Shearing strength and chemical composition in the selection for quality in Brachiaria brizantha

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Introduction Selection of quality pasture forages for productivity, nutritive value and animal performance require long-term, expensive trials. Simpler and accurate techniques to detect quality differences among genotypes have been proposed (Mackinnon *et al*., 1988; Hughes *et al*., 2000). This paper discusses the use of shearing strength in *Brachiaria brizantha* ecotypes to correlate physical traits with chemical composition: the objective being the identification of cultivars of improved quality forage suitable to the savannas of Brazil.

Materials and methods One-thousand-square-meter paddocks of nine ecotypes were evaluated, in a randomized block design with two replicates. Forage was sampled after 42 days regrowth in two seasons: rainy (summer) and dry (winter). Total forage produced was sampled using a 0.25 m frame but only leaves were used for chemical analysis performed by near infrared reflectance spectroscopy. The second fully expanded leaf was used to evaluate shearing strength (F) with a Warner-Brazler equipment, after weight, area, width and length had been measured to standardize the F value to account for different leaf sizes.

Results Shearing strength (F) and F standardized by leaf weight and area (F/DA) were the two best parameters to discriminate among ecotypes. Smaller differences were observed in the winter due to slower growth and less fiber accumulation. Higher significant differences were found in the summer (Table 1) and B2, B4, B5 e B6 were the best when compared to the check, particularly when total dry matter production was considered (5.7; 5.2; 3.5; 6.8 t/ha respectively vs. 2.5 of the check). Tropical forages tend to accumulate cell walls thus lower F or F/AD values signify less structural fibers which according to Jung & Allen (1995) should indicate better digestibility and consumption. The correlations of these parameters with chemical composition were highly significant (Table 2) and can be used as selection criteria for quality among ecotypes.

Table 1 Shearing strength and chemical composition on leaves of *B. brizantha* in the wet season

B. brizantha Ecotypes	F (kg)	F/AD (kg/g/cm^2)	ADF %	Cel. %	IVOMD %
check	2,9^{c}	132.2^{abc}	36^{c}	26de	62^{ab}
B1	3,9^{ab}	159.2^{ab}	38^{bc}	29^{b}	59^{bc}
B2	2,7^{c}	122.9^{cd}	38^{c}	27^{cd}	62^{ab}
B3	4,1^{ab}	166.6^{a}	40^{a}	30^{a}	55^{c}
B4	3,2^{bc}	118.4^{cd}	37^{c}	28^{bc}	63^{ab}
B5	1,7^{d}	92.6^{d}	33^{d}	25^{e}	66^{a}
B6	2,8^{c}	123.8^{bcd}	38^{c}	27^{cd}	57^{bc}
B8	4,3^{a}	160.2^{a}	40^{ab}	29^{ab}	58^{bc}
B9	3,0^{c}	133.2^{abc}	37^{c}	27^{d}	62^{ab}

Cel. = cellulose
Columns containing the same superscript do not differ significantly (P < 0.05)

Table 2 Correlation coefficients between physical and chemical parameters in the wet season

	F (kg)	F/AD (kg/g/cm^2)
ADF[#]	0.88**	0.82**
Cellulose	0.90**	0.82**
IVOMD	-0.74**	-0.75**

[#]ADF= acid detergent fiber
IVOMD= in vitro organic matter digestibility
** highly significant (P<0.001)

Conclusions Shearing strength (F) and F/Area density were the best predictors of quality in this study with ecotype being better discriminated in the rainy season. Both F and F/AD are highly correlated to fiber content and digestibility, proving to be a reliable, inexpensive and accurate selection technique.

References

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