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**DRYINIDAE (HYMENOPTERA: CHRYSIDOIDEA) PARASITOIDS  
OF THE CORN LEAFHOPPER, *Dalbulus maidis* (DELONG &  
WOLCOTT) (HEMIPTERA: CICADELLIDAE), IN ARGENTINA, WITH  
DESCRIPTION OF THE MALE OF *Gonatopus moyaraygozai* OLMÍ**

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Eduardo G. Virla and Massimo Olmi

**SUMMARY**

The parasitoids of the Corn Leafhopper, *Dalbulus maidis* (DeLong & Wolcott) (Hemiptera: Auchenorrhyncha) were studied in Tucumán Province, Argentina. Leafhoppers parasitized by Dryinidae (Hymenoptera: Chrysididae) were collected in cornfields from Dec 2003 to Apr 2005. Dryinid adults belonging to three species, *Gonatopus caraibicus* (Olmi), *Gonatopus contortus* Olmi, and *G. moyaraygozai* Olmi, were obtained. *G. moyaraygozai* is

quoted for the first time in Argentina, and the male is described for the first time. This contribution presents the first field host-association record for *G. caraibicus* and *D. maidis*; in addition, *G. contortus*, and *G. moyaraygozai* are cited for the first time attacking Corn Leafhopper populations. Data on the parasitization rate by *G. moyaraygozai* are given.

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**DRYINIDAE (HYMENOPTERA: CHRYSIDOIDEA) PARASITOIDES DE LA CHICHARRITA DEL MAÍZ, *Dalbulus maidis* (DELONG & WOLCOTT) (HEMIPTERA: CICADELLIDAE), EN ARGENTINA, Y DESCRIPCIÓN DEL MACHO DE *Gonatopus moyaraygozai* OLMÍ**

Eduardo G. Virla y Massimo Olmi

**RESUMEN**

Se estudiaron los parasitoides de la chicharrita del maíz, *Dalbulus maidis* (DeLong & Wolcott) (Hemiptera: Auchenorrhyncha) en la provincia de Tucumán, Argentina. Las chicharritas atacadas por Dryinidae (Hymenoptera: Chrysididae) fueron colectadas en campos de maíz entre dic 2003 y abr 2005. Se obtuvieron drínidos de tres especies diferentes: *Gonatopus caraibicus* (Olmi), *Gonatopus contortus* Olmi, y *G. moyaraygozai*

Olmi. Se cita por primera vez a *G. moyaraygozai* en Argentina, y se describe al macho de dicha especie. Se registra por primera vez en campo la asociación parasitoide-hospedador de *G. caraibicus* y *D. maidis*; además, se mencionan por primera vez a *G. contortus* y *G. moyaraygozai* como parasitoides de la chicharrita del maíz. Se calculó la tasa de parasitoidización de *G. moyaraygozai* en campo.

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**Introduction**

The Corn Leafhopper, *Dalbulus maidis* (DeLong & Wolcott) (Hemiptera: Auchenorrhyncha) is the most common leafhopper feeding on corn in northern Argentina (Paradell *et al.*, 2001). It causes great losses to corn crops in most parts of the tropical and subtropical Americas because it is able to transmit the following pathogens (Nault and Am-

mar, 1989): Corn stunt Spiroplasma (CSS), Maize bushy stunt phytoplasma (MBSP) and Maize rayado fino virus (MRFV). The diseases caused by these pathogens seriously affect corn crops in Argentina (Giménez Pecci *et al.*, 2002; Virla *et al.*, 2004).

Dryinid wasps (Hymenoptera: Dryinidae) are highly specialized parasitoids of Hemiptera Auchenorrhyncha (treehoppers, leafhoppers,

and planthoppers) nymphs and adults (Guglielmino and Olmi, 1997, 2006). Representatives of the family have been successfully utilized in several instances for the biological control of crop pests (Swezey, 1928; Olmi, 2000).

The Dryinidae species known in the Americas as parasitoids of *D. maidis* are *Gonatopus bartletti* Olmi 1984, *Gonatopus caraibicus* (Olmi, 1986) and *Go-*

*natopus desantisi* Olmi and Virla 1993 (for references see Guglielmino and Olmi, 1997). *Gonatopus bicolor* (Haliday), quoted by Maes and Godoy (1993), cannot be a parasitoid of *D. maidis* because it is a European species not present in other continents and attacking only Delphacidae (Olmi, 1999). *Agonatopus* sp., quoted by Quezada (1979), is a mysterious species that has never been identified, but probably

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**KEYWORDS / Argentina / Corn / Corn Leafhopper / Dryinidae / Parasitoids / Vector /**

