Effect of Three Harvest Intervals on Yield and Composition of Nineteen Forage Grasses in the Humid Mountain Region of Puerto Rico[1, 2]

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ABSTRACT

The response of 19 forage grasses to three cutting intervals in the humid mountain region of Puerto Rico was evaluated. Nine Brachiarias, nine Digitarias, and one *Cynodon* species were evaluated during a 2-year period under cutting management at the Corozal Substation for green forage (GF), dry forage (DF), and crude protein (CP) yields and for dry matter (DM), crude protein (CP), Ca, P, K, and Mg contents.

In terms of green forage yield (GFY), the most productive species at the 30-day harvest interval was *D. sĕtivalva* (PRPI 6402) with 86,794 kg/ha/year. At the 45- and 60-day harvest intervals, *Brachiaria* sp. (PRPI 9626) produced 102,116 and 109,213 kg/ha/year, respectively. This species also produced the highest DFY at the 30-day harvest interval with 18,430 kg/ha/year. *C. nlemfuensis*, var. *nlemfuensis* (PRPI 2341), stargrass, and *B. decumbens* (PRPI 5365) produced the highest DFY at the 45- and 60-day intervals with 21,758 and 27,238 kg/ha/year, respectively.

The highest CP content at the 30-, 45-, and 60-day intervals was observed on the three *Digitaria* hybrids, *D. pentzii* × *D. smutzii* (PRPI 9621), *D. pentzii* × *D. milanjiana* (PRPI 9619), and *D. pentzii* × *D. pentzii* (PRPI 9620) with 14.3, 12.0, and 11.1%, respectively.

D. decumbens (PRPI 6439), 'Transvala' Digitgrass, produced the highest CP yield at the 30-day harvest interval with 2,179 kg/ha/year. Stargrass had the highest CP yield at the 45- and 60-day harvest intervals with 2,141 and 2,030 kg/ha/year, respectively.

The P, Ca, Mg, and K contents of the 19 grasses on the average decreased as the harvest interval increased. A sharp decrease (from 1.81 to 1.47 to 1.42%) of the K content of the grasses was observed at the 30-, 45-, and 60-day intervals, respectively.

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[2] This paper covers work carried out cooperatively between the Agricultural Experiment Station, College of Agricultural Sciences, Mayagüez Campus, University of Puerto Rico, Río Piedras, and the Soil and Water Conservation Research Division, Agricultural Research Service, USDA, Río Piedras, P.R.

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The GFY, DFY, and DM of the 19 grasses increased on the average with the length of the harvest interval. On the other hand, the CP content and yield of the 19 grasses decreased as the harvest interval increased.

No significant correlation was obtained between total rainfall, CP, and DFY of the 19 grasses. Significant positive correlations were obtained between DFY of the 19 grasses and average temperature. A significant negative correlation was obtained between average temperature and CP content.

INTRODUCTION

Studies of response of major tropical grasses to harvest intervals, cutting heights, and the effect of these treatments on the chemical composition of the forage have been conducted in Puerto Rico. Vicente Chandler et al. (15, 18) and Caro-Costas et al. (2, 4) reported that the annual green forage yield (GFY) and dry forage yield (DFY) of pangola (*Digitaria decumbens* Stent.), guinea (*Panicum maximum*), star (*Cynodon nlemfuensis* var. *nlemfuensis*), congo (*Brachiaria ruziziensis*), merker (*Pennisetum purpureum*), para (*Brachiaria mutica*), and other grasses increase with length of harvest interval, while percentage content of crude protein (CP), P, and K decrease.

A large number of grass species belonging to various genera have been studied in Puerto Rico under cutting management (11, 12, 13, 14, 18). Annual DFY of 36,370 and 44,504 kg/ha have been reported by Sotomayor-Ríos et al. (11, 14) on *Digitaria eriantha* and glabrous signalgrass, *Brachiaria brizantha*, when these grasses were cut every 60 days. At Isabela, Puerto Rico, *Digitaria decumbens* (P.I. 299752) produced annual DFY of 28,988 and 33,105 kg/ha at 30- and 45-day intervals, respectively (12). In the same study, stargrass produced annual DFY of 42,642 kg/ha at the 60-day interval.

Based partially on these results, the supposedly highest yielding species, together with various introductions not previously tested, were selected for a study designed to compare the yield and composition of 19 promising grasses in the humid mountain region of Puerto Rico as affected by three cutting intervals.

MATERIALS AND METHODS

Excellent examples of utilization of grasses in the *Digitaria* (1, 6, 7, 8, 10, 17) *Brachiaria* (9, 17), and *Cynodon* (2, 5, 17) genera have been cited in the literature. Grass species in these genera are important components of natural and improved pastures in many parts of the world. The diversity and large number of species in these three genera merit as detailed an evaluation as forage crops as possible for their final

utilization in the diverse and climatic conditions prevailing in the Tropics.

In this study the 19 grasses (table 1) were established on a deep, red, acid, moderately well-drained Corozal clay (Ultisol) on a 15 to 20% slope at the Corozal Substation, located at an elevation of about 214 m in the humid mountain region of Puerto Rico.

