

Extension briefs for



December and January 2023

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Integrated pest management

False codling moth (S.D. Moore)

It is utterly imperative that the False Codling Moth Management System (FMS) for citrus, including the False Codling Moth (FCM) Systems Approach, be implemented as diligently and thoroughly as possible. Neither growers nor the industry can afford a lapse in the implementation of comprehensive and effective management practices. 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.

One of the most important practices is orchard sanitation, which 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 that appear damaged or infested in any way. 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 summer months orchard sanitation should be increased to at least twice a week, in order to have the same effect. Fruit must not be mulched inside the orchard.

The use of an area-wide control technique, such as the sterile insect technique (SIT) or mating disruption, from early in the season, will also provide effective suppression of the FCM population while it is still low. Initiating control measures only a few weeks or months before harvest is unlikely to be sufficiently effective.

Finally, monitoring of fruit infestation, as described in the FMS is extremely

important to ascertain FCM risk. Monitors must be trained and proven competent for this very important task. Colour plates are available from CRI, to assist with correct identification of FCM larvae and other insects that can internally infest citrus fruit. If there is any doubt as to whether a larva is FCM or not, it must be recorded as FCM, due to its phytosanitary status and the potential consequences of underestimating levels of incidence.

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 secondary pest. Growers should be scouting regularly for mealybug by inspecting underneath calyxes and thereby, determining the percentage of infested fruit. 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 to early February, suppression with a chemical treatment is advisable on early maturing cultivars. Unfortunately, due to residue restrictions, buprofezin can no longer be used at this stage. However, there are relatively new, effective options that can now also be used correctively for mealybug, i.e. spirotetramat and sulfoxaflor. In addition, it is crucial that a full cover film spray be applied.

If it is necessary to spray for thrips during December or January, it is extremely

important that only IPM compatible thripicides be used. Use of any harsh thripicides at this stage will result in mealybug repercussions.

Augmentative releases of parasitoids (*Coccidoxenoides perminutus*) – which is only effective against citrus mealybug – and *Anagyrus vladimiri* – which also attacks at least oleander mealybug, in addition to 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.

Fruit flies (A. Manrakhan)

Fruit flies are pests of phytosanitary concern. The fruit fly pests affecting citrus are: *Ceratitis capitata* (Mediterranean fruit fly or Medfly), *Ceratitis rosa* (Natal fly) and *Bactrocera dorsalis* (Oriental fruit fly). Oriental fruit fly has a restricted distribution in SA and is regulated within the country. There is a zero tolerance of fruit fly eggs and larvae in fruit consignments for export. Monitoring and control are two important components in Fruit Fly Good Agricultural Practices. It is essential to initiate monitoring activities for Medfly and Natal fly between December and mid-January, before the peak of fruit fly activities. Monitoring of Oriental fruit fly should be carried out throughout the year. Fruit fly control, using protein baits, should be initiated in middle to late summer (either January or February, depending on regions). However, for farms with either mixed fruit crops (such as mangoes, deciduous fruit or grapes) or near-fruit types prone to high fruit fly infestation, fruit fly control should already be implemented by December. In citrus production areas infested by Oriental fruit fly, the Male Annihilation Technique (MAT) must also be applied preferably by mid-January. All fruit fly control products should be applied correctly. Frequency of application of fruit fly control products should be adjusted based on fruit fly catches. Catches should not exceed threshold levels for registered



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traps. Orchard sanitation is also an important practice in managing fruit flies, and must be conducted at least weekly. Details of fruit fly monitoring and control practices are available in English and Afrikaans on the CRI website (register as a member, for access to the guidelines). In all *B. dorsalis* infested areas, a removal permit is required for movement of fruit outside those areas. Start application for removal permits early. The contact for removal permit application is: RemovalPermits@daff.gov.za.

