ECOLOGY

Drugs and People Threaten Diversity in Andean Forests

Trees are a major hallmark of biodiversity in tropical rain forests. In the Amazon rain forest, there are places where an astounding 300 or more species of trees grow on just one hectare (2.5 acres); no wonder the words "forest," "biodiversity," and "Amazon" seem inextricably linked.

But the Amazon is not the only forest home of biodiversity. Along the flanks of the Andes are montane forests that house numerous species of ferns, orchids, mosses, and other groups that are unique to the region. And though the rain forests may get more attention from the media and environmental groups, the montane forests are even more severely threatened, as participants at a recent scientific symposium at the New York Botanical Garden* heard.

The meeting was the first time researchers on different groups of plants gathered to exchange their data on the species of the Andean forests. And the assembled scientists heard unsettling news. In addition to the usual threats of economic development and slash-and-burn agriculture, some of the forests are facing a new danger: a lucrative crop that endangers the forests' very existence. The crop is the opium poppy, grown by the powerful Colombian drug cartels.

The symposium was dedicated, in part, to redressing the attention lavished on the Amazon at the expense of the equally diverse montane forests that stretch from Venezuela to Argentina. "The Amazon has been like the panda or the tiger," says botanist Steven Churchill of the Botanic Garden, one of the meeting's organizers. It is a popular symbol, he says, for forest destruction. Yet the Andean forests have already lost much more of their territory to agricultural clearing.

Scientists at the meeting estimated that montane forests have about 40,000 species of flowering plants, while about 30,000 species have been identified for the Amazon. This abundance persists even though the original montane forests of the northern Andes are already 90% deforested, according to evolutionary biologist Alwyn Gentry of the Missouri Botanical Garden.

The forests are rich in species of a small, subtle variety that tend to attract specialists such as Churchill, who focuses on bryophytes: mosses and liverworts. Of the roughly 900 species of mosses identified from Colombia, he says, 93% occur in the montane region, which accounts for only 25% of the country's area. By contrast, fewer than 250 species of mosses have been identified for all of the Amazon basin. Similar stories can be told for a number of lichens, ferns, orchids, and other groups of plants.

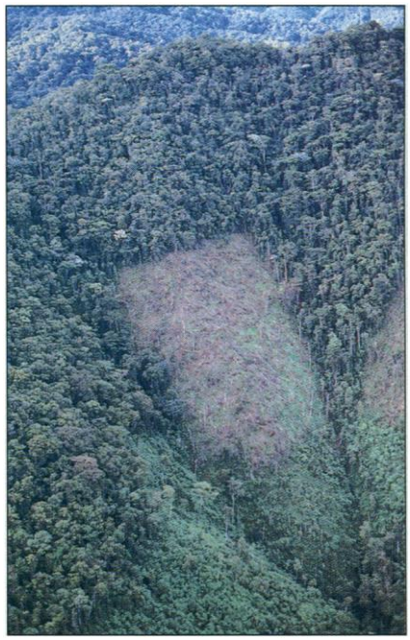
"What's special about the Andes," says Gentry, "is the high concentration of local rather than widespread species." One reason for the high degree of endemism is the area's geologic history, which features numerous mountain uplifts that have fragmented montane habitats, separating populations and allowing species to evolve separate identities.

The localized distribution of species is especially noticeable in Colombia, where the Andes form three parallel ranges or cordilleras. Botanist Paul Berry of the Missouri Botanical Garden says that for the hummingbird-pollinated fuchsia, a group of flowering plants often cultivated in hanging baskets, "each cordillera has its characteristic assemblage." Other plant groups show the same pattern, because species have evolved separately on adjacent cordilleras or on opposite sides of the same cordillera. "If you gave me a list of fuchsia species," says Berry, "I could tell you which cordillera they came from."

But species confined to small areas are particularly vulnerable to habitat loss; when the areas go, so do the species, and much of the montane region has already gone. Most of the damage was done during the past several hundred years, as people moved into the mountain valleys and onto the slopes, clearing trees to grow crops and pasture cattle. The latest threat, however, comes not from agriculture but from the drug trade.

The damage began with cocaine. Since 1970, more than 700,000 hectares of montane forest have been cut down in Peru to make room for coca and the infrastructure needed to process it, according to Fernando Echavarria, a geographer from the University of South Carolina. That number represents about 10% of Peru's total deforestation during this century. And paradoxically, Echavarria says, the drug war promoted by the United States during the 1980s may have exacerbated this process, since attempts to catch growers and destroy their crops pushed them higher up the slopes and into the forest.

Recently the cartels have begun to diversify their product line into opium poppies. The poppies are refined into heroin, and recent anecdotal reports have indicated that heroin use is on the upswing in the United States and in Europe. Reports of poppy fields in Colombia's central cordillera surfaced in the mid-1980 and as recently as 1991 the poppy fields covered only about 1000 hectares, according to an ecologist working in the region who, fearing for his life, wants to remain anonymous. The scientist compiled his data from information gathered during government antidrug efforts. Now, poppies cover about 20,000 hectares, and an additional 30,000 hectares have been cleared in advance of planting. Even worse than the loss of species, the scientist says, is the potential loss of soils and clean water as a result of erosion of former forest lands. Government forces are attacking the poppy fields with Roundup, a quickly degrading herbicide. The scientist reports that during 1992, about 80% of opium fields were destroyed. But the usual relationship between demand and supply points to their return.



Losing ground. A lower altitude montane forest in Colombia has been partly cleared to make room for an opium poppy field.

And what of the future of the forests? Forest protection in some countries revolves around their national parks systems, yet in the Andes, says Gentry, protection from the parks doesn't seem to be forthcoming. Unlike in Costa Rica, he says, "the national parks are not working." Parks are supposed to safeguard these natural resources, but these relatively new institutions have not been a high priority for cash-strapped Andean nations. Gentry told of one Peruvian park that had but a single guard. And he quit because he was not being paid.

–Billy Goodman

Billy Goodman is a science writer in Montclair, New Jersey.

*Neotropical Montane Forests: Biodiversity and Conservation, held June 21-25 at the New York Botanical Garden.