# MAMMALWATCHING IN GHANA

With notes on birding, 18 Nov - 3 dec 2021

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With photographs and recordings of Jurriën van Deijk, Daan Drukker, Jacob Lotz and Ruben Vermeer



Upper left: Blue-moustached bee-eater, Nsuta (DD). Upper right: Beecroft's Anomalure, Nsuta (JvD). Lower left: Spot-nosed Monkey and Tantalus Monkey, Shai hills (DD). Lower right: Green Bush Squirrel, Kakum NP (DD), same as on <u>this recording</u>.

Front page: Pardine Genet, Mole NP (JvD)

## Introduction

This report focuses on the mammalwatching part of our birding and mammalwatching trip to Ghana. Our crew consists of Jacob Lotz, Jurriën van Deijk, Ruben Vermeer and myself, Daan Drukker. We are fanatic in both birding and mammalwatching, and combined this as well as possible. I will give some info and lists about birds, but mainly focus on the mammals. For birding I highly recommend the report by <u>Sjoerd Radstaak</u> (2021), which we ourselves used intensively.

This trip had a lot of "firsts" for me. Above all, it was my first trip to the tropics, and for all of us, it was our first experience with the rainforests of the Afrotropics. We have been to Morocco, but that was very Palearctic in almost every way. This was also the first time we travelled and birded with a local guide, as up till now we were always able to arrange things and recognise species on our own during trips. The obvious other "firsts" were the 38 new mammals and 350 new bird species. In total, the four of us observed **41** mammal species (**+3** only identifiable to genus level) and **401** bird species.

Our guide was Kalu Afasi, founder of Malimbetours. Kalu is an excellent bird guide, with very sharp eyes and ears, and great knowledge of all the spots. Accommodation, transport and food were very decently arranged by Malimbetours. For Kalu it was his first time guiding people who were such fanatic mammalwatchers, and though his knowledge on mammals and many mammal sounds is more than good, he is used to mammals being "bycatch". It is therefore recommended that if you want to see certain mammal species, you put some extra effort in finding the best exact locations, and communicating well that some mammals are very important to you. More on that in the chapter "How to see more than us".

## GENERAL INFORMATION ABOUT GHANA AND THE REGION

Ghana is a great country to connect with the Afrotropics, as it is relatively well-organised, with good infrastructure (although it was very easy for us as our driver Godwin was very experienced), and accommodation with showers and sometimes WiFi. The southeastern part of Ghana holds still some good patches of rainforest, while the rest is in the savanna zone, with some nature reserves here and there. In the far north the savanna gradually becomes the Sahel.

Ghana holds no endemic birds and one endemic mammal species, the Ghana Mole Rat *Fukomys zechi*. This mole rat is endemic to the Dahomey Gap (might be present in Togo as well?), which brings me to the drivers of endemism in the region. There are no mountains in Ghana, but the hills bordering the Volta basin in combination with the part of the coastline that lies parallel with the moist southwesterly winds cause a sudden "gap" within in the Guinean rainforest zone. This is called the "Dahomey Gap", a savanna zone that separates the so called Upper Guinean Forests from the Lower Guinean Forests and the Congo Basin. This is all illustrated in the map below:



In both the Upper Guinean Forests and the Dahomey Gap, there are mammal species which only occur in those regions respectively. Many of these occur in Ghana, but some Upper Guinea Forest endemics are confined to the mountains of Sierra Leone and Liberia and therefore do not occur in Ghana. For birds less important, but for mammals a lot more, is the presence of large rivers. The two most important rivers that are drivers for speciation in the region are the Volta and the Niger. While the Volta is some kind of extra barrier within the Dahomey Gap, the massive Niger is thought to cause a division between the Western and Eastern Savanna and Sahel. This information enabled me to classify the target list (p. 20) into several levels of endemism. Keep in mind that I have done this without years of research and that it therefore might be susceptible to mistakes:

Table 1: Levels of endemism used in this text. In orange the more restricted zones possible to visi	it in
Ghana	

Code	Name	Explanation			
0.W.	Old World	Species also occurs outside Africa, in e.g. Europe or Asia			
А	Africa	Species only occurs in Africa (including the northern part)			
ARF	Afrotropic Rainforests	Species only occurs in the African Rainforest zone			
GUI	Guinean Forests	Species only occurs in the Guinean Rainforests			
UPGUI	Upper Guinea Forests	Species only occurs in the Upper Guinea Forests			
DAHOMEY	EY Dahomey Gap Species only occurs in the Dahomey Gap				
WESA	Western Sahel/Savanna	Species only occurs in the western part of the savanna or sahel			

In Ghana you have to take the rainy season(s) into account when planning your trip. According to Kalu, the best time of year for birds are the months after the large rainy season, i.e. November to March. It might be that mammals in the savanna are easier to find in the later half (February-March), as the grass is shorter than.

## **ITINERARY**

Kalu provided our itinerary, in which we made some slight changes, although in hindsight we should have changed a bit more in favour of mammalwatching, but for that see that chapter. In the next section I give a short overview of our route. Furthermore I have provided links to the pages on Observation.org showing the photo's that dit not make it into this report, as well as observations, sound recordings and photo's made by other birders and mammalwatchers. We arrived in the evening of the 18<sup>th</sup> of November 2021 and went directly to a hotel near the <u>Shai hills</u>, where our actual trip started on the 19<sup>th</sup>. After this first savanna experience, we went west and exchanged the

savanna for all kinds of rainforests. We spent a few days at <u>Kakum NP</u> and its surrounding farmbush, before going further west to Wassa and Nsuta, eventually to reach <u>Ankasa</u>. Making several stops on the way back at several wetlands, we went north, crossing the Pra river for Rock Pratincole and eventually getting to the Bonkro forests for the Picathartes. Our journey continued northwards and via the <u>Boabeng Fiema</u> Monkey sanctuary we went to <u>Mole NP</u>. This meant that we were really back in the savanna and left the rainforest. We went back to the rainforests after a few days when we spent the night at the <u>Bobiri Butterfly sanctuary</u>. We flew back to Amsterdam in the evening of the 3<sup>rd</sup> of December, so that we were able to bird at least for half a day at the <u>Atewa</u> hills. We did not go east of the Volta. For birds there are only a few extra targets there, but we did not know that there were many more mammal species to be seen. In the map on the next page, all locations visited are noted, our route in red and the names and dates of our accommodations in black. In orange I have noted some extra locations that might be worth visiting for extra mammal species.



Map of our itinerary. Red line: our route. Red letters: places we visited. Black letters: names of our accommodations, the numbers indicate the dates we stayed at these accommodation. Orange dots and letters: potential extra locations for me species of mammals.

