



**PRESENCE OF DIACHASMIMORPHA LONGICAUDATA  
(HYMENOPTERA: BRACONIDAE) IN A GUILD OF  
PARASITIDS ATTACKING ANASTREPHA  
FRATERCULUS (DIPTERA: TEPHRITIDAE) IN  
NORTHWESTERN ARGENTINA**

Authors: Oroño, Luis E., and Ovruski, Sergio M.

Source: Florida Entomologist, 90(2) : 410-412

Published By: Florida Entomological Society

URL: [https://doi.org/10.1653/0015-4040\(2007\)90\[410:PODLHB\]2.0.CO;2](https://doi.org/10.1653/0015-4040(2007)90[410:PODLHB]2.0.CO;2)

---

BioOne Complete ([complete.BioOne.org](https://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](https://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.

PRESENCE OF *DIACHASMIMORPHA LONGICAUDATA*  
(HYMENOPTERA: BRACONIDAE) IN A GUILD OF PARASITOIDS  
ATTACKING *ANASTREPHA FRATERCULUS* (DIPTERA: TEPHRITIDAE)  
IN NORTHWESTERN ARGENTINA

LUIS E. OROÑO AND SERGIO M. OVRUSKI

PROIMI-Biotecnología, División Control Biológico de Plagas, Av. Belgrano y Pje. Caseros  
T4001MVB San Miguel de Tucumán, Tucumán, Argentina

The braconid *Diachasmimorpha longicaudata* (Ashmead) is a fruit fly parasitoid native to the Indo-Pacific region, which has been widely disseminated into America via Hawaii (Ovruski et al. 2000). It was used in augmentative release programs against *Anastrepha suspensa* (Loew) in the United States of America (Florida state) (Sivinski et al. 1996), against *Anastrepha ludens* (Loew) and *Anastrepha obliqua* (Macquart) in Mexico (Montoya et al. 2000), and against *Anastrepha fraterculus* (Wiedemann) and *Ceratitidis capitata* (Wiedemann) in Brazil (Carvalho 2005). In Mexico, this exotic parasitoid is currently a common parasitoid species of *Anastrepha* larvae, particularly in exotic commercial fruit in the state of Veracruz (Sivinski et al. 2000; Sivinski et al. 2001), and it is also being mass-reared on *A. ludens* larvae in the state of Chiapas (Cancino et al. 2002; Montoya & Cancino 2004). During 1961, *D. longicaudata* and the eulophid *Aceratoneuromyia indica* (Silvestri) were introduced into Argentina from Mexico and released in limited numbers in citrus-growing areas of the northwestern provinces of Jujuy, Salta, and Tucumán, and of the northeastern provinces of Misiones and Entre Ríos (Ovruski et al. 1999). Although *D. longicaudata* was recovered immediately after release in Jujuy and Tucumán (Turica 1968), up to this time, there was no evidence of permanent establishment of this parasitoid species in any release sites of the northwestern Argentinean region. However, that *D. longicaudata* is permanently established on *A. fraterculus* has been documented in the northeastern province of Misiones (Schliserman et al. 2003). Similarly, the exotic *A. indica* was recently recorded on *A. fraterculus* in both Misiones and Jujuy provinces (Ovruski et al. 2006). Recent fruit fly parasitoid surveys made in Salta province (El Oculito locality) included specimens of *D. longicaudata*. Thus, *D. longicaudata* was recovered 40 years after its first release in the northwestern Argentinean region.

Between Nov and Dec 2001, 103 (= 4.3 kg, individual weight  $37.5 \pm 5.3$  g) peaches (*Prunus persica* (L.) Batsch, Rosaceae) were collected in patches of disturbed wild vegetation with high diversity of exotic fruits in the locality of "El Oculito" (23°06'S, 64°24'W, 530 m above sea level). The collecting area is located in the northern-most extension of the Argentinean subtropical mountain

rainforest (locally known as "Las Yungas forest") (Cabrera 1976). Climate is defined as temperate-hot humid with a summer rainy season (Dec through Mar), winter dry season, and annual rainfall varies from 259 to 1,947 mm. The temperature of the warmest month is  $>22^{\circ}\text{C}$  with a mean annual temperature of  $18^{\circ}\text{C}$ .

The fruit samples consisted of fallen ripe fruit (80%) and ripe fruit still on the tree (20%). In the laboratory, all fruits in the sample were weighed and rinsed with a 20% solution of sodium benzoate, and each fruit was placed in a plastic glass (250 cm<sup>3</sup>) with damp sand in the bottom as a pupation substrate for fly larvae. Pupae were removed weekly and the *A. fraterculus* and *C. capitata* pupae were separated by external pupal characters (White & Elson-Harris 1992). Then, pupae were placed in plastic vials containing sterilized humid sand until either a fruit fly or a parasitoid emerged. Fruit fly species were identified by L. Oroño based upon Zucchi's (2000) taxonomic key. Parasitoid specimens were identified to species by S. Ovruski with the keys from Wharton & Marsh (1978), Wharton & Gilstrap (1983), and Ovruski (2003) for Opiinae (Braconidae), and the taxonomic description by Wharton et al. (1998) for Eucilinae (Figitidae). Voucher specimens were placed in the entomological collection of the Fundación Miguel Lillo (FML) (San Miguel de Tucumán, Argentina).

