

PHYSIOLOGICAL AND CHEMICAL CHARACTERISTICS OF FIVE CULTIVARS OF *CYNODON*

C.C.C. Gomide*, L.R.de A. Rodrigues, T.de J.D. Rodrigues, R.A. Reis, D.A. Banzatto
UNESP-FCAV, 14870-000 Jaboticabal-SP, Brazil.

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ABSTRACT

The experiment was carried out at UNESP, Brazil, to evaluate five *Cynodon* cultivars: (*Cynodon nlemfuensis* Vanderyst cv “Tifton 68”, *Cynodon* spp. cv “Tifton 85”, *Cynodon dactylon* cv “Florakirk”, *Cynodon nlemfuensis* Vanderyst var. *nlemfuensis* cv “Florico” e *Cynodon nlemfuensis* Vanderyst var. *nlemfuensis* cv “Florona”). Plants were sampled once a week from 14 to 84 days of growth to study physiological characteristics and at 14-day intervals to study chemical characteristics. The following variables were studied: DM production, leaf/stem ratio, leaf weight/total dry matter ratio, relative growth rate, chlorophyll contents, leaf area, specific leaf area, LAI, and the contents of CP, NDF, and ADF. The five cultivars showed similar responses for all variables studied. The data obtained allowed us to conclude that the five cultivars would be better managed when cut or grazed at 28-42 days intervals of plant growth.

KEYWORDS

Growth rate, leaf area index, chlorophyll, crude protein, NDF, ADF.

INTRODUCTION

Cynodon species have been used as a valuable forage in many tropical and subtropical areas of the world. In the southeast part of United States bermudagrass and stargrass are used with success for pastures and hay (Sollenberger *et al.*, 1995). New cultivars released in the USA were recently introduced in Brazil. However, there is little information concerning their management and forage quality.

Thus, this work was carried out to evaluate the DM production and some physiological and chemical characteristics of these grasses.

MATERIALS AND METHODS

The experiment was carried out in a dark-red Latossol at UNESP - SP, Brazil, from February 1 to April 10, 1996. The treatments consisted in the evaluation of five *Cynodon* cultivars : (*C. nlemfuensis* Vanderyst cv “Tifton 68”, *Cynodon* spp. cv “Tifton 85”, *C. dactylon* cv “ Florakirk”, *C. nlemfuensis* Vanderyst var. *nlemfuensis* cv “Florico” e *C. nlemfuensis* Vanderyst var. *nlemfuensis* cv “Florona”) sampled at cutting ages (14, 21, 28, 35, 42, 49, 56, 63, 70, 77 and 84 days) to study physiological characteristics, and five cutting ages to study chemical characteristics (14, 28, 42, 56 and 70 days).

A completely randomized split-plot design with three replications was used, being the cultivars studied in the plots and the cutting ages in the sub-plots. The following variables were studied: dry matter production (DMP), leaf/stem ratio, leaf weight/total DM weight ratio, relative growth rate (RGR), chlorophyll contents, leaf area, specific leaf area (SLA), leaf area index (LAI), and the contents of crude protein (CP), neutral detergent fiber (NDF) and acid detergent fiber (ADF) in the green leaves, stems, and the whole plant.

The chlorophyll contents were determined according to Linder (1974). The contents of CP were determined according to AOAC (1970) and the contents of NDF and ADF were determined according to Goering and Van Soest (1970). The physiological characteristics were determined according to Evans (1972) and Hunt (1982).