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**Eduardo G. Virla.** Doctor in Biology (Zoology), Universidad Nacional de La Plata, Argentina. Researcher CONICET. Address: PROIMI-Biotechnology. Av. Belgrano & Pje. Caseros

(T4001 MVB) San Miguel de Tucumán, Tucumán, Argentina. e-mail: evirla@proimi.org.ar

**Massimo Olmi.** Doctor in Agricultural Sciences, Turin University, Italy. Professor, Università degli studi della Tuscia, Viterbo, Italy. e-mail: olmi@unitus.it

**DRYINIDAE (HYMENOPTERA: CHRYSIDOIDEA) PARASITOIDES DA CIGARRINHA DO MILHO, *Dalbulus maidis* (DELONG & WOLCOTT) (HEMIPTERA: CICADELLIDAE), EM ARGENTINA, E DESCRIÇÃO DO MACHO DE**

***Gonatopus moyaraygozai* OLMI**

Eduardo G. Virla e Massimo Olmi

**RESUMO**

Os parasitoides da cigarrinha do milho, *Dalbulus maidis* (DeLong & Wolcott) (Hemiptera: Auchenorrhyncha) foram estudados na província de Tucumán, Argentina. As cigarrinhas atacadas por Dryinidae (Hymenoptera: Chrysidoidea) foram coletadas em cultivos de milho entre dezembro de 2003 e abril de 2005. Foram obtidos dryínidos de três espécies diferentes: *Gonatopus caraibicus* (Olmi), *Gonatopus contortus* Olmi e *Gonatopus moyaraygozai* Olmi. *G. caraibicus*, anteriormente obtido

de *D. maidis* somente em laboratório, foi criado também em campo. Pela primeira vez *G. contortus* e *G. moyaraygozai* são citados como parasitoides de *D. maidis*. De *G. moyaraygozai*, citado pela primeira vez em Argentina, foram obtidos ambos os sexos; a descrição do macho, anteriormente desconhecido, é feita pela primeira vez. A taxa de parasitismo de *G. moyaraygozai* foi avaliada em campo.

corresponds to *Gonatopus bartletti* Olmi.

Thirty five species of the genus *Gonatopus* Ljungh occur in Argentina (Virla and Olmi, 1998, 2007) and only two of them, *G. caraibicus* and *G. desantisi*, were mentioned as affecting *D. maidis* populations. The development of a research project on the natural enemies of Corn Leafhopper in northern Argentina resulted in the discovery of new parasitoids of *D. maidis* and permitted to obtain the new biological data reported below.

**Material and Methods**

Nymphs and adults of *D. maidis* were sampled by sweeping with a standard entomological net. Samples were collected in both subsistence and commercial cornfields in Tucumán province from Dec 2003 to Apr 2005.

Several individuals of the Corn Leafhopper parasitized by Dryinidae were obtained, as evidenced by the possession of the typical larval sac. Most of the specimens died as prepupa or pupa in laboratory, probably due to experimental environmental conditions (temperature and humidity). However, some Dryinid adults emerged, allowing the specific identification.

In order to estimate the rate of parasitism affecting the Corn Leafhopper population

inhabiting a cornfield in Horco Molle, Tucumán, Argentina, site (26°47'29.3''S and 65°19'39.7''W; 636masl), a trial of three replicates of 10 sweep beating over the corn plants was done on Jan 28<sup>th</sup>, 2004. All collected individuals were isolated in glass tubes containing corn leaves. Leaves were changed as needed, and leafhoppers were checked daily, looking for parasitization evidences. After 12 days, individuals without parasitization symptoms were considered as healthy.

Dried voucher, host as well as parasitoid specimens studied were deposited in the collection of Fundación e Instituto Miguel Lillo in San Miguel de Tucumán, Argentina.

**Results**

The following three species of Dryinidae parasitizing *D. maidis* were obtained: *Gonatopus caraibicus* (Olmi 1986), *G. contortus* Olmi 1984, and *G. moyaraygozai* Olmi 1991.

***Gonatopus caraibicus* Olmi**

*Reared specimens:* One female specimen of *G. caraibicus* was obtained from a female adult of *D. maidis* on 14/VI/2004 in San Miguel de Tucumán (26°48'35.8''S, 65°14'24.8''W; 464masl).

*Remarks:* *G. caraibicus* is a broadly distributed spe-

cies cited in Puerto Rico and Argentina (Olmi, 1984; Virla and Olmi, 1998; Virla, 2000). This species is known to parasitize the following leafhoppers (Cicadellidae): *Exitianus obscurinervis* Stål (De Santis *et al.*, 1988); *Amplicephalus simpliciusculus* Linnavuori, *Haldorus sexpunctatus* Berg (Virla, 1992); *Chlorotettix* sp. (Virla and Olmi, 1998); *Planicephalus flavicosta* (Stål), *Amplicephalus (Mendozaellus) dubius* (Linnavuori) and *Graminella stelliger viridescens* Linnavuori (Virla, 2000). Virla (1992) verified that *G. caraibicus* parasitized *D. maidis* in the laboratory, but the dryinid was not able to complete the development. Thus, this is the first field record confirming this host-species relationship.

