

Fruit fly protocol for citrus production regions under high fruit fly populations (Western Cape and Eastern Cape)

Aruna Manrakhan, Martin Gilbert & Sean Moore
Citrus Research International (CRI)

This fruit fly protocol has been developed specifically for regions that experience high fruit fly populations such as those in the Western Cape and Eastern Cape.

The general recommendations for fruit fly monitoring and control are summarised below and are based on recommendations in the "Fruit fly - Citrus Production Guidelines" chapter which was updated in January 2016. As such, for further details on the recommendations below, the updated "Fruit fly- Citrus Production Guidelines" chapter must be consulted.

The timing of fruit fly control in citrus orchards, which is provided after the summarised fruit fly monitoring and control recommendations, is, however, specific for the Western Cape and Eastern Cape regions. We stress the importance of area-wide control, especially in regions of the Western Cape with mixed crops (deciduous including grapes and citrus).

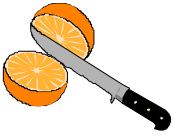
Fruit fly monitoring

1. Fruit fly pests should be monitored in citrus orchards from October until the completion of harvest on the entire farm. Fruit fly monitoring should be carried out using traps and attractants recommended by CRI. CRI recommends the use of both Capilure and Questlure baited Sensus traps for monitoring of Medfly and Natal fly, since thresholds have been developed for these trapping systems for the targeted fruit fly pests. For the Oriental fruit fly, methyl eugenol baited bucket traps are recommended. Even if other traps like Delta traps with trimedlure or Chempac Bucket traps with Biolure are used for monitoring of Medfly and Natal fly, the Sensus traps with Capilure and those with Questlure should also be included in the fruit fly monitoring network. Fruit fly monitoring in deciduous orchards neighbouring citrus orchards is highly recommended as it will provide better guidance with regard to fruit fly control actions over space and time.

2. Trap thresholds developed for these Capilure and Questlure baited Sensus traps should be adhered to at all times during the control programme (see notes below on fruit fly control & Fig. 1). Higher numbers of flies per trap per week than the above thresholds indicate that control is inadequate and that additional intervention is required. Non-compliance with thresholds will lead to increased risk of fruit infestation. For Medfly, the threshold in a Capilure-baited trap is four flies per week. For Natal fly, the threshold in a Capilure baited trap is two flies per week. When using Questlure in a Sensus trap, the threshold is one female fly per trap per week for both species. In areas where the Oriental fruit fly is currently absent, detection of suspected *B. dorsalis* specimens should be reported immediately to the citrus surveillance co-ordinator (Aruna Manrakhan: 013 759 8000) or to DAFF (Jan Hendrik Venter: 012 319 6384).

Fruit fly control

1. The timing of fruit fly control is crucial in (a) regions with mixed deciduous and citrus and (b) regions with mainly citrus cultivation but with historically high fruit fly populations (See Fig. 1).
 - a. For mixed deciduous and citrus areas, control should start as early as December in the citrus orchards. It would be preferable if fruit fly monitoring and control are also carried out in deciduous orchards from at least one month before harvest of deciduous fruit until at least one month after harvest.
 - b. In areas with mainly citrus, fruit fly control should commence in January.
2. All fruit fly pests of citrus should be controlled using registered protein baits. Fruit fly control products should be applied according to product label. In areas where the Oriental fruit fly is detected, baiting should then be combined with methyl eugenol based Male Annihilation Technique (MAT).
3. Baiting (aerial or ground) must be conducted weekly (unless bait stations and other registered attract and kill methods are used). If weekly bait sprays are not sufficient to reduce fly numbers below the thresholds, then sprays will have to be conducted twice weekly. On farms where only M3 fruit fly bait stations or other registered attract and kill