Entrance fees must be paid at most of the parks, so if you are not travelling with a guide, here are the locations of the entrance: Shai: 5.8837, 0.0388, Kakum: 5.3496, -1.3841, Ankasa: 5.2152, -2.6509, Picathartes: 6.1248, -1.3277, Boabeng Fiema: 7.7085, -1.6955, Mole: 9.2419, -1.8444.

## EQUIPMENT AND OBSERVATIONS

The only item we forgot to bring was a ruler of any kind, to make measurements for reference. We did not bring life traps or bat detectors on this trip, but we had a lot of other devices to look for mammals. Our usual birding gear consists of binoculars, DSLR camera with 400 mm telelens and one telescope for the four of us. One telescope is recommended as there is a lot of walking and that way you can easily share the weight. I also took my sound recorder, which I used a lot, also for mammal sounds (Sony PCM M10). My <u>recordings of mammals can be</u> <u>found here</u>. Last but not least, we brought stuff for spotlighting. Every one of us had a Nitecore P30 torch, but I attached mine to my thermal scope, the Keiler 13. It was the first time I used my thermal scope outside Europe



Construction I made to combine my torch with my thermal scope. See text for advantages.

and it worked surprisingly well in the rainforest to find mammals and birds in the dark (in the savanna it worked remarkably less), especially in combination with just normal spotlighting by my friends. The most productive way my thermal-spotlight combo worked was to turn the torch on in a low strength while looking through the thermal scope while walking, so that you can see where you put your feet. Another way was by only illuminating your torch at the moment you found something, as not to disturb the animal as little as possible, but this was only possible on smooth roads. The thermal scope helped us find cool species like several **Demidoff's Dwarf Galago's, Flat-nosed Hylomyscus, Beecroft's Anomalure** and **Nagtglas's African Dormouse**, as well as some very hard to see species of bird, like **White-bellied Kingfisher, Red-billed Dwarf Hornbill, Latham's and Ahanta Francolin** and **Fraser's and Akun Eagle Owl**. A roosting **Blackcap Illadopsis** was found by Kalu with the spotlight. It was the only roosting bird we did not discover with the thermal scope, but a very hard to see bird indeed! We noted all mammals via ObsMapp on Observation.org with exact gps-coordinates. Note that Red-listed species tend to be obscured and that on the new site at this time, their names are often not even visible. This new site is under construction, but

Ghana.observation.org still runs on the old version and therefore it is still possible to see more there anno 2021. All our 180 mammal observations can be found <u>here</u>. Our total of 2463 (and still growing) observations, including birds, reptiles, dragonflies, butterflies etc. can be found <u>here</u>, and most of our photos <u>here</u>. Sound recordings <u>here</u>. We like to share our documentation of the species and that resulted in 230 photographed species of birds, 30 sound recorded species of birds, bringing the total of documented bird species to 255 d.d. 1 January 2022 (more might follow). For mammals we did the same thing. <u>This resulted in 33 mammal species being photographed</u>, 6 being sound recorded and this brings the total to 34. Only 7 species not documented (Four-toed Hedgehog, Clawless Otter, Kintampo Rope Squirrel, Crested Porcupine, Hartebeest, Waterbuck and Yellow-winged Bat). Aside from pictures, we also made lots of movies, of which a compilation is available <u>here</u> (including a beautiful Forest Giant Squirrel at min. 12:50).

## TAXONOMY

For this report I follow the rather split-happy Illustrated Checklist of the Mammals of the World. Personally I enjoy looking for minute differences, but it is nice to know where to pay attention to beforehand. That is why I wrote down some of the differences between the recently split taxa of which at least one occurs in Ghana **Cercopithecus** -monkeys (diana): If you are the extremely lucky person who sees a Diana Monkey in Ghana, you will know that you are looking at the taxon *roloway* a.k.a. the Roloway Monkey. If I understand correctly *roloway* has a longer beard, a longer white eyebrow and less white on the upper side of the thighs compared to the "real" *diana* occurring west of the Sassandra river in Ivory Coast. The hinder part of the thighs are orange in *diana* and white in *roloway*.

*Cercopithecus* -monkeys (mona): The most common monkey of Ghana will be called the onomatopoeic "Mona Monkey" by everyone. However, only the population east of the Volta is the actual Mona Monkey *C. mona*, while everything west of the Volta is now called the Lowe's Monkey *C. lowei*. The difference between the two is remarkable when you know where to look, as the *mona* has a conspicuous white spot on the thighs just below the tail, which is missing in *lowei*. The colouration of belly and cheeks is more white, while the brown on the dorsum is more intense in *mona* compared to *lowei*. Hybrids may occur, but we did not see any candidates. I find the difference between Lowe's and the extralimital Campbell's Monkey *C. campbelli* a little more difficult. The easiest way to separate *campbelli* -that replaces *lowei* west of the Sassandra in Ivory Coast - from *lowei* is their lighter colour of their cheeks (grey in *lowei*). The sounds of the three species might also be different.

*Chlorocebus* -monkeys: In the savanna areas, you will be able to find olive coloured monkeys. The taxonomic situation is complex. There are two species in Ghana. According to Booth (1956) and Grubb et al. (1998) the Tantalus Monkey *C. tantalus* occurs east of the White Volta and on the Accra plain, while the Green Monkey *C. sabaeus* occurs west of the White Volta. Nowadays, the monkeys are mostly seen in Mole and the Shai Hills. This would mean that in Mole, the species is Green Monkey *sabaeus*, while in the Shai Hills. This would mean that in Mole, the species is Green Monkey *sabaeus*, while in the Shai Hills it is *tantalus*. That might be confusing, as the Shai hills are west of the Volta. The difference between the two is that *sabaeus* has a golden yellow tail tip (black in *tantalus*), that the cheeks are more yellow in *tantalus* and that the white eyebrow is much more pronounced in *tantalus*. The eyebrows of the specimens in Shai were indeed more pronounced and the tails <u>are visible on our films</u> (not very saturated, but light). On photos on iNat and Obs.org however, these tails seem to be a little bit yellowish, which might mean that there is some *sabaeus*-influence on the Accra plain. To make things even more complicated, I saw a black tailed specimen at Mole (but the eyebrows were not very pronounced).

Tantalus Monkey, Mole (JvD), Green monkeys (and tantalus-look-a-like), Mole (DD) and Lowe's Monkey, Boabeng (JvD)



*Heliosciurus* -sun squirrels: The Small Sun Squirrel *H. punctatus* is split from the Gambian Sun Squirrel *H. gambianus*. They are easily separated by their colour, as *punctatus* is dark grey with a little brown on the dorsum, while *gambianus* is lighter, olive grey on the dorsum and head. Especially the belly of *gambianus* is more white. Their ranges are different too, as *punctatus* only occurs in the rainforests, while *gambianus* is a species of savannas.

