

Sexing the “drop-drop” beetle, *Psiloptera pertyi* (Coleoptera: Buprestidae)

Sexando el escarabajo “cai-cai”, *Psiloptera pertyi* (Coleoptera: Buprestidae)

RODOLFO MOLINARIO DE SOUZA¹, NORIVALDO DOS ANJOS², JANAÍNA DE NADAI³,
RODRIGO DINIZ SILVEIRA^{4*}, GLAUCIA CORDEIRO³

Abstract: The sexual description of adult *Psiloptera pertyi* was carried out through observations of their external morphological characteristics. Males have their first five abdominal sternites, as well as the seventh and eighth, strongly sclerotized. Females have a similar morphology except the eighth abdominal sternite is not sclerotized. Males have a prominent apex on the seventh sternite, while females have a deep incision in the apical margin of the same segment. Males also have a triangular incision in the extreme posterior margin of the fifth sternite; in females, this segment is rounded. The number and form of the abdominal sternites should be taken into account for sexing adults of *P. pertyi*.

Key words: Sexual dimorphism. Eucalyptus pest.

Resumen: La descripción sexual de los adultos de *Psiloptera pertyi* se realizó a través de observación de sus características morfológicas externas. Los machos presentan los cinco primeros esternitos abdominales, así como el séptimo y octavo, fuertemente esclerotizados. Las hembras presentan morfología semejante, excepto por el octavo esternito abdominal que no es esclerotizado. Los machos tienen una fuerte proyección en el séptimo esternito, mientras que las hembras tienen una profunda incisión en el margen posterior del mismo segmento. Los machos también presentan una incisión triangular en el extremo posterior del margen del quinto esternito; en las hembras, este segmento es redondeado. El número y la forma de los esternitos abdominales deben ser considerados para sexar los adultos de *P. pertyi*.

Palabras clave: Dimorfismo sexual. Plaga del eucalipto.

Introduction

Many problems have arisen with eucalyptus plantations, as has happened with other monocultures, and pest outbreaks are included among these problems. Some papers have reported on the occurrence of *Psiloptera* spp. attacking young plantations of eucalyptus in Brazil (Berti Filho 1981; Anjos and Majer 2003; Vellozo *et al.* 1953; Zanuncio *et al.* 1986; Ribeiro *et al.* 2001). Adults of these insects are tree defoliators that destroy the lateral branches and main shoot, stopping apical growth and reducing wood production (Anjos and Majer 2003). Since the knowledge on life history is one of the basic premises to a successful control of insect pests, sexual differentiation is basic to understand their reproductive habits (Weber 1976; Lima 2001). The purpose of this paper is to report on the morphological characters that allow sexing in *Psiloptera pertyi* (Laporte & Gory, 1836), without dissection.

Materials and Methods

Adults of *P. pertyi* were collected from Grão Mogol region, northeast of Minas Gerais State, in November 2003, were stored in plastic containers filled with 70% ethanol. Sexual identity was previously obtained through dissections to ascertain the presence of an aedeagus. Then the external morphology of determined males and females was studied. Morphological details were examined through stereoscopic 40X microscope.

We looked for characters that were useful to differentiate each sex, such as the shape of urosternites and elytra (Macrae 2003; De Nadai *et al.* 2005), sclerite colors (Rejzek 2007; Piper *et al.* 2005) and body measurements (Nelson 1994; De Nadai *et al.* 2005). Body length is the distance between the anterior margin of the head and the apex of elytra. The body width is the longest distance between lateral margins of body (Anjos 1992). Evaluation of morphological characters was carried out on 50 males and 50 females. Morphological measurements were then compared by one-way ANOVA.

Results

We note eleven abdominal segments for both males and females. The 1st to 5th uromeres are distinguishable, but others are retracted inside the fifth. After relaxing the specimens and lifting the apical opening of the 5th abdominal sternite, we located both the 7th and 8th uromeres in males, but only the 7th in females.

