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Chapter 9

Rapid Survey of the Small Mammals of Ajenjua Bepo and Mamang River Forest Reserves, Ghana

Patrick Barrière, Violaine Nicolas and Lokko Kwaku Oduro

SUMMARY

Small mammals (shrews, rodents and bats) were surveyed in the Ajenjua Bepo and Mamang River forest reserves of eastern Ghana. A total of 128 specimens belonging to at least 18 species were recorded including five species of rodent, six species of shrew and seven bat species. Within Ajenjua Bepo, six shrew species were recorded including four forest species. Despite the high degree of disturbance of the secondary forest, three specimens of *Crocidura muricauda* were collected. Only three species of murid rodents were collected, with two forest species (*Malacomys edwardi* and *Praomys tullbergi*). Six pteropodid bat species and a single insectivorous bat species were recorded. Several of these species were forest-dwelling species. Within the Mamang River Forest Reserve, five or six shrew species were collected, the dominant species being the forest-dwelling *Crocidura obscurior*. With a similar trapping effort as at Site 1, a higher number of specimens (39) and species (5) of rodents were recorded within Mamang River. The forest-dwelling *Praomys tullbergi* was dominant. Only four specimens of a single forest-dwelling bat species (*Myonycteris torquata*) were recorded within the forest, most likely a result of weather conditions during surveys. Both species richness and species abundance of the forest shrew and murid rodent species point to a higher conservation potential of Mamang River than Ajenjua Bepo. Mamang River appears to present better conservation value due to 1) its larger size, 2) the absence of plantations within Mamang, and 3) the more structured arboreal vegetation within Mamang probably providing more fruit and leaf litter.

INTRODUCTION

Small mammals (shrews, rodents and bats) were investigated to assess the biodiversity of Ajenjua Bepo and Mamang River forest reserves, in the Birim North District of the Eastern Region of Ghana, on the Right bank of the Volta River.

Small mammals are considered to be good bio-indicators of habitat because of their short lifespan, rapid population dynamics and low level of pressure on their populations as a result of hunting in comparison to larger mammals (shrews are never hunted because of the strong, unpleasant smell of their flank glands). They are also good bio-indicators because of the diversity, in tropical Africa, in terms of species and habitat preferences (Barrière et al. 2006).

SAMPLING METHODS AND STUDY SITES

In each of the two forest reserves, terrestrial small mammals (shrews and small rodents) were sampled mainly with pitfall and Sherman traps, and flying small mammals (bats) with mist nets. The pitfall trapping protocol follows Nicolas et al. (2003) except for the number of buckets per line as the number of available buckets was limited to 25. Two types of Sherman live traps were available: 112 Large Fording Aluminum (LFA) and 26 Small Folding Aluminum (SFA). Large Sherman traps were set at the ground level, in line, 10 m apart and small traps were set 5 m apart on combined or distinct lines, or even on lianas up to 3 m above the

ground. All Sherman traps were baited with palm nut that was changed, if necessary, after three trap-nights. At each site, pitfall and Sherman traps were set between 4-5 nights and checked once a day, early in the morning. Six and ten m-long mist nets were set in open areas, opened at 18.00 h, checked every 30 or 45 minutes until 24.00 h and finally checked and closed at 06.00 h. In addition, some glue trap stations were set on lianas to sample potential scansorial (climbing) species.

Site 1: Ajenjua Bepo (Camp coordinates: N 06° 22' 2.3", W 01° 01' 58.6")

The RAP scientific team arrived at the camp on 24 August 2006 in the evening and left on the 30 August 2006 in the morning. The area consisted of a network of mixed plantation banana-cassava plantations, of cacao plantations, and of a degraded secondary forest with open canopy, quite low and very dense understory with many lianas, and low leaf litter depth. In the secondary forest, the slope was high, the mineral ground was composed of silt and rocks, and all the small rivers and streams were dry. Moreover, the availability of fruits seemed very low. Pitfall trapping effort was 50 bucket-nights in secondary forest and 60 bucket-nights in included plantation, Sherman trapping effort was 628 trap-nights in secondary forest and 28 trap-nights in included plantation, and mist-nets totaled 360 m² net-hours in secondary forest and 2,700 m² net-hours in included plantation at the forest edge. Finally, 14 glue trap stations were set for the last two trapping nights.

