

Forests in the clouds face stormy future

Though environmentalists have riveted public attention on the loss of the Amazon rainforests, another Latin American ecosystem at least as diverse faces even greater threats, botanists concluded at a symposium late last month in New York City. Sunflowers that bloom at the foot of glaciers and others that grow into 20-foot-high trees form but a small part of the rambunctious biodiversity of the montane forests in the Andes.

Some 90 percent of these mountain forests have disappeared from the northern Andes, says James L. Luteyn, a botanist with the New York Botanical Garden (NYBG). In comparison, developers have slashed and burned at most 20 percent of the Amazon rainforest, says Enrique Forero, director of the NYBG's Institute of Systematic Botany. Yet the public remains unaware of the dangers to the montane forest.

"The problem is that people only think of diversity in terms of trees," says Forero. And while many more tree species grow in the Amazon lowlands than in the mountains, the diversity of herbs, shrubs, epiphytes (plants that grow on other plants), and mosses increases with altitude, he adds. This diversity includes economically valuable plants. In fact, the Andes ranks as one of only 12 places worldwide where major food crops originated. Potatoes, lima beans, quinine, and some spices are among the plants first discovered in these mountains.

Humidity and elevation help explain the richness of the mountain flora. "As altitude changes, the climate changes and plants adapt," Forero says. In contrast to the relatively homogeneous Amazon basin, "unique species may live in narrow bands extending only 500 meters up a mountain slope," he says. Species proliferate in the cloud forests, located between the lowland Amazon and the alpine grasslands. Plants from these bordering ecosystems crossbreed in the cloud forests, creating new species, explains Fausto O. Sarmiento, a landscape ecologist at the University of Georgia in Athens.

Mountainous Peru, with over 25,000 plant species, typifies the region's diversity. The species richness includes wild relatives of crop plants, which form a valuable genetic pool for farming. Furthermore, local people employ 3,140 plant species in many aspects of life, including medicine, cosmetics, birth control, stimulants, and ornaments — 33 different uses in all, reports Antonio Brack-Egg with the United Nations Development Program in Quito, Ecuador.

Many of these resources are rapidly vanishing. Unlike the Amazon rainforests, the montane forests are extremely delicate, and pressures from the burgeoning population threaten what little remains. Migration from rural areas to

mountain cities has swelled over the last 30 years. Today, more than 70 million people call the northern Andes home, making it the world's largest high-altitude population. People harvesting timber and clearing the way for roads, cattle, and crops are denuding the forests, Forero says.

Case studies of different countries point to specific problems, Sarmiento adds. "In Ecuador, the main problem is gold mining; in Costa Rica, cattle ranching; in Bolivia, coca for cocaine; and in Colombia, coca and poppies for opium," he says. In 1992, Colombian drug dealers converted 11,000 hectares of pristine montane forest to poppy fields, reports biologist Jaime Cavaleri of the University of the Andes in Bogotá, Colombia.

No quick fix exists for the forests. The symposium, which brought together 120 scientists, 60 of them Latin American, discussed conservation efforts. These include biological inventories to deter-



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Montane forest in Ecuador.

mine the most threatened areas, ecological restoration, and on- and off-site conservation. Sarmiento argues that solutions must encompass "population policies, redistribution of wealth in the Andean countries, and international cooperation." — B. Wuethrich

Mom's smoking linked to hearing defect

For pregnant women who smoke, here's another reason to quit: A new study suggests that exposure to cigarette-smoke chemicals in the womb may lead to subtle hearing difficulties for a child later in life.

As part of a long-term study, Peter A. Fried at Carleton University in Ottawa and his colleagues have been monitoring children born to women who smoked cigarettes during pregnancy. The team's earlier studies showed that infants born to smokers responded abnormally to a test of auditory functioning. Normal newborns will extend their arms and legs in the so-called startle reflex when they hear a bell ring, whereas babies born to women who smoked during pregnancy responded less vigorously to the sound of the bell. That finding suggested a problem with the babies' hearing but didn't pinpoint the nature of the difficulty.

When those same children reached the ages of 6 to 11, the team administered a three-part screening battery for auditory processing disorders.

Their analysis revealed a dose-response correlation between prenatal exposure to cigarette smoke and a child's performance on the auditory tests, Fried told scientists attending the Neurobehavioral Teratology Society's annual meeting in Tucson last week. In a dose-response relationship, the higher the exposure to smoke, the poorer the performance on the tests.

That association held even when the researchers accounted for children's exposure to passive smoking.

The Canadian data suggest that abnormalities in auditory processing stem from prenatal exposure to chemicals such as nicotine in cigarette smoke. Such exposure during fetal development, Fried speculates, may adversely affect the outer hair cells in the cochlea, the inner ear that transforms sound waves into nerve impulses.

Children exposed in the womb to chemicals from cigarettes performed below average on all three components of the auditory battery. Compared with children whose mothers had not smoked during pregnancy, their performance showed the greatest impairment on the most complicated exam, which is called the competing word test, Fried says. In it, a word is spoken into each ear simultaneously. The child has to repeat one word and remember the second word, Fried says.

Such results suggest that children born to mothers who smoke may have trouble processing sound. Fried wonders whether such a subtle deficit may create problems for kids when they reach school age. To keep up with their schoolwork, children must quickly understand the teacher's oral instructions, which often compete with a chorus of other sounds.

Will they outgrow this auditory deficit? Nobody knows. However, Fried points out, even if the ability to deal with spoken information improves, it may be too late. Kids who have fallen behind in their performance at school may have trouble catching up, he says.

— K.A. Fackelmann