

# MANAGEMENT OF KEY COTTON ARTHROPOD PESTS WITH INSECTICIDES AND ACARICIDES

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## Introduction:

Integrated pest management is an accepted tool in dealing with cotton pests. Insecticidal control of the key cotton arthropod pests in California is a major component of our cotton IPM programs. Are insecticides the only answer and a long-term solution? No, for several reasons. First, insecticides must be compatible with biological control; this natural control is very important in California cotton. Studies should be conducted to determine the effects of registered and new insecticides on natural enemies and therefore the best means to integrate these two tactics. Changes in registration guidelines, such as the Food Quality Protection Act, alter the available suite of insecticides. This requires constant attention. Resistance build-up in pests render some materials ineffective and means that new products have to be worked into the system. Finally, new products are being developed and must be evaluated under California conditions. Therefore IPM programs must be continuously refined because of emerging new pests, different cotton varieties, varying agronomic/production practices, changing insecticide resistance patterns, and new registered insecticides.

We have evaluated product efficacy on spider mites (1997 and 1998), cotton aphids (1997), and lygus bugs (1997) at the West Side Research and Extension Center and on lygus bugs, cotton aphids, and spider mites at Shafter Research and Extension Center in 1998. Different issues surround integrated management for each of the key arthropod pests of cotton. In summary, maintaining susceptibility is of utmost importance in spider mites. In addition, the array of products all have some limitations and niche uses so what looks like a long list of products really isn't. The difficult to control spider mites at Shafter in 1998 resulted in research plot work being done at that location in 1999 to further evaluate this. The primary issue for lygus bug management in SJV cotton is selectivity and effects on beneficials. These treatments are generally applied first during the growing season when populations of natural enemies are expanding. Several products, namely pyrethroid insecticides provide excellent lygus bug control, but they are toxic to predators and parasites. This hastens and promotes outbreaks of spider mites and particularly cotton aphids.

A selective, but highly effective lygus material is severely needed. One product thought to fill this void, Regent®, flared spider mites in my 1998 testing. This warranted further research in 1999. Cotton aphid is the third major arthropod pest on SJV cotton. During the squaring and boll-filling period, high populations of cotton aphids can develop. Control of cotton aphids with insecticides is erratic. Following repeated exposure, aphids develop insecticide resistance quickly; in addition, cotton aphid control with insecticides is influenced by environmental and agronomic conditions. Additional research on cotton aphid control was conducted in 1999.

There are numerous new products that are in the registration pipeline. Most of these products fulfill the “reduced risk” guidelines put forth by EPA and they are characterized by low toxicity to mammals, specificity to pests, short residual, etc. The FQPA actions to ban many of the existing insecticides has fueled these efforts. Microbial products, insect growth regulators, fermentation products from microbes, anti-feedants, etc. are all being developed. The research community has clamored for these less toxic alternatives for many years; now the challenge is to determine how these products can best be used.

#### **PROTOCOL:**

Replicated field plots were established to evaluate the effect of registered and experimental compounds on cotton aphids, spider mites, and lygus bugs. The spider mite work in 1999 was conducted at the Shafter Research and Extension Center and the lygus bug test was done at the West Side Research and Extension Center. These locations were reversed in 1998. Cotton aphid studies were done at Shafter as in 1998. Spider mites treatments were applied to plots 6 rows by 75' with 4 replicates on 20 July. The standard registered materials (Kelthane®, Comite®, Zephyr®, Savey®) were examined as well as two reduced risk “organic” products. No experimental miticides were available for testing in 1999. Two additional treatments of Regent (an experimental lygus material) were included to see if it flared mite populations as in 1998. Leaf samples for evaluation purposed were collected at 7, 14, 21, and 28 days after treatment. All data are presently being summarized.

A late-season aphid test was established on 7 September. Efficacy with Fulfill®, Furadan®, Provado®, Lorsban® and Bollwhip® were compared. Data were collected at 3, 7, 10, and 14 days after treatment.