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# Die beheer van suurvrot vereis die ywerige toepassing en bestuur van boordpraktyke ten einde tot die verlaging in die voorkoms van hierdie na-oes siekte by te dra

deur
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## Inleiding

Na-oes swamdoder-opsies vir die beheer van suurvrot in die pakhuis is beperk, en word ietwat gekompliseer deur bestaande en moontlike beperkings in die MRLs in sleutel markte. Dit sal vir die boordbestuursspan wys wees om die rol wat boordpraktyke speel, ten einde die ontwikkeling van suurvrot in uitvoervrugte te beheer, te besef – gegewe hierdie beperkinge.

## Swamdoderstatus

***Guazatine:*** Guazatine is al vir baie jare die mees betroubare suurvrotswamdoder. Suid-Afrika is aktief betrokke in 'n proses om die EU MRL vir guazatine op sitrus te behou, maar die EU het voorheen meegedeel dat hulle van plan is om die MRL te verminder. Indien die pogings om die MRL te behou, nie slaag nie, gaan die MRL verminder word en sodoende gaan die gebruik van guazatine beperk word. Die vinnigste wat hierdie veranderinge in werking gaan tree, is Mei 2016 (ons sal eers weet wanneer dit amptelik in die EU gepubliseer word). CGA sal die industrie van enige toekomstige verwikkelinge diensooreenkomstig inlig. Guazatine is, in terme van die ander markte, op die CODEX lys, maar word nie in Japan, V.S.A. en Kanada toegelaat nie.

***Propiconazole:*** Propiconazole is 'n nuwe na-oes swamdoder wat binnekort vir die Suid-Afrikaanse sitrus-bedryf beskikbaar gaan wees. Dit is nie so effektief soos guazatine vir die beheer van suurvrot nie, en die gebruik van propiconazole kan 'n risiko vir imazalil-weerstand in blou- en groenskimmel inhou aangesien hulle 'n soortgelyke chemiese samestelling het. **Die swamdoder weerstandsrisiko wat propiconazole op die effektiwiteit van imazalil inhou, kan nie genoeg beklemtoon word nie, en die gebruik van propiconazaole sal baie versigtig gedoen moet word.** CRI sal met verloop van tyd oor die optimale gebruik van propiconazole kommunikeer. Propiconazole se MRLs is reeds vir sitrus in die EU, V.S.A. en in CODEX vasgestel.

***Imazalil en GRAS (oor die algemeen as veilig beskou) samestelling.*** Hierdie behandeling is as Imaculate 300 EC beskikbaar en as 'n wakstoediening geregistreer. Hierdie produk het beheer van suurvrot getoon, hoewel nie so effektief soos guazatine nie. Die produk se geregistreerde gebruik is tot 'n konsentrasie van 3000 dpm beperk, en pakhuise wat imazalil ook in die dompelbad toedien, moet versigtig wees om nie die 5 dpm MRL vir imazalil te oorskry nie.

## Boordbestuurspraktyke

Vanuit proewe wat tot op datum gedoen is, weet ons dat die plaasvervangingsprodukte nie so effektief vir die beheer van suurvrot is as guazatine nie. Boordbestuurspraktyke moet dus geïmplementeer word ten einde suurvrot op 'n geïntegreerde manier te beveg.

**NEEM KENNIS:** Die oorsprong van suurvrot is in die boord.
Boordbestuur moet op die volgende praktyke fokus en verbeter:

- **Soomsnoei (Skirt) van bome(Skirt)**
  Suurvrot-inokulum kom vanaf die grond, en dit sal met druppels versprei wat tydens reën en besproeiing opspat. Die algemene reël is om die some van die bome tot op 'n hoogte van ten minste 50 cm hoog te snoei. Hou in gedagte dat vrugte in die some laer en nader aan die grond sal hang, aangesien die vruglading in die boom en die vruggrootte toeneem. Daar moet met sorg seker gemaak word dat vrugte in die some nie te naby aan die grond kom nie.
- **Moenie laaghangende soom vrugte uitvoer nie**
  Die risiko vir suurvrot (en Phytophthora bruinvrot, Fusarium en Trichoderma ook) is hoër op laaghangende soom vrugte as vrugte in die res van die boom. Onthou dat suurvrot vanaf geïnfekteerde vrugte na die ander gesonde vrugte in 'n uitvoerkarton kan versprei. Daar word aanbeveel dat die hoë risiko vrugte in die some nie met die res van jou topkwaliteit uitvoervrugte gemeng moet word nie. Daarom moet alle vrugte wat op of naby die grond hang 'n dag of twee voor die beplande oesdatum gepluk word en eerder na die plaaslike of industriële mark te versend word.
- **Insekskade beheer**
  Insekte soos vrugtevlieg en valskodlingmot veroorsaak wonde, en hierdie wonde is toegangspunte vir suurvrot-infeksies. Selfs indien hierdie

