

# EXTENSION BRIEFS • JUNE/JULY 2013

H.F. LE ROUX & J.J. BESTER

Citrus Research International



## INTEGRATED PEST MANAGEMENT

### False codling moth S.D. MOORE

All fruit remaining on orange, mandarin and grapefruit trees (i.e. all FCM susceptible cultivars) after harvest must be removed and destroyed. This is because FCM activity does not cease during winter and any remaining fruit can therefore serve to facilitate this activity. In addition, this winter fruit creates a reservoir of inoculum of FCM for the following spring. Conversely, removal of all fruit after harvest can dramatically reduce FCM levels in the following season. In addition, fruit fly numbers can also build up on unharvested fruit.

Packhouses are strongly urged to implement the most painstakingly thorough inspection systems for FCM, preferably on delivery of fruit at the packhouse. Grading of fruit should similarly be as stringently applied as possible at various points on the packing line. Staff appointed to conduct such inspections and grading should be properly trained and incentivised to do the most reliable and accurate job possible.

### Red scale T.G. GROUT

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 is higher than it used to be, 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. Other treatments for red scale would normally be applied in August, September or after petal fall and will be discussed in the next edition of Extension Briefs.

### Ant control T.G. GROUT

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.

### NA-OES PRAKTYKE P.J.R. CRONJÉ

Vir die voorkoming van na-oes fisiologiese afwykings is die korrekte produksiepraktyke, soos bemesting en besproeiing, asook snoei, uiters belangrik. Daar is egter gedurende die oes en pak-

proses kritiese faktore waarop gelet moet word wat die voorkoms van skildefekte, asook algemene vrugkwaliteit kan beïnvloed. Bepaal die optimum plukvenster vir elke kultivar per area deur 'n maand voor die beplande oesdatum met rypheidsindeksering (interne kwaliteit en skilkleur) te begin. Daar moet gepoog word om die temperatuurlading op die vrug te beperk vanaf die plukproses tot in die pakhuis, deur die vrugte se veldhitte so gou as moontlik te verwyder (bv. deur vrugte gouer te "drench"). Die paklyn het 'n invloed op skilkondisie, asook die voorkoms van skildefekte, en dit is belangrik dat detail aandag aan alle bewegende dele, bv. rollers en borsels, asook waks-tipe en aanwending geskenk word.

Ontgroening is 'n belangrike aspek van die sitrus na-oes hantering en moet optimaal bestuur word. Dis belangrik om te beseft dat daar 'n interaksie tussen kultivar, vrugrypheid en die effektiwiteit van ontgroening bestaan. As vrugte te vroeg (onvoldoende kleur-ontwikkeling aan boom) in die ontgroenkamer geplaas word, sal die verlangde kleur nie ontwikkel nie. Gedurende ontgroening is daar egter aspekte wat streng beheer moet word, nl. etileen konsentrasie (1-3 ppm), temperatuur en relatiewe humiditeit (95%+).

| Optimum ontgroeningstemperatuur |             |
|---------------------------------|-------------|
| Satsuma mandaryne               | 18 tot 21°C |
| Clementine en Nova mandaryne    | 19 tot 22°C |
| Nawel lemoene                   | 21 tot 23°C |
| Ander lemoene                   | 23 tot 24°C |
| Pomelos en suurlimoene          | 24 tot 25°C |

Ontgroen altyd meer sensitiewe vrugte teen die laagste temperatuur. Die etileenbehandeling is die effektiwste as vrugte van dieselfde kleur

gelykertyd behandel word. Die tydperk van die behandeling moet ook so kort as moontlik wees. Hou die CO<sub>2</sub> vlakke onder 0.3% (3000 dpm) deur die ventilasie sodanig te stel; hoë CO<sub>2</sub> vlakke verlangsamen die ontgroeningsproses deur as kompeterende inhibeerder teen etileen op te tree. 'n Stadiger ontgroeningstempo sal 'n verlenging van die tyd in die ontgroenkamer vereis en 'n verkorte rakleef tyd tot gevolg hê. Vir meer informasie raadpleeg die "Common defects associated with degreening of citrus" deur Krajewski en Pittaway, wat bestel kan word van CRI in Nelspruit (kontak Bella 013-759 8000).

