Nototriton nelsoni is a moss salamander endemic to cloud forest in Refugio de Vida Silvestre Texíguat, located in the departments of Atlántida and Yoro, Honduras. This cryptic species long was confused with *N. barbouri*, a morphologically similar species now considered endemic to the Sierra de Sulaco in the southern part of the department of Yoro. Like many of its congeners, *N. nelsoni* rarely is observed in the wild, and is known from just five specimens. Pictured here is the holotype of *N. nelsoni*, collected above La Liberación in Refugio de Vida Silvestre Texíguat at an elevation of 1,420 m. This salamander is one of many herpetofaunal species endemic to the Cordillera Nombre de Dios.

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Amphibians of the Cordillera Nombre de Dios, Honduras: COI barcoding suggests underestimated taxonomic richness in a threatened endemic fauna

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Abstract: The Cordillera Nombre de Dios is a chain of mountains along the northern coast of Honduras that harbors a high degree of herpetofaunal endemism. We present a preliminary barcode reference library of amphibians from the Cordillera Nombre de Dios, based on sampling at 10 sites from 2008 to 2013. We sequenced 187 samples of 21 nominal taxa for the barcoding locus cytochrome oxidase subunit I (COI), and recovered 28 well-differentiated clades. We posit that the taxonomic diversity in three named species, *Bolitoglossa porrasorum*, *Nototriton barbouri*, and *Ptychohyla spinipollex* is underestimated, and summarize their taxonomic history. We discuss the conservation status of members of the endemic amphibian fauna, the anthropogenic environmental impact on them, and future prospects for conservation and sustainability.

Key Words: Anurans, *Bolitoglossa porrasorum*, conservation status, environmental impact, north-central Honduras, *Nototriton barbouri*, *Ptychohyla spinipollex*, salamanders

Resumen: La Cordillera Nombre de Dios es una cadena de montañas a lo largo de la costa norte de Honduras que posee un alto grado de endemismo herpetofaunístico. Presentamos una biblioteca de referencia de código de barras de ADN preliminar para los anfibios de la cordillera Nombre de Dios, en base al muestreo de 10 sitios de 2008 a 2013. Sequenciamos 187 muestras de 21 taxones nominales para el gen conocido como el código de barras del locus citocromo oxidasa subunidad I (COI), y recuperamos 28 clados bien diferenciados. Postulamos que se subestima la diversidad taxonómica en tres especies nombradas, *Bolitoglossa porrasorum*, *Nototriton barbouri*, y *Ptychohyla spinipollex*, y resumimos la historia taxonómica de las tres especies. Discutimos el estado de conservación de los miembros de la fauna anfibia endémica, el impacto de los factores antropogénicos que los afectan, y las perspectivas futuras para su conservación y sostenibilidad.

Palabras Claves: Anuros, *Bolitoglossa porrasorum*, estatus de conservación, Honduras norcentral, impacto ambiental, *Nototriton barbouri*, *Ptychohyla spinipollex*, salamandras

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INTRODUCTION

The Cordillera Nombre de Dios (CND) is a high relief coastal mountain chain in northern Honduras that contains one of the richest areas of herpetofaunal endemism in Mesoamerica (Wilson and McCranie, 2004; McCranie and Castañeda, 2005; Townsend et al., 2012). Together with the Sierra de Omoa and Sierra de Espíritu Santo, the CND is part of the Northern Cordillera of the Chortís Highlands (Townsend, 2014). The CND stretches for more than 215 km across the departments of Atlántida, Colón, and Yoro, and is bordered by the Sula Graben Valley to the west, the narrow coastal plain known as the Nombre de Dios Piedmont to the north, and the subhumid Aguán Valley to the south and east (Townsend, 2014). Geologically, the CND is characterized as one of the most seismically active and highest relief areas of the modern Chortís Block (Rogers and Mann, 2007), and is part of a Honduran Borderlands portion of the Chortís Highlands geomorphological province (Marshall, 2007).

The CND contains at least six isolated highland areas that, under natural conditions, support relatively extensive areas of premontane rainforest and cloud forest (Fig. 1). These areas include the following (from west to east): Reserva Ecológica (RE) Montaña Mico Quemado (maximum elevation 1,430 m), Refugio de Vida Silvestre (RVS) Texíguat (maximum elevation 2,210 m), Parque Nacional (PN) Pico Bonito (maximum elevation 2,435 m), PN Nombre de Dios (maximum elevation 1,725 m), Cerro Corre Viento (maximum elevation 1,235 m), and PN Capiro y Calentura (maximum elevation 1,185 m). A significant fragment of old growth lowland rainforest also is protected within the ecological reserve of the Jardín Botánico Lancetilla (maximum elevation 725 m).

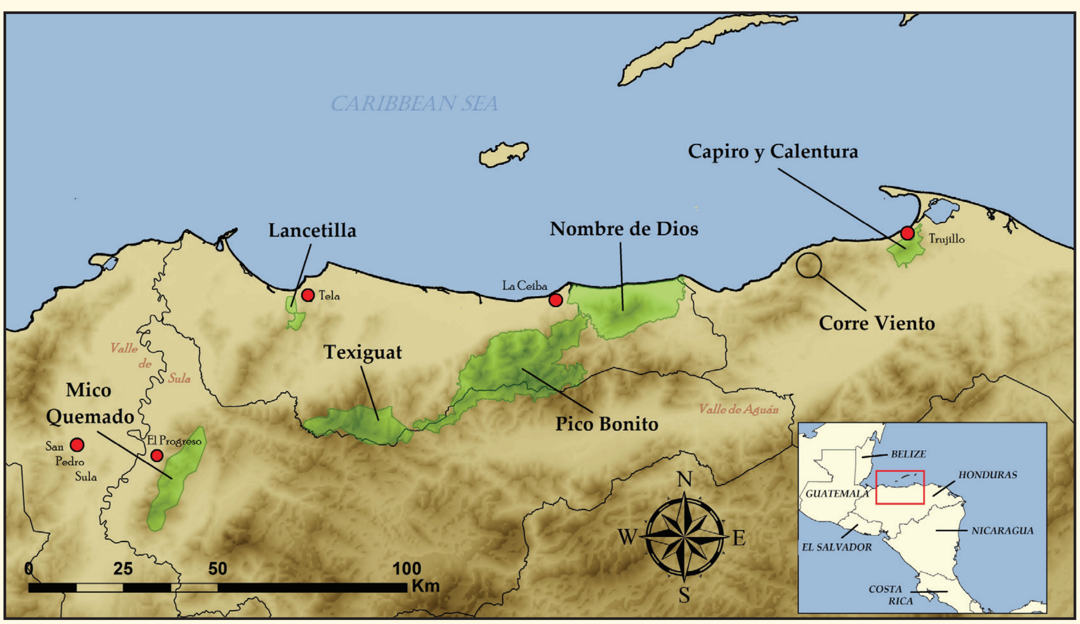

Fig. 1. Map of the Cordillera Nombre de Dios in north-central Honduras, showing the relative position of major cities, protected areas, and features; protected areas are shaded in green: Jardín Botánico Lancetilla, Reserva Ecológica Montaña Mico Quemado, Refugio de Vida Silvestre Texíguat, Parque Nacional Pico Bonito, Parque Nacional Nombre de Dios, and Parque Nacional Capiro y Calentura.

Two of the protected areas of the CND, RVS Texíguat (Townsend et al., 2012) and PN Pico Bonito (McCranie and Castañeda, 2005; McCranie and Solís, 2013), are home to well-documented endemic herpetofaunas. A third isolated highland area, Cerro Corre Viento, recently has been uncovered as a new locality for the endemic highland species *Bolitoglossa porrasorum*, *Duellmanohyla salvavida*, and *Ptychohyla spinipollex* (JHT, unpublished). To date, the remaining areas of the CND have received relatively little attention from investigators.

