

Integrated Disease Management for: Cotton Bunchy Top

Cotton bunchy top (CBT) is a viral disease spread by the cotton aphid.

Symptoms

Leaves usually have pale green angular patterns around the margins and darker green centres, and can be leathery and brittle compared to the leaves on healthy plants.

After the plant is infected, subsequent growth is characterised by small leaves, short internodes and small bolls. This is usually limited to growth that occurred after the plant was infected; growth before infection usually appears normal.

When plants are affected at a very early stage (e.g. as seedlings) the growth of the whole plant is affected and has a compact, severely stunted appearance.

Roots appear hairy and dark brown in comparison to the light yellow-brown colour of healthy roots and form small knots on the secondary root branches. Symptoms are difficult to distinguish in perennial volunteer cotton & late crops (post cut out) where there has been insufficient new growth to show symptoms.

There is usually a period of 3-8 weeks from infection until symptoms become obvious.



CBT affected bolls vs healthy bolls.

Patches of infected plants may occur around ratoon plants that were affected by CBT and survived from the previous season. These infected plants often also harbour aphids which can then move to adjacent plants, spreading the disease.

Economic impact

CBT has potential to cause significant yield losses. The extent to which yield is affected depends on the proportion of plants infected and the timing of infection. The greatest potential for yield losses occurs when a high proportion (e.g. > 50 per cent) of plants are infected within the first weeks after germination.

Favoured by

The Cotton bunchy top virus (CBTV) can only survive in living plants. Fields at highest risk of CBT are

those with high aphid populations, in close proximity to ratoon cotton. Ratoons act as both a preferred host for the aphids and a reservoir for the disease, creating a source of infection in the new season. Disease spread is favoured by climatic conditions suitable for aphid reproduction, feeding and spread. The risk from CBT appears to be higher after wet winters and lower after dry winters. Wet, mild winters enable more volunteer and ratoon cotton and aphids to survive between season and copping cycles.

Cotton aphid has a broad host range, including many weeds. The presence of weed hosts allow cotton aphid populations to persist overwinter, increasing the likelihood of aphids re-establishing on CBT ratoons and moving into cotton early in the season.

Host range

CBTV can infect many different host plants. However, the most critical alternative host plant is ratoon or volunteer cotton. They survive between seasons, retaining leaves through winter and supporting infected aphid populations from one season to the next. The importance of the other host plants is not well understood but in some situations Marshmallow weed (*Malva parviflora*) may be an important overwintering host for virus and aphids.

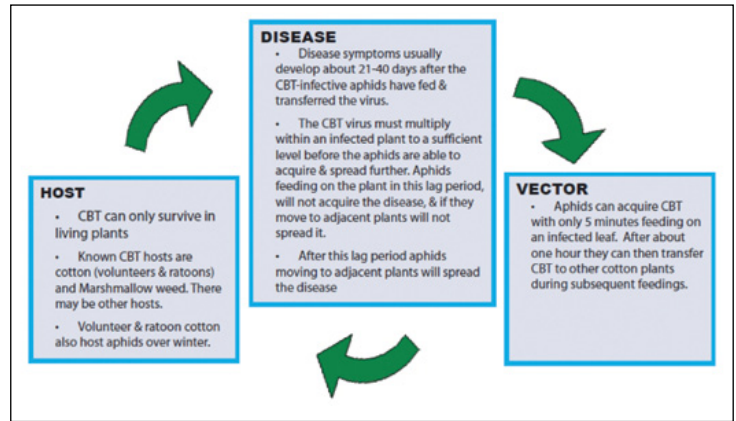
Thirteen natural field hosts of CBT have been identified including: cotton, *Abutilon theophrasti* (Velvetleaf), *Anoda cristata* (Spurred anoda), *Chamaesyce hirta* (Asthma plant), *Gossypium sturtianum* (Sturt's desert rose), *Hibiscus sabdariffa* (Rosella), *Hibiscus trionum* (bladder ketmia), *Lamium amplexicaule* (deadnettle), *Malva parviflora* (Marshmallow weed), *Malvastrum coromandelianum*,

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Medicago polymorpha (burr medic), *Sida rhombifolia* (Paddy's lucerne), and *Trianthema portulacastrum* (black pigweed). *Gossypium australe* and *Cicer arietinum* (chickpea) were also found to be experimental hosts.

These are currently the only known hosts of CBT. However the virus may have a wider host range than originally thought and include further non-Malvaceae species.

Life cycle



Control strategy

1. Avoid the problem - elimination of hosts, particularly over winter, is the most effective means of minimising the risk of CBT. Break the green bridge and step 2 will not be required.
 - CBTV can only survive in living plants. If there is a break in the presence of host between cotton seasons, this will reduce the risk of CBTV surviving on-farm through winter. Cotton volunteers, regrowth and ratoons are an important host of CBTV. Good crop destruction and control of ratoons and volunteers is critical for controlling CBT (and for minimising the risk of several other important cotton pathogens). This also removes an important over winter host for cotton aphid.
 - Growers should also control volunteer cotton plants on their farms, especially near sheds, head ditches, water ways, riparian areas and roads.

- Good on-farm management of broad leaf weeds is important as they can also host aphids and some are also hosts of CBTV.
- Controlling volunteers or ratoons may force winged aphids to move to nearby cotton crops and spread CBT. To reduce this risk, control volunteers/ratoons before cotton emerges.

2. Manage the risk – aphid control should not be the primary means of preventing infection.

- Don't over-react to aphids. Excessive use of aphicides will select for resist aphid populations and restrict control options.
- Sample young cotton regularly for aphids and assess aphid spread within the field.
- If aphid populations are unhealthy (many beneficials present, high mortality and little spread) then keep monitoring. If healthy then consider selective control so that beneficials can provide ongoing mortality.
- If a high influx of aphids is experienced consider a quick selective control to reduce the risk of CBT infection.
- Maintain the beneficial complex to help control aphids.



Leaves are small and have a leathery appearance. Leaf mottle may turn red.

BREAK THE GREEN BRIDGE!

To reduce your risk of CBT next year, don't give the virus & its vector a home for the winter. Plan for good crop destruction to reduce ratoons. Control all ratoons & volunteers & other hosts.

For more information:

- Visit www.cottoninfo.net.au
- Download the *2014-15 Cotton Pest Management Guide* from www.cottoninfo.com.au/publications

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Good farm hygiene is key to preventing CBT and aphids – volunteers and ratoons must go.