



## Effective management of mealybug for exports to South Korea and other markets

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Last season there was a problematic increase in the percentage of citrus fruit destined for South Korea that was rejected for mealybug infestation. The Korean authorities have expressed dissatisfaction with this situation. At the annual export coordinating meeting held in Nelspruit on 13 November 2019, **DALRRD issued a strong warning to the industry to ensure effective management of mealybug.** We therefore cannot afford to have a repeat of this situation in the 2020 export season. Consequently, growers are urged to control mealybug as well as is possible and to ensure, through thorough monitoring and inspection, that only fruit from orchards with no detectable mealybug infestation are presented for export to the South Korean market and other sensitive markets. To this end, the following recommendations are made.

### 1. Preventative treatment of mealybug

Although too late to make such a recommendation, preventative treatments should have been applied around 100% petal drop, or earlier. It is important to point out that early-season preventative treatment for mealybug is far more effective than any corrective treatment can be. Consequently, if no preventative treatment has been applied in orchards where mealybug is present, growers are strongly urged to NOT consider exporting fruit from such orchards to mealybug-sensitive markets.

### 2. Biological control of mealybug

Mealybug, particularly citrus mealybug, has an excellent naturally occurring biocontrol complex (parasitoids and predators). If this complex is conserved, through careful selection of a spray programme that is relatively benign, it will contribute significantly towards reducing mealybug to non-detectable levels. Additionally, it is imperative that ants are well controlled i.e. there must be no ant presence in trees. Experience has shown that failure to control ants adequately, may prevent mealybug infestation ever dropping below about 20%, which is unacceptably high.

Biocontrol can be augmented by the release of commercially available parasitoids and predators, such as *Anagyrus*, *Coccidoxenoides*, *Nephus* and *Cryptolaemus*. The earlier in the season the parasitoids are released, the more effective they will be. *Cryptolaemus* beetles are only suitable for release against high levels of mealybug infestation.

### 3. Scouting/monitoring for mealybug infestation in the orchard

Routine scouting for mealybug in the orchards should be conducted. This must be done in the normal manner recommended by CRI for scouting for mealybug (see "Orchard Inspection" and "Mealybugs" in "Integrated Production Guidelines Volume 3" on CRI's website ([www.citrusres.com](http://www.citrusres.com))). A minimum of 5 trees per hectare and 10 fruit per tree (including inside fruit) should be inspected. Inspection must also be conducted underneath the calyx of fruit, using a magnifying glass. Such inspections should be conducted at least fortnightly for mealybug. Data must be recorded for comparison with each subsequent scouting event. If mealybug infestation does not decline from December to January in the northern areas and January to February in the Cape areas, this is a very strong indication that biocontrol is not adequate and that corrective intervention is required.

### 4. Corrective treatment of mealybug

Much concern appears to have been expressed about the removal of buprofezin as a corrective option for mealybug, by the reduction in MRLs in certain markets. However, there are other corrective options available to replace buprofezin in this niche. These are Closer, Lesson and Tivoli. Research trials conducted by CRI indicate a similar efficacy with Closer to that of buprofezin. However, as with buprofezin, the timing of the application of the product is important, as Closer is most effective against the crawler stage of mealybug. In order to achieve optimum possible efficacy with such a corrective treatment, treatments must be applied as full cover film sprays to the point of run-off, penetrating right to the tree trunk. Despite this recommendation, efficacy of greater than 50-60% cannot be expected.

### 5. Identifying suitability of orchards



Regular scouting in orchards must continue up to harvest. If any live mealybug is found, the species of mealybug must be identified. If any species other than citrus mealybug (*Planococcus citri*) is recorded during the last four weeks before harvest, the orchard should be considered unsuitable for export to a sensitive market.

On first delivery of fruit from an orchard to the packhouse, a sample of 100 fruit can be inspected for mealybug. It may be most convenient to use a portion of the FMS packhouse delivery sample for this purpose. As for orchard monitoring, inspection should also be conducted under the calyx of the fruit and a magnifying glass must be used. If the fruit are Navel oranges, inspection must also be conducted inside the navel-end if there is any sign of residues or sooty mould on the fruit. This must be done by slicing the navel-end open, piece by piece. Any finding of live mealybug, should render the orchard unsuitable for export to a sensitive market, particularly if it is a species other than citrus mealybug.

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## Effektiewe bestuur van wiltuis vir uitvoer na Suid-Korea en ander fitosanitêre markte

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Verlede seisoen was daar 'n problematiese toename in die persentasie sitrusvrugte wat vir Suid-Korea bestem was wat weens wiltuisbesmetting afgekeur is. Die Koreaanse owerhede het ontevredenheid oor hierdie situasie uitgespreek. Op die jaarlikse uitvoerkoördineringsvergadering wat op 13 November 2019 in Nelspruit gehou is, het **DALRRD 'n sterk waarskuwing aan die bedryf gerig om effektiewe bestuur van wiltuis te verseker**. Ons kan dus nie 'n herhaling van hierdie situasie in die 2020-uitvoerseisoen bekostig nie. Gevolglik word produsente aangemoedig om wiltuis so effektief as moontlik te beheer, en om deur deeglike monitering en inspeksie, te verseker dat slegs vrugte van boorde met geen opspoorbare wiltuisbesmetting vir uitvoer na die Suid-Koreaanse mark en ander sensitiewe markte aangebied word. Hiervoor word die volgende aanbevelings gemaak.

