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# THE REPTILES OF THE UZUNGWA SCARP FOREST RESERVE (USFR): AN UPDATED CHECKLIST WITH NOTES ON DAGGER-TOOTH VINE SNAKE *XYELODONTOPHIS ULUGURUENSIS*

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## ABSTRACT

Uzungwa Scarp Forest Reserve (USFR) is one of the largest continuous forests within the Eastern Arc Mountains that has not been surveyed adequately from a herpetological perspective. A herpetological survey was carried out in the USFR at the beginning of the wet season, from December 2014 to February 2015. Bucket pitfall traps, night surveys and opportunistic search methods were conducted in six sites. Of 21 reptile species recorded during the survey, five are reported for the first time in the USFR. The checklist of reptiles for the area is updated from thirty three to thirty eight species. The study also provided notes on reproduction and extension in distribution for *Xyelodontophis uluguruensis,* a snake that was only discovered in 2002 and is known to be restricted to the Uluguru, Nguru and Mahenge mountains. These findings add to the conservation importance of the USFR and calls for more long term surveys especially in the least explored areas.

**Keywords:** Herpetofauna, biodiversity, conservation, Eastern Arc Mountains, Udzungwa

## INTRODUCTION

The Uzungwa Scarp Forest Reserve (hereafter USFR) is one of the largest and species-rich protected areas in the Eastern Arc Mountains (EAM). It covers the southeastern part of the Udzungwa Mountains and lies between 7°39'–7°51'S and 35°51'–36°02'E (Ndangalasi, 2005; MNRT, 2010). The USFR is bordered by Chita River to the south, the Kidete River to the north and the Ruaha, Iwolo and Lukosi Rivers to the west (Ndangalasi, 2005). It stretches between two administrative regions, Morogoro (Kilombero District) and Iringa (Mufindi and Kilolo Districts) (figure 1). The rainfall pattern in the reserve is unimodal starting from November to May and ranges from 1800 to 3000 mm per annum (Shangali *et al.,* 1998; Ndangalasi, 2005). Due to its wide range in elevation (300–2576 m), the USFR is comprised

of a variety of vegetation types that are characteristic of certain altitudinal zones. This wide range of altitude and vegetation plays a significant role in the distribution of reptiles and amphibians (Menegon & Salvidio, 2005). About 21.7% and 53.6% of the reptile and amphibian species found in the USFR are endemic/near endemic to the Udzungwa Mountains and the EAM respectively (Menegon & Salvidio, 2005).

The Udzungwa Mountains biodiversity has attracted a number of researchers over the last few decades, with most of them focusing on flowering plants, birds and mammals (*e.g.* Dinesen *et al.,* 2001). Although the herpetological studies in the area date back to more than 70 years ago (Loveridge, 1933), detailed knowledge on the reptiles of the Udzungwa Mountains was lacking. Several studies have recently revealed new species of reptiles from this area (Broadley & Wallach, 2000; Menegon *et al.,* 2002; Salvidio *et al.,* 2004; Menegon & Salvidio, 2005), indicating the need for more surveys especially in least explored areas. Despite the relatively few recent studies on reptiles, the Udzungwa Mountains are known to harbour a number of endemic, endangered and vulnerable reptile species (Spawls *et al.,* 2004; Menegon & Salvidio 2005; Burgess *et al.,* 2007; Meng *et al.,* 2016). Some of these species occur in the USFR, such as the red-snouted wolf snake *Lycophidion uzungwense* (status unknown, Udzungwa endemic), Usambara bush-viper *Atheris ceratophorus* (Vulnerable, EAM endemic), the spiny-flanked chameleon *Trioceros laterispinis* (Endangered, Udzungwa endemic), Udzungwa viper *Adenorhinos barbouri* (Vulnerable, EAM endemic) and Uluguru forest snake *Buhoma procterae* (Vulnerable, EAM endemic).

While USFR is valued for harbouring large number of EAM endemic species of amphibians and reptiles (Menegon & Salvidio, 2005), it is also one of the most threatened regions of global biodiversity significance (Burgess *et al.,* 2007), with most threats arising from anthropogenic activities (Zilizona *et al.,* 1998; Ndangalasi *et al.,* 2007; Rovero *et al.,* 2010). These threats have been reported for more than a decade (Zilihona *et al.,* 1998), but still the forest is not fully protected (Rovero *et al.*, 2005). However, efforts are underway by the Tanzanian government through the Ministry of Natural Resources and Tourism to upgrade the USFR to a Nature Reserve (Elimoo Mkiramwene, pers.comm). This report is a result of preliminary survey for a MSc project that aimed to explore the least known areas of the USFR from an herpetological perspective.

