ARTICLES

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Herpetological Survey of Huíla Province, Southwest Angola, Including First Records from Bicuar National Park

BRETT O. BUTLER*
Museo de Zoología "Alfonso L. Herrera", Departamento de Biología Evolutiva, Facultad de Ciencias, Universidad Nacional Autónoma de México, A.P. 70-399, Ciudad de México CP 04510, México; Department of Biology, Villanova University, 800 Lancaster Avenue, Villanova, Pennsylvania 19085-1699, USA
LUIS M. P. CERÍACO
Museu de História Natural e da Ciência da Universidade do Porto, Praça Gomes Teixeira, 4099-002 Porto, Portugal; Departamento de Zoologia e Antropologia (Museu Bocage), Museu Nacional de História Natural e da Ciência, Universidade de Lisboa, Rua da Escola Politécnica 58, 1269-102 Lisboa, Portugal
MARIANA P. MARQUES
Departamento de Zoologia e Antropologia (Museu Bocage), Museu Nacional de História Natural e da Ciência, Universidade de Lisboa, Rua da Escola Politécnica 58, 1269-102 Lisboa, Portugal; Research Center in Biodiversity and Genetic Resources (CIBIO), InBIO, University of Porto, Rua Padre Armando Quintas 7, Vairão, 4485-661 Porto, Portugal
SUZANA BANDEIRA
Department of Biology, Villanova University, 800 Lancaster Avenue, Villanova, Pennsylvania 19085-1699, USA; Instituto Nacional da Biodiversidade e Áreas de Conservação, Ministério do Ambiente de Angola, Centralidade do Kilamba, Rua 26 de Fevereiro, quarteirão Nimi ya Lukemi, edifício Q11, 3º andar, Angola
TIMÓTEO JÚLIO
Departamento de Biologia, Faculdade de Ciências da Universidade Agostinho Neto, Avenida 4 de Fevereiro nº 71, Luanda, Angola
MATTHEW P. HEINICKE
Department of Natural Sciences, University of Michigan-Dearborn, 4901 Evergreen Road, Dearborn, Michigan 48128, USA
AARON M. BAUER
Department of Biology, Villanova University, 800 Lancaster Avenue, Villanova, Pennsylvania 19085-1699, USA

**Corresponding author; e-mail: brett.butler@ciencias.unam.mx*

Angola harbors an exceptional level of biodiversity that has been relatively under-studied compared to other southern African countries. It represents an important biogeographic transitional zone that links the tropical rainforests of Congo to the arid deserts of Namibia (Leaché et al. 2014), and the Angolan Great Escarpment serves as a buffer-zone between the drier coastal lowlands to the more humid interior plateau (Crawford-Cabral 1991). These factors promote high endemism across taxa, making Angola an important area for further research and conservation efforts. Studies of the Angolan herpetofauna continue to uncover previously unknown diversity, document new country records, and expand distributions of known species (Conradie et al. 2012, 2014, 2016a; Ceríaco et al. 2014, 2016a,b, 2018a; Ernst et al. 2014; Branch and Conradie 2015; Stanley et al. 2016; Branch et al. 2017; Marques et al. 2018; Baptista et al. 2018; Branch 2018).

The province of Huíla, in southwestern Angola, is an area of historical importance in the documentation of the Angolan herpetofauna. It has the second highest number of amphibian and reptile records (398) in Angola and is tied with Benguela Province in having the country's highest amphibian and reptile diversity (both with 36 amphibians and 102 reptiles; Marques et al. 2018). Despite the great diversity of reptiles and amphibians already known from Huíla, much work remains to be done in the province to address taxonomic questions, delimit species boundaries, and establish conservation areas. In addition, many type localities for amphibians and reptiles were described from Huíla in the nineteenth and twentieth centuries by herpetologists studying the Angolan fauna, including José Vicente Barbosa du Bocage (1823–1907) and Raymond Laurent (1917–2005). Some of these species are only known from their original descriptions and their validity has not been revisited or assessed with modern molecular techniques.

The location and physiography of Huíla has contributed to the high diversity of herpetofauna known from the province. Occupying an area of 79,023 km^2, Huíla is bordered by the arid Namibe Province to the west, Cunene Province to the south, Cuando Cubango Province to the southeast, Bié Province to the northeast, and Benguela and Huambo provinces to the north. Huíla is geographically characterized as high plateau, and is isolated from the lowlands of the Namib Desert by the Serra da Leba and Chela of the Great Escarpment at its western limits, which rise to a maximum elevation of nearly 2300 m and support isolated montane forests with many endemic plants and animals (Figueiredo 2010; Clark et al. 2011). The central and eastern regions of Huíla are part of the Cunene River Basin that lies slightly lower in elevation, ~1300 m, and are characterized by miombo woodlands (*Brachystegia* sp.), mopane woodlands (*Colophospermum mopane*), and Zambezian *Baikiaea* woodlands interspersed with open grasslands.

Most of Huíla's human population lives in the vicinity of the provincial capital, Lubango, in the western reaches of the province. Environments surrounding Lubango and other western and northern Huíla towns (including Caconda, Humpata, and

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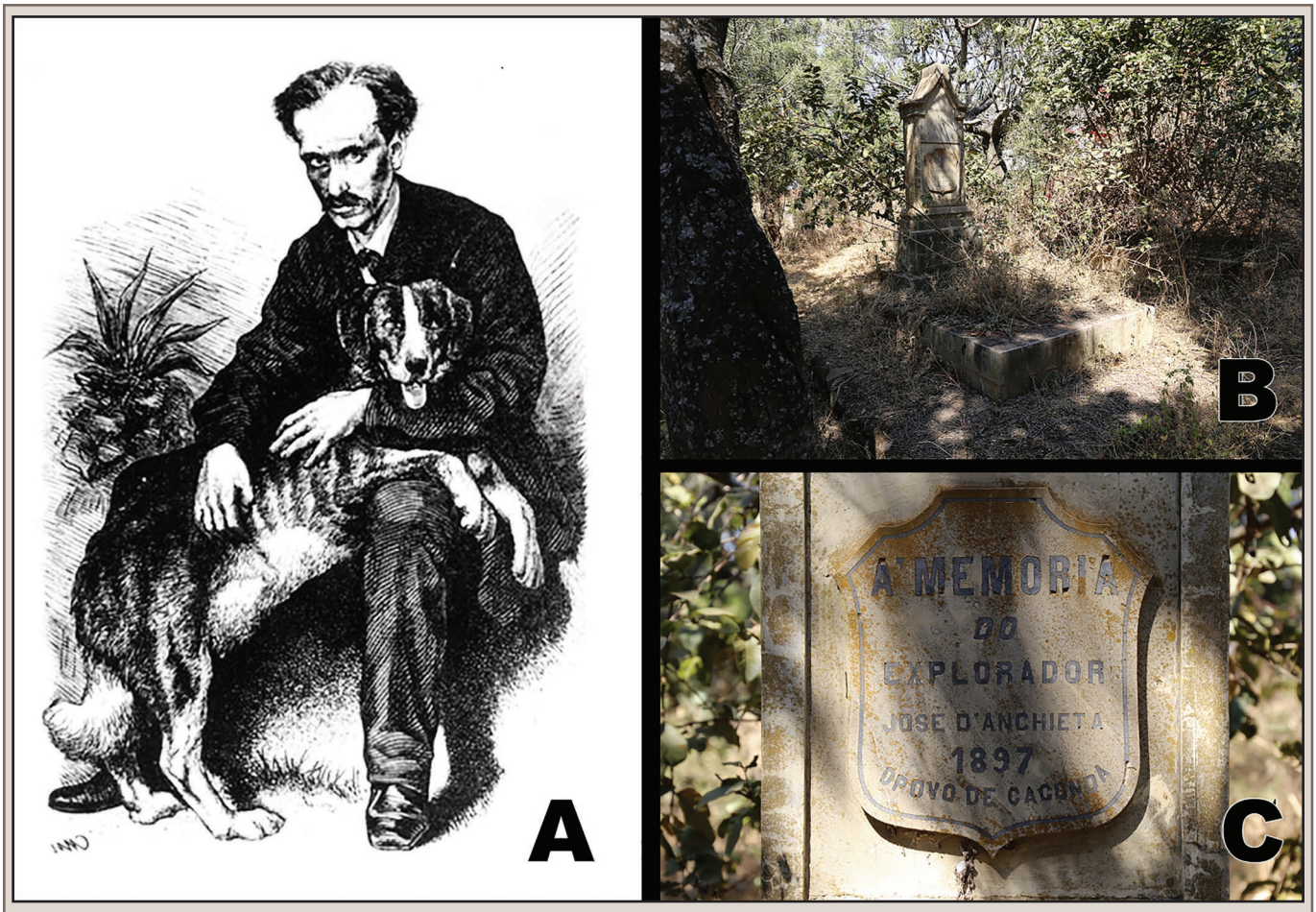

FIG. 1. A) Portrait of Portuguese naturalist José de Anchieta (1832–1897) (Source: Arquivo Histórico do Museu Bocage/MUHNAC-UL); B) General view of Anchieta's tomb in Caconda, Huíla Province; C) Detail of Anchieta's tomb. "À Memoria do Explorador Jose d'Anchieta. 1897. O povo de Caconda" [In memory of the explorer José d'Anchieta. 1897. The people of Caconda].

Chibia) are often rocky, with waterfalls, ravines, and kopje-like outcrops all being common. Vegetation in these areas consists of cropland or fire-managed grazing land in flat areas and remnant woodland along cliffs and in ravines.

Bicuar National Park (BNP) is the only protected area within the borders of Huíla. Occupying 7900 km^2, the park lies in the south-central region of the province, bordered by the Cunene River to the east. It was originally created as a hunting reserve in 1938 due to the abundance of game species in the area, and in 1964 it was elevated to a national park. Despite this designation, much of the mammalian diversity was hunted during the civil war that raged from independence in 1975 until 2002. Some of this fauna has since been able to recover within park boundaries, with game species such as elephant, eland, and roan persisting, but illegal poaching is still a problem (LMPC, pers. obs.). Drainage basins form temporary streams in the wet season (December–March) and provide open watering holes for mammals during the remainder of the year. The landscape is flat with sandy substrate, and little or no exposed rock in most places. Overall, the physical environment bears a closer resemblance to wetter parts of the Kalahari basin in eastern Angola and Namibia than it does to western Huíla Province. Despite being such a large and long-established national park, no published observations of herpetofauna exist from BNP prior to this study, leaving a large gap in the knowledge of Huíla's reptiles and amphibians.

