Beneficial bugs boosted through native vegetation insectaries trials in Werribee

September 2021

National Vegetable Extension Network

VICTORIA - NORTHERN, WESTERN & SOUTH EASTERN

Introduction

You never know where a simple conversation might take you.

This was the case in October 2019, when VegNET Victoria (Northern, Western and South-Eastern) hosted a workshop in Werribee South to provide an update on recent R&D projects, with a focus on improving pest management through establishing native vegetation insectaries.

Karen Thomas from the Port Phillip and Westernport Catchment Management Authority was invited to discuss her work in developing insectaries in vineyards, which sparked the interest of two vegetable growers in the audience from Werribee South.

While on a trip to Europe, Anthony Mason from Mason Fresh Produce observed that crop boundaries were often surrounded by grasses, with little reliance on herbicides.

"I thought it would be good to do something back in Australia. The major hurdle back home was knowing what to plant without becoming a problem area to manage," Anthony said.

Jason Agosta from AAA Farms was also interested in learning more about how native plants can regenerate dam banks to stop erosion and attract beneficial insects.

"We have for a long time had a particular interest in beneficial insects, as part of an integrated pest management (IPM) program for vegetable production," Jason said.

Following the presentation, the growers struck up a conversation with Karen and local agronomist Stephen Moore from E.E. Muir & Sons.

"We put two and two together and thought it was a good idea to start a project of planting native vegetation insectaries at the two farms in Werribee South," Stephen said.

Key messages

- **AAA Farms and Mason Fresh Produce in Werribee South, Victoria are trialling native vegetation insectaries on their farms to boost beneficial insect activity and better manage pests, prevent weeds and reduce soil erosion.**
- **VegNET Victoria (Northern, Western and South-Eastern) helped to facilitate discussions to kick off the trial back in 2019, and have since been instrumental in communicating progress and results back to industry.**
- **The growers worked closely with local agronomist Stephen Moore from E.E. Muir & Sons and Karen Thomas from the Port Phillip and Westernport Catchment Management Authority to design the site, source plants and organise the plantings.**
- **Low lying and groundcover plants such as Pigface were selected to limit erosion and taller native plants were included to act as a windbreak in some areas.**
- **Native vegetation was planted in April 2021 with early results looking promising. Further monitoring will take place over spring and summer 2021/22.**
- **It is expected that it will take a further 12 months for the plants to establish properly and the key benefits of the insectaries to be realised.**
- **This case study provides growers with key information and tips and tools to establish native vegetation insectaries in other Victorian vegetable growing regions.**

Hort Innovation Strategic levy investment | VEGETABLE FUND

This project has been funded by Hort Innovation using the vegetable research and development levy and funds from the Australian Government. For more information on the fund and strategic levy investment visit horticulture.com.au

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What are native vegetation insectaries?

Native vegetation insectaries are areas of flowering plants on a farm. They attract and maintain beneficial insect populations by providing shelter from highly disturbed crop areas as well as alternative food sources, namely pollen and nectar.

The goal of on-farm insectaries is to enhance diversity and abundance of beneficial insects on your farm to build resilience, particularly against seasonal variations and pest incursions. Acting as a 'fixed home address' for beneficial insects to interact with your crop, they complement cultural and biological control methods of your IPM program.

The advantages of planting native vegetation compared to non-native vegetation are numerous and include reduced likelihood of harbouring pests and diseases that can affect crops, longer flowering windows, lower maintenance and water requirements, and increased habitat and connectivity that better support native biodiversity including native beneficial insects.

Read more in this fact sheet: https://www.ausvegvic.com.au/crop/native-vegetation-insectaries-permanent-habitat-for-beneficial-insects/.

Approach and rollout

Werribee South's vegetable growing region relies heavily on irrigation due to low rainfall. Surface drainage channels are common across many vegetable farms within the Werribee Irrigation District and, if not well maintained, they can harbour unwanted weeds which attract pest insects.

Both Jason and Anthony were keen to reduce weed maintenance on their farms, which requires a significant amount of labour and herbicides. In addition to increasing beneficial insects within the region, they also wanted to prevent soil erosion of the dam banks and channels caused by heavy rain and run-off.

