Traditional indigenous perspectives on soil-dwelling vertebrates in Oku, Cameroon, with special reference to the caecilian *Crotaphatrema lamottei*

THOMAS M. DOHERTY-BONE[1,3], R.K. NDIFON[2] and DAVID J. GOWER[1]

[1] *Department of Zoology, Natural History Museum, London, SW7 5BD, UK.*

[2] *Oku Fon's Palace, Elak-Oku, North West Region, Cameroon.*

[3] Corresponding author: tommy_dbone@yahoo.com

ABSTRACT - The limbless and mostly tropical and soil-dwelling caecilian amphibians (Gymnophiona) are an extremely poorly known vertebrate order. Some species sometimes occur in agricultural settings, where being mistaken for earthworms or snakes and their accidental and purposeful killing are almost the only human cultural interaction yet recorded. *Crotaphatrema lamottei* is a caecilian endemic to the top of Mount Oku, Cameroon, and is poorly known scientifically, with only eight specimens ever having been recorded. Fieldwork in 2008 aimed at finding *C. lamottei* included interviewing people of the native, traditional Oku community who encounter this species while working the soil. Oku people recognise *C. lamottei* and consider it, along with other soil-dwelling vertebrates (Kefa-ntie), harmful to encounter but bad juju to kill. Oku people tainted by encountering *C. lamottei* seek a cleansing potion from a medicine man. The potion is produced in a traditional multi-person ceremony, and is made from ground herbs, palm oil and chicken blood. It is administered by being smeared on the base of the tainted person's thumb and licked off. Following the acquisition of the potion, more *C. lamottei* were presented to the field team by members of the Oku community. Understanding local perspectives can be helpful when researching rarely encountered and poorly known species.

OF the three orders of living amphibians, by far the least is known about the biology of the approximately 180 species of limbless and mostly tropical and soil-dwelling Gymnophiona or caecilians. This applies to all areas of caecilian biology, and is exemplified by knowledge of their conservation biology, where approximately two thirds are categorised as Data Deficient in the IUCN Redlist because of inadequate taxonomic, distributional, and ecological data (IUCN, 2010). Indeed, many caecilian species are known from only one or very few specimen records (Gower & Wilkinson, 2005), and a similar lack of data occurs also for many other soil-dwelling herpetofauna (e.g. Measey, 2006). The Cameroon endemic genus *Crotaphatrema* is typical in many respects, with the three nominal species (*C. bornmuelleri*, *C. lamottei*, *C. tchabalmbaboensis*) known from only 14 specimens, from three point localities (Doherty-Bone et al., 2011). During recent fieldwork at the only known locality for *C. lamottei* (Mount Oku, northwest Cameroon), two of us (TMD-B, RKN) spent time with the local Oku people, a local community with many aspects of their culture still intact (Koloss, 2000). It became apparent that *C. lamottei* was sometimes encountered by Oku people in agricultural soils, and was incorporated into their traditional belief system. We report here on these anthrozoological observations.

METHODS

Fieldwork took place from October to December 2008, in farmland on the northern slopes approaching the rim of the Lake Oku crater. This focused around the Oku settlements of Jikijem and Elak-Oku (see Doherty-Bone et al., 2011), where agriculture consists mostly of mixed smallholdings (including coffee and maize), some small fish ponds and limited amounts of livestock with grazing occurring more intensively on montane grasslands above the settlements.

The main aim of the fieldwork was to locate

specimens of *C. lamottei* in order to improve knowledge on the taxonomy and natural history of this species. Three main methods were applied, pitfall trapping, timed digging surveys and interviews with local people and showing them specimens and photographs of caecilians (Doherty-Bone et al., 2011). In applying the latter approach it emerged that *C. lamottei* was recognised by local people who believed this species to have adverse effects when encountered that could be cured only with a cleansing potion prepared in a ritual led by a medicine man. Given the perception that *C. lamottei* is harmful, local people were reluctant to find and/or collect specimens unless the potion was available. TMD-B and RKN participated in a traditional cleansing potion ritual near Elak-Oku on 1 November 2008 and subsequently administered the concoction to local people as they assisted in searches for specimens. These events were recorded through field notes and photographs. Local people were urged not to harm animals, and this was observed except when digging soil caused accidental injury.

RESULTS

In traditional Oku culture, *C. lamottei* is classified with other burrowing vertebrates including moles (*Chrysochloris balsaci*), scolecophidian snakes (at least *Rhinotyphlops* sp.) and probably other burrowing snakes (e.g. Atractaspididae) under the single term Kefa-ntie (= thing in the ground). Oku people commonly believe that Kefa-ntie can cause degeneration of any limb that contacts these animals, and to kill one (even accidentally) is considered bad juju. The contacted limb reportedly swells up and becomes covered in sores. When women came across Kefa-ntie, they would be unable to return home without taking a specific curative potion produced in a ritual led by a medicine man, in the belief that otherwise their next child would be born with bad luck. Anyone who encounters the animal without potion has to bring the Kefa-ntie to the medicine man. Dried moles and caecilians were often encountered at the hut of one medicine man near Jikijem, these apparently are not incorporated into the potion, but brought to prompt its preparation or administration.