From 2008 to 2013, the authors and collaborators made 10 trips to localities in the CND in an effort to better characterize the phylogenetic diversity of the herpetofauna. Presently, collections made during this period have led to the descriptions of six new species of amphibians and reptiles: *Nototriton tomamorum* (Townsend et al., 2010), *N. nelsoni* (Townsend, 2016), *N. oreadorum* (Townsend, 2016), *Oedipina petiola* (McCranie and Townsend, 2011), *Bothriechis guifarroi* (Townsend et al., 2013a), and *Tantilla olympia* (Townsend et al., 2013b), as well as the rediscovery of *Plectrohyla chrysopleura*, a Critically Endangered treefrog previously feared extinct (Townsend et al., 2011). This paper, the first in a projected series of contributions, adds to our taxonomic knowledge of the amphibian fauna of the CND, serves to provide an introduction and contextualization of the physiographic, ecological, and biological diversity of this region, summarizes published information on the amphibian fauna and the results of unpublished fieldwork carried out by the authors in the CND, applies a COI-based DNA barcoding approach to aid in assigning our samples to known taxa, and presents an outline for a series of taxonomic problems we plan to resolve in subsequent contributions.

MATERIALS AND METHODS

Field-based Sampling

Samples were collected over the course of the following 10 trips to localities in the CND since 2008: Jardín Botánico Lancetilla (8–9 June 2010, 23–24 June 2010), Parque Nacional Nombre de Dios (5–7 June 2012), Parque Nacional Pico Bonito (2–3 December 2009, 21–26 May 2010, 9–12 August 2010), Refugio de Vida Silvestre Texíguat (Dept. Atlántida: La Liberación, 4–22 June 2010, 24–30 July 2010; Dept. Yoro: La Fortuna, 15–20 April 2008), San José de Texíguat (Dept. Atlántida/Yoro: 9–11 November 2010) and Cerro Corre Viento (Dept. Colón: 4–10 January 2013). Tissue samples were preserved in SED buffer (20% DMSO, 0.25 M EDTA, pH 7.5, NaCl saturated; Seutin et al., 1991; Williams, 2007). Voucher specimens were preserved in 10% formalin solution and later moved to storage in 70% ETOH. Appendix 1 includes a list of all samples used in this study along with locality data, Barcode of Life Database (BOLD) process ID numbers, and associated museum numbers, if available; a number of samples still under study have not been accessioned into a museum collection. Abbreviations in sample and voucher numbers represent the National Museum of Natural History, Smithsonian Institution (USNM), Florida Museum of Natural History (UF), and the field series of the first author (JHT), Cesar A. Cerrato (C/CAC), and Melissa Medina-Flores (MMF).

DNA Extraction, Amplification, and Sequencing

The extraction, amplification, and sequencing were carried out at the Smithsonian Institution Laboratory of Analytical Biology (Suitland, Maryland) following standard BOLD protocols (Borisenko et al., 2009). The template DNA was obtained using phenol-chloroform extraction implemented by an AutoGen Geneprep 965 (AutoGen, Holiston, MA) automated DNA isolation robot, and then amplified for cytochrome oxidase subunit I (COI) using the primers and dgLCO-1490 and dgHCO-2198 (Meyer, 2003). The unincorporated nucleotides were removed from PCR product using 2 uL of ExoSAP-IT per sample. The product was cycle sequenced using BigDye Terminator v3.1 Cycle Sequencing kit (ABI), cleaned using spin column filtration through Sephadex, and electrophoresed on an ABI 3730xl DNA Analyzer.

DNA Sequence Analysis

The sequence data were aligned using ClustalW (Thompson et al., 1994) implemented in the program MEGA v.7 (Kumar et al., 2016). The summary statistics and pairwise sequence divergence were calculated in MEGA v.7 using the Tamura-Nei (1993) model of nucleotide evolution with gamma-distributed rate variation among sites (shape parameter = 1) and differential composition bias among sequences. The nucleotide positions with less than 95%

site coverage were eliminated. The species-level clusters were identified using a Neighbor-Joining tree in MEGA v.7, with the percentage of replicate trees in which the associated taxa clustered together calculated using *p*-distance with 1,000 bootstrap replicates. All the positions with less than 95% site coverage were eliminated, with a total of 585 positions in the final dataset. The Maximum Likelihood analysis of the dataset was carried out in the program RAxMLv8 (Stamatakis, 2014) using raxmlGUIv1.5 (Silvestro, 2012), consisting of 1,000 pseudoreplicates using the default GTR+GAMMA model of nucleotide substitution, with the dataset partitioned by codon.

RESULTS

We sampled 187 individuals of 21 nominal taxa from localities in the CND (Appendix 1). The aligned dataset contained 187 COI sequences that were 608–657 base-pairs in length, containing an average of 319 variable and 296 parsimony-informative sites. The average nucleotide composition favored cytosine (28.7%) and thymine (29.3%), with guanine representing only 18.6%. Guanine was under-represented at the third codon position (10.84%), with a relatively even composition of adenine (30.43%), cytosine (31.08%), and thymine (27.65%) at the third position. Neighbor Joining (Fig. 2) and Maximum Likelihood (Fig. 3) analyses of 21 nominal taxa recovered congruent clustering of COI sequences, with clades representing at least 28 monophyletic groups (bootstrap support ≥ 95, *p*-distance ≥ 3.5%; Fig. 2). Within-clade (= intraspecific) divergence ranged from 0.0–3.1% within the 28 aforementioned clades. The nominal taxa containing more than one monophyletic lineage within the CND were *Bolitoglossa porrasorum* (McCranie and Wilson, 1995), *Craugastor aurilegulus* (Savage, McCranie, and Wilson, 1988), *Lithobates maculatus* (Brocchi, 1877), and *Ptychohyla spinipollex* (Schmidt, 1936). Within these taxa, pairwise sequence divergence between clades ranged from a minimum of 3.5% between the east/central and western CND populations of *C. aurilegulus* to a maximum of 16.5% between the east/central and western CND of *P. spinipollex* (Table 1).

Table 1. Comparison of the known assemblages of endemic amphibians from five sites in the Cordillera Nombre de Dios. RVS = Refugio de Vida Silvestre; PN = Parque Nacional; and *s.s.* = *sensu stricto*.

RVS Texíguat	PN Pico Bonito	PN Nombre de Dios	Corre Viento	PN Capiro y Calentura
Bolitoglossa sp. A	*B.* sp. B		*B.* sp. B	*O. quadra*
Nototriton nelsoni	*N. oreadorum*		*O. quadra*	
Nototriton tomamorum	*O. quadra*			
Oedipina gephyra	*O. petiola*			
Atelophryniscus chrysophorus	*A. chrysophorus*	*C. aurilegulus*	*D. salvavida*	*C. aurilegulus*
Craugastor aurilegulus	*C. aurilegulus*	*D. salvavida*	*P. spinipollex s.s.*	*P. spinipollex s.s.*
Craugastor saltuarius	*C. chrysozetetes*	*I. leucomyos*		
Craugastor stadelmani	*C. cruzi*	*P. spinipollex s.s.*		
Duellmanohyla salvavida	*C. fecundus*			
Incilius leucomyos	*C. saltuarius*			
Isthmohyla insolita	*D. salvavida*			
Plectrohyla chrysopleura	*I. leucomyos*			
Ptychohyla sp.	*P. chrysopleura*			
	P. spinipollex s.s.			

