THE UNIVERSITY OF ARIZONA
COLLEGE OF AGRICULTURE AND LIFE SCIENCES
COOPERATIVE EXTENSION
Arizona Pest Management Center

Making Whitefly & Predator Counts

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Counting Whiteflies

- Sample 30 leaves (15 from 2 areas in the field).
- Score leaf with 3 or more adults as infested.
- Score disc (7/8 inch diameter) as infested if any live, large nymphs are present.
- Sum infested leaves. Sum infested discs. See column 1 in Tables.
- Determine percent infested leaves & discs from tables. See column 2.
- Obtain corresponding average number of adults per leaf and nymphs per disc. See column 3.
- Use fully selective products when there are at least 1 nymph per disc *and* 3–5 adults per leaf.
- For all other chemistry, spray at 5 adults per leaf.

Sweep Nets

Our cotton industry standard sweep net should be 15 inches (38 cm) in diameter with a strong galvanized metal hoop frame, sturdy wooden ≥2 foot (60 cm) dowel handle with a strong, reinforced canvas bag. Guidelines depend **on 100 sweeps total, usually taken as four subsamples of 25 sweeps each**.

Counting Predators

Invert the net and push the pinched off tip of the net through the opening of the net, slowly releasing your grip to allow insects to crawl or fly out. Count the predators (***Geocoris* big-eyed bugs, lacewing larvae, *Collops* beetles, crab spiders, *Orius* minute pirate bugs, and/or *Drapetis* flies**) (Fig. 1). Plant material can be slowly lifted out, inspected and discarded. Once all the plant material is sorted, thoroughly inspect the net seam for any remaining predators using a hand lens if necessary. **Compare counts of each of the 6 predators per 100 sweeps to the adjacent tables. See columns 4–7.**

Other Resources:

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

Ellsworth, P.C., L. Brown, G. Castro, S. Naranjo. 2012. In 7 Minutes or Less. Ibid. http://cals.arizona.edu/apmc/docs/WhiteflySamplingShort.pdf

Ellsworth, P.C., N. Pier, A.J. Fournier, S.E. Naranjo, T. Vandervoet. 2019. Predator "Thresholds". Ibid. http://cals.arizona.edu/apmc/docs/PredatorThresholds.pdf

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

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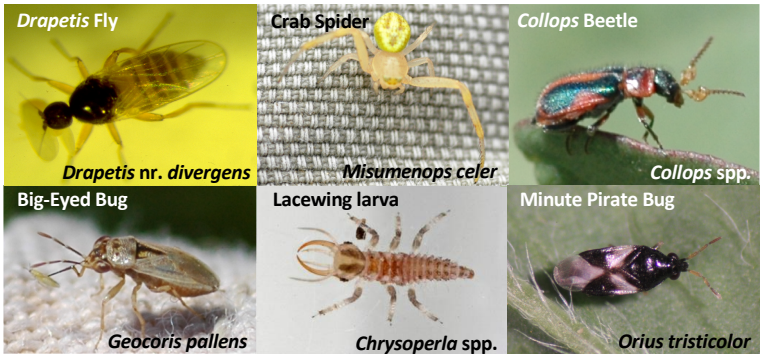

Figure 1. *The six key predators of whiteflies found in cotton. Tracking their numbers in your sweep counts will help remove uncertainties in decision-making.*

Using the Threshold – Predator Tables

1. Locate the field counts of number of leaf discs (for large nymph counts) and the number of leaves (for adults) infested with whiteflies in the appropriate tables below. See columns 1–3.
2. Compare predator field counts (per 100 sweeps) for each predator species against the levels needed to provide biocontrol of whiteflies. Each predator count is considered independently. See columns 4–7.

Whitefly Levels		Spray Decisions
White	Below Threshold	→ No need to spray or count predators
Yellow	Approaching Threshold	→ Count Predators: 1 or more predators ≥ numbers in table; Defer Spray
Green	At Threshold	→ Count Predators: All 6 predators < numbers in table; Spray
Red	Above Threshold	→ Spray regardless of predator densities

Whitefly Large Nymphs

(1) Number of discs infested with large nymphs	(2) Percent infested discs	(3) Average per disc	Predators per 100 Sweeps — Minimum number needed to provide biocontrol: (4) Big-eyed bug	(5) *Collops* beetle	(6) Crab spider	(7) *Drapetis* fly
4	13	0.2	Whitefly numbers are far too low; No need to spray or count predators			
5	17	0.3	**1**	**1**	**2**	**14**
6	20	0.3	**1**	**1**	**2**	**14**
7	23	0.4	**1**	**1**	**2**	**18**
8	27	0.5	**1**	**1**	**2**	**22**
9	30	0.6	**1**	**2**	**3**	**27**
10	33	0.7	**1**	**2**	**3**	**31**
11	37	0.8	**1**	**2**	**3**	**36**
12	40	1.0	**1**	**2**	**4**	**44**
13	43	1.1	**1**	**3**	**4**	**49**
14	47	1.2	**1**	**3**	**5**	**53**
15	50	1.4	**2**	**3**	**5**	**62**
16	53	1.6	**2**	**4**	**6**	**71**
17	57	1.8	Whitefly numbers are too high; Spray regardless of predator numbers			

Whitefly Adults

(1) Number of leaves infested with 3 or more adults	(2) Percent infested leaves	(3) Average per leaf	Predators per 100 Sweeps — Minimum number needed to provide biocontrol: (4) Lacewing larva	(5) Crab spider	(6) Minute pirate bug	(7) *Drapetis* fly
3	10	0.8	Whitefly numbers are far too low; No need to spray or count predators			
4	13	1.0	**1**	**1**	**2**	**8**
5	17	1.3	**1**	**2**	**2**	**11**
6	20	1.5	**1**	**2**	**3**	**12**
7	23	1.8	**1**	**2**	**3**	**15**
8	27	2.1	**2**	**3**	**4**	**17**
9	30	2.3	**2**	**3**	**4**	**19**
10	33	2.6	**2**	**3**	**4**	**21**
11	37	2.9	**2**	**3**	**5**	**24**
12	40	3.2	**2**	**4**	**5**	**26**
13	43	3.6	**2**	**4**	**6**	**29**
14	47	3.9	**2**	**4**	**6**	**32**
15	50	4.3	**3**	**5**	**7**	**35**
16	53	4.7	**3**	**5**	**8**	**38**
17	57	5.1	**3**	**6**	**8**	**41**
18	60	5.5	Whitefly numbers are too high; Spray regardless of predator numbers			

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