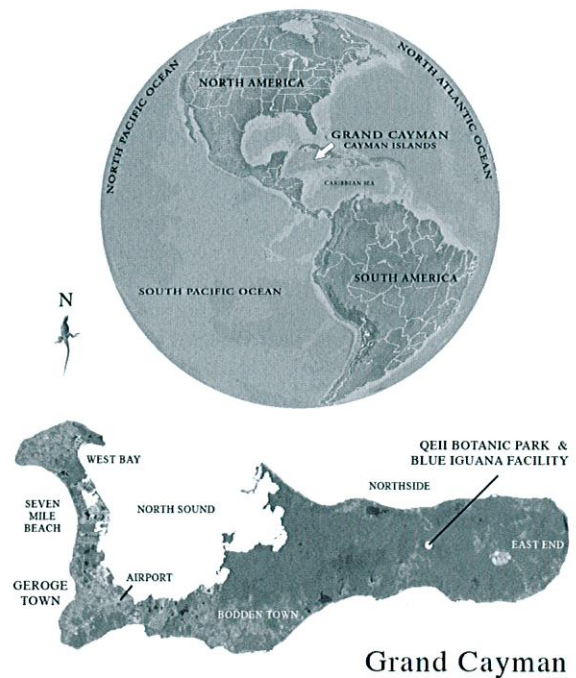




Founder male Daniel, 13 years old at the time of this photograph, is breeding successfully in a large open-air pen at the Blue Iguana Recovery Program's captive breeding and head-starting facility on Grand Cayman. *Photograph by John Binns.*



Potential founder male, Hal, was until recently in illegal captivity and is now recovering from a decade of chronic malnutrition. He mated in 2003 and 2004, but so far remains infertile.



Location of Grand Cayman in the north-west Caribbean, the only island where *Cyclura lewisi* occurs. *Illustration by John Binns.*

Color and Pattern in Grand Cayman Blue Iguanas

Fred Burton

Blue Iguana Recovery Programme, Grand Cayman Island

Photographs by author, except where indicated.

In a recent paper in *The Caribbean Journal of Science*, I relied on several different lines of evidence to formally conclude that the Grand Cayman Blue Iguana is a full species, *Cyclura lewisi*. The old classification, in which the Blue Iguana was considered to be a subspecies of the Cuban Iguana (*C. nubila*), didn't make much sense after 2000, when Catherine Malone and her colleagues showed that Cuban Iguanas and the iguanas from Little Cayman and Cayman Brac are, if anything, more closely related to the Bahamian species (*C. cycblura*) than they are to Blues.

Apart from DNA, the most diagnostic feature distinguishing the Blue Iguana is the color of adults. The remarkable bright

blue of adult *C. lewisi* was first described by Chapman Grant in 1940, but the color patterns of hatchlings and subadults have never been reported in detail.

When they first emerge from the nest, Blue Iguana hatchlings are intricately patterned, very much like hatchlings of *C. nubila* and *C. cycblura*. The head and dewlap are pale bluish gray and unmarked, except in some individuals, which may show subtle dark marks just behind the eyes. The interparietal scale (the "pineal eye" in the middle of the back of the head) is particularly pale, and the nostrils are narrowly rimmed with black. The iris of the eye is golden and essentially fills the exposed area of the eye. The surrounding sclera is reddish but rarely seen at this age.

Starting at the neck and proceeding down the length of the body is a pattern of dark "chevrons" — looking down from above, they appear as a series of V's running diagonally back and down both sides of the body. From the side, they look like diagonal dark stripes on a paler background, running from the neck and back rearwards down the flanks to the belly. To some people, they look like pale stripes on a dark background — I guess it all depends on your point of view.

This pattern starts with an inconspicuous, very short, dark gray chevron starting near the front of the incipient nuchal (neck) crest. Viewed from above, this and a conspicuous second dark chevron are U-shaped, curving over the neck crest. The ends of the second chevron turn downward to stop above the front legs. The third and subsequent chevrons are V-shaped from above and somewhat wavy on the flanks, sometimes breaking up lower on the sides. Eight chevrons usually are present between the beginning of the nuchal crest and the pelvis, each becoming progressively less distinct after the fourth.

The skin between the first and second chevrons is unmarked silvery gray, becoming pale cream away from the nuchal crest. After the second chevron, from the rear edge of each dark band the flanks are pale bluish gray, heavily mottled with dark gray. The mottling gives way to a series of discrete small pale cream spots, close to (but not usually in contact with) the front edge of the next chevron.

