Different Harvest Schedules to Prepare Deferred Forage from C4 Grasses in Córdoba, Argentina

M. R. Steinberg
Universidad Nacional de Córdoba, Argentina

E. F. Nienstedt
Universidad Nacional de Córdoba, Argentina

H. A. Valdez
Universidad Nacional de Córdoba, Argentina

J. C. Coraglio
Universidad Nacional de Córdoba, Argentina

C. A. Vieyra
Universidad Nacional de Córdoba, Argentina

See next page for additional authors

The XIX International Grassland Congress took place in São Pedro, São Paulo, Brazil from February 11 through February 21, 2001.

Proceedings published by Fundacao de Estudos Agrarios Luiz de Queiroz

Presenter Information

M. R. Steinberg, E. F. Nienstedt, H. A. Valdez, J. C. Coraglio, C. A. Vieyra, and P. A. Minuzzi

ID # 09-22

DIFFERENT HARVEST SCHEDULES TO PREPARE DEFERRED FORAGE FROM C4 GRASSES IN CÓRDOBA, ARGENTINA.

M. R. Steinberg, E. F. Nienstedt, H. A. Valdez, J. C. Coraglio, C. A. Vieyra and P. A. Minuzzi

Cátedra de Forrajes y Manejo de Pasturas, Facultad de Ciencias Agropecuarias, Universidad Nacional de Córdoba, C.C. 509, Córdoba, Argentina, 5000, martein@agro.uncor.edu

Abstract

From 1995 until 1999 a trial was done in the fields of the Universidad Nacional de Córdoba with four C4 forage grasses. These fields lie in the subtropical and semiarid region of Argentina. This research aimed to identify forage species that could be used as deferred forage for the drier and cooler winter season. Four species of C4 grasses were used: Rhodesgrass *(Chloris gayana* Kunth*)*, Gatton *(Panicum maximum),* coloratum (*Panicum coloratum)* and digitgrass *(Digitaria eriantha),* respectively. Two growing periods were used: full season growth (FS) and half season regrowth (HS), in both cases the deferred forage was harvested three times: at the beginning, in the middle and at the end of the winter. This paper foccuses DM yields in kg/hectare (DM) and percentage of crude protein (CP). The HS yields less but shows better CP than the FS, therefore it may be a better forage in winter. Coloratum and digigrass seems to give better deferred forage than the other species.

Keywords: C4 grasses, deferred forage, yield, crude protein

Introduction

In the northern central region of the province of Córdoba, Argentina, the area sown with perennial C4 forage grasses has expanded in the last 20/30 years. In this period a limited number of C4 grasses was grown. There are few local reports on the yield and quality of these grasses. Thus, it is important to compare the less known species digitgrass and coloratum with the better known Rhodesgrass and Gatton.This , in turn, will improve the stock raising system. The soundest and cheapest way to supply the winter forage, under conditions of unreliable rains and low temperatures, is to transfer the large grass biomass produced in the warm, rainy season by the C4 grasses to winter (Hernández y Ventura,1981) as deferred grass or as hay (Covas,1982). Rhodesgrass has been cultivated long ago in the north of Argentina. It is the best known of these C4 forage grasses and it is well adapted to the northern central region of Córdoba and to most of the Argentine Chaco region. It offers fair deferred grazing, but its nutritive value diminishes in winter with only 4.1 CP (Melo et al.,1982). Therefore, this deferred grazing will not fulfill the requirements of pregnant cows (Bulaschevich et al.,1987). We are looking for C4 species with good DM yield and in CP concentration in the vegetative period that will mantain their yield and quality in time, to transferral it into the drier and cooler season to feed the livestock better.

