



La Mosquitia, the easternmost part of Honduras along the Mosquito Coast, extends into northeastern Nicaragua. This region contains the largest wilderness area in Central America, and includes mangrove swamps, lagoons, rivers, savannas, and tropical rainforest. The population in this area includes several indigenous and ethnic groups. Pictured here is an unnamed river that flows near Ciudad Blanca, in the Department of Gracias a Dios, Honduras. In the following article, the authors report an interesting record for the colubrid snake *Rhinobothryum bovallii*, which was found along this river. 📷 © Milton Salazar Saavedra



A second locality for *Rhinobothryum bovallii* Andersson (Colubridae) in Nuclear Central America, with comments on its habitat

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ABSTRACT: *Rhinobothryum bovallii* Andersson is rediscovered from the northern part of Central America in the historic site of “Ciudad Blanca” in the Honduran Mosquitia, Departamento de Gracias a Dios. Since a 1965 record reporting a specimen of *R. bovallii* from Arenales, El Paraíso, Honduras, no records of this species have been recorded from north of Costa Rica. During a recent herpetofaunal survey in Honduras, we encountered an individual of *R. bovallii*. Herein we provide a morphological description of the specimen, an ecological discussion of the site where it was found, and brief historical information on the previous Honduran record.

Key Words: Ciudad Blanca, distribution, Honduras, Mosquitia, new record

RESUMEN: *Rhinobothryum bovallii* Andersson se redescubre para el norte de América Central en el sitio histórico conocido como “Ciudad Blanca” en la Mosquitia hondureña, Departamento de Gracias a Dios. Desde un registro de 1965, que reporta un espécimen de *R. bovallii* de Arenales, El Paraíso, Honduras, no se han registrado registros de esta especie desde el norte de Costa Rica. Durante una reciente expedición sobre herpetofauna en Honduras, nos encontramos con un individuo de *R. bovallii*. Aquí proporcionamos una descripción morfológica del espécimen, una discusión ecológica del sitio donde se encontró, y breve información histórica sobre el registro hondureño anterior.

Palabras Claves: Ciudad Blanca, distribución, Honduras, La Mosquitia, nuevo registro

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INTRODUCTION

McCranie (2015) listed 401 species of amphibians and reptiles from Honduras, which included the coralsnake mimic *Rhinobothryum bovallii* Andersson. Campbell and Howell (1965: 135) recorded what has remained the only known specimen of this species from Honduras (LACM 204888), but noted that the record originated “from Nicaragua or Honduras.” The specimen had been collected in 1954, and ownership of that portion of the Mosquitia was in dispute at that time between the governments of Honduras and Nicaragua. In 1961, however, the World Court (today the International Court of Justice) settled the dispute by granting the area to Honduras (see Monroe, 1968). Despite having spent a considerable amount of time (especially since 2001) conducting fieldwork in the Honduran Mosquitia, JRM never encountered an individual of this species. Fortunately, during a RAP (Rapid Assessment Program) in which the first three authors participated, a second specimen of *R. bovallii* from northeastern Honduras was collected.

Rhinobothryum bovallii is known to occur at low elevations on the Atlantic versant from northeastern Honduras and from northeastern Costa Rica to northwestern Venezuela, and on the Pacific versant from central Panama to northwestern Ecuador (McCranie, 2011). The purpose of this manuscript is to provide ecological and morphological data on the new specimen, and to discuss the previously known record from Honduras. The new locality also represents a distributional extension for this species.

MATERIAL AND METHODS

Study Area

An expedition from a Rapid Assessment Program (RAP) by Conservation International (CI) was made to an archaeological site known as “Ciudad Blanca,” located in the nuclear zone of “Reserva del Hombre y la Biosfera del Río Plátano.” Recently, the site was given a vernacular name: The Lost City of the Monkey God (Preston, 2017). This area lies in Lowland Moist Forest (LMF), as defined by Holdridge (1967), and is part of the Mosquitia coast of the Caribbean lowland region (see McCranie [2011] for a brief discussion of variation within LMF). According to IHCIT (2012), the mean annual precipitation in the study area ranges from 1,782.8 to 2,122 mm, with October to December as the rainiest months; the mean annual temperature ranges from 24.9 to 28.8°C; and the months with the highest average temperature are from December to February, corresponding to the dry season. The sampling site was near an unnamed tributary of the Río Pao, a tributary of the Río Wampú, in turn also a tributary of the Río Patuca on the Caribbean (Atlantic) versant of northeastern Honduras. Much of the area remains covered by broad-leaf rainforest and gallery forest. The banks and terrain near the unnamed tributary, with its numerous meandering curves, have been deforested and converted to pasture land.

