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Scientists think theyve solved a 99 million-year-old fossil mystery – Inverse

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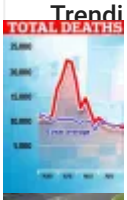
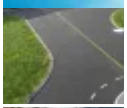
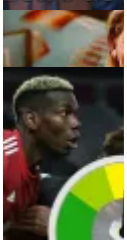






In 2016, researchers announced a landmark discovery made at a site in Myanmar: They had found 99 million-year-old chameleons, preserved in amber.

Fossils preserved in amber offer a far clearer glimpse at the ancient animal world than fossils embedded in rock or individual bones, but that doesn't mean mistakes cannot be made.

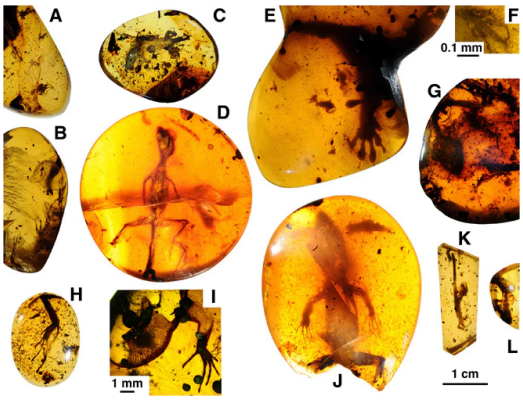
Now, a new paper published Thursday in the journal *Science* reveals the original study's researchers have a confession to make: These are not chameleons.

In fact, they are something else entirely.

Identifying a fossil animal's species is a complex process at best. Especially when you're deal with 99-million-year-old fossils preserved in amber.

Juan Diego Daza is an assistant professor of biological sciences at Sam Houston State University and was the lead author on the 2016 study. Published in *Science Advances*, Daza and his colleagues reported the discovery of a dozen amber-bound fossils from Myanmar dating back mid-Cretaceous period.

Amber is "good for trapping small and elusive animals that you won't be able to find under oth methods of fossilization," Daza tells *Inverse.* "These animals are so small that their chances o being fossilized with other methods — for example, normal, hard-rock fossils — would be very difficult."



Amber is also great for trapping other objects that can yield important clues to these animals' environments — a single grain of sand may reveal a beach habitat, for example, while a chance fly may suggest the fossilized animal's preferred prey.

But amber is no snow globe. With its dark, variable orange hue and rounded form, amber visually distorts the things it contains, making it difficult to easily identify details about the animals preserved within. This is made even harder when handling juvenile specimens, the bones of which would not have been fully developed when they were trapped.

Cut back to 2016. Daza and his colleagues were fairly confident that one of the fossils they fo — which sported a nifty tongue bone — was an ancient chameleon.

It turns out that they were wrong.

Forensic fossils — After publishing the 2016, Daza got a call. Another paleontologist, Susan Ev had some bad (and good) news: Daza's chameleon was in fact a long-extinct species of amph — *albanerpetontids*, also known by the cute moniker "albies."

"The *albanerpetontids* — they're very unusual amphibians," Daza says. "In a way, the body shap similar to a salamander in the sense that they have four legs. And they have a tail — somethin that other amphibians that are alive today [don't have]."

> "Maybe, some day, someone will discover one in a lated jungle in Borneo or someplace in the world where nobody has gone before."

"*Albanerpetontids* share with chameleons a unique bone in between the jaws, that's basically a bone that supports the tongue. And that is very similar in both groups," Daza says.

To complicate matters, at the time, the majority of albie fossils had been found in Europe or North America, not Asia. Daza was left unsure what they had found, until he got an unexpected breakthrough in 2018.

