

EXTENSION BRIEFS FOR APRIL/MAY 2011

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Citrus Research International

INTEGRATED PEST MANAGEMENT

T G GROUT and S D MOORE

Phytosanitary pests All the recommendations made in the Extension Briefs for February and March also apply to this period. Monitoring numbers of fruit flies and false codling moth (FCM) is critical to determine whether control measures taken are adequate. Remember that a threshold of 2 Natal flies per Sensus trap per week applies when using Capilure (not 4 as used for Medfly). Growers are urged to be diligent about weekly monitoring of fruit drop under 5-10 data trees in each orchard, particularly those most susceptible to

FCM. This entails careful dissection of fruit and inspection for FCM larvae, tunnelling and frass (amongst all other causes of fruit drop). Although

this should be done weekly from around December, it is particularly important in the last few weeks leading up to harvest as this is a very good indicator of the post-harvest risk posed by fruit harvested from the orchard. This could play a key role in deciding whether fruit is suitable for certain sensitive markets or not. Sanitation of split, stung or infested fruit in the trees, or fallen fruit on the ground, should take place at least once a week.

Blemish factor analysis The analysis of fruit blemish factors on the tree just prior to harvest or once fruit have been harvested, provides the grower with an evaluation in commercial terms, of all control programmes implemented during the season and also assists with pest management decisions for the season to follow. With the trend towards selective picking and a variable degree of culling occurring in the orchard, it is more accurate to conduct the final analysis of fruit blemish factors before picking starts. Care must be taken to include fruit from inside the tree and all

blemish factors or pest infestations should be recorded, whether they are sufficient to cull the fruit from export quality or not. If fruit blemish is analysed at the packhouse, samples can be taken at a convenient point before the fruit are graded. Samples should be randomly selected and the number of samples should ensure that a true picture is obtained of the situation in a particular orchard. Having taken the sample, it is important to record separately each pest or other blemish factor that is severe enough to downgrade a fruit in its own right. With this procedure a particular fruit in the sample may be shown to have more than one factor that can cause it to be culled from export.

CROP & FRUIT QUALITY MANAGEMENT J S VERREYNNE

Maturity indexing Maturity indexing on early and mid-season 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 by 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.

Pruning Pruning of early cultivars (Satsuma, Clementine) should be done during this period as soon as possible after harvest. Prune

VERVOLG VAN BLADSY 45

streer nie. Volwasse mannetjies kom slegs gedurende Junie tot Augustus voor en beheerstrategieë moet vanaf die eerste week in Junie toegepas word.

Beheerstrategieë teen wyfies wat gedurende Junie tot Augustus voorkom, moet vanaf begin Junie toegepas word. Wyfies voed ook nie en kontak- of berokingsmidels moet gebruik word. Dit blyk dat hierdie spesie slegs kan voortplant indien paring plaasvind. Strategieë om paring te voorkom is dus 'n belangrike aspek in die beheer van hierdie spesie.

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VERWYSINGS

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DE KLERK, C.A. & VERMEULEN, A.K., 2007. Life cycle of *Margarodes prieskaensis* (Jakubski) (Homoptera: Coccoidea: Margarodidae) on table grapes in the Northern Cape, South Africa. Extended abstract of research poster delivered at the 5th International Table Grape Symposium, November 2007, pp 139-141.

more heavily after a light crop and if a heavy crop is expected and when the orchard has a history of alternate bearing.

Post harvest urea application A foliar urea application (low biuret urea at 1%) can be applied on early cultivars (Satsuma, Clementine) as soon after harvest as possible.

GRONDGEDRAAGDE SIEKTES M C PRETORIUS

Phytophthora en aalwurmbeheer Dit is nou 'n goeie tyd van die jaar vir die winterreënvalgebiede soos die Wes-Kaap om *Phytophthora* en aalwurmontledings te doen. Beheerprogramme moet 'n aanvang neem na die eerste goeie winterreëns. Beheermaatreëls moet 'n program van minstens twee maar verkieslik drie toedienings (twee maande uitmekaar) insluit. Let op residu-weerhoudingstydperke van veral aalwurmdoders en lees die ETIKETTE van die verskillende produkte!!!

