

Lizard fauna (Squamata, Sauria) from Serra do Ouro Branco, southern Espinhaço Range, Minas Gerais, Brazil

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ABSTRACT: The present study evaluated the lizard fauna in Serra do Ouro Branco, Minas Gerais, Brazil, a transition area between the Atlantic Forest and Cerrado. Data was collected using pitfall traps, active and occasional encounters, and through information from zoological collections and the literature. Field sampling was performed in two stages over a period of 36 months: from December 2006 to December 2008, and from January to December 2010. The study area is home to 15 species belonging to eight families: Anguidae, Gekkonidae, Gymnophthalmidae, Leiosauridae, Polychrotidae, Mabuyidae, Teiidae, and Tropiduridae. Lizard species evaluated in this study represent a relevant asset for this zoological group inhabiting the transitional areas between the Atlantic Forest and Cerrado. They include strictly forest species and endemic Atlantic Forest species such as *Ecleopopus gaudichaudii*, *Enyalius perditus* and *Heterodactylus imbricatus* in addition to typical Cerrado taxa common to both biomes.

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INTRODUCTION

Lizards are traditionally studied as a cohesive group, although recognized as paraphyletic (Pyron *et al.* 2013). These organisms are considered model organisms, either in studies of human impact on wildlife (Kitchener *et al.* 1980; Gibbons *et al.* 2000; Lehtinen *et al.* 2003; Jellinek *et al.* 2004; Bell and Donnelly 2006; Gardner *et al.* 2007; Dixo and Martins 2008; Dixo and Metzger 2009), or in the interpretation of data on patterns of distribution and endemism between ecosystems (Pianka 1973; Vanzolini *et al.* 1980; Huey *et al.* 1983; Rodrigues 1987, 2005; Recorder and Nogueira 2007). They comprise one of the most diverse groups of amniotes, with about 5800 described species (Uetz and Hosek 2013), of which 248 occur in Brazil (Bérnills and Costa 2012). However, this great diversity is threatened in several ecosystems, mainly due habitat loss (Gibbons *et al.* 2000). In this aspect, the Brazilian state of Minas Gerais deserves special attention, since it contains two biodiversity hotspots (Cerrado and Atlantic Rain Forest; see Mittermeier *et al.* 2004).

About one quarter of all Brazilian lizards were reported for the state of Minas Gerais (Bérnills *et al.* 2009). However, basic information, such as area of occurrence and studies on ecology and natural history, is still lacking for most species. Local composition of lizard communities has been surveyed only in the following localities: Lagoa Santa (Reinhardt and Lutken 1861., based on specimens from Lagoa Santa collected by Peter Lund); Northeast of Minas Gerais (Feio and Caramaschi 2002); Parque Nacional Grande Sertão Veredas (Recorder and Nogueira 2007);

Estação de Preservação e Desenvolvimento Ambiental de Peti (Bertoluci *et al.* 2009); Viçosa (Costa *et al.* 2009); Ritópolis (Sousa *et al.* 2010); Juiz de Fora (Sousa *et al.* 2012); Serra do Brigadeiro (Moura *et al.* 2012); Reserva Ecológica Unilavras-Boqueirão (Novelli *et al.* 2012); and Intituto Inhotim (Linares and Eterovick 2013).

The Espinhaço Range is a mountainous formation that extends about 1200 km from the state of Minas Gerais to the state of Bahia, containing ecosystems such as Rocky Grasslands (Campos Rupestres), Cerrado, Atlantic Rainforest and Caatinga (Derby 1906; Giulieti *et al.* 1997; Vitta 2002; Almeida-Abreu and Renger 2002). Due to the high degree of endemism of the fauna and flora, and human disturbance, this mountain range, including the Serra do Ouro Branco, was declared a priority area for Biodiversity conservation in Minas Gerais (Drummond *et al.* 2005).

Most of the biodiversity of the Espinhaço Range is yet unsampled, besides its great biological relevance. The reptile fauna is particularly poorly known. Most reptile studies in the southern parts of the range have examined only the snake communities in the Serra do Cipó (Assis *et al.* 1999); Serra do Ouro Branco (São Pedro and Pires 2009) and the municipalities of Ouro Preto, Itabirito and Mariana (Silveira *et al.* 2010). Surveys of lizard species were conducted only in Chapada Diamantina by Juncá (2005), and in EPDA Peti by Bertoluci *et al.* (2009).

Recently the Parque Estadual Serra do Ouro Branco was created to protect the biodiversity of this mountainous complex in the southern end of the Espinhaço Range, state of Minas Gerais. However there is little information

