

EXTENSION BRIEFS FOR DEC '17 & JAN '18

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INTEGRATED PEST MANAGEMENT False codling moth S.D. MOORE

By now, all growers and virtually all industry role players should be familiar with the FCM Management System (FMS) for citrus, including the FCM Systems Approach, as presented at the CRI IPM and Disease Management regional workshops in August/September 2017 and most recently at the CGA and DAFF regional briefing sessions. The detailed FMS is available to all growers, who by now should have begun implementing the FMS in each and every orchard where fruit will be destined for Europe (except lemons).

The FMS involves registration of orchards with DAFF, weekly orchard sanitation, weekly systematic inspection of FCM traps and FCM infestation of fruit, record keeping and appropriate response to FCM levels recorded.

There are also clear requirements and guidelines within the FMS for practices at harvest and within the packhouse.

The details of all of these practices are described in the FMS, with reference to CRI's IPM Guidelines for FCM Management (available on the CRI website). These Good Agricultural Practices (GAPs) must be followed as described. Due to the extreme importance of suppressing FCM to as low a level as possible, there should be absolutely no compromise in the diligent use of all available measures, used in the right manner, to control this pest.

Remember #1: Orchard sanitation MUST be conducted at least weekly in all orchards, including lemons. This involves not only collecting and destroying fallen fruit, but also removing all hanging fruit which in any way appear damaged or infested. It has been shown that such a practice can effectively remove an average of up to 75% of FCM larvae from an orchard. In the hotter months of summer, orchard sanitation should be increased to twice per week in order to have the same effect.

Remember #2: The use of any "harsh" or disruptive products more than 4 weeks after petal fall can have a devastating impact on FCM egg parasitoids, leading to elevated levels of FCM infestation in fruit (see Cutting Edge 124).

Mealybug S.D. MOORE

Apart from the obvious pest status of mealybug, it is also important to control this pest as it can attract carob moth and increase infestation of this pest. Growers should be scouting for mealybug regularly, by inspecting underneath calyxes and thereby determining percentage of fruit infested. The most effective way of doing this is to break the fruit off from the calyx. Both the fruit and the underside of the calyx should then be inspected. Where mealybug is under good biocontrol, infestation should peak during December in the northern production areas and during January in the Cape production areas. If mealybug infestation does not decline during early January and late January to early February, respectively, suppression with a chemical treatment is advisable on early maturing cultivars. Trial results have demonstrated that buprofezin (Applaud) is by far the most effective corrective option for mealybug control. Where buprofezin is applied correctly it is imperative that application be targeted against the younger stages of mealybug, i.e. eggs, crawlers and second instars. In addition, it is crucial that a full cover film spray be applied.

Augmentative releases of parasitoids (*Coccidoxenoides perminutus* (which is only effective against citrus mealybug) and *Anagyrus* sp nr *pseudococci* (which appears to attack more mealybug species than just the citrus mealybug) should be initiated as early in the season as possible for optimal efficacy. The phytosanitary status of certain species must also be borne in mind.

Citrus thrips M. GILBERT

Thrips can still cause damage in December on citrus fruit, particularly in hotter production areas such as the Lowveld and on later-flowering cultivars such as Valencias, whose fruit are still relatively small at this time of year. Scouting should therefore continue to be carried out at least twice a week, in order to prevent a build-up of numbers, to avoid possible late damage known as "scribbling" or "browning" on the sides of the fruit. Thrips control materials applied at this time of the year should preferably not have a long residue so that the activity of mealybug and scale parasitoids is not disturbed

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too much. From January, the chance of thrips damage declines with increasing fruit size but one should still be vigilant.