Along the back, the chevrons connect to an alternating pattern of near-black and pale cream spots down the middorsal line, marking where the dorsal crest will emerge. The cream spots begin as a single pale nuchal crest scale between the first and second chevrons, followed by three progressively larger spots to the third chevron, two large spots to the fourth, and a single spot between subsequent chevrons. Black scales between these spots



Newly hatched *Cyclura lewisi*: at this age the hatchling is still consuming its yolk sac and has not started feeding.

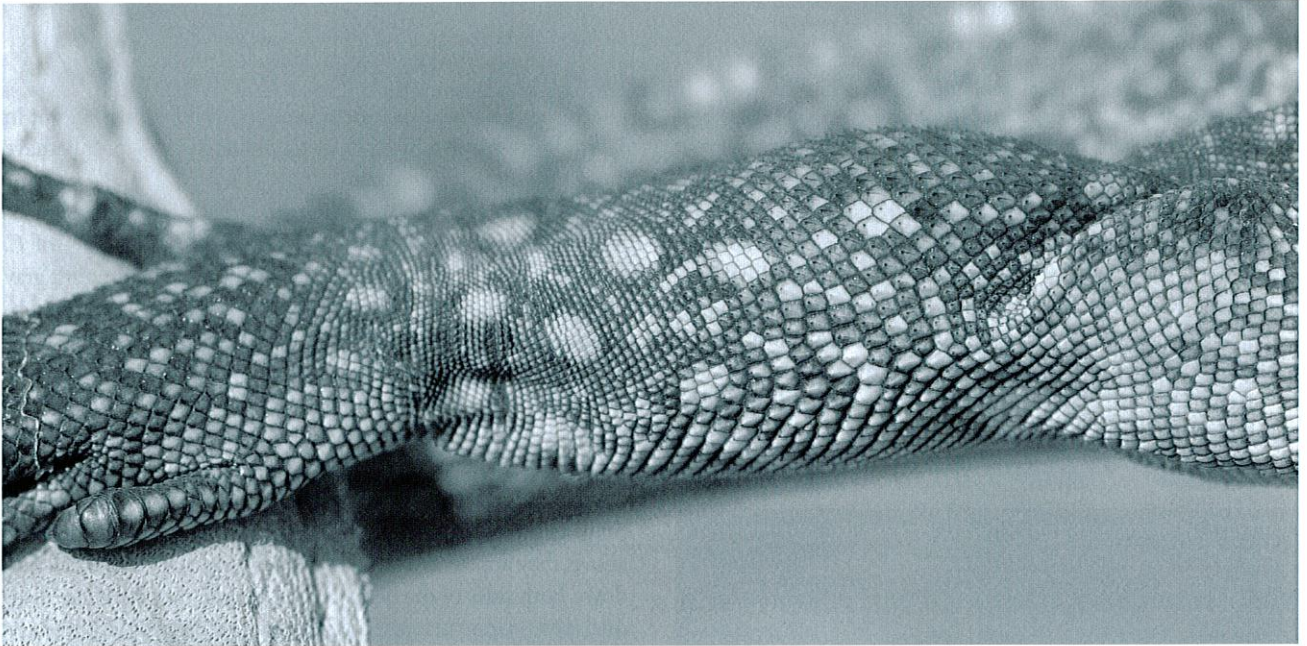
are continuous with chevrons, where those occur, and otherwise form isolated dark spots. This complex arrangement creates a bold alternating pattern down the middorsal line.

The series of cream spots continues onto the tail, merging into an alternating series of narrow pale cream bands and broad dark gray bands around the upper two-thirds of the tail. The end of the tail is almost black.