Bactrocera dorsalis
fruit fly

Citrus thrips (M. Gilbert)

Thrips can still cause damage on citrus fruit in December, 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, and 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 too much. From January, the chance of thrips damage declines with increasing fruit size, but one should still be vigilant.

Citriculture (P.J.R. Cronjé)

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 characterised 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) during this stage. Fruit growth during this period of fruit development is important to achieve optimal size at harvest, and an individual factor or a combination of factors that are sub-optimal, e.g. irrigation or ambient temperature may contribute to small fruit size. All the factors influencing fruit size should be considered and managed optimally and it is recommended that Cutting Edge



Wayne Mommsen

no. 103 or Chapter 5 - 8 in the CRI Production guidelines (Vol. II, www.citrusres.com/category/chapter-5-crop-manipulation) is used for revision of the various lemon fruit size management strategies.

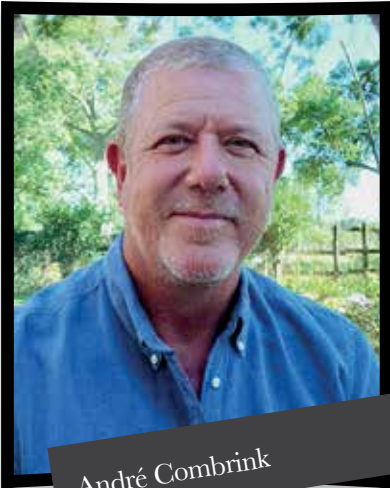
Fruit size and crop load prediction

This exercise 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



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load prediction for citrus” or in the *SA Fruit Journal* of Oct/Nov 2009 for details on how these predictions can be made.

Regrowth

The 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. A heavy fruit set could also promote the incidence of creasing.

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 after December 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 en M.C. Pretorius)

Phytophthora beheer

Alhoewel redelike goeie reënval gedurende Desember voorkom, is Januarie en Februarie gewoonlik droër en die dagtemperatuur heelwat hoër. Daarom die waarskuwing dat

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indien daar 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 toegedien word indien dagtemperatuur hoër as 28°C is nie, of dat die bome onder enige mate van droogte- of hittestres verkeer. Geen bespuitings moet gedoen word indien enige warm bergwinde waai nie. En geen wortelvrotbespuitings moet in hierdie warm maande op vroeë sagte-sitruskultivars, bv. Satsumas en Clementines, gespuit word nie.

Aalwurmbeheer

Reën en 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 belangrik om monsters te neem voordat h boord vir herplantdoeleindes verwyder word, om die aalwurm en *Phytophthora*-status te bepaal vir toekomstige verwysings. Inligting aangaande

die metode van monsterneming is beskikbaar by die Diagnostiese Sentrum in Nelspruit. Monsters kan ook na die Diagnostiese Sentrum gestuur word vir ontledings.

Fruit and foliar diseases

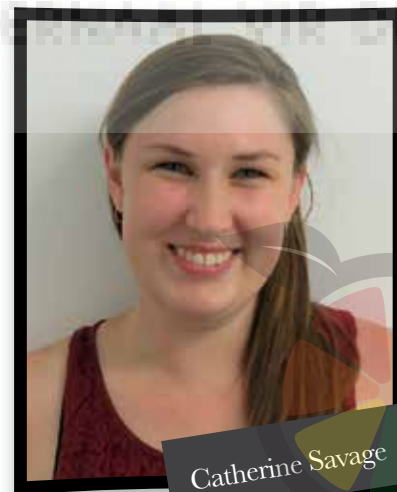
(P. Moyo)

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. There are also severe restrictions for citrus (other than soft citrus) going to the US. 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). However, it remains the growers' responsibility to determine the benzimidazole resistance status of their orchards before applying these products. Fruit samples can be sent to the Diagnostic Centre in Nelspruit for analysis. 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,



