

Climate Emergency

Researchers debunk 185-year old name mix-ups in snake species

This is a Suno India Production and you're listening to Climate Emergency

Scientists discovered a new snake species in the southern state of Tamilnadu. Enthralled by this new discovery, researchers jumped on to their next task- well, that's naming the snake! But hey, it's not an easy thing to name a snake. Let me tell you why. The researchers have a specific process for scientific naming of the species. First and foremost, the snake has to be described. And for that, the snake needs to be looked at in greater detail. It was also important to look at the closest family it is associated with. In this case, the new species was said to be similar to banded racer, a widespread species in India.

Hi, this is Sharada Balasubramanian, and I'm doing this podcast for Suno India.

So, the work began as a simple species description project in late 2016, however; later researchers realised that the Banded racer had a complex taxonomic and nomenclature history. And, a simple description paper grew into a revision, said Deepak Veerasamy, the primary author of the paper, who works at the Natural History Museum.

I spoke to Surya Narayanan, researcher from ATREE, and also one of the co-authors, to know more about this project.

Surya Narayanan: The whole India has banded racer and parts of Pakistan also. So then we had to compare the compare our new species with the previously described banded racer. So, usually, the usual processes, when you have a new species in the hand, you you know, what is the close relative to it, or what it is previously confused with? You have to compare your species with the already available one. So you have to make the type types specimens for all the species. So you have to check the type specimen and see how yours is different from that. So you have to check the previous description or the type specimen if you can and all that.

So, the researchers went to the next step of describing the snake. During the description process, when the researchers were writing some other parts of the paper, they get an email from Frank

Tillac, a German collaborator, and co-author of this paper and he said, hey, stop this work, there is a huge mess.

The entire confusion here was the new snake's similarity with banded racer. The researchers, then, got to the Banded racer's description first, and then compared it with the newly found species. The description of banded racer was done on the basis of snake skins collected in 1796, which are now in the museum's collections in London.

So here's what the mess was all about. What happens is in the year of 1856, Albert Gunther, an English scientist makes a catalogue describing snake species based on the collection at the Natural History Museum. So Gunther, instead of writing 21, cites plate number 29, which is actually a wolf snake, not a banded racer. Both these species were mixed up. Frank Tillac noticed a mismatch in the common names on the paintings and the literature. Over weeks, through emails and independent opinions from experts, discussions of these new findings went on.

So, in this case, historical archives from museums helped in sorting this confusion. How were these snakes collected in the past, how were they illustrated, Surya takes us back in time.

Surya Narayanan: So what happened is initially when Brits and during the colonial era, and people started describing species, not everybody had type specimens. So there was one concept called iconotypes types. People want to draw them, they do illustrations, okay, you don't have a physical specimen as such. But so your description will be based on an illustration, you would have got a specimen, and you would illustrate it. Either you will describe it based on the illustration or somebody else will describe, describe it based on the illustration. Right. So there's one fellow called Patrick Russell. So he lived around in Vizag why's that for a long time. He lived around 1700s- 1750s to sound in 1780 or something. So he had collected a lot of specimens around the coast, mostly around the Coromandel coast and he had got specimens from Arni, he got specimens from Tanjavore.. a lot of places like he may not have gone and gone all these places, but he would have given specimens. It was very common. There were jugglers they collect it and sell it to their Brits. So they get some money. This Patrick Russel, what he did is he is the first one to put a lot of illustrations together, like scientifically, and we call him father of Indian ophiohology. Okay, yeah. So he had made a lot of illustrations, a series of illustrations and

with short descriptions, but he did not assign a scientific name to any of this. Okay, so he just made illustrations gave regional names and data about like how local people call it and what are some myths about it some all that information he had given.

Ophiology here refers to the study on snakes.

Deepak and his colleagues also looked at a series of natural history paintings produced in 1836 by a Danish physician, zoologist and botanist, Theodore Cantor. Cantor was working for the British East India Company. And he was the first western scientist to collect and scientifically describe many species like the King cobra, Cantor's black headed snake, Northern snakehead, Lesser black krait, Chinese Cobra, etc. He also collected paintings of many of these animals, including snakes. These are now at the Natural History Museum and the Bodleian Library in Oxford University.

The research team studied these images from Cantor in greater detail. And these paintings are so detailed that even the number of scales on the snake's heads can be counted. And this can clearly differentiate two different species.

