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Abamectin resistance

in two-spotted mite now common

Mites are an induced or secondary pest in cotton – that is, spraying for other pests, such as *Helicoverpa spp.* or mirids, reduces the abundance of beneficial species that eat mites, allowing them to rapidly increase to damaging levels.

There are four types of mites that establish in cotton. Two-spotted spider mite (TSM) is the main pest species. Bean spider mite and strawberry spider mite also colonise cotton but rarely cause economic damage. The fourth is broad mites (*Polyphagotarsonemus latus*). Broad mites have been relatively uncommon in cotton but within the last decade reports of this mite have increased. Uniquely, broad mites are tiny (0.25mm), and can be dispersed by silverleaf whitefly. It may be that the increased pest status of whiteflies has also benefited broad mites. The pest status of broad mites in cotton is unknown but reports of crop damage to date have been relatively minor, presenting late season in isolated patches.

Historically TSM has been the dominant species, but the dramatic reduction in insecticide use in Bt cotton has allowed bean and strawberry spider mites to become more abundant in recent years.

Prior to the introduction of Bt cotton, TSM populations commonly increased to levels that required control. TSM developed resistance to several chemicals including dimethoate/omethoate, profenofos and bifenthrin.

Abamectin resistance monitoring rarely detected positive results in TSM until the 2007-08 season. By 2010-11, abamectin resistance was detected in three out of four TSM strains tested. Since then, resistance has regularly been detected, and remains at concerning levels.

The 2020-21 resistance testing results of TSM from NSW DPI, showed high resistance to abamectin in all populations tested from the lower Namoi and Gwydir regions in northern NSW with survival rates ranging from 53 to 63 percent. In contrast, TSM from southern growing regions had lower resistance with only 14 percent survival.

These results suggest usage of insecticides that contain abamectin (including mixtures) should be restrained where possible in northern growing regions. Careful management of abamectin resistance in southern regions will also be necessary to retain efficacy in TSM.

A common use pattern for abamectin has been to apply this product in combination with mirid sprays as an 'insurance additive' to avoid secondary mite outbreaks. However, there are risks associated with this strategy for mite control:

1. Some sprays used for mirid management can cause disruption to natural enemies of mites.

2. The prophylactic use of abamectin in combination with mirid sprays is compounding resistance selection and will lead to abamectin failure against TSM.

In the recent past, numbers of TSM in crops across most regions has dramatically reduced. This suggests insurance sprays against mite outbreaks in most situations may be unnecessary and may instead be contributing to abamectin resistance.

However, in seasons where seeding cotton is heavily impacted by mites there is an urgent need for growers to consider the potential for abamectin sprays to undermine IPM and to increase the risk of further resistance selection.

Identification of mites

Adult two-spotted spider mite and bean spider mites are 0.5mm long and have eight legs. Two-spotted spider mites are usually yellow-green with darker green spots on either side of the body. This species also has an orange-red overwintering form, but in cotton regions this is rarely seen. Adults of bean spider mite are deep red or maroon and the nymphs are also slightly reddish. Adults of the strawberry spider mite are smaller: about 0.3mm long, yellow-green and have six spots around the tail end of the body. Accurate identification of species is important as strawberry spider mites have a very low risk of causing loss.

For more information

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Top left: Bean spider mite.
Bottom left: Strawberry mite.
Top right: Two spotted mite.
Bottom right: Bright orange diapause form of two spotted spider mite.

Images courtesy Dr Lewis Wilson, CSIRO.

Issues to consider

- Spraying mirids below threshold may increase the chances of flaring other pests, such as mites, mealybugs and silverleaf whitefly (SLW).
- The use of an 'insurance' spray of abamectin against mites at below threshold values may increase the risk of resistance to this compound.
- Correct species identification is important. Bean and strawberry spider mite are often prevalent in some areas, but rarely cause economic damage though they should be monitored.

Things to remember

- Control pests at or above industry recommended thresholds.
- When making spray decisions and insecticide choices, consider the impact on beneficials and risk of flaring non-target pests.
- More information on insect thresholds, control options and impact on beneficials can be found in the Cotton Pest Management Guide.