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Avoiding mealybug repercussions

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During the 2015 growing season numerous reports of mealybug outbreaks on citrus were received from throughout the country. Mealybug is known to have an extremely effective biocontrol complex and therefore any outbreak of the pest is most likely a repercussion from the injudicious use of chemical insecticides. In seeking the reason or reasons for the widespread elevated levels of mealybug, it is therefore helpful to look at current trends in pesticide usage and the non-target effect profiles of these insecticides.

For more than 15 years, CRI has conducted non-target effect tests with a wide range of pesticides used on citrus, measuring the effects of field-weathered residues against five natural enemy indicator species over a 6-week period. One of these indicator species is the mealybug parasitoid, *Coccidoxenoides perminutus*, thus providing a reliable indication of potential mealybug repercussions resulting from the use of tested products. Using both the level of mortality and the persistence of negative effects on the parasitoid, products are rated as either harmless, slightly harmful, harmful or very harmful. Recent bioassays conducted with chlorpyrifos 250 CS (Pyrinex) indicate that this microencapsulated formulation is very harmful to the mealybug parasitoid. Previous trials demonstrated that fenpropathrin (Meothrin), formetanate (Dicarzol) film spray, spinosad (Tracer) and thiacloprid (Calypso) are very harmful and that acetamiprid (Mospilan/Allice), tau-fluvalinate (Klartan) and chlorfenapyr (Hunter) are harmful. A recent bioassay showed spinetoram (Delegate) to be slightly harmful. In addition, research published by Hattingh (1996) showed that pyriproxyfen reduced viability of pupae of *C. perminutus* by 50% and the fecundity of survivors by a further 30%. This, together with its detrimental effect on ladybird beetles, is why pyriproxyfen should preferably only be considered for the control of red scale in the case of an emergency.

In noting the pesticide usage programmes and associated mealybug levels in citrus throughout the country, it is our opinion that mealybug levels last season can be linked to the injudicious usage of these products. Consequently, we provide the following cautions to assist in avoiding elevated levels of mealybug in orchards. Additionally, these cautions are also influenced by the known non-target effects of these products on natural enemies of other key citrus pests, such as red scale and false codling moth (FCM).

Consequently, it is our opinion that the following actions could lead to repercussions of mealybug or other key and secondary pests:

- The use of chlorpyrifos 250 CS, even early in the season (chlorpyrifos 750 WG and 480 EC are far less likely to cause repercussions).
- Spraying of acetamiprid; acetamiprid can be used safely as a stem treatment.
- The use of any pyrethroid, chlorfenapyr (film spray) or fipronil at any time later than immediately after petal drop. (This is with the obvious exception of pyrethroids registered against FCM, applied no sooner than 5 weeks before harvest.)
- The use of a chlorfenapyr bait application later than 4 weeks after petal drop (even though registration permits its use until mid-December, with a 140 day withholding period).
- The use of a formetanate bait spray later than 4 weeks after petal drop.
- The use of spinetoram after November.
- Regular use of pyriproxyfen.

It is understood that short residual IPM compatible thripicides are in short supply and therefore adherence to these recommendations, particularly for certain regions and cultivars, is challenging. However, it must be understood that non-compliance with these recommendations may well render a single preventative treatment for mealybug in spring insufficient to maintain mealybug infestation at an acceptable level.

Also note that mealybug infestation naturally peaks in December in the northern regions of the country and in January in the Cape regions. Where the biocontrol complex is not compromised, mealybug levels should decline notably after these peaks. Therefore, decisions on the need for corrective treatment of mealybug can only be made in January in the northern regions and February in the Cape regions and only if regular scouting has been conducted. If a corrective treatment is required, buprofezin is very effective when timed against the younger life stages and unlikely to cause a repercussion. Its preharvest interval is 45 days.

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Voorkoming van witluis reperkussies

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Gedurende die 2015 produksie-seisoen is verskeie verslae van witluis-uitbrake op sitrus deur die land ontvang. Dit is bekend dat witluis 'n baie doeltreffende biologiese beheer kompleks het en daarom is enige uitbraak van die plaag heel waarskynlik 'n reperkussie agv van die onoordeelkundige gebruik van chemiese insekdoders. Om redes vir die wydverspreide verhoogde witluis vlakke te vind, is dit nuttig om die huidige tendense in die gebruik van plaagdoders en die nie-teiken effek profiele van hierdie insekdoders te ondersoek.

