

First record of *Tachinaephagus zealandicus* Ashmead, 1904 (Hymenoptera: Encyrtidae) parasitizing the blowfly *Sarconesia chlorogaster* (Wiedemann, 1830) (Diptera: Calliphoridae) in Brazil

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(With 1 figure)

The blowfly *Sarconesia chlorogaster* (Wiedemann, 1830) (Diptera: Calliphoridae) (Figure 1a) is endemic in South America and occurs in colder regions with more temperate climates. It has been recorded in: Argentina, Uruguay, Bolivia, Chile, Peru and the Southern region of Brazil (Dear, 1979). Due to the necrophagous habits of their larvae, *S. chlorogaster* is commonly recorded feeding on carcasses (e.g. Moura et al., 1997) and human bodies (Vairo et al., 2015). Thus, this species can help estimate the time elapsed between death and the discovery of a body, defined as postmortem interval (PMI).

Tachinaephagus zealandicus Ashmead, 1904 (Hymenoptera: Encyrtidae) is a gregarious endoparasitoid wasp that attacks the third instar of the maggots, the post feeding larvae, or the prepupae of synanthropic flies (Calliphoridae, Muscidae, Sarcophagidae) (Olton and Legner, 1974). This species, probably native to Australia and New Zealand, has been introduced into various parts of the world since the late 1960s and early 1970s (Legner and Olton, 1968) in attempts to control pest species of synanthropic Diptera. It is currently established in areas of Africa (Prinsloo, 1979), Europe (e.g. Frederickx et al., 2013), North America (e.g. Legner and Olton, 1968) and

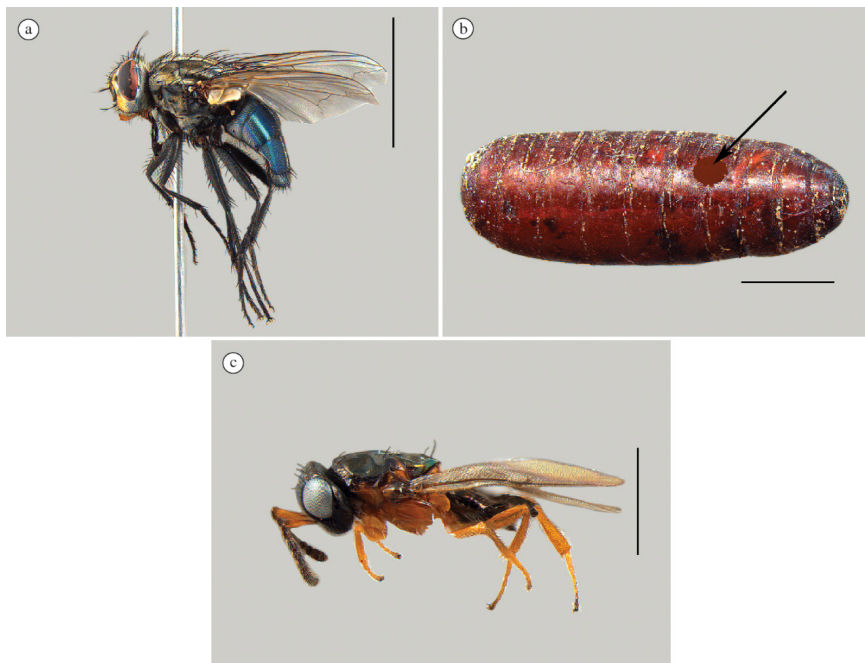


Figure 1. (a). *Sarconesia chlorogaster* (Wiedemann), female, lateral view, scale bar = 5mm; (b). Pupae of *S. chlorogaster* parasitized by *Tachinaephagus zealandicus*. Black arrow indicates parasitoid emergence hole, scale bar = 2mm; (c). *T. zealandicus* Ashmead, female, lateral view, scale bar = 1mm.

South America. In Brazil, *T. zealandicus* was reported in the states of São Paulo, Minas Gerais and Rio de Janeiro parasitizing flies of the families Muscidae (e.g. Silveira et al., 1989), Sarcophagidae (Carvalho et al., 1995) and Calliphoridae. The parasitoid has been recorded attacking the following calliphorid species: *Cochliomyia hominivorax* (Coquerel, 1858) (Silveira et al., 1989), *Chrysomya putoria* (Wiedemann, 1830) (Almeida et al., 2002) and *Chrysomya megacephala* (Fabricius, 1794) (e.g. Carvalho et al., 2003).

Here we present the first record for *T. zealandicus* parasitizing *S. chlorogaster* and the genus *Sarconesia* and the first record of its occurrence in Paraná State.

In 2012, during a study involving colonies maintained in field conditions of *S. chlorogaster* in Curitiba (25°25'S; 49°14'W), Paraná State, Brazil, we noticed the presence of many parasitoids emerging from the puparium (Figure 1b) of this species. After that, in the next generation, all pupae were individualized in test tubes to confirm the occurrence of parasitoids. We observed that about 3% of pupae were parasitized and the average of parasitoids emergence were 30 individuals per pupae. Parasitoids were identified as *T. zealandicus* (Figure 1c) using Subba Rao (1978) key to species. Parasitism occurred in more than one generation while the colony was maintained under field conditions.

These new records presented here are valuable due to the possibility of using *S. chlorogaster* in PMI estimates based on insects, since the presence of parasitoids can either help or hinder these estimates (Holdaway and Evans, 1930; Amendt et al., 2000; Turchetto and Vanin, 2004). Thus, more studies are needed to evaluate the effect of this parasitoid on development of *S. chlorogaster* and its possible implications for PMI estimations.

