

SOIL

Soil conditioning programme

In the December *Timely Hints* we looked at the procedure for soil sampling for maintenance lime. The analysis results should now be available.

In the Western Cape we are prone to speak of a “Liming Programme” when it comes to rectifying soil chemical conditions in established orchards. As fruit production occurs in many areas where no lime is required, I will refer to this programme as a ‘soil conditioning programme’ instead. This programme should incorporate the soil analysis and leaf analysis (Sampled in weeks 3 to 4) and orchard observations. The aim is twofold:

- 1) Create a uniform orchard by treating zones of variation differently, and
- 2) Balance the chemistry in the soil to create optimum conditions for crop production.

These optimum conditions are:

- pH (KCl) 5.5 (5 to 6)
- Salinity absent (Resistance greater than 400 to 750 ohm)
- Ca 70-80% of CEC*
- Mg 12-15% of CEC
- Ca:Mg of 4:1
- K 80ppm and/or 3-4% of CEC
- Na <8% of CEC
- P 30ppm (Bray 2)

* CEC = Cation Exchange Capacity, very simply put, is the soil’s capacity to bind positively charged compounds (cations). We thus not only consider the absolute values of elements, but also the portion of the CEC occupied by an element.

Note that the T value as stated in the analysis report commonly represents the CEC but can be misleading in soils with a high Ca or Mg content.

For maintenance programmes we will not apply trace elements, these should have been incorporated at planting, via fertigation or most commonly via foliar application. If there is a drastic deficiency in the foliar analysis we can consider analyses for trace elements on an ad hoc basis for troubleshooting purposes. Trace element uptake through roots is limited at soil pH greater than 7 and we will not even consider it in these conditions. Amend through foliar application in the latter case.

The soil conditioning programme will aim to amend the above-mentioned parameters through application of:

- Calcitic Lime (Increase pH and Ca)
- Dolomitic Lime (Increase pH, Ca and Mg)
- Gypsum (Increase Ca)
- Magnesium Oxide (Increase Mg)
- Phosphate should be ameliorated if:
 - Soil P (<30ppm) and leaf P (< 0.2-0.25%) OR
 - Soil P (<20ppm) OR
 - Leaf P (< 0.15%)
- P products are expensive and regular analysis and interpretation will allow for effective management.
- Saline soils should be treated on an ad-hoc basis as each scenario is unique. The approach should review drainage, irrigation water, soil chemical and physical status and fertilization. Note that it is not as simple as applying gypsum.

A soil conditioning programme should be done every two to three years to address the changing requirements.

Use of precision sampling methods and precision agriculture

There are more and more precision services being offered to farmers every day. These include both wonderful and worthless technologies and strategies.

Precision agriculture is not the use of drones, big tractors and GPS's. Yes, these are tools used in precision agriculture. Precision agriculture is a strategy of farming more accurately by doing the 'right thing' in the 'right place' at the 'right time'.

The GPS technology mentioned above is used to identify the 'right place'. The other two factors ('right thing' and 'right time') can only be determined through inspection and interpretation. There are farmers in the industry that have been doing precision zone management for over 20 years, not with a GPS, but purely by painting trees in areas that require more or less fertilizer than the flat rate dose.

With this in mind I want to give some pointers to consider when using such a service:

- Taking samples on a grid instead of a composite sample per orchard
 - This will have a great cost and effort implication as we are taking more samples
 - Do not reduce cost of analysis by leaving out critical analyses such as resistance
 - Do you have the means to apply ameliorants (lime etc.) on the scale that you are sampling?
 - Are samples taken from a single point on a grid (core sample) or is it still a composite sample. A core taken in a misrepresented spot will give skewed results
 - Is the variation in your soils such that it justifies the scale of sampling?
- Sampling to correct soil chemical status
 - Is this done only from a soil perspective or is the leaf analysis taken into consideration?
 - Is the person/software making the recommendation familiar with the crop type, the specific phenology, farm soil distribution or the orchard history?

If you are satisfied you understand what you are paying more for and that it is the right technology for you, go for it. This is a great technology but ensure your precision approach is based on proven scientific principles, offered by reputable providers, fits your budget and current equipment. The tools (and toys) will come over time.