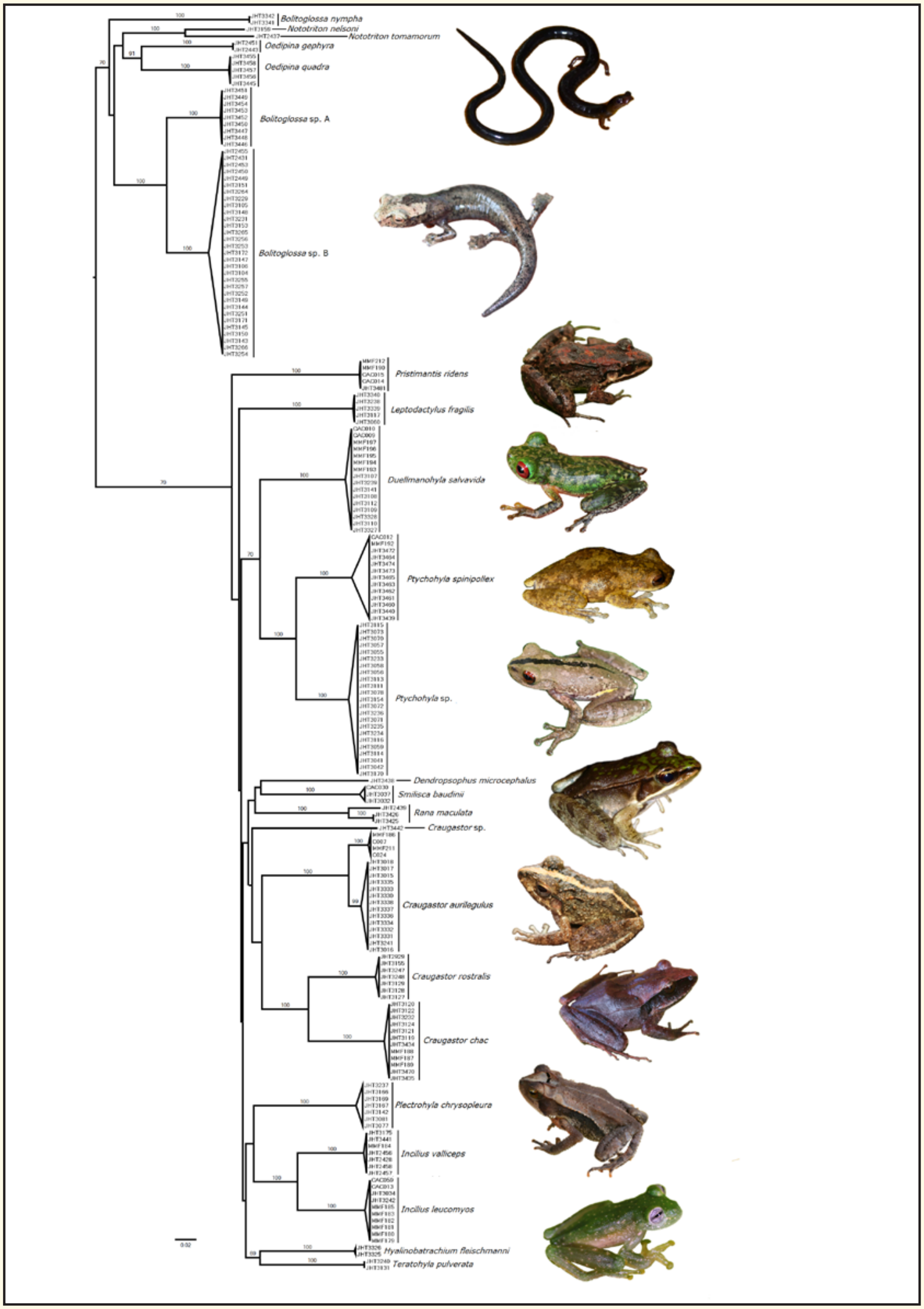

Fig. 2. Neighbor Joining tree showing COI sequence clusters corresponding to taxa and lineages of amphibians from the Cordillera Nombre de Dios, Honduras. Branch labels show percentage of trees from 1,000 bootstrap replicates that recovered the corresponding cluster. Amphibians shown from top to bottom, with locality of individual shown in parentheses: *Oedipina quadra* (Cerro Corre Viento), *Bolitoglossa* sp. B (RVS Texíguat), *Leptodactylus fragilis* (RVS Texíguat), *Duellmanohyla salvavida* (RVS Texíguat), *Ptychohyla spinipollex* (Cerro Corre Viento), *Ptychohyla* sp. (RVS Texíguat), *Rana maculata* (Cerro Corre Viento), *Craugastor aurilegulus* (RVS Texíguat), *Craugastor chac* (RVS Texíguat), *Incilius leucomyos* (RVS Texíguat), *Teratohyla pulverata* (RVS Texíguat). © Josiah H. Townsend

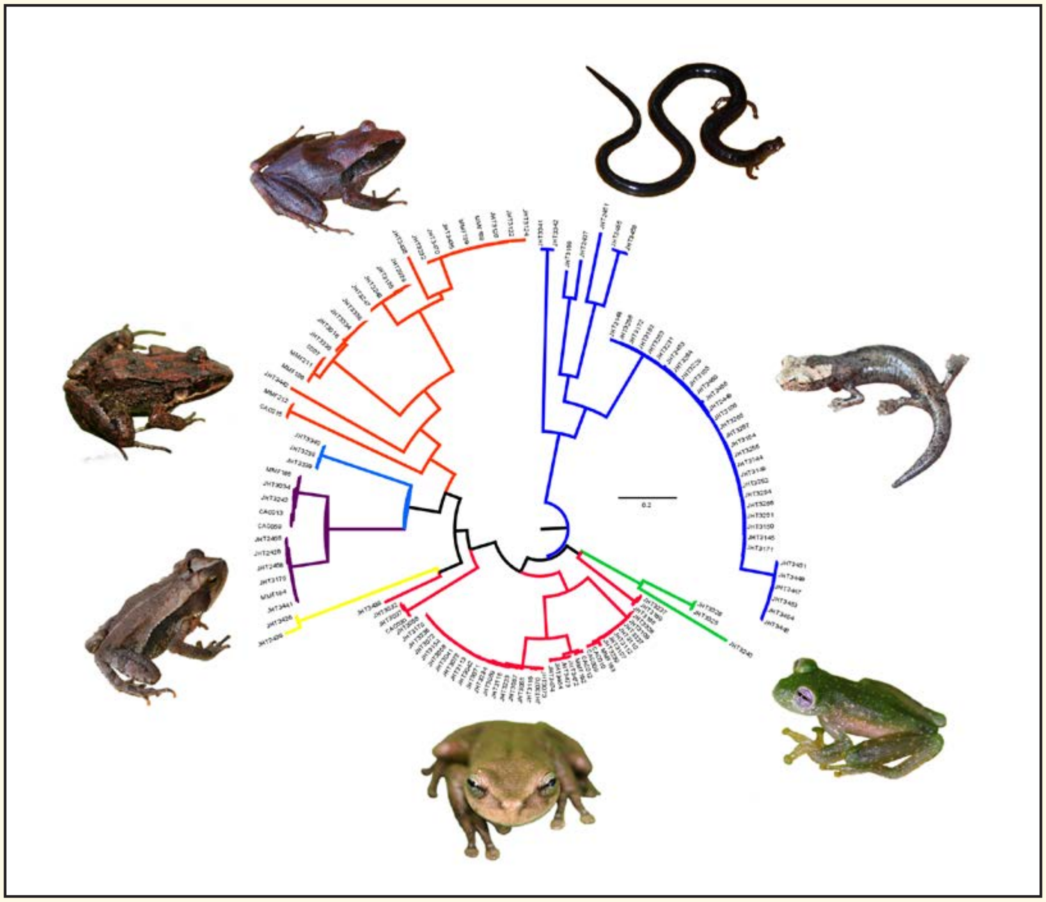

Fig. 3. Maximum likelihood phylogram showing the relationships of COI sequences from amphibians from the Cordillera Nombre de Dios, Honduras. Amphibians shown clockwise from the top: *Oedipina quadra* (Cerro Corre Viento), *Bolitoglossa* sp. B (RVS Texíguat), *Teratohyla pulverata* (RVS Texíguat), *Plectrohyla chrysopleura* (RVS Texíguat), *Incilius leucomyos* (RVS Texíguat), *Leptodactylus fragilis* (RVS Texíguat), *Craugastor chac* (RVS Texíguat). © Josiah H. Townsend

DISCUSSION

Taxonomic Implications of Preliminary Barcoding Results

Our analysis of the COI dataset presented in this paper suggests the need for additional focus on the diversification and systematics of the nominal taxa recovered as multiple divergent clades. Herein we provide a brief summary of the current taxonomy of three focal taxa that exhibit the highest degree of divergence among populations, *Bolitoglossa porrasorum*, *Nototriton barbouri*, and *Ptychohyla spinipollex*, and provide justification for further studying their taxonomy. Thus, we are preparing taxonomic revisions of each of these taxa.

