

# Biology of the Aardvark (*Orycteropus afer*)

Diplomarbeit

vorgelegt der Fakultät für Biowissenschaften  
der Ruprecht-Karls-Universität Heidelberg

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Dezember 2005



Die vorliegende Arbeit wurde im Institut für Zoologie  
der Universität Heidelberg in der Zeit von August bis Dezember 2005  
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# Erklärung

Ich erkläre hiermit, dass ich die vorliegende Diplomarbeit selbstständig unter Anleitung verfasst und keine anderen als die angegebenen Quellen und Hilfsmittel benutzt habe.

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# Introduction

The aardvark (*Orycteropus afer*) is a very extraordinary animal and there is no other animal on earth similar to it. It has a very strange appearance — the long slender nose reminds one at antbears, the big ears are similar to those of donkeys and the tail shows a strong resemblance to the one of rats. People who see an illustration of the aardvark (cf. figure 2.1) for the first time often think it would be a fabulous beast like the jackalope<sup>1</sup> e.g. or perhaps a prehistoric creature, but hardly believe that this animal is really existing today. Regarding a baby aardvark (cf. figure 7.3) it becomes even more fantastic. It resembles the alien creatures known from science fiction and people would believe it is a creation of the Hollywood film studios — perhaps for a new E.T.-sequel — before they believe this is a recent mammal.

The aardvark is a rather unknown species in most parts of the world. In English-speaking countries at least its name is famous because of its position as the first word in an encyclopaedia. In African countries where the aardvark lives it is also known by the locals, but in countries like Germany most people have never heard of a species called aardvark nor do they know anything about this interesting mammal.

If a person is interested in learning more about this very special creature and starts to do some research, he or she will find out soon that it is not easy to get information. There has not been a complete work with an encyclopaedic description of the biology of the aardvark recently. One can quickly find the very basic information on the aardvark in encyclopaedias of mammals or on the internet but once you try to obtain more detailed information you will notice that up to now there has only been the possibility to read a number of different articles. There is knowledge about the aardvark and it is also accessible but not in a condensed form. That was exactly the reason for writing the thesis at hand. The aim was to collect data on the aardvark and present it in a condensed form to allow to reach a deeper knowledge of the aardvark without reading numerous different sources.

The author is very grateful for having the honour to close this gap by writing this interesting thesis. This was only possible because PROF. DR. DR. H.C. VOLKER STORCH and PROF. DR. THOMAS BRAUNBECK, both of the Department of Zoology at the University of Heidelberg accepted the topic of this work and supported the author to write it.

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<sup>1</sup>A mythical Bavarian creature (locally called ‘*Wolpertinger*’) made up of body parts of several local animals.

The distribution of this work will be realized by the media internet. During the development of this thesis a survey was run and a number of people helped in providing information. With handing in this thesis the corresponding file will be sent out to all those people and it will be explicitly stated that it is allowed and even desired to forward the thesis or to load it into the Web to ensure the distribution of this work. That way it shall be possible in the future to learn about the aardvark by reading a single work covering the different aspects of its biology.

The thesis is divided into ten chapters and an appendix.

The first chapter describes the materials and methods used to write this thesis.

Chapter 2 gives a short description of the aardvark and examines the aardvark's familiarity as well as its name.

Chapter 3 is dedicated to the anatomy and physiology of the aardvark. Especially the characteristics of all parts of the body are described in there.

Chapter 4 deals with the taxonomy of the aardvark which even today is still controversial. The other part of this chapter describes the evolution of the aardvark.

Chapter 5 contains information on the habitat where aardvarks occur and on their distribution.

Chapter 6 deals with the nutrition of the aardvarks. Not only their diet is described but also the manner in which they feed.

Chapter 7 describes the aardvarks' behaviour.

The maintenance of aardvarks in captivity is dealt with in chapter 8. Here the zoos keeping aardvarks are also mentioned.

Chapter 9 evaluates the game parks and zoos questionnaires' survey. This chapter is particular insofar as a lot of new information received from the participants of the survey flowed in and extends today's knowledge on the aardvark.

The last chapter goes beyond the biology of the aardvark. The interaction with man, especially the aardvark's agricultural role is discussed here. In addition, the significance of the aardvark beyond biology is stated. E.g. different uses of the word '*aardvark*' are mentioned.

The appendix lists the game parks' and zoos' questionnaires. The answers received from game parks are also quoted in there, the zoos' answers, however, are confidential.

# Chapter 1

## Materials & Methods

The thesis at hand has the aim to give a complete overview of the armadillo and its biology. Therefore the materials used are publications in the first place. A number of books, articles and internet pages were read in order to collect the most important information on the armadillo. In addition to this some surveys were run. It would not have been possible to do some direct research in the field as armadillos are extremely shy and only rarely seen. It is almost impossible to observe them in the wild. The only chance to observe the armadillo would be in captivity. This, however, would only give information in a quite particular case and was considered to be too specific to get on with the task of creating a general overview of the armadillos' biology. This is the reason why an other approach was chosen.

The literature research served to form the basis of this thesis. In addition a survey was run to find out some new information on interesting questions that are still open. To achieve this, a lot of people who have made experiences with armadillos had to be asked because a direct research would not have been possible as already mentioned above.

### 1.1 Game Parks Questionnaire's Survey

One part of this survey was addressed to game parks in Africa, where the armadillo lives. Addresses of national parks and game reserves all-over Africa were searched and a questionnaire was created which was then sent out to them. As the official language of some African countries is French, two versions of the questionnaire were created — an English and a French version. The two blank forms as well as the answers received can be found in appendix A. The questions together with the reason for asking them can be found in the next paragraph and the evaluation of the game parks questionnaire's survey can be found in chapter 9.1.

In order to receive a large number of answers the thesis at hand was promised to all the people participating at the survey. Most questions were formulated as multiple choice

questions in order to lower the time needed to fill out the questionnaire and thus increase the chance to receive a large number of answers.

As the rest of this chapter requires knowledge on the aardvark, however, the author suggests to read the next chapters first.

## 1.2 Aims of the Game Parks Questionnaire's Survey

The questions asked had the aim to find out some new information on the biology of the aardvark.

The first question (*'Name of game park:'* and *'Province, country:'*) served to assign the answers received.

Question 2 (*'Your name:'*) was important to communicate properly with the people who joined the survey.

Question 2b (*'Your position:'*) helped to evaluate some answers. A field ranger e.g. has made a lot of experiences in the field but an administration assistant not necessarily has first-hand knowledge of what happens in the wild.

Question 3 (*'Do aardvarks occur in your game park?'*) was raised to get current information on the distribution of the aardvark.

Question 4 (*'How frequently is the aardvark sighted in your park (approximately)?'*) was asked to confirm the scarcity of aardvark sightings and also to evaluate the answers given to the other questions; e.g. it is not surprising if a certain behaviour has never been observed in a game park where the aardvark is seen annually only. If, however, a behaviour has never been observed in a game park where the aardvark is seen daily, this must be a very exclusive behaviour or it might be a sign that this behaviour does not appear at all.

Question 5 (*'Do you make night drives in your park?'*) together with questions 5a (*'At which time (mostly)?'*) and 5b (*'How often (approx.)?'*) helped to evaluate questions 4 and 6 most of all. Namely, if no night drives are made in a game park it is not surprising that no aardvarks are seen as they are nocturnal animals and they are only exceptionally seen during the day. If the night drives are only made during the early night this explains why the aardvarks are seen more often during the early night than during the deep night.

Question 6 (*'When is the aardvark sighted in your park?'*) was asked to find out the conditions under which the aardvark is most active and if there are conditions that make the aardvarks stay in their burrows. It was asked more specifically in questions 6a (*'At which season?'*), 6b (*'At which moisture?'*), 6c (*'At which temperature?'*) and 6d (*'At which time?'*).

Question 7 (*'Did you ever observe interactions with other myrmecophagous (=ant-eating) mammals in your park?'*) was asked to find out whether different myrmecophagous mam-

mals interact or not. Question 7a (*'If so, what exactly have you observed?'*) was asked to learn more about these possible interactions.

Question 8 (*'Are armadillos sometimes accompanied by other animals in your park?'*) went beyond the question ahead. It is reported of associative feeding of armadillo and arctophila but this question was meant to find out whether there are also other interactions with other — not necessarily myrmecophagous — animals. Questions 8a (*'If so, by which animals?'*) and 8b (*'Is there any obvious connection between them?'*) should then provide further information.

Question 9 (*'Did you ever observe an armadillo at daylight in your park?'*) was asked because the armadillo is normally a nocturnal animal and only few information about activity during the day can be found in the literature. Question 9a (*'If so, what did it do?'*) was asked to help finding out the reasons why armadillos are also sometimes active during the day.

Question 10 (*'Did sightings of the armadillo increase, decrease or stay constant in the past ten years in your park?'*) was raised to get information on the change of the status in the last years, whether armadillos are still widespread today or whether their distribution has changed.

The next four questions were raised to learn about the diet of the armadillo. Apart from their regular diet of termites and ants it is sometimes reported that mouse skeletons were found in their faeces. Question 11 (*'Did you ever observe an armadillo feeding on mice in your park?'*) was asked to revise this. Question 11a (*'If so, did the armadillo kill the mouse or was it just the carcass?'*) was then meant to find out whether armadillos really hunt mice or not.

