

# BIODIVERSITY

## WILD BIRDS IN LATIN AMERICAN PASTURELANDS

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Over the last decades of the twentieth century, large areas of forest habitats in Latin America were cleared to promote extensive livestock grazing. Throughout much of the region, ranching includes a variety of systems established in different types of soil, vegetation and climate. Since landscape transformation caused by livestock grazing encompasses such a wide variety of practices, its environmental impacts can also be widely diverse (Murgueitio 1999). The intensity of direct impacts depends both on the type of grazing system, as well as on the characteristics of local ecosystems.



The high deforestation rates in tropical countries not only have local effects such as soil impoverishment and loss of their productivity, but also result in one fourth of global CO<sub>2</sub> emissions to the atmosphere, contributing to climate change, and to biodiversity losses in natural forests. Increasing isolation of the remnants of natural forest amid a homogeneous agricultural landscape further increases the negative effects of the dominant forms of livestock grazing in the Neotropics.

### Biodiversity conservation

Forest conversion into pastures threatens the survival of many species, and therefore is considered as a priority subject for conservationists (Serrao & Toledo 1990; Szott *et al.* 2000). When pastures are used for a short period and then abandoned, forest regeneration is very rapid as compared to those situations in which pastures have been used for more than 12 years. However, boundaries between degraded pastures and both second growth and primary forests are often very sharp, resulting in biodiversity losses (Wiens 1992).

In recent years, ranchers have started to manage silvopastoral systems in order to increase the productivity of their lands while promoting the conservation of natural resources (Ibrahim y Schlönvoigt 1999). In Central America, isolated trees are a common feature within silvopasture. Recent studies indicate that these trees play a major role in the survival of wildlife species by providing scarce resources and refuge; it has also been shown that seed rain under trees within pastures is larger than in open grasslands, and that there is a higher propagation rate of native forest plants under these scattered trees (Harvey & Haber 1999).

Living fences and wind screens are man made habitats modified over time by the driving forces of plant succession. Species composition depends on local ecological conditions, and the original preferences of the farmers, and not necessarily on the nature of the forest seed bank. Connectivity provided by a series of living fences affects the movement of wild animals between natural habitats, and facilitates seed dispersal (Burel 1996). Therefore, this kind of fencing can actually serve as a biological corridor in agricultural landscapes characterized by the fragmentation of the natural habitats.

### Wild birds in Latin American pasturelands

Because the original plant cover throughout most of the Neotropics was dominated by different kinds of forests, habitat transformation into open grasslands undoubtedly has a tremendous impact on local biotas. In those areas of Latin America where human settlements have been transforming

"Maintaining environmental services and promoting biodiversity conservation can enhance the active search of viable solutions for

the landscape for centuries, the few remaining patches of forest have a depauperate biota as compared to those in more remote areas. For instance, judging from very raw estimates of bird species richness in the region, a negligible proportion of the original avifauna can survive in degraded agricultural systems. However, depending on the original habitat considered, agroecosystems can support a substantial proportion of the original avifauna. This is particularly striking for natural grasslands, where more than one fourth of the local avifauna regularly use the agroecosystems.

Species richness is higher in silvopastoral systems than in monocultural grasslands, thanks to the heterogeneity of the vegetation. Food availability for wild birds is higher in these systems, and the complex structure of the vegetation provides more adequate nesting substrate and better protection against predators than other agroecosystems. In addition, several authors have noted that both silvopastures and other agroforestry systems harbour a larger and more complex assemblage of invertebrates than monocultural pastures, which explains the diverse bird communities found within (Dennis *et al.* 1996). Recent information on neotropical migrants using silvopastures suggest that these systems have a high potential for bird conservation: Greenberg *et al.* (1997) discovered that managed patches of *Acacia pennatula* in south-eastern Mexico supported both the highest density and diversity of migratory birds compared to other habitats in the region, and also, the highest numbers of more than one half of the common migratory species.

In an open range pastureland in the Cauca River Valley of Colombia, Naranjo (1992) found that of 141 species of birds occurring in the region where the study site was located, 42 were counted during censuses in pastureland, and only 14 regularly used this habitat. However, silvopastoral systems in another locality of the same valley support a significantly larger number of bird species than open pastureland with very low densities of trees and shrubs. In a survey of the avifauna in the different agricultural habitats of "El Hatico" Ranch and Nature Reserve in this region, Cárdenas (1998) recorded 135 bird species belonging to 39 families and 17 orders. Of this total, 89 (66%) were found using the agroecosystems, and 25 (18.5%) were commonly found during the censuses.

**BBC News Reports:** "Scientists from the Royal Society for the Protection of Birds and the British Trust for Ornithology have found that intensive grazing practices can have a major impact on bird species in the UK. See main report at BBC News site: <http://news.bbc.co.uk>. See more news in the "[Livestock and Environment in the News](#)" section.

