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Distributional Data of the Lizard Fauna (Sauria) of the *Maringa-Lopori-Wamba* Landscape, Democratic Republic of the Congo

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Abstract: This paper presents the composition of the lizard fauna of *Maringa-Lopori-Wamba* landscape in the western portion of the central Congo basin in the Democratic Republic of the Congo and its weak similarity with the lizard fauna of Gaboon and Ituri faunal areas. It also fills a gap of knowledge in a region where no previous research on Sauria has been undertaken and signals the presence of *Leptosiaphos hylophilus* and *Lygodactylus n. sp.* The paper mentions the finding of a subspecies of *Gastropholis echinata*. These data are important since collected for the first time in a spot where no herpetological research on lizards has previously been undertaken.

Key words: *Leptosiaphos hylophilus*, lizards, *Gastropholis echinata*, Congo basin forest, *Lygodactylus*.

1. Introduction

Most surveys on the Reptiles of the central Congo basin in the Democratic Republic of the Congoare are obsoleted.

In order to ease the analysis of the distribution of the reptiles of the country, Schmidt, K. P. [1] divided the country into five sectors:

• The lower Congo area that encompasses Kinshasa and pool *Malebo* is a forest-savanna mosaic. The American Museum of Natural History mission in 1909-1915 had surveyed the reptilian fauna of this region and subsequently Schmidt, K. P. [1] examined the material and reported its composition. De Witte, G. F. [2] and Nagy, Z. T. et al. [3] have also collected from this sector. The area is a mix of the fauna of the West African forest province and the savanna province. Thus, considering the rich fauna of the savanna province, its low species richness calls for more surveys;

• The northeast area consisting of the portion of the former province *Orientale* north of the *Uélé* River includes also the shores of *Albert* Lake and the *Garamba* national park. It is a forest-savanna mosaic including a portion of the afromontane region. The fauna of the area has been reported by Schmidt, K. P. [1]. A small collection was obtained from Ango by Lanza, B. and Vanni, S. [4]. Muller, L. [5] and Calebressi, E. [6] also collected there. The lizard fauna of the Northeast sector comprise more species than the lower Congo since the sudanese fauna adds up [1];

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• The east area encompassing the afromontane region of the Eastern *Kivu* province and lowland forest patches around *Edouard* lake and *Kivu* lake comprises the *Virunga* national park, the rift Albertine mountains and the shores of *Edouard* lake and *Kivu* lake. Its fauna had been surveyed, among others, by Laurent, R. F. [7-9], Loveridge, A. [10], De Witte, G. F. [11], Messen, J. M. [12], Hoier, R. [13], Burgeon, L. [14], Angel, F. [15, 16], Parker, H. W. [17] and Schouteden, H. [18]. Greenbaum, E. et al. [19] have surveyed the area more recently. Its fauna is featured by a high diversity of Chamaeleons. It is richer than the western lowland forest;

• The south area includes the whole *Katanga*, portion of *Bandundu* and *Kasai* south of the latitude 5° south. The area is a forest-savanna mosaic with extensive miombo woodlands and afromontane patches. This area had been surveyed by Broadley, D. G. and Cotterill, F. P. D. [20], De Witte, G. F. [21], Dollo, L. [22], Gunther, A. [23], Muller, L. [24] and Steindachner, F. [25]. The fauna of this region harbours several endemic species;

• Finally, the central Congo basin area, authors' study site, is a continuous lowland rainforest encompassing the whole *Equateur* province, those portions of *Kasai* and *Bandundu* north of the latitude 5° south, *Orientale* province south of the *Uélé* River and the *Kivu* province except its afromontane component. It encompasses two botanical districts: the western district of Tshuapa and the middle-east district of the *Maiko* [26] toward the Iturian faunal area. Schmidt, K. P. [1] has studied the Iturian subprovince. However, the western district of Tshuapa has hardly been sampled except a few sporadic collections made by Laurent, R. F. [27] and by Curry-Lindahl, Ghesquière, Hullstaert, Lootens, Moureau all mentioned by Laurent, R. F. [9]. *Maringa-Lopori-Wamba* landscape was not surveyed and is a black hole in herpetology.