In total, 316 *C. capitata* and 25 *A. fraterculus* pupae were recovered from all infested peach fruits. From *C. capitata* pupae, 151 adult flies (47.8% emergence rate) and 25 *Aganaspis pelleranoi* (Brethes) (Hymenoptera: Figitidae) adult parasitoids (19 females and 6 males) were recovered. From *A. fraterculus* pupae, 8 adult flies (32.0% emergence rate) and 7 adult parasitoids (3 *D. longicaudata* females, 2 *Doryctobracon brasiliensis* (Szépligeti) (Hymenoptera: Braconidae) males, and 2 *A. pelleranoi* females) were obtained. Pupal viabilities (number of emerging adult flies and wasps) were 60.0% and 55.1% in *A. fraterculus* and *C. capitata*, respectively. Parasitism rates were 28.0% and 7.3% in *A. fraterculus* and *C. capitata*, respectively.

All wasp species identified are solitary, koinobiont larval-pupal endoparasitoids belonging to the fruit fly parasitoid guild number "2" defined by Ovruski et al. (2000). *Aganaspis pelleranoi* and

the braconid *Doryctobracon brasiliensis* are native species from the Neotropical region. *Aganaspis pelleranoi* accounted for more than 80% of all parasitoids recovered from *P. persica* we sampled. This eucoiline species and the braconid *Doryctobracon areolatus* (Szépligeti) (Hymenoptera: Braconidae) are the most abundant *A. fraterculus* parasitoid species in wild guava habitats from the northernmost to the southernmost portion of the Yungas forest in Argentina (Ovruski et al. 2004; Ovruski et al. 2005). Furthermore, *A. pelleranoi* would be better adapted to *C. capitata* larvae than any of the native braconid parasitoid common in Latin America (Ovruski et al. 2004). *Doryctobracon brasiliensis* was previously recorded from Las Yungas forest of the northwestern Argentina in association with *A. fraterculus* in several native and exotic host fruit species (Ovruski et al. 2004).

Even though *D. longicaudata* was recovered in smaller numbers, the data presented here and also those published by Schliserman et al. (2003) show the successful establishment of this exotic parasitoid in 2 different Argentinian biogeographical areas: Las Yungas forest in the northwestern region and Paranaense forest in the northeastern region.

We acknowledge financial support from Consejo Nacional de Investigaciones Científicas y Técnicas de la República Argentina (CONICET) (grants PIP No. 0702/98 and No. 5129/05) and Fundación PROYUNGAS (Argentina).

#### SUMMARY

Specimens of *Diachasmimorpha longicaudata* (Ashmead), native to Indo-Pacific region, *Aganaspis pelleranoi* (Brethes) and *Doryctobracon brasiliensis* (Szépligeti), both native to Neotropical region, were recovered from *Anastrepha fraterculus* (Wiedemann) pupae collected from *Prunus persica* (L.) Batsch in the province of Salta. Thus, the braconid *D. longicaudata* was recovered 40 years after its first release in the northwestern Argentinean region.

