Inconspicuous Lizards Evolved To Blend In

Jeff Mitton

In southeastern Colorado the Purgatoire River flows beside an extensive bed of dinosaur footprints in Picketwire Canyon. I went to see the dinosaur tracks, but the most memorable event of the trip was an encounter with a small lizard.

The trail wound over bare rock and across sandy stretches with sparse vegetation. I would not have noticed it if it had not moved. A small lizard stood beside the path, propped up against a clump of short grasses. I backed up, got down on my belly, and then crept close to get a better look. The lizard was beautifully cryptic, with stripes and blotches of grey-green on a cream background. The grey-green matched the grasses, the cream blended with the sand. An orange upper eyelid was the only aspect of the pattern that did not blend in.

The lesser earless lizard, *Holbrookia maculata*, derives its common name from a lack of ear openings, a beneficial trait for a lizard living on and digging in sand. It grows to a length of about six inches and it is prey to a variety of visual predators. Biologists have reported predation by loggerhead shrikes and burrowing owls and it is likely that many other predators, such as kestrels, hunt them as well.

If avoidance of predators is a matter of blending in, prey species with large geographic ranges may face the problem of blending in with a variety of different landscapes and colors. Lesser earless lizards occur in midwestern prairies and arid portions of the southwest and Mexico. Colors and textures of soils and plants vary extensively throughout their range, yet the lizards are cryptic wherever they live.

Initially, color and pattern variation inspired biologists to describe lesser earless lizards as several different species. Then, as biologists learned more, lesser earless lizards were described as a single widespread species with seven recognized subspecies. For example, the northern earless lizard is on the plains of eastern Colorado while the speckled earless lizard is in the extreme southwestern corner of our state.

A natural experiment is provided by the stark contrast of the white gypsum sand dunes at White Sands National Monument and the surrounding, darker desert soils. Lesser earless lizards live both on the dunes and in the surrounding areas and they are cryptic in both environments. The lesser earless lizards on the dunes are blanched, with only subtle remnants of the familiar pattern seen in populations on the adjacent desert soils. The blanched lizards were once thought to be a separate species but are now recognized as a subspecies named bleached earless lizards.

Blanched forms have developed in two other lizard species at Great Sand Dunes National Monument. Little striped whiptails, *Aspidoscelis inornata*, and eastern fence
lizards, *Sceloporus undulates*, have populations with traditional colors and patterns on desert soils and populations of blanched lizards on the dunes.

Evolution of blanched lizards must have proceeded relatively quickly, for the major development of the gypsum sand dunes occurred only 2,000 years ago. Thus, three species of lizards evolved blanched forms in less than 2000 years, but we do not know whether the transformation took decades, centuries, or over a thousand years.