RESULTS AND DISCUSSION

The DMP increased from the 14th-day (2212 kg/ha) to 84th-day (11032 kg/ha) of growth, and was not different among cultivars. The leaf/stem ratio differed ($P<0.01$) among cultivars (C) being higher in the cv.Tifton-85 (0.78) and lower in the cvs. Florona and Florico (0.53). The RGR was similar ($P>0.05$) for all cultivars and varied with plant age, being the higher average value (0.0740 g/g/day) observed from 21 to 28 days of growth (Table 1). The cv. Tifton-85 showed a higher value ($P<0.01$) of leaf weight/total DM weight ratio (0.1032 g/g) than the others. The leaf area increased as the plant age increased. The cv. Tifton-85 showed a greater average leaf area (117.98 dm²/m²) than the others. The higher values of SLA were obtained at 21 (2.19 dm²/g) and 28 days (2.41 dm²/g) of plant growth. The average LAI of the cultivars increased from 14 (1.21) to 42 days (5.80) of growth and tended to decrease thereafter. The content of chlorophyll (a+b) did not limit the plant growth and was always above 1.616 mg/g. The contents of CP were higher ($P<0.05$) in all cultivars at 14th and 28th-days of plant growth. In general, the content of CP in the whole plant was higher than that observed in the stems and lower than that observed in the leaves (Table 2). The contents of NDF and ADF showed similar values in all cultivars (73.28 % in the cv. Florico to 80.14 % in the cv. Tifton-85), and increased with plant age (68.28% to 80.49%).

These results are in agreement with those reported by Pedreira (1995). The data obtained allowed to recommend the defoliation management of the five cultivars studied at 28 to 42 day-intervals.

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Table 1Relative growth rate (g/g/day) of five cultivars of *Cynodon* at 7-day intervals from 14 to 84 days of growth.

Growth period (days)	Cultivars					Means
	85	Florakirk	68	Florona	Florico	
14 - 21	-0.010	0.046	0.014	0.024	-0.001	0.0147 BC
21 - 28	0.084	0.042	0.070	0.090	0.085	0.0740 A
28 - 35	0.026	0.065	0.086	0.038	0.068	0.0568 AB
35 - 42	-0.022	0.029	-0.010	0.037	0.029	0.0127 C
42 - 49	0.065	-0.004	0.041	0.020	0.023	0.0291 BC
49 - 56	0.027	0.031	0.021	0.022	-0.004	0.0192 BC
56 - 63	-0.018	0.003	0.016	-0.003	0.014	0.0024 C
63 - 70	0.026	-0.009	0.003	0.012	-0.017	0.0030 C
70 - 77	0.006	0.018	0.002	0.018	0.037	0.0163 BC
77 - 84	-0.003	0.009	0.018	-0.019	0.008	0.0026 C
Means	0.0182 a	0.0230 a	0.0261 a	0.0239 a	0.0242 a	

+ Means followed by the same letter, smaller in the line and capital in the column, are not different ($P > 0.05$) by the test of Tukey.**Table 2**Contents of crude protein in the whole plant, culms and green leaves of five cultivar of *Cynodon* in five cutting ages.

Cutting ages (days)	Cultivars					Means
	85	Florakirk	68	Florona	Florico	
CP (%) - whole plant						
14	16.28	17.46	20.78	19.71	21.67	19.18 A
28	14.21	18.46	20.56	18.96	21.45	18.93 A
42	10.29	12.76	15.17	13.92	16.42	13.71 B
56	8.56	7.60	10.69	9.65	11.21	9.54 C
70	8.58	9.65	13.11	9.48	11.68	10.50 C
Means	11.58 c	13.18 bc	16.26 a	14.34 b	16.48 a	
CP (%) - green leaves						
14	21.11	22.18	26.07	21.96	23.40	22.94 A
28	16.19	20.25	25.39	22.80	23.36	21.55 A
42	12.97	17.54	18.41	20.65	18.24	17.56 B
56	14.23	14.90	16.15	18.14	15.25	15.73 B
70	14.45	17.08	18.54	15.46	16.50	16.41 B
Means	15.79 c	18.39 b	20.87 a	19.80 ab	19.35 ab	
CP (%) - culms						
14	13.78 Aa	16.44 Aa	15.63 Aa	14.06 Aa	17.34 Aa	15.45
28	9.64 Bc	12.94 ABbc	15.31 Aab	12.93 Abc	18.03 Aa	13.77
42	7.86 Bbc	9.41 BCabc	10.80 Bab	6.55 Bc	11.57 Ba	9.24
56	6.58 Bab	5.07 Db	7.34 Bab	8.95 Ba	10.27 Ba	7.64
70	6.20 Ba	6.43 Cda	8.68 Ba	5.86 Ba	5.72 Ca	6.58
Means	8.81	10.06	11.55	9.67	12.58	

+ Means followed by the same letter, smaller in the line and capital in the column, are not different ($P > 0.05$) by the test of Tukey.