



Cotton Field Check

Management Updates from UC Cooperative Extension
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All Things in Moderation

Even with the pressure to produce high quality, non-sticky cotton, it is important to follow the basic tenets of IPM.

1. Visit and sample fields regularly.
2. Treat only when the population exceeds the action threshold.
3. Be realistic about yield potential and strive for the shortest season possible. Delaying harvest makes your fields available for aphid and whitefly migration late in the season.
4. Manage the crop to a successful termination. Take care with late irrigations; avoid situations that lead to re-growth before and after defoliation
5. Consider both species (aphids and whiteflies) in the treatment decision as well as both whitefly nymphs and adults.
6. Practice good insecticide resistance by rotating compounds with differing modes of action.
7. Always read and follow labels



Towards Late-Season Cotton - Managing Aphids and Whiteflies

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Minimizing the occurrence of sticky cotton remains a critical goal for San Joaquin Valley cotton. San Joaquin Valley cotton growers and PCAs have done an exceptional job in maintaining quality lint by preventing sticky cotton caused by whitefly and aphid. Close monitoring is paying off with consistent high quality lint but constant vigilance is required every year. PCAs and growers must still carefully watch the fields for the migration and buildup of whitefly and aphid during the critical period from first open boll to the last boll picked. The weeks prior to crop termination are especially critical because adult whitefly and aphid populations can rapidly move into cotton fields from neighboring crops that are being harvested.

The Situation

The reports of whitefly populations in fields first appeared in June. The areas that typically experience whitefly populations (southern end and eastern edge of valley and fields adjacent to urban areas) again have populations approaching or in some cases already exceeded treatment thresholds. Insecticide applications have started in many of these areas. But it is surprising that populations are being seen in cotton growing more in the interior of the San Joaquin Valley, i.e., away from the typical whitefly "hot spots". In many cases, these populations are approaching threshold levels.

Aphids have been present in cotton fields for most of the season but their populations in most cases have not required treatment. Populations continue to develop in more locations around the Valley.

As an example, in a Pima field Godfrey has been monitoring at the West Side Research and Extension Center, populations of both aphids and whiteflies are developing. This field was somewhat late-planted (~20 April), received one application for Lygus and one for spider mites, and has good fruit set, no open bolls yet. This week the aphids averaged ~35 per leaf, whitefly nymphs were at 5 per leaf and whitefly adults at 2+ per leaf. These levels are approaching or at threshold levels; none greatly exceeded the threshold. However, there are two concerns, 1.) continued growth of populations as the crop matures, and 2.) the combined effects of both aphids and whiteflies, i.e., more of a combined threshold.

The maturity of the cotton crop in the San Joaquin Valley is fairly uniform due to the tight planting window, in spite of some mid-season loss to high temperatures. This should make pest management somewhat easier since fields are similar in their development and insecticide treatments somewhat synchronized. If harvest preparation and the harvest occur within a small window the amount of inter-field migration problems should be limited. Of course, Pima fields will follow after Acala fields and could experience late season migration of both pests.

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Crop Conditions and Cultural Practice Impacts

Fields with higher late season vigor may be more attractive to and support higher late season populations of aphids and whiteflies. This late season vigor could be due to higher water, more nitrogen, or later plantings. Such vigorous plants could result in regrowth of new leaves after the first defoliant application and support late, concentrated populations of aphids and whiteflies. Fields should be watched carefully until the day of harvest, to prevent honeydew deposition on lint.

Making Whitefly Treatment Decisions

Making treatment decisions late in the season can be complicated. Sampling using the existing pest management guidelines (see www.ipm.ucdavis.edu) is the first step, including proper identification. Take care to identify the whitefly as Sweetpotato whitefly Biotype B (formerly Silverleaf) and not one of the other species that could be present (for identification tips, see http://ucanr.edu/sites/CottonIPM/Useful_Resources/). In most of the cases seen this year, the triggering factor tends to be adults but leaves should be inspected closely for immature insects. Decisions should be based on population demographics and crop development. If control is required, there are three main approaches:

- Situation 1. Insect Growth Regulators (Courier –Group 16 and Knack Group 7) and Oberon (Group 23) to prevent a light-moderate population from developing more severely.
- Situation 2. Non-pyrethroid chemistry to manage adults, limit population establishment and protect open cotton. Products include organophosphates (Group 1B), carbamates (Group 1A), as well as Assail and Vemon (both Group 4A) and Oberon.
- Situation 3. Pyrethroid (Group 3) combinations with Groups 1B, 1A and to knockdown adult whiteflies and limit honeydew secretion just prior to defoliation, at the time of defoliation or even on regrowth after defoliation.

