Cutting frequency on quality indicators of Pennisetum and Saccharum varieties during the dry period

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A random block design with five replications and thirteen treatments was applied. Treatments consisted of three varieties of *Pennisetum purpureum* (king grass, Cuba CT-115 and Cuba CT-169) cut two (August and February), four (May, July, September and February) and five times a year (November, February, May, July and September) and two of *Saccharum officinarum* (Jaronú 60-5 and Villa Clara 21), cut one (February) and two (February and August) times a year for determining their influence on some forage quality indicators. The experiment was conducted in a red ferrallitic soil for four years with fertilization (100-60-80 kg/ha/year of N, P_2O_5 and K_2O, respectively) and irrigation during the dry period. There were differences ($P < 0.001$) in the CP content of the varieties according to the cutting frequency. The highest values were registered in leaves, stems and the whole plant of the Pennisetum varieties with ranging values of 7.6-10, 4.2-5.9 and 5.1-7.3 %, respectively when cut five times a year. Crude fiber differed ($P < 0.001$) and the lowest values were recorded in the Pennisetum varieties with the highest cutting frequency. For *in vitro* organic matter digestibility there were differences ($P < 0.001$) favorable to the highest cutting frequency. Best results were attained when the Pennisetum varieties were cut five times per year. Cutting Saccharum two times per year propitiated the disappearance of Jaronú 60-5 at the end of the second year of study. The best balance of the studied indicators was obtained when Pennisetum and Saccharum varieties were cut five and once per year, respectively. There is available information that will allow improving the management of these varieties, for using them efficiently and attaining greater longevity of the plantation.

Key words: *protein, fiber, digestibility, forages*

The presence in Cuba and in other tropical countries of two well-defined climatic seasons (dry and rainy periods) favors high seasonal unbalance in the production and quality of pastures and forages destined to ruminant feeding. This has led securing lower biomass production during the dry period that can last up to six months.

Multiple studies have been conducted for improving this unbalance. However, they have been more expensive that make the animals graze the accumulated biomass in the field during the rainy period, especially in those pasture species of long growth cycle (Martínez and Herrera 2006). Pennisetum and Saccharum genera are characterized by their high potential for biomass production, due to their high capacity for transforming daylight energy into biomass (Lawrence *et al*. 1984 and Burton 1986), though they are an option for using them during the dry period, when forage production only attains 30 % of the maximum annual production.

The objective of this study was to determine the effect of different cutting frequencies on the quality indicators of two varieties of Saccharum and three of Pennisetum during the dry period.

Materials and Methods

Treatments and design. A random block design was applied with five replications and 13 treatments consisting of three varieties of *Pennisetum purpureum* (king grass, Cuba CT-115, and Cuba CT-169), cut two (August and February), four (May, July, September and February) and five times a year (November, February, May, July and September) and two of *Saccharum officinarum* (Jaronú 60-5 and Villa Clara 21), cut one (February) and two (February and August) times a year.

Procedure. The experiment was developed in a typical red ferrallitic soil (Hernández *et al*. 1999), prepared conventionally. Plantation was carried out in August in spaced rows one meter apart. Plots had 25 m^2 of total area and 12 m^2 were hand harvested and cut with a machete, at 15-20 cm height after eliminating border effects. Once a year, in the rainy period, fertilization was supplied with 100-60-80 kg/ha of N, P_2O_2 and K_2O, respectively as integral fertilizer. Irrigation was applied in the dry period and rainfall during the experimental stage were 1702, 1674, 1603 and 1651 mm for the first, second, third and fourth year, respectively.

In each sampling date, described in the previous heading, five random plant cuttings were taken per replication, according to Herrera *et al*. (2013). They were manually separated into leaves and stems. These, as the whole plant, were introduced in an air circulation oven at 60 ºC until reaching constant weight. They were ground to a particle size of 1 mm and stored in airtight glass flasks until completing the chemical analysis.

Crude protein and crude fiber contents were determined according to AOAC (2001). The organic matter digestibility was established as indicated by Kesting (1977). All analyses were made by duplicate and by replicate. Results were expressed on dry basis.

Statistical analysis. Data were analyzed as stated by the experimental design through INFOSTAT, 1.0 version (Balzarini *et al*. 2001) and mean values were compared according to Duncan (1955.