This paper presents the results of two expeditions conducted by a team from Villanova University (VU), Villanova, USA; University of Michigan-Dearborn (UM), Dearborn, USA; and the Instituto Nacional da Biodiversidade e Áreas de Conservação (INBAC), Kilamba-Kiaxi, Angola. A total of 43 herpetological taxa were collected, including 10 species that are either undescribed or are likely to be resurrected from synonymy, eight new provincial records, and affirmation of taxa that had previously been known only from original descriptions. These expeditions were the sixth and eighth joint expeditions in Angola under the memorandum of understanding signed by INBAC and international partners, which is included in the national biodiversity plan. The results of previous expeditions are reported in Ceríaco et al. (2016a,b, 2018a) while others are currently in different stages of preparation. We provide a brief description of the past, present, and future prospects for the study of herpetofauna in the province and the country.

History of Herpetological Exploration of the Province

Knowledge of Angolan herpetology has accumulated over the past two centuries through various expeditions within the country (see Crawford-Cabral and Mesquitela (1989) and Marques et al. (2018) for a comprehensive review). The first zoological studies in Huíla were conducted by the Portuguese naturalist José Alberto de Oliveira Anchieta (1832–1897), working

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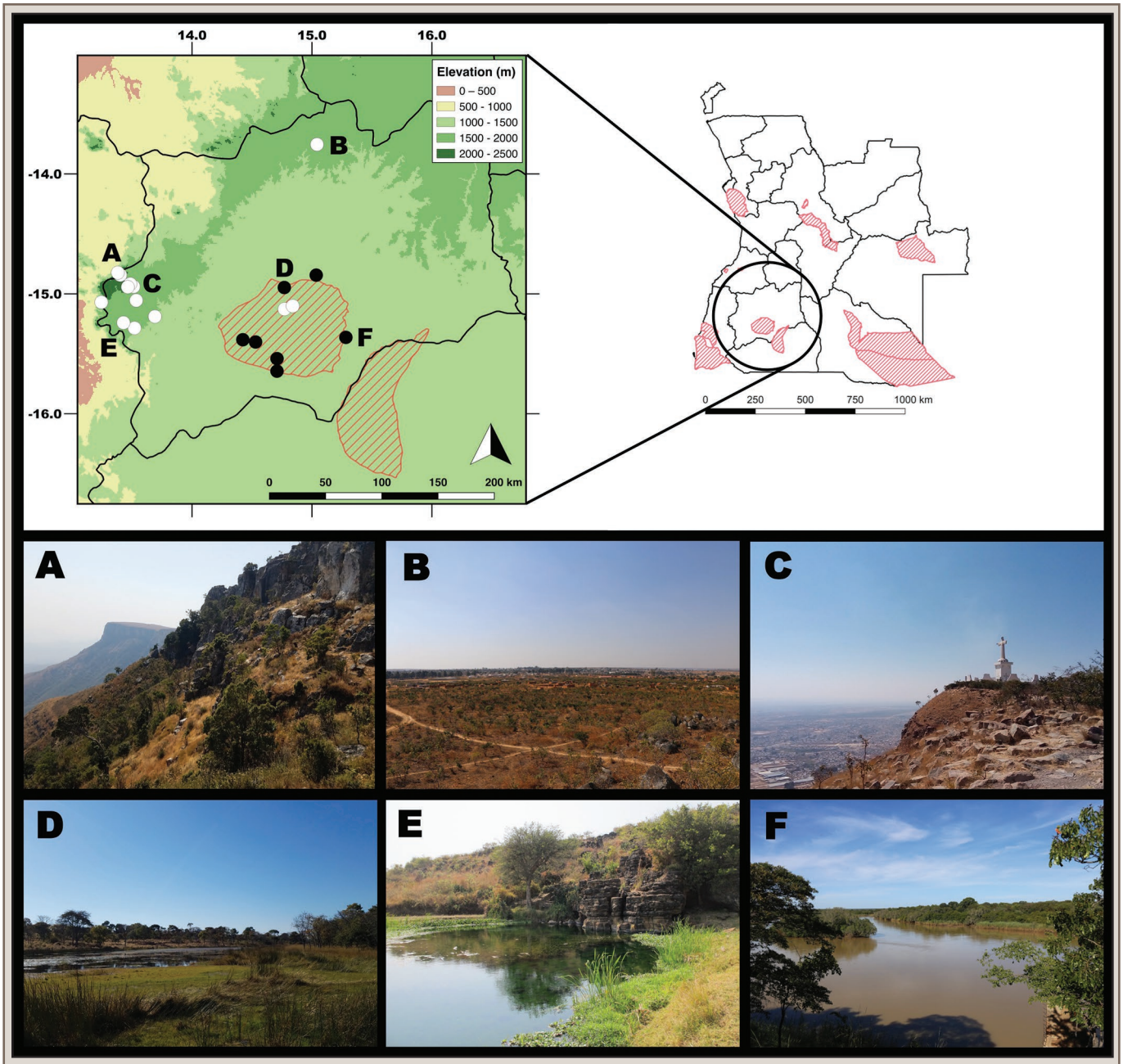

FIG. 2. Map of Huíla Province and collecting localities. White dots correspond to July–August 2017 collecting localities, while black dots correspond to those of March 2018. Red grids correspond to National Parks (Bicuar National Park, Huíla, in the center, and Mupa National Park, Cunene, below). A: Tundavala; B: Vicinities of Caconda; C: Cristo-Rei statue overlooking Lubango; D: Bicuar National Park; E: Chivinguiro pond and caves; F: Cunene River near Matunto.

for the National Museum of Lisbon under the direction of José Vicente Barbosa du Bocage (1823–1907). From 1866 onward, Anchieta was employed by the museum to explore the fauna of Angola, and he collected and sent thousands of specimens to the Lisbon museum, greatly contributing to knowledge of the Angolan biota and leading to the description of many new taxa (Ceríaco, *in press*). The first reptile species described from Huíla was *Eumecia anchietae* Bocage, 1870, which Anchieta sent to Bocage in 1870 (Bocage 1870). Over the next few decades, Bocage continued to publish records and new species from Huíla based on the collections of Anchieta (Bocage 1873a,b, 1879, 1882, 1886, 1893) until the death of the latter in 1897 in the vicinity of Caconda during a field expedition (Fig. 1). After Anchieta's death, Júlio Guilherme Bettencourt Ferreira (1866–1948), Bocage's protégé in the Lisbon Museum, studied and published on Anchieta's last shipment of specimens, which were mostly from Huíla (Ferreira 1897).

In the first half of the twentieth century, multiple foreign naturalists visited Huíla Province during their expeditions to Angola. These included William John Ansorge (1850–1913) during his 1903 and 1905 Angolan trips (material studied by Boulenger 1905, 1907a,b, 1915); the Vernay Expedition to Angola (1925; snakes studied and published on by Bogert 1940); the Pulitzer Angola Expedition (1930; material studied and published on by Schmidt 1933, 1936); and the Swiss naturalist Albert Monard (1886–1952), who collected for the Museum of La Chaux-de-

Fonds (Switzerland) between 1928 and 1933, and published several important contributions to the Angolan herpetofauna (Monard 1931, 1932, 1937, 1938).

During the second half of the twentieth century, especially during the 1950s and 1960s, the province was again explored by naturalists, including Gustav Adolf von Maydell (1919–1959) and Dr. Schönfeldt of the Hamburgische Angola-Expedition (Zoological Museum of Hamburg, Germany), who surveyed the central regions of Angola from May 1952 to April 1954, and whose results were then published by Walter Hellmich (1906–1974) (Hellmich and Schmelcher 1956; Hellmich 1957a,b). Other naturalists included Gert Hermann Heinrich (1896–1984), who led the Conover Angola Expedition sponsored by the Chicago Natural History Museum (Field Museum) that collected specimens from across Angola between 1953 and 1955. However, Heinrich's herpetological collection was never properly studied and published, as he was mostly interested in the country's avifauna. Some of the most important contributions to the Huíla herpetofauna were made by Belgian herpetologist Raymond F. Laurent (1917–2005) who, based on the collections of the Museu do Dundo, described several new species from the province, including the lizards *Cordylus machadoi* Laurent, 1964 and *Trachylepis bayonii huilensis* (Laurent, 1964). The Angolan Civil War (1975–2002) limited accessibility to the country and precluded local researchers from going to the field, causing a near complete halt to the study of Angola's herpetofauna.

Recently, the Ministry of Environment, in collaboration with the South African National Biodiversity Institute, organized a multidisciplinary expedition to Huíla and Namibe provinces, which led to the description of a new endemic species of reed-frog from Huíla, *Hyperolius chelaensis*, by Conradie et al. (2012a), although most of the other results of the expedition remain unpublished. Most recently, Baptista et al. (2018) published a paper on the amphibians and reptiles of the Tundavala area west of Lubango, in which new records for rare species such as *Psammophis ansorgii* (Boulenger, 1905) and *Psammophylax rhombeatus ocellatus* (Bocage, 1873) were recorded.

Materials and Methods

We conducted two herpetological surveys in Huíla Province from 21 July–11 August 2017 and 8–12 March 2018, sampling during both dry and wet seasons. A total of 20 localities were surveyed, including multiple sites in BNP, the greater Lubango area, and surrounding towns (Fig. 2). The combination of sites was chosen to maximize the types of habitats surveyed, including rocky outcrops, woodlands, open grasslands, streams, and ponds. In addition, several historic localities were targeted (e.g., Caconda, Leba Pass, Chivinguiro) in order to obtain topotypical material of certain species. In 2017, fieldwork conditions were hot and dry during the day (~30°C), with temperatures dropping significantly at night (to ~5°C) given the high elevation of the Huíla Plateau. Conditions during the 2018 survey were more typical of Angola's wet season, with hot and humid conditions during the day, including some fortuitous rains and lower temperatures at night. We captured specimens using long-nooses, rubber bands, or by hand during both diurnal and nocturnal visual surveys. All specimens were euthanized following Villanova University animal care and use protocol #1866, preserved in 10% buffered formalin in the field, and then transferred to 70% ethanol for storage. Liver tissues were extracted and preserved in 95% ethanol. Voucher specimens and tissue samples were deposited in the herpetological collections of California Academy of Sciences (CAS), Florida Museum of Natural History (UF), Museu de História Natural e da Ciência da Universidade do Porto (MHNC-UP/REP), and a subset of specimens were deposited in the reference collection of INBAC in Luanda, Angola. In some cases, we further confirmed species identifications by sequencing the mitochondrial 16S ribosomal RNA gene.

Results

A total of 385 specimens were collected from across the Huíla Province during the two expeditions, representing eight amphibian taxa from seven genera, and 32 reptile taxa from 24 genera. In addition, we include one amphibian and one reptile species represented by photographic voucher only. In the following species accounts, we provide information on voucher numbers and sampling localities. Brief notes on identification, taxonomy, and/or natural history are also given when appropriate. The specimens deposited at INBAC are listed with their original field numbers (AMB = Aaron M. Bauer field series). AMB material not at INBAC is pending museum deposition. Latitude and longitude (WGS 84), and elevation (in meters) of the collection sites are given for each species account. Species accounts are ordered taxonomically by family and alphabetically within families.