Deepak, through a series of analysis with the paintings, illustrations and snake skin collections concluded that none of the skins collected in 1796 were from the banded racer, but instead belonged to a completely different species called the wolf snake. He told me - and I quote- We summarised data for 50 individuals of banded racers across its range and 11 different individuals of the new species. We show that these two species are clearly distinct in scale arrangements, colour pattern and have genetic differences. All the molecular lab work for this study was done while Deepak was in India, so there were no issues there. However, access to collections became tough. He had to wait for six months during the lockdown but eventually got access to the museum collections through his colleagues in London.

Surya Narayanan: Only after fixing both of these issues. Our route got cleared, only then you can describe your species when the other species is if you can't do it. It started off with one species description then we got into trouble and then we stepped in to resolve the whole mess.

With this research paper, the banded racer and the new species received new names. The new species found in Tamilnadu was named Joseph's Racer after Naveen Joseph who worked on this species and passed away.

And the entire effort was supported by Kristin Mahlow from the Berlin museum and German researcher Frank Tiller, among many researchers and experts.

Host: So, I just want to ask this out of curiosity. You know, such colossal mistakes like misnaming or mistagging a species, how does it impact conservation?

Surya Narayanan: It impacts a lot. You completely misidentified one species for a long time. Right. So mislabelling makes a lot of problem, these things will not directly impact conservation as such. These are just nomenclature issues, just how you address somebody's going to call the person with the right name or wrong name but you don't, you don't fail to acknowledge the presence of the person. These guys are here to shift and that is completely fine. But in the past, there are instances where people take specimens from one place and wrongly tag it. That would create a lot of mess. Some person had taken a normally collected one specimen from here and wrongly tagged saying someplace in central India. So now you have this, your distribution goes until central India, right? And if this fellow, this person is not alive anymore, imagine 100 years before how are you going to cross confirm it- you can't. The only option is you have to trust it. Otherwise, proving the absence is very difficult, can't prove them. Wrong tags, like that is a huge problem. Wrong names, these are nomenclature issues, that we keep fighting with each other. Right, and this doesn't impact conservation as such.

How has the research and evolution of modern science helped conservation? To know this, I spoke to renowned herpetologist Varad Giri.

Varad Giri: And taxonomy is the basic science. Its a fundamental science, no, right. Because it gives the name and the division starts with that anything related to research or conservation, it starts with the name, then that science is really very crucial in that way very vital in that way. Yeah. So what is happening now, there because of this modern techniques, filogenetics and everything, right, our understanding of conventional taxinomy changing quite drastically, and see science is dynamic, things do change know what we used to think earlier today, that is not the

case. Okay. Earlier, two species, were supposedly two species because they had those typical morphological characters and so on and so forth. But now, with the advent of this DNA, we started understanding their evolutionary trajectories, they also started looking at you know their your evolutionary thing, and that is changing our understanding of taxonomy as well, that is changing like the taxonomy. So, quite a lot of changes are happening now.

Also, what the study brought forth was the need for museums for future reference. When I spoke to Deepak, he told me that this work was possible only because of the old collections kept in the Zoological Survey of India, Calcutta and Bombay Natural History Museum in India and several other European museums.

Two years into the study, Deepak and his team managed to find two specimens at the natural history museum in Vienna which matched with the new species which was found in Tamil Nadu. These two were collected in Salem in the 1870's.

Museums played such a crucial role in demystifying this mix-up, but how much of an importance or thrust are we giving to setting up a good museum?

Host: Considering that India has so many, the wealth of pieces that we have, don't you think we should have like a kind of museum that's really one of its kind?

Varad Giri: But considering I mean, it's just coming very randomly considering that India has so maybe the wealth of species that we have we don't you think we should have like, we could have a kind of museum? That's really one of its kind like? We are a country, which we proudly say that we are a battle that rich countries in the world, right, but the best museums, are there in the countries where there is no biodiversity. Absolutely Absolutely. They have the repositories, they have everything like go to NHM Natural History Museum, London, right. See one thing what I realised is we've taken our biodiversity for granted. For us all that it is there, No, we are not concerned about it. But those people value it because they don't see it on regular basis. For them, everything becomes really very important.

Deepak says that museums are somewhat similar to libraries. Like many books which are out of publication which are now only found in libraries there are several lesser known species which are known only based on museum collections. These are invaluable information on biodiversity.