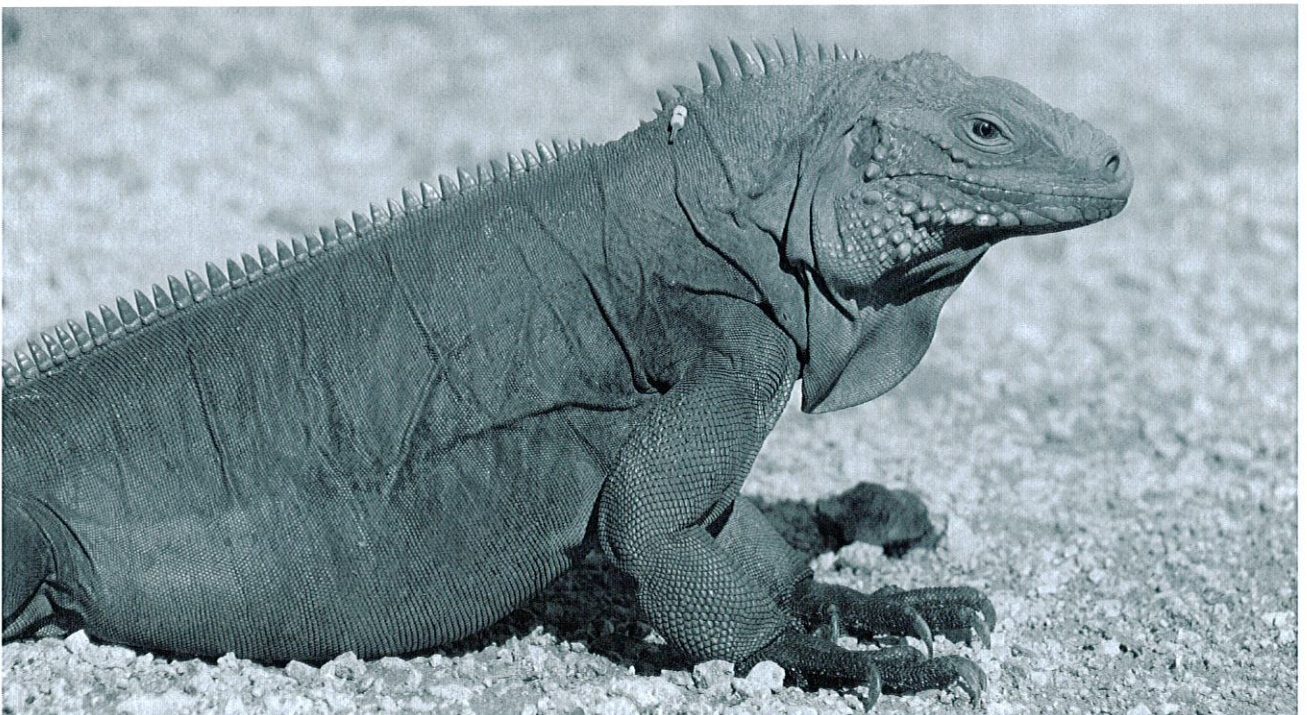
The legs have extensive cream mottling and pale bluish gray flecks on a dark gray base, with distinct cream spots particularly

evident on the rear legs and feet. Pale cream spots extend onto the toes, where they coincide with the joints, making the toes on both front and rear feet appear banded. The underside of the abdomen is silvery gray with the pale, fragmented ends of the strongest chevrons from each side almost meeting beneath.

By one year of age, the bluish gray and gray base colors have become clear blue and the chevrons have begun to erode, narrowing and breaking up into spots on the lower flanks, where they may become circles exposing a center of blue. The back is



Spots on the legs, still evident at one year, usually disappear completely as the animal ages.



Adult female *C. lewisi*: juvenile markings have been lost.

speckled with isolated pale cream scales and the flanks between chevrons are still marked with diffuse pale cream spots. The blue base color is progressively obscured by dark gray on the tail, where the banding becomes less distinct with age. The alternating cream and black pattern on the dorsal crest is reduced but still evident.

The juvenile pattern changes to the adult form gradually, by further replacement of cream spots and speckling with the blue base color and the variable loss of the dark chevrons (some adults lose them entirely). Limbs also become blue, apart from the toes, which lose all banding and darken to black. The nuchal and dorsal crest scales all become bright blue, with no trace of the juvenile pattern. The lower half of the tail becomes darker, with banding either totally obscured or very indistinct. The sclera of the eye becomes redder and more exposed as the animal grows.

Having said all of that, a Blue Iguana is only blue when it wants to be blue. All that blue is masked in dark gray when an iguana is cold, sleeping, or just trying to remain inconspicuous. The gray color closely matches the surrounding carbonate karst rock, on which iguanas seem to vanish into the landscape.

Watching these iguanas in the wild, they appear to use their color selectively and carefully, as signals to each other. In the greens and earth tones of Grand Cayman's dry shrublands, the bright blue of *C. lewisi* shines out like a beacon.

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S P E C I E S P R O F I L E

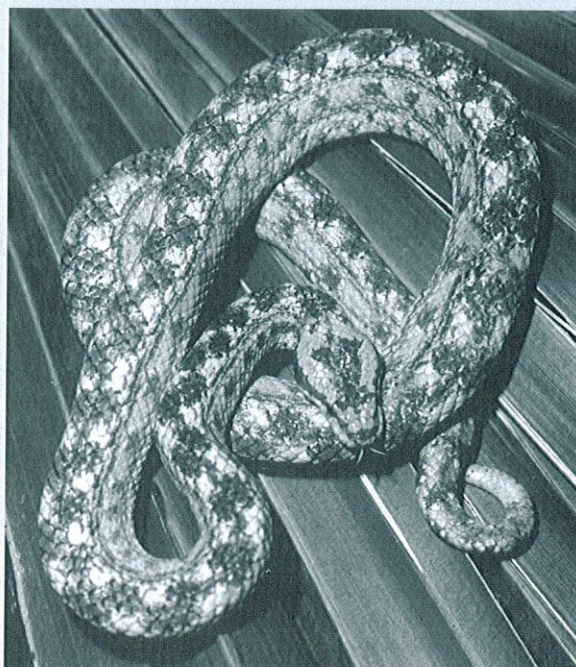
Ground Boas (*Tropidophis*) of the Cayman Islands

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Photographs by the author.

