

Forage production and nutritive value of *Chamaecrista rotundifolia* (Persoon) Greene in the eastern Amazon, Brazil

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Introduction

Chamaecrista rotundifolia is a perennial legume of the subfamily Caesalpinioideae, native of North and South America (Ducke, 1949). It is considered as one of the six most promising legumes for the subhumid regions of Nigeria by Tarawali (1991; 1994) who reported dry matter production of 2.84 t/ha per year and crude protein content of 10.7%. In Brazil, Cruz (1996) found that the dry matter production of six accessions of *C. rotundifolia* varied from 1.32 to 4.53 t/ha per year. Partridge and Wright (1992) observed that cattle grazing native pasture plus *C. rotundifolia* had liveweight gain 40% higher than cattle grazing native pasture alone. Michaelk et al. (1994) recommend that this species should be used as a pioneer legume due to its good establishment and persistence in soils with low content of phosphorus.

In 1964, one native accession of *C. rotundifolia* from Valinhos, São Paulo, Brazil, was introduced in Australia, where after field evaluations was named *C. rotundifolia* cv. Wynn (Oram, 1984). According to Oram (1984) it was well accepted by sheep and goats. Carrying biological trials with rats, Strickland et al. (1985) did not observe any deleterious effect for the animals fed with *C. rotundifolia*; digestible dry matter intake was similar to *Medicago sativa*, but liveweight gains were higher for *C. rotundifolia*. Partridge and Wright (1992) observed that cattle grazing a native pasture mixed with *C. rotundifolia* had liveweight gains 40% higher than cattle grazing native pasture, and through isotopic relation ($^{13}\text{C}/^{12}\text{C}$) analysis of the feces found that about 16% of the ingested diet was composed by this legume. Considering the good adaptation of this legume in the Northeast State of Pará (Cruz, 1996) the knowledge of

its forage quality would give a better contribution for animal feeding.

The aim of this work was to evaluate forage production and nutritive value of *C. rotundifolia* in the region of Belém, State of Pará, Brazil.

Materials and methods

The experiment was carried out in Belém (1° 27' 17" S and 48° 26' 21" W), State of Pará, in a sandy Yellow Latosol, pH of 4.3, 8 ppm of P and 4 ppm of K. The levels of Al^{+3} and $\text{Ca}^{+2} + \text{Mg}^{+2}$ were 1.3 and 0.8 cmol, respectively. The climate is an Afi type, according Köppen classification. Annual rainfall is 2990 mm, rainy season from January to June and dry season from July to December. Average annual temperature is 26.5 °C and humidity 84%.

It was evaluated the accession of *C. rotundifolia* BRA 000183 (CIAT 7792). It was seeded at the beginning of the rainy season. Plants were spaced 0.50 m apart, in plots of 10 m² without any fertilization. The plants were cut 4 months after seeding and at 56-day intervals during one year, at the height of 30 cm above ground. After cutting, the forage was weighed and samples were separated into stems and leaves for determination of crude protein (CP), crude fiber (CF) according to Sawazaki (1978) and in vitro dry matter digestibility (IVDMD) (Tilley and Terry, 1963; Tinnimit and Thomas, 1976) using rumen liquor of an adult water buffalo.

Forage production and nutritive value were evaluated from six cuts. The experimental design was a complete randomized with two treatments (season) and three replications. Means of total dry matter (DM) production, leaf percentage, CP, CF, and IVDMD were compared by the test of Tukey at the significance level of 5%.

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Results and discussion

Dry matter production was 6.94 t/ha per year. This annual forage production was higher than that obtained by Cruz (1996) for other accessions of the same species. Peters et al. (1994) reported DM productions (t/ha) of 3.5 (year 1), 7 (year 2) and 2.7 (year 3).

The averages values for forage production, CP, IVDMD and CF of leaves and stems in the two periods are shown in Table 1. There were significant differences ($P < 0.05$) for stem fraction for forage production and CP. Average leaf percentages were similar to those reported by Pizarro et al. (1995) for the shrubby legumes *Cratylia argentea* and *Gliricidium sepium*.

Significant differences were found only for CP levels of stems between season. Levels of CP and CF in the leaves were, respectively, higher and lower than those found for some tropical legumes in the Amazon region (Camarão et al., 1983). Peters et al. (1994) found CP values very close to those found in this work. IVDMD values were lower than those obtained by Quirk et al. (1992) and by Ahn et al. (1988).

Other studies will be necessary to measure the effect of cutting height and frequency on forage production, as well as the levels of tannin, lignin and cell wall nitrogen.

Conclusions

In the Northeastern Pará State, Brazil, *Chamaecrista rotundifolia* had good forage production, high level of crude protein and low digestibility. Seasonal DM production did not differ as well as nutritive value, except for CP of stems.

Table 1. Forage production, crude protein (CP), in vitro dry matter digestibility (IVDMD), and crude fiber (CF) of leaves and stems of *Chamaecrista rotundifolia*.

Variable	Season	Leaf	Stem
Forage production MS (t/ha per year)	Rainy	1.93 a*	2.17 a
	Dry	1.62 a	1.22 b
CP (%)	Rainy	18.6 a	9.1 a
	Dry	16.0 a	5.5 b
IVDMD (%)	Rainy	29.2 a	26.6 a
	Dry	28.7 a	25.5 a
CF (%)	Rainy	28.5 a	32.5 a
	Dry	28.7 a	36.7 a

* For each variable, means in the same column followed by the same letter do not differ significantly ($P > 0.05$) for forage production, CP, IVDMD, and CF.

Resumen

Chamaecrista rotundifolia es una leguminosa perenne de la subfamilia Caesalpinioideae, nativa de Norte y Sur América. En el trabajo se evaluaron la producción de MS y el valor nutritivo de esta leguminosa cultivada en el noreste del Estado de Pará, Brasil. Los cortes se iniciaron 4 meses después de la siembra y se realizaron con una frecuencia de cada 56 días durante 12 meses, a una altura de 30 cm sobre el nivel del suelo. En la época de lluvias, los valores de producción de MS, PC, DIVMS y fibra cruda en las hojas fueron, respectivamente, de 1.93 t/ha, 18.6%, 29.2% y 28.5%, mientras que en la época seca fueron de 1.62 t/ha, 16%, 28.7% y 28.7%.

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