

# Cutting Edge

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## Fruit Fly Control Recommendations

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Fruit fly remains a major phytosanitary risk and the citrus industry cannot afford to jeopardise their exports through supplying infested produce. The industry has a number of risk mitigating options at its disposal ranging from pre-harvest treatments, elimination of infested material in the packhouse, inspection and finally cold disinfestation treatments (for certain markets).

The recommendations that were followed last season have been effective and PPECB recorded few interceptions during their inspections (<0.3% of the exports were affected). This result indicates that the current control options are adequate and there is little need for any drastic revision.

The monitoring for fruit fly has been dealt with in a recent Cutting Edge article (no. 26). Notice should be taken of the changes in these recommendations.

Recommendations for fruit fly control were last made in Cutting Edge 17 dated 17 February 2004. For convenience these are repeated here.

### Ground-based control

- A fixed weekly baiting programme (or use of M3 baiting stations) must be initiated before colour break (about 2 months before the earliest expected harvest date).
  - These control measures must be continued while the orchard is being harvested until all the fruit has been removed.
  - If monitoring trap thresholds are exceeded in the harvested orchard then treatments must be continued as for bearing orchards.
  - M3 bait stations (2 per tree) must be hung in all backyard fruit trees, including indigenous hosts such as marula trees.
  - Maintenance sprays must be applied to every tree in every second row in a particular week and to the alternate rows in the following week (see Note 1).
  - If monitoring indicates control to be inadequate and an additional spray is required, then the second spray must not be applied on the same day but later in the week on the alternate row.
- Ensure that only fresh bait mixed on the day of application is used.
  - Repeat bait application if rain falls within 48 hours.
  - Hang M3 bait stations before the expiry (or use by) date and do not expect control for longer than 4 months.
  - Bait mixtures:
    - The registered dilute volume of protein bait is 400 ml Hym lure (Ready-to-use) (see Note 2) in 100 l water and sprayed at between 300 to 800 ml per tree (amount is dependent on tree size).
    - If the volume of bait applied per tree is less than the above range, then the protein concentration should be increased so that a similar amount of protein is applied to the tree. In other words if half the amount of water is used then the concentration of protein is effectively doubled but only half the volume should be applied (Note 2). In the case of the Mantis or Ladybird applicator the protein is concentrated 15 times to 6 l per 100 l water but only 45 ml is applied per tree.
    - Under no circumstances must the toxicant concentration be increased (see Note 3). The volumes used remain 50 g Dipterex, 175 ml Malathion EC or 300 g Malathion WP per 100 l water regardless of the protein concentration (see Notes 1 and 3).
    - GF-120 (spinosad) is registered as a formulated bait mixture and only 1-1.2 l needs to be diluted with 20-30 l water. This is then applied to every hectare. If a Mantis or Cima spray machine is used then no modifications are required. However, conventional mist blowers may require modification to deliver the material at these volumes. The pre-harvest interval is one day. Although the product is more expensive than the traditional protein bait, it is registered as an organic control option and its use should be considered where there is a chance of exceeding fruit residue limits or when application is required while harvesting the fruit. It can also be used as a resistance management tool.
    - All baits are most effective when applied in the morning before temperatures

increase.

### **Control with toxicants applied from the air**

- If aerial baiting is only used at the beginning of the season to lower the local fruit fly populations before the commencement of a ground-based control option, control measures will follow those applied above.
- If aerial baiting is the only method of fruit fly control and the whole farm can be treated in one day, baits can be applied when trap counts are exceeded rather than on a fixed weekly basis as this method of control is more effective than ground-based methods.
- If the numbers of flies trapped in the monitoring traps still exceed the recommended thresholds after an aerial application, the number of bait applications must be increased until the threshold values are reached.
- The traditional mixture registered for aerial baiting is 750 ml Hymlure 1:1 plus 250 ml Malathion UL. This is applied at 1 l per hectare. Alternatively, GF120 can now be used at 1 litre per hectare in a spray mix with 1-3 litres water.

### **SIT**

- SIT (sterile insect technique) is only applicable to Mediterranean fruit fly. As Natal fruit fly is not affected by the treatment the above control measures must be implemented (see Note 4).

### **Cultural control methods**

- Weekly orchard sanitation is essential. Remove all fallen and out-of-season fruit. This should be shredded or buried (30 cm deep).
- Alternate host plants within 100 m from the orchard should be removed. This includes plants such as bugweed.
- Fallen marulas near orchards should be sprayed with a pyrethroid once a week.
- After harvesting an orchard, the control measures must continue until the trees are stripped and the fruit disposed of.