Fieldwork

From 14 to 25 February of 2017, we spent a total of 252 person-hours searching randomly for amphibians and reptiles, following the protocols of Catenazzi and Glos (2016); we conducted our survey along roads and along the unnamed tributary, and in and around swampy areas. In general, we made extensive searches, and explored areas likely to contain populations of various herpetofaunal species. We also searched within the leaf litter, under rocks (including those along the tributary), inside and under fallen tree trunks, and generally were on the lookout for active individuals and listening for vocalizing anurans. We programmed day and night surveys in advance (ca. 6 h/day, 3 h/night). To avoid excessive disturbance to a given area, we limited the number of persons working a given site

to three or fewer. We conducted our day searches approximately from at 0800 to 1100 h, and night searches from 2000 to 2300 h. We also conducted sporadic searches, interspersed among the regularly scheduled ones, from 1100 to 1500 h, and from 2300 to 0300 (the following day).

We used headlights or hand-held flashlights during our nocturnal and crepuscular surveys and noted a description of each capture site (substrate, vegetation), recorded the temperature and relative humidity with a standard thermometer that contained a dry and humid bulb, and after handling each individual recorded any peculiarities in behavior. We measured and weighed all the specimens collected, following McCranie et al. (2006): measurements (snout–vent length [SVL], tail length [TL], total length [ToL]) taken to nearest 0.01 mm shortly after euthanasia with vernier dial calipers, and determined body mass with a Pesola (Swiss made) scale of 100 g.

Preservation

We preserved the specimens using the conventional methods outlined in Rabinowitz et al. (2000), in which 10% formaldehyde was injected internally, the specimen was left in the fluid for 24 h and later soaked in distilled water, and finally it was transferred to 70% ethanol. The specimen of *Rhinobothryum bovallii* is catalogued as UVS-V-01080 in the “Biodiversidad y Ciencia” at the Universidad Nacional Autónoma de Honduras, in the Valle de Sula, Municipio de San Pedro Sula, Departamento de Cortés.

RESULTS AND DISCUSSION

Morphological Description

The specimen of *Rhinobothryum bovallii* (UVS-V-01080) (Fig. 1A) is an adult female, as indicated by the absence of a hemipenis, with the following measurements and weight: SVL = 1,170 mm; ToL = 1,500 mm; TL: 330 mm; and body mass = 63.0 g. Other characteristics are as follows: the head is distinct from the neck; 2 parietals scales; 1 frontal scale; the loreal is in contact with the 2nd and 3rd supralabials; 2 internasals; 2 postmentals around the mental scale; the mental groove includes the mental scale to the 2nd preventral; 2 supraoculars; 2 postoculars; 1 preocular; temporals 2+3/2+2, with an anterior temporal fused with a secondary temporal; 1 prenasal; 1 postnasal; 8 supralabials, with the 4th and 5th in contact with the eye; 10 infralabials, the 8th and 9th (from left side) and 9th and 10th (from right side) lack black spots; eye pupil round; 248 ventrals + 119 paired subcaudals; anal plate divided; dorsal scales 21–21–17, mostly smooth, but slightly keeled from the 5th row at midbody to the 7th row at the vent; 23 complete black rings without spots, 42 yellow rings, and 22 red rings along the body from the neck to the tail; black coloration on the head includes the parietals, rostral, postmental, infralabials, and the first two dorsal scale rows; all of the red rings contain spots of different sizes, except for along the ventral scales.

Ecological and Behavioral Data

The adult female *Rhinobothryum bovallii* (Fig. 1B) was found active on 19 February 2017 at 1818 h, between UTM coordinates 1686472 and 718529 (elev. 204 m), when the air temperature was 22°C; and the relative humidity 91%. The snake was coiled on a *Chamaedorea* sp. (Arecaceae) about 15 cm above the ground, with the head pointing upward (Fig. 1B), and the area from its midbody to the tail was wrapped around lianas and ferns at the base of the palm. When found, the snake was moving slowly toward the upper portion of the palm. When handled, it released musk but did not attempt to bite.

The tricolored (with accessory black elements) pattern of the specimen clearly mimics the sympatric species of *Micrurus* present in the area (*M. alleni* and *M. nigrocinctus*), and also is part of the mimetic complex of the genera *Erythrolamprus*, *Oxyrhopus*, and *Pliocercus* found in this region. This coloration might represent a local example of Mullerian mimicry (Fig. 1A).

The site where the *R. bovallii* was encountered was approximately 20 m from the river, where males of *Incilius valliceps* and *Smilisca sordida* were calling, and 15 m away we found an adult male *M. nigrocinctus* (SVL = 530.50 mm; TL = 106.60 mm; body mass = 66.0 g) exiting a rotten trunk. We also found individuals of *Pristimantis cerasinus*, *Leptodactylus savagei*, and *Norops limifrons* near this area.

The area where we found the *R. bovallii* corresponds to the Lowland Moist Forest formation of Holdridge (1967). This species normally inhabits lowland broadleaf rainforests (McCranie, 2011) and is known to occur at

elevations from near sea level to 750 m (Solórzano, 2004). Wilson and McCranie (2003) classified *R. bovallii* as an “indicator species,” thereby signifying the presence of healthy Caribbean lowland rainforest. Savage (2002) and McCranie et al. (2006) considered this species a canopy resident; however, Solórzano (2004) suggested that *R. bovallii* is primarily terrestrial, as 28 out of 30 individuals from Limón province in Costa Rica were found active on the forest floor at night.

