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Research Article

Acarian Parasites of Reptiles from the South Kivu Province, Democratic Republic of Congo

M.A.Bisusa[1], M.H.Birindwa[2], M.C.Baraka[3], B.E Marara[4] and K.Chifundera[5]*

[1]*Laboratory of Veterinary Entomology, Department of Biology, Research Center of Research in Natural Sciences at Lwiro, DR Congo*

[2]*College of Agro-veterinary Studies at Walungu, Democratic Republic of Congo*

[3]*Researcher independent from Evangelique University in Africa (UEA)in health animals sciences*

[4]*Project Management of the University Luther King, Junior Teacher at the Permanent Interdisciplinary Education Center (CIDEP) Bukavu South Kivu, Democratic Republic of Congo*

[5]*Reptilarium, Research Center of Research in Natural Sciences at Lwiro, Democratic Republic of Congo*

***Corresponding Author:** K Chifundera, Reptilarium, Research Center of Research in Natural Sciences at Lwiro, Democratic Republic of Congo. **Email:** chifkusamba@gmail.com

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Abstract

In the South Kivu area, reptiles are usually seen bearing haemic (protozoan, haematozoans) and nonhaemic (ticks, mites and worms) parasites. Nonhaemic parasites include ectoparasites (ticks, mites) and endoparasites (worms) that were identified from agamid lizards and snakes. Ticks from snakes include *Aponoma latum, Aponoma, Amblyomma variegatum* and *Rhipicephalus appendiculatus.* However, microscopic examination of snake's stool led to the identification of worms including nematodes (*Ophidascaris sp* and *Strongylus sp*). *Pentastomida Porocephalus armilllifer* were collected from the snakes lung. Moreover, enterobacterial S*almonella* strains were found in the stools from lizards, tortoises and snakes. Given that reptile individuals are kept in captivity at Lwiro, curators are advised to observe higher hygienic standards in manipulating these animals in order to avoid zoonotic cross-contamination.

Keywords: *D.R. Congo; Reptile; Tick; Mite; Nematode; Pentastomida; Salmonella; Zoonosis*

Introduction

Reptiles constitute an important component of the biodiversity and play a significant role in maintaining the ecosystem function. As cool-blooded organisms, they are sensitive to temperature variation and for this reason they are used as bio-indicators for detecting some environmental changes [1]. Reptile health is a major issue for scientists and conservationists and parasitological studies are usually carried out on wildlife, especially on animals kept in captivity throughout the world [2-4]. Despite a one century herpetological studies in DR Congo [5] Laurent, 1956 a few works were devoted to the study of parasites of reptiles in the region of South Kivu until this day. In order to deepen the knowledge of diseases from reptiles a study of parasitic organisms responsible for several affections was undertaken [6]. The reptiles are usually affected by endoparasites and ectoparasites [4,6]. Thus, this study presents the results from some parasitological observations carried out on the reptiles by a team of biologists from the Research Center in Natural Sciences at Lwiro, Democratic Republic of Congo.

Methodology

The study area

The region of South Kivu is located in Eastern DR Congo within the Albertine Rift (28° 45' to 28°85'E and 2° 15' to 2° 30'S and altitudes vary between 600m and 3308m [7] and stretches on an area of 65070 km^2 [8]. The area experiences a humid tropical climate temperate by the altitude which is characterized by a long rainy season lasting 9 months from September to May and a three months short dry season from June to August. The air annual mean temperature is 19,5°C and the relative humidity varies between 68% and 75%. The vegetation that grows on the basaltic and lateritic soils offers a landscape of mosaics due to anthropogenic activities, so that there is a larger savannah area alternating with fallows, cultivated zones and forest patches that are observed along the rivers (Pole Pole, 2015, Iragi, 2013). The forested area harbors remnant tree species including *Albizia grandibracteata, Polyscias fulva, Musanga cecropioides, Ficus capensis, Macaranga mildbraedii, Agauria salicifolia, Bridelia grandibracteata, Xymalos monospora* and *Maesa lanceolata*. It is reported a rich faunal diversity that is found in aquatic and terrestrial ecosystems with a significant component of reptiles [1]. These combined biological and physical factors have produced environmental conditions that are suitable for the diversification of habitats and species. Savanna habitats are colonized by several kind of ticks and mites that are responsible for several diseases. These types of habitat are used by cattle breeder as natural pastures and during the grazing time; cattle are infected by acarian fauna.

