THE UNIVERSITY OF ARIZONA

COLLEGE OF AGRICULTURE AND LIFE SCIENCES

COOPERATIVE EXTENSION

Arizona Pest Management Center

Predator "Thresholds"

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Natural enemy conservation is central to pest avoidance in cotton. The benefit of predators for controlling whiteflies should not be overlooked**. Today's growers can use selective technologies that conserve predators, which play a critical (& free) role in controlling whiteflies.** We don't normally think of predators as having "thresholds", but new research identifies critical levels of predators that impact economic spray decisions for whiteflies.

Six predators (Figure 1) are strongly related to the natural control of whiteflies in cotton. Predator counts can be taken in standard sweep net samples. Knowing how many predators are needed to prevent whitefly population growth can help you make more confident decisions when near the normal whitefly threshold (see Table 1).

Research indicates that **only one predator species needs to be at its "threshold" to effectively control whitefly populations without spraying.** When whitefly numbers are well below the normal threshold, there is no need to spray or count predators. When whitefly numbers are well above threshold, spray to prevent losses, regardless of predators. And, when whiteflies are approaching threshold and predators are low, advance your spray. **However, high predator numbers relative to whitefly numbers can delay the need for spraying and save the grower money (Figure 2).**

Predator to Count (per 100 sweeps)	Minimum Number of Predators Needed to Provide Biocontrol	
	When Whitefly Adults are at Threshold	When Whitefly Large Nymphs are at Threshold
***Drapetis* Fly**	26-41	44
Crab Spider	4-6	4
***Collops* Beetle**	NA	2
Big-Eyed Bug	NA	1
Lacewing Larva	2-3	NA
Minute Pirate Bug	5-8	NA

Table 1. *Minimum number of predators per 100 sweeps needed at the normal whitefly threshold (40–57% adults, 40% large nymphs) to continue deferring sprays. Whitefly infestation percentages based on the sampling of 30 leaves (with 3 or more adults) and 30 leaf discs (with 1 or more live, large nymphs). Each of these predators can be counted and considered independently. NA, not applicable.*

A PDF of this is available on-line at: https://cals.arizona.edu/crops/cotton/files/wfBIT.pdf

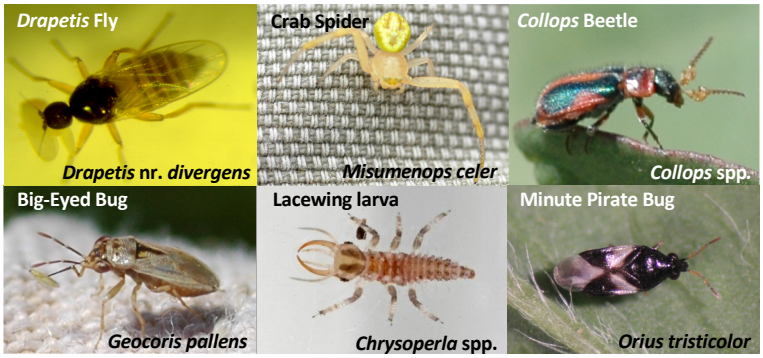

Figure 1. *The six key predators of whiteflies found in cotton.*

Natural enemy thresholds are another tool to improve decision making. Working with the predators in your field by using fully selective products can delay or potentially eliminate sprays, leading to greater economic gains; or, alert you to important imbalances (not enough predators) that require you to advance sprays ahead of the whitefly-only threshold.

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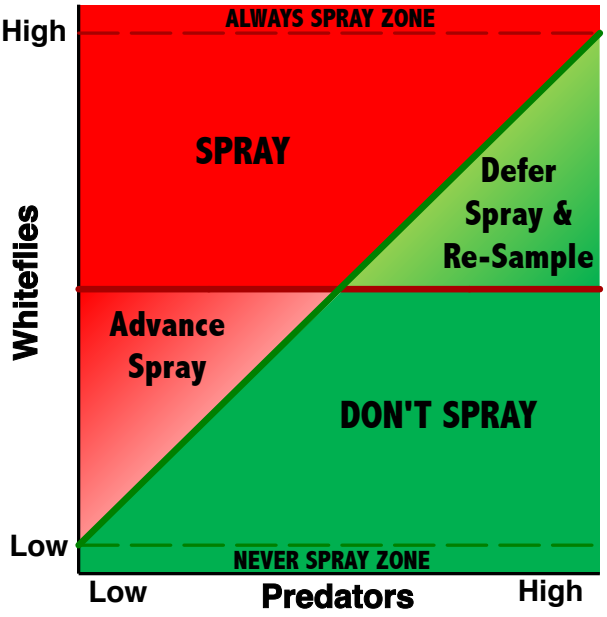

Figure 2. *When pest numbers are high, farmers will want to spray. However, measuring predator numbers gives more confidence in decisions, sometimes deferring sprays when predators are high and sometimes advancing sprays when predators are low.*

Other Resources:

Ellsworth, P.C., L. Brown, G. Castro, S. Naranjo. 2012. In 7 Minutes or Less. University of Arizona Cooperative Extension IPM Short. http://cals.arizona.edu/apmc/docs/WhiteflySamplingShort.pdf

Ellsworth, P.C., L. Brown. 2012. Anatomy of a Cotton Sweep. University of Arizona Cooperative Extension IPM Short. https://cals.arizona.edu/apmc/docs/SweepsAnatomyv2c.pdf

Vandervoet, T. P.C. Ellsworth, S. Naranjo, A. Fournier, L. Brown. 2014. Save Money the Easy Way with Bio-control. University of Arizona Cooperative Extension IPM Short. https://cals.arizona.edu/crop/cotton/files/BiocontrolAndSave.pdf

Vandervoet, T., P.C. Ellsworth, L.M. Brown, A.J. Fournier, S.E. Naranjo. 2019. Making Whitefly and Predator Counts. University of Arizona Cooperative Extension IPM Short. https://cals.arizona.edu/crop/cotton/files/PredatorToPreyRatios.pdf

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