vrugte op die grond val en nooit die uitvoerketting bereik nie, word dit 'n bron van inokulum vanwaar die siekte na gesonde vrugte kan versprei.

- **Boordsanitasie**
  Die hoof-aktiwiteit hier is om alle vrot en afgekeurde vrugte te verwyder. Hierdie vrugte is bronne van inokulum. Hoe laer die inokulumvlak in 'n boord, hoe laer sal die voorkoms van die siekte wees. Dit moet ten minste weekliks gedoen word, en op 'n daaglikse basis twee weke vóór oes, afhangende van die vrugval. Verwyder alle vrugte uit die boord **dadelik ná oes**. Sanitasie ná oes sal inokulumvlakke in die boord verminder, en sal suurvrot-infeksies in toekomstige seisoene verminder.
- **Verminder die voorkoms van vrugbars (split)**
  Optimaliseer boordpraktyke (bemesting en besproeiing) ten einde die voorkoms van vrugbars so min as moontlik te hou. Hierdie is eintlik massiewe wonde en hoogs vatbaar vir suurvrot. Vlieë broei ook in hierdie wonde en kan suurvrot tot in die top van die boom versprei. Die navel-ent moet ook verklein word om so klein as moontlik te wees aangesien navel-ent-bars ook 'n wond-ingangspunt vir suurvrot is. Gebarste vrugte moet so spoedig moontlik afgepluk en verwyder word as deel van boordsanitasie.
- **Moenie in die week ná reën oes nie**
  Die suurvrotpatogeen floreer in nat en humiede toestande. Die boord moet toegelaat word om vir 'n paar dae ná reën af te droog voordat oes hervat word. Wonde wat tydens oes veroorsaak word, die hoër humiditeit en spat van modder, sal die moontlikheid dat suurvrot ontwikkel verhoog.
- **Oes so versigtig as moontlik**
  Die suutvrotpatogeen benodig 'n vars wond vir 'n infeksie om te kan ontwikkel. Gedurende oes word baie vars wonde geskep wat as ingangspunte vir die siekte kan dien. Lei die oeswerkers op om met sorg te werk. Aansporingsprogramme moet nie net op spoed en volume van oes gefokus wees nie, maar ook op faktore soos vars wonde, wat dmv indigo carmine meer sigbaar gemaak kan word vir regstellings tov van oespraktyke.
- **Oes in gesaniteerde kratte**
  By die pakhuis word kratte gebruik om vrugte in te stoor en ook vir opkleur (degreening). Bederf kan ontwikkel in hierdie kratte en as dit nie gesaniteer word nie, word die spore terug geneem na die boord en kan dit so die nuut geoesde vrugte besmet.

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# The control of sour rot requires the diligent implementation and management of orchard practices to assist in reducing the incidence of this postharvest disease

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## Introduction

Postharvest fungicide options to control sour rot in the packhouse are limited and somewhat complicated by existing and potential changes in the MRLs in key markets. It would be wise for the orchard management team to realise the roll orchard practices play in controlling the development of sour rot in export fruit given these constraints.

## Fungicide status

***Guazatine:*** Guazatine has been the most reliable sour rot fungicide for many years. South Africa is actively engaging in a process to retain the EU MRL for guazatine on citrus, but the EU has previously advised that they intend reducing the MRL. Unless these efforts to retain the MRL are successful the MRL will be lowered, which will restrict the use of guazatine. The soonest these changes would come into effect is May 2016 (only known once officially published in the EU). CGA will advise the industry of any future developments accordingly. In terms of the other markets guazatine is on the CODEX list, but not allowed in Japan, USA and Canada.

