

Keeping Cotton Green!

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“Green” is a terribly overused and poorly defined term. Yet, consumers seem to know that “green is good,” and some scrutinize where their food and fiber comes from and how it is produced. Arizona has made great advances in cotton insect pest management. *Bt* cotton is the ultimate green technology and has permitted growers to forego most, if not all, lepidopteran chemical controls and more recently to functionally eradicate pink bollworm. Along with *Bt*, whitefly-specific insect growth regulators (Courier & Knack) ushered in a new era of “selective” pest control beginning in 1996. **Selective means that the target is controlled, while most or all other non-target organisms are unaffected (e.g., predators, parasitoids, pollinators).** In 2006, Arizona gained access to a fully selective, *Lygus*-specific feeding inhibitor (Carbine). **So one way to stay “green” in cotton is to choose selective chemical controls** when insecticides are needed for insect control.

Our guidelines emphasize efficacy and selectivity in chemical controls and are based on over a decade of field research in the Arizona cotton system (Table 1). Selectivity can only be assured by this type of direct testing in the field, where both the target and non-target organisms live. Poor choices of chemical controls can have negative impacts on a whole range of species that are otherwise important in contributing to control of primary and secondary insect pests (Fig. 1). With lepidopteran pests diminished in importance in our system, whiteflies and *Lygus* bugs remain as our key or primary pests. **Good management for these two pests, including use of selective controls when indicated by careful sampling and use of thresholds, helps protect against outbreaks of many other secondary pests, saves money, and saves the environment.** Or, if you prefer... it helps us keep our cotton system “green.”

Also see:

- <http://ag.arizona.edu/crops/presentations/2011/11/MexicaliCarbineEMCFlo.pdf>
- http://ag.arizona.edu/crops/presentations/10ESA_IRAC_Bemisia7Flo.pdf
- <http://ag.arizona.edu/crops/presentations/09IPMPortlandBiorationalvF7lo.pdf>

Naranjo, S.E. & P.C. Ellsworth. 2009. 50 years of the integrated control concept: moving the model and implementation forward in Arizona. Pest Management Science, 65: 1267–1286.

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>

Table 1. Selectivity or safety on beneficials of insecticides field-tested in the Arizona cotton system. Products are either fully (green), partially (yellow), or non-selective (red). Compounds in parentheses are tentative determinations based on preliminary research results only. Compounds below dotted lines are currently not registered for use in cotton.

Selectivity	Whitefly	Lygus
Full	Courier	Carbine
	Knack	(Belay ³)
	Oberon ¹	
	(cyazypyr)	(Transform)
	(spirotetramat)	
Partial	Centric	(Belay ⁴)
	Intruder	
	Oberon ²	
	Venom	
	(pyrifluquinazon)	
No	pyrethroid + organophosphate	acephate
	pyrethroid + carbamate	endosulfan
	pyrethroid + endosulfan	Vydate C-LV

- 1, at 8–10 oz rate only
- 2, at 12–16 oz rate only
- 3, at 4.5 oz rate only
- 4, at ≥6 oz rate only

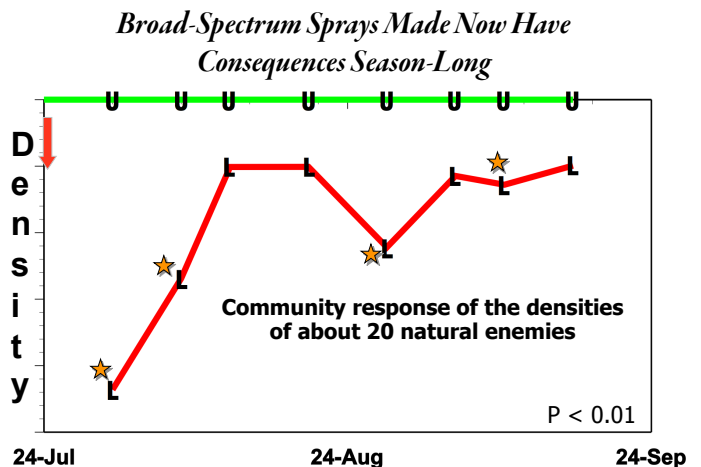


Figure 1. A single spray of acephate (red arrow) resulted in significantly depressed natural enemy densities (indicated by stars on the red L-line) for 7 weeks after application relative to unsprayed cotton (green U-line) (Naranjo & Ellsworth, 2009). This reduces conservation biological control and increases the risks of pest resurgence and secondary pest outbreaks. Whitefly, aphid, and/or mite outbreaks are possible under these conditions.

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