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References

ALMEIDA, MAF., PRADO, AP. and GEDEN, CJ., 2002. Influence of temperature on development time and longevity of *Tachinaephagus zealandicus* (Hymenoptera: Encyrtidae), and effects of nutrition and emergence order on longevity. *Environmental Entomology*, vol. 31, no. 2, p. 375-380. <http://dx.doi.org/10.1603/0046-225X-31.2.375>.

AMENDT, J., KRETTEK, R., NIESS, C., ZEHNER, R. and BRATZKE, H., 2000. Forensic entomology in Germany. *Forensic Science International*, vol. 113, no. 1-3, p. 309-314. [http://dx.doi.org/10.1016/S0379-0738\(00\)00239-5](http://dx.doi.org/10.1016/S0379-0738(00)00239-5). PMID:10978642

CARVALHO, LML., LINHARES, AX. and FERREIRA DE ALMEIDA, MA., 1995. Ocorrência de microhimenópteros parasitoides associados às pupas de Sarcophagidae e Calliphoridae criadas na carcaça animal numa reserva natural de Campinas,

SP. In *Anais do XV Congresso de Entomologia*, 1995. Caxambu. Lavras: Editora UFLA. p. 590.

CARVALHO, AR., MELLO, RP. and D'ALMEIDA, JM., 2003. Microhimenópteros parasitoides de *Chrysomya megacephala*. *Revista de Saude Publica*, vol. 37, no. 6, p. 810-812. <http://dx.doi.org/10.1590/S0034-89102003000600019>. PMID:14666314

DEAR, JP., 1979. A revision of the Toxotarsinae (Diptera, Calliphoridae). *Papéis Avulsos de Zoologia*, vol. 32, no. 13, p. 145-182.

FREDERICKX, C., DEKEIRSSCHIETER, J., VERHEGGEN, FJ. and HAUBRUGE, E., 2013. The community of Hymenoptera parasitizing necrophagous Diptera in an urban biotope. *Journal of Insect Science (Online)*, vol. 13, no. 32, p. 1-14. <http://dx.doi.org/10.1673/031.013.3201>. PMID:23895458

HOLDAWAY, FG. and EVANS, AC., 1930. Parasitism a stimulus to pupation: *Alysia manducator* in relation to the host *Lucilia sericata*. *Nature*, vol. 125, no. 3155, p. 598-599. <http://dx.doi.org/10.1038/125598a0>.

LEGNER, EF. and OLTON, GS., 1968. Activity of parasites from diptera: *Musca domestica*, *Stomoxys calcitrans*, and species of *Fannia*, *Muscina*, and *Ophyra*. II. At sites in the Eastern Hemisphere and Pacific area. *Annals of the Entomological Society of America*, vol. 61, no. 5, p. 1306-1314. <http://dx.doi.org/10.1093/aesa/61.5.1306>. PMID:5758059

MOURA, MO., CARVALHO, CJ. and MONTEIRO-FILHO, ELA., 1997. A preliminary analysis of insects of medico-legal importance in Curitiba, State of Paraná. *Memorias do Instituto Oswaldo Cruz*, vol. 92, no. 2, p. 269-274. <http://dx.doi.org/10.1590/S0074-02761997000200023>. PMID:9332590

OLTON, GS. and LEGNER, EF., 1974. Biology of *Tachinaephagus zealandicus* (Hymenoptera: Encyrtidae), parasitoid of synanthropic Diptera. *Canadian Entomologist*, vol. 106, no. 8, p. 785-800. <http://dx.doi.org/10.4039/Ent106785-8>.

PRINSLOO, GL., 1979. On some little-known african Encyrtidae (Hymenoptera: Chalcidoidea), with new records and descriptions of genera and species. *Journal of the Entomological Society of South Africa*, vol. 42, no. 1, p. 17-34.

SILVEIRA, GAR., MADEIRA, NG., AZEREDO-ESPIN, AML. and PAVAN, C., 1989. Levantamento de microhimenópteros parasitoides de dípteros de importância médico-veterinária no Brasil. *Memorias do Instituto Oswaldo Cruz*, vol. 84, no. 4, p. 505-510. <http://dx.doi.org/10.1590/S0074-02761989000800089>.

SUBBARAO, BR., 1978. A revision of *Tachinaephagus* Ashmead (Hymenoptera: Encyrtidae) with descriptions of four new species. *Bulletin of Entomological Research*, vol. 68, no. 01, p. 65-73. <http://dx.doi.org/10.1017/S000748530000715X>.

TURCHETTO, M. and VANIN, S., 2004. Forensic evaluations on a crime case with monospecific necrophagous fly population infected by two parasitoid species. *Anil Aggrawals Internet Journal of Forensic Medicine and Toxicology*, vol. 5, no. 1, p. 12-18.

VAIRO, KP., CORRÊA, RC., LECHETA, MC., CANEPARO, MF., MISE, KM., PRETI, D., CARVALHO, CJ., ALMEIDA, LM. and MOURA, MO., 2015. Forensic use of a subtropical blowfly: the first case indicating minimum postmortem interval (mPMI) in southern Brazil and first record of *Sarconesia chlorogaster* from a human corpse. *Journal of Forensic Sciences*, vol. 60, supplement 1, p. S257-S260. <http://dx.doi.org/10.1111/1556-4029.12596>. PMID:25425207