Species Accounts

Amphibia
Anura
Pipidae
***Xenopus petersii* Bocage, 1895**
PETER'S CLAWED FROG – Fig. 3A

Material.—**49 specimens:** Huíla Waterfall, -15.0549, 13.5349, 1658 m, 5 August 2017, UF 187328–30, INBAC: AMB 10786; BNP, Matunto, -15.3694, 15.2751, 1159 m, 10 March 2018, MHNC-UP/REP/AMP 270–85 (tadpoles), INBAC: AMB 11033–11061 (tadpoles).

Comments.—In their taxonomic revision of *Xenopus laevis*, Furman et al. (2015) designated all central and western Angolan individuals as *X. petersii*, and Frétey et al. (2018) designated a lectotype of *X. petersii* from nearby Benguela Province, Angola. This species is known from several localities in Huíla (see Marques et al. 2018) and the new localities fall within the expected range for the species in the province. Adults collected resemble typical *petersii* morphologically in having mottled pigmentation on the belly.

Bufonidae
***Sclerophrys pusilla* (Mertens, 1937)**
MERTENS' STRIPED TOAD – Fig. 3B

Material.—**16 specimens:** Serra da Leba waterfall, -15.0703, 13.2438, 1668 m, 4 August 2017, AMB 10760–72 (tadpoles); Comuna Capelongo, Camulemba, -14.8443, 15.0356, 1220 m, 11–12 March 2018, MHNC-UP/REP/AMP 263–5.

Comments.—The species is recorded from several localities in the northern, western, and eastern limits of the province (see Marques et al. 2018), and we collected new records from Camulemba that fill in the distribution for central Huíla. Records of *S. funereus* (Bocage, 1866) from Monard (1937, 1938) from northern Huíla are referable to *S. pusilla* (Marques et al. 2018).

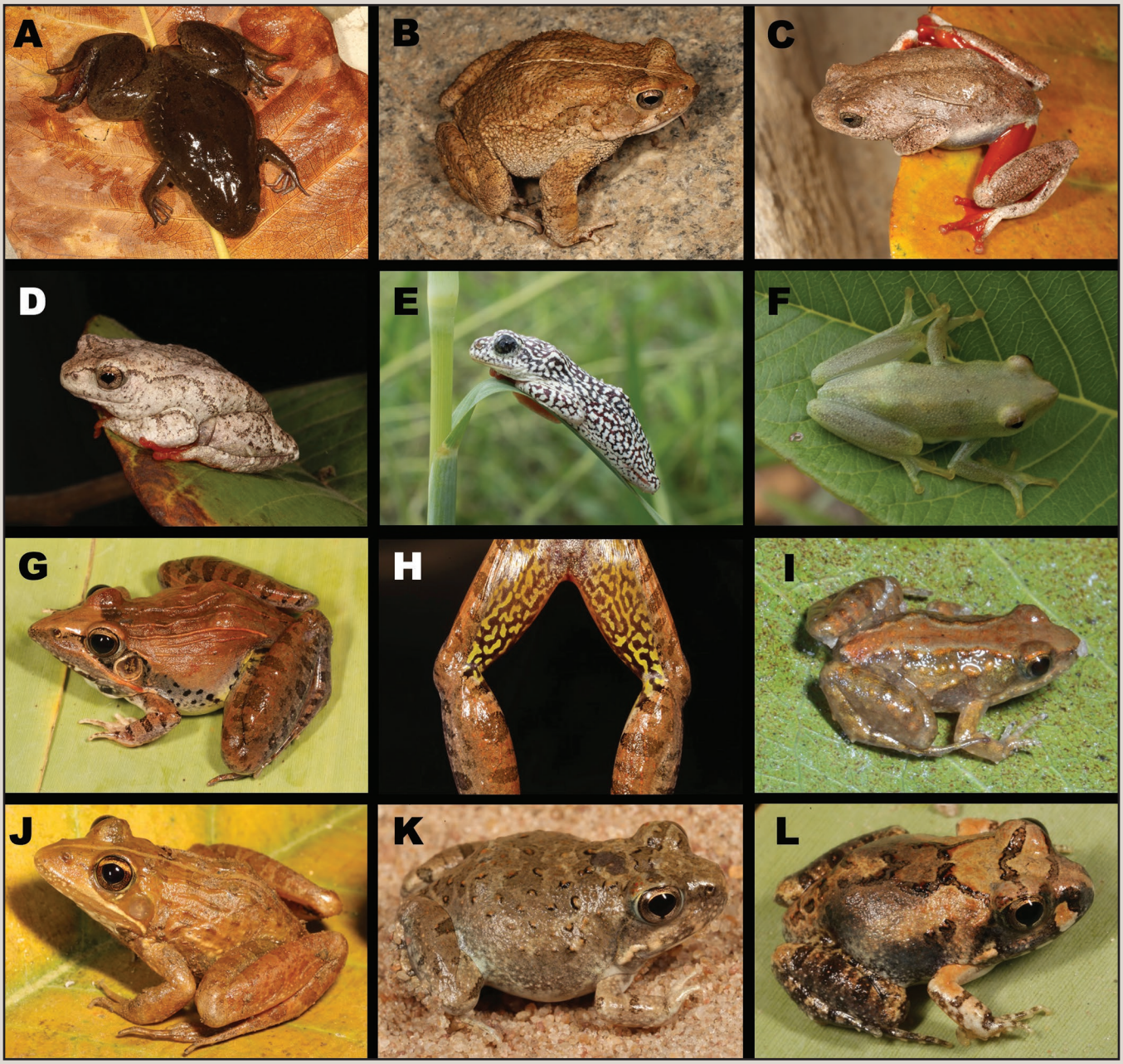

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FIG. 3. A) Peter's Clawed Frog, *Xenopus petersii* Bocage, 1895; B) Merten's Striped Toad, *Sclerophrys pusilla* (Mertens, 1937); C-E) Different color morphs of Angolan Reed Frog, *Hyperolius* cf. *angolensis* Steindachner, 1867; F) Large-nosed Long Reed Frog, *Hyperolius* cf. *nasutus* Günther, 1865; G) Sharp-nosed Grass Frog, *Ptychadena oxyrhynchus* (Smith, 1849); H) Thigh coloration and pattern of Sharp-nosed Grass Frog, *Ptychadena oxyrhynchus* (Smith, 1849); I) Mababe Puddle Frog, *Phrynobatrachus* cf. *mababiensis* (FitzSimons, 1932); J) Angolan River Frog, *Amieta angolensis* (Bocage, 1866); K) Damaraland Sand Frog, *Tomopterna damarensis* Dawood and Channing, 2002; L) Rough Sand Frog, *Tomopterna tuberculosa* (Boulenger, 1882).

Hyperoliidae

***Hyperolius* cf. *angolensis* Steindachner, 1867**

ANGOLAN REED FROG – Fig. 3C–E

Material.—**3 specimens:** Lubango-Tundavala road, -14.8452, 13.4047, 2086 m, 10 August 2017, UF 187213–4; BNP, main camp, -15.1048, 14.8269, 1224 m, January 2018, photographic voucher, see Fig. 3E.

Comments.—Ceríaco et al. (2014) and Marques et al. (2018) provided some clarification on the taxonomy and nomenclature of Angolan populations of this species complex, suggesting the use of the nomen *H. angolensis* until a more detailed and thorough review of the group is made available. Other authors refer to these populations as *Hyperolius paralellus* (Frétey et al. 2011; Baptista et al. 2018). Bocage (1873) described a different species from Huíla, *H. huillensis* that agrees with our specimens in general shape and coloration, however our specimens differ from the *H. huillensis* description by having a rough instead of smooth dorsum. The specimens from the Lubango-Tundavala road were found aestivating attached to the inner post of a roadside sign.

***Hyperolius* cf. *nasutus* Günther, 1865**

LARGE-NOSED LONG REED FROG – Fig. 3F

Material.—**1 specimen:** BNP, -15.1851, 14.8219, 1264 m January 2018, photographic voucher only, see Fig. 3F.

Comments.—The complex taxonomic and nomenclatural history of the *H. nasutus* complex was most recently addressed by Channing et al. (2013), who also included morphological, acoustic, and molecular characters that allow the identification of *H. nasutus* against the sympatric and phenotypically similar *H. benguellensis* (Bocage, 1893). Given that our record is solely based on a photographic voucher, we are unable to provide a detailed identification. Furthermore, both species occur in the area (Channing et al. 2013; Marques et al. 2018), so biogeographic patterns are not informative in inferring its identification. Baptista et al. (2018) reported the same doubts with specimens from the Tundavala area.

Ptychadenidae

***Ptychadena oxyrhynchus* (Smith, 1849)**

SHARP-NOSED GRASS FROG – Fig. 3G–H

Material.—**17 specimens:** BNP, Hombo, -14.9476, 14.7696, 1308 m, 12 March 2018, MHNC-UP/REP/AMP 251–62, INBAC: AMB 11077–8, AMB 11089–90, AMB 11094.

Comments.—This species is broadly distributed in Angola and other sub-Saharan African countries (Frost 2018), and can be found in savanna, agricultural areas, marshes, and secondary vegetation. Several records exist for Huíla (see Marques et al. 2018).

Phrynobatrachidae

***Phyrnobatrachus* cf. *mababiensis* (FitzSimons, 1932)**

MABABE PUDDLE FROG – Fig. 3I

Material.—**3 specimens:** BNP, main camp, -15.1048, 14.8269, 1223 m, 25 July 2017, UF 187245, INBAC: AMB 10160; BNP, Hombo, -14.9476, 14.7696, 1308 m, 12 March 2018, MHNC-UP/REP/AMP 250.

Comments.—These miniscule puddle frogs were observed in large numbers in shallow watering holes surrounded by open savanna in BNP. Currently, four members of the *Phrynobatrachus cryptotis* complex are known from Angola: *P. cryptotis*, *P. mababiensis*, *P. minutus*, and *P. parvulus* (see Marques et al. 2018). The systematics of the group is still highly problematic, and the diversity may be underestimated, as Zimkus et al. (2010) presented evidence for three cryptic lineages within *P. mababiensis*. We tentatively identify our specimens as *P. mababiensis*; however, more detailed studies are needed to assess its taxonomic identity.

