

Use of Basta 150 SL in strawberries

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Abstract. The experiment was carried out in the strawberry plantations of the Polli Horticultural Institute during two years, 2000–2001. ‘Bounty’ was the strawberry cultivar studied. The objective of the experiment was to evaluate the effectiveness of herbicide Basta 150 SL for problematic weeds and strawberry daughter plants. The strawberry plants were set in spring 1999, using black plastic mulch. In the experiment, the plot size was 30 m² (2 x 15 m) and planting scheme 1.2 x 0.3 m. The following treatment variants were used: 1. Untreated (control); 2. Basta 150 SL 3l/ha; 3. Basta 150 SL 5l/ha. Each variant was represented with 4 replications. The herbicide was applied twice by means of a backpack sprayer: in May before blooming and in August when new weeds had grown. The results of the experiment indicated that due to Basta 150 SL weed infestation in strawberry plantation was decreased. It was noted that, in both treatment variants, Basta 150 SL destroyed nearly 90–96% of strawberry daughter plants. The results also showed that Basta 150 SL did not cause damage to strawberry plants and berries. The herbicide applied in two doses (5 l/ha and 3 l/ha) did not affect the strawberry yield negatively. It was established that in both treatment variants yields were increased by 26.9 and 29.2%, respectively. We noted that it was practical to use Basta 150 SL at the rate of 5 l/ha only in the case of appearing perennial weeds (*Taraxacum officinalis*, *Cirsium arvense*, *Viola arvensis*) in an orchard. For other weeds, the rate of herbicide 3 l/ha suited well.

Key words: Herbicide Basta 150 SL, weeds, strawberry

INTRODUCTION

Strawberry is a berry crop of high popularity in Estonia. The growing of strawberries has increased greatly in Estonia during last years. It is especially popular on small farms. According to the statistics, the area of strawberries increased from 294 ha in 1995 to 1,050 ha in 1999 (the Statistical Office of Estonia, 2000). Weeds are one of the most harmful factors in strawberry production as they compete with strawberry plants for soil moisture and nutrients, resulting in delayed strawberry growth and development. Studies conducted in many countries have confirmed a positive effect of Basta 150 SL on all imported grass and broad-leaved weeds (Sharma, 1988). The objective of the experiment was to evaluate the effectiveness of herbicide Basta 150 SL on problematic weeds and strawberry daughter plants.

MATERIALS AND METHODS

The experiment was carried out in the strawberry plantations of the Polli Horticultural Institute during two years, 2000–2001. ‘Bounty’ was the strawberry cultivar studied. The strawberry plants were set in spring 1999 and a black plastic mulch was used. In the experiment, the plot size was 30 m² (2 x 15 m) and the planting scheme 1.2 x 0.3 m.

The following treatment variants were included:

1. Untreated (control).
2. Basta 150 SL (active ingredient 150 g/l glufosinate-ammonium) 3 l/ha, two times.
3. Basta 150 SL (active ingredient 150 g/l glufosinate-ammonium) 5 l/ha, two times.

Each variant consisted of 4 replications. The herbicide was applied twice by means of a backpack sprayer: in the first week of May before the flowering and in the second week of August when daughter plants and new weeds had grown. Plots were sprayed with herbicides in the form of water suspensions, using 400 l per ha in both the treatments. The daughter plants and weeds were counted in plots both before and after the use of Basta 150 SL on an area of 1 m². All weeds with their roots were dug up from each plot on a 10-dm² area in the last week of July. The roots were washed free of soil, and all the biomass of the weeds was weighted in order to determine the effectiveness of Basta 150 SL against weeds at the end of harvest.

The berries were harvested between 25 June and 20 July in 2000 and between 2 July and 16 July in 2001. The data were analysed by using the analysis of variance, with significance level 95%.

RESULTS AND DISCUSSION

In spring 2001, prior to the start of the experiment, the soil samples were taken from the experimental field. The chemical properties were: soil pH 5.6, 2.1% of humus content, 0.18% of N, 108 mg/kg of P, 1352 mg/kg of Ca, 230 mg/kg of K and 107 mg/kg of Mg. The soil was considered suitable for strawberry growing (Eskla et al., 2000; Ilus, 1988). The analyses of the soil were carried out at the Estonian Control Center of Plant Production. The weather conditions during both the growing seasons were favourable. The lowest air temperatures were –5°C in May, 2000, and –2.5°C in April, 2001. The average air temperatures of both growing seasons were quite similar, 12.7°C in 2000 and 12.9°C in 2001. In 2000, in the period from April to July, the rainfall equaled 233 mm and, in 2001, 408 mm.

The effects of the treatments with Basta 150 SL on daughter plants and weeds are shown in Table 1.