A comparison of the species richness between the different production systems revealed that the silvopastures were, by far, the most diverse habitats. Citrus groves contained 57 species, pastures associated with *Leucaena* 46, and star grass pastures with shade trees, 43. A forest remnant in this ranch and organic sugar cane fields contained 33 species each. A bamboo stand harboured 29 and the industrial sugar cane fields were used only by 19 species. The high species richness and diversity in the citrus groves was undoubtedly related to the availability of food resources for many species. This habitat contained the most diverse array of foraging

guilds. Other habitats lacked some guilds because of the characteristics of the dominant plant species. The higher bird species richness and diversity in the *Leucaena* protein banks as compared to the star grass revealed the importance of an additional layer in the vegetation to increase the heterogeneity of the habitat and food availability for wild birds (Pimentel *et al.*, 1992; Saab & Petit, 1992).

Bird community composition in different habitats revealed an interesting pattern. The two natural habitats (a forest remnant and a bamboo stand) were clearly distinct from the production systems, while the impoverished sugar cane fields were different than the silvopastures. For the whole ranch, the presence of the various agroforestry elements such as living fences, hedgerows and shade trees not only allows the movement of birds among the different agroecosystems but also provides adequate refuge for several native species (Murgueitio & Calle 1999, Lynch 1989).

## Expanding biodiversity friendly systems of livestock production

With the information currently available on the technological requirements for setting up and maintaining silvopastoral systems, we are in a position of becoming more aggressive in the promotion of the social, economic, and environmental benefits of such systems. The reluctance of most producers to convert their enterprises into silvopastoral systems, due to cultural limitations and to the lack of economic incentives to compensate for the high initial investments must be overcome by a battery of solutions.

Maintaining environmental services and promoting biodiversity conservation can enhance the

active search of viable solutions for food production in marginal areas all over Latin America. A partnership of conservation organizations, agricultural researchers, and grass-roots organizations can effectively devise ways to implement diverse agroforestry systems adapted to livestock production at different scales. Careful design of such enterprises, keeping ecological principles in mind, may contribute to preserving the remaining natural ecosystems in the region, and recovering degraded landscapes both for agricultural production and biodiversity conservation.

#### Literature Cited

- Burel, F.** 1996. Hedgerows and their role in agricultural landscapes. *Critical Reviews in Plant Sciences*, 15(2), 169-190.
- Cárdenas, G.** 1998. Comparación de la composición y estructura de la avifauna en diferentes sistemas de producción. Tesis de Grado en Biología, Universidad del Valle, Cali.
- Dennis, P., Shellard, L. & R. Agnew.** 1996. Shifts in arthropod species assemblages in relation to silvopastoral establishment in upland pastures. *Agroforestry Forum* 7: 14 -21.
- Greenberg, R., P. Bichier & J. Sterling.** 1997. Acacia, cattle, and migratory birds in southeastern Mexico. *Biological Conservation* 80:235-247.
- Harvey C. & W. Haber.** 1999 Remnant trees and the conservation of biodiversity in Costa Rican pastures. *Agroforestry System* 44: 37-68.
- Ibrahim, M. & A. Schlonvoigt.** 1999. Silvopastoral systems for degraded lands in the humid tropics. Environmental friendly silvopastoral alternatives for optimising productivity of livestock farms: CATIE´s experience. Pp. 277-282 en: *Actas de la IV Semana Científica, CATIE*. 6 al 9 abril 1999.
- Lynch, J. F.** 1989. Distribution of overwintering nearctic migrants in the Yucatan peninsula, II: Use of native and human-modified vegetation. *Manomet Symposium* 178-195.
- Murgueitio-R., E.** 1999. Sistemas Agroforestales para la Producción Ganadera en Colombia. Seminario Intensificación de la ganadería en Centroamérica, beneficios económicos y ambientales FAO- CATIE -SIDE- Turrialba, Costa Rica mayo 24-26 1999.
- Murgueitio, E. & Z. Calle.** 1999. Diversidad biológica en sistemas de ganadería bovina en Colombia. En: *Agroforestería para la producción animal en Latinoamérica. Estudio FAO sobre producción y sanidad animal* 143. Ed: M Sánchez y M Rosales Roma pp 53-88.
- Naranjo, L. G.** 1992. Estructura de la avifauna en un área ganadera en el Valle del Cauca, Colombia. *Caldasia* 17: 55-66
- Pimentel, D., Stachow, U., Takacs, D. A., Brubaker, H. W., Dumas, A. R., Meaney, J. J., O'neil, J. A. S., Onsi, D. E. & D. B. Corzilius.** 1992. Conserving Biological Diversity in Agricultural/Forestry Systems. *BioScience* 42: 354-362
- Saab, V. A. & D. R. Petit.** 1992. Impact of pasture development on winter bird communities in Belize, Central America. *Condor* 94: 66-71.
- Serrão, E.A.S. & J. M. Toledo.** 1990. The search for sustainability in Amazonian pastures. Anderson A.B (ed.). New York, Columbia University Press, pp. 195 -214.
- Szott, L., Ibrahim, M. & J. Beer.** 2000. The hamburger connection hangover: cattle, pasture land degradation and alternative land use in central America, CATIE, Costa Rica (en edicion).
- Wiens, J.A.** 1992. Ecological flows across landscape boundaries: a conceptual overview. Pp. 218-235 In: A.J. Hansen and F. di Castri (Eds). *Landscape boundaries: consequences for biotic diversity and ecological flows*. Springer-Verlag, Berlin.