Pyxicephalidae

***Amietia angolensis* (Bocage, 1866)**

ANGOLAN RIVER FROG – Fig. 3J

Material.—**29 specimens:** Hunguéria waterfall, -15.2852, 13.5201, 1405 m, 7 August 2017, UF 187157, UF 187165–70 (tadpoles), AMB 10806–10 (tadpoles), INBAC: AMB 10799–800 (tadpoles); Huíla Waterfall, -15.0549, 13.5349, 1658 m, 5 August 2017, UF 187161 (tadpole); Serra da Leba waterfall, -15.0703, 13.2438, 1668 m, 4 August 2017, UF 187158–60 (tadpoles), AMB 10751–4 (tadpoles), INBAC: AMB 10757 (tadpole), 10759 (tadpole); Lubango-Tundavala road, -14.8433, 13.4018, 10 August 2017, UF 187162 (metamorph), UF 187163–4 (tadpoles), INBAC: AMB 10871, AMB 10874 (tadpole).

Comments.—This species is commonly found in streams throughout Huíla and much of Angola, excluding the arid southwest. All specimens presented here represent new localities except those from Serra da Leba waterfall (Ceríaco et al. 2016a; Marques et al. 2018).

***Tomopterna damarensis* Dawood and Channing, 2002**

DAMARALAND SAND FROG – Fig. 3K

Material.—**3 specimens:** BNP, Hombo, -14.9476, 14.7696, 1308 m, 12 March 2018, MHNC-UP/REP/AMP 266–7, INBAC: AMB 11082.

Comments.—When originally described, this species was only known from its type locality in Khorixas, northern Namibia (Dawood and Channing 2002). Ceríaco et al. (2016a) provided the first evidence of the presence of this species in Angola. Later, Heinicke et al. (2017a) used morphological and mtDNA data to show that this species is broadly distributed in Namibia and Angola, and suggested that many older records of *Tomopterna* from this region likely correspond to *T. damarensis*. The reported specimens represent the second confirmed locality from Angola and the first records for Huíla Province, extending the northern limits of its known range by 237 km. These specimens were collected at night in an irrigated area near the northern entrance of BNP.

***Tomopterna tuberculosa* (Boulenger, 1882)**

ROUGH SAND FROG – Fig. 3L

Material.—**2 specimens:** BNP, Hombo, -14.9476, 14.7696, 1308 m, 12 March 2018, MHNC-UP/REP/AMP 268–9.

Comments.—Known from several other localities in Huíla (see Marques et al. 2018), this species was collected in an irrigated agricultural plot, syntopic with *T. damarensis*.

Reptilia

Pelomedusidae

***Pelomedusa subrufa* (Bonnaterre, 1789)**

HELMETED TERRAPIN – Fig. 4A

Material.—**1 specimen:** BNP, Tunda dos Gambos, -15.4021, 14.5302, 1341 m, 9 March 2018, MHNC-UP/REP/AMP 438.

Comments.—This side-necked turtle has a broad distribution with numerous records for Huíla (Marques et al. 2018). The specimen was found in a puddle in the middle of a dirt road in the southern part of BNP.

Testudinidae

***Kinixys belliana* Gray, 1831**

BELL'S HINGEBACK TORTOISE – Fig. 4B

Material.—**2 specimens:** BNP, Matunto, -15.3694, 15.2751, 1159 m, 11 March 2018, MHNC-UP/REP/REP 433–4.

Comments.—Kindler et al. (2012) elevated previous subspecies within this widespread lineage to species-level, retaining *K. belliana* (*sensu stricto*) for Angolan populations. There are three other published records from Huíla (see Marques et al. 2018).

Squamata

Gekkonidae

***Afroedura* cf. *bogerti* Loveridge, 1944**

BOGERT'S ROCK GECKO – Fig. 4C

Material.—**4 specimens:** Tundavala, -14.8239, 13.3811, 1295 m, 1 August 2017, CAS 263848–9, INBAC: AMB 10691; 9 August 2017, CAS 263878.

Comments.—The highly dorsoventrally compressed bodies of this species allow them to fit in tight rock cracks in suitable

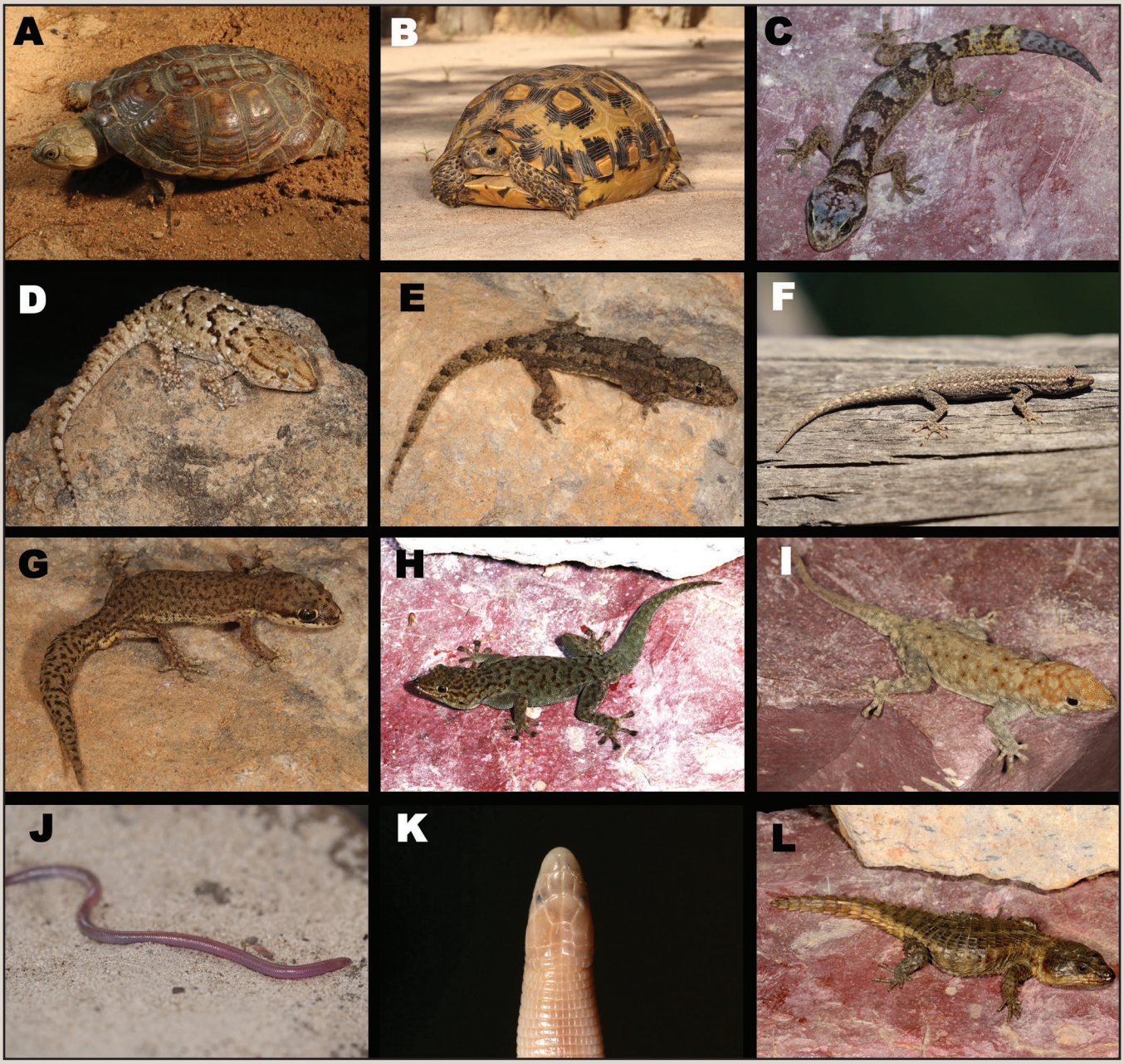

FIG. 4. A) Helmeted Terrapin, *Pelomedusa subrufa* (Bonnaterre, 1789); B) Bell's Hingeback Tortoise, *Kinixys belliana* Gray, 1831; C) Bogert's Rock Gecko, *Afroedura* cf. *bogerti* (Loveridge, 1944); D) Button-scaled Gecko, *Chondrodactylus laevigatus* (Fischer, 1888); E) Benguela Gecko, *Hemidactylus benguellensis* Bocage, 1893; F) Bradfield's Dwarf Gecko, *Lygodactylus bradfieldi* Hewitt, 1932; G) Speckled Thick-toed Gecko, *Pachydactylus* cf. *punctatus* Peters, 1854; H) Mountain Namib Day Gecko, *Rhoptropus montanus* (Laurent, 1964); I) Undescribed Namib Day Gecko, *Rhoptropus* sp.; J) Kalahari Round-snouted Worm Lizard, *Zygaspis quadrifrons* (Peters, 1862); K) Dorsal head view of Kalahari Round-snouted Worm Lizard, *Zygaspis quadrifrons* (Peters, 1862); L) Machado's Girdled Lizard, *Cordylus machadoi* Laurent, 1964.

habitat, often in the same cracks as *Rhoptropus montanus*, *Trachylepis sulcata*, and *Agama schacki*. These specimens represent the first published records for Huíla, although localities have been reported from neighboring Namibe, Benguela, and Huambo provinces, as well as Cuanza Sul and northern Namibia. This species adds to the known diversity of Tundavala recorded by Baptista et al. (2018). Additionally, Branch et al. (2017) reported deep divergences between the Angolan populations of this species, suggesting the presence of cryptic diversity comprising a species complex.

***Chondrodactylus laevigatus* (Fischer, 1888)**

BUTTON-SCALED GECKO – Fig. 4D

Material.—**6 specimens:** BNP, Tunda dos Gambos, -15.6450, 14.7085, 1203 m, 8 March 2018, MHNC-UP/REP 425, INBAC: AMB 10974; BNP, Matunto, -15.3694, 15.2751, 1159 m, 10 March 2018, MHNC-UP/REP 426–8; BNP, Comuna Capelongo, Camulemba, -14.8443, 15.0356, 1220 m, 11 March 2018, MHNC-UP/REP 429.

Comments.—Western and northern Angolan populations of *Chondrodactylus* are chiefly referable to *C. pulitzerae* (Ceríaco et al. 2014, 2016a, 2017; Marques et al. 2018). However, specimens

more closely resembling *C. laevigatus* have been reported for Huíla, Cunene, and Cuando Cubango provinces. The specimens noted here have particularly large and spinose tubercles, as is typical for *C. laevigatus* from north central Namibia (e.g., Grootfontein), but dramatically different from the "button-scales" of western Namibian and South African individuals. However, only the Cuando Cubango specimens have yet been verified genetically (Bauer et al., unpubl.).

***Hemidactylus benguellensis* Bocage, 1893**
BENGUELA GECKO – Fig. 4E

Material.—**13 specimens:** Chivinguiro Cave entrance, -15.2406, 13.4281, 2237 m, 4 August 2017, CAS 263393–6, INBAC: AMB 10742–3; Lubango, -14.9342, 13.4693, 1865 m, 21 July 2017, INBAC: AMB 10131; Lubango, -14.9182, 13.4849, 1795 m, 23 July 2017, UF 187207; 6 August 2017, UF 187209, INBAC: AMB 10793; Lubango, -14.9341, 13.4693, 1865 m, 21 July 2017, UF 187210; Lubango, -14.9434, 13.4644, 2012 m, 10 August 2017, CAS 263407; Comuna Capelongo, Camulemba, -14.8443, 15.0356, 1220 m, 11 March 2018, MHNC-UP/REP 431.