TABLE 1.—*Identification of 19 forage grasses evaluated at Corozal, Puerto Rico*

Species	Plant Introduction Number		
	USDA PI[1]	PRPI[2]	Common name
Brachiaria brizantha (Hochst) Stapf.	—	1525	Signal
Brachiaria brizantha (Hochst) Stapf.	—	5567	—
Brachiaria ruziziensis (Germain et Everard)	247404	5366	Congo
Brachiaria mutica (Forsk) Stapf.	299499	6451	Tanner
Brachiaria brizantha Stapf.	255346	5909	Signal (glabrous)
Brachiaria brizantha Stapf.	—	5569	—
Digitaria pentzii × *D. smutsii*	—	9621	U. F. 38[3]
Brachiaria decumbens Stapf.	210724	5365	—
Digitaria setivalva Stent.	299892	6402	—
Digitaria pentzii × *D. milanjiana*	—	9619	U. F. 59-1
Digitaria decumbens Stent.	—	5124	A-24
Brachiaria sp.	299497	9626	—
Cynodon nlemfuensis var. *nlemfuensis*	—	2341	Star
Digitaria milanjiana subsp. *eylesiana*	299731	6416	—
Digitaria decumbens Stent.	299752	6439	'Transvala' Digitgrass
Digitaria smutsii Stent.	299828	6434	—
Digitaria pentzii × *D. pentzii*	—	9620	U. F. 42-1
Digitaria decumbens Stent.	111110	0560	'Pangola' Digitgrass
Brachiaria decumbens Stapf.	—	9625	—

[1] United States Department of Agriculture plant introduction number.
[2] University of Puerto Rico Agricultural Experiment Station plant introduction number.
[3] University of Florida.

The grasses were evaluated over two consecutive years using a randomized split-plot design and three harvest intervals, 30, 45, and 60 days, as the subplots. A 15-5-10 fertilizer was applied at a rate of 2,400 kg/ha yearly in 6, 8, and 12 equal applications corresponding to the harvest intervals tested. At the start of the experiment all plots were limed to about pH 5.5.

Main plots were 8.10 × 4.50 m and subplots 2.70 × 4.50 m. A center swath 1.05 × 4.50 m was cut and the forage weighed, sampled, and removed at the prescribed interval.

DM and CP contents were determined in all samples. For each harvest interval, samples were composited by replications and by individual cuttings and analyzed for P, K, Ca, and Mg.

RESULTS AND DISCUSSION

FORAGE YIELD

The data in tables 2, 3, 4, and figures 1, 2, 3, show the yields of the 19 grasses at the 30-, 45-, and 60-day intervals. The highest GFY at the 30-day interval was obtained by *Digitaria setivalva* (PRPI 6402) with 86,794 kg/ha/year. *Digitaria pentzii* × *D. milanjiana* (PRPI 9619), had the lowest GFY with 49,518 kg/ha/year. At the 45-day interval *Brachiaria* sp., (PRPI 9626) had the highest GFY with 102,116 kg/ha/year. The lowest GFY at the 45-day interval was obtained with *Digitaria pentzii* × *D. pentzii* (PRPI 9620), with 56,523 kg/ha/year. At the 60-day interval *Brachiaria* sp. (PRPI 9626) had the highest GFY with 109,213 kg/ha/year. The lowest GFY at the 60-day interval was observed on *D. pentzii* × *D. pentzii* with 54,537 kg/ha/year.

Average GFY of the 19 grasses at the 30-, 45-, and 60-day intervals were 67,861, 78,487, and 86,607 kg/ha/year, respectively (table 5). The average yields of the 19 grasses at the 60-day interval were significantly better ($P < .05$) than those obtained at the 45- and 30-day intervals. The average GFY of the 19 grasses at the 45-day interval were significantly better ($P < .05$) than those at the 30-day interval.

At the 30-day interval, *Brachiaria* sp., (PRPI 9626) had the highest DFY with 18,430 kg/ha/year, while *D. pentzii* × *D. milanjiana* (PRPI 9619), had the lowest DFY. Stargrass (PRPI 2341) exhibited the highest DFY at the 45-day interval with 21,758 kg/ha/year. The lowest DFY at the 45-day interval was observed on *D. pentzii* × *D. pentzii* (PRPI 9620) with 13,649 kg/ha/year. *Brachiaria decumbens* (PRPI 5365) had the highest DFY at the 60-day interval with 27,238 kg/ha/year, while PRPI 9620 had the lowest with 13,718.

The average DFY of the 19 grasses increased with length of harvest interval. When cut at 30-, 45-, and 60-day intervals, the average DFY of the 19 grasses were 14,987, 18,786, and 22,057 kg/ha/year, respectively (table 5). The average yields at the 60-day interval were significantly better ($P < .05$) than at 45- and 30-day harvest intervals, respectively. The average DFY at the 45-day interval were also significantly better ($P < .05$) than those at the 30-day interval.

In general, the DFY of most of the grasses in this experiment were somewhat low. Vicente-Chandler et al. (17) reported DFY of over 33,000 kg/ha/year for congograss (PRPI 5366) when this grass was cut every 60 days at Corozal during a 2-year period. At Corozal, also, Sotomayor-Ríos

TABLE 2.—*Yield and crude protein content of 19 forage grasses cut every 30 days over a 2-year period at Corozal*

