

# Noteworthy snake records from Nicaragua (Reptilia: Serpentes)

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**ABSTRACT:** We report new localities in Nicaragua for thirteen poorly known snake species that were collected for the second (*Dipsas articulata* and *Ungaliophis panamensis*), third (*Coniophanes bipunctatus*, *Lachesis stenophrys*, *Sibon annulatus*, *Sibon dimidiatus*, *Tantilla reticulata*, and *Tropidodipsas sartorii*), fourth (*Atropoides mexicanus*, *Enuliophis sclateri*, *Imantodes inornatus*, and *Nothopsis rugosus*), and fifth (*Corallus annulatus*) times in the country. We also provide distributional range extensions for all viper species known to occur in Nicaragua (*Agkistrodon howardgloydi*, *Atropoides mexicanus*, *Bothriechis schlegelii*, *Bothrops asper*, *Crotalus simus*, *Lachesis stenophrys*, *Porthidium nasutum*, and *Porthidium ophryomegas*), one coral snake (*Micrurus alleni*), and four mildly venomous snakes (*Conopsis lineatus*, *Leptodymus pulcherrimus*, *Leptophis ahaetulla*, and *Xenodon rabdocephalus*), and the first records for four snake species (*Imantodes gemmistratus*, *Lachesis stenophrys*, *Pseudoelaphe flavirufa*, and *Tantilla armillata*) from within the Nicaraguan national protected areas system.

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Nicaragua is a megadiverse Neotropical country. As the largest and most centrally located country in the Central American isthmus, it constitutes the transitional area between Nuclear and Lower Central America, and its lowlands have acted as a bottleneck in the dispersal routes of mainland American species (Stehli and Webb 1985; Savage 2002). The Nicaraguan Depression historically has been the meeting ground of several herpetofaunal units involved in dispersals from the north (mostly through the Pacific lowlands) and from the south (mostly through the Atlantic lowlands). Additionally, it has acted as an important barrier in the dispersal of highland herpetofaunal species through the isthmus (Savage 2002). The composition of Nicaragua's snake fauna is derived from three main historical elements (sensu Savage 2002): 45% Middle American, 47% North American, and 8% South American (J. Sunyer unpublished data). Nevertheless, when compared to that of neighboring countries, Nicaragua's snake fauna is the third least diverse in the region, both in the number of total species and endemic species (after El Salvador and Belize), which is the lowest number for all of the Central American countries with Pacific and Atlantic Ocean boundaries (Wilson and Johnson 2010). This situation probably has resulted from the country's young geological origin and low relief, which combined with its relatively constant historical political instability, continuous uncontrolled deforestation, and inaccessibility to remaining forested areas, among other reasons, have occasioned the attraction of relatively few herpetologists when compared to such neighboring Central American countries as Panama, Costa Rica, Honduras, or Guatemala.

Our knowledge of Nicaraguan snake diversity has been updated as herpetological research has occurred in

the country. Vouchers of approximately 51 snake species collected in Nicaragua were accumulated during the second half of the 19<sup>th</sup> century. By 1950, the country's snake checklist contained 66 species, and by the end of the 20<sup>th</sup> century around 96 species. Currently, the total recorded snake fauna of Nicaragua consists of 102 species representing 62 genera and 9 families (Sunyer and Köhler 2010; Myers 2011; Salazar and Barquero 2012). The number of snake species in Nicaragua is expected to keep growing as herpetological research continues in the country. For example, no voucher specimens are available for two snake species (i.e., *Rhadinella godmani* [formerly in the genus *Rhadinaea*; Myers 2011] and *Rhinobothryum bovallii*) that have been recorded to the south (Costa Rica) and north (Honduras) of the country, and are therefore expected to be found in Nicaragua (Köhler 2001; Sunyer and Köhler 2010). In addition, several other snake species with nearby distributional ranges in Costa Rica (e.g., *Chironius exoletus* and *Trimetopon pliolepis* on the Atlantic lowlands, *Epicrates maurus* on the Pacific lowlands, and *Bothriechis lateralis* in the volcanic highlands; Savage 2002; Campbell and Lamar 2004; Solórzano 2004; Köhler 2008) and Honduras (e.g. *Coniophanes imperialis*, *Mastigodryas melanolomus* [see McCranie 2011], *Pliocercus elapoides*, *Scaphiodontophis annulatus*, *Sibon manzanaresi*, and *S. miskitus* on the Atlantic lowlands, *S. carri* on the Pacific lowlands, and *Atropoides indomitus*, *Cerrophidion wilsoni*, *Leptophis modestus*, *Storeira dekayi*, *Tantilla lempira*, *Thamnophis fulvus*, and *Tropidodipsas fischeri* in the central highlands; Wilson and Meyer 1985; McCranie 2006a, b; 2007; 2011; Köhler 2008; Jadin *et al.* 2012) could occur in respective habitats in Nicaragua; and, finally, in such an underexplored country, the possibility

of finding undescribed snake species exists, especially on higher isolated mountains in the northern part of the country and on islands. For example, on Great Corn Island, the largest of the Nicaraguan marine islands, three endemic subspecies of snakes (*Drymobius margaritiferus maydis* Villa 1968; *Tretanorhinus nigroluteus obscurus* Villa 1969; and *Micrurus nigrocinctus babaspul* Roze 1967) have been described. In addition to these remnants from the taxonomic practices of the 1960s, further collecting in Nicaragua might point to the existence of recognizable species-level taxa, given a modern systematic assessment.

Snakes are solitary predators that in nature generally occur in lower abundances than other herpetofaunal groups, and are usually less represented in herpetological museum collections worldwide. The catastrophic 1972 earthquake in Managua destroyed all of the alcoholic herpetological specimens housed in the Museo Nacional de Nicaragua (Villa 1981), and the subsequent Nicaraguan civil war prevented further collecting in the country until barely two decades ago. Currently, most specimens of snakes collected in Nicaragua are stored in foreign museums (mostly in the USA and Europe), and most published records of Nicaraguan snake specimens come from scattered literature that deals with specific species or groups of species. Very few bibliographic compilations cite the exact collecting localities of all the snake species occurring in the country, and the most complete is that of Köhler (2001). His meticulous work clearly reflects the need for further sampling in the country, as well as for gathering additional collecting data from Nicaraguan snake specimens deposited in museums worldwide in order to assess a detailed picture of the distribution of each species in the country. For example, many Nicaraguan snake species are poorly represented in museums collections, including the only two endemic snake species (i.e., *Geophis dunni* and *Rhadinella rogerromani* [formerly in the genus *Rhadinaea*; Myers 2011]), which are only known from their respective holotypes (Schmidt 1932; Köhler and McCranie 1999; Köhler 2001; Townsend 2006).

