Snakes mimic extinct species to avoid predators

Scarlet kingsnakes in North Carolina have evolved to more closely resemble a poisonous lookalike no longer found in the area.

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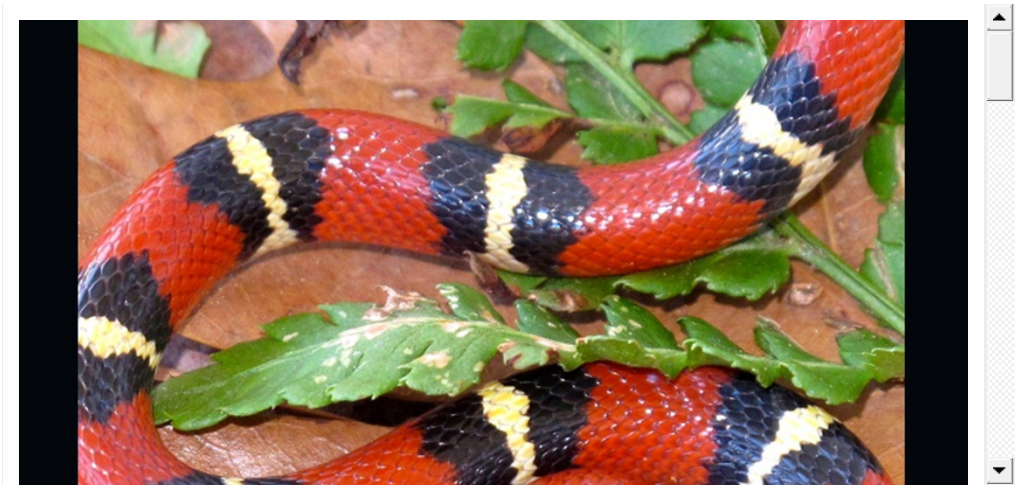
11 June 2014



Scarlet kingsnakes are chasing an evolutionary ghost. In North Carolina's Sandhills forest, the harmless snakes have evolved to better resemble a poisonous species that vanished from the region more than 50 years ago.

The scarlet kingsnake, *Lampropeltis elapsoides*, copies the stripe patterns of deadly coral snakes, *Micrurus fulvius*, so well that people use mnemonic rhymes to tell them apart, such as: “If red touches yellow, you’re a dead fellow; if red touches black, you’re all right, Jack.” The species live side by side across much of southeastern North America. The scarlet kingsnake uses mimicry to dupe predators, such as red-tailed hawks, keen to avoid attacking the venomous reptile.

The Sandhills, a pine and oak forest in the eastern Carolinas, were once home to both snakes, but coral snakes disappeared from the area in the 1960s, says Chris Akcali, an evolutionary biologist at the University of North Carolina in Chapel Hill. He and his colleague David Pfennig are interested in how biological mimicry evolves, and they wondered whether the extinction of coral snakes would influence the colour patterns of scarlet kingsnakes.

To find out, Akcali and Pfennig compared scarlet kingsnakes from the Sandhills collected over the 40 years after coral snakes went extinct, and compared them to kingsnakes from the Florida panhandle, where coral snakes still slither. They expected that the Sandhills scarlet kingsnakes would have started evolutionarily drifting and looking less and less like coral snakes.

“When I went and collected the data, I looked at it and said, ‘This can’t be’,” Akcali says. The kingsnakes from the Sandhills that were collected in recent years tended to more closely resemble coral snakes — with red and black bands more similar in size — than did snakes collected in the 1970s, which tended to have larger black bands. He and Pfennig detected no such change in the Florida panhandle snakes over the same period. They report their results today in *Biology Letters*[1].

The result makes sense, Akcali says. “If you are a predator, and you’re in an area like Florida, where coral snakes are everywhere, then you should avoid anything that looks like a coral snake,” he says. “If you are in North Carolina where coral snakes are really, really rare, predators can benefit from attacking [mimics] sometimes.”

Scarlet kingsnakes in the Sandhills should eventually stop resembling coral snakes, Akcali predicts. “Presumably, at some point predators are going to act as if there are no coral snakes, and they should attack them indiscriminately.“ A shortage of prey, he suggests, could provide the spark.

But Tom Sherratt, an evolutionary biologist at Carleton University in Ottawa, is not so sure that scarlet kingsnakes’ mimicry will become

sketchier over time. “Many of the predators — especially avian ones — are mobile and may visit locations where the model is present, which might explain why selection for mimicry still lingers.”

Nature | doi:10.1038/nature.2014.15397

References

1. Akcali, C. & Pfennig, D. W. *Biol. Lett.* http:/dx.doi.org/10.2098/rsbl.2014.0304 (2014).
2. Harper, G. R. Jr & Pfennig, D. W. *Proc. R. Soc. B* **274**, 1955–1961 (2007).