## MATERIALS AND METHODS

The field survey was conducted in USFR at the beginning of the wet season from December 2014 to February 2015 (table 1). Six sites were selected on the base of elevation and vegetation types (Shangali *et al.,* 1998) (figure 1, table 1). Other factors known to influence reptile abundance and distribution were also considered *i.e.* amount of leaf litter, availability of rotten logs, presence of water bodies and rock crevices. Data were collected both during the day and night using bucket pitfall traps, night transects and opportunistic searches in order to detect the highest number of species. In each site, two bucket pitfall lines were established. One bucket pitfall line consisted of six 20 L buckets and a 26 m long drift fence of transparent plastic sheet 0.5 m high, traversing the line and bisecting each bucket. Two sites were surveyed per month for three consecutive months (table 1). At each site, traps were checked in the morning and evening for eight consecutive days. Also, four 50 m long night transects were set in each site. Each transect was located and marked in advance during the day using neon flagging tape at an interval of 10 m for easy searching during the night. Night searches involved two people each with a head torch, walking along the transect

looking for reptiles from 19:00 to about 22:00 h. In all sites, the two methods were supplemented by opportunistic searching that involved searching for reptiles in their possible hiding places *e.g.* in rotting logs, under stones and along/around water bodies. Also all reptiles that were observed from other locations (apart from the six sites) within USFR during the study were recorded as opportunistic encounters (table 2).

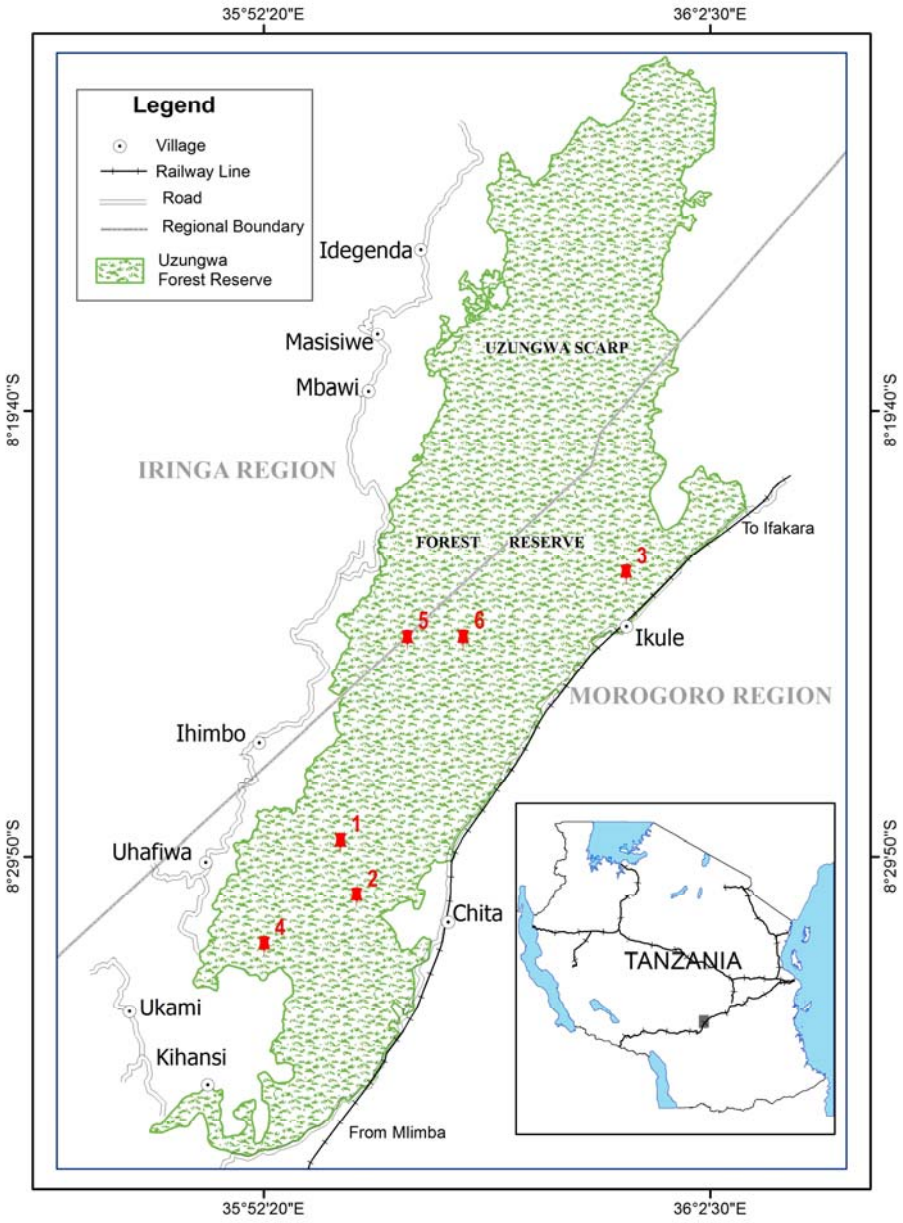


*Figure 1: Uzungwa Scarp Forest Reserve with the six study sites indicated in red.*

