUSSION

The pupal case of *Systropus (Systropus) fumipennis* is similar to the pupal case of other four *Systropus (S.)* described pupal case: *S. (S.) barnardi* Hesse,

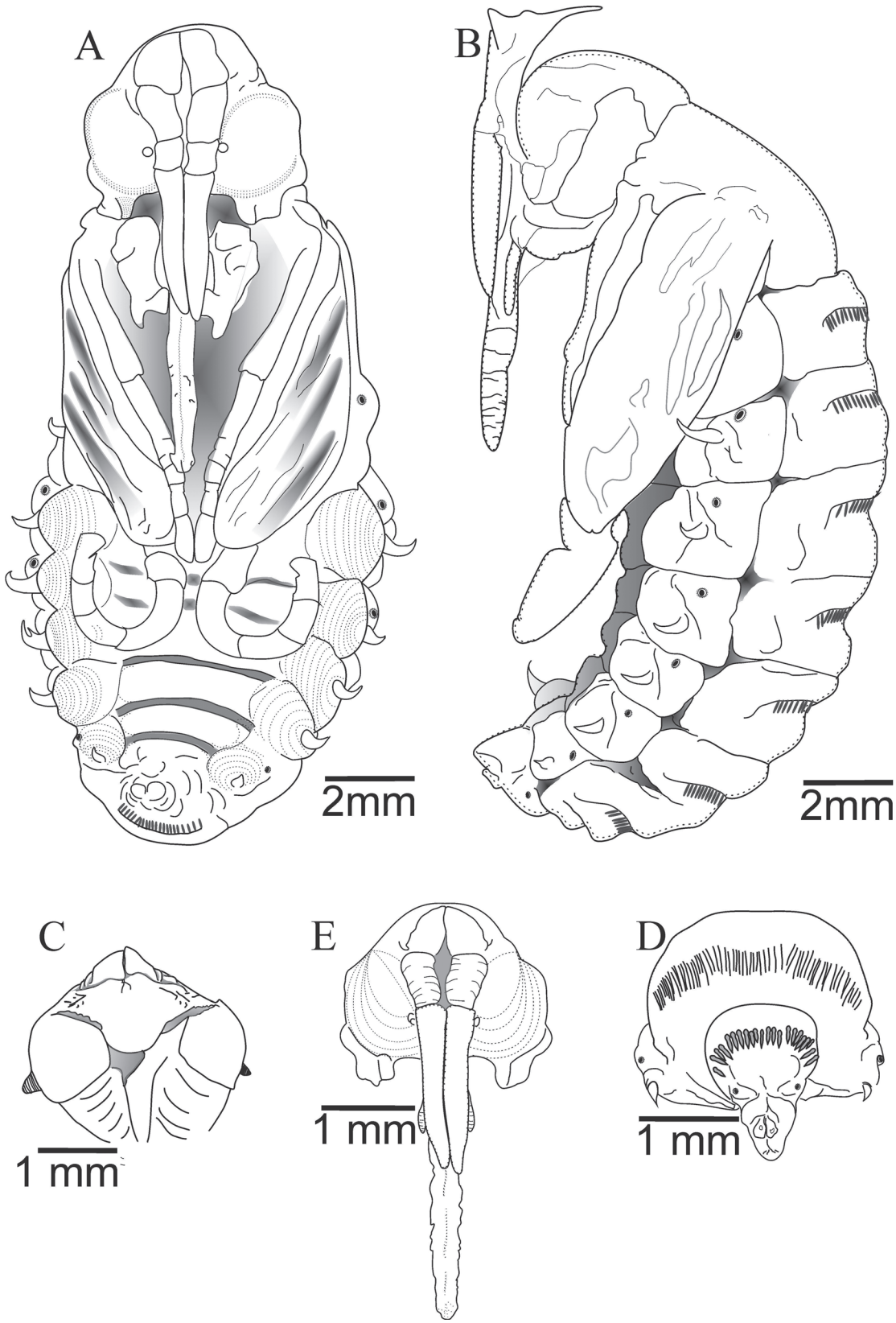

FIGURE 2: Pupal case of *Systropus (Systropus) fumipennis* Westwood, 1842 (Diptera: Bombyliidae): **(A)** Habitus ventral; **(B)** Habitus lateral; **(C)** Head dorsal view; **(D)** Head ventral view; **(E)** Abdominal segments 7-8 and anal segment, dorsal view.

1938; *S. (S.) macer* Loew, 1863; *S. (S.) crudelis* Westwood, 1876; and *S. (S.) nitidus* Wiedemann, 1830, except for the longer wing pad, labellum not reaching the fore leg end neither the wing apex coloration of the spines on pleura VII and for the absence of tubercles on the anal segment (Westwood, 1876; Hesse, 1938; Brooks, 1952; Rodrigues & Lamas, 2009). Other difference between *S. (S.) fumipennis* and *S. (S.) nitidus* is the process on lateral sides of head in dorsal view, in *S. (S.) fumipennis* is rouded and in *S. (S.) nitidus* is bilobed, furthermore *S. (S.) fumipennis* has chitinous rods in tergite I while these are absent in *S. (S.) nitidus.*

The pupal case of *Systropus (Systropus) fumipennis* is similar to *S. (S.) barnardi, S. (S.) macer* and *S. (S.) nitidus* by a reduced cephalic transverse ridge, for the strongly developed chitinous rods on tergites.

