

HERPETOLOGY IN JAMAICA WITH GENERAL REFERENCE TO CONSERVATION

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This is another of a range of articles published in BHS Bulletin on herpetology in different Commonwealth countries and of importance in relation to the first World Congress of Herpetology being held in the U.K. in September 1989. Every encouragement is to be made for Commonwealth nationals, especially from tropical developing countries (where most of the world's herpetofauna occur), to attend and participate in the Congress.

Jamaica was discovered by Christopher Columbus in 1494, and after British rule from 1655, became an independent member of the Commonwealth in 1962. It is a tropical Caribbean island whose attributes, as far as most of the visitors are concerned (mainly American tourists), are sea, sun and sand! But these are complemented by a great diversity of plant and animal life with many species only found on Jamaica.

The island from east to west is 146 miles (234km) long and 51 miles (82km) wide. Topographically, it consists mainly of coastal plains, divided by the Blue Mountains in the east, and the hills and limestone plateaux (the Cockpit Country) which occupy the central and western areas of the interior. The highest mountain, the Blue Mountain Peak, achieves 7402 feet (2256m). Rivers flow down from the central mountainous area. Most are narrow and fast flowing; some with rapids (such as the Dunn's River Falls), and those flowing south are generally longer and are fed by more tributaries than those flowing north. Jamaica is divided into three counties: Surrey, Middlesex and Cornwall, whose names invoke perhaps the country's strongest influence! There are also fourteen parishes with very British names. The Cayman Islands are a dependency of Jamaica.

As part of my official duties, I was given the opportunity by the U.K. Government's Overseas Development Administration to visit Jamaica in May 1986. While meeting the country's increasing nutritional needs, special concern had been expressed in recent years about the environmental effects of pesticide usage in agriculture, and in the state of wildlife (a tourist asset) on account of land development and erosion.

The Natural Resources Conservation Department (NRCD) was formed to administer three Governmental Acts, including the Wildlife Protection Act, 1973. The Aquatic Resources Division within NRCD is concerned about the quality of water used for domestic and agricultural purposes and on the living organisms (including amphibia) supported in freshwater courses and the sea (marine turtles) — freshwater wetlands support the American Crocodile (*Crocodylus acutus*) and beaches provide a medium for egg laying by a range of marine turtles. The Resource Management Division is responsible for the protection of wildlife, especially rare species. About 800 of the 3000 flowering plants are unique to Jamaica, 27 of over 100 species of birds, which include ten distinctive pigeon and dove species, eighteen of the 133 species of butterflies (the largest species of swallowtail is found in Jamaica) and 61 of the 68 native forms of frogs and reptiles. There are also over 800 species of snail in Jamaica.

Under the 1973 Act, it is illegal to take or sell the eggs of any turtle species in Jamaica; the Jamaican Iguana (*Cyclura collei*) — if surviving still — and *Crocodylus acutus* also became protected, and in 1983, all five species of marine turtle. Species protection posters have been produced by NRCD for the crocodile and turtles, and the Jersey Wildlife Preservation Trust has produced one for the endemic Jamaican Boa or locally-known Yellow Snake, *Epicrates subflavus*. The endangered status of the Iguana, the Jamaican Boa and the American Crocodile, and three other species, namely two skinks: the Galliwasp, *Celestus (Diploglossus) occidentus* — a species described by Underwood (1959) — and Snake-Waiting Boy, *Mabuya spilonotus* (or *M. mabouya sloanei*), and the snake, *Alsophis ater*, was highlighted by Mittermeier (1972). All these species are found in or near the Hellshire Hills, a largely undeveloped and impenetrable area

not far (about 10 miles (16km)) south-west of the capital town of Kingston. In his article on the Fauna & Flora Preservation Society's journal, *Oryx*, Mittermeier proposed that properly managed and protected, the hills would be an ideal wildlife reserve or National Park. The Crocodile is used as a symbol by the Jamaican Army and is seen on Staff Cars.

