

# Wasp Parasitoid *Doryctobracon areolatus* (Szépligeti) (Insecta: Hymenoptera: Braconidae)<sup>1</sup>

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## Introduction

*Doryctobracon areolatus* (Szépligeti, 1911), formerly *Parachasma cereum* (Gahan), is a parasitoid of *Anastrepha* spp. in the Neo- and subtropics (Ovruski et al. 2000). It was introduced into Florida and the Dominican Republic for control of the Caribbean fruit fly, *Anastrepha suspensa* (Loew) (Diptera: Tephritidae), and the West Indian fruit fly, *A. obliqua* (Macquart) (Baranowski et al. 1993, Serra et al. 2011) (see Host Table below).

## Distribution

*Doryctobracon areolatus* is the most widely distributed, Neotropical/subtropical, larval-prepupal parasitoid of *Anastrepha* (Ovruski et al. 2000, López et al. 1999). Its range extends from Florida (where it was introduced in 1969) deep into South America (Sivinski et al. 1997). At one time, it was abundant in the Florida peninsula to well north of Lake Okeechobee (Eitam et al. 2004). Recently, its numbers appear to have declined, perhaps from competition with other fruit fly parasitoids and/or climate change.

## Description

### Adult

*Doryctobracon areolatus* is a larval-prepupal synovigenic (produce eggs over the life of the adult), endoparasitic koinobiont (parasitoid allows the host to continue development and does not kill the host until the parasitoid larva pupates) that develops particularly well in 2nd instar larvae



Figure 1. Adult male *Doryctobracon areolatus* (Szépligeti), a parasitoid wasp of *Anastrepha* spp.

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(Wharton and Marsh 1978). The adult body coloration is yellow to orange with clear wings, and the apical abdominal tergites in males are often black (Wharton and Marsh 1978). The labrum is usually visible and the clypeus is relatively short compared to some of the other *Doryctobracon* species, with an ovipositor length of ~3.8 mm (Sivinski and Aluja 2003).

1. This document is EENY-525, one of a series of the Entomology and Nematology Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Original publication date June 2012. Visit the EDIS website at <http://edis.ifas.ufl.edu>.
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Figure 2. Adult female *Doryctobracon areolatus* (Szépligeti), a parasitoid wasp of *Anastrepha* spp.

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There is a very distinctive banding pattern on the hind tibia.



Figure 3. Hind leg of an adult female *Doryctobracon areolatus* (Szépligeti), a parasitoid wasp of *Anastrepha* spp.

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The Cu2 submarginal cell of the forewing is 4-sided (Wharton and Marsh 1978, Sivinski et al. 2001) and this shape distinguishes it from the two other opiine braconid wasps attacking *A. suspensa* in Florida.

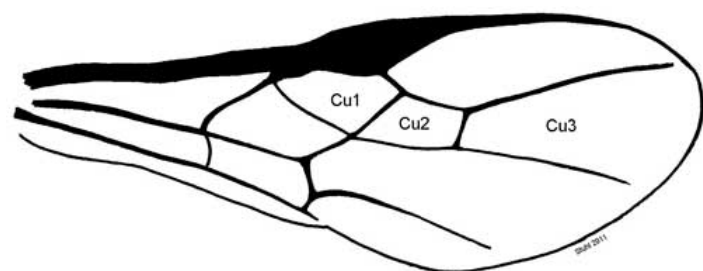


Figure 4. Forewing.

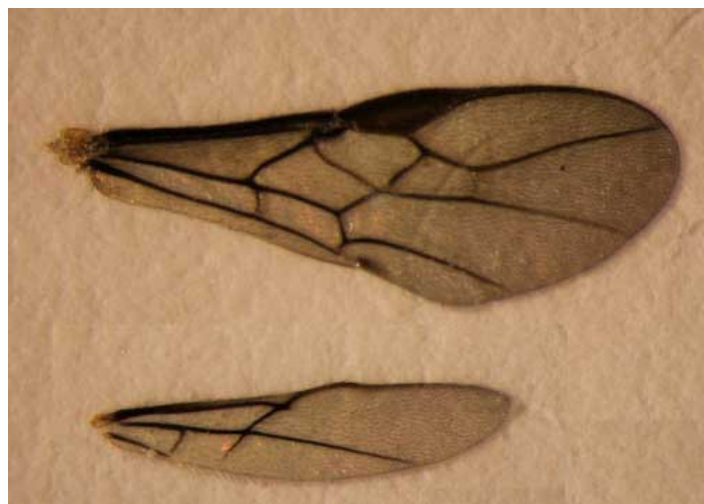


Figure 5. Forewing (top) and hindwing (bottom) of an adult *Doryctobracon areolatus* (Szépligeti), a parasitoid wasp of *Anastrepha* spp.

