THE EFFECT OF WEED COMPETITION ON BLACK CURRANT CUTTINGS

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SUMMARY

The effect of weed competition on black currants (*Ribes nigrum*) was determined by maintaining weed free conditions for varying periods after planting. Crop growth and subsequent fruit yields were reduced where weeds established prior to mid-December, both on hand weeded and herbicide treatments.

INTRODUCTION

Weed competition during black currant establishment can reduce both the number of canes produced in the first season and subsequent yields (Rhodes and Tabley 1983). Meeklah and Mitchell (1982) considered early to mid season weed control more important than late season control, since there is little cane elongation and leaf production in black currants after February. The period for which soil applied herbicides remain efficacious could be an important factor in determining the degree to which black currants are affected through weed competition. This paper presents the results of an experiment designed to provide information on the minimum period after planting for which black currants must be kept weed free to avoid reduced crop growth and yield. Terbutometon/terbuthylazine (Caragard) treatments used in a previous experiment (Rhodes and Tabley 1983) were included to assess crop tolerance to this herbicide.

METHODS AND MATERIALS

An experiment was conducted at Templeton Research Station on trickle-irrigated cv. Magnus black currant cuttings which were planted at 25 cm intervals in rows 2.5 m apart in July, 1982. A randomised block design with four replicates was used to compare treatments (Table 1) which were applied to single row plots 4 or 5 m long. Where appropriate, hand weeding within rows and hand hoeing between rows was carried out at regular intervals to prevent weed seedlings from becoming established. Herbicide treatments were applied in late July, 1982 with a modified Oxford precision sprayer which applied 200 litres/ha at 200 kPa. Weeds were scored at monthly intervals from mid-November to March.

In winter, 1983, all weeds were removed and terbutometon/terbuthylazine at 3.8 kg ai/ha in 200 litres/ha was applied with a tractor mounted boom sprayer over the entire experimental area. Californian thistle (*Cirsium arvense*) was the main weed which appeared during the 1983/84 season and was controlled by hand hoeing or rope wick application of glyphosate (Roundup). The number of canes and cane length within a 2.5 m segment of row was recorded during the winter, and fruit from these plants was harvested in December, 1983. The number of surviving plants on each plot was recorded.

RESULTS

Weed scores in mid-November were highest on untreated plots (Fig. 1), when the main weed species present was fathen (*Chenopodium album*) with some Californian thistle, shepherds purse (*Capsella bursa-pastoris*), storksbill (*Erodium cicutarium*) and hedge mustard (*Sisymbrium officinale*). Fathen was as tall as the black currants at this time (15 cm) but by mid-December was 80 cm high and completely covered the crop.

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TABLE 1: The effect of herbicide and weed control on black currant cane growth and subsequent berry yield.

Treatment*	cutting survival (%)	Mean cane length (cm)	Canes/plant	Berries/cane	Mean berry wt. (g)	Berry yield (g/pl)
untreated	72	19	1.9	0.4	0.24	0.4
hand weeded until mid-November	74	29	2.7	8	0.56	12
mid-December	89	30	4.1	42	0.63	111
mid-January	89	30	3.6	43	0.70	123
mid-February	86	31	3.6	54	0.74	144
continuously (control)	92	32	3.9	40	0.74	116
terbumeton/terbuthylazine 2.5	71	30	2.4	18	0.58	36
terbumeton/terbuthylazine 3.8	79	30	2.6	12	0.56	21
terbumeton/terbuthylazine 5.0	90	31	2.9	26	0.61	50
terbumeton/terbuthylazine 6.3	86	29	2.6	29	0.62	57
LSD (5%)	16	9	1.1	19 +	0.19 +	64 +

* herbicide rates are kg ai/ha

+ untreated plots excluded for these estimates

On plots where hand weeding ceased in mid-November, fathen was up to 25 cm high in December and by mid-January had reached 50 cm, the same height as the black currants. One month later, fathen had increased to 150 cm and had formed a canopy over the black currants.

Where weeds had been controlled until mid-December, only a few small (1-2 cm) fathen were present in January. These had increased to 50-60 cm by mid-February and were about 100 cm tall in March.

Weeds (mainly Californian thistle and fathen) were not controlled by terbumeton/terbuthylazine. Fathen had established by mid-November, particularly at lower rates, and by mid-January was 50-100 cm high on these treatments.

Mean cane length was considerably less for untreated than for other treatments (Table 1). Canes per plant, berries per cane and berry yield per plant were lower on untreated and where hand weeding ceased in mid-November than where weed control continued for a longer period. Yields on chemical treatments were intermediate. Mean berry weight was lowest on untreated and tended to increase as the period of hand weeding increased. Berry weights on herbicide treatments were similar to those where weeds were controlled until mid-November or December.

More cuttings survived at higher rates of terbumeton/terbuthylazine and where hand weeding lasted at least until mid-December than on other treatments.

DISCUSSION

These results indicate that annual weeds which germinate and establish after mid-December will not have a detrimental effect on the growth of first year black currants or yield in the next season. Conversely, competition from weeds which establish before this time will result in reduced cane growth and subsequent yield; the earlier weeds grow, the greater the depression.

Early weed competition during the first season reduced the number of canes produced by each cutting. However, this was not the only factor which contributed to a reduced berry yield in the following (fruiting) season, when all plots were kept weed free. Although mean cane length was similar (except for untreated), there were fewer berries per cane and these tended to be smaller where weeds established prior to mid-December in the previous season. These results confirm findings from a previous

Fig 1: Weed scores on herbicide and hand weed treatments during the establishment season. (Weed score, 1 = No Weeds, 5 = Complete weed ground cover).

experiment (Rhodes and Tabley 1983) and suggest that weed competition may reduce carbohydrate accumulation in canes on which fruit set in the following season may be at least partially dependent.

The failure of terbumeton/terbuthylazine to adequately control annual weeds in this experiment is in marked contrast to previous results at the same site, where excellent weed control was achieved until the end of autumn (Rhodes and Tabley 1983). The seasonal variability in the effectiveness of this chemical indicates that a follow up

application of a herbicide such as simazine, applied in November, may be prudent to ensure adequate weed control until the critical month of December. It is imperative that black currant cuttings be kept weed free until this time, not only because of the effects on yield in the first fruiting season, but also because these effects continue through to the second fruiting season (Rhodes unpublished) and probably into the third and fourth seasons.

CONCLUSIONS

Soil applied herbicides are required to remain effective at least until mid-December in Canterbury during the establishment season to ensure that weed competition does not depress black currant yields in following seasons.

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