Possibly the most distinctive, certainly the most active and conspicuous reptile species on Jamaica, and for that matter elsewhere in the West Indies, are the *Anolis* lizards. These small iguanids (snout-vent length about 4 inches or 100mm) were first worked out on Jamaica by Underwood & Williams (1959). Dr Garth Underwood, a long-standing BHS member and former member of Council (now an International Herpetological Committee member for the first World Congress of Herpetology), spent several years on Jamaica while lecturing at the University of the West Indies. He undertook seminal studies on the reptiles until leaving in 1960, but making a last visit in 1964. Before 1953, a preliminary study by Barbour (1910) unfortunately confused the anoles and only recognized six amphibia. Lynn & Grant (1940) followed-on from this. They outlined the history of herpetology in Jamaica and the work formed the first in a series of monographs on the natural history of Jamaica and its dependencies, published by the Institute of Jamaica in Kingston. *Anolis reconditus*, which only occurs in the Blue Mountain forest region, was discovered, described and named by Underwood & Williams (1959). Lazell (1966) collected further specimens in 1965. The paper was also published by the Institute of Jamaica.

Much work on the herpetofauna of the West Indian islands, not unexpectedly and on account of proximity, has been carried out by herpetologists from North America. Schwartz & Thomas (1975) and with Ober (1978) quite recently published a check list of West Indian amphibia and reptiles. They included detailed information on the distribution of many of the species. Island lists have also been produced by Maclean, Kellner & Dennis (1977) and for Jamaica, they list 24 amphibian and 45 reptile species and subspecies. In light of some taxonomic revision since, Schwartz & Henderson's (1985) guide to their identification (exclusive of Hispaniola) makes 57 full species for Jamaica (21 amphibia, 36 reptiles) of which nineteen amphibia and 27 reptiles (the remarkable proportion of 90% and 75%, respectively) are endemic (see Appendix). Species include sixteen (fourteen endemic) *Eleutherodactylus* Whistling Frogs (family Leptodactylidae) and seven each of *Anolis* lizard (family Iguanidae) (six endemic), *Celustus* Galliwasp (family Anguidae) (six endemic — the other, *C. cruscus*, only otherwise occurs on Little Cayman and Cayman Brac) and *Sphaerodactylus* Wood Slave (family Gekkonidae) (six endemic). Other notable amphibia include the giant toad (*Bufo marinus*), introduced like the American Bull Frog (*Rana catesbeiana*), and endemic Tree Frogs (family Hylidae): *Calyptahyla crucialis*, two species of *Hyla* and *Osteopilus brunneus*. Other reptiles include an endemic, edible freshwater terrapin (*Chrysemys terrapen*), an endemic teiid (*Ameiva dorsalis*), the Croaking Lizard (*Aristelliger praesignis*) and *Gonatodes albogularis* (both geckos), an endemic burrowing snake (*Typhlops jamaicensis*) and three endemic species of *Arrhyton* snake (family Colubridae). *Anolis sagrei*, the bush lizard, occurring in the west of the island, has been introduced from Cuba.

In the town of Kingston itself, several species of herpetofauna may be seen:— *Anolis grahami*: many individuals, mostly immature, were to be seen on the leaves, trunks and branches of ornamental garden shrubs by buildings everywhere, especially in the Hope Botanical Gardens where they were also on walls.

Bufo marinus: tadpoles of the giant toad (called "bull frog" locally — the *Eleutherodactylus* tree frogs are called toads!) were to be seen feeding in small shoals on the carcass remains of adults that had drowned in pools around fountains in the Hope Botanical Gardens (13.v).

Ameiva dorsalis: this quite substantially-sized teiid is often found in gardens within the city. It runs actively through long grass and other vegetation and alarms the womenfolk. The lizard is regarded as a nuisance in town gardens, like *Anolis grahami*, and pest control operators advertise lizard control as one of their services. The control chemical used is apparently mocap or ethoprop (U.S.A.) — ethoprophos (Europe) — and is normally recommended for the control of nematodes, wire-, cut and rootworms and beetle larvae.

Chrysemys terrapen: two full-grown terrapins, probably of this species, were to be seen swimming in the murky water and coming to the surface for air in the pool around the fountain in the gardens of Devon House (2.v), which has the National Gallery of Art.

HOPE ZOO, KINGSTON

The Hope Zoo is situated in the Botanical Gardens. About seven *Crocodilus acutus* were on display in a large pool and enclosure with information plaques indicating that the species is preserved in nature reserves in Jamaica, including the Black River Lower Morass (Garrick, 1986). School parties were also visiting the Zoo, which plainly has an educational function in Jamaica. About twelve Jamaican boas (*Epicrates subflavus*) were kept singly or in pairs in cages with glass fronts. The Jamaican Boa is rare, but occurs in the mountains. One of the Jersey Wildlife Preservation Trust's posters was on display to give more information on the snakes. There were also two Reticulated Pythons for educational purposes.

