

EXTENSION BRIEFS FOR OCTOBER & NOVEMBER '18

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INTEGRATED PEST MANAGEMENT T.G. GROUT & S.D. MOORE

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, being sure to look 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 5-6 weeks after petal fall, then 4% for 7-8 weeks after petal fall. These thresholds can be approximately doubled if the population comprises mostly adults. 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 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. However, first ensure that sufficient time has lapsed since application of pesticides that would be detrimental to parasitoids. This information is available from the biocontrol agent producers.

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, or up to 20% six weeks after petal fall, requires immediate chemical intervention. Anything short of an absolutely thorough full cover film spray will compromise the effectiveness of a chemical treatment. If citrus mealybug is not the dominant species, augmentative releases of *Coccidoxenoides perminutus* should be considered unsuitable.

Bollworm 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 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 *N.B. As was the case last season, all growers intending to export citrus to the EU must implement the FCM Management System (FMS), which includes the FCM Systems Approach!*

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. 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 not be hung later than November. It is imperative that these traps be hung strictly according to the recommendations on the label.

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.

If mating disruption (e.g. Isomate, Checkmate, Splat, X-Mate) is being used, there are a few very important principles to be aware of. Firstly, application must be initiated early in the season (preferably October, but no later than November), before FCM levels begin to rise; secondly, the product must be applied (or hung) as high as possible in the tree; lastly, large areas (at least 5 ha, but preferably even larger) must be treated.

CROP AND FRUIT QUALITY MANAGEMENT **O.P.J. STANDER & P.J.R. CRONJE**

Fruit set treatments according to cultivar requirements need to be applied. Treatments include the application of gibberellic acid (GA3) and girdling, especially for parthenocarpic cultivars. General guidelines cannot be given as fruit set treatments differ by cultivar

and orchard. 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 with optimal nutrition and irrigation practices. During this phase of fruit development, the rind (flavedo and albedo) is formed. 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. In addition, fruit thinning practices need to be applied to reduce inter-fruit competition and optimise fruit growth.

The acidity of fruit at harvest is largely determined within the first 6 weeks of fruit growth and development. Thereafter, only minor modifications to acidity can be achieved. Under conditions of anticipated high acidity 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 has reduced acidity on Valencia orange and Temple tanger, but not on grapefruit.

Pruning of late cultivars should be done 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 on the inside of the tree should be thinned out, cut back or removed. Light levels above 30% are necessary for optimal photosynthesis. Enough windows should be cut to allow adequate light distribution and improve bearing wood within the tree. This will lead to increased fruit size and internal fruit quality (Brix°), better fruit colour, increase in rind integrity, as well as a more uniform fruit size distribution. Pruning can be used as a thinning technique: prune more heavily after a light crop 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.

GRONDGEDRAAGDE SIEKTES **M.C. PRETORIUS & J.M. 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

sitrusaalgwurm word nie aanbeveel alvorens ten minste 30 mm reën geval het nie (Oktober). Elke aalgwurmdoedtoediening 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 fitotoksiteit 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

P. MOYO & C. KOTZE

Alternaria core rot *Alternaria* core rot, also known as navel-end rot or black rot, is prevalent on citrus cultivars such as navels and Clementines; which are characterised by the presence of a secondary fruitlet (navel) located within the styler-end of the primary fruit. The navel can vary in size and usually results in the development of navel-end openings. Fruit with large navel-end openings are more susceptible to *Alternaria* core rot and physiological disorders such as fruit splitting; which provide entry points through which fungi can penetrate into locules of the primary fruit and form infections that remain quiescent until favourable environmental conditions stimulate further fungal growth. Fungicides registered for the control of *Alternaria* core rot include Score (50 ml/100 L water) and Folicur (80 ml/100 L water).

Black spot Usually the first ascospore releases take place during November, but there can be deviations from the norm with early rain events during September or October. 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. In certain areas, spore release is used as an indicator to start a spray programme. In these cases, strobilurins with a curative action are used after the first spore release. If strobilurins

are selected for the November application, inclusion of mancozeb in the spray tank is required according to the registration. It should just be noted that mancozeb has MRL restrictions to certain markets and that the spray intervals differ when using it in tank mixtures with strobilurins. It is, therefore, very important to consult product labels before use.

POSTHARVEST PATHOLOGY

W. DU PLOOY, K. LESAR & J. VAN NIEKERK

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. Here are a few factors to consider:

- How long did it take from harvest to the first fungicide treatment? The shorter this period the less likely it is to have latent infections developing and rotten fruit arriving 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? A more effective drench application will lead to curb disease development, leading to fewer rotten fruit arriving at the packhouse, and again, less pressure on the sanitation protocol.
- Is there enough packline facility for sorting and removal of rotten fruit in the very first part of the packline just after tip? Most packhouses have insufficient sorting in the beginning of the packline, which allows for rotten fruit to enter the packhouse, contaminating 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 removed 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, as well as *Rhizopus* and other pathogen spores in the solution. Coliform counts that seem to skyrocket can often be traced back to poor sanitation of reused water.
- The end of the season is the time to thoroughly sanitize the entire packhouse from roof beams to the floor, but this should be done only 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 with the cleaner used, are rinsed off with clean water. Do not postpone this cleaning until next season, as the pressure of preparing for the new season always leads to unsatisfactory sanitisation.