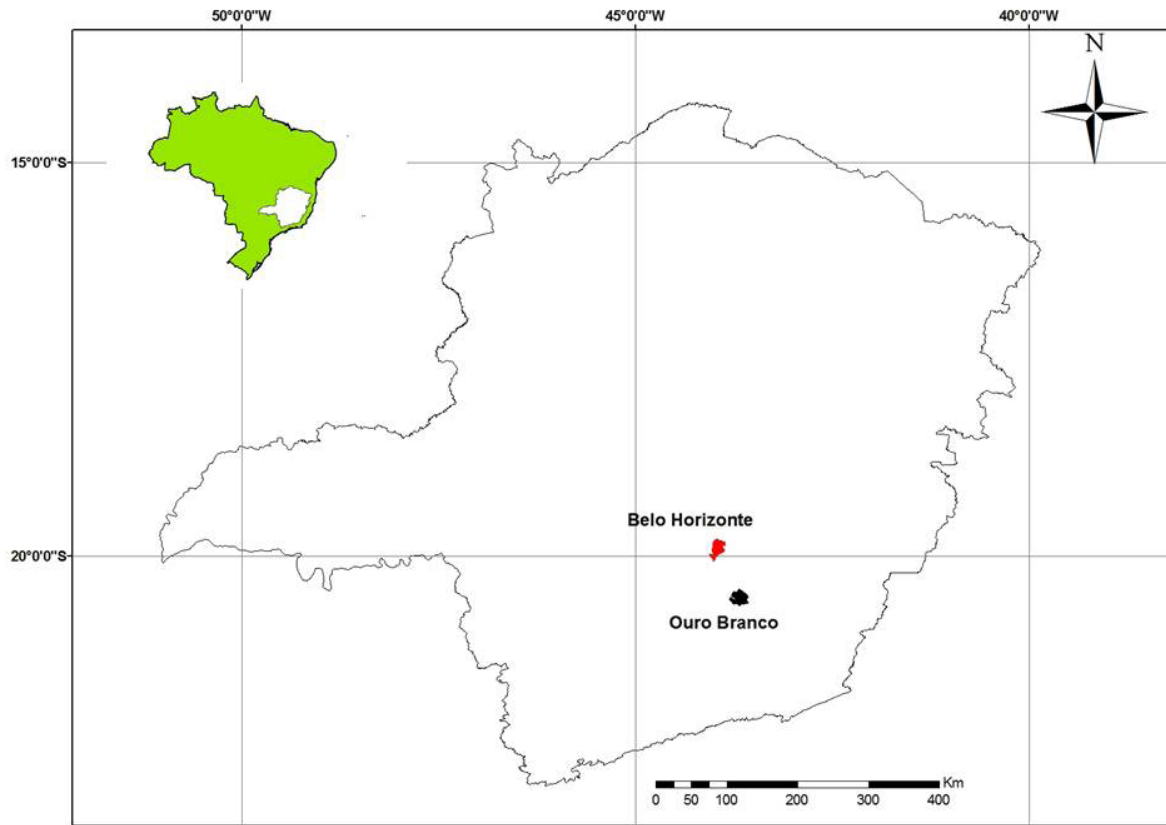


FIGURE 1: Location of the Serra do Ouro Branco, state of Minas Gerais, Brazil.

about the composition, richness or distribution of the lizard fauna of this region, making it difficult to evaluate the importance of this protected area for the conservation of this group. Thus, the present study aims to provide an inventory and a key for identification of the lizards from the Serra de Ouro Branco.

MATERIALS AND METHODS

Study Area

This study was carried out in the Serra do Ouro Branco ($20^{\circ} 31' 15''$ S, $43^{\circ} 41' 31''$ W), located in the municipality of Ouro Branco, state of Minas Gerais, in the southern end of the Espinhaço Range (Figure 1), including the area surrounding Itatiaia, a village with 18th century buildings, today with about 80 residences. The elevation of the region varies between 900 m to 1600 m (Veloso *et al.* 1991). The vegetation of the region consists of Seasonal Semideciduous Forest and Rocky Grassland at higher elevations, plus grasslands and other environments typical of the Cerrado biome (Veloso *et al.* 1991). The climate is Cwb mesothermal, according to Köppen's classification, with a dry season between the months of June and September (winter), and a higher incidence of rainfall from November to February. The mean annual temperature is 20.7°C and the mean annual rainfall is 1321.07 mm, according to data from the Meteorological Station of Gerdau Açominas, located approximately 15 km from the study area.

Sampling

Fieldwork was carried out in two stages, totaling 36 months of sampling. To better cover the different environments of Serra do Ouro Branco, three sampling

methods were used: pitfall traps (Cechin and Martins 2000), active search (Crump and Scott Jr. 1994) and incidental encounters. Animals were collected under permits issued by the Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis- IBAMA-481/06-NUFAS-MG and Instituto Chico Mendes de Conservação da Biodiversidade- ICMBIO- 21543-1.

During the first stage, from December 2006 to December 2008, pitfall traps were installed in five distinct forest areas. Each row consisted of ten 60 L buckets, buried at intervals of four m in a straight line. The buckets were connected by one m high fences. Every month, the traps remained open for five consecutive days, giving a total sampling effort of 50 buckets per day for a total of 125 sampling days, or 6250 bucket-nights.

During the second stage, from January to December 2010, a new sample design was adopted, in which four 60 L buckets were buried in a Y-shaped array *i.e.*, one central bucket linked to three peripheral ones by 1 m high fences, the three arms forming angles of approximately 120° . Thus, 27 new sampling points were installed in sets of three, in nine different areas. The traps remained open for five days/month, giving a total sampling effort of 108 buckets per day for a total of 60 days of sampling, or 6480 bucket-nights. This type of trap was used exclusively in forest environments, where it was possible to find soil deep enough to bury the buckets.