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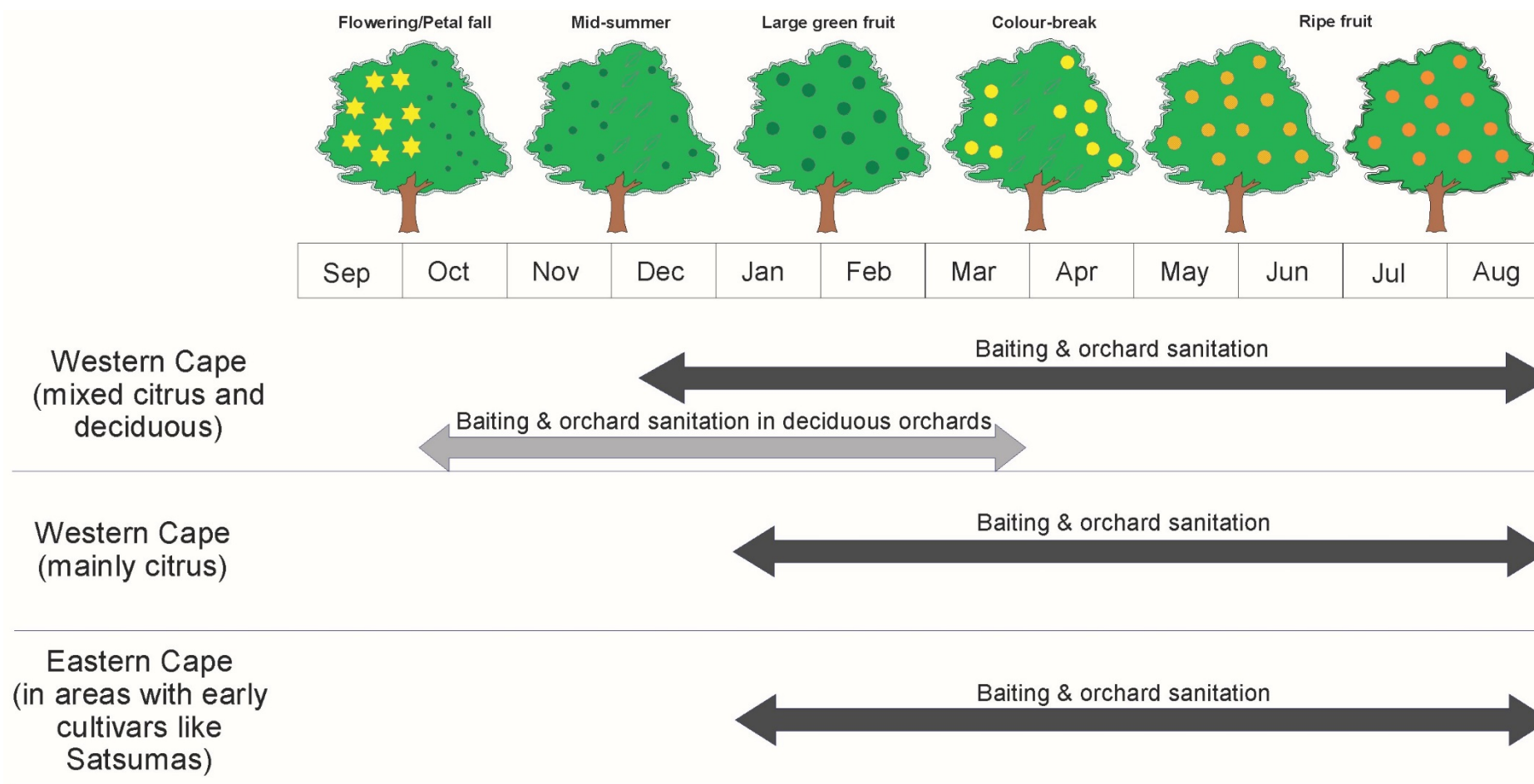
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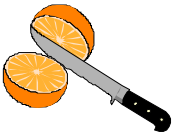
products (like Magnet Med) are applied, additional bait sprays will be required to bring the fly population down if trap thresholds are exceeded. Aerial bait sprays (using mixtures of malathion and HymLure or LokLure, or alternatively GF-120) are very effective in reducing high fruit fly numbers.

