



Mongabay Series: **Almost Famous Animals**

Resurrected Jeypore ground gecko faces second death sentence

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*Life isn't easy for *Geckoella jeyporensis*: once thought extinct; now known to occupy a mere 20 square kilometers in India's fragmented, developing Eastern Ghats.*

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- *In India – a land that's home to the regal tiger, the majestic elephant and the flamboyant peacock – gaining the Endangered Species spotlight can be difficult. Equally challenging in a land with 1.3 billion mouths to feed, is the conservation of habitat that is vital to threatened species.*
- *The Jeypore ground gecko (*Geckoella jeyporensis*) was first noted in India's Eastern Ghats in 1877, then not seen again and presumed extinct. Rediscovered by scientists in 2010, it exists in just two known areas covering a mere 20 square kilometers (7.7 square miles) of degraded habitat threatened by development.*
- *Conservationists are working with the public and private sectors, and with local communities, urging the creation of "gecko reserves" to protect *G. jeyporensis* as well as the golden gecko (*Calodactylodes aureus*). But whether these little reptiles will inspire enough public enthusiasm is anyone's guess.*



*The Jeypore ground gecko (*Geckoella jeyporensis*) was rediscovered by researchers after an 133 year absence, but was quickly listed as Critically Endangered by the IUCN due to severe threats to its habitat. It is endemic to India's Eastern Ghats. Photo courtesy of Ishan Agarwal*

The Jeypore ground gecko (*Geckoella jeyporensis*) was first noted and described by a British colonel in 1877, but was not seen again for more than 130 years, and presumed extinct. Enter a team of committed scientists, who scoured the

northern hills of India's Eastern Ghats mountain range in the hope of discovering a specimen.

Armed with only the brief notes of amateur naturalist Colonel Richard Henry Beddome, the team's search paid off in 2010 and again in 2011, when they discovered the strikingly beautiful ground gecko in two locations.

Ishan Agarwal led the project. He was conducting PhD research on Indian bent-toed geckos (*Cyrtodactylus*) at the time, which include *Geckoella*, a genus of Gekkonidae found only in India and Sri Lanka.

"It turns out that most of these are undescribed species with very small ranges, and many require conservation attention," Agarwal told Mongabay.com. "All the [*Geckoella*] are relatively common, while *G. jeyporensis* had not been recorded since its original sighting and description.

"Its unique morphology and the fact that it wasn't known apart from a single specimen motivated my search. *G. jeyporensis* is unique in its dorsal scalation as well as phylogenetic position. (Morphology is the study of an organism's structure, while phylogeny refers to an organism's evolution or development.) "All other Indian species are complexes, while *G. jeyporensis* is a relict lineage found only in high elevations of the Eastern Ghats."

The Jeypore ground gecko's new lease on life was brief, however. It was quickly listed as Critically Endangered by the IUCN due to severe threats to its habitat.



The natural beauty and the wildlife of India's Eastern Ghats face an uncertain future. Courtesy of the Photography Club of Hyderabad

A tiny range, multiple threats

The gecko's range is small — estimated at just 20 square kilometers (7.7 square miles), between elevations of 1200 and 1300 meters (roughly 3,900 to 4,265 feet). The exact locale has been kept secret to prevent poachers hunting the gecko back into extinction. But the general locations are to be found in two neighboring states: Andhra Pradesh (near Galikonda), and Odisha (near the species' namesake Jeypore).

"The high elevation forests at Galikonda are highly degraded, and have been extensively converted to coffee plantations, only some of which have native shade trees," Agarwal and his team wrote in their 2013 article announcing the rediscovery. "The plantations do not seem well maintained, and there are small patches of native vegetation toward the fringes and near streams. At Deomali [near Jeypore], high elevation forests are restricted to pockets in depressions and sheltered areas, and have stunted trees, rich leaf litter and epiphytic growth.

"The forest habitats in which *Geckoella jeyporensis* was found are under extreme anthropogenic pressures. Neither area in which the new material was collected is formally protected and both have been severely deforested. Galikonda and the surrounding hills have also been extensively converted to coffee plantations, while Deomali faces grazing and fuel wood collection pressures. More broadly, the hills in Koraput District face pressures from mining as well as social forestry activities."



Note how well the Jeypore ground gecko blends into its surroundings. That camouflage helps explain its disappearance from science for so many years. Photo courtesy of Ishan Agarwal

Agarwal included a strong warning in his paper regarding the Jeypore gecko's future: "Even if it is widely distributed in the region, the potential habitat available to *G. jeyporensis* may be restricted by its presumed habitat preference," he wrote. "Deomali and Galikonda, the only localities from where *Geckoella jeyporensis* is definitely known, require immediate protection and surveys in the region are needed to determine where else [it] occurs."