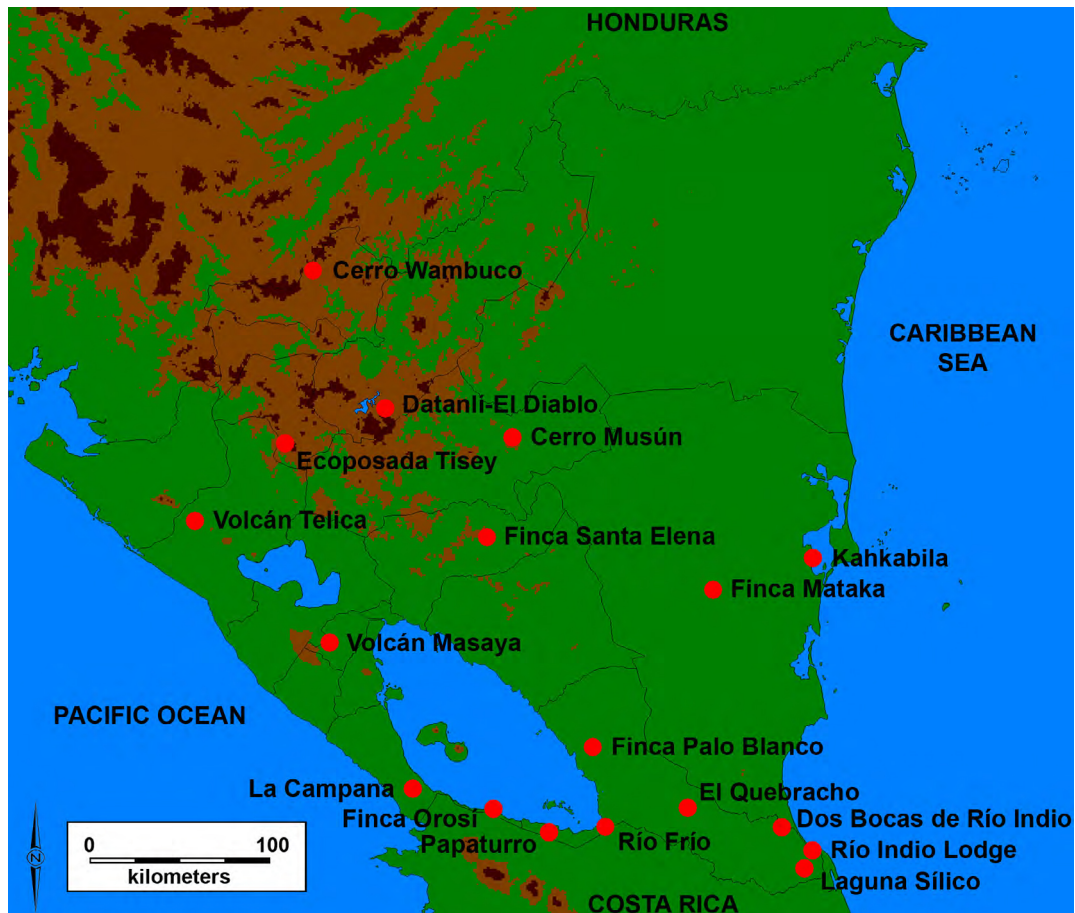
Venomous snakes are responsible for hundreds (if not thousands) of accidents with people in Nicaragua annually, some of which have resulted in deaths. Between 2005 and 2009 there were 3286 reported human snakebites in Nicaragua, 34 of which were fatal (Hansson et al. 2010). All fatalities occurred in the central and eastern part of the country with the highest incidence in the southeastern corner (Hansson et al. 2010), with a snakebite mortality of up to 25% (i.e., deaths/reported bites; Coe and Anderson 2005). Still, people living in rural areas of Nicaragua rely mostly on traditional medicine for the treatment of snakebites, and morbidity and mortality rates frequently go unreported (Coe and Anderson 2005). In Nicaragua, 31% of all snakebites occur among children under 15 years and 61% among those between 15–49 years, especially affecting men (Hansson et al. 2010). Approximately 45% of all snakebites in Nicaragua occur on the feet, 20% on the lower extremity excluding the feet, 30% on the upper extremity, principally the hands or fingers, and 5% on the trunk or face (Russell et al. 1997).

As a result, in Nicaragua most snake species are greatly feared and normally killed on sight despite the fact that only roughly 12% of the country's snake species

can potentially cause fatal envenomations in humans (i.e., eight vipers: *Agkistrodon howardgloydi*, *Atropoides mexicanus*, *Bothriechis schlegelii*, *Bothrops asper*, *Crotalus simus*, *Lachesis stenophrys*, *Porthidium nasutum*, and *P. ophryomegas*; three coral snakes: *Micrurus alleni*, *M. multifasciatus*, and *M. nigrocinctus*, the latter with three subspecies occurring in Nicaragua: *M. n. nigrocinctus*, *M. n. babaspul*, and *M. n. mosquitensis*; and one marine snake: *Hydrophis platurus*; Köhler 2001; 2008; Sunyer and Köhler 2010). Another viper species, *Cerrophidion wilsoni*, formerly referred to as *C. godmani* (Jadin et al. 2012), has been left out of Nicaragua's checklist until voucher material is available (Köhler 2001; Sunyer and Köhler 2010), although the presence of this species in the northern highlands of the country is highly likely (Jadin 2010; Jadin et al. 2012) where it has even been reported to have bitten a finger of a cousin of Nicaragua's most prominent herpetologist (Villa 1962:46). Other venomous snake species that have been recorded from Nicaragua although their presence in the country seems more unlikely given their current distributions and are not included in the country's checklist until voucher specimens become available include *Atropoides occiduus*, *Bothriechis marchi*, *B. lateralis*, and *Laticauda colubrina* (Villa 1962; 1983; 1984; Villa et al. 1988; Ruiz 1996; Castoe et al. 2003; 2009; Ruiz and Buitrago 2003).

Sunyer and Köhler (2010) rated all Nicaraguan snake species under the IUCN Red List Categories (<http://www.iucn.org>) as well as provided each terrestrial species with an Environmental Vulnerability Score (EVS). Under the IUCN categorizations, all Nicaraguan snake species are considered as of Least Concern except for two species considered as Data Deficient, four as Vulnerable, and eight as Near Threatened (including *Agkistrodon*, now considered its Nicaraguan populations, *A. howardgloydi*, as an Endangered species [Porras et al. 2013]). The Environmental Vulnerability Score is a value that can indicate the potential vulnerability of each species in the country to environmental damage and is calculated with the use of three components: the extent of geographical range, the extent of ecological distribution in Nicaragua, and the degree of human prosecution (Wilson and McCranie 2003). At a Nicaraguan level, and out of the 101 Nicaraguan terrestrial snake species (not including *Hydrophis platurus*, the only marine snake species present in the country), 28 are considered as of High Vulnerability (including *Urotheca decipiens* and *U. pachyura*, both with an EVS of 14 [3+9+2]), 61 of Medium Vulnerability, and 12 of Low Vulnerability (including *Drymarchon melanurus*, a species with an EVS of 9 [1+4+4] that was not included in Sunyer and Köhler's [2010] Table 1, in error). Sunyer and Köhler (2010) additionally identified 10 snake species that have not yet been recorded from any of the Nicaraguan national protected areas.

The present contribution deals with one fourth of the snake species known to occur in Nicaragua and its purpose is to supply new findings of species poorly recorded in the country, including geographical range extensions, new departmental records, and the first photographs of Nicaraguan specimens, as well as new records of snake species previously unknown from any Nicaraguan national protected area.



**FIGURE 1.** Map of Nicaragua showing the collecting localities mentioned in text, with the exception of “between El Castillo and San Juan del Norte, along the Río San Juan and its tributaries” and “Laguna La Playuela”, 1.5 km south of “Río Indio Lodge”. Water surfaces are colored blue. Areas below 600 m green. Areas above 600 m brown. Areas above 1200 m dark brown.

Searches were made during the day and night, and specimens were photographed and/or caught by hand or with the help of a telescopic hook. For euthanasia, we applied an intracardial injection of T61 (Intervet) the day after capture. For preservation, we injected all soft parts of the specimen with a solution of formalin [4], and after fixation we submerged it in a closed bottle filled with the same solution. Collecting and exportation permits were provided by the personnel of MARENA (Ministerio del Ambiente y los Recursos Naturales), Managua, Nicaragua. Acronyms for museum collections follow those of Sabaj-Pérez (2013).

Figure 1 depicts all of the collection localities mentioned in text except for the area between El Castillo and San Juan del Norte, along the Río San Juan and its tributaries (the entire southeastern corner of the country), and Laguna La Playuela, located 0.5 km south of Old Greytown, which is equivalent to 1.5 km south of Río Indio Lodge (see Figure 1) or 2 km south of the town of San Juan del Norte, also known as San Juan de Nicaragua. In the Reserva Natural Cerro Musún we collected snake samples both on the northern (Palán-Bilampí) and the southern slope (proximities of Río Blanco). These two relatively nearby localities are depicted as a single dot in Figure 1. Geocoordinates are based on datum WGS84.