Question 12 (*'Did you ever observe an armadillo feeding on other animals than ants, termites and possibly mice in your park?'*) should check if also other animals are on the armadillo's menu. Question 12a (*'If so, what kind of animals?'*) and 12b (*'And: was it killed by the armadillo or was it a carcass?'*) then asked about the details.

Question 13 (*'Did you ever observe an armadillo feeding on cucumber in your park?'*) was asked because it is known that a certain cucumber is eaten by armadillos and this question should confirm this.

Question 14 (*'Did you ever observe an armadillo feeding on fruit or roots in your park?'*) was asked for two reasons. As armadillos feed on the cucumber mentioned above they might also feed on other plants. The second clue is that armadillos feed on fruit in captivity. Question 14a (*'If so, what exactly?'*) was asked to name the plants eaten.

It is said that armadillos would preferentially dig into termite mounds from the west and therefore question 15 (*'Did you notice a preference regarding the digging into termite mounds?'*) was meant to check this.

Question 16 (*'Did you ever observe an armadillo swim in your park?'*) was asked because of the reports that armadillos are good swimmers. Question 16a (*'If so, was there an*

*obvious necessity for doing so?*) should answer why armadillos swim at all.

Question 17 (*‘What animals could you observe killing an armadillo in your park?’*) was asked to find out the enemies of armadillos.

Question 18 (*‘When attacked, which reaction of the armadillo could you observe in your park?’*) should bring information on the defence behaviour of armadillos.

Question 19 (*‘Did you ever observe anything special in your park concerning the armadillo?’*) should give the possibility to state special observations on the armadillo.

Questions 20 (*‘Which folk originally lived in the area of the game park?’*), 20a (*‘What language do they speak?’*) and 20b (*‘How do they name the armadillo?’*) were asked to give information for a compilation of the armadillo’s name in different languages. Questions 20c (*‘Does the armadillo play a role in their mysticism?’*) and 20d (*‘Does (or did) the armadillo play any other role in their life?’*) were asked to learn about the role of the armadillo in the natives’ life.

Questions 21 (*‘What is the official language of your country?’*) and 21a (*‘How do you name the armadillo?’*) also served to get information for the compilation of the armadillo’s name in different languages.

Question 22 (*‘Do you know any zoos keeping armadillos?’*) was raised to find more zoos keeping armadillos in order to send them the questionnaire for zoos that is presented in the next paragraph.

### 1.3 Zoos Questionnaire’s Survey

The second part of the survey was addressed to zoos keeping armadillos. A questionnaire was created which was then sent out to those zoos keeping armadillos that were found. Two versions of the questionnaire were created — an English and a German one. The two blank forms can be found in appendix B. The questions together with the reason for asking them will be found in the next paragraph and the evaluation of the zoos questionnaire’s survey can be found in chapter 9.2.

In order to receive a large number of answers the thesis at hand was promised to all the people participating at the survey. As many questions as possible were formulated as multiple choice questions in order to lower the time needed to fill out the questionnaire and thus increase the chance to get a large number of answers.

### 1.4 Aims of the Zoos Questionnaire’s Survey

The first question (*‘Name of zoo:’* and *‘Country:’*) served to assign the answers received.

Question 2 (*‘Your name:’*) was important to communicate properly with the people who



joined the survey.

Question 2b (*'Your position:'*) helped to evaluate some answers. A keeper spends more time with the animals as a curator e.g., but the latter normally has more background information and access to the zoo's databases.

Question 3 (*'How many aardvarks do you keep in your zoo at present (males, females, undetermined)?'*) was asked to find out how many individuals are kept in zoos. Questions 3a (*'How many enclosures do they have?'*) and 3b (*'How large (how many square meters) are the enclosures?'*) should help to get a first rough overview of how the individuals are kept.

Question 4 (*'How old is/was the oldest aardvark in your zoo?'*) aimed to find out the life span of aardvarks in zoos as well as the record holder. It was asked more precisely in the sub-questions 4a (*'age:'*), 4b (*'date (at least year) of birth:'*), 4c (*'if applicable date (at least year) of death:'*), 4d (*'name:'*), 4e (*'sex:'*), 4f (*'where was it from (bred in your zoo, captured wild, ...):'*), 4g (*'ISIS-ID if existing:<sup>1</sup>'*) and 4h (*'How old do aardvarks get in your zoo on average?'*).

Question 5 (*'Did you have any breeding success in your zoo?'*) was raised to learn about the breeding in zoos. Questions 5a (*'At which time of the year does the birth take (mostly) place?'*) and 5b (*'At which time of the day/night does the birth take (mostly) place?'*) were asked to find out if there are certain conditions preferred for birth. Questions 5c (*'How many births have you had in the past ten years?'*), 5d (*'How many of them grew older than 30 days?'*) and 5e (*'How many of them were hand-reared?'*) should allow to analyse the breeding successes.

Question 6 (*'What diet (food & nutrients) do you feed the aardvarks in your zoo?'*) was asked to learn the substitute diet of aardvarks as they cannot be fed with termites alone in captivity. Question 6a (*'Do you sometimes feed them food scraps (as sometimes pigs are fed with)?'*) was asked to find out how narrow the spectrum of the substitute diet of aardvarks is.

Question 7 (*'How do you feed the food?'*) was asked in the hope that some zoos would use a fake termite-mound. Then questions 7a (*'If a fake termite-mound is used, can they feed from any direction?'*) and 7b (*'If a fake termite-mound is used, do they preferably feed from one side?'*) would allow to find out whether there is an intrinsic preference for a certain direction or not. This again would help to understand why aardvarks feed from a certain direction in the wild, if they do so at all.

Question 8 (*'Did you ever observe aardvarks kill (and feed on) mice in your zoo?'*) was asked to revise whether aardvarks really feed on mice and if so, whether they really hunt them or not.

Questions 9 (*'What kind of diseases did you have to deal with regarding the aardvarks in your zoo?'*) and 10 (*'What are the main causes of death regarding the aardvarks in your*

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<sup>1</sup>This ID number helps to get detailed information on the individual from the International Species Information System (ISIS) ([62]).

zoo?') were asked to find out whether aardvarks are prone to certain specific diseases in captivity.

Questions 11 ('*Did you notice an annual period at the aardvarks in your zoo?*') and 11a ('*If yes, what exactly did you notice?*') were asked to find out annual periods of aardvarks. It might be e.g. that they give birth at a certain time of the year or that their activity period changes in the course of a year. Questions 11b ('*Do you have constant conditions during the whole year?*') and 11c ('*If no, what is not constant?*') were then asked to be able to find out possible triggers or to understand that due to constant conditions certain annual periods do not occur.

Questions 12 ('*Do the aardvarks in your zoo have the possibility to swim?*') and 12a ('*Do they use it?*') were raised because it is often cited in the literature that aardvarks are good swimmers. Question 12b ('*What seems to be the purpose?*') should then help to understand why aardvarks swim at all.

Question 13 ('*Are the aardvarks in your zoo a crowd puller or a rather unnoticed species?*') was asked in order to learn how popular the aardvark is among zoo visitors.

Question 14 ('*Are they socialised with other animals?*') was asked to learn whether aardvarks tolerate other species or not. Question 14a ('*If yes, with which animals?*') should give more details and question 14b ('*If yes, have you observed any interactions between the species?*') was asked in order to learn about the interactions with other species in captivity.

Question 15 ('*Did you notice interactions with other animals (e.g. from adjacent enclosures or dogs of visitors)?*') was asked to find out whether other interactions with different species occur.

Questions 16 ('*Do you offer any behavioural enrichment to the aardvarks in your zoo?*') and 16a ('*If yes, what exactly do you do?*') were asking for the behavioural enrichment programmes. They might also give information on what is important for the aardvarks as the methods used only work if the animals have interest in the programmes offered.

Question 17 ('*When are the aardvarks active?*') was asked to find out the conditions under which the aardvark is most active and if there are conditions that make the aardvarks stay in their sleeping places. It was asked more specifically in questions 17a ('*At which season?*'), 17b ('*At which moisture?*'), 17c ('*At which temperature?*') and 17d ('*At which time?*').

Questions 18 ('*Do you keep the aardvarks as individuals or in groups?*') and 18a ('*If in groups, how large are the groups?*') were asked because aardvarks are solitary in the wild. Question 18b ('*If in groups, are there any social contacts within the group?*') should give information on the intra-specific behaviour of the aardvarks.

Question 18c ('*Are the breeding couples always kept together?*') was asking for the strategy if a baby is born, e.g. whether the mother and its baby stay together with the rest of the group or whether they are separated after birth.

Question 19 (*'Did you ever observe anything special in your zoo concerning the aardvark?'*) should give the possibility to state special observations on the aardvark.

Question 20 (*'Do you know any non-ISIS-zoos keeping aardvarks?'*) was raised to find more zoos keeping aardvarks in order to send them the questionnaire as well. The ISIS-zoos were excluded here because they were already known to the author as they can be easily found by means of the ISIS homepage ([62]). These zoos were even listed to prevent that a survey's participant starts the needless effort of searching for the same zoos again.



# Chapter 2

## Description

The chapter at hand gives a first rough description of the appearance of the aardvark. The familiarity of the aardvark is discussed and its common English name as well as the scientific one are derived.

