

Whitefly Management

Management of the sweetpotato whitefly (SWF), [Strain B, *Bemisia tabaci* (Genn.) = *B. argentifolii* Bellows & Perring], in Arizona depends on three key elements: careful monitoring, effective use and timing of insecticides, and avoidance of damaging populations. Avoidance strategies include a wide variety of cultural controls and best management practices, including variety selection and crop placement; uniform, optimal planting; efficient single fruit set; minimization of crop stress; in-crop and post-harvest sanitation in all whitefly host crops; optimization of natural controls; and pest source reduction (often outside of the cotton crop). With these cultural controls in place, reliance on insecticides can be minimized.

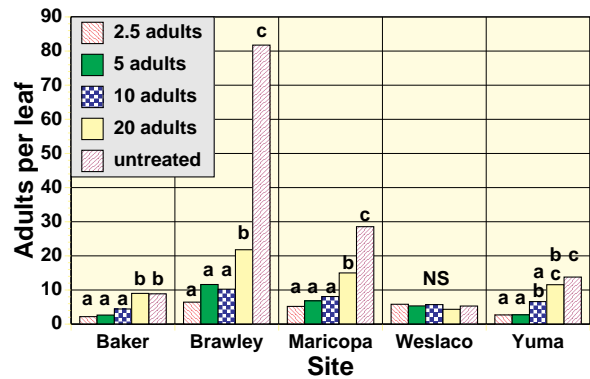
Sampling Plans

Monitoring, in the form of an efficient, accurate and practical sampling program is central to the judicious use of insecticides. A sampling program was developed for use and widely disseminated in 1994 (Naranjo et al., 1994; Ellsworth et al., 1994). This whitefly sampling program was evaluated in 8000 A of commercial cotton in central Arizona (Ellsworth et al. 1995) (see “*Evaluation of Sampling Plans*”). This plan calls for the visual inspection of a total of 30 leaves from two sites per field using a “leaf turn” technique. This technique requires the scout to approach the plant and locate the fifth mainstem node leaf below the terminal. Grasping the leaf by the tip or petiole, the scout searches for the presence or absence of at least three adult whiteflies per leaf. The presence of three or more whiteflies categorizes the leaf as “infested,” while less than three deems the leaf “uninfested.” A percentage of infested leaves is then calculated and compared to a table that matches this number with the average number of adults per leaf predicted for the field. With this information, scouts can readily track the progress of an infestation in the grower’s field and time insecticide applications using action thresholds. Implementation studies in central Arizona show that the time of day has no consistent effect on the number of whiteflies counted and samplers with only modest training obtained similar results as more experienced individuals for the same fields. Furthermore, the technique is time efficient, adding on average less than 8 minutes to a field-checking routine. The sampling plan was also found to be

conservative; almost no decisions to delay suppression occurred when suppression was indicated by the mean density of adults. Decisions to spray before the intended threshold were reached were far more common. These “errors” were almost always within the confidence intervals set-up by the original sampling model (± 2 adults per leaf).

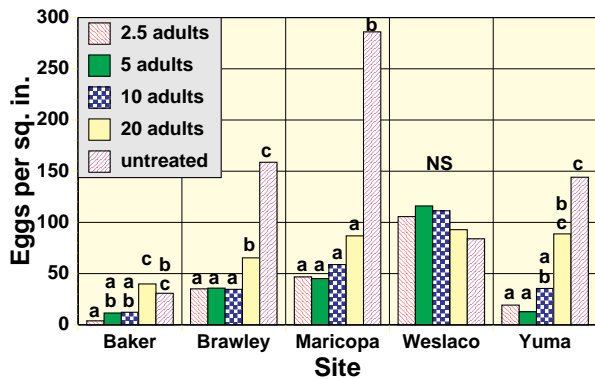
Action Thresholds

Use of an action threshold for scheduling applications is important in optimizing inputs while minimizing risk of economic damage and environmental hazards. The levels recommended by the University of Arizona in 1994 for initiating chemical controls were between 5 and 10 adults per leaf. In order to distinguish among various candidate action thresholds (2.5, 5, 10 & 20 adults per leaf) (see graph below), a regional research project was initiated in 1994 by Cotton Incorporated and co-sponsored by the

