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Lists of Species

A checklist of the amphibians and reptiles of San Isidro de Dota, Reserva Forestal Los Santos, Costa Rica

Erick Arias* and Federico Bolaños

Universidad de Costa Rica, Escuela de Biología, Museo de Zoología. San Pedro, 11501-2060, San José, Costa Rica.
* Corresponding author. E-mail: *eapiedra@gmail.com*

Abstract: We present an inventory of amphibians and reptiles of San Isidro de Dota, northwest of the Cordillera de Talamanca in the Central Pacific of Costa Rica. The study was conduced from January to August 2012 in premontane wet forest from 689 m to 800 m elevation. We found a total of 56 species, including 30 species of amphibians and 26 of reptiles. It results striking the presence of the frog *Leptodactylus insularum*, uncommon above 400 m elevation, and the lizard *Coloptychon rhombifer*, a very uncommon species.

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Introduction

Lower Central America represents one of the regions with the highest number of amphibians described in the Neotropics in relation to the area it represent (Savage 2002; Boza-Oviedo *et al*. 2012; Hertz *et al.* 2012). Much of this richness of species is associated with the Cordillera de Talamanca, site of speciation and dispersion center of several species (Streicher *et al.* 2009; Chaves *et al.* 2009; Boza-Oviedo *et al.* 2012). This cordillera extends from the Central Valley of Costa Rica to the southeast and continuing to western Panama. The herpetofauna has been well documented only in very few sites due to the difficult access to many of the sites in this mountain ranges, hence, several sites explored in the past decade have brought out the discovery of many new species of amphibians and reptiles (Poe and Ibañez 2007; Wake *et al.* 2007; García-París *et al.* 2008; Bolaños and Wake 2009; Chaves *et al.* 2009; Boza-Oviedo *et al.* 2012).

Biodiversity inventories are needed for population management, conservation and education plans (Caughley and Gunn 1996); however, in the Cordillera de Talamanca these inventories are even more important given the high degree the endemism in groups as amphibians and reptiles where 27% of the species are endemic to this region (Savage 2002). Also taking into account the decline of several populations of amphibians in Costa Rica (Whitfield *et al.* 2007), including some localities in this mountain range (Lips 1998), it is relevant to make inventories regarding the composition of amphibians in the region. This list presents the first inventory of amphibians and reptiles of San Isidro de Dota, northwest of the Cordillera de Talamanca in Central Pacific of Costa Rica, a site unexplored scientifically.

Materials and Methods

Study area

The inventory was conducted in the Reserva Forestal Los Santos, in the Central Pacific of Costa Rica (Figure 1), in the community of San Isidro de Dota (9°29′31.34″ N, 83°58′32.41″ W, WGS84 *datum,* from 689 m to 800 m elevation). The region is dominated by premontane wet forest (Bolaños *et al.* 1999) with several sites used for agriculture and pastures. The region presents the climate of the pacific slope of the Cordillera de Talamanca, characterized by moderate temperatures and dry periods from January to March, an average annual rainfall of 2190 mm with an average of 147 rainy days, and a bio-temperature that ranges from 17–24°C (Solano and Villalobos 2001).

Data collection

Fieldwork was conducted from January to August 2012, during daily and nightly checks. Total sampling effort was 33 days and 384 hours of active random searches. We sampled the forest, ponds, streams and open areas around human constructions, using the active search and visual encounter survey. According to the distribution ranges given by Savage (2002) and Solórzano (2004) a list of possible species was performed. The individuals collected were euthanized with alcohol, fixed in formalin 10% and stored in alcohol 70%. We follow Savage (2002) and Bolaños *et al.* (2011) for the identification and taxonomy of the specimens. The individuals were collected according to permit granted by SINAC to FB (007-2012-SINAC). Vouchers were deposited in the herpetological collection of the Museo de Zoología, Universidad de Costa Rica (UCR).