The active search method (Crump and Scott Jr. 1994) was used in grasslands, rocky grasslands, gallery forests and forests. This method was carried out in nonconsecutive diurnal (09:00–15:00 h) and nocturnal (18:00–22:00 h) surveys, by two or more researchers. Specimens found while walking along the trails between the pitfall traps

were considered incidental records.

The specimens were killed using 0.5% lidocaine, fixed in 10% formalin, preserved in 70% ethanol, and deposited in the herpetological collection of the Laboratório de Zoologia dos Vertebrados of the Universidade Federal de Ouro Preto (LZV-UFOP). Field guides, identification keys and articles were used to assist in species identification (Vanzolini 1948; Peters and Donoso-Barros 1970; Vanzolini 1978; Vanzolini *et al.* 1980; Rodrigues 1987; Avila-Pires 1995; Doan 2003; Rodrigues *et al.* 2007, 2009). Taxonomy follows Estes *et al.* (1988), Frost *et al.* (2001) and Gamble *et al.* (2008). For the Teiidae we follow the recommendations of Pyron *et al.* (2013) to maintain the traditional nomenclature and for the Scincidae we follow the nomenclature proposed by Hedges and Conn (2012).

To supplement the samples, specimens from the herpetological collection of the LZV-UFOP were examined as well as one specimen from the herpetological collection of the Museu de Zoologia João Moojen of the Universidade Federal de Viçosa (MZUFV), Minas Gerais.

To evaluate the effectiveness of the sampling to detect the lizard richness of the Serra do Ouro Branco, we constructed an individual based rarefaction curve (Colwell 2011), using the program EstimateS 9.1 (Colwell 2013). We contextualize regionally the local lizard composition of the Serra do Ouro Branco evaluating the dissimilarity

between it and other sampled areas in Minas Gerais. The dissimilarity of lizard communities of Minas Gerais was evaluated using Jaccard's distance coefficient, a method based only on the composition, which does not take into account the species abundance. The Jaccard's coefficient was used to construct a dendrogram based on the UPGMA grouping method (Unweighted Pair Group Method with Arithmetic Mean). This analysis was performed using the vegan package (Oksanen *et al.* 2010) at R software (R Development Core Team 2013). For the analyses, we exclude species identified only to the genus taxonomic level.

RESULTS

A total of 15 lizard species were recorded in the Serra do Ouro Branco, belonging to 13 genera and eight families. Gymnophthalmidae and Leiosauridae, represented by three species each, were the most diverse families in the area, followed by Mabuyidae, Teiidae and Tropiduridae, represented by two species each, and Anguidae, Gekkonidae and Polychrotidae represented by a single species each. Detailed accounts of habits, habitats and distribution of each species are in Table 1. Photographs of all species are in Figures 2 and 3. Voucher specimens are listed in Appendix 1, and scientific articles, books and guides consulted to analyze the occurrence of the lizards in

TABLE 1: List of species of lizards of the Serra do Ouro Branco, state of Minas Gerais, recorded between December 2006 and December 2008 and from January to December 2010. **Activity:** D, diurnal; N, nocturnal. **Habit:** SF, semi-fossorial; TR, terrestrial; SA, semi-arboreal; A, arboreal; C, climber; FL, forests; CL, clearings; RG, rocky grasslands (*Campos Rupestres*); UA, urban areas. **Biomes:** AR, Atlantic Rainforest; CE, Cerrado; WD, wide distribution (species occurring in more than two biomes). **Methodology** (Capture): PT, pitfall; AS, active search; OC, incidental encounter.

TAXON	ACTIVITY	HABIT	HABITAT				BIOMES	METHODOLOGY
			FL	CL	CR	UA		
Anguidae								
<i>Ophiodon striatus</i> (SPIX, 1824)	D	SF	x	x	—	x	WD	PT/OC
Gekkonidae								
<i>Hemidactylus mabouia</i> (Moreau de Jonnés, 1818)	N	C	—	—	—	x	WD	OC
Gymnophthalmidae								
<i>Cercosaura quadrilineatus</i> (Boettger, 1876)	D	SF	x	—	—	—	AR	PT
<i>Ecleopopus gaudichadii</i> Duméril & Bibron, 1839	D	SF	x	—	—	—	AR	PT
<i>Heterodactylus imbricatus</i> Spix, 1825	D	SF	x	—	—	—	AR	PT
Leiosauridae								
<i>Enyalius perditus</i> Jackson, 1978	D	SA	x	—	—	—	AR	PT/AS/OC
<i>Enyalius bilineatus</i> Duméril & Bibron, 1837	D	SA	x	—	—	—	AR/CE	PT/OC
<i>Urostrophus vautieri</i> Duméril & Bibron, 1837	D	SA	x	—	—	—	AR	PT
Polychrotidae								
<i>Polychrus acutirostris</i> Spix, 1825	D	A	x	—	—	—	WD	OC
Mabuyidae								
<i>Aspronema dorsivittatum</i> (Cope, 1862)	D	T	—	—	x	—	WD	OC
<i>Notomabuya frenata</i> (Cope, 1862)	D	T	x	—	—	x	WD	PT/OC
Teiidae								
<i>Ameiva ameiva</i> (Linnaeus, 1758)	D	T	—	—	x	—	WD	PT/AS/OC
<i>Tupinambis merianae</i> (Duméril & Bibron, 1839)	D	T	x	x	x	—	WD	PT/OC
Tropiduridae								
<i>Tropidurus itambere</i> Rodrigues, 1987	D	T	—	—	x	x	CE	AS
<i>Tropidurus torquatus</i> Wiegmann, 1934	D	T	—	x	—	x	AR/CE	AS/OC