Die koueketting se invloed op die vrugkwaliteit is van kardinale belang en sal nie net die voorkoms van skildefekte beïnvloed nie, maar ook algemene kwaliteitsaspekte soos vrugfermheid en rakleef tyd. Die belangrikste faset van die koueketting is dat dit nie onderbreek mag word nie, m.a.w. as vrugte tot op die verlangde temperatuur verkoel is, mag die temperatuur nie weer styg nie.

## CROP AND FRUIT QUALITY MANAGEMENT

P.J.R. CRONJÉ & J.J. BESTER

**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 database 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 & post harvest rind disorders** The two publications *Common Defects Associated with Degreening of Citrus* by Andy Krajewski & Tim Pittaway and *Postharvest Rind Disorders of Citrus Fruit* by Paul J.R. Cronje are a must for any grower. Both available from CRI. Contact Bella Thulare 013 759 8000/bella@cri.co.za.

**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 above 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 can drop below this threshold level in the inside of the tree and adversely affect 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.

## BEMESTING/FERTILISATION

J.T. VAHRMEIJER & J.G.K. COETZEE

**Blaarontleding/Leaf analysis** The very last opportunity to get leaf analyses done is in June and July. Leaf analysis is still the best diagnostic method to measure the nutritional status of the trees.

**Grondontledings/Soil Analyses** Soil analyses should be done annually and preferably during the same time as leaf analyses. A good practice is to take soil samples from the same spot every year to ensure that an accurate historic dataset is developed for the soils. Sampling areas can be marked with GPS coordinates.

**Other analyses** If manure or compost is used as a fertiliser source, then the material should be analysed to determine the nutrient value of the organic material. The amount of organic material applied is determined by the amount of nutrients that is available in the compost or manure. Normally the nutrient content of organic material is much lower than inorganic fertilisers and therefore high quantities of organic material are applied. Be careful that excessive nutrients or toxic amounts of other elements are not applied.

**Bemesting Fertilisation** The fertilisation programme is compiled from results of both soil and leaf analyses. Potential yield is used as an indicator for the amount of fertiliser to be applied. Use historic yield data to determine a realistic target yield.

The fertilisation program for the 2013 crop starts in July or August 2012, depending on the production area, and is usually completed by November (where micro-sprinklers are used) or January (where drippers are used). Due to the properties of the specific chemical ion, the properties of the soil and the physiological requirements of the trees, certain basic rules should be adhered to when applying fertilisers to citrus.



28 Donkersvliet Street • PO Box 3014 Daljosaphat Paarl 7620  
Tel: 021 868 1652 • Fax: 021 868 1739

**Quality machine builders**

**The complete solution for all  
packing and sorting of fruit and vegetables**







| Element                    | Mikrospruite/Micro-sprinklers                                                                                                                                                                                                                                                                       | Druppers/Drippers                                                                                                                                                                                                                                                                   |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>N</b>                   | Dien die meeste N gedurende Julie tot September toe. Die aantal toedienings word bepaal deur die totale massa kunsmis wat toegedien moet word en die klei-inhoud van die grond. Die beginsel vir sproeibemesting of hand- en meganiestoediening bly dieselfde.                                      | Die beginsel is soos dié vir mikrospruite maar die massa word verdeel in 'n groot aantal toedienings wat tot Desember strek. Die meeste N moet egter nog steeds in Julie tot September toegedien word, en die toedienings moet nie veel langer as Januarie aanhou nie.              |
| <b>Organiese materiaal</b> | Dien al die organiese materiaal soos kompos, kraal- of hoendermis gedurende Julie tot Augustus toe. Genoeg tyd moet gelaat word sodat 70% van die stikstof teen Oktober vrygestel is.                                                                                                               | Die huidige metode is om die totale massa organiese materiaal te verdeel en gelyke massas bo-op elke druppers te plaas. Dit moet gedurende Julie/Augustus gedoen word.                                                                                                              |
| <b>P</b>                   | Use only single or double supers and apply it in a narrow strip of about 5 cm wide, below the drip line of the trees.                                                                                                                                                                               | Use a water soluble source like mono ammonium phosphate (MAP) or phosphoric acid and apply it over an extended period (4 to 5 months) at lowish concentrations.                                                                                                                     |
| <b>K</b>                   | Wanneer sproeibemesting gebruik word, kan dit teen 100 g K per boom per toediening oor die hele lengte van die siklus toegedien word. Wanneer meganies of met die hand uitgestrooi word, word een (leem- tot kleigronde) tot drie (sandgronde) toedienings gedurende die lente/ vroeë somer gemaak. | Dien die aanbevole massa kaliumnitraat, -sulfaat of -chloried oor 'n periode van 3 tot 6 maande gedurende Julie tot Desember toe.                                                                                                                                                   |
| <b>Ca</b>                  | The most critical time for a deficiency would be August to October. Therefore when gypsum is required, apply it during August or September.                                                                                                                                                         | Calcium nitrate is the only suitable source and must be applied during August or even July to September/ October. The application can however be extended to December. Remember to take into account the nitrate component of the calcium nitrate when calculating N fertilisation. |
| <b>Magnesium</b>           | Dolomitiese kalk, magnesium-hidroksied of -oksied kan in die lente, vroeë somer of herfs toegedien word.                                                                                                                                                                                            | Magnesiumnitraat of -sulfaat word ook oor 'n periode van 3 tot 6 maande toegedien. Die nitraat word gewoonlik vroeg en die sulfaat na Oktober toegedien.                                                                                                                            |
| <b>Sulphur</b>             | Sulphur deficiency has the most devastating effect on fruit set. Where a deficiency is present, apply the sulphate during July to August. Maintenance applications are done during spring or early summer.                                                                                          | Magnesium-, potassium or ammonium sulphate are the sources and the application is timed to fit the requirement of these four elements.                                                                                                                                              |

