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HORSES GRAZING MANAGEMENT TO PROMOTE DISTRIBUTION OF *LOTUS TENUIS* (WALDST. ET KIT) IN A TEMPERATE GRASSLAND.

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Abstract

In a temperate grassland of the Argentine Pampa, the birdsfoot trefoil (*Lotus tenuis* Waldst. et Kit) distribution was analyzed as a consequence of the grazing method used. In a plot of 40 ha occupied by native grassland an area of 16 ha was implanted with reed canary grass (*Phalaris aquatica* L.) and *L. tenuis*. This area was divided into two parts that contained the same pasture and native grassland surfaces, being grazed by horses. One, under continuous grazing and another one, under a controlled grazing. In the continuous grazing the whole year the animals had permanently access to the pasture and the native grassland. In the controlled grazing the pasture and the native grassland were alternated weekly. Floristic censuses were carried out and the plant cover was determined. At the beginning of the experience, October 1994, the pasture showed a homogeneous plant cover, 15% of *L. tenuis* and 30% of *P. aquatica*, meanwhile in the native grassland their presence was not registered. At the end of the experience, October 1998, under continuous grazing, in the pasture as well as in the native grassland, both species presented the same cover, 1%. On the contrary, the cover of the *L. tenuis*, 20% in the pasture and 10% in the native grassland, and of *P. aquatica*, 30% and 10% respectively, under controlled grazing were grater. The nutritive value and the

forage availability of the native grassland were improved (3,584 kg.ha^{-1} of DM under controlled grazing versus 1,187 kg.ha^{-1} under continuous grazing).

Keywords: Temperate grassland, grazing, *Lotus tenuis* (Waldst. et Kit), horses.

Introduction

The birdsfoot trefoil (*Lotus tenuis*) is a legume that is desirable in the diet of domestic herbivorous for its protein components and condensed tannins (Waghorn *et al.*, 1994). It is very common to find this naturalized specie in the temperate grasslands of Argentina. Besides, it has been observed that it presents a good ecological adaptation in the pampa region and that its dissemination is related to grazing. However, the continuous grazing and overstocked to which these native grasslands are exposed has led not only to overgrazing situations with vegetal growth reduction, but also to valuable forage species loss (Ansín and Deregibus, 1997) and what is more, *L. tenuis* is found among them as well. It has been postulated that the controlled grazing of pasture having *L. tenuis* in its mixture would allow its distribution, through animals, in the neighboring native grasslands.

The main objective of this investigation was to analyze the distribution of *L. tenuis* as consequence of the grazing method used. To do so, variations in the botanical composition, plant cover and forage availability were determined in native grasslands without *L. tenuis*, associated to pastures with *L. tenuis*. The two imposed grazing methods were: 1) continuous and 2) controlled.

Material and Methods

The experiment was carried out in a horse-breeding ranch, situated in the province of Buenos Aires (34º 52' S, 58º 98' W, 50 m.a.s.l.). The climate in that region is humid and warm with an average annual precipitation of 950 mm and maximum temperatures in summer of 22º C (Ansín and Marlats, 1997).

The experimental area was a 40 ha, located in an Argiudol soils which were originally covered with a native grasses with predominance of galician lucerne (*Galega officinalis* L.) and partly conformed by species of good value forages like *Lolium multiflorum* (Lam.) and *Trifolium repens* (L.). This area was divided into two plots of 20 ha in the autumn of 1994 and 8 ha of each plot were farmed with *Phalaris aquatica* and *L. tenuis*. Each one contained the same cultivated pasture (8 ha) and native grassland (12 ha). Each area, of 20 ha, was grazed by horses. One, by continuous grazing and another one by controlled grazing. Four treatments (Tn) were evaluated: in the continuous grazing (0.83 horse.ha^{-1}.year^{-1}) during de whole year the animals had permanently access to the pasture (T1) and the native grassland (T2). In the controlled grazing (0.92 horse.ha^{-1}.year^{-1}) the access to the pasture (T3) was alternated weekly with access to the native grasslands (T4).

In spring during five years, floristic censuses were assessed and the plant cover was determined by the Braun-Blanquet method on areas of 25 m^2 (Ansín and Marlats, 1997) taken five samples in each treatment.

