



Presentation information

Symposium

3. Biological Control

[3-2] Classical Biological Control of Arthropod Pests: Theoretical Premise and Practical Challenges

Mon. Aug 26, 2024 1:30 PM - 6:15 PM Room B-2

Chair: Jian J Duan (U.S. Department of Agriculture), Mark Hoddle (University of California Riverside), Nicole F Quinn (University of Florida / Institute of Food and Agricultural Research)

4:30 PM - 4:45 PM

[3-2-10] Classical biological control of BMSB in apple orchard; a successful story?

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The brown marmorated stink bug (BMSB), *Halyomorpha halys* (Stål, 1855) (Hemiptera: Pentatomidae) is a polyphagous, invasive insect of economic concern to agricultural production. Native to eastern Asia, BMSB was first recorded outside its native range in the United States in the mid-1990s and in Europe almost 10 years later. Since then, BMSB has become one of the most serious pests of Italian fruit orchards, including apple, where its control relies heavily on pesticide applications. Due to the revitalized interest in classical biological control, *Trissolcus japonicus* (Ashmead), a native BMSB parasitoid, was identified as the most effective and specialized biocontrol agent. Following a comprehensive risk assessment submitted by Italian scientific institutions and phytosanitary services to the Italian Ministry of Ecological Transition in 2020, the release of *T. japonicus* was authorized in five regions and two autonomous provinces. We report here the results of the four-year release program implemented in the autonomous province of Trento (northeastern Italy), one of the most relevant apple production areas in Europe. The total area of apple orchards is about 10,000 hectares, accounting for 23 percent of the total apples produced on the fresh market in Italy. In this area, large populations of *H. halys* have been recorded since 2017. Control strategies were based on weekly trap catches, sampling insects with the beating method and estimating fruit infestation through visual inspections in approximately 300 highly exposed warning orchards. Fifty-three release sites were selected after checking for the presence of *H. halys* individuals and/or attractive host plant species and

the absence or reduction of chemical inputs. Each site received three releases of 100 females and 10 males each year, three weeks apart, from late June to mid-August. The establishment of *T. japonicus* was ascertained by sampling the egg masses of pentatomids, which were examined to determine both the host species and any oophagous species present. During the four years, the number of sites where *T. japonicus* established gradually increased up to 70%. The percentage of parasitized egg masses reached 69.2% and the percentage of parasitized egg was 41.4%. *T. japonicus* also emerged from egg masses of two nontarget stinkbugs, *Pentatoma rufipes* and *Palomena prasina*, as well as from a nontarget species, *Graphosoma lineatum*. The average apple damage at harvest decreased significantly from 7 to 1.5%. The average number of insecticide applications decreased from 2.6 to 0.8 treatments/year, and the orchards not requiring insecticide applications for BMSB control increased from 14 to 54%. Although both the results obtained, considering the numerous biotic and abiotic variables at play, and the trend of biological control of BMSB needs to be confirmed in the coming years, the data so far seem to indicate good prospects for the scientific and practical success of the project.