Left: Gambian Sun Squirrel, Mole (JvD). Right: Small Sun Squirrel, Kakum (DD).

Note the difference in colour of the belly, but also the rest of the body.



**Dendrohyrax -tree hyraxes:** Fresh from the press, Oates et al. (2021) describe a new species of tree hyrax that occurs east of the Volta up to the Niger river, the Benin Tree Hyrax *D. interfluvialis.* This animal sounds totally different from their relatives west of the Volta, the Western Tree Hyrax *D. dorsalis.* See further the text in chapter "targets".

*Loxodonta* -elephants: Just to let you know there is uncertainty to which taxon the West-African elephants belong to.

**Alcephalus -hartebeest:** ICMW splits the estern African *major* hartebeests from the others. The external differences are not too clear to me, but they are lighter and more plain than the southern species.

**Philantomba -duikers:** Be aware that if you see a Maxwell's Duiker east of the Volta, this should concern a Verheyen's Duiker *P. walteri*. The real Maxwell's Duiker *P. maxwelli* occurs in the rest of the southern half of Ghana. I have no idea how to tell them apart.

*Kobus* -waterbucks: The taxonomy here is far from resolved, but two groups are treated by ICMW as separate species. In Ghana, the waterbuck is now called Defassa Waterbuck *K. defassa*, characterised from Southern and extremely Eastern African *K. ellipsiprymnus* by the lack of the conspicuous white circle around the butt. The white on the rear end of *defassa* is more extensive and reaches to the tail.

*Kobus* -kobs: Also the kobs have been under a taxonomic magnifying glass, but as the nominate occus in Ghana, there is no need for confusion, except that the common name now sometimes is Buffon's Kob. I have no idea how to separate it from the kobs east of the Niger river.

**Genetta** -maculated genets: The Pardine Genet *G. pardina* is split from the Maculated and Blotched Genet *G. maculata* and *G. tigrina* that occur east of the Volta. You can find *pardina* at Mole, but in the south of Ghana, you have to beware of the "King". Although the King Genet *G. poensis* is only known from museum specimens and last recorded in 1946 according to IUCN, there might still be a chance of finding it in the rainforests. It should have spots that are fused into lateral stripes judging from the drawing in ICMW.

## Targets and species observed

My main targets for this trip mammalwise were Slender-tailed Squirrel, Black-bellied Pangolin, White-bellied Pangolin and **Pel's Anomalure**. Of these, we only managed to see the latter, but I consider that as a logical consequence of trying to combine birding and mammalwatching, together with some inexperience in the tropics (and of course luck plays a role). I hope to help the reader in succeeding with this target list as well as a chapter at the end on how to see more than us.

There are many other target species that for example have a restricted range or look spectacular, and therefore I treat all species that are somewhat possible in the section below, as they in fact can all be considered as "targets". They would all be new for me anyway. In **bold** are the species that we have seen on our trip. I've included the link to the observation in case of a sound recording or identification remarks. You can find all the exact locations in our observations online, but in addition I gave some GPS-coordinates of park entrances in the text below, and for specific locations, I also put GPS-coordinates in the trip list notes. In total the four of us noted **41** mammal species.

#### NOCTURNAL PRIMATES

Four species of nocturnal primates are possible in Ghana. The **West-African Potto** is quite common in the rainforests and can be found thanks to its reflecting eyes at night. The eyes of the galago's also reflect, but for these the situation is a little more complicated. In Mole and the rest of the savanna zone, the **Northern Lesser Galago** can be found jumping around bushes, while in the rainforests, there are two possibilities: **Demidoff's Dwarf Galago** and Thomas's Dwarf Galago. Both are most easily found by their crescendo calls, those of the very rare Thomas's are much higher pitched and more often repeated than those of the commoner and lower living <u>Demidoff's</u>. They can be located by their sound, and then by spotlighting or with the thermal scope. Thanks to the <u>recordings</u> of prof. Simon Bearder and his colleagues we were able to identify all our 15 observations as Demidoff's. Make sure to get decent photographs of the facial markings or – even better – recordings of the calls. Also the calls of the Northern Lesser Galago could be interesting, as there is a suspicion of cryptic diversity.

#### **DIURNAL PRIMATES**

Chimpanzees are thought to be extirpated from Ghana, but there are many other very interesting monkeys to be found! The Volta forms a barrier between several closely related species, such as Green and Tantalus Monkey in the savanna zone and Lowe's and Mona Monkey in the forest zone. Lowe's Monkey was common in the rainforest zone, we saw and heard them at Boabeng, Ankasa and Kakum. The Green Monkeys were common at Mole, while the Cholorcebus at Shai were Tantalus. See the chapter "taxonomy" for more information about the monkeys, as we saw intermediate specimens with influence of both species. Olive Baboons were common in both Mole and Shai. Common Patas Monkey can be found at Mole. White-naped Monkey in the southern belt, we saw it in Shai, but they can also be found in the rainforests. An interesting range restricted species is the White-thighed Colobus. This beautiful monkey occurs on both sides of the Volta, but does not extend very much in either Ivory Coast or Nigeria. It is vulnerable and can be found in woodland and rainforest. After a very unsatisfactory heard-only at Kakum, we saw them at the Boabeng Fiema Monkey Sanctuary, where they are wild, but not shy at all. You can access the sanctuary for a small fee, and the entrance is at this location: 7.7085, -1.6955. White-naped Mangabey and Roloway Monkey (sometimes considered a subspecies of Diana Monkey, also an Upper Guinea endemic) are very rare apparently. There is a possibility that Miss Waldron's Red Colobus occurs in SW Ghana. The Olive Colobus should be less rare, but we did not see it.

#### HARES

In Mole, it is easy to see hares at night. They should be African Savanna Hares.

#### ANOMALURES OR SCALY-TAILED FLYING SQUIRRELS

Although not technically flying squirrels, they are just as cool as the Holarctic and Oriental "real" flying squirrels. Four species are known from Ghana, including the very different Long-eared Flying Mouse and the beautiful Upper Guinea endemic **Pel's Anomalure**. The other two are the **Beecroft's** and Lord Derby's Anomalure. The flying mouse is almost never seen. The other three are large and during spotlighting they can be found by their eyeshine or with the termal scope if they are low and close enough. If you know their roosting tree, you can also see them flying away from there after dusk. Apparently there is a tree along the canopy walk where up to ten Pel's Anomalures can be seen flying out, but we were not aware of that and we did not have enough time in Kakum to try again. Luckily we were able to find two **Pel's Anomalures** during our last night spotlighting, at Bobiri! A nice surprise was the **Beecroft's Anomalure** we found with the thermal scope at Nsuta. Beecroft's and Lord Derby's Anomalure are both not as pied and conspicuous as the Pel's. The best way to separate them therefore is the shape of the tail, which is much shorter and without a large plume at the end in Beecroft's.