Results

Tables 1, 2 and 3 show CP performance in leaves, stems and whole plant of the three varieties of Pennisetum and two of Saccharum submitted to different cutting frequencies. There were differences ($P < 0.001$) between varieties. The highest values were obtained, in general, when the Pennisetum varieties were cut five times a year. Leaves of both genera exhibited higher values than stems and the whole plant. In all cases there was a decreasing tendency during the course of the years.

The CF variation in leaves, stems and whole plant of the Pennisetum and Saccharum varieties submitted to different cutting frequencies are set out in tables 4, 5 and 6. There were differences ($P < 0.001$) between them. In general, the lowest values were reached when Pennisetum varieties were cut five times a year. Leaves of both genera showed lower values than stems and the whole plant. In all cases, there was a tendency to decrease their contents as time went by.

Tables 7, 8 and 9 indicate the variation of the *in vitro* OM digestibility in leaves, stems and the

Table 1. CP contents (%) of leaves according to the cutting frequency in the dry period of the four years

Variety	Cutting per year	Year			
		1	2	3	4
King grass	5	10.0^{a}	8.3^{ab}	8.3^{a}	8.0^{a}
CT-115	5	8.2^{b}	7.8^{abc}	8.2^{ab}	7.7^{ab}
CT-169	5	10.3^{a}	7.6^{bc}	8.4^{a}	7.6^{abc}
King grass	4	5.8^{f}	7.3^{bc}	7.5^{bcd}	7.2^{bc}
CT-115	4	7.4^{cd}	8.6^{a}	7.1^{cde}	7.4^{abc}
CT-169	4	7.1^{d}	7.7^{abc}	7.2^{cde}	7.7^{ab}
King grass	2	6.0^{f}	7.1^{c}	6.7^{e}	7.1^{bc}
CT-115	2	6.3^{ef}	7.2^{c}	7.4^{cd}	7.9^{a}
CT-169	2	7.4^{cd}	7.2^{c}	7.6^{bc}	7.6^{abc}
Sugar cane 21	2	7.9^{bc}	7.4^{bc}	6.9^{de}	7.4^{abc}
Sugar cane J. 60-5	2	7.4^{cd}	7.0^{c}	---	---
Sugar cane 21	1	7.5^{bcd}	8.7^{a}	7.5^{bcd}	7.1^{bc}
Sugar cane J. 60-5	1	6.9^{de}	8.0^{abc}	7.1^{cde}	7.0^{c}
SE ±		0.2***	0.3***	0.2***	0.2***

^{abcde}Values with different letters per column differ at $P < 0.05$ (Duncan 1955)

***$P < 0.001$

Table 2. CP content (%) of stems, according to the cutting frequency in the dry period of the four years

Variety	Cutting per year	Year			
		1	2	3	4
King grass	5	5.2^{bc}	4.2^{ab}	6.1^{a}	5.2^{a}
CT-115	5	4.6^{cd}	4.1^{ab}	5.5^{a}	4.4^{bcd}
CT-169	5	5.9^{a}	4.5^{a}	5.8^{a}	4.7^{ab}
King grass	4	3.7^{ef}	3.2^{def}	3.7^{b}	3.9^{cde}
CT-115	4	4.4^{d}	3.6^{bcde}	3.9^{b}	2.8^{gh}
CT-169	4	3.5^{f}	4.0^{abc}	3.5^{b}	3.6^{ef}
King grass	2	3.7^{ef}	2.7^{fg}	3.4^{b}	4.8^{ab}
CT-115	2	4.1^{def}	2.6^{fg}	3.7^{b}	3.8^{de}
CT-169	2	3.5^{f}	2.5^{g}	3.4^{b}	3.4^{efg}
Sugar cane 21	2	5.2^{bc}	4.0^{abc}	4.1^{b}	3.4^{efg}
Sugar cane J. 60-5	2	5.4^{ab}	3.4^{cde}	---	---
Sugar cane 21	1	4.1^{def}	3.7^{bcd}	4.1^{b}	3.1^{fg}
Sugar cane J. 60-5	1	2.5^{g}	3.0^{efg}	3.4^{b}	2.2^{h}
SE ±		0.2***	0.2***	0.3***	0.2***

^{abcdefgh}Values with different letters per column differ at $P < 0.05$ (Duncan 1955)

***$P < 0.001$

whole plant of Pennisetum and Saccharum varieties, subjected to different cutting frequencies. There were differences (P < 0.001) between varieties. The highest values, in general, were attained when Pennisetum varieties were cut five times a year. Leaves presented higher values than stems and the whole plant and, in all cases, there was a tendency to increase their contents as time went by.

