

## On the composition of the snake fauna of Uyo, a recently deforested area in Nigeria (Squamata: Serpentes)

Zur Zusammensetzung der Schlangenfauna von Uyo,  
einem kürzlich entwaldeten Abschnitt in Nigeria  
(Squamata: Serpentes)

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### KURZFASSUNG

Die vorliegende Arbeit untersucht die Zusammensetzung der Schlangenfauna des Gebietes von Uyo (Akwa-Ibom, südöstliches Nigeria). Das Gebiet wurde in den vergangenen 15 Jahren stark abgeholzt und ist derzeit durch einen als "dezentral entwaldet" bezeichneten Landschaftstyp charakterisiert, in dem sich zwar keine großen urbanen Zentren aber zahlreiche kleinere Städte und Dörfer finden. Im Gebiet ist der Zustand intensiver Entwaldung nahezu überall gegeben, sekundäre Savanne und Plantagen sind die einzigen verbleibenden Landschaftstypen. 19 Schlangenarten (drei Pythons, eine Atractaspide, zwei Viperide, zwei Elapide, und 11 Colubride) wurden im Untersuchungsgebiet festgestellt. *Naja nigricollis* und *Psammodon* "phillipsi" waren die häufigsten Arten. Interessanterweise kamen an einigen Stellen zwei Formen von *P. "phillipsi"* gemeinsam vor (Exemplare mit geteiltem Anale überwogen gegenüber solchen mit ungeteiltem Afterschild). *Lamprophis olivaceus*, eine zuvor für Nigeria als selten betrachtete Schlangenart, wurde im Stadtgebiet gefunden.

### ABSTRACT

The composition of the snake-fauna of Uyo area (Akwa-Ibom State, south-eastern Nigeria) is studied in this paper. This area has experienced an extensive deforestation in the last 15 years, and is nowadays characterized by a landscape of "decentralized deforestation", where no very large urban centers are found, but where there are plenty of towns and villages with a consequent extensive deforestation almost everywhere, and with a secondary savanna (derived savanna) and plantation as only landscapes available. Specimens of 19 different species (three pythons, one Atractaspidae, two Viperidae, two Elapidae, and 11 Colubridae) were found in the study region. *Naja nigricollis* and *Psammodon* "phillipsi" were the most abundant species. Interestingly, co-occurrence of two forms of *P. "phillipsi"* (specimens with divided cloacal scale dominant over specimens with entire cloacal scale) was observed at a few spots. *Lamprophis olivaceus*, a previously thought rare species in Nigeria, was found in urban areas.

### KEY WORDS

Squamata: Serpentes; Snakes; rainforest; deforestation; community structure; ecology; Nigeria

### INTRODUCTION

Nigeria, with a population well over hundred millions of people, is by far the most populated country of the African continent, and also one of the most developed in its southernmost regions where much of the oil and gas industry is concentrated (DE MONTCLOS 1994). Due to this excess of anthropisation, more than 90% of the originally wooded area was deforested and – apart from a few regions of Cross River State in the extreme south-east of the country – the actual landscape is formed by some few fragments of rainforest islands inter-

persed among a sea of farmland, cultivations, and urban centres. In a generalized view, the deforested landscape of southern Nigeria can be assigned to one of two types (POLITANO 1998): (i) a landscape of centralized deforestation, with a few very large urban centres where the former forest has been completely destroyed but with neighbourhoods still characterized by a patchy mosaic of forests and plantations (and low human density), and (ii) a landscape of decentralized deforestation, where no very large urban centers are found, but where

there are plenty of towns and villages with a consequent extensive deforestation almost everywhere, and with a secondary savanna (derived savanna) and plantations as only landscapes available. Landscape type (i) is typical of some sectors of the Niger Delta (e.g., Rivers State, where the total population is 2,079,583, and 936,385 people [45.03%] are concentrated in the capital city [Port Harcourt]), and of Cross River State (where the total human population is 1,865,604, but with 907,954 people [48.67%] concentrated in the capital city [Calabar]) (Federal Republic of Nigeria 1996; POLITANO 1998). Landscape type (ii) is typical of Abia State and Akwa-Ibom State. In this latter state, the total human population in 1996 was 2,359,736, but only 234,615 (9.94%) were concentrated in the capital city (Uyo) (Federal Republic of Nigeria 1996).

Of course, the ecological situation of these two landscape types is very different (POLITANO 1998). In landscape type (i) one should expect to find little "rainforest islands" with a still important diversity of forest taxa. In landscape type (ii) the loss of forest biodiversity should probably be total or almost so, with a persistence of those species that are adaptable to altered landscape like secondary bush and plantations.

