REPTILES & AMPHIBIANS

Robert's Wormlizard, *Amphisbaena roberti* (Squamata: Amphisbaenidae): Attempted Predation and an Updated Distribution Map

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Wormlizards (Amphisbaenia) are one of the least known reptilian groups. Their subterranean lifestyle makes their study difficult and natural history observations uncommon (Vitt and Caldwell 2014; Costa and Garcia 2019). Although some species occasionally can be found foraging on the surface (Gorzula et al. 1977; Moraes and Recchia 2011; Aragão et al. 2019), wormlizards are more commonly seen after heavy rains, when they are forced outside their flooded underground tunnels (Bates 1993), which renders them susceptible to a range of predators like birds (Hayes et al. 2015).

On 5 October 2021, after a heavy rain at 1915 h in the Vila Olinda neighborhood of Campo Grande, Mato Grosso do Sul, Brazil (20.499°S, 54.609°W), we observed a Southern Lapwing (*Vanellus chilensis*) on a lawn with a snake-like prey item in its beak. As we approached cautiously, the bird noticed our presence and flew away, releasing its prey, a Robert's Wormlizard (*Amphisbaena roberti*). The animal was struggling vigorously and we noted that its backbone seemed to have been broken at about two-thirds the length of its body, presumably due to the attempted predation (Fig. 1). We captured the wormlizard (collection permit Sisbio 72874-3) and deposited it in the Coleção Zoológica da Universidade Federal de Mato Grosso do Sul (ZUFMS-REP 4524).

The Southern Lapwing (Charadriidae), known in Brazil as "quero-quero," is an abundant species in open habitats of Central and South America. Its diet comprises mainly arthropods, earthworms, seeds, and fruits (Sick 1997; Gantz et al. 2009). *Amphisbaena roberti* also inhabits open areas from southeastern to west-central Brazil and eastern Paraguay (Cacciali et al. 2016; Colli et al. 2016). It is a medium-sized wormlizard, approaching 270 mm SVL (Strüssmann and Mott 2009), identified by a combination of features (tail tip with a vertical keel, two precloacal pores sequentially arranged, a dorsal sulcus, 232–265 body annuli, 17–21 caudal annuli, 13–18 dorsal, and 12–16 midbody segments) (Gans 1964; Vanzolini 1991; Oliveira et al. 2018).

To find previous records of interactions between *Amphisbaena roberti* and *Vanellus chilensi*, we searched for the keywords "*Amphisbaena roberti*" and "*Cercolophia roberti*" (Vanzolini 1992; Mott and Vieites 2009) in *Google Scholar* (December 2021). We also reviewed all editions of the journal *Herpetological Review* (whose articles and notes are not always tracked by *Google Scholar*), and our personal libraries. Finally, we took the opportunity to update the geographic range map of *A. roberti* based on this literature search and specimens examined by HCC.

Our search in *Google Scholar* resulted in 92 records, 10 with relevant geographic distribution data for *Amphisbaena roberti* (most records cited only the species name), and only one reporting predation by the mildly venomous semifossorial false coralsnake, *Phalotris lativittatus* (Braz et al. 2014). The search of our personal files recovered 13 articles with informa-

Fig. 1. A Robert's Wormlizard (*Amphisbaena roberti*) (ZUFMS-REP 4524) collected after attempted predation by a Southern Lapwing (*Vanellus chilensis*) (Charadriidae). Photograph by Henrique C. Costa.

