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AMPHIBIANS AND REPTILES OF THE UPPER RASPACULO RIVER BASIN, MAYA MOUNTAINS, BELIZE

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The Maya Mountain range is a dominant and spectacular landscape feature of Belize which runs northeast to southwest across the central and southern part of the country, extending in the west over the border into Guatemala. Its geological base consists largely of a granite core covered by Paleozoic sediments, overlaid in all but the highest parts with limestone. The Upper Raspaculo river basin lies in the centre of the mountain range immediately northwest of the main divide, separating western and eastern watersheds. The basin is about 24 km long and about 8 km wide, enclosing an area of approximately 200 km², and the river runs in a southwesterly direction to the Macal, a major tributary of the Belize River. The headwaters and catchment area are inaccessible by land and the valley has remained uninhabited since the Mayan pre-classic period of 250 BC.

The valley slopes of the Raspaculo generally have a very thin soil cover and outcropping of rock is common. The basic vegetation type is broad-leaved rainforest, but the area has been prevented from reaching a climax state by the continual effects of cyclones and flooding. The most severe storm damage was caused by Hurricane Hattie in 1961, which left some 80% of the canopy trees either felled or with their crowns stripped away. Consequently the area is characterised largely by regeneration with secondary growth tree species such as *Cecropia obtusifolia* (Guarumo, Trumpet), *Swietenia macrophylla* (Mahogany) and *Schizolobium parahybum* (Quamwood). In lowland areas there also persists an abundance of old-growth forest trees including *Dialium guianense* (Ironwood), *Guarea grandiflora* (Wild Akee) and *Protium schippii* (Copal Macho), and in upland areas *Cedrela odorata* (Cedar), *Cordia alliodora* (Salmwood) and *Bursera simaruba* (Gombolimbo) (Brokaw, 1991). Conspicuous in the understorey are several species of small *Chamaedorea* and *Geonoma* palms, and the occasional colony of the large terrestrial bromeliad, *Aechmea magdalenae*. Other plant forms present include shrubs, lianas, epiphytes (orchids, aroids, bromeliads, cacti) and a variety of ground herbs, particularly *Selaginella* sp. Using the life-zone system of Holdridge (1967), Hartshorn *et al* (1984) places the region near the transition between the "Subtropical moist forest" and the higher "Subtropical lower montane moist forest" zones. Rainfall in the area is thought to be in the region of 2540 mm per year (Walker, 1973).

The reptiles and amphibians of Belize were first documented by Smith (1941), and later more comprehensively by Henderson & Hoeffers (1975). A number of additional species have recently been listed, by McCoy (1990), Meerman (1992) and Stafford (in press). In terms of its herpetofauna the Maya Mountains has remained something of an unknown quantity. The region falls within the Petén faunal area described by Campbell and Vannini (1989), encompassing the northern portion of Guatemala, all of Belize, and the lower Polochic and Motagua Valleys, but its higher peaks may represent an isolated sub-area, and at least one frog, *Rana juliani*, appears to be endemic (Hillis & de Sa, 1988). By most accounts however, the area is not noted for endemism of terrestrial vertebrates.



Eleutherodactylus chac



Gravid female *Norops lemurinus* of the golden "diamondback" type.

The herpetofauna of the Upper Raspaculo was initially investigated in January - February 1991 (Stafford, 1992), and this was followed by a second survey of the area in mid-April to early June 1993, together covering the duration of the dry season and beginning and end of the wet season. Animals were recorded by conducting intensive searches at different times of the day and night and during different weather conditions. A drift-fence and pit-fall trap system (O'Shea, 1992) was used to sample small terrestrial and semi-fossorial species, although this was found to be somewhat selective. However, the method was effective in trapping some of the diminutive snakes (*Tantilla* and *Ninia* spp.), toads, and some terrestrial lizards, including the nocturnal ground-dwelling gecko, *Coleonyx elegans*. In 1993 a pair of opossums (*Philander opossum*) were observed to enter the buckets at night and may have treated them as a regular source of food.

A full report on the geology and biodiversity of the area is currently in preparation.

