GRASSLAND MAPPING UNITS IN THE FLOODING PAMPA (ARGENTINE)

S.P. Debelis and A.A. Bozzo
Facultad de Ingeniería y Ciencias Agrarias. Universidad Nacional de Lomas de Zamora. Ruta 4. Km. 2. Lomas de Zamora (1832) C.C. 95.
E. mail: unilomas@server1.microstar.com.ar

ABSTRACT
A thematic map of grassland has been drawn up using studies carried out at farm level as a starting point, correlating soils and specie group through significant parameters that condition their presence. The work method included the analysis of a geomorphologically homogeneous area through cartography and aerial photography.

An elemental unit of the landscape was studied in detail with a pattern repeated all over the subregion, with soil samples at specie group level. Hidromorphism and variable alkalinity and saline patches are present in all profiles, gramineous, juncaceous, cyperaceous and forbs linked to the problems of soil already mentioned.

A system was studied, that when applied to the units determined by sampling, allowed for the extrapolation of the areas to the great unit of landscape where the study was carried out.

The aim of the study, particularly technological, is to facilitate the optimum use of the grasslands.

KEYWORDS
Rangeland, cartography, resources, hidromorphic, landscape units

INTRODUCTION
The purpose of the thematic map which has been prepared is to supply information regarding the distribution of the herbaceous vegetation which develops on soils with geomorphologic unit located to the north of the Flooding Pampa known as "Area of sea abrasion with deflation depressions" (Tricart, 1973). The importance of this interrelation between soils and vegetable covering resides in its utility for making decisions where livestock production is the predominant economic activity. The unit location is to be found in the borough of Chascomus, Province of Buenos Aires.

The climate is warm and humid with a lack of hydric estival. The surface hydrography lacks streams due to the lack of runoff energy caused by the low gradient of the surface. For this reason several bodies of water exist.

The points mentioned above underline the value of the topographic factor in the variance of the stretches of land, which in turn provoke modifications in the genetic processes of the soil, in its hydrological features and in the appearance of vegetable species with different requirements.

MATERIALS AND METHODS
A detailed study of the vegetation and soil profiles in the sample areas was conducted and compared at different points of the chart within similar cartographic units.

The materials used for the maps are as follows:
- As a base map the topographic charts of the Argentine Republic were used scale 1:50.000 from de Military Geographic Institute Chart 3557-26-3 Laguna Yalca; Chart 3557-26-4 Comandante Giribone; Chart 3557-32-1 Monasterio and Chart 3557-32-2 Libres del Sur.
- Photographic mosaics scale 1:50.000 from National Institute of Agriculture Technology (I.N.T.A.).
- Photograms scale 1:20.000 applied specifically to the study of samples areas.

Detailed observations of the herbaceous cover were carried out to study the quantity and diversity. Productivity evaluations were performed in the months of April and December only in the communities used for the feeding of the livestock, using for the measurements vegetation cuts of (1/4 m-) oven dried to constant weight. The results received were analysed (Mg. ha-1) within a random pattern performing the ANOVA and Comparison of averages test (Tukey a= 0.05%).

RESULTS AND DISCUSSION
The criteria used to establish a legend of the map (Figure 1) were based on the level of grazing use and points of natural drainage of the soils to delineate the cartographic units (emphasising other features for each case that accompany this property).

The scale chosen for the map allows the cartographic units to contain groups of species whose botanic composition and productivity are different compared with neighbouring units.

Cartographic unit description of survey area
Moderately drained uplands (1) : Thapto Argic Hapludoll and Aquic Argiudoll, land capability IIw (USDA. 1959). Complexes and associations of soils with Molic epipedon well defined horizon B2t neutral or weakly acid with mottles and/or ferromanganesic concretions.

Swamping alkaline soils (2): Typic Natraqualf and Thapto Natric Hapludoll , land capability VIws. Complexes of soils with high risk of hibernal flooding and swamping non-sodic or sodic varied irregular distribution pattern formed by small surfaced polipedons.

Floodable soils (3) Hydrohalomorphic complexes, land capability VIII. Undifferentiated flooding complexes situated in lower relief positions.

Vegetation
Vegetation in the soil units showed the presence of a great diversity of species which in some cases share more than one unit.

The uplands (1) vegetation was made up of several gramineous groups of forages. The dominant gramineous species was Lolium multiflorum, together with *Stenotaphrum secundatum, Bromus mollis, Botriochloa laguroides and Paspalum dilatatum*. As companions from the same family *Stipa papposa, Cynodon dactylon, Stipa hialina, Melica brasiliana;* presence of *Setaria geniculata, Polypogon elongatus, Sporobolus poiretii*; leguminous species such as *Trifolium repens, Medicago lupulina and Adesmia incana*; graminoids and forbs such as *Juncus imbricatus, Carex sororia, Hipochoeris radicata and Pamphalea bupleurifolia* was noted. In the swamping alkaline soils (2) a lesser grassland diversity is found, compared with the upland sites. In alkaline pedons (2.2) *Dystichlis spicata* dominated, with considerable areas of bare ground. *Juncus imbricatus, Polypogon monspelliensis, Sporobolus poiretii* and *Hordeum stenostachis* were also present.