Results

We recorded a total of 56 species (Table 1; Figures 2, 3 and 4), 30 species of amphibians (3 orders, 9 families and 20 genera) and 26 species of reptiles (1 order, 13 families and 20 genera). These data represent approximately 12.4% of the herpetofauna of Costa Rica (Bolaños *et al.* 2011), and 28% of the herpetofauna of the herpetological province of Montane Slopes and Cordillera Central located on the pacific slope from 600 m to 1600 m elevation (Savage 2002). We found 73% of the species of amphibians proposed and 40% of reptiles proposed.

Discussion

The species richness of the study area was less in comparison with the San Vito region, in the extreme southwestern of the Cordillera de Talamanca in Costa Rica (Santos-Barrera *et al.* 2008), a site located in the same herpetological province with 67 species of amphibians and reptiles. The difference in species richness found at both sites can be attributable to the effect of altitude on San Vito region, since the sampling sites were located between 1100 m to 1500 m, but mainly to greater sampling effort, 648 hours, conducted by Santos-Barrera *et al.* (2008). This effort is reflected in the number of snakes found on the San Vito region, 25 against 10 on San Isidro de Dota, given that the effort should be greater to find snakes by its secretive behavior (Green 1997). Instead, in San Isidro de Dota the amphibian richness was higher in comparison to the San Vito region, 30 against 26.

It was interesting the presence of *Leptodactylus insularum* to 689 m elevation, a species uncommon above 400 m elevation (Savage 2002). San Isidro de Dota is located just 5 km from the nearest locality of *L. insularum* (9°27′31.10″ N, -83°56′38.36″ W, 433 m elevation), however this site is within the altitudinal range considered common for this species. Also highlights the presence of *Coloptychon rhombifer* which was observed but no specimens were collected, this species is know from only four vouchers in colections (ZMB 8655, UCR 3143, 6971, 15000) and a photographic voucher (Dwyer and De Plecker 2013). The list of species presented here, mainly with the reptiles, can significantly increase with more effort, however, we consider that this inventory contributes to the knowledge of the herpetofauna of the region and provides a basis for future inventories in this region and surrounding sites.