#### **SQUIRRELS**

My main interest is with these amazing rodents. No less than 11 species can be found in Ghana, of which we saw at least seven. I was hoping to finally get more images of living Slender-tailed Squirrels. This Upper Guinea Forest endemic is quite often noted by trip reports and on citizen science websites, but very rarely photographed. I was therefore very eager to get a grip on this species, also because of the book/document I am working on for squirrel identification. Except for a candidate at Ankasa, we failed to see this species. The Slender-tailed Squirrel is large, only slightly smaller than Forest Giant Squirrel and should be all dark with long limbs and a long tail. If anyone has photos of this species, or if you are going to Ghana, please send the pictures to me. Apparently the Kakum canopy walk is the best place to see it. Coincidentally just when we got back, <u>a specimen was finally photographed well</u> at Mount Nimba in Liberia!

The Kakum canopy walk is also a very good place to see other species of squirrel, such as the **Forest Giant Squirel** and the **Small Sun Squirrel**. The latter is a darkly coloured split of the Gambian Sun Squirrel. It only occurs in the rainforests, while the Gambian Sun Squirrel only occurs in the savanna in the North. My friends saw one **Gambian Sun Squirrel** at the Mole motel, which was the first documented of its kind on the citizen science portals in Ghana. The third species of sun squirrel is the **Red-Legged Sun Squirrel**. This species is much larger, with a more rounded head. Characteristic are the red in the limbs, especially on the inner side, as well as on the belly. When the red is not well visible, confusion might be possible with the Slender-tailed Squirrel. It occurs throughout the rainforest zone.

The rope squirrels are species mainly of the undergrowth, such as bushes and the lower zones of the rainforest and wooded savanna. The Red-cheecked Rope Squirrel only occurs east of the Volta in the far southeast of Ghana. The Fire-footed Rope Squirrel should be widespread in both rainforest as wooded savanna, but we did not see it. The only rope squirrel I got a glimpse of is the Dahomey gap endemic **Kintampo Rope Squirrel**. This species is possible at Mole, where it co-occurs with the Gambian Sun Squirrel in bushes.

The last group of squirrels are the species that live mainly on the ground. Rope squirrels can often be found on the ground, but are much smaller than the **Striped Ground Squirrel**. This species is large and occurs through the savanna and the Sahel in the North, as well is in the southern agriculture of

the Dahomey gap. Much rarer and never photographed alive in West-Africa, is the enigmatic Western Palm Squirrel. This beautiful species should occur in the rainforest zone.

#### DORMICE

The African dormice are quite difficult taxonomically, but they look very cool. Three species should be present in Ghana, but their names might change as a result of splitting. The largest one is **Nagtglas's African Dormouse**, and only its size is reliable as external ID feature. This is therefore the species we saw deep in the Ankasa forest near the pools. Firstly I doubted a bit, because despite its size, the face mask was not obvious. In the Handbook of the Mammals of the World, only Lorrain's Dormouse was said to have the facemask often missing. However, in the Rodents of West-Africa, Rosevaer (1969) writes about Nagtglas's: "There is sometimes, but by no means always, a distinct black mark running from the eye to the nose". A plain face is therefore no problem for a definite ID as <u>Nagtglas's Dormouse</u>. The other species are also often more reddish coloured.

#### **OTHER RODENTS**

I'll begin with the most conspicuous: the porcupines. Brush-tailed Porcupines are very difficult to see in the rainforests such as Kakum, but **Crested Porcupine** is somewhat easier in Mole. We saw one crossing the road there. However, this was the first observation on the citizen science portals! Another interesting rodent is the endemic Ghana Mole Rat. According to the IUCN it is observed in Mole NP (outside the known distribution map on that same website), but we did not know that at the time and therefore did not search for it.

Other mice and rats, let's call them Muridae and allies, are hard to observe without life trapping, but with our thermal scope we were able to photograph five individuals at Ankasa. We saw three arboreal *Hylomyscus*, of which we were able to ID at least one as **Flat-nosed Hylomyscus** (*H. simus sp. 2*), see for more details on identification <u>here</u> and <u>here</u>, for which Nicolas (2020) was very useful. Another, more terrestrial one was a *Praomys*, but the two species that occur here are not separable without DNA or cranial measurements (*rostratus* and *tullbergi*, see <u>here</u>). It was not possible to identify the fifth to genus level.

#### PANGOLINS

Not the most pleasant paragraph for me to write about, as we failed to see a pangolin of any kind, even though it was one of our most important targets. We should have done some things differently to increase our chances, but when we were at Kakum (one of the hotspots), we walked way to fast and before I knew it, we already left the park. I hope that everyone who reads this will approach their quest differently, because it is definitely possible to see both Black-belleid Pangolin (a.k.a Long-tailed Pangolin) and White-bellied Pangolin (a.k.a. Tree Pangolin) in the rainforest zone. Giant Pangolin seems to be impossible though. Pangolins are sometimes – but very rarely – seen in trees by daytime, but it seems to be more promising by spotlighting (they should have some slight eye reflection) and thermal scoping. We received signals that some other tour guides use a rather shady technique to show pangolins to mammalwatchers. Apparently the hunters confirmed that other tour guides sometimes pay them to put a caught pangolin at a pre-arranged location, so that they could be "coincidentally" found by the tour. The tour members would have no clue that this was pre-arranged. If you do not want a pangolin on your list this way, make sure you communicate this with your guide.

#### AFROTHERIA

This awesome clade of mammals is represented by some iconic African species, also in Ghana. The African Manatee is almost never seen, and the only observations come from hunted specimens in the Volta delta and the western mangroves on iNat. It does not seem to be "doable" in Ghana.

The most obvious of all African mammals is of course the **Elephant**. Elephants are found in Kakum, Ankasa and Mole, but only in the latter National Park they are easy to see. They are often seen from the viewpoint of the Mole motel, and during our stay there, we saw two bulls on several occasions. As it was my first time in Africa, I was still genuinely impressed, even though I thought it would be somehow boring beforehand. Seeing them in the rainforests is much more difficult, and it can disturb your plans quite a lot apparently. We only saw them at Mole though.

