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**Southern Fields and the Pampas**

Southern Fields or “Pampas”? These terms can be confusing! Southern fields is a more general denomination that involves several field physiognomies of the south of Brazil in a wide range of relief compartments. The natural fields that occur in southern Brazil and in some countries of South American like Uruguay and Argentina form a unique and interesting landscape. They are one of the seven Brazilian biomes and represented approximately 44% of plant cover in the state of Rio Grande do Sul (ARRUDA, 2001).

Rural landscapes in southern Brazil have characteristics that vary according to their phytogeographical distribution. The term Pampas, as these landscapes are known, is of indigenous origin and means “flat region”. The Pampas comprises a region of more than 200 mil Km2, in Brazil, consisting of country landscapes on a slightly undulated relief that forms hills covered with several ecosystems mostly made up of herbaceous vegetation of small gramineous plants and shrubs (fields of the southern half of Rio Grande do Sul). This landscape also contains the rural vegetation of humid areas of the extreme south, along the coastline of Rio Grande do Sul, forming swamps (flooded ecosystems), which are environments that favour the nesting of a wide range of birds, capybaras, deer and otters.

The rural physiognomy also occurs in reliefs at higher altitudes, such as the so-called “fields on top of the mountain range” in the states of Paraná, Santa Catarina and Rio Grande do Sul. In this latter state, fields appear as enclaves in the domain of the Atlantic Forest. According to Brandão *et al.* (2007):

(...) vegetation of temperate fields mostly consists of groups of mesothermal grass, and these grass groups are a combination of megathermal and microthermal species. The former blossom in summer and autumn and the latter blossom in spring and scatter seeds at the start of summer.

These fields evolved in humid conditions and very low winter temperatures.

According to the IBGE (2004) classification, these two country areas are prominent in Rio Grande do Sul (RS). One is included in the Pampas biome, in the mid-south and west of the state, and the other in the Atlantic Forest biome in the highest parts of the plateau where the fields are mostly associated with forests with araucaria.

As in the case of other Brazilian landscapes, the Pampas also faces conservation challenges.

**Protection of the Pampas and Southern Fields**

Similarly to other Brazilian biomes, the Pampas and Southern Fields are “extremely rich ecosystems that are an important forage food source for cattle raising, which has been present in the southern region of Brazil for centuries”(BOLDRINI, 1997; NABINGER *et al.*, 2000), given the widespread use of native pastures as cattle feed support.

Is there a uniqueness to these pastures that is valued from the perspective of conservation? In a country with extensive natural pasture degradation for economic exploitation, the Southern Fields and the Pampas have been destroyed by the transition of vegetation into agricultural crops and forestry. This growing degradation is also associated with the invasion of exotic grass, such as *Eragrostis plana* Nees (BILENCA *et al.*, 2004; PILLAR *et al.*, 2007).

According to Jacques & Nabinger (2000), recent data indicate 10.5 million hectares covered with native fields and show a transition of fields in the state of Rio Grande do Sul to different uses (e.g.: introduction of exotic forage species, soybean cultivation and forestry) at a rate of around 130 thousand hectares per year (BRANDÃO *et al.*, 2007).

What are we losing by overlooking protection and inadequate usage? Approximately 2.2 thousand plant species and a rich wildlife diversity, including endemic and endangered species (BENCKE, 2009). That is what we are losing with the inappropriate use of the Pampas!

In a recent estimate, it was concluded that 50% of the original pampas area in Rio Grande do Sul has already been degraded (CORDEIRO & HASENACK, 2009) by agriculture and forestry. The latter activity has been expanding in the region at an alarming rate. The expansion of eucalyptus forestry has also led to a process of sandy desertification (SUERTEGARAY, 2011). This degradation does not merely affect plant cover, it also leads to the extinction of habitats, which is accompanied with fragmentation of remnant areas and ecosystem services.

The conservation of natural rural landscapes also enables preservation and availability of water sources, quality of soil, beauty of scenery and other material and immaterial benefits.

**Ancient and exuberant**

The Southern Fields and Pampas have been in South America for thousands of years, long before the expansion of forests after the recovery of humidity in the middle Holocene (last 4 thousand years, BEHLING *et al.*, 2009).