***Gonatopus contortus* Olmi**

*Reared specimens:* Female specimens of *G. contortus* Olmi were obtained from adults of *D. maidis* on 19/XII/2003 (1 ♀) and 23/II/2004 (2 ♀♀) in Ranchillos, Tucumán, Argentina (26°57'37.7''S, 65°03'03.1''W; 387masl). With these specimens, a small laboratory colony was established. The reproduction of this species was parthenogenetically telitokous.

*Remarks:* This species is known from Puerto Rico,

Bolivia, Paraguay, and Argentina (Olmi, 1984; Virla and Olmi, 1998; Olmi *et al.*, 2000; Garcete Barrett, 2001). It was previously mentioned as a parasitoid of Cicadellidae Dectocephalinae (Virla, 2001).

***Gonatopus moyaraygozai* Olmi 1991**

*Reared specimens:* Two females and a male of *G. moyaraygozai* Olmi were obtained from parasitized corn leafhoppers collected on 28/I/2004 in Horco Molle, Tucumán, Argentina site. Later, two females were further bred from the same place on 13/II and 24/II/2004.

*Remarks:* This species was known only from México (Olmi, 1990) and it is now mentioned for the first time in Argentina. Cicadellidae was the previously known host of this parasitoid (Guglielmino and Olmi, 1997) and in México it was found attacking *Dalbulus quinque-notatus* De Long and Nault (Olmi, 1990), so that this is the first quotation of this species affecting *D. maidis* populations.

Only female specimens of *G. moyaraygozai* were known. The male reared during this study is the first known male of this species. It may be described as follows:

MALE: fully winged; length 1.62mm. Head brown,

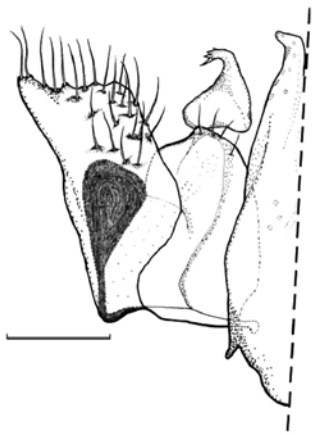


Figure 1. Male genitalia of *Gonatopus moyaraygozai* Olmi from Horco Molle, Tucumán, Argentina. Right half removed. Bar: 0.1mm

with mandibles testaceous; antennae brown; mesosoma black; gaster brown; legs brown. Antennae filiform; antennal segment 3 approximately twice as long as broad (6.3); antennal segments in the following proportions: 5:5:6:6:6:6:5.5:5.5:5:8. Head shiny, smooth, without sculpture; frontal line absent; occipital carina absent; POL= 5; OL= 1; OOL= 2.5; greatest diameter of posterior ocelli= 2. Scutum, scutellum and metanotum shiny, finely punctate, without sculpture among the punctures. Notauli complete, posteriorly separated; minimum distance between notauli much shorter than greatest diameter of posterior ocelli (1:2). Propodeum dull, completely reticulate rugose. Forewing hyaline, without dark transverse bands; marginal cell open; stigmal vein regularly curved. Dorsal process of the parameres (Figure 1) short, with proximal part slender and distal apex broadened. Palpal formula 5/2. Tibial spurs 1, 1, 2.

#### Parasitization rate

At a cornfield in Horco Molle site (Jan 28<sup>th</sup>, 2004), a total of 217 corn leafhoppers were captured (68

nymphs, 101 females and 48 males). Mean of *D. maidis* individuals/10 sweep beating was 72.3 (SD= 9.3). Eleven individuals were parasitized by dryinid wasps (6 nymphs, 4 females and only one male), but only 3 adults of *G. moyaraygozai* Olmi emerged (2 females and 1 male). So, the parasitization rate measured on that day was 5.1%.

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#### Key to the males of *Gonatopus* species attacking *Dalbulus maidis* in America

1. Antennal segment 3 less than three times as long as broad . . . . . 2
- Antennal segment 3 three times or more than three times as long as broad . . . . . 3
2. Propodeum granulated . . . . . *carabicus* (Olm)
- Propodeum reticulate rugose . . . . . *moyaraygozai* Olmi
3. Head punctate, without sculpture among punctures; frontal line absent . . . . . *desantisi* Olmi and Virla
- Head slightly granulated; frontal line complete . . . . . *bartletti* Olmi

The male of *G. contortus* is still unknown