SHORT, NON-REFEREED PAPER

DEVELOPMENTS IN THE USE OF INSECTICIDES FOR THE CONTROL OF THE SUGARCANE THRIPS *FULMEKIOLA SERRATA* (KOBUS) IN SOUTH AFRICA

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Abstract

Over two seasons, two trials were conducted to assess the at-planting use of insecticides for the suppression of *Fulmekiola serrata* (Kobus) (Thysenoptera: Thripidae) in sugarcane. Products tested in the first trial were two formulations of imidacloprid as well as aldicarb and oxamyl. In the second trial three rates of each imidacloprid formulation were tested and two rates of carbofuran. Crops were planted monthly from October to December in the first trial and from September to December in the second. The imidacloprid formulations, in both trials, were the more effective. In the first trial these significantly improved tons sucrose/ha in the November planted crop, showing a yield increase of between 20.7% and 21.7% compared to the control. In the second trial yield responses (tons sucrose/ha) were also obtained from these formulations. Depending on rate and formulation, significant increases of between 40% and 49% were obtained in the September planted crop. In the first trial, at the time of peak thrips pressure (January), oxamyl and an imidacloprid formulation significantly reduced numbers, but only in the November planted crop. In the second trial, only imidacloprid formulations significantly reduced numbers at all planting dates.

Keywords: crop protection, *Fulmekolia serrata*, insecticides, pest control, thrips

Introduction

Since 2004 the sugarcane thrips *Fulmekiola serrata* (Kobus) (Thysenoptera:Thripidae) has become a serious pest of this crop in southern Africa (Way *et al.,* 2006). Approaches to control include planting date, variety choice and insecticide use (Keeping *et al.,* 2008). Recent trials have indicated that use of an insecticide can be effective against thrips (Leslie and Moodley, 2009) and Bandit® 350 SC (imidacloprid) is now registered for use against this pest in sugarcane. This product can be applied as a foliar spray or an in-furrow application at planting. The latter approach was investigated in the trials reported here.

Materials and Methods

Two trials were conducted, one in 2008 and the other in 2009. Products tested were Bandit® 350 SC (imidacloprid); suSCon Maxi®, a CR granule formulation of imidacloprid; Temik® (aldicarb), Vydate® (oxamyl) and Curatter® (carbofuran). Rates applied are shown in Table 1.

Trial plots comprised six rows*12 metres with six replicates per treatment. Treatments were applied (in the furrow) to crops planted monthly from September to December (October to December 2008 trial). The variety N27 was used as it is among the more susceptible varieties to thrips.

Monthly assessments were made of thrips numbers by sampling six randomly collected spindles diagonally across each plot. Yield estimates were taken 12 months after planting for each crop following standard SASRI practices.

Results

Shown in Table 2 are the counts of thrips for each treatment in the two trials. Only counts sampled in January are presented as it is in this month that thrips numbers are highest and so treatment impact greatest.

In the 2008 trial thrips numbers were significantly suppressed in the November planted crop in the Vydate, Bandit and suSCon Maxi treatments. At a lower level of significance suSCon Maxi also reduced thrips numbers in the December planted crop. No other treatment did so and no treatment reduced numbers in the October planted crop.

Table 1. Treatments, rates applied and application frequency in two thrips control trials.

Product	Rate applied	Frequency of application
2008 Trial		
Temik 1	2.4 g/m row	At planting
Temik 2	2.4 g/m row	At planting, then every two months until February
Vydate	3.6 g/m row	At planting, then 60 ml/100 m row after one month
Bandit	1 L/ha	At planting
suSCon Maxi	1.5 g/m row	At planting
Control		Untreated
2009 Trial		
Bandit	1, 2 and 3 L/ha	At planting
suSCon Maxi	1, 1.5 and 2 g/m row	At planting
Curatter	15 and 30 kg/ha	At planting
Control		Untreated

In the 2009 trial, most treatments significantly reduced thrips numbers in crops planted in September, October and November. Fewer treatments did so in the December planted crop.

Treatment effect on crop yield (tons sucrose/ha) in the two trials are summarised in Table 3. In the 2008 trial, Bandit, suSCon Maxi and Temik significantly increased crop yield in crops planted in November and December. No treatment increased yield in the October planted crop.

In the 2009 trial Bandit and Curatter at all rates tested and suSCon Maxi at the highest rate tested significantly improved yield in the September planted crop. No treatment significantly increased yield in the October planted crop and only suSCon Maxi (at 1.5 g rate) and Bandit (at 1 L/ha) increased yield in the November and December planted crops respectively.

Table 2. The effect of treatments on thrips numbers in two trials.