It is therefore necessary for herpetologists to fill this gap of knowledge: what lizard species do exist in the *Maringa-Lopori-Wamba* forest landscape and how similar are the lizard fauna of the *Maringa-Lopori-Wamba* with its surrounding faunal areas.

2. Materials and Method

339 specimens of Lizards were collected in different habitats of the study site. Collection was carried out in 27 localities along a 347 km road linking Djolu to Lokutu since the road crosses a diverse range of vegetation communities and microclimates. A portion of the *Maringa-Lopori-Wamba* landscape was surveyed in the territories of Djolu and Yahuma as shown in the map in Fig. 1.

The MLW (*Maringa-Lopori-Wamba*) landscape lies partly on the Tshopo and Tshuapa new provinces and encompasses 74.544 km² of tropical rainforests. The landscape is poorly known as it is a remote and isolated area difficult to reach. Maringa and Lopori are the main river corridors. The annual rainfall varies between 2,250-2,400 mm of water [26].

The whole landscape is covered by dense humid forests. These forests experience disturbances stemming from agricultural and forestry development. MLW has been better described elsewhere [28]. Collecting localities are given in Table 1.

Lizards were collected in randomly chosen villages and forests blocks. They were observed and spotted by visual contact, a method known to yield better results than traps [29]. Food items were determined by the analysis of the stomach contents. The sex and the absolute fecundity were determined by the analysis of the gonads.

3. Results

3.1 Species Account

20 species of lizards were found in the study area, divided into 12 genera and 6 families as shown in Table 2.