Comments.—This species, originally described from "Cahata" = [Caota], Benguela Province (Bocage 1893), has generally been regarded as a synonym of the wide-ranging *H. mabouia*. However, ongoing revision of this species complex has confirmed that *H. benguellensis* is a genetically distinct and a morphologically diagnosable species (Ceríaco et al., unpubl.). Prior records of this species were exclusively from Benguela Province to the north of Huíla, making these the first records for Huíla. These geckos were found at night both on man-made structures (hotel walls) and in natural habitats (rocky crevices).

***Lygodactylus bradfieldi* Hewitt, 1932**
BRADFIELD'S DWARF GECKO – Fig. 4F

Material.—**19 specimens:** Lubango, -14.9342, 13.4693, 1865 m, 21–23 July 2017, CAS 263417–21, UF 187226, INBAC: AMB 10133, AMB 10137, AMB 10140; Lubango, -14.9182, 13.4849, 1795 m, 23 July 2017, CAS 263422; 9 August 2017, CAS 263423 (juvenile); BNP, main camp, -15.1016, 14.8399, 1224 m, 25–27 August 2017, UF 187227–8, INBAC: AMB 10151; Huíla Waterfall, -15.0549, 13.5349, 1658 m, 5 August 2017, CAS 263405; Chibia, -15.1894, 13.6906, 1486 m, August 2017, UF 187229; BNP, Matunto, -15.3694, 15.2751, 1159 m, 10 March 2018, MHNC-UP/REP 435; BNP, Hombo, -14.9476, 14.7696, 1308 m, 12 March 2018, MHNC-UP/REP 436; Comuna Capelongo, Camulemba, -14.8443, 15.0356, 1220 m, 12 March 2018, MHNC-UP/REP 437.

Comments.—The specimens collected in Huíla represent the first reported records for this species in the province, although a detailed molecular and morphological analysis is needed to better understand present and historical records of this species in Angola due to confusion with the similar *L. capensis*. These diurnal geckos are often found around man-made structures, particularly wooden fences.

***Pachydactylus* cf. *punctatus* Peters, 1854**
SPECKLED THICK-TOED GECKO – Fig. 4G

Material.—**1 specimen:** Lubango, -14.9434, 13.4644, 2012 m, 10 August 2017, AMB 10863.

Comments.—This individual was found under a small rock in a forested ravine near Lubango. The species complex as currently recognized is widespread across southern Africa, although deep species-level divergences suggest a minimum of four taxa that occur in Angola (Heinz 2011). Endemics of this genus from Namibia and South Africa suggest the possibility of local endemics in southern Angola, and a phylogeographic study of the complex is currently being undertaken (Bauer et al., unpubl.).

***Rhoptropus montanus* (Laurent, 1964)**
MOUNTAIN NAMIB DAY GECKO – Fig. 4H

Material.—**18 specimens:** Tundavala, -14.8239, 13.3811, 1295 m, 24 July 2017, CAS 263846, INBAC: AMB 10148; 1 August 2017, CAS 263850–7; 9 August 2017, CAS 263876–7; Tundavala, -14.8234, 13.3925, 1293 m, 2 August 2017, CAS 263900–2, INBAC: AMB 10718; Chivinguiro, -15.2406, 13.4281, 2237 m, 4 August 2017, CAS 263910; Serra da Leba waterfall, -15.0703, 13.2438, 1668 m, 4 August 2017, CAS 263913.

Comments.—This Angolan endemic is known only from high-elevation sites above the Great Escarpment in Huíla and Namibe provinces, preferring cooler, more mesic environments than most of its congeners. *Rhoptropus montanus* was previously considered a subspecies of *R. boultoni*, however recent molecular work (Kuhn 2016; Heinicke et al. 2017b) confirmed the specific status of this taxon.

***Rhoptropus* sp.**
NAMIB DAY GECKO – Fig. 4I

Material.—**10 specimens:** Serra da Leba waterfall, -15.0703, 13.2438, 1668 m, 4 August 2017, CAS 263914; Huíla Waterfall, -15.0549, 13.5349, 1658 m, 5 August 2017, CAS 263895–6, INBAC: AMB 10778; Lubango, Cristo Rei, -14.9401, 13.5117, 2200 m, 9 August 2017, CAS 263880–3, INBAC: AMB 10830, AMB 10832.

Comments.—This undescribed Namib day gecko is superficially similar to *R. barnardi*, but molecular work places it as sister to *R. biporosus* (Kuhn 2016). It is parapatric with *R. biporosus* near the escarpment, and sympatric with *R. montanus* at Serra da Leba, but extends its range into the lowlands of Namibe Province. This is the first record for Huíla Province, although it has been collected nearby on the Namibe border with Huíla (Ceríaco et al. 2016a). The discovery of a cryptic species suggests further hidden diversity in this group. A phylogenetic analysis and revision of the genus, including a formal description of this species, is currently under study (Kuhn and Bauer, unpubl.).

Amphisbaenidae
***Zygaspis quadrifrons* (Peters, 1862)**
KALAHARI ROUND-SNOUTED WORM LIZARD – Fig. 4J–K

Material.—**1 specimen:** BNP, main camp vicinity, -15.0971, 14.8352, 1243 m, 29 August 2017, AMB 10680.

Comments.—This specimen was found under a fallen log in sandy substrate in BNP, and represents the first record for Huíla Province. Other Angolan localities are reported from Cunene and Cuando Cubango provinces to the southeast (see Marques et al. 2018). Monard (1931) described Angolan representatives of this group as *Amphisbaena* (= *Zygaspis*) *ambuellensis* based on two specimens from Cunene and Cuando Cubango with slight scalation differences. Loveridge (1941) tentatively synonymized this species with *Z. quadrifrons*, but he still remained skeptical about sinking the species, and noted that more specimens were needed for a complete analysis. A detailed morphological and molecular study is required to determine the status of a potentially endemic *Zygaspis* species from Angola.

Cordylidae
***Cordylus machadoi* Laurent, 1964**
MACHADO'S GIRDLED LIZARD – Fig. 4L

Material.—**3 specimens:** Tundavala, -14.8239, 13.3811, 1295 m, 1 August 2017, CAS 263578–9, INBAC: AMB 10686.

Comments.—*Cordylus machadoi* is a locally endemic girdled lizard restricted to rocky crevices along the Huíla Plateau. These specimens represent the second record for this locality (see Baptista et al. 2018). Stanley et al. (2016) described a sister species from lower elevations in Namibe Province, *C. namakuiyus*, exemplifying the high endemicity found along the Angolan Great Escarpment. Some specimens from northern Namibia are also assigned to *C. machadoi*, however morphological disparities and appreciable geographic separation of these specimens from the confirmed range warrants further research (Stanley et al. 2016).

Gerrhosauridae

***Gerrhosaurus* cf. *multilineatus* Bocage, 1866**

KWANZA KEELED PLATED LIZARD – Fig. 5A

Material.—**2 specimens:** BNP, main camp vicinity, -15.1158, 14.8071, 1241 m, 26 July 2017, CAS 263400; BNP, Matunto, -15.3635, 15.2832, 1150 m, 10 March 2018, MHNC-UP/REP 430.

Comments.—One specimen was spotted as it crossed a sandy road and retreated under a small shrub in BNP at midday. The taxonomy of the Angolan *Gerrhosaurus* is currently in review, however the collected specimen appears to represent an undescribed species, closely related to the *G. bulsi-multilineatus* species complex (Michael F. Bates, unpubl.).

Lacertidae

***Ichnotropis bivittata bivittata* Bocage, 1866**

ANGOLAN ROUGH-SCALED LIZARD – Fig. 5B

Material.—**1 specimen:** Tundavala, -14.8234, 13.3925, 1293 m, 2 August 2017, CAS 263905.

Comments.—This subspecies is known from high plateau habitats in Central Africa and throughout Angola (except Namibe Province), however no modern revision of *Ichnotropis* has been carried out to confirm the identity of these populations. This specimen was found inside a dry cow bone in recently burned grass plains atop the Tundavala escarpment.

***Ichnotropis bivittata pallida* Laurent, 1964**

PALE ROUGH-SCALED LIZARD – Fig. 5C

Material.—**6 specimens:** BNP, main camp vicinity, -15.1138, 14.8104, 1241 m, 26 July 2017, CAS 263906; BNP, main camp vicinity, -15.1099, 14.8203, 1241 m, 27 July 2017, CAS 263907; BNP, main camp, -15.1016, 14.8399, 1224 m, 28 July 2017, CAS 263909; BNP, main camp vicinity, -15.0941, 14.8353, 1243 m, 29 July 2017, INBAC: AMB 10677; BNP, Tunda dos Gambos, -15.6450, 14.7085, 1203 m, 9 March 2018, MHNC-UP/REP 432; BNP, Tunda dos Gambos, -15.6404, 14.7056, 1199 m, 9 March 2018, INBAC: AMB 10980.

Comments.—This subspecies was previously known only from the holotype described by Laurent (1964) from "Boca da Humpata." These specimens were found foraging on sandy substrates throughout xeric grass and shrub habitat in BNP, ~150 km east of Laurent's (1964) original description.

Scincidae

***Eumecia anchietae* Bocage, 1870**

WESTERN SERPENTIFORM SKINK – Fig. 5D

Material.—**1 specimen:** Tundavala, -14.8234, 13.3925, 1293 m, 2 August 2017, CAS 263903.

Comments.—Baptista et al. (2018) recently recorded this serpentine skink species from Tundavala, representing the first topotypical material collected since its original description from the Huíla Plateau. Other records from Huíla exist from Caconda in the north and Kuvango in the east (see Marques et al. 2018).

***Panaspis* aff. *namibiana* Ceríaco, Branch, and Bauer, 2018**

NAMIBIAN SNAKE-EYED SKINK – Fig. 5E

Material.—**1 specimen:** BNP, main camp, -15.1034, 14.8311, 1243 m, 27 July 2017, CAS 263401.

Comments.—The taxonomic history of the genus *Panaspis* is problematic. Recently Medina et al. (2016) provided evidence that *P. wahlbergi* is a species complex with several undescribed lineages, sister to *P. maculicollis*. The latter is also a species complex, with at least three different lineages, one of which has recently been described as *P. namibiana*, endemic to central and northern Namibia (Ceríaco et al. 2018b). Several records of *P. wahlbergi* have been reported for Angola (see Marques et al. 2018). Based on preliminary morphological and molecular analyses these appear to belong to an undescribed sister taxon of *P. namibiana*, part of the *P. maculicollis* species complex and not *P. wahlbergi* (Ceríaco et al., unpubl.). The formal description of the Angolan form is being prepared and will be published elsewhere. This specimen was collected in an open savanna field within BNP under a piece of burnt charcoal.

