Growth characteristics of kikuyu grass with different sources and doses of phosphorus

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Introduction Growth is defined as the increase in size, volume and mass as a function of time. Growth analysis allows evaluating the final growth of the plant as a whole and the contribution of the different organs in total growth (Benincasa, 1988). The experiment had as objective to evaluate specific leaf area (SLA), leaf area per unit of leaf DM, leaf area ratio (LAR), leaf area per unit of whole plant DM, leaf weight ratio (LWR), leaf weight per unit of plant weight, leaf area index (LAI), leaf area per unit of soil area, leaf/stem ratio (LSR), leaf weight per unit stem weight, of 35 days old kikuyu grass with different sources and doses of P.

Materials and methods The field experiment was conducted from August, 2000 till October, 2003 at the Universidade Federal de Lavras, southern Minas Gerais, Brazil, (21º14' S ; 40º00' W, altitude 918.84 m). The climate is Cwb, with a very defined wet season (October to March) and dry season (April to September) and average precipitation of 1,526.7 mm The experimental design was a split plot within a completely randomised block, with source of P [Triple superphosphate (TS), Phosphate of Arad (PAd) and Phosphate of Araxa (PAx)] as plots and doses of P (0, 40, 80 and 120 kg/ha of P_2O_5) as subplots. Cuts were made every 35 days in the wet season.

Results SLA, LAR and LWR were affected by the sources and doses of P, however LSR only varied with the doses of P (Table 1). LAI was not affected ($p > 0.05$) (mean 3.27). There was a linear increase of SLA when fertilised with PAd and a quadratic one for TS and PAx. LAR increased linearly to increased doses of P as PAd. LWR was quadratically inversely related to SLA. Fertilisation with PAx gave a maximum value of LWR of 0.6237 g/g at 72.3 kg/ha and with TS it was of 0.5213 g/g at 23.2 kg/ha of P_2O_5. Irrespective of the source of P, the LSR was increased to a maximum of 1.97 at the rate of 52.5 kg/ha of P_2O_5. In the range of 40-80 kg/ha of P_2O_5 the plants had higher LSR and consequently higher LWR.

Table 1 Adjusted regression equations for SLA, LAR, LWR and LSR of kikuyu grass, as a function of the doses of P (X)

Growth characteristics	Source of P	Regression equations	R^2	Prob.
SLA (m^2/g)	Triple superphosphate	$Y = 0.0421 - 0.000142X + 0.000003X^2$	0.94	<0.001
	Phosphate of Arad	$Y = 0.04098 + 0.00011X$	0.90	<0.001
	Phosphate of Araxa	$Y = 0.07457 - 0.00107X + 0.000006X^2$	0.99	<0.001
LAR (m^2/g)	Triple superphosphate	$Y = 0.0213$	-	-
	Phosphate of Arad	$Y = 0.0203 + 0.000053X$	0.73	<0.001
	Phosphate of Araxa	$Y = 0.0209$	-	-
LWR (g/g)	Triple superphosphate	$Y = 0.5105 + 0.00093X - 0.00002X^2$	0.99	<0.05
	Phosphate of Arad	$Y = 0.5083$	-	-
	Phosphate of Araxa	$Y = 0.3992 + 0.00636X - 0.000044X^2$	0.98	<0.001
LSR		$Y = 1.6917 + 0.01056X - 0.00011X^2$	0.86	<0.05

Conclusions Phosphorus fertilisation particularly from more reactive sources, stimulated growth of the kikuyu grass, leading to increments of SLA, LAR, LWR and LSR.

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References

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