

Focus Paddock Report

Investigation into the potential of releasing beneficial mites to control Two-Spotted Mite in Maize

Prepared By

Irrigation Discussion Group

Acknowledgements

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Focus Paddock Summary

During the 2019/20 maize season a demonstration trial was established at Cooma near Byrneside, Northern Victoria to evaluate the effectiveness of these predatory mites in controlling Two-Spotted Mite in a commercial maize crop.

The blocks treated with the Persimilis was the most effective of the two beneficial insects in controlling the Two Spotted Mite. The small focus block, despite Two Spotted Mite still being present at a modest level, had very good Persimilis numbers. The Persimilis that had been released by the drone were also well established.

Californicus did not establish as well as the Persimilis, with more mites and less beneficials being observed, although the Two Spotted Mite in this area did not causing any significant damage.

The Zeal® treatment was effective at controlling the Two Spotted Mite, with only low numbers of Two Spotted Mite observed, with only a few nymphs starting to survive.

Although the Two Spotted Mite pressure had not been as high as previous years during the 2019/20 season Two Spotted Mite control of some form was required at Byrneside in Northern Victoria.

The commercial release of Persimilis could be considered as a viable alternative to the application of a foliar miticide, although timing, and crop monitoring is essential.

The effectiveness of Californicus needs further investigation. It is typically released earlier in the season, almost as a prophylactic treatment in that it can survive on pollen & stops mite numbers from building up.

In a typical pest pressure year more than one application of Zeal® would be expected, whereas only one application of Persimilis may be required as once established they would keep building up within the field over the season. This would need to be evaluated in a high pest pressure year though prior to growers considering commercial adoption.

Background & Paddock Aims

Currently many growers rely upon the use of Zeal® (Etoxazole), applied to the crop via a helicopter

to control mites post tasselling in the maize. Some growers are wishing to reduce their reliance upon insecticides and enable the beneficial insects to increase on their farms.

Beneficial insects are known to be effective at controlling a number of insect pests in a range of commercial crops. In particular of two predatory mites, *Persimilis* (*Pytoseiulus persimilis*) & *Californicus* (*Neoseiulus californicus*) are known to be effective at controlling Two-Spotted Mite (TSM).

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Persimilis adults are known to feed on TSM eggs, along with young and adult mites. An adult can destroy twenty young or seven adult TSM's per day. The *Persimilis* can multiply twice as fast as their prey under preferred conditions. The *Californicus* work best by preventing the early build up of mites, but may not be as tolerant to the higher temperatures. The *Californicus* works mainly by consuming mite eggs.

Focus Paddock Details

Location	Cooma
Crop type	Maize
Irrigation system	Drip Irrigation

Methodology:

The irrigated commercial crop of maize (Pioneer 1467) was planted on 5 November 2019. The crop was monitored, with agronomy services from Luke Nagle of Advanced Ag, resulting in a commercial application of Zeal to the untreated part of the crop at 350ml/ha on 30 January 2020 via helicopter.

On the 7 February 2020 Persimilis (*Pytoseiulus persimilis*) & Californicus (*Neoseiulus californicus*) were released by a drone two 3ha blocks of maize – 3ha treated with Persimilis at 30,000 per ha & 3ha treated with with Californicus at 100,000 per ha. No Zeal® had previously been applied to these



two blocks.

Additionally, a small focus plot (30m²) was set up where a higher number of Persimilis per hectare were applied on bean leaves which had a two-spotted mite infestation to act as an immediate food source.. This was done to closely monitor the establishment, persistence and performance of the Persimilis.

The blocks treated with predatory mites were closely monitored on the 21 February, 6 and 19 March 2020 by Fraser Harris and David Loxley from Bugs for Bugs. At the 28 day inspection, an assessment of Zeal® performance on the adjacent block was also made. Ongoing observation and monitoring of the crop was also conducted by Luke Nagle from Advanced Ag and the grower, Ian Hamono.

This work was also overseen by Paul Jones of Bugs for Bugs.

Agronomic results

The assessment on the 21 February confirmed that the Persimilis had established well. The Californicus was also present, although numbers were not as strong.

The assessment on the 6 and 19 March also included an inspection of the Zeal commercially treated area.

	21/02/2020				6/03/2020				19/03/2020			
Block	Focus Persimilis area	Drone Persimilis	Drone Californicus	Miticide	Focus Persimilis area	Drone Persimilis	Drone Californicus	Miticide	Focus Persimilis area	Drone Persimilis	Drone Californicus	Miticide
Beneficials												
Persimilis	4	1			5	4			7	6		
Californicus	1	1	2			1	3	1	2	2	4	2
Montdorensis												
Other beneficials	ladybirds & lacewings eggs	lacewings eggs			ladybirds & lacewings eggs	lacewings eggs	lacewings eggs					
Pests												
Two Spot Mite	4	3	3	1	6	5	5	2	2	3	4	2
Caterpillar	white cabbage butterflies											
Whitefly												
Aphids										2	2	2
Rutherglen bug												
Thrip	2	2	2		2	2	1	1	2	2	2	2
Cotton seed bug												
Mirid		1 juvenile			1 juvenile	1 juvenile						
Comments	moderate spring tales	moderate spring tales			low millipede	low millipede						

Figure 2: Numbers of insects observed (Assessment of numbers present: 0 = nil present, 10 = extremely high numbers)

The blocks treated with the Persimilis was the most effective of the two beneficial insects in controlling the TSM. The small focus block, despite TSM still being present at a modest level, had very good Persimilis numbers. The Persimilis that had been released by the drone were also well established.

Californicus did not establish as well as the Persimilis, with more mites and less beneficials being observed, although the TSM in this area did not causing any significant damage.

The Zeal® treatment was effective at controlling the TSM, with only low numbers of TSM observed, with only a few nymphs starting to survive.

Due to the season and feed requirements on local farms the crop was cut for silage, and no yield differences between blocks were apparent at harvest.

Economic results

Cost of one application of Zeal® (product and application/ha) = applied 350 ml/ha via helicopter = \$56.61+\$42= \$98.61 (plus GST)

Cost of Persimilis (insects and drone application/ha) = \$210 (plus GST)

Cost of Califonicus (insects and drone application/ha) = \$150 (plus GST)

In a typical pest pressure year more than one application of Zeal® would be expected, whereas only one application of Persimilis may be required as once established they would keep building up within the field over the season. This would need to be evaluated in a high pest pressure year though prior to growers considering commercial adoption.

Key learnings & recommendations

Although the Two Spotted Mite pressure had not been as high as previous years during the 2019/20 season Two Spotted Mite control of some form was required at Byrneside in Northern Victoria.

The commercial release of Persimilis could be considered as a viable alternative to the application of a foliar miticide, although timing, and crop monitoring is essential.

The effectiveness of Califonicus needs further investigation. It is typically released earlier in the season, almost as a prophylactic treatment in that it can survive on pollen & stops mite numbers from building up.

The 2019/20 season was regarded as one of only moderate mite pressure. Under high pressure, the relative performance of Persimilis versus Zeal® should not diminish, as long as release guidelines are followed.

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