In *P. pertyi* males, we found a sharp projection just in the central apex of the 7th abdominal sternite (Fig. 1A). In contrast, females possess a deep notch in the same position (Fig. 1B). Additionally, we found a notch in the posterior border of 5th abdominal sternite for males; females have a rounded margin in the equivalent sternite. No consistent color differences were detected between males and females of *P. pertyi*. Females have body dimensions statistically larger than males (length: F =

¹ Ms. Produção Vegetal, Departamento de Biologia Animal, Universidade Federal de Viçosa, Viçosa, MG, Brasil. 36571-000. molinariodesouza@yahoo.com.br

² Dr. Entomologia, Departamento de Biologia Animal, Universidade Federal de Viçosa, Viçosa, MG, Brasil. 36571-000. nanjos@ufv.br

³ Ms. Entomologia, Departamento de Biologia Animal, Universidade Federal de Viçosa, Viçosa, MG, Brasil. 36571-000. janadenadai@insecta.ufv.br; glacordeiro@hotmail.com

^{4*} Autor para correspondência. Dr. Entomologia, Departamento de Zootecnia, Universidade Federal dos Vales do Jequitinhonha e Mucuri, Diamantina, MG, Brasil. 39100-000. silveirard@insecta.ufv.br

63,68; d. f. = 1; $P < 0,01$ and width: $F = 22,53$; d. f. = 1; $P < 0,01$) (Table 1) but ranges are overlapping. So, adults can not be differentiated through length or width measurements.

Discussion

According to Hastir and Gaspar (2002), sexual dimorphism in buprestids varies in different species, but most variations occur in margin shape of the last sternite abdominal. In some cases, as in *Lampetis* spp (De Nadai *et al.* 2005), this is applicable, but *Acmaeodera lupinae* Nelson, 1996 females have 5th urosternite more elongated than in the male (Nelson 1996). According to Gigli (2007), body color may be used to differentiate sex in some buprestids. Females in *Anthaxia nitidula* (L., 1758) species have the head color different from body color, but males are uniformly colored along their body (Rejzek 2007). In contrast, females in *Agrilus hyperici* (Creutzer, 1799) species are uniformly colored while male beetles have their head color different from the rest of the body (Piper *et al.* 2005).

In insects, the females are usually larger than the males (Snodgrass 1993), but overlapping intervals for body dimensions were found by Nelson (1996) in *Acmaeodera vanduzeei* VanDyke, 1934; *A. ephedrae* Barr, 1942; *A. constricticollis* Knull, 1937 and *A. barri* Cazier, 1940 and by De Nadai *et al.* (2005) in *Lampetis nigerrima* (Kerremans, 1897), *L. instabilis* (Castelnau & Gory, 1836), and *L. roseocarinata* Thomson, 1878 (De Nadai *et al.* 2005). So, *P. pertyi* adults have similar dimensions. Finally, we conclude that adults of *P. pertyi* have morphological differentiations in the abdomen. Sexing adults in Buprestidae species should be done by checking the shape of the 7th abdominal sternite, only

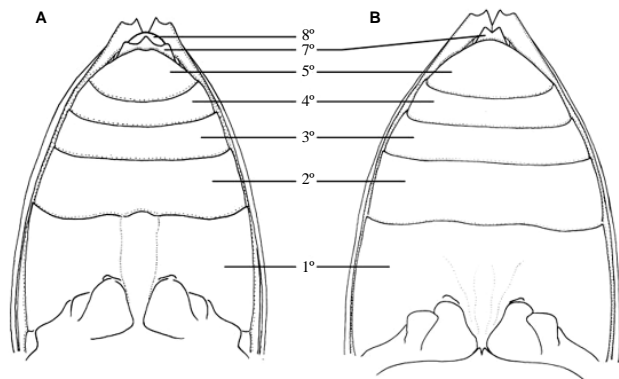


Figure 1. Abdominal morphology in *Psiloptera pertyi* (Laporte & Gory) male (A) and female (B).

Table 1. Body size (mm) for *Psiloptera pertyi* (Laporte & Gory) males (n = 50) and females (n = 50). Specimens from Grão Mogol, Minas Gerais, 2003.

Adults	Length (Mean and interval)	Wide (Mean and interval)
Female	30,6 a (23,0 - 34,0)	11,8 a (9,0 - 13,0)
Male	27,1 b (22,0 - 29,0)	10,9 b (8,0 - 12,0)

¹ Means followed by the same letter, in the same column, do not differ between them ($P < 0,01$).

after 5th abdominal sternite is opened for careful internal examination.

Acknowledgments

This work would not be possible without the financial support from CAPES. We are grateful to both of these institutions.