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Table 1. Known records of Robert's Wormlizard (*Amphisbaena roberti*). The voucher number of the holotype and the specimens addressed in this study are indicated by bold type. Latitude and longitude in °S and °W, respectively. Coordinate precision in decreasing order: L = local; P = proximate; M = municipal seat. Museum acronyms: CHLS = Coleção Herpetológica Lagoa do Sino, Universidade Federal de São Carlos; CHUNB = Coleção Herpetológica, Universidade de Brasília; CN = Laboratório de Ecologia e Comportamento Animal, UFOPA (field series); CZPLT = Colección Zoológica Para la Tierra, Santa Rosa del Aguaray; MAP = Mapinguari Lab (UFMS, field series); MCNR = Museu de Ciências Naturais, Pontifícia Universidade Católica de Minas Gerais; MHNCI = Museu de História Natural do "Capão da Imbuia"; MNHNP = Museo Nacional de Historia Natural del Paraguay; MNRJ = Museu Nacional, Universidade Federal do Rio de Janeiro; MTR = Miguel Trefaut Rodrigues (field series); MZUSP = Museu de Zoologia, Universidade de São Paulo; RE = Laboratório de Ecologia e Comportamento Animal, UFOPA (field series); SMF = Senckenberg Forschungsinstitut und Naturmuseum; TM = Tami Mott (field series); UFMG = Universidade Federal de Minas Gerais; UFMT = Universidade Federal de Mato Grosso; UFOPA = Universidade Federal do Oeste do Pará; ZMH = Zoological Museum, Universität Hamburg; ZUEC = Museu de Zoologia da Universidade Estadual de Campinas; ZUFMS = Coleção Zoológica de Referência da Universidade Federal de Mato Grosso do Sul.

Locality	Source(s)	Voucher(s)
BRAZIL		
Bahia, Cocos (14.184, 44.534) M	S. Ribeiro et al. 2019	MZUSP 88124
Espírito Santo, Alfredo Chaves ("Chaves") (20.635, 40.750) M	Vanzolini 1991	MZUSP 36589
Goiás, Aporé (18.957, 51.926) M	Oliveira et al. 2018	UFOPA-H 869–71
Goiás, Catalão, Aproveitamento Hidrelétrico Serra do Facão (17.978, 47.719) L	Colli et al. 2016	CHUNB —
Goiás, Itajá, Complexo Aporé-Sucuriú (19.300, 51.083) P	Uetanabaro et al. 2006	—
Goiás, Mambaí, Pequena Central Hidrelétrica Santa Edwiges (14.488, 46.113) P	Cintra et al. 2009	MZUSP 95639
Goiás, Mineiros, Parque Nacional das Emas (17.559, 52.675) L	Valdujo et al. 2009	CHUNB 33962
Goiás, — (—, —)	Oliveira et al. 2018	RE 24, 46, 59, 83, 242, 339, 1946, 2100, 3125, 7624
Goiás, Rio Verde (17.798, 50.928) M	Gans 1964; Vanzolini 1991	MZUSP 3372
Goiás, Santa Rita do Araguaia (17.326, 53.205) M	Vanzolini 1991	MZUSP 69857
Mato Grosso, Alto Taquari (17.849, 53.283) L	Colli et al. 2016	UFMT —
Mato Grosso, Chapada dos Guimarães, — (15.461, 55.750) M	Oliveira et al. 2018	UFMT 6122
Mato Grosso, Chapada dos Guimarães, Barragem do Rio Manso (14.870, 55.785) P	Strüssmann and Mott 2009	UFMT 360–3
Mato Grosso do Sul, Campo Grande, UFMS (20.505, 54.612) L	**This study**	**ZUFMS-REP 4524**
Mato Grosso do Sul, Sonora (17.577, 54.758) M	Oliveira et al. 2018	RE 463
Mato Grosso do Sul, Três Lagoas, Fazenda Barra da Moeda (20.996, 51.792) P	Costa et al. 2018	ZUEC 3497
Mato Grosso do Sul, Alcinópolis, Parque Estadual Nascentes do Rio Taquari (18.162, 3.402) L	**This study**	**MAP 6248**
Minas Gerais, Uberaba, Peirópolis (19.748, 47.932) P	**This study**	**MNRJ 7220**
Minas Gerais, Uberaba, Peirópolis (19.748, 47.932) P	Vanzolini 1991	MZUSP 13728–34, 13736–7
Minas Gerais, Uberlândia (18.919, 48.277) M	Gans 1964; Vanzolini 1991	MZUSP 4636–7
—, — (—, —) —	Gans and Montero 2008	MZUSP 3118
Paraná, Campo Mourão (24.046, 52.383) M	Moura-Leite et al. 1996	MHNCI 3473
Paraná, Cornélio Procópio, Parque Estadual Mata São Francisco (23.181, 50.647) P	Detzel Consultores Associados 2015	—
Paraná, São José dos Pinhais (25.535, 49.206) M	Morato et al. 2017	MHNCI 6458
São Paulo, Águas de Santa Bárbara, Estação Ecológica Águas de Santa Bárbara (22.881, 49.239) P	Oliveira et al. 2018	CN 1001, 1014

