EXTENSION BRIEFS FOR OCTOBER & NOVEMBER 2015

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INTEGRATED PEST MANAGEMENT

THRIPS MANAGEMENT

T.G. GROUT

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 on fruit 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 avoid spraying two consecutive sprays of the same active ingredient. Treatments that give 6-8 weeks thrips' control will eliminate natural enemies of false codling moth, mealybug and scale insects for a month or more so if this degree of control is required it is best to spray these at petal fall and follow up with softer options when necessary.

PARASITOID RELEASES

S.D. MOORE

Growers planning to augment parasitoids for mealybug (i.e. *Coccidoxenoides perminutus* or *Anagyrus* sp.) or FCM (i.e. *Trichogrammatoidea cryptophlebiae*) control 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 both mealybug and FCM parasitoids indicate that better suppression of the pest is achieved with releases initiated as early as October. Anagyrus sp. is a relatively new product on the market. Trials conducted by CRI show that it can be very effective in suppressing citrus mealybug and possibly other species of mealybug too, thus appearing to have a wider host range than *C. perminutus*.

PREVENTATIVE SPRAYS FOR MEALYBUG

S.D. MOORE

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, or 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 long-tailed 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 is 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.

BOLLWORM

S.D. MOORE

In many regions, it might already have been necessary to treat bollworm during September. However, routine spraying for bollworm is generally not necessary. By monitoring the percentage of blossom clusters infested, it will be possible to determine whether a spray is necessary. A treatment should be applied when more than 20% of blossom clusters are infested with larvae or mature eggs. Enlarged navel end problems in Navel oranges can be further exacerbated by bollworm attack. In such an instance, a threshold of 11% of clusters infested should be used.

Four biocontrol options are available for the control of bollworm. These are DiPel (Bt), Helicovir, Bolldex and Graboll (all viruses). In order to be effective, these biological products should be applied immediately after egg hatching and certainly not once larvae are longer than a centimetre in length.

LEMON BORER MOTH

S.D. MOORE

Moths of the lemon borer moth (or citrus flower moth), *Prays citri,* are attracted to lemon blossoms. Growers should inspect these blossoms in spring to determine whether they are infested with larvae or pupae. These can be identified by their colouration, which is usually greenish and the association of webbing with pupation. Even if the damage to, and loss of blossom is not considered sufficiently severe to justify control measures, no intervention will allow the development of a second generation. It is the moths of this second generation which lay their eggs on the lemon fruitlets. Hatching larvae can potentially cause severe damage. It is therefore more effective to control the first generation. No plant protection products are registered for use against the lemon borer

moth. However, there are a number of pesticides which are registered for other pests on citrus that are effective, including Bt (DiPel) and mevinphos.

FALSE CODLING MOTH

S.D. MOORE

N.B. Effective control of false codling moth (FCM) from early in the season is critical! If this is not done, FCM could escalate to undesirable levels which will be far more difficult to bring under control. As soon after harvesting as possible, all out of season fruit should be removed from trees and destroyed. These fruit can act as a reservoir for FCM and fruit flies, enabling particularly the former to carry over onto the new crop set in spring. Field observations indicate that the removal and destruction of out of season fruit can have a significant impact in reducing FCM levels. **Do not neglect orchard sanitation early in the season.** Infested fruitlets can contribute significantly to the buildup of FCM populations later on and any extra labour required is well worthwhile.

FCM pheromone traps should be hung during October. It is imperative that these traps be hung strictly according to the recommendations on the label. Unfortunately the Lorelei trapping system is still in the process of being redesigned and is not yet available so alternative trapping systems may have to be used.

Growers wishing to control FCM with Cryptogran, Cryptex or Gratham (FCM granulovirus) should apply the first treatment no later than the end of November or early December – applied shortly after the flight peak which occurs at this time in all production areas.

Recommendations for the use of Isomate (mating disruption) are that it should be hung during early October, followed by a second hang during early January. Checkmate, a sprayable mating disruption product, should be applied at a very low volume to the top third of trees at three to four-weekly intervals. As with any mating disruption product, it is essential that an application precedes a moth flight peak and that large areas (at least 5 ha) are treated.

