



Bewusmaking van die risikos in die bestuur van storting ('drench')-stelsels

deur

Arno Erasmus^a, Paul Fourie^{a,b}, Keith Lesar^a, Mareli Kellerman^{a,b}, Charmaine Christie^b en Marius Seyfferdt^c

^aCRI Naoes Plantpatologie Span, 013 7598000, arno@cri.co.za, keithlesar@cri.co.za

^bDepartment Plantpatologie, Universiteit Stellenbosch

^cMarius Seyfferdt, Besproeiings spesialis, 082 5602165, Marius-s@telkomsa.net

Oor die afgelope paar jaar is baie klem geplaas op die opgradering van storting-stelsels. Dit sluit in die korrekte deursnee van pype, sterker pompe, en kleiner tenks. Die gevolg was 'n algemene tendens van verhoogde residuvlakke, veral pyrimethanil. Residu lading, veral wisselende en wisselvallige residu lading, insluitend oorskredings, is 'n groot en ingewikkelde probleem. Die CRI se aanbevole mengsel bevat tiabendasool (TBZ), pyrimethanil (PYR), guazatine en 2,4-D. Hierdie produkte verskil almal in hul formulasies, reaksie op vloeitempo en blootstellingstyd, interaksie met ander swamdoders en verskeie ander faktore. Min navorsing is tot op hede gedoen op stortings-stelsels, maar die CRI naoes span is tans besig met 'n projek wat fokus hierop, en dit sal hopelik meer insig gee op die effek van vloeitempo, bedekking en blootstellingstyd op residu lading. Die doel van hierdie CRI Snykant is om pakhuisse in te lig om die bestuur van hul storting-stelsels te verbeter. 'n Aantal kritiese beheerpunte word kortliks hieronder bespreek.

- **Ontwerp:** Dit is belangrik dat die pompkapasiteit korrek is en dat die deursnit van die suig en lewering optimaal is. Dit moet hoë-vloeitempo pompe wees en die suigpyp deursnee moet groot genoeg en in ooreenstemming met die vloeitempo van die pompe wees. Baie pakhuisse fouteer deur slegs te fokus op 'n hoë lewering vloeitempo, maar versuim om die suig spesifikasie van die stelsel aan te pas. Vloeispoed in die suigpype hoef nie 1 m.s^{-1} te oorskry nie. Die optimalisering van hierdie verhouding sal 'n beter algehele vloeitempo tot gevolg hê, en sodoende sal die toediening en die vermenging van die oplossing verbeter. Vloeitempo is direk verwant aan wrywing en wrywing aan kilowatt verbruik.

- **Hoë-vloei-tempo pomp.**
- **Suigpype en deursnee moet optimaal wees (so wyd as moontlik).**
- **Verkry advies van 'n kundige.**

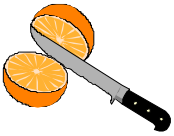
- **Sirkulasie en vermenging:** Die volume van die tenk en vloeitempo van die pomp moet sodanig wees dat die hele volume van die oplossing 'n paar keer per minuut deur die stelsel gesirkuleer word. Daar moet geen areas in die tenk wees waar die oplossing nie geroer (beweeg) word nie. TBZ en PYR moet in suspensie bly, want sonder deeglike sirkulasie sal altwee neerslaan. **Die sirkulasie van die vloeistof mengsel moet gedurende die hele lewensduur van die oplossing gehandhaaf word.**

- **Voortdurende sirkulasie**

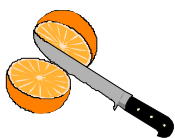
- **Moenie onmiddellik die vrugte behandel nadat die pomp aangeskakel is nie.** Dit is hier waar baie pakhuisse die hoogste risiko loop om 'n MRL oorskryding van PYR en TBZ te kry. Wanneer die stelsel afgeskakel is, sal die swamdoders uitsak en op die bodem van die tenk gaan lê. Wanneer die stelsel weer aangeskakel word suig die pomp 'n hoë konsentrasie van die swamdoder neerslag van die tenkbodem op. Die stelsel het tyd nodig om die oplossing weer in sirkulasie, en die swamdoders terug in 'n eenvormige suspensie te kry. As die pakhuis versuim om dit te doen, sal die eerste klomp vrugte die risiko loop om residu-vlakke van hoër as die MRL te oorskry.