Blaarbespuitings word gebruik om tekorte reg te stel of om die bome se fisiologie te manipuleer. Vir manipulasie is dit hoofsaaklik lae biuret ureum of kaliumnitraat wat gebruik word.

Beide bespuitings moet 6 tot 8 weke voor die 50% blom-stadium toegedien word. Dit is meestal Julie of vroeë Augustus.

| Element                    |                                                                                                                                                           | Timing                                                                                                                            |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| <b>N</b>                   | Low biuret urea to improve the quality of the blossom.<br>Low biuret urea to supplement the nitrogen supply.                                              | July or early August<br>October to February                                                                                       |
| <b>P</b>                   | Om die suur-inhoud van die vrugte te verminder.<br>Om die TOV van die vrugte te verhoog.                                                                  | 6 weke na blom-blaar-val.<br>6, 4 en 2 weke voor oes.                                                                             |
| <b>K</b>                   | Potassium nitrate to improve the quality of the blossom.<br>Potassium sulphate to supplement the K supply<br>Potassium nitrate to supplement the K supply | July or early August<br>August/September for the best results and up to February for maintenance.<br>After fruit drop to December |
| <b>Mg, Zn, Mn, B en Mo</b> | Waar 'n tekort ondervind word.<br>Instandhouding.                                                                                                         | Julie en weer in Oktober.<br>Oktober tot Desember                                                                                 |
| <b>Cu</b>                  | Usually only recommended to correct a deficiency                                                                                                          |                                                                                                                                   |

## POST HARVEST PATHOLOGY – WASTE PREVENTION CHECKLIST K.H. LESAR & A. ERASMUS

Intermittent rainfall already experienced in the summer rainfall production areas and possible heavy rain in the winter rainfall production areas during the 2012 packing season could lead to the following problems:

- high pathogen inoculum levels in orchards on all surfaces resulting in
- infections by latent pathogens – Anthracnose, Diplodia and Phomopsis stem-end rot
- infections by wound pathogens – green and blue mould and sour rot
- infections by soil pathogens – Phytophthora brown rot, sour rot, Trichoderma and Fusarium

### Precautions and Recommendations

- Minimise injuries to fruit during picking, handling and transport to packhouse.
- Handle the fruit as a perishable product, because it is a perishable product.
- Ongoing removal of dead wood from trees.
- Ongoing orchard sanitation is a non negotiable requirement.
- Minimise the delay between picking and treatment. The longer the delay the higher the risk for high decay.
- Packed fruit must be cooled down as soon as possible.

**Phytophthora brown rot** Adequately skirt trees to minimise the risk of Phytophthora brown rot infection after rainfall.

Do not pick skirt (low hanging) fruit for packing. Remove this fruit before harvesting and discard or sell on the local market.

