

Rainforest Canopy Research Underway In Olympic NP

By Nalini M. Nadkarni

The upper tree canopy of the rainforest is an unexplored world of both aesthetic and biological significance. Processes fundamental to forest growth and regeneration — photosynthesis, pollination, fruiting, nutrient exchange — take place high above the forest floor. With funding from the Man and the Biosphere (MAB) Secretariat, forest ecologists at the University of Washington have initiated a study of nutrient cycling within the canopies of two rainforest ecosystems, one temperate and the other, tropical.

Our two-year project concerns the role which epiphytes (plants deriving support but not nutrition from host trees) play in the nutrient dynamics of a temperate and a tropical rainforest. Epiphytes comprise a large portion of the canopy in both sites: the Olympic rainforest, on the west coast of Washington State, and the Monte Verde Cloud Forest Reserve, in Costa Rica. By focusing on how this one component of the ecosystem affects other parts, we simplify the bewildering complexity of rainforest interactions. By comparing analogous interactions in two geographically distant but environmentally similar ecosystems, we increase our understanding of some of the fundamental processes underlying rainforest dynamics.

To carry out the necessary measurements for investigating processes of within-canopy nutrient storage and exchange, longterm support was needed. Objectives of the MAB Consortium, outlined in the 1979 MAB *Bulletin*, matched almost exactly the work goals we envisioned. Their primary objectives include: carrying out basic research on structure and dynamics of tropical and temperate forest ecosystems to provide a basis of natural resource management; implementation of longterm biological monitoring in established Biosphere Reserves; promotion of international involvement of forest research and management, especially in developing countries; expansion of public understanding for forest ecosystems; and promotion of conservation as a strategy for safeguarding the genetic diversity of biota.

A 26-month proposal was submitted early in 1980. Happily, the project was funded, and field and laboratory work is proceeding in the temperate site, the Hoh River Valley of the Olympic National Park, an established Biosphere Reserve. The tropical fieldwork in montane Costa Rica will be carried out in 1982.

Progress to date includes estimation of epiphyte biomass and nutrient content to learn the magnitude of nutrients stored in the epiphyte component of the canopy. The nutrient flux in precipitation to quantify epiphyte effects as rain falls through the canopy also is being monitored. A reference collection of



Modified mountain-climbing techniques – with ropes, harness, and Jumar ascenders – help to expand a naturalist's perceptions high above the forest floor.

epiphytes is growing, and ecological interactions such as colonization rates, succession, and competition are being monitored with photographs of canopy "mini-quadrats."

Another future plan includes interpretation of the canopy world to park visitors. A slide/tape program for use in the Olympic NP visitor station is being developed. The presentation will focus on biological interactions of canopy plants and animals, with emphasis on parallels and similarities between temperate and tropical rainforests.

Rainforest ecosystems are being recognized rightfully as valuable and unique, worthy of preservation and careful management for a multitude of reasons. Funding organizations such as MAB have made a commitment to supporting baseline ecological research on these fragile and important biomes.



Forest ecologist Nalini Nadkarni takes a close look at epiphyte/host tree relationships in the upper canopy of the Hoh Rainforest in Olympic National Park.