SPRAY PROGRAMMES

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INTRODUCTION

Good pest and disease control depends on FOUR main aspects:

1. Clear identification of the pest or disease.
2. Selecting the best spray material for the job.
3. Applying it at the right time.
4. Applying it effectively.

When preparing a spray programme it is important to also consider:

- Spray compatabilities
- Phytotoxic effects
- Residues (especially for export)
- Safety

Spray programmes are usually prepared by technical people who consider many of these factors. The spray programme is a guide based on the best information available but it is the practical grower who must know his enemies, when to attack them and how to attack them effectively.

It is important that fruitgrowers adopt a professional approach to pest and disease control. Make sure all staff handling and applying pesticides have a good understanding of their job.

Help is available from a number of commercial firms and Government services. Please use this help.

I will briefly summarise the pests and diseases affecting kiwifruit with comments on the important aspects of control. Much of this has been well publicised in the references below. I will look closely at the fungus disease Sclerotinia to illustrate the main points about effective disease control.

KIWIFRUIT PESTS

1. LEAF ROLLER

This pest is most damaging to the kiwifruit crop within the first six weeks of fruit set. The single most important spray is the immediate post-blossom insecticide. Don't forget to check that all bees, brought in for pollination, have been removed from your locality before applying this spray..

Damage can also occur before blossom to young shoots and late in the season.

Check your orchard for alternative hosts. Most shelter species are hosts for leaf roller and should be sprayed with insecticides when necessary.

2. GREEDY SCALE

This pest has caused more difficulties for growers than others. Scale has a wide host range with crawlers being released for most of the summer and moving onto foliage and fruit. The main period of fruit infestation is January to May and control in this period is essential. Dormant sprays applied in late July-early August assist with control.

3. PASSION VINE HOPPER

This pest produces only one generation a year and can easily be controlled if recognised at the nymph stage on alternative hosts in gullies and waste areas. Spraying oil and insecticides can be used in these areas to prevent a build up of the population. This is a case where a stitch in time saves nine. Keep a close watch on alternative hosts (especially bracken fern) and spray as soon as the pest is

noticed. Once this insect moves onto kiwifruit it is difficult to avoid problems from sooty mould.

4. WHEAT BUG

This is a passenger pest which lives under grasses over the summer. Clean weed control around bin storage areas and packing sheds will eliminate this pest.

5. MITES

Occasional infestations of mite can occur, but as yet we have seen no major problems in kiwifruit.

DISEASES

1. RIPE ROT (Botryosphaeria)

This fungus caused some serious storage rot problems in the 1980/81 season but has been less of a problem in the 1981/82 year. There is some evidence that infection can occur during flowering as well as immediately pre-harvest.

The use of fungicides over flowering and seven days pre-harvest should contain this disease. Plant Diseases Division, DSIR, are continuing research into this disease to pin point the main infection period.

2. BOTRYTIS (Storage Rot)

This disease has been well studied and sprays at flowering time and immediately pre-harvest are important to its control. Again, research is continuing on this disorder.

3. SCLEROTINIA (White Rot)

I will examine this disease in more detail to illustrate the important points about disease control.

(a) Sclerotinia infection occurs during periods of warm wet weather. Infection occurs where spores are lodged against fruit in a position where moisture is retained for a few hours.

(b) Infection of male blossoms can occur as early as late November and female flowers and fruit are at risk from immediately pre-blossom until February.

(c) The spores are produced from small fruiting bodies, called apothecia, in the litter under kiwifruit vines. They are produced from small black sclerotes under the soil.

(d) Millions of spores are released under the right weather conditions.

(e) Infection is often caused by infection of petals which then infect the fruit.

To prevent infection from this fungus it is necessary to apply a fungicide protective cover to vines at the correct time. Horticultural Advisory Officers will be encouraging growers to search their own orchards for signs of infection of male blossoms early and to learn to recognise the tiny apothecia that release spores. The best time to look is following wet/showery weather but the fungus can be found in dry weather where the soil is damp and shaded.

The timing and duration of infection periods varies widely from season to season. Last year, the Te Puke area had almost continuous infection periods from December 2 until early January.

We hope that by looking for signs of infection in male flowers and finding the fruiting bodies on the soil, growers will be able to time sprays and obtain more certain control.

4. LEAF SPOT

A number of minor fungi will cause leaf and fruit spots on kiwifruit vines. This is not widespread but can be serious on individual

blocks. Vines under stress appear prone to these fungi.

5. PSEUDOMONAS VIRIDAFLAVA (Bud Rot)

This is a bacterial disease that has varied in intensity between seasons. Last year this problem was more widespread than usual. We still have no effective control measure for bud rot and trials with bacteriocide sprays during the summer hold out the best hope.

CONCLUSION

A spray programme is only the start of good pest and disease control.

General orchard hygiene, open pruning, weed control and wise use of irrigation all assist with producing a pest free crop.

Spray timing and coverage are as important as knowing the pests and the chemicals.