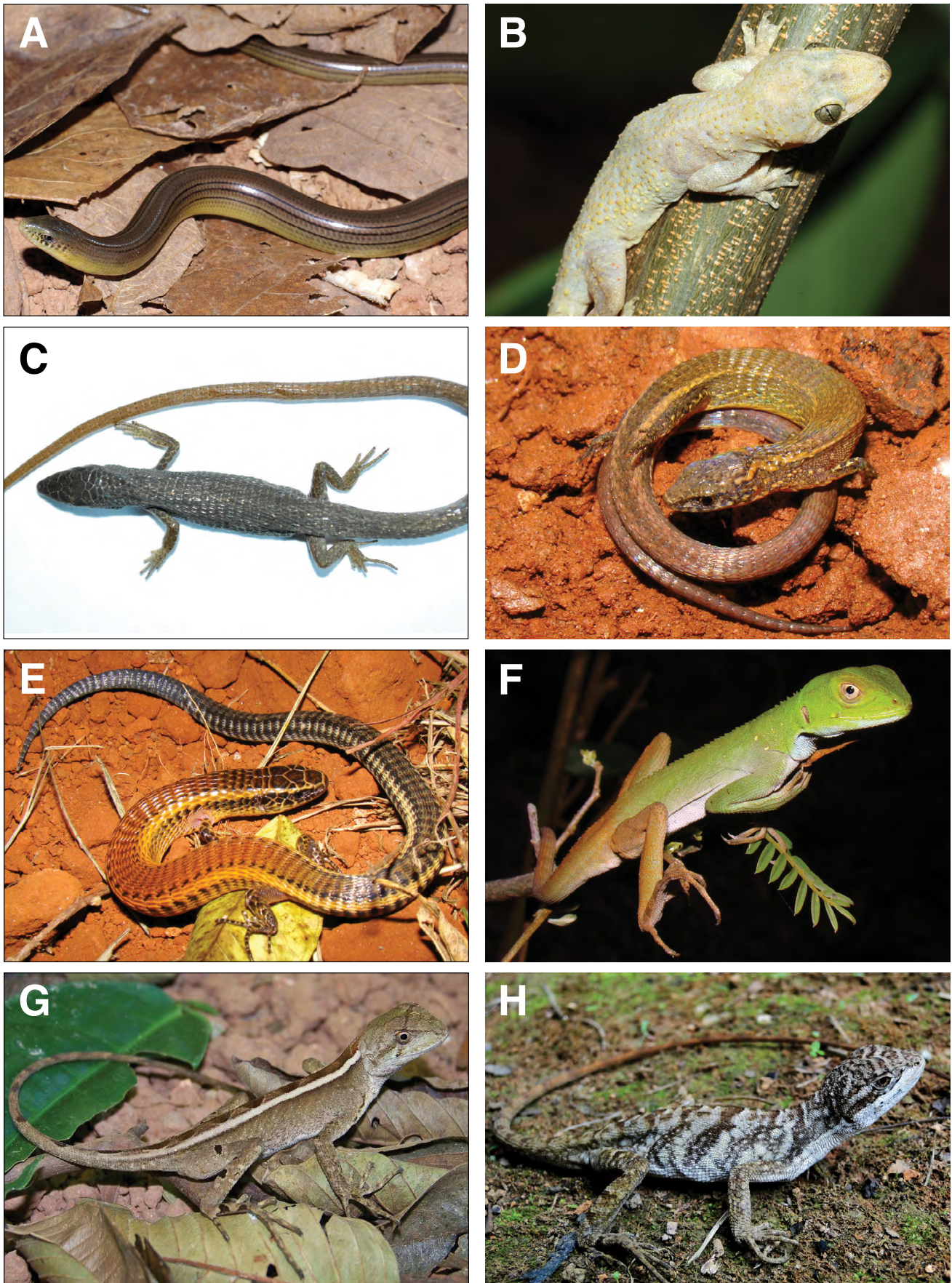


FIGURE 2: Lizards from Serra do Ouro Branco: A) *Ophiodes striatus*; B) *Hemidactylus mabouia* (Photo: Pedro H. Bernardo); C) *Cercosaura quadrilineatus*; D) *Ecleopopus gaudichaudii*; E) *Heterodactylus imbricatus*; F) *Enyalius perditus* (male); G) *Enyalius perditus* (Juvenile); H) *Enyalius bilineatus*.

