

# impact

of the College of Agriculture and Life Sciences



## Greater Harmony Between Agriculture and the Environment Reducing Insecticide Use in Arizona

### Issue

Insecticide applications in cotton typically account for about half of all insecticide use in the United States. New materials on the market are now enabling cotton growers to reduce their spray applications while maintaining competitive yields. These technologies also help growers implement more ecologically-based IPM programs and become less dependent on broadly toxic insecticides.

### What has been done?

An integrated pest management program implemented two new tools in 1996 and continued their use through 2000: insect growth regulators (IGRs, effective against whiteflies) and transgenic cotton (containing Bt effective against pink bollworms). The University of Arizona College of Agriculture and Life Sciences collaborated with growers, the USDA, the Arizona Department of Agriculture, the Arizona Cotton Growers' Association, Cotton Incorporated, industry and others. Both of these tools are highly effective against pests, but safe to humans and the environment. Based on insect hormones, growth regulators disrupt

the growth and development of insects. Transgenic cotton is genetically engineered to carry its own biological insecticide, targeting lepidopterous pests, within the plant tissues.

### Impact

Nearly 100 percent of the cotton acreage in Arizona was sprayed multiple times for pink bollworm and silverleaf whitefly in 1995; however, in 1999 and 2000 the majority of acres were never sprayed even once for these two pests. This success was mainly due to the efforts of the Arizona IPM program and the availability of IGRs and transgenic cotton in reducing the number of insects that appeared. Weather patterns and other factors may also have influenced the appearance of fewer numbers of insects in 1999; however these trends have been sustained through 2000. Annual cotton acreage in Arizona is usually over 250,000 acres.

As a result of this program, during 1999 the average foliar insecticide use in Arizona cotton was the lowest in 21 years, according to state records first kept in 1979. Overall, 1999 had the

lowest number of foliar sprays against all insect/arthropod pests in cotton during the 90s, and the lowest costs per acre during the same period. In 1990, growers applied about 11 sprays during the season at an average cost of \$113.76. By 1999 this number had dropped to 1.91 (between one and two sprays) at an average cost of \$37.18.

For silverleaf whitefly (SWF) in particular, the number of sprays dropped from 6.6 per season in 1995 to 0.40 for the season in 1999. Lint quality went from "very sticky" in 1992 to "very clean" in 1999. In 1995 SWF sprays cost an all time high of \$145.20 per acre, and amounted to nearly 70 percent of the total foliar insect control budget. By 1999 growers spent an average of \$10.91 per acre on SWF, which was only about 30 percent of the total foliar insect control budget. This was the lowest amount of money per acre spent to control SWF since its introduction to the state in the early 1990s.

Along with resistance management, these IPM efforts reduced insecticide use, conserved biological control agents, and enhanced sustainability and profitability.

### Funding

Hatch Act

Smith-Lever 3(b) and (c)

Special Research Grants

Smith-Lever 3(d)

Other CSREES: Western Region IPM; National Pesticide Impact

Assessment Program, Western Region, PEST MANAGEMENT ALTERNATIVES; Cotton

Incorporated; Arizona Cotton Growers Association; Agrichemical industry

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