4. Fruit fly baiting and MAT must always be combined with weekly orchard sanitation and proper management of other insect pests, such as FCM, which also damage maturing fruit. Inadequate management of FCM and consequent elevated FCM levels often leads to elevated fruit fly infestation. Vineyards can harbour high fruit fly numbers in March and so sanitation after harvest will also be effective here.

Fig. 1. Schedule of fruit fly control activities in Western Cape and Eastern Cape
(Dark grey arrows indicate fruit fly control in citrus orchards; Light grey arrow indicates fruit fly control in deciduous orchards including table grapes and wine grapes)



Fruiting phenology diagram by Peter Stephen, CRI



Vrugtevliegprotokol vir sitrusproduksie-areas onder hoë vrugtevliegpopulasies (Wes-Kaap en Oos-Kaap)

Aruna Manrakhan, Martin Gilbert en Sean Moore, Citrus Research International (CRI)

Hierdie vrugtevliegprotokol is spesifiek ontwikkel vir areas onder hoë vrugtevliegpopulasies, soos dié in die Wes-Kaap en Oos-Kaap. Die algemene aanbevelings vir vrugtevliegmonitering en -beheer word hieronder opgesom en word gebaseer op aanbevelings in die “*Fruit fly - Citrus Production Guidelines*” hoofstuk wat in Januarie 2016 opgedateer is. Vir verdere besonderhede rakende die aanbevelings hieronder, moet die opgedateerde “*Fruit fly - Citrus Production Guidelines*” hoofstuk gevolglik geraadpleeg word. Die tydsberekening van vrugtevliegbeheer in sitrusboorde, soos verskaf ná die opgesomde vrugtevliegmonitering en -beheer aanbevelings, is egter spesifiek vir die Wes-Kaap en Oos-Kaap areas. Ons beklemtoon die belang van area-wye beheer, veral in areas van die Wes-Kaap met gemengde gewasse (sagtevrugte en sitrus).

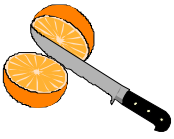
Vrugtevliegmonitering

1. Vrugtevliegplae in sitrusboorde moet vanaf Oktober tot die voltooiing van oes oor die hele plaas gemonitor word. Vrugtevliegmonitering moet uitgevoer word deur gebruik te maak van lokvalle en lokmiddels soos deur CRI aanbeveel. CRI beveel die gebruik van beide Capilure en Questlure lokaas Sensus lokvalle aan vir monitering van die Mediterreense vrugtevlieg en Natalse vlieg, aangesien daar drempelwaardes vir hierdie lokvalsisteme vir die geteikende vrugtevliegplae ontwikkel is. Metiel eugenol lokaas emmer-lokvalle word vir die Oosterse vrugtevlieg aanbeveel. Selfs indien ander lokvalle soos Delta lokvalle met trimedlure of Chempac emmer-lokvalle met Biolure vir die monitering van die Mediterreense vrugtevlieg en Natalse vlieg gebruik word, moet die Sensus lokvalle met Capilure en die met Questlure ook in die vrugtevliegmonitering netwerk ingesluit word. Vrugtevliegmonitering in sagtevrugteboorde aangrensend aan sitrusboorde word sterk aanbeveel aangesien dit beter leiding kan verskaf met betrekking tot vrugtevliegbeheer-aksies in ruimte en tyd.