Phytophthora beheer Wortel en kraagvrot Wortel en kraagvrot beheerprogram kan in die herfs begin. Ridomil wortelsone behandeling (2 g/m^2) en fosfonaat blaarbespuitings kan gebruik word om wortel en kraagvrot effetief te beheer. Drie fosfonaat toedienings twee maande uitmekaar behoort gedoen te word. Slegs 'n ligte dekbespuiting met die fosfonaat produkte sal effektief wees.

Baie belangrik: *Lees die etikette van die verskillende produkte deeglik veral die waarskuwings!* Vermoed die gebruik van die fos-

fonate indien toestande mag voorkom wat bome onder enige vorm van stres mag plaas. Producente het oor die algemeen 'n probleem om te weet wanneer hulle boorde onder vogstremming is en wanneer nie. Bo en behalwe droogte en hitte kan bergwindtoestande ook bome onder tydelike verwelkte toestande plaas wat 'n gevaar inhou vir blaarbespuitings. Bome moet dus nie tydens of kort na sulke toestande gespuit word nie. Laastens beïnvloed drag ook 'n boom se gevoeligheid vir droogtespanning. Hoe hoër die drag, hoe gevoeliger is die boom vir uitdroging en hoe groter is die risiko vir fitotoksiteit.

Bruinvrot Herfsreëns kan lei tot ernstige na-oesbederfverliese deur *Phytophthora* bruinvrot, soos wat verlede jaar ondervind is deur sekere produsente. 'n Enkele vrug besmet met bruinvrot kan tydens verskeping die res van die vrugte in 'n uitvoerkarton laat bederf teen die tyd wat die vrugte hul bestemming bereik. In die somerreënvalgebiede word bruinvrot op sitrus hoofsaaklik veroorsaak deur die patoogeen *Phytophthora nicotianae* var. *parasitica* en affekteer dit meestal die vrugte op die onderste 1.5 m van die boom naaste aan die grondoppervlak. Dit behoort dus redelik veilig te wees om slegs hierdie onderste band vrugte te spuit. In die winterreënvalgebiede kom *Phytophthora citrophthora* hoofsaaklik voor. Hierdie patoogeen versprei hoër op in die boom en kan vrugte tot bo in 'n sitrusboom besmet. Daar word dus aanbeveel dat die bome in hierdie streke volledig bespuit sal word. Bruinvrot ontwikkel slegs wanneer die klimaatstoestande gunstig is vir die patoogeen (*Phytophthora*) om te infekteer

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en te ontwikkel. Indien dit dus 'n droë najaar is en geen of slegs ligte reënuitjies voorkom, is voorkomende bespuitings nie nodig nie. Indien

dit egter 'n nat winter of na-jaar is, moet bome gespruit word. Koper (200 g/100 l) of mancozeb (200 g/100 l; let op marktoeganklikheid tov residue) kan gespruit word om bruinvrot te beheer. Hierdie produkte is slegs kontakmiddels en die moontlikheid dat dit afgewas kan word deur reën en besproeiing is wel moontlik. Fosfonaat swammiddels is uiters effektief maar is tans nie geregistreer vir die gebruik teen bruinvrot nie. Hierdie middels sal wel effektief wees selfs indien dit in 'n wortelvrot program gebruik word. Fosfonaat stamaanwendings is nie effektief teen bruinvrot nie. Brilliant is geregistreer.

GEÏNTEGREERDE BEMESTING J G K COETZEE

Die stikstofstatus van sitrus gedurende die herfs en vroeë winter Die voorsiening van stikstof aan die bome moet bestuur word sodat dit gedurende die laat winter en lente (Julie tot Oktober) hoog is en dan geleidelik daal om in die laat somer, herfs en vroeë winter (Februarie tot Junie) 'n laagtepunt te bereik. By vroeë kultivars soos Satsumas moet die lae stikstofvlak selfs vroeër bereik word. Om die hoë en lae stikstofvlakke te bereik,

moet voorsiening deur bemesting beheer word. Dit sal nie van self gebeur nie en moet bestuur word.

Managing the nitrogen supply High N-status Control is obtained by starting with the first nitrogen application in July (Northern areas) or August (Western Cape and Vaalharts). Depending on the clay content of the soil and the type of irrigation used, one, two or more applications are required to maintain the high from July / August until October and to facilitate the steady decrease reaching a low in February to June. The aim is to increase the nitrogen content of the trees rapidly, keep it at a high for 3 to 4 months and then let it decrease gradually. The high concentration of nitrogen in the trees is required for cell division, cell growth and fruit set.

