THE EFFECTS OF SOME POST-EMERGENCE HERBICIDE TREATMENTS ON A RANGE OF SUGARCANE VARIETIES GROWN IN SOUTH AFRICA

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ABSTRACT

A number of post-emergence herbicide treatments were tested for their phytotoxic effects on plant and first ratoon crops of six South African cane varieties. Treatments were applied at twice the standard recommended rates to plant cane but at the recommended rates only to the first ratoon crop. Herbicides were sprayed directly over the sugarcane foliage which had 5-7 leaves unfurled at the time of spraying.

Varying susceptibility of the varieties was evident from early stalk height measurements, in the effects on cane leaves and in the final yield. No good relationship existed however, between early growth retardation and the yield at harvest because of varying extents and rates of growth of the six varieties after treatments.

In the plant crop, herbicide treatments inhibited flowering of varieties N52/219, NCo 293 and N11 and any detrimental effects of the herbicide treatments were masked by low yielding unsprayed plots in which the cane flowered. No flowering occurred in N8, NCo 376 and N55/805. Of these varieties N8 was the most severely affected by alachlor + atrazine + paraquat, diuron + 2,4-D + surfactant (S) and ametryne + 2,4-D + S. N55/805 was more susceptible to alachlor + atrazine + paraquat than to ametryne + 2,4-D + S and was tolerant to diuron + 2,4-D + S. NCo 376 was equally affected by all treatments in terms of tons cane per hectare.

Yield results of the ratoon crop are not yet available but early growth measurements indicate that NCo 293 and NCo 376 are particularly tolerant to diuron + metribuzin. Diuron + hexazinone is similarly to slightly less phytotoxic than diuron + 2,4-D + S on all varieties. N8 is again the most susceptible variety as growth severely retarded by all three treatments. The pattern and degree of phytotoxicity due to diuron + 2,4-D + S in the ratoon crop is very similar to that displayed in the plant crop although the rate applied to the ratoon was only half of that applied to the plant crop;
the ratoon crop was also younger at the time of spraying.

INTRODUCTION

That sugarcane varieties differ in their tolerance to herbicide treatments has been reported by workers in Mauritius, Puerto Rico, Hawaii and South Africa. As early as 1950, Nolla\(^3\) reported that varieties in Puerto Rico differed substantially in their tolerance to applications of 2,4-D. Rochecouste\(^7\) in Mauritius found that the most important commercial varieties showed no differences in susceptibility to diuron under normal field conditions but that a difference in tolerance to dalapon and paraquat did exist between varieties. In Hawaii, Osgood et al\(^4\) showed that varieties H50-7209 and H53-263 differed in their susceptibility to diuron under both controlled and field conditions.

Richardson\(^5\) in South Africa found that the South African varieties NCo 376, NCo 382 and NCo 310 differed in their resistance to various formulations of phenoxyacetic acid. Hence, as soon as possible after a variety reaches the “pre-release” of “bulking-up” stage in the breeding program of the South African Sugar Associations Experiment Station, it is included in trials designed to test its susceptibility to a range of commonly used herbicides. The varieties N52/219, N8 and N11 are relatively new releases and an experiment which included these three and three commonly used varieties, NCo 376, NCo 293 and N55/805, was designed to test their susceptibility to three post-emergence herbicides. A second set of treatments was applied to the first ratoon crop.

EXPERIMENTAL PROCEDURE

The trial was established in November 1977 at Pongola (27°23' south and 31°37' east) in the semi-arid region of the Eastern Transvaal, using a randomized block design with split plots and four replications. Each plot consisted of six cane rows spaced 1.4 m apart and 8 m long with the two outer rows and a 1 m section from the ends of each row being discarded at harvest, leaving a net plot of 4 rows x 6 m. Each row was planted with a double line of Beyed setts, which had been dipped in Benlate fungicide prior to planting.