Material and Methods

A trial was run in the Experimental Farm, Facultad de Ciencias Agropecuarias, Universidad Nacional de Córdoba, in the southeast of the city at 31º 25’ SL and 63º 50’ WL, on an entic haplustol soil, summer rains of 690 mm average and frost possibilities from May to September. It was carried under a split plot design. The species were the main plots and the harvest schedules were the treatments of the split plots. There were four species under trial: *Chloris gayana*, *Panicum maximum* cv. Gatton, *Panicum coloratum* cv. Klein Verde and

Digitaria eriantha. Six different harvest schedules were used: 1, 2 and 3 which were cut at the end of December and the yield discarded, the regrowth yield was that of half season (HS); 4, 5 and 6 were let to grow until the end of the vegetative period, the growth yield was that of the full season (FS). Then the forage was harvested at the end of May (1 and 4), in the first days of July (2 and 5) and in the middle of August (3 and 6). The trial lasted three years (sown in 1995 and harvested in 97/98 and 98/99), the dates of the first year after the establishment was discarded, this paper refers only to the second and the third year taken as normal. This paper reports dry matter yield (DM) and percentage of crude protein (CP).

Results and Discussion

Yield - The four species under trial showned greater DM under FS than under HS treatment (Fig 1). This agrees with the report of De León et al. (1995). Under FS treatment there was a tendency for the May cut to yield higher than the August harvest, this was not so under HS treatments in which the trend was generally the opposite. There was no species x harvest schedules interaction on DM yield (P=0.27). There was no difference among the 1,2 and 3 HS cuts nor among the 4, 5 and 6 FS cuts (P>0.05). Between the FS and the HS treatments the differences were significant (P<0.05). In the FS series the higher yielding species were Rhodesgrass and coloratum and in the HS series Rhodesgrass led the group followed by digigrass and coloratum.

Crude protein - CP showed a significant interaction between species and harvest schedules (P=0.001), for this reason each species was statistically analyzed individually using as treatment the harvest schedule. All species had higher CP content under HS growth as compared to FS growth. There was no difference among harvest schedules in HS or in FS (P>0.05) (Fig 2). This also agrees with the data reported by De Leon et al. (1995) with similar species in a drier site. Coloratum CP content at HS series are similar to the one reported by

Ferri et al. (1998); however, it does not coincide at FS. The FS CP of coloratum and digitgrass are similar to those registered by Petruzzi (1997). Rhodesgrass shows CP content similar to those reported by De Leon et al. (1995) in the FS treatments, but lower CP content in the HS treatment. De Leon´s et al. (1995) HS deferment begins in January while in the present study HS deferment period began in December, so harvested grass has more structural tissue.

The intake of mature grasses by ruminants may be limited by CP content lower than 62 g/kg MS (Minson,1990). It may be concluded that for a profitable use of deferred pastures in the drier season it may be advisable to let it to accumulate growth during half season only. It can also be concluded that coloratum and digitgrass are species of good performance as deferred pastures in the northern–central region of Córdoba-Argentina.

References

Bulaschevich, M.C., Melo O.E., Bollati G.P., Castillo A.R. and Peuser A.R. (1987). Efecto de la suplementación nitrogenada sobre la tasa de digestión y digestibilidad de grama Rhodes *(Chloris gayana Kunth)* en invierno. Rev. Arg. de Prod. Animal. **7:** 527-534.

Covas, G. (1982). Potencial y limitaciones de los recursos forrajeros actuales y de aquellos en vías de experimentación en la Región Pampeana Semiárida. Facultad de Agronomía, Universidad Nacional de La Pampa.

De Leon, M., Boetto G.C., Peuser R.A., Bulaschevich M.C. and Luna G. (1995). Efecto de la época de diferimiento sobre la producción total, disponibilidad invernal y calidad forrajera de gramíneas subtropicales. Rev. Arg. de Prod. Animal **15:** 236-238.

Ferri, C.M., Petruzzi H.J., Stritzler N.P. and Jouve V.V. (1998). Consumo voluntario, digestibilidad *in vitro* y proteína bruta dietaria en distintas épocas de utilización de *Panicum coloratum* diferido. Rev. Arg. de Prod. Animal. **18:** 163-170.

Hernandez, O.A. and Ventura L.J. (1981). Sistemas fotosintetizantes en gramíneas forrajeras y sus implicancias sobre el rendimiento y calidad de los pastos. Boletín Consejo Provincial de Tecnología Agropecuaria. Provincia de la Pampa.

Melo, O., Cangiano C.A., Carranza F.R. and Boiero D.T. (1982). Efecto de la urea sobre el consumo y la digestibilidad del diferido de Grama Rhodes *(Chloris gayana Kunth)*. Rev. Arg. de Prod. Animal **2:** 254-262.