Species	PRPI Number	Weighted green forage yields	Dry matter content	Weighted dry forage yields	Crude protein content	Weighted crude protein yields
		Kg/ha/year	%	*Kg/ha/year*	%	*Kg/ha/year*
Digitaria setivalva	6402	86,794 a[1]	20.2 g	16,070 ad	13.3 bc	1,946 ad
Brachiaria sp.	9626	84,576 ab	23.2 de	18,430 a	11.1 e	1,870 ad
Brachiaria mutica	6451	82,183 ac	20.8 fg	15,982 ad	13.8 ab	2,051 ab
Digitaria decumbens	6439	75,841 ad	24.8 bd	16,947 ac	13.8 ab	2,179 a
Brachiaria decumbens	5365	75,609 ad	24.4 bd	17,114 ab	11.6 de	1,866 ad
Brachiaria brizantha	5909	75,376 ad	24.6 bd	17,138 ab	12.0 d	1,958 ac
Digitaria pentzii × *D. smutsii*	9621	74,889 ad	22.4 ef	14,747 be	14.3 a	1,929 ad
Digitaria milanjiana	6416	71,972 be	24.2 bd	15,113 bd	13.8 ab	1,938 ad
Brachiaria brizantha	5569	70,277 cf	24.8 bd	15,854 ad	14.0 ab	2,062 ab
Brachiaria decumbens	9625	66,943 df	24.6 bd	15,400 bd	13.3 bc	1,910 ad
Digitaria smutsii	6434	66,362 df	24.1 ce	14,590 be	13.8 ab	1,830 be
Brachiaria ruziziensis	5366	62,029 eg	24.8 bd	13,684 df	11.2 de	1,437 f
Digitaria decumbens	5124	61,436 eg	25.1 bc	13,748 df	13.8 ab	1,757 bf
Digitaria decumbens	0560	60,601 eg	25.6 bc	13,790 df	13.3 bc	1,711 cf
Brachiaria brizantha	5567	60,125 eg	25.8 bc	14,448 be	12.8 c	1,758 bf
Brachiaria brizantha	1525	58,940 fg	25.6 bc	14,076 ce	12.0 d	1,618 df
Cynodon nlemfuensis var. *nlemfuensis*	2341	52,783 g	29.5 a	14,450 be	14.0 ab	1,883 ad
Digitaria pentzii × *D. pentzii*	9620	52,435 g	25.5 bc	12,053 ef	13.8 ab	1,525 ef
Digitaria pentzii × *D. milanjiana*	9619	49,518 g	26.1 b	11,118 f	14.0 ab	1,440 f

[1] Means followed by the same letter are not significantly different at the 0.05 level of probability.

TABLE 3.—*Yield and crude protein content of 19 forage grasses cut every 45 days over a 2-year period at Corozal*

Species	PRPI Number	Weighted green forage yields	Dry matter content	Weighted dry forage yields	Crude protein content	Weighted crude protein yields
		Kg/ha/year	%	*Kg/ha/year*	%	*Kg/ha/year*
Brachiaria sp.	9626	102,116 a[1]	22.6 ef	21,703 a	9.0 i	1,824 ad
Digitaria setivalva	6402	101,443 a	21.1 f	20,344 ac	11.1 bd	2,066 ab
Brachiaria brizantha	5909	91,186 ab	24.7 cd	21,486 ab	9.3 hi	1,907 ac
Brachiaria mutica	6451	87,724 bc	22.8 ef	19,508 ad	10.3 dg	1,902 ac
Brachiaria decumbens	5365	87,549 bc	25.5 bd	21,393 ab	9.5 gi	1,961 ac
Digitaria milanjiana	6416	87,213 bc	24.6 cd	20,116 ad	10.8 be	2,009 ab
Digitaria pentzii × *D. smutsii*	9621	84,262 bd	22.3 ef	17,478 cg	11.5 ab	1,836 ac
Brachiaria brizantha	5569	82,380 be	25.8 bd	19,760 ad	11.4 ab	2,018 ab
Digitaria smutsii	6434	81,695 bf	25.6 bd	19,695 ad	11.2 ac	1,864 ac
Brachiaria decumbens	9625	78,466 bf	24.6 cd	18,636 be	10.1 eh	1,800 bd
Digitaria decumbens	6439	74,911 cf	27.2 b	19,383 ad	10.3 dg	1,834 ac
Brachiaria riziziensis	5366	72,344 dg	24.0 de	16,247 eh	9.7 fi	1,460 e
Digitaria decumbens	5124	70,787 eg	26.1 bc	17,288 dg	11.6 ab	1,811 ad
Brachiaria brizantha	5567	70,207 eg	26.7 b	18,368 cf	10.4 df	1,754 be
Digitaria decumbens	0560	69,440 fg	26.5 bc	17,286 dg	10.5 cf	1,662 ce
Cynodon nlemfuensis var. *nlemfuensis*	2341	69,092 fg	32.5 a	21,758 a	10.3 dg	2,141 a
Brachiaria brizantha	1525	62,087 gh	26.4 bc	15,787 fh	9.8 fi	1,504 de
Digitaria pentzii × *D. milanjiana*	9619	61,821 gh	26.4 bc	15,016 gh	12.0 a	1,642 ce
Digitaria pentzii × *D. pentzii*	9620	56,523 h	26.0 bc	13,649 h	11.3 ab	1,482 e

[1] Means followed by the same letter are not significantly different at the 0.05 level of probability.

