EXTENSION BRIEFS FOR DEC '16 & JAN '17

J.J. BESTER &
M.C. PRETORIUS

J.J. Bester
Citrus Research International

M.C. Pretorius
Citrus Research International

INTEGRATED PEST MANAGEMENT

False codling moth (SEAN MOORE)

By now, all growers and virtually all industry role players should be familiar with the Systems Approach proposed for FCM management (Cutting Edges 155, 168, 192 and 192 addendum) and presented at the CRI Citrus Research Symposium. Growers are strongly urged to begin implementing the proposed Systems Approach in as many orchards as possible. Even though this is not mandatory, it is extremely important that growers begin preparing for the inevitable. This involves weekly systematic inspection of FCM traps and FCM infestation of fruit, record keeping and appropriate response to FCM levels recorded.

The practice of evaluating fruit drop should be initiated in December or January in all FCM susceptible orchards and should be conducted weekly right up to harvest. The inspection of dropped fruit will provide exact data for losses due to FCM; an indication of the efficacy of treatments; a possible indication of whether further treatments for FCM are required; and an indication of post-harvest risk and therefore market suitability. In addition, such surveys will corroborate the accuracy of trap data and enable producers to gain confidence in their trap counts or indicate possible problems with the trapping procedure, in particular poor trap placement.

It is recommended that at least five trees be used as a data station. Each orchard should have its own data station. These trees should be marked and the same data trees used each week. All dropped fruit must be collected under the data trees, cut open and the probable reason for the fruit drop recorded. FCM infestation is identified either by the presence of the larva or the presence of its frass (and moulted head capsules), if the larva has already exited the fruit. Note that there are other larvae which can also infest fruit and these should not be confused with FCM larvae (See Cutting Edge 139, May 2012 for assistance with this). Fruit fly and vinegar fly larvae should fairly easily be distinguishable from FCM larvae. However, some larvae can easily be mistaken for FCM larvae (e.g. Carob moth and scavenging beetle larvae) if inspections are not conducted with the necessary attention to detail. Particularly with Navel oranges, there are often a multitude of other causes of fruit drop, such as fruit splitting, *Alternaria* navel end rot, bud mite and several others, including natural abscission and other unidentifiable factors. Without cutting fruit it is very easy to form an incorrect impression of the extent of the FCM problem and therefore the efficacy of treatments.

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: ***It is important to realise that 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 (SEAN MOORE)

As levels of mealybug infestation were elevated on citrus in most production regions last season, it is very important that the following guidelines be adhered to.

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

correctively 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.

This is also a good time to determine which species of mealybug are present. This is important, as it appears that the biocontrol complexes of oleander mealybug and long-tailed mealybug, in particular, might not be as effective as that of citrus mealybug. Therefore, treatments can be applied more easily when either of these species is identified as the dominant species in a particular orchard. Also note that in addition to *Coccidoxenoides perminutus* (which is only effective against citrus mealybug), the parasitoid, *Anagyrus* sp nr *pseudococci i*s currently available through local insectaries and it appears to attack more mealybug species than just the citrus mealybug. The phytosanitary status of certain species must also be borne in mind.

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

HORTICULTURE (OPJ STANDER and PAUL 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, e*specially 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 (JAN VAN NIEKERK & M.C. PRETORIUS)

Phytophthora beheer Alhoewel redelike goeie reënval gedurende Desember-maande voorkom, is Januarie en Februarie-maande gewoonlik droër en die dagtemperature 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 dagtemperature 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 reënbui. 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.

FRUIT AND FOLIAR DISEASES (G.C. SCHUTTE)

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. Carbendazim and any other breakdown products of the benzimidazole fungicide group that results 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). 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. Remember that the addition of mancozeb or copper fungicides is essential and has been proven to be necessary for effective control of CBS in independent studies. 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.