HENNIE LE ROUX
CRI - Nelspruit

CITRUS BLACK SPOT

G.C. SCHUTTE

Various new control programmes consisting of copper fungicides, dithiocarbamates, benzimidazoles, strobilurins and the sanitizing agent, Sporekill, have been evaluated with promising results. Research trials with different copper formulations indicated that two or more successive applications of copper fungicides (*viz.* a:b:b:a) are the cause of stippling. If the copper fungicides are alternated with mancozeb for instance, no stippling was observed (*viz.* a:b:a:b). Furthermore, research trials where mancozeb was replaced by copper in tank mixtures with strobilurins and oils, showed that it was not only effective, but that the copper and oil mixtures had no effect on the trees and were also less expensive. If growers are interested in spraying such a programme where the strobilurins are applied in November and December (according to the label), then copper must not be used in more than one of the tank mixtures as copper in both treatments will result in copper stippling.

With regards to the dithiocarbamates, growers who export to Canada must familiarize themselves with the restrictions and protocols before they consider spraying mancozeb or maneb. Residue analysis done from fruit treated with one, two or four mancozebs in different spray programmes, showed that four successive mancozeb treatments sprayed at monthly intervals during the susceptible period from October to January, resulted in an MRL of 0.45 ppm before the packhouse treatment and 0.26 ppm after the packhouse treatment. Where a single mancozeb treatment was used in a tank mixture with a strobilurin and spray oil (sprayed in January) and was preceded with a strobilurin, copper and spray oil (sprayed in November), no mancozeb residues were detected after the fruit was also subjected to packhouse treatments and procedures. Field evaluations of tank mixtures of mancozeb or copper (tank mixtures of half the registered rate (100 g/hl water)) with the sanitizing agent Sporekill (100 ml/hl water) showed that these mixtures were not only effective in controlling the disease, but that no mancozeb residues were detected on fruit taken from the orchard or on fruit subjected to normal packhouse procedures. Sporekill in tank mixtures with coppers was also effective in controlling CBS.

ALTERNARIA BROWN SPOT

Spray programmes should start with the appearance of the first spring flush and it is important to adhere to the spray intervals set for the control of the disease in the summer rainfall regions. Strobilurins, sprayed according to the black spot registration in mid-November and mid-December with mancozeb/copper or copper/mancozeb, can also be used to control the disease. It is then necessary for growers in these areas to carry on with mancozeb at 24-day intervals until harvest. Remember that dew plays an even greater role than rain in the infection process. New spray programmes with strobilurins will only be developed this coming season for the winter rainfall region, but the commencement dates of the spray programme are also with the first spring flush.

ALTERNARIA BLACK CORE ROT (ABCR)

ABCR is associated with dry, hot (RH < 20%; temperature > 30°C) weather conditions during blossom, accompanied with dew during the evening. The dry weather conditions result in the drying out of the primary style (exterior) while the secondary style (interior) is not affected. This results in cracks in the dry style through which ABCR can infect and stay latent within the fruit until harvest. Certain regions that experienced extremely dry conditions during blossom last year, had serious ABCR infections at harvest and in extreme cases, fruit drop also occurred. Growers can rely on triazole fungicides as registered for control.

CROP LOAD AND FRUIT QUALITY MANAGEMENT

G.H. BARRY

Fruit set treatments according to cultivar requirements need to be applied. Specific treatments include the application of gibberellic acid (GA) and girdling. A general guideline cannot be given as fruit set treatments differ by cultivar and, in many cases, by orchard depending on previous crop load. Water stress must be avoided during the flowering and fruit set period.

Fruit growth must be optimised during stage 1 of fruit development. Optimal nutrition and irrigation practices are required. In addition, thinning practices (chemical or hand thinning) need to be applied where required to reduce inter-fruit competition and optimise fruit growth.

The acidity of fruit at harvest is largely determined within 6 weeks of fruit growth and development. Thereafter, only minor modifications to acidity can be achieved. Under conditions of anticipated high acidity at harvest, calcium arsenate can be applied approximately 6 weeks after full bloom. Specific concentrations for various cultivars can be found in the

Production Guidelines for Export Citrus. However, depending on target market, growers should only apply this product where permitted by the importing country. Alternative products that have a lesser effect on acid reduction include mono-ammonium phosphate (MAP) and mono-potassium phosphate (MKP) applied at 1%, i.e. 1 kg per 100 litres of water, 6 weeks after full bloom. Please note that these phosphate sources have not been tested on all citrus cultivars; until now 1% MAP or MKP have reduced acidity on Valencia orange and Temple tangor, but not on grapefruit. A higher concentration, e.g. 5%, has worked well in Israel.

INTEGRATED PEST MANAGEMENT

S.D. MOORE

PARASITOID RELEASES

Growers planning to augment parasitoids for control of red scale, mealybug or false codling moth should initiate releases as early in the new season as possible. Augmentative releases of parasitoids are not a corrective option, and growers should therefore not wait until the pest reaches a problematic level. Research trials with mealybug and FCM parasitoids indicate that better suppression of the pest is achieved with releases initiated as early as October.

