

Peristenus spp. Surveys in the San Joaquin Valley

Shannon Mueller, Farm Advisor, UC Cooperative Extension, Fresno County

A tiny parasite of lygus bug nymphs, *Peristenus digoneutis*, was released in alfalfa at the Parma Idaho Research & Extension Center in 1996, 1997, and again in June 1998. *Peristenus digoneutis* is a member of the parasitic wasp family Braconidae, and has successfully established in New York, New Jersey, Delaware, and Quebec since its introduction there in the 1980's. In the eastern US, it has resulted in a 30% reduction of the eastern tarnished plant bug, a Lygus species that also occurs in Idaho and is closely related to our western tarnished plant bug, *Lygus hesperus*. The newly introduced parasite is a native of Western Europe and was brought to the US to aid in the biological control of Lygus bugs. It does not parasitize other insects in the Northwest.

Researchers in Idaho recovered *P. digoneutis* from *Lygus hesperus* nymphs collected in alfalfa at the Parma Research and Extension Center in 1997 and 1998. They reared them to maturity at the USDA Beneficial Insects Research Laboratory in Newark, Delaware. Among the thousands of nymphs reared for parasite development, three *P. digoneutis* wasps were recovered from the hundreds of wasps reared. This confirms the susceptibility of western Lygus to the parasite in the wild, but because of small numbers, it is too early to say it has established.

Through weekly lygus sampling and dissection in 1997 and 1998, it became apparent that a related *Peristenus* parasite occurs naturally in Lygus bugs in alfalfa at Parma, ID. These parasites have also been documented in several locations in Washington (Mayer et al, 1998). Although previously thought to be a rarity, parasitism of Lygus bug nymphs in the Pacific Northwest occurs from one or more naturally occurring *Peristenus* parasites. During the last two summers, researchers dissected hundreds of 3rd, 4th, and 5th instar lygus nymphs from unsprayed and uncut alfalfa and found 70-80% parasitized by the larvae of these naturally occurring wasps during mid-summer. Parasitism levels were 0-8% in Caldwell, ID from an unsprayed hay field. Several parasites were reared to adulthood and identified as *Peristenus* sp., but the species could not be determined except to say it is not the introduced *P. digoneutis*. It has now been reported that this is a new species that has never been formally described in the scientific literature.

The parasite normally attacks the 1st and 2nd instars of lygus. The lygus nymphs continue to grow and develop, but do not mature and cannot reproduce. In 1997, in Idaho, parasite populations peaked in June and stayed high through the latter part of the season. In 1998, populations also peaked in June, but dropped off through September.

Last year, Dan Mayer (Washington State University) designed a study to determine if a 15-inch sweep net could be used to collect and identify adult *Peristenus*. Collections were done during June from 40 different fields. One sample collected on 22 June had one adult *Peristenus*. No *Peristenus* were found in any of the other samples. They also dissected 259 lygus bugs collected in Oregon and did not find any *Peristenus* in the lygus.

Here in the San Joaquin Valley, samples were collected on a weekly basis between late June and mid-September to determine whether the new species of *Peristenus* occurs in California. Approximately 100 2nd-4th instar lygus nymphs were aspirated from a sweep net into a cardboard carton containing excelsior. A small amount of clipped alfalfa foliage was also placed in the carton. A sponge fitting into the lid was moistened to maintain humidity and the nymphs were shipped overnight express to Bill Day at the USDA-ARS Beneficial Insects Laboratory in Newark, DE.

Upon receipt, half of the population was immediately frozen for later dissection, and the other half of the population was reared out in cages to grow the parasite. Dissection of the frozen insects allows for more precise measurement of percent parasitism, but samples must also be reared to late stage nymphs and adults to obtain adult parasites for identification. Parasite populations may be either diapausing or non-diapausing. For non-diapausing generations, it takes 45 days to identify the level and species of parasite. A diapausing population must be kept for 1 year, and then reared through adulthood to identify the level of parasitism and species of parasite.

Bill reported good survival of the shipped parasites, but in all of the samples submitted in 1998, there were no non-diapausing parasites. Samples will be maintained for a year and then analyzed to determine the presence of a diapausing population, but at this stage, it does not appear that the parasite occurs naturally in sufficiently high populations to assist alfalfa seed growers in lygus control.

The background information in this report is taken from a research report presented on February 2, 1999 by Dr. Craig Baird, University of Idaho, at the Northwest Alfalfa Seed Growers Association Winter Seed Conference in Reno, NV.

Mayer, D.F., C.R. Baird, B. Simko. *Peristenus* (Hymenoptera: Braconidae) parasitism of *Lygus hesperus* in the Pacific Northwest. Accepted for publication in Journal of British Columbia Entomological Society, 1998.