WELCOME SURPRISES FROM MT. BANAHAW

STORY AND PHOTOS BY LAWRENCE R. HEANEY, DANILO S. BALETE, ERIC A. RICKART, MA. JOSEFA VELUZ AND JOEL SARMIENTO

The three peaks of Mt. Banahaw rise high above Laguna and Quezon Provinces, a familiar sight to vast numbers of people. Steeped in Filipino history, the mountain has a prominent place in the minds and hearts of the people of the southern Tagalog region. We recently discovered that this familiar mountain is able to surprise, even amaze, in ways that we could never have anticipated.

We had gone to the mountain, most of which is within Mt. Banahaw-San Cristobal National Park, to conduct a survey of its small mammals, since the animals of the area are surprisingly poorly known.

About the authors: Lawrence R. Heaney is curator of the Field Museum of Natural History, Chicago; Danilo S. Balete and Joel Sarmiento are from Laksambuhay Conservation, Los Baños; Eric A. Rickart is from the Utah Museum of Natural History, Salt Lake City; and Ma. Josefa Veluz is from the National Museum of the Philippines.

This mysterious "mini-mouse" is tiny, but represents the biggest surprise to biologists in many, many decades.

The mysterious mouse has exceptionally long whiskers on its blunt, sturdy snout, but also has a bare patch behind the eyes where still more long hairs grow.

We knew beforehand that Luzon Island has one of the world's greatest concentrations of unique mammal species, and that tall mountains and mountain ranges in Luzon often support species that live nowhere else, separated by broad lowland plains. For that reason, we predicted that Mt. Banahaw could have several previously unknown species of small mammals, but that they would be closely related to other species elsewhere in Luzon.

We also went to Mt. Banahaw with the expectation of seeing widespread destruction of the lowland forest by logging and *kaingin*, as is the case in far too many places in the Philippines. But the prospects of finding previously unknown species outweighed the problems we expected, so on April 28, 2004, we left the Haribon office in Quezon City with our camping and research gear. The next day, we hired porters from among the local farming community in Barangay Lalo, Tayabas Municipality in Quezon Province, and hiked to our first campsite at about 1500 meters elevation on the mountain.

For the next two weeks, we sought the small mammals that live on the ground and in the trees in the montane forest that cloaks the mountain at that elevation, and still higher at 1750 meters, where the steep terrain and cold, wet weather have caused the forest to be left mostly untouched. Much to our delight, we found forest mice (the genus *Apomys*) to be abundant, with one large, short-tailed species on the ground, and one long-tailed species in the trees. The large one seems to be somewhat different from those we have studied elsewhere, and we will study our voucher specimens carefully during the coming year to determine if they represent a distinct species. We also caught quite a few of the fruit-eating forest rats of the genus *Bullimus*, and found them to be smaller and darker than those anywhere else, and so perhaps also representing a species new to science. We were especially excited and happy to catch a *Rhynchomys*, which feeds almost exclusively on earthworms. With their extremely elongate snouts and tiny mouths and teeth, they are unmistakable, but this one had several features that are different from the two known species from Mt. Isarog in Bicol (*R. isarogensis*) and from the Central Cordillera (*R. soricoides*).

And so, on May 12, we happily left our high mountain camp to spend the last few days in remnant lowland forest at 600 meters elevation. With help from our new friends in the farming community, we hiked down the mountain with our gear, and temporarily set up camp at a small community building that was still under construction. Our first surprise came as we explored the nearby area. Rather than rampant logging and increasing areas of *kaingin*, we found the adjacent watershed to be clothed in naturally regenerating secondary lowland forest; instead of degradation, we saw evidence of years of careful reforestation with native trees and vigorous volunteer growth of understory plants, vines, and epiphytes. There were dozens of small vegetable garden plots, but they were carefully laid out and densely planted to avoid erosion, and each was surrounded by a buffer zone of thick natural vegetation. We learned that the farmers were members of a barangay that recognized that their rice fields further down the mountain required the mountain's clear, abundant water for irrigation, and since their livelihoods depend on rice, they place great emphasis on careful management of the watershed. They restrict further clearing for garden plots, and they very carefully limit burning. They have also all but eliminated logging, and they forbid mining or treasure hunting. All of this is done in cooperation with the Protected Areas and Management Board of the Mt. Banahaw National Park, which deserves credit for their ongoing efforts to protect the park, but it

Rhynchomys feeds on little other than earthworms; their greatly elongate snout allows them to probe for worms among fallen leaves and moss.