Discussion

Table 3. CP values (%) of the whole plant during the dry period of the four years

Variety	Cutting per year	Year			
		1	2	3	4
King grass	5	6.8^{a}	6.4^{a}	7.3^{a}	6.9^{a}
CT-115	5	5.9^{b}	6.1^{ab}	7.0^{a}	5.1^{bc}
CT-169	5	7.7^{a}	6.3^{a}	7.1^{a}	5.8^{b}
King grass	4	4.4^{de}	5.1^{c}	5.1^{b}	4.8^{cd}
CT-115	4	5.2^{c}	6.3^{a}	5.0^{bc}	4.2^{de}
CT-169	4	4.9^{cd}	5.6^{bc}	5.2^{b}	5.0^{bc}
King grass	2	4.2^{e}	3.4^{g}	3.8^{d}	4.9^{cd}
CT-115	2	4.8^{cde}	3.9^{efg}	4.3^{bcd}	4.3^{cde}
CT-169	2	4.8^{cde}	3.4^{g}	4.0^{d}	4.1^{de}
Sugar cane 21	2	5.9^{b}	4.1^{ef}	4.6^{bcd}	4.4^{cd}
Sugar cane J. 60-5	2	6.1^{b}	4.4^{de}	---	---
Sugar cane 21	1	4.5^{de}	4.9^{cd}	4.6^{bcd}	3.6^{ef}
Sugar cane J. 60-5	1	2.9^{g}	3.6^{fg}	4.2^{cd}	3.0^{f}
SE ±		0.2***	0.2***	0.3***	0.3***

^{abcdefg}Values with different letters per column differ at P < 0.05 (Duncan 1955)
***P < 0.001

Table 4. CF content (%) of leaves during the dry period of the four years

Variety	Cutting per year	Year			
		1	2	3	4
King grass	34.2^{de}	30.2^{c}	33.3^{de}	33.3^{bcd}	5.2^{a}
CT-115	35.0^{cd}	33.6^{b}	33.0^{e}	33.6^{bcd}	4.4^{bcd}
CT-169	34.6^{cde}	32.5b	33.5^{de}	33.1^{cd}	4.7^{ab}
King grass	37.0^{ab}	33.0^{b}	34.1^{de}	32.6^{cd}	3.9^{cde}
CT-115	34.5^{cde}	32.0^{b}	33.2^{e}	33.2^{cd}	2.8^{gh}
CT-169	34.8^{cde}	32.0^{b}	33.6^{de}	32.1^{d}	3.6^{ef}
King grass	34.5^{e}	33.2^{b}	34.6^{cd}	34.6^{abc}	4.8^{ab}
CT-115	36.2^{bc}	33.3^{b}	33.0^{e}	31.8^{d}	3.8^{de}
CT-169	33.3^{e}	32.0^{b}	33.3^{de}	32.1^{d}	3.4^{efg}
Sugar cane 21	38.7^{a}	37.4^{a}	40.0^{a}	35.5^{b}	3.4^{efg}
Sugar cane J. 60-5	38.2^{a}	36.5^{a}	---	---	---
Sugar cane 21	34.5^{cde}	36.8^{a}	36.9^{bc}	36.3^{a}	3.1^{fg}
Sugar cane J. 60-5	34.8^{cde}	37.0^{a}	37.7^{b}	34.2^{bc}	2.2^{h}
SE ±	0.5***	0.5***	0.4***	0.6***	0.2***

^{abcdefgh}Values with different letters per column differ at P < 0.05 (Duncan 1955)
***P < 0.001

