

Focus Paddock Report

Maize Group: Integrated Pest Management

Prepared By

Irrigation Discussion Group

Acknowledgements

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Focus Paddock Summary

The Summary should summarise project objectives, significant results, conclusions and recommendations for future actions. It should answer the questions:

- What was the aim of the focus paddock?
 - To monitor for 3 key pests in maize crops - Heliothis, Fall Armyworm & Two Spotted Mites, then apply treatments that are IPM friendly if needed (Bugs for Bugs and IPM friendly insecticides). The demonstration block will be compared to the farmers conventional treatments on the crop.
- what was achieved?
 - Four bucket trap monitoring traps were established at each sites. Two traps per site for both Heliothis & FAW.
 - Beneficial insects were applied to each site. At all three sites *Phytoseiulus persimilis* were applied to control Two Spotted Mite. At Cooma *Neoseiulus californicus* was also applied for the control of Two Spotted Mite. The heliothis pressure was low during the season, but ViVUS® Max was applied to two of the sites. No significant numbers of Fall Armyworm were found at any of the sites.
- What were the key learnings from the paddock & scenario testing and how does this compare with grower practice?
 - Drone application of beneficial insects and ViVUS® Max was demonstrated as an alternative to using a plane or helicopter.
 - ViVUS® Max could be considered to be a viable option for the control of heliothis. If it was also applied via overhead irrigation 2-3 applications of ViVUS® Max could be done for the same cost as a single application of Zeal.
 - At sites with a low Two Spotted Mite pressure (Coleambally and Tocumwal) the beneficial insects did control the mites at an equivalent level to Zeal or Abamectin.
 - At the high Two Spotted Mite pressure site (Cooma), the trial had to be terminated as the beneficial insects were not able to adequately control the mites.
 - No difference in yield was found between the conventional and IPM blocks at Tocumwal and Coleambally.

Background & Paddock Aims

In January 2020 Fall Army Worm (FAW) was detected in far north Queensland and has since been found in northern Western Australia and the Northern Territory. In September 2020, it was detected near Moree in northern New South Wales, and then in December 2020 FAW was found at a single location in East Gippsland in Victoria. (<https://agriculture.vic.gov.au/biosecurity/pest-insects-and-mites/priority-pest-insects-and-mites/fall-armyworm#:~:text=Photo%20credits-.A%20newly%20established%20pest%20to%20Australia,subtropical%20regions%20of%20the%20Americas.>)

At the start of the 2020/21 maize season a number of growers were concerned about what impact FAW may have upon maize crops. A number of FAW monitoring traps were placed in maize crops, from Queensland to Victoria. During that season low numbers of FAW were found in traps in Southern NSW and Victoria. Although the impact on the crop was negligible growers were once again concerned about FAW going into the 2021/22 season.

In addition to FAW, other insect pests which can cause significant damage to maize include Heliothis and Two Spotted Mite (*Tetranychus urticae*). Previous work done by the Maize Association of Australia trialled two predatory mites, Persimilis (*Pytoseius persimilis*) & Californicus (*Neoseiulus californicus*) to control Two Spotted Mite.

Due to growers acknowledging the importance of beneficial insects and IPM in maize the decision was made to once again establish three different demonstration sites, at Coleambally (NSW), Tocumwal (NSW) and Cooma (Vic). These demonstration plots also included monitoring traps for both Heliothis and FAW. The conventional insecticide applications occurred on all of the maize crop except for the 6-9ha demonstration plot.

Focus Paddock Details

Location	Cooma
Crop type	Maize
Irrigation system	Sub-surface Drip

Location	Coleambally
Crop type	Maize
Irrigation system	Furrow/Flood

Location	Tocumwal
Crop type	Maize
Irrigation system	Furrow/Flood

Methodology:

Heliothis & FAW numbers were monitored and recorded on a regular basis. In the FAW trap numbers remained very low or zero. The Heliothis trap numbers did increase during the season, which resulted in the crop requiring treatment.

The crops were inspected for mites from 3 weeks before tasselling. The crops did receive a miticide application around this time.

The mite pressure at the Hamono site continued to be high throughout the season.

TREATMENTS:

Fall Army Worm were not found at levels at any of the sites which required treatment.

Many growers in Northern Vic and Southern NSW manage Heliothis and Two Spotted Mite by applying insecticides such as Zeal® (350ml/ha) or Abamectin (18g/L @ 300ml/ha) and Vantacor® (50 ml/ha).