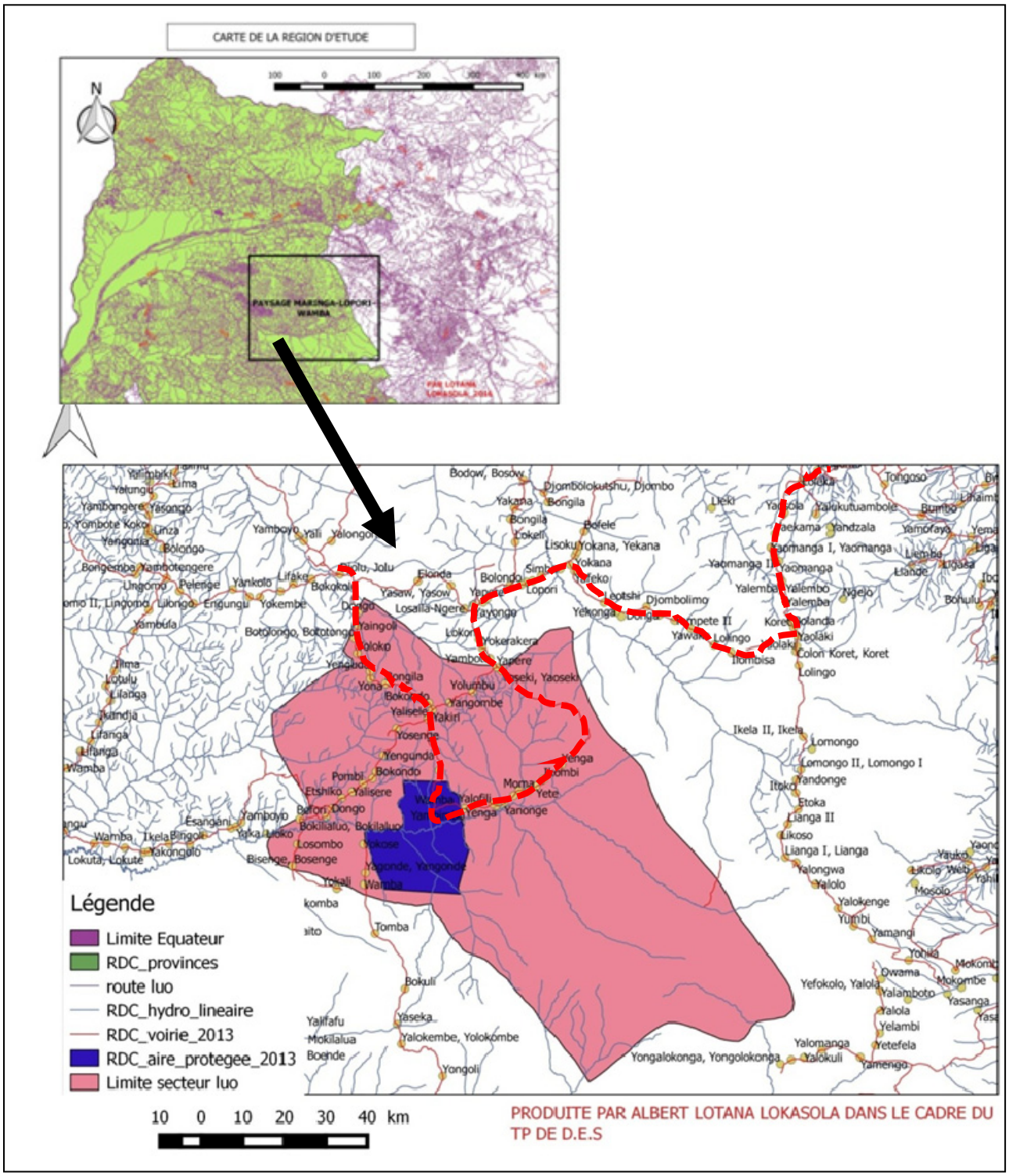

Fig. 1 Map of the study area complete with the itinerary.

Table 1 List and coordinates of collecting localities.

Localities	Longitude	Latitude	Altitude	Habitat type
Liyande	E 023°27'50.6''	N 00°50'20.9''	441 m	Secondary forest
Liyande	E 023.46124°	N 00.82507°	494 m	Fallows with bamboos
Lingomo	E 023°27'03.8''	N 00°54'42.0''	400 m	Herbaceous vegetation
Lingomo	E 023.45111°	N 00.91169°	402 m	Fallow
Ifoti	E 023°25'26.0''	N 00°53'46.9	404 m	Primary forest
Ifoti	E 023.42388°	N 00.89636°	406 m	Secondary forests
Yamungu	E 023°25'28.2''	N 00°57'43.9''	494 m	Primary forest
Yefoloko	E 023°26'07.5''	N 00°53'01.4''	486 m	Fallows
Yefoloko	E 023.43503°	N 00.89703°	397 m	Swamps
Koret	E 023.40281°	N 00.59768°	536 m	Old secondary forest
Koret	E 023.40821°	N 00.60037°	543 m	Rubber plantation
Koret	E 023.40441°	N 00.59610°	548 m	Primary forest
Bilaka	E 023.37212°	N 01.04784°	457 m	Primary forest
Ngima	E 023.36740°	N 01.03477°	470 m	Secondary forest
Lisalama	E 023.53317°	N 01.18761	404 m	Old secondary forest
Yefoli	E 023.53889°	N 01.17070°	408 m	Secondary forest
Yama	E 023.40995°	N 00.97618°	434 m	Secondary forest
Lobolo	E 023.44463°	N 00.90610°	392 m	Swamps
Lobolo	E 023.44470°	N 00.90612°	413 m	Secondary forest
Yetee	-	-	-	Fallows
Ngelealoto	-	-	-	Primary forest
Nkokoaloto	-	-	-	Secondary forest
Yalokole	-	-	-	Secondary forest
Yalokole	-	-	-	Secondary forest
Eho	-	-	-	Primary forest
Lokangi	-	-	-	Old secondary forest
Djolu cité	-	-	-	Fallows

Table 2 List of lizards collected at the MLW.

