Final report to:	Mr J Wickham GlaxoSmithKline Wallis House Brentford Middlesex TW8 9BD (Tel. 0208 560 5151)
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Project leader:	Roger Umpelby, ADAS Rosemaund
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AUTHENTICATION

I declare that this work was undertaken either, directly by me, or under my personal supervision according to the procedures described herein and that this report represents a true and accurate record of the results obtained.

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i. Background and objectives

Black currant leaf midge developed into a major pest of black currants during the late 1970s through the 1980s. The insecticides approved for leaf midge control, Metasystox and Fenitrothion, became less effective and have now been withdrawn. Work in the early 1900s identified Zolone as a very effective alternative, but it could only be used on crops for propagation, and it too has been withdrawn. It became clear however that Meothrin applied for black currant gall mite control gave extremely effective control of leaf midge, and as Meothrin use increased leaf midge problems diminished to almost undetectable levels on most farms. Some doubts have been raised about the future availability of Meothrin and it is therefore vital to identify alternative insecticides for leaf midge control. Additionally with the increased area of Ben Gairn and Ben Hope, it is likely that Meothrin usage will be minimal on these cultivars and leaf midge problems may increase. The possibility of decreased reliance on synthetic pyrethroids, such as Meothrin, presents the opportunity for the development of an IPM programme for black currants, but for this to be possible IPM compatible pesticides need to be identified.

The objectives of the study were:

1. to test the efficacy of a range of insecticides for the control of black currant leaf midge
2. to identify IPM compatible insecticides for leaf midge control

ii. Results and conclusions

In a replicated small plot experiment, control of black currant leaf midge damage acheived by 2 insecticides currently approved for use on blackcurrants, Dursban and Talstar, and 2 new IPM-compatible insecticides was compared to that achieved with Meothrin.

Sixty five percent of shoots in untreated plots were damaged by leaf midge and where Meothrin was used, the damage was reduced to 9%. Between 40 and 77%

of shoots were damaged by leaf midge where Dursban, and the two experimental IPM-compatible insecticides were used. Where Talstar was applied leaf midge damage was reduced to 6%.

One of the experimental IPM-compatible insecticides, Calypso, is already approved in the UK (on apples) and where it was used no aphids were recorded and capsid damage was reduced. This indicates a possible potential for incorporation in an IPM programme for these pests, although its' effect on leaf midge was poor.

iii. Recommendations

Leaf midge incidence has fallen to insignificant levels in commercial plantations in the past few years and there is evidence that, even in the absence of any treatment, it will take several years for populations to become damaging again. If Meothrin is withdrawn, Talstar applied for two-spotted spider mite control should give good incidental leaf midge control.

Given the identification of Talstar as an alternative to Meothrin, and the failure of the currently available IPM-compatible insecticides to give effective control, it is therefore recommended that no further work on chemical control of leaf midge should be undertaken until new IPM-compatible insecticides are developed.

2. Experimental Section

SUMMARY

A replicated small-plot study was done on a commercial plantation of black currants to identify alternative insecticides for control of black currant leaf midge. Treatments included Meothrin which although not specifically approved for control of this pest, is known to give excellent incidental control when applied for control of black currant gall mite. Two other products currently approved for control of other pests on black currants were included and two experimental insecticides. Optimum treatment timing was determined using water traps to monitor adult midges and each treatment was applied twice.

An assessment of leaf midge damage 20 days after the second treatment showed that 65% of shoots in the untreated plots were damaged by leaf midge. Where Meothrin had been applied damage was reduced to 8.8% and with Talstar to 6.2%. Other treatments, which included Dursban 4 and Calypso, gave little or no reduction in damage. Other pests were present and some effects of treatments were apparent, but none were significant.

INTRODUCTION

The black currant leaf midge (*Dasineura tetensi*) adults lay their eggs in the tips of young shoots and their larvae's feeding causes gross distortion of new growth and, in the worst cases, death of the growing point. This results in a substantial reduction in the amount of new growth produced, and of excessive branching which results in weak and unproductive growth for the following and subsequent years crop.

Due to the withdrawal of all the organophosphate insecticides which previously had a label recommendation for leaf midge control, there are currently no insecticides approved for control of leaf midge. Control at present is obtained by the incidental control obtained with Meothrin when applied for gall mite control. The introduction of gall mite or reversion resistant cultivars (Ben Hope and Ben Gairn respectively) means that the need for application of Meothrin, a broad-spectrum synthetic pyrethroid insecticide is likely to fall. Any such fall would provide an opportunity for the development of an IPM programme for control of the pest complex on

black currants. Regardless of this, where control of a pest is only known to be possible using a single product, it is advisable to identify alternatives in case the product currently used is suddenly withdrawn.

The study described below aimed to identify alternatives to Meothrin for leaf midge control, and to evaluate potential IPM-compatible insecticides.

MATERIALS AND METHODS

Site

Bradford on Tone, Taunton, Somerset

Variety

Ben Tirran

Plots

Plots were each part of a single row, plots were 8 metres in length.

Layout

Treatments were laid out in a randomised block design with 4 replicates of each treatment.

Treatments

The treatments listed in Table 1 were applied using a precision knapsack sprayer (hydraulic) at a medium spray volume, i.e. just to the point of run-off.

Treatments were applied twice, on 10 May 2001 and on 5 June 2001, these dates being determined by the activity of the adult black currant leaf midge as recorded in water trap catches.