Since middle of the 1990s, a long-term scientific research on the snakes of southern

Nigeria has been active, and has focused primarily on the snake communities of swamp-rainforest patches (e.g., LUISELLI et al. 1998; LUISELLI & AKANI 1999) and mangroves (LUISELLI & AKANI 2002 in press). However, data on snakes from altered habitats are available, either with respect to species of particular ecological, social, and conservation significance (LUISELLI & ANGELICI 2000; LUISELLI et al. 2001, 2002 in press), or to snakes from altered landscape of type (i) (see above) (LUISELLI & AKANI 2002 in press).

In this paper we examine the composition of the snake fauna of Uyo (Akwa-Ibom State), an area of south-eastern Nigeria that has been recently deforested and strongly developed after the formal establishment (in 1987) of the new Akwa-Ibom State, and the successive migration of hundred thousand people into the new state from the surroundings (especially from the adjacent Cross River State). It is an area clearly belonging to landscape type (ii) described above, and so it can be valuably used as a case study for this nowadays widespread landscape pattern in southern Nigeria. Given the preliminary nature of this study, here we just refer to the species found up to now around Uyo town in the period May 2000 until February 2001, without any attempt to establish their relative abundance in the field. This further step will be achieved by a forthcoming research project.

## MATERIALS AND METHODS

The field study was conducted between May 2000 and February 2001 by random walks along bushes, farmlands, and cultivations at Uyo and surroundings within a radius of 30 km from the center of the town. We considered as the point from where the radius is calculated the "Ibom connection" (cross point between the five major roads of Uyo). The landscape follows type (ii) in the introduction (POLITANO 1998) (i.e., without any remnant forest fragment and with secondary bush patches mainly concentrated along rivers banks). Compared with the surrounding Nigerian regions (i.e., eastern Niger Delta at west, and Cross River State at east), the study region is nowadays much more extensively deforested.

According to the most recent census data (Federal Republic of Nigeria 1996), the human population has grown about 4% from 1992 to 1996, and the urban population of Uyo town about 10% in the same period.

This study was conducted as a part of the BSc Diploma project of one of the authors (I. J. EKPO) at the University of Uyo. Snakes were observed and collected on over 60 days of field research during random walks conducted throughout every habitat type available in the study area, at every hour of the day and night. The abundance of snakes was evaluated by applying a 'time-constrained' searching protocol (100 hours of field observation by two independent searchers walking through appropriate

Table 1: List of the snake species encountered in the study area in the period May 2000 until February 2001. Vouchers deposited in the Uyo University collections are also indicated. ad - adult, juv - juvenile, subad - subadult, \*\* - several (more) specimens observed, not preserved.

Tab. 1: Die im Untersuchungsgebiet zwischen Mai 2000 und Februar 2001 festgestellten Schlangenarten. Die Nummern der in den Sammlungen der Universität von Uyo hinterlegten Belegexemplare sind angegeben. ad - adult, juv - juvenil, subad - subadult, \*\* -einige (weitere) Exemplare beobachtet, nicht konserviert.

Species Art	Specimens Exemplare	Vouchers Belegexemplare	Notes Anmerkungen
<i>Python sebae</i> (GMELIN, 1788)	5 ad	--	University of Uyo Main Campus / Universität von Uyo, Hauptcampus
<i>Python regius</i> (SHAW, 1802)	3 ad	001, 013, 026	--
<i>Calabaria reinhardtii</i> (SCHLEGEL, 1848)	2 ad	009	--
<i>Crotaphopeltis hotamboeia</i> (LAUR., 1768)	3 ad	002, 003, 016	--
<i>Lamprophis lineatus</i> (DUMÉRIL, BIBRON & DUMÉRIL, 1854)	1 subad ♂	005	--
<i>Lamprophis olivaceus</i> (DUMÉRIL, 1856)	2 ad	012, 028	Rare in Nigeria / Selten in Nigeria (BUTLER & REID 1990)
<i>Gastropyxis smaragdina</i> (SCHLEGEL, 1837)	7 ad	029	--
<i>Thrasops flavigularis</i> (HALLOWELL, 1852)	1 juv	004	--
<i>Thrasops occidentalis</i> PARKER, 1940	1 ad	017	--
<i>Psammodphis "phillipsi"</i> (HALLOWELL, 1844)	4 ad, 4 subad, **	006, 008, 018, 020, 021, 023, 024, 031	Sympatric animals with divided and entire anal scutes / Tiere mit geteiltem und ungeteiltem Anale sympatrisch
<i>Toxicodryas blandingii</i> (HALLOWELL, 1844)	3 juv	019, 022	--
<i>Natriciteres fuliginoides</i> (GÜNTHER, 1858)	1 ad	014	--
<i>Grayia smythii</i> (LEACH, 1818)	**	--	--
<i>Mehelya poensis</i> (SMITH, 1847)	2 ad	010, 011	--
<i>Aparallactus</i> sp.	1 ad	034	--
<i>Dendroaspis jamesoni</i> (TRAILL, 1843)	1 ad	--	--
<i>Naja nigricollis</i> REINHARDT, 1843	11 ad, 2 juv	007	Even in densely populated spots / Auch an dicht bewohnten Orten
<i>Bitis g. gabonica</i> (DUMÉRIL & BIBRON, 1845)	1 ad	--	University of Uyo Campus Annex / Universität von Uyo Kampusannex
<i>Causus maculatus</i> (HALLOWELL, 1842)	2 ad	015, 033	--