Table 5. CF (%) variability of stems during the dry period of the four years

Variety	Cutting per year	Year			
		1	2	3	4
King grass	5	39.9[bcd]	33.0[de]	32.3[cd]	34.9[c]
CT-115	5	38.1[d]	34.4[cd]	35.0[bc]	42.0[a]
CT-169	5	38.7[cd]	34.4[cd]	31.7[d]	35.0[c]
King grass	4	34.8[e]	38.4[b]	38.5[a]	39.6[ab]
CT-115	4	40.0[bc]	35.7[c]	37.7[ab]	39.7[ab]
CT-169	4	41.5[ab]	35.7[c]	37.7[ab]	39.7[ab]
King grass	2	42.3[a]	38.8[ab]	37.5[ab]	36.2[c]
CT-115	2	37.8[d]	39.1[ab]	38.1[a]	37.3[bc]
CT-169	2	40.0[bc]	40.9[a]	40.5[a]	39.5[ab]
Sugar cane 21	2	31.4[f]	34.9[cd]	32.1[d]	36.2[c]
Sugar cane J. 60-5	2	30.8[f]	30.0[f]	---	---
Sugar cane 21	1	29.7[fg]	31.7[ef]	32.9[cd]	32.0[d]
Sugar cane J. 60-5	1	28.2[g]	23.6[g]	26.8[e]	32.0[d]
SE ±		0.6***	0.6***	0.8***	0.8***

[abcdefg]Values with different letters per column differ at P < 0.05 (Duncan 1955)
***P < 0.001

Table 6. CF (%) variations of the whole plant during the dry period of the four years

Variety	Cutting per year	Year			
		1	2	3	4
King grass	5	38.0[bc]	32.1[f]	32.5[e]	33.5[b]
CT-115	5	37.0[c]	34.4[e]	33.4[de]	29.6[c]
CT-169	5	34.1[d]	33.4[ef]	32.9[de]	33.9[b]
King grass	4	34.1[d]	37.9[bc]	38.6[a]	37.1[a]
CT-115	4	37.7[bc]	37.3[cd]	36.1[bc]	33.3[b]
CT-169	4	39.1[ab]	35.7[de]	36.2[bc]	37.6[a]
King grass	2	40.2[a]	39.2[bc]	37.2[ab]	37.3[a]
CT-115	2	37.0[c]	40.0[ab]	37.3[ab]	36.1[ab]
CT-169	2	38.0[bc]	42.0[a]	39.0[a]	37.5[a]
Sugar cane 21	2	33.4[d]	38.6[bc]	33.5[de]	33.3[b]
Sugar cane J. 60-5	2	34.0[d]	34.6[e]	---	---
Sugar cane 21	1	30.3[e]	34.9[e]	35.0[cd]	33.7[b]
Sugar cane J. 60-5	1	27.9[f]	27.0[g]	29.3[f]	36.4[ab]
SE ±		0.5***	0.7***	0.6***	1.0***

[abcdefg]Values with different letters per column differ at P < 0.05 (Duncan 1955)
***P < 0.001

Table 7. OM (%) digestibility of leaves during the dry period of the four years

Variety	Cutting per year	Year			
		1	2	3	4
King grass	5	58.1[a]	58.6[a]	58.8[ab]	67.6[ab]
CT-115	5	57.7[abc]	59.4[a]	59.6[ab]	62.2[bc]
CT-169	5	58.7[a]	59.5[a]	59.0[ab]	64.1[bc]
King grass	4	57.0[bcd]	58.5[a]	59.1[ab]	71.5[a]
CT-115	4	57.2[abcd]	60.5[a]	58.4[b]	65.3[bc]
CT-169	4	58.6[a]	59.7[a]	59.0[ab]	64.0[bc]
King grass	2	53.6[f]	58.8[a]	60.1[a]	66.9[ab]
CT-115	2	55.8[de]	59.5[a]	60.5[a]	61.4[c]
CT-169	2	57.7[abc]	60.5[a]	59.5[ab]	62.9[bc]
Sugar cane 21	2	54.2[ef]	55.7[b]	54.9[cd]	59.9[d]
Sugar cane J. 60-5	2	55.0[e]	55.2[b]	---	---
Sugar cane 21	1	57.2[abcd]	55.4[b]	56.2[c]	60.6[cd]
Sugar cane J. 60-5	1	56.7[cd]	55.6[b]	53.6[d]	64.6[bc]
SE ±		0.5***	0.6***	0.5***	1.6***

[abcdef]Values with different letters per column differ at $P < 0.05$ (Duncan 1955)
***$P < 0.001$

