

# Reptiles of Takamanda Forest Reserve, Cameroon

Matthew LeBreton, Laurent Chirio, and Désiré Foguekem

## 1 Introduction

Cameroon has a rich reptile fauna of more than 265 species (Chirio and LeBreton in prep.), resulting from the country's varied landscape and climate and its center of diversity in the western highlands.

While this diversity is well known and although many unique and characteristic species have been recorded from Cameroon, there are few published local inventories. Most lists were compiled during general expeditions across Cameroon (Sternfeld 1908, 1909; Müller 1910; Neiden 1910a,b; Mertens 1938, 1940, 1968; Monard 1951; Perret and Mertens 1957; Böhme 1975b; Joger 1982; Böhme and Schneider 1987) or through studies of a taxonomic nature based on specimens in European or American museums (e.g., Loveridge 1947, Klaver and Böhme 1992). Notable exceptions include studies of snake fauna from Yaoundé (Gauduin 1970) and western Cameroon (Stucki-Stern 1979) and short-term research on fauna in Campo Fauna Reserve (Ota et al. 1987) and Korup National Park (Lawson 1993).

The non-governmental organization (NGO) CAMHERP has been operating in Cameroon since 1998, compiling an atlas of reptiles and providing regional and local inventories for other NGOs, the government sector, and regional projects. This paper presents the first list of reptiles from Takamanda forest (Takamanda Forest Reserve and adjoining areas), based on four excursions to the area in 2001 and 2002, in cooperation with the Takamanda Forest Surveys Project (GTZ/MINEF PROFAMAMFE) and Wildlife Conservation Society.

## 2 Study area

The southern border of Takamanda Forest Reserve (TFR) is located approximately 15 km north of Mamfe in the Southwest Province of Cameroon (Figure 1 Chapter 1). The reserve, approximately 67,500 ha in size, follows the Cameroon/Nigeria border for about 30 km.

In a simple breakdown of natural vegetation, four major types can be determined: lowland forest, medium altitude forest, montane forest, and elevated savanna (Sunderland *et al.* this volume). Derived vegetation types include cultivated areas, farm bush, and secondary forest around the reserve. Altitude varies from 100 m to about 1,600 m.

Four field trips were conducted in and around TFR over the course of one year. The first, from 14 - 30 May 2001, focused the areas of Matene and Mende. At Matene, palm plantations, farm bush, dense lowland humid forest, and mid-elevation forest were examined, while at Mende, gallery forest, montane forest, elevated grassland, and farmland were surveyed. The second trip, from 2 - 17 August 2001, centered on the villages of Atolo—where sub-montane forest, ridge forest, farm bush and cocoa farms were the dominant vegetation types—and Tinta, where woodland savanna, moist evergreen forest, and the interface between these vegetation types were assessed. The third and fourth trips, from 6 - 19 December 2001 and 28 - 31 May 2002, examined lowland forest areas in the south of the reserve in the vicinity of the villages of Takamanda, Obonyi 1 and 2, and Kekpane (Figure 2 in Chapter 1).

### 3 Methods

A team of experienced herpetologists, a graduate student, and field assistants from the Takamanda area carried out the field work. Field searches took place in areas where—and at times when—reptiles were known to be active or detectable, based on the experience of the field researchers. Searchers looked for active reptiles on the ground and in trees and shrubs. Inactive and burrowing reptiles were sought beneath rocks, exfoliating layers of bark, leaf litter, and fallen logs and in dark tree hollows and rock crevices (with the aid of a torch). Some searching was undertaken at night along tracks and in trees and houses, again with a torch. Captured reptiles were kept in cloth bags and small plastic containers lined with moistened moss.

Bottles of 10% unbuffered formalin were left with volunteers in the villages of Mendé and Bidjan (close to Mamfé) from May to August 2001, in Atolo and Tinta from August 2001 to February 2002, and Obonyi 1 and 2, Kekpane, and Takamanda villages from December 2001 to May 2002 (Figure 1). Any reptiles killed in the villages were preserved in the formalin and removed during subsequent field work. Shells, bones, and skins of tortoises and crocodiles were also recorded from some villages.

All specimens were preserved in 10% unbuffered formalin or 70% alcohol. Specimens collected will be deposited in the University of Yaoundé I, Cameroon, and the Museum National d'Histoire Naturelle, Paris, France.

