SHORT COMMUNICATION

PROGRESS IN THE USE OF INSECTICIDES FOR THE CONTROL OF THE SUGARCANE THRIPS *FULMEKIOLA SERRATA* (KOBUS) (THYSANOPTERA: THRIPIDAE) IN SOUTH AFRICA

LESLIE GW and MOODLEY S

South African Sugarcane Research Institute, Private Bag X02, Mount Edgecombe, 4300, South Africa
graeme.leslie@sugar.org.za *suran.moodley@sugar.org.za*

Abstract

Field trials examined the efficacy of insecticides against *Fulmekiola serrata* (Kobus) (Thysanoptera: Thripidae). Their aim was to determine the possible effect of timing insecticide applications on thrips numbers and crop yield, in relation to the December/January thrips population peak. Products selected for testing were the nematicides oxamyl and aldicarb as well as the insecticides imidacloprid and chlorphenapyr. A commercial formulation of a thrips-specific strain of *Beauveria bassiana* was also tested.

During the first trial in 2006-2007, it was evident that plant crops were more severely affected by *F. serrata* than ratoons. Accordingly, a later trial included planting date as a treatment with crops planted monthly from September to December 2007. Frequency of application was also examined, with foliar treatments being applied at two and three weekly intervals at each planting date.

Results showed that treatments applied before the thrips peak significantly increased yield, increasing tons sucrose/ha by between 13% and 30%; nematicides and imidacloprid were the more effective products tested.

Keywords: sugarcane, *Fulmekiola serrata*, insecticides, nematicides, pest control

Introduction

The sugarcane thrips, *Fulmekiola serrata* (Kobus) (Thysanoptera: Thripidae) has become a serious pest of sugarcane cultivated in southern Africa. As one possible approach to controlling this pest, the role of insecticides is being investigated, an approach that has been used successfully in other crops as well as sugarcane (Lewis, 1997).

Previous studies have shown that, in South Africa, thrips numbers peak in December or January (Keeping *et al.,* 2008). Additionally, it is young, plant sugarcane that is most severely affected (Anon, 2006). The trials reported here aimed at examining the effects of timed insecticide application in relation to the peak in thrips numbers, as well as planting date.

Materials and Methods

Trial 1: November 2006 to February 2007
Insecticides were applied twice, a month apart, at monthly intervals from November to February to a field of plant N39 planted in October 2006. The trial comprised 96 plots; gross

plots were five rows by 14 metres, and the nett plots three rows by 10 metres. Each treatment (product by time combination) was replicated six times in a randomised design, which included untreated controls. The products used were oxamyl (Vydate) at 60 ml/100 m row, chlorphenapyr (Hunter) 500 ml/ha and imidacloprid (Bandit) at 3 ml/100 m row. Products were applied in 250 L water/ha using CP3 hydraulic sprayers. Flat fan nozzles were rotated so that the spray fan was parallel to the cane row. Products were applied to the centre of rows to maximise coverage of the spindle area.

Trial 2: September 2007 to February 2008
In this trial the variety N27 was used as it is considered to be one of the more thrips susceptible varieties cultivated. Products were applied in the furrow at planting, or to foliage as the crop developed. Insecticides were applied to crops planted at monthly intervals commencing in September 2007 and ending in December 2007. At each of the four planting dates, treatments (and untreated controls) were replicated six times in a randomised block design. Gross plots comprised seven rows by 12 m, nett plots five rows by 10 m.

The products and rates used were as follows:

Two products were applied at planting; Aldicarb (Temik) at a rate of 240 g/100 m row and Vydate, at a rate of 360 g/100 m row, followed by a foliar application of 60 ml/100 m row. In one treatment, Temik was re-applied at two monthly intervals until February 2008. The remainder were foliar applications, commencing after the development of three to four green leaves. Hunter was applied at 500 ml/ha, Bandit at 6 ml/100 m row and the pathogen (a *Beauveria bassiana* formulation) at an initial rate of 1 L/ha and subsequently at 500 ml/ha. Hunter, Bandit and the pathogen were applied at two and three weekly intervals at each of the four planting dates until February. Products were applied using the same methods used in Trial 1.

Sampling
In Trial 1, thrips numbers were monitored by collecting nine spindles (six in Trial 2) from the nett rows of each plot (three from each row). Spindles were bagged in the field; thrips were extracted in water in the laboratory and counted under a microscope. Samples were collected monthly from November 2006 to February 2007 (Trial 1) and September 2007 to February 2008 (Trial 2). Yield estimates following standard South African Sugar Research Institute procedures were taken just before the crops were harvested, 12 months after planting. In addition the growth of the crop was monitored in Trial 2. The height of four stalks per plot was measured monthly from the first month after crop emergence until May 2008.

