Differential Behaviour of Guineagrass (*Panicum Maximum Jacq.*) Hybrids, With Different Al^{+3} Reactions, as to Major Nutrient Translocations to the Leaves

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Differential behaviour of guineagrass (*Panicum maximum Jacq.*) hybrids, with different Al^{+3} reactions, as to major nutrient translocations to the leaves

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Introduction Most of the Brazilian cultivated pasture fields presents soils with high Al^{+3} levels and liming is economically unfeasible. So, there is an urgent need for grasses with good forage yielding potentials that can withstand Al^{+3} deleterious effects (abnormal root development: short, thick and poorly branched roots, which are unable to effectively translocate water and essential nutrients to the leaves) (Foy, 1984); as a consequence, susceptible genetic materials have their field persistences greatly affected, mainly during drought periods. Researches on Al^{+3} reaction are usually compare supposedly resistant/tolerant genotypes with a resistant control check; doing so, the genotypic effect is not isolated, making unreliable the comparisons made (Thomas & Lapointe, 1989). Guineagrass hybrids were tested as to nutrient translocations to the leaves, through comparisons of results obtained in treatments with and without N, P and K applications to the soil, for each genotype.

Materials and methods Greenhouse pot trials were carried out with 6 guineagrass hybrids showing different Al^{+3} reactions (Susceptible, Tolerant, Resistant: S, T, R) and flowering cycles (Early, Intermediate, Late: E, I, L) (Oliveira et al., 2000). A complete fertiliser formula was developed with the proper levels of N, P, K, Ca, Mg and S (control check); the treatments were additionally supplied with N, P and K. During the vegetative stage, full developed leaves were picked up and properly analysed (AOAC, 1995). Hybrid differences as to N, P, K, Ca, Mg and S leaf levels were calculated through comparisons between treatments with additional N, P and K and the control checks. The effects of Al^{+3} resistance/tolerance were analysed, by observing the hybrids that showed the two highest percent increases or the two smallest percent decreases in the leaf nutrient levels.

Results Hybrid differences as to nutrient translocations to the leaves were detected, after N, P and K applications to the soil (Table 1). After N addition, no clear trend was observed in leaf nutrient levels which could be related to Al^{+3} reaction; however, after P and K addictions, resistant and tolerant genotypes outperformed the susceptible ones (83.3 and 70.0% of the cases, respectively), suggesting that both are highly correlated to Al^{+3} reaction.

Table 1 Effects of N, K and P application to the soil on the N, P, K leaf contents of six guineagrass (*Panicum maximum* Jacq.) F_1 apomictic hybrids, variable as to flowering cycles and Al^{+3} reactions.

Hybrid	Percent leaf content increases / reductions*1								
	N			P			K		
	N*2	P*2	K*2	N*2	P*2	K*2	N*2	P*2	K*2
H31 (E, S)	+ 23.8c	- 15.2 b	- 32.6b	- 7.1a	+ 42.8bc	- 36.8b	- 41.6bc	+ 17.7b	+ 82.3b
H33 (E, T)	+ 40.5bc	+ 3.1a	- 17.7a	- 31.2bc	+ 28.6c	- 31.8b	- 52.8cd	+ 8.9bc	+ 125.0a
H55 (I, S)	+ 67.5a	- 29.5c	- 25.5ab	- 27.2bc	+ 25.0c	- 30.4b	- 34.4ab	- 38.2d	+ 43.8c
H54 (I, R)	+ 45.0b	- 5.2ab	- 24.5ab	- 34.6c	+ 57.1ab	- 17.4a	- 24.4a	- 4.7cd	+ 86.9b
H64 (L, S)	+ 48.8b	- 34.2c	- 28.1ab	- 30.4bc	+ 37.5c	- 3.8a	- 59.0d	- 12.8d	+ 38.4b
H79 (L, R)	+ 50.0b	- 14.3b	- 34.6b	- 21.1b	+ 66.7a	- 36.0b	- 50.2bcd	+ 32.2a	+ 78.3c
lsd $p<0.05$	16.8	13.5	14.8	12.6	17.8	12.8	15.8	14.2	18.2
CV %	12.4	11.2	16.4	10.5	13.4	15.4	13.4	10.3	13.2

**1 Calculated through comparisons between treatments with and without N, for each genotype; b) *2 N, P, K application; c) Means followed by different letters, in the same column, are different according to least significant difference test at p<0.05; d) CV % = coefficient of variation*

Conclusions Al^{+3} resistant/tolerant genotypes are able to translocate nutrients to the leaves in a more effective way than the susceptible ones, mainly after P and K applications to the soil.

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