(continued)

Locality	Source(s)	Voucher(s)
São Paulo, Angatuba, UFSCAR (23.490, 48.413) P	Nehemy and São Pedro 2021	CHLS —
São Paulo, Assis, Estação Ecológica de Assis (22.662, 50.412) P	Araujo and Almeida-Santos 2011	MZUSP 100093
São Paulo, Avanhandava (21.461, 49.950) M	Gans 1964; Vanzolini 1991	MZUSP 1261, 6526
São Paulo, Avaré (23.099, 48.926) M	Vanzolini 1991	MZUSP 42690
São Paulo, Botucatu (22.886, 48.445) M	Gans 1964; Vanzolini 1991	MZUSP 1930, 1932, 1935, 2523–4, 45810
São Paulo, Campinas, Barão Geraldo (22.906, 47.061) P	Costa et al. 2018	ZUEC 1256, 2069
São Paulo, Campinas, UNICAMP (22.906, 47.061) P	Costa et al. 2018	ZUEC 1111
São Paulo, Ilha Solteira (20.433, 51.343) M	Vanzolini 1991	MZUSP 42770–1, 42773
São Paulo, Ilhabela, Ilha de São Sebastião (23.778, 45.358) P	Gans 1964; Vanzolini 1991	MZUSP 1253
São Paulo, Itapetininga (23.592, 48.053) M	L.B. Ribeiro et al. 2018	UFMG 19
São Paulo, Itirapina (22.253, 47.823) L	Colli et al. 2016	—
São Paulo, Leme (22.186, 47.390) M	Gans 1964; Vanzolini 1991	MZUSP 2672
São Paulo, Marília (22.214, 49.946) M	Dal Vechio et al. 2018; Oliveira et al. 2018	TM 5, 16; UFMT 4713
São Paulo, Mogi Mirim (22.409, 46.905) M	Dal Vechio et al. 2018	MTR 33386
São Paulo, Pirassununga, Cachoeira de Emas (21.996, 47.426) P	Gans 1964; Vanzolini 1991	MZUSP 1928, 2674–5, 6449, 7119–20, 7667, 7669
São Paulo, Poá (23.578, 46.345) M	Gans 1964; Vanzolini 1991	MZUSP 6435
São Paulo, Ribeirão Preto (21.178, 47.810) M	Gans 1964; Vanzolini 1991	MZUSP 36952, 60603–6, 60608–10; SMF 26472
São Paulo, Rio Claro, UNESP (22.383, 47.533) P	Costa et al. 2018	ZUFMS 43
São Paulo, Rio Claro (22.411, 47.561) M	Gans 1964; Vanzolini 1991; Cruz Neto and Abe 1993	MZUSP 6434; — (169 specimens)
São Paulo, São Carlos (22.018, 47.891) M	S. Ribeiro et al. 2016	MNRJ 12455
São Paulo, São Paulo, Ipiranga (23.548, 46.636) P	Gans 1964; Vanzolini 1991	ZMH 1879A, MZUSP 755, 1257, 1937, **1946**–47
São Paulo, São Simão (21.479, 47.551) M	Dal Vechio et al. 2018	MTR 18104
São Paulo, São Vicente, Ilha de São Vicente (23.960, 46.350) P	Gans 1964; Vanzolini 1991	MZUSP 8426
Tocantins, Abreulândia, Piau (9.622, 49.152) L	Gans 1964; Vanzolini 1991	MZUSP 4050
Tocantins, Palmas (10.189, 48.109) L	Colli et al. 2016	CHUNB —
Tocantins, Porto Nacional (10.708, 48.417) M	**This study**	**MCNR 5935–7, 5943, 5945–8, 5956, 5958, 5960–1, 5963–5, 5967**
PARAGUAY		
Amambay, 8 km E Parque Nacional Cerro Corá (22.666, 58.966) P	Cacciali et al. 2016	MNHNP 5113
Amambay, Parque Nacional Cerro Corá (22.583, 58.116) P	Montero and Terol 1996; Cacciali et al. 2016	MNHNP 6098
San Pedro, Santa Rosa del Aguaray, Reserva Natural Laguna Blanca (23.800, 56.283) P	Smith et al. 2016	CZPLT 095, 482, 540, 572, 713