2. Lokval drempelwaardes wat vir hierdie Capilure en Questlure lokaas Sensus lokvalle ontwikkel is, moet ten alle tye gedurende die beheerprogram nagekom word (sien notas onder oor vrugtevliegbeheer & Fig. 1). Hoër getalle vlieë per lokval per week as bostaande drempelwaardes dui daarop dat beheer onvoldoende is en addisionele ingryping vereis word. Indien die drempelwaardes nie nagekom word nie, sal die risiko vir besmetting verhoog. Vir die Mediterreense vrugtevlieg is die drempelwaarde in 'n Capilure lokaas lokval vier vlieë per week. Vir die Natalse vlieg is die drempelwaarde in 'n Capilure lokaas lokval twee vlieë per week. Wanneer Questlure in 'n Sensus lokval gebruik word, is die drempelwaarde een wyfie vlieg per lokval per week vir beide spesies. In areas waar die Oosterse vrugtevlieg tans afwesig is, moet die waarneming van moontlike *B. dorsalis* monsters dadelik by die sitrus waarnemingskoördineerder aangemeld word (Aruna Manrakhan: 013 759 8000) of by DAFF (Jan Hendrik Venter: 012 319 6384).

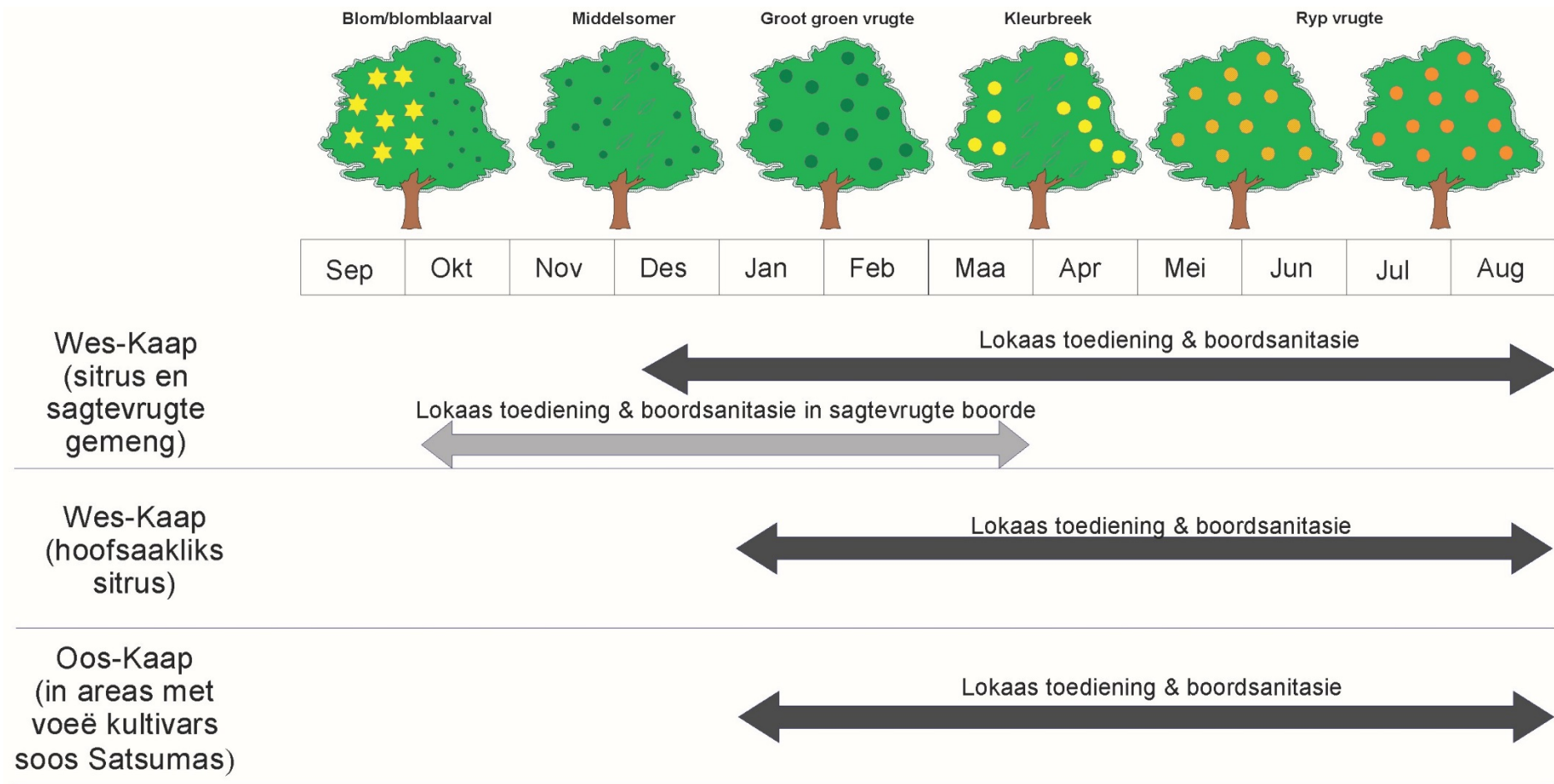
Vrugtevliegbeheer

1. Die tydsberekening van vrugtevliegbeheer is krities in (a) areas met gemengde sagtevrugte en sitrus en (b) areas met hoofsaaklik sitrusverbouing maar met histories hoë vrugtevliegpopulasies (Sien Fig. 1).
 - a. Vir gemengde sagtevrugte- en sitrus-areas, moet beheer in die sitrusboorde so vroeg as Desember begin word. Verkieslik moet vrugtevliegmonitering en -beheer ook in sagtevrugteboorde vanaf minstens een maand vóór oes van sagtevrugte tot minstens een maand ná oes uitgevoer word.
 - b. In areas met hoofsaaklik sitrus, moet vrugtevliegbeheer in Januarie begin word.