### 2.1 Description

Aardvarks have a strange morphology resembling no other animal (see figure 2.1). Their oblong head is connected to the plump body by a short neck. The back is rounded. The long, soft snout is roundish, widens out to its distal end and ends up in a flexible, hairy disc. The furry nostrils can be closed actively. Swollen upper lips completely conceal the small mouth below. Big ears that fold back and close while tunneling and which can be moved independently, round up the bizarre appearance of the aardvark's head. ([7, 21, 47, 50, 124, 69])

In comparison to the massive body and muscular limbs the long snout, the head and the tapered end of the tail are delicate. Some measurements of the aardvark are quoted in table 2.1. A more profound description of the aardvark will be given in chapter 3. ([69])

Aardvarks are shy nocturnal animals and spend the day in a self-burrowed den (see chapter 7.1). ([21, 47, 50, 69, 124])

Figure 2.1: Illustration of *Orycteropus afer*. Taken from [14].

## 2.2 Familiarity

If we disregard the countries where the aardvarks range over wide territories (see chapter 5.2), there is only little knowledge about this species among the inhabitants — apart from the name in English-speaking countries (see chapter 2.3). There is a variety of reasons explaining this phenomenon. One, of course, is that only little is known about the aardvark and even among a broad mass of zoologists there is hardly any knowledge except perhaps that it is an archaic mammal living in Africa, feeding on termites and ants and they only have a hazy idea of its appearance. There are only relatively few scientists who do research on the aardvark and not much is published compared to other mammals (cf. table 2.2).

Another reason for the obscurity of the aardvark is that only a few individuals are kept in zoos worldwide (cf. chapter 8). In films and books on African animals the aardvark is rarely mentioned and even the most popular publication about African wildlife ‘Serengeti shall not die’ ([51]) does not mention these animals.

None of about 50 people of the author’s circle of friends — biologists excluded — knew the aardvark. In addition more than 100 pupils of a primary school and a secondary modern school were asked and only 4.7% of them knew the aardvark (cf. table 2.3) although children of this age are particular well-informed on mammals in general. This confirms the obscurity of the aardvark.

On safaris aardvarks are almost never seen. It is no wonder that an African belief says seeing an aardvark twice would presage a long life ([12]). The author personally spent about 20 weeks in game reserves in Southern Africa<sup>1</sup> observing the mammals occurring there. Neglecting the numerous small insectivores, rodents, hares and bats that are often hard to specify there exist about 75 mammals in this region ([7, 69]). Among them only seven species<sup>2</sup> could not be found — one of them was the aardvark that was particularly searched for by additionally asking local guides for hints. The only signs of aardvarks found were rather often the holes in termite mounds, burrows and once its fresh spoors<sup>3</sup>. Other signs of their existence are spade-like scratchings and often the trails of their tails dragged behind ([42, 53, 69, 106]).

If you mention the aardvark on a safari ride most tourists look confused — they just do not know this animal. Only the locals do know the aardvark but even they often state that they only had a few sightings in their life — or even none. The aardvark is a nocturnal animal but that alone can hardly explain the very rare sightings (see chapter 7.1).

<sup>1</sup>Namely South Africa, Namibia and Botswana.

<sup>2</sup>Aardvark (*Orycteropus afer*), aardwolf (*Proteles cristatus*), brown hyena (*Hyaena brunnea*), caracal (*Caracal caracal*), striped polecat (*Ictonyx striatus*) and two species of duikers (blue duiker (*Cephalophus monticola*) and red duiker (*Cephalophus natalensis*)).

<sup>3</sup>On 6 October 2002 east of Oddball’s Camp, Chief’s Island, Moremi, Okavango Delta, Botswana.

<b>Total length:</b>	~170 cm ([44]) 170–200 cm ([50])
<b>Length without tail:</b>	100–130 cm ([7]) ~150 cm ([12]) 105–160 cm ([20]) 100–160 cm ([47]) 140–170 cm ([61]) 100–158 cm ([69]) 100–130 cm ([109])
<b>Tail length:</b>	45–63 cm ([7]) 45–80 cm ([20]) 50–80 cm ([47]) 60–70 cm ([50]) 44–63 cm ([69])
<b>Shoulder height:</b>	60–65 cm ([7]) ~65 cm ([44]) 40–65 cm ([47]) 58–66 cm ([69]) ~60 cm ([109])
<b>Weight<sup>a</sup>:</b>	~52 kg ([6]) 41–65 kg males, 40–58 kg females ([7, 21]) 40–100 kg <sup>b</sup> ([20]) 40–70 kg ([47]) 40–82 kg ([69]) 41–65 kg ([91]) ~70 kg ([109])
<p><sup>a</sup>GRZIMEK ([50]) states 80–100 kg as the general weight but that is inconsistent with any other source except BRICKS ([20]) (cf. footnote <i>b</i>).</p> <p><sup>b</sup>The upper limit probably quotes GRZIMEK ([50]) (see footnote <i>a</i>).</p>	

Table 2.1: Measurements of the aardvark taken from different sources ([6, 7, 12, 20, 21, 44, 47, 50, 61, 69, 91, 109]).

Species <sup>a</sup> :	No. of hits at PubMed ([103]):	No. of hits at Zoologi- cal Records ([139]):	No. of hits at Google ([46]):	No. of hits at AltaVista ([9]):
<i>Orycteropus afer</i> :	9	43	~7,920	~12,500
<i>Proteles cristatus</i> :	12	53	~5,090	~6,430
<i>Myrmecophaga tridactyla</i> :	18	57	~9,790	~14,400
<i>Ceratotherium simum</i> :	49	240	~18,100	~41,800
<i>Diceros bicornis</i> :	82	422	~17,300	~46,800
<i>Syncerus caffer</i> :	164	266	~13,900	~32,500
<i>Loxodonta africana</i> :	180	1,172	~113,000	~129,000
<i>Panthera leo</i> :	307	589	~66,800	~556,000
<i>Panthera pardus</i> :	315	377	~50,900	~497,000

<sup>a</sup>The scientific names were chosen as there are often different trivial names and some also have further meanings — e.g. Aardvark (Aar) is the *Dictyostelium* homologue of  $\beta$ -catenin playing a role in adherens junctions ([23]) — which both would adulterate the statistics. If the genus name only was chosen instead of the full scientific name, the statistics would also give a wrong impression as some genera comprise several species: E.g. *Panthera* comprises the big cats whereas *Orycteropus* only has one recent species — the aardvark. So it does not make sense to list the common English name or the genus name here.

Table 2.2: Statistics on the occurrence of different species' names at different databases and search engines (accessed August 24, 2005).

Form:	Age of pupils in the form:	No. of pupils in the form:	No. of pupils who know the aardvark:
1:	5–7	14	—
2:	6–8	20	2
3:	7–9	27	—
4:	8–10	24	1
6:	10–14	21	2
<i>Total:</i>	5–14	106	5

Table 2.3: Statistics on the familiarity of the aardvark among German pupils. The pupils of all four forms of a primary school and the pupils of a 6th grade of a secondary modern school in the Main-Tauber-district have been asked whether they have ever heard of the aardvark. (The question was asked in German: ‘*Wer hat schon einmal was vom Erdferkel gehört?*’) It has to be stated here that in some forms more pupils put their hands up at first — what is typical in these classes — but after asking them more accurately the number of pupils quoted in this table was the result.



## 2.3 The name *Aardvark*

The English term *aardvark* comes from the obsolete Afrikaans<sup>4</sup> name. This again is derived from the two words *aarde* — meaning earth — and *vark* — meaning pig. The name is descriptive as the aardvark is a burrowing animal sleeping in a den<sup>5</sup> under the earth (*aard(e)*) (cf. chapter 7.1) and the outer appearance — at least on superficial examination — resembles a pig (*vark*) (cf. chapter 2.1). ([12, 47, 90, 96, 111])

The aardvark is sometimes referred to as *antbear* or *anteater*. The first term (*antbear*) is wrong as it describes the family of the *Myrmecophagidae*<sup>6</sup> which, however, is mostly referred to as the *anteaters* or more precisely the *American anteaters*. ([50, 126])

The term *anteater* has multiple meanings. Mostly it denotes the *Myrmecophagidae* in special or the *Edentata* in general. It sometimes, however, is used for very different myrmecophagous species as the antbears (see above), the echidnas<sup>7</sup>, the pangolins<sup>8</sup> and the aardvark<sup>9</sup>. So the term *anteater* can be taken as a general term for myrmecophagous mammals. In order to avoid misunderstandings, the aardvark is hardly ever referred to as (*Cape*) *anteater* in scientific literature. ([50, 126])

The aardvark is a fairly well-known mammal in English-speaking countries — at least for its name (cf. chapter 2.2). The clear reason is that the aardvark is the first animal if ordered alphabetically<sup>10</sup>, in any encyclopaedia. One has to add, of course, that the fame of the aardvark lies much behind animals like the ‘big five’<sup>11</sup> for instance. In non-English-speaking countries even the name of the aardvark is hardly known.

The scientific name of the aardvark is *Orycteropus afer*. The genus name *Orycteropus* is a concatenation of the Greek words *ὀρυκτήρ*<sup>12</sup> — meaning miner — and *πούς*, the genitive form of *ποδός* — meaning foot. The epitheton *afer* is the Latin word for African<sup>13</sup>, describing the origin of the aardvark (see chapter 5.2). ([5, 45, 78, 83])

In most languages the name of the aardvark is either derived from the scientific name *Orycteropus* or a translation of the descriptive Afrikaans name or both (cf. table 2.4).

<sup>4</sup>Afrikaans again is derived from Dutch (cf. table 2.4).