snake habitats). Details are available in I. J. EKPO's unpublished thesis. Road kills and specimens killed opportunistically by natives, were collected to supplement field sightings of living specimens. They are actually stored in formalin at the University of Uyo, Department of Agricultural Science. All snakes were identified to species and sex, measured to SVL, tail length, head length, head width, inter-orbital length, and their ventral scales were counted. All these morphometric measurements will be used for more specific contributions on the single species which will eventually appear in the future years. Snakes were determined using keys in MEIRTE (1992) and CHIPPAUX (1999). However, based on the examination of series of characters, we considered as "phillipsi" several *Psammodphis* specimens with divided cloacal plate, that according to these keys (e.g., CHIPPAUX 1999, page 161)

would have been considered as "sibilans" (see also HUGHES 1999). Moreover, the specimen of *Aparallactus* collected was without head, that is why we decided to avoid further specifications of its identity, although it was most probably *A. modestus* (GÜNTHER, 1859). Concerning *P. "phillipsi"*, the above consideration should apply to previous papers by the same authors where it was not clearly specified (e.g., LUISELLI et al. 1998). Anyway, as the taxonomic problems of *P. "phillipsi"* are major, and since we have much materials of it (it is indeed one of the most abundant snake species in southern Nigeria), it will be the subject of further specific papers, for which we prefer to avoid any further comment, and also wait for the yet announced revision of West African *Psammodphis* by HUGHES (cf. HUGHES 1999).

## RESULTS AND DISCUSSION

We collected snake specimens of 19 species (table 1), including three pythons, one Atractaspididae, two Viperidae, two Elapidae, and 11 Colubridae. Although very preliminary, our data suggest that *Naja nigricollis* (frequency: 1 specimen / 40 minutes of field effort in appropriate bushy habitat) and *P. "phillipsi"* (8 specimens stored in the Uyo collection, apart from those encountered during the field excursions) are the most abundant species. In this regard, our data are not surprising if we consider that both these species have been considered among the most versatile ones in the adjacent areas of Eket (LUISELLI et al. 1998, 2002 in press), Niger Delta (AKANI et al. 1999), and Calabar (BUTLER & REID 1986, 1990). Six out of eight voucher specimens of *P. "phillipsi"* from the study area have a divided cloacal scale, and two of these specimens originated from the same spot as the two specimens having an entire cloacal scale (i.e., University of Uyo Annex). However, the co-occurrence patterns of the two "forms" of *P. "phillipsi"* (maybe different "species" if we go with HUGHES 1999) in southern Nigeria is too

complicated to be shortly examined in the present study.

In general terms, the snake-fauna of Uyo region seems to be severely depleted, in that it lacks all the species typically linked to forests (e.g., *Atheris squamiger*, *Bitis nasicornis*, *Pseudohaje goldii*, *Naja melanoleuca*, etc), despite the time elapsed since the destruction of the true forest has been short (< 15 years). In addition, only approximately a third of the species known for the adjacent Niger Delta region are present, which suggests that extinction of many snake species may be very rapid when the remnant blocks of forests disappear. So, given the sensitivity to habitat alteration and the fact that they occupy high levels in the food chain (i.e., they are sensitive to a broad range of environmental stressors that disrupt lower trophic levels, cf. RAXWORTHY & ATTUQUAYEFIO 2000), it is clear that snakes are excellent target organisms to long-term monitoring of habitat quality in southern Nigeria, and should be arguably largely used by Environmental Impact Assessment (E.I.A.) projects as regular pieces of environmental works (POLITANO 1998).

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