Spray contact fungicides only (copper at 200 g / 100 ℓ or Dithane at 200 g / 100 ℓ) as a preventive measure against Phytophthora brown rot after rainfall. Contact fungicides must be re-sprayed after any follow-up rainfall.

The phosphonates are systemic and highly effective against *Phytophthora* brown rot. **Fighter 350 and Brilliant (Ammonium Phosphite)** are currently the only registered phosphonates for the control of brown rot on citrus.

The registered foliar applications of phosphonates for the control of Root and Collar rot will also be effective against brown rot whereas phosphonate stem treatments and soil applications will not control brown rot.

In the summer rainfall regions where *P. nicotianae* predominantly occurs, only low hanging fruit and leaves need to be sprayed.

*P. citrophthora* is more prevalent in the cooler winter rainfall regions. As this pathogen also forms aerial spores, it can be found higher in a tree. It is therefore essential to spray the whole tree. When a drier summer is experienced no precautionary sprays are necessary.

All the soft citrus cultivars are very sensitive for phytotoxic burn when a phosphonate is applied. Read the warning notification on the labels of these products. Do not spray soft citrus cultivars with phosphonates.

### Recommendations to packhouses that are still degreening

Pick selectively for degreening. Place only fruit that has reached colour break into the same crates, and not fruit of different colours in the same crate.

### Drench with recommended mixture within 24 hours.

Fruit must not spend too long in degreening (preferably not longer than 48 hrs; maximum 72 hrs).

Extended time in degreening predisposes fruit to poor quality and waste.

**NB do not dump wasty fruit (especially green and blue mould and sour rot), found in bins after degreening, into packhouse washing systems. Pre-sort and remove this infected fruit before the fruit moves into the packhouse.**

### Recommendations to packhouses that are not degreening

**Option:** Drench with STANDARD MIXTURE within 24 hours and allow bins to stand for 1-2 days before packing.

**Remove wasty fruit in bins. Do not dump wasty fruit into packhouse washing systems.**

### Ethephon (Ethrel) application on export fruit in the packhouse

**NB!!** A change to the citrus Ethephon EU MRL (now 0.05 mg/kg) and a revised Ethephon residue testing methodology are recent developments producers using Ethephon (Ethrel) should note.

The recommended restrictions that apply are as follows:

**Not permitted:** EU, USA, Japan (postharvest) and other markets, except where other restrictions apply.

**Permitted:** Canada, Middle East and Indonesia

**Refer:** Cutting Edge/Snykant no. 84 and “Recommended Usage Restrictions” September 2011.

In the markets where Ethephon/Ethrel is permitted, those packhouses that do not 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 packhouse 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 on the packhouse line before waxing as a total loss spray over a set of brushes. Ensure that the brushes are adequately wet to ensure 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).

plus 2.5 ml Agral 90.

**NB.** 2,4-D Deccomone (250 ml/25 ℓ water) must be used when applying Ethrel.

Fruit must be dry before waxing.

**Packhouse Sanitation** Constantly monitor sanitiser concentrations in dump tanks and “descaler” water washing systems, and fungicide concentrations in the hot water fungicide bath.

# CRI Na-oes Werkswinkels Uiters Gewild

HANNES BESTER & HENNIE LE ROUX, CRI VOORLIGTING

**V**anjaar het die CRI Na-oes Werkswinkels, voorheen bekend as die Pakhuiswerkswinkels, 'n week vroeër as vorige jare afgeskop om pakhuis meer tyd te gee om voor te berei voor die aanvang van die pakseisoen, asook om oorvleueling met die CGA 'roadshow' en Fruit Logistica te voorkom. Die omvang van hierdie werkswinkels het die afgelope jare tot so 'n mate gegroei dat die getalle die 'venues' waar dit aangebied kan word in die verskillende streke, aansienlik beperk het. Dit is vanjaar deur meer as 670 persone bygewoon.

As gevolg van die uitstekende bywoningsgetalle die vorige jare, het die borge toenemend belangstelling begin toon. *Citrosol/Wenkem was vanjaar die hoofborg by al vyf die werkswinkels en hul ruim bydrae het gehelp om van die werkswinkels 'n sukses te maak.* Citrosol is 'n maatskappy in Spanje wat spesialiseer in die vervaardiging van na-oes produkte. Hierdie produkte is reeds in verskeie lande beskikbaar en word in Suid-Afrika eksklusief deur Wenkem bemark. Hul borgskap het hulle die geleentheid gegee om 'n aanbieding te doen by elk van die werkswinkels. Verskeie ander borge was ook betrokke en het blootstelling gekry tot die mate waartoe hulle geborg het.