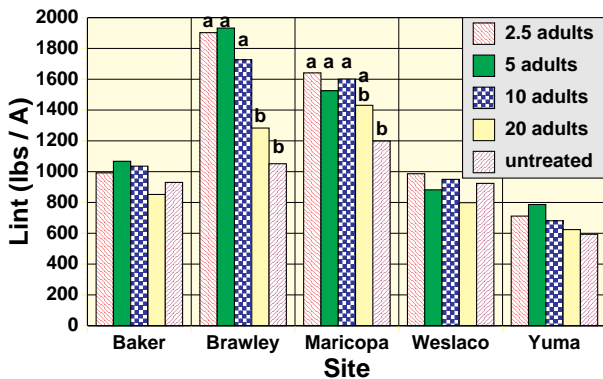


Arizona Cotton Growers Association. This test was replicated at five different sites: Weslaco, TX; Maricopa & Yuma, AZ; and Brawley & Bakersfield, CA. All applications were made only when the intended threshold was reached for each treatment. Actual number of applications ranged from 0 to 12 depending on threshold and location (see table below). The same insecticide combination was used each time at all sites (Danitol®)

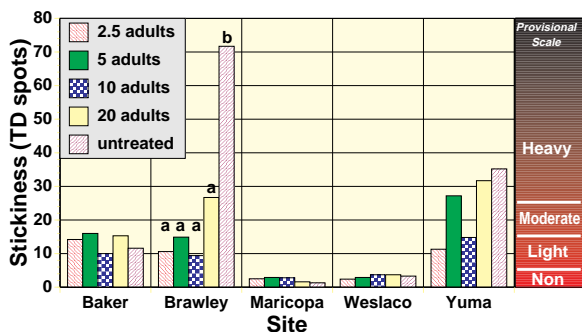
Site	2.5 adults	5 adults	10 adults	20 adults	untreated
Baker	2	2	1	0	0
Brawley	12	11	10	7	0
Maricopa	8	7	5	3	0
Weslaco	4.2	3.4	1	0	0
Yuma	3	3	2	1	0



0.10 lb. a.i./A + Orthene® 0.50 lbs. a.i./A). Populations were drastically different at each site with the greatest SWF pressure experienced at Maricopa and Brawley. No differences in population parameters (eggs, nymphs, and adults) were observed among the three lower thresholds (2.5, 5 & 10) (see graph above); however, 20 adults per



leaf and the untreated check resulted in significantly higher populations at some sites. Yield loss was evident at 20 adults per leaf and in the check compared to the remaining treatments which were similar at Brawley and Maricopa (see graph above). Stickiness measurements made with a thermodetector showed that all of the Weslaco (only late SWF pressure) and Maricopa (heavy



pressure with 2 in. of rain on open bolls) cotton samples were non-sticky regardless of action levels (see graph above). The Yuma (moderate pressure, low yield potential

cotton) and Bakersfield sites (light SWF pressure with aphids) also lacked significant differences in stickiness among all action levels. In contrast, the Brawley site had significant differences in stickiness between all of the treated plots and the check. Large increases in stickiness measurements were also noted at 20 adults per leaf and above. The lowest levels of stickiness at Brawley were observed at 10 and 2.5 adults per leaf. Depending on study location, the 2.5 threshold required between 2 and 12 applications. Between 1 and 3 more applications were required for the 2.5 threshold than for the 10 threshold.

Keys to Whitefly Management

In summary, whitefly management in Arizona cotton depends on the fundamental strategy of avoidance which maximizes the effectiveness of cultural and natural controls within a sound agronomic framework. When insecticides are needed, an efficient and practical sampling program should be in place. This program can then be used to monitor critical population events and schedule timely applications through the use of action thresholds. With the appropriate selection of chemistry and observance of these fundamentals, growers can successfully grow a high-yielding, quality cotton crop in Arizona.

References

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- Ellsworth, P.C., J.W. Diehl and S.E. Naranjo. 1995. Validation and implementation of a sampling model for whiteflies. pp. 978-979. In Proc. Beltwide Cotton Conf., D.J. Herber and D.A. Richter (eds.) National Cotton Council, Memphis, Tenn.
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