Based on the concept of life zones proposed by Holdridge (1967) and used by Sunyer and Köhler (2010) in Nicaragua, nine forest formations are recognized in the country. The forest formations of each mentioned locality

correspond to the following (see Figure 1): Lowland Wet Forest (Laguna Sílico, Río Indio Lodge, Laguna La Playuela, Dos Bocas de Río Indio, and between El Castillo and San Juan del Norte, along the Río San Juan and its tributaries); Lowland Moist Forest (Finca Palo Blanco, Río Frío, Papaturre, Finca Mataka, Kahkabila, Finca Santa Elena, and portions of Cerro Musún below 600 m a.s.l.); Lowland Dry Forest (Volcán Telica, Volcán Masaya, and La Campana); Premontane Wet Forest (portions of Cerro Musún between 600–1200 m a.s.l.); Premontane Moist Forest (portions of Cerro Datanlí-El Diablo and Cerro Wambuco between 600–1200 m a.s.l.); and Lower Montane Moist Forest (portions of Cerro Datanlí-El Diablo and Ecoposada Tisey above 1200 m a.s.l.). El Quebracho corresponds to a transitional area between Lowland Moist and Wet Forests. Finca Orosí corresponds to a transitional area between Lowland Moist and Dry Forests and, together with Papaturre, Río Frío, Laguna Sílico, Río Indio Lodge, Laguna La Playuela, Dos Bocas de Río Indio, and Kahkabila, is immersed or surrounded by wetlands.

#### SPECIES ACCOUNTS

##### *Agkistrodon howardgloydi* (Conant, 1984)

Cantil; Castellana

On July 14, 2010, A. E. Moraga Zamora, G. E. López Cruz, and J. G. Martínez Fonseca collected an adult male (MHUL 139) at Parque Nacional Volcán Masaya (11.97845°N, 86.15525°W), 405 m, Dept. Masaya, Nicaragua. The specimen was found during the early evening (*ca.* 18:30 h) coiled at ground level

near a small trail (Jiñocuabo trail). Since this specimen was collected, at least two additional individuals have been observed by park rangers in nearby localities within Parque Nacional Volcán Masaya. Another adult specimen of this species (Figure 2A) was photographed by N. Sonati on 2011, at Reserva Natural Volcán Telica-Rota, Dept. León, Nicaragua. The snake was trapped in a large hole in the ground at the base of Volcán Telica.

Porras *et al.* (2013) proposed species-level recognition to all previously recognized subspecies of *Agkistrodon bilineatus*, classifying *A. howardgloydi* as an Endangered species under the IUCN categories (the most threatened snake species in Nicaragua under the IUCN Red List Categories; Sunyer and Köhler 2010), and as a High Vulnerability species using the Environmental Vulnerability Scores. Villa (1962:42–43) recorded this species as “common in Nicaragua, especially in the proximity of rivers, lakes, and ponds ... [being] abundant in southern Nicaragua” but later considered it “not a common species in Nicaragua” (Villa 1984:19). Köhler (2001) provided specific voucher information for only three localities of this species in central Pacific Nicaragua (Depts. Granada and Masaya), and Campbell and Lamar (2004) plot five localities in central and northern Pacific Nicaragua. Currently *A. howardgloydi* is an uncommon and rarely recorded species, probably because of current land use policies and human population growth and expansion that have taken place along the Pacific forests of Nicaragua during the last decades. MHUL 139 represents the first record for Parque Nacional Volcán Masaya, and Figure 2A constitutes the first definite confirmation for Dept. León (see Villa 1984:17), filling in a gap in the distribution of this species in Pacific northern Nicaragua (Villa 1984; Köhler 2001; Campbell and Lamar 2004).

***Atropoides mexicanus*** (Duméril, Bibron & Duméril, 1854)  
Central American Jumping Pitviper; Mano de piedra

On January 18, 2013, M. F. Ubeda Olivas, R. A. Vado Hernández, H. López Guevara, B. M. García Miranda, and M. R. Guerra Blandino photographed an adult female (Figure 2B) on the slopes of Cerro Wambuco (13.87449°N, 86.26934°W), 1145 m, Dept. Nueva Segovia, Nicaragua. The viper was found during the morning (*ca.* 10:00 h) on the side of an unpaved road and was not collected.

Günther (1895:191, as *Bothriechis nummifera*), Boulenger (1896:544–5, as *Lachesis nummifer*), Villa (1962, 1984, as *Bothrops nummifera*), Köhler (2001:205, as *Atropoides nummifer*), and Campbell and Lamar (2004:281) recorded this species from two very closeby localities in Nicaragua based on three female specimens collected by Dr. E. Rothschild from Hacienda Rosa de Jerichó, 3250 ft. elevation, Dept. Matagalpa (two specimens), and from Matagalpa, Nicaragua (one specimen; Boulenger 1896). King *et al.* (2007) and Gómez *et al.* (2011) cited additional records of this species (as *A. nummifer*) from the surroundings of Siuna (170–600 m elevation, Dept. Atlántico Norte) and Matiguás (224–500 m elevation, Dept. Matagalpa), respectively, although did not provide supportive material, photographs, or data of these specimens. Castoe *et al.* (2003:423) plotted in their distribution map an isolated locality of *A. occiduus* in southwestern Nicaragua, which was not taken into

consideration in a subsequent publication (Castoe *et al.* 2009:92).

Our specimen (see Figure 2B) differs from typical *Atropoides mexicanus* in the following aspects (data taken from photographs; Savage 2002; Smith and Ferrari-Castro 2008): it has the prelacunal separated from second supralabial by one subfoveal row (vs. 2–3 subfoveal rows in *A. mexicanus*); it has the prenasal in broad contact with rostral (vs. separated by 2–4 small nasorostrals in *A. mexicanus*); it has the median preocular bordering the orbit (vs. separated from the orbit in *A. mexicanus*); it presents a wide postorbital stripe partially including the first row and reaching up to the fourth temporal row at midlength (vs. rows 3 and 4 in *A. mexicanus*); and it presents a relatively large dark subocular spot, which although is typical from other congeners such as *A. occiduus* and *A. indomitus*, it is sometimes also present in *A. mexicanus*. Our specimen agrees with *A. mexicanus* and differs from its most similar and geographically closest congeners *A. indomitus* and *A. occiduus* in having (data estimated from photographs) 118 ventral scales (vs. 140 in *A. indomitus*) and 39 subcaudals (vs. 24–36 in *A. occiduus*; Smith and Ferrari-Castro 2008). We believe our specimen corresponds either to an atypical *A. mexicanus*, an atypical *A. indomitus*, or to an undescribed species. Therefore, and until confirmation of the identity by voucher and genetic material of this population is available, Figure 2B represents the first published photograph in life of *A. mexicanus* from Nicaragua, the third and highest record for this species in the country, and the first published record from Dept. Nueva Segovia.

***Bothriechis schlegelii*** (Berthold, 1845)

Eyelash Palm-Pitviper; Cachito

On June 4, 2006, J. Sunyer, A. Hertz, S. Lotzkat, and D. E. Manzanarez collected a young male (SMF 89023; Figure 2C) at Fundación Fundeverde, Río Frío (11.06161°N, 84.74083°W), 45 m. Another specimen (SMF 89027) was collected by A. Gómez on 2007, near Papaturre (11.02270°N, 85.05130°W), 40 m. Both specimens were found during the night on vegetation in a patch of secondary forest surrounded by wetlands. On May 22, 2012, J. Sunyer photographed this species (Figure 2D) near the mouth of Papaturre River (11.02270°N, 85.05130°W), 35 m. The snake was found active by day on vegetation 1 m above the ground on the shore of the lower portions of the river in forested wetlands. All mentioned records correspond to the Refugio de Vida Silvestre Los Guatuzos, Dept. Río San Juan, Nicaragua.