In the same topographic position but in soils whose alkalinity is

shown only in depth, or that lack depth, a low gramineous cover is presented (2.1) represented by *Cynodon dactylon, Stenotaphrum secundatum, Panicum milioides, Paspalum vaginatum, Paspalidium paludivagum, Sporobolus poiretii, Leersia hexandra*. Forbs and graminoids like *Heleocharis viridans, Jussiaea repens, Hidrocotile bonariensis, Juncus imbricatus, Juncus microcephalus* and *Carex sororia* were recorded on these sites. Amongst the shallows (2.3) *Solanum malacoxylon*, is found accompanied by *Glyceria multiflora, Alternanthera philoxeroidea* and *Marsilea concinna*.

The vegetation of the floodable soils (3) is mainly represented by *Scirpus Californicus* and type *Ceratophyllum* and *Myriophyllum.* No significant differences were found in species diversity and productivity between the swamping and floodable soils including the alkaline pedons, therefore it is correct to group them as a grassland unit (2) for their management in as much as their productivity (table 1).

It is evident that the recognition of landscape provides a first orientation to differences between areas when of grassland mapping. Despite the soils being mainly presented in cartographic units of a complex type, the analysis of their features and properties , amongst these primordially the kind of natural drainage, allows for the delineating of map units which sustain different vegetables between them.

REFERENCES

Tricart, J. 1973. Geomorfología de la Pampa Deprimida: Base de los estudios edafológicos y agronómicos. INTA. Colección N° XII. Bs. As.

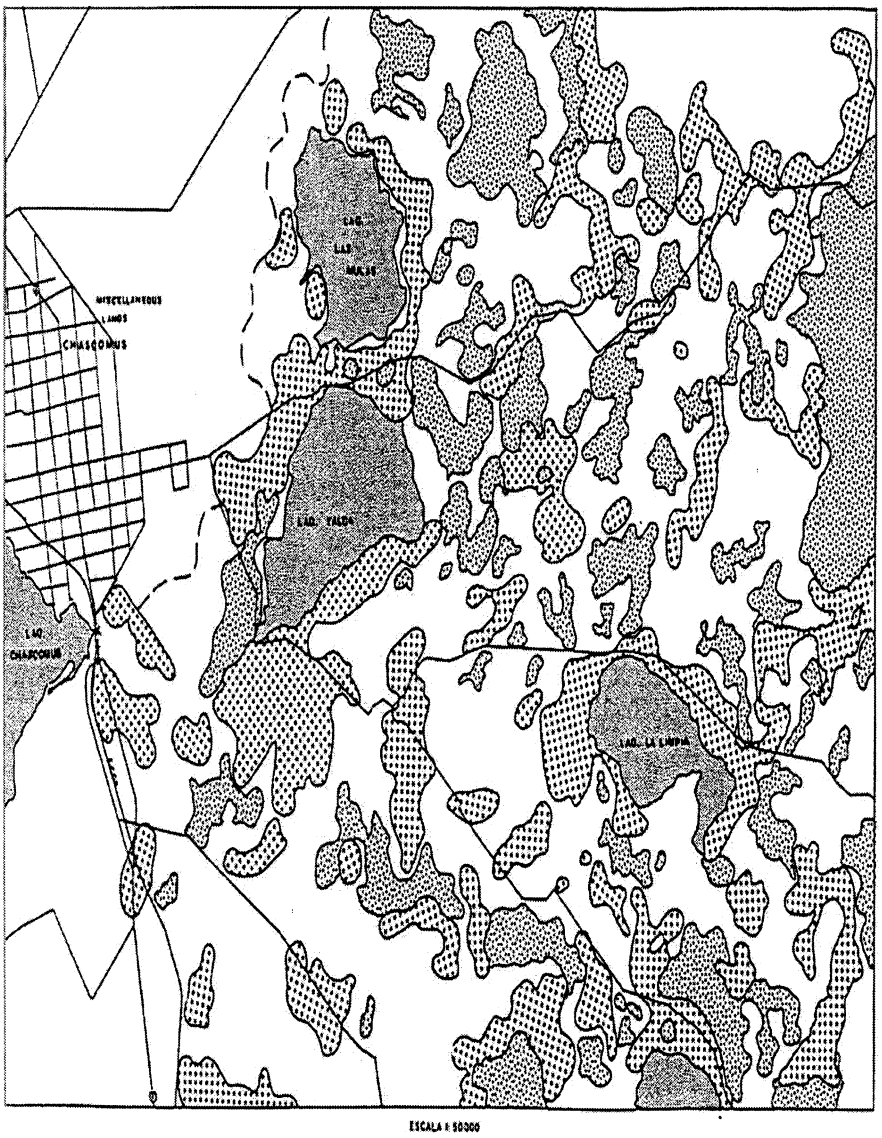
USDA. SCS. 1959. Land capability.

USDA. SCS. 1975. Soil Taxonomy. Handbook N° 436.

Table 1
Determinations of productivity

Cartographic Unit	**Productivity (Mg.ha-1)**	
Upland soil (1)	4,297	A
Swamping alkaline soil (2.2)	1,820	B
Swamping non-alkaline soil (2.1)	1,763	B
Floodable soil (2.3)	1,155	B

Different letters indicate significance.



Legend

Moderately drained soils uplands with predominance of gramineous vegetation, occasional old stubble or low cultivated soils

Swamping soils, hydromorphic complexes with alkaline inclusions, swamping close to surface. Flat to slightly concave areas standing out within the complexes they occupy.

2.1) Community of gramineous, juncaceous, cyperaceous and forbs.

2.2) Grassland of *Dystichlis sp.*

2.3) Shallows of *Juncus sp* and other *hydrophtytes*

Floodable depressions with marshy vegetation.

Lagoon shaped accumulations of water

___ ____ Geomorphological limit