

FUNDING ALLOCATIONS

T.G. GROUT

The relative funding of research, extension and market access co-ordination in 2005 remains very similar to that in 2004 (Fig. 1). The Disease Management programme remains the highest funded research programme, just above Integrated Pest Management. The other two research programmes receive approximately one-third of the funding that these former programmes receive. The funding of Extension in 2005 has increased slightly while market access funding has reduced slightly. Within each of the research programmes the relative distribution of funds is very similar to that in 2004 (Fig. 2). One global change that was introduced was the separate allocation of funds to researchers who were presenting papers on CRI-funded research at local conferences, rather than the inclusion of these costs in research budgets. Within the Disease Management programme, funding of research on graft transmissible diseases increased at the expense of soilborne diseases and citrus black spot.

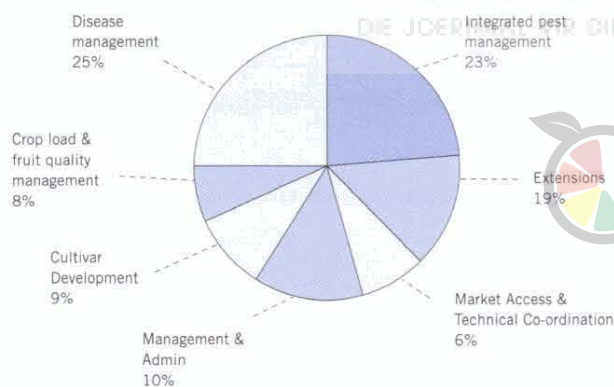


Fig. 1 Percentage funding in each CRI programme.

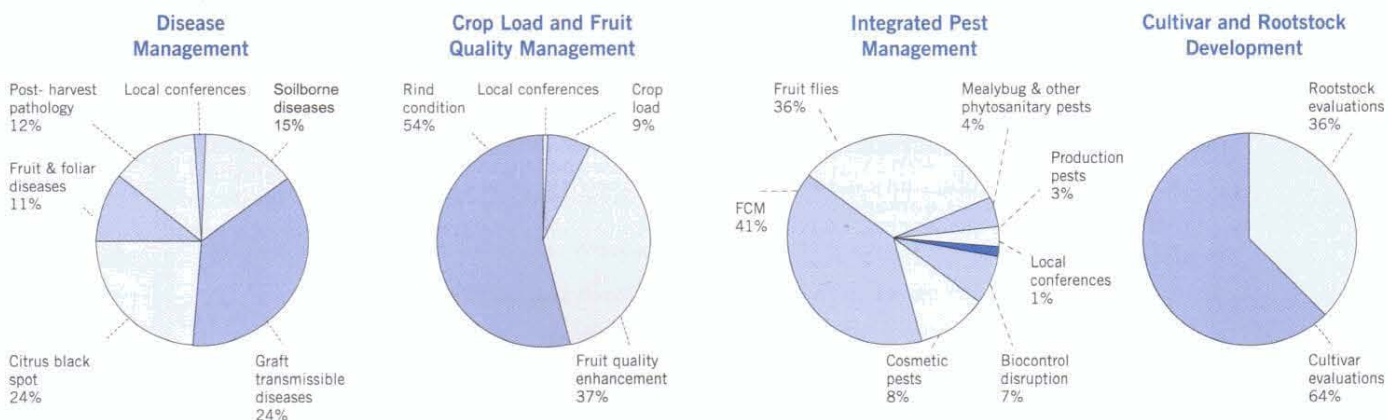


Fig. 2 Percentage funding in each CRI Research Project - Disease Management, Crop Load and Fruit Quality Management, Integrated Pest Management and Cultivar and Rootstock Development.

INTEGRATED PEST MANAGEMENT

T.G. GROUT

CITRUS THRIPS

Good management of citrus thrips without causing pest repercussions can only be achieved with good pest scouting. Relative numbers of citrus thrips in orchards can be determined with the use of yellow sticky traps (available from CRI) before bloom, to help plan a management strategy.