Single superphosphate fertilizer was applied in the furrow at planting and the cane was subsequently topdressed with nitrogen and potassium in the form of 1:0.1 (47). The soil was sandy clay loam of the Shorocks series containing 8.5% silt, 65% sand and 26.5% clay. The trial was irrigated with 60 mm of effective water from overhead sprinklers every 25 days, or as soon thereafter as the soil moisture deficit reached 60 mm. The varieties used were NCo 376, NCo 293, N52/219, N8, N55/805 and N11.

The treatments used and the rates of herbicide application were:

1. Unsprayed control
2. 3.84 kg ai alachlor + 2.0 kg ai atrazine + 0.4 ae paraquat
3. 4.0 kg ai diuron + 2.88 kg ae 2,4-D + S
4. 3.0 kg ai ametryne + 2.88 kg ae 2,4-D + S

A non-ionic surfactant, Agral 90, was used where indicated at a rate of 0.2% volume for volume. The rates of herbicide used are twice those normally recommended because a safety factor of x 2 is considered desirable in the field.

The treatments were applied directly over the cane rows by means of a lever-operated knapsack sprayer fitted with a Spraying Systems,TK5 floodjet. The output was 270 l/ha using a pressure of 1.25 bars. The cane was sprayed in January 1978 and the stage of growth of cane then was on average:

NCo 376 – 0.6 m canopy height and 7 - 8 leaves unfurled per shoot.  
N52/219 – 0.55 m canopy height and 6 - 7 leaves unfurled per shoot.  
N55/805 – 0.6 m canopy height and 6 - 7 leaves unfurled per shoot.  
NCo 293 – 0.6 m canopy height and 6 - 7 leaves unfurled per shoot.  
N8 – 0.55 m canopy height and 7 - 8 leaves unfurled per shoot.  
N11 – 0.55 m canopy height and 6 - 7 leaves unfurled per shoot.

The plant crop was burnt at harvest in November 1978, the tops raked off the plots and the first ratoon allowed to regenerate. A new set of treatments was applied in January 1979 in the same manner to the ratoon crop. The four new treatments were applied in such a way that each new treatment was sprayed over four plots which had previously received one each of the earlier treatments in order to discount any residual treatments, effects that might exist.

The ratoon treatments and rates were:

1. Unsprayed control
2. 2.0 kg ai diuron + 1.44 kg ae 2,4-D + S
3. 1.6 kg ai diuron + 1.4 kg ai Sencor
4. 1.0 kg ai diuron + 0.675 kg ai Velpar

The leaf height of the ratoon crops at the time of spraying was less than that of the plant crop, being on average 0.45-0.5 m.

Both trials were maintained weed-free by means of hand weeding and mechanical cultivation to prevent any weed competition throughout the crop period. Growth measurements in the form of stalk counts and height measurements, were made at regular intervals. Counts were conducted on one net row of each plot and stalk heights to the top visible dewlap were measured on 20 randomly selected stalk in two net rows.

In November 1978, when the trial was 11.8 months old, it was harvested and the cane in the net plots weighed by means of a tractor mounted scale and grab. Twelve stalks per plot were taken at random for analysis and cane quality determination using the formula ers % cane = 1.05 - 0.485M - 0.057F, where S = sucrose, N = non-sucrose, F = fiber and the coefficients are factors.
accounting for average sucrose losses due to non-sucrose and fiber, respectively, in South African sugar factories.

RESULTS

Plant crop

a. Leaf symptoms

Visual ratings of leaf scorch were made seven days after treatments were applied and the mean results are presented in Table 1. Ratings are based on the European Weed Research Society (EWRS) scoring system of 1-9 where 1 = no effect and 9 = dead.