CROP AND FRUIT QUALITY MANAGEMENT

JAKKIE STANDER & PAUL CRONJE

FRUIT SET treatments according to cultivar requirements need to be applied. Specific treatments include the application of gibberellic acid (GA) and girdling especially for parthenocarpic cultivars that have a poor set. A general guideline cannot be given as fruit set treatments differ by cultivar and, in many cases, by orchard depending on previous crop load. Girdling during full bloom improves set. Moisture stress should be avoided during full bloom, fruit set and early fruit growth.

FRUIT GROWTH must be optimised during stage 1 of fruit development. Optimal nutrition and irrigation practices are required. It is during this phase of fruit development in which the rind (flavedo and albedo) is formed and it is essential to ensure optimal uptake of essential nutrients such as Ca and Mg, which play an important role in the structural integrity of cell membranes of the fruit rind. 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, mono-ammonium phosphate (MAP) or mono-potassium phosphate (MKP) can be 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.

PRUNING of late cultivars should be done during this period as soon as possible after harvest. All of the following should be removed during pruning: old, broken and dead shoots/twigs; weak and entangled shoots crossing each other or hanging downwards; as well as any rootstock regrowth. Regrowth from main frame shoots on the inside of the tree should be thinned out, cut back or removed, depending on the situation. Light levels of above 30% of full sunlight are necessary for optimal photosynthesis, therefore enough windows should be cut in all trees to allow for adequate light distribution to improve the bearing wood within the tree. Increase in photosynthesis and light distribution will lead to increased fruit size and internal fruit quality (Brix°), better fruit colour development, increase in rind integrity as well as a more uniform fruit distribution across the tree, i.t.o. fruit quality.

Pruning can also be used as a thinning technique: prune more heavily after a light crop if a heavy crop is expected and when the orchard has a history of alternate bearing. A follow-up prune of regrowth in the summer is of critical importance.

Pruning tools should always be sanitised with 10% Jik when moving from one orchard to another.

REGROWTH control, especially after heavy pruning earlier in the season, should commence during mid-summer (December & January). A lot of regrowth adversely affects fruit size and is antagonistic to fruit colour development, especially for early maturing cultivars.

GRONDGEDRAAGDE SIEKTES

M.C. PRETORIUS & JAN VAN NIEKERK

Aalwurms

Grond- en wortelmonsters kan nou in die lente getrek word en na die Diagnostiese Sentrum in Nelspruit gestuur word vir ontleding sodat die status van die aalwurmpopulasie in die wortels bepaal kan word. Die resultaat sal dien as 'n bestuurshulpmiddel om 'n koste-doeltreffende aalwurmbeheerstrategie daar te stel.

Die gebruik van chemiese aalwurmdoders vir die beheer van die sitrusaalwurm word nie aanbeveel alvorens ten minste 30 mm reën geval het nie (Oktober). Elke aalwurmdodertoediening behoort op nat (veldkapasiteit) grond toegedien te word en met 'n behoorlike besproeiing opgevolg te word om daardeur te verseker dat die middels deeglik in die grondprofiel ingewas word. **Toedienings behoort slegs volgens etiketaanbevelings toegedien te word. Afwykings van die geregistreerde dosisse, om kostes te bespaar, is glad nie 'n effektiewe benadering nie.**

Phytophthora

Phytophthora wortelvrot – die gebruik van fosfonaat produkte wat sistemies is, is 'n uiters effektiewe en bekostigbare beheermaatreël wat suksesvol deur produsente gebruik word. Dit is van uiterste belang dat die etiket deeglik bestudeer word asook die waarskuwings voordat die produk gebruik word om effektiwiteit te verseker en fitotoksisiteit te voorkom. Indien kraagvrotletsels voorkom kan 'n stamverf of blaarbespuiting aangewend word, drie aanwendings per seisoen met 6-8 weke intervalle. Vir wortelvrotbeheer word 'n blaarbespuiting van ten minste twee of drie blaarbespuitings met 6-8 weke intervalle aanbeveel. Fosfonaat-behandelings behoort jaarliks op nie-draende bome toegedien te word.

FRUIT AND FOLIAR DISEASES

G.C. SCHUTTE

Alternaria core rot

Alternaria core rot, also known as navel-end rot and black rot, occurs in all areas of southern Africa. The disease is most prevalent on those citrus cultivars such as navels and Clementines characterised by the presence of a secondary fruit called the fruit-navel, which varies in size and develops at the stylar end of the primary or main fruit. These fruitlets are extremely sensitive to environmental stress conditions during early stages of development and are therefore also prone to diseases such as navel-end rot and physiological disorders.