Materials and Methods

During several herpetological surveys we used the site scanning or opportunistic search methods for collecting reptile specimens. Lizard individuals are free-hand caught and snakes are captured by using a snake tongue or lasso, and species are identified by using morphological and genetic taxonomic characters [9]. During the morphological examination, parasites are collected and kept in a 70% alcohol solution with the objective of understanding the interaction between the reptiles and their biotopes. Some living individuals are kept in captivity at the Reptilarium of Lwiro [4]. The specimens of ticks and mites were collected on reptiles kept in captivity at Lwiro and from individuals collected during several fieldwork in the surrounding areas. Tick species were identified by using keys to the ticks of DR Congo and used by the Laboratory of Veterinary Entomology [10,11]. However, the bacteriological examinations were carried out in the Laboratory of Bacteriology by using an elective Muller-Hinton culture broth. The endoparasites were identified by microscopic examination in the Laboratory of Veterinary Medicine of the Sanctuary of the Centre of Primate Rehabilitation at Lwiro, DR Congo.

Results

From several observations conducted in natural and captive conditions many parasites were identified (Table 1).

Types	Groups	Species	Hosts
Ectoparasites	Ticks	*Aponoma latum*	*Naja subfulva, Naja melanoleuca, Bitis gabonica*
		Aponoma exornatum	Lizards
		Amblyomma variegatum	*Bitis gabonica, Thrasops jacksoni*
		Rhipicephalus appendiculatus	*Acanthocercus atricollis*
	Mites	Ophionyssus	*Acanthocercus atricollis*
Endoparasites			
	Nematodes	*Ophidascaris sp*	*Python sebae*
		Ophiostrongylus	*Python sebae*
	Pentastomides	*Porocephalus armillifer*	*Python sebae*
Protozoan	Nonhaemic	*Trichomonas vermicularis*	*Python sebae*
Bacteria	Enterobacteria	*Salmonella* sp	Tortoise, lizard, snake

Table 1: *List of parasites identified on specimens from the reptile individuals collected in the South Kivu Province, DR Congo.*

The table 1 shows types of parasite, zoological groups, and scientific name of parasite and host species.

A. Ectoparasites

- **A1. Ticks:** Four species of ticks were identified on reptile individuals from the South Kivu Province.
  - **A1.1. *Aponoma latum:*** Adult and subadult individuals, and nymph are often found attached between the scales on the body of cobras (*Naja subfulva* and *Naja melanoleuca*) and vipers (*Bitis gabonica*).
  - **A1.2. *Aponoma exornatum:*** Tick species that is parasite of the blue-headed lizards *Acanthocercus atricollis*.
  - **A1.3. *Amblyomma variegatum*:** Adult individuals were collected on the body of the Gaboon vipers (*Bitis gabonica*) and on the arboreal black colubrids (*Thrasops jacksoni*).
  - **A1.4. *Rhipicephalus appendiculatus*:** A tick species parasite of the blue-headed lizard *Acanthocercus atricollis.*

Figure 1: *Amblyomma variegatum.*

Amblyomma variegatum, the big individuals are females blocked b the host's blood

Figure 2: *Porocephalus armillifer from snakes in the Kasai area.*

- **A2. The mites**
    - **A2.1. *Ophionyssus* sp:** Individuals of mite species belonging to the genus *Ophionyssus* were collected on the body of the blue-headed lizard *Acanthocercus atricollis.*

B. Endoparasites

- **B1. Nematodes or rounded worms:** Two species of rounded words were identified.
    - **B1.1. *Ophidascaris sp:*** A total number of 220 adult individuals of Ophidascaris, 7,0 cm long, were collected in the intestine of a rock python Python sebae, 3,0m long and weighing 8,18 kg, from the Ruzizi Plain at Kamanyola, South Kivu, DR Congo.
    - B1.2. ***Strongylus sp:*** Other endoparasite found from the stools collected from the rock python Python sebae, 3,3om long and 16,5 kg, kept in captivity at Lwiro, South Kivu, DR Congo.
- **B2. Pentastomids**
    - **B2.1. *Porocephalus armillifer:*** This parasite is often found in the lung of the rock python Python sebae. Nine specimens 7,32 cm long were collected from the lung of an individual kept in captivity at Lwiro, South Kivu, DR Congo. We observed that they are responsible for pneumonia, peritonitis, and hepatitis in snakes. Recently, this parasite species was found in several snakes from the Kasai area Congo Basin (Photo from Dr 2015).

C. The nonhaemic protozoans

- C1. *Trichomonas* sp: *Trichomonas cf vermicularis* was found in rock python's stools.