Organic nitrogen should be applied during July to September to facilitate breakdown of the material and release of the majority of the nitrogen before October.

Lae N-status Gedurende November moet die stikstofstatus van die bome begin daal om die minimum gedurende Februarie tot Junie te bereik. Die lae stikstofvlak gedurende Februarie tot Junie, is noodsaaklik vir die produksie van kwaliteit vrugte en die akkumulasie van reserwes (veral koolhidrate) vir die komende bot, blom, seldeling en vrugset periodes. Daar is net een manier waarop bepaal kan word of die stikstofstatus van die bome reg bestuur word, en dit is om 'n vaste program te volg en dit met blaaronledings gedurende Februarie tot Junie te kontroleer.

Blaar- en grondontledings By sitrus word blaar- en grondmonsters gedurende Februarie tot Mei geneem maar die periode kan tot Julie verleng word. Die enigste probleem met monsters wat in Julie geneem word, is die beperkte tyd om die resultate betyds te verskaf sodat met bemesting in Julie / Augustus begin kan word. Ensure that the correct leaf is picked from the trees in the index rows or block. Collect 50 to 100 leaves per sample. Take the soil sample at the same index trees. Collect 15 to 20 subsamples, mix and submit 400 g of the composite samples for analyses.

Deficiencies Any nutrient deficiency will reduce the potential of the trees. It is therefore important to avoid going into this high activity period of flowering and fruit set with any deficiency. Foliar sprays can be used to correct deficiencies or at least reduce their impact, even during autumn and winter.

Maak seker dat die regte dosis gespruit word en dat toestande so gunstig moontlik vir opname deur die blare is. Die aanvaarbare dosis is 100 mg Zn, 300 mg B, 50 mg Cu en 450 mg Mn per liter wat gespruit word. Pluk die blaarmonster voordat u 'n herfs- of winterbespuiting doen.

POST HARVEST PATHOLOGY WASTE PREVENTION CHECKLIST

K H LESAR

Waste Control – Essential points to remember High humidity, rainfall and temperatures create an environment that is suitable for waste development. However, the mere occurrence of the above does not necessarily mean that there will be higher waste. Other factors or conditions are necessary. These include injuries (mechanical, stings, etc.) as well as the presence of decay-causing organisms (pathogens) in the orchard, packhouse and picking bins.

PROTECTOR 400 SC

A NEWLY APPROVED POST HARVEST FUNGICIDE
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ADVERTORIAL

Protector 400 SC is a new fungicide from ICA International Chemicals Pty (Ltd). The product was recently registered (Reg. no. L8606 of Act 36 of 1947) for the control of amongst other post harvest decay in citrus caused by *Penicillium digitatum* (green mould) and *Penicillium italicum* (blue mould) including *Penicillium* strains resistant to Imazalil.

Protector 400 SC, containing 400 g/L pyrimethanil as active ingredient, is a contact and translaminar fungicide with curative and preventative/protective activities. This is achieved through rapid penetration of plant tissue providing protection and stopping latent infection. The active ingredient, pyrimethanil, is a member of the Anilinopyrimidine chemical group. Pyrimethanil MRL's (maximum residue limit) have been set for South Africa as well as the most important international export destinations (USA, EU and Codex) for citrus.

Benefits of Protector 400 SC within citrus packhouses are:

- Protector 400 SC is active against *Penicillium* strains resistant to imazalil, thiabendazole and guazatine.
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The disease triangle Since the pathogen, the host (fruit) and the environment are invariably related, they can be grouped into three basic components which are illustrated in the form of a 'disease triangle'. The elimination of one or more of the components of the disease triangle results in a situation where waste cannot develop.

Although we have no control over the environmental factors, we definitely have control over the presence of the pathogen and the susceptibility of the fruit to waste. Below are some points to take heed of:

Pathogen: Keep inoculum to an absolute minimum.

- Regular sanitation (this is not only important to keep the spore load down, but is also necessary for reducing fruit fly and FCM levels).
- Disinfection of dumptanks (check regularly and keep records of concentrations).
- Post-harvest fungicides (regular checks/records).
- Disinfection of packhouses, trailers, picking bins, etc. Following hard surface disinfection, rinse surfaces with clean water to remove any possible disinfectant residues.