<sup>5</sup>A synonym for the English noun *den* is the term *earth* but the Afrikaans term *aarde* misses this meaning ([111]).

<sup>6</sup>With the species *Myrmecophaga tridactyla* (giant (or great) anteater), *Tamandua tetradactyla* (tamandua or collared (or lesser) anteater) and *Cyclopes didactylus* (two-toed (or dwarf, pygmy, silky) anteater).

<sup>7</sup>*Zaglossus* (long-beaked spiny anteater) and *Tachyglossus* (porcupine anteater).

<sup>8</sup>*Manidae* (scaly anteater).

<sup>9</sup>*Orycteropus afer* (Cape anteater).

<sup>10</sup>The aardwolf which is ordered second is already known at a much lower level.

<sup>11</sup>A term from the hunters’ dialect that subsumes the five African mammals that are most dangerous to hunt: lion (*Panthera leo*), leopard (*Panthera pardus*), elephant (*Loxodonta africana*), buffalo (*Syncerus caffer*) and rhino (both black (*Diceros bicornis*) and white (*Ceratotherium simum*)).

<sup>12</sup>Or even more probably a derivation of the Greek word *ὀρύκτης* — meaning digger, ploughshare or implement for digging ([78]).

<sup>13</sup>‘Of or connected with Africa, African’ ([45]).

<b>Afrikaans:</b>	erdvark, aardvark <sup>a</sup>
<b>Arabe locale<sup>b</sup>:</b>	aboundoullaf
<b>Bisa-Bemba<sup>c</sup>:</b>	inengo, pendwa, mphendwa
<b>Bulgarian:</b>	мраволд
<b>Chichewa<sup>d</sup>:</b>	godi
<b>Chinyanja, Nyanja<sup>c</sup>:</b>	mpendwa, impendwa, pendwa, mphendwa
<b>Czech:</b>	hrabáč kapský (hrabáč takaru)
<b>Danish:</b>	jordsvin ( <i>genus</i> ), det kapske jordsvin ( <i>species</i> )
<b>Dutch:</b>	aardvarken
<b>English:</b>	aardvark ( <i>genus &amp; species</i> ), Cape anteater <sup>e</sup> ( <i>species</i> )
<b>Esperanto:</b>	orikteropo ( <i>genus</i> ), orikteropo terporko ( <i>species</i> )
<b>Estonian:</b>	tuhnik
<b>Farsi:</b>	khuk-e khaki
<b>Finnish:</b>	maasika
<b>French:</b>	oryctérope, cochon de terre
<b>German:</b>	Erdferkel, Erdschwein <sup>f</sup> , Kapschwein <sup>f</sup>
<b>Goba<sup>c</sup>:</b>	gwiba, gweba
<b>Greek:</b>	ορυκτερόπους
<b>Hungarian:</b>	földi malac
<b>Irish:</b>	arcán talún
<b>Italian:</b>	oritteropo
<b>Kunda<sup>c</sup>:</b>	gwenu gwenu
<b>Manx<sup>g</sup>:</b>	muc hallooin
<b>Norwegian:</b>	jordsvin
<b>Polish:</b>	mrównik, prosię ziemne
<b>Portuguese:</b>	porco-formigueiro, oricterope, porco-da-terra
<b>Russian:</b>	трубкозуб ( <i>genus</i> ), капский трубкозуб ( <i>species</i> )
<b>Senga<sup>c</sup>:</b>	godi
<b>Serbo-Croatian:</b>	južnoafrički mravojed
<b>Shangaan<sup>h</sup>:</b>	xiyambana
<b>SiSwati<sup>i</sup>:</b>	sambane
<b>Spanish:</b>	cerdo hormiguero
<b>Swahili:</b>	muhanga, kukukifuku
<b>Swazi:</b>	s-ámbane
<b>Swedish:</b>	jordsvin, myrslok
<b>Turkish:</b>	yerdomuzu
<b>Xhosa<sup>h</sup>:</b>	ihodi

<sup>a</sup>Obsolete.  
<sup>b</sup>A local Arabic dialect in Chad.  
<sup>c</sup>A dialect in Zambia.  
<sup>d</sup>A dialect in Malawi.  
<sup>e</sup>Not very common; cf. chapter 2.3.  
<sup>f</sup>Uncommon.  
<sup>g</sup>A Celtic dialect of the inhabitants of the Isle of Man.  
<sup>h</sup>A dialect in South Africa.  
<sup>i</sup>A dialect in Swaziland.

Table 2.4: The name of the aardvark in different languages (a composition of different sources [50, 67, 69, 95, 109, 111, 126, 133, 135, 136] and personal notes (cf. game parks questionnaires in appendix A)).

## Chapter 3

# Anatomy & Physiology

This chapter describes the anatomy of the aardvark as well as some physiological items.

### 3.1 Skin

Aardvarks have no layer of fat and are hypotrichous<sup>1</sup> with a seminaked appearance<sup>2</sup>. The constant temperature in the burrow that equals the outside-temperature at night explains how aardvarks can live with that (cf. chapter 7.1). The skin is thick in order to protect the aardvarks from the bites of termites. While the newborns are yet bare-skinned, the pelage is most intense after a year. The coarse hairs are short and yellow to greyish brown on the body and longer and blackish on the limbs. Head and tail are pink-gray or whitish. Considering the colour of an aardvark one has to bear in mind, however, that they sleep in their subterranean dens and thus take on the earth-colour of the environment. The fur of many old individuals is heavily abraded. ([7, 12, 21, 42, 47, 50, 61, 69, 106, 109])

### 3.2 Extremities

The aardvarks' well-developed muscular tail has a strong resemblance to that one of a kangaroo on the surface. Its base has a circumference of approx. 40 cm and it is tapering to a point. The limbs are short with the hind legs longer than the forelegs. Also the hindquarter is heavier and higher than the front body. The legs are very strong though.

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<sup>1</sup>Sparsely haired.

<sup>2</sup>Except *Orycteropus afer capensis* with a more intense pelage ([106]).

Figure 3.1: Hind limb of aardvark. Taken from [140].

Figure 3.2: Upper jaw and teeth of aardvark. Taken from [141].

The long hoofed claws with their great spade-like nails at the forefoot (4 fingers) and the hind foot (5 toes) are specialized for digging (cf. figure 3.1); especially the front ones whereas the hind ones are shorter and weaker. They again act as a support for the massive body. The hind legs have calluses on the soles of the feet but aardvarks are digitigrades<sup>3</sup>. The calluses only touch the ground when the aardvark squats in front of a termite mound in its typical manner to dig it up (cf. chapter 6.1). ([7, 12, 21, 47, 50, 61, 69, 91, 106, 109, 123, 124])

### 3.3 Ingestion

Aardvarks are predominantly feeding on termites (see chapter 6.1). The long tongue is flattened and exsertile. It measures 25–30 cm and is made sticky by salivary glands which are strongly developed, especially the ones of the lower jaw. The saliva supports the feeding of termites through its adhesive effect. ([7, 12, 21, 47, 50, 123, 124])

While the embryos and infants have a complete dentition<sup>4</sup>, the incisors and canines of mature aardvarks are rudimentary. They have a dental formula of  $\frac{0.0.2.3}{0.0.2.3}$ . These premolars and molars are located at the back of the long slender snout and serve to crush the hard exoskeleton of termites. These homodont teeth are without enamel and have no roots. They grow durable and consist of dentine tubes<sup>5</sup> which are cemented to densely packed, parallel hexagonal prisms and are surrounded by columns of dentine (cf. figure 3.2). In the middle of these prisms there is a duct that is filled with dental pulp. The whole tooth is contained in a sleeve of dental cement. The largest tooth is the second molar and is build of about 1,500 such prisms. In variation to the regular dentition with five teeth in each half of the jawbones, aardvarks can also have four or six to seven teeth each. GRZIMEK reports of a full-grown aardvark which had two additional molars and even a canine that, however, was tiny and hiding in the gum ([50]). ([47, 50, 57, 69, 79, 92, 106, 109, 123, 124])

The special structure of the teeth is unique among all mammals. Several derivations have been made up. LÖNNEBERG ([79]) derives it from hypsodont teeth<sup>6</sup>. HEUSER ([58]) regards it as typical mammalian teeth with an early degeneration of the enamel pulp. The theories based on the idea of a polybunodont dentition<sup>7</sup> or a fusion of teeth ([59, 97]) are rather unlikely for they would imply a radical change of the feeding habit from highly specialized herbivores to insectivores. The most interesting theory, however, was made up

<sup>3</sup>Walking on their toes.

<sup>4</sup>40 vestigial milk teeth in dental cavities, 20 of them break through ([79]).

<sup>5</sup>Cf. the name of the order *Tubulidentata* (see chapter 4.1).

<sup>6</sup>Teeth with high crowns where the roots close late or even with a durable growth.

<sup>7</sup>Teeth with multiple eminences.