*Bothriechis schlegelii* is a relatively common arboreal viper along the Atlantic lowlands of Nicaragua and the humid highlands on the northern part of the country (Köhler 2001; Campbell and Lamar 2004). Although it rarely causes death in humans, accidents with this species occur quite often in the country, especially during coffee bean harvesting. In Nicaragua this species is normally encountered in its variable and perfectly camouflaged green color phase (Figures 2E 1–4), occasionally in a striking and relatively variable yellow color phase, also known as oropel (Figure 2D), and rarely in other colorations such as the brown color phase shown in Figure 2C. SMF 89027 and Figure 2D represent the westernmost locality of this venomous species in southern



**FIGURE 2.** (A) *Agkistrodon howardgloydi* from Dept. León (Photo: N. Sonati); (B) *Atropoides mexicanus* from Dept. Nueva Segovia (Photo: R. A. Vado Hernández); (C) brown color phase (Photo: S. Lotzkat) and (D) orpel color phase *Bothriechis schlegelii* from Dept. Río San Juan; (E) variation in the green color phase of *B. schlegelii* from: (1–2) lowlands of Dept. Río San Juan (Photos: A. Ruiz Alemán and S. Lotzkat, respectively) and (3–4) highlands of Dept. Jinotega; (F) *Bothrops asper* from Dept. Rivas; (G) *Coniophanes bipunctatus* from Dept. Río San Juan; and (H) *Conopsis lineatus* from Dept. Matagalpa.

Nicaragua, with a range extension of about 18 km to the southwest from its nearest record on Solentiname Islands (Isla Venada, the easternmost of the largest islands on Archipiélago Solentiname), and 80 km westwards from its nearest Nicaraguan mainland record (Villa 1984; Köhler 2001; Campbell and Lamar 2004), being the Río Frío record (SMF 89023; Figure 2C) a middle locality.

***Bothrops asper*** (Garman, 1884)

Fer-de-Lance; Barba amarilla

On September 2, 2011, L. E. Gutierrez López and J. G. Martínez Fonseca collected an adult female (MHUL 140; Figure 2F) at Finca Orosí (11.14134°N, 85.33101°W), 35 m, Dept. Rivas, Nicaragua. The specimen was found active at ground level during the daytime (*ca.* 9:30 h) in a seasonally flooded cattle field, near areas of secondary forest that are transitional from Lowland Moist Forest to Lowland Dry Forest (Holdridge 1967).

*Bothrops asper* is an abundant species in the Atlantic lowlands of Nicaragua and is responsible for most of the human snakebite mortalities, which constitute up to 25% of the total recorded bites in that region (Coe and Anderson 2005; Villalobos-Salazar 2008). Therefore, a detailed distribution picture of this dangerous viper in the country is of great importance for clinical purposes (Hansson *et al.* 2010). MHUL 140 constitutes the westernmost voucher of this feared snake species in Nicaragua (Villa 1984; Köhler 2001).

***Coniophanes bipunctatus*** (Günther, 1858)

Two-spotted Snake; Culebra ventripunteada

On June 6, 2012, J. Sunyer, A. Gómez, and D. M. Galindo collected an adult female (MHUL 141; Figure 2G) at Papaturo (11.02270°N, 85.05130°W), 40 m, Refugio de Vida Silvestre Los Guatuzos, Dept. Río San Juan, Nicaragua. The specimen, which is missing part of the tail, was found along the shore of the Papaturo River, active at night at ground level in the garden of “Caiman Cabins”.

*Coniophanes bipunctatus* was previously known in Nicaragua from two localities in Depts. Atlántico Norte (erroneously placed in Dept. Nueva Segovia in Köhler 2001:198) and Granada (Campbell and Howell 1965; Villa 1971; Köhler 2001). To the south of these localities, the species is known only from a single specimen collected in the Atlantic lowlands of northern Costa Rica (Savage 2002). Therefore, MHUL 141 represents the third locality for this species in the country, the first record in the southern part of Nicaragua, and the second southernmost record of this species along its entire distribution filling in a 265 km gap in the distribution of this species (Köhler 2001; Savage 2002). Figure 2G additionally constitutes the first published photograph of this species in life from Nicaragua.

***Conopsis lineatus*** (Duméril, Bibron & Duméril, 1854)

Road Guarder; Guardacaminos

On July 13, 2006, J. Sunyer, L. A. Obando, and D. E. Manzanarez obtained an adult male of this species (SMF 88986; Figure 2H) from a local farmer, which came from Reserva Natural Cerro Musún (12.94944°N, 85.23378°W), 450 m, in the proximity of Río Blanco, Dept. Matagalpa, Nicaragua. The farmer killed the snake near his home that morning.

*Conopsis lineatus* is a relatively common species that, in Nicaragua, is restricted in distribution to the Pacific versant (Köhler 2008). Therefore, Reserva Natural Cerro Musún constitutes the easternmost locality of this venomous species (Greene 1997:83) in Nicaragua, with a range extension of about 70 km eastward from the nearest record (Köhler 2001).

***Corallus annulatus*** (Cope, 1875)

Ringed Tree Boa; Boa arborícola

On June 11, 2010, J. Sunyer, K. Nicholson, L. A. Obando, G. Gubler, and J. Phillips collected this species (MHUL 142; Figure 3A) at Laguna Sílico (10.84046°N, 83.76687°W), 16 m, Refugio de Vida Silvestre Río San Juan, Dept. Río San Juan, Nicaragua. The snake was found active at night on vegetation 2 m above the ground in primary forest.

*Corallus annulatus* was previously known in Nicaragua from four localities (Travers *et al.* 2011). Therefore, MHUL 142 constitutes the fifth voucher of this species for the country.

***Crotalus simus*** Latreille, 1801

Central American Rattlesnake; Cascabel

On 2011, N. Cerrato photographed a dead specimen of this species (Figure 3B) at Ecoposada Tisey (12.98141°N, 86.38090°W), 1230 m, Reserva Natural Tisey-Estanzuela, Dept. Estelí, Nicaragua, in a secondary forest. Since this specimen was photographed (Figure 3B), at least two other unconfirmed sight records of *Crotalus simus* have been reported from the vicinity of Ecoposada Tisey at elevations of up to 1300 m.

*Crotalus simus* is known to inhabit the Pacific versant of Nicaragua at elevations up to 670 m (Köhler 2001; Campbell and Lamar 2004; Sunyer and Köhler 2010). Therefore, Figure 3B extends the elevation of this venomous species in Nicaragua by 560 m: the elevational distribution of this species in Nicaragua is now extended from about sea-level to at least 1230 m.

***Dipsas articulata*** (Cope, 1868)

American Snail-eater; Falso coral caracolero bicolor

On February 26, 2010, J. Sunyer collected an adult male (MHUL 143; Figure 3C) at Río Indio Lodge, on the trail from the hotel to La Finca, along the old dredged canal portion (10.93101°N, 83.72604°W), 10 m, Refugio de Vida Silvestre Río San Juan, Dept. Río San Juan, Nicaragua. The snake was found active at night on vegetation 0.2 m above the ground, in a secondary forest. Since the collection of this specimen, at least four other individuals of this species have been observed by the senior author in the surroundings of Río Indio Lodge.

*Dipsas articulata* was previously known in Nicaragua from a single specimen collected at Refugio Bartola, Dept. Río San Juan (Köhler and Vielmetter 2002). Therefore, MHUL 143 represents the second confirmed specimen of this species in Nicaragua and extends the known distributional range about 67 km to the east.

