things. What message does this [demand] send to other institutions?"

Officials respond that the National Institutes of Health, of which NCI is part, states in its grant policy that awards may have to be returned if they're misspent. Kalt adds that NCI has previously recovered research grants in "a small number of [misconduct] cases"—although they are the exception. Although ORI doesn't track recovered grants, Lawrence Rhoades, director of ORI's Division of Policy and Education, says he's aware of only a few cases among the 100 or so misconduct findings by ORI since 1992. "Figuring out how much money the government should get back is not always easy to do," explains Rhoades. Often the scientist found guilty played a small role in a study, or the overall conclusions are still valid.

To Bissell this inconsistency adds to the unfairness of NCI's demand. The NCI letter gives LBNL 30 days to either pay or appeal the decision. Kolb says the lab plans to appeal.

–MARCIA BARINAGA AND JOCELYN KAISER

SPECIATION

Mexican Pairs Show Geography's Role

The forested mountain ranges that march across each side of Mexico's Isthmus of Tehuantepec are a naturalist's paradise, full of rare birds, mammals, and butterflies. They are a playground for evolutionary biologists too, because these nearly identical habitats were separated relatively recently, when climate change created an arid strip between them. Now, researchers who examined pairs of species on either side of the lowland report on page 1265 that they have new evidence that such geographic barriers are the major force driving the formation of new species.

Where species are born. This hummingbird and many other species arose in the cloud forests of the Isthmus of Tehuantepec.

Biologists since Darwin have analyzed—and argued about—how species are born. Recently researchers have looked favorably on a version of Darwin's own idea: that populations of a single species can separate when they change their ecology, adapting to different temperatures, food resources, or other environmental conditions (*Science*, 25 June, p. 2106). But after examining 37 pairs of closely related species, one from each side of the arid Tehuantepec barrier, a team led by ornithologist A. Townsend Peterson of the Natural History Museum of the University of Kansas, Lawrence, found that members of each pair had similar ecological niches. In every case it appears that the geographic barrier, rather than any difference in ecology, was the critical factor in speciation, isolating the original populations so that they accumulated genetic differences and eventually became unable to interbreed, says Peterson. "Speciation is taking place simply because of geographic isolation," not through ecological adaptation, he says.

The idea of geographical speciation is well understood, but unambiguous examples are rare. "Showing it the way they did … is pretty clever," says Robert Zink, curator of birds at the Bell Museum in St. Paul, Minnesota. Even so, he and others warn against dismissing the role of ecology in speciation, because the method needs refinement and there are counterexamples in which ecological differences have driven populations apart into species.

Peterson and colleagues Jorge Soberón and Victor Sánchez-Cordero from the National Autonomous University of Mexico in Mexico City recognized the potential of the dry lowland to test speciation theories. The 300-kilometer-wide strip was once forested, but climate changes left it scrub-dry by 100,000 years ago, interrupting the ranges of forest species to the north and south.

To carry out their test, the team used published literature to identify 37 pairs of sister species on either side of the isthmus and searched museum records to find out where specimens of each species were collected. They used these location data to define each species' ecological niche based on four conditions: temperature, precipitation, elevation, and vegetation. They then plugged these parameters into a computer program to determine the potential geographic range of each species.

Peterson tested whether the observed ecological niche of one species could predict the niche and range of its sister. For all 37 species pairs, the answer was yes. For instance, the ecological parameters favored by a blue mockingbird also predicted the range of its counterpart south of the barrier, a blue-and-white mockingbird. This means that each species' niche remained stable throughout the speciation process. Such conservatism makes it "pretty clear that speciation did not take place in an ecological dimension," says Peterson.

The work offers "an intriguing contribution" to the speciation debate, says biologist Thomas Lovejoy of the Smithsonian Institution. However, Trevor Price, an ornithologist at the University of California, San Diego, says he and others don't doubt that geography can create new species; what they want to know is when and how ecology plays a role, too. "We are now asking what is the role of ecology over and above geographic isolation," he says. And he thinks Peterson's study may have overlooked some complexities. An ecological niche is much more than just four physical parameters, he notes. Herpetologist David Wake of the Museum of Vertebrate Zoology in Berkeley, California, adds that the literature identifying species as sisters may or may not be accurate, nor is it certain that all of the supposed sisters were born when the barrier appeared.

Nonetheless, Wake and other researchers agree that Peterson's method of predicting geographic ranges from ecological data holds great promise. Peterson is now improving his method to incorporate dozens of ecological parameters and applying it to predict the potential distribution of invasive species. "If their analysis holds … they'll have the ability to predict where species will and won't occur as habitat changes," says Zink. "[They could] forecast the fate of species"—a valuable power indeed.

–BERNICE WUETHRICH

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ANIMAL TESTING

One Mouse's Meat Is Another One's Poison

Just as government labs are gearing up for a major campaign to ferret out industrial chemicals and pollutants that mimic sex hormones, scientists have discovered that some of their favorite test subjects—lab mice—vary greatly from strain to strain in their sensitivity to the hormone estrogen. According to a report on page 1259, estrogen injected into young male mice sharply curtails testis growth and sperm production in some strains, while leaving a

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