

Evaluation of the potential for permanent establishment of the *Lygus* parasitoid, *Peristenus relictus*, in the southern San Joaquin Valley

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Background and Justification

The western tarnished plant bug and other lygus species are key pests of cotton in western arid cotton production regions, and the lygus complex has become increasingly important in other US cotton production regions. Lygus adults are active fliers and periodically redistribute among the many crop and non-crop hosts within the agricultural landscape. Because the principle management tactic for lygus in cotton relies on use of conventional pesticides, efforts to control lygus may result in environmental contamination or induction of secondary pests. Ecologically-based management tactics that lower the equilibrium population level of lygus would reduce the incidence of injurious lygus populations in cotton, and thereby reduce the costs and potential ecological consequences associated with pesticide use. A braconid parasitoid (*Peristenus relictus*) that attacks lygus nymphs has been established in the coastal regions of California, but efforts to establish this natural enemy in the Central Valley were unsuccessful. Recently, a strain of *P. relictus* was collected from plant bugs in Morocco, and this strain is thought to possess sufficient tolerance to high ambient temperatures to permit establishment in the southern San Joaquin Valley. Successful establishment of this parasitoid could contribute to efforts to better manage lygus on a landscape scale.

We propose to apply inoculative releases of *P. relictus* over a 3-year period in insecticide-free alfalfa, and to monitor seasonal occurrence of the parasitoid to evaluate the effectiveness of such releases in achieving permanent establishment.

Objectives

The objective of the project is to evaluate the potential for permanent establishment of the Moroccan strain of *P. relictus* in the southern San Joaquin Valley of California.

Procedures

A plot of alfalfa between 1 and 2 acres in area was established and divided into three sub-plots. The alfalfa was managed without insecticides, and was mowed in narrow (6 ft) strips using a sickle-bar mower such that one third of the total area was mowed every 1-2 weeks. Mowing in alternating strips was intended to promote development of high population levels of lygus nymphs. During the first summer of the study, collections of ≥ 50 third- through fifth-instar nymphs were collected biweekly between early-May and early-July. Collected nymphs were placed in vials of alcohol and shipped to the collaborator (C. Pickett) for examination to detect background levels of parasitism. Beginning in early-July and at about three-week intervals, 500-600 adult *P. relictus* adults were released into the alfalfa. A total of three parasitoid releases

were made during the summer of 2009. One additional sample of nymphs will be collected during the early fall of 2009 to estimate the incidence of parasitism. Additional releases of adult parasitoids are scheduled for the spring and summer of 2010 and 2011. During the third spring and summer of the project, the alfalfa will be sampled biweekly to estimate population levels of lygus nymphs and parasitoids. Overwintering potential and establishment of the parasitoid will be assessed based on the incidence of parasitism observed in late-winter or early-spring lygus collections.

Results

Field samples verified that management of the alfalfa by strip-cutting resulted in high population levels of lygus nymphs. Dissection of nymphs collected during 2009 did not indicate the presence of *P. relictus* before the time of the first parasitoid release.