The fruit: Our most important rots develop from injuries.

- Minimise picking injuries (Indigo carmine test).
- Spray for Phytophthora brown rot.
- Control fruit fly and FCM. The main type of decay found in cartons is green mould and sour rot. This type of waste is mainly caused by injuries made by fruit fly and FCM, and picking and handling injuries.
- Minimise any delay between picking and treatments in the packhouse.
- Prevent over-maturity.
- Train contract pickers to handle fruit correctly. Indications are that the substantial waste over the last number of seasons was due to high numbers of injuries. NB!!!
- Prevent build-up of latent pathogen (Diplodia, Anthracnose and Phomopsis) inoculum by removing dead wood in trees at the end of each season.

How safe is your descaler and dumptank water? A simple method to check whether your descaler and/or dumptank water is a source of fungal contamination.

- Place 30 uninjured fruit from a picking trailer into a large bucket containing a 1% Jik solution.
- After washing the fruit place the fruit carefully into a clean citrus carton to dry (away from any place where surface contamination of fruit with spores can take place).
- Make an instrument to injure the fruit. It is recommended that you push a nail through a cork so that the sharp end of the nail extends 2 mm from the end of the cork. Sterilise this instrument in Jik.
- Injure all 30 fruit by scraping the instrument across the fruit (2-3 mm long) and penetrating the rind.
- Randomly select 15 of the injured fruit and place them into a paper bag for your control treatment.
- Measure the concentration of your sanitising agent in the descaler water prior to putting the injured fruit through the system.
- Treat the remaining 15 fruit (one at a time) by holding each fruit for 3 seconds under the high pressure spray of the descaler. Allow this fruit to dry in a clean carton and place into a paper bag.
- Make sure that both paper bags are tightly sealed so that no

vinegar flies can contaminate the injuries.

Place the two bags in a room at ambient temperature (no air-conditioning), and check on the situation 5-7 days later. If the control has no waste and the treated fruit has lots of waste then you need to carefully check on your descaler sanitation process. *This exercise/check should also be done on the dumptank washing system.*

Citrus Packhouse Sanitation NB: Important to remember for packhouse sanitation and fungicide resistance

- Do not allow partly decomposed fruit or decomposed fruit with visible spores into the packhouse.
- If decomposed fruit is found in the packing bins or on grading tables the whole line must be disinfected.
- Culled fruit, especially fungicide-treated fruit, must not be left in or near the packhouse.
- Fungicide-treated local market fruit must not be stored in or around the packhouse and allowed to decay and develop spores.
- Spores on fungicide-treated fruit are highly likely to contain a large proportion of spores resistant to that fungicide. If these resistant spores are allowed to spread back into the packhouse, this situation could be conducive to the development of full-scale resistance to a fungicide.
- The packhouse and packline must be cleaned and disinfected every day, after packing.

It is important to understand how sanitisers complement the use of fungicides and the reality of what sanitisers can and cannot do.

The difference between fungicides and sanitisers Fungicides only kill specific fungi. Whereas sanitisers are non-specific and will kill not only fungi but bacteria as well. Fungicides will kill fungi over a prolonged period whereas sanitisers will only kill fungi or bacteria on contact. Fungicides bind to fruit surfaces and give some residual protection to the fruit preventing latent infections and infection of wounds after treatment. Unlike fungicides, sanitisers are highly reactive and once inactivated will no longer offer any residual protection. Sanitisers react not only with fungi and bacteria but also with dirt, leaves, twigs and even with fruit surfaces, so the greater the amount of organic matter the quicker the sanitiser will lose its activity. Sanitisers, therefore, cannot prevent mould from developing on infected fruit, but can effectively limit the build-up of fungal and bacterial spores in dump tanks and high-pressure spray fruit washing systems. This is done by sanitising the water and preventing spores washing onto clean fruit or into wounds on clean fruit.

Effective use of any sanitiser requires a reliable, approved test kit (no dipsticks) to be able to read and monitor the sanitiser concentration in a washing system, and maintain the sanitiser concentration at the correct recommended concentration, as the washing system becomes dirtier. As stated above, the more the build up of organic material and spores, the greater the demand on the sanitiser and the less effective the sanitiser will be. Therefore it is necessary to maintain a fairly clean washing system and monitor the product concentration for the washing system to be effective.