Results and Discussion

Impact of treatments on thrips numbers
In Trial 1, no significant effect of treatments on thrips numbers was recorded at all application dates. However, there was a trend for numbers to be lower than the control in the November-December Vydate treatment compared to other treatments (December-January, January-February and February-March applications).

In Trial 2, some treatment/planting date combinations significantly lowered thrips numbers compared to the controls. However repeated sampling over time and planting date showed no consistent trend for any particular treatment to reduce numbers significantly. From such findings, it was thought that, possibly due to rapid reinfestation by thrips, such sampling may

not reflect the true impact that treatments may have. For this reason, crop growth measurements were initiated in Trial 2.

Impact of treatments on stalk length

Stalk length measurements showed that, at every planting date except October, stalks in the Vydate and Temik treatments were significantly taller than the controls. The lack of response in the October 2007 plant is ascribed to 94 mm of rain falling the week after the treatments were put down. Interestingly, only in the September planting did any other treatment (foliar applied Bandit) significantly improve stalk length.

Impact of treatments on crop yield

Shown in Tables 1 and 2 are the yield estimates (tons sucrose/ha) obtained from the two trials. In Trial 1 (Table 1) two of the three treatments (Vydate and Bandit) significantly increased crop yield in the November-December application. Only at one other date did a treatment (Vydate) significantly improve yield.

Table 1: Effect of staggered applications of three insecticides on crop yield (t. sucrose/ha) in Trial 1.

Product		Application period			
		Nov-Dec 2006	**Dec 2006-Jan 2007**	**Jan-Feb 2007**	**Feb-Mar 2007**
Hunter	Treated	6.6	7.1	6.8	6.8
	Control	6.6	6.8	6.4	6.8
Bandit	Treated	7.4*	6.6	6.9	6.7
	Control	6.6	6.8	6.4	6.8
Vydate	Treated	8.1*	7.1	7.3*	6.9
	Control	6.6	6.8	6.4	6.8
LSD 0.76					

* = Treatments significantly greater than the control at the 0.05% level

In Trial 2, the only treatments that significantly increased yields were Vydate, Temik and Bandit (Table 2). Vydate and Temik were effective in the September and November planted crops, while Bandit, applied at two-weekly intervals, was effective only in crops planted in September and October. As noted earlier, the lack of effect of the nematicides in October can probably be related to rainfall, and it is probable that these products are effective in plantings from September to November.

Interestingly, no product was effective in the December planted crop. This is surprising since the nematicides had proved to be effective at earlier planting dates. A possible explanation is the stage of development of the crop in relation to the peak in thrips numbers. It is known that thrips numbers peak over December/January and thereafter decline rapidly. It may well be that, while young shoots were exposed to the high January thrips populations, recovery was rapid due to the decline in thrips pressure in the following months.

While the effectiveness of the nematicides has been demonstrated, it remains to be determined what proportion of the yield benefit is due to the control of nematodes and what proportion can be ascribed to the control of thrips.

Table 2: The effect of various treatments on crop yield (t. sucrose/ha) in crops planted at different dates (Trial 2).

Treatment		Month of planting			
		Sept	Oct	Nov	Dec
Control		6.73	5.87	5.90	6.19
Vydate		8.29*	6.61	7.05*	5.49
Aldicarb	at plant	8.22*	5.80	6.90**	5.75
	repeat applic	8.53*	6.02	7.73*	5.28
Hunter	2 weeks	6.96	5.78	5.61	5.32
	3 weeks	6.14	5.14	5.40	5.24
Bandit	2 weeks	8.31*	6.94*	5.66	5.30
	3 weeks	7.15	6.31	6.71	5.24
Pathogen	2 weeks	6.61	5.31	5.61	5.50
	3 weeks	5.92	4.85	6.05	6.14
LSD 0.05		1.35	0.99	1.16	1.62
LSD 0.10		1.12	0.83	0.97	1.35

* = Treatments significantly greater than the control at the 0.05% level
** = Treatments significantly greater than the control at the 0.10% level

Conclusions

The products, Vydate Temik and Bandit were the more effective products tested as measured by crop yield. These products significantly increased tons sucrose/ha. in crops treated or planted over the September, to November period.

REFERENCES

Anon (2006). Thrips Update. The Link, Vol. 15, No. 2. South African Sugarcane Research Insitute, Mount Edgecombe, South Africa.

Keeping MK, Butterfield M, Leslie GW and Rutherford SR (2008). Initial measures for management of sugarcane thrips. The Link, Vol. 17, No. 3. South African Sugarcane Research Insitute, Mount Edgecombe, South Africa.

Lewis T (1997). Chemical Control. pp 567-593 In: Lewis, T (Ed.) *Thrips as Crop Pests*. CAB International, Wallingford, UK.