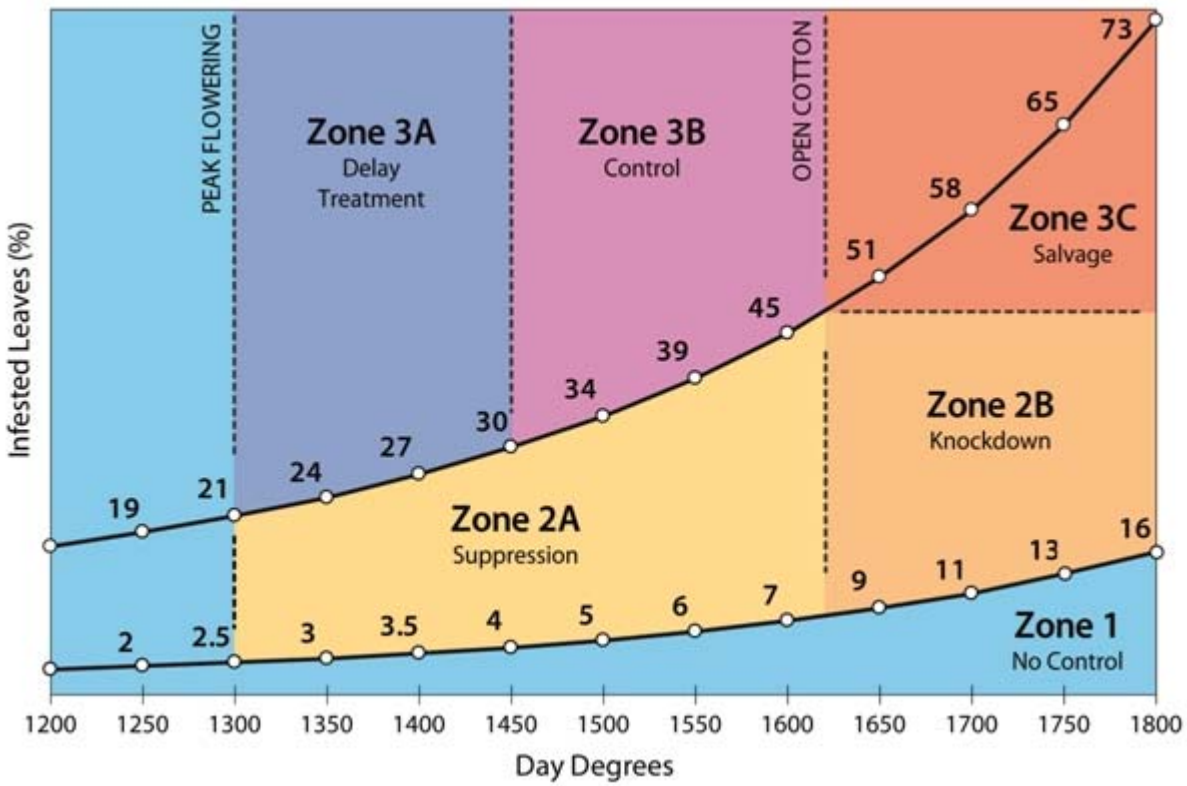
Late Season Silverleaf Whitefly Management

Management of Silverleaf whitefly in later maturing crops is complex, and growers and consultants need to manage to avoid honeydew contamination. This article focuses on management options for crops in the salvage zone (3C) of the threshold. For more information on best practice in managing silverleaf whitefly refer to the cotton pest management guide, available from www.myBMP.com.au

Silverleaf whitefly (SLW), B biotype *Bemisia tabaci*, is a major cotton pest due to contamination of cotton lint by honeydew. Honeydew contamination would result in severe discounts to the grower, and could also affect Australian Cotton's reputation. Greenhouse whitefly (*Trialeurodes vaporiorum)* and Australian Native Whitefly (*Bemisia tabaci)* can also be present in cotton but are not considered pests, as their honeydew secretions do not cause problems for textile processing, and are both susceptible to many of the insecticides used to control other pests. Verify which whitefly species is present before implementing any management strategies. Greenhouse whitefly can be visually differentiated from *Bemisia tabaci* by comparing their wing shape in adults and the presence/absence of hairs on the nymphs (see cotton pest management guide). The different biotypes of *Bemisia tabaci* cannot be distinguished by eye

Management of SLW is challenging as they are resistant to many insecticides, and good IPM that preserves beneficial is critical. For SLW there are separate thresholds for early season suppression, control and for knockdown late in the season. Thresholds are based on rates of population increase relative to the accumulation of day degrees and crop development. A Threshold Matrix and binomial sampling technique has been developed to assist in the interpretation of population monitoring data. For more information refer to the 2012/13 Cotton Pest Management Guide.



Honeydew and sooty mould from silverleaf whitefly would result in large discounts.

What if my crop is late?

Control of whitefly in delayed or later maturing crops is complex. Whitefly that may occur in these crops are likely to be a combination of both the resident population and those that have dispersed from earlier maturing defoliated crops or sprayed out winter cropping lands. In these instances the threshold matrix MAY NOT be an accurate predictor of SLW population build up. Firstly, the day-degrees that a crop accumulates may no longer align well with the matrix if it is late developing due to flood damage. Secondly, the matrix is predicated primarily on SLW populations having built up in the crop without additional mid to late season influxes from surrounding areas. Agronomists and consultants will need to adjust their management strategy to one that accounts for open bolls and honey dew

build up as opposed to the direct use of the chart.