The potion-making ritual that TMD-B and RKN participated in was led by a local medicine man, began in the morning and took a leisurely six hours or so. Several other local men, including a second medicine man, participated in and witnessed the ritual. One woman was present and also took part in the collection of herbs. Women otherwise do not participate in Oku rituals (Koloss, 2000). The ritual was initiated by the medicine man anointing the door frames of a medicine house (nda emkum [Koloss, 2000]) with traditional paint (Fig. 1) before leading the participants into the building. Participants entered in single file holding on to each other's shoulders. Ground green herbs were taken by the participants (Fig. 1) in turn, placed on the base of the thumb of the left hand by the medicine man, and washed down with palm wine. Eggussi (pumpkin seed pudding) was consumed by the participants. The participants sat opposite the "medicine-corner", around a central fire. A clay vessel (Fig. 2, "wine vessel of the juju" [Koloss, 2000]) was filled with palm wine and several whole, empty shells of giant snails (Achatinidae). Palm wine was drunk throughout the ritual, a common social practice among the Oku and other ethnic groups in the region. The medicine man addressed the group and gently cast morsels of eggussi around the room.

The medicine man then led the participants on a short (c. 45 minutes) walk outside to collect herbs (Fig. 1). The medicine man stabbed at the ground with a spear ("spear of the juju" or Egbong emkum [Koloss, 2000]) and threw feathers plucked from a live chicken to indicate which herbs to collect. The party stopped frequently and all the participants were expected to collect herbs at each site and place them in a single woven bag. The contents of an ants' nest were also collected (Fig. 1) and bagged up with the herbs, perhaps based on the belief that ants are ubiquitous and can contact killed animals to beg forgiveness (Koloss, 2000). The party returned to the hut, where the contents of the bag were reduced to ash in a pot on the fire (Fig. 2). The core of the ceremony included the telling of fortunes of the main participants using cowry shells, and then the preparation of the remedy using the ashes from the herbs, palm oil and the blood of a freshly killed chicken (Fig. 2). The concoction was prepared in the

Figure 1. Beginning of potion preparation ceremony. Clockwise from top left: Medicine man anoints the door of the medicine house prior to the group entering. Ground herbs are given to each participant at the start of the ceremony, placed on the base of the left thumb to be consumed. Collection of herbs, which are placed into a bag woven from *Raphia* palms. Contents of an ants' nest are added to the woven bag.

horn of an antelope (Fig. 2; possibly a Bushbuck, *Tragelaphus scriptus*). The resulting paste was kept in the horn and used to cleanse people who encountered Kefa-ntie, administered (Fig. 2) by placing the paste on the base of the thumb of the left hand, to be licked off by the recipient. The killed chicken was cooked and eaten by the participants with fou-fou (maize flour bread).

Following TMD-B and RKN's participation in the ritual, community members were much more forthcoming in presenting caecilians (n = 5), moles (n = 2) and scolecophidian snakes (*Rhinotyphlops* sp., n = 2) to the field team, and in each case the potion was provided to the contributor for cleansing. TMD-B and RKN were also instructed to take the potion and, on one occasion, they were asked by a man to provide an aliquot in a plastic bag so that he could subsequently give it to his wife.

DISCUSSION

Reports of human interactions with amphibians have typically been restricted to frogs (e.g. Tyler et al., 2007), with an increasing literature from Cameroon and western central Africa (Akani et al., 1998; Pauwels et al., 2003; Gonwouo & Rödel, 2008; Mohneke et al., 2010). Human interactions with soil-dwelling herpetofauna have very rarely been documented and the extent of the human cultural interaction with caecilians on Mount Oku is exceptional, though some of the 'interactions' might be based on Oku people confusing *C. lamottei* with other limbless burrowing animals. Other