Nototriton barbouri: This species was described by Schmidt (1936: 43) based on a series of moss salamanders collected from bromeliads at elevations from approximately 1,520 and 1,830 m on Montaña Macuzal, an isolated karstic mountain at the eastern end of Sierra de Sulaco (McCranie and Wilson, 2002). Subsequently, populations of *Nototriton* from PN Pico Pijol, at the western end of the Sierra de Sulaco, along with PN Pico Bonito and RVS Texíguat in the Cordillera Nombre de Dios all have been assigned to this taxon (McCranie and Wilson, 2002).

While our COI dataset contains only a single sample of *Nototriton* from RVS Texíguat, a previously published phylogenetic analysis of the genus *Nototriton* that included this sample, as well as a sample from the Montaña Macuzal and additional samples from the CND, indicates that the PN Pico Bonito and RVS Texíguat populations of *Nototriton* are sufficiently distinctive from typical *N. barbouri*, and from each other, to warrant recognition as distinct taxa (Townsend, 2011; Townsend et al., 2010, 2011b, 2013c). Townsend (2016) subsequently restricted the taxon *N. barbouri* to populations in the Sierra de Sulaco, and described the RVS Texíguat population as *N. nelsoni* and the PN Pico Bonito population as *N. oreadorum*.

Bolitoglossa porrasorum: McCranie and Wilson (1995) erected this taxon to accommodate populations of climbing salamanders from PN Pico Pijol and Montaña Macuzal in the Sierra de Sulaco, and RVS Texíguat in the CND. A population of salamanders subsequently was discovered in PN Pico Bonito and referred to this taxon (McCranie, 1996). Our own sampling at Cerro Corre Viento in the eastern CND revealed a fifth allopatric population that can be tentatively assigned to *B. porrasorum* (*sensu lato*).

An analysis of our COI dataset suggests deep divergence (11.0–12.7%) between populations of *B. porrasorum* (*sensu lato*) from RVS Texíguat and Cerro Corre Viento. A preliminary analysis of the 16S and COI data for these populations, as well as samples from Pico Bonito and Montaña Macuzal presented by Townsend (2011), also suggests that populations from the CND are not conspecific with those from the Sierra de Sulaco, and a high degree of divergence is present between the RVS Texíguat population and populations from the east/central portion of the CND.

Ptychohyla spinipollex: This taxon was described by Schmidt (1936: 45) to accommodate a single adult male stream treefrog from the highlands south of the city of La Ceiba in the Department of Atlántida, Honduras. Until 1993, this name was applied to populations from western Guatemala to northern Nicaragua (Stuart, 1943, 1948; Duellman 1963, 1970). McCranie and Wilson (1993) restricted this taxon to populations known from PN Capiro y Calentura, PN Pico Bonito, and RVS Texíguat in the Cordillera Nombre de Dios, a concept that continues to be recognized (McCranie and Wilson, 2002).

Our COI data indicate that the population from RVS Texíguat represents a deeply divergent, monophyletic sister lineage to the remaining populations of *P. spinipollex* (*sensu lato*), with sequence divergence ranging from 14.1–16.5% (Table 1). Townsend (2011) also reported a minimum divergence of 4.8% for 16S, supporting the need for additional taxonomic study.

Assemblages of Endemic Amphibians

As indicated in the Introduction, the CND is notable for its high degree of amphibian endemism. The amphibian faunas of five sites in this cordillera have been sampled to varying degrees of completeness (Table 2), with those for the RVS Texíguat (Townsend et al., 2012) and PN Pico Bonito (McCranie and Wilson, 2002; McCranie and Castañeda, 2005; McCranie and Solís, 2013) being the best characterized. Townsend et al. (2012) reported two endemic salamanders and four anurans from the portion of RVS Texíguat located in the department of Atlántida. In Table 2, we added these species to those found from the Yoro side of RVS Texíguat (Townsend et al., 2010), for a total of four salamanders and nine anurans. As discussed above, two of these endemic taxa (*Bolitoglossa* sp. A and *Ptychohyla* sp.) remain to be formally described.

Parque Nacional Pico Bonito also is a significant site of amphibian endemism (McCranie and Wilson, 2002; McCranie and Castañeda, 2005; McCranie and Solís, 2013). McCranie and Solís (2013), in their update of the herpetofauna of this national park, listed 14 endemic amphibian species, including four salamanders and 10 anurans. We list the same number of species in Table 2, but indicate that our data suggest that two taxa McCranie and Solís (2013) identified as *Bolitoglossa porrasorum* and *Nototriton barbouri* are distinguishable from these two nominal taxa at the species level (see above).

The three remaining sites in the CND all are under-sampled, which, in light of what has been discovered in RVS Texíguat and PN Pico Bonito, are in serious need of additional intensive study. Parque Nacional Nombre de Dios is home to at least four endemic anurans (Table 2), including *Ptychohyla spinipollex* (*sensu stricto*), which Schmidt (1936) described on the basis of material from this region. Recent work in the Cerro Corre Viento region (JHT, unpublished) presently unincorporated into the Honduran protected areas system, demonstrated the presence of four species of endemic amphibians, two salamanders, and two anurans. We identified one of the salamanders (*Bolitoglossa* sp. B) as distinguishable at the species level from *B. porrasorum* (*sensu stricto*). PN Capiro y Calentura is understudied and sampling from this site has not been reported for nearly half a century (Meyer and Wilson, 1971). Nonetheless, one endemic salamander and two anurans are recorded from this national park (Table 2).

From the information provided in this section, the CND evidently is an area of hugely significant amphibian endemism and underestimated taxonomic diversity that is in serious need of continuing targeted sampling. To date, 21 endemic species of amphibians are recorded from the CND, including five species awaiting formal description.

Table 2. Intraspecific and interspecific genetic divergence for ingroup taxa.

Taxon	Clade/Sample Size	Within-clade Divergence	Divergence from Sister Clade
Plethodontidae			
Bolitoglossa nympha	*n* = 2	0.0%	
Bolitoglossa porrasorum	East-Central (*n* = 9)	0.0–0.3%	East-Central × West = 11.0–12.7%
	West (*n* = 30)	0.0–2.4%	
Oedipina gephyra	*n* = 2	0.0%	
Oedipina quadra	*n* = 5	0.0–0.2%	
Bufonidae			
Incilius leucomyos	*n* = 10	0.0–1.1%	*I. leucomyos* × *valliceps* = 15.5–16.9%
Incilius valliceps	*n* = 7	0.0–0.5%	
Centrolenidae			
Hyalinobatrachium fleischmanni	*n* = 2	0.2%	
Teratohyla pulverata	*n* = 2	0.0%	
Craugastoridae			
Craugastor aurilegulus	East-Central (*n* = 2)	0.0–1.2%	East-Central × West = 3.5–4.3%
	West (*n* = 16)	0.0–0.9%	
Craugastor chac	*n* = 12	0.0–0.4%	
Craugastor laticeps	*n* = 2	0.0%	*C. laticeps* × *rostralis* = 5.7–6.3%
Craugastor rostralis	*n* = 7	0.0–0.5%	
Hylidae			
Duellmanohyla salvavida	*n* = 16	0.0–1.1%	
Plectrohyla chrysopleura	*n* = 7	0.0–1.0%	
Ptychohyla spinipollex	East-Central (*n* = 13)	0.0–3.1%	East-Central/West = 14.1–16.5%
	West (*n* = 24)	0.0–1.9%	
Smilisca baudinii	*n* = 3	0.2–1.1%	
Leptodactylidae			
Leptodactylus fragilis	*n* = 5	0.0–0.3%	
Ranidae			
Lithobates maculatus	East (*n* = 2)	0.0%	East/West = 5.7%
Lithobates maculatus	West (*n* = 1)	–	
Strabomantidae			
Pristimantis ridens	*n* = 4	0.0–0.2%	

Conservation Status of CND Endemic Amphibians

In general, the highest degree of amphibian endemism of any country in Central America occurs in Honduras (Solís et al., 2014). Solís et al. (2014) reported a total herpetofauna of 389 native species, of which 107 (27.5%) are endemic. Of the 135 amphibians documented by Solís et al. (2014), 52 (38.5%) are endemic to Honduras, including 28 of 97 anurans (29.2%) and 24 of 36 salamanders (66.7%). Interestingly, 21 of the 52 countrywide endemics (40.4%) are recorded from the CND. When the candidate species we identified from the CND alone have been described, the number of CND endemics will rise to 26, compared to 57 countrywide amphibian endemics, and the percentage of endemism will increase to 45.6%.