After petal fall, fruit must be monitored at least once a week and scouts must look under the sepals of the calyx until it becomes too tight for thrips to fit underneath. Larvae cause more damage than adults so intervention thresholds for larvae must therefore be lower. Pre-blossom sprays of the spring growth flush will reduce citrus thrips populations damaging fruit after petal fall and will allow for the use of less-disruptive thripicides at this time. This also applies to the pre-blossom use of soil systemics such as Confidor when used for the control of other pests. Thrips management options are also dependent on the availability of spray machinery. If it is not possible to apply a thrips treatment within one week of thresholds being exceeded, some orchards will have to be sprayed with more residual thripicides or intervention thresholds would have to be lowered. The suggested threshold for fruit infestation by larvae during the first four weeks after petal fall is 2% to prevent more than 1% cull due to thrips. If this level is exceeded, a spray should be applied within one week. If this level is attained but not exceeded for two consecutive weeks, a spray should still be applied. If populations are allowed to exceed 15% fruit infestation, control with IPM-compatible treatments such as abamectin plus oil or tartar emetic plus sugar, will be difficult. Do not use more than three applications of abamectin in a season and do not apply more than two consecutively. This will slow resistance development.

RED SCALE TONY WARE

This programme should be considered for organo-phosphate resistant scale.

The optional treatments should be considered if natural enemy activity is insufficient or inadequate.

Infestation level (% fruit of previous crop with 1+ scale)	Swollen axil bud to green bud stage	Petal fall to nine weeks later	10-14 weeks after petal fall
Green or light (0-5%)	Optional: 1.25% light NRO or 1.0% medium NRO	-	-
	-	-	Optional: 1.25% medium NRO or 1.0% heavy NRO
	-	-	Optional: Mospilan trunk treatment
Yellow or moderate (6-15%)	1.25% light NRO or 1.0% medium NRO	-	Optional: 1.25% medium NRO or 1.0% heavy NRO
	Optional: 1.25% light NRO or 1.0% medium NRO	-	1.25% medium NRO or 1.0% heavy NRO
	Confidor drench	-	-
	Optional: 1.25% light NRO or 1.0% medium NRO	-	Mospilan trunk treatment
	-	Mospilan trunk treatment	Optional: 1.25% medium NRO or 1.0% heavy NRO
Red or severe (>15%)	1.25% light NRO or 1.0% medium NRO	Optional: 0.75% light NRO or 0.5% medium NRO	1.25% medium NRO or 1.0% heavy NRO
	Confidor drench	-	1.25% medium NRO or 1.0% heavy NRO
	-*	Mospilan trunk treatment	1.25% medium NRO or 1.0% heavy NRO
	Nemesis + 0.3% oil	Nemesis + 0.2% oil	-*
	-*	Nemesis + 0.2% oil	Nemesis + 0.3% oil

* With extremely severe red scale population density, additional treatments may be required here.

fruit journal
DIE JOERNAAL VIR DIE VRUGTEBEDRYF IN SUID-AFRIKA



Weather Protection Products for all Agricultural Crops TREES - VINES - ROW CROPS

FROST SHIELD

ORGANIC
NON-TOXIC
COMPLETELY SAFE
NON POLUTING
BIO-DEGRADABLE

SUN SHIELD

- Full strength protection on apples, apricots, cherries, pears and other crops subject to weather damage
- Protects plants, trees, vines, leaves, buds, blooms, and fruit from weather damage
- Field proven as a cost effective micro-thin protein pro polymer coating
- Organic - Approved by SGS for organic production

Available from Agro-Hytec 082 900 6025
Contact us for our full range of Fertilisation Products

PREVENTATIVE SPRAYS FOR MEALYBUG

SEAN MOORE

If pre-harvest blemish analyses or winter inspections of trees indicate that preventative spraying for mealybug is necessary, then these sprays should be applied in spring (September/October). Field trials conducted over the last two seasons have demonstrated that sprays applied before calyx closure are significantly more effective than corrective sprays applied later in the season. It is very important to bear in mind that nothing less than a thorough full cover film spray will provide adequate mealybug control. The single most common reason for sub-optimal mealybug control is inadequate spray coverage. As a resistance management tactic, growers who generally use organophosphates are encouraged to consider the use of Applaud (buprofezin). This product will work extremely well where its application is timed with a crawler movement. The spring crawler movement has been found to be fairly well synchronised with 100% petal drop. Growers who wish to apply a maintenance spray for mealybug are encouraged to consider augmentative releases of *Coccidoxenoides perminutus*, as long as there is absolute certainty that citrus mealybug, *Planococcus citri*, is the dominant species. Such releases should be initiated as early in the season as possible, bearing in mind the duration of the harmful residual effect on the parasitoids of any pesticide used.

