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Search for *Brachiaria brizantha* genotypes with sexuality levels high enough to allow future intra-specific crossings

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Key words: *B. brizantha*, off-type" genotypes, sexuality levels, agronomic traits, molecular markers

Introduction *B. brizantha* is the most used tropical forage grass for setting cultivated pastures in Brazil, accounting for more than 80% of the traded forage grass seeds. Its available cultivars have shown high forage and seed yielding potentials as well as good field performances when in competition with several weed species. However, all of them reveal only regular forage quality (as to crude protein levels in fresh/dry matter and forage digestibility), regular forage acceptability by grazing animals, high soil fertility requirements, low tolerance to acid and/or poorly drained soils, and so on. Being a facultative apomictic species (Alves *et al.*, 2001), most of the breeding programs are based on the selection of new cultivars in available germplasm banks. However, this methodology has not been successful in recent years, because of the remaining narrow genetic variability to be exploited. Recently, inter-specific hybrids *B. brizantha* x *B. ruziziensis* have been developed, showing several desirable forage traits but extremely poor seed yielding levels (Lutts *et al.*, 1991), which prevent their uses in cultivated pastures. Therefore, the only option seems to be the increase of the amount of genetic variation within the species, through intra-specific crossings. To do so, it is imperative the selection of genotypes with sexuality levels high enough to allow those crossings, which was the main aim of this research work.

Materials and methods Thirty thousand *Brachiaria brizantha* individual plants were established in the field, after previous seed sowing in plastic bags, filled up with a proper soil, supplied with organic/mineral items. Plant spacing was enough to allow a clear visualization of each genotype. During the vegetative period, proper soil fertilization and weed control were performed. At the onset of flowering, a careful selection of "off-type" genotypes was carried out, taking into account the following morpho-agronomic traits: plant height, growth habit, number of vegetative tillers, leaf blade length and width, sheath and leaf hairiness, tiller diameter, leaf colour and flowering cycle. Selected individuals were transferred to greenhouse and possible genetic differences among them and the standard types were checked through RAPD markers (Renganayaki *et al.*, 2001).

Results and discussion Out of the 30,000 individual plants analysed in the field, only 14 (0.00046%) showed major differences for the above cited forage traits, as compared to those belonging to the standard type group (Table 1). RAPD marker analysis carried out on them revealed that genotypes 2, 5 and 8 are, consistently, genetically different (Figure 1), probably due to previous sexual reproduction and hopefully able to act as female parents in future crossings, aimed at the synthesis and selection of new intra-specific hybrids.

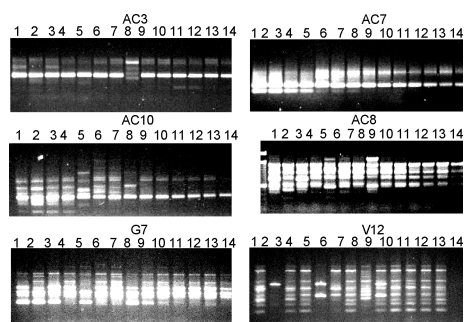


Figure 1

Table 1 Morphoagronomic characteristics on "off-type" individuals selected in a population of *Brachiaria brizantha* cv. Marandu.

Individual	PH	GH	NVT	LL	LW	SH	LH	TD	TF	TBC	FC	LC
1	110	SP	20	94	22	S	S	13.5	F	P	L	LC
2	90	E	64	38	20	H	H	4.0	R	G	E	DG
3	95	E	62	45	18	H	H	4.0	R	G	L	NG
4	95	E	92	53	18	H	S	3.5	R	G	I	NG
5	120	SP	31	36	14	S	S	4.5	R	G	E	DG
6	97	E	58	43	10	H	S	2.5	R	G	L	NG
7	120	E	47	56	10	H	S	3.5	R	G	I	NG
8	125	E	98	43	11	H	S	4.0	R	G	E	LG
9	125	E	57	51	12	H	H	4.0	R	G	L	DG
10	105	E	77	43	9	H	S	3.0	R	G	L	NG
11	105	E	55	52	12	H	S	2.5	R	G	L	DG
12	100	E	59	48	15	H	S	3.0	R	G	L	NG
13	105	E	57	44	12	H	S	3.0	R	G	L	NG
14	110	E	94	54	12	H	S	3.5	R	G	L	NG

Observations PH=plant height at 60 days (cm); GH=growth habit (E=erect; SP=semiprostrata; P=prostrated); NVT=number of vegetative tillers; LL=leaf length (cm); LW=leaf width (mm); SH=sheath hairiness (H=hairy; S=smooth); LH=leaf hairiness (H=hairy; S=smooth); TD=tiller diameter (mm); TF=tiller format (R=round; F=flat); TBC=tiller base colour (G=green; P=purple); FC=flowering cycle (E=early; I=intermediate; L=later); LC=leaf colour (LG=light green; NG=normal green; DG=dark green).

Conclusions The occurrence of "off-type" genotypes in *B. brizantha* population revealed to be a very rare event; even so, their identification, hopefully with good sexuality levels, might be rewarding in the future.

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