***Sepsina angolensis* Bocage, 1866**

ANGOLAN REDUCED-LIMB SKINK – Fig. 5F

Material.—**2 specimens:** Tundavala, -14.8234, 13.3925, 1293 m, 2 August 2017, CAS 263904, INBAC: AMB 10721.

Comments.—These specimens were found burrowed under rocks on the open Tundavala plateau. *Sepsina angolensis* is known from several localities in Huíla Province (see Marques et al. 2018), and the current record fits in the expected range for the species in the province.

***Trachylepis albopunctata* (Bocage, 1867)**

VARIABLE SKINK – Fig. 5G

Material.—**21 specimens:** BNP, main camp vicinity, -15.1271, 14.7715, 1246 m, 26 July 2017, CAS 263398–9, INBAC: AMB 10156; BNP, main camp, -15.1016, 14.8399, 1224 m, 27–28 July 2017, CAS 263387–91, UF 187324, INBAC: AMB 10661; BNP, main camp vicinity, -15.1028, 14.8477, 1241 m, 28 July 2017, UF 187325, INBAC: AMB 10664–5; BNP, on road to Nongalafa, -15.1274, 14.7714, 1225 m, 30 July 2017, CAS 263392, INBAC: AMB 10685; Huíla Waterfall, -15.0549, 13.5349, 1658 m, 5 August 2017, CAS 263406; Lubango, Cristo Rei, -14.9401, 13.5117, 2200 m, 9 August 2017, CAS 263410; Lubango, -14.9434, 13.4644, 2012 m, 10 August 2017, CAS 263408–9, UF 187326–7.

Comments.—The broadly distributed *Trachylepis varia* species complex was recently revised by Weinell and Bauer (2018), who suggested that specimens from central and northern Angola, Zambia, and southern Democratic Republic of the Congo likely correspond to *Trachylepis albopunctata* (Bocage, 1867). This clade was subsequently treated as *T.* cf. *albopunctata* by Marques et al. (2018). The type locality for this taxon is in the neighboring Benguela Province, however the type specimen was lost in the 1978 fire that destroyed most of the zoological collection in the Lisbon Museum. These skinks are habitat generalists and can be found on rock walls and man-made structures in addition to natural outcrops and downed logs.

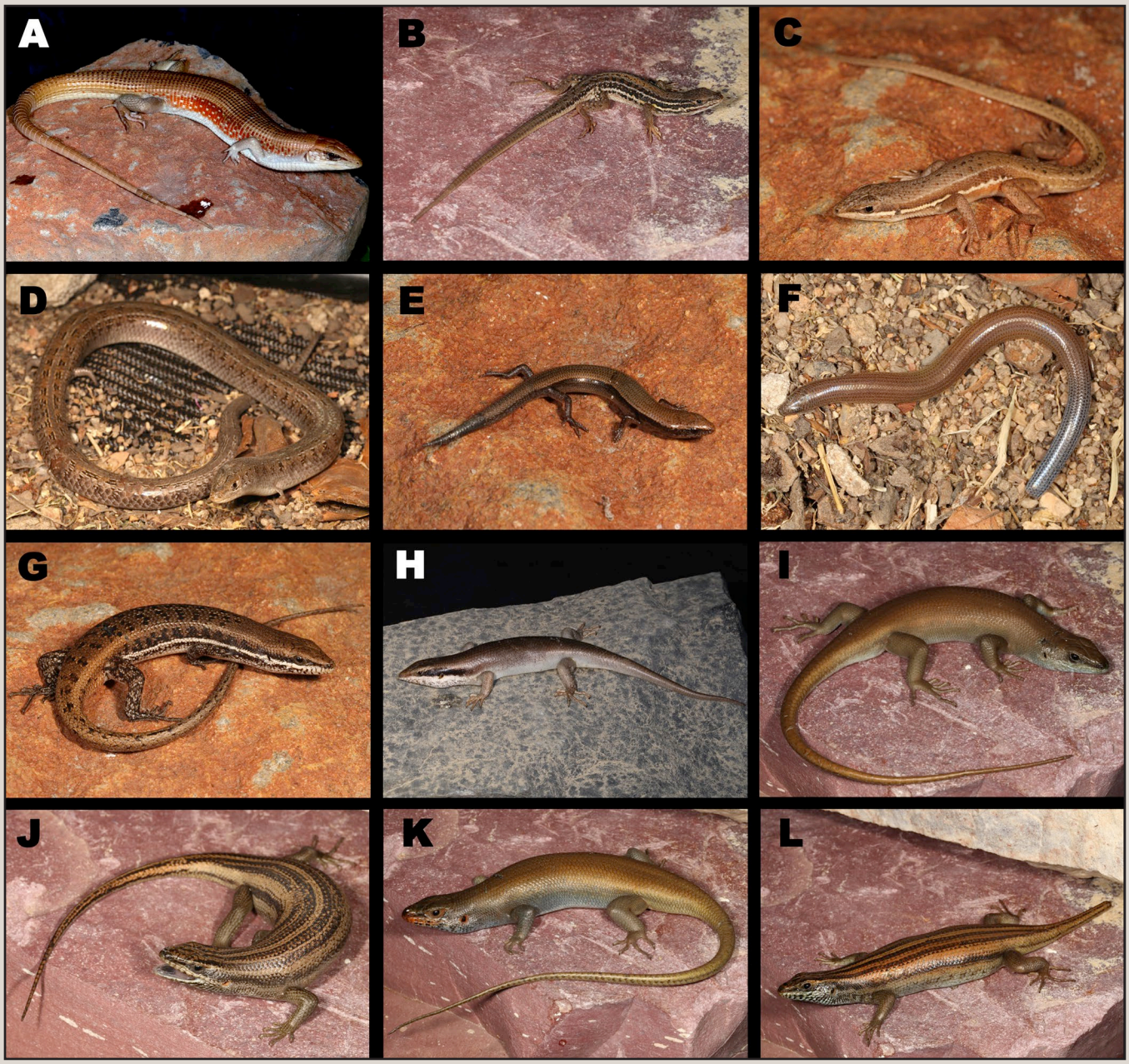

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FIG. 5. A) Kwanza Keeled Plated Lizard, *Gerrhosaurus* cf. *multilineatus* Bocage, 1866; B) Angolan Rough-scaled Lizard, *Ichnotropis bivittata bivittata* Bocage, 1866; C) Pale Rough-scaled Lizard, *Ichnotropis bivittata pallida* Laurent, 1964; D) Western Serpentiform Skink, *Eumecia anchietae* Bocage, 1870; E) Namibian Snake-eyed Skink, *Panaspis* cf. *namibiana* Ceríaco, Branch and Bauer, 2018; F) Angolan Reduced-limb Skink, *Sepsina angolensis* Bocage, 1866; G) Variable skink, *Trachylepis albopunctata* (Bocage, 1867); H) Ovambo Tree Skink, *Trachylepis binotata* (Bocage, 1867); I) Male Western Rock Skink, *Trachylepis sulcata sulcata* (Peters, 1867); J) Female Western Rock Skink, *Trachylepis sulcata sulcata* (Peters, 1867); K) Male Angolan Rock Skink, *Trachylepis sulcata ansorgii* (Boulenger, 1907); L) Female Angolan Rock Skink, *Trachylepis sulcata ansorgii* (Boulenger, 1907).

***Trachylepis binotata* (Bocage, 1867)**

OVAMBO TREE SKINK – Fig. 5H

Material.—**1 specimen:** BNP, Matunto, -15.3694, 15.2751, 1159 m, 10 March 2018, MHNC-UP/REP 441.

Comments.—A large, arboreal skink, *Trachylepis binotata* is known from southern Angola and northern Namibia. This is the second reported locality from Huíla Province. An uncollected specimen was also observed near the vicinity of Hungueria waterfall.

***Trachylepis huilensis* (Laurent, 1964)**

HUÍLA'S SKINK

Material.—**1 specimen:** Tundavala, -14.8239, 13.3811, 1295 m, 1 August 2017, CAS 263351 (juvenile).

Comments.—Bocage (1872) noted two varieties within *T. bayonii*—the typical one from Duque de Bragança (= Kalandula, Malanje), and a high-elevation one from the Huíla Plateau. Laurent (1964) formally described the latter as a subspecies, *T. bayonii huilensis* from Humpata, Huíla, noting that it varied from the nominotypical form in several aspects of squamation. We

collected a single juvenile specimen, found sympatrically with *T. sulcata sulcata*. A preliminary molecular analysis confirms the identification of this individual (Butler et al., unpubl.).

***Trachylepis sulcata sulcata* (Peters, 1867)**
WESTERN ROCK SKINK – Fig. 5I–J

Material.—**25 specimens:** Tundavala, -14.8239, 13.3811, 1295 m, 1–2 August 2017, CAS 263344–50, INBAC: AMB 10725; 24 August 2017, CAS 263342–3; Lubango, Cristo Rei, -14.9401, 13.5117, 2200 m, 9 August 2017, CAS 263333–41, INBAC: AMB 10835–7, AMB 10846; Comuna Capelongo, Camulemba, -14.8443, 15.0356, 1220 m, 12 March 2018, MHNC-UP/REP 460–1.

Comments.—Portik et al. (2011) found northern Namibian populations of *T. sulcata* to have high genetic diversity; however, a lack of sampling from Angola prevented the assessment of the validity of the Angolan subspecies, *T. sulcata ansorgii* (Boulenger, 1907), described from Caconda, northern Huíla. A comprehensive phylogeographic study is currently investigating the status of Angolan populations (Butler et al., unpubl.). Many females were visibly gravid in August, suggesting a winter/spring reproductive season.

***Trachylepis sulcata ansorgii* (Boulenger, 1907)**
ANGOLAN ROCK SKINK – Fig. 5K–L

Material.—**7 specimens:** Caconda, -13.7548, 15.0422, 1620 m, 8 August 2017, CAS 263425–9, INBAC: AMB 10825–6.

Comments.—These specimens represent the first topotypical material since the subspecies was originally collected and described by Boulenger (1907). A full taxonomic and phylogeographic analysis of *T. sulcata* in Angola is currently underway (Butler et al., unpubl.).

