BioOne COMPLETE

Egg Paeasitoids of Dalbulus maidis (Hemiptera: Cicadellidae) in Jalisco State, Mexico

Authors: Virla, Eduardo G., Albarracin, Erica Luft, and Moya-Raygoza, Gustavo

Source: Florida Entomologist, 92(3) : 508-510

Published By: Florida Entomological Society

URL: https://doi.org/10.1653/024.092.0316

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.

Downloaded From: https://bioone.org/journals/Florida-Entomologist on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use

EGG PARASITOIDS OF *DALBULUS MAIDIS* (HEMIPTERA: CICADELLIDAE) IN JALISCO STATE, MEXICO

EDUARDO G. VIRLA[1], ERICA LUFT ALBARRACIN[1] AND GUSTAVO MOYA-RAYGOZA[2]
[1]PROIMI-Biotecnología, Div. Control Biológico, Av. Belgrano y Pje. Caseros (T4001 MVB), San Miguel de Tucumán, Tucumán, Argentina

[2]Departamento de Botánica y Zoología, CUCBA, Universidad de Guadalajara, km 15.5 carretera Guadalajara-Nogales, Zapopan, C.P. 45110, Jalisco, Mexico
E-mail: gmoya@cucba.udg.mx

The corn leafhopper, *Dalbulus maidis* (Delong & Wolcott) (Hemiptera: Cicadellidae) is broadly distributed throughout the American continent, from southeastern and southwestern USA to Argentina. It is the most important leafhopper pest of maize, *Zea mays* L., in Latin America (Nault 1990), and causes great losses to corn crops because of its capacity to transmit efficiently corn stunt spiroplasma (CSS), maize bushy stunt phytoplasma (MBSP), and maize rayado fino virus (MRFV) (Nault & Ammar 1989).

Egg parasitoids are the most important natural enemies of leafhoppers (Freytag 1985). The known egg parasitoids of *D. maidis* comprise 4 taxa of Mymaridae, 4 of Trichogrammatidae, and 1 Eulophidae (Table 1), but none of these are known in Mexico, putative corn leafhopper origin center (Nault 1990).

In the laboratory, 6-10 females of *D. maidis*, which were 2 weeks old and obtained from Zapopan site, were placed in polyethylen-terephtalathe (PET) cylindrical cages (35 cm high × 18 cm diam.) on maize leaves in order to obtain sentinel eggs. Potted maize plants (pot of ca. 10 dm^3) in the vegetative stage (3 to 5 leaves) were checked daily for eggs. Twice, on 17 Aug and 23 Aug, 10 plants containing less than 24-h-old eggs were exposed in each site during 72-96 h. Potted plants containing sentinel eggs were placed inside the cornfield at no more than 3 m from the edge of the field. Sentinel eggs of *D. maidis* were exposed to parasitization in 2 cornfields in Jalisco State from Aug to Sep, 2008 at Zapopan site (20°44'40.2"N, 103°30'48.3"W, elevation 1,662 m), and El Grullo site (19°47'50.4"N, 104°12'43"W, elevation 869 m).

After 8 to 10 d, the leaves containing exposed eggs were cut from the plant in the laboratory and transferred to a petri dish with the bottom containing wet tissue paper and covered with clear plastic food wrapping to avoid desiccation, and to keep wasps from escaping. Parasitized eggs were checked daily to ensure leaf quality until the emergence of the adult wasps. The parasitization rates were not measured due to rotting or desiccation of some leaves containing exposed eggs.

TABLE 1. SUMMARIZED INFORMATION ABOUT THE KNOWN EGG PARASITOIDS OF *DALBULUS MAIDIS* (HEMIPTERA: CICADELLIDAE).

