

Elephant grass response to amino-acid synthesis inhibitor herbicides

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Elephant grass (*Pennisetum purpureum* Schum) belongs to the Poaceae family and originates in Africa (Schmelzer 1997). It was introduced as forage in many tropical and subtropical regions of the world. Weed interference is one of the main difficulties in elephant grass cultivation. The crop is very sensitive in the first weeks after planting (3-6 w) (Silva et al. 2002). The objective of this study was to evaluate the tolerance of elephant grass plants to amino-acid synthesis inhibitor herbicides in order to provide subsidies to weed control in elephant grass fields.

Material and Method

The experiment was conducted in Coronel Xavier Chaves, Minas Gerais State, Brazil (21° 01' 23" S and 44° 09' 58" W). The experimental pastures were treated using the following herbicides at 1X and 2X of the normal field use rates (g ai ha⁻¹): metsulfuron-methyl (7.8 and 15.6), chlorimuron-ethyl (15 and 30), halosulfuron (112.5 and 225), ethoxysulfuron (150 and 300), and nicosulfuron (60 and 120). A control was also set up where no herbicide was applied.

Results

➤ Percentage of phytotoxicity and elephant grass plant height.

Table 1. Phytotoxicity (%) on elephant grass plants at 7, 14, and 21 days after application of the herbicides (DAA) and plant height at 30 DAA.

Treatments	Doses	Days			Height (cm)
		7	14	21	
Metsulfuron-methyl	7.8	1.5 D ¹	0.0 F	0.0 C	50.4 B
Metsulfuron-methyl	15.6	2.5 C	1.2 E	0.0 C	46.7 C
Chlorimuron-ethyl	15	1.2 D	0.0 F	0.0 C	48.0 C
Chlorimuron-ethyl	30	2.0 C	1.2 E	0.0 C	49.0 C
Halosulfuron	112.5	0.0 E	0.0 F	0.0 C	49.6 C
Halosulfuron	225	1.2 D	2.2 D	0.0 C	49.1 C
Ethoxysulfuron	150	1.2 D	2.2 D	0.0 C	51.8 B
Ethoxysulfuron	300	1.7 C	5.5 C	0.0 C	51.8 B
Nicosulfuron	60	5.5 B	24.0 B	73.2 B	20.4 D
Nicosulfuron	120	7.0 A	31.0 A	83.0 A	21.1 D
Control	-	0.0 E	0.0 F	0.0 C	60.2 A
Mean ±Standard Deviation		1.69±0.92	2.16±0.12	2.43±0.05	45.3±2.0

¹ Mean values followed by different letters are significantly different (P ≤ 0.05) by Scott-Knott test.

➤ Spad index, fresh and dry matter weight of elephant grass plants

Table 2. Spad index (SPAD) at 14 and 21 days after application of the herbicides; fresh matter weight (FMW) and dry matter weight (DMW) of elephant grass.

Treatments	Doses (g ha ⁻¹)	Days		FMW (kg ha ⁻¹)	DMW (kg ha ⁻¹)
		14	21		
Metsulfuron-methyl	7.8	46.5 A ¹	43.3 A	60,241.9 A	8,995.0 A
Metsulfuron-methyl	15.6	36.5 D	40.8 A	56,629.4 A	8,301.1 A
Chlorimuron-ethyl	15	45.5 B	42.5 A	49,640.7 A	7,029.4 A
Chlorimuron-ethyl	30	38.9 C	45.6 A	44,896.1 A	6,466.4 A
Halosulfuron	112.5	47.6 A	43.8 A	55,241.2 A	7,858.0 A
Halosulfuron	225	48.02 A	42.5 A	48,487.7 A	6,903.4 A
Ethoxysulfuron	150	44.9 B	42.5 A	54,175.7 A	8,093.2 A
Ethoxysulfuron	300	35.8 D	34.4 B	51,466.0 A	7,481.1 A
Nicosulfuron	60	20.4 E	21.2 C	8,724.5 B	2,725.4 B
Nicosulfuron	120	16.7 F	18.9 C	7,420.1 B	2,373.5 B
Control	-	47.3 A	45.2 A	49,946.4 A	7,519.7 A
Mean ±Standard Deviation		38.9±1.6	38.2±3.4	44,260.9±10,406.3	6,704.2±1,103.2

¹ Mean values followed by different letters are significantly different (P ≤ 0.05) by Scott-Knott test.