TABLE 4.—*Yield and crude protein content of 19 forage grasses cut every 60 days over a 2-year period at Corozal*

Species	PRPI Number	Weighted green forage yields	Dry matter content	Weighted dry forage yields	Crude protein content	Weighted crude protein yields
		Kg/ha/year	%	*Kg/ha/year*	%	*Kg/ha/year*
Brachiaria sp.	9626	109,213 a[1]	23.4 h	25,395 ac	8.3 ef	1,617 ch
Brachiaria decumbens	5365	105,775 ab	26.5 de	27,238 a	7.9 f	1,887 ad
Digitaria setivalva	6402	104,521 ac	22.8 h	22,886 ce	9.3 cd	1,790 af
Brachiaria brizantha	5909	100,966 ad	26.4 de	26,105 ab	7.8 f	1,696 bh
Brachiaria mutica	6451	97,214 ae	25.4 eg	24,227 bd	9.3 cd	2,010 ab
Brachiaria brizantha	5567	96,203 be	28.4 bc	27,022 a	7.7 f	1,827 ae
Digitaria milanjiana	6416	96,076 be	25.8 dg	23,827 be	9.5 bd	1,925 ac
Digitaria pentzii × *D. smutsii*	9621	92,231 cf	24.5 fh	21,287 eg	9.7 bd	1,764 ag
Brachiaria decumbens	9625	90,825 df	26.1 df	23,014 ce	8.5 ef	1,718 ah
Brachiaria brizantha	5569	85,529 eg	27.1 ce	22,270 df	9.7 bd	1,711 ah
Brachiaria ruziziensis	5366	83,670 fh	24.2 gh	19,570 fh	8.9 de	1,483 fh
Digitaria smutsii	6434	81,718 fh	27.4 bd	22,154 df	9.7 bd	1,721 ah
Digitaria decumbens	6439	80,441 fh	29.0 b	22,344 df	9.5 bd	1,859 ae
Cynodon nlemfuensis var. *nlemfuensis*	2341	77,595 gi	33.1 a	24,619 ad	9.2 de	2,030 a
Digitaria decumbens (Pangola)	0560	75,272 gi	27.0 ce	19,616 fh	9.6 b	1,546 eh
Digitaria decumbens	5124	74,796 gi	26.4 de	19,025 gi	10.1 bc	1,567 dh
Brachiaria brizantha	1525	72,089 hi	25.7 dg	18,216 hi	8.8 de	1,401 hi
Digitaria pentzii × *D. milanjiana*	9619	66,873 i	27.2 be	16,554 i	10.3 b	1,437 gi
Digitaria pentzii × *D. pentzii*	9620	54,537 j	26.5 de	13,718 j	11.1 a	1,158 i

[1] Means followed by the same letter are not significantly different at the 0.05 level of probability.

et al. (13) reported DFY of approximately 26,000 kg/ha/year for tanner (PRPI 6451) and pangola when these grasses were cut every 60 days during a 2-year period. DFY of over 30,000 kg/ha/year at Gurabo were reported by Sotomayor-Ríos et al. (11) for pangola, signal (PRPI 5909), star (PRPI 2341) and congo (PRPI 5366) when these grasses were cut

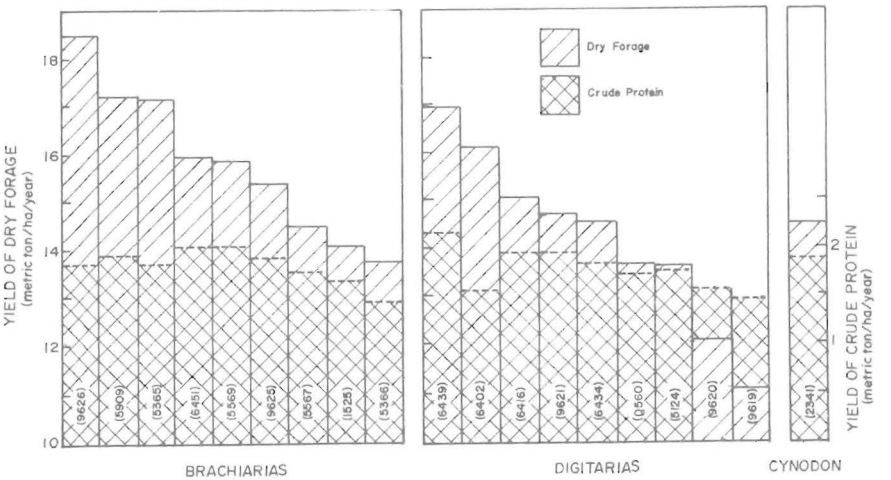

FIG. 1.—Dry forage and crude protein yields of 19 grasses cut every 30 days over a 2-year period at Corozal, P.R.

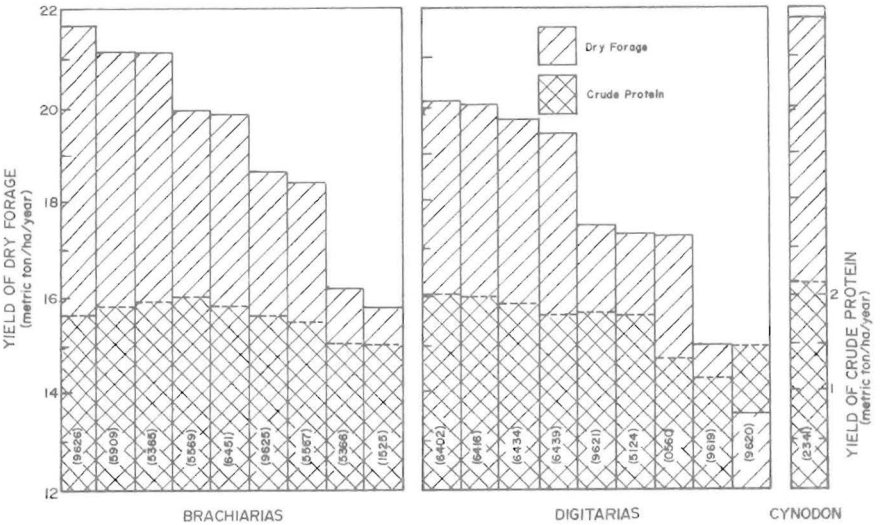

FIG. 2.—Dry forage and crude protein yields of 19 grasses cut every 45 days over a 2-year period at Corozal, P.R.

every 60 days during a 2-year period. In all cases approximately 672 kg/ha/year of N were applied.

