Organic crop protectants for controlling blueberry rust – second trial results

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NSW Department of Primary Industries with the help of Southern Cross University (SCU) have recently conducted a second round of field trials to evaluate a range of organic crop protectants to manage blueberry rust disease (caused by *Thekopsora minima*). This trial is part of a larger project led by Kara Barry from the Tasmanian Institute of Agriculture and funded via the Tasmanian Government through the Agricultural Innovation Fund.

The field trial

The trial was carried out on a commercial blueberry orchard in Brooklet, NSW using the southern highbush variety 11-11. High disease levels were experienced during the trial due to the high rainfall experienced on the Northern Rivers throughout the trial period.

The trial evaluated eight products for control of blueberry rust (Table 1). Products were applied as foliar sprays every two weeks from December 2021 through to March 2022. Mancozeb and copper were included as reference treatments in the trial, in addition to the products being evaluated.

Table 1. Fungicides and application rates evaluated for their efficacy against blueberry rust.

Active constituent	Trade name	Rate of application (g/100L)
Mancozeb	Mancozeb DF 750	200 g/100 L
Copper present as hydroxide	Blue Shield® DF 500g/kg	105 g/100L
Bacillus amyloliquefaciens strain QST 713	Serenade® Opti	250g/100L
Crustacean and wild fish waste fortified with trace minerals and vitamins	Aminogro® +	1 L
Emulsifiable botanical oil	Synertrol® Horti Oil 850 EC	250mL
Polyoxin D zinc salt	Intervene®	40g/100L
Potassium bicarbonate + potassium silicate	Ecocarb® Plus 945 SP +	400g/100L
Emulsifiable botanical oil	Synertrol® Horti Oil 850 EC	250ml/100L
Electrolysed oxidised water	Anolyte	20L/100L
Emulsifiable Botanical Oils	Eco-oil® 850 SL	500ml/100L

Trials were set up in a complete randomised block design with four replicate blocks per treatment and three plants assessed in each treatment block.

Each block had a 2-plant internal buffer, and each row was separated by a buffer row.

Measuring rust severity

We assessed disease severity on 20 leaves per plant by visually rating the leaf area affected by blueberry rust every two weeks (Figure 1).

This amounted to a massive 25,000+ leaves assessed over the season! The cumulative disease severity for the whole season can be visualised by looking at the area under the disease progress curve (Figure 2).

Visual assessment of whole plants revealed a very similar result with copper, mancozeb and intervene treatments displaying very low levels of leaf drop or leaf yellowing compared to other treatments.

Key Findings

Disease severity increased over the season (Figure 1). Blueberry rust is favoured by high relative humidity, rainfall and mild-warm temperatures (18–25°C).

These conditions were experienced throughout the trial which most likely contributed to the high disease levels experienced.

Best performing products included Mancozeb, Copper and Intervene. There were no differences found between Ecocarb Plus + Oil, Serenade Opti, Anolyte, Aminogro + oil or Eco Oil (Figure 2).

What's next?

The team is currently preparing data to support a minor use permit for Nufarm Intervene® for rust management in blueberries. With approval from APVMA and organic certifiers, this will give organic growers a new management option for suppression of blueberry rust.

New study to develop on farm management strategies for blueberry rust

A new 3-year study beginning in 2023 will test on farm strategies to help prevent and manage blueberry rust, funded by the Tasmanian Government Agricultural Innovation Fund.

The project team will tackle two key management issues:

1. Managing rust on semi-evergreen and evergreen cultivars where infection persists on leaves over winter
2. Understanding what environmental conditions are optimal for blueberry rust survival and infection and relating these to both climatic conditions in Tasmania and the cultivars grown

The research study includes:

Defoliation studies:

The aim is to break the rust lifecycle in semi-evergreen varieties. We will measure the impact of short term (8-10 week) defoliation on plant health, bud development, fruit yield and quality.

Survival & Infection studies:

The team will assess what environmental conditions are needed for blueberry rust survival and infection to help identify higher risk sites and weather conditions. This data will feed into blueberry rust models to pinpoint when and where there is a risk of infection or if blueberry rust is likely to persist over winter. Growers will be able to use the information to decide if defoliation would be an effective strategy to prevent blueberry rust overwintering in their orchard.