A lot harder to see is the Aardvark, but apparently this is possible at Mole. We saw a lot of digging activity by Aardvarks on the burnt areas and tried for them unsuccessfully in the evening with our thermal scope.

No tenrecs, elephant shrews or golden moles present in Ghana, but there are Hyraxes! Apparently Rock Hyrax can be found in the far North. The Tree Hyraxes form the true attraction of the Ghanaian Afrotheria (in my modest opinion). Their eerie climactic loud calls fill up the ambiance of the rainforest at night. There is something interesting going on with the taxonomy of the West-African Tree Hyraxes. Prof. Simon Bearder noted that the loud calls of tree hyraxes east of the Volta sound completely different, and indeed, they are much more like rattles as can be heard on the vocal profiles on the <u>Wildsolutions</u> website. This population, confined between Volta and Niger, is just described as a new species, the Benin Tree Hyrax *Dendrohyrax interfluvialis* (Oates et al. 2021). A very good reason indeed to visit for example the Kalakpa Resourse Reserve. That was not on our itinerary, so we only heard the **Western Tree Hyrax** *D. dorsalis sylvestris*, of which I managed to make a decent recording, enjoy it <u>here</u>.



#### BATS

One of the most remarkable bat species in Ghana is the **Yellow-winged Bat**, that is sometimes found roosting in the savanna at daytime. We saw one at Mole, also during the day, but it was a short observation as it suddenly flew out of a bush, showing its very yellow wings indeed! Another species that is very conspicuous is the **African Straw-Coloured Fruit Bat**. Enormous numbers roost along the N1 at Ankasa or at the Hospital of Accra. The sight of their immense departure during the hours around sunset at Ankasa was one of the most spectacular sights of the trip. We were also able to photograph a foraging one at the entrance of Ankasa. **Hammer-headed Fruitbats** were also high on our wishlist, but we failed to see them while they were roosting. Thanks to Jurriën's very fast photography skills we were able to identify one flying around at Bobiri, but that one of course did not have its inflatable nose-sacs inflated. We saw similar specimens flying around at Ankasa. We were not able to ID any other fruit bats, and there are many species of them.

The colony of **Egyptian Tomb Bats** is accessible at the Shai hills, and apparently there is also *Coleura afra* sometimes present here according to Jakob Fahr. There is a second cave with Egyptian Rousette (but we did not visit that one). Shai is accessible for a small fee, and the entrance is here: 5.8837, 0.0388. For the identification of the tomb bats, see <u>here</u>.

In the two tunnels we checked where small rivers go under the Ankasa road, we saw roosting bats. It might be worthwhile to check **all** the tunnels along the Ankasa road, but we did not do that. In the first tunnel we checked we saw a *Nycteris* Slit-faced Bat, but according to Jakob Fahr, it is not possible to ID the species.. If we would have photographed a **ruler** at that same location, it might be possible, but the taxonomy is not clear yet. In the second tunnel we found a colony of *Hipposideros* Leaf-nosed Bats. Also for this genus the taxonomy is not clear and our photos were not sufficient. It might be advisable to get closer and take photos of the leaf with a macro lens.

#### UNGULATES

Hoofed animals in the Ghanaian rainforest are very hard to find, especially outside the national parks as the hunting pressure is huge. Of the many duikers that should occur in Ghana, only Maxwell's is regularly seen. Alas, not by us. Other duikers include Brooke's, Yellow-backed, Black and Bay in the rainforests. In the savannas there is chance on Common, Red-backed and – perhaps on the eastern side of the Volta – Verheyen's Duiker. We might have heard the call of a Red-backed Duiker at Mole, where there are quite a few reports from others. The extremely rare Bongo is as good as impossible I guess, just like the Red River and Giant Forest Hog and the Water Chevrotain. In the savanna areas that enjoy some kind of protection, there is a larger array of ungulates that sometimes show themselves to a mammalwatcher. At the Shai Hills, you have a chance on **Kob** (common) and **Bushbuck**. The latter we only saw numerously at Mole. Mole is also swarming with **Warthogs**. Less frequently observed are **Western Hartebeest, Defassa Waterbuck**, Roan Antelope and African Buffalo.



#### CARNIVORES

Theoretically all sorts of amazing carnivores should be possible in West-Africa, but your chances of seeing let's say a Golden Cat are so infinitesimally small, that I will not mention them as targets in this text. Lions, Leopards and Spotted Hyena's occur in Mole NP, of which the latter is heard sometimes by visiting naturalists, but the others as good as never. The main carnivore attractions are civets, genets and mongooses. African Palm Civet is sometimes seen at Kakum. African Civet is very rarely seen at Mole. No less than three species of genet are possible in Mole NP, where we saw a beautiful Pardine Genet near the houses of the Mole motel, as well as one crossing the road the night before a little further down the village. This species is split from Maculated genet which occurs east of the Niger. Other possibilities during night safaris in Mole are the Common Genet and the Hausa Genet. Just like the Pardine Genet, also the Common Genet is seen near the Mole motel. The mongoose species that are observed regularly in Ghana are Gambian Mongoose in the savannas of Mole and Shai, where we saw a nice group in the latter area. Next there is the relatively rare Common Cusimanse in the rainforests, of which we saw a small group at Ankasa. Less rangerestricted is the White-tailed Mongoose, but this one is very rarely observed, so we were lucky we saw this stunning one at Mole. Remarkably it did not have a pure white tail, but apparently that happens more often in West-Africa (Grubb et al. 1998). Other widespread species we did not see are Slender Mongoose and Marsh Mongoose, both are regularly noted by other naturalists. Last but not least, we had an observation of an African Clawless Otter in a river deep in the Ankasa forest. It only showed itself briefly though.



Upper left: Fraser's Eagle-owl, Ankasa (DD). Lower left: Hammer Bat, Bobiri (JvD). Right: White-tailed Mongoose, curiously with a very dark tail. Mole (JvD).

Previous page: Upper left: Egyptian Plover, White Volta (DD). Lower left: Kobs, Shai Hills (DD). Upper right: Blackcap Illadopsis, Ankasa (DD). Lower right: *Hipposideros sp.,* Ankasa (JvD).