PREVENTATIVE SPRAYS FOR MEALYBUG

Pre-harvest blemish analyses or winter inspections of trees might have indicated that preventative spraying for mealybug is unnecessary. This can be confirmed or refuted by inspecting fruit in October and November for the presence of mealybug. Sprays applied before calyx closure will most likely be more effective than those applied thereafter. An infestation level in excess of approximately 5% at petal fall, up to 20% six weeks after petal fall, indicates the need for immediate chemical intervention. Anything short of an absolutely thorough full cover film spray will compromise the effectiveness of a chemical treatment.

It appears that the biocontrol complexes of oleander mealybug and longtailed mealybug, in particular, may not be as effective as that of citrus mealybug. Therefore, more conservative treatment thresholds can be used when either of these species are identified as the dominant species in a particular orchard. If citrus mealybug is not the dominant species, augmentative releases of *Coccidoxenoides perminutus* should be considered unsuitable.

T.G. GROUT

THRIPS MANAGEMENT

During October and November, citrus fruit are highly susceptible to damage from citrus thrips and orchards should be scouted at least once a week for this pest. This scouting should include looking under the sepals. Citrus thrips larvae cause more serious damage than adult thrips so low numbers of adults in the absence of larvae may not require immediate intervention. The intervention threshold for citrus thrips larvae is 2% for the first four weeks after petal fall, 3% for five to six weeks after petal fall, then 4% for seven to eight weeks after petal fall. These thresholds can be approximately doubled if the population comprises mostly adults. If thripicide treatments are required, use products suited to both the thrips population density and the spray machinery available for reapplication at short notice. The use of dedicated spray machines for the rapid application of thrips baits prevents clashes with black spot and red scale spray programmes. Citrus thrips are genetically predisposed towards developing resistance to pesticides so remember not to apply more than two consecutive sprays of the same active ingredient.

J.H. HOFMEYR

VALSKODLINGMOT

Dit is teen dié tyd algemene kennis dat geen enkele bestrydingsmaatreël werklik teen VKM doeltreffend is nie. Produsente moet daarom van 'n multidissiplinêre strategie gebruik maak. Dit beteken dat alle maatreëls wat 'n produsent kan bekostig, saam gebruik moet word om VKM die beste te onderdruk. Meer as een van die maatreëls, soos boordsanitasie, loslatings van die eierparasitoïed *Trichogrammatoidea cryptophlebiae*, paringsontwrigting en bespuiting met 'n geregistreerde insekdoder kort voor oestyd, behoort saam gebruik te word.

Boordsanitasie speel in dié opsig 'n belangrike rol, aangesien dit kan help dat VKM-bevolkingsgetalle van vroeg in die seisoen af onderdruk word. Dit kan daartoe lei dat die uiteindelike bevolking baie kleiner is as wat dit in die afwesigheid van boordsanitasie sou gewees het. Boordsanitasie moet vroeg begin aangesien VKM alreeds ertjie-grootte vrugte kan besmet. Alhoewel slegs 'n klein persentasie van sulke vruggies deur VKM besmet word, val daar tienduisende vruggies van die bome in die vrugspeentydperk af. Groot getalle motte kan daarom potensieel daaruit ontwikkel. Boordsanitasie moet deeglik tot na die einde van die seisoen uitgevoer word en nie in oestyd afgeskeep word nie. Na oestyd moet alle buiteseisoen vrugte ook afgepluk en vernietig word.

Volledige aanbevelings vir boordsanitasie word in die Riglyne vir Sitrusproduksie Deel III (Geïntegreerde Plaag- en Siektebestuur), verstrek.

BEMESTING EN BESPROEIING

H. COETZEE

DO'S AND DON'TS WITH FOLIAR SPRAYS

Citrus trees can be fed by means of foliar sprays. However the efficacy of these sprays depends on a number of factors of which climate is the dominant. To ensure that the nutrients are taken up by the leaves, optimise the following conditions.

1. Concentration

On average a mature citrus tree carries 5 kg dried leaf material. Therefore to increase the concentration of zinc in the leaves by 10 mg per kg one has to apply 50 mg Zn per tree. The absorption will

never be 100% and the application rate will then be even more.

Many products contain enough Zn to provide these rates after dilution. Unfortunately many products do not contain enough Zn and spraying these on the leaves is a waste of money.

Dit geld ook vir ander produkte wat tans beskikbaar is. Indien u boor wil aanvul en die produk wat u wil gebruik bevat nie genoeg B om in die vraag te voorsien nie, soek iets anders. Ons weet dat die volgende konsentrasies van die elemente in die oplossing wat gespuit word, effektief is. Gebruik dit as riglyn om vreemde produkte te evalueer.

