

Sustainability and range management in the Patagonian steppes*

Rodolfo A. Golluscio, V. Alejandro Deregibus¹ and José M. Paruelo

IFEVA, Departments of Ecology and Plant Production (1), Faculty of Agronomy, University of Buenos Aires, Av. San Martín 4457, 1417 Buenos Aires, Argentina.

Abstract. *One hundred years of grazing by domestic herbivores hampered the ecological sustainability of the Patagonian steppes. We propose three management-related factors of such ecosystem degradation: (1) overestimation of carrying capacity of the rangelands, (2) inadequate distribution of animals in very large, heterogeneous paddocks, and (3) year-long continuous grazing. We suggest that these three management factors interact with the highly selective grazing habit of sheep generating a pattern of grazing heterogeneity at three scales: landscape, community, and population. Grazing differs in intensity among areas of the same paddock, among plant species, and even among individuals of the same species. As a consequence, the most palatable species within a patch are almost continuously subjected to a very high frequency of defoliation in the most preferred areas, which increases the mortality of the most preferred individuals of these forage species. We review the available ecological knowledge and range management technologies that may contribute to revert degradation. A quick assessment of both the availability and spatial heterogeneity of forage resources is now possible with the aid of remote sensing. Range assessment will allow to estimate the carrying capacity of each paddock, and separate different vegetation units. From information on the phenology of the different vegetation units it is possible to decide the timing of grazing and/or resting periods of single paddocks. Rotational grazing methods allow for a recovery of the most preferred species and for a reduction of the heterogeneity of defoliation at the three mentioned levels. Research efforts are needed to develop warning systems, improve the productivity and use efficiency of meadows, and design and evaluate grazing methods for the most arid areas of the region.*

Introduction

By the time G. Musters traveled across Patagonia horses were the only domestic herbivores (Musters 1871). Aborigine economy was almost exclusively based on gathering and on hunting wild animals (guanaco, ñandú, piche, fishes, birds, etc.). The European colonization of inland Patagonia started at the end of the 19th century, and by the beginning of the 20th century the whole region was devoted to the sheep industry. Native rangelands were, and still are, almost the exclusive source of forage for sheep (Soriano and Paruelo 1990). Grazing has been identified as one of the main causes of ecosystem degradation, a process that hamper the sustainability of the region (Borelli et al. 1984, León and Aguiar 1985, Soriano and Movia 1986, Paruelo and Sala 1992 [Appendix 2][†], Paruelo et al. 1993a [Appendix 2]). However, the mechanisms underlying the causal relationship between grazing and degradation are not yet clear.

The objectives of this article are (1) to suggest some explanations to the degradative effects of sheep grazing on the Patagonian ecosystems, (2) to analyze the ability of available technologies to offset the degradative effects of grazing, (3) to discuss some experiences of range management that

* Spanish version available on request.

[†] Appendix 2 is a list of supplementary references not published in formal books or journals.