Figure 3.3: Aardvark skull. Taken from [127].

by PATTERSON ([100]), who suggests the development of the special teeth structure as a result from the symbiosis with the aardvark-cucumber *Cucumis humifructus* (cf. chapter 6.1). ‘*The gape and the nature of the jaw articulation would permit taking the fruit into the mouth, where it could be crushed by the teeth.*’ ([100])

The gizzard-like stomach of the aardvarks has a simple construction with one chamber and strong muscles at its pyloric region where the insects are processed. The caecum is big in comparison with other insectivores. ([47, 50, 57, 69, 91])

### 3.4 Senses

The aardvarks’ brain is primitive with an expression similar to the ones of the ungulates. However, according to the pronounced sense of smell, the olfactory lobe is greatly enlarged. Minutely convoluted bones and tissue radiating from there visibly swell the middle profile of the skull (cf. figure 3.3). Their function is to vastly increase the turbinal surface which helps processing the olfactory signals. Another anatomical aspect of the aardvarks’ sensitive olfactory sense is the highest number of *Endoturbinalia*<sup>8,9</sup>. The resulting extremely fine sense of smell is important for the location of termites. A further adaptation are thick, fleshy tentacles on the septum of the nose. They probably function similar to the appendages of the North American star-nosed mole (*Condylura cristata*). ([47, 50, 57, 69, 91])

Whiskers are spread out over the back and located in groups at the nostrils, the corners of the mouth, the bridge of the nose and above the eyes. They are longer than the regular hairs and probably play a role in digging. BIGOURDAN claims that the hairs at the nostrils were no whiskers but a kind of air filter ([19]). ([72])

The eyes of aardvarks are quite small. They have a size similar to the ones of hares which means they are small in relation to their body mass. The retina only consists of rods what makes the aardvarks colour-blind but what is also typical for nocturnal vertebrates because the rods are more sensitive for light as the cones. The visual faculty of aardvarks, however, is poor. They compensate this with their well-developed olfactory and hearing senses. ([21, 47, 50, 109, 106])

The large ears of aardvarks reminds one of donkeys. Even though not proven they probably act as thermo regulators. As with other species — especially those that live in deserts

<sup>8</sup>Aardvarks have 9, followed by *Xenarthra* with 8 and *Echidna* with 7 ([57]).

<sup>9</sup>*Endoturbinalia* are bony or gristly lamellas that reach from the olfactory pit (more precisely from the *Os maxillare*) into the lumen and enlarge the surface of the inner nose which is covered with the olfactory mucous membrane.

— the large surface can be used to cool down the animal via evaporative cold<sup>10</sup>. ([47])

Within the snout there is a labyrinth build-up of nine to ten thin bones. This is unique and also the highest number of all mammals. ([47, 50])

### 3.5 Sexual System

The uterus of the female aardvarks shows a resemblance to the one of rodents and hares. It is very primitive as it is still paired (Uterus duplex) and did not yet start to coalesce ([49]). The females have four teats; one pair at the lower hindquarter and the other one at the inguinal region. The number of lacteal ducts varies from one to three. ([47, 50])

The males are heavier and slightly larger than the females. The females again have lighter heads and their tail tip has a bright white. This might help the young to follow their mother.<sup>11</sup> ([21, 47, 69])

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<sup>10</sup>Cf. ALLEN's rule which, however, is only to apply in the field of species ([109]).

<sup>11</sup>Cf. the colour pattern on the backside of virtually all antelopes (some having it hidden on the bottom of their tail that they stretch up while fleeing).

# Chapter 4

## Taxonomy & Evolution

The chapter at hand deals with the taxonomy of the aardvark and describes its evolution.

### 4.1 Taxonomy

The aardvark *Orycteropus afer* is the only recent species of the order *Tubulidentata*<sup>1,2</sup>. ([47, 50, 57, 91, 109])

Even today the classification of the aardvark is still controversial. In early times the aardvark together with the pangolins (*Pholidota*) was wrongly ascribed to the order of the *Xenarthra*<sup>3,4</sup> ([27, 37]) but does not show any relation to them. Today both are assigned to their own isolated orders and the origin is clearly found in the primeval hoofed animals (see chapter 4.2). Similarities with the great anteater (*Myrmecophaga tridactyla*) arise from convergent evolution as a result of the same diet: In connection with the insectivorous food, the teeth are reduced and the tubular cranium as well as the long prehensile tongue are developed. The structure of the brain, the ears, the skeleton and the head muscles, however, show no signs for a relation to the *Xenarthra* or *Pholidota*. ([47, 50, 57, 100, 109])

Modern analyses have helped to clarify the position of the aardvark in the phylogenetic tree. A comparison of the amino-acid sequence of their myoglobin of the skeletal muscles with other species' myoglobin ([60]) as well as comparative analyses of the aardvark's complete mitochondrial DNA-sequence ([17, 119]) depict the aardvark lineage as one of

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<sup>1</sup>Derived from Latin: *tubus* — a pipe, tube; *-ulus* — diminutive suffix; *dens*, genitive *dentis* — a tooth; *-atus* — suffix meaning provided with ([5, 8, 83]).

<sup>2</sup>A descriptive name derived from the structure of the aardvark's specific teeth (cf. chapter 3.3)

<sup>3</sup>Some authors understood the *Xenarthra* as a suborder of an order named *Edentata* and grouped both, aardvarks and pangolins, to a new suborder named *Nomarthra* that stood next to the *Xenarthra* ([130, 131]).

<sup>4</sup>Another wrong theory was the derivation from the tertiary fossorials *Taeniodonta* ([57]).

Figure 4.1: Skeleton of *Phenacodus primaevus*. Taken from [102], altered.

the most ancient among *Eutheria*. The African clade<sup>5</sup> contains elephants, hyraxes, sea cows (dugongs and manatees), elephant shrews, golden moles, tenrecs and the aardvark. It is named as ‘*Afrotheria*’ and STANHOPE ET AL. ([120]) even suggest to summarise them into a new order called ‘*Afrosoricida*’ (African shrew-like mammals). The findings also show that the major radiation of recent Eutherian orders took place from a single common ancestor within quite a short span of time, between 110 and 90 Myr ago. During that time many still existent orders have diverged quickly. ([17, 60, 94, 101, 119, 120])

The recent aardvark (*Orycteropus afer*) was first described in 1766 by PALLAS. 15 to 18 subspecies<sup>6</sup> were described but most are based on single individuals only and can be considered to be invalid. The snout in particular is variable according to its proportions and angle and hence led to several descriptions of subspecies. ([50, 69, 106, 109, 142])

## 4.2 Evolution

Today it is undisputed that the aardvarks arose from a primitive form of the hoofed animals. This understanding — anything but obvious — came with numerous comparative analyses of the brain ([116, 118]), the tympanum ([66]), the dentition ([15, 79]), the skeleton ([38, 48, 76]) and the musculature<sup>7</sup> ([118]). Morphological and anatomical characteristics show a close relation to the 50-million-year-old fossil *Phenacodus* (see figure 4.1). Many authors define the polyphyletic grandorder *Ungulata* that unites the common hoofed animals from the orders *Paraxonia*<sup>8</sup> (even-toed ungulates) and *Mesaxonia*<sup>9</sup> (odd-toed ungulates) as well as some closely related orders. These are summarised as the *Paenungulata*<sup>10</sup>, the fossil *Amblypoda* and the *Protungulata* which represent the primitive forms of the hoofed animals. The most important order among them are the *Condylarthra* with the most famous genus *Phenacodus* (see above). ([12, 50, 57, 69, 123])

The *Condylarthra* are the most primitive group of the *Ungulata* and represent their origin<sup>11</sup> but the forms of the Early Tertiary (Palaeocene and Eocene) also show relations to

<sup>5</sup>Which is of Afro-Arabian origin ([120]).

<sup>6</sup>Best known are *Orycteropus afer aethiopicus* (SUND), *Orycteropus afer senegalensis* (LESSON) and *Orycteropus afer afer* (PALLAS) ([106]).

<sup>7</sup>An old-established alleged congruence of a certain head-muscle (*Musculus pterygo-tympanicus*) with the *Pholidota* and *Xenarthra* ([137]) (cf. chapter 4.1) was refuted and a derivation from the *Ungulata* instead was made clear ([39, 40]).

<sup>8</sup>Also referred to as *Artiodactyla*.

<sup>9</sup>Also referred to as *Perissodactyla*.

<sup>10</sup>Comprising the *Sirenia* (sea cows), *Proboscidea* (elephants and relatives), *Hyracoidea* (hyraxes) and sometimes the fossil order *Embrithopoda* though probably not closely related.

<sup>11</sup>At least the origin of the *Mesaxonia* ([50]).



Figure 4.2: Skeleton of *Orycteropus afer*. Taken from [140].

the *Insectivora* and the *Carnivora* (see below). Most *Condylarthra* were herbivorous<sup>12</sup> and the hooves were developed in this group. In addition to the *Condylarthra*, the order *Tubulidentata* belongs to the *Protungulata*<sup>13</sup>. The aardvark therefore is the last survivor of the primeval hoofed animals and so rightly called a ‘living fossil’<sup>14</sup>. Except the *Paraxonia* with more than 200 recent species the most successful and diverse time of the *Ungulata* — including the aardvarks — is passed. ([47, 50, 57, 69, 123, 124])

*Tubulidentata* and *Condylarthra* both have a quite primitive brain: The cerebrum is thin but a little furrowed; tectum and cerebellum are exposed ([121, 122, 138]). This structure also resembles the early *Carnivora* (cf. above). The path of the *Fissura rhinalis* shows great similarities with today’s *Ungulata* ([116]). Altogether it can be stated that aardvarks are not just ‘*persisting Condylarthra*’ ([84]) but they are survivors of the primeval hoofed animals which are specialized in a one-sided way. ([57])

Fossil findings show that the *Tubulidentata* originated in Africa<sup>15, 16</sup>. The oldest fossil findings date back to the Medium Tertiary (Miocene) and Early Quarternary (Pleistocene).<sup>17</sup> These findings already belong to the family of the *Orycteropodidae* and show great resemblance with today’s aardvarks in many points.<sup>18</sup> The fossil findings confirm that the type of the modern aardvark was already developed in the Medium Tertiary (Miocene) and that multiple lines coexisted at that time. Furthermore they show that the aardvarks were much more widespread than today (see chapter 5.2), as aardvarks of the genus *Orycteropus* also ranged in southern Europe and western Asia in the Pliocene and the genus *Plesiorycteropus*<sup>19</sup> on Madagascar in the Pleistocene. ([47, 50, 57, 69, 91, 99, 100])

It has to be stated here, however, that only very few<sup>20</sup> fossil individuals were found. Some species rely on parts of the skeleton of a single finding.<sup>21</sup> A reason therefore might be the fossorial way of life, as the bones of animals dying in burrows are particularly liable to

<sup>12</sup>Some early forms, however, were omnivorous.