**TABLE 1. Mean visual ratings* of leaf scorch taken 7 days after herbicide application**

<table>
<thead>
<tr>
<th>Variety</th>
<th>Alachlor + atrazine + paraquat</th>
<th>Diuron + 2,4-D + S</th>
<th>Ametryne + 2,4-D + S</th>
</tr>
</thead>
<tbody>
<tr>
<td>N55/805</td>
<td>5.8</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>NCo 376</td>
<td>6</td>
<td>2</td>
<td>3.3</td>
</tr>
<tr>
<td>N11</td>
<td>6.3</td>
<td>2</td>
<td>3.5</td>
</tr>
<tr>
<td>NC_o 293</td>
<td>6</td>
<td>2</td>
<td>3.8</td>
</tr>
<tr>
<td>N52/219</td>
<td>5.5</td>
<td>2.8</td>
<td>4</td>
</tr>
<tr>
<td>N8</td>
<td>6.3</td>
<td>3.3</td>
<td>4</td>
</tr>
</tbody>
</table>

* EWRS rating scale of 1-9 where 1 = no effect, 4 = just acceptable, 5 = just unacceptable and 9 = dead.

Symptoms due to alachlor + atrazine + paraquat were characteristic of paraquat effects and there was necrosis and chlorosis of leaves contacted by the spray solution. Diuron + 2,4-D + S produced a light chlorosis while ametryne + 2,4-D + S caused chlorosis and some characteristic bronzing (speckled brown necrotic spots on the leaf blades). All visual effects of the treatments on the cane leaves had disappeared two months after spraying.

Greater differences in leaf scorch were apparent between treatments than between varieties although N8 and N52/219 were affected slightly more than other varieties. The severity of the treatments was in relation to their contact action. The paraquat treatment was most severe, followed by the ametryne treatment and finally the diuron treatment which has less contact action.

b. Stalk heights and cane yield
Stalk heights taken one month after spraying and at harvest time, and sugarcane yields in tons/ha, all expressed as percentages of the stalk heights and cane yield in the unsprayed control plots are shown for the three treatments in Figures 1a, b and c.

1. **Early stalk heights**

There were large varietal differences in the early effects of herbicide treatment on stalk length. In Fig. 1b it can be seen that N55/805 showed virtually no reduction in height while N8 was severely stunted after treatment with diuron + 2,4-D + S. Stalk heights were reduced to some extent in all varieties.

The effect on varieties differed between treatments. N55/805 and NCo 293 were far more severely affected by paraquat or ametryne treatments than by treatments with diuron + 2,4-D + S. N11 was more susceptible to paraquat than to either ametryne or diuron treatments.

2. **Stalk heights at harvest**

After the initial retardation of growth stalk height depressions due to treatments decreased proportionately as demonstrated in Figs. 1a, b and c. Stalk heights were commonly reduced by 40% one month after spraying and at harvest were in most cases greater than 90% of that in the unsprayed control plots. Only NCo 293 showed no difference in stalk height after treatment with diuron + 2,4-D + S and ametryne + 2,4-D + S, but there were differences after treatments with alachlor + atrazine + paraquat.

Thus early height reductions were a poor indicator of height reductions at harvest as differences became less obvious with time. Stalk heights at harvest were only slightly depressed in treated plots of varieties N52/219, NCo 293, and N11 and this could be attributed to the flowering which occurred in untreated plots of these varieties.

3. **Cane yield**

The yield of sugarcane in tons/ha expressed as a percentage of the yield from unsprayed control plots differed substantially between varieties while a difference between treatments within a variety occurred to a lesser extent. The yield of N8 was reduced more than that of NCo 376 by all treatments. N55/805 was more severely affected by alachlor + atrazine + paraquat than by diuron + 2,4-D + S.

The results show that cane yield followed a fairly similar pattern that of stalk height at harvest in varieties NCo 376 and N55/805 but not in the other four varieties. For N8 stalk counts as well as heights were depressed by treatments and the yields were correspondingly lower. For varieties N52/219, NCo 293 and N11, treated plots surprisingly yielded more than did unsprayed control plots, although stalk heights at harvest were still slightly depressed.
The effects of flowering, which occurred mainly in untreated plots of these varieties, may have confounded the herbicide effects, and consequently caused the poor relationship between yield and final stalk height.

c. Flowering

Extensive flowering occurred in the unsprayed control plots of varieties NCo 293, N52/219 and N11, while in the treated plots flowering either did not occur or was severely delayed. Figs. 2a, b and c show the percentage of flowered stalks in each treatment five, four, three, two and one month before harvest.