PROTEIN CONTENT AND YIELDS

The CP content and yield of the 19 grasses at the 30-, 45-, and 60-day intervals are shown in tables 2, 3, 4 and figures 1, 2, 3. At the 30-day

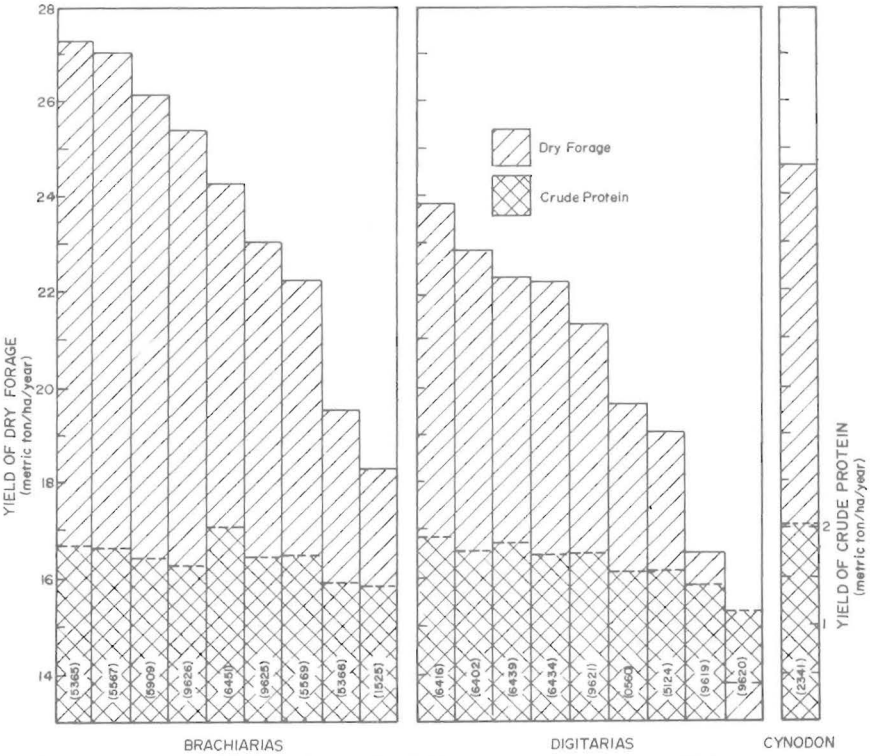

FIG. 3.—Dry forage and crude protein yields of 19 grasses cut every 60 days over a 2-year period at Corozal, P.R.

interval, *D. pentzii* × *D. smutsii* (PRPI 9621) had the highest CP with 14.3%. The lowest CP at the 30-day interval was obtained from *Brachiaria* sp., (PRPI 9626) with 11.1%. *D. pentzii* × *D. milanjiana* (PRPI 9619) had the highest CP at the 45-day interval with 12.0%. The lowest CP at the 45-day interval was observed on *Brachiaria* sp. (PRPI 9626) with 9.0%. At the 60-day interval *D. pentzii* × *D. pentzii* (PRPI 9620) had the highest CP with 11.1%, being significantly higher than that of remaining 18 grasses. *Brachiaria brizantha* (PRPI 5567) had the lowest CP at the 60-day interval with 7.7%.

CP content, on the average, decreased as the harvest interval increased. The average CP at the 30-, 45-, and 60-day intervals of the 19 grasses was 13.2, 10.5, and 9.2%, respectively (table 5). The average CP at the 30-day interval was significantly higher than at the 45- and 60-day intervals, respectively. In turn, the average CP at the 45-day interval, was significantly higher than at the 60-day interval.

TABLE 5.—*Average yields, crude protein, and dry matter content of 19 forage grasses at three harvest intervals during a 2-year period at Corozal*[1]

Cutting interval	Green forage	Yields of dry forage	Dry matter content	Crude protein	Crude protein
	Kg/ha/year	*Kg/ha/year*	%	%	*Kg/ha/year*
60	86,607 a[2]	22,057 a	26.5 a	9.2 c	1,692 b
45	78,487 b	18,786 b	25.3 b	10.5 b	1,814 a
30	67,861 c	14,987 c	24.5 c	13.2 a	1,824 a

[1] Includes averages of 19 grasses at three cutting intervals (30, 45, and 60 days).

[2] Means followed by the same letter are not significantly different at the 0.05 level of probability.

The highest CP yield at the 30-day interval was produced by *Digitaria decumbens* (PRPI 6439) with 2,179 kg/ha/year. Stargrass presented the highest CP yield at the 45-day interval with 2,141 kg/ha/year. Congo (PRPI 5366) had the lowest CP yield with 1,460 kg/ha/year. Stargrass had the highest CP yield with 2,030 kg/ha/year at the 60-day interval. The lowest CP yield at the 60-day interval was observed on *D. pentzii* × *D. pentzii* (PRPI 9620) with 1,158 kg/ha/year.

The average CP yield of the 19 grasses at the 30-, 45-, and 60-day interval were 1,824, 1,814, and 1,692 kg/ha/year, respectively (table 5). No significant differences were observed between the average CP yield of grasses at the 30- and 45-day intervals, but these in turn were significantly higher than those at the 60-day interval.