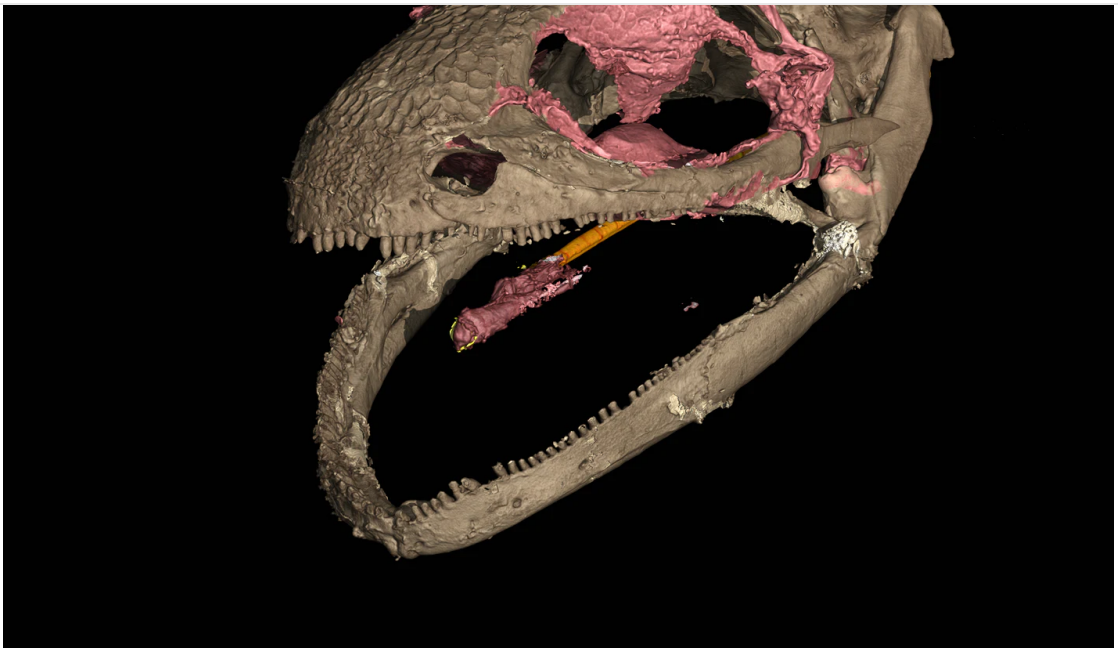
At the end of 2018, Daza received an email from gemologist Adolf Peretti that would change everything. Peretti had 60 vertebrate fossil samples from Myanmar, and Daza suggested Pere a CT scan of the entire collection to better identify key details in the fossils.

The results turned out to be a boon for Daza — Peretti found a well-preserved adult albie spec in his collection.

Comparing the juvenile in their study to Peretti's adult specimen allowed Daza and his colleag to make key updates to the 2016 study.

They identified these fossils from Myanmar under a new genus and species: *Yaksha perettii*, named not only for Peretti, but also Hindu spirits, or yakshas, which are associated with natur

In other words, Daza and his colleagues might have got the species wrong. But what they hav instead discovered is perhaps the oldest example of a projectile tongue discovered in nature.



Scans reveal the albie's skull structure in detail.*Daza et al, Science (2020)*

Waiting game — The albie's fast-moving "ballistic" tongue means it was likely a "sit-and-wait predator," according to Daza.