The interior of the regenerating lowland forest is dark and rich with vigorous plant growth.

The large species of *Apomys* was the most abundant mammal on Mt. Banahaw; they weigh about 75 grams.

Bullimus was the largest rodent caught by the team, weighing up to 300 grams. They are gentle animals that eat fruit on the forest floor.

seemed evident to us that it was the local community that provided the direction and determination to stabilize their environment. Lowland forest is now perhaps the rarest habitat on Luzon, and so even this relatively small area of recovering forest represents an important reason for hope for the future.

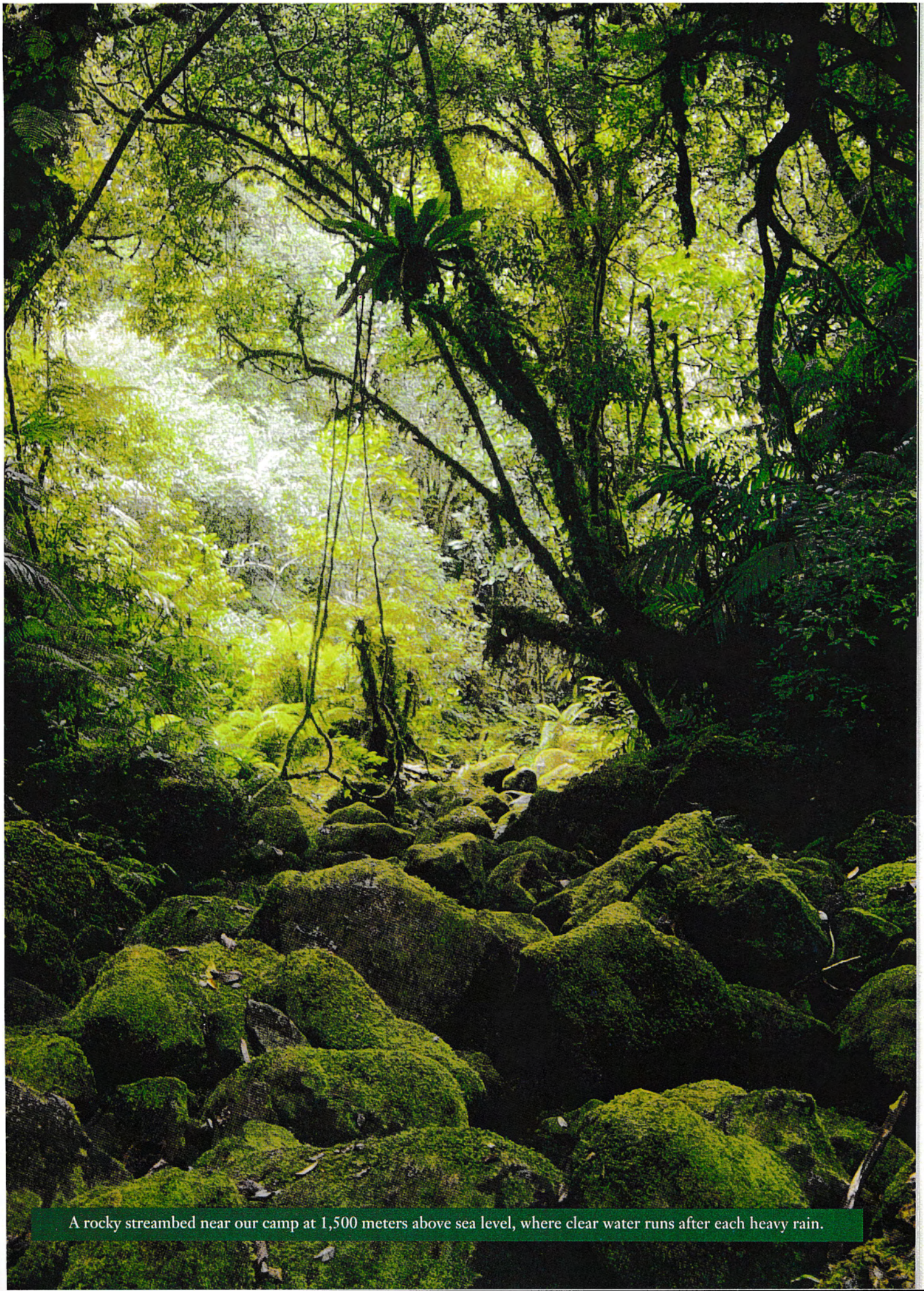
Truly delighted with this very unusual and heartening situation, we set about exploring the secondary forest of the vicinity. We quickly learned that the destructive rodent pests of Philippine croplands were restricted to the community building and the garden plots; in the regenerating forest were only the species native to the Philippines that typically do no harm to human activities, and that indeed usually avoid humans and their disturbance very actively, including *Apomys* and *Bullimus*. But in the process of our sampling came our second surprise.