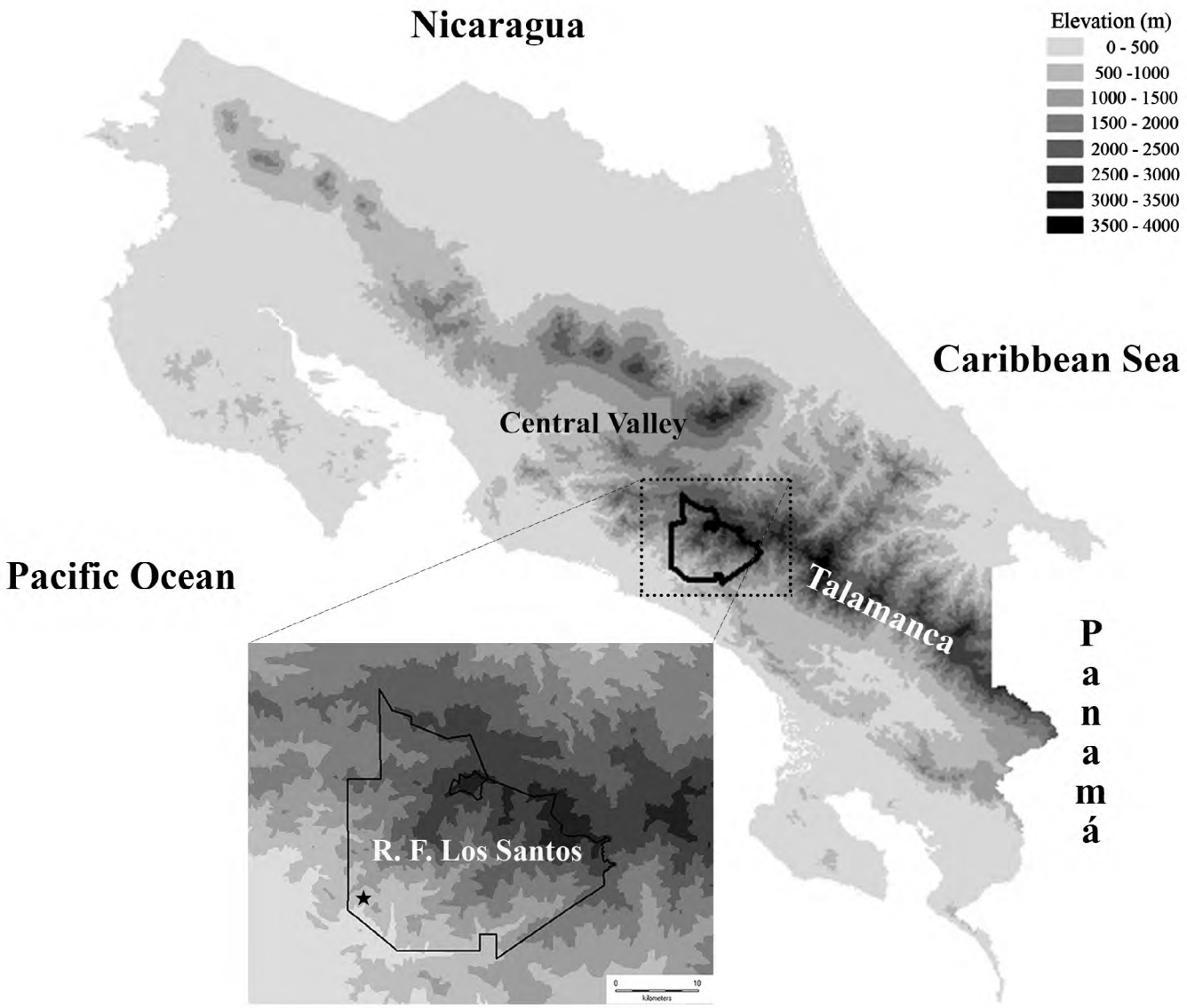

Figure 1. Location of study site in the community of San Isidro de Dota (star) in the Reserva Forestal Los Santos, Central Pacific, Costa Rica.

Figure 2. Some species of amphibians of San Isidro de Dota, Reserva Forestal Los Santos, Central Pacific, Costa Rica. A) *Bolitoglossa lignicolor*; B) *Oedipina alleni*; C) *Chaunus marinus*; D) *Incilius aucoinae*; E) *Incilius coniferus*; F) *Rhaebo haematiticus*; G) *Espadarana prosoblepon*; H) *Craugastor crassidigitus*; I) *Craugastor fitzingeri*; J) *Craugastor stejnegerianus*; K) *Pristimantis cruentus*; L) *Diasporus diastema*.

Figure 3. Some species of amphibians of San Isidro de Dota, Reserva Forestal Los Santos, Central Pacific, Costa Rica. A) *Agalychnis callidryas*; B) *Agalychnis spurreli*; C) *Dendropsophus ebraccatus*; D) *Dendropsophus microcephalus*; E) *Duellmanohyla rufioculis*; F) *Hypsiboas rosenbergi*; G) *Scinax elaeochroa*; H) *Smilisca phaeota*; I) *Leptodactylus fragilis*; J) *Leptodactylus insularum*; K) *Leptodactylus savagei*; L) *Lithobates forreri*;

Figure 4. Some species of reptiles of San Isidro de Dota, Reserva Forestal Los Santos, Central Pacific, Costa Rica. A) *Coloptychon rhombifer* (based on a photograph with locality); B) *Basiliscus basiliscus*; C) *Thecadactylus rapicauda*; D) *Norops aquaticus*; E) *Norops charlesmyersi*; F) *Norops polylepis*; G) *Pseustes poecilonotus*; H) *Leptodeira septentrionalis*; I) *Ninia maculata*; J) *Atropoides mexicanus*; K) *Bothriechis schlegelii*; L) *Bothrops asper*.

Table 1. Species collected in San Isidro de Dota, Reserva Forestal Los Santos in the Central Pacific of Costa Rica. *Visual Record.

