

# Raspberry & Blackberry Integrated Pest Management Update

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The real fun has started in the 'Raspberry & Blackberry Integrated Pest Management (RB21000)' project with flower powered plantings and crop surveys happening this summer and autumn. Tasmanian Institute of Agriculture (TIA) entomologist Dr Steve Quarrell leads the project, a strategic investment under the Hort Innovation Raspberry and Blackberry Fund.

## Flower powered plantings with SNAP

Our conservation biological control research is built around flowering plants and 'SNAP' to support beneficial insects and mites in Rubus crops by providing:

- Shelter
- Nectar
- Alternate prey, and
- Pollen

A practical way to achieve SNAP is with a diverse range of flowering plants. Dr Quarrell says this is particularly relevant to protected cropping where there is usually less plant diversity than an outdoor production system

"The interrow of a poly tunnel is a pretty inhospitable place for growing plants, the soil can be dry and has a lot of traffic. Over the last few months, we have been talking with growers about how to build SNAP into their production systems, and it's now starting to take shape," explained Dr Quarrell.

The research team is investigating conservation biological control (CBC) strategies at four farms, two in NSW (Costa Berries and Mountain Blue) and two farms in Tasmania (Burlington Berries and Pinata Farms).

## NSW 'sub-tropical' – Costa Berries, Corindi & Mountain Blue, Wollongbar

In NSW, Dr Saleh Adnan (DPI NSW) and PhD candidate Jaher Ahmed are screening eighteen different flowering plants (Table 1) to see how well they support SNAP principles as conservation biological control plants. This means screening them for beneficial species of insects and mites and other characteristics, including if they are super attractive to pests!

The team will also measure other relevant plant characteristics including growth habit, flowering time, manageability, and cost. The list of nineteen will be narrowed down to the most promising plants for a more intensive field trial in NSW in 2024/25.

**Table 1. Conservation Biological Control plant species for testing in NSW screening trial**

No.	Flowering plants	Scientific name	Family
1	Calendula 'Fiesta Gitana mix'	<i>Calendula officinalis</i>	Asteraceae
2	Basil 'Blue spice'	<i>Ocimum americanum</i>	Lamiaceae
3	Wallflower	<i>Cheiranthus cheirii</i>	Brassicaceae
4	Strawflower	<i>Xerochrysum bracteatum</i>	Asteraceae
5	Glove amaranth 'Strawberry Fields'	<i>Gomphrena haageana</i>	Amaranthaceae
6	Cornflower 'Blue boy'	<i>Centaurea cyanus</i>	Asteraceae
7	German chamomile	<i>Matricaria chamomilla</i>	Asteraceae
8	Silvia 'Blaze of fire'	<i>Salvia splendens</i>	Lamiaceae
9	Cosmos 'Sensation Dazzler'	<i>Cosmos bipinnatus</i>	Asteraceae
10	Zinnia 'Lilliput Mix'	<i>Zinnia elegans</i>	Asteraceae
11	Zinnia 'Luminosa'	<i>Zinnia elegans</i>	Asteraceae
12	Zinnia 'Zinderalla Purple'	<i>Zinnia elegans</i>	Asteraceae
13	Zinnia 'Benarys Giant Golden'	<i>Zinnia elegans</i>	Asteraceae
14	Zinnia 'Cherry Red Queen'	<i>Zinnia elegans</i>	Asteraceae
15	Billy Buttons	<i>Pycnosorus globosus</i>	Asteraceae
16	Allysum 'Snow cloth'	<i>Lobularia maritima</i>	Brassicaceae
17	Coriander 'Santo'	<i>Coriandrum sativum</i>	Apiaceae
18	Buckwheat	<i>Fagopyrum esculentum</i>	Polygonaceae