***Enuliophis sclateri*** (Boulenger, 1894)

Sock-headed Snake; Cabeza blanca

On January 20, 2011, J. G. Martínez Fonseca, M. Fernandez, J. Loza, and A. Ruiz Alemán, photographed an

adult male of this species (Figure 3D) at Reserva Privada El Quebracho (11.14655°N, 84.35366°W), 60 m, Dept. Río San Juan, Nicaragua. The snake was found during the day (*ca.* 9:00 h) at ground level around a rotten log in a patch of forest.

*Enuliophis sclateri* was previously known in Nicaragua from three specimens and two localities in the northern part of the country (Depts. Atlántico Norte and Matagalpa; Köhler *et al.* 2004). Gómez *et al.* (2011) provided two additional records of this species from the surroundings of Matiguás (224–500 m elevation, Dept. Matagalpa), although they did not provide supportive material, photographs, or data for these specimens. Therefore, Figure 3D is the fourth record of this species from the country and the first record in Dept. Río San Juan, as well as in the southern part of Nicaragua, filling in a 235 km gap in the distribution of this species (Köhler 2001; Savage 2002).

### ***Imantodes gemmistratus*** (Cope, 1861)

Banded Blunt-headed Tree Snake; Cordelilla desteñida

On May 16, 2009, J. G. Martínez Fonseca and G. E. López Cruz collected this species (MHUL 144; Figure 3E) at Parque Nacional Volcán Masaya (12.01192°N, 86.14534°W), 273 m, Dept. Masaya, Nicaragua. The specimen was found active at night crossing a paved road.

Although Köhler (2001) provided five localities of *Imantodes gemmistratus* in Nicaragua, the presence of this species inside a Nicaraguan protected area was unknown (Sunyer and Köhler 2010). Therefore, MHUL 144 constitutes the first record of this species in the Nicaraguan national protected areas system (SINAP), and is additionally the first published record of this arboreal snake in Dept. Masaya (Köhler 2001).

### ***Imantodes inornatus*** (Boulenger, 1896)

Yellow Blunt-headed Tree Snake; Cordelilla pálida

On July 21, 2007, J. Sunyer, I. Garbayo, and A. Gómez collected an adult female (SMF 88984; Figure 3F) near Papaturre (11.02270°N, 85.05130°W), 40 m, Refugio de Vida Silvestre Los Guatuzos, Dept. Río San Juan, Nicaragua. The snake was found active at night on vegetation 8 m above the ground in an old abandoned cacao plantation. Another specimen (MHUL 145) was collected by J. Sunyer, J. Touchon, and H.-J. Lee on August 10, 2012, at Pearl Lagoon's shore (12.37977°N, 83.73485°W), 5 m, 3 km S of Kahkabila, Dept. Atlántico Sur, Nicaragua. The snake was found active at night (*ca.* 21:00 h) in a forested swamp on vegetation 0.3 m above the water.

*Imantodes inornatus* was previously known in Nicaragua from three localities, all in the northern part of the country in Depts. Atlántico Norte, Matagalpa, and Jinotega (Köhler 2001; Travers *et al.* 2011). Therefore, SMF 88984 and MHUL 145 represents the fourth and fifth published localities for this species in Nicaragua and the first records in the central and southern parts of the country, filling in an over 250 km gap in the distribution of this species (Köhler 2001; Savage 2002).

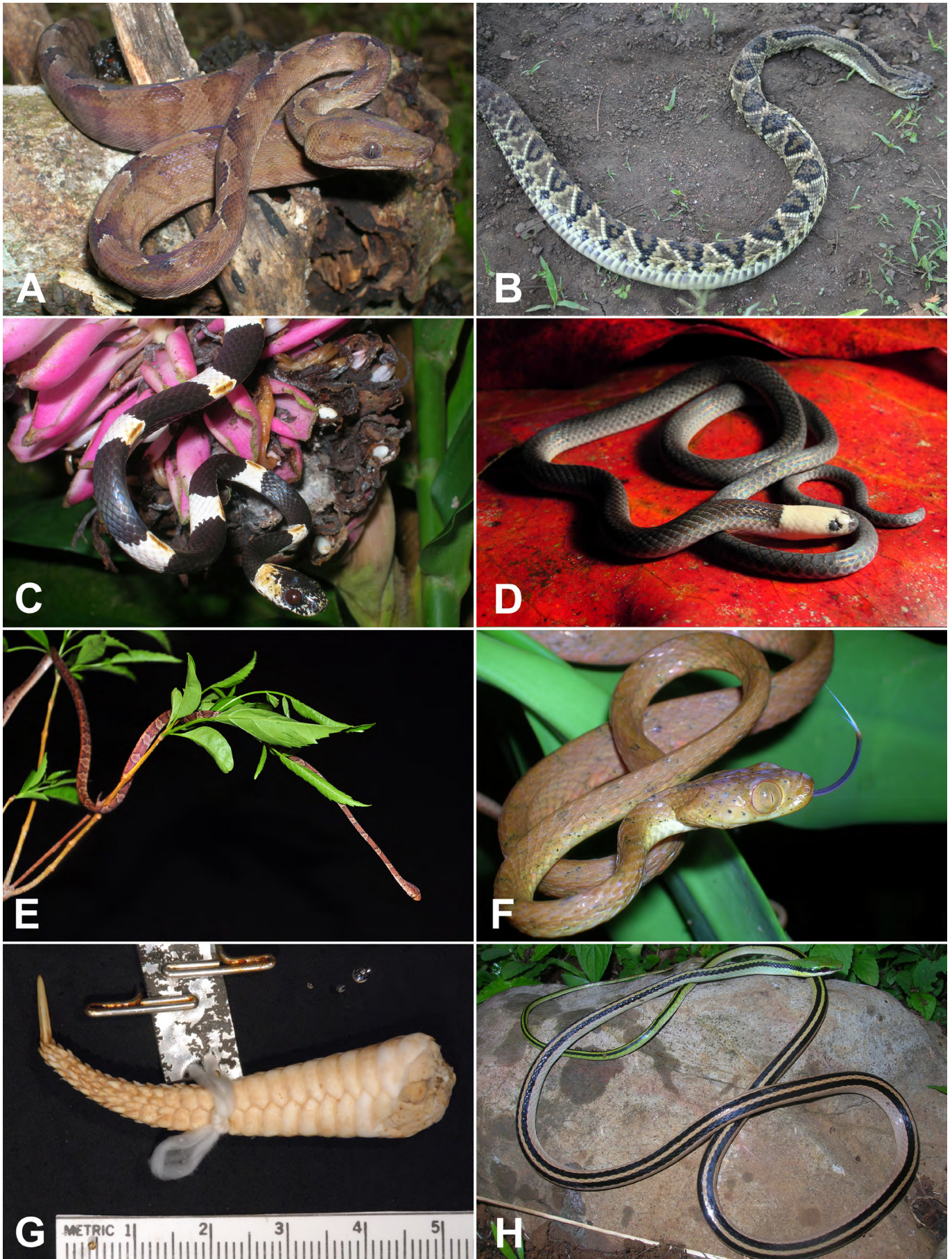
### ***Lachesis stenophrys*** Cope, 1875

Bushmaster; Matabuey

In 1885, Captain J. F. Bransford collected this species (USNM 14221; a portion of tail; Figure 3G) between El

Castillo and San Juan del Norte, along the Río San Juan and its tributaries, Dept. Río San Juan, Nicaragua.