Minson, D.J. (1990). Forages in ruminant nutrition. Academic Press Inc., San Diego, CA., California, USA. 483 pages.

Petruzzi, H.J., Fernandez G., Stritzler N.P., Zuccari A., Jouve V.V. and Ferri C.M. (1997). Pastoreo de forraje diferido de gramíneas de crecimiento estival. Rev. Arg. de Prod. Animal **17:** 121.

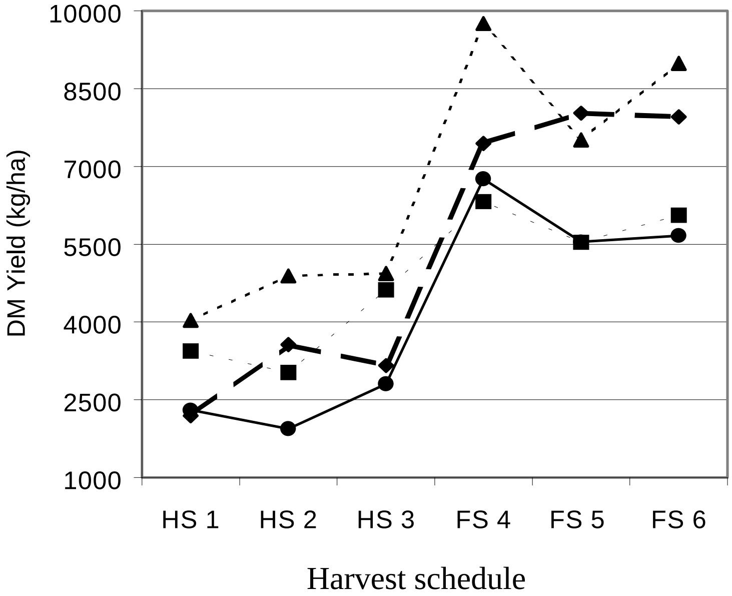

Figure 1 – Dry matter of *P. maximum* (—●—), *P. coloratum* (‒♦‒), *C. gayana* (- -▲- -) and *D. eriantha* (- - ■- -), as affected by harvest schedule: HS: half season growth; FS: full season growth. 1 and 4: end of may harvest; 2 and 5: begin of july harvest; 3 and 6 middle of august harvest.

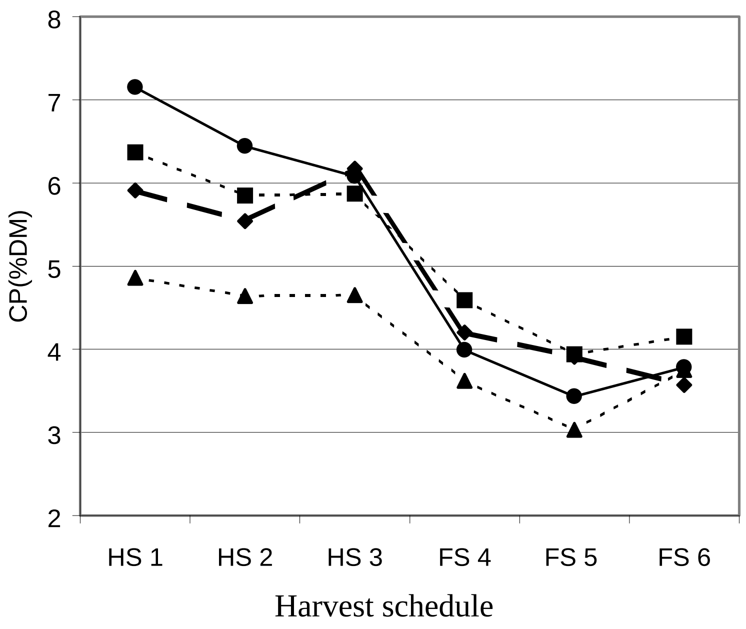

Figure 2 – Crude protein concentration of *P. maximum* (—●—), *P. coloratum* (━◆━), *C. gayana* (- - ▲- -) and *D. eriantha* (- - ■- -), as affected by harvest schedule: HS: half season growth; FS: full season growth. 1 and 4: end of may harvest; 2 and 5: begin of july harvest; 3 and 6 middle of august harvest.