

**SILVERLEAF WHITEFLY CONTROL IN  
COTTON WITH KNACK™ INSECT  
GROWTH REGULATOR**

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**Abstract**

KNACK (pyriproxyfen) is an insect growth regulator (IGR) which is being developed in the United States for control of silverleaf whitefly, *Bemisia argentifolii*, (SLWF) in cotton. KNACK acts as a juvenile hormone mimic and causes inhibition of metamorphosis, embryogenesis, reproduction, and larval development in certain insects. In SLWF, KNACK inhibits egg hatch, either through the females or by direct contact with the egg, and suppresses adult emergence when larvae stages are affected. KNACK also exhibits pronounced translaminar movement in cotton leaves which also leads to inhibition of egg hatch and suppressed adult emergence after SLWF feeding on the lower leaf surface.

KNACK has been tested by numerous University, USDA, and private contract personnel to determine its effectiveness on SLWF. In general, KNACK provided effective SLWF control and demonstrated IGR tendencies by reducing nymphal populations of the SLWF while not affecting adult populations and producing mixed results on egg populations in small test plots. This paper will report on two separate larger size trials that were conducted by a private contractor (Arid Ag-Research, Inc.) in 1994 and 1995 in Maricopa, AZ.

The 1994 trial was not replicated and consisted of cotton blocks of 24-40" rows X 280 ft (approximately 0.5 acre) in which 4 sub-samples were taken to determine efficacy. Applications were in 20 gpa at 80 psi pressure with overhead and drop nozzles. In one block, KNACK at 20 g ai/acre was applied as a double application on 7/12 and 8/2/94. In another block, KNACK at this same rate and schedule was alternated with DANITOL® + ORTHENE® (0.2 + 0.5 lb ai/acre) on 7/22/94. Also included in the trial were blocks that consisted of standard grower treatments and an untreated control. In this trial both KNACK regimes and the standard grower treatments significantly reduced SLWF nymph and egg populations on 8/27/94 (25 days after the last application). KNACK, alone, significantly reduced nymph populations by 93% and egg populations by 87% below the untreated control on this date. KNACK, alone, did not significantly reduce adult

populations in this trial, while the standard grower treatments and the KNACK/ DANITOL + ORTHENE alternating treatments significantly reduce adult populations below those found in the untreated control.

The 1995 trial consisted of cotton blocks of 24-40" rows X 580 ft (approximately 1.0 acre) in which 4 sub-samples were taken to determine efficacy. Applications in this unreplicated trial were in 20 gpa at 43 psi pressure using only overhead nozzles. In one block, KNACK at 20 g ai/acre was applied as a single application on 7/20/95 with three subsequent applications of non-IGR's used in the later season (8/8, 8/25, and 9/4/95). In another block, two applications of KNACK at 20 g ai/acre were applied on 7/20 and 8/8/95 with two subsequent applications of non-IGR's used (8/25 and 9/4/95). Also included in the trial were blocks that consisted of standard grower treatments (a total of six SLWF applications for the season) and an untreated control. In this trial both KNACK regimes and the standard grower treatments significantly reduced adult, nymph and egg populations on 9/11/95 (7 days after the last application). The two KNACK regimes reduced nymph populations by 99%, adult populations by 86%, and egg populations by 93% below the untreated control on this date. The control for the various SLWF life stages in the standard grower treatment plot was similar to the two KNACK regimes.

The 1994 trial showed that KNACK used alone could provide good control of SLWF but would not affect all stages of the pest. The 1995 trial showed that KNACK used in a program with certain other types of chemicals could result in a reduction of all stages of SLWF and that the total number of insecticide applications used to control SLWF in cotton could be reduced. Results from these two trials indicate that KNACK has activity on SLWF and as an IGR the product will probably fit well into integrated pest management and insect resistant management programs with other types of insecticides.