

# EXTENSION BRIEFS

## JUNE/JULY 2007

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*Citrus Research International*

### INTEGRATED PEST MANAGEMENT

T.G. GROUT

**Red scale** Those growers who have experienced red scale problems during the past season should consider applying narrow distillation range horticultural mineral oils. Although the oil price has increased considerably over the last year, oil is probably the most IPM-compatible treatment option for red scale. The generally accepted period to apply this treatment is from budswell to budburst (mid-July to mid-August). The concentration to be used is dependent on the grade of the oil to be applied (generally 1.0 – 1.25% medium grade oil). When spraying oil, care must be taken to apply the oil as a full cover, film wet spray. This is because oil suffocates the insect, a job it cannot do if the scale is not covered with oil. Trees to be sprayed must also not be under any stress.

**Ant control** Ants are usually indirect pests on citrus and interfere with the behaviour of natural enemies, sometimes protecting and even transporting pest species. The winter months are a good time to control ants before honey-dew-producing pests such as aphids increase on the spring growth flush. If trunk barriers are being used as a control method they should be replaced or rejuvenated at this time and trees should be skirt-pruned to prevent branches from touching the ground later in the season when bearing fruit.

### CROP LOAD AND FRUIT QUALITY MANAGEMENT

J.S. VERREYNNE, G.H. BARRY

**Maturity indexing** Maturity indexing on mid-season to late cultivars should commence. Maturity indexing is done to predict the rate of change in fruit maturity in order to harvest fruit at a maturity that would maintain acceptable commercial shelf life. The aim is to define changes or rate of change in acids and sugars and to build up a data base over a number of years for comparison. Random sampling of fruit every week from each of ten representative trees should start 4 to 6 weeks before the expected harvest date. Titratable acidity is determined by titration with sodium hydroxide, sugar content (Brix) is determined using a refractometer, the sugar:acid ratio calculated and fruit colour should be read from a colour chart. All the parameters mentioned above should be plotted on a graph over time. Once plotted, trends will become apparent, harvest dates can be

estimated and problem areas in internal and external quality parameters can be identified and manipulated.

**Degreening and post-harvest rind disorders** The publication "Common Defects Associated with Degreening of Citrus" by Andy Krajewski and Tim Pittaway is a must for any grower who degreens fruit. It puts degreening in perspective, gives the correct manner of treatment as well as a photographic identification of degreening defects. Another publication, "Post-harvest Rind Disorders of Citrus Fruit" by Paul J.R. Cronje is available (see advert in this issue). It is very useful in the correct identification of physiological rind disorders. Both are available from CRI. Contact Bella Thulare at 013 759 8000 or bella@cri.co.za.

**Pruning** Pruning for the earlier and mid-season cultivars should be done during this period as soon as possible after harvest. Prune heavier after a light crop if a heavy crop is expected and when the orchard has a history of alternate bearing. Pruning in the winter and not later than September improves the light distribution inside the tree and improves the quality of the bearing wood inside the tree. Pruning can also be used as a thinning technique. Light levels of 30% of full sunlight are necessary for optimal photosynthesis and light also improves colour development. In very dense trees and especially older trees, light levels drop to below 30% in the inside of the tree and adversely affects fruit size.

**Flower induction** Citrus trees require a rest period of about 6 weeks to ensure that adequate flower induction takes place. The two mechanisms involved in floral induction in citrus involve (i) low temperature, or (ii) controlled-drought stress, both to ensure no root activity. In the absence of low-temperature rest, citrus trees should be exposed to controlled-drought stress for a 4 to 6 week period during June and July if possible.

### GEÏNTEGREERDE BEMESTING

J.G.K. COETZEE

Die nuwe produksieseisoen is al onderweg en die bemestings-program moet dit vanaf Julie ondersteun om die beste voordeel daaruit te haal. Begin dus met die eerste stikstoftoediening in Julie/Augustus en poog om al daardie elemente waarvan die konsentrasies in die tekort gebied is, so gou moontlik reg te stel.

In cold areas (Vaalharts, Kat River) or the Western Cape with winter rains, the first nitrogen must be applied during August but the foliar sprays with either urea or potassium nitrate have to be applied in July, even with fruit still on the trees.

The other important aspect is to eliminate all deficiencies

before blossom. This could mean that zinc, manganese, boron and magnesium need to be sprayed quite early as indicated on the recommendations supplied by CAL.

Somtyds is dit nodig om bemesting met kalium, kalsium, fosfor en magnesium op ongewone tye toe te dien om te verseker dat die bome nie tekorte tydens blom ondervind nie. Sink is een van die elemente wat stres-skade aan selle kan beperk. Enige stres gedurende bot, blom en vrugset het 'n groot potensiele effek op produksie en wins. Daarom moet die sinkstatus van die bome optimaal tydens dié periode wees. Sink kan nie stres-verwante skade herstel nie, maar dit kan die omvang daarvan beperk.

