

Leapin' Lizards!

Researchers provide us with everything we ever wanted to know about our bold, amusing and favorite reptile – the curly-tail lizard

BY DAVID SPILLER,
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Curly-tailed lizards are arguably one of the most alluring reptiles in the world and are considered to be an Abaconian treasure by local residents. Their large heads, robust bodies and curly tails make them quite conspicuous. However, people are most captivated by their bold, complex and sometimes comical mannerisms. Despite their popularity, there have been relatively few scientific studies on curly-tailed lizards compared to the extensive body of work on the smaller anole tree lizards also occurring in Abaco. Here we summarize what is known about their distribution, diet, behavior and ecological interactions with other species.



Leiocephalus carinatus

They belong to the genus *Leiocephalus*, containing 22 different species distributed throughout the Bahamas, Cuba and Hispaniola. The most common species in the Bahamas is *Leiocephalus carinatus*, the only one occurring on Great Abaco. Within the Bahamas there are 13 subspecies of *Leiocephalus carinatus* which tend to be larger on the northern islands than in the southern islands. The subspecies occurring in Abaco, *Leiocephalus carinatus armouri*, was intentionally introduced to Palm Beach County, Florida in the 1940s. Now curly-tailed lizards are thriving in many areas of Palm Beach and have invaded adjacent Martin and Broward Counties.

Curlies forage mostly on the ground but will occasionally climb trees and shrubs. They are active only during the day. Each

curly has a retreat under a rock or in a burrow where he can escape from predators and spend the night. Most lizards achieve the high body temperature needed for activity by being in the sun, and curlies are relatively sensitive to this requirement. Thus curlies are usually found in sunny, open areas, and they rarely occur in deeply shaded areas in forests. They are often abundant in sunny shoreline habitats where their food supply is naturally high, but they will opportunistically reside further inland in sunny areas where human activities have increased their food supply. For example, a large population lives on the Abaco Big Bird Poultry Farm, where they feast on flies attracted to the chicken manure.

Being extreme opportunists, their diets are very catholic. Analysis of over 5,000 food

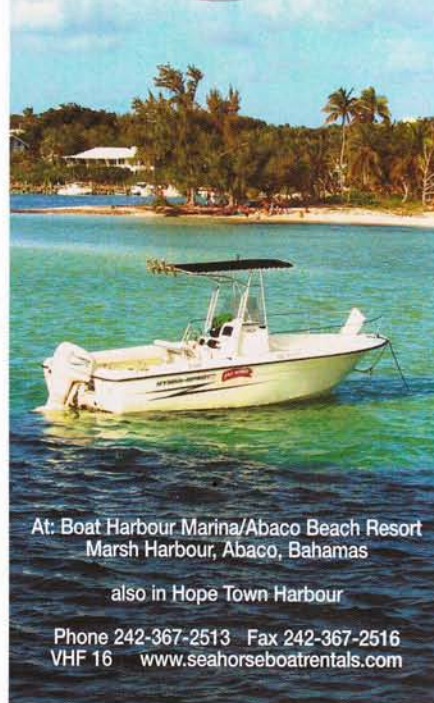


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Curly-tailed lizard eating a brown tree lizard

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items found in the stomachs of museum specimens revealed that they eat a broad array of animal species. Common prey are roaches, caterpillars, ants, beetles, spiders, centipedes, crabs, and snails. They are often observed feeding on beach hoppers and flies that breed in seaweed washed up on the shore. Curlies will occasionally eat other lizards, particularly the brown tree anole. In addition to these animal prey, curly-tailed lizards frequently eat plant materials. We have seen them climb to the tops of bushes to forage on fruits and flowers, balancing themselves precariously on the thin branches.

The social system of curly-tailed lizards is quite interesting. Adult males have relatively large home ranges that overlap broadly with those of certain adult females which may be potential mates. However, the adult males act very aggressively towards other adult males that trespass on their territories. Such encounters usually begin with the male bobbing up and down and raising the scales on his back. Sometimes this will scare away the intruder, but other times the interaction will escalate to chasing or fighting. Adult females may also act aggressively toward each other, but they are generally more tolerant toward individuals of the same sex than are adult males. Juveniles are usually tolerated by resident adults which may be their parents. On the other hand, juveniles not living in the home range of their parents may be attacked and occasionally eaten by other adults. Thus, territorial behavior by the resident adults may be protecting their offspring. On several occasions, we have seen juveniles follow an adult into a retreat, suggesting that they are related. Further studies are needed to determine the degree of parental care exhibited by curly-tailed lizards.