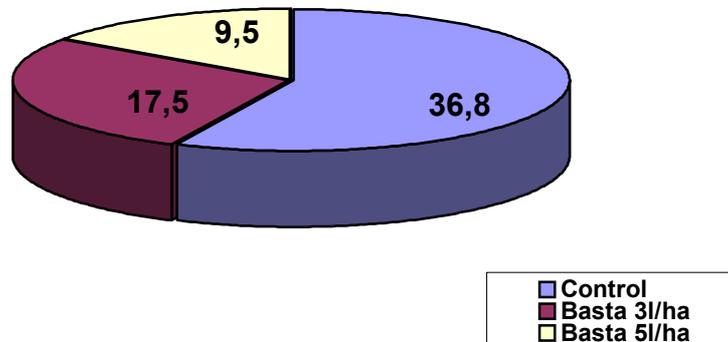
Our research over two seasons showed that 100% of daughter plants were destroyed by Basta 150 SL in both years. 94–98% of weeds were destroyed in 2000 and 86–89% in 2001. In 2001 the weeds were not so completely destroyed probably due to wet weather, as a result of which herbicide was rapidly washed downward to deeper layers of the soil. Also in 2001, there occurred much more perennial weeds in the experimental plantation (*Taraxacum officinalis*, *Cirsium arvense*, *Viola arvensis*) than in 2000. Their reactions to Basta 150 SL treatments were not so positive.

Table 1. Number of daughter plants and weeds in 1 m² of the strawberry plantations before and after the application of Basta 150 SL.

Variants	Years	Before application		After application			
				21 May		6 June	
		Plants	Weeds	Plants %	Weeds %	Plants %	Weeds %
		No/m ²	No/m ²				
Control	2000	7	344	x	x	x	x
	2001	9	324	x	x	x	x
Basta 3 l/ha	2000	6	208	100	88	100	94
	2001	7	488	100	78	100	86
Basta 5 l/ha	2000	6	220	100	96	100	98
	2001	5	340	100	71	100	89

The results indicated that the total biomass of weeds was significantly lower in herbicide-treated plots. The average biomass of weeds in the untreated variant was 36.8 g while in both herbicide-treated variants it was reduced by 47.6 and 25.8%, respectively (Fig 1). A statistical analysis showed that there was positive correlation ($F(f) 9.9 > F(t) 5.1$) between treatments with Basta 150 SL and the biomass of weeds. According to Eagle et al, 1981), yield injury resulting from the application of soil-active herbicides is common with strawberries. The application of Basta 150 SL caused no yield injury at the dosage rates used in this experiment.

Biomass of weeds



PD 95% = 13.8

Fig. 1. Average biomass of weeds on herbicide-treated and untreated variants (g).

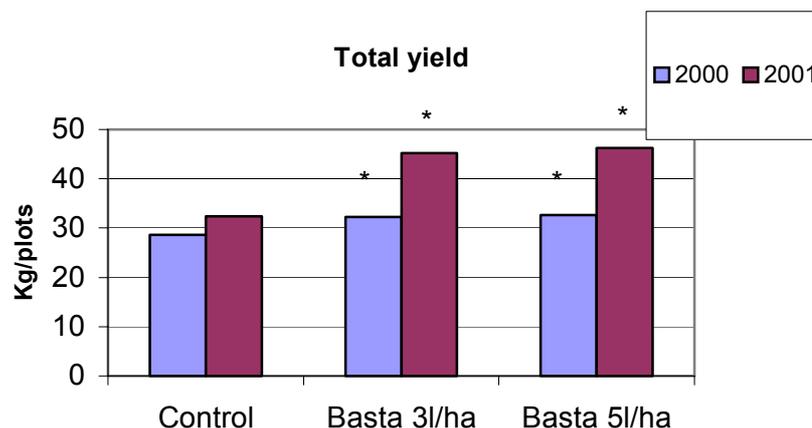


Fig. 2. Effect of Basta 150 SL on the yield of cultivar ‘Bounty’ in 2000 and 2001.

Total yield per plot is presented in Fig 2. The total yields for both treatments exceeded significantly that of the control. The average yield from the control (untreated) variant was 30.5 kg per plot. In the variants 2 and 3 with Basta 150 SL treatments, the yields per plots were significantly (26.9 and 29.2%, respectively) higher than that of the untreated variant. It could be explained by the fact that no symptoms of phytotoxicity (chlorosis in primary leaves, growth inhibition) were observed, and also by the small biomass of the weeds (Matala, 1994). The decrease of weeds would have the most advantageous effect on plants since weeds compete with them for soil moisture, light and nutrients. We noted that the use of Basta 150 SL at the rate of 5 l/ha is practical only in the case of appearing perennial weeds (*Taraxacum officinalis*, *Cirsium arvense*, *Viola arvensis*) in an orchard. In the case of other weeds, the rate of herbicide 3 l/ha suited well.

CONCLUSIONS

These results suggest that Basta 150 SL provides excellent weed control. According to our study, Basta 150 SL treatments were effective against most of all important weeds. The results of the experiment indicated that due to Basta 150 SL weed infestation in the strawberry plantation was decreased by 90–96%. The results also showed that Basta 150 SL did not cause damage to strawberry plants and berries.

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