### **Packhouses**

- Monitor fruit fly outside packhouses with one Questlure/Sensus trap. If the threshold is exceeded then apply control measures.
- Keep trailers containing fruit covered.
- Remove rejected fruit daily.

### **Records**

- Accurate records of trap counts, the changing of the lures, the volume of bait applied and

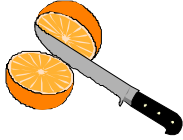
the products used must be kept.

- These records may be inspected by PPECB or some other appointed authority in the event of a fruit fly interception.

### **Notes**

1. The fixed weekly programme of fruit fly applications (and the extra applications when necessary) has resulted in an increase in the measurable residues of mercaptothion in the fruit at harvest. Although these values are still within the general export tolerance, they may exceed the Canadian tolerance levels, particularly if the toxicant is concentrated. It is therefore recommended that trees bearing fruit destined for this market be treated with trichlorfon or spinosad in the month before harvest. The protein hydrolysate attractant Buminal is no longer manufactured, although there is talk about it being produced in South Africa in the future. Hymlure is currently the only product available and can be obtained from Villa Crop Protection.
2. (i) Care should be taken when increasing the protein concentration as fruit burn has been reported after application of high bait concentrations. (ii) Laboratory experiments demonstrated that an increase in the protein hydrolysate concentration results in a slight lowering of the pH. It has been reported that mercaptothion, and in particular trichlorfon, break down more rapidly at high pH and therefore any addition of protein hydrolysate would effectively stabilise rather than degrade the product.
3. There appears to be much confusion around increasing toxicant dosages. Mercaptothion EC has been registered by Dow AgroSciences as a concentrated bait to be delivered in coarse droplets in 50 – 75 l mixture with water per hectare. The amount of mercaptothion applied per hectare in this way will be the same as the conventional bait. Note that special nozzles are needed to deliver these concentrated baits as recommended by Dow AgroSciences.
4. SIT involves the breeding of large quantities of a particular species of fruit fly, separating the males from the females, irradiating the males to sterilise them, and finally releasing them. The females generally mate once only and therefore the sterile male must find and mate before any of the naturally occurring (wild) males do. This means that one has to provide a large number of sterilised males if they are going to be able to compete successfully with their wild counterparts. This can be achieved by ensuring that the levels of the naturally occurring populations are low. This can only be done chemically, usually through aerial baiting. One of the downsides to the universal acceptance of the technique

in South Africa is that SIT has only been developed for Mediterranean fruit fly and it will be many years before the technique is developed for Natal fruit fly. This means that even if SIT provides acceptable control for Mediterranean fruit fly, unless it can reliably be determined through surveys, ongoing monitoring and species identification, that Natal fruit fly is absent from the area in question, one will still have to bait weekly for Natal fruit fly and baiting will control both Natal and Mediterranean fruit flies. SIT is therefore not currently recommended as a fruit fly control practice on citrus.



## BESTRYDING VAN VRUGTEVLIEË IN SITRUS

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Vrugtevlieg bly 'n groot fitosanitêre risiko en die sitrusbedryf kan nie bekostig om hul uitvoere in gevaar te stel deur besmette produkte te verskaf nie. Die bedryf het 'n aantal risiko-verlagende alternatiewe tot sy beskikking wat vooroesbehandelings, uitskakeling van besmette vrugte in die pakhuis, inspeksie en uiteindelik, koue-disinfestasië behandelings vir sekere markte, behels.

Die aanbevelings wat gedurende die afgelope seisoen toegepas was, was doeltreffend en PPECB het min besmettings in pakhuis onderskep (<0,3% van uitvoere was beïnvloed). Dié resultaat dui daarop dat die huidige bestrydingsmaatreëls voldoende is en dat daar min rede vir groot aanpassings is.

Die monitering vir vrugtevlieg is in 'n onlangse Snykant-artikel (nr. 26) bespreek. Kennis moet van die veranderinge in dié aanbevelings geneem word.

Die laaste aanbevelings vir vrugtevliegbestryding is in Snykant 17, gedateer 17 Februarie 2004, gemaak. Dit word geriefliksheidsomthale herhaal.