Composition of the herpetofauna

Reptiles were the most well represented component of the herpetofauna, accounting for some 76% of the total number of species. Altogether, 42 species from 15 families were recorded, consisting of 1 caecilian, 1 salamander, 6 anurans, 2 toads, 1 chelonian, 1 crocodylian, 11 lizards and 19 snakes. Of these 14 were recorded in 1993 and not seen at all in 1991 (denoted by *). Species diversity was greatest among the terrestrial, forest-dwelling reptiles, while in terms of overall numbers the most abundant species was the anoline lizard, *Norops humilis*.

Amphibia

As might have been expected, more amphibians were recorded at the end of May 1993, coinciding with the beginning of the wet season. The Red-eyed tree frog, *Agalychnis callidryas*, was first heard calling on the night of 23rd May after light rain, followed by *Smilisca baudini* on 27th May, and it is likely that a number of other species would have made their presence known had the expedition continued into June and July. The only amphibians to be found active during the height of the dry season were *Rana vaillanti*, along the banks of the river and tributary streams, *Eleutherodactylus* frogs (*E. chac* and *E. rugulosus*) in leaf litter, and the two toads, *Bufo marinus* and *B. valliceps*. A large ranid frog found in 1991 and presumed to be *Rana berlandieri* Baird, has been tentatively re-assigned to *R. vaillanti*. In January 1991 the caecilian, *Gymnopsis syntrema*, was recorded from the area, representing an extension to the geographic range of this species.

Species recorded:

Order: Gymnophiona

Family: Caeciliidae

Gymnopsis syntrema (Cope)

Order: Caudata

Family: Plethodontidae

Bolitoglossa m. mexicanus Duméril, Bibron and Duméril

Family: Bufonidae

Bufo marinus (Linnaeus)

B. valliceps Wiegmann

Family: Leptodactylidae

Eleutherodactylus chac Savage

E. laticeps (Duméril)

Eleutherodactylus cf. *rugulosus* (Cope)

Family: Hylidae

**Agalychnis callidryas* (Cope)

Smilisca baudini (Duméril and Bibron)

Family: Ranidae

Rana vaillante Spix

Reptilia

Snakes and lizards accounted for all but two of the reptiles recorded. Amongst the lizards, a greater presence of arboreal species was noted in 1993, either on or close to the ground. In particular, a female *Laemanctus longipes* was found (27th April) moving away from a shallow scrape beneath a tree root which contained three eggs. A gravid female captured in the Colombia Forest, Toledo District, is known to have laid five eggs in August (McCarthy, 1982), but the reproductive biology of this elusive canopy-dwelling species in Belize is otherwise poorly known. Another arboreal form, *Corytophanes cristatus*, seen only once in 1991, was observed more frequently in 1993, usually perched vertically on stems and lianas as described by Davis (1953). On one occasion a trio of males were also observed fighting between themselves on the forest floor. The "giant" green anole, *Norops biporactus*, another strictly arboreal species, was also more in evidence on tree trunks nearer to the ground towards the end of May.

The only other anole recorded in 1991 was the small terrestrial, semi-arboreal *N. humilis*, while in 1993 a further species, *N. lemurinus*, was found in considerable numbers. To some extent the rather sudden and inexplicable appearance of *lemurinus* has displaced the smaller *N. humilis*, confining it more to the forest floor, while the larger *N. lemurinus* was also commonly observed up to 2.5 metres in the understorey. On two occasions *N. lemurinus* was observed at night during light rain. The colour and pattern of *N. lemurinus* in the area is highly variable; specimens were found which varied brownish-grey with either a broad whitish dorsal stripe or large pale, dark-centred quadrangular blotches on the dorsum, while two females were pale greyish with large, tan or golden-yellow, diamond-shaped dorsal markings. The same colour and pattern variation has also been recorded in populations from Costa Rica, with the diamond pattern apparently restricted to females (Taylor, 1956).