	Families	Genera	Species	M	F	Total	Index of presence
1	Agamidae	*Agama*	*Agama agama complex*	18	14	32	++
2	Chamaeleonidae	*Trioceros*	*Trioceros sp. nov*	2	4	6	+
3	Gekkonidae	*Hemidactylus*	*H. mabouia*	25	28	66	+++
4			*H. fasciatus complex*	16	5	21	++
5			*H. muriceus*	2	1	3	+
6		*Lygodactylus*	*L. gutturalis*	6	7	13	+
7			*Lygodactylus sp. nov*	-	-	4	+
8	Lacertidae	*Gastropholis*	*Gastropholis echinata ssp. nov*	-	-	1	+
9		*Holaspis*	*Holaspis guentheri*	-	-	3	+
10	Scincidae	*Trachylepis*	*T. makolowodei*	2	4	6	+
11			*T. polytropis*	7	6	13	++
12			*T. albilabris*	10	8	18	++
13			*T. aureogularis*	28	14	42	++
14			*T. maculilabris*	55	27	82	+++
15			*Trachylepis sp.*	-	-	1	+
16		*Lepidothyris*	*L. fernandi*	5	6	11	++
17		*Leptosiaphos*	*L. hylophilus*	-	-	3	+
18		*Feylinia*	*F. currori*	-	-	9	+
19			*F. grandisquamis*	-	-	2	+
20	Varanidae	*Varanus*	*V. ornatus*	1	2	3	+

Legend: + = 0-10 encounters; ++ = 11-50 encounters; +++ = more than 50 encounters.

Fig. 2 Trioceros novum species.

3.1.1 Agamidae

32 specimens of *Agama agama* complex were collected. They were most captured in sunny days and were most active around eleven. They were captured on tree trunks and soils in open areas. Their dietary regime comprised maggots, ants, termites, grass-hoppers, caterpillars, wasps, crickets, leaves, barks, seeds, chilopods, snails, cockroaches and beetles. They had 4-5 well developed ova per litter. Agamas were present in every collecting locality.

3.1.2 Chamaeleonidae

6 specimens of a potentially new species of chamaeleon as shown in Fig. 2 were collected. Authors tentatively named it *Trioceros* novum species. It was a chameleon bearing a single horn and having a longer tail as opposed to *Trioceros oweni* and *Trioceros jacksoni* who have 3 horns each. It fed on termites, cockroaches, butterflies, dragonflies and beetles. Females had an absolute fecundity of 14 well developed ova per litter, six on left and eight on right oviducts.

The only chamaeleon specimen collected in the country having a single horn was collected at Kabalo during the belgian Congo, though it was not described in details. *Trioceros* novum species is described in a separate paper.

3.1.3 Geckonidae

66 specimens of *Hemidactylus mabouia*, 21 of *Hemidactylus fasciatus complex*, 3 of *Hemidactylus muriceus*, 13 of *Lygodactylus gutturalis* and 4 specimens of *Lygodactylus n. sp.* were collected. *Hemidactylus mabouia* and *Hemidactylus fasciatus* appeared to be cosmopolite and expansive. *Lygodactylus gutturalis* were captured in riverine periodically flooded forests. *Lygodactylus sp. nov.* were captured in bamboo tree vegetation and palmoil plantations. Their diets were mainly made of insects. Females contained two well developed ova per litter.