The dry matter (DM) availability was estimated by cutting the plants to ground level, in rectangles of 0.5 m^2 with the same numbers of repetitions in the locations of the floristic censuses. Cut plants were separated into gramineous, legumes, *L. tenuis*, wide leaf herbs and ground litter. Separated plant material was dried to a constant weight.

An ANOVA computer program was used to test differences among means ($P<0.05$).

Results and Discussion

At the beginning of the trial, the pasture showed a high homogeneous cover of *L. tenuis* and *P. aquatica*, meanwhile in the native grassland their presence was not registered (Tables 1 and 2). During the study although a good implantation of both species had been achieved in the pasture, in the associated native grassland under continuous grazing the presence of those species was not observed ($P>0.05$). Thus, at the end of the trial *L. tenuis* only reached 1% of the plant cover (Table 1) with heterogeneous distribution. On the contrary, under controlled grazing *L. tenuis* had grater ($P<0.05$) covering, 20% in the pasture and 10% in the native grassland, and *P. aquatica*, reached 30% and 10% respectively, achieving a homogeneous distribution (Table 2). The DM availability was higher ($P<0.05$) in the native grassland under controlled grazing, reaching in the year 1997 the maximum differences: 3,584 $kg.ha^{-1}$ of DM (954 $kg.ha^{-1}$ were of *L. tenuis*) in the controlled grazing *versus* 1,187 $kg.ha^{-1}$ (14 $kg.ha^{-1}$ of *L. tenuis*) in the continuous grazing. Thus, the greater presence of legumes detected in the native grassland under controlled grazing increased their nutritive value. These results are in agreement with those from Ansín y Deregibus (1997) who express that the continuous grazing affects the structure and functioning of native grassland, situation that can be reverted favorably through stock reduction and a controlled grazing method. Furthermore, the results indicate that planned horses grazing management promote distribution of *L. tenuis* in temperate grasslands.

References

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Table 1- Spring Plant Cover (%) in Pasture and Grassland under Continuous Grazing

	1994		1995		1996		1997		1998	
	Pasture	Grassland	Pasture	Grassland	Pasture	Grassland	Pasture	Grassland	Pasture	Grassland
G. officinalis	1 a	15 b	5 a	15 b	10 a	20 b	15 a	30 b	30 a	47 b
L. tenuis	15 a	- b	15 a	1 b	10 a	1 b	5 a	1 b	1 a	1 a
P. aquatica	30 a	- b	30 a	- b	30 a	1 b	20 a	5 b	1 a	1 a
L. multiflorum	10 a	15 b	15 a	15 a	15 a	15 a	20 a	15 b	15 a	15 a
Grasses	10 a	40 b	15 a	40 b	15 a	35 b	15 a	25 b	15 a	10 b
Herbs	5 a	10 b	5 a	10 b	10 a	15 b	10 a	10 a	10 a	5 b
Total cover	71 a	80 b	85 a	81a	90 a	87 a	85 a	86 a	72 a	79 a

Means within a year line followed by a different letter are significantly different ($P<0.05$)

Table 2- Spring Plant Cover (%) in Pasture and Grassland under Controlled Grazing

	1994		1995		1996		1997		1998	
	Pasture	Grassland	Pasture	Grassland	Pasture	Grassland	Pasture	Grassland	Pasture	Grassland
G. officinalis	1 a	15 b	1 a	15 b	1 a	10 b	1 a	5 b	1 a	5 b
L. tenuis	15 a	- b	20 a	5 b	20 a	5 b	20 a	10 b	20 a	10 a
P. aquatica	30 a	- b	30 a	5 b	30 a	5 b	30 a	10 b	30 a	10 a
L. multiflorum	10 a	15 b	10 a	15 a	15 a	20 a	15 a	20 b	15 a	15 a
Grasses	10 a	40 b	10 a	40 b	10 a	40 b	15 a	30 b	15 a	30 b
Herbs	5 a	10 b	5 a	10 b	5 a	10 b	5 a	10 a	5 a	10 b
Total cover	71 a	80 b	86 a	90a	81 a	90 b	86 a	85 a	86 a	80 a

Means within a year line followed by a different letter are significantly different ($P<0.05$)