Site 2: Mamang River (Camp coordinates: N 06° 15' 0.2", W 01° 02' 25.7")

The RAP scientific team arrived at the camp on the 30 August 2006 in the evening and left on the 5 September 2006 in the morning. The area consisted of secondary forest, bordered at its periphery by cacao and palm tree plantations, with the canopy height and cover similar to that at Site 1, but with an additional strata above the understory. The latter was higher and more open than at Site 1, with greater leaf litter depth and fruit availability. The slope was low, the mineral ground was sandy west of the camp, close to a dried river, and sandy-rocky east of the camp.

In the secondary forest, pitfall trap collecting effort consisted of 115 bucket-nights, both on sandy and rocky ground. Sherman trap collecting effort consisted of 635 trap-nights, and mist net collecting effort consisted of 2970 m² net-hours. Finally, 40 glue trap stations were set for the last two trapping nights.

After each trap checking session in the late morning, voucher specimens were identified, sexed, weighed and measured. A tissue sample was collected and preserved in ethanol for each specimen that was then eviscerated for a better preservation in 10% formalin. The final species identification of several shrew and small rodent taxa will require the preparation of the skulls and a precise expertise in crania-dental characters. This will be performed by P.B. at the Station Biologique de Paimpont (Soricidae), Violaine Nicolas at the MNHN Paris (Muridae) and Jakob Fahr at

the University of Ulm (Rhinolophidae). As the taxonomy of several sorcid and murid species are particularly problematic and subject to systematical revision (Querouil et al. 2005; Nicolas et al. 2005, 2006), several specimens of these taxa may be analyzed molecularly in order to confirm morpho-anatomical identification. For rodents, the identification of all specimens of the genera *Praomys*, *Lemniscomys*, *Malacomys* and *Mastomys* has been confirmed by molecular data.

RESULTS

Ajenjua Bepo

Shrews: Despite a reduced trapping effort and unfavorable dry season for sampling these terrestrial small mammals, 28 specimens of at least six species were captured (see Table 9.1, Appendix 9). Four species are forest species (*Crocidura crossi*, *Crocidura jowenetae*, *Crocidura muricauda*, *Crocidura obscurior*), and it is interesting to note that despite the high degree of disturbance of the secondary forest, three specimens of *Crocidura muricauda*, a species known to be abundant in the Taï primary forest (Côte d'Ivoire, Barrière et al. 1999), were collected. The dominant species were the ubiquitous *Crocidura olivieri* and *Crocidura buettikoferi*, which are known to have an ecological preference for open habitats within the rainforest.

Small Rodents: Only 14 specimens and at least three species of murid rodents were collected at Site 1. Two forest species (*Malacomys edwardsi* and *Praomys tullbergi*) were found in secondary forest and the savanna species *Mus Nannomys* sp. was recorded in both adjacent plantations and secondary forest. No other forest taxa previously recorded from southwestern Ghana (Decher et al. 2005) were collected here, which confirmed the high level of forest degradation.

Bats: In total, 15 specimens, six pteropodid bat species and a single insectivorous bat species, were recorded in Site 1. Most fruit-bat species are forest dwelling species, except *Lissonycteris angolensis* and *Rousettus aegyptiacus* that are ubiquitous.

Mamang River

Shrews: With a similar pitfall trapping effort as at Site 1, 28 specimens and five to six species were collected at Site 2. The identification of one specimen is uncertain and requires additional molecular and cranio-dental analyses to confirm the potential presence of *Crocidura douceti* at this site. Unlike Site 1, the dominant species was the forest-dwelling *Crocidura obscurior*, which indicates a decreased level of forest degradation. *Crocidura buettikoferi* was the second most abundant species at this site.

Small Rodents: With a similar trapping effort as at Site 1 (even lower), a higher number of specimens (39) and species (5) were recorded within Mamang River. The forest-dwelling *Praomys tullbergi* was dominant, which confirmed the lower level of forest degradation at Site 2. One individual

of an additional murid rodent species (the savanna-dwelling *Lemniscomys striatus*) was collected outside the forest, in a nearby village.

