IMPORTATION AND ESTABLISHMENT OF *LYGUS HESPERUS* NYMPHAL PARASITOIDS IN CENTRAL CALIFORNIA

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Abstract

We report on an ongoing effort to establish nymphal parasitoids that attack the western tarnished plant bug, Lygus *hesperus* (Hemiptera: Miridae). *Lygus hesperus* is a serious pest in California of cotton, strawberries and most seed crops. Parasitoids have been imported and released in central California since 1998 for their permanent establishment. Our first field releases were made into a ½ ac plot of alfalfa at our insect rearing facility in Sacramento August 1998. *Lygus hesperus* nymphs exposed to *Peristenus stygicus* (ex. Southern France; Hymenoptera: Braconidae) were released into this plot. During summers 1999, 2000, and 2001 a combination of both parasitized nymphs and adult *P. stygicus* and *P. digoneutis* were released at 4 to 7 locations in central California and details are reported in respective annual reports for CDFA's Biological Control Program: http://plant.cdfa.ca.gov/biocontrol. In 2001, we made releases into 7 locations consisting of both commercial alfalfa fields and managed plots at experiment stations. We added three new commercial release sites and dropped others with consistently low Lygus populations.

Parasitoids have been collected by CABI Bioscience and the USDA-ARS European Biological Control Laboratory from 1997 to 2001. Insects have been collected in Europe from alfalfa fields infested with Lygus *rugulipennis*. *Peristenus stygicus* has been collected from Spain, Italy, and France while a second species, *Peristenus digoneutis* has been collected from Italy and Spain. CDFA has increased Lygus production over the last four years which has, in turn, supported an increased number of Lygus parasitoids for field release. In addition CDFA has contracted with Agriculture Canada to produce *Peristenus digoneutis*.

Approximately 1100 parasites were released in fall of 1998, then 6000, 15,000, and 14,710 during summers of 1999, 2000, and 2001, respectively. By maintaining year-round production of parasitoids in Sacramento, we were able to increase the overall yearly production as well as begin field releases earlier in the year. The earlier in the summer that releases are made, the greater the number of parasitoid generations produced, and hence, higher the probability for permanent colonization.

We made our first overwintering recovery of *Peristenus stygicus* at CDFA's Sacramento release site spring 2000. *Peristenus stygicus* was also recovered in spring 2001, prior to additional releases, at the CDFA and UCD sites. These parasitoids persisted from releases made in fall 1999 to May 2000 and from fall 2000 to spring 2001 showing that they can reproduce and survive during this period of time. The proportion of Lygus parasitized at the CDFA site has increased from 3% (n=30) in May 2000 to an annual maximum of 34 % (n=32) August 2001. We recovered parasitoids this last year, summer 2001 from 6 of 7 sites where we made repeated releases beginning in late spring/early summer. The sites where no parasites were recovered had low (~0.5 nymphs per sweep) Lygus populations all summer. All recovered parasitoids have been identified as P. stygicus.