CITRICULTURE

O.P.J. STANDER & P.J.R. CRONJE

Fruit growth and size Citrus fruit development is divided into three distinctive development phases and fruit growth follows a sigmoidal curve. Phase I of fruit development (end of October – December) spans from full bloom until the end of December, and is characterized by cell division and the formation of the majority of the total cellular structures of the fruit. During this period, the majority of the fruit diameter comprises the rind. In phase II (January – March), the different sections of the fruit pulp volume increase substantially and make up most of the fruit diameter until harvest. The biggest increase in fruit diameter occurs in summer, and very little to no increase in stage III, as temperatures decrease from autumn until fruit harvest (April – August), in stage III. Fruit growth during this period of fruit development is important to achieve optimum size at harvest and an individual factor or a combination of factors that are sub-optimal e.g. irrigation or ambient temperature may be responsible for small fruit size. All the factors influencing fruit size should be considered and managed optimally and it is recommended that Cutting Edge no. 103 or Chapter 5-8 in the CRI Production guidelines (Vol. II, www.citrusres.com/category/chapter-5-crop-manipulation) should be used for a revision of the various lemon fruit size management strategies.

Fruit size and crop load prediction should commence after the physiological fruit drop period. Fruit size is inversely related to flower number and eventual fruit load. In contrast to fruit set treatments such as girdling and foliar sprays of GA3, producers can make use of various thinning practices to control flower intensity and eventual crop load. Except for hand thinning, foliar applications of synthetic auxins are particularly successful in this regard, and are used to reduce fruit load in an “on”-year, and increase final fruit size. A reduction in the number of flowers will reduce the eventual percentage fruit set, reduce the inter-fruit competition and increase fruit size. Fruit from trees bearing small yields experience increased growth rate. At high fruit loads increased inter-fruit competition for nutrients and water, especially during the early stages of fruit development, lead to a decrease in potential fruit size. Please refer to Chapter 5-7 in the CRI Production guidelines (Vol. II, www.citrusres.com/category/chapter-5-crop-manipulation) “Fruit size and crop load prediction for citrus” or in the SAFJ of Oct/Nov 2009 for details on how these predictions can be made.

Regrowth control, especially after heavy pruning earlier in the season, should commence as regrowth adversely affects fruit size and is antagonistic to fruit colour development, especially for early maturing cultivars.

Creasing: Gibberellic acid (GA) is applied in January to reduce the incidence of creasing, however it should be noted that improper

timing of GA delays colour development. When applying GA ensure that the side of the fruit facing inwards is also covered by the GA, as this part of the fruit is more prone to creasing. The incidence of creasing could also be promoted by a heavy fruit set.

Oleocellosis incidence: Late summer vegetative growth of bearing trees should be kept to a minimum as excessive vegetative vigour during this period is associated with high incidence of oleocellosis at harvest.

Rind colour development: Late nitrogen application and the use of high concentration, heavy summer oil sprays should be avoided as these treatments are antagonistic to rind colour development. In addition, GA treatment to reduce creasing incidence is also antagonistic to colour development and could reduce colour development if applied later than middle January.

DISEASE MANAGEMENT GRONDGEDRAAGDE SIEKTES

J. VAN NIEKERK & M.C. PRETORIUS

Phytophthora beheer

Alhoewel redelike goeie reënval gedurende Desember-maande voorkom, is Januarie en Februarie-maande gewoonlik droër en die dagtemperatuur heelwat hoër. Daarom die waarskuwing dat indien van fosfonate gebruik gemaak gaan word om *Phytophthora* wortelvrot te beheer, die middels met sorg en volgens gebruiksaanwysings toegedien moet word. Wat van uiterste belang is, is dat die middels nie gespuit behoort te word indien dagtemperatuur hoër as 28°C is nie, of die bome onder enige mate van droogte- of hittestres verkeer nie. Geen bespuitings moet gedoen word indien enige warm bergwinde waai nie. Geen wortelvrot bespuitings behoort in hierdie warm maande op vroeë sagtesitrus kultivars, bv. Satsumas, Clementines, gespuit te word nie.

Aalwurm beheer

Reën, asook besproeiingswater, is nodig om die aalwurmdoders effektief deur die grondprofiel te was. Dien aalwurmdoders toe op nat gronde direk na 'n goeie reënbuie. Volg die toediening op met ten minste 35 mm besproeiing.

Wenk vir effektiewe bestuur van wortelgesondheid

Onthou die neem van grond en wortelmonsters as 'n bestuurshulpmiddel, om die aalwurm en *Phytophthora* status in die grond en wortels van sitrusboorde te bepaal, moet ten minste elke drie jaar gedoen word.

