

SCIENTIFIC NOTE

First Host Record for *Anteon pilicorne* (Ogloblin) (Hymenoptera: Dryinidae), a Parasitoid of Cicadellidae, Including the Corn Leafhopper (Hemiptera: Cicadellidae)

EG VIRLA¹, MS ESPINOSA¹, G MOYA-RAYGOZA²

¹PROIMI – Biotecnología, Div Control Biológico, San Miguel de Tucumán, Tucumán, Argentina

²Depto de Botánica y Zoología, C.U.C.B.A., Univ de Guadalajara, Las Agujas, Zapopan, Jalisco, Mexico

Keywords

Natural enemy, disease vector, *Dalbulus maidis*, *Balclutha rosea*, Macrostelini

Correspondence

EDUARDO G VIRLA, PROIMI – Biotecnología, Av. Belgrano & Pje. Caseros, T4001 MVB, S. M. de Tucumán, Argentina; evirla@hotmail.com

Edited by Madelaine Venzon – EPAMIG

Received 16 November 2009 and accepted
31 May 2010

Abstract

For the first time the dryinid wasp *Anteon pilicorne* (Ogloblin) is recorded as a parasitoid of two Macrostelini leafhoppers: *Balclutha rosea* (Scott) and the corn leafhopper *Dalbulus maidis* (DeLong & Wolcott). New distributional records are presented.

The corn leafhopper *Dalbulus maidis* (DeLong & Wolcott) is the main leafhopper pest affecting corn in the Americas (Nault 1990), and it is also the most common leafhopper feeding on this crop in Argentina (Luft Albarracín *et al* 2008). This species is important because it efficiently vectors three plant pathogens: the corn stunt Spiroplasma (*Spiroplasma kunkelii* Whitcomb); the maize bushy stunt phytoplasma (*Candidatus phytoplasma asteris*, MBS strain); and the maize rayado fino virus (Nault 1980, Oliveira *et al* 1998, Virla *et al* 2004).

Nymphs and adults of corn leafhopper are parasitized by strepsipterans (Halictophagidae) (Kathirithamby & Moya-Raygoza 2000), big-headed flies (Pipunculidae) (Virla *et al* 2009) and wasps (Dryinidae) (Virla & Olmi 2007). Dryinid wasps are highly specialized parasitoids of nymphs and adults of Hemiptera Auchenorrhyncha (treehoppers, leafhoppers and planthoppers) (Guglielmino & Olmi 1997, 2006), and representatives of the family have been successfully utilized in several cases of biological control of crop pests (Swezey 1928, Olmi 2000).

In order to know the parasitoids of the leafhopper

populating corn crops in Argentina, nymphs and adults were sampled by sweeping plants with a standard entomological net. Samples were collected from corn fields at Los Nogales (26°42'27.5"S, 65°13'3.9"W, 585 m) in Tucumán, Argentina, between November 2008 and April 2009.

During the survey several corn leafhopper individuals were obtained, which had been parasitized by Dryinidae, as evidenced by the typical "larval sac". Two of them had the sac laterally on the intersegmental membrane of the host's thorax. Until our findings, all known species of Dryinidae affecting *D. maidis* belonged to Gonatopodinae (Virla & Olmi 2007) and they typically had the larval sac located on the host's abdomen. Unfortunately, the sampled specimens died as larvae before they completed the pupae cocoon at the laboratory.

Later, three specimens of *Balclutha rosea* (Scott) (Macrostelini) affected by larval sacs located in the thoracic region were found at the same sample site. This species was previously cited inhabiting wheat and corn crops in Tucumán province (Paradell 1995), being an

uncommon leafhopper that colonized corn in late sown dates (Luft Albarracín *et al* 2008). These specimens were isolated in glass tubes (10 x 2 cm) with a piece of fresh corn leaf, which was daily replaced, and covered with a water-wetted cotton pad. Fine sand was located at the bottom of the tubes which enabled us to rear one of the parasitoids obtaining an adult, allowing specific identification. The emerged female, was identified as *Anteon pilicornis* (Ogloblin) (Anteoninae).

Considering that most of dryinid wasps are thelytokous, some male, female and nymph of *D. maidis* were exposed in order to obtain offspring. Exposed corn leafhoppers were obtained from the PROIMI laboratory population. During the seven days of female life span, four parasitized adults of corn leafhoppers were obtained. From these specimens, one died as a larva in the sac, two as pharate adults and only one successfully emerged.

This is the first report on *A. pilicornis* hosts and it extends their distribution to Tucumán Province, Argentina. Although *D. maidis* hitherto is a fictitious host, we believe that it must have been attacked by the wasp in the field.

Anteon pilicornis was originally described from specimens collected in Gral. Urquiza (Buenos Aires province, Argentina), but it has also been found in Salta and Misiones provinces in Argentina. In Latin America it has been detected in Mexico, Jamaica, Costa Rica, Honduras, Nicaragua, Guatemala, Panama, Colombia, Venezuela and Brazil (Virla & Olmi 2008). Prior to this study, the hosts for this species were unknown.

Dried voucher specimens of *A. pilicornis* resulting from this study were deposited in the collection of the Fundación e Instituto Miguel Lillo (IMLA), San Miguel de Tucumán, Argentina. The material are labeled as follows: Los Nogales, Tucumán province, collected 12/iii/2009, ex *Balclutha rosea* female, Moya Raygoza-Virla-Espinosa leg., one ♀ (adult emergence 5/iv/09); Lab rearing, exposition date 6-7/iv/2009, adult (♀) emergence 6/v/09, ex *Dalbulus maidis* female.