*Lachesis stenophrys* is a secretive and rarely seen species that has only been recorded from two localities in Nicaragua, the northern limit of distribution of this giant viper (Campbell and Lamar 2004; Köhler 2008). Villa (1962) and Vial and Jiménez-Porras (1967) first recorded a specimen as *Lachesis muta* (KU 174464; Köhler 2001; Campbell and Lamar 2004) from between Acoyapa and Santo Tomás, Dept. Chontales. A second specimen was recorded by Villa (1971) as *L. m. stenophrys* from the vicinity of Muhán (a small town in Dept. Chontales *ca.* 26 km ESE Santo Tomás), which is approximately 16 km straight line westward from the current departmental border between Depts. Chontales and Atlántico Sur (formerly the southern portion of Dept. Zelaya). The Muhán specimen corresponded to a crudely stuffed, unnumbered specimen that was deposited in the Museo de Chontales (Villa 1971; also known as Museo Arqueológico “Gregorio Aguilar Barea”), Juigalpa, Dept. Chontales, and was discarded several decades ago due to the poor state in which the specimen existed (C. Villanueva, current administrator of the museum and son of museum's original administrator and taxidermist, Juigalpa, pers. comm. 2012). Campbell and Lamar (2004:444) plotted a third locality in Dept. Chontales in their species distribution map, but did not mention a voucher or source to justify this locality (Campbell and Lamar 2004:449). According to Vial and Jiménez-Porras (1967), all records of *Lachesis* from Nicaragua prior to Villa (1962) have been based on dubious evidence and lack locality records. This includes the specimen USNM 14221, where the designation of “Nicaragua” is probably inaccurate because a substantial part of the Bransford collection was known to be from Panama (Vial and Jiménez-Porras 1967; Campbell and Lamar 2004). Savage (1973) clarified the confusion surrounding the provenance of the Bransford collection: regarding the herpetological material collected by Bransford in 1885, “there can be no question that they were taken between El Castillo and San Juan [Juan] del Norte, along the Río San Juan and its tributaries, Departamento Río San Juan, Nicaragua, between 22 January and 29 April 1885” (Savage 1973). Vial and Jiménez-Porras (1967) and Campbell and Lamar (2004) additionally noted that the U. S. National Museum of Natural History assigned the number USNM 14221 to another species (*Micrurus nigrocinctus*), thus questioning the locality data of the *Lachesis* specimen. Currently, USNM 14221 corresponds to a portion of tail of *L. stenophrys* (see Figure 3G) labeled as a *L. muta* collected during the Nicaragua Surveying Expedition in 1885 (record last modified on August 31, 2012). Therefore, and although *ca.* 130 years later, USNM 14221 represents the second voucher and third definitive locality of *L. stenophrys* in Nicaragua filling in a *ca.* 200 km gap in the distribution of this species (Campbell and Lamar 2004). It additionally represents the first confirmation of this venomous species inside a Nicaraguan protected area (Reserva de Biosfera del Sureste de Nicaragua; Sunyer and Köhler 2010), as well as the first record for Dept. Río San Juan (Villa 1984; Köhler 2001; Campbell and Lamar 2004).



**FIGURE 3.** (A) *Corallus annulatus* from Dept. Río San Juan; (B) *Crotalus simus* from Dept. Estelí (Photo: N. Cerrato); (C) *Dipsas articulata* from Dept. Río San Juan; (D) *Enuliophis sclateri* from Dept. Río San Juan; (E) *Imantodes gemmistratus* from Dept. Masaya; (F) *Imantodes inornatus* from Dept. Río San Juan; (G) ventral side of portion of tail of *Lachesis stenophrys* from Dept. Río San Juan (Photo: J. Poindexter II); and (H) *Leptodrymus pulcherrimus* from Dept. Matagalpa.



***Leptodrymus pulcherrimus*** (Cope, 1874)

Striped Lowland Snake; Bejuquilla rayada

On July 13, 2006, J. Sunyer, L. A. Obando, and D. E. Manzanarez obtained an adult male (SMF 88976; Figure 3H) from a local farmer at Reserva Natural Cerro Musún (12.94944°N, 85.23378°W), 450 m, in the proximity of Río Blanco, Dept. Matagalpa, Nicaragua. The farmer killed the snake that morning near his home.

Although Köhler (2001) recorded this species from only four departments in the country, *Leptodrymus pulcherrimus* is a relatively common species that, in Nicaragua, is restricted to the Pacific versant. Gómez *et al.* (2011) cited two additional records of this species from the surroundings of Matiguás (Dept. Matagalpa), Río Blanco's adjacent western Municipality, although they did not provide voucher, photographs, or data for these specimens. Therefore, Reserva Natural Cerro Musún constitutes the easternmost locality for this species in Nicaragua and SMF 88976 represents the first voucher from Dept. Matagalpa.

***Leptophis ahaetulla*** (Linnaeus, 1758)

Parrot Snake; Chocoya

On January 24, 2012, J. G. Martínez Fonseca and M. F. Chavez Velasquez collected an adult female (MHUL 146; Figure 4A) on the northern slope of Cerro La Campana (11.24169°N, 85.73731°W), 214 m, Dept. Rivas, Nicaragua. The snake was found basking in the sun during the day (*ca.* 10:30 h) at ground level on a path's edge, about 5 m away from a stream in a patch of forest.

*Leptophis ahaetulla* is a relatively common species that in Nicaragua is restricted to the Atlantic versant and northern highlands (Köhler 2001; 2008). MHUL 146 constitutes the first record of the species on the Pacific versant of the country and is the westernmost voucher of this species in Nicaragua, extending its known distributional range 80 km to the west from its closest known locality in Papaturro, Dept. Río San Juan (see Figure 1; SMF 88993).

***Micrurus alleni*** Schmidt, 1936

Allen's Coralsnake; Coral Negro

In 2007, A. Gómez collected this species (SMF 87273; Figure 4B) near Papaturro (11.02270°N, 85.05130°W), 40 m, Refugio de Vida Silvestre Los Guatuzos, Dept. Río San Juan, Nicaragua. The snake was found active during the day at ground level in a patch of forest.

*Micrurus alleni* is a relatively well-recorded species along the Atlantic lowlands of Nicaragua (Köhler 2001; Campbell and Lamar 2004). SMF 87273 represents the westernmost record of this venomous snake in southern Nicaragua, extending its known distribution around 32 km westwards in the southern part of the country (Villa 1984; Köhler 2001; Campbell and Lamar 2004).

***Nothopsis rugosus*** Cope, 1871

Rough Coffee Snake; Culebrita rugosa

On June 9, 2010, J. Sunyer, K. Nicholson, L. A. Obando, G. Gubler, and J. Phillips collected an adult male of this species (MHUL 147; Figure 4C) at Río Indio Lodge, trail from hotel to airport (10.93101°N, 83.72604°W), 10 m, Refugio de Vida Silvestre Río San Juan, Dept. Río San Juan, Nicaragua. The snake was found active at night at ground

level along a swampy trail in a secondary forest.

*Nothopsis rugosus* was previously known in Nicaragua from two records in Dept. Atlántico Norte (Köhler and Schmidt 2001; Köhler *et al.* 2004) and one additional record at Colorado Junction, Dept. Río San Juan (Köhler 2001), about 17 km south of Río Indio Lodge. Therefore, MHUL 147 represents the fourth record for this species in Nicaragua.

***Porthidium nasutum*** (Bocourt, 1868)

Hog-nosed Pitviper; Ñatilla

On November 13, 2011, J. Sunyer and J. Bosch obtained an adult female (MHUL 148; Figure 4D) at El Gobiado (13.15785°N, 85.87355°W), 1050 m, Reserva Natural Datanlí-El Diablo, Dept. Jinotega, Nicaragua. The snake was found active during the day (*ca.* 11:30 h) while crossing a dirt road. The local farmer who collected the snake, a man in his early fifties, was bitten on the last phalange of his index finger while manipulating the specimen. His finger immediately swelled slightly, turned red (see inset in Figure 4D), and he experienced pain, although he considered the bite a minor accident and did not visit a health center or treat it with any traditional medicine. By the third day, the symptoms had almost disappeared.

