

## Biodiversity Of Southernmost Forests And Tundra Ecosystems

ScienceDaily (Oct. 26, 2007) — The definition of conservation priorities for biodiversity often focuses only on the numbers of vertebrate animals and seed plants in the northern hemisphere or in the tropics. But what about the other organisms, and the more extreme regions of the world, where the species richness of flowering plants and mammals is low? An interdisciplinary team of US, UK and Chilean taxonomists, ecologists, and philosophers explored the world's southernmost forest and tundra ecosystems to estimate the diversity of the dominant vegetation, namely tiny bryophytes and lichens growing on trees, soils and rocks.

Much of today's conservation strategies focus on "charismatic mega fauna" such as pandas, tigers, and whales; or on vascular plants such as giant redwoods and orchids. Ricardo Rozzi (University of North Texas and Universidad de Chile) and colleagues from Chile are pushing for the integration of other less conspicuous but not less important organisms in regional biological inventories. Their research compares the geographical distribution of species of vascular and non-vascular plants in southern South America, from the tropics to Cape Horn.

Mosses, liverworts, and lichens are important pioneer species colonizing bare rocks, and soil. They occur throughout the world, in virtually all ecosystems, contributing to the flow of nutrients and the overall water balance, particularly in areas where they are abundant (e.g., tropical montane forests, temperate rainforests, peatlands).

Globally, vascular plants are 20 times more abundant than non-vascular plants, with the global figures of 300,000 vascular plant and 15,000 non-vascular species. Yet, as Juan Armesto (Universidad de Chile and Universidad Catolica de Chile) and Bernard Goffinet (University of Connecticut, Storrs) point out, in the sub-Antarctic Magellanic ecoregion non-vascular plants such as bryophytes are dominant.

Since 2000, the researchers conducted a series of floristic inventories in the region of Cape Horn and updated recent checklists. They determined that more than five percent of the world's bryophytes are found at the southern tip of the Americas, in an area representing less than 0.01% of the Earth's land surface. Consequently, the sub-Antarctic Magellanic region appears as a bryophyte diversity hotspot and thus, say the researchers should be viewed as highly relevant in terms of global conservation.

This is part of what inspired the creation of the world's southernmost biosphere reserve.

"The designation of the Cape Horn Biosphere Reserve (CHB) by UNESCO (United Nations Educational, Scientific and Cultural Organization) in June 2005 documents how other, less-popularly known groups of organisms can motivate the protection of whole ecosystems," says Rozzi.

When it comes to conservation and understanding biodiversity, a biome or regional approach to identify suitable ecosystem indicator groups can be more useful than a set of global indicator species. This, say the authors, should allow for new hotspots of biological diversity to be uncovered and conserved.

Rozzi and collaborators further discuss the importance of these tiny but diverse organisms through a case study of the bryophytes in CHB Reserve.

These ecological miniatures have provided the theme for guided field tours involving ecotourists, government authorities, school teachers and others.

"The 'tourism with a hand lens' and the 'miniature forests of Cape Horn' tour programs proved a great success," says Rozzi. Activities at the Reserve have combined scientific research, communication with policy makers and conversations with the public, using innovative metaphors.

These activities offer unique opportunities to introduce people to bryophytes and lichens, inspire an appreciation for these easily overlooked components of biodiversity, and enhance the understanding of their biology. The Chilean government has provided support for the courses, guide training, and tours, boosting the local economy.

According to the researchers, the contrasting biodiversity trends between vascular and nonvascular plants point to the limitations arising from relying on a restricted set of indicator species to define conservation priorities. They also point out the benefits of international collaborations in reaching broader audiences.

They assess regional and global significance of sub-Antarctic plants in their study, "Changing lenses to assess biodiversity: patterns of species richness in sub-Antarctic plants and implications for global conservation." The work appears in the online issue of *Frontiers of Ecology and the Environment*.

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