

COSTA RICA



PHOTOS COURTESY JONATHAN PAULI



Sloths thrive at chocolate source

Like many and much more nimble Neotropical fauna, sloths are running out of room to maneuver.

As forests in South and Central America are cleared for agriculture and other human uses, populations of these arboreal leaf eaters, which depend on large trees for both food and refuge, can become isolated and at risk. But one type of sustainable agriculture, shade grown cacao plantations, could become critical refuges and bridges between intact forests for the iconic animals.

In Costa Rica, CALS forestry and wildlife ecology professors Jonathan Pauli and Zach Peery are using a complex of intact tropical forest, pasture, banana and pineapple plantations—all connected by a large, shade grown cacao farm—as a field laboratory to explore the ecology of two species of sloths in a rapidly changing environment.

“We know a lot about sloth physiology,” says Pauli. “But when it comes to sloth ecology and behavior, we know almost nothing. It’s a giant black box.”

But some of that mystery is being peeled away as studies of both the brown-throated three-toed sloth and Hoffmann’s two-toed sloth, two common species, are yielding new insights into their mating habits and how the animals navigate the landscape.

The fact that sloths require forested habitat and are sedentary makes them vulnerable to deforestation, says Peery. “Once a tract of tropical forest has been cleared, sloths have relatively little capacity to seek out new habitats.”

But the shade grown cacao plantation, with its tall trees and network of cables for moving the pods that ultimately become chocolate, seems to be a de facto refuge and transit hub.

“Because of the diverse overstory of native trees, the cacao farm appears to provide excellent habitat for both species of sloths,” explains Peery. “We want to compare sloth populations in cacao to populations in intact tropical forests to see if cacao provides habitat that is of as high of a quality as their natural forests.”

Fleshing out those ecological parameters, however, requires a better basic understanding of sloth behavior, knowledge the CALS researchers are now beginning to accumulate.

For example, in a study recently published in

Animal Behavior, Pauli and Peery described the mating system of Hoffmann’s two-toed sloth and showed that, unlike many other animals, the females tend to disperse from their home range and that the breeding territories of males can slightly overlap, with males tolerating competitors on the fringes but excluding them, sometimes violently, from the core. And Hoffmann’s two-toed sloths of both sexes seem to have multiple partners as well. “They’re more promiscuous than previously thought,” says Pauli. “We see a much more flexible system of multiple matings.”

That’s not so for the three-toed sloth. In another study, published in *PLoS ONE* in December, they found that three-toed sloths are strongly polygynous—males exclude other male competitors and mate with many females.

In addition to contributing to basic sloth knowledge, these findings should help wildlife and land managers in the Neotropics make sound decisions to better balance development and conservation.

“Understanding how shade-grown agriculture can benefit sensitive tropical animals such as sloths is highly relevant, considering the ongoing and rapid loss of biodiversity in the Neotropics,” notes Pauli. “What kinds of ecological services can these already altered landscapes provide? Can we mitigate future biodiversity loss with a greater emphasis on shade grown agricultural systems than crops grown in monocultures? That’s the future we’re facing.”

Because of their sedentary nature and dependence on forest, sloths can be viewed as an “umbrella species,” says Peery. “Protecting sloths could indirectly protect many other animal species in tropical forests that are harder to measure and study.”

—TERRY DEVITT

Pauli and sloth friends (two-toed on top and three-toed below): These slow-moving animals have found a refuge in cacao farms.