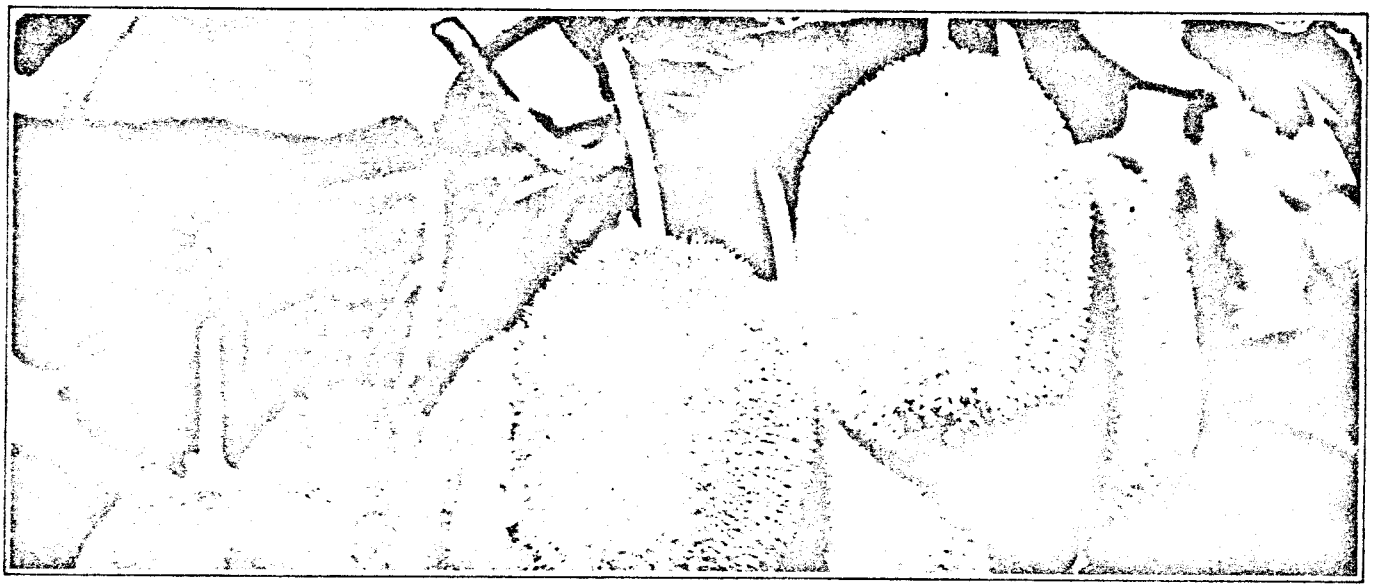
Horticultural Advisory Officers will be following up growers' progress in looking for Sclerotinia infection. We hope you can apply these same principles to help control other pests and diseases.

REFERENCES

Kiwifruit Pests - AgLink HPP 236, MAF
Kiwifruit Diseases - AgLink HPP 237, MAF
Export Spray Programme for Kiwifruit - MAF Pamphlet.
Proceedings of Kiwifruit Seminar, Tauranga, 1981 (MAF)

This article has been adapted from a paper presented by Russell Berry of Arataki Honey Ltd., to the conference seminar organised by the Northland Branch of the National Beekeepers' Association.

Arataki Honey Ltd., has been involved in pip and stone fruit pollination for over 30 years and kiwifruit pollination for seven years. Last year they put into the kiwifruit orchards 3 300 hives for the purposes of pollination.



No long term commitment by kiwifruit barons

SHOULD WE join Mr Muldoon and some civil servants and "Think Big" with the hive numbers required for kiwifruit pollination? Or should we take a more cautious, rational, flexible approach, to the numbers of beehives that may be required for kiwifruit pollination?

Many statements that we have seen published recently are based on eight hives/hectare, plus very large future plantings. Right now, in mature densely-planted kiwifruit areas, we are putting in an average of five hives/ha.

Using five hives/ha in mature orchards, and providing the kiwifruit industry does not go the same way as the boysenberry industry and dig out their vines, in 1985 we may require 25 000 hives of bees for kiwifruit pollination purposes, through New Zealand.

From here on, the suggested number of beehives to be used for kiwifruit pollination are only guestimates.

Some of the things that may influence hive numbers are profitability of growing kiwifruit; the price received for, and the amount of kiwifruit able to be sold; the profitability of using the land for other horticulture or farming purposes, and the changing of the minds of the kiwifruit orchardists of the number of hives required per hectare for pollination by artificial pollination, scientific research, increased density of orchards and lessening of competing nectar sources, and the availability of bees and their price.

As beekeepers it is up to us to have some knowledge of how kiwifruit orchardists can help themselves to get good reasonably priced pollination.

Think pollination before planting your orchards. Do not plant vines near other horticultural interests, which may put bees at spray poisoning risk because of the conflict of the spraying programme.

The position of your orchard will greatly affect the number of hives you'll require for your orchard pollination (competing nectar sources).

Keep access into and around your orchard as easy as possible for trucks and take care that what you plant in the shelter belts will not put bees at risk from spray poisoning at any time of the year.