Fig. 2a shows the extent of flowering in unsprayed control plots of N11 and the inhibition and delay in flowering in treated plots. Emergence of the inflorescence in treated plots was delayed about three and a half months, after which the trend followed that in untreated plots. Alachlor + atrazine + paraquat inhibited flowering more than did the other treatments. A similar trend occurred in variety NCo 293 as shown in Fig. 2c but N52/219 showed far less flowering and reached a peak two months before harvest.

d. Yield and crop characteristics

The yield in terms of tons cane/ha, estimated recoverable sugar as a percent of cane (ers % cane) and estimated recoverable sugar (ers) in tons/ha of each variety, together with the stalk heights and counts taken at harvest are presented in Table 2.

1. Tons cane/ha

N8 was the most severely affected by all three treatments. The yield of N55/805 was depressed to a statistically significant degree by alachlor + atrazine + paraquat but not by other treatments. In all the varieties which flowered the treated plots yielded higher than untreated control plots, but this did not reach a level of statistical significance except for the effect of diuron + 2,4-D + S on N11.

Inspite of yield reductions due to treatments NCo 376 performed better than all other varieties. Untreated control plots of N52/219, NCo 293 and N11 could be expected to have performed better had no flowering occurred, but they are unlikely to have outyielded variety NCo 376.

2. Ers % cane:

Statistically significant reductions in ers % cane were caused by all treatments on N8 but only by ametryne + 2,4-D + S on NCo 376 and N52/219. A trend towards lower ers % cane in treated plots existed for all varieties in all treatments except for diuron + 2,4-D + S on N11.

3. Ers tons/ha
Figure 1. The effect of treatment with ethephon, atrazine, and N-(2-chloroethyl) and carbaryl (K.Y.Ha).

- Mean cane yield at harvest
- Mean stalk height at harvest
- Mean stalk height one month after spraying
Figure 1b: The effect of treatment with Diquat + 2, 4-D + S on stalk heights and cane yield (t/ha).
FIGURE 1c. The effect of treatment with Ametryne + 2,4-D + S on stalk heights and cane yield (+/ha) expressed as percentage of stalk heights and cane yield from unsprayed control plots.
FIGURE 2a. Percentage flowered stalks of NII after treatment.

- Unsprayed control
- Alachlor + atrazine + paraquat
- Diuron + 2,4-D+S
- Ametryne + 2,4-D+S

FIGURE 2b. Percentage flowered stalks of N52/219 and after treatment.

The combined effects of lower tons cane/ha. and % cane caused a statistically significant reduction in ers tons/ha due to all treatments on NCo 376. In all treated plots variety N8 showed reductions in all yield parameters. Only
FIGURE 2c  Percentage flowered stalks of NCo 293 after treatment

in plots treated with alachlor + atrazine + paraquat were ers yields of N55/805 reduced to a statistically significant degree. In general the lower ers % cane of the sprayed varieties which were prone to flowering tended to offset the higher tons cane, and the resultant ers yields (tons/ha) were little altered from unsprayed control.

4. Stalk heights

The stalk heights of cane in the unsprayed control plots of all varieties were superior at harvest to those of cane in all the treated plots except where diuron + 2,4-D + S was applied to NCo 293. These height differences were not visible but do nevertheless indicate that treatment effects have not disappeared completely.

5. Stalk counts

Stalk counts were very variable and at harvest no large differences were apparent between varieties NCo 376, N55/805 and NCo 293. Stalk counts of N8 were depressed by all treatments while those of N11 were depressed by ametryne + 2,4-D + S and to a lesser extent by diuron + 2,4-D + S. Stalk counts of N52/219 were increased by all treatments.

2. 1st Ratoon crop

Stalk heights of the first ratoon crop taken one month after treatment and expressed as a percentage of heights in unsprayed control plots, are presented in Fig. 3.
### Table 2. Plant crop yields of six varieties which have been sprayed with three different herbicide mixture.