Boor	300 mg B per liter water
Sink	80 mg Zn per liter water
Mangaan	450 mg Mn per liter water
Koper	100 mg Cu per liter water

2. Druppelgrootte

'n Ander belangrike faktor is die grootte van die druppels. Klein druppels droog vinniger af as groot druppels en verkort dus die kontaktyd. Druppels groter as 500 mikron (0,5 mm) is ideaal. Dit kan bewerkstellig word deur byvoorbeeld groter openinge (3,2 mm), die regte warrelplaatjie (56) en 'n werksdruk kleiner as 8 bar.

Unlike sprays for pest control, foliar sprays do not have to cover all the leaves and neither the complete surface. Only wet the outer 40 to 50 cm of the canopy, but try to "load" as many of the nutrients on the leaves as possible by applying fairly large droplets.

3. Contact time

The initial contact time is important and must be extended as long as possible. Subsequent re-wetting will improve the overall mass of nutrients utilised, but the initial contact period is more important.

Poog om die blare vir ten minste 15 minute nat te hou. Daarom is bespuitings gedurende koel weer of gedurende die nag meer effektief. Dit is veral belangrik om die toestande so na aan optimaal te hou as moontlik, wanneer kalium en magnesium gespuit word.

4. Formulasies

Verskillende formulasies van K, Mg, Cu, Mn, Zn en B, veral chelate is deesdae beskikbaar. Sommige hiervan vereis spesiale toestande vir effektiewe opname. Maak seker dat die toestande geskep word en bereken die koste.

Zinc nitrate is a good example. If the pH of the spray solution is higher than 6,50 the spray will be less effective. Add an acidifier and calculate the total cost or use another product.

5. Manipulations

Low biuret urea and potassium nitrate (sometimes also magnesium nitrate) are applied in July to manipulate the blossom. These chemicals cannot be substituted by any other nitrogen or potassium source. The amino-N in urea and the nitrate in potassium nitrate are the ions that will induce the manipulations. Do not substitute these chemicals and do not reduce the concentration. In these cases timing of the sprays is also important.

GRONDGEDRAAGDE SIEKTES

M.C. PRETORIUS

WORTELSORG: AALWURMS EN PHYTOPHTHORA

'n Gesonde wortelstelsel is essensieel vir opbrengs, vruggrootte en algemene boom gesondheid. Onder droeë toestande sal wortelprobleme en simptome duideliker sigbaar wees. Daarom is dit belangrik dat alle faktore wat 'n invloed op die boom se wortelstelsel mag hê, in ag geneem behoort te word wanneer 'n aalwurmbeheerstrategie beplan word. Al die geregistreerde aalwurmdoders, Temik uitgesluit, het heelwat water nodig, minstens 40 mm, om die produkte effektief deur die grondprofiel te was om enigsins effektief te kan wees.

Probleem boorde, boorde met 'n kleinvrug- en opbrengsprobleme, behoort eerstens gemonster te word om te bepaal of aalwurmpopulasies wel bo die drempel waarde is en of *Phytophthora* nie dalk die probleem is nie, m.a.w. alle moontlike faktore wat 'n invloed op die wortelstelsel het moet uitgeskakel word.

Besproeiingstelsels behoort gereeld nagegaan te word om sodoende optimum besproeiing te verseker. Indien die aalwurmpopulasie wel die drempelwaardes oorskrei, moet die aalwurmdodertoediening volgens die effektiewe benattingsarea toegedien word. Geen aalwurmdodertoediening behoort gedoen te word indien besproeiing nie optimaal toegedien kan word op die behandelde area nie.

Monsterneming vir aalwurms kan regdeur die jaar gedoen word maar behandelingstye van besmette boorde in die verskillende reënvalgebiede sal van mekaar verskil, aangesien reënval 'n groot rol speel tydens die inwas van die middels in die grond. Geregistreerde middels kan dus nou met ses tot agt weke intervalle toegedien word in die somerreënvalgebiede.

Indien *Phytophthora* wortel en/of kraagvrot voorkom kan twee of drie fosfonaat *blaarbespuitings of stamaanwendings* volgens geregistreerde dosisse aangewend word met agt weke intervalle. Wat uiters belangrik is, is dat die voorsorgmaatreëls soos op die etiket gespesifiseer, streng nagevolg moet word. Geen boom behoort 'n blaar/stamaanwendingstoediening te ontvang indien die bome onder enige vorm van stres is nie. Die stres faktore sluit warm droeë dae, onder- of oorbesproeiing, hoë temperature en warm bergwind toestande in.

MAXIMUM RESIDUE LEVELS (MRLs)

V. HATTINGH

Growers are reminded that many sprays applied as early as the period petal fall to four weeks after petal fall may result in detectable residues at harvest. It is therefore recommended that the most current version of the document "Restrictions on the use of plant protection products on export citrus" as periodically updated and distributed by CRI, be consulted prior to the application of any sprays to citrus being produced for export.