

Preparedness in biological control of priority biosecurity threats

Glassy-winged sharpshooter, *Homalodisca vitripennis* (Germar)

Introduction

The glassy-winged sharpshooter (GWSS), *Homalodisca vitripennis* Germar (Hemiptera: Cicadellidae), is native to southeastern USA and northeastern Mexico (Haviland et al. 2021). GWSS spread to California where it is considered a major economic threat to the grape and wine industry. GWSS is a major vector of *Xylella fastidiosa*, a xylem-limited bacterium, responsible for several devastating plant diseases, including Pierce's disease in grapevines. GWSS has been accidentally introduced to Hawaii, Cook Islands, Easter Island, and French Polynesia. In California and French Polynesia, populations reached extraordinarily high densities (Grandgirard et al. 2009; Banks et al. 2019). Chemical control has been widely used for managing the pest in California but a resurgence in GWSS populations occurred after 2012 due to the development of imidacloprid resistance (Haviland et al. 2021), highlighting the need for more sustainable and long-term management options.

History of classical biological control against *Homalodisca vitripennis*

Biological control of *H. vitripennis* is considered extremely successful. Egg parasitoid species within the mymarid genus *Cosmocomoidea* (= *Gonatocerus*) have received specific attention, including *Cosmocomoidea ashmeadi* (Girault), *Cosmocomoidea triguttatus* Girault, *Cosmocomoidea morrilli* Howard, *Cosmocomoidea morgani* (Triapitsyn), *Cosmocomoidea fasciatus* (Girault) and *Cosmocomoidea walkerjonesi* (Triapitsyn) (Lytle and Morse 2012). Several species have been mass-reared and released in California, but to date, *C. ashmeadi* is the most widely used natural enemy to control this pest, having been introduced to California, French Polynesia, and Cook Islands (Lytle and Morse 2012). In California, egg parasitoids showed their potential in providing efficient control of *H. vitripennis* with parasitism often reaching 100% between June and October.

Most promising natural enemies

The introduction of *C. ashmeadi* to French Polynesia in 2005 has provided significant parasitism of GWSS (80-100%). Populations of GWSS have declined by over 90% since the end of 2005, with similar results in all other islands where *C. ashmeadi* has been introduced (Grandgirard et al. 2009). In California, *C. ashmeadi* has also caused GWSS population decline (Banks et al. 2019). Due to its success in other countries, *C. ashmeadi* has been identified as a potential candidate for control of *H. vitripennis* in New Zealand, if the pest established there. Results from a CLIMEX model predict that *C. ashmeadi* would be limited to the warmer northern part of New Zealand (Charles and Logan 2013).

Cosmocomoidea walkerjonesi, another egg parasitoid, has a complementary effect on the control of GWSS populations. While this species has been less studied than its close relative *C. ashmeadi*, it may be of particular interest for GWSS populations distributed into cooler climatic regions such as those of central California or coastal areas. A study led in California by Lytle and Morse (2012) showed that *C. walkerjonesi* was the most abundant parasitoid detected in coastal areas.

Other natural enemies



Network for phytosanitary research coordination and funding



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The parasitoid species discussed above appear to be the main natural enemies of GWSS.

References

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