

## Untangling the Web... Spiders in Arizona Fields!

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Spiders are beneficial inhabitants of agricultural fields because of their important contributions to biological control of pest insects, consuming tons of small arthropods every year. Spiders eat anything they can catch, even prey larger than themselves. When they are abundant, they contribute to the control of many insect pests in Arizona crop fields including whiteflies, *Lygus* bugs, fleahoppers, and lepidopteran larvae. Field studies in Arizona demonstrate that the crab spider, *Misumenops celer* (Family Thomisidae, Fig. 1A, B) and *Dictyna* spider, *Dictyna reticulata* (Family Dictynidae, Fig. 1C, D) are common in Arizona cotton fields and can be influential predators. Unlike other spiders that spin webs to capture their food, crab spiders rely on stealth and surprise. They actively search plant surfaces, litter, and debris for prey. They hide in flowers or foliage and ambush their prey. Their common name derives from the fact that they look like and walk like crabs. *Dictyna* are small, brownish, web-making spiders that trap whitefly adults and other insects in their webs (Fig. 1C). Examining their webs enables easy identification of what species of whitefly are in the field (sweetpotato or banded-winged). Jumping spiders (Family Salticidae, Fig. 1E) are generally less abundant in cotton fields but, like crab spiders, ambush their prey. They have stout bodies and long front legs adapted for jumping, as well as four pairs of eyes with one very large set in the middle of their face.

All species inhabiting cotton and other Arizona fields are part of what is called a “food web”. This flexible and resilient “web” encompasses all the predators and parasitoids that utilize other species and sometimes each other for food (e.g., Figure 1F). Overall, spiders are important components of natural and agricultural ecosystems and are good indicators of ecosystem health and natural control dynamics.

**The ratio of crab spiders to whitefly adults is a good indicator of the biocontrol potential in a cotton system and can be used in whitefly management.** This ratio is formed by the number of crab spiders (adults and immatures) per 100 sweeps to whitefly adults per leaf. When there are at least 0.6 crab spiders to 1 whitefly adult present in a field (0.6:1), a whitefly control spray may be deferred. Consult Vandervoet et al. (2014; see below) for more guidance on how to determine and interpret this and other predator to prey ratios.

Fye, R.E. 1979. Cotton insect populations: Development and impact of predators and other mortality factors. USDA, Tech. Bull. No. 1592, 65 pp.

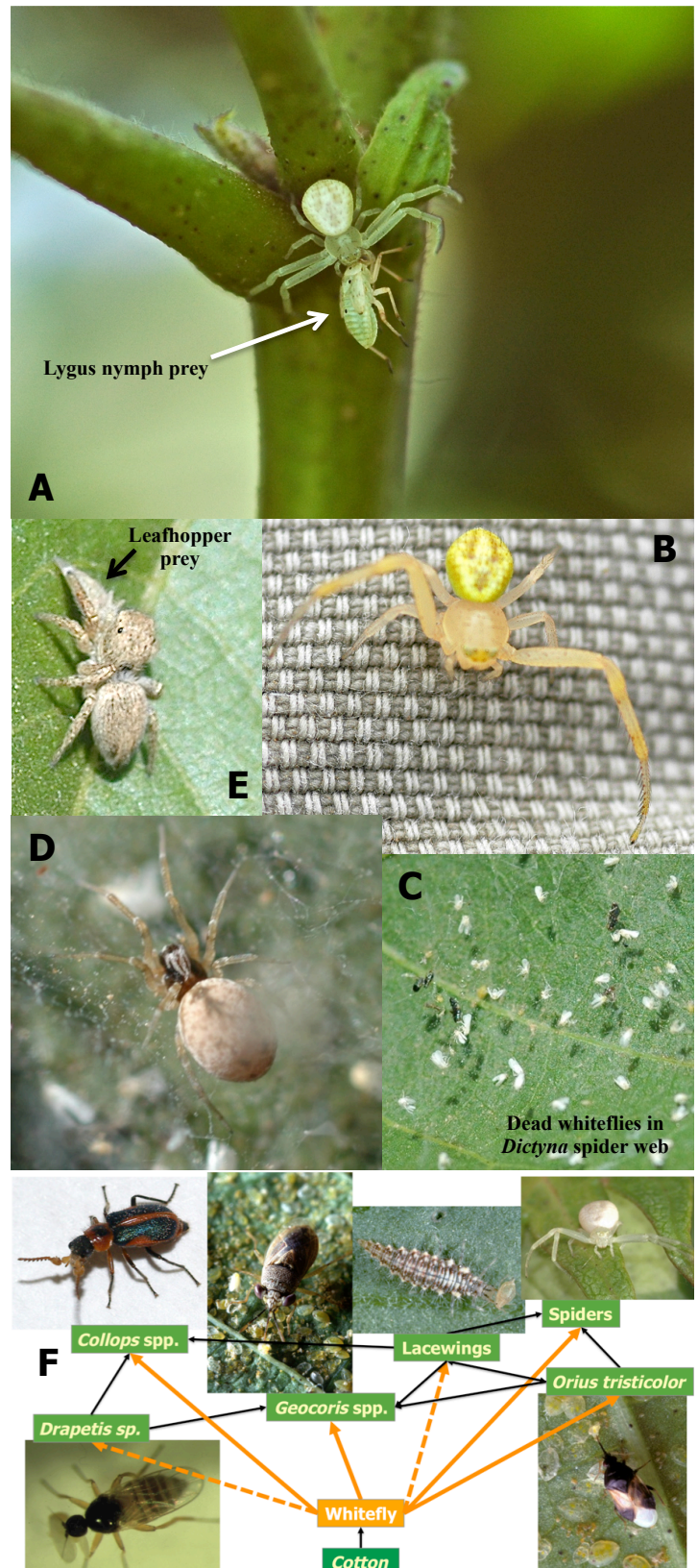
Ellsworth, P.C., J.C. Palumbo, S.E. Naranjo, T.J. Dennehy, R.L. Nichols. Whitefly Management in Arizona Cotton 2006. IPM Series No. 18. University of Arizona Cooperative Extension Bulletin, AZ1404, 5/2006. URL:

<http://cals.arizona.edu/pubs/insects/a-1404.pdf>

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<http://ag.arizona.edu/crops/cotton/files/PredatorToPreyRatios.pdf>

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**Figure 1.** A, B, Crab spider; C, whiteflies trapped in *Dictyna* web; D, *Dictyna* spider; E, Jumping spider; F, Cotton food web highlighting the most important predator groups for controlling whiteflies and other pests. Black lines show predators that also feed on other predators; Orange lines depict key predators of whiteflies, while solid orange lines are predators that can be used to predict the biocontrol potential within a cotton system.

A PDF of this publication is available on-line at:

<http://ag.arizona.edu/crops/cotton/files/CrabRatio.pdf>