SPECIES	HABITAT			
	FOREST	PONDS	STREAMS	OPEN AREAS
Amphibia				
Gymnophiona				
Dermophiidae				
Dermophis glandulosus (Taylor, 1955)				X
Caudata				
Plethodontidae				
Bolitoglossa lignicolor (W. Peters, 1873)			X	
Oedipina alleni (Taylor, 1954)	X			
Anura				
Bufonidae				
Chaunus marinus (Linné, 1758)		X		X
Incilius aucoinae (O'Neill & Mendelson, 2004)	X			
Incilius coniferus (Cope, 1862)	X			X
Rhaebo haematiticus (Cope, 1862)			X	
Centrolenidae				
Espadarana prosoblepon (Boettger, 1892)			X	
Craugastoridae				
Craugastor crassidigitus (Taylor, 1952)	X			X
Craugastor fitzingeri (O. Schmidt, 1857)	X			X
Craugastor stejnegerianus (Cope, 1893)	X			X
Pristimantis cruentus (W. Peters, 1873)	X			
Pristimantis ridens (Cope, 1866)	X			X
Eleutherodactylidae				
Diasporus diastema (Cope, 1875)	X			X
Diasporus vocator (Taylor, 1955)	X			X
Hylidae				
Agalychnis callidryas (Cope, 1862)		X		X
Agalychnis spurrelli (Boulenger, 1913)		X		
Dendropsophus ebraccatus (Cope, 1874)		X		
Dendropsophus microcephalus (Cope, 1886)		X		
Duellmanohyla rufioculis (Taylor, 1952)			X	
Hypsiboas rosenbergi (Boulenger, 1898)				X
Isthmohyla pseudopuma (Günther, 1901)				X
Scinax elaeochroa (Cope, 1875)		X		X
Smilisca phaeota (Cope, 1862)		X		X
Smilisca sordida (W. Peters, 1863)		X		
Trachycephalus venulosus (Laurenti, 1768)				X
Leptodactylidae				
Leptodactylus fragilis (Brocchi, 1877)				X
Leptodactylus insularum (Barbour, 1906)				X
Leptodactylus savagei (Heyer, 2005)		X	X	X
Ranidae				
Lithobates forreri (Boulenger, 1883)		X		
Reptilia				
Sauria				
Anguidae				
Coloptychon rhombifer (W. Peters, 1876)				*
Diploglossus bilobatus (O'Shaughnessy, 1874)				X
Corytophanidae				
Basiliscus basiliscus (Linné, 1758)			X	
Gekkonidae				
Lepidoblepharis xanthostigma (Noble, 1916)				X
Thecadactylus rapicauda (Houttuyn, 1782)				X
Gymnophthalmidae				
Leposoma southi (Ruthven & Gaige, 1924)	X			
Dactyloidae				
Norops aquaticus (Taylor, 1956)			X	
Norops biporcatus (Wiegmann, 1834)		X		

Table 1. *Continued.*

SPECIES	HABITAT			
	FOREST	PONDS	STREAMS	OPEN AREAS
Norops charlesmyersi (Köhler, 2010)				X
Norops lemurinus (Cope, 1861)				X
Norops limifrons (Cope, 1862)	X			X
Norops polylepis (W. Peters, 1874)	X		X	X
Scincidae				
Scincella cherriei (Cope, 1893)				X
Teiidae				
Ameiva festiva (Lichtenstein & von Martens, 1856)				X
Ameiva quadrilineata (Hallowell, 1861)				X
Xantusiidae				
Lepidophyma reticulatum (Taylor, 1955)				X
Serpentes				
Colubridae				
Chironius grandisquamis (W. Peters, 1868)	X			
Mastigodryas melanolomus (Cope, 1868)				X
Pseustes poecilonotus (Günther, 1858)	X			X
Didsadidae				
Leptodeira septentrionalis (Kennicott, 1859)	X			X
Ninia maculata (W. Peters, 1861)				X
Sibon nebulatus (Linné, 1758)	X			X
Elapidae				
Micrurus alleni (K. Schmidt, 1936)				X
Viperidae				
Atropoides mexicanus (C. Duméril, Bibron & A. Duméril, 1854)	X			
Bothriechis schlegelii (Berthold, 1845)	X			
Bothrops asper (Garman, 1884)	X			X

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Appendix 1. Specimens collected in the study site.