3.1.4 Lacertidae

Two species of Lacertidae namely *Holaspis guentheri* and *Gastropholis echinata ssp. nov*. were found. *Holaspis guenteri* was present in most of the capturing localities. The team captured only one specimen of *Gastropholis echinata ssp*. *nov.* The *Gastropholis echinata* subspecies authors found was bigger than its counter parts from Medjé in Ituri. It had a higher number of femoral pores (15 instead of 12-13) and had a different form of the parietals and

interparietal. It was collected on the ground in an old secondary forest of *Uapaca guinensis* near Lokangi river, a forest on a seasonally flooded soil. Morphological variations of *Gastropholis echinata* species are documented in a separate paper.

3.1.5 Scincidae

Scincidae was the taxon with the highest number of species. Authors collected 187 specimens in total divided into 10 species, 4 genera, 1 family. The list of Scincidae collected has been given in Table 2.

They were more frequent in deforested land. The presence of *Leptosiaphos hylophilus* was documented for the first time in the region.

3. 1.6 Varanidae

The team collected 3 specimens of *Varanus ornatus*. All the specimens were collected near *Lopori* and *Loleka* rivers.

3.2 Distributional Data and Similarity between Faunal Areas

3.2.1 Similarity between Faunal Areas

MLW landscape had 20 species. The Ituri forest has 25 species. The two faunal areas had a relatively poor similarity index as shown in Table 3.

However, *Maringa-Lopori-Wamba* landscape shared 9 species in common with the iturian subprovince. It had 11 species in common with the gaboon subprovince. *Hemidactylus fasciatus complex*, *Hemidactylus muriceus*, *Feylinia currori*, *Lepidothyris fernandi complex*, *Trachylepis maculilabris* and *Trachylepis polytropis* were widespread and encountered in the two subprovinces. Ituri and *Maringa-Lopori-Wamba* landscape had *Gastropholis echinata* in common. On the other hand, Gaboon shared with *Maringa-Lopori-Wamba* landscape *Feylinia grandisquamis* and *Trachylepis albilabris*. The lizard fauna of the *Maringa-Lopori-Wamba* is composed exclusively of forest species whereas the fauna of Ituri includes ectogenic fauna from the East African forest area and the sudanese area and the Gaboon fauna comprises savanna elements such as *Gerrhosaurus nigrolineatus*.

The fauna of the *Maringa-Lopori-Wamba* landscape show a little more similarity with the west African forest province species. In a smaller scale, the lizard fauna of Djolu territory is similar to that of Yahuma, except for *Gastropholis echinata* and *Leptosiaphos hylophilus* found only in Djolu and, *Lygodactylus n. sp.* found only in Yahuma. A checklist of species present per faunal area is given in Table 4.

Table 3 Jaccard index indicating the dissimilarity between MLW and Ituri faunal areas.

	Ituri	MLW	Gaboon
Ituri	1	0.28125	0.21622
MLW	0.28125	1	0.44
Gaboon	0.21622	0.44	1

Table 4 Comparison between the fauna of the *Maringa-Lopori-Wamba* landscape and that of the vicinal faunal areas.

Taxa	Ituri subprovince	Gaboon subprovince	*Maringa-Lopori-Wamba*	Cameroon
Agamidae (Species richness)	2	2	1	2
Agama agama complex	+	+	+	+
Acanthocercus atricollis	+	-	-	-
Chamaeleonidae	4	2	1	5
Trioceros sp. nov	-	-	+	-
Trioceros owenii	+	-	-	+
Trioceros camerunensis	-	-	-	+
Trioceros montium	-	-	-	+
Trioceros cristatus	-	-	-	+
Chamaeleo dilepis	-	+	-	-
Kinyongia adolfi-friderici	+	-	-	-