Bats: Despite thorough efforts in setting mist nests and a serious trapping effort, several rainy nights prevented opening the nets for a significant time. Consequently, only four specimens of a single forest species (*Myonycteris torquata*) were recorded within the forest.

Discussions with local inhabitants indicated that, in the surveyed area, even if local people generally ignore the existence of several species within the main families and genera of small mammals, they do distinguish general morphotypes and confirm the hunting/consumption of several species. Local inhabitants confirmed that shrews (“Ofiam”, in Twi language) were neither hunted for consumption nor killed for other reasons. Conversely, each mouse morphotype (“Akura”) seems to be hunted and consumed, from the forest *Praomys* morphotype (“Kron Kron”) to the savanna *Lemniscomys* (“Apotokura”). Within the Chiroptera (“Ampam”), fruit-bats (“Hwene Kron”) seem to be more frequently hunted and eaten than insectivorous bats only because of their larger size.

Table 9.1. Small mammal species, and number of specimen per species, recorded during the 2006 Ajenjua Bepo/Mamang River RAP survey, Ghana.

	Genus	Species	Ajenjua	Mamang
Rodents				
	<i>Lemniscomys</i>	<i>striatus</i>		1
	<i>Malacomys</i>	<i>edwardsi</i>	8	4
	<i>Mastomys</i>	<i>erythroleucus</i>		1
	<i>Mus</i>			
	<i>Nannomys</i>	sp.	3	6
	<i>Praomys</i>	<i>tullbergi</i>	3	27
Shrews				
	<i>Crocidura</i>	<i>buettikoferi</i>	8	9
	<i>Crocidura</i>	<i>crossi</i>	1	
	<i>Crocidura</i>	<i>jouvenetae</i>	2	5
	<i>Crocidura</i>	<i>muricauda</i>	3	2
	<i>Crocidura</i>	<i>muricauda</i> or <i>douceti</i>		1
	<i>Crocidura</i>	<i>obscurior</i>	5	10
	<i>Crocidura</i>	<i>olivieri</i>	9	1
Bats				
	<i>Epomops</i>	<i>franqueti</i>	2	
	<i>Hypsignathus</i>	<i>monstrosus</i>	1	
	<i>Lissonycteris</i>	<i>angolensis</i>	1	
	<i>Myonycteris</i>	<i>torquata</i>	3	4
	<i>Nanonycteris</i>	<i>veldkampii</i>	2	
	<i>Rousettus</i>	<i>aegyptiacus</i>	1	
	<i>Rhinolophus</i>	<i>alcyone</i>	5	

DISCUSSION

As several small mammals belong to problematic species complexes, the preparation of the skulls and expertise in identifying cranio-dental characters are necessary to obtain the final species list for both sites. At the present state of species identification, no threatened species or species new to science have been identified. At least four species of shrews (*Crocidura buettikoferi*, *Crocidura juvenetae*, *Crocidura Crocidura muricauda*, *Crocidura obscurior*) and two murid rodent species (*Malacomys edwardsi*, *Praomys tullbergi*) are endemic to West African rainforest. It is interesting to note that a single savanna murid rodent species (*Mus* sp.) was recorded at each site, except the single *Lemniscomys striatus*, which was collected outside the Mamang River Forest Reserve boundaries. Rodent and bat species richness was lower in Ajenjua Bepo and Mamang River than recorded previously in southwestern Ghana (Decher et al. 2005). Additional sampling is necessary to complement the present inventory and to test if these differences are due to sampling bias or to real differences.

CONSERVATION RECOMMENDATIONS

Both species richness and species abundance of shrew and murid rodent communities point to a higher conservation potential of Mamang River than Ajenjua Bepo. Forest species were more abundant in Mamang River than in Ajenjua Bepo. Mamang River appears to present better conservation value due to 1) its larger size, 2) the absence of plantations within Mamang (the presence of plantations within a forest reserve can allow penetration of anthropogenic species that compete with forest fauna), and 3) the more structured arboreal vegetation within Mamang providing more fruit and leaf litter.

Further sampling effort should be undertaken, especially in Mamang River, during the rainy season and for a longer time period in order to have a better knowledge of the small mammalian communities and of the rarest species.

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