

SUGAR BEET

COMPARISON OF GRANULES AND SEED TREATMENTS FOR PEST CONTROL ON LIGHTLY INFESTED LAND, 1992

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Summary

A trial was conducted on a sandy loam soil (Ashley series) at Morley to evaluate the effects of seed treatments on pests and beet. NAS 731 and Force (both without methiocarb seed treatment) improved beet populations compared with the granule treatments NAS 732 and Yaltox (both without methiocarb) and Oncol (with methiocarb). NAS 731 and NAS 732 reduced the number of insect bites on crop leaves significantly by comparison with many of the other treatments. Beet yields, sugar content and sugar yield were not affected by treatment.

Object

To compare the effects of different granule and seed treatments on pest populations and beet growth on sugar beet fields known to have a light pest infestation that did not include Docking Disorder.

Introduction

Granule treatments are commonly used at drilling to prevent seedling loss by soil pests. The pelleting process lends itself to inclusion of pest control chemicals in close contact with the seed. Whilst this could aid efficacy, it might result in seedling damage. This trial seeks to evaluate the effects of these treatments on beet populations, vigour and yield as well as on pest activity.

*Not for publication without the Director's consent. This report deals primarily with only one year's work, so any conclusions given are only provisional.

Method

The trial was a randomised block, replicated four times. Plot size was 24 m long by 3 m (6 rows) wide. The granules were applied by a Matco granular applicator attached to a 6 row Matco Monocentra sugar beet drill. The trial area received all commercial farm inputs except insecticide sprays (details are available in the Appendix).

Treatments

Without methiocarb

- Untreated
- NAS 731
- NAS 732
- 10 g/10 m row Temik
- 6 g/10 m row Yaltox
- 3 g/10 m row Oncol
- 10 g/10 m row Force

With methiocarb

- Control
- 10 g/10 m row Temik
- 6 g/10 m row Yaltox
- 3 g/10 m row Oncol

Appendix Table A3 gives details of active ingredients.

Assessments were made at intervals through the season. Beet vigour scores used a 0 to 10 linear scale where 0 = dead and 10 = normal healthy growth. Full details of the assessment records are available in the Appendix.

Results

Beet populations

The early count on 12 May showed no significant difference between treatments. However, at the 4 to 8 leaf stage of the beet on 29 May the NAS 731 and Force treatments resulted in beet populations above those for NAS 732 and Yaltox treatments without methiocarb and Oncol with methiocarb (Table 1).

A later count on 30 June showed that these two treatments resulted in significantly higher beet populations than NAS 732, Yaltox and Oncol each without methiocarb and Temik and Oncol with methiocarb (Table 1).

Crop effects

There was no difference between treatments for either beet vigour assessed on 7 May and 30 June or crop greenness on 22 September.

Table 1. *Effect of seed treatment on beet populations ('000s/ha)*

Treatments	12 May	29 May	30 June
without methiocarb			
untreated	97.9	91.5	90.4
NAS 731	99.7	98.3	99.2
NAS 732	93.2	86.3	85.4
Temik	93.7	95.0	92.2
Yaltox	88.2	83.5	79.4
Oncol	91.5	91.3	88.0
Force	102.7	100.0	99.3
with methiocarb			
control	99.7	95.2	90.5
Temik	90.5	89.3	88.5
Yaltox	110.2	95.4	91.4
Oncol	89.0	83.8	86.3
LSD	NS	9.02	8.81
SE per plot (30 df)	7.88	6.25	6.10
or as % GM	8.3%	6.8%	6.8%

However, Table 2 shows that the number of insect bites on the leaves on 29 May after treatment with NAS 731 and NAS 732 was significantly less than the untreated, Force alone, the control with methiocarb and Temik with or without methiocarb.

There was no significant difference between number of insect bites on the roots of beet when assessed on 29 May.

Beet yields, sugar content, and sugar yield were not affected by treatment.

Table 2. *Number of insect bites per plant, on 29 May*

Treatments	On leaves	On roots
without methiocarb		
untreated	89	23
NAS 731	26	17
NAS 732	25	18
Temik	63	28
Yaltox	40	23
Oncol	47	24
Force	80	25
with methiocarb		
control	107	25
Temik	62	36
Yaltox	45	27
Oncol	45	26
LSD	24.5	NS
SE per plot (30 df) or as % GM	17.0 29.7%	8.8 35.7%

Discussion and conclusions

The results show that all treatments resulted in satisfactory beet populations even though there were significant losses with some treatments. NAS 731 and NAS 732 both reduced the incidence of leaf damage by insects when compared to some other treatments, but the incidence of damage was not sufficient to affect beet yield. On more severely infected fields this level of protection could prove beneficial.

NAS 731 seed treatment is likely to become available commercially and offers additional benefits in the form of foliar protection when compared to Force.