The known Dryinidae parasitoids of *D. maidis* are *Gonatopus bartletti* Olmi, *G. caraibicus* (Olmi), *G. desantisi* Olmi & Virla, *G. contortus* Olmi and *G. moyaraygozai* Olmi (Virla & Olmi 2007). *Anteon ciudadii* Olmi is the only Anteoninae species that attacked a *Dalbulus* DeLong leafhopper: *D. quinquenotatus* DeLong & Nault in Mexico on gamagrasses (*Tripsacum* spp.) (Moya-Raygoza & Trujillo-Arriaga 1993).

The only known dryinid that attacked *B. rosea* was *Gonatopus nearticus* (Fenton) observed in Italy; other species of *Balclutha* Kirkaldy were affected by Anteoninae (i.e. *B. rubrostriata* (Melichar) by *Anteon yasumatsui* Olmi on the Fiji Islands, and *B. incisa* (Matsumura) by *A. micros* Olmi in México) (Guglielmino & Olmi 1997, 2007)

Taking into account the importance of the diseases the corn leafhopper vectors in the Americas, we would

like to emphasize the need for a proper evaluation of *A. pilicornis* as a potential biocontrol agent against this leafhopper pest.

Acknowledgments

We are grateful to Dr. Susana L. Paradell (UNLP-CIC, Argentina) for identification of the *B. rosea* specimens. The present work was supported by grant PICT 2007 n° 00143.

References

- Guglielmino A, Olmi M (1997) A host-parasite catalog of the world Dryinidae (Hymenoptera, Chrysidoidea). *Contrib Entomol Int* 2: 165-298.
- Guglielmino A, Olmi M (2006) A host-parasite catalog of world Dryinidae: first supplement (Hymenoptera: Chrysidoidea). *Zootaxa* 1139: 35-62.
- Guglielmino A, Olmi M (2007) A host-parasite catalog of world Dryinidae (Hymenoptera, Chrysidoidea): second supplement. *Boll Zool Agrar Bachic Ser II* 39: 121-129.
- Kathirithamby J, Moya-Raygoza G (2000) *Halictophagus naulti* sp. n. (Strepsiptera: Halictophagidae), a new species parasitic in the corn leafhopper (Homoptera: Cicadellidae) from Mexico. *Ann Entomol Soc Am* 93: 1039-1044
- Luft-Albarracín E, Paradell S, Virla EG (2008) Cicadellidae (Hemiptera: Auchenorrhyncha) associated to maize crops in Argentina northwestern, influence of the sowing date and phenology on their abundance and diversity. *Maydica* 53: 289-296.
- Moya-Raygoza G, Trujillo-Arriaga J (1993) Evolutionary relationships between *Dalbulus* leafhopper (Homoptera - Cicadellidae) and its Dryinid (Hym. - Dryinidae) parasitoids. *J Kans Entomol Soc* 66: 41-50.
- Nault L (1980) Maize bushy stunt and corn stunt: a comparison of disease symptoms, pathogen host ranges, and vectors. *Phytopathology* 70: 659-662.
- Nault L (1990) Evolution of an insect pest: maize and the corn leafhopper, a case study. *Maydica* 35: 165-175.
- Oliveira E, Waquil J, Fernandes F, Paiva E, Resende R, Kitajima E (1998) "Enfezamento pálido" e "enfezamento vermelho" na cultura do milho no Brasil central. *Fitopatol Bras* 23: 45-47.
- Olmi M (2000) Bio-ecologia degli Imenotteri Driinidi e loro impiego in programmi di lotta biologica, p.93-117. In Lucchi A (ed) *La Metcalfa negli ecosistemi italiani*. Firenze, ARSIA, 163p.
- Paradell S (1995) Especies argentinas de homópteros cicadélidos asociados al cultivo de maíz (*Zea mays* L.). *Rev Fac Agron* 71: 213-234.
- Swezey OH (1928) Present status of certain insect pests under biological control in Hawaii. *J Econ Entomol* 21: 669-676.

- Virla EG, Díaz C, Carpane P, Laguna I, Ramallo J, Gómez L, Giménez Pecci M (2004) Estimación preliminar de la disminución en la producción de maíz causada por el "Corn Stunt Spiroplasma" (CSS) en Tucumán, Argentina. *Bol SanVeg Plagas* 30: 257-267.
- Virla EG, Moya-Raygoza G, Rafael JA (2009) First record of *Eudorylas schreiteri* (Shannon) (Diptera: Pipunculidae), as a parasitoid of the corn leafhopper (Hemiptera: Cicadellidae) in Argentina, with a table of Pipunculid-host associations in the Neotropical Region. *Neotrop Entomol* 38: 152-154.
- Virla EG, Olmi M (2007) Dryinid (Hymenoptera: Chrysoidea) parasitoids of the corn leafhopper, *Dalbulus maidis* (Delong & Wolcott) (Hemiptera: Cicadellidae), in Argentina, with description of the male of *Gonatopus moyaraygozai* Olmi. *Interciencia* 32: 847-849.
- Virla EG, Olmi M (2008) Dryinidae, p.357-372. In Debandi G, Claps L E, Roig-Juñent S (eds) Biodiversidad de artrópodos argentinos. Vol II. Tucumán, SEA Ediciones Especiales, 599p.
-