tion on geographic distribution and one record of predation by the highly venomous Painted Coralsnake (*Micrurus corallinus*), another semifossorial species (Marques and Sazima 1997). The attempted predation of *A. roberti* by *Vanellus chilensis* is, to the best of our knowledge, the first reported interaction between any bird and this species of wormlizard. Vertebrates usually are not consumed by *V. chilensis* but earthworms are frequent prey (Gantz et al. 2009); the bird perhaps had mistaken the small wormlizard for a large earthworm.

Our review of the geographic range of *Amphisbaena roberti* resulted in records from 52 localities in Brazil and Paraguay (Table 1), 15 more records than the previous compilation (37 localities) by Colli et al. (2016). The distribution of the species (Fig. 2) is bounded by Piau (Tocantins, Brazil) in the north, 8 km E of Parque Nacional Cerro Corá (Amambay, Paraguay) in the west, São José dos Pinhais (Paraná, Brazil) in the south, and Alfredo Chaves (Espírito Santo, Brazil) in the east. Records are mostly in the Cerrado ecoregion, but also

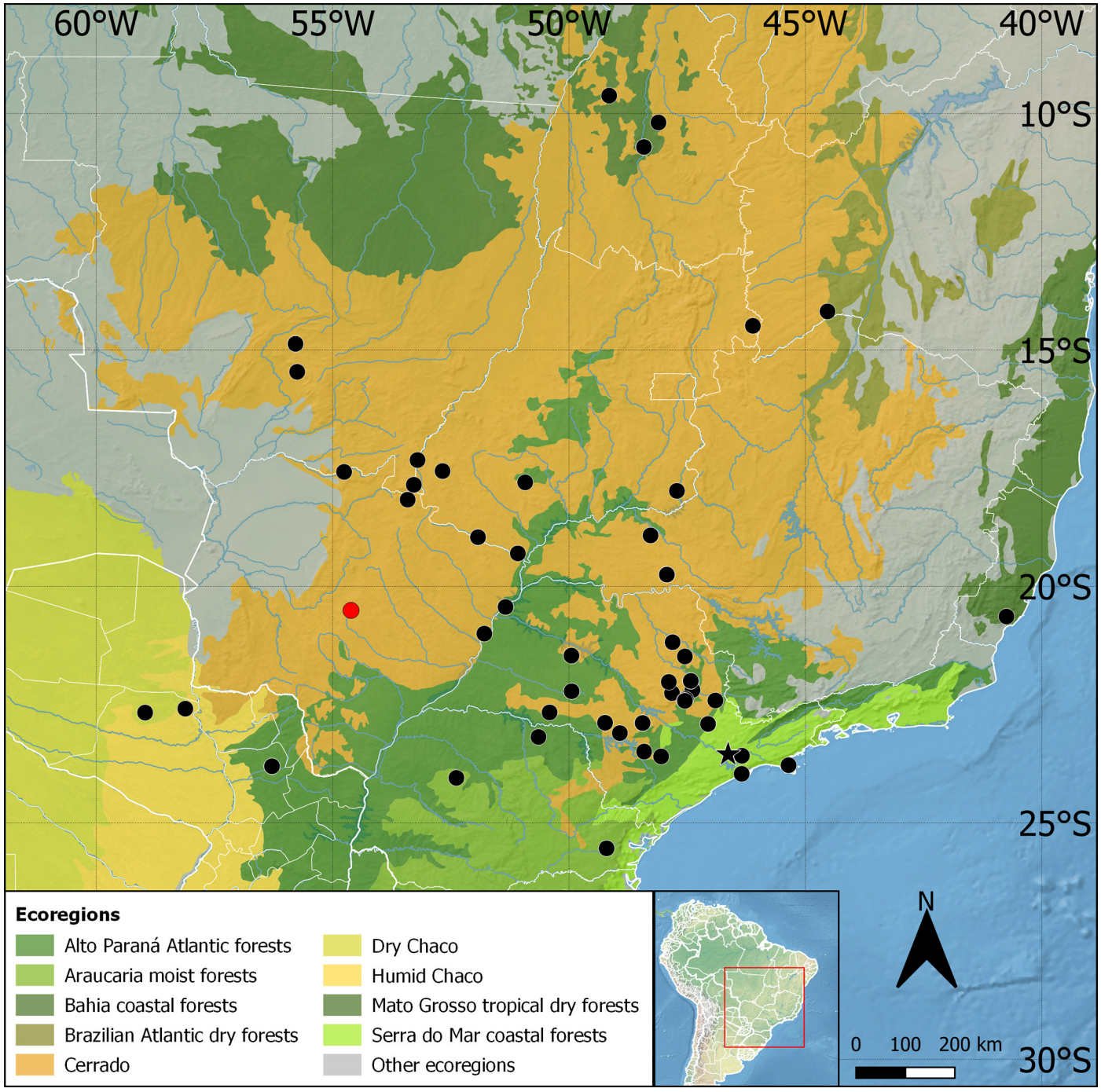

Fig. 2. An updated distribution map of Robert's Wormlizard (*Amphisbaena roberti*). The type locality is marked by the star, previously documented localities by black dots, and the site of the attempted predation event by the red dot. See also Table 1.

in the Alto Paraná Atlantic Forests, Araucaria Moist Forests, Bahia Coastal Forests, Brazilian Atlantic Dry Forests, Dry Chaco, Humid Chaco, Mato Grosso Tropical Dry Forests, and Serra do Mar Coastal Forests ecoregions (Dinerstein et al. 2017). Our record from Campo Grande fills a range gap of almost 700 km between localities in western Brazil and eastern Paraguay.

