Forage production on halomorphic soils of the Flooding Pampa

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INTRODUCTION

More than 12 million ha of the Argentinean Pampas are covered by lowlands with soils affected by water and exchangeable sodium excesses (Fig. 1). The area is characterized by its low (0.1-0.01 %) slopes. The soils (mainly Mollisols and Alfisols) have developed from loessoid sediments. The climate is humid and temperate.

This area is mainly devoted to cattle husbandry. The natural vegetation is a monotonous-looking grassland. Some patches of the original grassland still remain but most of the area shows a degraded grassland invaded by exotic species. There are four major types of plant communities with numerous variants:

"Mesophyte grasslands" associated with Udolls, "Humid mesophyte grasslands" associated with Natraquolls, "Hydrophytic meadows" associated with Albolls, "Halophyte steppes" associated with Natraqualfs.

The limitations imposed by landscape and soils characteristics are not easy to reverse technically and are not affordable from the economic and ecological point of view.

Recent research focused on to restore the natural vegetation by grazing management or implanting forages.

Present communication stressed results obtained with tall wheatgrass (*Thinopyrum ponticum*), and megathermal graminoids, Grama Rhodes (*Chloris gayana*) and Panicgrass (*Panicum coloratum*).

METHODOLOGY

An experiment was carried out across three years in the area known as "Depresión de Laprida", whose soils showed an intricate pattern of Natraquolls, Natraqualfs and Natralbolls.

Experiments with Grama Rhodes and Panicgrass were carried out in the "Cuenca del Salado" basin. The seeding of them was concentrated on Natraqualfs, because on other soils probed to be indifferent.

RESULTS

The replacement of natural vegetation by the tall wheatgrass produced a variable response from the soils. The response to tillage depended on the depth of the most superficial horizons of each soil. In the Natralboll the thin loamy horizon A was redistributed and "diluted" at different depths and partially replaced by the sodic silty clayey B horizon, thereby changing its alkalinity, its nutrient content and its texture.

The survival and productivity of tall wheatgrass differed between soils, since the performance of the implanted forage depended on the inherent characteristics of each soil and its reaction to tillage and sowing.

The productivity of native vegetation and that of Tall wheatgrass is shown in relative terms (Table 1). The term productivity encompasses several quantified parameters (biomass, persistence, soil cover, etc.).

Table 1. Productivity of tall wheatgrass

Soils	Grassland	Tall wheatgrass
Natraquoll	100	144.4
Natraqualf	100	177.8
Natralboll	100	77.2

Several experiments show that megathermals increase forage production with respect to the halophyte steppe. An example is shown in Table 2.

Soil properties improve.

Table 2. Megathermical yields (kg ha $^{-1}$ - MS)

Forage	Yields
Chloris gayana **(Grama Rhodes)**	**5.010 a**
Panicum Coloratum **(panicgrass)**	**5.496 a**
Natural grassland	**2.632 b**

Properly managed they can be considered a strategic forage resource to cover summer production, since they concentrate their forage supply in this season.

They can also be used for making reserves (rolls).

CONCLUSIONS

The soil type and its vegetation is the major factor to maintain the natural vegetation or to replace them.

In the Natraqualfs the implantation of tall wheatgrass was positive from the productivity point of view, while in the Natralbolls was clearly negative to soil and vegetation.

The replacement of the native vegetation by megathermic forages was clearly positive. They are a forage resource to cover summer needs and also render forage reserves.

Tall wheatgrass and grama Rhodes and panicgrass showed noteworthy success in the more saline and alkaline soils, Typic Natraqualfs.

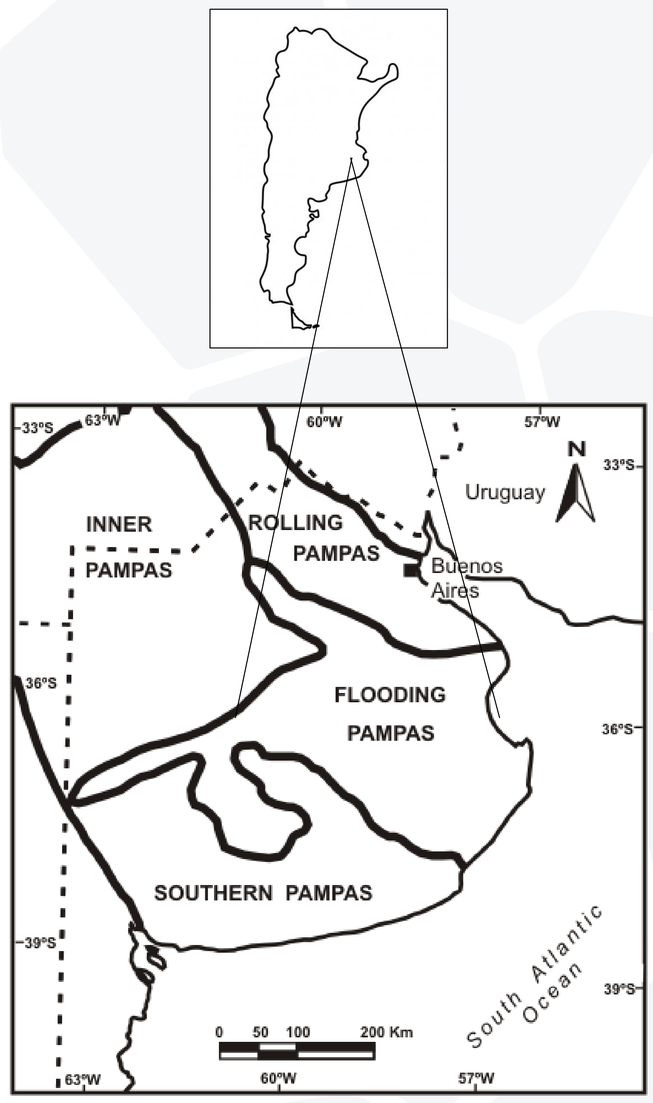

Fig. 1. Location of the Flooding Pampas in the Argentina geography

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