

Productivity gains from biologically active soil initiated through biochar activated compost in an avocado orchard

Research Questions

- 1 How does the proportion of biochar mixed into the top 30cm of the tree's planting bed affect soil physical structure, nutrient cycling and mycorrhizal fungi colonisation?
- 2 To what extent does biochar-activated composting mulch improve the growth, health and productive capacity of the avocado?

Project Aims

To assess the effects of a range of soil amendments (incorporated and topical) over a three year period on:

- Plant growth and vigour
- Plant uptake of nutrients
- Fruit nutrients and quality
- Soil health (biological, physical and chemical characteristics)
- Moisture retention
- Nutrient retention in the 0 – 30cm zone
- Sub-soil acidity
- Disease and pest protection (especially *Phytophthora cinnamomi*)
- Soil oxygen levels (if additional resources and expertise can be sourced)

Project Activities

Two matched rows of avocados 9m apart will be planted across three soil types: red karri loam on clay, red gravelly karri loam on deeper clay, brown sandy loam on gravel (no clay <60cm).

The planting 3m x 3m planting zone soil will have biochar rotary-hoed at rates of 0%, 5%, 10% or 20% v/v ie varying heights of mounding will result. Rows are deep-ripped to 60cm.

Each treatment will have three replicates for each soil type. Trees are planted 4.5m apart, staked, sprinkler per tree and will be electronically tagged.

Composting mulches will be applied across the replicates: chicken manure/woody chip mulch; biochar-activated chicken manure/woody chip mulch; control with no nutrient rich composting mulch (industry standard applied)

Extensive soil and tissue parameters will be measured throughout. Regular photo-monitoring and visual records will be maintained – at set intervals and at points of interest eg flower set.

Project Partner: Doug Pow, Middlesex