Principal works used in the identification of species include: for geckoes, Loveridge (1947), van den Audenaerde (1967), and Perret (1963, 1986); for *Mabuya*, Hoogmoed (1974) and Chirio and Ineich (2000); for *Panaspis*, Perret (1973); for chameleons, Klaver and Böhme (1992) and Wild (1993); and for snakes, Chippaux (2001), Meirte (1992), Laurent (1964), and unpublished data of Van Wallach.

### 4 Results

A total of 71 described species from 15 families were identified from TFR and the immediately surrounding

area during the field work. The 41 species of snakes made up 59% of all species encountered, and the family Colubridae was the most species-rich family (26 species). Three additional—and possibly undescribed—species were also recorded, two of which have been found in numerous localities in Cameroon's forests, while one is known only from the Takamanda and Furu-Awa areas.

Ten other species, not recorded from Takamanda, have been recorded from the adjacent towns of Mamfé and Bidjan (approximately 15 km to the south) during the current study (three species) or by Stucki-Stern (1979) (seven species). Unfortunately, the specimens collected by Stuki-Stern (1979) were destroyed, and identifications cannot be confirmed (Chris Wild pers.comm.).

Two species—*Chamaeleo montium* and *C. pfefferi*—found in the Takamanda area are endemic to Cameroon, while three other species—*Chamaeleo wiedersheimi*, *Cnemaspis koehleri*, and *Panaspis rohdei*—could be classed as regional endemics because their distribution also includes small areas in Nigeria, Equatorial Guinea, and Gabon.

The tortoises *Kinixys erosa* and *K. homeana* are listed as Data Deficient and the Dwarf Crocodile *Osteolaemus tetraspis* as Vulnerable in the IUCN's Red Lists.

Eleven species included in Appendix II of the CITES convention, which regulates international commerce in wildlife, were recorded from the area, including the terrestrial tortoises and dwarf crocodile noted above and chameleons, monitor lizards, and pythons.

### 5 Discussion

The number (81) of described reptile species in the Takamanda area is similar to other locations in the volcanic chain mountains of Cameroon (65 species at Korup National Park [Lawson 1993] and 81 non-marine reptile species in the Mount Cameroon area [LeBreton 2002]). Also typical of African forests is the high proportion (62%) of snakes in the species present at

Takamanda; compare to 65% at Korup National Park (Lawson 1993), 53% at Kibale National Park in Kenya (Vonesh 2001), and 56% in the Mount Cameroon area (LeBreton 2002).

### 5.1 Affinities/relationships with other areas

Seventy-five percent of the 65 reptile species found at Korup (Lawson 1993) and 78% of the 81 non-marine reptile species found in the Mount Cameroon area (LeBreton 2002) are also found at Takamanda. By contrast, the Bouba-Njida National Park area, dominated by savana, in northern Cameroon has only 25% of its 43 species in common with the Takamanda area (unpublished CAMHERP data).

Most of reptile species found at Takamanda are forest dwellers, giving the area an affinity with montane and sub-montane forest in the western parts of the country, including Mount Cameroon and Korup. There are, however, a number of savanna species that appear to reach their southern limit—at least in western Cameroon—in the Takamanda area.

### 5.2 Species of interest

The chameleons comprise a distinctive portion of the fauna in any part of Cameroon, and Takamanda is no exception. Five species have been recorded from the area, including the Dwarf Chameleon (*Rhampholeon spectrum spectrum*), Crested Chameleon (*Chamaeleo cristatus*), Mountain Chameleon (*C. montium*), Wiedersheim's Chameleon (*C. wiedersheimi*) and Pfeffer's Chameleon (*C. pfefferi*). The latter three species are Cameroon endemics, or near endemics, and are known only from restricted areas in Cameroon.

The presence of Pfeffer's Chameleon at Mendé extends the range of this species west from the Bamenda area where it was recently found (unpublished CAMHERP data); other populations of the species are about 150 km further south in the mountains of Kupe and Manengouba (Wild 1993) and Nlonako (Herrmann et al. 1999).

Two subspecies (*C. w. wiedersheimi* and *C. w. perreti*) of the near-endemic chameleon *C. wiedersheimi* are known from Cameroon, *C. w. perreti* has an extremely restricted distribution and is known only from around the Manengouba Mountains in Cameroon, while *C. w. wiedersheimi*, found at Mendé in the Takamanda area, is much more widespread. The Takamanda individuals bridge the gap between known populations on the Obudu Plateau of Nigeria (Böhme 1975a, Gartshore 1986) and populations at Bafut in Cameroon (Böhme 1975b) and west of Bamenda in Cameroon (unpublished CAMHERP data). This subspecies occurs in grassland and in gallery forests between about 1500 and 2200 m (Gartshore 1986).