LATE SEASON SLW MASS IMMIGRATION SCENARIO DECISION CASE STUDY				
Crop with low or no SLW experiences a mass immigration of SLW adults	>3 wks till leaf drop	Eggs may have time to develop to nymphs that could produce honeydew	Little or no honeydew on leaves in lower canopy	Monitor
			Heavily speckled leaves in lower canopy	Control (Admiral® or Movento®)
	<2 weeks till leaf drop	Too little time for nymph population to develop so manage adults.	Little or no honeydew on leaves in lower canopy	Monitor
			Heavily speckled leaves in lower canopy	Knockdown &/or defoliate early &/or delay picking if bolls contaminated

What if I have an influx of SLW adults late in the season?

A crop manager faced with these scenarios should aim to avoid honey dew contamination of open bolls. This means that high populations of displaced whiteflies prior to open bolls can be tolerated. The delay of treatment for as long as possible on late crops may also be advantageous as cooler temperatures in March/April will slow whitefly population growth and further reduce their capacity to generate honeydew. Purposeful treatment delay also allows more settling time for the likely inward flow of whiteflies before treatment is applied. Treating too early maybe partially ineffective due to further crop re-invasion by adult whitefly as the treatments efficacy declines and hence increases the risk of having to retreat.

For developmentally delayed crops or those fields that suffer influxes control decisions should be primarily based on four factors being:

1) Presence of whitefly and open bolls

2) Expected time until defoliation leaf drop

3) The rate of honey dew accumulation on the crop canopy and lint

4) The likely efficacy and residual impact of the chosen insecticide.

Product choices for SLW are primarily limited to knockdowns such as Pegasus (Diafenthiuron) and Pyrethroids (Bifenthrin) or the slower acting IGR's suchas Admiral (Pyrproxifen) and Movento (Spirotetramat). Resistance is a threat to these products, so follow the IRMS. Admiral can only be applied once.

What if my crop is in the salvage zone?

Crops with very low whitefly populations, <10% infested, and little honeydew at boll opening should not require control. However numbers and honeydew should continue to be monitored and if there is a sudden increase in whitefly, due to an influx from neighbouring fields control with a knockdown may be warranted.

Crops with moderate to high numbers at boll opening >30% infestation, may require treatment. Treatment options will depend on the origin and numbers of SLW, level of honey dew and rate of change and time left till defoliated leaf drop and relevant product withholding periods (WHP's).

If numbers are moderate to high and defoliated leaf drop is 3 or more weeks away an IGR may be the best control option as Pyrproxifen has excellent residual and will mostly prevent the continued build up of resident and immigrant SLW. The Central Queensland experience strongly suggests that Pyriproxyfen (Admiral®) works even better at lower autumn temperatures than it does in summer and is capable of cleaning up dense whitefly populations on late cotton very effectively with a single application. Again, continue to monitor whitefly numbers and honeydew. If adult numbers begin to rebuild a knockdown may be required – use the threshold matrix as a guide.

If the crop is less than 2 weeks from defoliation and an influx of adult SLW occurs, a knockdown type product may provide better value, keeping in mind relevant WHP's. Again monitor honeydew and revise control decisions accordingly. In each scenario, if whitefly numbers are beginning to recover and cause honeydew close to defoliation then consider defoliating a few days earlier. Once defoliant is applied adult whitefly will generally leave the crop and falling leaves will take the nymphs with them. In terms of monitoring honey dew, it is difficult to determine at exactly what point levels may become problematic once bolls begin to open. In CQ and during later outbreaks on the Darling Downs, honeydew was considered to be nearing levels that maybe problematic when leaves on the lower canopy start becoming heavily speckled with honeydew. If the leaves are at or get beyond this level and develop a honeydew "sheen" then corrective action is required immediately.

In some instances a crop will have an earlier and later maturing phase of bolls in the crop. It is important to manage whitefly to reduce the risk of contamination of the earlier bolls. The basic strategies outlined above should be used in relation to the earlier bolls eg, delaying the first treatment as late as possible, but not later than 5% open bolls. However, with ongoing monitoring of whitefly and honeydew as a guide, a second application of an insecticide from a different group may be required. Earlier defoliation may also be beneficial.

	10% open bolls **115 – 118 DAP** **~ 1650 DD**	**30% Open Bolls** **145 DAP** **~2000 DD**	**60% Open Bolls 155 DAP** **~2150 DD**
Pop. density < →50% infested leaves	• Continue to monitor SLW, and consider forecast temps, and rainfall outlook • Consider knockdown, IGR or Pegasus	• Use Pegasus and look out for re-infestation • Consider defoliation at 60%	Potential big problem • Look for nymphs. If none possibly late season migration (refer above to case study) • Defoliate ASAP * See below for management of honey dew contamination.
Pop. density ≥ 50% infested leaves	If there is still a few weeks to go until defoliation, the residual effect important. • Use IGR (residual 7-10 days)) with knockdown	• Use IGR (residual 7-10 days) if defoliation is >3 weeks away. • Consider knockdown if defoliation is <2 weeks • Early defoliation at around 60% open bolls* if necessary	
WORST CASE: Honey dew contamination of lint	•Defoliate as soon as possible •Harvest last •Allow Weathering time – especially rain, dew, high humidity		

*Normal defoliation is usually at 85% open boll

Honeydew sheen on lower leaves indicating corrective action is required

With heavy honey dew contamination and the appearance of sooty mould on bolls, growers should delay harvest.

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