



University of California Cooperative Extension
KERN FIELD CROPS



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Big-eyed Bugs, Trichogramma wasps, Green lacewings, and the Cotton Aphid Fungus. It's a bug eat bug world and that includes these and other imported assassins brought in to finish the job. Cotton insect pests in the San Joaquin Valley cause an estimated \$47,000,000 in damage annually. Unchecked, they would completely decimate the crop. To combat the problem, cotton growers use a combination of cultural and chemical practices. Integrated Pest Management (IPM) seeks a balance between yield and product quality losses and pesticide usage. Pesticides (herbicides, insecticides, fungicides, miticides, insect growth regulators, and nematicides) have been a boon to American agricultural producers and consumers. Plentiful quality farm products have filled the shelves of stores at affordable prices.

Americans spend from 12 to 20% of their income on food. In other countries, it can often exceed 80%. A combination of increasing environmental awareness, decreasing farm product prices and increasing cost of chemical pest control have combined to prompt the adoption of different pest control measures.

Scientists around the world and from all different disciplines use their unique expertise to bring together and develop an effective integrated pest management system. Cultural practices of crop rotations, alternate host management, weather monitoring and prediction models, intense scouting and efficacy trials are all combined into a management system to optimize productivity and reduce the use of and dependence on chemical control measures. At the heart of the system is the use of plant resistance and natural enemies. Scientists scout the world looking for native plants that are resistant to insects and diseases. Those plants are then included in breeding programs to develop new breeding lines and varieties. It is a mad and constant rush. It takes many years to develop a new variety and as new disease resistant genes are incorporated in varieties, the disease organism responds by altering its form into a new race that is not affected. And the cycle begins again.

The Pink Bollworm has been kept in check in the San Joaquin Valley through a combination of a cultural practice (a host free period) and the release of sterile moths to overwhelm the natural population. The program has successfully controlled this potentially devastating pest for 30 years without the use of chemicals. To duplicate this type of program for other pests, scientists study insects to determine everything about their life cycle and at what growth stage they are the easiest and most

economical to control. At the University of California Shafter Research and Extension Center, a cooperative effort is under way to find other non-chemical cotton pest control measures. Researchers from the University of California, California Department of Food and Agriculture, and USDA Agricultural Research Service are hard at work investigating control methods for cotton pests such as lygus and cotton aphid. Several insect species and fungi from other cotton growing regions around the world are being studied to determine if they are potential cotton insect parasites. Two Hymenoptera insects, *Aphelinus near paramali* and *Aphelinus gossypii* Timberlake, have been studied in enclosed cages and in open field releases for four years. They have been effective in reducing cotton aphid densities and have successfully reproduced in the natural environment. Before these imported assassins are released, extensive research has been conducted to be sure that they will not become a pest problem of their own. Additional studies are continuing. Fungal pathogens of aphid are rare in the San Joaquin Valley.

The release of one fungal species, *Neozygites fresnii*, has shown some promise. It has been able to cause 50% mortality in some release sites and has spread from the release site. Additional research and funding is needed to continue this work.

Cotton researchers from these and other agencies are committed to finding alternative methods of insect control. It is a long and arduous process but worth the effort for continued profitable crop production and environmental responsibility.