Aggressive display by an adult male towards another adult



Juvenile curly-tailed lizard being fed scraps of food.

Their innate boldness toward people is noteworthy. We have visited several small remote islands in the Bahamas containing populations of curlies which probably rarely come in contact with humans. There the lizards have approached us, sometimes jumping on our shoes and biting the laces, and have readily eaten our scraps of food. Such bravado may explain how they have successfully adapted to literally living under peoples' feet in urban areas such as Marsh Harbour.

As their name implies, the lizards are often observed with their tails curled upward, but they are also frequently observed with their tails uncurled, projecting straight out. Behavioral ecologists have proposed that tail curling by lizards may have two different functions. First, it may be a social signal addressed to members of their species to either attract mates or to repel potential competitors passively before the encounter escalates to fighting. Second, it may help them avoid being eaten by potential predators, such as birds and snakes. The anti-predation function may work in different ways. Tail curling may be a signal to would-be predators, notifying the predators that they have been detected and the signaler is prepared to escape, so pursuit by the predator is likely to be a waste of time. You can test the pursuit-deterrent hypothesis by slowly walking towards a curly-tailed lizard. In most cases, the lizard will run a short distance, stop, curl its tail and look back at you as if to say "I see you." Alternatively, tail curling may cause predators to focus their attack on the tail rather than the body, allowing the lizard to escape with just a broken tail rather than being entirely eaten by the predator. Lizards

with stubby tails, which are fairly common, are probably the result of such interactions. Note that the lizard can re-grow the missing tail segment, but it's not as good as new. In fact, because the replacement contains a rod of cartilage instead of the many vertebrae that compose an undamaged tail, they cannot curl the re-grown tail as extensively as the original tail.

We have been studying the ecological and evolutionary consequences of predation by curly-tailed lizards on the brown tree lizard, *Anolis sagrei*, the most abundant diurnal lizard in the Bahamas. During the past decade, we have documented the series of events that occur when curlies colonize tiny islands inhabited by anoles. Following colonization, there is a rapid decline in the anole population, probably caused by predation by the curlies. Furthermore, before curlies arrived most anoles were observed foraging on the ground, whereas after curlies arrived the proportion of anoles on the ground declines dramatically and some individuals occur much higher in the trees than any observed before curlies arrived, probably to escape predation by curlies. Most interestingly, we found that initially anoles with relatively long legs survived better than those with shorter legs, suggesting that those with longer legs could run faster on the ground and thereby escape the curlies. Later on, however, anoles with shorter legs survived better than those with longer legs, possibly because those with shorter legs were better at foraging in the trees. We are also measuring the impact of curlies on other species lower in the food chain. For example, we found that curlies cause an increase in the abundance of spiders,

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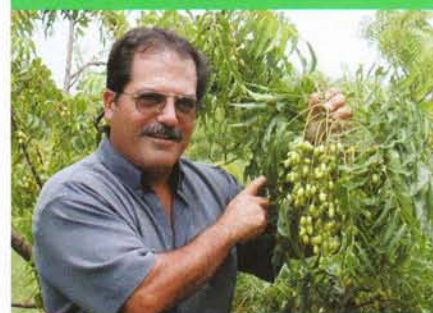
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Adult with a partially re-grown tail.

even though they may occasionally eat spiders. This happens because anoles eat more spiders than curlies, so the reduction of anoles by curlies leads to increased spiders. Thus, when curlies invade new areas, either naturally or when introduced by humans, their effects may cascade down the food web with profound ecological consequences. [↓](#)

David Spiller is a project scientist and Thomas Schoener is a professor at University of California, Davis. Jonathan Losos is a professor at Harvard University. Together they have been studying the ecological and evolutionary consequences of species interactions in The Bahamas for several decades.

No Godzillas, Abaco's Curly-tail lizards are as friendly as the Geico Gecko – but without the accent

BY RAY BROWN

The Abacos are home to a wealth of candidates for any short list of animal icons. Turquoise seas are home to rollicking dolphins. Turtles dart among the purple sea fans on pristine reefs, and overhead, Man-o-War birds scud effortlessly under billowing cumulus clouds while the Abaco parrot squawks out a boast of its enticing beauty. But there is another very special character that seems to have found its way into our daily lives with an unassuming familiarity and compelling friendliness.