Townsend and Wilson (2010: 461) characterized the entire herpetofauna of the megadiverse country of Honduras as being in "serious jeopardy." This characterization applies to any regional and/or taxonomic segment of this herpetofauna, including the highly significant CND amphibian fauna. In Table 3, we applied the available IUCN categorizations and those deriving from the Environmental Vulnerability Score (EVS) measure to the 21 CND endemics. Of the 16 species assessable by the IUCN, only 13 have been assessed (to date, the other three have not been evaluated). Of these 13, all but one falls into the "threat categories." The one exception is *Craugastor chrysozetetes*, considered Extinct by the IUCN. The other 12 species are considered as Critically Endangered (seven) or Endangered (five). When the other three species (*Nototriton tomamorum*, *Oedipina quadra*, and *O. petiola*) are assessed by the IUCN, they likely will be placed in the CR or the EN categories.

Table 3. Comparison of the IUCN ratings from the Red List website (updated 13 November 2015) and Environmental Vulnerability Scores (EVS) for 22 amphibians endemic to the Cordillera Nombre de Dios. IUCN ratings: EX = Extinct; CR = Critically Endangered; EN = Endangered; VU = Vulnerable; NT = Near Threatened; LC = Least Concern; DD = Data Deficient; NE = Not Evaluated; and UD = Undetermined. EVS category abbreviation: L = low; M = medium; H = high. EVS determinations largely from Johnson et al. (2015).

Taxa	IUCN Red List	Environmental Vulnerability Score				
		Geographic Distribution	Ecological Distribution	Reproductive Mode	Total Score	EVS Category
Bolitoglossa porrasorum sp. A	UD	6	8	4	18	H
Bolitoglossa porrasorum sp. B	UD	5	8	4	17	H
Nototriton nelsoni	UD	6	8	4	18	H
Nototriton oreadorum	UD	6	8	4	18	H
Nototriton tomamorum	NE	6	8	4	18	H
Oedipina gephyra	EN	5	8	4	17	H
Oedipina quadra	NE	5	8	4	17	H
Oedipina petiola	NE	6	8	4	18	H
Atelophryniscus chrysophorus	EN	5	7	1	13	M
Craugastor aurilegulus	EN	5	6	4	15	H
Craugastor chrysozetetes	EX	6	8	4	18	H
Craugastor cruzi	CR	6	8	4	18	H
Craugastor fecundus	CR	5	7	4	16	H
Craugastor saltuarius	CR	6	8	4	18	H
Craugastor stadelmani	CR	5	7	4	16	H
Duellmanohyla salvavida	CR	5	7	1	13	M
Incilius leucomyos	EN	5	6	1	12	M
Isthmohyla insolita	CR	6	8	3	17	H
Plectrohyla chrysopleura	CR	5	7	1	13	M
Ptychohyla sp.	UD	6	8	1	15	H
Ptychohyla spinipollex	EN	5	6	1	12	M

Use of the EVS measure to assess the conservation status of the 21 CND endemic amphibians illustrates that 16 (76.2%) are allocated to the high vulnerability category, with numerical scores of 15–18, and only five species (23.8%) are placed in the medium vulnerability category, with numerical scores of 12–13. All of the species, even those to be described, can be assigned an EVS, even though the score for the undescribed taxa remains tentative. Clearly, both the IUCN and EVS measures of conservation status demonstrate that the endemic segment of the CND amphibian fauna is highly threatened with extinction, with one species already been judged Extinct by the IUCN.

Environmental Impact on Endemic Amphibians in the CND

One of the principal conclusions of the Global Amphibian Assessment (GAA), publicized by Stuart et al. (2004), was that "all habitat loss" by far constituted the most important of the major threats to amphibians (Stuart et al., 2010), including both threatened and non-threatened species, as designated by the IUCN criteria. Stuart et al. (2010: 13) noted that of the 5,743 species assessed by the GAA at that time, "nearly 4,000 species" were impacted by "habitat loss and degradation," a figure "almost four times greater than the next most common threat, pollution." Townsend and Wilson (2010: 461) examined the issues impacting the conservation of the entire Honduran herpetofauna, and concluded that, "the major strategy for safeguarding [the herpetofauna] is to preserve sufficient habitat to support viable populations of all members of the…herpetofauna." They also noted that, "all other conservation strategies depend on habitat preservation, as does the continued scientific study of these creatures."

The above general statements also apply to any regional and/or taxonomic subunit of the Honduran herpetofauna. Thus, how are the endemic amphibian populations affected by habitat degradation and loss in the CND? We answered this question by examining the available assessments on the IUCN Red List website. As noted above, of the 21 species included in our study, 16 have been described, and of these, 13 have been assessed by the IUCN. We placed these 13 species in Table 3 and included several aspects of their conservation status, primarily drawn from the IUCN assessments.

James R. McCranie and LDW described all but two of the 13 species from 1986 to 2000, in some cases along with J. M. Savage or K. L. Williams. K. P. Schmidt described the other two species, of which one is *Ptychohyla spinipollex*. In most cases, therefore, these species have been known to science for fewer than 30 years. These species have been judged by the IUCN as Extinct, Critically Endangered, or Endangered, typically on the basis of criteria B1ab(iii), B1ab(iii, v), B2ab(iii), B2ab(iii, v), and/or A2ace (Table 3). These criteria generally are based on features associated with the extent of occurrence (B1) or area of occupancy (B2), or the degree of population reduction (A). In all cases except for *Craugastor chrysozetetes* (judged as Extinct), a decreasing population trend is indicated for the species listed in Table 3, which is to be expected with species assessed as Endangered or Critically Endangered. The major threats impacting these species generally relate to habitat degradation resulting from subsistence, small-scale slash-and-burn agriculture and ranching, logging, forest fires, encroaching human settlement, and landslides. In many cases, chytridiomycosis is implicated, but has not been confirmed, especially since the species involved disappeared more than a decade prior to the discovery of *Bd*. One exception involves the lowland populations of *Craugastor aurilegulus* in PN Pico Bonito, in which Puschendorf et al. (2006) demonstrated the presence of the fungus. The conservation actions suggested by the species account assessors involved a number of steps, including (1) continued survey research to attempt to identify surviving populations, especially outside their recorded range where they might no longer be known to occur; (2) efforts to determine population status of surviving populations, if they can be found; (3) improvement of management of protected areas where the amphibian species were reported originally; and (4) attempts to ascertain whether the chytrid fungus is impacting populations of these amphibians and to what extent. Unfortunately, all of these strategies depend on what we quoted from Townsend and Wilson (2010: 461), i.e., that preservation of sufficient habitat to support viable populations of all herpetofaunal members is the major strategy for safeguarding these creatures, and that all other conservation strategies depend on preservation of habitat. Thus, the question arises as to the degree of protection afforded to the endemic amphibians by the protected and non-protected areas within the CND.