#### REFERENCES CITED

- CABRERA, A. 1976. Regiones fitogeográficas argentinas. Enciclopedia Agricultura y Jardinería. Ediciones ACME, SACI, Buenos Aires, Argentina. 135 pp.
- CANCINO, J., L. RUIZ, Y. GOMEZ, AND J. TOLEDO. 2002. Irradiación de larvas de *Anastrepha ludens* (Loew) (Diptera: Tephritidae) para inhibir la emergencia de moscas en la cría del parasitoide *Diachasmimorpha longicaudata* (Ashmead) (Hymenoptera: Braconidae). Folia Entomol. Mex. 41: 195-208.
- CARVALHO, R. DA S. 2005. Avaliação das liberações inoculativas do parasitoide exótico *Diachasmimorpha longicaudata* (Ashmead) (Hymenoptera: Braconidae) em pomar diversificado em Conceição do Almeida, BA. Neotr. Ent. 34: 799-805.
- MONTOYA, P., P. LIEDO, B. BENREY, J. CANCINO, J. F. BARRERA, J. SIVINSKI, AND M. ALUJA. 2000. Biological control of *Anastrepha* spp. (Diptera: Tephritidae), in mango orchards through augmentative releases of *Diachasmimorpha longicaudata* (Ashmead) (Hymenoptera: Braconidae). Biol. Control 18: 216-224.
- MONTOYA, P., AND J. CANCINO. 2004. Control biológico por aumento en moscas de la fruta (Diptera: Tephritidae). Folia Entomol. Mex. 43: 257-270.
- OVRUSKI, S. M. 2003. Nuevos aportes a la taxonomía de las especies de Opiinae (Hymenoptera: Braconidae) parasitoides de *Anastrepha fraterculus* (Wiedemann) (Diptera: Tephritidae) en la provincia de Tucumán. Acta Zool. Lilloana 47: 39-68.
- OVRUSKI, S. M., J. L. CANCINO, P. FIDALGO, AND P. LIEDO. 1999. Nuevas perspectivas para la aplicación del control biológico contra moscas de la fruta (Diptera: Tephritidae) en Argentina. Rev. Manejo Integrado de Plagas 54: 1-12.
- OVRUSKI, S. M., M. ALUJA, J. SIVINSKI, AND R. A. WHARTON. 2000. Hymenopteran parasitoids on fruit-infesting Tephritidae (Diptera) in Latin America and the southern United States: diversity, distribution, taxonomic status and their use in fruit fly biological control. Int. Pest Management Rev. 5: 81-107.
- OVRUSKI, S. M., P. SCHLISERMAN, AND M. ALUJA. 2004. Indigenous parasitoids (Hymenoptera) attacking *Anastrepha fraterculus* and *Ceratitidis capitata* (Diptera: Tephritidae) in native and exotic host plants in Northwestern Argentina. Biol. Control 29: 43-57.
- OVRUSKI, S. M., R. A. WHARTON, P. SCHLISERMAN, AND M. ALUJA. 2005. Abundance of *Anastrepha fraterculus* (Diptera: Tephritidae) and its associated native parasitoids (Hymenoptera) in "feral" guavas growing in the endangered northernmost Yungas forest of Argentina with an update on the taxonomic status of opiine parasitoids previously reported in this country. Environ. Entomol. 34: 807-818.
- OVRUSKI, S. M., P. SCHLISERMAN, O. R. DECOLL, C. PEÑALOZA, L. OROÑO, AND C. COLIN. 2006. The establishment of *Aceratoneuromyia indica* (Hymenoptera: Eulophidae) in three biogeographical regions of Argentina. Florida Entomol. 89: 270-273.
- SCHLISERMAN, P., S. M. OVRUSKI, AND O. R. DECOLL. 2003. The recovery and permanent establishment of *Diachasmimorpha longicaudata* (Hymenoptera: Braconidae) in Misiones, northeastern Argentina. Florida Entomol. 86: 491-492.
- SIVINSKI, J., C. O. CALKINS, R. BARANOWSKI, D. HARRIS, J. BRAMBILA, J. DIAZ, R. E. BURNS, T. HOLLER, AND G. DODSON. 1996. Suppression of a caribbean fruit fly (*Anastrepha suspensa* (Loew) (Diptera: Tephritidae) population through augmentative releases of the parasitoid *Diachasmimorpha longicaudata* (Ashmead) (Hymenoptera: Braconidae). Biol. Control 6: 177-185.
- SIVINSKI, J., J. PINERO, AND M. ALUJA. 2000. The distributions of parasitoids (Hymenoptera) of *Anastrepha* fruit flies (Diptera: Tephritidae) along an altitudinal gradient in Veracruz, Mexico. Biol. Control 18: 258-269.
- SIVINSKI, J., K. VULINEC, AND M. ALUJA. 2001. Ovipositor length in a guild of parasitoids (Hymenoptera: Braconidae) attacking *Anastrepha* spp. fruit flies (Diptera: Tephritidae) in southern Mexico. Ann. Entomol. Soc. Am. 94: 886-895.
- TURICA, A. 1968. Lucha biológica como medio de control de las moscas de los frutos. Revista IDIA 241: 29-38.

- WHARTON, R. A., AND P. M. MARSH. 1978. New world Opiinae (Hymenoptera: Braconidae) parasitic on Tephritidae (Diptera). *J. Wash. Acad. Sci.* 68: 147-167.
- WHARTON, R. A., AND F. E. GILSTRAP. 1983. Key to and status of Opiinae braconid (Hymenoptera: Braconidae) parasitoids used in Biological Control of *Ceratitidis* and *Dacus* s. l. (Diptera: Tephritidae). *Ann. Entomol. Soc. Am.* 76: 721-741.
- WHARTON, R. A., S. M. OVRUSKI, AND F. E. GILSTRAP. 1998. Neotropical Eucilidae (Cynipoidea) associated with fruit infesting Tephritidae, with new records from Argentina, Bolivia and Costa Rica. *J. Hymenoptera. Res.* 7: 102-115.
- WHITE, I. M., AND M. M. ELSON-HARRIS. 1992. Fruit Flies of Economic Significance: Their Identification and Bionomics. CAB international, ACIAR, Redwood Press Ltd., Melksham, UK. 601 pp.
- ZUCCHI, R. A. 2000. Taxonomía, pp. 13-24 *In* A. Malavasi and R. A. Zucchi [eds.], *Moscas-das-frutas de Importância Econômica no Brasil. Conhecimento Básico e Aplicado*. Holos Editora, Riberão Preto, Brasil.