<sup>13</sup>As well as the fossil orders *Tillodontia*, *Litopterna*, *Notoungulata* and *Astrapotheria*.

<sup>14</sup>As they show primitive characteristics both in the anatomical and the molecular sense ([47]).

<sup>15</sup>Formerly thought to come from Europe ([13, 81]) or — because of *Tubulon* (cf. footnote 17) — from North America.

<sup>16</sup>Note that the *Phenacodus* ranged in North America and Europe ([124]).

<sup>17</sup>Older findings from the Early Eocene that were formerly ascribed to the *Tubulidentata* turned out to belong to other orders: *Tubulon* (JESPER) ([65]) belongs to the *Palaeodonta* ([41, 114]) and also *Palaeorycteropus* (FILHOL) ([35]) and *Archaeorycteropus* (AMEGHINO) ([10]) are no *Tubulidentata* ([80, 113]).

<sup>18</sup>All findings from the Pliocene and Pleistocene belong to the genus *Orycteropus* and resemble the modern aardvark *Orycteropus afer* with the distinctions that these forms are smaller in size, the dentition is more primitive and the skeleton of the limbs differs ([16, 25, 26, 56, 70, 80, 98]).

<sup>19</sup>With fossil findings from Madagascar’s Holocene ([36]).

<sup>20</sup>About 150 in total, with most being highly incomplete ([100]).

<sup>21</sup>E.g. *Leptorycteropus guilielmi* and *Myorycteropus africanus* ([100]).

destruction by the action of plant roots and percolating rain water. A second cause might be the reduction of the teeth which could affect both, the collection and the recognition of the fossil findings. ([99], [100])

The genus *Myorycteropus*<sup>22</sup> has further fossorial adaptations subject to the limbs skeleton and has to be considered as a branch but not as the primitive form of *Orycteropus* ([80, 100]).

The genus *Plesiorhycteropus* ([74]) is only based on a few fragments of skulls and limbs. They differ from both *Orycteropus* and *Myorycteropus* but LAVOCAT puts them in the same family of the *Orycteropodidae* ([75]). However, no teeth have been found yet so a definitive classification is not possible ([73]). Thus, it is not even sure whether they were myrmecophagous but there are indications from the build of the skull that point against this. The branching of the genus *Plesiorhycteropus* probably goes back to the Paleocene and thus it can be regarded as the genus least related to the genus *Orycteropus*. The leg bones suggest that *Plesiorhycteropus* was able to dig and jump but also a climbing ability is not unlikely, as also in conformity with forested sediments at one place of discovery. The termite fauna of Madagascar included tree-dwelling species as well as ground-dwelling species and the *Plesiorhycteropus*' menu might have included both. ([99, 100])

The genus *Leptorycteropus* ([99]) represents the most generalized member of the *Tubulidentata*. It was very probably not specialized for myrmecophagy. Probably it ate termites and ants, like a lot of other omnivores do as well, but it was not dependent on them to a major degree. In addition, the digging abilities were far behind the ones of *Orycteropus*, but *Leptorycteropus* may have already dug its own burrows. ([99, 100])

The aardvarks were more numerous and diverse in the early Tertiary when they encountered little competition and there were only hyena-like *Creodonta* as predators. With the arrival of the *Carnivora* they then faced new enemies and competitors as well, as a number of the recent smaller African carnivores are insectivorous-omnivorous and some of their fossil ancestors were the same as well. ([99, 100])

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<sup>22</sup>With fossil findings from East Africa's Miocene ([57]).

# Chapter 5

## Habitat & Distribution

The habitat of the aardvarks as well as their population area are described in this chapter.

### 5.1 Habitat

Aardvarks avoid areas with solid or rocky ground for they are dependent on burrowing dens. For the same reason they do not live where the ground-water level is high, as it is in palustrine wetlands. Interestingly, however, they live in flood areas — providing a sandy, loose soil optimal for digging. The earth they prefer for digging their burrows, however, may be at some distance from the foraging areas, what makes aardvarks having quite low demands for their home ranges on one side. On the other side they are quite selective regarding the earth where they build their regularly used dens in. For example they might select a specific stratum in a highly stratified hill. ([7, 47, 50, 69, 82, 91, 106, 117])

In addition, the incidence of the aardvark strongly relies on the presence of termites as they are the virtually sole food source (see chapter 6.1). That is also the reason why aardvarks are not found in mountainous areas at heights much above 2,000 m (cf. chapter 9.1.2, however). ([7, 47, 50, 61, 69, 117])

Figure 5.1: Distribution of the aardvark (dark patches). Taken from [132].

Addo Elephant Park, Andries Vosloo, Augrabies Falls National Park, Baberspan, Ben Alberts, Ben Lavin, Bontebok, Borokalano, Botsalano, Cape of Good Hope, Caprivi, Central Kalahari, Chizarira, Chobe, Daan Viljoen, Doorndraai Dam, Erfenis Dam, Etosha, Gamkaberg, Gamkapoort, Goegap, Gona-re-zhou, Gorongosa, Hans Merensky, Hans Strijdom Dam, Hardap Dam, Hlane, Hluhluwe/Umfolozi, Hwange, Karoo, Kaudom, Khutse, Klaserie, Kommandodrift, Kruger, Langjan, Lapalala, Londolozi, Madikwe, Mahango, Makalali, Makgadikgadi Transfrontier Park, Mala Mala, Mamili, Manapools, Manyeleti, Maputo Elephant, Marakele, Mashatu, Matetsi, Matobo, Matusadon, Messina, Milwane, Mkuzi, Moremi, Mountain Zebra, Mudumu, Naukluft, Ndumo, Nxaipan, Nyala Ranch, Nyanga, Nylsvley, Percy Fyfe, Phinda, Pilanesberg, Rietvlei, Rolfontein, Roodeplaat Dam, Royal Natal, Rustenburg, SA Lombard, Sabie-Sand, Sabi-Sabi, Skeleton Coast, Soetdoring, Sterkspruit, St. Lucia/False Bay, Suikerbosrand, Tankwa Karoo, Tembe, Thomas Baines, Timbavati, Tswalu, Tussen-die-Riviere, Vaalbos, Von Bach, Waterberg Plateau, Weenen, West Coast, Willem Pretorius, Zambesi, Zuurberg.

Table 5.1: CILLIÉ ([21]) claims that aardvarks would range over the southern African game parks listed. CILLIÉ states another 24 parks where the aardvark ostensible does not occur. These data presume that almost 80% of southern Africa's game parks house the aardvark. The author has to add that the cited data seem to be affected with mistakes as he recognized plenty contradictions to other sources. Possibly incomplete data were used for this list (that contains 91 species) and filled in by guess. However, this list is quite expansive and therefore cited.

## 5.2 Distribution

The aardvark was originally found in the savannas of south, east, west and central Africa. Not until 1906<sup>1</sup> the aardvark was also found in the pristine forests of Cameroon and the Congo. Nowadays it is known that aardvarks are very adaptable and widespread apart from deserts (also cf. chapter 9.1.1). They occur wherever termites are abundant — from arid savannas to rain forests, however, they are rare in the latter. ([7, 21, 50, 69, 106, 117])

The present range of distribution of the aardvark can be described in a coarse manner as sub-Saharan Africa (cf. figure 5.1). Aardvarks are almost omnipresent (also cf. table 5.1). ([7, 50, 69, 91, 106, 109])

Former populations down the Nile valley and Hogar/Tassili mountains are extinct. ([69])

The Gonarezhou National Park (Zimbabwe), the Karoo National Park (South Africa), the Chobe National Park (Botswana), the Lake Elementeita (Kenya), the Masai Mara Nature Reserve (Kenya) and the Serengeti National Park (Tanzania) are stated as hot spots of aardvarks in the Lonely Planet Watching Wildlife guides ([12, 61]).

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<sup>1</sup>1941 it was encountered in Gabon ([106]).

## 5.3 Status

The armvark is still widespread. In some areas — mainly agricultural ones — it has been widely exterminated (cf. chapter 10.1) — with great impact on the local ecosystem (cf. chapter 7.1). It is not listed<sup>2</sup> on the 2004 IUCN Red List of Threatened Species<sup>TM</sup> ([63]). Products made out of armvarks, however, are subject to trade restrictions. ([47, 69])

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<sup>2</sup>In contrast, KINGDON states the conservation status of the armvark as vulnerable in all settled areas and endangered or even extinct in many other localities ([69]).