Table 8. OM (%) digestibility of stems during the dry period of the four years

Variety	Cutting per year	Year			
		1	2	3	4
King grass	5	52.6[c]	56.9[cd]	58.4[b]	62.1
CT-115	5	52.8[c]	58.5[cd]	53.1[c]	60.5
CT-169	5	52.5[c]	55.4[d]	60.8[b]	61.1
King grass	4	49.9[d]	51.3[e]	52.0[c]	62.6
CT-115	4	49.4[d]	51.6[e]	51.7[c]	72.1
CT-169	4	46.9[e]	56.9[cd]	52.8[c]	59.8
King grass	2	48.1[de]	50.7[e]	50.4[c]	64.2
CT-115	2	47.2[de]	48.9[e]	51.9[c]	63.4
CT-169	2	49.4[d]	45.9[f]	49.2[c]	60.3
Sugar cane 21	2	61.3[b]	59.4[c]	58.7[b]	63.8
Sugar cane J. 60-5	2	60.4[b]	64.9[b]	---	---
Sugar cane 21	1	65.0[a]	59.2[c]	60.1[b]	72.6
Sugar cane J. 60-5	1	66.0[a]	70.2[a]	67.7[a]	62.5
SE ±		0.6***	0.9***	1.3***	4.3

[abcdef]Values with different letters per column differ at $P < 0.05$ (Duncan 1955)
***$P < 0.001$

Table 9. OM (%) digestibility of the whole plant during the dry period of the four years

Variety	Cutting per year	Year			
		1	2	3	4
King grass	5	54.5[c]	58.9[b]	59.3[bc]	64.8
CT-115	5	54.6[c]	59.2[b]	57.5[bcd]	56.6
CT-169	5	55.0[c]	57.6[bc]	59.7[b]	61.0
King grass	4	52.2[d]	52.8[d]	56.5[cde]	64.1
CT-115	4	52.4[d]	53.5[d]	54.2[efg]	68.0
CT-169	4	50.9[e]	52.8[d]	54.8[def]	61.8
King grass	2	49.6[e]	47.9[e]	51.5[gh]	63.8
CT-115	2	50.3[e]	47.9[e]	53.4[fgh]	61.7
CT-169	2	52.0[d]	46.7[e]	50.5[h]	60.2
Sugar cane 21	2	59.1[b]	54.6[cd]	57.3[bcde]	58.4
Sugar cane J. 60-5	2	58.4[b]	58.2[d]	---	---
Sugar cane 21	1	63.9[a]	56.2[bcd]	59.7[b]	71.2
Sugar cane J. 60-5	1	65.1[a]	66.2[a]	64.7[a]	61.4
SE ±		0.5***	1.1***	1.0***	3.4

[abcdefgh]Values with different letters per column differ at $P < 0.05$ (Duncan 1955)
***$P < 0.001$

Previous studies have demonstrated the biomass production potential of Pennisetum and Saccharum varieties when exploited with different cutting frequencies, according to the criteria reported by Martínez *et al*. (1994). These authors have stated the high yields attained by Pennisetum varieties and the low biomass productions that are attained when Saccharum varieties are cut two times a year. This limited notably the use of the referred cutting frequency, since after two years its population is minimal.

Herrera *et al*. (1995) on studying the soluble and structural carbohydrates of the varieties above mentioned, reported the Pennisetum synthesis potential of soluble carbohydrates (up to 18 %). These guarantee its rapid regrowth and contribute to the longevity of plantations. However, Saccharum is characterized by high sucrose values (higher than 30 %), that can unfavorably influence when used as cattle feed.

This could be determined by the fact that on cutting twice a year the Saccharum varieties, the normal growth and development cycle is interrupted and no reserve soluble carbohydrates necessary for regrowth are accumulated and, consequently, its population decreases in Jaronú 60-5 which is a purely sugar variety (Martínez *et al*. 1994 and Herrera *et al*. 1995). Nonetheless, this seems not occurring in clone 21 that has forage characteristics and its values of soluble carbohydrates, especially sucrose, are lower.

These antecedents have demonstrated the need of studying other quality indicators, such as crude protein, crude fiber and digestibility that can contribute to the selection of the best feeding source for the ruminant. These indicators cannot be considered as absolute, since it is necessary to reach the biological balance among biomass production, quality indicators y plantation longevity.

It is known that Pennisetum varieties are characterized by its low crude protein content, although when employed dosages of nitrogen fertilizer, the protein content can rise up to 12 % (Meléndez 2011).

In this study, in spite of using nitrogen fertilization (100 kg/ha/year), the protein values before mentioned, were not even attained in the leaf fraction. It is unquestionable that the cutting frequencies played an important function, since the most frequent cutting assured lower regrowth age and with that, greater efficiency in the protein synthesis. However, lower cutting frequency increased regrowth age and started the senescence process and with that the decrease of the rate of protein synthesis.