BOLLWORM CONTROL

SEAN MOORE

Spring of 2004/05 saw probably the highest levels of bollworm infestation on citrus in at least the last 10 years. This trend was apparent throughout the country. Despite this, routine spraying for bollworm is generally not necessary. By monitoring the percentage of blossom clusters infested, it will be possible to determine whether a spray is necessary. A treatment should be applied when more than 20% of blossom clusters are infested with larvae or mature eggs. Enlarged navel-end problems in navel oranges can be further exacerbated by bollworm attack. In such an instance, a threshold of 11% of clusters infested should be used. DiPel and other Bt products can work well, but must be sprayed while larvae are still less than 1 cm long and spray coverage must be thorough. Occasionally, more than one application of DiPel could be necessary, although good spray coverage will reduce this possibility.

LEMON MOTHS

SEAN MOORE

Lemons that have not been sprayed or are under a very soft spray programme should be inspected for lemon moth (usually *Prays*

citri) presence during blossoming. The conspicuous presence of larvae feeding on blossoms and small fruitlets and the formation of pupae webbed amongst petals, indicates the need to spray. If sprays are targeted against feeding larvae, a soft product such as DiPel should be adequately effective. Failure to control lemon moths at this stage might lead to a second generation. It appears that it is the young larvae of this second generation which are chiefly responsible for the unsightly damage known to occur on young fruit. Control is a lot more difficult to achieve at this later stage, as larvae hatch from the underside of the egg, therefore penetrating directly into the fruit. Probably the most effective product to apply at this late stage (around November) is Alsystin.

REMOVAL OF OUT OF SEASON FRUIT

SEAN MOORE

As soon after harvesting as possible, all out of season fruit should be removed from trees and destroyed. These fruit can act as a reservoir for false codling moth (FCM) and fruit flies, enabling particularly the former to carry over onto the new crop set in spring. Field observations indicate that the removal and destruction of out of season fruit can have a significant impact in reducing FCM levels. The fruit should be buried or destroyed some distance away from the orchards.

FRUIT AND FOLIAR DISEASES

G.C. SCHUTTE

ALTERNARIA CORE ROT

Alternaria core rot, also known as navel-end rot and black rot, occurs in all areas of southern Africa. The disease is most prevalent on those citrus cultivars such as navels and Clementines characterised by the presence of a secondary fruit called the fruit-navel, which varies in size and develops at the styler end of the primary or main fruit. These fruitlets are extremely sensitive to environmental stress conditions during early stages of development and are therefore also prone to diseases such as navel-end rot and physiological disorders.

Alternaria core rot is linked to large fruit-navels or to the abnormal growth of the secondary fruit into primary-fruit locules which leads to the formation of points of entry through which fungi can penetrate to form infections which remain quiescent until favourable conditions stimulate further fungal growth.

The style and stigma of navel blossoms are milky white at first and then turn light brown in colour and abscise cleanly. This happens one week after petals have dropped and young fruit are ± 8 mm in size. The two sets of styler tissue present in the primary and secondary fruit locules can be injured during the blossom



period if harsh weather conditions prevail for one or more days (hot days $>25^{\circ}\text{C}$), and low relative humidity ($<20\%$) followed by heavy dew during the evenings. This causes the outer or primary style to turn brown and dry out, while the inner or secondary style remains unaffected inside the outer style and continues to develop and swell in size to result in longitudinal cracks in the outer tissue. The longitudinal cracks enlarge as the orange increases in size. The inner ovary projects even more as the orange approaches maturity. This results in a large, irregular-shaped navel-end and creates an ideal site for *Alternaria* infections.

Score (50 ml/100l water) and Folicur (80 ml/100l water) are registered for control of the disease.

GRONDGEDRAAGDE SIEKTES

M.C. PRETORIUS

AALWURMS

Grond- en wortelmonsters behoort nou in die lente getrek word en kan na die Diagnostiese Sentrum in Nelspruit gestuur word vir ontleding sodat die aalwurmpopulasie status in die wortels bepaal kan word. Die resultaat dien as 'n bestuurshulpmiddel om 'n doeltreffende aalwurmbeheerstrategie daar te stel wat koste effektief sal wees.