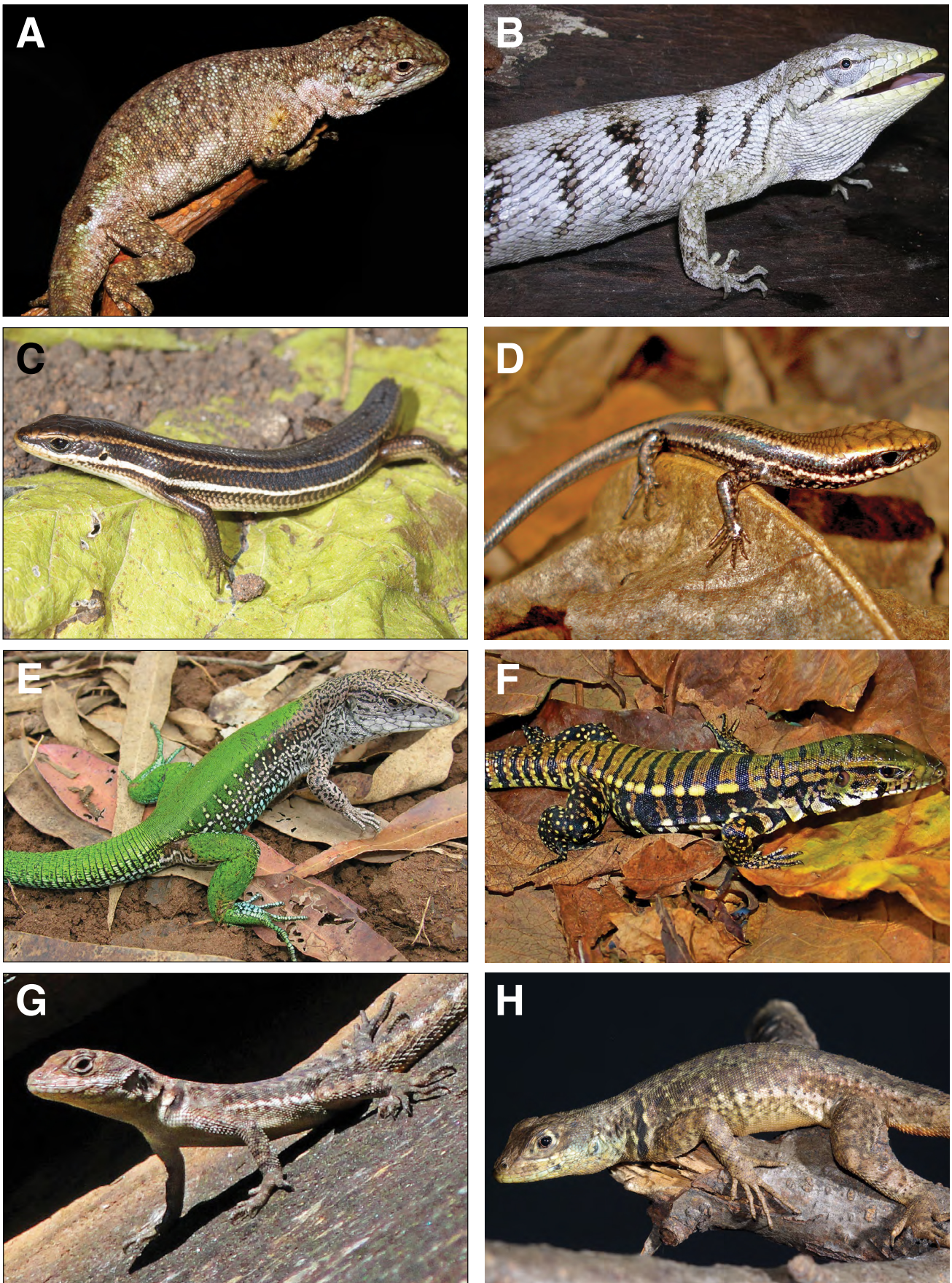


FIGURE 3: Lizards from Serra do Ouro Branco: A) *Urostrophus vaultieri*; B) *Polychrus acutirostris* (Photo: Pedro H. Bernardo); C) *Notomabuya frenata*; D) *Aspronema dorsivittatum* (Photo: Henrique C. Costa); E) *Ameiva ameiva* (Photo: Pedro H. Bernardo); F) *Tupinambis merianae*; G) *Tropidurus torquatus* (photo: Pedro Bernardo); H) *Tropidurus itambere*.

different biomes are listed in Appendix 2. The rarefaction curve based on the number of individuals recorded from all sampling methods has not stabilized, indicating the possibility presence of species not yet recorded in the study area (Figure 4).

The lizard fauna of Serra do Ouro Branco is most similar to those communities of the Atlantic Rainforest in Juiz de Fora and the Serra do Brigadeiro (dissimilarity coefficients of 0.45 and 0.47 respectively). In fact, the lizard fauna of Serra do Brigadeiro is a subset of the species founded in Serra de Ouro Branco. The lizard faunas of the farthest areas, Northeast of Minas Gerais and Parque Nacional Grande Sertão Veredas, showed the lowest similarity with that of the present study (dissimilarity coefficients of 0.89 and 0.78, respectively). The resulting dendrogram of dissimilarity reinforces the greater similarity of lizard fauna of the Serra do Ouro Branco with those of other areas in the Atlantic Rainforest of southeastern Minas Gerais (Juiz de Fora, Serra do Brigadeiro, Viçosa and EPDA-Peti; Figure 5).