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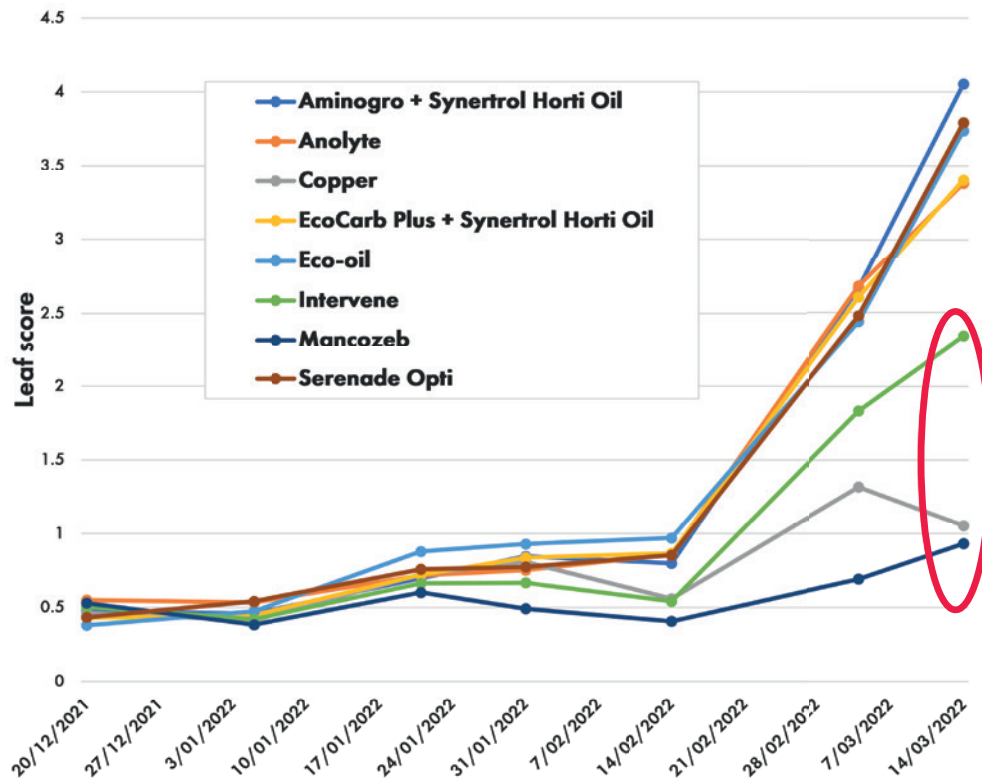
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Figure 1. Disease severity following application of treatments against blueberry rust. Data presented are the average disease score over time, where a score of 0 indicates leaves with no blueberry rust and 4 indicates leaves with 15-25% leaf area affected by blueberry rust.
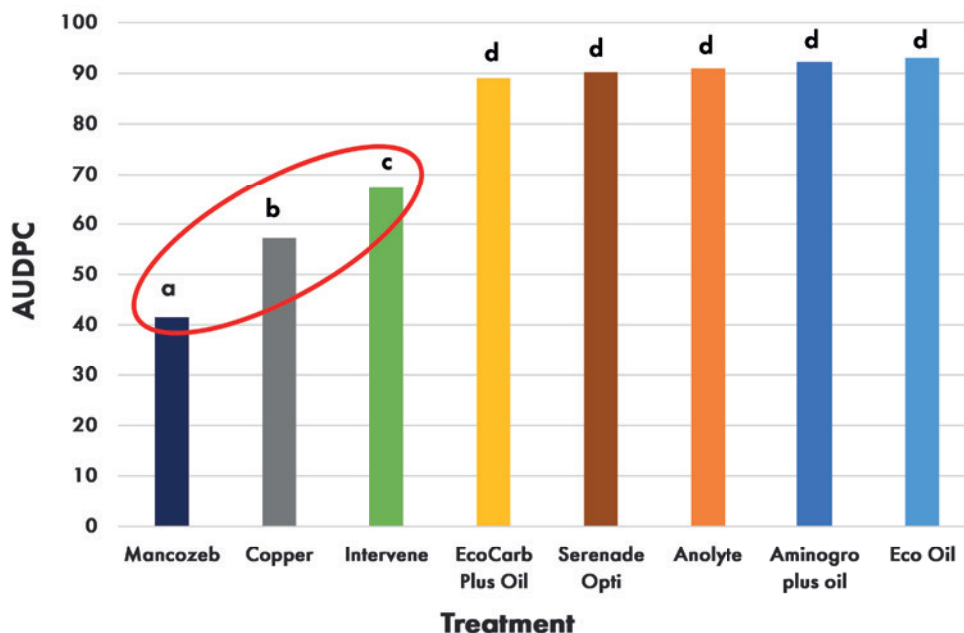

Figure 2. Disease severity of blueberry rust expressed as the area under the disease progress curve (AUDPC) following fortnightly application of selected chemicals from December 2021 through to March 2022. Different letters at each column indicate significant differences between treatments (P<0.05).