Alternaria core rot is linked to large fruit-navels or to the abnormal growth of the secondary fruit into primary-fruit locules, which leads to the formation of points of entry through which fungi can penetrate to form infections which remain quiescent until favourable conditions stimulate further fungal growth.

The style and stigma of navel blossoms are milky white at first and then turn light brown in colour and abscise cleanly. This happens one week after petals have dropped and young fruit are ± 8 mm in diameter. The two sets of stylar tissue present in the primary and secondary fruit locules can be injured during the blossom period if harsh weather conditions prevail for one or more days (hot days >25°C), and low relative humidity (<20%) followed by heavy dew during the evenings. This causes the outer or primary style to turn brown and dry out, while the inner or secondary style remains unaffected inside the outer style and continues to develop and swell in size to result in longitudinal cracks in the outer tissue. The longitudinal cracks enlarge as the orange increases in size. The inner ovary projects even more as the or-

CRI's Cutting Edge Milestone

T. G GROUT

Citrus Research International started an electronic information bulletin in July 1999 called the Cutting Edge or Snykant. This newsletter provides news of critical research breakthroughs, urgent advice of a technical nature to the industry or warnings about changed circumstances that may have a negative impact on citrus exports. Although it is an informal form of written communication, some people in the industry have said that it is the most important document coming from CRI because it always contains significant information that often requires action. In July 2015 the 200th edition of the Cutting Edge was circulated to the citrus industry. The more recent editions are available in the members' download area of CRI's website www.citrusres.com.

ange approaches maturity. This results in a large, irregular-shaped navel-end and creates an ideal site for Alternaria infections.

Score (50 ml/100 ℓ water) and Folicur (80 ml/100 ℓ water) are registered for control of the disease.

Black spot

Usually the first ascospore releases take place during November, but there can be deviations from the norm with early rain events during October (and sometimes even during September) that may lead to early spore releases. Therefore spray programmes should commence early in October and the first spray round must be completed before mid-October according to the selected fungicide's label instructions. This is required to protect the fruit if early rain and subsequent ascospore release does occur. If strobilurins are selected for the November application, inclusion of mancozeb in the spray tank is required according to the registration.

POSTHARVEST PATHOLOGY

A. ERASMUS, K. LESAR & P. FOURIE

By now most of the crop has been harvested, packed and shipped. Now is the time to consider what changes need to be done to improve disease management next season. It is advisable to get your team together and have a postmortem of the past season, while all is still fresh in everybody's minds. In this meeting you should follow the journey of the fruit from harvest to shipping and see where the process can be improved. There are many factors that we can suggest, but we will only focus on sanitation. If sanitation can be fully optimised, disease incidence due to sour rot should decline. Here follow a few factors to consider.

- How long did it take from harvest to the first fungicide treatment? What can be done to reduce this period? The shorter this period the less rotten fruit will arrive at the packhouse, which will reduce the strain on your sanitation protocol
- Was the flow of your drench applicator strong enough? Were you able to apply at least 250 ℓ per minute? Many packhouses have weak pumps or pipes that are too narrow, resulting in a reduced flow rate. A more effective drench application will lead to less rotten fruit arriving at the packhouse, and again less pressure on the sanitation protocol
- Is there enough space in the very first part of the packline just after tip for thorough sorting of rotten fruit? Most packhouses have insufficient sorting in the beginning of the packline and this allows for rotten fruit to enter the packhouse and to contaminate the rest of the packline.
- Consider installing a second sanitation treatment. This should be a total loss system and it should be situated in the packline after rotten fruit has been sorted thoroughly from the export fruit. This will protect the packline from contamination.
- Sanitation of dip tank; do you have a pasteurization protocol (heating overnight)? Heating the solution to 60°C and letting it cool down overnight will reduce the buildup of bacteria and Rhizopus spores in the solution.
- There should be time now to thoroughly sanitise the entire packhouse from roof beams to the floor, but this should be after all fruit (rotten or healthy) are removed from the packhouse environment. A quaternary ammonium product can be used, after which it should be ensured that the surfaces where fruit will make contact be rinsed off with clean water. This way you will start the next season with no remnants from the previous season in the form of fungicide resistant spores, which will haunt you.