The Bahamian curly-tailed lizard is an undisputed pop star in Abaco, endearing itself to resident and visitor alike, becoming the subject of art, crafts, photography and local lore, as well as being a familiar and welcome occupant of our gardens, walls and patios. These bold and gentle creatures seem to enjoy being around humans and will even venture into homes and businesses on occasion, where they may enjoy pet status, along with crumbs from the floor.

Although the first encounter with a curly-tail, particularly a large adult (they can exceed 8 inches in length), may be a little intimidating, he will quickly put you at ease with a beguiling behavior that seems to reflect the benign nature of island life.





Trying the ferocious approach



A taste for red

If you choose to befriend a curly-tail, it's a pretty straightforward deal: they are territorial so you can usually find the same animal in the same general area. From there, the trick is food; bring him crumbs or perhaps a small insect, such as a moth, and present the treat at a short distance from you. With patience, you can lure the little lizard ever closer, eventually reaching the stage of hand feeding with a short twig - or the ultimate goal of having him eat from the palm of your hand. Cheddar cheese seems to be among their favorite menu items, perhaps because of its orange color. An artist friend tells me these creatures seem to have color perception and preference, based on her observation that lizards visiting her studio

as she worked would move among the artwork and lick orange and yellow areas while seemingly being much less interested in other colors.

One thing about curly-tails you can count on is their appetite. Spend a little time watching these little garden dragons and you'll realize that despite the appearance of being laid-back sun worshippers, they're constantly alert for the movement of any potential food source, usually insects. They possess excellent vision and can move very quickly, even climbing trees in their perpetual search for a good lunch. Recently, Gary, the popular bartender at the Reef Bar of Hope Town's Harbour Lodge, showed me

a video made on his cell phone that looked like something from an old Japanese sci-fi monster flick. In this little epic a house gecko (a somewhat recent newcomer to Elbow Cay) was stalked, attacked and devoured by an only slightly larger curly-tail. Gary also says he has a routine visit from a curly-tail which is rewarded with a maraschino cherry from the bar. Bar geckos beware.

Nearly every Abaco resident has a personal story in which the lizards play a role. A friend related a story of her grandmother serving tea every afternoon, attended by family members and the resident curly-tail, who received a piece of biscuit. Another story featured a water-loving lizard which would show up on washday. As the washing machine was drained and the water flowed onto the ground, the little creature would approach the flowing stream, test the water with its foot and nose, then step back and jump high into a dive which would propel it into the water, where it would splash merrily. The person telling this tale said she thought she could almost hear the sound of Gene Kelly's "Singing in the Rain" when this happened. Another resident has created little wooden rafts to float in his cistern, allowing him to rescue curly-tails who inadvertently fall in. Other stories are told of gently catching and releasing curly-tails with little lasso-like snares made from palm fronds. I get a lot of pleasure watching my wannabe dragons bounce around playfully on the leaves of banana plants following a rain. Every story about these little creatures seems to have a common element: the animals are treated with respect, quiet



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A piece of the rock

admiration and kindness as befits a wondrous creation of the natural world.

Curly-tails, being reptiles, are temperature sensitive and most active on warm, sunny days, when they seek out rocky areas for extra warmth, often uncoiling their tails. During the winter months in Abaco, they are seen less often, spending more time in their underground burrows or rocky hide-aways. As cooler temperatures slow their metabolisms, their stay-at-home habits may help protect them from the few predators, primarily feral and domestic cats and herons, which might seek them out. Curly-tails lay eggs in the summer after active threat display competition among rival males and subsequent mating. The animals are born with a survival mechanism that allows them to forcibly restrict tail muscles, causing the tail to break off and perhaps

secure their escape from a predator. The tail subsequently regrows but usually is noticeable as not being the original.

The Bahamian curly-tailed lizard (*Leiocephalus carinatus armouri*) is perhaps the best-known member of a group of lizard species and subspecies commonly found in the Bahamas, most notably in the Abacos, and more recently established in South Florida, where it was introduced both to control insect pests in sugar cane and also as an exotic pet species. These robust, scaled lizards can reach nearly a foot in length and live in excess of 10 years. Despite the presence of predators and the destructive forces of hurricanes, they appear to be successfully proliferating and appear to all intents and purposes likely to persevere both as a species and as a highly attractive and pleasure-giving symbol of Abaco life. 🌿



Goodbye for now!