Snakes account for the greatest percentage of species recorded (45% of the total number of species), the most frequently seen being *Coluber constrictor stejnegerianus* (this species was mistakenly identified in 1991 as *Mastigodryas melanolomus*), followed by *Micrurus* spp. and *Coniophanes fissidens*. Of the 16 genera represented, 9 can be classified as diurnal and chiefly terrestrial forms (*Bothrops*, *Coluber*, *Coniophanes*, *Lampropeltis*, *Masticophis*, *Micrurus*, *Porthidium*, *Scaphiodontophis*, and *Stenorrhina*). Species adapted to a predominantly sub-terranean existence were represented by 3 genera (*Adelphicos*, *Ninia* and *Tantilla*), the most commonly seen being *Tantilla canula*. A specimen of *Tantilla* with a distinct collar and salmon-red coloration on the venter was subsequently found to be assignable to the species, *T. schistosa*. Terrestrial or semi-aquatic species further comprised 2 genera (*Drymobius* and *Xenodon*), and semi-arboreal species were represented by 2 (*Constrictor* and *Spilotes*), while only 1 strictly arboreal species was recorded (*Imantodes cenchoa*).

Evidence of seasonal inactivity was apparent in certain species of snake. In April and May (1993) the Jumping viper, *Porthidium nummifer*, was recorded in some numbers and also a Fer-de-Lance (*Bothrops asper*), while in January and February (1991) there were no viperid snakes recorded at all. *Porthidium* was found on the drier, rocky northerly-facing slopes, and the single *Bothrops* close to the river in a thicket of *Aechmea*. Both were found actively foraging on rather cool overcast days following overnight rain, within a temperature range of 17-21°C and high humidity (90-100%). On one occasion *Porthidium* was observed abroad at the coolest time of the day before dawn at 04.30 hrs. Despite meticulous searching, neither species

was observed basking. The apparent absence of *Porthidium* between January and March, and *Bothrops* until the end of May suggests that in upland areas the two species may remain inactive, possibly in aestivation, during the driest time of the year. In other, lower-lying and consistently wetter parts of Belize the Fer-de-Lance is known to be active all year round, although most abundant in the wet season. It is likely that two fairly common arboreal genera in Belize, *Leptophis* and *Oxybelis*, would have also been recorded had there been more rain and a greater presence of their anuran prey.

Coral snakes (*Micrurus*) were found to be relatively common and occurred in almost the same numbers as *Coluber constrictor*. Close examination of four specimens, and field observations on a further thirteen confirms that the genus is represented in the area by at least two species, *M. diastema* and *M. hippocrepis*. A number of *M. hippocrepis* were observed with distinctive black edging to the scales of the red bands and a completely black snout, and may be assignable instead to *M. nigrocinctus*, while two of the more typical *hippocrepis* had incomplete black banding. In terms of their relative numbers, coral snakes of the *M. hippocrepis/nigrocinctus* complex were the most abundant, representing some 70% of *Micrurus* seen.

Species recorded:

Order: Crocodylia

Family: Crocodylidae

Crocodylus moreleti Duméril and Bibron

Order: Testudines

Family: Kinosternidae

Kinosternon scorpioides (Linnaeus)

Order: Squamata

Suborder: Sauria

Family Geckonidae

**Coleonyx elegans* Gray

Famil Iguanidae

Basiliscus vittatus Wiegmann

Corytophanes cristatus (Merrem)

**Laemactus longipes* Wiegmann

Norops b. biporcatus (Wiegmann)

N. humilis uniformis Cope

**N. lemurinus bourgeaei* Bocourt

Iguana iguana rhinolopha Schmidt

Family: Scincidae

**Eumeces sumichrasti* (Cope)

Sphenomorphus cherriei (Cope)

Family: Teiidae

Ameiva festiva (Lichtenstein and Von Martens)

Suborder: Serpentes

Family: Boidae

Boa constrictor imperator Daudin

Family: Colubridae

**Adelphicos quadrivirgatus visoninus* (Cope)

Coluber constrictor stejnegerianus Hoervers & Henderson

Coniophanes f. fissidens (Günther)