TABLE 1. Treatments applied

Trt. No.	Trade name	Active ingredient (%)	Rate of use (dilution)
1	Untreated	-	-
2	Meothrin	Fenpropathrin (10)	100 ml per 100 litres
3	Dursban 4	Chlorpyrifos (48)	50 ml per 100 litres
4	Talstar	Befenthrin (10)	67 ml per 100 litres
5	Calypso	Thiacloprid (48)	75 g per 100 litres
6	Product A (low rate)	(not disclosed)	60 g per 100 litres
7	Product A (high rate)	(not disclosed)	80 g per 100 litres

Assessments:

1. Five yellow water traps were placed in the plantation in early May. The traps were placed on the ground under bushes randomly throughout the study area. The traps contained about 2 cm of water with a few drops of surfactant to reduce the surface tension and improve the retention of very small insects. The traps were emptied twice weekly until mid May and the contents were taken to the laboratory where the numbers of adult black currant leaf midge were recorded.

2. On 25 May 2001, 2 branches from each of 10 bushes in each plot were checked for the presence of: -

1. Old leaf midge damage to the shoot tips
2. New damage with live larvae
3. Caterpillar damage
4. Capsid damage
5. Aphid presence or damage
6. Other pest presence or damage

3. On 6 November after most leaves had fallen, the total length of extension growth made in 2001 was measured on 5 bushes per plot. The new extension growth measured included not only new shoots coming from the crown of the plant, but all of the new growth from previous seasons shoots.

Crop Husbandry:

The crop in the study area received routine fungicide and herbicide treatments throughout the growing season. No specific insecticides or acaricides were applied to the study area during the season other than the treatments applied to individual plots detailed in Table 1. Meothrin was applied to most of the rest of the crop but an additional untreated guard (unsprayed row) was included adjacent to the study area to minimise the risk of drift.

RESULTS and DISCUSSION

The results of the trapping of leaf midge adults are given in Table 2. The numbers are a sum of male and female midges trapped, of the total catch 27% were female and 73% male.

Table 2. Number of adult black currant leaf midge per trap

Date	Trap 1	Trap 2	Trap 3	Trap 4	Trap5
4 May	0	0	0	0	0
7 May	0	0	0	0	3
11 May	0	0	0	0	0
14 May	2	0	1	1	0
17 May	0	1	1	3	0
21 May	0	2	0	0	0
25 May	1	1	1	0	2
28 May	2	1	0	1	2
1 June	4	4	6	3	4
4 June	3	0	1	1	2
8 June	0	0	0	0	0
11 June	0	1	2	1	3

Table 3 gives the percentage of shoots damaged by leaf midge when assessed in late June after 2 treatments. The old leaf midge damage had occurred before the first treatment was applied and was caused by some very early emerging midge before trapping started.

Table 4 gives the percentage of shoots damaged or infested with the other pests recorded. Apart from aphid, caterpillar and capsid no other pest was present at significant numbers for an assessment to be made. It should be noted that the effect of the treatments on the other pests is only a guide because the timing of the sprays was targeted at leaf midge and may not have been appropriate for the other pests recorded in the assessments.

Table 3. Percentage of shoots showing old leaf midge damage or with live midge larvae causing new damage

Treatment	Old leaf midge damage	New leaf midge damage
Untreated	37.5	65.0
Meothrin	30.0	8.8
Dursban	27.5	40.0
Talstar	12.5	6.2
Calypso	35.0	48.7
Product A (low rate)	31.3	50.0
Product A (high rate)	42.5	77.5
Standard error (18 df)	*28.57*	*26.72*
CV (%)	*92.5*	*63.1*

Table 4. Percentage of plants with aphid, capsid or caterpillar damage or presence

Treatment	Aphid	Capsid	Caterpillar
Untreated	2.5	1.25	20.0
Meothrin	2.5	2.50	21.3
Dursban	11.3	1.25	12.5
Talstar	0	0	12.5
Calypso	0	0	20.0
Product A (low rate)	1.3	0	20.0
Product A (high rate)	3.8	0	11.3
Standard error (18 df)	*5.72*	*1.637*	*8.03*
CV (%)	*188.5*	*229.1*	*48.0*

The results clearly show that Meothrin gave a high level of control of black currant leaf midge damage compared to the untreated control, with Talstar also demonstrating a similar very strong activity. Dursban is the only other product currently approved on black currants, but leaf midge control was poor and would not be acceptable commercially. A similar poor result was obtained with Calypso and the experimental compound, neither of these compounds are

likely to be approved on black currants in the near future. Although the study achieved one of its objectives, by identifying Talstar as a very good alternative to Meothrin for leaf midge control, it did not achieve its other objective of identifying an IPM-compatible alternative.

Assessment of the incidental control obtained of other pests was not conclusive, although there were some promising signs of activity. The results indicated that caterpillar damage appeared to be extensive, but all the damage was very small and transient and had been caused before the treatments were applied. Aphid and capsid damage levels were very low, but no capsid damage was seen in plots treated with Calypso or Product A, nor was any aphid damage seen where Calypso had been applied. Similarly Talstar treated plots showed no damage from aphids or capsids.

CONCLUSIONS

Talstar gave a similar level of control of black currant leaf midge to the standard treatment Meothrin. Other materials tested did not give an acceptable level of control.

No IPM-compatible insecticides for leaf midge control were identified.

RECOMMENDATIONS

Leaf midge incidence has fallen to insignificant levels in commercial plantations in the past few years and there is evidence that, even in the absence of any treatment, it will take several years for populations to become damaging again. If Meothrin is withdrawn, Talstar applied for two-spotted spider mite control should give good incidental leaf midge control.

Given the identification of Talstar as an alternative to Meothrin, and the failure of the currently available IPM-compatible insecticides to give effective control, it is therefore recommended that no further work on chemical control of leaf midge should be undertaken until new IPM-compatible insecticides are developed.

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