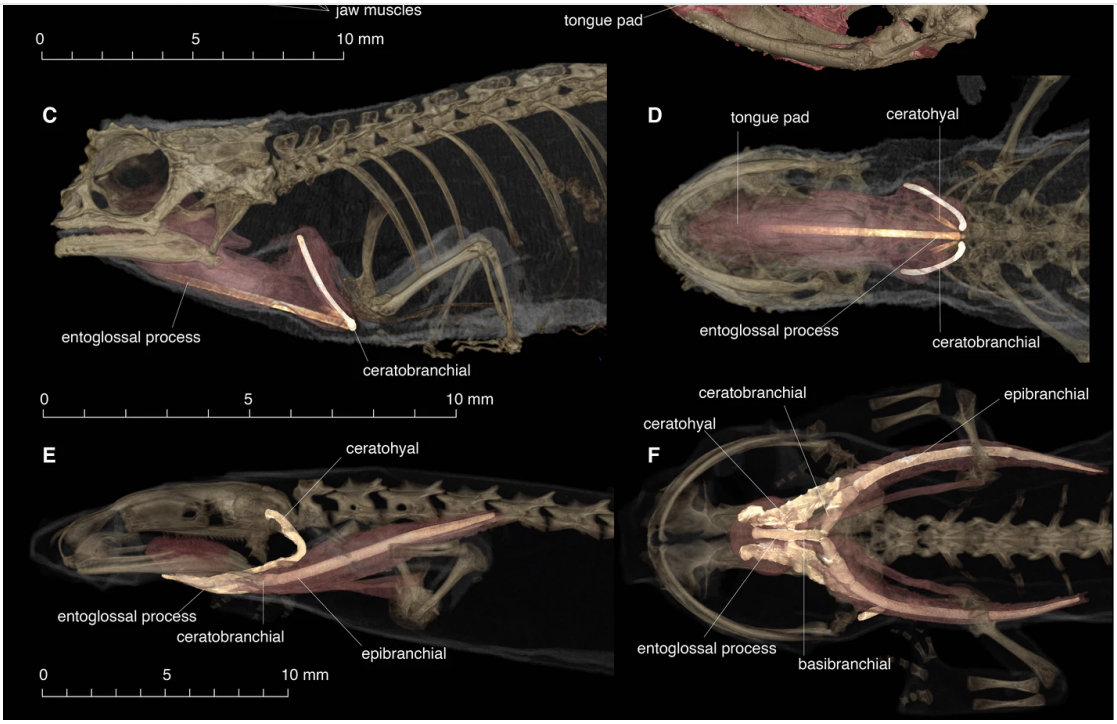
"They remain steady until a prey approaches and when the prey is in the range of their tongue, will shoot at the tongue quickly. And, usually, the tongue is sticky at the end. And that allows t to engulf the prey and drag it to their mouths," he says.

But why does a chameleon, a reptile, share such a similar feature to an albie, an amphibian? It due to convergent evolution, Daza says.

"It's a process in biology that we call convergence. It's basically when two or more groups dev similar traits to perform the similar function," he explains.

"It's the first amphibian of this group with such a good preservation, so it helped us to underst better the anatomy, and helped us do something that's almost impossible to do with many fos to do a bone-by-bone analysis of each one of the bones that formed the skull," Daza adds.

The researchers also formed a better understanding of the creatu velopment. For exan seems like albies don't necessarily have a larval stage, like a tadpole does before it becomes adult frog.



Albies share a similar 'slingshot' tongue to modern chameleons, the study suggests. *Daza et al, Science (2020)*

"If this is a juvenile, and then this is an adult, we suspect, for example, when they hatch from t eggs, they are already almost formed. The lack the larvae stage that other amphibians might h says Daza.

Albies had a long reign; the species existed for at least 165 million years and reportedly becam extinct only two million years ago, leaving behind no living descendants today.

But is there a small chance that the albie may not actually be extinct, but is actually out there, waiting to be found? It's actually *not* that far-fetched an idea.

"We don't know. Maybe, some day, someone will discover one in an isolated jungle in Borneo o someplace in the world where nobody has gone before," Daza says.

> **Abstract:** Albanerpetontids are tiny, enigmatic fossil amphibians with a distinctive suite of characteristics, including scales and specialized jaw a neck joints. Here we describe a new genus and sp of albanerpeto represented by fully articulated and three-dimensional specimens prese

projecting tongue of chameleons. Our results thus suggest that albanerpetontids were sit-and-wait ballistic tongue feeders, extending the record of this specialized feeding mode by around 100 million years.

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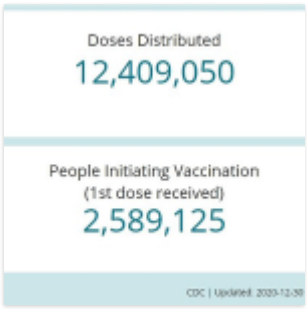

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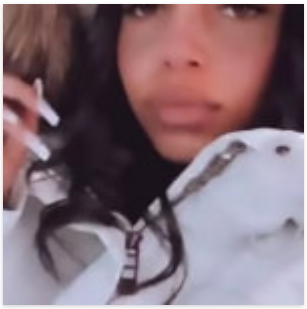

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