

IMPORTATION OF PARASITOIDS OF *HOMALODISCA* AND OTHER PROCONIINI GENERA FROM NORTHWESTERN MEXICO FOR BIOLOGICAL CONTROL OF THE GLASSY-WINGED SHARPSHOOTER

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ABSTRACT

Nine species of Mymaridae and Trichogrammatidae parasitic on eggs of Proconiini sharpshooters were collected in northwestern Mexico in relation to biological control of glassy-winged sharpshooter, *Homalodisca vitripennis* (Germar) in California. These included an unidentified (likely new) species of *Gonatocerus* Nees (Mymaridae), an egg parasitoid reared from Proconiini eggs in Sonora state, Mexico. The other species, also reared from Proconiini eggs in Sonora and Sinaloa, included *Gonatocerus atriclavus* Girault, *Gonatocerus morrilli* (Howard), and *Gonatocerus novifasciatus* Girault, and the trichogrammatids *Burksiella* sp(p.), *Paracentrobia* sp., *Pseudoligosita* sp., *Ufens ceratus* Owen, and *U. principalis* Owen. Colonies of *Gonatocerus atriclavus*, *Gonatocerus novifasciatus* and *Pseudoligosita* sp. were successfully established in the quarantine laboratory of the Department of Entomology, University of California, Riverside (UCR), on eggs of the glassy-winged sharpshooter.

INTRODUCTION

Species of Mymaridae and Trichogrammatidae are common parasitoids of Proconiini sharpshooter eggs, such as glassy-winged sharpshooter (GWSS) [*Homalodisca vitripennis* (Germar)]. GWSS is native to the southeastern U.S. and northeastern Mexico, and became established in California ca. 1990 (Sorensen and Gill 1996). The economic importance of GWSS stems mostly from its efficiency as a vector of *Xylella fastidiosa*, which is the causal agent of Pierce's disease in grapes, among other important diseases. Substantial research emphasis has been placed thus far on importation biological control of GWSS. To date, two approaches to importation biological control of GWSS in California are being followed. The "classical" approach of reuniting an exotic pest, such as GWSS, with its coevolved natural enemies from the pest's area of origin is being explored via importation of parasitoids from the southeastern U.S. and northeastern Mexico. The "neoclassical" approach of importing non-coevolved natural enemies (i.e. parasitic on closely related host species) against exotic pests is being explored via importation of parasitoids from Minnesota (*Anagrus epos* Girault), southeastern Mexico, and Argentina.

The long-term goal of the activities described herein was to contribute to neoclassical biological control efforts against GWSS, through importation of natural enemies from central- and north-western Mexico. At least six species of Proconiini were known from those areas, though it was doubtful that GWSS occurred there (MacGregor and Gutiérrez 1983, Pacheco Mendivil 1985, Takiya 2006). A neoclassical approach against GWSS was considered promising because efforts to date have not uncovered effective natural enemies in the pest's native range, and because closely related host species occur in central- and north-western Mexico. This report presents the results of activities aimed at surveying and collecting egg parasitoids of Proconiini in the Mexican states of Colima, Jalisco, Nayarit, Sinaloa, and Sonora between July 2006 and June 2007.

OBJECTIVES

1. Import to California via UC Riverside quarantine parasitoids of *Homalodisca* spp. and other Proconiini from the Mexican states of Jalisco, Nayarit, Sinaloa, and Sonora.
2. Systematically document the parasitoid fauna associated with *Homalodisca* spp. and other Proconiini genera in the Mexican states of Jalisco, Nayarit, Sinaloa, and Sonora.

RESULTS

Proconiini collections

Adult specimens of seven Proconiini species were collected and identified from the states of Colima, Jalisco, Sinaloa, and Sonora. These included *Cyrtodisca major* (Signoret), *Homalodisca insolita* (Walker), *Phera centrolineata* (Signoret),

Homalodisca liturata Ball, and three unidentified species of *Oncometopia* Stål. Adult Proconiini were not collected in Nayarit.

Egg masses of Proconiini were shipped to UCR from Sinaloa and Sonora, and these were of *Oncometopia* sp., or *Homalodisca liturata*, respectively. Egg masses were not found in the states of Jalisco, Colima, and Nayarit.

