

Phytoplasma Update Autumn 2017

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What is phytoplasma??

Phytoplasma are specialised bacteria that infect plants causing stunting, deformation and delayed maturity of leaves, flowers and pods. Phytoplasma has been widely reported this summer in mungbeans, soybeans, peanuts and pigeon pea from North Queensland to Central NSW and all areas in between, including the South Burnett and Darling Downs. The phytoplasma most likely responsible for these symptoms in these crops is pigeon little leaf.

What do the symptoms look like?

In some crops, phytoplasma symptoms have appeared before flowering, severely affected plants producing masses of small cupped leaves but no flowers or pods – see above. In other crops, (see right) phytoplasma appears post flowering, affected plants having masses of deformed flowers and small pods that stay green and produce no harvestable seeds. In many mungbean crops, symptoms have not appeared until the second flush of flowers. In many crops the incidence has been low (1-5% of plants affected) but in some CQ crops the incidence has been as high as 60-80%.



How is phytoplasma spread?

Phytoplasma is most probably vectored by the small (3 mm long) common brown leafhopper *Orosius orientalis* – see right. While the vectoring capability of this species has to be re-confirmed, brown leafhoppers have been collected this summer from phytoplasma-affected crops in CQ, the Downs and the South Burnett. Note that relatively few vectors are required to transmit phytoplasma and the sheer abundance this summer of Rutherglen bugs and green leafhoppers (jassids) does not mean these species are responsible. The literature also says phytoplasma is not seed transmitted.



Why so much phytoplasma this summer and what about next year?

The honest answer is that we don't know. One potential reason is that spring rains in 2016 favoured weeds (such as Datura) that host the leafhopper. Another alternative is that the phytoplasma has changed its physiological requirements, meaning it can infest and survive in different and more plant hosts. It is also possible that the disease is vectored by other insect vectors that we are unaware of. Whatever, it is important that any new outbreaks are reported so that researchers can get a better handle as to the possible causes. In particular, close attention should be paid to the next spring's mungbean plantings, and also to any suspicious symptoms in chickpeas.

Has phytoplasma been previously reported in summer pulses?

Phytoplasma is not uncommon, but usually occurs at very low levels with < 0.1% of plants affected. In the past 3-4 years, there have been high (up to 60% plants infested) but localized outbreaks mungbeans in the Springsure and Orion regions of Central Queensland. Last summer (2015/16) over 200 ha of soybeans was lost to phytoplasma on the Central Downs, the affected

crops remaining green and producing no harvestable seeds. This summer, phytoplasma has been widely reported in mungbeans, soybeans, peanuts and pigeon peas from North Queensland to Central NSW. In the South Burnett, phytoplasma has been widely reported in both spring and summer planted mungbeans, and sometimes in the second flush of flowers.

Is phytoplasma linked with puffy pod?

There is also a possibility that phytoplasma may be linked with puffy pod, as puffy pods have been observed in many phytoplasma-infested crops. Puffy pod symptoms include mottled pods containing brown seeds. Interestingly the puffy pods illustrated (see right) tested positive for phytoplasma, and this phenomena requires further investigation.



Should we be spraying our crops routinely to kill the leafhopper vectors?

At this stage it is unclear whether spraying for the hoppers would prevent the transmission of phytoplasma. Experience with other insect-transmitted diseases suggests sprays are ineffective as the insect only has to feed once to infect a plant. As well, very few insects are required to spread the disease and by the time they are noticed, the crop may well be infected. Limited survey data from another mungbean-growing area (St George) tentatively suggests no correlation between the level of phytoplasma and the number of insecticide sprays applied. If any sprays are applied, we would strongly suggest leaving sizable unsprayed strips to evaluate their effectiveness or otherwise.

But will multiple prophylactic sprays do any harm anyway?

If multiple prophylactic sprays of non-selective insecticides are applied, there is a risk of flaring of other pests, particularly mites, silverleaf whitefly (in soybeans and adzukis), and helioverpa. Increased outbreaks of the latter increase the risk of resistance developing to the two most effective caterpillar insecticides registered in pulses, namely Altacor (chlorantraniliprole) and Steward (indoxacarb). Resistance to indoxacarb in *Helicoverpa armigera* is now at nearly 7 per cent, up from only 1.6 per cent in 2013-14. Of concern are the very low but detectable levels of resistance to Altacor that have been reported by the CRDC resistance management group led by Dr Lisa Bird.

If I am targeting other pests, what insecticide would co-incidentally impact on leafhoppers?

Dimethoate at 800 mL/ha can be used under permit against leafhoppers, but this high rate is extremely disruptive of beneficials and is much higher than the half-label mirid rate (250 mL/ha) commonly used against mirids. This 250 mL/ha rate is far less disruptive of beneficials, but has a cumulative disruptive impact if used repeatedly at short intervals (e.g. weekly).

Clearly there needs to be ongoing monitoring and reporting of phytoplasma. Please report past, current and future outbreaks to:

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