African Savanna Hare, Mole (DD), Common Cusimanse, Ankasa (DD), Northern Lesser Galago, Mole (RV), <u>Pel's Pouched Bat</u>, Nsuta (JvD), Gambian Mongoose, Shai Hills (JvD), <u>Egyptian Tomb Bat</u>, Shai Hills (DD), Forest Giant Squirrel, Kakum (RV)

## BIRDS

As mentioned before, the report by Radstaak (2021) is very complete and it is not necesary at all to give much more information. Just for fun, here are some statistics and trivia. In total the four of us noted 401 bird species, this includes heard-onlies. This is quite all right considering the two-week duration of our trip, the fact that we did not visit a single spot for waders, and considering that we skipped a morning of birding at Opro in favour of looking at monkeys at Boabeng (much to our guide's disbelief). Of the 30 Guinea endemics listed by Sjoerd as somewhat possible in Ghana, we had 24. Of these 30 Guinea endemics, 13 were listed as endemics to the Upper Guinea Forest endemics, of which we noted 9, excluding a very badly heard-only Brown-cheecked Hornbill. I found the bird biodiversity amazing here. The sheer number of species is astounding. However, as also mentioned by Sjoerd, the birds are often very shy and/or skulky. This makes photographing opportunities rather slim. According to Kalu, birds tend to be shy because of hunting for voodoo practices. There are markets in West-Africa full of bee-eaters and tinkerbirds.



#### MOST BEAUTIFUL BIRD

The sheer beauty of the Black Bee-eater was even better than I imagined, from the Van Gogh's Starry night-like belly to the subtle blue edges of the tertials. We got the best looks at these birds on the canopy walk of Kakum and at Atewa. Closely followed – and according to some of my friends even better – is the stunning Egyptian Plover of the White Volta.

#### **BEST ENDEMIC BIRD**

This is of course the Picathartes. At the "classic" Picathartes forest of Bonkro, there are three spots where they can be observed before they start roosting. Kalu arranged the nicest one, with a steep walk towards it. Be aware that an entrance fee has to be payed to the local community for all the Picathartes sites. Other than the Picathartes, we enjoyed many other Upper Guinea Forest endemics.

#### RAREST BIRD

We did not find any vagrants or anything like that (we also did not have time to visit good wader hotspots), but we did see the extremely rarely recorded Grey-Throated Rail. Kalu knew a very valuable spot for this species and this worked out great.

#### **BEST BIRD SOUND**

The best sound of the jungle by far is produced by the Nkulengu rail, followed by some distance by the Blue-shouldered Robin Chat and the Great Blue Turaco. The rhythmic, guttural sounds of the rail resonated after dawn through the jungles of Ankasa and Bobiri, but they can be heard at other places

as well. The trick to see them is to run as hell towards it as soon as they start calling nearby, but personally I would recommend to stay still and just enjoy the ambiance. The song of the Robin Chat is of a totally different order and is just very pleasant to hear. We heard it near a brook at the foot of the Atewa hills. The booming sound of the Great Blue Turaco suddenly explodes in a long cackle that is joined in by the others. It inspired me to compose a house-track which is now available <u>here on SoundCloud</u>.



## OTHER FAUNA

We saw 14 species of dragonfly, that were well identifiable by comparing the photos and behaviour to the descriptions on the website of African Dragonflies and Damselflies Online: <a href="http://addo.adu.org.za">http://addo.adu.org.za</a> (and I had some good help of KD Dijkstra in some cases). List and observations can be found here, and a direct link to the photos is here. Our butterfly list will be available here, and the photos here. Considering the Herpetofauna, it was a shame that we did not see any identifiable snakes and that we missed Dwarf Crocodile, which should occur in the ponds near the powerline of Ankasa. We did see Nile Crocodile at Hans Cottage Botel and Mole, where we also had one of the soft-shelled turtles. We also saw plenty of agamas and lizards. Here are our identifications so far.

## HOW TO SEE MORE THAN US

As said before, we missed some very important targets. Aside from that, there are some other things that I would do differently when going to the Tropics. Keep in mind that this was my first time in the Tropics and the first time we worked with a local guide. Key is good communication with the guide, I think. Make sure that you want to see certain mammal species and that you care more about those than e.g. seeing a glimpse of an Illadopsis you heard fine anyway (and that you are willing to pay extra for night walks and extra days at national parks).

For the best mammalwatching, I think it is crucial to spend more time at Kakum NP than we did. We only spent one morning and one evening there. For birds, this is fine, because you can find many birds at areas you don't have to pay an entrance fee for outside the park, such as Wassa and Nsuta. The hunting pressure outside the protected areas is huge however, so for mammals like duikers, pangolins etc., the protected areas are much better! If you also only have two weeks like we did, I would recommend to skip Nsuta or Wassa and spend an extra day at Kakum NP.

In Mole NP, we struggled with the fact that our van was not very suitable for spotlighting, even though for the rest of the trip, it was very good. I fully recommend arranging a different vehicle for spotlighting at Mole. The National Park provides night safaris in 4x4 vehicles and that should work a lot better!

If you – like us – like to combine birding and mammalwatching, going an extra week would not be a bad idea either.

## LITERATURE CONSULTED

Luckily I have access to the fantastic library of Naturalis Biodiversity Center in Leiden. I was able to intensively use several old books for identification when I got back, in addition to some of my own books. In Ghana itself, you will not need many books. The bird guide is the most important one:

In Ghana recommended books:

Borrow, N. & R. Demey 2020. *Birds of Ghana*. Helm Field Guides (or alternatively *Birds of Western Africa* second edition by the same authors) and the *Kingdon Field Guide to African Mammals*.

We combined this with Sjoerd Radstaaks trip report, available <u>here at cloudbirders</u>. Printing out this trip report was a remarkably good decision, as this works very comfortable compared to checking it on the offline documents of your smartphone. Back home I made use of the following works to identify mammals.

Rosevear, D.R. 1969. The Rodents of West Africa. British Mus.(Nat. Hist.), London, 604 pp

Rosevear, D.R. 1965. The Bats of West Africa. British Mus.(Nat. Hist.), London, 418 pp

Happold, M. & D.C.D. Happold (eds) 2013. *Mammals of Africa*. *Volume IV: Hedgehogs, Shrews and Bats*. Bloomsbury publishing, London. 800 pp

Additionally I consulted The Handbook of the Mammals of the World Volum VI and volume IX, as well as the two volumes of the Illustrated Checklist of the Mammals of the World.

Nicolas, V., Fabre, P. H., Bryja, J., Denys, C., Verheyen, E., Missoup, A. D., ... & Demos, T. 2020. The phylogeny of the African wood mice (Muridae, Hylomyscus) based on complete mitochondrial genomes and five nuclear genes reveals their evolutionary history and undescribed diversity. *Molecular phylogenetics and evolution*, *144*, 106703.

Oates, J. F., Woodman, N., Gaubert, P., Sargis, E. J., Wiafe, E. D., Lecompte, E., ... & Bearder, S. K. 2021. A new species of tree hyrax (Procaviidae: Dendrohyrax) from West Africa and the significance of the Niger–Volta interfluvium in mammalian biogeography. *Zoological Journal of the Linnean Society*.