# Chapter 6

## Nutrition

This chapter deals with the nutrition of the aardvarks. Their diet is described as well as the manner in which they feed.

### 6.1 Nutrition

Aardvarks in general almost exclusively feed on termites<sup>1</sup> (cf. below, however). In savannas they mainly feed on the termite genera *Trinervitermes*, *Cubitermes* and *Macrotermes* and in rain forests they favour *Macrotermes* and *Hodotermes*. Also the genera *Odontotermes*, *Microtermes* and *Pseudacanthotermes* are on the menu of the aardvark. To satisfy their food demand with such a small species, aardvarks need to eat an enormous amount of individuals.<sup>2</sup> Feeding on single termites alone can hardly satisfy their needs. So it is insufficient to open out termite mounds and feed on the termites they can reach there. Actually most food is found on or very close to the surface. Aardvarks have to find large groups of termites and that means they have to locate the columns in which the termites migrate above ground during their collections. This is the way of harvesting termites of the genus *Trinervitermes* swarm in armies of thousands of individuals with a march length of ten to forty meters in the nights. Such huge columns, however, are not entirely destroyed. Probably the concentration of defending soldiers which alone cannot harm the thick skin of an aardvark is the deterrent. ([7, 12, 24, 33, 47, 50, 55, 61, 69, 91, 106])

Foraging aardvarks zigzag across an area of 30 m in a leisurely trotting speed<sup>3</sup> and sniff at the ground continuously. They prefer open, grassy country and stretches with low bushes and frequently use runways ([53, 129]). They often dig narrow exploratory trenches and

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<sup>1</sup>In zoos, however, they can change over to substitute diet quite easily (see chapters 8 and 9.2.2).

<sup>2</sup>BRICKS ([20]) maintains that an aardvark would feed on about 50,000 termites or ants respectively per night but to the author that number seems to be wrong in more than one order of magnitude as the much smaller aardwolves (*Proteles cristatus*) (about a fifth in size regarding the mass) already consume up to 250,000 ([61]) to 300,000 ([32]) termites per night.

<sup>3</sup>Similar to warthogs (*Phacochoerus africanus*) ([106]).

Figure 6.1: Aardvark feeding on termites. Taken from [34].

use their olfactory sense to detect the termites. They also use their good auditory sense<sup>4</sup> having their ears directed anteriorly. In locating termites the olfactory sense seems to dominate, however. ([7, 12, 33, 47, 50, 53, 61, 69, 91, 106, 129])

Besides tracking the above mentioned columns aardvarks dig up termite mounds. They can do so within a few minutes<sup>5</sup>. They squat in front of a termite mound and start to rip it open furiously. Using their sharp front claws they open up the hills just above the ground and create a single cavity of about 30–40 cm in diameter. Termites quickly appear to repair the damage of their climate tower and the aardvark catches them with its sticky tongue (cf. chapter 3.3). It is also said that aardvarks would press their snout onto truncated corridors and soak up the termites. More probably they try to stick in their long glutinous tongue (cf. figure 6.1). The aardvark digs in in layers much deeper, however, and feeds on the termites almost simultaneously. ([12, 21, 47, 50, 106])

Aardvarks do not empty a complete termite mound in a single night. They often go to the same mounds again in successive nights and continue their feeding. Aardvarks are regularly followed by aardwolves (*Proteles cristatus*) that lick up exposed termites left over by the aardvarks (cf. chapter 9.1.2). They are, however, too weak to rip open the termite mounds any further. ([61])

The tongue serves to transport the termites to the palate where they get scraped off once the tongue is stuck out again. Then the premolars and molars crush the hard exoskeleton but the termites do not get chewed any more than this.<sup>6</sup> Actually the poorly developed teeth are unsuited for more than that and they probably play a quite marginal role as at least one fossil aardvark species had no teeth at all (cf. chapter 3.3). The nostrils can be closed via muscular contraction. That ensures that termites cannot crawl into the snout. ([12, 47, 50, 69, 91])

A frequently uttered statement says aardvarks would dig up termite mounds preferably from the west — at least in the Karoo<sup>7</sup> (also cf. chapter 9.1.3). This comes from the study of DEAN & SIEGFRIED ([29]) who reported of a *‘highly significant number of diggings into the western quadrant’* of termite mounds and also that *‘the eastern part of the nest tended to be avoided and seldom excavated’*. The main reason probably is the movement of the termites. Because termites cannot generate much body heat as other social insects can due to their wings and flight muscles, something which are lacking at termite workers, they move to the periphery of the nest for warmth on cool days and especially to the western side in the evening as this side is shined on at last and is therefore the warmest

<sup>4</sup>Termites cutting or carrying dried grass are even audible to human ears.

<sup>5</sup>The termite mounds are so hard that a man needs an axe or other suitable tools to open it up.

<sup>6</sup>BRICKS even claims aardvarks would swallow the termites and ants without chewing except a single species of ants that would be chewed first ([20]).

<sup>7</sup>South Africa.



part of the termite mound ([24, 112, 115]). The digging into the western side of the termite mounds can thus be called optimal from an energetic point of view as the food intake is maximised while the energy expenditure at the same time is minimised because the highest number of termites is located at the side where the aardvark dug in. Other reasons trying to explain why the western side might be preferred are that the building materials might harden less at the shady side<sup>8</sup>, or because the queen cell could be located in the exterior surface of that area ([50, 106]). It has to be stated, however, that the theory of the optimal digging cannot always be confirmed. BERNARD & PEINKE ([18]) investigated if the digging is really optimal and came to the result that the preferred orientation differed both spatially and seasonally. Their results show that there was a preferred direction in any cases observed that was significantly different from random, but it was not always the western side. The differences cannot be finally explained but two important points come into play. First, termite soldiers and workers always congregate in areas of disturbance and thus they are a food resource independent of the orientation of the opening. Second, in most excavations the entire core of the termite mound is removed so that the aardvark has access to all four quadrants from the inside, and thus as well to the clustered termite nymphs. The differences might be a sign that the preferred digging direction is an acquired and not an innate behaviour (also cf. chapter 9.2.2). In conclusion it can be stated that the difference in temperature<sup>9</sup> is sufficient to allow the aardvarks to discriminate between the western and the southern side but the orientation nevertheless is not always the same. Due to their massive excavations, however, the aardvarks get access to most termites anyway. Finally, it has to be stated that aardvarks mostly do not rip open a termite mound straightaway, but instead they first do numerous scrapes to explore termite nests ([28, 89]). ([18, 29, 28, 50, 89, 106])

Termites are light sensitive and therefore they walk under corridors they specially constructed and most of all during the night, when sunlight cannot harm them. Also the above mentioned huge columns of termites swarm at night. That gives a clear reason why aardvarks are nocturnals — just because their food source can only be found in sufficient numbers during the night.

During the rainy months aardvarks almost only feed on ants if they find them in the termite mounds dug up but aardvarks do not specially track them. Not so in the dry season when aardvarks feed on them repeatedly. Favoured genera are *Anoplepis*, *Campotonotus*, *Crematogaster* and *Dorylus* but many more are also taken. In some areas the ants outnumber the termites and are better available and the aardvarks then switch over to them as their principal diet. ([7, 50, 69, 91, 106])

Termites and ants normally are not able to harm the aardvarks as their skin is too thick. Aardvarks are extremely resistant to their prey's chemical defences and can carry on until their body is entirely submerged in a termite mound. SHOSHANI, however, reports of one observation where an aardvark was bitten by ants and rolled over for three minutes on the hard ground ([47]). ([47, 61, 91])

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<sup>8</sup>The west is shined on not before the evening.

<sup>9</sup>23–5 degrees Celcius ([18]).

Aardvarks also feed on grasshoppers (*Saltatoria*) and beetles (*Coleoptera*) — especially of the family *Scarabidae* whose pupae and larvae can be found in lucrative numbers in some regions seasonally —, and it is even reported of a mouse (also cf. chapter 9.1.3). ([12, 47, 69, 100])

Another item on the one-sided menu of the aardvark is the cucurbit *Cucumis humifructus* growing below-ground. This species is called ‘aardvark-cucumber’ in South Africa and often grows near deserted aardvark burrows. As aardvarks bury their faeces (cf. chapter 7.1) they also bury the kernel of the cucurbit fruit. The locals believe aardvarks would consciously fertilize their field that way — a common interpretation known for a lot of animals<sup>10</sup>. It is undisputed, however, that albeit unconsciously, aardvarks really support the plants distribution that way<sup>11</sup>. Even more than that. Actually aardvarks are the only animals known to feed on this species and are critical for their dispersal. Ironically it’s also the other way round insofar as aardvarks are not feeding on any other cucurbits or even other fruit<sup>12</sup> and it is a mystery why they feed on this cucurbit of all plants available. MEEUSE ([87]) even describes this dependency as symbiotic. ([47, 50, 61, 86, 87, 106, 129])

The aardvark-cucumber is a melon-like member of the cucumber family. Its fruits ripen about 30 cm below ground<sup>13</sup> and therefore are safe from rodents and other seed-eaters — a reproductive strategy known as geocarpy. The fruits have a leathery, water-resistant rind that prevents them from rotting in damp soil. Germination of the seeds, however, is triggered by sunlight. The aardvarks excavate the fruit and eat it but the seed are excreted undigested. Certainly the faeces of the aardvark is burried, but only little and not deep enough to keep sunlight off completely. So the seeds can grow out in a nutrient-rich milieu of aardvark-dung. ([61, 86])

Feeding on the aardvark-cucumber might be a means to quench the aardvarks thirst<sup>14</sup> in water-poor regions as known from other species<sup>15</sup>. Normally aardvarks visit water holes frequently to drink there and cover their demand for water. ([47, 50, 61, 86])

Aardvarks eat a lot of earth together with their food and also during digging. ([91])

Mainly in the wet season when termites are most abundant, aardvarks can build up some fat deposits. ([69])

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<sup>10</sup>Cf. the jay (*Garrulus glandarius*) who burrows acorns in the fall as a food resource for the winter but does not find all caches again and that way supports the distribution of the oaks (*Quercus spec.*). Some European locals also interpret that as a conscious means of spreading the own food.