Coleambally

Conventional area:

- Zeal @ 350 ml/ha (Cost \$52.50 per ha) and Vantacor @ 50 ml/ha (\$47.50 per ha)
- Total cost \$100/ha

IPM area:

- Predatory mite Persimilis at 30,000 per/ha, with a Retail value of \$208.50 per ha. (March 2023 price, about 5% cheaper back then) and
- 150mls ViVUS® Max is about half a trillion occlusions bodies /ha (\$19.90 per ha)

Tocumwal

Conventional area:

- Abamectin (18g/L) @ 300 ml/ha (Cost \$13.20 per ha) and Vantacor @ 50 ml/ha (\$47.50 per ha)

IPM area:

- Predatory mite Persimilis at 30,000 per/ha, with a Retail value of \$208.50 per ha. (March 2023 price, about 5% cheaper back then) and
- 150mls ViVUS® Max is about half a trillion occlusions bodies /ha (\$19.90 per ha)

Cooma

This site was terminated as the Two Spotted Mite pressure remained high following the application of the Predatory mites.

Agronomic results

The site at Coleambally yielded at 16.5 t/ha, with no difference between the blocks.

The Tocumwal site showed considerable yield variation across the blocks, as shown I Figure 1, but there didn't appear to be any difference in yield between the conventional and IPM blocks.

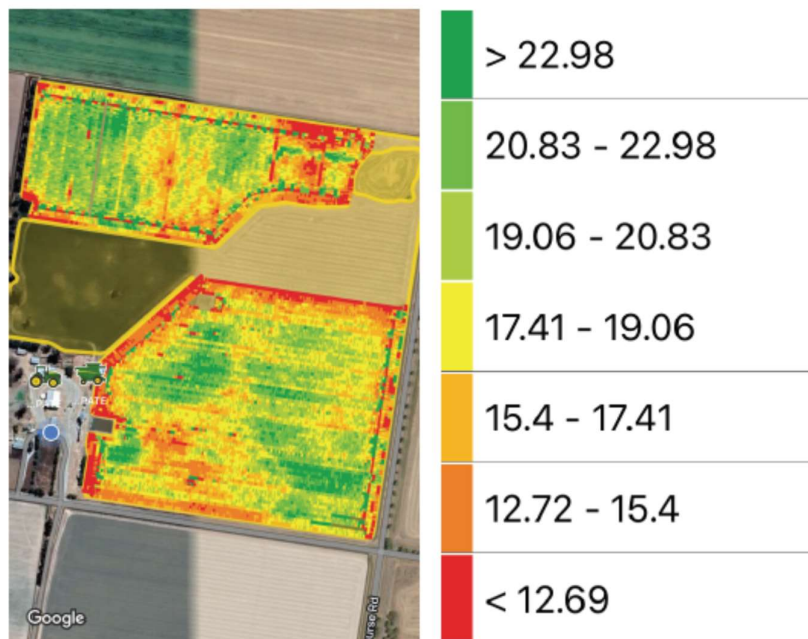


Figure 1: Yield Map, Demo block was the bottom area to dam, the rest was grower standard

Economic results

The cost of the IPM treatments for the control of heliothis was cheaper, especially if only one application was applied. The cost of the ViVUS® Max was \$19.90 per ha compared to the cost of Vantacor at \$47.50 per ha. ViVUS® Max provided control of heliothis to a similar level as the conventional treatment.

ViVUS® was applied via a drone, if overhead irrigation was available the recommendation would be to inject it into the irrigation water, which would actually make it a more cost effective control option for heliothis than Vantacor, even if 2-3 applications were required during the season.

The Predatory mite Persimilis was approximately 4x higher in price than the conventional treatment (\$208.50 per ha compared to \$52.50), and unfortunately did not provide adequate control of the Two Spotted Mite in a high pest pressure environment.

Key learnings & recommendations

- Drone application of beneficial insects and ViVUS® Max was demonstrated as an alternative to using a plane or helicopter.
- ViVUS® Max could be considered to be a viable option for the control of heliothis. If it was also applied via overhead irrigation 2-3 applications of ViVUS® Max could be done for the same cost as a single application of Zeal. If injecting ViVUS® into irrigation water check the following:
 - Dilution water is clean (no silt)
 - The pH is 8 or less
 - Ensure constant agitation or mixing
 - If possible rain water should be used dilution
 - Ensure any diluted product is used within 10 hours of mixing
 - Apply in no more than 10mm of irrigation water



Figure 2: Water run ViVUS using a dye



Figure 3: Boom application

- At sites with a low Two Spotted Mite pressure (Coleambally and Tocumwal) the beneficial insects did control the mites at an equivalent level to Zeal or Abamectin.
- At the high Two Spotted Mite pressure site (Cooma), the trial had to be terminated as the beneficial insects were not able to adequately control the mites.
- No difference in yield was found between the conventional and IPM blocks at Tocumwal and Coleambally.