*Table 1: Location and main characteristics of the sampling sites within the USFR.*

| Time of survey | Site | Location | Elevation (m) | Main habitats surveyed |
|---|---|---|---|---|
| Dec 2014 | 1 | S08.49226°, E035.90142° | 1429 | Closed canopy forest, riverine, open swamp |
| | 3 | S08.39037°, E036.00979° | 633 | Closed canopy forest near the forest edge, riverine, small patched grasslands |
| Jan 2015 | 4 | S08.53167°, E035.87246° | 1416 | Closed canopy forest, riverine, small swamps |
| | 5 | S08.41489°, E035.92684° | 1596 | Closed canopy forest, small parts of wooded grasslands, small swamps |
| Feb 2015 | 2 | S08.51279°, E035.90757° | 777 | Closed canopy forest, small swamp |
| | 6 | S08.41474°, E035.94809° | 1640 | Closed canopy forest, large swamps, patched mountain grasslands and riverine |

Field guides and keys, especially Broadley (1983), Broadley & Howell (1991), Spawls *et al*. (2004) and Branch (2005) were used for field identification. Species names followed Spawls *et al*. (2004) except for *Xyelodontophis uluguruensis*, which followed Branch (2005). Where the species name/taxonomy has been changed, naming followed Reptile Database (Uetz et al., 2017). Animals that were difficult to identify in the field were preserved in 70% ethanol for further observation and curation. The specimens were deposited at the Department of Zoology and Wildlife Conservation of the University of Dar es Salaam with the accession numbers as shown in table 2.

## RESULTS AND DISCUSSION

A total of 21 reptile species belonging to eight families were recorded during this survey (table 2). Five species (*Boaedon fuliginosus, Varanus niloticus, Hemidactylus platycephalus, Python natalensis* and *Xyelodontophis uluguruensis*) and one family (Varanidae) are reported for the first time in the USFR. These records update the reptile checklist for the area from 33 species (Menegon & Salvidio, 2005) to 38 species. Among the five species recorded for the first time, all except *Xyelodontophis uluguruensis* were found at relatively low elevations (below 700 m). This is in agreement with Spawls *et al*. (2004) who note many reptile species to occur at low altitudes. In contrast, more endemic species are reported to be restricted to the higher elevations (Menegon & Salvidio, 2005). *Philothamnus hoplogaster* and *Atractaspis* cf. *aterrima* were reported from the area by Menegon & Salvidio (2005) and are here confirmed to occur inside the USFR. Nine species recorded in the area before were not detected during this study (table 2). This could probably be due to the relatively short period of data collection for the present study, and because the field survey was conducted only at the beginning of the wet season. Most of the species that are reported for the first time (*Boaedon fuliginosus, Varanus niloticus, Hemidactylus platycephalus* and *Python natalensis*) are widely distributed across the region (Spawls *et al.,* 2004) except *Xyelodontophis uluguruensis*, which was discovered in 2002 and only known from the Uluguru mountains (Broadley & Wallach, 2002; Branch, 2005), Nguru mountains (Menegon *et al.,* 2008) and Mahenge mountains (Menegon *et al.,* 2011). One 1.53 m long individual of *Xyelodontophis uluguruensis* was found basking on understory vegetation along the river in site 1 during this survey (figure 2a). This individual

*Table 2: List of the reptiles of Uzungwa Scarp Forest Reserve based on this study and that of Menegon and Salvidio (2005).*