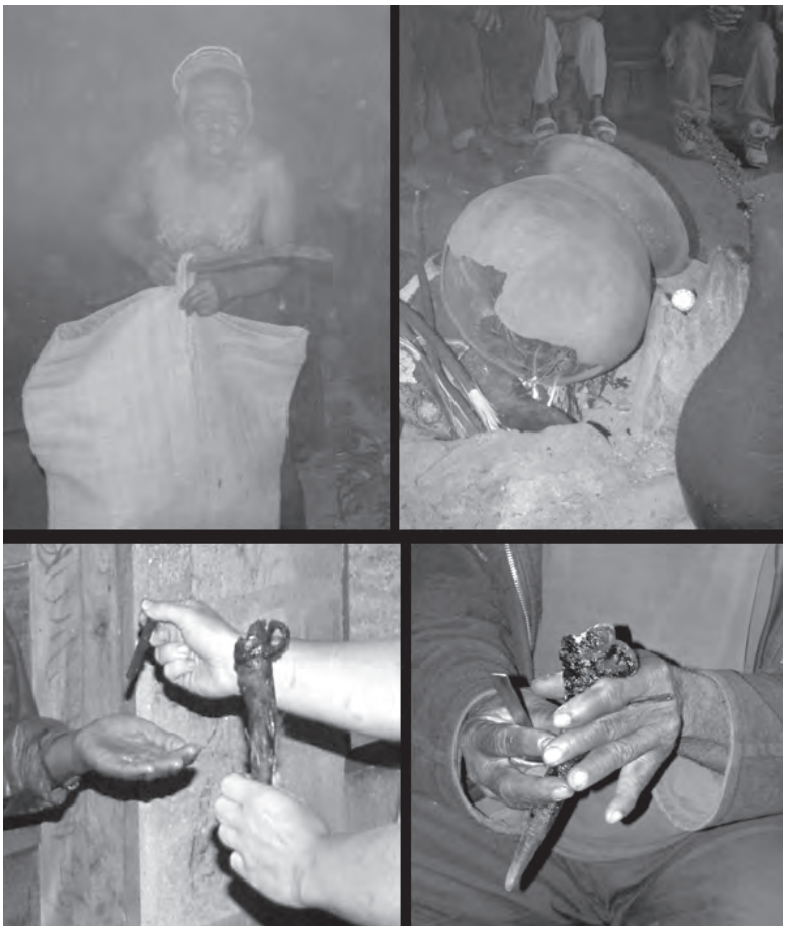

Figure 2. End of potion preparation ceremony. Clockwise from top left: Medicine-man receives bag containing collected herbs. Herbs are burned to ash. Ashes are gathered, placed into an antelope horn and mixed with palm oil. A freshly slaughtered chicken is bled (below) onto the horns with blood also mixed into the powder and oil. The resulting potion is provided to a member of the Oku community who has presented a caecilian to the fieldworkers and wishes to be cleansed of the bad juju.

reports of human perceptions of, and interactions with, caecilians are very rare and light on detail. Where humans and caecilians interact, the latter frequently seem to be viewed as snake-like and potentially dangerous, to the extent that they are routinely killed, such as occurs in agricultural communities in Kerala, India (Gower & Wilkinson, 2005; Ramachandran & Oommen, 2008). Other than exceptional cases where special conservation effort and education is carried out (e.g. for the Kenyan *Boulengerula niedeni*, see Wojnowski & Malonza [2009]), perhaps the best that can be hoped for the conservation of caecilians in many

human-modified habitats is that they are mistaken for harmless (perhaps even beneficial) earthworms. Where caecilians tolerate human disturbance, they can even be found in dung and compost heaps (e.g. Nussbaum & Gans 1980), and this is possibly the source of stories that they enter the anus of humans (Campbell, 1998) or domesticated animals (Taylor, 1968).

It is likely that, as with many frogs and salamanders, the skin secretions of most or all caecilians are toxic to some degree (e.g. Moodie, 1978; Toledo & Jared, 1995; Schwartz et al., 1999) and those of at least one East African scolecomorphid have been recorded as irritating to humans (Measey & Turner, 2008). Descriptions by Oku people of swollen limbs following contact with Kefa-ntie bear a resemblance to pathologies of envenomation by mildly venomous snakes. Mildly venomous burrowing snakes of the family Atractaspididae do occur in the Oku area (Chirio & LeBreton, 2007), and there has been at least one documented occasion where one of these snakes envenomated an individual who had mistaken it for a harmless scolecophidian snake (Durrell, 1954). We, however, suspect that the mistrust of *C. lamottei* on Mount Oku is as likely attributable to beliefs about the uncleanliness of soil-dwelling animals more generally (e.g. Koloss, 2000) than evidence among local people of unpleasant interactions with this caecilian.

The understanding of Oku local beliefs by field workers proved to be vital for observing a very rarely encountered species of amphibian. Only two specimens of *Crotaphatrema lamottei* were located by field workers without assistance from local donations. The utilisation of local knowledge is not a novel technique for carrying out scientific studies of rarely encountered soil-dwelling herpetofauna (e.g. Loader et al., 2004; Gower & Wilkinson, 2005), but this study's engagement with Oku perspectives and customs has added another dimension to the potential importance of local knowledge.

ACKNOWLEDGEMENTS

We thank Fai Mankon and associates for conducting the cleansing ceremony for the field workers. Thanks are due to Gonwouo Nono LeGrand, Simon Loader, Oscar Ndifon Nyingchia, Henry Kolem, David Ndifon, Devine Fotibu, Matthew LeBreton, Khimal Peter Yumhil, Marcel Talla Kouete and Mark Wilkinson. Fieldwork was funded by the Natural History Museum, London, The Royal Zoological Society of Scotland and an Erasmus Darwin Barlow Award to TMD-B from the Zoological Society of London. Permits were provided in Cameroon by the Ministry of Science and Innovation, Ministry of Forests and Wildlife and local forest management institutes. Gratitude is expressed to the many members of the Oku community who helped with our study.

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