The Mountain Chameleon (*C. montium*) was found during the current field work at Tinta to the north of TFR, and there is a single record from nearby Atolo (Klaver and Böhme 1992). While these two locations are close to each other, they are otherwise very isolated from other known populations of Mountain Chameleon at Mt. Cameroon, Mt. Kupe, Manengouba, and Rumpi Hills. Forests to the northeast of Takamanda have not been surveyed, however, and the population may be more extensive in that area. This species is usually found in moderate- to high-altitude forest (500 to 1300 m), often along forest edges and sometimes in cultivated areas (Klaver and Böhme 1992).

A number of geckos, not endemic to Cameroon and known only from scattered localities, were found in the Takamanda area. Three of these species, *Cnemaspis koehleri*, *Hemidactylus echinus*, and *H. intestinalis*, apparently depend on large, old trees where they shelter beneath decorticating bark, among the roots of epiphytes, and in other crevices. This dependency on older trees has perhaps led to a patchy distribution; much of the forest in Cameroon is at least partially exploited, and few large, old trees remain in many areas. Two other gecko species were recorded in this study. *Cnemaspis spinicollis* is found in rocky outcrops in densely forested areas, and *Lygodactylus conraui* is commonly found in palm plantations. Both are known only from scattered locations.

*Bothrolycus ater* is a non-venomous snake restricted to central African forests, and in Cameroon there are only scattered records from the extensive rainforests of the south and the elevated forests of the west (unpublished CAMHERP data). A single specimen was found during this field work in the elevated forests at Mendé.

### 5.3 Savanna species

A number of savanna species known from the plains in northern Cameroon were found in the Takamanda area. The Royal Python (*Python regius*) is well known from the northern edge of the Cameroon's Adamawa Plateau north to Waza National Park. It is usually found in drier habitats, including rocky hills and sometimes houses. In Nigeria, it is known from farmland and dryland rainforest (Luiselli and Akani 1999). The records of this species from Bidjan during this study are extremely isolated from the other known locations in Cameroon, but are likely contiguous with populations in adjacent Nigeria (e.g., Cross River National Park; Jim Comiskey pers. obs. 2001).

Another savanna species, the egg-eating snake (*Dasypeltis scabra*), was recorded in elevated grassland around Mendé. This species is better known from the dry savanna further north in Cameroon, but has also been recorded from Bamenda (unpublished CAMHERP data) and from elevated savanna in other parts of Africa (Hughes 1983). This was the only snake recorded from the elevated grassland at Mendé. All other species are apparently restricted to gallery forests.

*Panaspis kitsoni* is a small skink commonly found in lowland gallery forests on the Bénoué Plain in northern Cameroon, but it is also known from scattered locations in western Cameroon and from Nigeria. During the current field work, it was found in Takamanda village and at Bidjan. The distribution of this species and its continuity with Nigerian populations is not yet clearly defined in western Cameroon.

### 5.4 Undescribed species

Three possibly undescribed species were found during these surveys. An Agama, superficially similar to *Agama agama* and found in similar habitats but restricted mostly to the coast and hinterland, was found in four locations in the Takamanda forest area. A species of *Mabuya* allied to *Mabuya affinis* was also recorded. *Mabuya affinis* is found throughout the forests of Cameroon, including some of the gallery forests on the Bénoué Plain. The closely related undescribed species has been recorded from numerous locations throughout the Cameroon and Central African Republic forest block. The third species is a large gecko (*Hemidactylus*), similar to *H. fasciatus* but bigger and with less distinct broad bars on the back. In Cameroon, it has also been recorded from the Furu-Awa area north of Wum near the Nigerian border.

## 6 Concluding remarks

### 6.1 Implications for conservation

#### 6.1.1 Endemics and other species with localized or restricted distributions

Much of the Cameroon highlands are being converted to agriculture and settlement. Thus, certain species with restricted distributions are of conservation concern. Species found in areas particularly suitable for intensive grazing or cultivation may be affected by deterioration in habitat quality caused by poor land management such as overgrazing or clearing of habitat (especially elevated forests) for cultivation. These problems have already been identified in the Manengouba and Bamboutos highlands where a number of lizards and frogs are exhibiting signs of stress brought on by human activities (Gartshore 1986). Our recording of a number of these lizards in the area of Takamanda Forest Reserve enhances the potential for conservation.