The record from Alfredo Chaves ("Chaves" in the primary source) (Vanzolini 1991) is the only report of *A. roberti* in the Bahia Coastal Forests ecoregion and is almost 600 km northeast of the nearest record. We cannot eliminate the possibility that this record is the result of a labeling error.

Specimen MTR 6770 from Lajeado, Tocantins, Brazil (9.75°S, 48.36°W), identified by some authors as *A. roberti* (Mott and Vieites 2009; S. Ribeiro et al. 2019), is actually a Wagler's Wormlizard (*A. vermicularis*) (Dal Vechio et al. 2018).

Colli et al. (2016) recorded a specimen from "Ibipeba, Grande Sertão Veredas." However, Ibipeba (11.70°S, 42.10°W) is 540 km north of Grande Sertão Veredas (15.26°S, 45.84°W). After consulting the collection manager (Rafael Dias, Coleção Herpetológica, Universidade de Brasília [CHUNB]) and the collector of the specimen (Reuber Brandão), we concluded that this record is problematic and omitted it from our database.

Updated distribution maps are useful tools against the Wallacean shortfall (Hortal et al. 2015) and observations of natural history often have filled gaps in our knowledge of a species' biology and distribution (Vitt 2013; Martins 2021). This is particularly relevant for squamate reptiles, for which we lack adequate information on the natural history of about 95% of known species (Vitt 2013).

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