Natasha Jackson

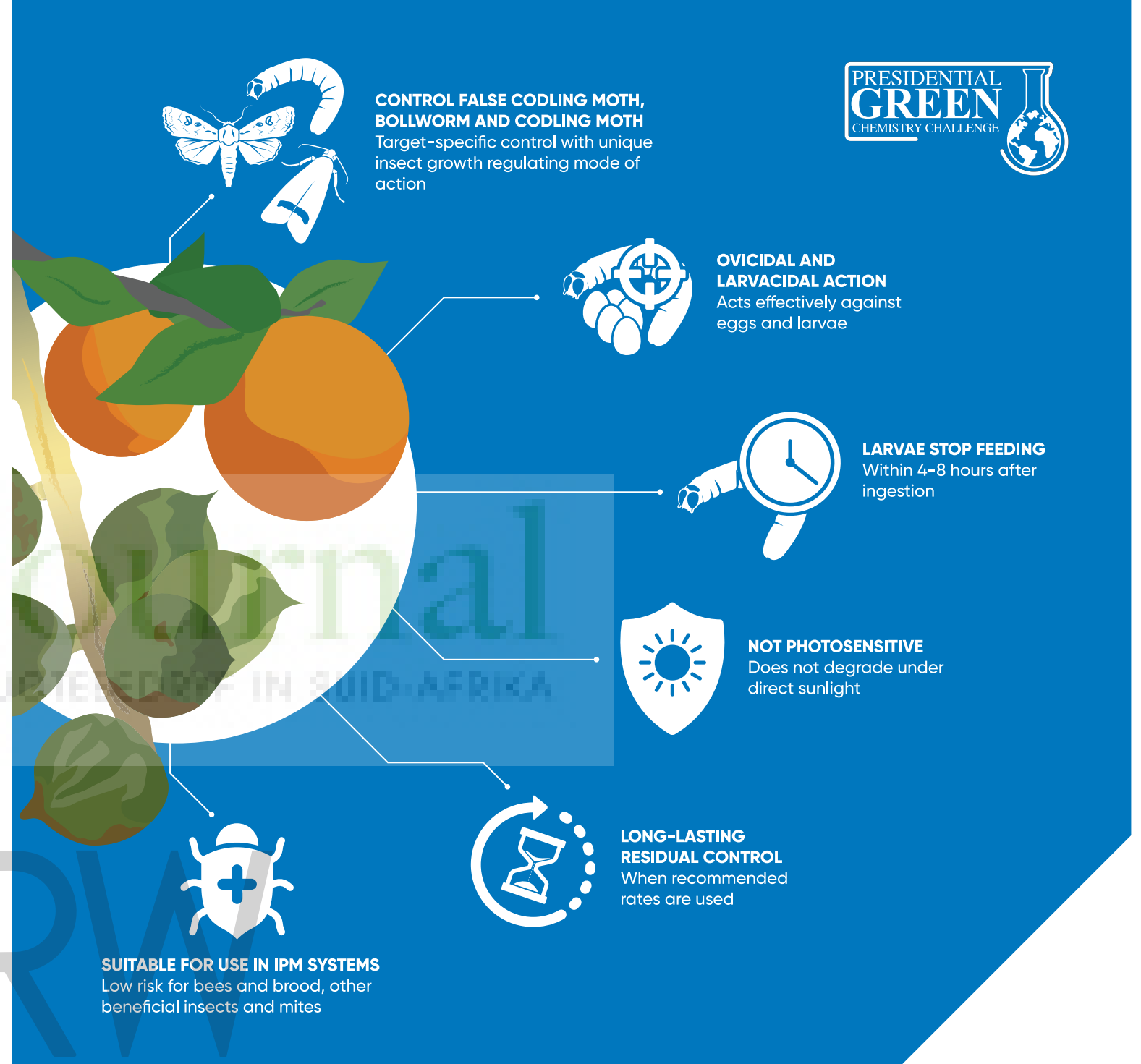


Catherine Savage



Jan Landman

as it will cause stippling. Yet, 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 six hours after applications. 



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