***Trachylepis spilogaster* (Peters, 1882)**
KALAHARI TREE SKINK – Fig. 6A

Material.—**44 specimens:** Lubango, -14.9342, 13.4693, 1865 m, 21–22 July 2017, CAS 263411–6, UF 187319, INBAC: AMB 10129; BNP, main camp, -15.1016, 14.8399, 1224 m, 25–28 July 2017, UF 187320–1, CAS 263383, CAS 263385–6, INBAC: AMB 10168; BNP, -15.1014, 14.8398, 1243 m, 27 July 2017, CAS 263402; Serra da Leba overlook, -15.0770, 13.2329, 1677 m, 4 August 2017, CAS 263403–4, UF 187322; Huíla waterfall, -15.0549, 13.5349, 1658 m, 5 August 2017, INBAC: AMB 10775; Lubango, -14.9182, 13.4849, 1795 m, 6 August 2017, CAS 263424, INBAC: AMB 10792; Chibia, -15.1894, 13.6906, 1486 m, 7 August 2017, CAS 263397; Lubango, -14.9434, 13.4644, 2012 m, 10 August 2017, UF 187323; BNP, Matunto, -15.3694, 15.2751, 1159 m, 10 March 2018, MHNC-UP/REP 442–59, INBAC: AMB 10993, AMB 11007, AMB 11010.

Comments.—Previous records of *Trachylepis spilogaster* in Angola exist only from Huambo, Bié, and Cuando Cubango provinces (see Marques et al. 2018), making these the first records from Huíla and extending the western range of this species known within Angola by 212 km. These skinks are generalists and can be found on trees, rocky outcrops, and around buildings.

Chamaeleonidae
***Chamaeleo dilepis quilensis* (Bocage, 1886)**
FLAP-NECKED CHAMELEON – Fig. 6B

Material.—**1 specimen:** BNP, near Tumbaeque, -15.185, 14.822, 1263 m, January 2018, photographic voucher only, see Fig. 6B.

Comments.—Although some authors have considered Angolan populations of this chameleon as a variant of a polymorphic *C. dilepis* (Tilbury 2010, 2018), differences in hemipenial morphology have led other authors to retain subspecific status (Klaver and Böhme 1987; Ullenbruch et al. 2007) or even full species designation (Klaver and Böhme 1986). We tentatively retain the subspecific designation; however, cryptic lineages recently found in South African populations suggest hidden diversity within this species that likely underestimate Angolan diversity (Main et al. 2018). Various records exist from Huíla (Marques et al. 2018).

Agamidae
***Acanthocercus* sp.**
TREE AGAMA – Fig. 6C

Material.—**9 specimens:** Lubango, -14.9342, 13.4693, 1865 m, 21 July 2017, CAS 263911; BNP, main camp, -15.1016, 14.8399, 1224 m, 26 July 2017, CAS 263908, INBAC: AMB 10667; BNP, Matunto, -15.3635, 15.2832, 1150 m, 10 March 2018, MHNC-UP/REP 420–422, INBAC: AMB 10984; BNP, Matunto, -15.3694, 15.2751, 1159 m, 10 March 2018, MHNC-UP/REP 423, INBAC: AMB 11003.

Comments.—In a recent revision by Wagner et al. (2018), all Angolan *Acanthocercus* specimens were treated as *A. cyanocephalus* (Falk, 1925). However, specimens from Huíla are distinct, and a formal description of this new species is being prepared (Butler et al., unpubl.). These lizards commonly bask on tree trunks near human dwellings. The local name for the species in the autochthonous N'Ganguela language of southern Angola is "Fimpantini" (LMPC, pers. obs.).

***Agama aculeata* Merrem, 1820**
WESTERN GROUND AGAMA – Fig. 6D

Material.—**13 specimens:** BNP, on the road to Nongalafa, -15.1274, 14.7714, 1225 m, 30 July 2017, CAS 263328, INBAC: AMB 10683; Huíla Waterfall, -15.0549, 13.5349, 1658 m, 5 August 2017, CAS 263329; Caconda, -13.7548, 15.0422, 1620 m, 8 August 2017, UF 187151, INBAC: AMB 10813; Lubango, Cristo Rei, -14.9401, 13.5117, 2200 m, 9 August 2017, CAS 263331–2, INBAC: AMB 10854; Lubango, -14.9434, 13.4644, 2012 m, 9 August 2017, CAS 263330; BNP, Tunda dos Gambos, -15.3842, 14.4342, 1205 m, 9 March 2018, INBAC: AMB 10976; BNP, Tunda dos Gambos, -15.3830, 14.4237, 1386 m, 9 March 2018, INBAC: AMB 10977; BNP, Tunda dos Gambos, -15.5408, 14.7088, 1202 m, 9 March 2018, INBAC: AMB 10978; Comuna Capelongo, Camulemba, -14.8443, 15.0356, 1220 m, 12 March 2018, MHNC-UP/REP 424.

Comments.—The specimens collected in this study were found basking on rocks, stone walls, or low on tree trunks. Numerous records exist from Huíla (see Marques et al. 2018)

***Agama schacki* Mertens, 1938**
SCHACK'S ROCK AGAMA – Fig. 6E–F

Material.—**42 specimens:** Tundavala, -14.8239, 13.3811, 1295 m, 24 July 2017, CAS 263847; 1 August 2017, CAS 263858–65, INBAC: AMB 10706; 2 August 2017, CAS 263866–75; Lubango, Cristo Rei, -14.9401, 13.5117, 2200 m, 24 July 2017, CAS 263879; 9 August 2017, CAS 263884–7, INBAC: AMB 10849; Serra da Leba overlook, -15.0770, 13.2329, 1677 m, 4 August 2017, CAS 263912; Serra da Leba waterfall, -15.0703, 13.2438, 1668 m, 4 August 2017, CAS 263915; Huíla Waterfall, -15.0549, 13.5349, 1658 m, 5 August 2017, CAS 263897–8, INBAC: AMB 10780–2;

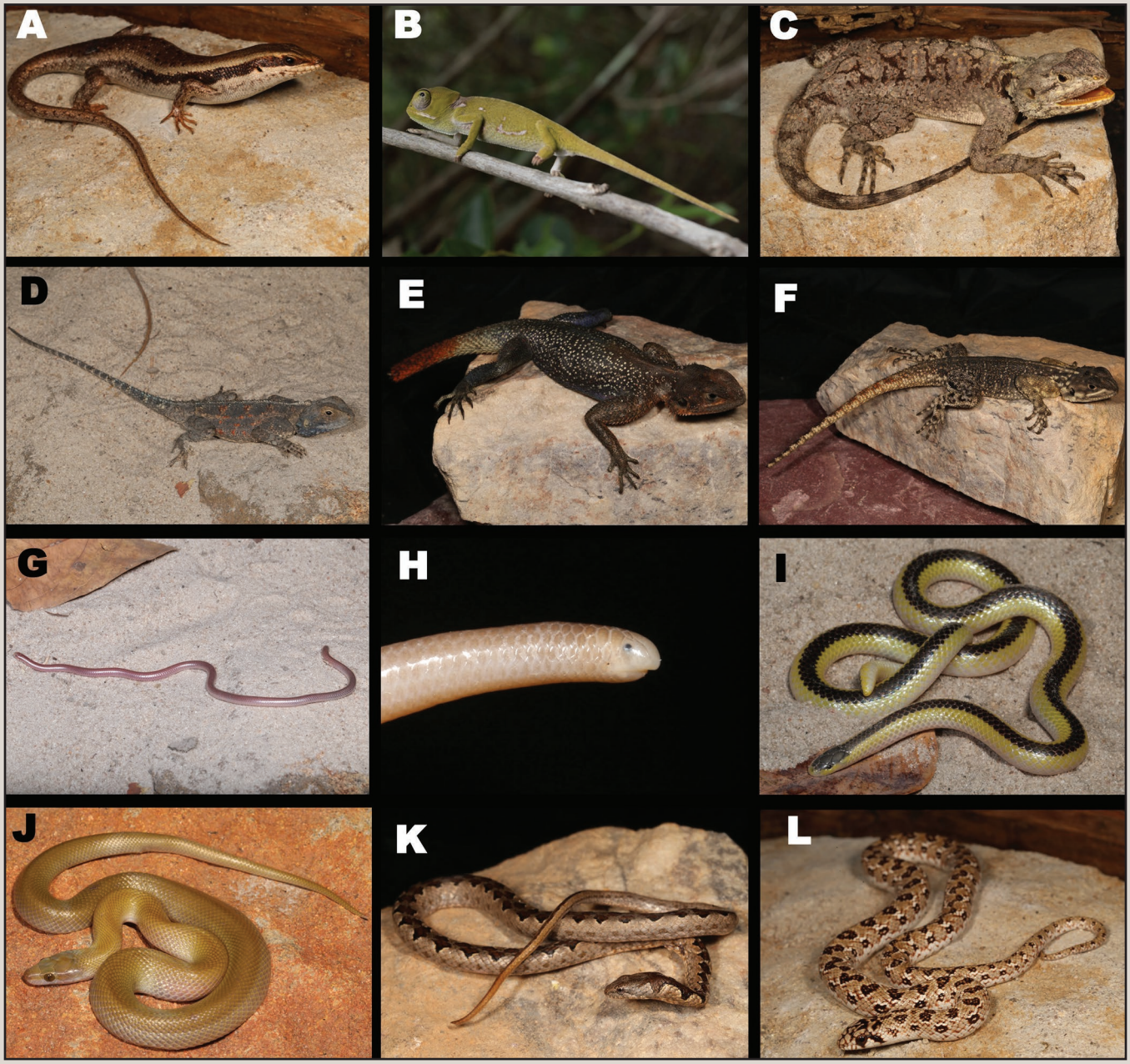

PHOTO BY LUIS M.P. CERÍACO

FIG. 6. A) Kalahari Tree Skink, *Trachylepis spilogaster* (Peters, 1882); B) Flap-necked Chameleon, *Chamaeleo dilepis quilensis* (Bocage, 1886); C) Female undescribed Tree Agama, *Acanthocercus* sp.; D) Western Ground Agama, *Agama aculeata* Merrem, 1820; E) Male Schack's Rock Agama, *Agama schacki* Mertens, 1938; F) Female Schack's Rock Agama, *Agama schacki* Mertens, 1938; G) Angolan Beaked Thread Snake, *Namibiana rostrata* (Bocage, 1886); H) Lateral head view of Angolan Beaked Thread Snake, *Namibiana rostrata* (Bocage, 1886); I) Kalahari Purple-glossed Snake, *Amblyodipsas ventrimaculata* (Roux, 1907); J) Angolan House Snake, *Boaedon angolensis* Bocage, 1895; K) Western Bark Snake, *Hemirhagerrhis viperina* (Bocage, 1873); L) juvenile Mole Snake, *Pseudaspis cana* (Linnaeus, 1758).

Hunguéria Waterfall, -15.2852, 13.5201, 1405 m, 7 August 2017, CAS 263899; Caconda, -13.7548, 15.0422, 1620 m, 8 August 2017, CAS 263888–94, INBAC: AMB 10819.