**Drymobius m. margaritiferus* (Schlègel)

Imantodes cenchoa leucomelas Neill
Lampropeltis triangulum polyzona Cope
Masticophis m. mentovarius (Duméril, Bibron and Duméril)
 **Ninia diademata nietoi* Burger & Werler
Scaphiodontophis annulatus (Duméril, Bibron and Duméril)
 **Spilotes pullatus* (Linnaeus)
Stenorrhina freminvillei Duméril, Bibron and Duméril
Tantilla canula brevis (Günther)
 **T. s. schistosa* (Bocourt)
 **Xenodon rabdocephalus mexicanus* Smith
 Family: Elapidae
Micrurus diastema sapperi Roze
Micrurus hippocrepis (Peters)
 Family Viperidae
 **Bothrops asper* (Garman)
 **Porthidium nummifer mexicanus* (Duméril, Bibron & Duméril)

REFERENCES

- Brokaw, N.V.L., (1991). *Vegetation*. In *The Upper Raspaculo River Basin, Belize, Central America* (Eds. D.A. Sutton and A.D.F. Rogers). Report of The Joint Services Scientific Expedition to the Upper Raspaculo, Belize. Unpublished report.
- Campbell, J.A. and Vannini, J.P. (1989). Distribution of Amphibians and Reptiles in Guatemala and Belize. *Proc. Western Foundation of Vertebrate Zool.*, 4(1): 21 pp.
- Davis, D.D. (1953). Behaviour of the lizard *Corytophanes cristatus*. *Fieldiana Zool.*, 35(1): 1-8.
- Hartshorn, G.S., Nicolait, L., Hartshorn, L., Belvier, G., Brightman, R., Cal, J., Cawich, A., Davidson, W., Dubois, R., Dyer, C., Gibson, J., Hawley, W., Leonard J., Nicolait, R., Weyer, D., White, H. and White, C., (1984). *Belize: Country Environmental Profile: A Field Study*. Robert Nicolait & Associates Ltd., Belize City, Belize.
- Henderson, R.W. and Hoervers, L.G. (1975). A checklist and key to the amphibians and reptiles of Belize, Central America. *Contribs. Biol. Geol., Milwaukee Publ. Mus.*, 5: 1-63.
- Hillis, D.M. & de Sá, R. (1988). Phylogeny and taxonomy of the *Rana Palmipes* group (Salientia: Ranidae). *Herpetological Monographs*, 2: 1-26.
- Holdridge, L.R., 1967. *Life Zone Ecology*. Revised edition. Tropical Science Center, San Jose, Costa Rica.
- McCarthy, T.J. (1982). A note on reproduction in *Laemanctus longipes* in Belize (Sauria: Iguanidae). *Carib. J. Sci.*, 18(1-4): 133.
- McCoy, C.J. (1990). Additions to the Herpetofauna of Belize, Central America. *Carib. J. Sci.*, 26(3-4): 164-166.
- Meerman, J.C. (1992). A new snake for Belize. *Occasional Papers of the Belize Natural History Society*, 1(1-4): 26-27.
- O'Shea, M., (1992). *Expedition Field Techniques. Reptiles and Amphibians*. Expedition Advisory Centre, Royal Geographical Society, London.
- Schmidt, K.P. (1941). The Amphibians and Reptiles of British Honduras. *Zool Ser. Field Mus. Nat. Hist.*, 22(8): 475-510.
- Stafford, P.J. (1991). *Amphibians and Reptiles*. In *The Upper Raspaculo River Basin, Belize, Central America* (Eds. D.A. Sutton and A.D.F. Rogers). Report of The Joint Services Scientific Expedition to the Upper Raspaculo, Belize. Unpublished report.

- Stafford, P.J. (in press). *Gymnopsis syntrema* (Cope); an addition to the herpetofauna of Belize. *Carib. J. Science*.
- Taylor, E.H., (1956). A Review of the Lizards of Costa Rica. *Univ. Kansas Sci. Bull.*, 38(1): 3-322.
- Walker, S.H., (1973). *Summary of Climatic Records for Belize*. Lane Res. Div., Surbiton, Surrey, U.K.