

# **Case Study**

# Avocado Interrow Cropping

A pilot demonstration to increase pollinator diversity and abundance while improving soil health In 2021 Balingup farmer, Andrew Scott, set out to discover whether increased plant diversity in avocado orchard interrows could improve soil health, and increase species abundance and richness of pollinators and other beneficial insects on his property, Ridgewood Farm.

Andrew farms with minimal intervention when it comes to insects, only using small amounts of pesticide when necessary and keeping his own honeybees in the orchard.

Ridgewood Farm is a small avocado farm for the region, with 500 active trees. The farm is bordered by state forest on two sides and farmland on the other two, with a creek line that runs through the property around 200m from the avocado orchard. Avocados have a very complex pollination process, with flowers that are both male and female. Most studies indicate that declines in insect populations affect pollination, fruit set, and yield. With threats to honeybees on the horizon, such as Varroa mite and climate change, it's important to diversify the range of pollinators present on the orchard wherever possible.

Avocados have a very complex pollination process, with flowers that are both male and female.





#### Interrow cropping

The aim of the interrow cropping demonstration was to attract more beneficial insects by planting crimson clover and cereal oats. Two pairs of "trial" interrows were sown to this mix and compared to "control" interrows that consisted of existing groundcover dominated by Guildford Grass, Capeweed and Flat weed. The demonstration ran from June to November.

To measure the effects, insect surveys were carried out in trial and control interrows in mid-November through a combination of sweep netting and pan traps. The pan traps were set and left out over 24 hours and the contents collected the following day. The project saw a significant increase in both number and species richness of insects, with almost twice the number of insects in the trial rows as compared to the controls. Andrew commented that:

"We weren't getting a lot of bees in the orchard because of the cool weather but the rows where the crimson clover was flowering were fairly humming all the time...There seemed to be a greater fruit set where [the trial rows] were. I wasn't expecting that."

The rows where the crimson clover was flowering were fairly humming all the time...

## Challenges

But the demonstration did also have its share of troubles in the beginning. Due to the timing of planting, it was difficult to find a small enough seeder to fit between the rows. Andrew opted to use a tow behind spike seeder which did the job but was unable to plant to optimal depth, which created further problems later.

"We had a huge rain event which washed a lot of the seeds out of the furrows, so we had to reseed with the crimson clover", Andrew explained.

On the advice of his agronomist Andrew fertilised with Guano, lime, potash, and Avocado Eco Growth applied monthly. He staggered the fertiliser spread between rows so that they were fertilising something once a week, but the demonstration added some difficulty: "To not damage the demonstration, we had to carry buckets of fertiliser down the rows by hand."

The high yield that year meant that picking had to begin during flowering. "If it had been a normal

year the flowering would have been finished. But we had 37t per hectare, so we had to pick. We were walking through the rows to try and minimise traffic".

Pests are a common concern when planting interrow cover crops, with snails posing a threat to the adjacent fruit trees. But Mr Scott says he didn't have any issues:

"We didn't have any snail problems. In general, we have very few problems with insects. We used to spray for the weevils but sometimes it worked and sometimes it didn't. We decided to stop spraying for them and now we just get a little bit of damage on the branches touching the ground, but I can't tell you the last time I noticed it as a problem. The larvae of the hoverfly breeds up on the broadleaf roots and that attacks the larvae of the weevils, so I think they're just in balance."

We had a huge rain event that washed a lot of the seeds out of the furrows...



## Soil carbon benchmarks

It is said that plant diversity can also play a significant role in the generation of soil fertility as well as improving microbial diversity.

So, while the plants were primarily used to attract insects, soil samples were also taken prior to planting and again when the crimson clover were flowering to check what was happening below the surface.

The tests focused on dissolved organic carbon as well as the living matter in the soil in terms of microbial biomass nitrogen and carbon. While there was no demonstrable change in dissolved organic carbon, there was a significant increase in the microbial biomass nitrogen and carbon.

Overall Andrew found the demonstration to be effective due to the benefits he observed:

"It improves soil and improves the insects and that's something we're always aiming to do in the orchard. But we're only a small orchard and a lot of the practices we have would be very hard to implement on a large orchard."

It improves soil and improves the insects and that's something we're always aiming to do in the orchard...







This project is delivered by **South West NRM**, through funding from the **Australian Government's National Landcare Program**.