Compared to their relatives in the families Boiidae and Pythonidae, the Ground Boas of the genus *Tropidophis* (Family Tropidophiidae) are relatively small and are sometimes referred to as “dwarf boas.” The largest species reaches a total length of barely over a meter and the smallest less than a third of that length. Unlike most boas and pythons, Ground Boas lack infrared sensors in interlabial pits, but, like their larger relatives, they possess vestiges of hind limbs, which are visible externally as a pair of cloacal spurs. All are live-bearers. They are ground-dwelling or semiariboreal and feed primarily on small vertebrates, mainly frogs and lizards. When disturbed, these snakes may exhibit autohemorrhaging from the eyes and mouth as well as cloacal discharge. On loose substrates, at least one species is known to employ sidewinding locomotion. Many (maybe all) species also are capable of physiological color changes, a phenomenon that is rare in snakes. Ground Boas apparently are unique among those snakes that can change colors in that they do so on a 24-hour cycle: they are lighter in color at night and darker during the day. All members of the genus are listed in CITES Appendix II and are rarely seen in the pet trade.

Species of *Tropidophis* are relatively broadly distributed in the West Indies and South America, but they are secretive. Consequently, many are not well-represented in museum collections and their taxonomy has been poorly understood. Previous



Adult Grand Cayman Ground Boa, *Tropidophis caymanensis*.



Subadult Little Cayman Ground Boa, *Tropidophis parkeri*.



classifications recognized 13–16 species, but a recent taxonomic study conducted by S. Blair Hedges elevated several subspecies to species rank and recognized 29 species. Three of these occur only in South America (Ecuador, Brazil, and Perú) and one is known only from a single specimen. The remaining 26 species occur in the West Indies, where most are restricted to single islands. Fifteen species are found in Cuba, and only in Cuba are the geographic ranges of multiple species (4–6 species, depending on the locality) known to overlap. Three species occur in Jamaica, two in the Bahamas, and one each on Hispaniola, Navassa, the Turks & Caicos Islands, Grand Cayman, Little Cayman, and Cayman Brac.

The local common name for the Ground Boas of the Cayman Islands is “lazy snake.” The name is derived from their habit of balling up when first captured rather than trying to escape. This behavior is widespread within the genus and is most likely to be exhibited by juveniles. The three Caymanian species were, until recently, considered to be subspecies of *T. caymanensis*, each endemic (restricted) to a single island. Each is now considered a full species: *T. caymanensis* (Grand Cayman), *T. parkeri* (Cayman Brac), and *T. schwartzi* (Little Cayman). All three are relatively small snakes, usually less than 50 cm in total length.

In the Cayman Islands, Ground Boas are primarily active at night and, on Grand Cayman, Grant found them to be especially active late in the summer following periods of rain. Ground Boas may occur throughout Grand Cayman and Little Cayman, but on Cayman Brac they appear to be limited in distribution to the northern and western coastal areas. Most are found on the ground, but exceptions exist: they have been found in the leaf bases of epiphytes and Richard Thomas found one 2.4 m above the ground in the roof of an outhouse! They have been found in habitats ranging from beach to dry forest and in leaf litter, rotten tree stumps, cracks in the walls of houses, and under palm fronds, rocks, slabs of limestone, logs, and boards. The diet seems to consist mainly of lizards of the genus *Anolis* and Cuban Tree Frogs, *Osteopilus septentrionalis*. The ends of the tails of Caymanian

Ground Boas are white to yellow in color, in stark contrast to the darker coloration of the rest of the snake. This pattern is usually seen in sit-in-wait (ambush) predators. As a snake lies quietly in wait, it wiggles the tip of its tail. This may attract the attention of a sight predator, like an anole or tree frog, that mistakes it for something to eat and ends up being eaten by the snake.

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Grand Cayman Blue Iguana, *Cyclura lewisi*, Grand Cayman, Cayman Islands (see story p. 148). Photograph by Fred Burton.