

What Shared Ancestry Actually Predicts

A research spotlight comparing gargoyle and crested geckos

The Question

The gargoyle gecko (*Rhacodactylus auriculatus*) and the crested gecko (*Correlophus ciliatus*) are close relatives that evolved on the same island, New Caledonia, in overlapping humid forest habitat. They share a similar diet, similar temperature and humidity needs, and a similar climbing lifestyle. If two species share so much ancestry and habitat, how much of their day-to-day biology should we actually expect to match — and where should we expect it to diverge?

What Shared Ancestry Predicts Well

Traits shaped by shared environmental pressures tend to converge across closely related species living in the same habitat. Both gargoyle and crested geckos are humidity-dependent, arboreal, and crepuscular to nocturnal — all traits well explained by a shared forest habitat and shared evolutionary history. Diet is a strong example too: both species do well on the same style of powdered meal-replacement diet, because both evolved as opportunistic omnivores taking insects, fruit, nectar, and sap in the same kind of forest.

Where Close Relatives Still Diverge

Shared ancestry does not guarantee identical traits, especially where a specific adaptation has a narrow, specific advantage that not every member of a lineage retains. Tail regeneration is the clearest example in this pair: gargoyle geckos retain the ability to regrow a lost tail, while crested geckos lost this ability at some point in their evolutionary history. Toe pad structure is another: gargoyle geckos rely on claws, while crested geckos evolved adhesive lamellae for climbing smooth surfaces. Neither difference is explained by habitat alone — both point to specific evolutionary changes that occurred after the two lineages split.

Why This Matters for Comparative Biology

Pairs of closely related species that share a habitat but differ in a small number of specific traits are valuable to biologists precisely because they let researchers hold most variables constant (habitat, general body plan, broad diet) while isolating the effect of the traits that do differ. This is part of why herpetologists studying tail regeneration, toe pad evolution, or the genetics of colour and pattern variation in geckos often compare gargoyle and crested geckos directly — the similarities make the differences more informative, not less.

A Question for Further Thought

If a trait like sticky toe pads offers such a clear climbing advantage, why might a species like the gargoyle gecko not have evolved it too, despite living in the same trees? Consider what trade-offs a trait might carry beyond its most obvious benefit.