Hives are often placed in at night by people who do not know your orchard. **Think safety!** Wires, pipes, wind shelter material above tracks can be very dangerous in the dark. I know people who've been knocked off the back of trucks by wires they couldn't see in the dark.

Kiwifruit only

Some problems some orchardists may have with the owning of their own hives are:

- Getting involved in a very demanding business, in which you may have great difficulty in employing a sufficiently experienced beekeeper, to assure you of good pollination of your kiwifruit.
- Owning sufficient beehives to be assured of enough good hives for pollination, when things have gone wrong, due to adverse weather conditions or farming techniques.
- The controlling of disease. If diseased hives get shifted into orchards, commercial beekeepers will be at grave risk of their beehives becoming diseased as well. They may become reluctant to place their beehives into the orchards.

If you are considering offering your hives for kiwifruit pollination, here are some of the costs involved: Learning how to do kiwifruit pollination; visiting orchardists and arranging orders; making your hives and your sites so that they are easily shifted out in all weather conditions.

Purchasing the necessary vehicles and plant for kiwifruit pollination, also arranging for back-up in case of breakdowns; the employing of extra staff that will be required for pollin-

ation work and back-up in case of illness; the additional farming of hives; shifting costs; consumption and loss of crop during pollination period; the effect on crop after pollination and the likely effect on other hives because of your commitment to pollination.

And too, the stress factor must be considered of having to commit yourself 100 per cent to the demands of kiwifruit, even to the extent of possibly starving other hives in your outfit.

But there are benefits involved: An income even in a bad honey producing year and having more trucks and more staff the rest of the year.

Horticulture's effect on all beekeepers

It will be essential to get the continued co-operation of horticulturalists, as they spread throughout New Zealand not only to see that no bees get put at risk from toxic sprays during the flowering period when bees are in the orchards, but also for the rest of the year, because in future, horticulture is always going to be only a short distance away from our bee hives in many parts of New Zealand.

In some areas there will be difficulty with overstocking of beehives during the summer period for efficient honey production because of the proximity to large horticultural areas requiring pollination at other times of the year.

Kiwifruit pollination is going to greatly increase the number of queens required from our queen breeders.

But remember, the orchardists have made no commitment to use our hives for pollination in the future, so do not build your business assuming that they will be required. Keep your options open, be able to supply large numbers of hives if required but also have an economic business with very little pollination. Think of the effects if artificial pollination becomes practicable in a few years.

It is essential to have good communication between beekeepers and all horticulturalists to give them the very best pollination service possible, which they are happy to pay us for. And remember, the cost of pollination is a cost of producing fruit, not a cost of producing honey.

Finally, if you are going to become involved in putting many hives into kiwifruit (and it involves long hours of night work), you may become difficult to live with, so a very tolerant, understanding wife (or a large dog box) is essential!

Arataki 1981 Estimated Costs Involved Per Beehive For Kiwifruit Pollination

1.	Extra farming cost per hive.	4.00
2.	Extra feed used – sugar or honey.	5.00
3.	S.I. 100 hives to depot.	3.50
4.	S.I. to orchards.	3.50
5.	S.O. from orchards to depot.	3.00
6.	S.O. from depots back to bee yards.	3.50
7.	Arranging location hives, sending out accounts, administration, overheads.	5.00
8.	Loss of 20 kg production at $1.25 per kg on hive.	25.00
	$	52.50

ARATAKI LETTER TO KIWIFRUIT GROWERS

September 14, 1981

Just a friendly reminder re SPRAYS

Dear Sir,

We do not wish to interfere with your economic farming of kiwifruit, but if you do choose to spray during the flowering period, we ask that you use extreme care in the protection of the bees.

We would recommend that spraying be done only when the bees are not flying, such as at night. And please – never ever – allow insecticide to be accidentally or intentionally, mixed with these fungicidal sprays during the flowering period. The results can be disastrous, not only for our beehives and other beehives in the area, but also to your kiwifruit crop and to your neighbour's crop, as there would be practically no field bees left in the hives to pollinate the remaining kiwifruit flowers.

I am sure that you will all co-operate in this, but the element of danger does still exist. Sprays might be applied to kiwifruit or surrounding crops in a manner that would kill bees and affect our later honey production. Charges at the moment do not cover this.

Beekeepers are the only ones who can estimate the cost to a beekeeper, of spray damage. If some hives in one area are damaged, all orchardists in that area will be charged more for hives:

Minor Bee Losses – The following year an additional increased charge to cover last year's spray damage.

Major Bee Losses – Increased charge this year on all hives in the area, to cover our losses.

A satisfactory outcome of this will determine whether we or other beekeepers can afford to put bees back into that area next year.

As I understand it, the Fruitgrowers Federation and Kiwifruit Growers will again be setting up a map which will indicate when hives are put in and when hives are taken out of the orchards, thus helping you to determine when it is safe to spray with a spray that may be toxic to bees. This, I am sure, will help to overcome any spray damage to our hives.

Please help us to keep pollination costs reasonable.

Thanks for your co-operation last year.

Russell Berry

R.A. BERRY.