DISCUSSION

The number of lizard species recorded for Serra do Ouro Branco corresponds to 26.31% of the lizards known for the state of Minas Gerais (Bérnils *et al.* 2009) and 6% of the species of Brazilian lizards (Bérnils and Costa 2012). Colli *et al.* (2002) and Nogueira (2006) state that in well-sampled localities of the Cerrado the estimated richness of lizards is 13 to 28 species. There are no studies providing such estimates for the Atlantic Rainforest. However, some studies carried out specifically in this biome found lizard communities ranging from four to 15 species (*e.g.*, Bertoluci *et al.* 2009; Carvalho *et al.* 2007; Cicchi *et al.* 2009; Condez *et al.* 2009; Costa *et al.* 2009; Dixo and Verdade 2006; Forlani *et al.* 2010; Moura *et al.* 2012). Thus Serra de Ouro Branco has both lower diversity than other studies in the Cerrado and higher diversity than studies in Atlantic Rainforest. Nevertheless, these comparisons are not conclusive, since differences in the extent of the sampling areas and the methodologies used in each study

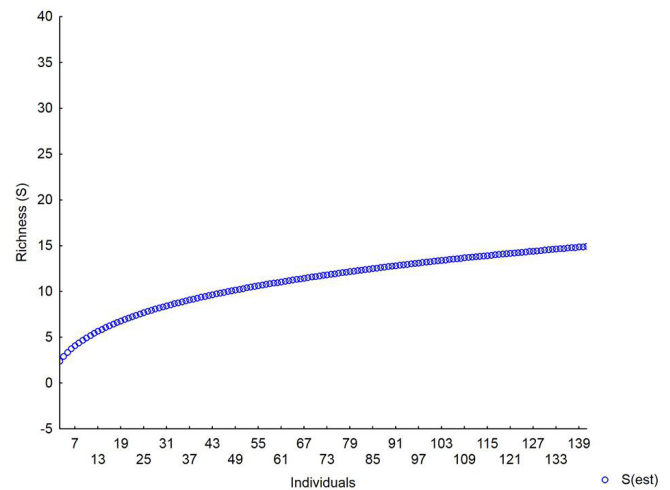


FIGURE 4: Individual sample based rarefaction curve of the species recorded in Serra do Ouro Branco, Minas Gerais.

site can directly influence species richness (Rodrigues 2005).

The use of different methods of capture proved to be essential to obtain a more complete picture of the assemblage of lizards of Serra do Ouro Branco. Pitfall traps were responsible for the capture of the majority of the species (10 species, including 5 species exclusively). However, active search and incidental encounters together added five species to the list: *Hemidactylus mabouia*, *Polychrus acutirostris*, *Aspronema dorsivittatum*, *Tropidurus torquatus*, and *Tropidurus itambere*. These species are good climbers, able to escape from the buckets, and are typical of open environments, which cannot be sampled by pitfalls since the soil is shallow.

All native species collected are diurnal. The only nocturnal lizard present in the region is the gekkonid *Hemidactylus mabouia*. Individuals of this species were observed near light sources in human settlements, possibly preying on small invertebrates. This gecko is an exotic (African) species and a successful colonizer with a broad distribution in the tropics (Rödder *et al.* 2008).

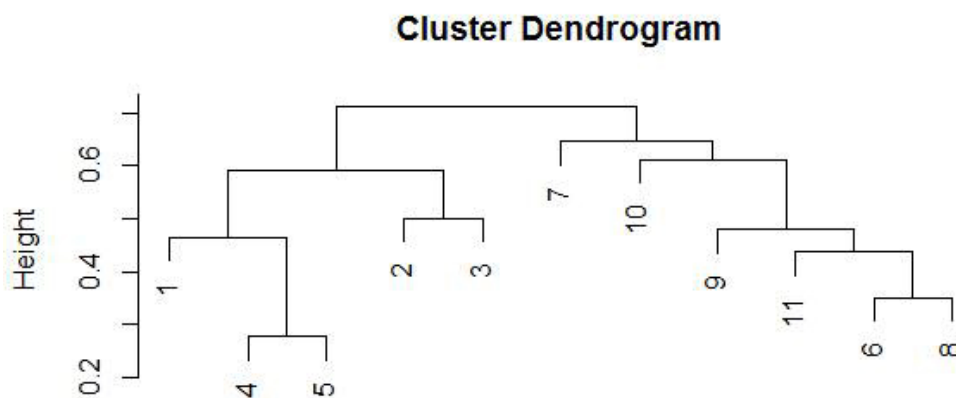


FIGURE 5: Dissimilarity dendrogram of the composition of lizard species in 11 localities from the state of Minas Gerais, Brazil. UPGMA cluster method and Jaccard's dissimilarity index. 1- Serra do Ouro Branco (this study), 2- EPDA Peti (Bertoluci *et al.* 2009), 3- Viçosa (Costa *et al.* 2009), 4- Serra do Brigadeiro (Moura *et al.* 2012), 5- Juiz de Fora (Sousa *et al.* 2012), 6- Ritópolis (Sousa *et al.* 2010), 7- Parque Nacional Grande Sertão Veredas (Recorder and Nogueira 2007), 8- Reserva Ecológica Unilavras-Boqueirão (Novelli *et al.* 2012), 9- Lagoa Santa (Reinhardt and Lutken 1861), 10- Nordeste de Minas Gerais (Feio and Caramaschi 2002), 11- Instituto Inhotim (Linares and Eterovick 2013).