| Species | Voucher | Site | | | | | |
|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 |
| Gekkonidae | | | | | | | |
| *Cnemaspis uzungwae* Perret, 1986 † | JVL 14015, JVL 14003, JVL14004 | | + | + | | | |
| *Cnemaspis dickersoni* (Schmidt, 1919)* | | | | | | | |
| *Hemidactylus platycephalus* Peters, 1854 | JVL 14020 (Tail) | | | + | | | |
| Scincidae | | | | | | | |
| *Melanoseps uzungwensis* Loveridge, 1942 † | JVL 15029 (Tail) | | | | | | + |
| *Melanoseps loveridgei* Brygoo & Roux-Estève, 1982* | N/A | | | | | | |
| *Scelotes uluguruensis* Barbour & Loveridge, 1928* | N/A | | | | | | |
| *Trachylepis varia* (Peters, 1867) † | JVL 15030, JVL 15022 | | | + | + | | |
| *Trachylepis maculilabris* (Gray, 1845) † | N/A | | | + | | | |
| Chamaeleonidae | | | | | | | |
| *Kinyongia oxyrhinum* (Klaver & Böhme, 1988) † | N/A | Opportunistic from other locations within USFR | | | | | |
| *Trioceros werneri* (Tornier, 1899) † | N/A | Opportunistic from other locations within USFR | | | | | |
| *Trioceros tempeli* (Tornier, 1899) ‡ | N/A | | | | | | |
| *Trioceros laterispinis* (Loveridge, 1932) ‡ | N/A | | | | | | |
| *Rhampholeon moyeri* Menegon, Salvidio & Tilbury, 2002 † | N/A | + | | | + | | |
| *Rieppeleon brevicaudatus* (Matschie, 1892) † | JVL 14007 | | + | + | | | |
| Varanidae | | | | | | | |
| *Varanus niloticus* (Linnaeus, 1766) | N/A | | | + | | | |
| Typhlophidae | | | | | | | |
| *Afrotyphlops nigrocandidus* (Broadley & Van Wallach, 2000) † | JVL 14019, JVL 14018 | | + | + | | | |
| Colubridae | | | | | | | |
| *Boaedon fuliginosus* (Boie, 1827) | JVL 14008 | | | + | | | |
| *Buhoma procterae* (Loveridge, 1922) † | N/A | Opportunistic from other locations within USFR | | | | | |
| *Crotaphopeltis tornieri* (Werner, 1897)* | N/A | | | | | | |
| *Dasypeltis medici* Bianconi, 1859* | N/A | | | | | | |
| *Dipsadoboa werneri* (Boulenger, 1897)* | N/A | | | | | | |
| *Duberria lutrix shirana* (Boulenger, 1894) † | JVL 15025, JVL 15027 | + | | | | + | |
| *Lycophidion capense* (Boulenger, 1893)* | N/A | | | | | | |

| Species | Voucher | Site | | | | | |
|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 |
| *Lycophidion uzungwense* (Loveridge, 1932)* | N/A | | | | | | |
| *Natriciteres variegata* (Peters, 1854) † | N/A | | | | + | | |
| *Philothamnus macrops* (Boulenger, 1895) † | NA | | + | | | | |
| *Philothamnus hoplogaster* (Günther, 1863) ¥ | JVL 14017 | | | + | + | | |
| *Philothamnus semivariegatus* (Smith, 1847) ‡ | N/A | | | | | | |
| *Python natalensis* Smith, 1840 | N/A | Opportunistic from other locations within USFR | | | | | |
| *Thelotornis kirtlandii* (Hallowell, 1844)* | N/A | | | | | | |
| *Thelotornis mossambicanus* (Bocage, 1895) † | JVL 14016, JVL 14010 | | + | + | | | |
| *Xyelodontophis uluguruensis* Broadley & Wallach, 2002 | JVL 15024 | + | | | | | |
| Atractaspididae | | | | | | | |
| *Atractaspis* cf. *aterrima* Günther, 1863 ¥ | JVL 15023 | | | | + | | |
| Viperidae | | | | | | | |
| *Causus defilippii* (Jan, 1862) ‡ | N/A | | | | | | |
| *Atheris ceratophorus* (Werner, 1895) † | JVL15026, JVL15028, | + | | | | + | + |
| *Adenorhinos barbouri* (Loveridge, 1930) ‡ | N/A | | | | | | |
| *Bitis arietans* (Merrem, 1820) ‡ | N/A | | | | | | |
| *Bitis gabonica* (Duméril & Bibron, 1854) ‡ | N/A | | | | | | |

Notes: * means the species was collected by Menegon & Salvidio (2005) but was not collected in this study, † means the species was collected by Menegon & Salvidio (2005) and confirmed by this study, ‡ means the species was reported by Menegon & Salvidio (2005) for the area but outside the USFR (*i.e.* the authors recorded the species from the village belts surrounding the USFR, or as reported more generally for the area from a literature search), ¥ means the species was recorded both as ‡ and by this study

appears far longer than the species holotype (snout–vent length 740 + tail length 407 mm; the total length of the paratype is not available since the tail is truncated near the base (Broadley & Wallach, 2002). Later, an adult female 1.42 m long was killed by local people near site 2, and was found to contain 12 eggs in its oviduct (figure 2b). One of the eggs measured 46 mm long and 14 mm wide. This information adds to our knowledge on the biology of the *Xyelodontophis uluguruensis* since very little is known about its reproduction.

This study provides insights on the biology of the poorly known *Xyelodontophis uluguruensis*, and updates the checklist of reptiles in the USFR. It also extends the known range of *Xyelodontophis uluguruensis* and adds to the conservation importance of the USFR.

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*Figure 2:* Xyelodontophis uluguruensis *from Uzungwa Scarp Forest Reserve; a- specimen from site 1 and b- a preserved specimen collected near site 2 showing eggs in its oviduct.*

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