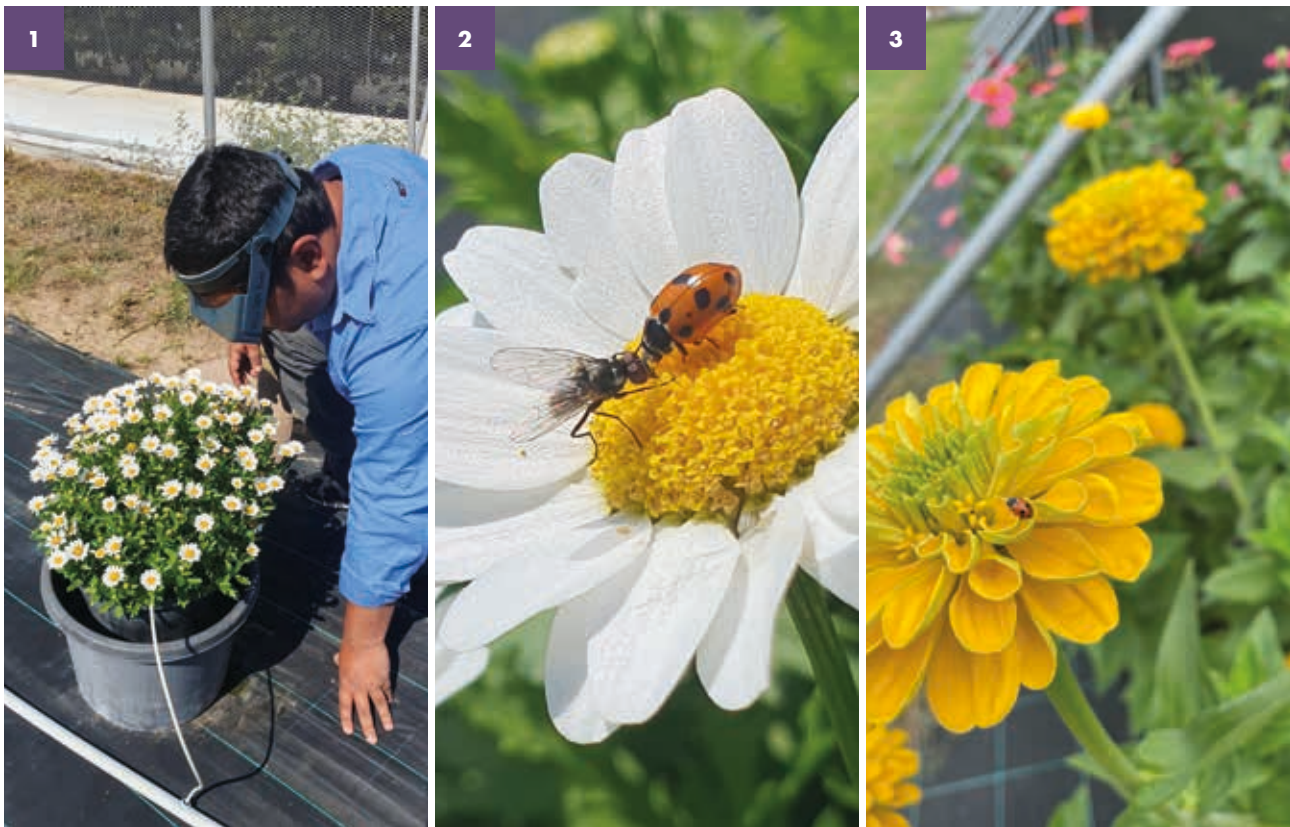
The flowering test plants have been set up in the vacant space between tunnels. The aim is to convert this space into a productive habitat for beneficial species. Dr Adnan says pots were chosen as an alternative to in-ground plantings.

"Initially we considered planting directly into the soil, but weeds grow so prolifically in this environment we decided potted plants were a more reliable alternative. Our establishment method will be refined more once we select the most suitable plants," he said.

Ten plants of each species in 8L coir filled pots have been established using the same system used for raspberries to make it simple and efficient for growers (Figures 1 & 2). The propagated plants were introduced to the crop in late December 2023 to coincide with the raspberry production cycle. PhD candidate Jaher Ahmed is monitoring the diversity and abundance of pests and natural enemies on each plant weekly until the end of March.



**Figure 1. Conservation biocontrol screening trial at Mountain Blue Farms, Wollongbar.**  
Photo credit: Dr Saleh Adnan, NSW DPI



**Figure 2. Dr Saleh Adnan scouting for insects (1); insects come face to face on German Chamomile (2); and Calendula (3)**

Photo credit: Steve Quarrell, TIA

### **Tasmania ‘Cool climate’ trials – Burlington Berries, Cressy and Pinata Farm, Orielton**

The two sites in Tasmania reflect quite different growing environments, one being surrounded by vegetable and seed crops – the other by mostly pasture and vineyards.

