

# Early season aphid management

## Getting it right, now and for the future

Early season pests present a great challenge for pest decisions makers, as any disruption to beneficials early in the season is likely to result in the flaring of pests and increase the necessity for further sprays later in the season. Aphids have the potential to reduce yield, create sticky cotton and are vectors for Cotton Bunchy Top Disease (CBT). The high levels of resistance to a number of chemical groups in aphids mean that adherence to the Insect Resistance Management Strategy (IRMS) and an effective whole farm Integrated Pest Management (IPM) strategy for the management of aphids is critical.

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### Do aphids require control early season?

When aphids feed they take in the sugars produced during photosynthesis and if they feed for long enough early in the season, this can translate into reduced yield. The following information will help determine whether aphids will require control.

### Verify species

If winged aphids are seen on cotton, verify which aphid species is present. A simple strategy to establish if aphids are a cotton pest is to mark the area and return several days later to see if a colony establishes and is reproducing (non-winged forms present) before considering control. Many winged forms of non-pest aphid species will settle on cotton and test feed, then move on when they find it unsuitable.

Cotton aphids (*Aphis gossypii*) vector CBT and are the most common aphid pest, but green peach aphid (*Myzus persicae*) & cowpea aphid (*Aphis craccivora*) may also establish though usually will decline in numbers as temperatures increase (generally early December). Green peach aphid and cowpea aphid do not appear to be CBT vectors. For more information on identifying aphid species refer to the "Which Aphid Species" handout.

### Identify 'Friends with Benefits'

Natural enemies of aphids include predators such as ladybirds, larvae of lacewings, silverfly & hoverflies. Wasp parasites (*Aphidius colemani* & *Lysiphlebus testaceipes*) can mummify & kill aphids. Mummified aphids are easily

identified due to their distinctive, bloated appearance and pale brown colouring. Following good IPM principles will help to preserve these beneficial populations, reducing the need for control.

## "Friends with Benefits"



*Integrated Pest Management focuses on looking after your pest's natural enemies, your 'friends with benefits'. Many species of ladybeetle are predators of aphids.*

Photo by Johnelle Rogan

### Aphid Threshold

From seedling to first open boll cotton aphid thresholds are based on the potential for aphids to reduce yield. Sample for aphids on the underside of mainstem leaves 3-4 nodes below the plant terminal. Use a 0 to 5

scoring system as described in the Cotton Pest Management Guide and input this information into the aphid yield loss estimator on the CottASSIST web site, or use tables in the CPMG.

**Cotton Bunchy Top**

The aphid threshold does not take into account losses from CBT. If CBT risk is considered high, don't start spraying aphids on sight, as you increase the risk of resistance and may induce control problems later in the season. Continue to monitor marked aphid populations twice weekly to determine if populations are healthy and expanding (ie. warrants control), or if beneficial populations are likely to prevent further aphid spread.



CBT transmission and severity is highly dependent on the size and movement of the aphid population. Many colonisation events fail to result in successful transmission. If just one CBT-infected aphid colonises a plant, the transmission rate is 5% (1 in 20 plants become infected). If >3 infected aphids colonise a plant, the transmission rate increases, but only up to ~40%. Because of the long latent period, CBT symptoms may not be visible until up to 8 weeks after infection. Earlier infection can result in more severe symptoms.

**Cultural control**

Good farm hygiene is a key component of good IPM. Aim to reduce the abundance of weed hosts that are favourable to aphid population build-up. Cotton aphid have a broad host range that includes winter weeds such as marshmallow, capeweed and thistles, & spring/summer weeds such as thornapples, nightshades, paddymelon, bladder ketmia and Bathurst bur (See Table 1). Farm gardens can also provide a habitat for cotton aphid especially when conditions are dry (see Table 2). Aphids overwintering on these weed hosts will also maintain chemical resistance within populations through reproduction by cloning. Ratoon & volunteer cotton are particularly important to control as they can host aphids & CBT throughout the year.

Weed hosts and volunteer and ratoon cotton located close to fields are potential sources of CBT as aphids can move from these hosts into cotton fields. Recent research by Murray Sharman (QDAFF), in collaboration with Lewis Wilson and Tanya Smith (CSIRO Plant Industry) have confirmed further weed hosts, in addition to the already identified CBT weed host, *Malva parviflora* (Marshmallow). These are:

- *Anoda cristata* (Spurred anoda), "common in irrigated and dryland cotton in Qld and is spreading in NSW" - Weedpak.
- *Abutilon theophrasti* (Velvetleaf, American jute, Chinese hemp, Chinese jute, Chinese lantern etc.), "relatively rare...scattered infestations where it does occur, particularly in parts of the Gwydir, Namoi and Macquarie." - Weedpak.
- *Hibiscus sabdariffa* (Rosella), "widely naturalised in northern Queensland, the northern parts of Northern Territory and northern Western Australia" - Weeds of Australia website.
- *Chamaesyce hirta* (Asthma plant, flowery headed spurge..), "Widely naturalised in northern and eastern Australia but most common and widespread in tropical and sub-tropical regions" - Weeds of Australia website.

Asthma plant (family *Euphorbiaceae*) is the only non-*Malvaceae* species identified as a host of CBTV so far but this does suggest that the virus may have a wider host range than originally thought.





**Table 1.\*** Hosts of cotton aphid (*Aphis gossypii*) recorded from regular sampling on cotton farms and weedy areas in the Namoi Valley, between May 2002 and September 2004.

