

Final report, SARE project FNE99-236
Demonstration of the Effectiveness of *Pediobius* for Control
of Mexican Bean Beetle and Squash Beetle
Kathy Caruso, May 9, 2000

Since starting our farm in 1986 one of our main crops has been beans, numerous varieties; green beans, yellow beans, purple beans, lima beans, shell beans, edamame, to name a few, along with other gourmet varieties. We would always plant extra to accommodate the loss imposed on us by the Mexican bean beetle. Consistently our bean harvests would end by Labor Day each year and depending on particular conditions in any one summer, often our crops would be devastated by mid to late August. Using appropriate natural/organic sprays was dependent completely on weather conditions. If it rained we had to re-spray next day - if we were unable to re-spray the beetles would get even further in their destruction. We had to make sure of the proper spray for the density of infestation, often times leading us to purchase another type of spray. We would finally give in to the beetles and plow our crops under; usually the end of August and always by Labor Day. The beetles were just too much to contend with. When Kim Stoner announced her intent to study *Pediobius* wasp for control of the Mexican bean beetle I jumped at the chance to become part of the study. Between 1987 and 1997 we would harvest anywhere from 15 to 35 bushels per season, depending on weather and most importantly bean beetle infestation. We experienced a dramatic change in our harvest of beans in 1998. On October 30, 1998 we picked our final bushel of beans, bringing the total bushels harvested to 58 for the season. In spite of the drought we experienced in 1999 we harvested a record of 72 bushels of beans which accounted for approximately \$4000 in sales, (a significant figure for our small farm). It is my plan to keep the *Pediobius* wasp as a permanent part of our farm's cultural practices. It has become essential to the ecological and financial success of our farm. *Pediobius* not only saved our bean crops but has enabled us to increase our plantings and lengthen our harvest time to mid-to-end of October resulting in a huge increase in bean sales. The *Pediobius* wasp is here to stay in Cromwell, Connecticut.

Kim Stoner's addition to the report:

We did releases of *Pediobius* in both 1998 and 1999 (the year of the grant). We obtained the wasps from the New Jersey Department of Agriculture in 1998 and from the Maryland Department of Agriculture in 1999. They are also available commercially.

The wasps lay their eggs in Mexican bean beetle larvae, starting in the second instar. Timing of release of the wasps is probably important in getting good results. The first year, we put out mummies (parasitized and killed Mexican bean beetle larvae with wasps inside as pupae -- about 20 wasp pupae per mummy), and we set them out twice: once when we started finding Mexican bean beetle eggs, and then one week later. The second year, we released adult wasps. We scouted for Mexican bean beetle eggs in the field and flagged any egg masses we found. Then, we returned and examined the egg masses and the larvae, and tried to make the first release as close to the first molt (from 1st to 2nd instar) as we could. Then, we made two more releases, one week and two weeks later.

In sites like Kathy's farm with a history of Mexican bean beetle damage, there is generally damage to early bean plantings by the first generation larvae as the wasps go through their first generation. Only when the wasps have been able to multiply in the field do they bring the beetle population under control. Thus, the control worked well in Kathy's late season plantings. The control in the first year may have carried over as a lower initial beetle population in the second year. We are currently studying this possibility. The wasp itself does not survive the winter. We were able to use a lower release rate at Kathy's farm in the second year (2 wasps per square meter) than in the first year (about 60 wasps per square meter) and get better control.