Farida Tampla, World Wide Fund for Nature (WWF) India state director for Telangana, cites further risks to the Jeypore gecko and its habitat co-inhabitants: "The main threats facing the Eastern Ghats include deforestation, hydropower projects, bauxite mining and road widening," she told Mongabay. In addition, "massive impoundments that dams and their reservoirs have formed between the Andhra Pradesh and Odisha borders have submerged thousands of hectares of forests and [are] turning hilltops into island[s] and thereby isolating wild species."

Reptiles at risk

The Jeypore gecko isn't alone in its plight; 19 percent of the world's reptiles face extinction due to habitat loss and over-harvesting according to a recent study by the Zoological Society of London and the IUCN's Species Survival Commission. Additionally, global reptilian biodiversity has fallen by 58 percent since 1970, according to WWF's International's bi-annual Living Planet Index 2016.

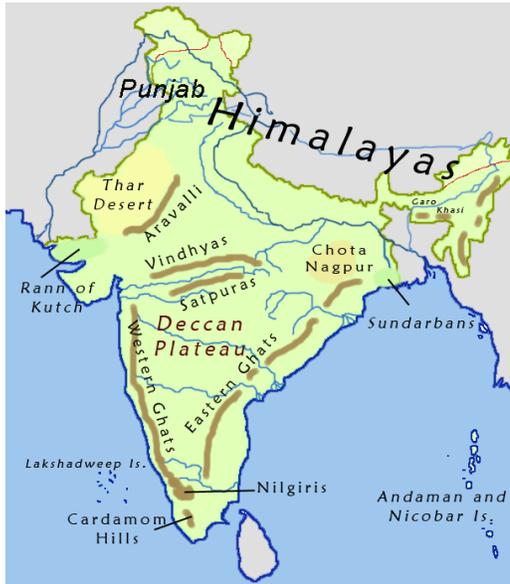
Lead author Monika Böhm notes a specific reason for these precipitous population drops: terrestrial reptiles are often restricted to limited localities due to their specialized biological and environmental requirements; they also aren't very mobile, making them particularly vulnerable to habitat degradation.

Böhm adds that, "Reptiles are often associated with extreme habitats and tough environmental conditions, so it is easy to assume that they will be fine in our changing world." But that isn't the case.

WWF director general Marco Lambertini sees this rapid decline in reptile biodiversity as a strong warning sign of a planet in peril. "The ecological footprint – which measures our use of goods and services generated by nature – indicates that we're consuming as if we had 1.6 Earths at our disposal," he said. "Lose biodiversity and the natural world, including the life support systems as we know them, will collapse."

A precarious tomorrow

The recently rediscovered Jeypore ground gecko's future



The Eastern Ghats and other hill and elevated regions of India. Note that the Western Ghats are a continuous mountain range, while the Eastern Ghats are broken by lowlands which has contributed to the region's more extensive development. Map courtesy of Wikipedia

is bound up with that of modern India; a nation of 1.3 billion people driven hard by the development-friendly policies of Prime Minister Narendra Modi. India remains a land of divisive contrasts, where progressive government plans to protect large swathes of habitat can as quickly be overturned by new government economic development plans, and/or undermined by lax law enforcement and corruption.

Sharing many floral and faunal elements with sister ghats to the west, the Eastern Ghats' uniqueness and biological vitality are often overlooked. The Eastern Ghats are fragmented, divided by four major rivers, while the celebrated Western Ghats — regarded as one of the jewels in India's natural crown — consist of an almost unbroken mountain landscape.



The Eastern Ghats, including the Mobile Belt geological region, are threatened by human development. Here National Highway 16 runs through Visakhapatnam in Andhra Pradesh. Photo by Adityamadhav83 licensed under the Creative Commons Attribution-Share Alike 4.0 International license

WWF's Tampal said that the 1986 rediscovery of the Indian golden gecko (*Calodactylodes aureus*), followed by the Jeypore ground gecko's more recent scientific resurrection, caused some resurgence of public interest in protecting the Eastern Ghats.

But a geopolitical realignment has generated a major conservation setback, Tampal explained. Andhra Pradesh's division into two states in 2014 — Telangana is a break-away — means that the Andhra Pradesh government is now trying to economically "catch up speed", and will be eyeing protected areas in the Eastern Ghats to meet its land, irrigation and mining needs, Tampal says. That spells more development pressures for the already besieged Eastern Ghats.

"Several researchers have begun to study the faunal diversity of this incredible region, but the [anthropogenic] threats... seem to loom larger," Tampal said.



*Researcher and conservationist Varad Giri says that *G. jeyporensis*' orangey-brown dorsum and chocolate-brown dorsal patches, make it one of the most beautiful Indian geckos. Photo courtesy of Ishan Agarwal*

As go the Eastern Ghats, so go the geckos

The Eastern Ghats and their dependent species are at equal risk if escalating development continues unchecked – representing a looming loss for scientists. “The ghats are [yet] to be completely understood in terms of [their] biodiversity, and losing this [habitat] to rapid development will be a huge loss to the country’s natural heritage, and with it some of the endemic species found nowhere else in the world,” Tampal said.