### Bestryding met insekdoders van die grond af

- 'n Vaste weeklikse lokaastoedieningsprogram, of gebruik van die M3-lokaashouers, moet voor kleurbreek ingelei word ( $\pm$  2 maande voor die vroegste verwagte oesdatum).
- Die bestrydingsmaatreëls moet voortgesit word terwyl boorde ge-oes word totdat alle vrugte verwyder is.
- Indien lokvaldrempels in geoeste boorde oorskry word, moet bestrydingsmaatreëls soos in ongeeste boorde toegedien word.
- M3-lokaashouers (2 per boom) moet in alle agterplaas-vrugtebome gehang word, insluitend inheemse voedsterplante soos maroela.
- Instandhoudende lokaastoedienings moet in 'n betrokke week op alle bome in elke tweede ry en die volgende week op die alternatiewe rye, toegedien word (raadpleeg Nota 1).
- As bestryding ontoereikend en 'n bykomende toediening nodig is, moet die tweede lokaastoediening later dieselfde week op die alternatiewe rye toegedien word.
- Verseker dat slegs vars lokaas, gemeng op die dag van toediening, gebruik word.
- Herhaal lokaastoedienings indien reën binne 24 uur val.
- Hang die M3-lokaashouers voor die verstrykingsdatum (of "gebruik voor datum") en moenie bestryding vir langer as 4 maande verwag nie.
- Lokaasmengsels:
  - Die geregistreerde verdunde hoeveelheid proteïenlokaas vereis 400 ml Hym lure (gereed-vir-gebruik) (raadpleeg Nota 2) in 100 l water en van 300 tot 800 ml mengsel per boom, afhangende van boomgrootte.
  - Indien minder as die aanbevole volume lokaasmengsel per boom toegedien word, moet die konsentrasie proteïen dienoreenkomstig verhoog word sodat 'n soortgelyke hoeveelheid proteïen per boom gebruik word. As die helfte van die aanbevole water gebruik word, moet die proteïenkonsentrasie verdubbel word. In die geval van die Mantis- of Ladybird-toedieners word die proteïen 15 keer gekonsentreer tot 6 l per 100 l water, aangesien slegs 45 ml lokaas per boom toegedien word.
  - Onder geen omstandigheid moet die insekdoderkonsentrasie in die lokaasmengsel verhoog word nie (raadpleeg Nota 3). Dié dosis bly 50 g Dipterex, 175 ml Malathion EC of 300 g Malathion WP per 100 l water, ongeag die hoeveelheid proteïen wat gebruik word (raadpleeg Notas 1 en 3).
  - GF-120 (spinosad), is as 'n geformuleerde lokaasmengsel geregistreer en 1-1,2 l hoef slegs met 20-30 l water gemeng en per hektaar toegedien te word. Die lokaas en insekdoder (spinosad) is klaar gemeng en moet slegs met water verdun en teen 10 tot 20 l verdunde mengsel per ha in groot druppels toegedien word. Indien 'n Mantis- of Cima-spuitmasjien gebruik word, is geen verstellers nodig nie. Konvensionele newelblasers kan egter

aanpassing benodig om die produk teen dié volumes toe te dien. Die vooroestonduingstyd is 1 dag. Alhoewel die produk duurder is as die tradisionele lokaasmengsels, is dit as 'n organiese bestrydingsopsie geregistreer en die gebruik daarvan behoort oorweeg te word indien daar 'n moontlikheid is dat residuvlakke oorskry kan word of wanneer toediening nodig is terwyl daar ge-oes word. Dit kan ook vir weerstandsbestuur oorweeg word.

- o Alle lokase is die doeltreffendste in die oggend voordat dit te warm word.

### Insekdoderbestryding met vliegtuie

- As lugtoediening slegs aan die begin van die seisoen gebruik word om vliegbevolkiings uit te dun voordat toedienings van die grond af begin, sal bestrydingsmaatreëls soos vir grondtoedienings toegepas word.
- As lugbespuiting die enigste manier van vrugtevliegbestryding is en die hele plaas kan in een dag behandel word, kan lokaas toegedien word wanneer die lokvaldrempelwaarde oorskry word, eerder as op 'n vaste weeklikse grondslag. Dit is omdat dié bestrydingsmetode soveel doeltreffender as grondtoedienings is.
- As die drempelwaarde vir gevangde vlieë in lokvalle nog steeds na 'n lugbespuiting oorskry word, moet die toedienings meer dikwels herhaal word totdat vlieggetalle tot op of onder die drempelwaarde afgedwing is.
- Die tradisionele mengsel vir lugbespuiting bestaan uit 750 ml Hymmlure 1:1 plus 250 ml Malathion UL en word teen 1 l per ha toegedien. GF-120 kan alternatiewelik teen 1 l per hektaar in 'n spuitmengsel saam met 1-3 l water per hektaar toegedien word.

### SIT

- SIT (Steriele Insektegniek) is slegs op Mediterreense vrugtevlieë van toepassing. Omdat Natalse vrugtevlieg nie deur genoemde behandeling beïnvloed word nie, moet bogenoemde bestrydingsmaatreëls toegepas word (raadpleeg Nota 4).

