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Orchard soil health and fruit quality

Key Points

- **Humate based nutrition programs are capable of yielding high quality cherry fruit with good pack-outs.** The alternate regime showed increased fruit set and pack-out, and a reduction in percentage reject fruit in most years.
- **Fruit cracking incidence reduced** in the alternate regime in most years, while effective microbe application reduced cracking every season
- **Key soil health indicators improved** under alternate treatments including reduced soil compaction, improved water infiltration, increased soil organic matter and a higher abundance of mycorrhizal fungi.

Cherry nutrition study from soil to fruit

There has been a strong and growing interest in alternate farming systems to address the environmental impacts of synthetic fertilisers and pesticides. In commercial fruit production there is uncertainty as to whether these alternate systems adequately support the production of quality fruit. A key question is can organic based fertilisers provide sufficient nutrients?

This project compares cherry production under conventional management with an alternate management system based on humates, effective microbes and targeted minerals.

The alternate management amendments included Ferbon™, a lignite-based soil conditioner (Interstate Energy Group), and humified compost (Foundation Aerobic Compost, Pure Living Soils). Effective microbes (EM1, VRM Pty Ltd) were applied as a monthly soil amendment throughout the study period.

Treatment application

Four treatments were applied at each site:

1. Conventional nutrition and herbicide program
2. Alternate nutrient regime (based on humates)
3. Conventional plus effective microbes (EM)
4. Alternate plus EM.

Humates were applied in spring and autumn along with targeted minerals based on annual soil tests. Effective microbes were applied monthly as a soil drench. Plots consisted of five trees with four plots of each treatment.

Fruit set and pack-out improved

The alternate regime resulted in higher fruit set than the conventional in most years, but EM had no effect.

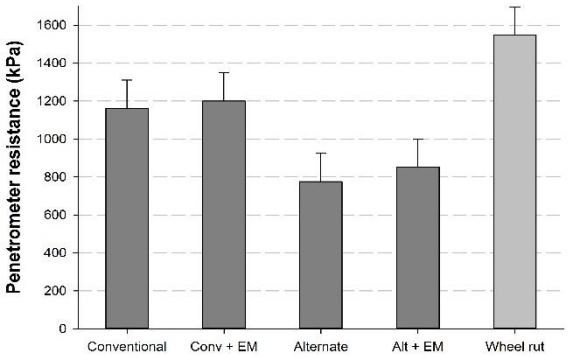
There was a general trend for increase in percentage of A-grade fruit in the alternate regime compared with the conventional in most years. A significant increase in A-grade fruit in years 2, 3 and 4 was associated with EM application.

Overall the alternate regime showed increased fruit set and pack-out, and a reduction in percentage reject fruit in most years.

Impact on soil health

At the end of the study, soil quality was improved in the alternate treatment plots compared with the conventional. The alternate plots showed:

- higher soil organic matter
- improved water infiltration
- increase in soil life
- reduced soil compaction (penetrometer resistance)
- increased mycorrhizal colonisation.

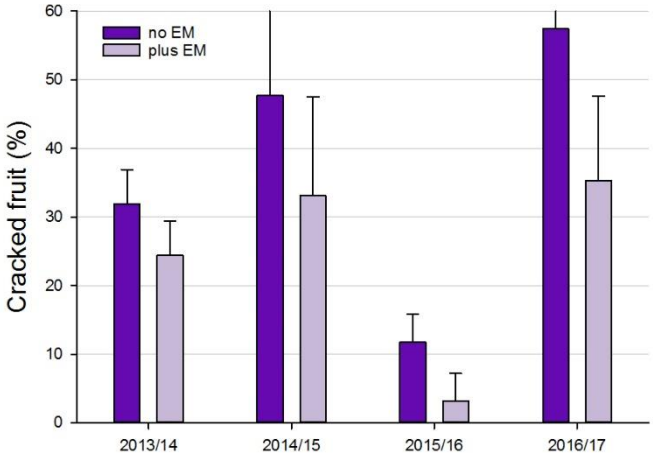


Graph showing reduced soil compaction in alternate treatments.

Photos show soil structure in alternate treatment (left) and wheel rut (right)

Fruit cracking reduced

There was significantly less fruit cracking in the alternate regime in years 3 and 4, while EM application reduced the incidence of cracking under both alternate and conventional regimes in every season.



Other quality parameters

Firmness, TSS and stem retention force met Australian 'export finest' standards in all years of the study across all treatments. Firmness and TSS content was higher in the alternate treatment in some years, but not others. TSS content increased with increasing mycorrhizal colonisation.

Assessing your soil

Dig a hole so you can see the subsoil:

- Does the soil smell earthy ? *(actinomycetes)*
- Is the soil dark in colour? *(soil organic carbon)*
- Is there evidence of bioturbation? *(macrofauna – earthworms and beetles)*
- Are old inactive roots decomposing? *(evidence of bacteria and fungi)*
- Is the soil well structured? (soil aggregation)

Looking for evidence of organisms

- Calico strips – monitor decomposition
- Set pitfall traps for macro and mesofauna
- Count earthworms
- Examine nodules on legumes

Contact

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