In this paper, we focused on the endemic amphibian herpetofauna in five areas of the CND (Table 1). Four of these areas are protected—three national parks (PN Capiro y Calentura, PN Nombre de Dios, and PN Pico Bonito) and one wildlife refuge (RVS Texíguat)—but the fifth area (Cerro Corre Viento) presently is not part of the Honduran protected areas system. Wilson et al. (2012) examined several features of two of the four protected areas (PN Pico Bonito and RVS Texíguat), based on the criteria identified for use in Panama by Jaramillo et al. (2010). These features are: "(a) appropriate signage at all access points on the periphery of the area; (b) sufficient amount of administrative and other personnel, including park guards, keyed to the size and nature of the protected area, present year-round; (c) provision of adequate facilities, including administrative offices, housing for personnel, visiting scientists, and other visitors, storage areas, repair shops, and so forth; (d) payment of reparations to previous landowners and their employees; (e) robust management plans, including periodic updating; and (f) completion of various floral and faunal surveys, updated as necessary." In Table 1, we indicate these two areas as the most important for harboring endemic amphibian species. Wilson et al. (2012) demonstrated that of these features, only a management plan is available for PN Pico Bonito. The results of herpetofaunal surveys, however, have been published for both areas (McCranie and Castañeda (2005) for PN Pico Bonito, and Townsend et al. (2012) for RVS Texíguat. McCranie and Solís (2013) also provided an update for PN Pico Bonito. After the publication of Wilson et al. (2012), a management plan for PN Nombre de Dios became available (ICF, 2012).

Future Prospects

Environmental scientists and conservation biologists have identified runaway population growth as the root cause of all environmental issues involving both the natural world and the human social world (Raven et al., 2015). Similarly, in previous works we emphasized that uncontrolled human population growth is directly or indirectly responsible for all forms of organismic population decline through unsustainable resource management practices promulgated by an anthropocentric worldview (Wilson and McCranie, 2004, Wilson et al., 2010, Townsend and Wilson 2010, Wilson and Townsend 2010, Wilson et al. 2013a, b, and Johnson et al. 2015).

Human population growth trends in Honduras are typical of those in other Mesoamerican countries. The mid-2015 population of Honduras was estimated as 8.3 million, with a population density of 74.0 inhabitants/km^2, which is relatively low compared to the mean density of 100.5 inhabitants/km^2 for the eight countries of Mesoamerica and 304.2 inhabitants/km^2 for neighboring El Salvador (2015 World Population Data Sheet, Population Reference Bureau and the CIA World Factbook). The doubling time for Honduras' population is 36.8 years (70/1.9), which, given that the growth rate remains stable, the country's population will increase from an estimated 8.3 million to 16.6 million by approximately 2052 (2015 World Population Data Sheet, Population Reference Bureau). These statistics speak to an exacerbation of the already critical social conditions existing in Honduras, as described in the CIA World Factbook (2015) as follows: "Honduras is one of the poorest countries in Latin America and has the world's highest murder rate (Overseas Security Advisory Council, 2015). More than half of the population lives in poverty and per capita income is one of the lowest in the region. Poverty rates are higher among rural and indigenous people and in the south, west, and along the eastern border than in the north and central areas where most of Honduras' industries and infrastructure are concentrated."

If the current social and economic conditions in Honduras do not improve, continued population growth would erode them even further. Consequently, more pressure will be placed on the natural habitats throughout the country, and particularly the CND because of its proximity to La Ceiba and San Pedro Sula, thereby further endangering the area's ecosystems and their endemic amphibians.

An examination of the region surrounding the CND reveals trends consistent with those existing across the country. To the west, the CND is bounded by the department of Cortés, the most populous area in the country, with the population of the capital (San Pedro Sula) at 772,472. This department is even more populated than Francisco Morazán, in which the capital of the country (Tegucigalpa) is located (INE, 2015). Another major city of northern Honduras, La Ceiba (population 212,458), is located at the northern foot of the CND directly north of PN Pico Bonito. On the other side of the range, in the upper valley of the Río Aguán, is the city of Yoro (population 83,300), the capital of the department of Yoro. Finally, at the eastern end of the CND lies Trujillo (population 47,154) on the coast of the department of Colón.

Thus, the CND and the protected areas and sites of endemism found within this mountain range are surrounded by significant population centers in the northern portion of the country that act as wellsprings of people capable of moving ever farther into the upper reaches of the CND in search of additional areas from which to extract resources to provide their livelihoods. As these population centers continue to grow in an ecologically unsustainable manner, and resources for promoting the protection and management of the remaining forests remain scarce to non-existent, critical habitat will continue to be lost, and with it the potential for the long-term survival of a unique and poorly-known amphibian fauna.

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Appendix 1. List of all samples used in this study along with locality data, Barcode of Life Database (BOLD) process ID numbers, and associated museum numbers, if available.

Taxon	Sample ID#	Museum Voucher #	Locality	Barcode of Life Database (BOLD) ID
Bolitoglossa nympha	JHT3341	–	San José de Texíguat	JTAMA526-12
B. nympha	JHT3342	–	San José de Texíguat	JTAMA527-12
B. porrasorum (sp. A)	JHT3446	–	Corre Viento	JTAMA1662-13
B. porrasorum (sp. A)	JHT3447	–	Corre Viento	JTAMA1663-13
B. porrasorum (sp. A)	JHT3448	–	Corre Viento	JTAMA1664-13
B. porrasorum (sp. A)	JHT3449	–	Corre Viento	JTAMA1665-13
B. porrasorum (sp. A)	JHT3450	–	Corre Viento	JTAMA1666-13
B. porrasorum (sp. A)	JHT3451	–	Corre Viento	JTAMA1667-13
B. porrasorum (sp. A)	JHT3452	–	Corre Viento	JTAMA1668-13
B. porrasorum (sp. A)	JHT3453	–	Corre Viento	JTAMA1669-13
B. porrasorum (sp. A)	JHT3454	–	Corre Viento	JTAMA1670-13
B. porrasorum (sp. B)	JHT2431	UF 156519	Texíguat (Fortuna)	JTAMA102-12
B. porrasorum (sp. B)	JHT2449	UF 156521	Texíguat (Fortuna)	JTAMA104-12
B. porrasorum (sp. B)	JHT2450	UF 156522	Texíguat (Fortuna)	JTAMA105-12
B. porrasorum (sp. B)	JHT2453	UF 156523	Texíguat (Fortuna)	JTAMA106-12
B. porrasorum (sp. B)	JHT2455	UF 156525	Texíguat (Fortuna)	JTAMA107-12
B. porrasorum (sp. B)	JHT3104	–	Texíguat (Liberación)	JTAMA072-12
B. porrasorum (sp. B)	JHT3105	–	Texíguat (Liberación)	JTAMA073-12
B. porrasorum (sp. B)	JHT3106	–	Texíguat (Liberación)	JTAMA074-12
B. porrasorum (sp. B)	JHT3143	–	Texíguat (Liberación)	JTAMA075-12
B. porrasorum (sp. B)	JHT3144	–	Texíguat (Liberación)	JTAMA076-12
B. porrasorum (sp. B)	JHT3145	–	Texíguat (Liberación)	JTAMA077-12
B. porrasorum (sp. B)	JHT3147	–	Texíguat (Liberación)	JTAMA079-12
B. porrasorum (sp. B)	JHT3148	–	Texíguat (Liberación)	JTAMA080-12
B. porrasorum (sp. B)	JHT3149	–	Texíguat (Liberación)	JTAMA081-12
B. porrasorum (sp. B)	JHT3150	–	Texíguat (Liberación)	JTAMA082-12
B. porrasorum (sp. B)	JHT3151	–	Texíguat (Liberación)	JTAMA083-12
B. porrasorum (sp. B)	JHT3153	–	Texíguat (Liberación)	JTAMA085-12
B. porrasorum (sp. B)	JHT3171	–	Texíguat (Liberación)	JTAMA086-12
B. porrasorum (sp. B)	JHT3229	–	Texíguat (Liberación)	JTAMA088-12
B. porrasorum (sp. B)	JHT3231	–	Texíguat (Liberación)	JTAMA090-12
B. porrasorum (sp. B)	JHT3251	–	Texíguat (Liberación)	JTAMA092-12
B. porrasorum (sp. B)	JHT3252	–	Texíguat (Liberación)	JTAMA093-12
B. porrasorum (sp. B)	JHT3253	–	Texíguat (Liberación)	JTAMA094-12
B. porrasorum (sp. B)	JHT3254	–	Texíguat (Liberación)	JTAMA095-12
B. porrasorum (sp. B)	JHT3255	–	Texíguat (Liberación)	JTAMA096-12

