

Chetogena scutellaris (Diptera: Tachinidae), an Endoparasite of Larval *Strymon acis bartrami* (Lycaenidae)

Authors: Salvato, Mark H., Salvato, Holly L., and Stireman, John O.

Source: The Journal of the Lepidopterists' Society, 66(2) : 113-114

Published By: The Lepidopterists' Society

URL: <https://doi.org/10.18473/lepi.v66i2.a5>

BioOne Complete (complete.BioOne.org) is a full-text database of 200 subscribed and open-access titles in the biological, ecological, and environmental sciences published by nonprofit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Complete website, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/terms-of-use.

Usage of BioOne Complete content is strictly limited to personal, educational, and non - commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

BioOne sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.

CHETOGENA SCUTELLARIS (DIPTERA: TACHINIDAE), AN ENDOPARASITE OF
LARVAL *STRYMON ACIS BARTRAMI* (LYCAENIDAE)**Additional key words:** parasitoid, population regulation, threatened species

The Bartram's hairstreak, *Strymon acis bartrami* (Comstock & Huntington) (Lycaenidae), occurs locally within the pine rocklands of southern Florida and the lower Florida Keys (Minno & Emmel 1993; Smith et al. 1994), where it is endemic. Due in large part to habitat loss, *S. a. bartrami* populations have declined considerably during the last several decades (Salvato & Salvato 2010). In response to this, *S. a. bartrami* was listed as candidate species for federal protection in 2006. Hennessey and Habeck (1991) and Worth et al. (1996) described many aspects of *S. a. bartrami* natural history. Salvato and Hennessey (2004) and Salvato and Salvato (2008, 2010) also discussed *S. a. bartrami* ecology and provided a review of known parasites and predators for the species. Although larval parasites have been recorded for other lycaenids throughout the New World (Arnaud 1978; Stireman & Singer 2003a, 2003b), little has been reported for *S. a. bartrami*. To our knowledge, the only observation of *S. a. bartrami* larval parasitism was provided by Hennessey and Habeck (1991) who collected a single unspecified braconid wasp from a late instar larva on Big Pine Key, Florida. Tracking the fate of late instar *S. a. bartrami* larvae is difficult due to the fact that this species tends to pupate in ground litter (Worth et al. 1996; Salvato & Hennessey 2004).

On 11 December 2010 MHS and HLS observed eggs ($n = 2$) of a parasitoid fly (Diptera: Tachinidae) attached to the cuticle of a late instar *S. a. bartrami* larva (Fig. 1) in the Long Pine Key region of the Everglades National Park (Miami-Dade County, Florida). The *S. a. bartrami* larva was encountered on pineland croton, *Croton linearis* Jacq. (Euphorbiaceae), the only known host plant for the species. After photographing the observation in the field, the parasitized larva was subsequently collected. Within approximately 72 h of the initial observation the white egg casings dropped off the larva, exposing dark spots (necrosis) on the cuticle.

The *S. a. bartrami* larva was maintained in a screen mesh cage and provided fresh food plants. MHS and HLS have successfully reared numerous *S. a. bartrami* larvae under these conditions over 15 years of research on this species. However this *S. a. bartrami* larva, which behaved lethargically in the field and laboratory, fed only minimally until 15 December 2010, when it became moribund while attempting to pupate. Five

days later on 20 December 2010 a tachinid larva emerged from the *S. a. bartrami* larva. The tachinid larva was placed in a small plastic cup containing a layer of soil in which it quickly pupated. An adult fly emerged on 6 January 2011.

The adult fly (Fig. 2) was pinned and sent to JOS who examined and identified it as a female *Chetogena scutellaris* (Wulp). Often, a male *Chetogena* specimen is required to determine the particular species, as females in this genus can be nearly indistinguishable (Parchami-



FIG. 1. A late-instar *Strymon acis bartrami* larva with eggs of *Chetogena scutellaris* attached to its cuticle on 11 December 2010 in Long Pine Key, Everglades National Park (Miami-Dade County, Florida) (Photo Credit: H. L. Salvato).



FIG. 2. A female *Chetogena scutellaris* reared from a moribund late-instar *Strymon acis bartrami* larva (Photo Credit: H. L. Salvato).

Araghi 2008). However, this individual possessed several characteristics typical of female *C. scutellaris*, including yellow-golden parafrontals, a “trident” pattern of pruinescence on the abdominal tergites, and the apex of tergite 5 reddish (Aldrich & Webber 1924).

