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COOPERATIVE EXTENSION

Being Selective!

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Much of the success of Arizona's insect cotton IPM program has been due to the availability and proper deployment of key selective control technologies. This has enabled us to derive great benefit from the key ecosystem service of conservation biological control. **Selective chemistry is both safer to the user and environment, as well as to the predators and parasitoids that maintain secondary pests below economic levels and help control our primary pests like whiteflies and *Lygus* bugs.**

While completely harmless to pollinators and other beneficials, *Bt* cotton is fully selective in eliminating the threat of damage from pink bollworms, *Pectinophora gossypiella*, and reducing losses to other lepidopteran species (e.g., Heliothines, *Spodoptera spp., Estigmene acraea, Bucculatrix thurberiella, Trichoplusia ni*).

The Insect Growth Regulators, Courier and Knack, and lipid biosynthesis inhibitors, Oberon and Movento[3], safely control whiteflies and leverage natural controls in a fully selective manner. Neonicotinoids (Intruder and others) are only partially selective, but play an important role in the control of all whitefly stages including the adults.

Carbine and Transform are both fully selective controls for *Lygus* in cotton. Belay also provides full or partial selectivity dependent on dosage. Some limited suppression of whiteflies is possible with both Belay and Transform.

Each compound has additional characteristics that should be considered. Courier has an important vapor phase that assists movement of residual to untreated surfaces in the canopy including to leaf undersides of new growth. Knack and Oberon tightly bind to the waxy layer of the leaf, and this rain-fast residue slowly moves from the top down to the leaf undersides where whiteflies live. Intruder, Carbine, Transform, and Belay are also translaminar, readily moving from one leaf side to the other, and are xylem-mobile moving up the plant. Movento is unusual in that it is fully systemic, readily moving in both directions in the plant and fully dosing all plant parts, even when applied foliarly.

"Being selective" with these compounds is what makes them so effective and critical to a successful IPM plan. **By strategically controlling only the target and leaving all or most non-target arthropods unharmed in cotton, conservation biological control can operate to prevent any secondary pest outbreaks and assist in the control of whiteflies and *Lygus*.**

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Also see:

Ellsworth et al. 2006. Whitefly Management in Arizona Cotton, 2006. UA IPM Series No. 18. http://cals.arizona.edu/pubs/insects/az1404.pdf
Ellsworth et al. 2011. Keeping Cotton Green! UA IPM Short. http://ag.arizona.edu/crops/cotton/files/SelectiveChemicalControlsvF.pdf
Mostafa et al. 2011. Untangling the Web…Spiders in Arizona Fields! UA IPM Short. http://ag.arizona.edu/crops/cotton/files/SpidersWebsvFc.pdf
Palumbo et al. 2003. Cross Commodity Guidelines for Neonicotinoid Insecticides in Arizona. UA IPM Series No. 17. http://cals.arizona.edu/pubs/insects/az1319.pdf

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Common Name	[1]IRAC Number	Chemical Group	Primary Cotton Target	Primary Target Stage	Secondary Cotton Targets	Product Name	lbs a.i. per gallon or per lb	Rate (lbs ai per acre)	Common Use Rates (oz/A)
buprofezin	16	Chitin inhibitor	Bemisia tabaci	Nymphs, instars 1–3	Scales, mealybugs	Courier	3.6	0.35	12.5
pyriproxyfen	7C	Juvenoid	Bemisia tabaci	Young egg & adult sterilization; nymphs, instar 4	Aphids, scales, mealybugs	Knack	0.86	0.054	8–10
spiromesifen	23	Lipid synthesis inhibitor	Bemisia tabaci	Nymphs	Mites	Oberon	2	0.125	8–10
spirotetramat	23	Lipid synthesis inhibitor	Bemisia tabaci	Nymphs	Aphids	Movento[3]	2	0.0623	4
acetamiprid	4A	Neonicotinoid	Bemisia tabaci	Adults & immatures	Aphids, cotton fleahopper, thrips	Intruder	0.7	0.1–0.15	[2]2.3–3.5
flonicamid	9C	Selective feeding inhibitor	Lygus hesperus	Nymphs	Aphids, cotton fleahopper	Carbine	0.5	0.088	2.8
sulfoxaflor	4C	Sulfoximine	Lygus hesperus	Nymphs	Bemisia tabaci, aphids, cotton fleahopper	Transform	0.5	0.047–0.07	1.5–2.25
clothianidin	4A	Neonicotinoid	Lygus hesperus	Nymphs	Bemisia tabaci, thrips, cotton fleahopper, flea beetles	Belay	2.13	0.075	4.5–6

1, The Insecticide Resistance Action Committee (IRAC) assigns numbers for each mode of action that appear on many U.S. insecticide labels and are helpful for resistance management.
2, The State of Arizona has approved a Special Local Needs (SLN) provision that permits usage of up to 3.5 oz of Intruder against difficult-to-control whiteflies.
3, Product(s) not currently registered for use in U.S. cotton.