B. porrasorum (sp. B)	JHT3256	–	Texíguat (Liberación)	JTAMA097-12
B. porrasorum (sp. B)	JHT3257	–	Texíguat (Liberación)	JTAMA098-12
B. porrasorum (sp. B)	JHT3264	–	Texíguat (Liberación)	JTAMA099-12
B. porrasorum (sp. B)	JHT3265	–	Texíguat (Liberación)	JTAMA100-12
B. porrasorum (sp. B)	JHT3266	–	Texíguat (Liberación)	JTAMA101-12
Nototriton nelsoni	JHT3159	USNM 578800	Texíguat (Liberación)	JTAMA112-12
Nototriton tomamorum	JHT2437	UF 155377	Texíguat (Fortuna)	JTAMA112-12
Oedipina gephyra	JHT2443	UF 176100	Texíguat (Fortuna)	JTAMA122-12
O. gephyra	JHT2451	UF 176101	Texíguat (Fortuna)	JTAMA123-12
O. quadra	JHT3445	–	Corre Viento	JTAMA1661-13
O. quadra	JHT3455	–	Corre Viento	JTAMA1671-13
O. quadra	JHT3456	–	Corre Viento	JTAMA1672-13
O. quadra	JHT3457	–	Corre Viento	JTAMA1673-13
O. quadra	JHT3458	–	Corre Viento	JTAMA1674-13
Craugastor chac	JHT3119	USNM 578630	Texíguat (Liberación)	JTAMA815-12
C. chac	JHT3120	USNM 578631	Texíguat (Liberación)	JTAMA816-12
C. chac	JHT3121	USNM 578632	Texíguat (Liberación)	JTAMA817-12
C. chac	JHT3122	USNM 578633	Texíguat (Liberación)	JTAMA818-12
C. chac	JHT3124	USNM 578635	Texíguat (Liberación)	JTAMA820-12
C. chac	JHT3232	USNM 578638	Texíguat (Liberación)	JTAMA831-12
C. chac	JHT3434	–	Corre Viento	JTAMA1650-13
C. chac	JHT3435	–	Corre Viento	JTAMA1651-13
C. chac	JHT3470	–	Corre Viento	JTAMA1686-13
C. chac	MMF187	–	Nombre de Dios	JTAMA1612-13
C. chac	MMF188	–	Nombre de Dios	JTAMA1613-13
C. chac	MMF189	–	Nombre de Dios	JTAMA1614-13
C. aurilegulus	JHT3015	USNM 578586	Lancetilla	JTAMA158-12
C. aurilegulus	JHT3016	USNM 578587	Lancetilla	JTAMA159-12
C. aurilegulus	JHT3017	USNM 578588	Lancetilla	JTAMA160-12
C. aurilegulus	JHT3018	USNM 578589	Lancetilla	JTAMA161-12
C. aurilegulus	JHT3241	USNM 578594	Texíguat (Liberación)	JTAMA163-12
C. aurilegulus	JHT3330	USNM 578595	San José de Texíguat	JTAMA517-12
C. aurilegulus	JHT3331	USNM 578596	San José de Texíguat	JTAMA518-12
C. aurilegulus	JHT3332	USNM 578597	San José de Texíguat	JTAMA519-12
C. aurilegulus	JHT3333	USNM 578598	San José de Texíguat	JTAMA520-12
C. aurilegulus	JHT3334	USNM 578599	San José de Texíguat	JTAMA521-12
C. aurilegulus	JHT3335	USNM 578600	San José de Texíguat	JTAMA522-12
C. aurilegulus	JHT3336	USNM 578601	San José de Texíguat	JTAMA523-12
C. aurilegulus	JHT3337	USNM 578602	San José de Texíguat	JTAMA524-12
C. aurilegulus	JHT3338	USNM 578603	San José de Texíguat	JTAMA525-12
C. aurilegulus	CAC007	USNM 578584	Pico Bonito	JTAMA132-12
C. aurilegulus	CAC024	USNM 578581	Pico Bonito	JTAMA135-12
C. aurilegulus	MMF186	–	Nombre de Dios	JTAMA1611-13
C. aurilegulus	MMF211	–	Nombre de Dios	JTAMA1636-13
Craugastor sp.	JHT3442	–	Corre Viento	JTAMA1658-13
C. rostralis	JHT2929	–	Lancetilla	JTAMA792-12
C. rostralis	JHT3127	USNM 578622	Texíguat (Liberación)	JTAMA821-12

C. rostralis	JHT3128	USNM 578623	Texíguat (Liberación)	JTAMA822-12
C. rostralis	JHT3129	USNM 578624	Texíguat (Liberación)	JTAMA823-12
C. rostralis	JHT3155	USNM 578636	Texíguat (Liberación)	JTAMA824-12
C. rostralis	JHT3247	USNM 578639	Texíguat (Liberación)	JTAMA833-12
C. rostralis	JHT3248	USNM 578640	Texíguat (Liberación)	JTAMA834-12
Dendropsophus microcephalus	JHT3438	–	Corre Viento	JTAMA1654-13
Duellmanohyla salvavida	JHT3107	USNM 578647	Texíguat (Liberación)	JTAMA472-12
D. salvavida	JHT3108	USNM 578648	Texíguat (Liberación)	JTAMA473-12
D. salvavida	JHT3109	USNM 578649	Texíguat (Liberación)	JTAMA809-12
D. salvavida	JHT3110	USNM 578650	Texíguat (Liberación)	JTAMA810-12
D. salvavida	JHT3112	USNM 578651	Texíguat (Liberación)	JTAMA812-12
D. salvavida	JHT3141	USNM 578654	Texíguat (Liberación)	JTAMA488-12
D. salvavida	JHT3239	USNM 578655	Texíguat (Liberación)	JTAMA492-12
D. salvavida	JHT3327	USNM 578656	San José de Texíguat	JTAMA514-12
D. salvavida	JHT3328	USNM 578657	San José de Texíguat	JTAMA515-12
D. salvavida	CAC009	USNM 578645	Pico Bonito	JTAMA471-12
D. salvavida	CAC010	USNM 578646	Pico Bonito	JTAMA472-12
D. salvavida	MMF193	–	Nombre de Dios	JTAMA1618-13
D. salvavida	MMF194	–	Nombre de Dios	JTAMA1619-13
D. salvavida	MMF195	–	Nombre de Dios	JTAMA1620-13
D. salvavida	MMF196	–	Nombre de Dios	JTAMA1621-13
D. salvavida	MMF197	–	Nombre de Dios	JTAMA1622-13
Hyalinobatrachium fleischmanni	JHT3325	USNM 578701	San José de Texíguat	JTAMA512-12
H. fleischmanni	JHT3326	USNM 578702	San José de Texíguat	JTAMA513-12
Incilius leucomyos	JHT3034	USNM 578698	Texíguat (Liberación)	JTAMA278-12
I. leucomyos	JHT3242	USNM 578700	Texíguat (Liberación)	JTAMA222-12
I. leucomyos	CAC013	USNM 578696	Pico Bonito	JTAMA238-12
I. leucomyos	CAC059	USNM 578697	Pico Bonito	JTAMA254-12
I. leucomyos	MMF179	–	Nombre de Dios	JTAMA1604-13
I. leucomyos	MMF180	–	Nombre de Dios	JTAMA1605-13
I. leucomyos	MMF181	–	Nombre de Dios	JTAMA1606-13
I. leucomyos	MMF182	–	Nombre de Dios	JTAMA1607-13
I. leucomyos	MMF183	–	Nombre de Dios	JTAMA1608-13
I. leucomyos	MMF185	–	Nombre de Dios	JTAMA1610-13
I. valliceps	JHT2428	–	Texíguat (Fortuna)	JTAMA197-12
I. valliceps	JHT2456	–	Texíguat (Fortuna)	JTAMA205-12
I. valliceps	JHT2457	–	Texíguat (Fortuna)	JTAMA1083-13
I. valliceps	JHT2458	–	Texíguat (Fortuna)	JTAMA1084-13
I. valliceps	JHT3175	USNM 578699	Texíguat (Liberación)	JTAMA230-12
I. valliceps	JHT3441	–	Corre Viento	JTAMA1657-13
I. valliceps	MMF184	–	Nombre de Dios	JTAMA1609-13
Leptodactylus fragilis	JHT3060	USNM 578705	Texíguat (Liberación)	JTAMA806-13
L. fragilis	JHT3117	USNM 578705	Texíguat (Liberación)	JTAMA814-13
L. fragilis	JHT3238	USNM 578709	Texíguat (Liberación)	JTAMA290-12
L. fragilis	JHT3339	USNM 578707	San José de Texíguat	JTAMA842-13
L. fragilis	JHT3340	USNM 578708	San José de Texíguat	JTAMA843-13
Rana maculata	JHT2439	–	Texíguat (Fortuna)	JTAMA396-12

