

COMMENTARY

Endangered by Research: Poachers Mine the Scientific Literature for Locations of Newly Discovered Animals¹

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The Chronicle of Higher Education

The gecko could have sprung from the mind of Dr. Seuss: It had black spots. It had white spots. It had stripes upon those spots. The nine-inch-long lizard with bright-orange eyes was new to science in the late 1990s, when L. Lee Grismer, a professor of biology at La Sierra University, first encountered it — but now, doing nothing more than research, he may have indirectly wiped out the gecko species from its home range in southern China.

Dr. Grismer simply described the lizard in a scientific journal, the *Journal of Herpetology*. He named it *Goniurosaurus luyi* and recalls thinking, “If we’re going to protect these animals, we need to describe them and get them on the books.” To his dismay, “Within months of the description, these things hit the pet trade with a bang,” he says. “These things were going for \$1,500 apiece.”

Dr. Grismer has not returned to the site, but other scientists have. “They say when you go to this place in southern

China, it looks like a bomb hit it,” he says. “The rocks are overturned, they’re smashed, you don’t have geckos anywhere.”

While poaching exotic animals is not new, Dr. Grismer thinks that smugglers have become more clever in that they are using scientists’ research papers to find newly described animals. He is not alone in that concern. Three other scientists joined him in a letter to the journal *Science* in May, telling the glum stories of three new species, all quickly decimated by poachers after their scientific description appeared in print. The letter warns fellow taxonomists that their activities may actually harm the animals they intend to study or to conserve.

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MARILYN PASKEK

Dr. L. Lee Grismer described *Goniurosaurus luyi* from southern China in the late 1990s. Within months, these geckos were demanding high prices in the pet trade.



JAMIE PLAZA

When the Wollemi Pine (*Wollemia nobilis*) was discovered in 1994, scientists kept its location a closely guarded secret.

The problem may not yet be widespread for new animal species, but the researchers urge their colleagues to debate solutions before it grows in scope. The issue is even forcing biologists to consider withholding information from publication — a solution anathema to some researchers. “Science is a free flow of information,” says Dr. Grismer. “I’ll be damned if I’m going to have these criminals dictate how I’m going to do my science.”

Plants in Peril

The wildlife trade is a multibillion-dollar industry, but it seems to have branched into newly discovered animals only recently. Botanists, by contrast, have faced the problem for longer. “That’s the unfortunate thing of discovering and publishing a new species — it obviously brings with it the need for collectors to have one,” says Geoff Bailey, a scientific consultant in Manchester, England, who studies cacti as a hobby.

When scientists discover a new animal or plant, they normally collect one or more — legally, they point out, often going through a lengthy permit process — to deposit in an institutional collection. That animal or plant becomes the “type” specimen, the representative of its species.

As hobbyists or poachers hunt for plants, says Michael Chamberland, collections manager of the herbarium at the U.S.

National Arboretum, the area where the type specimen was found often becomes the “sacrificial locality.” “One has to hope that there are satellite locations elsewhere and that those are not going to be revealed as widely,” he says.

Some botanists have concluded that to preserve species of commercial interest — like orchids, cacti, and carnivorous plants — they should publish only general geographical information, rather than precise locations. For example, when the Wollemi Pine (*Wollemia nobilis*) was discovered in 1994, in a national park near Sydney, Australia, scientists kept its location a closely guarded secret. Just a few dozen of the trees live in the wild, and before their discovery, the species was known only from fossils millions of years old. The Australian government restricts visits to the site, and some scientists were even brought there blindfolded.

Researchers rarely go to such extremes. However, botanists often play it coy in their publications. Mr. Bailey says, “Nowadays people are very guarded as to giving location other than a very generalized statement.” Other researchers object to withholding information in articles. W. John Kress, a research scientist and chairman of the department of botany at the Smithsonian Institution’s National Museum of Natural History, points out that habitat loss threatens far more plant species than does poaching. “One hundred years down the line,” he says, “when these habitats are destroyed anyway, having the records of where these things were scientifically will be very important.”

The animal scientists who published the letter in *Science* concur. “I believe very strongly that the conservation benefits far outweigh the potential detriment,” says Bryan L. Stuart, the lead author of the letter, who defended his Ph.D. thesis last month at the University of Illinois at Chicago. He described a new salamander that quickly appeared in the exotic-pet trade. In most countries, legislation to protect a rare species requires that it have a scientific name and that the government know where the species occurs.

What’s more, even if they don’t plan to sample the organism, scientists studying the species need to know where it lives (or lived) to determine how it evolved and adapted to its environment, among other things. Rogerio Bertani, a tarantula expert at the Butantan Institute, a biology and biomedicine organization in São Paulo, Brazil, agrees, even though Brazilian officials once caught smugglers with copies of his papers.

Dr. Grismer, who discovered the gecko, imagines taking matters into his own hands. “I fantasize that just one time I’m going to find one of these guys” taking a rare animal, he says, “and I’m going to make an example of him. I may end up in jail, but it would be worth it.” Of course, he realizes that violence would not solve the wildlife-smuggling problem — and neither would policing the areas, which costs too much for even the United States to eliminate poaching from its national parks. “The best thing I can come up with is an imperfect solution,” says Dr. Stuart. He recommends that taxonomists delay publishing their finds until they have worked with the government of the country where the animal was found to develop laws to protect it.

Internet Insecurity

Once researchers describe a species, the information often goes into online databases, which provide an even bigger security risk.



RICHARD L. PYLE

Centropyge boylei occurs at depths of nearly 100 m near the Cook Islands in the South Pacific. Unlike other species featured in this article, it is not in any way threatened by commercial harvesters, and indeed was brought to the attention of scientists with the help of a commercial harvester. Fortunately for the fish, its habitat is out of reach of most divers.