WATCH

Nutrition: Soil and Leaf Analysis

(Hortgro Science Technical Symposium 2016)



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IRRIGATION

The following principles are relevant to a situation where irrigation water is available – adjust your allocation according to your own irrigation plan based on your water availability:

Continue optimal irrigation as long as fruit are still on the tree. Systematically reduce the irrigation post-harvest until only 50–60% of the pre-harvest demand. Do not stop irrigation all together as trees will still grow to end of (February) and flower bud initiation is occurring at this

time. Only if trees are growing excessively should water be reduced further or stopped for a short period.

HARVESTING TIPS

Your exporter will be giving you guidelines as to the maturity standards that they require for export and the Department of Agriculture, Forestry, and Fisheries (DAFF) applies maturity standards for export which are monitored and verified by the Perishable Products Export Control Board (PPECB) who acts as an assignee for DAFF. The following are just some tips when it comes to harvesting:

WATCH

Harvesting: Picking Stone Fruit



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Dessert peaches

Check with the exporter for the maturity standards they require. Peaches are harvested according to flesh firmness and correct firmness will determine the background colour that one needs to harvest at.

- Injuries are also a major problem. One must take the same care as one would with apricot harvesting and ensure that one does not injure the fruit - especially the shoulder of the fruit.
- Over mature fruit is a problem, so one needs to harvest dessert peaches at least three and sometimes four to five times.
- It is best to harvest some of the early dessert peaches into trays and always keep the tip of the peach upright.
- Spray ReTain (3-Buteoic Acid Hydrochloride) to delay harvest a little bit and give firmer fruit with less soft tips. This works very well for nectarines but also for some of the peach varieties. Discuss with your exporter and spray representative.

Nectarines

Nectarines are also picked on flesh firmness; you should check maturity standards with your exporter. Some of the new nectarine varieties that are full red are difficult to harvest as they obtain the full red colour before they mature and one cannot just pick on colour. If there is a bit of background colour, that is useful to pick on but a tip that I have found that worked well over the years is that when the nectarine loses its glossy shine and gets a bit of a dull haze on the epidermis, is normally a sign of correct maturity. Again taking firmness tests and determining which fruit is mature and which fruit is not, can give one an indication of the colour standard one must pick to. Size does play a role in maturity, in that the larger fruit are more mature than the smaller fruit, especially for the first one or two picks.

Yellow cling peaches

Probably the easiest to pick but that does not mean to say they can be handled roughly. Here it is really only colour that determines maturity and especially if one is picking for canning. The canners will determine maturity by colour, they don't want green fruit. South Africa's reputation as a supplier of top quality canned peaches is partly because of the very good yellow colour. This is why many buyers around the world prefer South African canned peaches - because of their excellent yellow colour standard.

Plums

Plum maturity is also determined by flesh firmness, as well as % TSS (Total Soluble Solids). Check with your exporter regarding the maturity standards that they require for their markets. Most plum varieties are picked out, using colour as the guide of what to pick and what to leave behind. A good rule of thumb is, the day you think you must start picking the plum variety, wait two days and then pick. Your first pick should be at least 20% of the crop, if you cannot take off 20% with the first pick then you are picking too early.

The following guidelines are given:

- Varieties such as Laetitia: The first pick is almost always $\frac{3}{4}$ red fruit and redder. The next pick half red and redder fruit and the last pick is a strip pick. In other words for the 2nd and 3rd pick one has less red colour in the fruit. This rule of thumb generally works.
- Injuries are also a great problem in plums.
- Rub marks are also a big problem in plums. Some varieties are far more susceptible than others. Either pick plums into plastic bins or use plastic liners. The warmer the fruit, the more likely they are to incur rub marks. Try not to pick in the heat of the day.
- The size, especially with the first pick is an important maturity parameter, normally the larger fruit ripens first.
- For some of the yellow plums such as Songold, one can often get away with a single pick (strip pick). This can only be achieved if one had a very even blossom (Bud break).
- It is best to pick plums into plastic buckets (20 Litre) as the picking bags can cause too many rub marks and then to be transferred gently from the bucket to the picking bin.
- If one is transporting the fruit in bins to the pack shed it is very worthwhile to put a 150mm Polyethylene Sponge Mattress on top of the bin and tie it down tightly. This prevents fruit from moving up and down on the load bed of the lorry and causing rub marks.