Die volgende borge word bedank vir hul bydrae en deelname aan die werkswinkels: Citrosol & Wenkem (Hoofborg), ICA, Advantage Agri Products, Freshgold S.A., Houers Koöperatief, JBT Food Tech, Label Pro, Nampak, Nulandis, Workwear Depot.

Die eerste werkswinkel is vir Limpopo aangebied in Polokwane, gevolg deur Mpumalanga by Loskopdam, KZN & Swaziland in Durban, Oos-Kaap in Port Elizabeth en laastens Wes-Kaap in Stellenbosch. Hierdie werkswinkels is oor 'n twee dae tydperk aangebied, waartydens 'n groot verskeidenheid onderwerpe gedek is. Die doel is primêr om alle na-oes rolspelers op hoogte te bring met die nuutste inligting en tegnologie voor die aanvang van die pak- en uitvoerseisoen. Dit het ook die borge, pakhuis, produsente en ander rolspelers blootstelling aan me-

kaar gegee. Saans was daar 'n gesamentlike ete en drankies wat onderskeidelik deur Citrosol/Wenkem en ICA geborg was, waartydens informeel gekommunikeer en kontakte opgebou kon word.

Die onderwerpe wat gedek is, is sorgvuldig gekies met insette van verteenwoordigers uit die bedryf, met die uitsluitlike doel om in die behoeftes van die na-oes rolspelers te voorsien. Vervolgens 'n paar kerngedagtes van die verskillende aanbiedinge:

**Koste van produksie, verpakking en logistiek:** Daar is 'n magdom faktore en veranderlikes wat hierdie kostes beïnvloed. As gevolg van hierdie variasies in kostes, moet elke produsent weet wat sy eie kostes van produksie, verpakking en logistiek behels tot op 'FOB' en 'CIF' vlak, dws die vlak waarop meeste transaksies plaasvind. *Die beginsel is dat vrugte nie onder die gelykbreekpunt uitgevoer moet word nie en dat alternatiewe, soos die plaaslike mark of versapping, ook deurgaans oorweeg moet word.* Volume vs prys is 'n belangrike beginsel om in ag te neem tydens bemarkingsbesluite. Daar moet 'n doelgerigte poging wees om kostes te spaar, sonder om gehalte en raklewe van die vrugte in te boet.

**Terugvoer oor 2012 PPECB afkeurings en gehalte:** Oor die totale oes het sagtesitrus die hoogste persentasie afkeurings gehad (3.38%), gevolg deur nawels (2.96%), suurlemoene (1.31%), Valencias (1.29%) en die laagste was op pomelo's (0.47%). Valskodlingmot (VKM) was by verre die grootste oorsaak van afkeurings, veral op nawels, Valencias en pomelo's. Daarna was bederf en letsels die ander groot oorsake van afkeurings. Wat swartvlek betref, was daar 21 onderskeppings in Europa, met 15 produksie-eenhede wat op die swartlys geplaas is.

**Uitvoerders Tegnieese Paneel (ETP) markterugvoer:** Gedurende 2012 was skildefekte oorwegend die grootste faktor in terme van gehalte-probleme, veral kraakskil op nawels,

CONTINUED FROM PAGE 41      Change dirty systems on a *daily* basis with clean water and full strength chemicals.

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

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

Spray all packline belts, brushes, conveyors and all surfaces including coldrooms, degreening rooms etc. within the confines of the packhouse and also the packhouse with a suitable sanitiser, on a daily basis.

Likewise spray out trailers and bins with a suitable sanitiser before leaving for the orchard.

Remove all decay-rejected fruit from the packhouse.

Remove all infected fruit from grading belts before contaminating brushes and baths.

Sanitise grading belts regularly after removing infected fruit.

Store all culled fungicide-treated fruit out of the packhouse.

Never allow this fruit to stand in a crate and rot in the packhouse.

This allows for the selection of fungicide resistant spores and these spores could be carried back into the packline.

Store all fungicide-treated local market fruit away from the packhouse.

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