2. Alle vrugtevliegplae van sitrus moet beheer word deur gebruik te maak van geregistreerde proteïenlokase. Vrugtevlieg beheerprodukte moet volgens die produketiket toegedien word. In areas waar die Oosterse vrugtevlieg waargeneem word, moet lokaas toediening met metiel eugenol gebaseerde mannetjie uitwissingstegniek



- (*Male Annihilation Technique*) (MAT) gekombineer word.
3. Lokaasmetodes (lug- of grondgedraagd) moet weekliks gedoen word (tensy lokaasstasies en ander geregistreerde lokmiddel- en uitwismetodes gebruik word). Indien weeklikse lokaas toediening nie voldoende is om vlieëgetalle onder die drempelwaardes te laat sak nie, sal daar twee keer per week gespat moet word. Op plase waar slegs M3 vrugtevlug lokstasies of ander geregistreerde lok-en-vrek produkte (soos Magnet Med) toegedien word, sal addisionele lokaas toedienings vereis word om die vliegpopulasie af te bring indien lokval drempelwaardes oorskry word. Lokaas lugbespuitings (deur gebruik te maak van mengsels van malathion en HymLure of LokLure, of alternatiewelik GF-120) is baie doeltreffend om hoë vrugtevlugpopulasies af te bring.
 4. Vrugtevlug lokaasmetodes en MAT moet altyd met weeklikse boordsanitasie en effektiewe bestuur van ander insekplae, soos VKM, wat ook ryp vrugte beskadig, gekombineer word. Onvoldoende bestuur van VKM, en gevolglik verhoogde vlakke van VKM, lei dikwels tot verhoogde vrugtevlug besmetting. Wingerde kan hoë vrugtevluggetalle in Maart huisves, gevolglik sal die toepassing van sanitasie ná oes ook hier doeltreffend wees.

Fig. 1 Skedule van vrugtevliegbeheer-aktiwiteite in Wes-Kaap en Oos-Kaap
 (Donkergrys pyle dui vrugtevliegbeheer in sitrusboorde aan; Ligtegrys pyle dui vrugtevliegbeheer in sagtevrugteboorde aan, insluitende tafeldruiwe en wyndruiwe)



Vrugdraende fenologie diagram deur Peter Stephen, CRI