The TIA research team planted conservation biocontrol habitat strips in tunnel leg-rows to take advantage of an often weedy and nuisance area of the crop. This also receives natural rainfall making it ideal for establishing alternative plants.

In contrast to NSW, the Tasmanian trial opted to direct sow plants into the soil, using a topdressing of compost to give seedlings a headstart and suppress any weeds. The aim is to establish a permanent sward of flowering plants, some perennial and some self-seeded annuals, to reduce the maintenance costs of weeding and mowing. This has meant sowing frost sensitive annuals in December 2023 followed by perennial species in autumn 2024.

The research team selected species to provide a continuous source of nectar and pollen from spring through to late autumn coinciding with the production season for raspberries and blackberries (Table 2). Other selection criteria included plant habit with growers keen to avoid sprawling plants that might obstruct pickers and trolleys. The flowering plant Alyssum was rejected within the Tasmanian trials after advice from Malcom Durham from Smartbug Horti.

He found that despite this plant being very attractive to predators, it was also a thrip magnet which is not ideal! The NSW screening trial results should confirm whether this is the case.

Dr Quarrell says he is pleased with the establishment at both Tasmanian sites. “The buckwheat is flowering and attracting a nice diversity of beneficial species with flower beetles (*Chauliognathus* spp.) and lacewings (*Mallada* spp.) popping up in our first samples. We will be monitoring pests and beneficial species in the test strips and the commercial crop until the end of harvest,” he said.

**Table 2. Conservation Biological Control plant species for testing in Tasmanian conservation biological control trial**

Common name	Scientific name	Family
Buckwheat	<i>Fagopyrum esculentum</i>	Polygonaceae
Coriander "Santo"	<i>Coriandrum sativum</i>	Apiaceae
Basil "Geneva"	<i>Ocimum basilicum</i>	Lamiaceae
Cornflower "Blue Boy"	<i>Centaurea cyanus</i>	Asteraceae
Salvia "Blue Victory"	<i>Salvia farinacea</i>	Lamiaceae
Calendula "Fiesta Gitana" mix	<i>Calendula officinalis</i>	Asteraceae
German Chamomile	<i>Matricaria chamomilla</i>	Asteraceae
Paper Daisy "Rose"	<i>Rhodanthe manglesii</i>	Asteraceae
Wallflower "Cloth of Gold"	<i>Cheiranthus cheirii</i>	Brassicaceae
Globe Amaranth "Strawberry Fields"	<i>Gomphrena haageana</i>	Amaranthaceae
Lavender "English Dwarf"	<i>Lavandula angustifolia</i>	Lamiaceae
Dill	<i>Anethum graveolens</i>	Apiaceae



**Figure 3. Buckwheat planted in the leg row at Burlington Berries, Cressy. Perennial plants will be included in autumn 2024 to increase the diversity in the conservation biocontrol strip.** Photo credit: Steve Quarrell, TIA

## National Crop & Grower Surveys – Qld, NSW, Victoria and Tasmania

Dr Hasan Rahmani (AgVic) has been out and about getting to know raspberry growers around the country, their crop management practices and the good and bad insects and mites living in and near their crops.

This is all part of building a robust integrated pest management (IPM) program, uncovering the diversity of beneficials that are present and searching for new beneficial species that could potentially control existing pests.

“It’s exciting to see the range of beneficial insect and mite species present in the crops. The information

growers provided will also help us with the next stage of the project - testing the compatibility of popular pesticides and fungicides with commonly released biocontrol agents,” said Dr Rahmani.

Growers are getting involved by sending in sticky traps and other samples they have collected. Denis Betts’ farm in Tasmania might prove incredibly important to finding new beneficial species as this crop receives no chemicals and has a lovely diversity of plants in and around the crop.

The next stage is the slightly more tedious task of extracting and identifying who’s who in the zoo of insects and mites, a nice job for winter!



**Figure 4. Tasmanian grower Denis Betts and his furry assistant installing a sticky trap to collect insects, Thanks Denis!**

Photo credit: Hasan Rahmani, Ag Vic

### Acknowledgements

The research team from TIA, NSW DPI and Agriculture Victoria would like to express their appreciation to all growers who have and are contributing their time to grower and crop surveys and especially to our trial site collaborators, Costa Berries, Corindi; Mountain Blue, Wollongbar; Burlington Berries, Cressy; Pinata Farms, Orielson.



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