

The re-plant of new avocado trees on old avocado orchard's soil



Any avocado farmer who has had to replace an old avocado orchard with new avocado trees will bear witness to the struggle this involves. Young trees struggle to grow actively on old avocado orchards' soil due to mainly the excessive presence of *Phytophthora cinnamomi* in the soil. Following are a few suggestions to bear in mind when re-planting an old orchard.

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SUBTROP

PREPARING THE SOIL

Resting the soil

When preparing the soil of an old avocado orchard, it will be advantageous to let the soil 'rest' for at least 12 - 24

months before re-planting that orchard again. While resting, a green mulch can be planted and incorporated into the soil when the plants start flowering. Examples of green mulches are Sunhennep, "akkerbone" and velvet beans. This practice has served many avocado farmers in South Africa well, especially in replant situations.

Animal manure

It has been reported that animal manure, especially fresh or composted chicken manure, suppresses root rot.¹ Ammonia and organic acids are released by the manure which is toxic to *P. cinnamomi*. Unfortunately they are also toxic to avocado roots and therefore it is advised that chicken manure be applied and incorporated into the soil months before planting.¹ Chicken manure also improves the biological activity and populations to antagonistic micro-organisms in the soil.¹

Soil solarisation

The use of soil solarisation is not a widely used practice in South Africa. Clear polyethylene sheets are used to trap radiant heat from the sun under the sheets.¹ These sheets are laid on the surface of the soil to increase soil



The replanting of young avocado trees in an old avocado orchard requires the careful consideration of, amongst others, mulching, chemical application, rootstocks and root protection.



A newly planted orchard benefits from mulch.

temperatures in the top 5 cm of the soil to above 45°C.¹ Although this practice is reported to be very effective in countries with hot, cloud-free summers, it only reduces root rot.¹

THE USE OF MULCHES

The use of mulch in the avocado orchard is a widely used practice in South Africa. Mulching of small trees will conserve moisture, suppress weed growth, stabilise soil temperatures and will improve the organic content in the soil.² The organic content in the soil will improve the population of micro-organisms in the soil, as well as improve soil structure which will improve the root system of the tree.³ The overall advantage of mulching young trees is the benefit it holds for a healthy root system and to create a soil that is more suppressive to root rot.⁴

P. cinnamomi is a poor saprophytic

competitor and therefore does not exist successfully in organic rich soil.¹ The micro-organisms produce enzymes (cellulose and glucanases) which digest not only plant material, but also the cell walls of *P. cinnamomi*, which are composed of the same molecules (cellulose and glucan linkages) present in plants.⁵ Pathogen growth is therefore inhibited.

THE USE OF CHEMICALS AFTER TREES ARE PLANTED

It has been reported that fungicides effective against most fungi are not as effective against *P. cinnamomi*.¹ However, there are fungicides available which are effective against root rot.

Systemic chemicals

Metalaxyl has been used with success in controlling root rot in newly planted orchards. This product is highly soluble in water and is absorbed by avocado

roots to move rapidly in the xylem.¹ Please refer to SAAGA's registered list of chemicals for details on the use of Metalaxyl.

Quaternary ammonium compounds

Recently farmers have been using chemicals that contain quaternary ammonium compounds for the control of root rot in newly planted avocado orchards. These products "sterilise" the soil around the root zone of the plant. This means that both beneficial and pathogenic micro-organisms are killed.⁵ Although young trees look healthy, it is not a sustainable practice in the long run. Therefore, it is very important that when young trees are established, the soil around the tree should be "inoculated" with mulch, to build the population of micro-organisms again.

RESISTANT ROOTSTOCKS

The choice of a rootstock for avocado trees is crucially important. A rootstock such as Edranol will not be a good choice in a replant situation. There are far more superior rootstocks out there to choose from. However, total resistance against *P. cinnamomi* is not yet achieved. Therefore, control measures will still be necessary. On the bright side, research is continuing in the search for the golden bullet.

References

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- ⁴ SHEARD, A. 2009. Mulching of Avocado orchards. AvoInfo Vol. 166: 12-14.
- ⁵ CHRISTIE, B.J. 2012. Mulches: Good or Bad? AvoInfo Vol. 183: 3-6. 

Soil solarisation: Note the clear plastic mulch, a drip irrigation hose in the center underneath the plastic, the well sealed mulch edges and fogging from water vapor on the underside of the plastic which indicates a good soil solarisation (Source: R. Pokharel, 2011).