When we observed and manipulated the specimen we collected in our base camp, it showed some aggressive defensive behavior by coiling the neck and attempting to bite, and it also showed visual acuity by following our movements. We recorded one bite, which occurred while the specimen was being handled. The snake bit JRG on the wrist (Fig. 1C) and held on for over 5 min, and the bite produced mild local effects; initially he suffered mild pain, and then bleeding from the affected area. To our knowledge, this episode represents the first documented bite on a human by this opisthophis snake.



Fig. 1A. An adult *Rhinobothryum bovallii* found along an unnamed river near Ciudad Blanca, Departamento de Gracias a Dios, Honduras. This tricolored species possibly represents an example of Mullerian mimicry. 📷 © Josué Ramos Galdámez



Fig. 1B. An in situ view of the *Rhinobothryum bovallii* at the collecting site. The snake was moving toward the upper part of the palm, while its body remained coiled around the base of the palm. 📷 © Manfredo Alejandro Turcios-Casco



Fig. 1C. The *Rhinobothryum bovallii* biting JRG on the wrist an event that lasted more than five minutes.

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Historical Records

McCranie (2011: 191) wrote, “Campbell and Vannini (1989) reported *Rhinobothryum bovallii* from eastern Guatemala, based on a statement in Vanzolini (1986)” and provided information indicating that this statement was incorrect. Because of the lack of corroborating information, it is highly unlikely that *R. bovallii* occurs in Guatemala.

Campbell and Howell (1965) reported the first individual of this snake from Nuclear Central America, but their locality of “Arenal” (p. 135) was inaccurate; the correct name for the locality is Arenales, Municipio de Trojes, Departamento de El Paraíso, which lies 3 km from the Nicaraguan border. The forests in the area from where Campbell and Howell (1965) reported the snake have disappeared (McCranie et al., 2006). The new locality reported herein lies 176 km to the NE of Arenales. *Rhinobothryum bovallii* remains unreported from Nicaragua (HerpetoNica, 2015).

This report likely indicates a disjunct population of *R. bovallii*, especially because of the accelerated pace of fragmentation and deforestation occurring in the Honduran Mosquitia. Nevertheless, the area in which the specimen was found is part of a considerable extension of primary forest, and any protection of this forest would represent an important safeguard for the conservation of this species.

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Manfredo Alejandro Turcios Casco is a Honduran biologist born in Comayagüela M.D.C, who graduated from the Universidad Nacional Autónoma de Honduras (UNAH) in 2017. Early in his career Manfredo challenged bureaucratic processes that curtail scientific research in Honduras, but more recently he has been involved with studying the behavior and ecology of the herpetofauna of northeastern Honduras. His efforts within the “Centro de Rescate y Colección Privada El Ocotal” have contributed to the conservation of amphibians and reptiles in central Honduras. Current projects include the calls of Mesoamerican anurans, the biogeography of Central American salamanders, and the ecology of snakes in Honduras (including venoms).



Josué Ramos Galdámez is a student at the Universidad Nacional Autónoma de Honduras (UNAH) who is scheduled to graduate in the near future. His research efforts have centered on the diversity, taxonomy, distribution, behavior, and ecology of the Honduran herpetofauna. He is particularly interested in studying these creatures in tropical rainforest and cloud forest, and especially in how biodiversity is affected by the effects of mining, agricultural activities, urbanization, hydroelectric plants, and solar projects. Josué developed an interest in the herpetofauna of the Atlantic versant of Honduras at an early age, and currently is focused on analyzing the structure of amphibian and reptile communities.



Milton Salazar Saavedra was born in Chinandega, Nicaragua, and received a Bachelor’s degree in biology from the Universidad Nacional Autónoma de Nicaragua (UNAN) in 2002. Passionate about amphibians and reptiles, for the last 15 years he has been conducting research in the region and has reported distributional records for several species. Milton currently is the coordinator of HerpetoNica, a group whose principal objective is to spread the importance of amphibians and reptiles in Central America (and specifically in Nicaragua) through research and environmental education. He also is a member of Red-Mesoherp and ASG-IUCN, Nicaragua.



James R. McCranie is a self-taught herpetologist with a passion for fieldwork, who specializes in the taxonomy and systematics of the Latin American herpetofauna. His main area of interest is Honduras, where he has been conducting fieldwork since 1976. During his career McCranie has authored or co-authored five books (a sixth book is in press) and 300+ peer-reviewed scientific publications, including the descriptions of about 100 new taxa, mostly from Honduras. In 2015 he retired from fieldwork in Honduras because of the unavailability of scientific collecting permits. During his countless trips to Honduras Randy witnessed a time when extensive forests dominated the landscape; sadly, as a result of deforestation and fragmentation, many of these habitats no longer remain. Because of the lack of governmental effort to curb these practices he believes that the country has reached a point of no return regarding the conservation of its once magnificent natural habitats.