A good norm for picking productivity is that a picker in a nine hour picking day should be able to pick 450kgs of plums per day. That is 50kgs per hour. If you are doing a strip pick then the rate should be at least 75kgs per hour.

General

Visit the SA Orchard Video Training Website to learn more about picking of stone fruit. (see: www.saorchard.co.za)

PRUNING

1. Autumn Pruning

Pruning Videos



As discussed in previous *Timely Hint* Articles, the most important goal during the post-harvest period is to build up reserves within the trees for the following season. The greater the effective leaf area to photosynthesize and create reserves for next season, the better. One does not want photosynthetic products to go into new shoot growth, but into reserves. So everything you do, should be done so as to ensure that there is no new shoot growth in late summer in stone fruit trees. The question then is; when is the best time to start pruning and which fruit kinds and cultivars should be tackled first?

- Do not start pruning before you are sure that any cuts you make, will not stimulate new shoot growth.
- Start pruning in the most vigorous, shaded orchards, so that if you reduce the size of the “factory” a bit in these vigorous trees it doesn’t matter. The most important thing is to increase the light distribution in the tree and make sure that all the leaves intercept enough light to photosynthesize reserves for the adjacent buds for next year.

From approximately April onwards, one can start pruning vigorous peach and nectarine trees. You can do the final prune in April and May. The more one can open up the trees and expose the one-year-old, good quality-bearing wood to the sun, so that the wood ripens and matures properly, the better. So you can start pruning peach and nectarine trees that are over-vigorous and over-shaded as soon as you believe that you will not stimulate new shoot growth.

It is very important when pruning to practice the necessary sanitation and especially on stone fruit, not to prune on wet, rainy days. Especially the early pruning when the sap flow is to the roots, one makes a cut with a disinfected pruning shear or saw. The moisture can distribute the fungus and the bacteria and this makes bacterial and fungal infection a high risk. So always prune on dry, sunny days and disinfect all pruning equipment.

I prefer to prune the following fruit kinds and varieties in-blossom:

- Apricots: As apricots are very susceptible to bacterial disease infection and pruning in blossom means the sap flow is to the shoot tips, the risk of getting bacterial infection into the tree is greatly reduced.
- Vigorous orchards that struggle to set fruit: Pruning in blossom reduces the vigour and the competition of shoot growth with flower set and one tends to get slightly higher fruit set.
- Varieties that we make cutting back cuts into the two year old wood such as certain plum varieties and apricots etc.: Are best pruned in spring when these heading back cuts do not result in too great a stimulation of vegetative growth.

Important note: it is important to keep the leaves healthy as long as possible, so that they can carry on photosynthesizing for as long as possible and build up reserves. New shoot growth should not be stimulated otherwise all the energy generated by the leaves goes into shoot growth and one lacks reserves the following summer.

2. Post-harvest and autumn chores

A number of production inputs need to be attended to in the post-harvest/Autumn period. It is good to go through the check list to make sure that they are all actioned:

- Drainage: Make sure all drains are open, unblocked and ready for the winter rains
- Support Trellis: Repair and wires tightened etc.
- Weed Control: Attended to, especially perennial weeds; perennial grasses such as Kikuyu, Fynkweek etc., these are easy to control in autumn with a good systemic herbicide when the sap flows to the roots.
- Study Cull Analysis Results to determine what the pest and disease problems were in the previous season and start defining a strategy for the coming season. Many pest and diseases are controllable in autumn or winter.
- Make sure that all trees are tied firmly to the support trellis, you do not want trees rocking in the ground.
- Tie leaders firmly to support trellis.
- Analyse yields of the previous season and determine which factors contributed to lower than expected yields and how many of those factors can be addressed, and attended to, during the coming autumn, winter and spring.
 - For example; cross pollination: Was there adequate cross pollination and did you have the right pollinizers? For plums this is critical. As discussed previously, two

pollinizers are better than one. You can determine whether it is necessary to graft in additional cross pollinators in July/August and start making plans to action.