*Porthidium nasutum* is a relatively common terrestrial viper in lowland Atlantic Nicaragua that also occurs peripherally in the eastern slopes of the country's northern mountains up to 990 m elevation (Sunyer and Köhler 2010). MHUL 148 constitutes the highest record of this species along its entire distributional range, extending its known vertical distribution 60 m in elevation. It additionally represents the first confirmed record in the highlands of Dept. Jinotega (Travers *et al.* 2011).

***Porthidium ophryomegas*** (Bocourt, 1868)

Western Slender Hog-nosed Pitviper; Corníz

On December 28, 2012, J. G. Martínez Fonseca and M. Fernández, collected an adult male of this species (MHUL 149; Figure 4E) at Finca Palo Blanco (11.27431°N, 84.84141°W), 45 m, Comarca Los Pantanos, 6 km north of San Miguelito, Dept. Río San Juan, Nicaragua. The snake was found active at dusk (*ca.* 18:00 h) while crossing a trail in a patch of secondary forest.

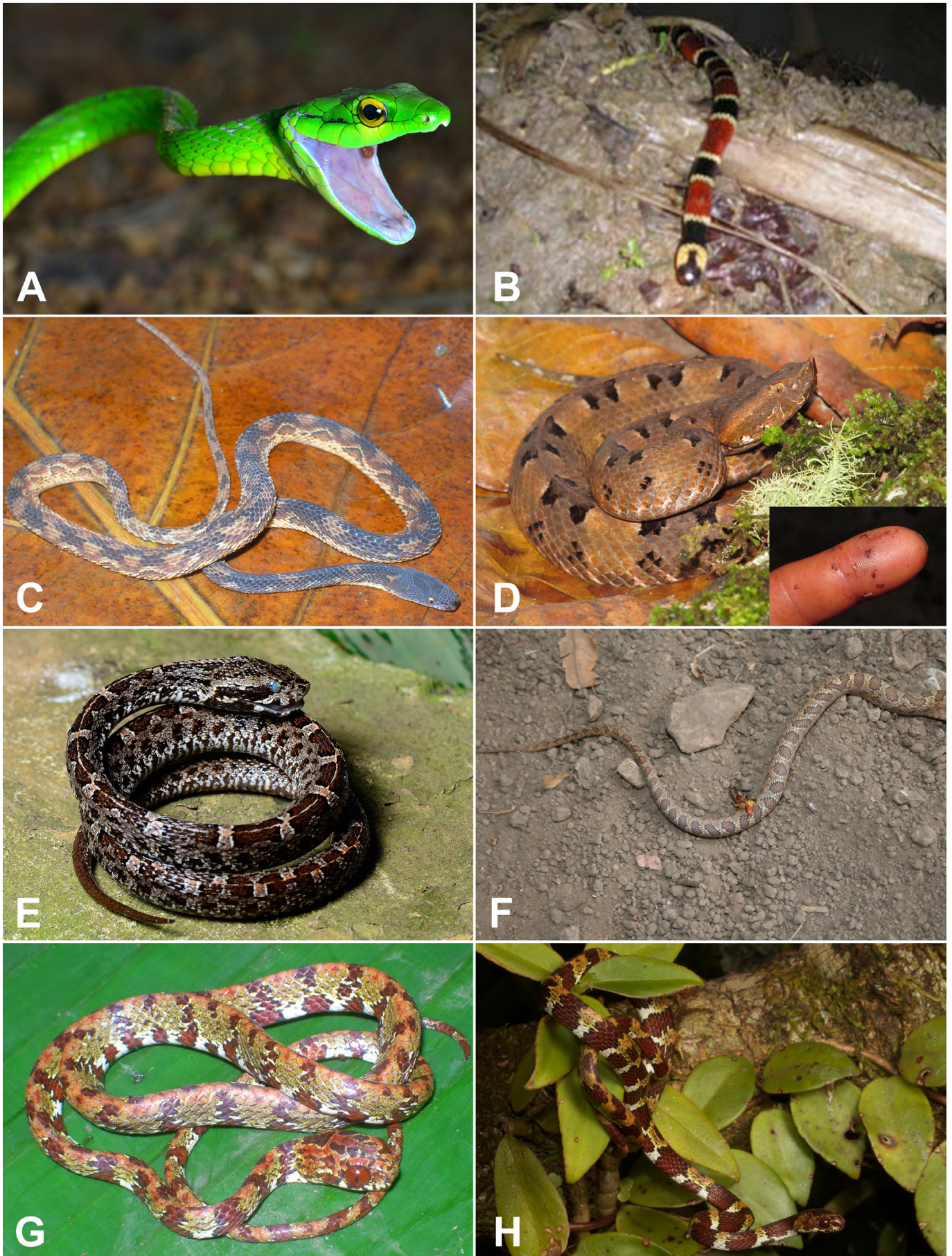
*Porthidium ophryomegas* is a relatively widespread viper across Pacific Nicaragua (Villa 1984; Köhler 2001; Campbell and Lamar 2004). MHUL 149 constitutes the easternmost record of this species in Nicaragua, extending its known distribution about 60 km to the southeast on the eastern side of Nicaragua's Great Lake (Villa 1984; Campbell and Lamar 2004).

***Pseudoelaphe flavirufa*** (Cope, 1867)

Yellow-red Rat Snake; Ratonera manchada

In 2011, N. Cerrato photographed a dead specimen of this species (Figure 4F) at Ecoposada Tisey (12.98141°N, 86.38090°W), 1230 m, Reserva Natural Tisey-Estanzuela, Dept. Estelí, Nicaragua, in a secondary forest.

*Pseudoelaphe flavirufa* is a poorly documented species in Nicaragua (Köhler 2001). Its distribution in Nicaragua is limited to few localities in the lowlands of the Pacific versant of the country and Great Corn Island (Köhler 2001), and includes a sight record from



**FIGURE 4.** (A) *Leptophis ahaetulla* from Dept. Rivas; (B) *Micrurus alleni* from Dept. Río San Juan (Photo: A. Gómez); (C) *Nothopsis rugosus* from Dept. Río San Juan; (D) *Porthidium nasutum* from Dept. Jinotega; (E) *Porthidium ophryomegas* from Dept. Río San Juan; (F) *Pseudoelaphe flavirufa* from Dept. Estelí (Photo: N. Cerrato); and *Sibon annulatus* from (G) Dept. Matagalpa; and (H) Dept. Río San Juan (Photo: T. Pierson).

central Nicaragua (surroundings of Matiguás, Dept. Matagalpa; Gómez *et al.* 2011). The presence of this species from inside a Nicaraguan protected area was unknown (Sunyer and Köhler 2010). Therefore, Figure 4F represents the first record of this species in the Nicaraguan national protected areas system (SINAP), the highest record for this species in Nicaragua, and the first published record from Dept. Estelí.

***Sibon annulatus*** (Günther, 1872)

Red-ringed Snail-eater; Tragababosas anillada

On July 6, 2006, J. Sunyer, L. A. Obando, and D. E. Manzanarez collected this species (SMF 88180; Figure 4G) at Palán-Bilampí (13.01139°N, 85.23656°W), 750 m, northern slope of Reserva Natural Cerro Musún (Figure 1), Dept. Matagalpa, Nicaragua. The specimen was found active on vegetation approximately 1 m above the ground at night (*ca.* 21:00 h). Another specimen (MVZ 269290; Figure 4H; adult female) was collected by J. Sunyer, T. Papenfuss, T. Pierson, and M. Ubeda on April 7, 2012, at Dos Bocas de Río Indio (11.04856°N, 83.88011°W), 10 m, Reserva Biológica Indio-Mañá, Dept. Río San Juan, Nicaragua. The snake was found active at night in a swampy area on vegetation approximately 2 m above the ground.