### 1. Voorkomende behandeling van wiltuis

Alhoewel dit te laat is om so 'n aanbeveling te maak, omdat voorkomende behandelings ongeveer teen 100% blomblaarval toegepas moes word, of vroeër, is dit belangrik om daarop te let dat vroeë seisoen voorkomende behandeling vir wiltuis baie meer effektief is as wat enige korrektiewe behandeling kan wees. Gevolglik, as geen voorkomende behandeling in boorde waar wiltuis voorkom, toegepas is nie, word produsente sterk aangeraai om NIE vrugte van sulke boorde vir uitvoer na wiltuis-sensitiewe markte te oorweeg nie.

### 2. Biologiese beheer van wiltuis

Wiltuis, veral die sitruswiltuis, het 'n uitstekende, natuurlike biologiese beheer kompleks (parasitoïede en predatore). As hierdie kompleks deur 'n noukeurige keuse van 'n oordeelkundige spuitprogram bewaar word, sal dit betekenisvol tot die vermindering van wiltuis tot nie-opspoorbare vlakke bydra. Daarbenewens is dit noodsaaklik dat miere goed beheer word, dws daar moet geen miere in bome wees nie. Ondervinding het getoon dat as miere nie voldoende beheer word nie, kan dit voorkom dat wiltuisbesmetting nooit onder 20% daal nie, wat onaanvaarbaar hoog is. Biologiese beheer kan versterk word deur die vrystelling van kommersiële parasitoïede en predatore, soos *Anagyrus*, *Coccidoxenoides*, *Nephus* en *Cryptolaemus*. Hoe vroeër in die

seisoen die parasitoïede vrygestel word, hoe meer effektief sal hulle wees. *Cryptolaemus* kewers is slegs geskik vir vrylating teen hoë vlakke van wiltuisbesmetting.

### 3. Verkenning/monitering vir wiltuisbesmetting in die boord

Roetine monitering vir wiltuis in die boorde moet gedoen word. Dit moet op die gewone manier soos deur CRI aanbeveel word vir die verkenning van wiltuis (sien "Boord-inspeksie" en "Wiltuis" in "Geïntegreerde Produksie Riglyne Volume 3" op CRI se webwerf ([www.citrusres.com](http://www.citrusres.com))), gedoen word. 'n Minimum van 5 bome per hektaar en 10 vrugte per boom (binne vrugte ingesluit) moet geïnspekteer word. Inspeksie moet ook onder die kelk van die vrug met behulp van 'n vergrootglas gedoen word. Sulke inspeksies moet ten minste twee-weekliks vir wiltuis uitgevoer word. Data moet aangeteken word sodat dit met elke daaropvolgende monitering vergelyk kan word. Indien wiltuisbesmetting nie van Desember tot Januarie in die noordelike gebiede en van Januarie tot Februarie in die Kaap afneem nie, is dit 'n baie sterk aanduiding dat biologiese beheer nie voldoende is nie, en dat korrektiewe ingryping nodig is.

### 4. Korrektiewe behandeling van wiltuis

Dit lyk asof daar bekommernis is oor die verwydering van buprofezin as 'n korrektiewe opsie vir wiltuis deur die vermindering van MRLs in sekere markte. Daar is egter ander korrektiewe opsies beskikbaar om buprofezin in hierdie nis te vervang. Dit is Closer, Lesson en Tivoli. Navorsingsproewe wat deur CRI uitgevoer is, dui op 'n soortgelyke effektiwiteit met Closer as dié van buprofezin. Soos met buprofezin, is die tydsberekening van toediening van die produk egter belangrik, aangesien Closer die doeltreffendste teen die kruiperstadium van wiltuis is. Om optimale effektiwiteit met so 'n korrektiewe behandeling te verkry, moet behandelings as 'n volledige dekbespuiting tot op die punt van afloop toegedien word. Dit moet tot op die boomstam deurdring. Ondanks hierdie aanbeveling, kan effektiwiteit van meer as 50-60% nie verwag word nie.

### 5. Identifiseer die geskiktheid van boorde

Gereelde monitering in boorde moet tot en met oes volgehou word. As daar enige lewendige wiltuis gevind word, moet die spesies van die wiltuis geïdentifiseer word. Indien enige ander spesie as die sitruswiltuis (*Planococcus citri*) gedurende die laaste vier weke voor oes aangeteken word, moet die boord as nie geskik beskou word om na 'n sensitiewe mark uit te voer.



By die eerste aflewering van vrugte vanaf 'n boord in die pakhuis, kan 'n monster van 100 vrugte vir witluis geïnspekteer word. Dit is miskien die beste om 'n gedeelte van die FMS-pakhuis-afleweringmonster vir hierdie doel te gebruik. Soos vir boordmonitering, moet inspeksie onder die kelk van die vrug gedoen word en 'n vergrootglas moet gebruik word. As die vrugte nawel-lemoene is, moet inspeksie ook aan die binnekant van die nawel-ent gedoen word as daar tekens van oorblyfsels van residue of roetskimmel op die vrug is. Dit moet gedoen word deur die nawel-ent stukkie vir stukkie oop te sny. Enige opsporing van lewendige witluis, sal die boord nie vir uitvoer na 'n sensitiewe mark geskik maak nie, veral as dit 'n spesie anders as sitruswitluis is.

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