Although it may be abundant in natural environments of various biomes, this species is primarily associated with urban areas (Rocha et al. 2011). In Serra do Ouro Branco *H. mabouia* is apparently restricted to perianthropic areas. Due to the differential daily activity and the specificity to anthropogenic habitats is unlikely that this species is competing directly with native species.

The majority of the lizard fauna of Serra do Ouro Branco is composed of species with wide distributions. About 60% (nine species) of the lizards recorded in the Serra do Ouro Branco have distributions covering both Atlantic Rainforest and Cerrado habitats, and seven of these species have distribution covering more than two biomes. However, some of these species are known to be species complexes, such as *Ophiodes striatus* (Borges-Martins 1998) and *Enyalius bilineatus* (see Rodrigues et al. 2006), and the populations of the Serra de Ouro Branco may actually belong to species with more restricted distribution.

The regional lizard fauna is composed predominantly of species with wide distribution and endemic species from the Atlantic Rainforest biomes. Despite the existence of records of *Heterodactylus imbricatus* (Novelli et al. 2011) and *Urostrophus vautieri* (Novelli et al. 2012) in Cerrado, we still consider these species as endemic to the Atlantic Forest biome, since these records are from riparian forests in marginal areas of this biome. Considering this, there are five species endemic from Atlantic Rainforest in the Serra do Ouro Branco. Added to this, Jaccard's dissimilarity index reinforces the greater influence of the Atlantic Rainforest in the composition of the regional fauna, grouping the Serra de Ouro Branco to areas of this biome in southeastern Minas Gerais. However, this apparent low influence of the Cerrado biome can be result of an imbalance in sampling effort among the different phytophysionomies of the Serra do Ouro Branco, since the higher sampling effort was conducted with pitfalls within forest fragments. Additional sampling in areas of Cerrado phytophysionomy, like *Campos Rupestres*, may further increase the species richness of the region.

Some species such as *H. mabouia*, *T. torquatus*, *T. merianae* and *A. ameiva*, seem to benefit from human intervention, especially the opening of forest clearings. However, species of the families Gymnophthalmidae, Leiosauridae and Polychrotidae, or 47% of the species in this study, are considered strictly forest species (Jackson 1978; Eisemberg et al. 2004; Verdade and Dixo 2006). Any problems associated with changes in vegetation can cause changes to or even extinction of populations of these lizards which are sensitive to microclimatic changes (Román-Cuesta and Martínez-Vivalta 2006).

No lizard from Serra do Ouro Branco is included in the list of endangered species from the State of Minas Gerais (COPAM 2010), Brazil (MMA 2003) or in the IUCN (2014). The species *Urostrophus vautieri* and *Enyalius perditus* are considered, respectively, vulnerable and possibly threatened, in the list of species of threatened fauna for the state of Rio Grande do Sul (Marques et al. 2002) and for the state of Rio de Janeiro (Rocha et al. 2000). Even though these species are not considered endangered, given the rarity of existing studies for this group, it is of utmost importance to preserve their communities in the various existing habitats (Rodrigues 2005).

Key to the lizards from Serra do Ouro Branco, municipality of Ouro Branco, South of the Espinhaço Range, Minas Gerais, Brazil

- 1a Forelimbs absent; Vestigial and toe-like hindlimbs ***Ophiodes striatus*** (Figure 2A)
- 1b All limbs present and well developed 2
- 2a Dorsal region of the head covered by small, granular scales; eyelids absent; digits short and dilated ***Hemidactylus mabouia*** (Figure 2B)
- 2b Dorsal region of head with scales of variable sizes, but never granular; eyelids present; digits not dilated 3
- 3a Dorsal region of the head covered by numerous scales, arranged irregularly. 4
- 3b Dorsal region of the head covered relatively few scales arranged in regular plates 9
- 4a Vertebral crest present 5
- 4b Vertebral crest absent 6
- 5a Distinctive enlarged and elongate subocular present; sexual dichromatism absent ***Enyalius bilineatus*** (Figure 2H)
- 5b Enlarged and elongate subocular absent, with orbit bordered below by an arc of small scales; sexual dichromatism present, with adult males uniformly green and females with different shades of brown ***Enyalius perditus*** (Figure 2F and 2G)
- 6a Dermal folds (mite pocket) present on the side of the neck; tail not prehensile; flat triangular scales around anterior part of ear-opening present. 7
- 6b Dermal folds on the side of the neck absent; tail prehensile; flat triangular scales around anterior part of ear-opening absent 8
- 7a One deep and oblique mite pocket on each side of the neck; axillary region without folds; side of the neck with scales similar in size to the adjacent dorsal scales ... ***Tropidurus itambere*** (Figure 3G)
- 7b Two shallow mite pockets on the neck filled with granules; axillary region with two to three folds covered by tiny granules separated by areas with larger scales; side of the neck with scales much smaller than the adjacent dorsal scales ***Tropidurus torquatus*** (Figure 3H)
- 8a Extendable, sac-like gular fan present; cone-shaped eyes with eyelids partially fused; femoral pores present ***Polychrus acutirostris*** (figure 3. B).
- 8b Extendable, sac-like gular fan absent; eyelids not partially fused; femoral pores absent ***Urostrophus vautieri*** (Figure 3A)
- 9a Ventral and dorsal body scales cycloid, similar in shape and size 10
- 9b Ventral scales squarish and distinct from dorsals 11
- 10a One frontoparietal scale ***Notomabuya frenata*** (Figure 3C)
- 10b Two frontoparietal scales ***Aspronema dorsivittatum*** (Figure 3D)
- 11a Nasals separated by frontonasal 12
- 11b Nasals in contact medially 14
- 12a Reduced front limbs, with four digits; ear opening absent ... ***Heterodactylus imbricatus*** (Figure 2E)
- 12b Front limbs with five digits; ear opening present. .. 12