*Sibon annulatus* was previously known in Nicaragua from two localities in Depts. Atlántico Norte and Jinotega (Köhler and Seipp 1998; Köhler 2001). Therefore, our records represent the third and fourth localities for this species in Nicaragua and the first in Depts. Matagalpa and Río San Juan, respectively; the latter also is the first confirmation of this species in the southern part of the country, which fills a distributional gap of over 300 km (Köhler 2001; Savage 2002). Köhler *et al.* (2010:85) erroneously recorded SMF 88180 from an elevation of 620 m.

***Sibon dimidiatus*** (Günther, 1872)

Orange-ringed Snail-eater; Tragababosas bandeada

On May 22, 2010, J. Sunyer, K. Nicholson, L. A. Obando, G. Gubler, and J. Phillips collected an adult female of this species (MHUL 150; Figure 5A) at El Gobiado (13.15785°N, 85.87355°W), 1252 m, Reserva Natural Datanlí-El Diablo, Dept. Jinotega, Nicaragua. The specimen was found active at night around 2 m above the ground in a secondary forest. Another specimen (MHUL 151; Figure 5B; juvenile male) was collected by J. Sunyer, J. G. Martínez Fonseca, and M. Fernandez on October 3, 2011, at the same general locality (13.15736°N, 85.87672°W), 1210 m. The specimen was found active at night along a small path, on herbaceous vegetation approximately 0.5 m above the ground, in a small patch of secondary forest that was entirely surrounded by coffee plantation parcels.

*Sibon dimidiatus* was previously known in Nicaragua from two localities, both located in Dept. Matagalpa (Köhler 2001; Köhler *et al.* 2010). Therefore, our two new records represent the third known locality for this species in Nicaragua and the first confirmed records for Dept. Jinotega. Additionally, Figure 5B is the first photograph of a juvenile of this species from Nicaragua; this species exhibits an extensive ontogenetic color change (compare Figures 5A and 5B; McCranie [2011:402–3]).

***Tantilla armillata*** Cope, 1875

Black-necked Crowned Snake; Culebrita de tierra tragaciempiés cabezinegra

On May 25, 2010, J. G. Martínez Fonseca and G. E. López Cruz collected an adult of this species (MHUL 152; Figure 5C) at Parque Nacional Volcán Masaya (11.98847°N, 86.15953°W), 588 m, Dept. Masaya, Nicaragua. It was found active during the day (*ca.* 15:00 h), at ground level in a natural pasture around the now extinct San Fernando crater.

Although *Tantilla armillata* is a relatively common species along the Pacific versant of Nicaragua, its presence inside a Nicaraguan protected area was unknown (Sunyer and Köhler 2010). In 2010, the entire island of Ometepe in Lake Nicaragua was protected formally under the category of Reserva de la Biosfera, thus including a historical record of this species inside the Nicaraguan national protected areas system (Hardy and Cole 1967). In addition to this historical record, MHUL 152 represents the first confirmation of this species inside a Nicaraguan protected area. The latter is also the first published record of this secretive fossorial snake from Dept. Masaya (Wilson and Villa 1973).

***Tantilla reticulata*** Cope, 1860

Black-headed Crowned Snake; Culebrita de tierra tragaciempiés reticulada

In 2007, L. A. Obando collected an adult male (SMF 88191; Figure 5D) at Laguna La Playuela, 1.5 km S of Río Indio Lodge (10.94936°N, 83.73544°W), 5 m, Refugio de Vida Silvestre Río San Juan, Dept. Río San Juan, Nicaragua. The snake was found active during the day while swimming across a lagoon.

*Tantilla reticulata* was previously known in Nicaragua from two specimens collected at Colorado Junction, Dept. Río San Juan, and Bachas Creek, Dept. Zelaya, respectively (Köhler 2001; McCranie 2011). Therefore, SMF 88191 represents the third voucher of this species in Nicaragua.

***Tropidodipsas sartorii*** Cope, 1863

Terrestrial Snake Sucker; Falso coralito tragacaracoles

On July 31, 2010, J. G. Martínez Fonseca and G. E. López Cruz collected an adult female (MHUL 153; Figure 5E) at Parque Nacional Volcán Masaya (11.97902°N, 86.16798°W), 475 m, Dept. Masaya, Nicaragua. The snake was found active at ground level during the day (*ca.* 15:00 h) in a rocky area near the entrance to a relatively large natural cave. Another specimen (Figure 5F) was secured and later released by G. E. López Cruz on December 28, 2011, while active at ground level during the day deep inside the same cave, in complete darkness.

*Tropidodipsas sartorii* was previously known in Nicaragua from two localities in Depts. Atlántico Norte and Managua (Köhler 2001; Travers *et al.* 2011). Therefore, MHUL 153 represents the third published locality for this species in Nicaragua, the first record for Dept. Masaya, and first published photographs in life of this species from the country (Figures 5E and 5F).

***Ungaliophis panamensis*** Schmidt, 1933

Panamanian dwarf Boa; Boita sureña

On July 30, 2012, J. Sunyer and D. M. Galindo collected a male (MHUL 154; Figure 5G) at Río Indio Lodge



**FIGURE 5.** (A) Adult and (B) juvenile *Sibon dimidiatus* from Dept. Jinotega; (C) *Tantilla armillata* from Dept. Masaya; (D) *Tantilla reticulata* from Dept. Río San Juan; (E-F) *Tropicodipsas sartorii* from Dept. Masaya; (G) *Ungaliophis panamensis* from Dept. Río San Juan; and (H) *Xenodon rabdocephalus* from Dept. Atlántico Sur.

(10.93095°N, 83.72630°W), 11 m, Refugio de Vida Silvestre Río San Juan, Dept. Río San Juan, Nicaragua. The snake was found active at night (ca. 21:30 h) at approximately 2 m above the ground, within the hotel installations on the floor of the elevated wooden corridor that communicates with all rooms.

*Ungaliophis panamensis* was previously known in Nicaragua from a single specimen collected over a century ago in a nearby locality (Río Misterioso; Dunn and Bailey 1939). Therefore, MHUL 154 represents the second confirmed specimen of this species in Nicaragua and constitutes the northernmost distributional record for the species, extending the range about 17 km to the northeast (Bogert 1968; Köhler 2001). Additionally, Figure 5G constitutes the first published photograph in life of this species from Nicaragua.

### *Xenodon rabdocephalus* (Wied, 1824)

False Fer-de-Lance; Falsa Barba amarilla

On September 16, 2009, J. Sunyer and L. A. Obando collected this species (MHUL 155) at Finca Santa Elena (12.53437°N, 85.36208°W), 535 m, Municipio de Camoapa, Dept. Boaco, Nicaragua. The snake was found active during the day (ca. 9:00 h) at ground level in a pasture. Another specimen (Figure 5H; adult male) was photographed by Julio C. Loza, J. G. Martínez Fonseca, and M. Fernandez on December 25, 2012, at Finca Mataka (12.24207°N, 84.21597°W), 45 m, 27 km northwest of El Rama, Dept. Atlántico Sur, Nicaragua. The snake was found active during the day (ca. 9:00 h) at ground level during a rainy day in a secondary forest.

*Xenodon rabdocephalus* is a mimetic dipsadid of the venomous *Bothrops asper* (see Figure 2F), a viper present along the entire Nicaraguan Atlantic lowlands. *Xenodon rabdocephalus* has only been recorded both to the north and south of Atlantic Nicaragua as well as peripherally in the northern highlands (Köhler 2001). Therefore, MHUL 155 and Figure 5H represent the first records in the central part of the country closing a gap of over 200 km in the distribution of this species along Nicaragua's central Atlantic lowlands. Additionally, MHUL 155 constitutes the first record of this species for Dept. Boaco (Köhler 2001).

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