Biology

Securing Madagascar's rare wildlife

Ecologists have long swooned over Madagascar's remarkable wildlife, born of the island's equally singular isolation off Africa's east coast. That location has not insulated the country from relentless human expansion, however, which has slashed the original tropical forest cover by 80 percent. The island's only primates have been particularly hard hit: Roughly 23 of the 32 remaining lemur species—all unique to Madagascar—are imperiled.

In an attempt to shore up the animals' numbers, five black-and-white ruffed lemurs born at the Duke University Primate Center in Durham, N.C., will be released in Betampona Natural Reserve later this month. The new lemurs will join a population in the reserve so attenuated that disease, extreme weather, or even a spell of infertility could obliterate it.

This dicey situation is due largely to expanding slash-and-burn subsistence farming and an active timber industry. The lemurs' problems are exacerbated by poaching—islanders describe the meat as tasty—and the illegal pet trade. Their small numbers promote inbreeding, so the newcomers will boost the gene pool as well as the head count.

J. Wallace/Duke Univ.

Cute, delectable, and nearly homeless: The black-and-white ruffed lemur.

The departure of the zoo-bred lemurs for Madagascar last week coincided with the inauguration of the much-heralded Masoala National Park, which secures 840 square miles of northeastern Madagascar from commercial logging. The decree should safeguard more of the island's gems, such as the exceedingly rare and primitive flowering plant recently recovered there (SN: 8/2/97, p. 68). *—M.M.*

Crab traps and terrapins

Build a better crab trap and they will come—but turtles will get away.

That was the aim, and the outcome, of a study by Willem M. Roosenburg of Ohio University in Athens and his colleagues. They modified a standard crab trap to prevent aquatic turtles, or terrapins, from drowning when they are accidentally caught in one. In terms of crab yield, the new traps worked just as well as the standard version, the researchers report in the October CONSERVATION BIOLOGY.

Diamondback terrapins frequent some of the same shallow waters along the Atlantic coast as crabs do, and they are attracted by the same fish or other bait used in crabbing. Large numbers of terrapins can end up dead in the process—on average, one terrapin per day per five crab traps. Roosenburg says he once found 49 drowned in a single trap.

It's a major problem facing terrapins, which are considered threatened along much of the East Coast, says Roosenburg, who studies the animal's evolutionary ecology. "People are noticing tremendous declines in areas where commercial crabbing can go on in shallow waters," he says. The researchers report that 15 to 78 percent of a local population may be captured per year.

The modified crab trap stands above the water, allowing terrapins to breathe if they are caught. The trap may work well for recreational crabbing in shallow waters, but it is too cumbersome to fit on commercial boats. This drawback inspired researchers to come up with another device. A wire panel designed to fit onto the standard pots reduces the number of trapped terrapins by 75 percent, says Roosenburg, without affecting the number or size of crabs caught. *—C.M.*

Paleobiology

The search for the oldest animals

The discovery of small grooves in a 1.1-billion-year-old rock from central India may dramatically push back the record of animal life on Earth.

"This is the oldest animal. I would say it is a worm burrow," says paleobiologist Adolf Seilacher of Tübingen University in Germany and Yale University. He presented his find last month in Salt Lake City at a meeting of the Geological Society of America. Seilacher proposes that worms made the lines as they slid across a carpet of bacteria on the seafloor.

The oldest currently accepted animal fossils come from rocks 600 million years old. Throughout this century, many scientists have reported finding older animal fossils, but none of those specimens has convinced the paleontological community.

The Indian rocks will also face considerable scrutiny. "I'm cautious," comments Guy M. Narbonne of Queen's University in Kingston, Ontario. "I don't think we can rule out the possibility that it could be a modern artifact." He wonders whether termites or other tunneling insects could have made the grooves quite recently.

Friedrich Pflueger, also at Yale, has come up with another possible explanation. He has found in experiments that gas bubbles can make horizontal tracks in sand when trapped beneath an impermeable layer. A billion years ago, bacterial films may have provided such a layer.

The Indian specimens, if accepted as worm traces, would resolve an ongoing debate about the timing of animal evolution. The fossil evidence suggests that animals appeared 600 million years ago, quite late in the history of life. Information gleaned from animal genes, however, points to a much more ancient origin, perhaps as early as 1.2 billion to 1 billion years ago (SN: 11/23/96, p. 335).

Pushing back the record of animal life would raise new problems, though. Geologists calculate from the chemicals in rocks that oxygen concentrations in the ocean 1 billion years ago hovered far below present values. Because animals require oxygen for growth and respiration, it seems unlikely that the oceans could have supported worms big enough to make the Indian traces, says Narbonne. According to the chemical evidence, oxygen finally reached adequate concentrations roughly 600 million years ago—about the time that generally accepted animal traces appeared in rocks for the first time. *—R.M.*

How much air could a dinosaur breathe?

Early dinosaurs got tuckered out faster than *Tyrannosaurus rex* and other species living near the end of the dinosaurs' reign, according to a researcher who studies fossil ribs.

The joint between an animal's backbone and its ribs provides evidence of how much the chest could expand during breathing, says Richard A. Hengst of Purdue University North Central in Westville, Ind. Hengst analyzed the ribs of 12 carnivorous dinosaur species to trace the evolution of their lung capacity—an indirect measure of aerobic endurance. The oldest species had only a limited ability to expand their chests, whereas later ones could take in 40 percent more air per breath, Hengst reported this month in Chicago at a meeting of the Society of Vertebrate Paleontology.

Dinosaurs in North America developed the improved lung capacity during the middle Jurassic period, roughly 140 million years ago. Species in South America acquired this innovation much later than their northern cousins, suggesting that they may have used different strategies in hunting. Northern species may have patrolled larger areas and run their prey down over longer distances, suggests Hengst.

John A. Ruben, a physiologist at Oregon State University in Corvallis, says that Hengst's findings make sense. "It quite independently lends some validity to work we're doing." *—R.M.*

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