Die gebruik van chemiese aalwurmdoders vir die beheer van die sitrusaalwurm word nie aanbeveel alvorens ten minste 50 mm reën geval het nie (Oktober). Elke aalwurmdodertoediening behoort met 'n behoorlike besproeiing opgevolg te word om daardeur te verseker dat die middels deeglik in die grondprofiel ingewas word. Toedienings behoort slegs volgens etiket aanbevelings toegedien te word. Afwykings van die geregistreerde dosisse, om kostes te bespaar, is glad nie 'n effektiewe benadering nie.

PHYTOPHTHORA

Phytophthora wortelvrot - die gebruik van fosfonaat produkte is 'n uiters effektiewe en bekostigbare beheermaatreël wat suksesvol deur produsente gebruik word. Dit is van uiterste belang dat die etiket deeglik bestudeer word asook die waarskuwings voordat die produk gebruik word om effektiwiteit te verseker en fitotoksiteit te voorkom. Indien kraagvrotletsels voorkom kan 'n stamverf/blaarbespuiting aangewend word, drie aanwendings met 6-8 weke intervalle. Vir wortelvrotbeheer word 'n blaarbespuiting, twee tot drie blaarbespuitings met 6-8 weke intervalle aanbeveel.



DO's AND DON'Ts WITH FERTIGATION

J.G.K. COETZEE

Fertigation can be practised using microjets or drippers. However, the success of fertigation depends on a number of basic requirements. These can be grouped into the chemistry of the fertilisers, texture of the soil and rooting depth.

CHEMISTRY OF THE FERTILISERS

Some nitrogen sources leach much easier than others. Urea is the most susceptible to leaching followed by nitrate and least susceptible, ammonium nitrogen. When nitrogen is applied by means of microjets, it should be done during the last quarter of the irrigation cycle. However, the following irrigations are also very important and must be timed to wet only the top 20 cm layer of soil.

Wanneer stikstof deur druppers toegedien word, moet dit oor feitlik die hele lengte van die siklus geskied. Dit kan nie net gedurende 'n kort gedeelte van die siklus toegedien word nie. Dieselfde geld vir al die ander elemente soos fosfate, kalium-, magnesium- en kalsiumsoute.

Fosfate wat deur mikrospruite toegedien word is egter baie minder effektief as deur druppers. Wanneer die fosfate deur 'n mikrospruit uitgesprei word, is die konsentrasie per oppervlakte-eenheid baie laag. Gevolglik beweeg die fosfor omtrent glad nie en kom met min wortels in aanraking. Op sekere sanderige gronde word wel 'n reaksie verkry maar die suksesse is minder as 20%.

Application of phosphate where microjets are used, is more effective if the phosphate is placed in a narrow strip of about 10 cm wide, below the drip line of the trees.

GRONDTEKSTUUR

Onder druppers versprei die water meer lateraal hoe hoër die konsentrasie klei in die grond is. By sanderige grond is die verspreiding meer vertikaal as horisontaal en kan sekere kunsmiste maklik geloog word.

The application rate of water and fertilisers should be dictated by the texture of the soil and rooting depth of the trees. There are a number of rules based on averages one can follow, but the best is still to take a look at what is happening during and after irrigation.

ROOTING DEPTH

The single factor with the greatest impact on the efficiency of fertigation is the rooting depth. Fertilisers placed in the rooting zone are absorbed quite easily. Remember that roots love oxygen and would like to grow closer to the surface. The majority of active roots are usually in the top 30 cm layer. Ensure that the fertilisers are placed in this zone. Limit the deep application of fertilisers and concentrate on the top part of the root system.

Om die sproeibemesting met druppers effektief te maak, moet

die kunsmis in klein dosisse in die wortelsone geplaas word. Onthou dat die volume grond wat met druppers bemest word, veel kleiner is as wat met mikrosprute bemest word. Daarom moet die toedienings met druppers minstens elke week gedurende Julie tot Desember geskied. Slegs 3 tot 4 toedienings met mikrosprute moet gedoen word. Toedienings van sproeibemesting met mikrosprute verskil nie veel van die met die hand- of meganiese toerusting nie.

CROP LOAD & FRUIT QUALITY ENHANCEMENT

G.H. BARRY

Fruit set treatments according to cultivar requirements need to be applied. Specific treatments include the application of gibberellic acid (GA) and girdling. A general guideline cannot be given as fruit set treatments differ by cultivar and, in many cases, by orchard depending on previous crop load. Water stress must be avoided during the flowering and fruit set period.