When required, most micronutrient elements can be mixed with the urea spray. However, beware, zinc and magnesium nitrate are not compatible with copper-oxychloride. Zinc nitrate is also not compatible with potassium nitrate.

Certain nutrient elements can be stored in the trees for later use when the demand increases. These include P, K and Mg. The application of nitrogen is restricted by the demand curve for the production of quality crops. It is important that the nitrogen applications be managed to follow the optimal demand curve.

Toedienings van kalium, fosfor en magnesium is dus nie tydgebonde nie. Al drie die elemente is mobiel in die plant en dit

kan gestoor word vir latere gebruik. Kalsium is nie mobiel nie en waar addisionele kalsium benodig word, moet dit gedurende Augustus tot Oktober voorsien word. Toedienings van gips moet dus in Augustus/September gedoen word om ekstra Ca gedurende die kritieke tyd van seldeling te voorsien.

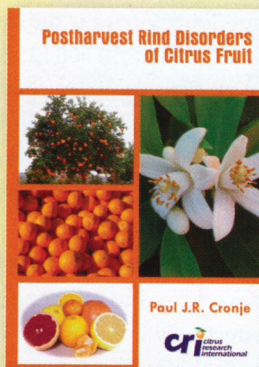
**Blaarontleding / Leaf analysis.** During 1967/68 dr. Doug Stanton reminded citrus growers of the limitations of leaf analyses. He pointed out that leaf analyses can only assist in getting the trees in an optimum nutritional state. Nutrition cannot substitute any of the other production factors. Without optimal root conditions, irrigation, pest control and other horticultural practices, fertilisation cannot sustain optimal production.

Gedurende die 2006 blaarontledingseisoen is dié feit weer onderstreep. Menige boorde met 'n optimale voedingstatus produseer nie na wense nie. Die basiese feit is dat voeding maar een van die produksie faktore is wat die finale produk bepaal. Die invloed van voeding op produksie kan grootliks uitgeskakel word indien op die volgende gelet word.

- Stel alle tekorte reg.
- Stel alle oormate reg.
- Handhaaf 'n optimale voedingstatus.

**Postharvest Rind Disorders of Citrus Fruit** is 'n nuwe publikasie deur Paul Cronje van Citrus Research International. Die handleiding bespreek agt van die belangrikste naoes fisiologiese defekte in die konteks van die Suid-Afrikaanse sitrusbedryf. Die nuutste inligting wat beskikbaar is oor elk van die defekte word bespreek in vyf onderafdelings, naamlik: Beskrywing, Oorsaak, Voorkoms, Ontwikkeling en Voorkomende-aksie. Daar word gebruik gemaak van kleurfoto's om die identifikasie van spesifieke simptome te vergemaklik. Die publikasie het ten doel om die produsent, pakhuispersoneel en uitvoerders te help om die verskillende defekte te identifiseer en inligting te verskaf oor die voorkoms en faktore wat 'n rol speel in elk van die defekte.

Die boek kan bestel word by Citrus Research International in Nelspruit.  
Tel: +27 13 759 8000,  
fax: +27 13 744 0578  
of bella@cri.co.za  
Prys: R100 (VAT ingesluit)  
plus posgeld.



**Postharvest Rind Disorders of Citrus Fruit** is a new publication by Paul Cronje from Citrus Research International. Eight of the most important and problematic post-harvest physiological disorders for the South African citrus industry are discussed. The latest information on each of the disorders is discussed in five subsections, namely: Description, Cause, Occurrence, Development and Remedial action. Colour photos of each disorder illustrating the typical symptoms are also supplied. The aim of the booklet is to assist citrus producers, pack-house personnel and exporters to identify the various disorders and the factors that play a role in each of these disorders.



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- Gebruik bespuitings met ureum en kaliumnitraat om blom en vrugset te bevorder.

Taking care of all these and still not getting the production, one has to resort to other methods to correct the problem. That implies that one has to investigate and identify the limiting factor or factors and the only way to rule out nutrition is leaf and soil analyses. Other methods to improve production will include any of the following depending on the problem.

- Applications of gibberillic acid.
- Pruning.
- Fruit thinning.
- Changing the irrigation schedules.
- Application of nematocides.
- Treatments for Phytophthora.
- Etc., etc.

Met bemesting kan ons net sover gaan en nie verder nie. Dit is byvoorbeeld sinloos om meer en meer kalium toe te dien as kalium nie die oorsaak van die te klein vrugte is nie. Oorweeg dan een of meer van die praktyke wat vruggrootheid sal verbeter. Sulke praktyke sluit optimale besproeiing, uitdun van vrugte, bespuitings met ouksiene en snoei in.

