GRAND CHALLENGES GREAT SOLUTIONS

Chemical Attributes of Savanna Soil Fertility after Low Rates of Fertilizer Application and Initial Growth of Eucalyptus Sprout Strains

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INTRODUCTION

Eucalyptus cultivation occupies large areas of the Brazilian territory, having increasingly relevant within the agriculture of the country this context, driving budding strains is an interesting and common technique used in eucalyptus plantations in Brazil. The objective of this research was to evaluate the effects of mineral fertilizer rates and the development of one or two sprout of eucalyptus (clone I-144 (*Eucalyptus grandis* x *Eucalyptus urophylla*), second cycle, under the nutrient content in the soil layer 0 - 20 cm in savanna soil with low fertility.

MATERIAL AND METHODS

Experiment was conducted in Três Lagoas, MS, Brazil (20¼ 45' South , 51° 40' West and 320 m). Experimental design was a randomized complete block design with 8 treatments and 5 replications in a factorial scheme 2 x 4: with one or two sprout of eucalyptus in the production cycle and four rates of mineral fertilizer (0, 50, 100 or 200% of the recommended amount (200 kg ha^{-1} the formula 06-30-06 + 1% Ca + 3% S + 1% Mg + 1.5% Cu + 1% Zn) for planting seedlings) applied immediately after the definition of the sprout. Each plot consisted for 49 plants.

The results of chemical analysis of soil in the experimental area were determined according to the methodology proposed by Raij et al. (2001).

The results were analyzed by analysis of variance and Tukey test at 5% probability for comparison of mean number of shoots. To the effect of doses of mineral fertilizer polynomial regression was applied. The statistical analysis program SISVAR (FERREIRA, 2003) was used.

RESULTS AND DISCUSSION

Highest contents of P, K, Mg, B, Cu, Mn and Zn were obtained when opted for driving a sprout per plant, thus indicating greater nutritional requirement when conducting two buds per vine eucalyptus. The increasing rates of fertilizer increased the contents of P, S-SO_4^{2-} and Cu in soil, irrespective of the conduct of one or two sprout of eucalyptus (Table 1).

Adjustment was increasing linear function for the CTC[1] and the contents of B[2], Mn[3] and Zn[4] [(1)Y=37.5233+0.0543x (R^2=0.91); (2)Y=0.3357+0.0004x (R^2=0.78); (3) Y=12.5663+0.0485x (R^2=0.75); (4)Y=0.6300+0.0104x (R^2=0.90)] only when it opted for a sprout per plant, thus there was less absorption of these micronutrients in conducting a sprout on two sprouts of eucalyptus, since no adjustment was made for such evaluations in this last treatment and the values are higher for a sprout.

Table 1. Means, Least Significant Difference (LSD), Coefficients of Variation (CV) and Tukey test related to chemical soil attributes at a depth of 0-20 cm, seven months after the definition of eucalyptus sprouts in the number of sprouts per stump and the first fertilization.

Treatments	P resin (mg dm^{-3})	O.M. (g dm^{-3})	pH ($CaCl_2$)	K	Ca	Mg	H+Al	SB	CTC
				----------(mmol$_c$ dm^{-3})----------					
Number of sprouts									
1	65.92a	13.41a	3,92a	0.52a	5.83a	4.13a	31.79a	10.48a	42.27a
2	42.83b	12.13a	3.93a	0.29b	5.33a	2.75b	28.38b	8.38b	36.75b
LSD (5%)	15.21	0.62	0.12	0.09	1.38	0.95	2.50	2.09	2.73
Fertilization(%)+									
0	27.83(1)	12.67	4.00(2)	0.41	5.42	3.33	29.33(3)	9.16	38.49
50	40.41	12.75	3.93	0.38	5.58	3.00	28.00	8.97	36.97
100	56.58	12.92	3.94	0.43	5.50	3.58	29.67	9.51	39.18
200	92.67	12.75	3.82	0.41	5.83	3.83	33.33	10.08	43.41
Test F									
Sprouts (S)	9.42**	17.89**	0.01ns	29.33**	0.54ns	8.55**	7.60**	4.13*	6.71**
Fertilization (F)	13.97**	0.12ns	1.79*	0.17ns	0.07ns	0.57ns	3.40**	0.22ns	4.17**
S *x* F	1.58ns	0.37ns	0.48ns	0.45ns	1.46ns	0.93ns	1.40ns	1.45ns	2.85*
CV (%)	23.32	8.28	5.05	8.02	20.61	20.55	14.25	18.79	11.84
Overall Average	54.38	12.77	3.92	0.41	5.58	3.44	30.08	9.43	39.15

Treatments	V (%)	m (%)	S-SO_4^{2-} (mg dm^{-3})	B	Cu	Fe	Mn	Zn
				----------(mg dm^{-3})----------				
Number of sprouts								
1	24.59a	37.46b	12.38a	0.37a	1.69a	63.13a	16.80a	1.54a
2	22.70a	48.96a	11.92a	0.29b	0.98b	61.71a	6.93b	0.85b
LSD (5%)	4.65	12.19	1.55	0.04	0.26	9.23	2.03	0.41
Fertilization(%)+								
0	23.91	39.00	8.08(4)	0.33	1.00(5)	63.00	9.22	0.75
50	24.17	44.00	10.00	0.31	1.08	56.42	12.79	1.03
100	24.27	40.17	12.75	0.33	1.53	68.42	10.70	0.97
200	22.23	49.67	17.75	0.35	1.74	62.00	14.78	2.03
Test F								
Sprouts (S)	0.67ns	3.64ns	0.36ns	18.88**	30.46**	0.09ns	96.74**	11.91**
Fertilization (F)	0.17ns	0.64ns	30.00**	1.31ns	7.31**	1.16ns	5.85**	8.03**
S *x* F	0.62ns	0.49ns	0.46ns	0.97*	2.93ns	2.33ns	5.56**	3.62*
CV (%)	17.57	29.46	21.86	18.48	33.10	25.30	29.30	19.91
Overall Average	23.64	43.21	12.14	0.33	1.34	62.46	11.87	1.19

B: Determined in hot water; Cu, Fe, Mn and Zn: Determined DTPA. + Percent referring to 200 kg ha^{-1} of formula 06-30-06 + 1.0% Ca + 3.0% S+ 1.0% Mg + 1.5% Cu + 1.0% Zn. Means within column followed by the same letter are not different using the Tukey test (*P>0.05*). (1) Y=25.6500+0.3283x (R^2=0.91); (2) Y=3.9983-0.00086x (R^2=0.92); (3) Y=28.0667 +0,0230x (R^2=0.74); (4) Y=7.8500+0.0490x (R^2=0.99); (5) Y=0.9867+0.0040x (R^2=0.91).

CONCLUSION

The contents of B, Mn and Zn in soil increased only when it opted for conducting a sprout per eucalyptus plant.

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