Family	Parasitoid species	Country	reference
Mymaridae			
	Anagrus breviphragma Soyka	Argentina, Brasil	(Triapitsyn 1997; Oliveira & Spotti Lopez 2000; Virla, 2001)
	Anagrus flaveolus Waterhouse	Argentina, Perú	(Marín 1987; Triapitsyn 1997)
	Anagrus nigriventris Girault	Argentina	Luft Albarracin et al. (2006)
	Anagrus sp.	Nicaragua	Gladstone et al. (1994)
Eulophidae			
	Aprostocetus (O.) infulatus De Santis	Argentina	Luft Albarracin & Triapitsyn (2007)
Trichogrammatidae			
	Oligosita sp.	Argentina, Brasil	(Oliveira & Spotti Lopez 2000; Luft Albarracin et al. 2005)
	Paracentrobia sp.	Argentina, Nicaragua	(Gladstone et al. 1994; Luft Albarracin et al. 2005)
	Paracentrobia subflava (Girault)	Argentina	Virla (1999)
	Zagella sp.	Argentina	Luft Albarracin et al. (2005)

Downloaded From: https://bioone.org/journals/Florida-Entomologist on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use

TABLE 2. NUMBER OF SPECIMENS AND PERCENT OF TOTAL EGG PARASITOIDS OF *DALBULUS MAIDIS*, OBTAINED FROM SENTINEL EGGS DURING SUMMER 2008 IN 2 SITES OF JALISCO, MEXICO.

Parasitoid species	Site El Grullo	Site Zapopan
Anagrus breviphragma	40 (9.5%)	495 (98.2%)
Polynema sp.	2 (0.5%)	0
Paracentrobia nr *subflava*	360 (85.9%)	9 (1.8%)
Aphelinoidea sp.	9 (2.2%)	0
Pseudoligosita sp.	8 (1.9%)	0
TOTAL	419	504

From the approximately 1600 exposed eggs, 923 wasps emerged. The specimens belonged to 5 species: 2 Mymaridae (*Anagrus breviphragma* Soyka and *Polynema* sp.), and 3 Trichogrammatidae (*Paracentrobia* nr *subflava*, *Aphelinoidea* sp., and *Pseudoligosita* sp.). *Anagrus breviphragma* and *P.* nr *subflava* were the most abundant taxa in the Zapopan site and El Grullo site, respectively, (Table 2).

Anagrus breviphragma belongs to the *incarnatus* species group, subgenus *Anagrus* s. str. It has a very broad distribution that includes Japan, England, France, Italy, Germany, Austria, Greece, Guadeloupe, Guyana, Colombia, Brazil, and Argentina (Chiappini 1989; Triapitsyn 1997). The known hosts for *A. breviphragma* are *Cicadella viridis* (L.), *Dalbulus maidis* (Cicadellidae), *Conomelus anceps* (Germar), *Delphacodes kuscheli* Fennah, *Dicranotropis hamata* (Boheman), *Muellerianella fairmairei* (Perris), *Peregrinus maidis* (Ashmead) (Delphacidae), and *Orthotylus virescens* (Douglas & Scott) (Miridae) (Triapitsyn 1997; Virla 2001).

The species of *Paracentrobia* is very close to *P. subflava* (Girault), but it has dense discal cilation in the forewings, between the areas delimited by the rows of the microtrichias, whereas in *P. subflava*, these areas are mostly bare, as reported by Girault in the original description, and in voucher specimens deposited in the entomological collection of La Plata Museum, Buenos Aires, Argentina (MLPA). We cannot yet determine the species of *Polynema*, *Aphelinoidea*, and *Pseudoligosita* because of the lack of specific keys to these genera.

Taking into account the importance of the corn leafhopper in Mexico and the lack of information about the egg parasitoid complex, we point out the need for a proper evaluation of this parasitoid guild and its influence on this leafhopper pest.

Slide-mounted and dried card-mounted voucher specimens resulting from this study were deposited in the collection of the Fundación e Instituto Miguel Lillo at San Miguel de Tucumán, Argentina (IMLA).

The research was carried out under the scientific and technological cooperation (nº 0710) between Mexico (CONACYT) and Argentina (MINCyT). Erica Luft Albarracin is a CONICET fellowship holder.