The following information is presented as an Appendix which is available on request:

1. Field details
2. Method
3. Table A1 - active ingredients of treatments
4. Experiment diary
4. Results
 - Table A2 - scores for beet vigour and greenness
 - Table A3 - effect of treatments on beet and sugar yield

Field details

Crop: Sugar beet **Variety:** Saxon
Field reference: 7M **Site:** Bayle Field, Morley, Norfolk

Previous crop: 1991 Winter wheat
1990 Winter beans
1989 Winter wheat
1988 Sugar beet

Soil type and series: Sandy loam (Ashley series)

Seed rate: 1.2 kg/ha **Date sown:** 11 April

Nutrients applied prior to sowing:

10 October 1991	P	32 kg/ha
	K	204 kg/ha
	Mg	56 kg/ha
	Na	153 kg/ha
	B	1 kg/ha
	+ FYM	

Cultivations:

November 1991 ploughed (25 cm)
10 April Roterra

Applications to crop:

23 April	40 kg/ha N as Urea
14 May	80 kg/ha N as Nitram
14 May	1.0 kg Goltix WG (metamitron, 700 g ai/kg) + 2.0 l/ha Betanal Tandem (phenmedipham, 80 g ai/l; ethofumesate, 100 g ai/l)
5 June	2.3 l Betanal E (phenmedipham, 114 g ai/l) + 1.0 l Magnum (chloridazon, 275 g ai/l; ethofumesate, 170 g ai/l) + 1.5 l/ha Avadex BW (tri-allate, 400 g ai/l)

Method

The trial was a randomised block design replicated four times with plots 24 m long by 3 m (6 rows) wide.

Granular treatments were applied with a tractor mounted Matco granular applicator driven from a land wheel.

Beet populations were assessed by counting plants on two 20 m row lengths at Morley. The two middle rows of the plot were used for these assessments.

Weed and beet vigour scores used a 0 to 10 linear scale where 0 = dead and 10 = normal healthy plants.

Counts for bites per leaf or root were assessed on 20 plants per plot taken randomly from rows 2 and 5, (rows 1 and 6 being the outer rows of the plot).

Treatments were harvested with a modified Standen self propelled Cyclone Mark II single row sugar beet harvester. Yields were assessed on 20 m lengths of the two centre rows of each plot.

Assessments of clean beet yields and sugar content were made in the Morley tare house. Beet were washed in a Cocksedge high water pressure continuous barrel washer and then sliced by a Cocksedge high speed saw machine. The brei produced was then analysed with a standardised Thorn EMI NPL automatic polarimeter type 243 to determine sugar content. Two 26 g samples of brei were each digested with 177 ml of basic lead acetate for a minimum of 4 and a maximum of 10 minutes, and then filtered. The filtrate was passed through the polarimeter and sugar content recorded. A variation of more than 0.4 % sugar necessitated a repeat of the two samples.

Table A1. *Active ingredients of treatments*

Product	Active ingredient
Force	10 g ai/seed unit tefluthrin
Methiocarb	2 g ai/kg methiocarb
Oncol	100 g ai/kg benfuracarb
Temik	100 g ai/kg aldicarb
Yaltox	50 g ai/kg carbofuran

Experiment diary

11 April 1992	(trial drilled and granular treatments applied)
Weather	hazy sun, 17°C wind SW force 1 to 2, dry
Soil	fine and friable
7 May 1992	(score for beet vigour)
Beet	cotyledon
12 May 1992	(beet population count)
Beet	cotyledon to 2 leaves
29 May 1992	(counts of beet population and number of bites per leaf and root)
Beet	4 to 8 true leaves
30 June 1992	(beet population counts and vigour scores)
Beet	meeting in rows
22 September 1992	(crop greenness score)
Beet	100% crop cover
13 October 1992	(harvest)
Weather	cloudy, 18°C, wind SW force 4
Soil	moist and firm
Crop	100% crop cover
19 October 1992	('tare-housing')
Beet	stored in bags

Results

Table A2. Scores for beet vigour and greenness

Treatments	Vigour		Beet greenness 22 September
	7 May	30 June	
without methiocarb			
untreated	8.8	8.8	7.1
NAS 731	8.5	9.5	7.8
NAS 732	8.0	9.3	7.6
Temik	8.5	9.8	6.8
Yaltox	7.8	9.0	7.6
Oncol	8.5	9.8	7.5
Force	9.0	9.8	7.0
with methiocarb			
control	9.3	9.3	7.1
Temik	8.5	9.8	7.6
Yaltox	8.3	9.3	7.1
Oncol	9.3	9.5	7.4
LSD	NS	NS	NS
SE per plot (30 df) or as % GM	0.67 7.8%	0.67 7.1%	0.58 8.0%

Table A2. *Effect of seed treatments on root and sugar yield at Morley*

Treatments	Beet yields (t/ha)	Sugar content (%)	Sugar yield (t/ha)
without methiocarb			
untreated	63.9	18.5	11.8
NAS 731	65.6	18.7	12.3
NAS 732	63.2	18.6	11.8
Temik	64.6	18.5	11.9
Yaltox	62.3	18.7	11.7
Oncol	63.5	18.4	11.7
Force	64.6	18.5	12.0
with methiocarb			
control	66.2	18.5	12.2
Temik	65.4	18.7	12.2
Yaltox	64.8	18.9	12.2
Oncol	63.4	18.6	11.8
LSD	NS	NS	NS
SE per plot (30 df) or as % GM	2.43 3.8%	0.23 1.3%	0.47 3.9%