Parasitoids of Proconiini eggs

Mymaridae

Gonatocerus sp.: One unidentified species of *Gonatocerus* was reared from eggs of Proconiini collected in Sonora. This is likely a new species of solitary parasitoid, and its taxonomic description will be published separately.

Gonatocerus atriclavus Girault: This species was reared from eggs of Proconiini collected in Sinaloa. *Gonatocerus atriclavus* is being reared under laboratory conditions on GWSS eggs on *Euonymus japonica* leaves. It is a solitary parasitoid, producing one adult per each host egg.

Gonatocerus morrilli (Howard): This species was reared from eggs of Proconiini collected in Sonora. It is a common, solitary egg parasitoid of various Proconiini in the southern U.S., and Mexico.

Gonatocerus novifasciatus Girault: This species was reared from eggs of Proconiini collected in Sonora. *Gonatocerus novifasciatus* was being reared under laboratory conditions on GWSS eggs on *E. japonica* leaves, though was discontinued after only males were obtained in the F2 generation. It is a solitary parasitoid.

Trichogrammatidae

Burksiella sp(p).: One or several species of *Burksiella* were reared from eggs of Proconiini collected in Sinaloa, and Sonora. This (or these) species are solitary parasitoids. Specific identifications are pending.

Paracentrobia sp.: This species was collected from eggs of Proconiini collected in Sonora. At least two other congeners in the Nearctic region are parasitic on Proconiini eggs (Triapitsyn 2003; Tipping et al. 2005). Specific identification is pending.

Pseudoligosita sp.: This species was collected from Proconiini eggs in Sonora. *Pseudoligosita* sp. is being reared under laboratory conditions on GWSS eggs on *E. japonica* leaves. *Pseudoligosita* sp. is a gregarious parasitoid, producing two to four adults per each egg of GWSS. Specific identification is pending.

Ufens ceratus Owen: This species was reared from eggs of Proconiini collected in Sonora. *Ufens ceratus* is a common parasitoid of GWSS eggs in southern California, and of eggs of other proconiine sharpshooters in Mexico and the U.S. (Al-Wahaibi et al. 2005).

Ufens principalis Owen: This species was collected from eggs of Proconiini collected in Sonora. *Ufens principalis* is a common egg parasitoid of *Homalodisca liturata* in southern California, and of GWSS in California (Al-Wahaibi et al. 2005).

CONCLUSIONS

At least seven species of Proconiini were found in the central- and north-western states of Colima, Jalisco, Nayarit, Sinaloa, and Sonora between July 2006 and July 2007: *Cyrtodisca major*, *Homalodisca insolita*, *Phera centroleinata*, *Homalodisca liturata*, and three species of *Oncometopia*. Proconiini egg masses were found and shipped to UCR from Sinaloa and Sonora. These egg masses yielded at least nine species of Mymaridae and Trichogrammatidae parasitoids: *Gonatocerus* sp., *Gonatocerus atriclavus*, *Gonatocerus morrilli*, and *Gonatocerus novifasciatus*, and *Burksiella* sp(p)., *Paracentrobia* sp., *Pseudoligosita* sp., *Ufens ceratus*, and *Ufens principalis*, respectively. Colonies of *Gonatocerus atriclavus*, *Gonatocerus novifasciatus* and *Pseudoligosita* sp. were successfully established UCR quarantine on eggs of GWSS.

Discovery of apparently new species of both Proconiini sharpshooters and parasitoids of their eggs, and successful rearing of three parasitoid species by the midpoint of the project's tenure is encouraging because observations and experiences to date will facilitate further searching in Mexico and successful colonization at UCR quarantine. Search efforts in 2007-2008 will focus on Colima, Jalisco, and Nayarit states, where egg masses have to date not been found, and intensive re-sampling of sites and host plants at localities in Sinaloa and Sonora states, where Proconiini and parasitoids have thus far been found. Efforts will continue at UCR quarantine to rear any novel parasitoids received from Mexico, and maintain existing parasitoid cultures.

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