<table>
<thead>
<tr>
<th>Variety</th>
<th>Treatment</th>
<th>Cane t/ha</th>
<th>Ers % cane</th>
<th>Ers t/ha</th>
<th>Height cm</th>
<th>Population 000/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>NCo 376</td>
<td>Control</td>
<td>139</td>
<td>12.2</td>
<td>17.0</td>
<td>240</td>
<td>137</td>
</tr>
<tr>
<td></td>
<td>Alachlor+ atrazine+ paraquat</td>
<td>130</td>
<td>11.6</td>
<td>15.0*</td>
<td>230</td>
<td>130</td>
</tr>
<tr>
<td></td>
<td>Diuron + 2,4-D + S</td>
<td>132</td>
<td>11.5</td>
<td>15.2**</td>
<td>223</td>
<td>135</td>
</tr>
<tr>
<td></td>
<td>Ametryne + 2,4-D + S</td>
<td>133</td>
<td>11.0</td>
<td>14.6**</td>
<td>225</td>
<td>128</td>
</tr>
<tr>
<td>N52/219</td>
<td>Control</td>
<td>115</td>
<td>13.1</td>
<td>15.1</td>
<td>242</td>
<td>77</td>
</tr>
<tr>
<td></td>
<td>Alachlor+ atrazine+ paraquat</td>
<td>117</td>
<td>12.8</td>
<td>14.9</td>
<td>238</td>
<td>86</td>
</tr>
<tr>
<td></td>
<td>Diuron + 2,4-D + S</td>
<td>117</td>
<td>12.2</td>
<td>14.3</td>
<td>236</td>
<td>90</td>
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<tr>
<td></td>
<td>Ametryne + 2,4-D + S</td>
<td>118</td>
<td>12.1*</td>
<td>14.3</td>
<td>237</td>
<td>92</td>
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<tr>
<td>N8</td>
<td>Control</td>
<td>112</td>
<td>11.9</td>
<td>13.4</td>
<td>255</td>
<td>120</td>
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<tr>
<td></td>
<td>Alachlor+ atrazine+ paraquat</td>
<td>100*</td>
<td>10.1**</td>
<td>10.2**</td>
<td>226</td>
<td>102</td>
</tr>
<tr>
<td></td>
<td>Diuron + 2,4-D + S</td>
<td>100*</td>
<td>10.9*</td>
<td>10.9**</td>
<td>234</td>
<td>98</td>
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<td>Ametryne + 2,4-D + S</td>
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<td>9.7**</td>
<td>9.5**</td>
<td>239</td>
<td>95</td>
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<tr>
<td>N55/805</td>
<td>Control</td>
<td>113</td>
<td>11.8</td>
<td>13.3</td>
<td>223</td>
<td>99</td>
</tr>
<tr>
<td></td>
<td>Alachlor+ atrazine+ paraquat</td>
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<td>11.3*</td>
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<td>97</td>
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<td>Diuron + 2,4-D + S</td>
<td>109</td>
<td>11.3</td>
<td>12.3</td>
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<tr>
<td></td>
<td>Ametryne + 2,4-D + S</td>
<td>104</td>
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<td>12.0</td>
<td>205</td>
<td>97</td>
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<tr>
<td>NCo 293</td>
<td>Control</td>
<td>112</td>
<td>11.8</td>
<td>13.2</td>
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<td></td>
<td>Alachlor+ atrazine+ paraquat</td>
<td>113</td>
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<td></td>
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<td>118</td>
<td>11.3</td>
<td>13.3</td>
<td>224</td>
<td>106</td>
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<tr>
<td>N11</td>
<td>Control</td>
<td>98</td>
<td>11.0</td>
<td>10.8</td>
<td>242</td>
<td>105</td>
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<tr>
<td></td>
<td>Alachlor+ atrazine+ paraquat</td>
<td>106</td>
<td>10.7</td>
<td>11.4</td>
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<td>102</td>
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<td></td>
<td>Diuron + 2,4-D + S</td>
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<td>94</td>
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<tr>
<td></td>
<td>Ametryne + 2,4-D + S</td>
<td>103</td>
<td>10.7</td>
<td>11.0</td>
<td>235</td>
<td>90</td>
</tr>
</tbody>
</table>