Discussion

Except nicosulfuron, all herbicide treatments showed mild symptoms of injury at 7 DAA, which disappeared at 21 DAA (Table 1). The injury symptoms caused by nicosulfuron were pronounced at the first evaluation and worsened over time. The injury reached 73.2% and 83% on application of the recommended dose and double dose, respectively. All the herbicide treatments resulted in lower plant height (Table 1). However, the effect was higher when treated with nicosulfuron. The SPAD values were not reduced at 14 DAA for the lower dose of metsulfuron or either halosulfuron treatment (Table 2). However, all the other treatments provided values significantly different from those of the control. The SPAD index at 21 DAA, for all treatments other than the highest dose of ethoxysulfuron and the two doses of nicosulfuron, was similar to that of the control. Only the two doses of nicosulfuron significantly reduced the values of fresh and dry matter yield when compared to that of the control.

The herbicides metsulfuron-methyl, chlorimuron-ethyl, halosulfuron and ethoxysulfuron were selective to elephant grass plants, being a potential practice for controlling weeds on elephant grass fields.

References

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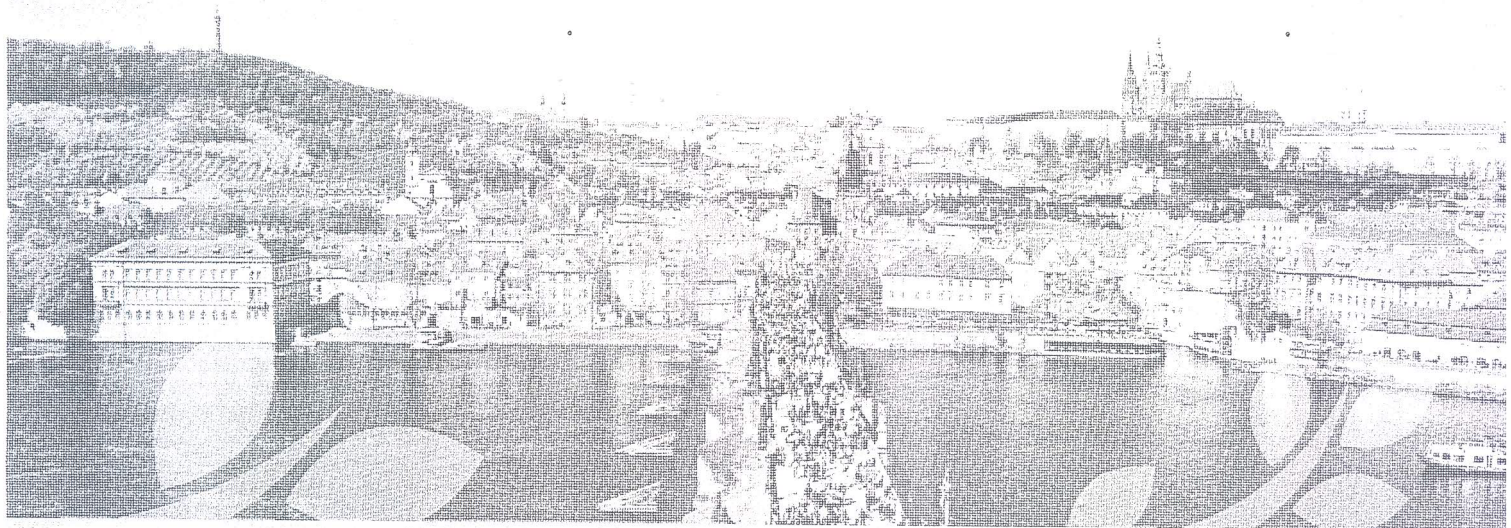
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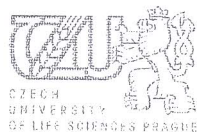


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