Dit is dus uiters belangrik om eers die beperkende faktore te identifiseer voordat besluit word wat daaraan gedoen kan word. Onthou bespuitings met ureum stimuleer 'n sterk en egalige blom, maar sal nie heeltemal die genetiese probleme van Midnights of Deltas met vrugset kan oorkom nie. Ringelering of bespuitings met gibberielsuur is nodig. Verder sal bespuitings met kaliumnitraat vruggrootheid verbeter slegs indien die kaliumstatus van die bome te laag is.

Blaarontleding is nie 'n towerstaf nie. Dit is 'n betroubare manier om die voedingstatus te bepaal en help om die regte bemestingsprogram te formuleer. Blaarontleding vorm 'n integrale deel van die totale proses van sitrusproduksie.

Although all the production factors are important for optimal production, the single most important one is irrigation. The basis of optimal irrigation is to apply the correct volume at the right time. The volume can fairly easily be calculated by measuring the diameter of the wetted area, the effective rooting depth and the water holding capacity of the soil. To determine when to apply the water is more complicated but can be done in various ways. These include the calendar method, evaporation pans, tensiometers, neutron probes and various other devices that can measure the water content in the root zone.

Optimale besproeiing is meer as natlei. Die regte volume moet op die regte tyd toegedien word. Doen dus moeite om die volume grond wat benat word en die waterhouvermoë van

die grond te meet. Gebruik dan een van die baie beskikbare maniere om te bepaal wanneer om die volume toe te dien. Die eenvoudigste is die kalender-metode.

## POST-HARVEST PATHOLOGY – WASTE PREVENTION CHECKLIST

**K.H. LESAR**

*The rationale regarding the use of the imazalil 500 EC formulation versus the imazalil 800 EC formulation applied in citrus wax.*

The imazalil 800 EC was formulated many years ago for post-harvest application on citrus. South Africa is the only country still using this formulation.

However its use has been discontinued and the product has been replaced by the imazalil 500 EC formulation.

The reasons for the use of the imazalil 500 EC instead of the imazalil 800 EC in citrus waxes are:

The imazalil 800 EC is very viscous and bottles are difficult to empty completely even after multiple rinsing.

Imazalil 800 EC has limited wax compatibility and is not readily miscible in citrus waxes. It was recommended that the imazalil 800 EC be diluted in a little tepid water prior to mixing in the wax to avoid the formation of large droplets and potential burn to the fruit. After mixing in the wax the product forms a "cheesy" deposit due to a reaction between the acidic fraction of the imazalil and the alkalinity of the wax.

Imazalil 800 EC is severely irritating to the eyes as it contains an acidic fraction to keep the active ingredient in emulsion.

The imazalil 500 EC is a far more user-friendly formulation and is safer for the operator handling the product. The product is readily miscible in citrus wax and soluble in water and can be diluted in water and wax without prior dilution in warm water. In waxes the product forms an immediate and stable emulsion with minimum stirring.

The imazalil 800 EC formulation was originally only registered in a few countries such as South Africa, Argentina and Morocco, but South Africa is the only country still using this formulation.

The imazalil 500 EC is being recognised as THE STANDARD in all the most important citrus exporting countries. It is in fact registered in more than twenty countries. The product is based on food grade ingredients listed in the US EPA limited list of ingredients allowed in post-harvest use.

**Ethrel application in the packhouse** Those packhouses that don't have access to ethylene gas degreening can easily, cheaply and effectively apply ethrel in the packhouse. One major drawback with this application is that relatively green fruit cannot be easily

graded out for blemishes.

The colour should shift by 1 or 2 colour plates after treatment and packing if the fruit stands within the confines of the pack house at a temperature range of 18-25°C or higher for a day or two prior to going into cold storage. Colour development will continue slowly after cold storage.

The application is applied in the line before waxing as a total loss spray over a set of brushes. Ensure that the brushes are adequately wet to obtain good coverage of the fruit.

The ethrel is applied as follows:

156 ml ethrel / 25 L water for lemons, grapefruit and Clementines (3000 ppm)

210 ml ethrel / 25 L water for oranges (4000 ppm).

NB. 2,4-D Deccomone must be used when applying ethrel.

**Packhouse Sanitation** Constantly monitor sanitiser concentrations in dump tanks and descaler water washing systems, and

fungicide concentrations in the hot water fungicide bath.

Change dirty systems on a regular basis with clean water and full strength chemicals.

These compounds do not work in dirty systems with high fungal spore load and organic material.

Top up these systems correctly and if not sure revert to CRI for proper procedures.

Never allow fruit to be stored and decay in a pack house.

Spray all pack line belts, brushes, conveyors and all surfaces including coldrooms, degreening rooms etc. within the confines of the pack house with a suitable sanitiser, on a regular (daily) basis.

Likewise spray out trailers and bins before leaving for the orchard.

**Retention Samples** Hold back samples of each consignment of packed fruit for a period of about 2 weeks and check regularly for waste and any other developing factors.

## SIEN U VARS PRODUKTE IN ONS SUPERMARK PROGRAMME



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