***Propiconazole:*** Propiconazole is a newly introduced postharvest fungicide that will become available to the South African citrus industry in due course. It is not as effective as guazatine for sour rot control and propiconazole use introduces the risk of imazalil resistance in blue and green mould due to the similarity in chemistry. **The fungicide resistance risk propiconazole poses on the efficacy of imazalil cannot be emphasised enough and the introduction of propiconazaole will need to be done with great caution.** CRI will communicate on the optimal use of propiconazole in due course. Propiconazole MRLs are already established for citrus in the EU, USA and in CODEX.

***Imazalil and GRAS (generally regarded as safe) compound:*** Available as Imaculate 300 EC this treatment is registered as a wax application. This product has demonstrated control of sour rot, although not as effectively as guazatine. Its registered use is limited to a concentration of 3000 ppm, and packhouses that do apply imazalil in the dip tank as well must be careful not to exceed the 5 ppm MRL for imazalil.

**Orchard management practices**

From trials done to date, we know that the replacement products are not as effective in controlling sour rot as guazatine. Orchard management practices should therefore be implemented to combat sour rot in an integrated manner.

**TAKE NOTE:** <u>The origin of sour rot is in the orchard.</u>

Orchard management needs to focus on and improve the following practices:

- **Skirt trees**
  Sour rot inoculum comes from the soil and it will spread with droplet splash during rain or irrigation. The rule of thumb is to skirt trees to a height of at least 50 cm. Keep in mind that the skirt fruit will hang lower and closer to the ground as the fruit load and fruit size in the tree increase. Care needs to be taken to ensure that skirt fruit does not get too close to the ground.
- **Do not export low-hanging skirt fruit**
  The risk for sour rot (and Phytophthora brown rot, Fusarium and Trichoderma for that matter) is higher on skirt fruit than for fruit in the rest of the tree. Remember that sour rot can spread from infected fruit to the other sound fruit in an export carton. It is recommended not to mix the high risk skirt fruit with the rest of your top quality export fruit. Therefore, all fruit hanging on or near the floor should be removed a day or two before the planned harvest date and rather be send to the local or industrial market.
- **Insect damage control**
  Insects such as fruit fly and false codling moth cause wounds and these wounds are portals for sour rot infections. Even if these fruit fall to the ground and never enter the export chain it becomes a source of inoculum from where the disease can spread to healthy fruit.
- **Orchard sanitation**
  The main activity here is to remove all rotten and rejected fruit. These fruit are sources of inoculum. The lower the inoculum level in an orchard the lower the incidence of the disease will be. This should be done at least on a weekly basis and on a daily basis two weeks prior to harvesting, depending on the fruit fall. Remove all fruit from the orchard

**immediately after harvest**. Sanitation after harvest will reduce inoculum levels in the orchard, and will reduce sour rot infections in future seasons.

- **Reduce the occurrence of fruit split**
  Optimise orchard practices (*i.e.* fertilisation and irrigation) to minimise the occurrence of fruit split. These are in actual fact massive wounds and are highly susceptible to sour rot. Flies also breed in these wounds and can spread sour rot right to the top of the tree. The navel end should also be reduced to be as small as possible as navel end split also becomes a wound portal for sour rot. Split fruit should be picked and removed as quickly as possible as part of the orchard sanitation protocol.
- **Do not harvest in the week after rain**
  The sour rot pathogen thrives under wet and humid conditions. The orchard should be allowed to dry for a few days after rain before harvest is commenced. Wounds caused during harvest, the higher humidity, and the splash of mud will increase the potential for sour rot to develop.
- **Harvest as gently as possible**
  The sour rot pathogen needs a fresh wound for an infection to develop. During harvest many fresh wounds are induced which will serve as portals for the disease. Train harvesters to work with care. Incentive programmes should not be related only to speed and volume of harvest, but also to factors such as fresh wounds; which could be made more visible with indigo carmine in order to rectify in terms of orchard operational practices.
- **Harvest in sanitised bins**
  At the packhouse bins are used to store fruit in and/or for degreening. Decay may develop in this period and if the bins are not sanitised spores may be taken to the orchard and the newly harvested fruit will be contaminated.