#### 6.1.2 Red List Species

Numerous undescribed species have recently been discovered in Cameroon, and we are now obtaining increased knowledge of the distribution of other species. It is likely that better understanding of species distribution and the factors that threaten some reptiles

will lead to a revision of IUCN's Red Lists. Some species may be removed, while others are added.

As noted above, the Red List species found at Takamanda include the Data Deficient terrestrial tortoises (*Kinixys homeana* and *K. erosa*) and the Vulnerable Dwarf Crocodile (*Osteolaemus tetraspis*). Local people consume these species, but it is not known how this affects populations of these reptiles in the Takamanda area.

### 6.1.3 Local hunting

The people of the Takamanda area collect several reptile species for food, most often as by-catch in fishing nets or on fishing lines, through encounters during cultivation, and along on forest paths or in villages. Direct hunting is unlikely, except perhaps for crocodile species.

As stated above, many people in Cameroon consume the terrestrial tortoises *Kinixys homeana* and *Kinixys erosa*. They are likely to be captured while walking on forest tracks or during cultivation. Numerous dried shells of both species were seen in local villages during this study. Insufficient data exist regarding distribution and stresses to assess their conservation status, which is why they are listed as Data Deficient in the Red Lists. However, a recent article on hunting pressure in southwestern Cameroon (Lawson 2001) indicated that around some villages and even in reserves, these species are intensely collected, with annual harvests up to 0.7 *Kinixys* per km<sup>2</sup>.

*Trionyx triunguis*, a soft-shelled aquatic tortoise known from scattered locations in Cameroon, inhabits medium to large rivers in both savanna and forest areas. One dried shell of this species, kept after the meat of the animal had been eaten, was found in the village of Obonyi I during this field work.

Larger species of snakes, including the Gabon Viper (*Bitis gabonica*), Horned Viper (*Bitis nasicornis*), Forest Cobra (*Naja melanoleuca melanoleuca*), Green Mamba (*Dendroaspis jamesoni jamesoni*), and African Rock Python (*Python sebae*), are all likely to be consumed by

villagers in the Takamanda area. These creatures are probably encountered during cultivation, while walking on forest tracks, or when they enter villages. The aquatic snakes of the genus *Grayia* attain a considerable size and are also likely to be consumed, as in other parts of Cameroon, if they are captured in fishing nets or on fishing lines. However, some of the people inhabiting the area avoid eating snakes for traditional reasons (Jacqui Sunderland-Groves pers. comm.).

The Dwarf Crocodile (*Osteolaemus tetraspis tetraspis*) is locally consumed, as are the other crocodile species (*Crocodylus cataphractus* and *C. niloticus*) that are likely to occur in the area. This factor may contribute to low numbers of crocodiles, but even as early as the 1960s, crocodile populations had been greatly reduced in central Africa (Cott and Pooley 1972) and remain so today (Luiselli *et al.* 2000), probably because of hunting for meat, export of skins, and degradation of habitat in some areas.

### 6.1.4 Intercontinental Trade Species

Because of the relative inaccessibility of Takamanda Forest Reserve, the collection of species such as chameleons, tortoises, and pythons for intercontinental trade is unlikely to pose a conservation issue in the area.

## 6.2 Additional study

In reptile research, even a near-comprehensive list of species is difficult to compile. The encounter rates for many snake species are low, and this is further complicated by the large number of secretive, burrowing species found in the forests of Cameroon and variance in weather conditions during field work. For a comprehensive list, extensive field work during different seasons and varying climatic conditions is necessary.

In Cameroon, many traditional beliefs are associated with reptile species, and these beliefs are often extremely localized. Some beliefs preclude the killing or eating of certain species. Management of reserves should therefore be sensitive to such beliefs, embracing those that enhance the conservation of certain species. Given that reptiles are

an important part of the forest fauna for the people of Takamanda—as food, in the preparation of medicines, and for traditional rituals—more research related to the relationships between local villagers and reptiles could prove to be an important resource for future management of the forest.