Plant Species	Common name	Warm Oct-May	Cool Jun-Sept
<i>Bidens pilosa</i>	Cobblers pegs	xxx	xxx
<i>Bidens subalternans</i>	Beggars ticks	xxx	
<i>Boerhavia diffusa</i>	Tarvine	x	
<i>Cajunus cajan</i>	Pigeon pea	xx	
<i>Chamaesyce drummondii</i>	Caustic weed	xxx	xx
<i>Chenopodium pumilio</i>	Small crumbweed		x
<i>Chrysanthemum sp.</i>	Chrysanthemum	xxx	
<i>Citrullus lanatus</i>	Camel melon/watermelon	xxx	
<i>Citrullus vulgaris</i>	watermelon	xx	xxx
<i>Convolvulus erubescens</i>	Australian bindweed		x
<i>Conyza bonariensis</i>	Flax leaf fleabane	x	x
<i>Cucumis myriocarpus</i>	paddymelon	xxx	
<i>Cucumis pepo</i>	pumpkin	xx	
<i>Cucumis sativus</i>	cucumber	xx	
<i>Cucurbita maxima (pumpkin)</i>	Winter squash	xx	
<i>Cucurbita pepo</i>	zucchini	xx	x
<i>Echium plantagineum</i>	Paterson's curse		xx
<i>Datura ferox</i>	Fierce thornapple	xxx	
<i>Fallopia convolvulus</i>	Black bindweed	xx	
<i>Glycine max</i>	Faba bean	xx	
<i>Gossypium hirsutum</i>	Cotton	xxx	xxx
<i>Helianthus annuus</i>	Sunflower	xxx	xx
<i>Hibiscus esculentus</i>	Okra	xxx	
<i>Hibiscus rosa-sinensis</i>	Hibiscus	xxx	
<i>Hibiscus sabdariffa</i>	Rosella	xxx	xx
<i>Hibiscus trionum</i>	Bladder ketmia	xxx	xx
<i>Impatiens hawkeri</i>	Impatiens	x	
<i>Lamium amplexicaule</i>	Deadnettle	xx	xx
<i>Malva parviflora</i>	Marshmallow	xx	xx
<i>Malvastrum corome-liandrum</i>	Malvastrum	xx	xx
<i>Medicago polymorpha</i>	Burr medic	x	xxx
<i>Physalis ixiocarpa</i>	Annual Ground Cherry	xxx	
<i>Portulaca oleracea</i>	Pigweed	xx	
<i>Rapistrum rugosum</i>	Turnipweed	xx	xx
<i>Silybum marianum</i>	Variiegated thistle		x
<i>Sida rhombifolia</i>	Paddy's lucerne	xx	x
<i>Solanum nigrum</i>	Blackberry nightshade	xx	
<i>Sonchus oleraceus</i>	Milkthistle	xx	xx
<i>Trianthema portulacastrum</i>	Giant pigweed	xxx	
<i>Triticum aestivum</i>	Wheat		x
<i>Tribulus terrestris</i>	Cat-head	xx	
<i>Urtica urens</i>	Small nettle	x	x
<i>Verbena bonariensis</i>	Purpletop	x	x

**Table 2.\*** Hosts of cotton aphid (*Aphis gossypii*) recorded from town and farm gardens in the Namoi Valley, between May 2002 and September 2004.

Plant Species	Common name	Warm Oct-May	Cool Jun-Sept
<i>Abutilon sp.</i>	Abutilon		xx
<i>Argyranthemum</i>	chamomile		x
<i>Begonia sp.</i>	Begonia	x	
<i>Calibrachoa</i>	Calibrachoa	x	
<i>Chili</i>	Chili	xx	
<i>Chrysanthemum sp.</i>	Chrysanthemum		xxx
<i>Citrus (lemon)</i>	Lemon		xx
<i>Citrus (Lime)</i>	Lime		xx
<i>Citrus (orange)</i>	Orange		x
<i>Cuphea llavea</i>	Tiny mice	xx	x
<i>Gazania sp.</i>	Gazania		xx
<i>Hypoestes phyllostachya</i>	Polka dot plant		x
<i>Lagenaria siceraria</i>	Bottle gourd	x	
<i>Lantana spp.</i>	Lantana	x	xx
<i>Melissa officinalis</i>	fennel	x	
<i>Mentha sp.</i>	Mint		x
<i>Nerium</i>	Nerium		x
<i>Origanum marjorana</i>	Marjoram	xx	
<i>Ozothamnus sp.</i>			x
<i>Rosa sp.</i>	Rose	x	x
<i>Salvia sp.</i>	Salvia	xx	x
<i>Solanum melongera</i>	Eggplant/aubergine	x	x
<i>Zinnia peruviana</i>	Zinnia		x
<i>Zinzibar</i>	Ginger		x
<i>Citrus hystrix</i>	Kaffir lime		x
<i>Hibiscus rosa-sinensis</i>	Hibiscus		xxx
<i>Malus</i>	Apple	x	xx
<i>Vinca</i>	Vinca		x

X, >1 aphid found on a plant on one sampling occasion  
 XX, >1 aphid found on one plant on more than one sampling occasion, but never more than 100/plant  
 XXX, >1 aphid found on one plant on more than one sampling occasion, and more than 100 aphids found on a plant at least once.

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