Chetogena scutellaris is a generalist endoparasite that preys on a variety of insect groups, including several families of Lepidoptera (Arnaud 1978; Sourakov & Mitchell 2002; Stireman & Singer 2003a, 2003b; Janzen & Hallwachs 2009) in Florida, Arizona and throughout the Americas. However, *Chetogena* has not previously been reported to parasitize lycaenids, despite a wide diversity of host records. *Chetogena scutellaris* has been consistently documented in Long Pine Key as a parasitoid of *Anaea troglodyta floralis* F. Johnson & Comstock (Nymphalidae) (Salvato et al. 2009). *Strymon acis bartrami* and *A. t. floralis* both use the host-plant *C. linearis* exclusively, with their larvae occasionally encountered feeding on the same individual plant (Salvato & Salvato 2008). As a result, it is possible that there may be some spillover of *Chetogena* parasitism from *A. t. floralis* to *S. a. bartrami*. Additional studies may help to better determine the influence of *Chetogena* parasitism on *S. a. bartrami* larval ecology.

ACKNOWLEDGEMENTS

The authors thank the staff of Everglades National Park, particularly Jimi Sadle, P. J. Walker and Nancy Russell, for permitting and technical assistance.

LITERATURE CITED

- ALDRICH, J. M. & R. T. WEBBER. 1924. The North American species of parasitic two-winged flies belonging to the genus *Phorocera* and related genera. Proc. U.S. Natl. Mus. 63: 1-90.
- ARNAUD, P. H., JR. 1978. A host-parasite catalog of North American Tachinidae (Diptera). USDA misc. publication no. 1319. USDA, Washington, D.C.
- HENNESSEY, M. K. & D. H. HABECK. 1991. Effects of mosquito adulticides on populations of non-target terrestrial arthropods in the Florida Keys. U. S. Fish and Wildlife Service and the Univ. of Florida Cooperative Wildlife Research Unit (Unpublished Final Report). Gainesville, Florida. 76 pp.
- JANZEN, D. H. & W. HALLWACHS. 2009. Dynamic database for an inventory of the macrocaterpillar fauna, and its food plants and parasitoids, of Area de Conservacion Guanacaste (ACG), northwestern Costa Rica (m-SRNP-nnnnn voucher codes) <<http://janzen.sas.upenn.edu>>.
- MINNO, M. C. & T. C. EMMEL. 1993. Butterflies of the Florida Keys. Scientific Publishers, Gainesville, Florida. 168 pp.
- PARCHAMI-ARAGHI, M. 2008. Identity of the previously unrecognized *Chetogena flaviceps* and its synonymy with *C. scutellaris* (Diptera: Tachinidae). J. Ent. Soc. Iran. 28:61-66.
- SALVATO, M. H. & M. K. HENNESSEY. 2004. Notes on the status, natural history and fire-related ecology of *Strymon acis bartrami* (Lycaenidae). J. Lepid. Soc. 58: 223-227.
- SALVATO, M. H. & H. L. SALVATO. 2008. Notes on the feeding ecology of *Strymon acis bartrami* and *Anaea troglodyta floralis*. Fla. Scient. 71: 323-329.
- . 2010. Notes on the status and ecology of *Strymon acis bartrami* (Lycaenidae) in Everglades National Park. J. Lepid. Soc. 64: 154-160.
- SALVATO, M. H., H. L. SALVATO, & M. K. HENNESSEY. 2009. *Chetogena scutellaris* (Diptera: Tachinidae) an endoparasite of larval *Anaea troglodyta floralis* (Nymphalidae). News. Lepid. Soc. 51: 85,101,106.
- SMITH, D. S., L. D. MILLER & J. Y. MILLER. 1994. The Butterflies of the West Indies and South Florida. Oxford University Press, New York. 264 pp. 32 pl.
- SOUROKOV, A. & E. R. MITCHELL. 2002. Laboratory biology of *Chetogena scutellaris* (Diptera: Tachinidae), a parasitoid of Noctuidae reared on fall armyworm and cabbage looper. Fla. Ent. 85:341-342.
- STIREMAN, J. O., III & M. S. SINGER. 2003a. Determinants of parasitoid-host associations: insights from a natural tachinid-lepidopteran community. Ecology 84: 296-310.
- . 2003b. What determines host range in parasitoids? An analysis of tachinid parasitoid community. Oecologia. 135:629-638.
- WORTH, R. A., K. A. SCHWARZ & T. C. EMMEL. 1996. Notes on the biology of *Strymon acis bartrami* and *Anaea troglodyta floralis* in south Florida. Holarctic Lepid. 3:52-65.

MARK H. SALVATO & HOLLY L. SALVATO, 1765 17th Ave SW, Vero Beach, FL 32962, anaea_99@yahoo.com, and JOHN O. STIREMAN III, Dept. of Biological Sciences, Wright State University, Dayton, Ohio, 45435, john.stireman@wright.edu.

Received for publication 19 January 2011, revised and accepted 21 December 2011