D. Bacteria: Enterobacteria S*almonella* strains were found in lizards, tortoises and snakes kept in captivity at Lwiro, South Kivu Province, DR Congo.

Discussion and Conclusion

The results of this study show that many reptile species are host of organisms that can affect the health of wildlife and humans. The case of ticks is well known because they are known as vectors of several diseases. In fact, ticks are ectoparasites that present a major constraint to the development of cattle breeding in the tropics [12] and are threat to the wildlife management because they are obligatory haematophagous of vertebrates [13]. They are parasites of a higher number of vertebrates including cool-blooded animals such as lizards, snakes and tortoises. They feed on their hosts by sucking the blood with their rostrum. Accordingly, they can communicate several pathogenic agents such as virus, bacteria and nematodes, and are responsible for allergic reactions observed in human populations, especially from animal keepers. About the other parasites, little is known about the possible zoonotic cross-contamination between humans and wildlife. However, hygienic measure must be taken when manipulating the reptiles. Consequently, the environmental health is an important issues for conserving the biological diversity throughout the study area [3] because communicable diseases transmitted by parasitic organisms of unknown origin can decimate human and wildlife [14]. In fact, we are obliged to understand the ecology of vectors, the causal agents, and their potentials for communicating diseases in order to prevent a possible biological disaster in terms of emergent diseases. The case of zoonosis or cross-contamination between humans and wildlife are recently reported around the world. Accordingly, it is important to improve our knowledge on parasite behavior in order to implement alerts and develop mechanisms for rapid riposte in case of biological disaster communicated by wild animals such as reptiles.

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Bibliography

1. Chifundera K and M Behangana. "Status of amphibians and reptiles in the AR and priorities for conservation". In Kanyamibwa S (Edition)". Albertine Rift conservation status report, ARCOS, Albertine Rift Conservation Series No 1 (2013).
2. RJ Klingenberg. "Understanding reptile parasites. A basic manual for herpetoculturists and veterinarians. Advanced Vivarium Systems". The Herpetocultural Library, Lakeside, CA (1993).
3. K Chifundera. "Practical laboratory manual for rapid identification and control of nonhaemic endoparasites from reptiles at Jersey Zoo, UK". Dissertation presented for the Certificate in Endangered Species Management, International Training Centre, Durrell Wildlife Conservation Trust, Jersey Zoo, UK (2000).
4. K Chifundera. Conservation in captivity at Lwiro, Solitaire 3 (2006).
5. RF Laurent. "Contribution à l'herpétologie de la Région des Grands-Lacs d'Afrique Centrale". Tortues, Crocodiles et Reptiles, Ann. Mus Roy. Afr. Centr., série Zoologie in 8 (1956).
6. SR Goldberg., *et al*. "Gastrointestinal helminthes of the black-necked Agama, Acanthocercus atricollis (Squamata: Agamidae), from the Democratic Republic of the Congo". *Comparative Parasitology* 79.1 (2012): 164-166.
7. K Chifundera. "Contribution to the inventory of medicinal plants from the Bushi area, South Kivu Province, Democratic Republic of Congo". *Fitoterapia* 72 (2001): 351-368.
8. Les secrets du Lac Kivu, accès juillet (2015).
9. J Eyman., *et al*. "Manual on field recording techniques and protocols for all taxa biodiversity inventories and monitoring". *ABC TAXA* 8.2 (2010): 331-653.
10. A Elbl and G Anastos. "Ixodid ticks (Acarina-Ixodidae) of Central Africa". Ann. Mus. Roy. Afr. Centr., Tervuren (1966).
11. AR Walker., *et al*. "Ticks of domestic animals in Africa: A guide to identification of species. International Consortium on Ticks and Tick borne diseases, Pergram RG and Preston PM". Edinburgh (2003).
12. MA Bisusa., *et al*. "Distribution altitudinale actuelle des tiques (Acarina: Ixodidae) chez les bovins élevés dans les groupements de Bugorhe et Irhambi-Katana, Sud-Kivu, RD Congo". Ann. UEA (2014): 69-80.
13. MA Bisusa., *et al*. "Fixation des tiques sur les bovins en function de la robe de leur pelage et de leur zone agroécologique dans les territoires de Kabare, Walungu et Uvira, Province du Sud-Kivu, République Démocratique du Congo". *IJIAS International Journal of Innovation and Applied Studies* 9.4 (2014): 1956-1965.
14. M Bagalwa., *et al*. "Etude retrospective sur les maladies d'origine environnementales dans la zone de santé de Katana, Kabare, Sud-Kivu, RD Congo". BULL Annal UEA (2014): 35-47.

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