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## Life Cycle

*Doryctobracon areolatus* forages for larvae in ripe fruit on the tree and, unlike some related species, seldom investigates fallen fruit. The females are attracted to fruit volatiles in their search for food and fly hosts. Host location within the fruit is mediated by antennation (sensing information by touching antennae) and perhaps probing with the ovipositor to detect compounds unique to larval hosts (Stuhl et al. 2011b). The adult female inserts a single egg inside the body of the fly larvae. Upon hatching, the parasitoid larva remains in the first instar stage until the host pupates. The development time from egg to adult parasitoid is temperature dependent, but usually takes about two weeks.

Adult foods consist of fruit juices expelling from ovipositor-wounded or infested fruit (Stuhl et al. 2011a) and other plant-produced substances such as extrafloral nectar and hemipteran honeydew. Fruit juice consumption allows the parasitoid to forage for both food and hosts in the same habitat and thus eliminates the expense and danger of separate forays to locate carbohydrates (Stuhl et al. 2011a).

## Hosts

Some fruit fly hosts and fruit fly host plant species of *Doryctobracon areolatus* (Aluja et al. 2000, Aluja et al. 2003).

## Economic Importance

*Doryctobracon areolatus* parasitism rate is highly dependent on fruit size (the larger the fruit the more difficult it is to reach hosts). In its native habitats, parasitism of fruit flies in certain fruit can reach >80%. Mean parasitism of Caribbean

fruit fly following original establishment in Florida was ~40% and, while it is too early to tell for releases in the Dominican Republic (Serra et al. 2011), parasitism is already similar to that exerted by the native parasitoid *Utetes anastrephae*.

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Table 1.

<b>Fruit Fly Host</b>	<b>Fruit Fly Host Plant</b>
<i>Anastrepha alveata</i>	<i>Ximenia americana</i> L.
<i>Anastrepha aphelocentema</i>	<i>Pouteria hypoglauca</i> (Standl.) Baehni
<i>Anastrepha bahiensis</i>	<i>Brosimum alicastrum</i> Sw. <i>Myrciaria floribunda</i> (H. West ex Willd.) O. Berg
<i>Anastrepha cebra</i>	<i>Quararibea funebris</i> (La Llave) Visher
<i>Anastrepha fraterculus</i>	<i>Ampelocera hottle</i> Standl. <i>Psidium guajava</i> L. <i>Syzygium jambos</i> L.
<i>Anastrepha ludens</i>	<i>Citrus aurantium</i> L. <i>Citrus paradisi</i> Macfad. <i>Citrus sinensis</i> (L.) Osbeck <i>Mangifera indica</i> L.
<i>Anastrepha obliqua</i>	<i>Mangifera indica</i> L. <i>Spondias</i> sp. L. <i>Spondias mombin</i> L. S <i>pondias purpurea</i> L. <i>Spondias radkolferi</i> Donn. Sm. <i>Tapirira mexicana</i> Marchand
<i>Anastrepha serpentina</i>	<i>Bumelia sebolana</i> Lundell <i>Calocarpum mammosum</i> (L.) Pierre <i>Chrysophyllum cainito</i> L. <i>Mangifera indica</i> L. <i>Manilkara zapota</i> (L.) P. Royen <i>Pouteria</i> sp. Aubl.
<i>Anastrepha spatulata</i>	<i>Schoepfia schreberi</i> J.F. Gmel.
<i>Anastrepha striata</i>	<i>Psidium guajava</i> L
<i>Anastrepha suspensa</i>	<i>Eugenia uniflora</i> L. <i>Prunus persica</i> L. <i>Psidium guajava</i> L. <i>Syzygium jambos</i> L. <i>Terminalia catappa</i> L.
<i>Rhagoletis</i> spp.	<i>Crataegus mexicana</i> DC. <i>Crataegus rosei rosei</i> Eggl.