Grubb, P., Jones, T. S., Davies, A. G., Edberg, E., Starin, E. D., & Hill, J. E. 1998. Mammals of Ghana, Sierra Leone and the Gambia. Cornwall.

## ACKNOWLEDGEMENTS

I owe a big thanks to the following people for helping me with certain identification issues: Simon Bearder, John Oates, Venkat Sankar, Rod Cassidy, Nils Bouillard, KD Dijkstra, Jakob Fahr and of course Kalu Afasi and our driver Godwin.



Upper left: Nagtglas's African Dormouse, Ankasa (DD). Lower left: White-bellied Kingfisher, Ankasa (DD). Right: Pel's Anomalure, Bobiri (JvD).





Top row: <u>Demidoff's Dwarf</u> <u>Galago</u>, Ankasa (DD), West-African Potto, Ankasa (DD).

Middle row: <u>Nycteris sp.</u>, Ankasa (JvD), Patas Monkey, Mole (DD).

Lower row: White-thighed Colobus, Boabeng (DD), us (JvD), Striped Ground Squirrel, Mole (JL).



## Target list and trip list

This list consists of all the species that are regularly seen by tripreports on Mammalwatching.org and on Observation.org and iNaturalist. See Table 1 for explanation of abreviations of endemism. A "1" in the second column means that we saw it, an "x" means that we were only able to id the genus. In **Bold** the locations where we saw the species. Green/frequent means that the species is regularly observed according to tripreports or citizen science websites, orange = infrequent and red is very difficult or impossible. In light grey there are the species that were not on our itinerary. In some of the notes, the exact coordinates are given.

endemic	us	Possible species	Species name	locations	frequency	note
A	1	Northern Lesser Galago	Galago senegalensis	Mole	frequent	
ARF	1	Demidoff's Dwarf Galago	Galagoides demidoff	Kakum, Ankasa, Bobiri, Atewa	frequent	
ARF		Thomas's Dwarf Galago	Galagoides thomasi	Kakum, other rainforests	very difficult	
GUI	1	West-African Potto	Perodicticus potto	Kakum, Ankasa, Bobiri	frequent	
UPGUI		Diana Monkey	Cercopithecus (diana) roloway	Kakum, Ankasa	impossible?	
UPGUI	1	Lowe's Monkey	Cercopithecus lowei	Kakum, Ankasa, Boabeng	frequent	
UPGUI		Mona Monkey	Cercopithecus mona	east of Volta		not on our itinerary
UPGUI	1	Spot-nosed Monkey	Cercopithecus petaurista	Shai, Kakum, Ankasa, South	frequent	
WESA	1	Green Monkey	Chlorocebus sabaeus	Shai, Mole	frequent	
A	1	Tantalus Monkey	Chlorocebus tantalus	east of Volta and <b>Shai</b>	frequent	there might be hybrids west of White Volta and Shai population has yellow tailtip
UPGUI		Olive Colobus	Procolobus verus	Kakum, Ankasa	infrequent	
UPGUI	1	White-thighed Colobus	Colobus vellerosus	Kakum, Ankasa, <b>Boabeng</b>	infrequent	aka Geoffroy's Pied Colobus, rare except in boabeng
WESA	1	Patas Monkey	Erythrocebus patas	Mole	infrequent	
A	1	Olive Baboon	Papio anubis	Shai, Mole	frequent	
A	1	African Savanna Hare	Lepus victoriae	Mole	frequent	
ARF	1	Beecroft's Anomalure	Anomalurus beecrofti	Ankasa, Bobiri, <b>Nsuta</b>	infrequent	Along the path: 5.2850, -1.6478
ARF		Lord Derby's Anomolure	Anomalurus derbianus	Ankasa, Bobiri	infrequent	
UPGUI	1	Pel's Anomalure	Anomalurus pelii	Kakum, <b>Bobiri</b>	infrequent	Shine along the Bobiri path, but also check other report for Kakum
GUI		Western Palm Squirrel	Epixerus ebii	Kakum	very difficult	probably not possible, aka Temminck's Giant Squirrel
ARF		Fire-footed Rope Squirrel	Funisciurus pyrropus	Kakum, Pica, Bobiri, Kintampo, Mole, Atewa, Ankasa	frequent	widespread
DAHOMEY	1	Kintampo Rope Squirrel	Funisciurus substriatus	Kintampo, <b>Mole</b>	infrequent	We saw it here 9.2472, -1.8582, but also check here 9.2459, -1.8570
A	1	Gambian Sun Squirrel	Heliosciurus gambianus	Mole	infrequent	
UPGUI	1	Small Sun Squirrel	Heliosciurus punctatus	Kakum, Ankasa, other rain forests	frequent	
ARF	1	Red-legged Sun Squirrel	Heliosciurus rufobranchium	Kakum, Ankasa, Shai, Bobiri, Atewa	frequent	
ARF	1	Green Bush Squirrel	Paraxerus poensis	Kakum, Nsuta and some other places	frequent	
UPGUI		Slender-tailed Squirrel	Protoxerus aubinii	Kakum and perhaps other rain forests	very difficult	Many observations, but no photographs!
ARF	1	Forest Giant Squirrel	Protoxerus stangeri	Kakum, Nsuta, Ankasa, Atewa, Boabeng	frequent	
A	1	Striped Ground Squirrel	Xerus erythropus	Mole, Southern agriculture	frequent	
А	1	Nagtglas's African Dormouse	Graphiurus nagtglasii	Kakum, Ankasa and perhaps other rain forests	infrequent	5.2904, -2.6382
A		Lorrain Dormouse	Graphiurus lorraineus	rainforests and savannah	infrequent	If size is small, ID is difficult. Larger animals are Nagtglas's
0.W.		Ship Rat	Rattus rattus	rainforests and elsewhere	frequent	
A		Greater Cane Rat	Thryonomys swinderianus	Shai, Mole	very difficult	
A		Forest Giant Pouched Rat	Cricetomys emini	Kakum and perhaps other rain forests	infrequent	aka Emin's Pouched rat: no mask
A		Northern Pouched Rat	Cricetomys gambianus	Mole, Kakum, Ankasa	infrequent	mask separates this one from emini
UPGUI	1	Flat-nosed Wood Mouse	Hylomyscus simus	Ankasa and perhaps other rainforests	infrequent	split from H. stella. Found with thermal
UPGUI	х	Praomys	Praomys tullbergi/rostratus	Ankasa	very difficult	
A	1	Crested Porcupine	Hystrix cristata	Mole	very difficult	first obs on the platforms, 9.2812, -1.8499
ARF		Brush-tailed Porcupine	Atherurus africanus	Kakum	very difficult	report Jon Hall
DAHOMEY		Ghana Mole Rat	Fukomys zechi	Mole? Eastward	impossible?	IUCN: present in Mole, but we didn't know
ARF		Black-bellied Pangolin	Phataginus tetradactyla	Bonkro, Kakum	infrequent	
ARF		White-bellied Pangolin	Phataginus triuscips	Bonkro, Atewa, Kakum	infrequent	
ARF		Giant Pangolin	Smutsia gigantea	very rare	impossible?	
UPGUI	1	Western Tree Hyrax	Dendrohyrax dorsalis sylvestris	Kakum, Ankasa, Bobiri	frequent	
IFLU		Benin Tree Hyrax	Dendrohyrax interfluvialis	east of Volta		
Α	1	Elephant	Loxodonta africana	Mole, Ankasa	frequent	
A		Aardvark	Orycteropus afer	Mole	very difficult	we found tracks here: 9.3352, -1.8687