These results are backed up with those attained by Fortes *et al*. (2012) who reported decrease of the protein content of *P. purpureum* cv. Cuba CT-115 as regrowth age increased which is related to the decrease in the net assimilation rate and of the duration of the effective foliar area. Ramírez *et al*. (2012) claimed similar data, on studying the protein synthesis dynamics in *P. purpureum* cv. Cuba CT-169 and also indicated that the climatic factors particularly influence on the performance of this indicator.

It is indisputable that the information cited contributes explaining the different values found throughout the whole experimental period, since in each year the climatic factors as temperature, solar radiation, rainfall and relative humidity, among others, varied and, as consequence, influenced on N absorption and protein synthesis at each regrowth age. This has been demonstrated by Ramírez *et al*. (2011), on studying the relationship among quality, climatic factors and regrowth age in *P. purpureum* cv. Cuba CT-169.

Saccharum varieties are characterized by CP contents ranging between 1.9 and 3.0 % (Aranda *et al*. 2012). However, in this study values were higher than those previously found for the whole plant and much higher in the leaves. This could be determined by the management to which the varieties were submitted and the conditions of climate and soil in which the experiments were developed.

The highest values found in the leaves of the Pennisetum varieties are encouraging from the nutritional point of view, since it is the first fraction consumed by the animal. In addition, as they were higher than those found in Saccharum leaves confer them certain nutritive superiority, not only by the CP content, but also by the leaf characteristics which are softer and with lower hairiness.

As expected, the fiber percentage was increased as cutting were practised with lower frequency, an aspect widely treated in the scientific literature and that is closely related to the accumulation of structural carbohydrates produced as the maturity stage of plant advances (Herrera and Ramos 2006).

An aspect that attracted the attention was the difference of values found in the fiber between Pennisetum and Saccharum leaves. This could be determined by the characteristics and proportions of the compounds that constitute the fiber in each species, since Valenciaga *et al*. (2010) established the amount of chemical structural units that form the lignin of *P. purpureum* cv. Cuba CT-115 and its variation with regrowth age. This also could occur in other chemical compounds that constitute the fiber and that could vary between species and varieties. It would be appropriate to design new investigations on these aspects.

One of the indicators of greatest importance in pasture and forage quality is *in vitro* digestibility, since it offers the degree of utilization that the animal makes of the feed. The performance recorded in this experiment agree with what was reported in the wide-ranging literature, where it is referred that as plant ages increase or is employed with lower cutting frequency, the digestibility decreases. In addition, the classical performance was obtained where the highest digestibility is shown by the leaves, regardless their development stage.

Stems of Saccharum varieties displayed higher OM digestibility values than those of Pennisetum. This could be determined by the highest soluble carbohydrate content, especially sucrose, present in sugar cane and that is accumulated in the stems (Herrera *et al*. 1995). Since they are water soluble, they dissolve rapidly during the *in vitro* procedure, the same as *in vivo*. This does not occur in the leaves, since as carbohydrates are synthesized in the referred organ, part of them are used in the metabolism of other substances and the rest is translocated to the reserve organs provoking and increase of the digestibility values.

It is important to point out that these results only agree with the dry period which is determined by the fact that in this period pasture production is notably decreased as a consequence of the performance of the climatic factors (lower temperature, rainfall and daylight duration, among other aspects). Also, it is the period of sugar cane harvesting which favors greater use to compensate the cattle forage deficit.

The decreasing tendency of the protein and fiber content as years of study went by could indicate possible nutrient exhaustion in the soil, that the fertilization used was not enough to supply the soil and the plant, as well as that can be occurring processes such as soil compacting that limit nutrient and water utilization by the plant. These aspects must be considered in pasture management to increase their utilization efficiency and longevity of the plantation, since in this study no labor culture was carried out.

Relaying on information about the quality indicators of these forages in the referred period will allow to learn what amount of other feeds will be necessary to cover the animals' requirements and, in this way, the strategic planning allowing the efficient utilization of resources.

Best results were attained when Pennisetum varieties were cut five times a year. Cutting Saccharum twice a year had an impact on Jaronú 60-5 which disappeared at the end of the second year of study. The best balance of the indicators studied was obtained when the Pennisetum and Saccharum varieties were cut five and once a year, respectively. With this study, there is information available allowing the improvement of the management of these varieties, as well as using them efficiently and with longer longevity of the plantation.

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