UNIVERSITY OF THE WEST INDIES, MONA

There are two herpetologists presently researching on the herpetofauna of Jamaica and attached to the University. Dr Peter Vogel (University of Bochum, F.R. of Germany), a Swiss from Basle, is working on *Anolis* feeding strategies and Stefan Zabanski (University of Hamburg, F.R. of Germany) is working on the influence of predators on *Anolis* hatchlings. *Anolis grahami grahami*, which is blue-green in colour, occurs in the west and central part of Jamaica and *A.g. aquarum*, which is emerald green, in the east. When still at the Department of Zoology, Garth Underwood remembers observing that at the road bridge across the Morant River on the south coast and east of Kingston, *A.g. grahami* was on the west side and *A.g. aquarum* on the east side, the Morant River being the exact divider. On the north coast, an intermediate population may be found at Mt. Pleasant about 4 miles (7km) west of Port Antonio. The south-west slopes of the John Crow Mountains in the extreme east of the island are in the lee of north-east trade winds and dry, and are preferred by *A.g. grahami*. On the coast also on the east, under cocout husks at the rear of beaches, the active Galliwasp, *Celestus cruscus*, can be found, and on one occasion, Garth Underwood also remembers finding 50 *Eleutherodactylus* frogs. Stewart & Martin (1980) later described such husk piles as a unique habitat! The *Anolis* lizards on Jamaica are very common, active and really lend themselves to observation. They are easy to catch, either with a noose during the day, or picked off leaves of forest trees, like fruit, when inactive at night. *Anolis* lays a single egg — with good rainfall, one a week, but none during the dry season — and this is probably related to food abundance and/or water availability. In the Fairy Glade Trail between Hardwar Gap and Newcastle in the Blue Mountains, there is another species, *Anolis l. lineatopus*, inhabiting dense rain forest and difficult to see. Away from the towns, the local Jamaicans regard *Anolis* as helpful in the environment because they eat insects. Such a species as *A. grahami* seems to thrive in changed habitats, often where there are buildings. This probably explains the abundance of the species within the confines of Kingston town.

JAMAICA SAFARI VILLAGE — CULTURAL CENTRE AND CROCODILE SANCTUARY, FALMOUTH

Just 2 miles (3km) west of Falmouth, there is a safari village amidst the mangrove swamp of the coastal part of Trelawney Parish with a number of American Crocodiles on display in enclosures. There was also an American alligator to add variety! Two or three Jamaican Boas were also on display in a tall glass-fronted cage with branches. Some of the crocodiles were basking in the late morning sunshine at the time (11.v) on muddy banks amidst the tangle of mangrove roots, and others in the brown water. It was at this Village that some of the scenes for the James Bond film "Live and Let Die" were shot. Our hero (an Indian stunt man was used!) was obliged to escape from a small lake island when threatened by crocodiles from all sides and ran to safety across their backs! The stunt man survived without problem but sadly sustained wounds during the filming that required over 50 stitches! Ian Fleming, the author of the James Bond books, who like Noel Coward lived in the north of the island, named his hero after an ornithologist who wrote a book on the birds of Jamaica. *Epicrates* (it can only be *subflavus*) even features in one of his novels, "The Man with the Golden Gun", when the main villain, Scaramanga, decapitated one with a knife, carefully skinned and ate it raw while resting after a chase ending in one of the island's Morasses. "Dr No" was also filmed on Jamaica.

INSTITUTE OF JAMAICA, KINGSTON

The Museum of the Institute of Jamaica has a Natural History Section. Several of the typical Jamaican herpetofauna are on display as museum specimens. These include *Anolis garmani* and *A. valencienni*, the former green with orange dewlap, the latter pale grey with a pale mauve

dewlap or gular flap, and both are described as being common on the island. *Tropidophis haetianus* is known locally as the Lazy Snake.

WEST INDIAN RANGE OF SOME JAMAICAN REPTILES

Crocodilus acutus: besides Jamaica, the American Crocodile only otherwise occurs in the West Indies on Little Cayman, Cuba (with *Crocodilus rhombifer*) and such Cuban islands as Isla de la Juventud (Isla de Pinos) (with *C. rhombifer*), Cayo Cantilles and Cayos Largo. It also occurs on Cayo Real (Cayo de San Felipe islands) and Hispaniola (Haiti and the Dominican Republic).