In a 2000 paper, Madireddi V. Subba Rao warned of the dire future facing the Eastern Ghats should there be no intervention by conservationists. The former Andhra University Department of Environmental Sciences chair was especially alarmed at the rate of fragmentation in recognized reptile habitats.

To counter this degradation, Subba Rao wrote, “habitat restoration needs to be a vital component of forest management programs to improve reptile habitat, help ensure a balanced ecosystem, conserve natural flora and fauna and serve as a model for other regions”.

Agarwal worries that if no proactive conservation plan is put in place soon for the Jeypore ground gecko, it will face a tough climb back from the brink of extinction: “[T]here is no understanding of its ecology and distribution, and it is likely that the species will not persist indefinitely in these marginal habitats.”

The future is uncertain for the Golden gecko as well. Long considered extinct, it was rediscovered in 1986. Though now categorized as a species of Least Concern, the IUCN notes that its habitat faces several site-specific threats. Zoologists argue that the Golden gecko’s conservation status needs to be revisited, as its existence is under threat from new development projects.



Dr Varad Giri was awarded a Wildlife Service Award for his commitment to effective conservation strategies for India's less famous creatures.

Photo courtesy of Varad Giri

Urgent need to create “gecko reserves”

Agarwal argues that official habitat protection is needed now to ensure the survival of the region's unique geckos. And there are precedents for such protections: the Indian Forest Act allows central and state governments to designate natureland as “reserve forests” (as a tiger reserve, for example), or as “protected forests,” which either restrict or limit activities permitted within their boundaries. These protection orders can easily be overturned, however, as seen in the case of the Ken-Betwa River Link project and the proposed destruction of the Panna Tiger Reserve.

Tampal urges a public private conservation partnership: central and state governments, industries and local communities have an equal stake in, and are equally responsible for, ensuring the protection of the Eastern Ghats, with its unique mountain chain and endemic animal inhabitants.

She noted that the Andhra Pradesh government has moved swiftly in the past to designate protection areas for more charismatic fauna. “Protection of environment, forest and wildlife is enshrined in the Constitution of India and the government will have to continue to be the main player in species protection,” Tampal said. “However, the focus will need to not only be on the larger and well-known animals. Even the lesser-known animals are under greater threat, and the government will have to put together species recovery plans for many of these species.

“People, especially those living close to wildlife, have always been an important constituency in the protection of wildlife,” she added. “They will need to be incentivized to ensure that they continue to be equal partners in protection, and at the same time ensuring that these forest people are also able to live a life of dignity and self-respect.”

Avoiding gecko Armageddon

Despite the many challenges, Agarwal has some optimism for the future of the Jeypore ground gecko and for the Eastern Ghats, suggesting that if the reserve forests where *G. jeyporensis* now resides remain forest, then there is hope.

“The good thing is the species is also found in degraded habitats and coffee plantations,” he explained. “If key reserve forest areas are protected, and some simple measures followed in coffee plantations, it is likely we can save this species.”



Neither of the two Eastern Ghats locales where the Jeypore ground gecko was rediscovered are formally protected, and both have been severely deforested. Photo courtesy of Ishan Agarwal

WWF India CEO Ravi Singh emphasized that the gecko's local problem has a global and national source: that unless the world's and India's consumption patterns are examined and sustainable agricultural practices adopted to decrease the anthropogenic impact on the planet's biodiversity, then many species, including the gecko, will be lost.

Tampal is more blunt: "It is the more privileged, and those living in the city, who will need to be shaken out of their inertia, to become less consumerist and bring about a change in their lifestyle, be less wasteful of resources and to contribute to species protection." But how to remind coffee drinkers each time they sip a cup of the caffeinated Indian brew that geckos are threatened by the habit?

Local advocacy is critical too, which is where scientists like Varad Giri come into the picture. An unsung hero of conservation, according to Sanctuary Asia, which bestowed a Wildlife Service Award on him last year, Giri was a member of the team that rediscovered the Jeypore ground gecko in 2010.

"Giri is pushing the boundaries of science, and filling the cavernous gaps in our knowledge of India's 'less charismatic' species," Sanctuary Asia wrote. "This enables us to formulate effective conservation strategies. He was especially praised for his ability to spread enthusiasm for conservation and a willingness to share knowledge with a new generation of researchers.

"Highly skilled and regarded, he prefers to work in the background and is little known to the public, though people involved with the study and conservation of amphibians and reptiles are in awe of his achievements, and for them he is already something of a celebrity."

Without committed local conservationists like Giri, along with global champions, the Jeypore ground gecko and its reptilian cousins – found only in the Eastern Ghats – will surely face a quiet extinction.

Citations:

Agarwal, I., Dutta-Roy, A., Bauer, A.M. and Giri, V.B., 2012. Rediscovery of *Geckoella jeyporensis* (Squamata: Gekkonidae), with notes on morphology, coloration and habitat. *Hamadryad*, 36, pp.17-24.

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