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

Save Money the Easy Way with Bio-control

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Do you want to spend less time worrying about whitefly control decisions and get more sleep at night? Managing whiteflies in cotton can be stressful — early sprays waste money and late sprays may lead to a loss of control. As whitefly populations near threshold, it can sometimes be difficult to make control decisions with absolute confidence. One way to reduce uncertainty in decision-making is to consider effects of natural enemies on whitefly populations.

A diverse and large community of natural enemies are known to suppress whitefly populations in cotton at certain levels — this is considered biological control (or bio-control). Four common predators, *Geocoris* spp. (Big-Eyed Bugs), *Orius* spp. (Minute Pirate Bugs), *Collops* spp. (*Collops* Beetles), and *Misumenops celer* (Crab Spiders), have been found to track closely with whitefly populations. These predators also serve as indicators of whitefly suppression by the entire natural enemy community.

The relationships between whiteflies and each of these four predators are indicators of the amount of bio-control within a system. When **any one of them** is abundant relative to whiteflies (Fig. 1, Zone of Control, or green zone) then bio-control is functioning to limit whitefly population growth. Similarly, when predators are not abundant enough to suppress whiteflies, that bio-control potential is lost and whitefly populations will grow much more quickly (Fig. 1, Loss of Control, or red zone). Measuring bio-control is most useful when whitefly populations are near threshold (Fig. 1, Zone of Uncertainty, or yellow zone). At these times, the abundance of predators relative to whiteflies will help you make better spray decisions.

Predator populations can be estimated from counts made in the course of taking 100 sweeps per field. Measure both whitefly stages (adults per leaf and large nymphs per quarter-sized leaf disk) as part of the existing sampling system (Ellsworth et al. 2012).

Consult Vandervoet et al. (2014; see below) for guidance on how to measure the bio-control natural enemies provide by sampling these predators. Using bio-control as an indicator of whitefly damage potential can decrease management costs and uncertainty while improving control.

7/2014

Also see:

Asiimwe, P., L.M. Brown, T. Vandervoet, P.C. Ellsworth, S.E. Naranjo. rev. 2014. Big-Eyed Bugs Have Big Appetite For Pests. University of Arizona Cooperative Extension IPM Short. URL: http://ag.arizona.edu/crops/cotton/files/GeocorisRatio.pdf

Brown, L.M, A. Mostafa, T. Vandervoet, A. Fournier, P.C. Ellsworth, S.E. Naranjo. rev. 2014. Minute Bug with Enormous Impacts on Insect Pests. Ibid. URL: http://ag.arizona.edu/crops/cotton/files/OriusRatio.pdf

Ellsworth, P.C., T. Vandervoet, A. Mostafa, L.M. Brown, S.E. Naranjo. rev. 2014. Soft-bodied *Collops* likes Soft Bodies. Ibid. URL: http://ag.arizona.edu/crops/cotton/files/CollopsRatio.pdf

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

Mostafa, A., L.M. Brown, T. Vandervoet, P.C. Ellsworth, V. Barlow, S.E. Naranjo. rev. 2014. Untangling the Web…Spiders in Arizona Fields! Ibid. URL: http://ag.arizona.edu/crops/cotton/files/CrabRatio.pdf

Vandervoet, T., P.C. Ellsworth, L.M. Brown, S.E. Naranjo. 2014. Making Whitefly & Natural Enemy Counts. Ibid. URL: http://ag.arizona.edu/crops/cotton/files/PredatorToPreyRatios.pdf

A PDF of this publication is available on-line at:
http://ag.arizona.edu/crops/cotton/files/BiocontrolAndSave.pdf

This project was funded in part by the USDA National Institute of Food and Agriculture through the Western Integrated Pest Management Center

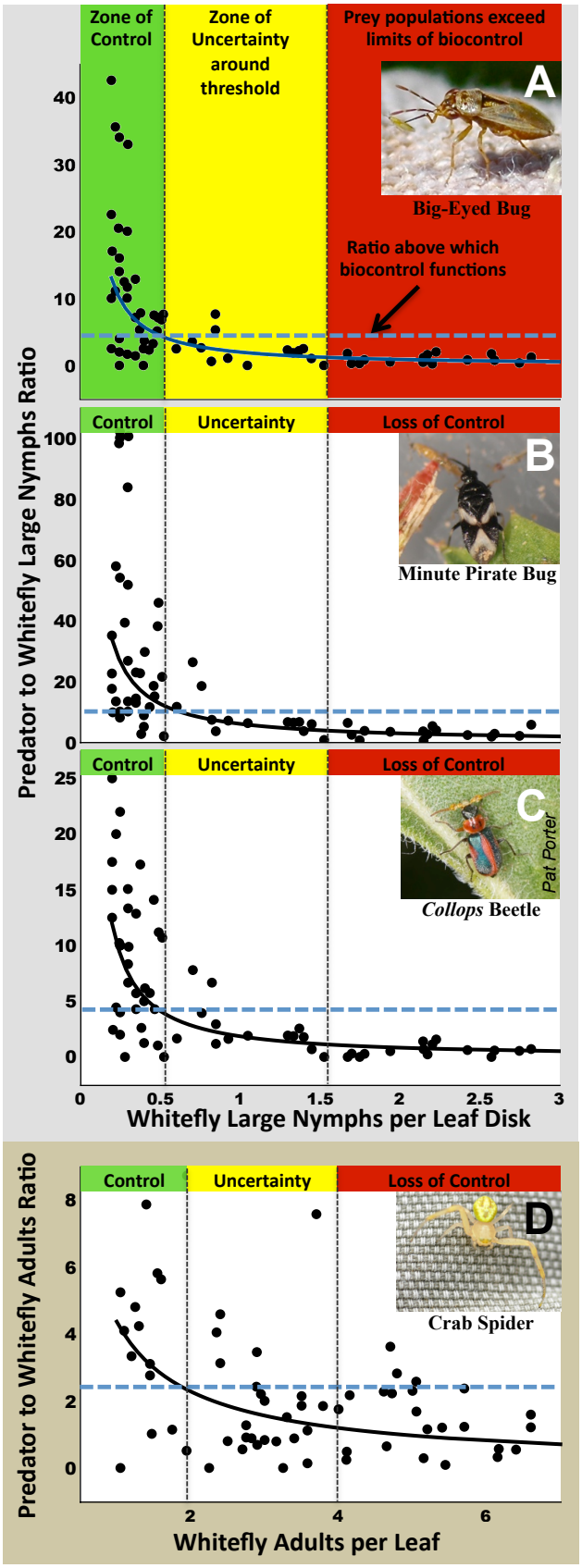

Figure 1. *Relationship of predator : prey ratios to whitefly density for* ***A****, big-eyed bugs;* ***B****,* Collops *beetles,* ***C****, minute pirate bugs and* ***D****, crab spiders. When in the green zone no sprays are needed because predators are high and whiteflies are low; in the red zone, whitefly levels have increased beyond what predators can efficiently control and a spray is needed. In the yellow zone between, predator & whitefly levels should be carefully considered: ratios above the blue dotted lines, defer spraying; below this level, spray immediately.*