



*New species of fresh water flounder.*



*Smithsonian's Don Duckworth collects insect specimens.*

## AMAZONIA IV

# Research void

**For fear of Amazonia's confusion of life, science virtually ignores the area**

by Christopher Weathersbee

Trying to get a scientific grasp of the biological profusion of tropical America is something like trying to untangle a boy's fishing line. The sheer number of possible starting places confounds thought.

It has been said of one small tropical mountain that there were more plant species growing on it than exist in all of the United States. In a typical neotropical rain forest there may be on the order of 100 tree species per acre, compared with less than a dozen in a temperate, mixed deciduous forest. There are, very roughly, 30,000 plant species in the Amazonian jungle, and a comparable welter of animal life.

**It would seem** that this treasure house would attract investigation, that botanists and zoologists would naturally seek out its diversity for study, that ecologists would have many a field day studying the interactions among the thousands of life forms. However, this hasn't been the case.

On a per-species basis, next to no research is carried on in Amazonia compared with the lavish attention paid the biology of more temperate zones. There are still many species left to be discovered, let alone studied and described. The ecological role of very few Amazonian species is known. Even the ecological theory applied in the few studies undertaken is derived from temperate zone theory, and may not truly be applicable.

Amazonia probably has more unexploited but possibly valuable plant species than any place else in the world. It certainly has the need to exploit some of them if it is to support an economy to fit its population. But research is

needed to convert the wild forms of plants to forms that can be successfully cultivated. Research requires the kind of money that few Amazonian nations acting alone are able to spend.

Rubber is an example of the short-range view often taken of South American research. It also illustrates a peculiar difficulty faced in the Amazon. During World War II, at the height of U.S. interest in Latin American sources of rubber, many attempts were made to get rubber under cultivation.

But every early effort at planting rubber in cultivated concentrations failed. While rubber is native to Amazonia, so is South American Leaf Disease, a fungus-caused rubber disease so bad it dooms cultivation efforts. Wild trees, being scattered, don't sustain epidemics. But SALD wipes out concentrations of trees.

Because of the U.S. interest in rubber during the war, intense efforts were made to find rubber strains resistant to SALD. This work was beginning to show promise when the war ended and Far Eastern rubber again became available to the United States. Instead of supporting an ongoing research program in SALD that could have had tremendous economic benefit, funds were cut off.

The same kind of research is needed on potentially more valuable crops than rubber. In the tropics it is almost axiomatic that exotic plants are more susceptible to cultivation than native ones. Thus rubber does well in Southeast Asia where SALD is not endemic. Coffee does well in South America but not in Africa, its country of origin. The rule is: "Export the plant, but not the disease."

It is remarkable, at least academically, that so little science has been wielded in Amazonia. Theoretically ecologists and biologists should start studying in the tropics and work north and south. Strangely, the life forms of the tropics can be considered typical of the planet, while the life forms of colder climates are the more outlandishly specialized.

The reason for this is fairly simple. As is the case anywhere, life in the tropics constantly is trying out new forms, new species, which are more or less successful according to how well they can utilize ecological niches not occupied by other species or how well they compete for occupied niches.

The tropical environment is kind. Many species survive even though they may not be the most successful organism that ever grew. Each new model scatters itself out in a search for the particular niche it evolved to use. The end result is the great variety of life forms of the tropics, with a great variety of combinations of interactions and interdependences. A side effect is that, because there are so many species of plants and animals, there tend not to be very many of any one species. Usually, therefore, it is impractical, or at least inefficient, to attempt to gather wild harvests for a cash crop.

**More northerly** climates, compared with the tropics, are unkind. The farther north one goes the unkinde it gets. Here it takes an exceptional species to flourish. There are fewer ecological niches and it requires more adaptation to stringent conditions to be able to utilize them. Thus there are fewer species distributed in the north. A side



*Epiphytes: a species for every niche.*

effect here is that because there are fewer species, there tend to be many of any one species. There are (or were) vast herds of buffalo and caribou and millions of acres of forest containing only spruce. These built up through lack of interspecific competition.

In the north ecological relationships tend to be rather specialized because of the stress of the environment. It is unfortunate in a way, then, that ecology is one of the natural sciences that was developed in the north, because it has been developed on the basis of a somewhat special case of a paucity of species. The situation is analogous to developing the science of botany in the arctic tundra, then trying to extend resulting theory south.

What is needed is a whole new approach to the ecology of tropical America. The first step requires massive amounts of pure data gathering so that there can be a factual basis on which to build theories that really fit the tropics. Unfortunately no one seems willing to spend the kind of money this would take, just to build up an inedible, unwearable, unsaleable body of basic scientific knowledge.

The necessity for a new approach may be one of the dampers on enthusiasm for neotropical research. But an equally strong deterrent seems to be the "You first, Charlie!" syndrome: Most biological scientists look at the tropics as a confusion of barely described floral, faunal, and environmental factors into which no one else seems to be venturing. It is safer to work in a well-populated field where there is plenty of opportunity for corroborations, than to step out into the unknown. ◇

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