On the next to the last day of our stay in camp, one of our team was checking a line of traps he had set well above the ground, up on horizontal branches and on the tops of some large lianas that snaked up into the canopy. As he approached one trap he saw a tiny bit of orange fur—and as he came closer, he realized that it was a complete animal. He carefully removed it from the trap, and immediately headed back to camp, knowing that this was one of those grand and glorious moments that all biologists dream about.

Within the next several months, we will gradually compare the mouse to other known species, and we will eventually learn how it fits into the broad picture of the evolution and ecology of mammalian biodiversity that we have been gradually building. But as of the day of this writing, May 21, just four days after capturing the mouse, we know that it is utterly unlike any species of mammal ever before seen by a biologist in Luzon. It is tiny, only 15 grams as an adult. The fur is bright orange. The ears are nearly pointed and the tail is long with stiff hairs near the tip like a bottle-brush. The whiskers are nearly five times the width of the head, and behind the eye is a bare patch with still more long hairs growing from it. Most unusual are the front teeth, which appear quite narrow from the front but are three to four times as long as wide—a condition that none of us can ever recall seeing on another species. The head is proportionately large, and the muscles of the jaws are exceptionally strong, leading us to believe that they probably eat the seeds contained within very hard nuts, which other small mammals of the Luzon forest are unable to open.

One of the most distinctive features of the Luzon mammal fauna is that dozens of the species have evolved from just two species that arrived from the Asian mainland many millions of years ago. Once here, they evolved into a wide diversity of species, some of which live on the forest floor and eat earthworms (such as *Rhynchomys*), and others of which live in the treetops and eat tender young leaves (such as the cloud rats, *Phloeomys* and *Crateromys*). We feel confident that our "mysterious mini-mouse" represents an entirely different group of animals that have arrived in the Philippines independently from Asia, and apparently have evolved to live in the vine-laced forest canopy of the lowlands. Our evolutionary and taxonomic studies will eventually allow us to understand more about when and how this happened, and perhaps now that we know they exist, we will find other, similar species elsewhere. But for now, a final, remarkable fact has become apparent: it is principally through the efforts of the community of Barangay Lalo that the lowland rainforest habitat of this remarkable species exists, and that without their efforts to protect their watershed and livelihood as farmers, we would never know that the species exists.

This smaller species of *Apomys*, *A. microdon*, lives above ground, running nimbly along vines and lianas from tree to tree.



A rocky streambed near our camp at 1,500 meters above sea level, where clear water runs after each heavy rain.