L.S.D. (0.05) 9.75 0.97 1.5
L.S.D. (0.01) 13.47 1.3 2.1

* L.S.D. (0.05) from control
** L.S.D. (0.01) from control
Again marked differences were apparent in the effects of herbicide treatments on the six varieties. NCo 376 and NCo 293 were noticeably less affected by diuron + metribuzin (Sencor) than were other varieties. Varieties N55/805, NCo 293 and N11 which showed greater susceptibility to scorch treatments in the plant crop were more severely affected by diuron + hexazinone (Velpar) than by diuron + 2,4-D + S which caused less foliar scorch. Other varieties were more susceptible to diuron + 2,4-D + S. The pattern of the effects of diuron + 2,4-D + S on the first ratoon (sprayed at half the plant cane dose and at a younger stage of growth) were very similar to those in the plant crop. Hence it appears that a double dose was little more severe than a single dose and that ratoon cane was only slightly less susceptible than plant cane.

DISCUSSION

Leaf scorch

Yield reductions in N55/805 and NCo 293 appear to show a similar trend in terms of the degree of leaf scorch. These varieties showed marked tolerance to diuron + 2,4-D + S which caused few symptoms of leaf scorch while ametryne + 2,4-D + S and particularly alachlor + atrazine + paraquat caused severe leaf symptoms and corresponding yield reductions. Yields of N8 and NCo 376 were reduced to a similar extent by both diuron + 2,4-D + S and alachlor + atrazine + paraquat and hence did not show the same trends as those of N55/805 and NCo 293. It would thus be misleading to regard the degree of leaf scorch as an indication of subsequent yield loss except possibly for varieties N55/805 and NCo 293.

Stalk heights

The large depression in stalk heights caused by all treatments soon after spraying became less noticeable with time and this confirms the results obtained by Richardson with various 2,4-D formulations on NCo 376, NCo 310 and NCo 382. The length of time from spraying to harvest and the growth conditions during that period influenced the ultimate treatment effects. Although the plant crop in this experiment was harvested at only 11.8 months of age and was planted in late summer, the growth after spraying masked the treatment effects.

In most situations in the South African sugar industry sufficient time would be available for the effects of timely sprays to have virtually disappeared by harvest. It is interesting however, that none of the varieties tested except NCo 293, after treatments with diuron + 2,4-D + S, recovered completely, indicating that some effect, no matter how slight, is likely to persist due to early growth retardation.
FIGURE 3. The effect of soil fertility one month after spraying three different herbicide treatments to the first rain.

Plant crop results after treatment with cliron + Z4+D + S are also included.

( )
Stalk counts

Osgood et al. have reported statistically significant effects on stalk counts and stalk diameter in three varieties due to treatment with both diuron and ametryne applied at 10.0 kg ai/ha. Results in the trial reported here confirm that stalk counts in some varieties, namely N8 and N52/219, can be affected by treatments. Stalk mass was increased in N11 and decreased in N52/219 by all treatments. Thus final yield would be difficult to predict from only one of these yield parameters. Yield may be affected by the degree of foliage scorch, the effect on population and stalk mass.

Plant versus ratoon cane susceptibility and stage of spraying

Plant cane is generally regarded as being more susceptible to herbicide treatments than is ratoon cane. Richardson reported that visual damage was far more severe on plant than on ratoon cane from treatment with 2,4-D, but that no conclusive evidence of yield reduction was present at harvest. No differences between plant and ratoon cane were evident in this trial despite the ratoon crop having received only half the herbicide dosage applied to the plant crop. This comparison is however restricted to the effects on stalk height only and was also made in two successive years when different growth conditions may have prevailed.

Spray application

Richardson reported that marked differences may occur in yield depending on the stage of cane at spraying and whether the spray is directed across the interrow or not. Once cane has reached 40 cm in height directed sprays are far less damaging due to the reduced contact with cane foliage. In this trial double applications over the row produced small reductions in yield in N55/805 and NCo 376. Thus, directed sprays at single rates could be expected to have negligible effects on cane yield and the danger of damage to cane from any of these treatments applied correctly should be minimal.