DRY MATTER AND MINERAL CONTENT

The DM of the 19 grasses at the 30-, 45-, and 60-day harvest intervals are shown in tables 2 to 5. At the 30-day harvest interval stargrass (PRPI 2341) had the highest DM content, 29.5%, which was significantly different from that of the other grasses. *Digitaria setivalva* (PRPI 6402) had the lowest DM at the 30-day interval with 20.2%. Stargrass had also the highest DM at the 45-day interval with 32.5%, significantly different in this respect from the other grasses. The lowest DM at the 45-day interval was observed on *D. setivalva* (PRPI 6402) with 21.1%. As in the previous cases, stargrass had the highest DM content at the 60-day

interval with 33.1% being significantly higher than that of the other 18 grasses at the 5% level. *D. setivalva* (PRPI 6402) had the lowest DM content at the 60-day interval with 22.8%.

On the average the DM content of the grasses increased with length of the harvest interval. At the 30-, 45-, and 60-day intervals the 19 grasses had an average of 24.5, 25.3, and 26.5%, respectively. The DM of the 19 grasses at the 60-day interval were significantly higher than those at the 45- and 30-day intervals. Likewise, the DM of the 19 grasses at the 45-day interval, on the average, were significantly higher than those obtained with a 30-day harvest interval.

The average P, K, Ca, and Mg contents of the 19 grasses varied as indicated below. A marked decrease in the K content of the forage and a less marked decrease in the P, Ca, and Mg contents were observed on these forages as the length of harvest interval increased. The average P content of the 19 grasses at the 30-, 45-, and 60-day harvest interval was 0.38, 0.32, and 0.30%, respectively. The harvest interval apparently had little effect on the P content of the forage. The average K content of the 19 forages at the 30-, 45-, and 60-day interval was 1.81, 1.47, and 1.42%, respectively. A sharp decrease was observed on the K content of the forages from the 30- to the 45-day interval as was observed in the case of the P content. The average Ca content of the 19 grasses was 0.65, 0.64, and 0.62% for the 30-, 45-, and 60-day intervals, respectively. The average Mg content of the 19 grasses at the 30-, 45-, and 60-day intervals was 0.21, 0.17, and 0.15%, respectively. Apparently the harvest interval had little effect on the Ca content of the forage.

EFFECT OF SEASON OF THE YEAR

Vicente Chandler, et al. (18) have shown that, in the humid mountain region of Puerto Rico, short days and cooler weather are the most important factors responsible for the relatively low yields during December to April. In the present study the lowest DFY in the 19 grasses corresponded to the period of December to April during the first year of experimentation when rainfall was the lowest. On the other hand, this same period during the second year had more rainfall and yields were higher (fig. 4). Also the CP content of the 19 forages was consistently lower during seasons of high rainfall (fig. 5).

The influence of temperature on the seasonal yields of dry forage produced by the 19 forage grasses cut every 30, 45, and 60 days is shown in figure 6. High temperatures were associated with higher yields and vice versa. The influence of temperature on CP content of the 19 forage grasses when cut every 30, 45, and 60 days is shown in figure 7. The percent CP content of the forages was consistently higher during the winter months and lower during the rest of the year.

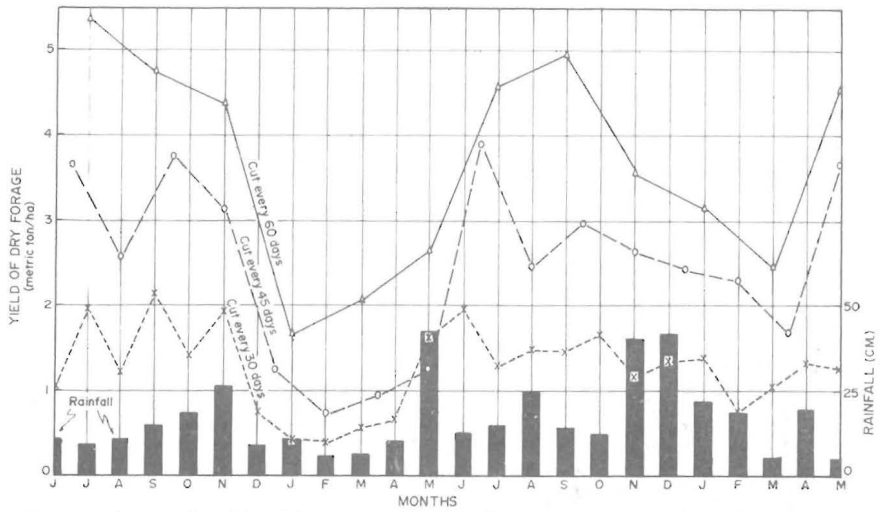

FIG. 4.—Seasonal yields of dry forage per acre of 19 grasses cut every 30, 45, and 60 days over a 2-year period at Corozal, P.R.