"Developing insectaries was a direct on-ground action that the growers could take in Werribee South and it was very practical, not just high-level research," Karen said.

"If those channels and dam banks could be planted with suitable flowering vegetation – preferably native to get the biodiversity benefits – that can become a beneficial habitat rather than a pest habitat and help to reduce erosion and weeds. Growers see the benefit of doing that and it doesn't impact production at all.

"Once the growers were interested, I generated a fairly big plant list on all the possibilities of native vegetation and why you would want to plant them, including habitat, the type of beneficials they can attract, and their size, shape and level of maintenance so the growers could make an informed decision."

Stephen worked closely with Karen and the growers to revise the plant list and identify potential sites for insectaries on the two properties, which also considered elements such as dam structural integrity. As Karen was unable to visit the farms in person due to COVID-19 restrictions, site planning was completed remotely with Stephen supplying photos and measurements.

"Predominately it was up to the growers to choose what they wanted as it had to fit in with their overall farm plans, IPM program and objectives of the property," Karen said.

Low lying and groundcover plants such as Pigface were selected to limit erosion and taller native plants were included to act as a windbreak in some areas. The full plant list is available here: https://www.ppwcma.vic.gov.au/wp-content/uploads/2021/04/Werribee-South-Insectary-Plant-List.pdf.

Figure 1: Jason Agosta with native vegetation insectaries planted on a dam bank at AAA Farms in Werribee South, Victoria.

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Figure 2 (clockwise from top left): Myoporum viscosum (sticky boobialla shrub); Harlequin bugs; Dichondra repens (kidney weed groundcover); and the structural integrity of a cardboard tree guard is compromised.

After a series of delays due to COVID-19 restrictions, the plantings took place in autumn 2021 to ensure the plants were given the best opportunity to establish. This timing also coincided with the Victorian Government's Working for Victoria initiative, which provided work crews to complete the plantings in April.

"It was fantastic to have the team come down to do the plantings. I don't think it would have progressed anywhere near this level if it was not for the support that was provided," Stephen said.

From Jason's perspective, this was the ideal approach as the growers were provided resources including a plant list and planting plans, native plants, tree guards, mulch and labour.

"My experience was good because my involvement was minimal. I supplied a site that I cleaned up prior to planting and provided some facilities for the work crew. Most of the work involved hand weeding a couple of times, because spraying is too risky for the native plants," Anthony added.

Expected benefits

The trial of native vegetation insectaries is hoped to achieve a range of benefits including:

- Diversity and abundance of beneficial insects
- Increased habitat and connectivity that better support native biodiversity
- Reduced likelihood of harbouring pests and diseases that can affect crops
- Reduced weed growth and maintenance
- Improved soil structure, particularly on embankments, and reduced soil erosion
- Longer flowering windows and reduced water requirements.

Native vegetation insectaries: Top tips for vegetable growers

- **Start small:** Try native vegetation insectaries on a small scale to see what works for your property and what plants are suitable.
- **Tailor it to your region:** While the principles of native vegetation insectaries will be the same for other growing regions, local biodiversity challenges and indigenous plant species will need to be taken into consideration.
- **Get support:** Contact your local CMA and local council for plant lists and planting guides on indigenous vegetation as well as the contact details for community nurseries. Become familiar with native vegetation species and talk to the experts about plant selection and management.
- **Look across the fence:** There is no 'one size fits all' approach to native vegetation insectaries and it can be achieved using a combination of approaches. Look at existing research which has been conducted in vegetable farms, vineyards and nurseries (see next page for further information and resources).
- **Put in the effort:** Be prepared to put in the time to select, source and plant native vegetation. A conservation mindset is necessary to weigh up the potential benefits of native vegetation and prioritising areas of the farm that may be less productive to host the plantings. Irrigation (including hand watering) and hand weeding will be essential to help the plants establish, particularly in the early days.
- **Go local:** Where possible, order plants from a community nursery to source tubestock or seed that is suited to local conditions and is easier to grow. It is also more cost-effective to source plants from a community nursery (around $2.50 each) and you will be supporting a local business. Allow plenty of time to order tubestock (e.g. a couple of months in advance).