Ers % cane

Although reductions in ers % cane have been noted due to herbicide treatments, seldom have they reached a level of statistical significance. In this trial however, ers % cane was generally depressed and in some instances severely so. Because herbicide treatments inhibited flowering it is impossible to differentiate between the effects of flowering and herbicides on cane quality in varieties N52/219, NCo 293 and N11.

Flowering

The incidence of flowering in the South African sugar industry is erratic due to variable climatic conditions but it is more common in the warmer, irrigated, northern region. Flower initiation occurs during the first half of March and it is interesting to note the strong inhibiting effect on flowering
caused by the herbicide treatments which were applied two months earlier in January.

Since a reduction in stalk height was evident in treated plots of all flowered varieties before initiation took place, it could be expected that treated plots would yield lower than untreated plots or at least no higher. Thus it appears that flowering was responsible for the reduction in yield in the untreated plots. The extent of the reduction due to flowering cannot be accurately assessed but the mean increase in treated plots of the flowered varieties was 5 tons cane/ha and the mean decrease in treated plots of unflowered varieties was 9 tons cane/ha. Thus the mean reduction due to flowering could have been as much as 14 tons cane/ha.

General

In the ratoon crop Sencor, which is one of the safest treatments on NCo 376, the major variety used in the South African sugar industry, was severe in its effect on N8. Stunting was also noticeable in N52/219, N11 and N55/805 from diuron + Sencor. It has been reported from Taiwan that many varieties were sensitive to metribuzin (Sencor) when this was sprayed over cane at the three to four leaf stage (Yuh Huong-jaan9). This effect lasted for only six weeks however. It is clear that it is dangerous to extrapolate results from one variety to another, and any new variety should be tested for its tolerance to herbicide treatments before these are used generally.

CONCLUSIONS

The six varieties used in these trials showed very variable susceptibility to herbicide treatments and so the effects on any new variety cannot be easily predicted. Thus continued screening of new varieties for herbicide susceptibility is essential.

Of the varieties tested N8 was most severely affected by all herbicide treatments. For this variety pre-emergence treatments would be expected to show less phytotoxicity and are therefore to be preferred to treatments which are sprayed after the crop emerges.

Of the varieties which did not flower the order of increasing susceptibility to herbicides in terms of tons ers/ha was N55/805, NCo 376 and N8. N55/805 is more susceptible to contact chemicals than treatments such as diuron + 2,4-D + S. Thus paraquat and to a lesser extent ametryne should be used with great care on varieties such as N55/805.

NCo 376, currently the most important variety in the South African sugar industry, was susceptible to all the treatments tested except diuron + Sencor. Despite the yield reductions caused by the herbicide treatments however, NCo 376 substantially outyielded the other five varieties whether sprayed or not.
Thus in general, varieties differ substantially in their susceptibility to post-emergence herbicides and different herbicide treatments may have different effects on any one variety. No general relationship existed between leaf scorch or early stalk height reduction and final yield for the six varieties tested. Ratoon cane appeared to be only slightly less susceptible to herbicides than plant cane although yield results are not yet available to confirm this.

REFERENCES


LOS EFECTOS DE TRATAMIENTOS POST-EMERGENTES DE HERBICIDAS SOBRE DISTINTAS VARIEDADES DE CAÑA DE AZÚCAR CULTIVADA EN SUD AFRICA

P. E. T. Turner

RESUMEN

Se ensayaron varios tratamientos de herbicidas post-emergentes en cuanto a sus efectos fitotóxicos en cosecha de plantilla y primer
En la planilla los términos con híbridos se indican al final del término.

Las cantidades de cada parámetro se muestran en la tabla que sigue.

El término de la izquierda del cálculo se observa como función de los híbridos.

En la tabla que sigue se muestran los valores de los híbridos.

El término de la derecha del cálculo se observa como función de los híbridos.

En la tabla que sigue se muestran los valores de los híbridos.

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