No traces of the host were found in the cocoon, but for the shape of the cocoon, especially for the circular shape of operculum, it was possible to determine that the host belongs to the family Limacodidae (Lepidoptera), already recorded as host for the genus by Bezzi (1912), Gonçalves (1946), Yeates & Greathead (1997) and Rodrigues & Lamas (2009).

CONCLUSION

The pupal case of *Systropus (Systropus) fumipennis* described in this work follows the pattern of the pupal case of *Systropus (Systropus) nitidus* Wiedemann, 1830 (Rodrigues & Lamas, 2009), except for the coloration of the spines on pleura VII and for the absence of tubercles on the anal segment.

RESUMO

O pupário de Systropus (Systropus) fumipennis *é descrito, ilustrado e fotografado pela primeira vez. A pupa foi encontrada dentro de uma crisálida, não identificada, típica de lepidópteros pertencentes à família Limacodidae (Insecta: Lepidoptera). Um macho adulto emergiu do pupário, permitindo a identificação do material em espécie.*

Palavras-Chave: Morfologia; Mata Atlântica; parasitóide.

ACKNOWLEDGMENT

The authors thanks to Elastre Lima, administrator of Parque Municipal do Açude da Concórdia, for the assistance in use of the park's facilities and Eduardo Barros for field work cooperation.

REFERENCES

Adams, J.K. & Yanega, D. 1991. The Lepidopteran host of a neotropical Bombyiid Fly (Lepidoptera: Limacodidae, Diptera: Bombyliidae). *Journal of the Kansas Entomological Society,* 64(4):443-444.

Bezzi, M. 1912. Dipteros do Brazil. Sobre três interessantes dipteros de S. Paulo. *Broteria (Serie Zoologia),* 10:76-84.

Brooks, A.R. 1952. Identification of Bombyliid parasites and hyperparasites of Phalaenidae of the prairie provinces of Canada, with descriptions of six other Bombyliida pupae (Diptera). *The Canadian Entomologist,* 84(12):357-373.

Costa Lima, A. da. 1945. *Insetos do Brasil. Lepidoptera.* Rio de Janeiro, Escola Nacional de Agronomia. v. 5, 379p. (Série didática: 4).

Evenhuis, N.L. & Greathead, D.J. 2015. *World catalog of bee flies (Diptera: Bombyliidae).* Leiden, Backhuys Publishing . (Revised September 2015. Available at: http://hbs.bishopmuseum.org/bombcat/bombcat-revised2015.pdf. Accessed in: 02/15/2016).

Gonçalves, C.R. 1946. Systropus fumipennis Westw. (Dipt. Bombyliidae) Parasita de Miresa clarissa (Stoll) (Lep. Eucleidae). *In:* São Paulo. Secretaria da Agricultura. *Livro de homenagem a R.F. d'Almeida.* São Paulo, Imprensa Oficial. p. 199-204.

Greathead, D.J. 1987. Bombyliidae. A summary of the recorded bombyliid parasitoids of south-east Asian Limacododidae. *In:* Cock, M.; Godfray, H.C.J.; Holloway, J.D. (Eds.). *Slug and nettle caterpillars: the biology, taxonomy and control of the Limacodidae of economic importance on palms in south-east Asia.* Wallingford UK., CAB International. 270p.

Hesse, A.J. 1938. A revision of the Bombyliidae (Diptera) of Southern Africa. *Annals of the South African Museum,* 34:1-1053.

Hull, F.M. 1973. Bee flies of the world. The genera of the family Bombyliidae. *Bulletin of the United States National Museum,* 286:3-687.

Metcalf, R.G. & Flint, W.P. 1984. *Insectos destructivos e insectos útiles.* México, D.F., CECSA.

Rodrigues, P.F.M. & Lamas, C.J.E. 2009. Description of the pupal case of Systropus (Systropus) nitidus Wiedemann, 1830 (Diptera, Bombyliidae, Toxophorinae, Systropodini). *Papéis Avulsos de Zoologia,* 49(29).

Westwood, J.O. 1876. Notae Dipterologicae. Monograph of the genus Systropus, with notes on the economy of a new species of that genus, nº 4. *Transactions of the Entomological Society of London,* 1876:571-79.

Yeates, D.K. & Greathead, D.J. 1997. The evolutionary pattern of host use in the Bombyliidae (Diptera): a diverse family of parasitoid flies. *Biological Journal of the Linnean Society,* 60:149-185.

Aceito por Carlos Lamas em: 05/10/2016
Publicado em: 24/10/2016