R. maculata	JHT3425	–	Corre Viento	JTAMA1641-13
R. maculata	JHT3426	–	Corre Viento	JTAMA1642-13
Plectrohyla chrysopleura	JHT3077	USNM 578994	Texíguat (Liberación)	JTAMA182-12
P. chrysopleura	JHT3081	USNM 578993	Texíguat (Liberación)	JTAMA183-12
P. chrysopleura	JHT3142	USNM 578992	Texíguat (Liberación)	JTAMA184-12
P. chrysopleura	JHT3166	USNM 578995	Texíguat (Liberación)	JTAMA185-12
P. chrysopleura	JHT3167	USNM 578996	Texíguat (Liberación)	JTAMA186-12
P. chrysopleura	JHT3169	USNM 578660	Texíguat (Liberación)	JTAMA188-12
P. chrysopleura	JHT3237	USNM 578997	Texíguat (Liberación)	JTAMA832-12
Ptychohyla spinipollex	JHT3439	–	Corre Viento	JTAMA1655-13
P. spinipollex	JHT3440	–	Corre Viento	JTAMA1656-13
P. spinipollex	JHT3460	–	Corre Viento	JTAMA1676-13
P. spinipollex	JHT3461	–	Corre Viento	JTAMA1677-13
P. spinipollex	JHT3462	–	Corre Viento	JTAMA1678-13
P. spinipollex	JHT3463	–	Corre Viento	JTAMA1679-13
P. spinipollex	JHT3464	–	Corre Viento	JTAMA1680-13
P. spinipollex	JHT3465	–	Corre Viento	JTAMA1681-13
P. spinipollex	JHT3472	–	Corre Viento	JTAMA1688-13
P. spinipollex	JHT3473	–	Corre Viento	JTAMA1689-13
P. spinipollex	JHT3474	–	Corre Viento	JTAMA1690-13
P. spinipollex	CAC012	USNM 578664	Pico Bonito	JTAMA754-13
P. spinipollex	MMF192	–	Nombre de Dios	JTAMA1617-13
Ptychohyla sp.	JHT2441	USNM 578665	Texíguat (Liberación)	JTAMA311-12
Ptychohyla sp.	JHT3041	USNM 578665	Texíguat (Liberación)	JTAMA292-12
Ptychohyla sp.	JHT3042	USNM 578666	Texíguat (Liberación)	JTAMA300-12
Ptychohyla sp.	JHT3055	USNM 578667	Texíguat (Liberación)	JTAMA308-12
Ptychohyla sp.	JHT3056	USNM 578668	Texíguat (Liberación)	JTAMA316-12
Ptychohyla sp.	JHT3057	USNM 578669	Texíguat (Liberación)	JTAMA324-12
Ptychohyla sp.	JHT3058	USNM 578670	Texíguat (Liberación)	JTAMA332-12
Ptychohyla sp.	JHT3059	USNM 578671	Texíguat (Liberación)	JTAMA340-12
Ptychohyla sp.	JHT3070	USNM 578672	Texíguat (Liberación)	JTAMA348-12
Ptychohyla sp.	JHT3071	USNM 578673	Texíguat (Liberación)	JTAMA356-12
Ptychohyla sp.	JHT3072	USNM 578674	Texíguat (Liberación)	JTAMA364-12
Ptychohyla sp.	JHT3073	USNM 578675	Texíguat (Liberación)	JTAMA372-12
Ptychohyla sp.	JHT3078	–	Texíguat (Liberación)	JTAMA489-12
Ptychohyla sp.	JHT3111	USNM 578651	Texíguat (Liberación)	JTAMA811-12
Ptychohyla sp.	JHT3113	USNM 578653	Texíguat (Liberación)	JTAMA813-12
Ptychohyla sp.	JHT3114	USNM 578679	Texíguat (Liberación)	JTAMA329-12
Ptychohyla sp.	JHT3115	USNM 578680	Texíguat (Liberación)	JTAMA337-12
Ptychohyla sp.	JHT3116	USNM 578681	Texíguat (Liberación)	JTAMA345-12
Ptychohyla sp.	JHT3154	USNM 578682	Texíguat (Liberación)	JTAMA371-12
Ptychohyla sp.	JHT3170	USNM 578683	Texíguat (Liberación)	JTAMA284-12
Ptychohyla sp.	JHT3233	USNM 578685	Texíguat (Liberación)	JTAMA369-12
Ptychohyla sp.	JHT3234	USNM 578686	Texíguat (Liberación)	JTAMA347-12
Ptychohyla sp.	JHT3235	USNM 578687	Texíguat (Liberación)	JTAMA355-12
Ptychohyla sp.	JHT3236	USNM 578688	Texíguat (Liberación)	JTAMA363-12

Pristimantis ridens	CAC014	USNM 578643	Pico Bonito	JTAMA755-12
P. ridens	CAC015	USNM 578644	Pico Bonito	JTAMA756-12
P. ridens	MMF190	–	Nombre de Dios	JTAMA1615-13
P. ridens	MMF212	–	Nombre de Dios	JTAMA1637-13
Smilisca baudinii	JHT3032	USNM 578690	Texíguat (Liberación)	JTAMA804-13
S. baudinii	JHT3037	USNM 578691	Texíguat (Liberación)	JTAMA805-13
S. baudinii	CAC030	USNM 578689	Pico Bonito	JTAMA759-13
Teratohyla pulverata	JHT3131	USNM 573991	Texíguat (Liberación)	JTAMA490-12
T. pulverata	JHT3140	USNM 573992	Texíguat (Liberación)	JTAMA493-12

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Larry David Wilson is a herpetologist with lengthy experience in Mesoamerica. He has authored or co-authored over 350 peer-reviewed papers and books on herpetology, including two papers published in 2013 entitled "A conservation reassessment of the amphibians of Mexico based on the EVS measure" and "A conservation reassessment of the reptiles of Mexico based on the EVS measure," one in 2014 entitled "Snakes of the genus *Tantilla* (Squamata: Colubridae) in Mexico: taxonomy, distribution, and conservation," four in 2015 entitled "A conservation reassessment of the Central American herpetofauna based on the EVS measure," "The herpetofauna of Oaxaca, Mexico: composition, physiographic distribution, and conservation status," "The herpetofauna of Chiapas, Mexico: composition, distribution, and conservation," and "A checklist and key to the snakes of the *Tantilla* clade (Squamata: Colubridae), with comments on taxonomy, distribution, and conservation," and one in 2016 entitled "The herpetofauna of Tamaulipas: composition, distribution, and conservation." Larry is the senior editor of *Conservation of Mesoamerican Amphibians and Reptiles* and the co-author of seven of its chapters. His other books include *The Snakes of Honduras*, *Middle American Herpetology*, *The Amphibians of Honduras*, *Amphibians & Reptiles of the Bay Islands and Cayos Cochinos, Honduras*, *The Amphibians and Reptiles of the Honduran Mosquitia*, and *Guide to the Amphibians & Reptiles of Cusuco National Park, Honduras*. To date, he has authored or co-authored the descriptions of 70 currently recognized herpetofaunal species, and seven species have been named in his honor, including the anuran *Craugastor lauraster*, the lizard *Norops wilsoni*, and the snakes *Oxybelis wilsoni*, *Myriopholis wilsoni*, and *Cerrophidion wilsoni*. Currently, Larry is an Associate Editor and Co-chair of the Taxonomic Board for the journal *Mesoamerican Herpetology*.