- 13a With 9–10 femoral pores
..... *Cercosaura quadrilineatus* (Figure 2C)
- 13b Femoral pores absent
..... *Ecleopos gaudichaudii* (Figure 2D)
- 14a Ventral rows: 29–33 transverse and 10 across mid
body; preanal pores absent.....
..... *Ameiva ameiva* (Figure 3E)
- 14b Dorsum with black transverse bands; Ventral
rows: 30–38 transverse and 133–172 scales across
midbody; preanal pores present.....
..... *Tupinambis merianae* (Figure 3F)

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EDITORIAL RESPONSIBILITY: Ross MacCulloch

APPENDIX 1: Voucher specimens from Serra do Ouro Branco, state of Minas Gerais, Brazil

Ameiva ameiva: LZV 494S, 616S. *Aspronema dorsivittatum*: MZUFV-530. *Cercosaura quadrilineatus*: LZV 003S-L. *Ecleopopus gaudichaudii*: LZV 973S, 991S, 992S, 1000S, 1006S, 1007S, 1008S, 1009S, 1010S, 1024S, 1041S, 1044S, 1049S, 1050S, 1051S, 1063S, 1064S, 1068S, 1069S, 1090S, 1091S, 1101S, 1111S, 1112S, 1113S, 1114S, 1115S, 1116S, 1148S. *Enyalius bilineatus*: LZV 943S, 971S, 1060S, 1065S. *Enyalius perditus*: LZV 939S, 940S, 942S, 944S, 966S, 967S, 968S, 976S, 977S, 978S, 993S, 995S, 996S, 997S, 1005S, 1038S, 1039S, 1040S, 1042S, 1043S, 1045S, 1047S, 1048S, 1057S, 1059S, 1062S, 1067S, 1070S, 1071S, 1075S, 1066S, 1077S, 1079S, 1080S, 1081S, 1082S, 1083S, 1085S, 1086S, 1087S, 1098S, 1099S, 1117S, 1118S, 1109S, 1110S. *Hemidactylus mabouia*: LZV 207S. *Heterodactylus imbricatus*: LZV 941S, 974S, 990S, 999S, 1017S, 1019S, 1052S, 1058S, 1119S 1100S. *Notomabuya frenata*: LZV 1061S, 1066S, 002S-L. *Ophiodes striatus*: LZV 746S, 811S, 937S, 938S. *Polychrus acutirostris*: LZV 028S-L. *Tropidurus itambere*: LZV 873S. *Tropidurus torquatus*: LZV 232S. *Tupinambis merianae*: LZV 994S. *Urostrophus vautieri*: LZV 1046S.

APPENDIX 2: *Ophiodes striatus*: Peters and Donoso 1970, Galardo 1966; *Hemidactylus mabouia*: Vanzolini et al. 1980, Avila-Pires 1995, Carranza and Arnold 2006, *Cercosaura quadrilineatus*: Vanzolini 1948, Doan 2003; *Ecleopopus gaudichaudii*: Ramos and Silveira 2011, Dias and Rocha 2013; *Heterodactylus imbricatus*: Dixo and Verdade 2006, Rodrigues et al. 2007, 2009, Novelli et al. 2011; *Enyalius bilineatus*: Jackson 1978; *Enyalius perditus*: Jackson 1978; *Urostrophus vautieri*: Etheridge and Williams 1991, Sazima and Haddad 1992, Santos et al. 2009, Gasparini et al. 2010; *Polychrus acutirostris*: Vanzolini et al. 1980, Vanzolini 1983, Kawashita-Ribeiro and Avila 2008; *Aspronema dorsivittatum*: Recorder and Nogueira 2007, Quintela et al. 2006, Rocha et al. 2003; *Notomabuya frenata*: Peters and Danoso-Barros 1970, Recorder and Nogueira 2007, Costa et al. 2008, Sousa et al. 2010; *Ameiva ameiva*: Vanzolini 1986, Vitt and Colli 1994, Sartorius et al. 1999; *Tupinambis merianae*: Sazima and Haddad 1992, Vanzolini et al. 1980, Ávila-Pires 1995; *Tropidurus torquatus*: Rodrigues 1987; *Tropidurus itambere*: Rodrigues 1987.