SUMMARY

A survey of eggs parasitoids of the corn leafhopper, *Dalbulus maidis* (DeLong & Wolcott) was conducted in Jalisco State, Mexico. Samples were collected during the summer of 2008 with sentinel eggs. Five taxa, *Anagrus breviphragma* Soyka and *Polynema* sp. (Mymaridae), *Paracentrobia* nr *subflava*, *Aphelinoidea* sp., and *Pseudoligosita* sp. (Trichogrammatidae) were reared. This is the first reference to an egg parasitoid complex of the corn leafhopper in Mexico, and *A. breviphragma* is recorded for the first time occurring in Mexico.

REFERENCES CITED

CHIAPPINI, E. 1989. Review of the European species of the *Anagrus* Haliday (Hymenoptera Chalcidoidea). Boll. Zool. Agr. e Bachic., II, 21: 85-119.

FREYTAG, P. H. 1985. The insect parasites of leafhoppers, and related groups, pp. 423-467 *In* L. R. Nault and J. Rodriguez [eds.], The leafhoppers and Planthoppers. John Wiley & Sons, New York, 500 pp.

GLADSTONE, S., DE LA LLANA, A., RIOS, R., AND LOPEZ, L. 1994. Egg parasitoids of the corn leafhopper *Dalbulus maidis* (De Long & Wolcott) (Homoptera: Cicadellidae) in Nicaraguan maize. Proc. Entomol. Soc. Washington 96: 143-146.

LUFT ALBARRACIN, E., VIRLA E., AND TRIAPITSYN, S. 2005. Diversidad e incidencia de los parasitoides oófilos del vector del Achaparramiento (CSS), *Dalbulus maidis* (Hemiptera, Cicadellidae), en Tucumán, Argentina, VIII Congreso Nacional de Maíz, Rosario, Argentina. p. 258-261.

LUFT ALBARRACIN, E., VIRLA E. G., AND TRIAPITSYN, S. V. 2006. A new host record for the egg parasitoid *Anagrus nigriventris* (Hymenoptera: Mymaridae) of the corn leafhopper, *Dalbulus maidis* (Hemiptera: Cicadellidae). Florida Entomol. 89: 284-285.

LUFT ALBARRACIN, E., AND TRIAPITSYN, S. V. 2007. *Aprostocetus* (*Ootetrastichus*) *infulatus* (Hymenoptera: Eulophidae): description of the male, new distribution and first host records. Zootaxa 1438: 65-68.

MARÍN, R.1987. Biología y comportamiento de *Dalbulus maidis* (Homoptera: Cicadellidae). Rev. Peruana Entomol. 30: 113-117.

Downloaded From: https://bioone.org/journals/Florida-Entomologist on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use

NAULT, L. R. 1990. Evolution of an insect pest: maize and the corn leafhopper, a case study. Maydica 35: 165-175.

NAULT, L. R., AND AMMAR, D. 1989. Leafhopper and planthopper transmission of plant viruses. Annu. Rev. Entomol. 34: 503-529.

OLIVEIRA, C., AND SPOTTI LOPEZ, J. 2000. Parasitoides de ovos da cigarrinha-do-milho, *Dalbulus maidis* (DeLong & Wolcott) (Hemiptera: Cicadellidae), em Piracicaba. Rev. Agric. 75: 263-270.

TRIAPITSYN, S. V. 1997. The genus *Anagrus* (Hymenoptera: Mymaridae) in America south of the United States: a review. CEIBA 38: 1-12.

VIRLA, E. G. 1999. Aportes acerca de la bionomía de *Paracentrobia subflava* (Hymenoptera: Trichogrammatidae), parasitoide de Hemipteros Cicadeloideos argentinos. Rev. Soc. Entomol. Argentina 58: 17-22.

VIRLA, E. G. 2001. Notes on the biology of *Anagrus breviphragma* (Hymenoptera: Mymaridae), natural enemy of the corn leafhopper *Dalbulus maidis* (Hemiptera: Cicadellidae) and other plant diseases vectors in South America. Bol. Sanidad Veg. "Plagas" 27: 239-247.

Downloaded From: https://bioone.org/journals/Florida-Entomologist on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use