- **Maak seker dat die swamdoder terug is in 'n egalige suspensie voordat die behandeling begin.**

- **Kratstapeling:** Aanvanklike waarnemings van 2 en 3 kratstapels vir storting het getoon dat die krat se ontwerp nie bevorderlik is vir optimale bedekking van vrugte in die middelste en onderste kratte nie. Dit kan lei tot meer droë dele in die middelste en onderste kratte, wat weer kan lei tot hoër vlakke van bederf, veral na ontgroening.



- **Stort een krat op 'n slag vir optimale bedekking, residu lading en bederfbeheer.**
 - **Vrugte moenie onder- of oorblootgestel word nie:** Die CRI aanbeveling vir blootstellingstyd is 1-3 minute. Hoewel dit nog nie bewys is dat langer blootstellingstyd tot hoër residu-lading kan lei nie, is dit beter om liever aan die veilige kant te bly (voorkom MRL oorskryding) en nie die vrug vir langer as 3 minute bloot te stel nie. Die teenoorgestelde is ook waar: te kort blootstellingstyd kan lei tot swak bedekking van die vrugte en swak bederfbeheer. Die blootstellingstyd van baie storting-stelsels maak staat op die vurkhyser vir op en aflaai van die kratte. Indien hierdie taak nie konsikwent verrig word nie sal dit tot onder of oor blootstelling lei.
 - **Hou blootstellingstyd binne die grense van 1 tot 3 minute.**
 - **Meet om te bestuur:** Jy sal nie weet hoe goed die bestuur van jou storting-stelsel is voordat jy nie hierdie belangrike parameters meet nie:
 - **Konsentrasie**
 - Alhoewel die konsentrasies van die swamdoders in die vloeistof-mengsel nie gemeet kan word nie, moet verseker word dat voldoende inligting en instrumente (soos maatbekers) vir die opmaak van die mengsel beskikbaar is.
 - **Blootstellingstyd**
 - Dit moet gereeld gemeet word
 - Tydige laai en verwydering van die kratte in die stelsel sal verseker dat die vrugte nie te kort of lank blootgestel word aan die swamdoder-oplossing nie.
 - **Residu-vlakke**
 - Alle pakhuse moet gereeld vrugmonsters van stortbehandeling vir residu-vlak ontledings stuur.
 - Deur dit te doen kan wanbestuur vermy word.
 - Pakhuise kan 'n beter prys met analitiese laboratoriums onderhandel as hulle weet hulle gaan 'n groot aantal monsters stuur.
- Dit is raadsaam om 'n betroubare en ervare ingenieur te raadpleeg wanneer opgradering of bou van 'n storting-stelsel beplan word.



A cautionary note on the management of pre-packhouse drench systems

by

Arno Erasmus^a, Paul Fourie^{a,b}, Keith Lesar^a, Mareli Kellerman^{a,b}, Charmaine Christie^b and Marius Seyfferdt^c

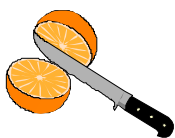
^aCRI Postharvest Pathology Team, 013 7598000, arno@cri.co.za, keithlesar@cri.co.za

^bDepartment Plant Pathology, University Stellenbosch

^cMarius Seyfferdt, Irrigation Specialist, 082 5602165, Marius-s@telkomsa.net

Over the past few years a lot of emphasis has been placed on upgrading drench systems. This includes the correct diameter of the pipes, stronger pumps, and smaller tanks. The result of this is a general trend of increased residue levels, especially pyrimethanil. Residue loading, especially inconsistent or fluctuating residue loading, and residue exceedance, is a major and complicated problem. The CRI recommended mixture contains thiabendazole (TBZ), pyrimethanil (PYR), guazatine and 2.4-D. All these products differ in their formulations, reaction to flow rate and exposure time, interaction with other fungicides and various other factors. Little research has been done on drench application to date, but the CRI postharvest team is currently working on a project focusing on drench application, and this will hopefully give some insight into the effect of flow rate and exposure time on residue loading. The aim of this CRI Cutting Edge is to caution packhouses to improve the management of their drench applications. A number of critical control points are briefly discussed below.