Literature Cited

- ANJOS, N. 1992. Taxonomia, ciclo de vida e dinâmica populacional de *Costalimaita ferruginea* (Fabr., 1801) (Coleoptera: Chrysomelidae), praga de *Eucalyptus* spp. (Myrtaceae). Tesis de Doctorado en Entomologia. Escola Superior de Agricultura "Luiz de Queiroz", Universidade de São Paulo, Piracicaba. 165 p.
- ANJOS, N.; MAJER, J. D. 2003. Leaf-eating beetles in Brazilian eucalypt plantations. *School of Environmental Biology* 23 (1): 10-11.
- BERTI FILHO, E. 1981. Insetos associados a plantações de espécies do gênero *Eucalyptus* nos Estados da Bahia, Espírito Santo, Mato Grosso do Sul, Minas Gerais e São Paulo. Escola Superior de Agricultura "Luiz de Queiroz", Universidade de São Paulo, Piracicaba. 176 p.
- DE NADAI, J.; ANJOS, N.; SOUZA, R. M.; SILVEIRA, R. D. 2005. Dimorfismo sexual em *Lampetis* spp. (Coleoptera: Buprestidae). *Acta Biológica Leopoldensia* 27 (1): 43-46.
- GIGLI, M. 2007. Sexual Dimorphism. <http://utenti.romascuola.net/bups/dimorph.htm>. [Last access: 16 January 2007].
- HASTIR, P.; GASPAR, C. 2002. Les <<richards>> (Coleoptera: Buprestidae) de la faune de Belgique: éthologie, phénologie, classification et systematique. *Notes fauniques de Gembloux* 47 (2): 3-40.
- LIMA, E. R. 2001. Feromônio sexual do bicho-mineiro do café, *Leucoptera coffella*: avaliação para uso em programas de manejo integrado. Universidade Federal de Viçosa, Viçosa. 82 p.
- MACRAE, T. C. 2003. *Agrilus* (s. str.) *betulanigrae* Macrae (Coleoptera: Buprestidae: Agrilini), a new species from North America, with comments on subgeneric placement and a key to the otiosus species-group in North America. *Zootaxa* 380 (1): 1-9.
- NELSON, G. H. 1994. Six new species of *Acmaeodera* Eschscholtz from México (Coleoptera: Buprestidae). *The Coleopterists Bulletin* 48 (3): 272-282.
- NELSON, G. H. 1996. A new genus, *Squamodera* Nelson, for the vanduzeei group of *Acmaeodera* Eschscholtz from Western North America (Coleoptera: Buprestidae). *The Coleopterists Bulletin* 50 (2): 167-175.
- PIPER, G. L.; VILLEGAS, B.; STORY, J. 2005. *Agrilus hyperici* (Creutzer) - "Klamath Weed Root Borer". http://www.wes.army.mil/el/pmis/biocontrol/html/agrilus_html [Last access: 14 august 2005].
- REJZEK, R. 2007. *Anthaxia* (s. str.) *nitidula nitidula* (Linné, 1758). <http://volny.cz/midge/buprang/antnit.htm> [Last access: 15 january 2007].
- RIBEIRO, G. T.; ZANUNCIO, J. C.; SOSSAI, F. M.; ZANUNCIO, J. S. 2001. O besouro Buprestidae em reflorestamento. *Folha Florestal* 99: 19-20.
- SNODGRASS, R. E. 1993. Principles of insect morphology. McGraw-Hill Book Co., New York. 667 p.
- VELLOZO, L. G. C.; NOWACKI, M. J.; VERNALHA, M. M. 1953. Contribuição ao levantamento fitossanitário do Estado do Paraná. *Arquivos de Biologia e Tecnologia* 8 (1): 349-378.
- WEBER, R. G. 1976. Sexing the elm leaf beetle, *Pyrrhalta luteola* (Coleoptera: Chrysomelidae). *Annals of the Entomological Society of America* 69 (1): 217-218.
- ZANUNCIO, J. C.; MOURA, J. I. L.; OLIVEIRA, A. C.; ANJOS, N.; SANTOS, G. P. 1986. Coleópteros associados a *Eucalyptus* spp. em Minas Gerais. In: Congresso Brasileiro de Entomologia, 10, 1986, Rio de Janeiro. Resumos. Rio de Janeiro: S.E.B., p. 339.