- Nematode Samples: Take Nematode samples and submit for analysis, to determine if this is one of the limiting factors in the orchards.
- Obtain a post-harvest fertilizer and foliar nutritional spray programme from your plant nutrition consultant

3. Conclusion

In conclusion, post-harvest/autumn is the time that one starts planning for the new season and try to rectify the short comings of this past season. A well planned strategy for this coming season is invaluable and this should be undertaken in the post-harvest/Autumn period.

PEST AND DISEASE CONTROL

Stone Fruit Pests and Diseases:

From March onwards, the critical pests to be controlled on the later stone fruits are False Codling Moth and Fruit Fly. The fly and moth pressure, on especially later dark coloured plums, remains very high at this time of the year. In addition to this, the all-year round fruiting window being achieved through the combined farming of stone fruit, citrus and vines on the same farm, is creating an ideal haven for pests to flourish and complete their life cycles in different fruit types and times of the year, achieving a year-round build-up of insect pressure.

- **False Codling Moth (FCM) – All Stone Fruit.** At this later stage of the season, as required, products with a nil, or short withholding window are to be used. Here, one could look at the following options:

<u>Product Rate/hl</u>	<u>Safety (Days)</u>	<u>Number of Sprays</u>	<u>Peaches</u>	<u>Nectarines</u>	<u>Plums</u>	<u>Apricots</u>
Altacor 10g OR Coragen 17.5ml	14	2	√	√	√	
Exirel 50ml	7	2	√	√	√	Not Export
Marskman 60ml	7	2	√	√	√	√
Delegate 20g	7	4 Including Tracer	√	√	√	√

Broadband 50ml – Min of 1L/Ha OR Eco Bb 100g	0	Minimum of 3	√	√	√	√
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In addition to the sprays listed in the table, there are a range of pyrethroids registered for FCM control on stone fruit. One must however, be cautious of using too many pyrethroids, as they have a very detrimental effect on predators, which can result in problems controlling red spider. Pyrethroid use is not considered good IPM strategy.

Broadband or Eco Bb(*Beauveria bassiana*) is a fungal contact insecticide which must be sprayed on its own. Must add a wetter-sticker like Biodew or Villa 51 @ 6ml/hl to the spray solution. A series of 3 sprays should be applied. If this is done, will suppress red spider mite.

Marksman, despite the 7-day safety window, needs to be positioned early in the control programme as the FCM eggs need to be laid on top of the spray for best efficacy.

- **Fruit Fly – All Stone Fruit.** One must keep **monitoring** and **baiting** after harvest in all orchards to suppress fly populations, as per the Stone Fruit FF MS for export to the EU. Weekly baiting must continue until May, applying 1L/Ha of attractant per bait application. HymeLure at a 2L/hl solution rate, mixed with 175ml/hl Mercaptothion, applied at 50L/Ha of solution, applies the 1L/Ha. The pH of the water solution should be buffered to 4.5 – 5.5 for optimum efficacy of Mercaptothion.
- **Post Harvest Red Spider Mite – All Stone Fruit.** If needed, based on monitoring which confirms the lack of predator activity, a clean-up spray may be needed. Try and use a different chemical group to that which may have been used before harvest, to retard resistance, as residues on the fruit are no longer a problem. Acarstin Flo @ 50ml/hl is registered on peaches, nectarines and plums (not to be applied onto fruit destined for export.) Remember, trees under moisture stress are far more prone to spider mite activity than trees that are not stressed for water.
- **Post Harvest Fungal Infections – All Stone Fruit.** If orchards have a history of being prone to gum spot, brown rust or powdery mildew, preventative sprays should be applied to ensure the leaf quality and efficacy is not negatively impacted in the post harvest period when reserve assimilation is so important. The imported cultivars seem far more susceptible to brown rust, than the locally bred cultivars. Either Mancozeb @ 150g/hl or Wettable Sulphur @ 300g/hl could be applied. The wettable sulphur, will control both powdery mildew and brown rust, whereas Mancozeb, controls brown rust and gum spot.

This section of the Timely Hints was compiled by Andrew Hacking of Ad Lucem Agricultural Services CC, using agrochemical information obtained from Agri-Intel and Hortgro's MRL database.

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