Comments.—*Agama schacki* is endemic to southwestern Angola (see Marques et al. 2018). Mertens (1938) described *A. planiceps schacki* from Cubal, Benguela Province, and Branch (1998) referred to all Angolan individuals as such; however, material from Namibe Province resembles the nominate form (Ceríaco et al. 2016a). A current study is underway to assess the phylogeography and taxonomy of this species (Butler et al., unpubl.). Within its range, this species is abundant when suitable rocky habitat is present.

Leptotyphlopidae

***Namibiana rostrata* (Bocage, 1886)**

ANGOLAN BEAKED THREAD SNAKE – Fig. 6G–H

Material.—**2 specimens:** BNP, main camp vicinity, -15.0903, 14.8213, 1240 m, 29 July 2017, AMB 10676, INBAC: AMB 10675.

Comments.—This fossorial thread snake is endemic to Angola, known from the western, more arid regions of the country. We found two specimens in close proximity under logs in sandy substrate in BNP. The only other reported locality in Huíla is from the Lubango region (Broadley and Broadley 1999).

Lamprophiidae

***Amblyodipsas ventrimaculata* (Roux, 1907)**

KALAHARI PURPLE-GLOSSED SNAKE – Fig. 6I

Material.—**2 specimens:** BNP, main camp vicinity, -15.0903, 14.8213, 1240 m, 29 July 2017, AMB 10679; BNP, main camp vicinity, -15.0971, 14.8352, 1243 m, 29 July 2017, INBAC: AMB 10678.

Comments.—This fossorial species was previously known from the Kalahari region of northern Botswana, eastern Namibia, and western Zambia (Broadley 1971), and was recently recorded from the Okavango Basin of southeastern Angola (Portillo et al. 2018). These specimens represent the first records for Huíla and second country record, extending the known range of this species within Angola approximately 700 km west. They were found under logs in sandy substrate within BNP, in the vicinity of known prey items such as the lizard *Zygaspis quadrifrons* and the snake *Leptotyphlops scutifrons* (Broadley 1990).

***Boaedon angolensis* Bocage, 1895**

ANGOLAN HOUSE SNAKE – Fig. 6J

Material.—**1 specimen:** BNP, main camp, -15.1016, 14.8399, 1224 m, 28 July 2017, CAS 262843.

Comments.—This specimen was encountered on sandy substrate in BNP at night at ~10°C. The only previous record from Huíla is from Caconda (Bocage 1895), nearly 200 km to the north. This species was originally described by Bocage (1895) as a variety of *Boaedon lineatus* Duméril, Bibron, and Duméril, 1854, but was subsequently regarded as a synonym of *B. fuliginosus* or *B. lineatus*. Laurent (1956) mentioned phenotypic characters that distinguish Angolan material, but he did not discuss the availability of *B. angolensis*. This species was regarded as valid by Marques et al. (2018). The taxonomic status of Angola *Boaedon* populations is currently under review and will be revised in the near future (Hallermann et al., unpubl.).

***Hemirhagerrhis viperina* (Bocage, 1873)**

WESTERN BARK SNAKE – Fig. 6K

Material.—**1 specimen:** Lubango, -14.9434, 13.4644, 2012 m, 10 August 2017, INBAC: AMB 10864.

Comments.—This specimen was found under a rock on a forested slope near Lubango. This species is fairly common in its range from southwestern Angola to northern Namibia, and multiple records exist from Huíla Province (see Marques et al. 2018).

***Psammophis subtaeniatus* Peters, 1882**

WESTERN STRIPE-BELLIED SAND SNAKE

Material.—**1 specimen:** BNP, Matunto, -15.3694, 15.2751, 1159 m, 10 March 2018, MHNC-UP/REP 439.

Comments.—This specimen was collected dead on the road. The only other record from Huíla is from "Mulondo," on the Cunene River southeast of BNP (Monard 1937).

***Pseudaspis cana* (Linnaeus, 1758)**

MOLE SNAKE – Fig. 6L

Material.—**1 specimen:** BNP, Tunda dos Gambos, -15.6404, 14.7056, 1199 m, 9 March 2018, MHNC-UP/REP 440.

Comments.—*Pseudaspis* is a monotypic genus and is widespread across sub-Saharan Africa. A northern subspecies, *P. cana anchietae* was described by Bocage (1882); however, Broadley (1990) did not find sufficient evidence to recognize a distinct northern lineage. Several other localities are known for Huíla, all in the northeast of the province. This juvenile specimen was found moving through an open area near an elephant wallow in the morning.

Discussion

Despite the numerous herpetological records already known from Huíla, this study adds to the knowledge of the reptile and amphibian taxa of the province, and on a larger scale, Angola, and provides the first records of amphibians and reptiles from BNP. The above species accounts detail approximately 30% of the known herpetofauna from Huíla (8 of 35 amphibian taxa, and 32 of 102 reptile taxa) (Marques et al. 2018). Additionally, we present the first confirmed provincial records for *Tomopterna damarensis*, *Afroedura* cf. *bogerti*, *Hemidactylus benguellensis*, *Lygodactylus bradfieldi*, *Rhoptropus* sp., *Zygaspis quadrifrons*, *Trachylepis spilogaster*, and *Amblyodipsas ventrimaculata*. These records, including the five new provincial records from the recent Tundavala paper (Baptista et al. 2018), bring Huíla above Benguela as Angola's most taxon-rich province at 151 taxa (38 amphibian, 113 reptile) (Marques et al. 2018). Many other records presented here represent only the second occurrence record of species for the province (*Ichnotropis bivittata pallida*, *Trachylepis binotata*, *Namibiana rostrata*, *Boaedon angolensis*, *Psammophis subtaeniatus*), or for the country (*Tomopterna damarensis*, *Amblyodipsas ventrimaculata*). Additionally, topotypical specimens (Caconda: *Trachylepis sulcata ansorgii*; Huíla plateau: *Eumecia anchietae*, *Trachylepis huilensis*) will help clarify taxonomic questions in future studies. Furthermore, many other records presented here fill gaps in the known distributions of species in the country, given the lack of herpetological data for the southern and southeastern areas of Huíla Province, as well as for the neighboring Cunene Province (see Marques et al. 2018).

Importantly, this study provides the first assessment of the herpetofaunal diversity from BNP. Within the park boundaries, we report 72 records of seven species of amphibians and 88 records of 19 species of reptiles (2 turtles, 12 lizards, and 5 snakes). While this is likely not an exhaustive list of the herpetofauna found within BNP, it provides a vital first step in documenting the biodiversity of this national park, and provides valuable data for local and national governmental agencies to support the continued allocation of resources to this protected area.

Huíla sits at the crux of multiple biogeographical regions, resulting in the high species richness of this region. As expected, many of the widespread taxa common across southern Africa were found in Huíla (i.e., *Sclerophrys pusilla*, *Kinixys belliana*, *Pseudaspis cana*). The Great Escarpment, known to harbor high levels of species-level endemism across higher taxa (Figueiredo 2010; Clark et al. 2011), runs along the western reaches of the province, where we collected the locally endemic *Rhoptropus montanus* and *Cordylus machadoi*. Taxa such as *Trachylepis sulcata sulcata*, distributed throughout the more arid southwestern regions of South Africa and Namibia, reach their northern limits in western Huíla. In addition, Caconda in northern Huíla has biogeographic affinities to central and northern Angola, displayed by the phylogeographic patterns of *Agama schacki* and *Trachylepis sulcata ansorgii* (Butler et al., unpubl.). The southwestern Angolan provinces of Benguela, Namibe, Huíla, and Cunene, as well as northern Namibia, seem to comprise a biogeographic entity characterized by species such as *Tomopterna damarensis*, *Afroedura* cf. *bogerti*, *Trachylepis binotata*, and *Hemirhagerrhis viperina*, and Huíla also constitutes

the northwestern extent of a Kalahari biogeographical region, as evident by the presence of *Trachylepis spilogaster*, *Amblyodipsas ventrimaculata* and *Psammophis subtaeniatus*.

Despite having one of the highest numbers of amphibian and reptile records of all Angolan provinces and harboring more than one third of the total taxa that occur in the country (Marques et al. 2018), the sampling of amphibians and reptiles from Huíla is far from complete. Many records from Huíla date back to the nineteenth and mid-twentieth centuries and are circumscribed to a few localities. Most of the remaining areas of the province lack data, specifically the northeastern and central regions, including BNP. Future surveys should target these regions.

Vital in accompanying biodiversity surveys are molecular studies of systematics and taxonomy. The taxonomic status of many taxa from Huíla, and Angola in general, remain unresolved. Confusion in the literature over correct nomenclature and species boundaries largely stems from the inaccessibility of the country for scientific research due to internal conflict at a time when molecular systematics was blossoming, paired with a high number of cryptic species. Additionally, many of the type specimens known from Angola were lost in a fire that destroyed most of the zoological collection of the Lisbon Museum in 1978 (Almaça and Neves 1987), further complicating taxonomic studies. It is not uncommon for multiple synonyms to exist and be in use for the same populations, or conversely, for a single name to represent multiple cryptic species.

The main threats to amphibians and reptiles in Angola are related to habitat destruction, fragmentation, and alteration, as well as persecution by humans. Although there are no published records of amphibian diseases such as chytrid fungus (*Batrachochytrium dendrobatidis*) or ranavirus from Angola, it is possible that they are present in the country, as chytrid has been reported from 15 other sub-Saharan African countries (Conradie et al. 2016b). Although BNP is a protected area, we did observe evidence of small-scale logging inside park boundaries. The land-use surrounding the park boundaries is characterized by large plantations and farms, smaller farms for subsistence agriculture, slash-and-burn agricultural practices, and high intensity cattle grazing. These practices limit the availability of standing or fallen woody vegetation to serve as microhabitats for amphibians and reptiles.

Fires are known to have a detrimental effect on herpetological communities in Africa (Masterson et al. 2008; Kennedy et al. 2012). Most fires are deliberately set to regenerate new grazing patches for cattle or for agriculture purposes. Such fires can have major negative impacts on natural vegetation, as well as causing direct mortality on the herpetofauna, particularly amphibians. We witnessed the intentional burning of grasslands on the Tundavala plateau during our survey work.

A few large-bodied species, including tortoises and African Rock Pythons, are the subject of poaching for food, and such instances have been reported within Cangandala National Park, Malanje Province, as well as other areas of the country (Ceríaco et al. 2018a; Marques et al. 2018). While in BNP, we noted that locals collected the tortoise *Kinixys belliana* for human consumption. Local persecution and killing of some reptiles, especially chameleons and snakes, may also be a potential threat to BNP reptile populations. We hope that this study, along with the recent Tundavala herpetofauna assessment (Baptista et al. 2018), the historical atlas of Angolan herpetofauna (Marques et al. 2018), and the annotated checklist of the snakes of Angola (Branch 2018), will help to advance the research and conservation of the diverse amphibians and reptile species within Huíla Province, and Angola in general.

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