### Verbouingspraktyke

- Weeklikse boordsanitasie is noodsaaklik. Afgevalle of buiteseisoense vrugte moet verwyder, fyngeskap of minstens 300 mm diep begrawe word.
- Afgevalle maroela-vrugte naby boorde moet een keer per week met 'n piretroïed bespuit word.
- Alternatiewe gasheerplante, insluitende ander plante as vrugtebome, soos luisboom ("bugweed"), binne 100 m van sitrusboorde

af, moet verwyder word.

- Nadat 'n boord geoes is, moet bestryding voortgesit word totdat die boord gestroop en die oorblywende vrugte vernietig kan word.

### Pakhuisse

- Monitor vrugtevlieë buite elke pakhuis met een Sensus/Questlure-lokval. As die drempelwaarde oorskry word, moet bestrydingsmaatreëls toegepas word.
- Sleepwaens met vrugte moet bedek word.
- Vernietig afgekeurde vrugte daagliks.

### Verslae

- Dit is noodsaaklik dat goeie rekord gehou word van lokvaltellings, wanneer lokmiddels vervang word, hoeveelheid lokaas toegedien is en die produkte wat gebruik is.
- Rekords mag deur PPECB of ander gemagtigdes ondersoek word indien vrugtevlieë in die pakhuis onderskep word.

### Notas

1. Die vasgestelde weeklikse program vir vrugtevliegtoedienings (en die bykomende toedienings, indien nodig) het tot 'n verhoging in die meetbare residu's van malathion met oestyd bygedra. Alhoewel dié residu's nog steeds onder die vasgestelde algemene uitvoertoleransie is, kan dit die Kanadese toleransievlak oorskry. Daar word dus aanbeveel dat bome met vrugte wat vir dié mark bedoel is, in die maand voor oestyd met met trichlorfon of spinosad behandel word. Die proteïenhidrolisaat-lokaas, Buminal, word nie meer geproduseer nie, alhoewel daar sprake is dat dit in die toekoms in Suid-Afrika vervaardig sal word. Hymmlure is tans die enigste beskibare produk en kan van Villa Crop Protection verkry word.
2. (i) Sorg moet gedra word wanneer die proteïenkonsentrasie verhoog word, aangesien berig al van vrugbrand na toediening van hoë lokaaskonsentrate ontvang is. Die mengsel-pH is al as 'n moontlike oorsaak genoem. (ii) Laboratoriumproewe het egter gewys dat 'n verhoging van die proteïenhidrolisaat-konsentrasie 'n effense verlaging in pH veroorsaak. Daar word gemeld dat merkaptotion, maar veral trichlorfon, vinniger by hoë pH afbreek en enige byvoeging van proteïenhidrolisaat sal daarom die mengsel eerder stabiliseer as degradeer.
3. Daar skyn heelwat verwarring oor hoër insekdoderdosisse te heers. Mercaptothion EC is deur DOW AgroSciences in 'n gekonsentreerde lokaasmengsel geregistreer om in slegs 50-75 l water per hektaar as growwe druppels toegedien te word. Die

hoeveelheid merkaptotion wat só per hektaar toegedien word, sal dieselfde wees as met die konvensionele lokaasmengsel. Let op dat spesiale spuitneuse nodig is om dié gekonsentreerde lokase soos deur DOW AgroSciences aanbeveel, toe te dien.

4. SIT behels die teling van groot getalle van 'n besondere vrugtevliespesie, die skeiding van die twee geslagte, sterilisasie van die mannetjies met gammabestraling en uiteindelijke loslating in boorde. Wyfies paar gewoonlik slegs een keer en die steriele mannetjies moet hulle daarom eerste vind en paar voor die wilde mannetjies dit kan doen. Daar moet dus 'n oormaat steriele mannetjies wees indien hulle met sukses teen hul wilde eweknieë moet meedien. Dit kan gedoen word deur te verseker dat die vlak van die natuurlike bevolking laag is. Dit kan slegs met lokaastoedienings, gewoonlik deur lugtoediening, bewerkstellig word. Een van die nadele van die algemene aanvaarding van die benadering is dat SIT vir die Mediterreense vrugtevlies ontwikkel is. Dit kan etlike jare neem voordat die tegniek vir Natalse vrugtevlies ontwikkel word. Dit bring mee dat al bied SIT doeltreffend bestryding van Mediterreense vrugtevlies, lokaas nog steeds weekliks vir Natalse vrugtevlies toegedien sal moet word (wat beide spesies sal bestry!), tensy daar deur opnames, voortdurende monitering en spesie-identifikasie vasgestel kan word dat Natalse vrugtevlies in die betrokke gebied afwesig is. SIT word daarom tans nie as 'n vrugtevliesbestrydingstegniek op sitrus aanbeveel nie.