Table 4 continued

Taxa	Ituri subprovince	Gaboon subprovince	*Maringa-Lopori-Wamba*	Cameroon
Trioceros ituriensis	+	-	-	-
Rhampholeon boulengeri	+	-	-	-
Rhampholeon s. spectrum	-	+	-	+
Gekkonidae	6	3	5	12
Hemidactylus fasciatus complex	+	+	+	+
Hemidactylus mabouia	-	+	+	+
Hemidactylus muriceus	+	+	+	+
Hemidactylus brooki angulatus	-	-	-	+
Hemidactylus echinus	-	-	-	+
Hemidactylus ansorgi	-	-	-	+
Hemidactylus longicephalus	-	-	-	+
Lygodactylus fischeri	-	-	-	+
Lygodactylus sp. nov.	-	-	+	-
Lygodactylus gutturalis	-	-	+	-
Lygodactylus depressus	+	-	-	-
Lygodactylus conraui	-	-	-	+
Cnemaspis dickersoni	+	-	-	-
Cnemaspis koehleri	-	-	-	+
Cnemaspis spinocolis	-	-	-	+
Hemidactylus ituriensis	+	-	-	-
Hemidactylus richardsoni	+	-	-	+
Lacertidae	5	1	2	0
Gastropholis echinata	+	-	+	-
Holaspis guentheri	+	-	+	-
Congolacerta vauereselli	+	-	-	-
Gastropholis tropidopholis	+	-	-	-
Adolfus africanus	+	-	-	-
Poromera fordii	-	+	-	-
Gerrhosauridae	0	1	0	0
Gerrhosaurus nigrolineatus	-	+	-	-
Scincidae	7	10	10	11
Feylinia currori	+	+	+	+
Feylinia grandisquamis	-	+	+	-
Melanoseps occidentalis	-	-	-	+
Lacertaspis reichenowi	+	+	-	-
Leptosiaphos hylophilus	-	-	+	-
Lacertaspis gemmiventris	-	-	-	+
Leptosiaphos vigintiserierum	-	-	-	+
Lepidothyris fernandi complex	+	+	+	+
Panaspis breviceps	+	+	-	+
Trachylepis albilabris	+	+	+	+
Trachylepis aureogularis	-	-	+	-
Trachylepis affinis	-	+	-	+
Trachylepis maculilabris	+	+	+	+
Trachylepis makolowodei	-	-	+	-
Trachylepis polytropis	+	+	+	+
Trachylepis sp.	-	-	+	-
Lacertaspis rohdei	-	+	-	+
Varanidae	1	1	1	1
Varanus ornatus	-	+	+	+
Varanus niloticus	+	-	-	-

3.2.2 Species Dispersal Pattern

Scincidae except *Leptosiaphos hylophilus* and *Agama agama* complex were all found in disturbed forests with more or less an open canopy. They were found either in fields, fallows, secondary forests or gaps in primary forests. Gekkonidae were found under the shades of trees or houses, some under the cover of tree barks. Chameleons were collected on twigs both in primary and secondary vegetations. Lacertidae were found in relatively mature forests. The varans were found in marshes and swampy forests. All terrestrial species except *Leptosiaphos hylophilus* and one arboreal species, *Holaspis guentheri*, had a random distribution pattern. The distribution of the rest of the arboreal species was fragmented.

4. Discussion

Considering the continuity of the lowland rainforest ecoregion, the dissimilarity of lizard fauna between the *Maringa-Lopori-Wamba* landscape and its surroundings should be attributable to ectogenic fauna entering the forest province through its boundaries with the savanna province.

Authors' results confirm the main characteristics of the distribution of african reptiles. Most species including forest species have enormous range due to the absence of barriers to the distribution of land animals. Those species with restricted range seem to be under the influence of the demarcation of the botanical districts [1]. More surveys in the *Maringa-Lopori-Wamba* landscape are needed in order to find out more species in the region, especially the arboreal undersampled species.

5. Conclusion

Maringa-Lopori-Wamba landscape has about 20 lizard species. Species richness and fauna is a bit similar to that of the Gaboon subprovince and the Iturian subprovince, except for the ectogenic savanna fauna entering from the neighboring. Each faunal area has its own endemics. Most species have a random dispersal pattern throughout their range. The communities of arboreal species are confronted to loss of forest cover and need more surveys.

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