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**Appendix 1.** Reptiles from the Takamanda Forest Reserve, Cameroon.(a: Klaver and Böhme 1992; b: Stucki-Stern 1979; other records come from the present work)

	Lowland forest sites					Highland sites		Savanna/forest		
	Takamanda	Obonyi 1	Obonyi 3	Kekpane	Basho 2	Mamfe/Bidjan	Matené	Mendé	Atolo	Tinta
Testudinidae (terrestrial tortoises)										
<i>Kinixys erosa</i> (Schweigger 1812)	✓	✓	✓					✓	✓	✓
<i>Kinixys homeana</i> (Bell 1827)							✓			
Trionychidae (soft-shelled tortoises)										
<i>Trionyx triunguis</i> (Forskål 1775)		✓								
Crocodylidae (crocodiles)										
<i>Osteolaemus tetraspis tetraspis</i> (Cope 1861)	✓									
Gekkonidae (geckoes)										
<i>Cnemaspis koehleri</i> (Mertens 1937)								✓	✓	
<i>Cnemaspis spinicollis</i> (Müller 1907)								✓	✓	
<i>Hemidactylus brookii angulatus</i> (Hallowell 1852)	✓	✓	✓			✓	✓		✓	
<i>Hemidactylus echinus</i> (O'Shaughnessy 1875)		✓								
<i>Hemidactylus fasciatus fasciatus</i> (Gray 1842)	✓								✓	✓
<i>Hemidactylus intestinalis</i> (Werner 1897)		✓	✓				✓		✓	
<i>Hemidactylus mabouia mabouia</i> (Moreau de Jonnés 1818)						✓	✓			
<i>Hemidactylus</i> sp.		✓								
<i>Lygodactylus conraui</i> (Tornier 1902)	✓		✓				✓			
Agamidae (dragon lizards)										
<i>Agama agama</i> (Linnaeus 1758)	✓							✓		
<i>Agama</i> cf. <i>agama</i>	✓	✓					✓		✓	
<i>Agama sylvanus</i> (Macdonald 1981)							✓		✓	
Chamaeleonidae (chameleons)										
<i>Chamaeleo cristatus</i> (Stutchbury 1837)	✓	✓				✓(a)	✓		✓	
<i>Chamaeleo montium</i> (Buchholz 1874)									✓(a)	✓
<i>Chamaeleo pfefferi</i> (Tornier 1900)								✓		
<i>Chamaeleo wiedersheimi wiedersheimi</i> (Nieden 1910)								✓		
<i>Rhampholeon spectrum spectrum</i> (Buchholz 1874)	✓		✓					✓	✓	✓
Lacertidae (lacertid lizards)										
<i>Holaspis guentheri</i> (Gray 1863)	✓		✓							

Continued

## Appendix 1 (cont.). Reptiles from the Takamanda Forest Reserve, Cameroon

	Lowland forest sites					Highland sites		Savanna/ forest		
	Takamanda	Obonyi 1	Obonyi 3	Kekpane	Basho 2	Mamfe/Bidjan	Matené	Mendé	Atolo	Tinta
Scincidae (skinks)										
<i>Mabuya affinis</i> (Gray 1838)	✓	✓	✓	✓			✓		✓	
<i>Mabuya cf affinis</i>	✓						✓		✓	
<i>Mabuya albilabris</i> (Hallowell 1857)	✓			✓						
<i>Mabuya maculilabris maculilabris</i> (Gray 1845)			✓		✓			✓	✓	
<i>Mabuya polytropis</i> (Boulenger 1903)				✓			✓			
<i>Mochlus fernandi</i> (Burton 1836)						✓	✓		✓	✓
<i>Panaspis breviceps</i> (Peters 1873)	✓	✓	✓				✓		✓	
<i>Panaspis kitsoni</i> (Boulenger 1913)	✓					✓				
<i>Panaspis rohdei</i> (Muller 1910)								✓		
Varanidae (monitor lizards)										
<i>Varanus ornatus</i> (Daudin 1803)				✓			✓		✓	✓
Typhlopidae (blind or worm snakes)										
<i>Typhlops angolensis</i> (Bocage 1866)								✓		
<i>Typhlops congestus</i> (Duméril and Bibron 1844)						✓				
<i>Typhlops steinhausi</i> (Werner 1909)						✓			✓	
Pythonidae (pythons)										
<i>Calabaria reinhardti</i> (Schlegel 1848)						✓(b)				
<i>Python regius</i> (Shaw 1802)						✓				
<i>Python sebae</i> (Gmelin 1788)			✓			✓(b)			✓	✓
Colubridae (colubrid snakes)										
<i>Afronatrix anoscopus</i> (Cope 1861)	✓	✓	✓			✓(b)	✓			
<i>Bothrolycus ater</i> (Günther 1874)								✓		
<i>Buroma depressiceps depressiceps</i> (Werner 1897)										✓
<i>Dasypeltis fasciata</i> (Smith 1849)	✓			✓						
<i>Dasypeltis scabra</i> (Linnaeus 1758)								✓		✓
<i>Dipsadoboa underwoodi</i> (Rasmussen 1993)		✓								
<i>Dipsadoboa unicolor unicolor</i> (Günther 1858)	✓	✓	✓					✓		
<i>Dipsadoboa viridis</i> (Peters 1869)			✓							
<i>Gonionotophis brussauxi brussauxi</i> (Mocquard 1889)	✓	✓								
<i>Grayia smythii</i> (Leach 1818)						✓(b)				
<i>Hapsidophrys lineatus</i> (Fischer 1856)						✓		✓		✓
<i>Hapsidophrys smaragdina</i> (Schlegel 1837)		✓				✓(b)			✓	✓