Chrysemys terrapen: the Jamaican species of freshwater turtle is endemic and there is a remarkable dearth of freshwater chelonians on the West Indian islands generally. This is probably because most have few areas of slow-moving or standing water in such small land masses. *Chrysemys decussata granti* occurs on the Jamaican dependencies of Grand Cayman and Cayman Brac, and other subspecies elsewhere. *C.d. decussata* occurs on Cuba and the Cuban islands of Isla de la Juventud and Cayo Santa Maria (Jardines de la Reina), *C.d. vicina* on Hispaniola and Marie Galante of the Iles des Saintes, and on the latter with *C.d. stejnegeri*, which also occurs on Puerto Rico and possibly Vieques of the Passage islands.

JAMAICAN LAND TORTOISE

It is surely certain that no land tortoises now occur on Jamaica. Accounts of Sloane (1707-1725), who was a resident on Jamaica for 15 months during 1688/89, indicated that a land tortoise answering to a similar description to *Geochelone carbonaria* was common in the woods between what are now Guanaboa Vale and Spanish Town (St. Catherine Parish) everywhere. While *Geochelone denticulata* is a native species on Trinidad, *G. carbonaria* has almost certainly been introduced to the West Indian islands from northern South America. Barbour (1934) has refuted the tortoise's indigeneity anywhere in the West Indies and Pritchard & Trebbau (1984) discuss this in more detail. Maclean et al. (1977) list *G. carbonaria* on several of the islands, Schwartz & Thomas (1985) likewise and Underwood (1962) reported it on many of the Grenadines (Mustique is one of these). While there in May 1986, I saw none nor spoke with anyone whom had ever seen land tortoises on Jamaica.

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APPENDIX

A CHECK LIST OF THE AMPHIBIA AND REPTILES OF JAMAICA AND ISLANDS.

After Maclean, Kellner & Dennis (1977) and Schwartz & Henderson (1985).

AMPHIBIA

Bufonidae
Bufo marinus†
 Leptodactylidae
*Eleutherodactylus alticola**
*E. andrewsi**
*E. cavernicola**
*E. cundalli** *cundalli*
*E.c. glaucoreius**
*E. fuscus**
*E. gossei** *gossei*
*E.g. oligaulax**
*E. grabhami**
*E. jamaicensis**
*E. johnstonei**
*E. junori**
*E. luteolus**
*E. nubicola**
*E. orcutti**
*E. pantoni** *pantoni*
*E.p. amiantus**
*E.p. pentasyringos**
*E. sisypodemus**
 Hylidae
*Calyptrahyla crucialis**
*Hyla marianae**
*H. wilderi**
*Osteopilus brunneus**
 Ranidae
Rana catesbeiana†

REPTILIA

Emydidae
*Chrysemys terrapen**
 Gekkonidae
Aristelliger praesignis praesignis
*Gonatodes albogularis notatus**
Sphaerodactylus argus argus
*S. gilvitoques**
*S. goniorhynchus**
*S. oxyrhinus** *oxyrhinus*
*S.o. dactnicolor**
*S. notatus atactus*¹
*S. parkeri**
*S. richardsoni** *richardsoni*
*S.r. gossei**
*S. semasiops**
 Iguanidae
*Anolis garmani**
*A. grahami** *grahami*
*A.g. aquarum**
*A. lineatopus** *lineatopus*
*A.l. ahenobarbus**
*A.l. merope**
*A.l. neckeri**
*A. opalinus**
*A. reconditus**
A. sagrei sagrei†
*A. valencienni**
*Cyclura collei**
 Teiidae

*Ameiva dorsalis**
Scincidae
*Mabuya mabouya sloanei**
Anguidae
*Celestus barbouri**
*C. cruscus cruscus**
*C.c. cundalli**
*C.c. molesworthi**
*C. duquesneyi**
*C. fowlweryi**
*C. hewardi**
*C. microblepharis**
*C. occiduus**
Typhlopidae
*Typhlops jamaicensis**
Boidae

*Epicrates subflavus**
Tropidophidae
*Tropidophis haetianus jamaicensis**
*T.h. stejnegeri**
*T.h. stulli**
Colubridae
*Alsophis ater**
*Arrhyton callilaemus**
*A. funereum**
*A. polylepis**
Crocodylidae
Crocodilus acutus

† On N.E. Morant Cay, not Jamaica

* Endemic forms

† Forms known to be introduced