One does not have to collect everything and preserve it in a jar but many road-killed specimens could be useful for future taxonomic research. Such studies help indirectly in conservation of an area, for example only when we understand the true diversity and rarity of species in a given area we could plan how to conserve them.

In India, we have few old museums, like the Zoological Survey of India and Bombay Natural History Museum, which also have some important specimens. However, Deepak said that we could certainly improve the quality of repositories in India to have temperature and humidity controlled environments to store the specimens. This would help in maintaining the conditions of some of the specimens which are 200 years old.

From history to modern science, to now- where are the new species, Joseph's Racer located? And how much do we really know about this snake? Surya has the answers.

Surya Narayanan: Yeah, natural history very little information is available -it is non-venomous, terrestrial and ground dwelling. They don't climb is what we all believe. If you look at the whole distribution, they are mostly in the rainshadow regions of Western Ghats. If you are travelled down to South- Tirunelveli. Madurai open grasslands, right, they are found there, the rocky scrubby open outcrops. Yeah, they've all found a we've never seen them in the woody habitat never. And it's always in the open lands and like somewhere near some mess, you find them inside. Quite rare, not very common too. So, that also makes the habitat restricted. If you come towards the eastern Tamilnadu, like Pondicherry, Cuddalore there are no woods now, like, it's mostly plantations and all that, but if you see the middle central from Madurai, Karur, down south, it's all the grassland and then in the rainshadow regions of Western Ghats. This snake is very much restricted towards that specific habitat.

And even before the researchers could find out more about this snake, the habitat now seems to be fast disappearing. Surya tells us more.

Surya Narayanan: However, now these very habitats where the snakes were found are going for a toss. The grasslands are completely changing. So I was doing my research on the grasslands in south of Tirunelveli and parts of Kanyakumari. So I was studying with ATREE in 2016 and 17. While I was studying, there's one community grazing community called kona community. So

they graze sheep, a rare breed of sheep they keep traveling, as the sheep can't stand in one place. So they have to keep walking all day. So they travel a lot and all these grasslands in Tamil, it's called meykkal porambokku or mandhai porambokku. Either grasslands given only for grazing. You can't convert technically, according to the gazette of India, these are mandhaipurambokku, grazing wastelands, not even waste lands- just lands. But there are a lot of loopholes here and there. So these great grazing lands are actively converted into plantations because of availability of water now. Earlier, they never had technologies to water. Now you have drip irrigations. So availability of water is increased, also there is river linking issue. In Tirunelveli, there's a place called Kennedy canal from this canal they're moving surplus water to the dry regions, which is the Peykulam and all these regions. So when this place gets water, of course, they will do farming. So, these habitats are going for a toss and that is one thing.

Now, there are more plantations there. The grazing land is given to companies which not just take away the habitat of species, but also, snatch away the grazing land for people, and in turn, impact their livelihood. Also, when there is monoculture, and when the entire land is filled with one plantation, the prey base also changes, the prey changes and in this case we would not know where these snakes would go. Active cultivation of dry areas is a mess. More surveys would be needed to know about the impact. You are not directly killing the snake as such but by killing the prey habitat, you are going to kill these snakes too. So that is another thing to worry about. Currently, this habitat is under a huge threat.

Varad Giri: We have, like, discovered the species, but then how we don't even have much information about it. And then conservation is another big question because the habitat is getting lost. So how do researchers, you know, kind of work in this kind of situation and how do you think, I mean, people have been lobbying and all that, but much not much to, you know, success. So what do you think in this kind of situation, how can conservation efforts go? I think we need to work with people we need as many people as possible. Today, right. Like at the end of the day, we need to correlate that particular animal with the local people also Now we need to tell them that this is your species, these are the things which are occurring in your landscape. That is something which is really needed one more thing, which is totally needed is a strong, strong political support. Look at Maharashtra. Because how many new conservation reserves got declared here, what are the new things that are happening? Very good things are happening

pertaining to biodiversity here. And probably the credit goes to the government because they are interested in doing all these things, you know, and we need to motivate the government also in that direction. So I think we need to work very hard. See, we are losing, we are fighting a losing battle today. At the end of the day, the way things are happening. So we are on the verge of our own extinction. And along with that we are finishing everything knows that it true The thing is, work with people try to convince people try to encourage people. We need to work at the grassroots level, we need to work with people. No, absolutely have to know we have to change our attitude towards the species we describe as well.

Thank you for listening to this episode of Climate Emergency. You can listen to more episodes on our website sunindia.in or any other podcast app of your choice.