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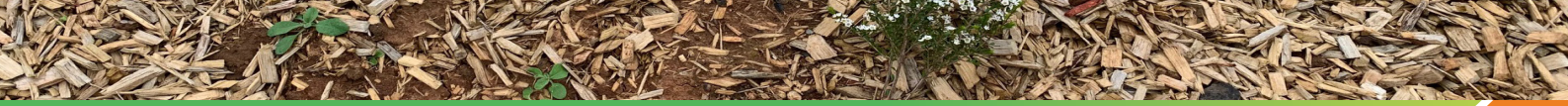

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Challenges and practical considerations to date

- **COVID-19 delays:** In addition to delaying the plantings, the COVID-19 pandemic also delayed plant orders as many nurseries were not growing tubestock. This meant that plants were sourced from outside the Werribee South district rather than a community nursery which uses local seed.
- **Monitoring and reporting:** Due to insufficient funding, there is no official monitoring and reporting in place to measure the change in beneficial and pest insect numbers. This will be conducted ad-hoc by Stephen who will look at activity around the native vegetation as well as nearby crops and let the growers know of any obvious issues.
- **Attracting unwanted species:** While there is no suggestion that native vegetation can attract pest insects as well as birds and rabbits, it is an ongoing concern for the trial. At the time of writing there was limited occurrence of pests, apart from one site out of four that had some snails and harlequin bugs. Native vegetation with nectar will attract nectar-feeding birds which are unlikely to attack crops but will feed on insects (including the beneficial ones). Managing an insectary as an 'ecosystem' will have trade-offs and balancing these is important for overall success.
- **Plant management:** Following the plantings, both growers took the time to help the plants establish through irrigation (including hand watering) and hand weeding, but it is uncertain what long-term weed management will be required. The addition of mulch has helped to manage weeds and held up well following heavy rain (about five inches on a steep bank in one event) but more mulch could be added to future plantings. The structural integrity of cardboard tree guards for some plants has been compromised and could include a third stake to support plant growth.

Next steps

At the time of writing, the native vegetation insectaries were progressing well. The spring and summer months (2021/22) will be key to see the plants' impact on pest numbers and beneficial insects such as ladybirds, hoverflies and lacewings, as well as weed management and soil structure.

"It's too early to confidently say [what] the results [will be] but we're happy with how it's progressing so far. Pigface in particular is establishing well given the cooler climate," Stephen said.

"From a soil erosion point of view, it does seem like it's worthwhile and we hope that the weeds will be out-competed when the groundcover is established. If the weeds are out-competed and no pests show up that require extra maintenance, we'll be on track to having a good system.

"It will probably take another 12 months for the plants to establish properly and see the beneficials move in significantly."

If the insectaries are successful, the next step for Karen will be to approach the water authorities to investigate the potential for the channels in Werribee South to be planted with suitable native vegetation.

"There is no research component to this, so we need to know how the plants perform in Werribee South and see the beneficials they attract. We can develop a good, customised list based on these two sites," she said.

For the growers, time will tell if the trial is a success.

"We'll keep monitoring for any issues and benefits over summer and see how it develops. All going well, we'll consider planting more areas depending on whether there is further support and funding available," Jason said.

"The next step is to wait 1-2 years to see the results. To cover all farms would be a big job and significant investment. We will review all the benefits (e.g. aesthetics not just bare soil and costs involved) compared to spraying several times over the year," Anthony added.

VegNET Victoria will continue to share updates from the initiative as they become available.

Further information and resources

- **Field and landscape management for beneficial arthropods webinar recording:** https://www.ausvegvic.com.au/crop/webinar-recording-field-and-landscape-management-for-beneficial-arthropods/
- **Boosting beneficials in your vegetable crop fact sheet:** https://www.ausvegvic.com.au/boosting-beneficials-in-your-vegetable-crop/
- **How does the surrounding landscape affect beneficials on your farm fact sheet:** https://www.ausvegvic.com.au/crop/how-does-the-surrounding-landscape-affect-beneficials-on-your-farm/
- **Farm biodiversity plan template:** https://www.ppwcma.vic.gov.au/priorities-projects/sustainable-agriculture/farm-biodiversity/
- **EnviroVeg self-assessment against biodiversity outcomes:** https://enviroveg.com.au.