2008 Trial					2009 Trial					
Product	Rate	Plant month			Product	Rate	Plant month			
		Oct	Nov	Dec			Sept	Oct	Nov	Dec
Vydate	3.6 g/m row	212.8*	145.0 $	167.5	Curatter	30 kg/ha	103.7#	139.7$	255.2$	194.0
Temik 1	2.4 g/m row	207.8	216.3	185.2		15 kg/ha	109.5#	98.3$	343.7	221.5
Temik 2	2.4 g/m row	186.2	212.2	218.0	Bandit	3 L/ha	56.3$	61.0$	270.5#	164.0
Bandit	1 L/ha	164.8	91.50 $	168.8		2 L ha	65.7$	129.7$	199.3$	169.5
suSMax	1.5 g/m row	258.8	147.3$	160.2#		1 L ha	93.2$	110.3$	308.2	137.2#
					suSMax	2.0 g/m row	78.5$	74.5$	189.2$	109.3$
Control		211.3	220.0	237.8		1.5 g/m row	97.8	79.8$	203.2$	220.0
						1.0 g/m row	48.5$	52.3$	264.8 $	134.8#
LSD 05		148.8	72.8	87.6						
LSD 10		123.7	60.5	72.8	Control		168.7	215.5	356.7	255.8
					LSD 05		71.6	74.8	89.5	125.3
					LSD 10		59.7	62.3	74.6	104.4

* = values are total thrips/plot averaged over six pots/treatment.
$, # = values significantly different from the control at 0.05% and 0.10% levels respectively.

Table 3. The impact of insecticide treatments on crop yield (tons sucrose/ha) for crops planted at different dates in two thrips control trials.

2008 Trial					2009 Trial					
Product	Rate	Month of planting			Product	Rate	Month of planting			
		Oct	Nov	Dec			Sep	Oct	Nov	Dec
Vydate	3.6 g/m row	8.40	8.44	6.58	Curatter	30 kg/ha	4.77*	5.45	5.05	3.05
Temik 1	2.4 g/m row	8.05	9.32*	6.77		15 kg/ha	4.65$	5.23	4.37	2.67
Temik 2	2.4 g/m row	7.97	9.08$	7.37	Bandit	3 L/ha	5.36*	5.69	5.05	3.23
Bandit	1 L/ha	8.99	9.64*	7.51$		2 L/ha	5.23*	5.80	4.23	3.40
suSMax	1.5 g/m row	8.46	9.72 *	7.71*		1 L/ha	5.59*	5.56	4.61	3.67*
					suSMax	2.0 g/m row	5.71*	6.13	4.66	3.40
Control		8.41	7.99	6.45		1.5 g/m row	4.30	5.81	5.71*	3.32
						1.0 g/m row	4.40	5.24	4.50	2.96
LSD 05		1.91	1.11	1.19						
LSD 10		1.59	0.92	0.99	Control		3.82	5.15	4.30	2.59
					LSD 05		0.89	1.12	1.00	1.07
					LSD 10		0.74	0.93	0.84	0.89

*, $ = values significantly different from the control at 0.05% and 0.10% levels respectively.

Discussion

In the 2008 trial there was generally a good association between the impact of treatments on thrips numbers and yield in the imidacloprid treatments (Bandit and suSCon Maxi). Yield increases (tons sucrose/ha) ranged between 16.4% and 21.7% for these two formulations. The lack of effect of the Temik treatment on thrips numbers, but significant effect on yield, may in part be attributable to the nematicidal effect of this product where yield increases of between

13.6% and 16.6% were recorded. However, in the 2009 trial, there was a poor association between the control of thrips and crop yields at all planting dates except September, where yield responses from the imidacloprid formulations ranged between 36.9% and 49.5% increase in tons sucrose/ha.

While the insecticides were taken up by the crop (giving good thrips control), crop yields were nevertheless poor. A possible explanation may be the severe drought experienced in the region during 2010. A simple crop modelling exercise showed that estimated yields (tons cane/ha) for all planting dates were poor. The least effected crop was the September planting, which had good rain in the early stages of growth. Interestingly, it was the only crop showing significant treatment effects on yield. It thus seems probable that, while there was sufficient uptake of insecticides in all crops to reduce thrips numbers, subsequent crop development was so poor that thrips control had little effect on yield.

Conclusions

In the 2008 trial, where treatments significantly reduced thrips numbers, improved yields resulted.

In the 2009 trial, although thrips numbers were reduced by all treatments at all planting dates, a yield response was only shown in the September planted crop. The lack of a similar response at later planting dates was attributed to drought conditions during the growth of these crops.

In both trials imidicaloprid formulations were the more effective products tested.

Acknowledgements

Thanks to A Singles and P Sithole who provided the crop modelling analyses.

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