AMPHIBIA. Gymnophiona: Dermophiidae: *Dermophis glandulosus* (UCR 21734). **Caudata**: **Plethodontidae:** *Bolitoglossa lignicolor* (UCR 21758); *Oedipina alleni* (UCR 20929, 21841). **Anura: Bufonidae:** *Chaunus marinus* (UCR 21481); *Incilius aucoinae* (UCR 21489, 21737); *I. coniferus* (UCR 21543, 21738); *Rhaebo haematiticus*

(UCR 20920). **Centrolenidae:** *Espadarana prosoblepon* (UCR 21474, 21747, 21748). **Craugastoridae:** *Craugastor crassidigitus* (UCR 20927, 21739-21741); *C. fitzingeri* (UCR 21475, 21745, 21761, 21762, 21764, 21802, 21804); *C. stejnegerianus* (UCR 21456, 21742, 21765, 21766); *Pristimantis cruentus* (UCR 21541); *P. ridens* (UCR 21476, 21767). **Eleutherodactylidae:** *Diasporus diastema* (UCR 21477, 21803); *D. vocator* (UCR 21021). **Hylidae:** *Agalychnis callidryas* (UCR 20922, 21780-21781); *A. spurreli* (UCR 21779); *Dendropsophus ebraccatus* (UCR 21490, 21798); *D. microcephalus* (UCR 21457, 21796, 21800, 21805, 21807); *Duellmanohyla rufioculis* (UCR 20926, 21743, 21744, 21746, 21788, 21790); *Hypsiboas rosenbergi* (UCR 21484); *Isthmohyla pseudopuma* (UCR 21948); *Scinax elaeochroa* (UCR 21787, 21789, 21791, 21792); *Smilisca phaeota* (UCR 21023, 21759, 21763); *S. sordida* (UCR 21024, 21542, 21760); *Trachycephalus venulosus* (UCR 21483). **Leptodactylidae:** *Leptodactylus fragilis* (UCR 21736); *L. insularum* (UCR 21801); *L. savagei* (UCR 21022). **Ranidae:** *Lithobates forreri* (UCR 21461, 21482, 21778, 21786).

REPTILIA. Sauria: Anguidae: *Diploglossus bilobatus* (UCR 21757). **Corytophanidae:** *Basiliscus basiliscus* (UCR 21470). **Gekkonidae:** *Lepidoblepharis xanthostigma* (UCR 21769); *Thecadactylus rapicauda* (UCR 20935, 21749). **Gymnophthalmidae:** *Leposoma southi* (UCR 20930). **Dactyloidae:** *Norops aquaticus* (UCR 21750, 21751, 21794); *N. biporcatus* (UCR 21793); *N. charlesmyersi* (UCR 21756); *N. lemurinus* (UCR 20932, 21546); *N. limifrons* (UCR 21479); *N. polylepis* (UCR 21458-21460, 21752-21755, 21768, 21797). **Scincidae:** *Scincella cherriei* (UCR 21028). **Teiidae:** *Ameiva festiva* (UCR 21487); *A. quadrilineata* (UCR 21488). **Xantusiidae:** *Lepidophyma reticulatum* (UCR 21480). **Serpentes: Colubridae:** *Chironius grandisquamis* (UCR 21770, 21773); *Mastigodryas melanolomus* (UCR 21486); *Pseustes poecilonotus* (UCR 21043, 21546, 21771, 21774). **Didsadidae:** *Leptodeira septentrionalis* (UCR 21732, 21785); *Ninia maculata* (UCR 21545, 21730); *Sibon nebulatus* (UCR 21544, 21731, 21733). **Elapidae:** *Micrurus alleni* (UCR 21485). **Viperidae:** *Atropoides mexicanus* (UCR 21548); *Bothriechis schlegelii* (UCR 21549); *Bothrops asper* (UCR 21772).