Finding articles in obscure research journals takes some hunting by poachers, but anyone with an Internet connection can check the online archives at many institutions, finding the origins of the plants and animal species in their collections.

Scientists treasure that kind of easy access. For instance, combining data from an entire region with past records of plant ranges should help scientists predict how climate change could affect plant populations, says Zack E. Murrell, an associate professor of biology at Appalachian State University and director of a database organization called the Southeast Regional Network of Expertise and Collections. But curators of herbaria are debating how much data to reveal online. "It's very ad hoc," says Richard L. Pyle, an associate zoologist in ichthyology and the database coordinator for natural sciences at the Bishop Museum, a museum of natural and cultural history in Honolulu. "Every scientist and institution makes up their own approaches as they go."

Arthur D. Chapman, an independent scientist in Queensland, Australia, hopes to get more scientists talking about the issue. This spring, under the auspices of the Global Biodiversity Information Facility, an international organization trying to provide online access to biodiversity data, he conducted an online survey of people who worked at botanical and zoological collections. He found that most of the 102 who responded said they did restrict access to sensitive data in their publicly accessible data sets, using a variety of methods. He plans to publish the results of the survey and hold a workshop about them.

Working Together

While many scientists fight commercial collectors, some researchers have taken a more cooperative approach. Dr. Pyle has found collectors in his field friendly and useful. He studies coral-reef fish. When an aquarium-fish collector finds an unusual animal, he says, "in almost every case they've deferred to science instead of making a quick buck" by selling their specimen. The money is no small potatoes: "Some collectors spend literally \$10,000 for a single fish," he says.

In the late 1980s, a collector named Chip Boyle described to Dr. Pyle two rare species that he had seen while scuba diving off Rarotonga in the Cook Islands. He invited Dr. Pyle to see them, stay in his house, and use his boat. The brightly colored species turned out to be new to science, and Dr. Pyle described them in the scientific literature, naming one *Centropyge boylei* after the aquarium-fish collector. He also discovered a third species while visiting Mr. Boyle.

With all three fish, Mr. Pyle had no qualms about describing their location. "You have to have high-tech equipment to go to that depth," he says, since the fish live some 300 feet below the surface. Besides, he says, "they're the most abundant species down there." But he acknowledges that terrestrial species are another matter. When people discover new fish species, he says, they usually reside in an unexplored area or deeper in the ocean than taxonomists had looked before. "Usually the species is very abundant wherever it lives," he says. On dry land, different rules



BRYAN L. STUART

Paramesotriton laoensis, known only from two streams in Laos, is being exploited before we have any idea how abundant it is.

apply. For both animals and plants, says Dr. Kress, of the Smithsonian museum, “99 percent of the common stuff has already been found, so it is going to be things that are inherently endangered and rare that are discovered and described now.” And unfortunately, that very rarity can drive the exotic pet or plant trade. “It’s like rare art collectors,” says Dr. Stuart. “The rarer a piece is, the more desirable it is.”

Too Much Information

Scientists who find a new species of plant or animal face a difficult choice. If they follow scientific procedures and publish the precise location of their find, that new species may soon be snatched up by collectors, who are always looking for rare organisms. Here are tales of three newly discovered species.

Bryan L. Stuart was horrified this year to find that a large, colorful, warty salamander, which he had first described in the scientific literature in 2002, was for sale online. He eventually



HANS-JÜRGEN BRÄUER, WWW.THEAMATELURSDIGEST.COM

A “living rock” cactus (*Ariocarpus bravoanus*) survived unmolested for a decade after its discovery in 1992. Poachers since discovered where the species grew. Today, these cacti are virtually extinct.

found out that German and Japanese collectors had hired local people in Laos to collect the salamander, called *Paramesotriton laoensis*, from the two streams where the amphibian lives. “It has a very restricted range,” says Dr. Stuart, a research assistant at the Field Museum in Chicago. “It’s being exploited before we have any idea how abundant it is.” Dr. Stuart fears his paper in the *Journal of Herpetology* led the smugglers to their treasure. “All that’s been published is what’s contained in the original description,” he says. The collectors may take so many animals that the species will be in danger. “It’s very sad for the salamander,” he says.

A “living rock” cactus species survived unmolested by thieves for a decade after its discovery. The cactus, *Ariocarpus bravoanus*, which blends in with its rocky surroundings in Mexico, was described in 1992 in a scientific journal, with only vague details of its location. But poachers later discovered the site and by 2002 had removed almost all of the plants. Scientists discovered two new sites where the cacti grew and did not publish their locations, but when Geoff Bailey, a cactus enthusiast from Britain, visited in 2003, he and two others could not find a single plant. “To all intents and purposes,” he says, “it’s virtually extinct.”



ENICA MORON

A new “slipper orchid” (*Phragmipedium kovachii*) was first brought to light by a commercial dealer, who smuggled it into the United States and made it available to scientists. Within a year of its formal description, signs of poaching were prevalent throughout the species’ habitat.

The 2002 discovery of a new “slipper orchid,” *Phragmipedium kovachii*, in Peru set the orchid world buzzing — the deep-reddish flower was twice the size of most other slipper orchids, which feature flowers with pouches. But that was not all that got people talking. The plant was first brought to light by a commercial dealer, who smuggled it into the United States and made it available to scientists at the Marie Selby Botanical Gardens, in Sarasota, Florida. The dealer and the gardens were eventually fined for illegally importing and possessing the rare flower. A year later, an orchid expert visited the region where it lived and saw signs of substantial poaching. Four locations were totally stripped of the plants, and at one site, he found seven large sacks stuffed with the orchids.