

**RESULTS OF A TWO YEAR  
REGIONAL PROJECT TO DETERMINE  
AN ACTION THRESHOLD TO MANAGE  
WHITEFLIES IN COTTON**  
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**Abstract**

A regional, two-year project sponsored by Cotton Incorporated and the Arizona State Support Committee was initiated in 1994 to determine action thresholds for management of *Bemisia tabaci* (Gennadius) in cotton using chemical insecticides. This cooperative study involved Cotton Incorporated, the Universities of Arizona and California, Riverside, Texas A&M University and the USDA-ARS, Western Cotton Research Laboratory. Replicated field trials were conducted in 1994 at sites in Maricopa and Yuma, AZ, Bakersfield and Brawley, CA, and Weslaco, TX using a standard set of protocols. Trials were repeated in 1995 at all locations except Bakersfield, CA.

Whitefly populations were treated with a standard tank-mix application of fenprothrin plus acephate at (0.1 + 0.5 lb AI.)/acre in 20 gallons of water/ acre by ground equipment whenever whitefly populations reached or exceeded 2.5, 5, 10, or 20 adults per leaf. Insecticide treatments were continued through defoliation. Untreated plots served as a reference. All treatments were replicated five times in a latin square design. Individual plots were ca. eight 40-inch rows by 50 feet. Whitefly adults, nymphs, and eggs were counted weekly commencing 30 days following planting. Other pests (e.g. lygus, aphids) were controlled as needed over the season. All plots were harvested and lint yields

determined. Samples of lint were tested with a manual sticky cotton thermodetector.

In 1994 results differed among locations in response to differing infestations of whitefly. In general, there were few differences in immature whitefly populations among action thresholds of 2.5, 5 and 10 adults/leaf. These treatments reduced populations below those in plots treated at 20 adults/leaf and in cases of heavy populations, substantially below those of non-treated plots. Adult population densities differed little between thresholds of 2.5 and 5 adults/leaf or between 5 and 10 adults/leaf depending on site. The number of insecticide treatments increased with the use of lower thresholds (Table 1). As few as 2 treatments were needed at a threshold of 2.5/leaf at Bakersfield, CA and as many as 8 were needed for this threshold in Maricopa, AZ. Twelve applications were made at Brawley, CA at this lowest threshold, however, there were some deviations from protocols at this site. No treatments were made at 20 adults/leaf in Bakersfield, CA or Weslaco, TX. Cotton yields at Brawley and Maricopa did not differ among thresholds of 2.5, 5 and 10 adults/leaf, but yields declined significantly when left untreated or treated at 20 adults/leaf. Yields did not differ among any of the treatments at Bakersfield, Yuma or Weslaco. There was no general relationship between the thermodetector ratings and threshold levels. All of the treatments at Weslaco and Maricopa had thermodetector ratings  $\leq 5$ , while all the treatments at the other three sites had ratings  $> 5$ . Rain in September may have affected stickiness results in Maricopa, AZ.

In comparison with 1994, whitefly populations were generally higher in 1995, with the exception that no whiteflies were present at the Bakersfield, CA site during the months of the test. As in 1994, there were generally few differences in immature whitefly populations among action thresholds of 2.5, 5 and 10 adults/leaf, but significant differences between these lower thresholds and 20 adults/leaf or the untreated controls. Adult population densities did not differ between thresholds of 2.5 and 5 adults/leaf or between 10 and 20 adults/leaf, but differences existed between these threshold levels and the untreated control. As few as 6 treatment were needed at 2.5 adults/leaf in Yuma, AZ and as many as 9 treatments were made at this threshold in Brawley, CA. As few as 1 (Yuma) and as many as 4 (Maricopa and Weslaco) treatments were necessary at 20 adults/leaf (Table 1). Cotton yields were affected by heavy whitefly pressure and cool spring temperatures in AZ and CA, and other pest problems in Yuma and Weslaco. Again there were few differences in yield between plots treated at 2.5, 5 and 10 adults/leaf and no difference between those treated at 20 adults/leaf and the untreated controls. There was again no general relationship between the thermodetector ratings and threshold levels, but stickiness ratings overall were much lower in 1995 in comparison with 1994. Stickiness readings did not differ among treatments at Weslaco, Maricopa, or Yuma with

most plots having thermodetector ratings < 5. Only results from Maricopa were affected by timely rain showers prior to harvest. No differences were detected in Brawley, CA between any of the treated plots, and plots treated at 2.5, 5 and 10 adults/leaf had thermodetector ratings < 5.

Overall results suggest that there is little difference in either insect population density or plant responses to damage when insecticide treatments were initiated between about 2.5 to 10 adults/leaf. Sticky lint results are more difficult to interpret due to weather factors and inconsistent correlations with pest abundance. A simple economic analysis assuming ca. \$24/A for a spray treatment, \$0.85/lb for lint and an \$0.08/lb discount for thermodetector ratings > 5 rating suggests that the net return was generally highest for action thresholds of 5-10 adults/leaf across all sites and over both years.

Table 1. Summary of results for number of applications, yield (lb/A), and thermodetector ratings (TD).

Site	Threshold	1994			1995		
		Appl.	Yield	TD	Appl.	Yield	TD
Bakersfield	2.5	2	992	14.2	-	-	-
	5	2	1067	16.0	-	-	-
	10	1	1035	10.0	-	-	-
	20	0	852	15.3	-	-	-
	UTC	0	930	11.6	-	-	-
Brawley	2.5	12	1902	10.6	9	1429	2.3
	5	11	1932	14.9	6	1292	4.2
	10	10	1726	9.4	5	1397	5.1
	20	7	1283	26.7	2	1008	9.2
	UTC	0	1051	71.7	0	834	12.6
Maricopa	2.5	8	1642	2.5	8	1203	4.4
	5	7	1526	2.9	6	1252	4.6
	10	5	1600	2.8	4	1089	4.9
	20	3	1431	1.6	4	1139	4.3
	UTC	0	1198	1.3	0	1091	7.2
Weslaco	2.5	4	986	2.4	8	762	1.4
	5	4	882	2.9	6	783	1.7
	10	1	950	3.7	5	642	2.2
	20	0	798	3.7	4	637	2.3
	UTC	0	924	3.3	0	647	1.4
Yuma	2.5	3	712	11.6	6	1118	1.5
	5	3	787	27.4	5	1109	1.1
	10	2	681	15.2	3	953	1.5
	20	1	623	32.2	1	860	1.2
	UTC	0	593	35.6	0	693	1.6