Fruit growth must be optimised during stage 1 of fruit development. Optimal nutrition and irrigation practices are required. In addition, thinning practices (chemical or hand thinning) need to be applied where required to reduce inter-fruit competition and optimise fruit growth.

The acidity of fruit at harvest is largely determined within 6 weeks of fruit growth and development. Thereafter, only minor modifications to acidity can be achieved. Under conditions of anticipated high acidity at harvest, calcium arsenate can be applied approximately 6 weeks after full bloom. Specific concentrations for various cultivars can be found in the Production Guidelines for Export Citrus. However, depending on target market, growers should only apply this product where permitted by the importing country. An alternative product that has a lesser effect on acid reduction is mono-ammonium phosphate (MAP) applied at 1%, i.e. 1 kg per 100 litres of water, 6 weeks after full bloom. Please note that these phosphate sources have not been tested on all citrus cultivars; until now 1% MAP has reduced acidity on Valencia orange and Temple tangor, but not on grapefruit. A higher concentration, e.g. 5%, has worked well in Israel.

DIAGNOSTIESE SENTRUM

L. HUISMAN

Laura Huisman beveel aan dat produsente in boorde waar probleme met vrugsgrootte ondervind word, wortelmonsters neem vir aalwurmontledings. Dit is ook 'n geskikte tyd vir die instuur van *Phytophthora* grondmonsters vanaf die winterreënvalgebiede.

VOORLIGTING

H.F. LE ROUX

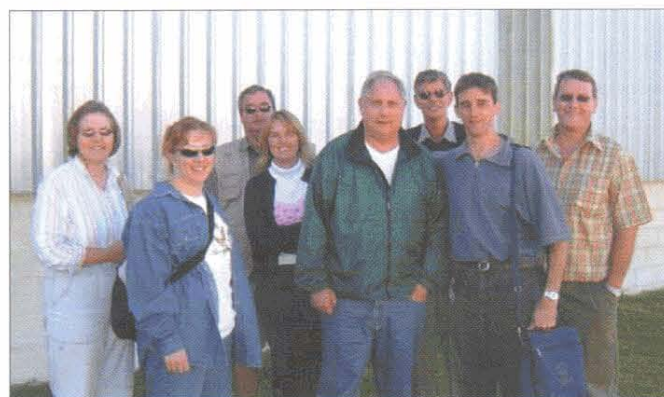
AREA-VOORLIGTINGS-BESTUURDER VERGROOT CRI SE VOORLIGTINGSKAPASITEIT



Die voorligtingskapasiteit van die CRI het 'n groot hupstoot gekry met die aanstelling van Hannes Bester as die areavorligtingsbestuurder vir die Wes-Kaap, Oos-Kaap, Noord-Kaap en sekere sitrusproduserende streke in Natal. Hannes, wat sy MSc onder Prof Etienne Rabe aan die Universiteit van Stellenbosch verwerf het in 1993, is 'n ou bekende in sitruskringe. Hy is in 1989 by Outspan Internasionaal as kwekeryadviseur in Nelspruit aangestel, het na die voltooiing van sy studies navorsing op kultivars en onderstamme gedoen totdat hy na die Wes-Kaap verplaas is. Hy was sedert 1999 Capespan se besigheidsbestuurder in die Wes-Kaap.

Hannes sal betrokke wees by 12 van die Kennisoordragings-groepe en dit sal sy verantwoordelikheid wees om te verseker dat elk van hierdie areas se navorsingsprioriteite bepaal word en aan die navorsers oorgedra word. Net so sal hy ook verantwoordelik wees om toe te sien dat die navorsingsresultate die produsente in sy gebied bereik. Hannes is getroud met Anneke en het twee kinders, Jessie en Leana. Hy sal by die CRI kantore in Port Elizabeth gestasioneer wees.

VISIT OF USDA PEST RISK SPECIALISTS TO SA



USDA Pest Risk Specialists visiting Saamfarm in the Northern Cape. From left to right: Ann Ferguson (USDA Pest Risk Assessment Advisor), Dr. Shaharra Usnick (USDA Risk Mitigation Specialist), Danie and Johanna Mathewson (Saamfarm), Paul Courneya (USDA Entomologist), Francois Moller (SAAFQIS), Jan Hendrik Venter (Plant Health), and Dr. Hennie le Roux (Manager: Extension, CRI) (Photograph by courtesy of Joey Coetzee).