Several steps are required to formulate a control strategy.

- First, what is the target, adults or immature whiteflies or both?
- Next, how long before defoliation?
- How well (and quickly) does the field defoliate?

These questions will direct you toward one of the approaches listed above. See UC Pest Management Guidelines for details (www.ipm.ucdavis.edu).

Thresholds and Sampling: Routinely check field margins for whiteflies; these areas are usually infested first. Be especially alert for rapid population buildup when nearby host crops are in decline. During these critical periods, check cotton fields twice weekly. Whitefly adults and nymphs need to both be monitored for the threshold. Check for whitefly adults on undersides of fifth main stem node leaves—if 3 or more are found, rate the leaf as infested. If 1 or 2 whitefly adults are found on a leaf, for the purposes of this threshold it is “not infested”. The treatment threshold is 40% of leaves infested with whitefly adults. For whitefly nymphs, place a quarter-sized ring on the same leaf between the central and left-side main veins and check for presence or absence of large nymphs. Score the leaf as infested if any large nymphs are present (3rd and 4th instars) within the quarter-sized ring. Fourth instars nymphs typically have “red eyes”/spots near the head/front end and third instars have yellow spots mid-way on the body. The treatment threshold is 40% of leaves infested with large nymphs.

If using insect growth regulators (IGRs), nymphs must also be present to justify treatment. If high numbers of adults are at field edges, but no nymphs, an edge treatment with a non-IGR may be required. Treatments for whitefly nymphs should be limited to IGRs (buprofezin [Courier], pyriproxyfen [Knack], or spiromesifin [Oberon]), or nonpyrethroid insecticides if made before boll opening. These products provide long residual control (up to 6 weeks) so this period needs to be available to maximize the cost-effectiveness of the treatment. Pyrethroids should not be used until

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when the bolls are open, because they increase populations of spider mites and aphids by causing them to reproduce faster; they are more toxic to natural enemies of aphids, spider mites, and sweetpotato whiteflies than the other materials; and they are most effective against adult whiteflies, whereas nonpyrethroids are most effective against nymphs.

Pyrethroid combinations: Pyrethroid insecticides (Group 3) in combination with other insecticides are useful options when a large migrating adult population (Situation 3) occurs, especially near defoliation. If several weeks from defoliation, 5 adults/5th is treatable, but within days of defoliation, the action threshold can be raised to 10 or more adults/5th leaf is treatable. While knockdown is good, residual control is limited. When combined with an organophosphate (Group 1B), a synergism occurs that enhances control. This approach can be applied at defoliation when DEF (an organophosphate defoliant) is used. If aphids are present or other defoliants besides DEF are used, combining the pyrethroid with an organophosphate insecticide such as Lorsban will provide synergy and limit the aphid buildup. *Always read and follow the pesticide label.*

Aphid Management:

Aphid management is always difficult as the crop progresses from the mid to late-season period. The threshold on mid-season cotton is ~50 per leaf (this threshold was developed on upland cotton and not validated on Pima cotton) whereas on late-season cotton the action threshold after lint is exposed is between 5-10 aphids/5th leaf. Managing aphids late season can be challenging when trying to rotate different insecticide chemistries. Dependence on a single mode of action, such as neonicotinoids, may facilitate resistance development. Aphid populations at this part of the season tend to be rather persistent and do not fluctuate rapidly up or down as they do during the mid-season. Populations on severely cut-out and/or plants stressed by defoliants may occur on regrowth or green patches (such as near mid-ribs) on leaves. In addition to the neonicotinoids (Group 4A), aphid control products include Organophosphates Lorsban (Group 1B), and flonicamid [Carbine] (Group 9C). If Carbine has been used previously during the season, such as in July for Lygus bugs, consider another class or chemistry for the first application for aphids.

Aphids and Whitefly

Making decisions when both pests are present requires evaluation of the most threatening insect. Combination treatments will likely be needed. Keep in mind that using of pyrethroid combinations for whitefly control will likely flare aphids, if present. If whitefly adults are of primary concern, Lorsban would also help reduce aphid.