Dit is uiters noodsaaklik om 'n monster te neem voordat 'n boord vir herplant doeleindes verwyder word om die aalwurm en *Phytophthora* status te bepaal vir toekomstige verwysings. Inligting aangaande die metode van monsterneming kan verkry word van die Diagnostiese Sentrum in Nelspruit. Monsters kan ook na die Diagnostiese Sentrum gestuur word vir ontledings.

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CRI IPM & Disease Management Workshops on Raising the Standards of Citrus production in South Africa

WAYNE MOMMSEN & HANNES BESTER *Citrus Research International*

PHOTO CREDITS TO PETER STEPHEN AND ELAINE BASSON.

The South African citrus industry has seen tremendous growth over the last decade which can be attributed to the incredible determination of South African citrus growers to achieve excellence in quality citrus exports around the World. The Citrus Growers' Association is strongly supported by Citrus Research International (CRI), whose aim is to empower citrus growers to sustainably produce citrus fruit of exceptional quality, which ultimately complies with the statutory phytosanitary, sanitary and consumer standards set by overseas markets.

Recent developments in the European Union on regulation of the phytosanitary pest, false codling moth (FCM), will force the South African citrus industry to comply with a new set of management practices that will ensure that consignments of citrus are free from FCM on arrival in the European Union. In September 2017, CRI held a series of workshops on integrated pest and disease management, where the false codling moth management system (FMS) was presented to growers as an effective system to ensure continued citrus exports to the EU.

Presentations also included control of other important insect pests and diseases on citrus, as well as technology development and recent information on the development of the Citrus Improvement Scheme (CIS) in southern Africa.

False codling moth (FCM) On 14 July 2017 an amendment of the European Union's Directive on protective measures against the introduction of harmful organisms into the EU was published in the Official Journal of the EU, and included FCM. This now means that FCM is officially a regulated pest for the EU and this will come into

force on 1 January 2018. The implication of this is that citrus from South Africa must be subjected to an effective treatment to ensure freedom from FCM. Therefore, the **False Codling Moth Management System (FMS)** was discussed in depth, since this will in all likelihood be the only way to export citrus to the EU. The various options within the FMS were explained and growers were urged to fully comply with the requirements, both from a pre-harvest and packhouse point of view. Diligent management of FCM, monitoring and control measures will be critical for future citrus exports to the EU. (Pic 1)

Carob moth management Carob moth is a phytosanitary pest on citrus to China, but is otherwise not a primary pest of citrus. There is a close correlation between carob moth infestation and mealybug infestation, therefore, control of mealybug is also important in the control of carob moth. The use of 2,4-D to close navel ends further reduces the incidence of both mealybug and carob moth infestations. There is not a good correlation between carob moth trap catches and fruit infestation. It is important to differentiate between the larvae of FCM and carob moth. Research

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FRUIT AND FOLIAR DISEASES

P. MOYO & C. KOTZE

Growers are reminded that mancozeb may not be sprayed later than December on fruit destined for the Canadian market and not later than the end of January for Japan. It should also be mentioned that mancozeb has a 25 day protection period when applied on its own, but when sprayed in conjunction with a strobilurin spray programme, the first tank mixture application thereafter should be within 21-24 days depending on the strobilurin product used. Carbendazim and any other breakdown products of the benzimidazole fungicide group that result in carbendazim residue (Benlate, Spotless, Bavistin, Bendazid, Knowin) may again be sprayed on fruit intended for the EU and countries that abide by the CODEX MRL system (refer to Recommended Usage restrictions document);

it however remains the growers' responsibility to determine the benzimidazole resistance status of their orchards before applying these products. Copper fungicides or strobilurins in tank mixtures with copper or mancozeb are also options for January. If a spray mixture containing copper will be used, then a copper spray less than 60 days prior to this is not recommended as it will cause stippling. However, it is important to mention that copper is the only residue permitted when lemon fruit is processed to produce citrus rind oil while copper and strobilurin sprays are permitted when used for juice processing. Never allow gaps to occur in and during the susceptible period from October to January, especially where contact fungicides are chosen for control. Problem periods are usually over Christmas and New Year. Follow-up treatments are necessary where rainfall occurred within 6 hours after applications.