- **Design:** It is important that the pump capacities are correct and the suction and delivery diameters are optimal. The pumps should be high flow rate pumps and the suction pipe diameter should be ample in accordance with the flow rate of the pumps. Many packhouses err by focusing on having a high delivery flow rate, but neglect to adapt the suction side of the system. Flow-speed in the suction pipes need not exceed $1 \text{ m}\cdot\text{s}^{-1}$. By optimising this ratio, a better overall flow rate will be achieved, thereby improving the application and the mixing of the solution. Flow rate is directly related to friction and friction to kilowatt usage.
- **High flow-rate pump.**
- **Suction pipes and diameter should be optimal (as wide as possible).**
- **Acquire advice from an expert.**
- **Circulation and agitation:** The volume of the tank and flow rate of the pump must be such that the entire volume of solution is circulated through the system a few times per minute. There must be no areas in the tank where the solution is not agitated. TBZ and PYR must remain in suspension, otherwise both will precipitate out without thorough agitation. **The circulation of the drench mixture must be continuous during the entire lifespan of the solution.**
- **Continuous agitation**
- **Delay treatment after switching on pump:** This is where many packhouses have the highest risk of an exceedance of the MRL of PYR and TBZ. When the system is switched off, the fungicides will precipitate out and settle on the bottom of the tank. When the system is switched on again the pump sucks up a high concentration of the precipitated fungicides from the bottom of the tank. The system needs time to get the solution into circulation and the fungicides back into a uniform suspension. If the packhouse neglects to do this, the first loads of fruit will stand the risk of exceeding the MRL.
- **Make sure that the fungicides are back in uniform suspension before you start the treatment**
- **Stacking:** Initial observations of 2 and 3 bin stacks for drenching, have demonstrated that the bin design is not conducive to optimal drench application in the middle and bottom bins. This might lead to more dry pockets in the middle and bottom bins, which can lead to higher levels of decay, especially after degreening.



CRI Cutting Edge

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- **Drench one bin at a time for optimal deposition, residue loading and decay control**
- **Do not under or over expose:** The CRI recommendation for exposure time is 1 – 3 minutes. Although it has not been shown that longer exposure times lead to higher residue loading, it is better to err on the safe side (prevent MRL exceedance) and not expose the fruit for longer than 3 minutes. The opposite is also true: too short an exposure time will lead to poor coverage of the fruit and poor decay control. The exposure time of many drench systems are dependent on the on and off loading by the forklift, if this is not consistent, then the exposure time will vary.
 - **Keep exposure time within the limits of 1 to 3 minutes.**
- **Measure to manage:** You will not know how well you are managing your drenching system, unless you measure these important parameters:
 - **Concentration**
 - Although the concentrations of the compounds in the drench mixture cannot be measured it can be ensured that the person responsible for adding the products to the mixture has adequate information and tools (such as measuring jugs) to do the mixing accurately.
 - **Exposure time**
 - This should be measured frequently.
 - Timeous loading of the bins into the drench system will ensure that the fruit in the bins is exposed to the drench mixture at the recommended rates and avoid under or over exposure.
 - **Residue levels**
 - All packhouses should frequently send fruit samples from drench treatments for residue analyses.
 - By doing this mismanagement will be avoided
 - Packhouses can negotiate a better price with analytical laboratories if they know they are going to send in more samples.

It is advisable to consult a reputable engineer when upgrading or building a drench system.