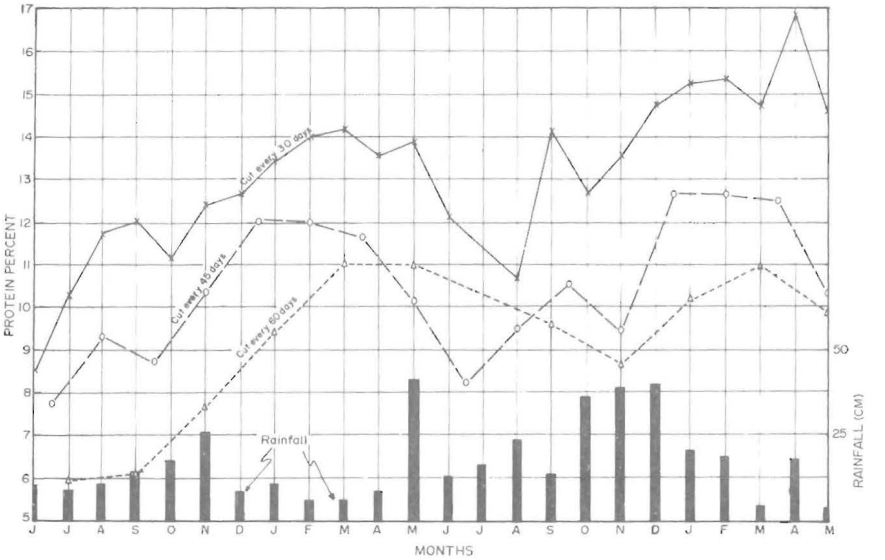

FIG. 5.—Seasonal crude protein content per acre of 19 grasses cut every 30, 45, and 60 days over a 2-year period at Corozal, P.R.

The influence of average temperature, percent CP content, and DFY of the 19 grasses was studied by simple regression analysis. No correlation was obtained between total rainfall, percent CP content, and DFY of the 19 grasses; therefore, these data were excluded from the regression

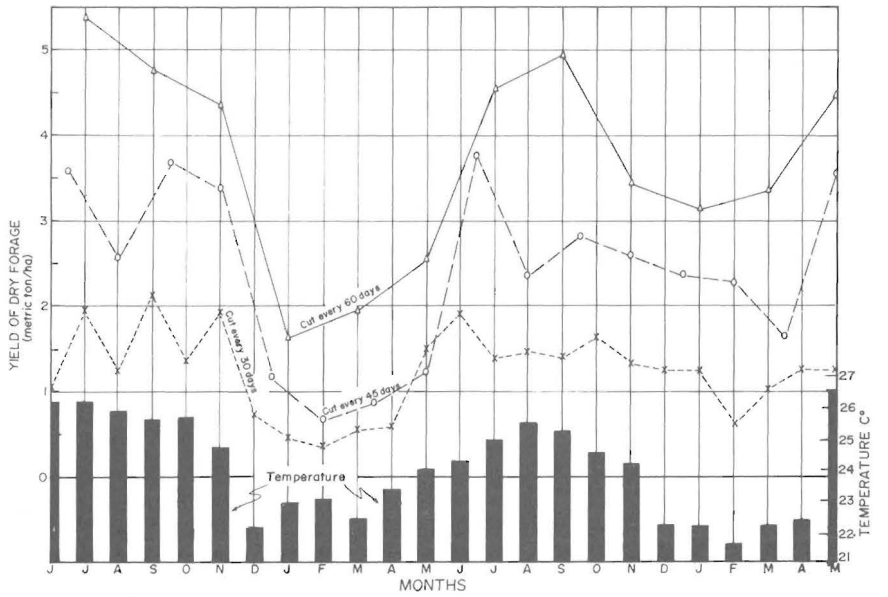

FIG. 6.—Seasonal yields of dry forage per acre of 19 grasses cut every 30, 45, and 60 days, as influenced by temperature, over a 2-year period at Corozal, P.R.

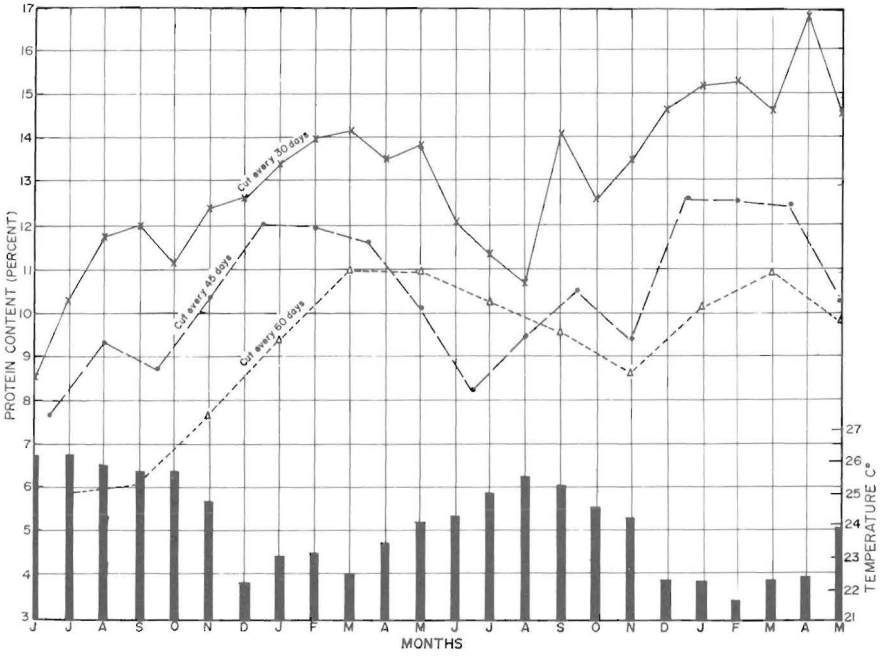

FIG. 7.—Crude protein percentage of 19 grasses cut every 30, 45, and 60 days, as influenced by temperature, over a 2-year period at Corozal, P.R.

model. The relationship between yield of DF/ha produced by the 19 grasses cut every 30, 45, and 60 days over a 2-year period at Corozal and temperature is shown in figure 8. As the temperature increased, the yields of the 19 grasses increased. The *r* value for yield of DF and