Continued

## Appendix 1 (cont.). Reptiles from the Takamanda Forest Reserve, Cameroon

	Lowland forest sites					Highland sites		Savanna/forest		
	Takamanda	Obonyi 1	Obonyi 3	Kekpane	Basho 2	Mamfe/Bidjan	Matené	Mendé	Atolo	Tinta
<i>Lamprophis olivaceus</i> (Duméril 1856)		✓	✓				✓		✓	
<i>Lamprophis virgatus</i> (Hallowell 1854)						✓				
<i>Mehelya capensis savognani</i> (Mocquard 1887)		✓							✓	
<i>Mehelya guirali</i> (Mocquard 1887)		✓	✓			✓(b)				✓
<i>Mehelya poensis</i> (Smith 1847)			✓	✓		✓			✓	✓
<i>Mehelya stenophthalmus</i> (Mocquard 1887)	✓					✓(b)	✓			
<i>Meizodon coronatus</i> (Schlegel 1837)										✓
<i>Natriciteres fuliginoides</i> (Günther 1858)	✓					✓(b)				
<i>Natriciteres olivacea</i> (Peters 1854)						✓(b)				
<i>Philothamnus carinatus</i> (Andersson 1901)			✓							
<i>Philothamnus heterodermus</i> (Hallowell 1857)		✓	✓			✓(b)				
<i>Philothamnus heterolepidotus</i> (Günther 1863)						✓(b)				
<i>Philothamnus nitidus</i> (Günther 1863)						✓(b)				
<i>Psammophis phillipsii</i> (Hallowell 1844)						✓				✓
<i>Thelotornis kirtlandi</i> (Hallowell 1844)	✓									
<i>Thrasops aethiopicus</i> (Günther, 1862)		✓								
<i>Thrasops flavigularis</i> (Hallowell 1852)						✓(b)				
<i>Thrasops occidentalis</i> (Parker 1940)			✓			✓(b)				
<i>Toxicodryas blandingii</i> (Hallowell 1844)			✓			✓				✓
<i>Toxicodryas pulverulenta</i> (Fischer 1856)			✓			✓(b)	✓			✓
Elapidae (front-fanged snakes)										
<i>Dendroaspis jamesoni jamesoni</i> (Traill 1843)		✓	✓			✓	✓			✓
<i>Naja melanoleuca melanoleuca</i> Hallowell 1857	✓		✓	✓		✓	✓		✓	✓
<i>Pseudohaje goldii</i> (Boulenger 1895)	✓					✓(b)			✓	
Viperidae (vipers)										
<i>Atheris squamigera</i> (Hallowell 1854)						✓(b)	✓		✓	
<i>Bitis arietans</i> (Merrem 1820)										✓
<i>Bitis gabonica</i> (Duméril and Bibron 1845)			✓	✓		✓(b)			✓	✓
<i>Bitis nasicornis</i> (Shaw 1802)		✓	✓	✓		✓(b)	✓		✓	✓
<i>Causus lichtensteinii</i> (Jan 1859)		✓								
<i>Causus maculatus</i> (Hallowell 1842)						✓				✓

Continued

## Appendix 1 (cont.). Reptiles from the Takamanda Forest Reserve, Cameroon

	Lowland forest sites					Highland sites		Savanna/forest		
	Takamanda	Obonyi 1	Obonyi 3	Kekpane	Basho 2	Mamfe/Bidjan	Matené	Mendé	Atolo	Tinta
Atractaspididae (burrowing asps)										
<i>Aparallactus modestus</i> (Günther 1859)			✓	✓						
<i>Atractaspis irregularis irregularis</i> (Reinhardt 1843)			✓	✓						✓
<i>Polemon collaris collaris</i> (Peters 1881)		✓						✓		✓
<i>Polemon gabonensis gabonensis</i> (Duméril 1856)						✓(b)				