They cohabit with the woody vegetation, creating, in many regions, field/forest mosaics. Although the current climate favours forests, several factors interact to define whether a field or forest will be formed in a given location. Both are stable ecosystem states that coexist with a variable level of tension. Alternative ecosystem states in the same set of environmental conditions constitute the most appropriate conceptual basis to study field/forest dynamics in tropical and sub-tropical regions, keeping in mind that it would be incorrect to consider vegetation that has endured for thousands of years an “initial stage of succession” (BOND & PARR, 2010 *apud* PILAR, 2010).

Studies show that the origin of these rural landscapes is related to natural disturbances that occurred in the past, such as, herbivorous megafaunal grazers in the Miocene epoch and fires to make way for cattle ranching (OVERBECK *et al.*, 2007).

Studies on the evolution of these landscapes show that large herbivorous grazers of the extinct megafauna have coevolved with grass species in South America since the start of Miocene. (MACFADDEN, 1997)

As in the case of savannahs, many herbaceous plants of the Southern Fields present adaptations associated with fire. The disturbance caused by fire and herbivory allows the renewal of processes of succession, which prevents a few species that are competitively better adapted from dominating a community. Fire favours heterogeneity of rural coverage and stimulates flowering in several species, but there are still few studies on the effects of fire on the germination of species of this type of ecosystem. Similarly to the Cerrado, fire (and grazing) maintain the rural physiognomies and their diversity (OVERBECK *et al.,* 2007). The estimated number of species for the Southern Fields is 2500 (BOLDRINI *et al.,* 2009).

Fires in the Southern Fields are quick and not very intense, with temperatures that do not exceed 530ºC at ground level (FIDELIS & PIVELLO, 2001). In the current southern fields region, burning became more frequent around 7400 years ago, and also changed the floristic composition of vegetation (BEHLING *et al.,* 2004; BEHLING & PILLAR, 2007).

Some disturbances produced by pasture management seem to correspond with natural disturbances that were suppressed. Herbivory by domestic cattle, which has been present since its introduction in the 17th century, can be considered the reintroduction of an ecosystem process previously performed by grazing megafauna, if the correct proportions are maintained. Grazing modifies the structure of vegetation due to the selection between palatable and non-palatable plants and influence in topographic microvariation, thus increasing spatial heterogeneity of habitats. (MORRIS, 2000)

In this interaction, there is a paradox in the conservation of these landscapes. To maintain this ecosystem heterogeneity, it is important to maintain a certain level of disturbance. Studies conducted in a conservation unit in the Southern Fields showed that, when anthropic disturbances are suppressed

(...) country communities evolve to a composition with few dominant species with a predominance of caespitose grasses (tufts) and shrubs, and with a build-up of inflammable biomass, thus increasing the risk of catastrophic fires. In field/forest mosaic regions, there is also the rapid advance of forest over fields. Without disturbances, pioneer forest species are no longer eliminated and progressively take over the landscape. (PILLAR, 2009)

The lack of field management in conservation units has resulted in the loss of its biodiversity. So, how do we ensure the survival of rural diversity? Maybe the reintroduction of a minimal level of disturbance in remnant rural areas is necessary to maintain the right disturbance, with which the maximum richness of species would be maintained (GRIME, 1973).

**Protection is fundamental!**

The level of protection of the Southern Fields is much lower than the levels of other Brazilian biomes. Only 0.33% of fields are currently protected in integral protection units of Rio Grande do Sul (OVERBECK *et al.,* 2007). One of the difficulties in implementing protection policies is that remaining natural fields are concentrated in private properties for pastoral purposes and subject to an imminent transition for other financial uses, such as forestry. This problem is not exclusive of Brazil, considering that fields are endangered all over the world. Temperate fields and savannahs are among the world´s biomes in the most critical situation – 45.8% of conversion and only 4.6% of protection (HOEKSTRA *et al.,* 2005). Fields present particularities in their vegetation dynamics that should be considered in the correct management for their protection.

**Cultural landscape**

The cultural setting of Rio Grande do Sul only exists on a natural rural landscape. Therefore, the regional identity built on the native fields of Rio Grande do Sul, and the associated economic activity, can be a conservation characteristic of these unique landscapes.

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