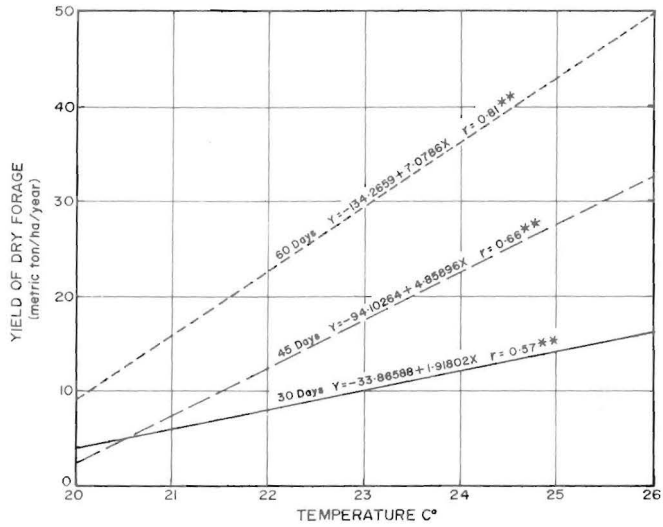

FIG. 8.—Relationship over a 2-year period between yield of dry forage per acre of 19 grasses cut every 30, 45, and 60 days, and temperature, at Corozal, P.R.

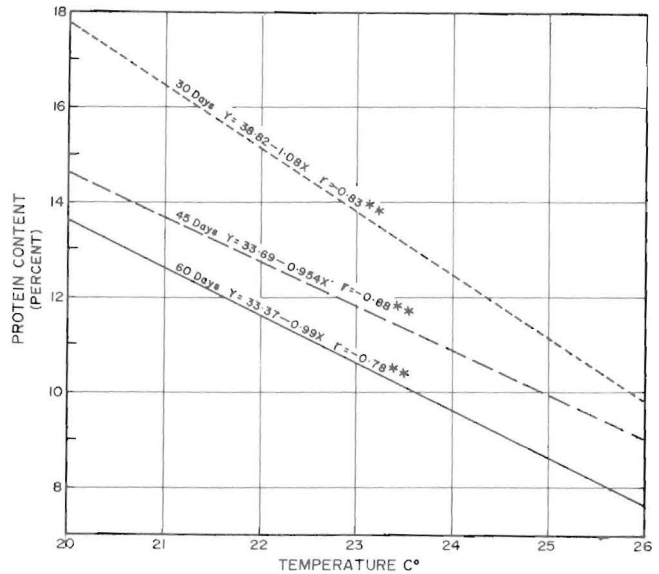

FIG. 9.—Relationship over a 2-year period between crude protein content of 19 grasses cut every 30, 45, and 60 days, and temperature, at Corozal, P.R.

temperature increased with harvest interval from 30 to 60 days (0.57 to 0.81). The relationship between CP content and temperature is shown in figure 9. The correlation between CP content and temperature decreased with harvest interval from 30 to 60 days (−0.83 to −0.78).

RESUMEN

Los rendimientos de forraje verde (FV), materia seca (MS) y proteína bruta (PB) se determinaron en 19 yerbas pertenecientes a los géneros *Cynodon*, *Brachiaria* y *Digitaria* durante un período de 2 años.

La mejor productora en términos de FV en el corte a 30 días fue *Digitaria setivalva* (PRPI 6402), mientras que a 45 y 60 días correspondió a *Brachiaria sp.* (PRPI 9626).

Estas yerbas produjeron 86,794, 102,116 y 109,213 kg. de FV por hectárea y año, en los cortes a 30, 45 y 60 días, respectivamente. Las producciones medias de FV por hectárea y año de las 19 yerbas aumentaron según se alargó el intervalo de corte.

Las mejores productoras en términos de MS en los cortes a 30, 45 y 60 días fueron *Brachiaria sp.* (PRPI 9626), Estrella (PRPI 2341) y *Brachiaria decumbens* (PRPI 5365) con un total de 18,430, 21,758 y 27,238 kg./ha./año, respectivamente. Las producciones medias de MS por año de las 19 yerbas aumentaron según se alargó el intervalo de corte.

Digitaria pentzii × *D. smutsii* (PRPI 9621), *D. pentzii* × *D. milanjiana* (PRPI 9619), *D. pentzii* × *D. pentzii* (PRPI 9620), mostraron el contenido de PB mas alto en los cortes de 30, 45 y 60 días con 14.3, 12.0 y 11.1%, respectivamente. El contenido medio de PB de las 19 yerbas, disminuyó a medida que se alargó el intervalo de corte.

Digitaria decumbens (PRPI 6439) en el corte a 30 días y Estrella en los cortes de 45 y 60 días fueron les mejores productoras en términos de PB total con 2,179, 2,141 y 2,030 kilogramos por hectárea y año, respectivamente.

La yerba Estrella mostró tener el porcentaje más elevado en de MS los intervalos de corte a 30, 45 y 60 días, con 29.5, 32.5 y 33.1%, respectivamente. El contenido medio de MS de las 19 yerbas, aumentó según se alargó el intervalo de corte.

El contenido en fósforo, magnesio y potasio en el forraje también disminuyó a medida que se alargó el intervalo de corte. Por otro lado, tuvo muy poco efecto sobre el contenideo en calcio.

Se obtuvo una correlación positiva significativa entre la producción de MS total de las 19 yerbas y la temperatura media para los cortes a 30, 45 y 60 días. Por otro lado, la correlación entre el contenido en PB y la temperatura media fue negativa, pero significativa. No se observó correlación significativa alguna entre lluvia y producción total de MS o el contenido en PB y lluvia.

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