Vir meer as 15 jaar het CRI nie-teiken effek toetse uitgevoer met 'n wye reeks plaagdoders wat op sitrus gebruik word. Die effek van boordverweerde residue is teen vyf spesies, wat as aanwysers van natuurlike vyande dien, oor 'n 6-weke tydperk gemeet. Een van hierdie indikatorspesies is die witluisparasiet, *Coccidoxenoides perminutus*, wat dus 'n betroubare aanduiding van moontlike witluis reperkussies kan gee as gevolg van die gebruik van die getoetste produkte. Deur middel van beide die mortaliteitsvlak en die nawerking van die negatiewe effekte op die parasiet, word produkte as skadeloos, effens skadelik, skadelik of baie skadelik aangetoon. Onlangse biotoetse wat met chlorpyrifos 250 CS (Pyrinex) uitgevoer is, het aangedui dat hierdie mikro-geïnkapsuleerde formulasie baie skadelik vir die witluisparasiet is. Vorige proewe het gewys dat fenpropathrin (Meothrin) en formetanaat (Dicarzol) filmbespuiting, asook spinosad (Tracer) en thiacloprid (Calypso) baie skadelik is en dat asetamiprid (Mospilan/Allice), tau-fluvalinate (Klartan) en chlorfenapir (Hunter) skadelik is. 'n Onlangse biotoets het aangedui dat spinetoram (Delegate) effens skadelik is. Boonop het navorsing, wat deur Hattingh (1996) gepubliseer is, gewys dat piriproxifen die lewensvatbaarheid van *C. perminutus* papies met 50% verminder het en vrugbaarheid van oorlewendes met 'n verdere 30%. Om hierdie rede, tesame met sy nadelige effek op skilpadkewers (ladybirds), moet piriproxifen verkieslik net vir die beheer van rooidopluis in die geval van noodgevalle oorweeg word.

Na 'n ondersoek van die plaagdoder programme wat gebruik word en verwante witluis besmettingsvlakke op sitrus regdeur die land, is dit ons gevolgtrekking dat witluis vlakke verlede seisoen aan onoordeelkundige gebruik van hierdie produkte gekoppel kan word. Gevolglik gee ons die volgende waarskuwings om verhoogde vlakke van witluis in boorde te help voorkom. Boonop word hierdie waarskuwings ook beïnvloed deur die bekende nie-teiken effekte van hierdie produkte op natuurlike vyande van ander belangrike sitrusplae soos rooidopluis en valskodlingmot (VKM).

As gevolg van bogenoemde redes is dit dus ons mening dat die volgende aksies tot reperkussies van witluis of ander sleutel- en sekondêre plae kan lei:

- Die gebruik van chlorpirifos 250 CS, selfs vroeg in die seisoen (die waarskynlikheid van reperkussies met chlorpirifos 750 WG en 480 EC is baie minder).
- Asetamiprid bespuitings; asetamiprid kan sonder sodanige probleme eerder as 'n stambehandeling gebruik word.
- Die gebruik van enige piretroïed, chlorfenapir (filmbespuiting) of fipronil op enige tyd later as direk na blomblaarval. (Hierdie is natuurlik met die uitsondering van piretroïdes wat teen VKM geregistreer is, wat nie vroeër as 5 weke voor oes toegedien word nie.)
- Die gebruik van 'n chlorfenapir lokaas toediening later as 4 weke na blomblaarval (selfs as registrasie die gebruik tot middel-Desember, met 'n 140 dae onthoudings tydperk, toelaat).
- Die gebruik van 'n formetanaat lokaas toediening later as 4 weke na blomblaarval.
- Die gebruik van spinetoram na November.
- Gereelde gebruik van piriproxifen.

Daar is wel begrip vir die feit dat daar 'n tekort aan kort-residu IPM-verenigbare blaaspootjiedoders is en daarom is nakoming van hierdie aanbevelings 'n uitdaging, veral vir sekere streke en kultivars. Dit moet nogtans verstaan word dat as hierdie aanbevelings nie nagekom word nie, 'n enkel voorkomende bespuiting vir witluis in die lente onvoldoende mag wees om witluis besmetting teen 'n aanvaarbare vlak te hou.

Let ook daarop dat witluis besmetting 'n natuurlike piek in Desember in die noordelike streke bereik, en in Januarie in die Kaapse streke. Waar die biologiese beheerkompleks nie versteur is nie, behoort witluis vlakke na hierdie pieke beduidend af te neem. Daarom kan besluite oor die behoefte vir korrektiewe behandeling vir witluis eers in

Januarie in die noordelike streke en in Februarie in die Kaapse streke gemaak word, en net as gereelde plaagverkenning uitgevoer is. As 'n korrektiewe behandeling nodig is, is buprofezin baie doeltreffend wanneer dit teen die jonger lewensstadiums gemik word en is dit onwaarskynlik dat dit 'n reperkussie tot gevolg sal hê. Die vooroes interval is 45 dae.

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