endemic	us	Possible species	Species name	locations	frequency	note
A	1	Common Warthog	Phacrochoerus africanus	Mole	frequent	
ARF		Red River Hog	Potamochoerus porcus	Ankasa	impossible?	
ARF		Giant Forest Hog	Hylochoerus meinertzhageni	Kakum	impossible?	
A		Hippopotamus	Hippopotamus amphibius	apparantly near Berekum in the far west		not on our itinerary
A		African Buffalo	Syncerus caffer	Mole	very difficult	observation.org and Vaisanen 2019
WESA	1	Hartebeest	Alcealaphus (bucelaphus) major	Mole	infrequent	9.3376, -1.8690
UPGUI		Maxwell's Duiker	Philantomba maxwelli	Kakum, Ankasa	infrequent	
DAHOMEY		Verheyen's Duiker	Philantomba walteri	east of Volta		not on our itinerary
A		Red-flanked Duiker	Cephalophus rufilatus	Mole and perhaps elsewhere	infrequent	
GUI		Brooke's Duiker	Cephalophus (ogilbyi) brookei		impossible?	
А		Bay Duiker	Cephalophus dorsalis	rain forests	very difficult	by Berghaier 1999 in Kakum
GUI		Black Duiker	Cephalophus niger	rain forests	very difficult	
A		Yellow-Backed Duiker	Cephalophus silvicultor	rain forests	very difficult	by Berghaier 1999 in Kakum
A		Common Duiker	Sylvicapra grimmia	Mole?	very difficult	reported in Mole, but never with pictures
A		Roan Antelope	Hippotragus equinus	Mole	infrequent	
A	1	(Defassa) Waterbuck	Kobus (ellipsiprymnus) defassa	Mole	infrequent	
А	1	Kob	Kobus kob	Mole, Shai	frequent	
A	1	Bushbuck	Tragelaphus scriptus	Mole, Shai	frequent	
A		Bongo	Tragelaphus eurycerus	Kakum	impossible?	
A		African Palm Civet	Nandinia binotata	Kakum, Bobiri, Ankasa	infrequent	
А		African Civet	Civettictis civetta	Mole	very difficult	
A		Spotted Hyena	Crocuta crocuta	Mole	very difficult	rarely heard at Mole
0.W.		Common Genet	Genetta genetta	Mole	infrequent	observation.org and Vaisanen 2019. Photographed around the motel on obs.org
GUI	1	Pardine Genet	Genetta pardina	Mole	infrequent	Seen and photographed around the motel, but see above!
GUI		Hausa Genet	Genetta thierryi	Mole	very difficult	Vaisanen 2019
A		Marsh Mongoose	Atilax paludinosus	Mole, Ankasa, Shai	very difficult	observation.org and Vaisanen 2019
UPGUI	1	Common Cusimanse	Crossarchus obscurus	Kakum, <b>Ankasa</b>	infrequent	seen along Ankasa road at 5.2804, -2.6440
А		Slender Mongoose	Herpestes sanguinea	rain forests	infrequent	quite a few obs, but none by trip reports.
А	1	White-tailed Mongoose	Ichneumia albicauda	Mole	very difficult	seen at 9.3512, -1.8676
GUI	1	Gambian Mongoose	Mungos gambianus	Shai, Mole	infrequent	seen at 5.9070, 0.0523
ARF	1	African Clawless Otter	Aonyx capensis	Ankasa	very difficult	The river where we saw it is here: 5.2773, -2.6451 (access from the road)
A	1	Four-toed Hedgehog	Atelerix albiventris	Savannah	infrequent	Jurriën saw one between the White Volta and Mole
A	1	Straw-coloured Fruit Bat	Eidolon helvum	Ankasa, Kumasi, Accra, Kakum, widespread	frequent	
A	1	Hammer-headed Fruit Bat	Hypsignathus monstrosus	Kakum, Ankasa, <b>Bobiri</b>	infrequent	
A		Gambian Epauletted Fruit Bat	Epomophorus gambianus	Mole, and close to Boabeng (Bono)	infrequent	
GUI		Veldkamp's Epauletted Fruit Bat	Nanonycteris veldkampii	Accra, Kakum	infrequent	
0.W.		Egyptian Rousette	Rousettus aegyptiacus	Shai	infrequent	apparantly in a second cave at the Shai hills, ask guides
0.W.	1	Egyptian Tomb Bat	Taphozous perforatus	Shai	frequent	Accessibly by path: 5.9293, 0.0750
A		African Sheath-tailed Bat	Coleura afra	Shai	infrequent	Apparantly in the same cave as Egyptian Tomb Bat
ARF	1	Pel's Pouched Bat	Saccolaimus peli	Nsuta	very difficult	ID thanks to Nils Bouillard based on recording and photos
A	1	Yellow-winged Bat	Lavia frons	Mole, Southern agriculture	frequent	check Obs.org. Two flew away here: 9.2968, -1.8522
A		Cyclops Roundleaf Bat	Hipposideros cyclops	Kakum	infrequent	aka Doryrhina cyclops, in dead trees. One obs
A	х	Roundleaf Bat	Hipposideros caffer/ruber complex	Ankasa, Fort Amsterdam	infrequent	Large roost in this tunnel: 5.2804, -2.6439, but not identifiable due to taxonomy
A	х	Slit-faced Bat	Nycteris sp.	Tunnels Ankasa	infrequent	One in this tunnel, take a ruler with you! 5.2773, -2.6451
A		Large-eared Slit-faced Bat	Nycteris macrotis	Bonkro	very difficult	Bocquier 2017 in dead tree
	41	Total trip list	plus 3 species we were not able to	o idenftify to species level		