<sup>11</sup>A well-known strategy of spreading. Cf. the brown hyena (*Hyaena brunnea*) who is an important dispenser of the tsama melon (*Citrullus lanatus*) and other wild fruit seeds that are eaten but not digested ([32]).

<sup>12</sup>At least in free nature. They do so, however, in captivity (cf. chapter 8).

<sup>13</sup>Requiring loose soil ([100]).

<sup>14</sup>Other species alike have a water content of up to 95% ([32]).

<sup>15</sup>Cf. the ‘gemsbok-cucumber’ (*Acanthosicyos naudinianus*) that gets eaten for the same reason by gemsboks, mole-rats, jackals, honey-badgers, squirrels, porcupines, crickets and an array of other rodents and insects ([32]).

## 6.2 Comparison with other Myrmecophages

The aardvark is by far not the only myrmecophagous mammal. In Africa it coexists with the pangolins (*Manis spec.*), the aardwolf (*Proteles cristatus*), the cape fox (*Vulpes chama*) and the bat-eared fox (*Otocyon megalotis*). Partly striped polecat (*Ictonyx striatus*), small-spotted genet (*Genetta genetta*), yellow mongoose (*Cynictis penicillata*), jackals (*Canis spec.*) and honey badgers (*Mellivora capensis*) also feed on termites and ants. In other parts of the world there are also myrmecophages, like the giant anteater (*Myrmecophaga tridactyla*), the tamandua (*Tamandua tetradactyla*), the dwarf anteater (*Cyclopes didactylus*), the echidnas (*Zaglossus* and *Tachyglossus*) and some others.

If one only regards the strict myrmecophages, they all share some characteristics. They have a long slender snout, a sticky tongue being even longer and most of them also have strong limbs capable of digging. A lot of myrmecophages lack teeth which are not essential. Instead, the stomach with its very well-developed muscular pyloric area that acts as a gizzard grinds the food.<sup>16</sup> ([100])

The long nose that is a common feature of myrmecophagous mammals does not necessarily indicate a highly developed sense of smell in all cases. Nevertheless, most myrmecophages either have a very well-developed olfactory or auditory sense in order to locate the termites.

In southern Africa the aardvarks and the aardwolves are the two major mammalian predators on termites and their distribution overlaps completely ([117]). Both are nocturnal, but the aardwolf feeds by licking foraging parties of termites, usually *Trinervitermes trinervoides* ([33, 107]). These are nocturnal as the aardwolf but they are also active during the day in the cold winter months and so is the aardwolf ([32]).

Concluding, it has to be mentioned that none of the other myrmecophages competes with the aardvark because it is the most powerful digger and thus can reach prey which is not available for the other species. The aardwolf, however, often follows the aardvark in order to lick up some of the termites it left (cf. chapter 6.1).

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<sup>16</sup>In echidnas the stomach is simple and the food is ground by the spiny base of the tongue acting against spines on the palate ([100]).



# Chapter 7

## Behaviour

This chapter describes the behavioural pattern of armadillos.

### 7.1 Species Specific Behaviour

Armadillos are virtually strict nocturnals. They leave their dens not before complete darkness — around one or two hours after dusk — and they do so in a ritualized manner. First they remain motionless at the entrance for a few minutes and check the area for enemies (cf. figure 7.2 b)). Then they run out and do a few jumps to stop again after some meters. Now they straighten their body, prick up their ears and check the area again turning their head in all directions. Once more a few jumps are performed before the armadillo starts to pick up the scent while walking around the den in a semicircle. Then it leaves searching for food in its typical trotting gait. ([12, 50, 69, 106])

In isolated cases armadillos also leave their dens backwards but that seems to be the case only if the burrow is still under construction and the animal cannot turn around in the unfinished den. In that case they beat around with their strong tail while coming out. They never go into their den backwards, however. ([50])

The careful procedure while leaving the burrow is also typical for the armadillos' behaviour in general. That gives another explanation for the fact that armadillos are only rarely seen (cf. chapter 2.2).

Armadillos are mostly solitary or seldom gregarious (see chapter 7.2). They inhabit a large territory (see below). Both results in a low density of the armadillos — and thus once again in rare sightings. It is, however, not unambiguously proven that armadillos are territorial. There are areas with comparatively high densities of individuals where the home ranges overlap. ([21, 47, 50, 91])

Armadillos are almost exclusively active during the night (cf. figure 7.1). BIGOURDAN claims this habit as primeval in contrast to an adaptation to new conditions ([19]). They

Figure 7.1: Running aardvark at daylight. Taken from [4].

are seen only exceptionally during the day. EISMANN reports of an aardvark digging a burrow at lunchtime in South Africa ([31]). MALBRANT ([82]) encountered one in the Chad and GRZIMEK ([50]) and VERHEYEN ([129]) argue they would sometimes warm up after a cold night in the early morning hours. ([7, 12, 19, 21, 31, 50, 61, 69, 82, 91, 106, 109, 129])

Aardvarks are good swimmers. VERHEYEN reports of an aardvark that crossed a 20 m wide strong-flowing water to get to an island ([129]). SHOSHANI claims aardvarks would be frequently seen at water holes and they would also swim there ([47]).

Aardvarks can cover a long distance. They walk two to ten kilometres each night.<sup>1</sup> In single cases they can walk 15 km or even up to 30 km in a single night. The distance they cover largely depends on the frequency of the occurrence of termites. In areas with a good food supply they are rather philopatric<sup>2</sup> and inhabit a distinct home range of 2–4.7 km<sup>2</sup>. In such an area they visit the same termite mounds in a specific order what leads to an equilibrium of the natural growth of the termite populations and their reduction through the aardvark. ([1, 32, 47, 50, 88, 91, 106, 129])

Aardvarks are less active during the cold, dry months (May to August) (also cf. chapter 9.2.4). VAN AARDE ET AL. ([2]) recorded their activity periods from 1930 h to 0530 h in summer and 1800 h to 0130 h in winter. Also the mean foraging speeds were lower during winter and the aardvarks travelled significantly shorter distances per night then.

Aardvarks are very good and quick burrowers — the best in Africa<sup>3</sup>: They can unearth prey which is too hard for any other predator and they are the most productive diggers of all African mammals. As reported above, aardvarks — especially the males (see below) — usually do not inhabit a strict home range but move along an area and burrow a new den every few days or weeks — depending on the food supply. In contrast to most other cave-dwelling mammals<sup>4</sup> aardvarks burrow their dens themselves. Moving frequently, other animals get the possibility to move into the deserted burrows. That way the aardvark plays an important role in the ecology of many other animals, amongst them also cave-dwelling mammals. ([21, 33, 50, 61, 69, 106])

One of the most numerous beneficiaries are the warthogs (*Phacochoerus africanus*) who frequently inhabit left aardvark burrows. In some areas even their occurrence depends on the deserted dens. Also hyenas<sup>5</sup> use the aardvark burrows. Sometimes the dens have

<sup>1</sup>MELTON calculated a mean nightly distance travelled as 9.6 km — what can be already reached within one hour —, with a maximum estimated distance of 14.7 km ([88]).

<sup>2</sup>Fidel to place.

<sup>3</sup>Followed by the honey badger (*Mellivora capensis*) ([33]).

<sup>4</sup>They frequently use existing burrows and sometimes enlarge and adapt them.

<sup>5</sup>Especially the widespread spotted hyena (*Crocuta crocuta*) but also the brown hyena (*Hyaena brun-*

a) b)

Figure 7.2: a) Burrowing aardvark. Taken from [34]. b) Aardvark in den. Taken from [64].

multiple inhabitants and in some cases even enemies might use the same burrow. Thus, it occurs that a hyena inhabits the den during the day and after leaving it in the evening a warthog comes to rest there for the night.<sup>6</sup> Not only the above mentioned mammals often inhabit deserted aardvark burrows but also a lot of other animals such as jackals<sup>7</sup>, rock dassies<sup>8</sup>, ground squirrels<sup>9</sup>, hedgehogs<sup>10</sup>, hares<sup>11</sup>, genets<sup>12</sup> and mongooses<sup>13</sup>, porcupines<sup>14</sup> and other nocturnals as well as reptiles<sup>15</sup>, birds<sup>16</sup> and bats<sup>17</sup>. In addition aardvark burrows can protect a lot of animals from bush fires. This ecological meaning of the aardvark is of great importance and demonstrates the massive side-effects of extermination of aardvarks. ([12, 30, 43, 47, 50, 69, 106, 109, 129])

When burrowing, they use their massive front claws and then scabble the loose soil to the back with their feet and then further on with the muscular tail (cf. figure 7.2 a)). Around the entrance of their den the thrown out earth forms a semilunar hillock that can easily be identified as the soil from deeper strata differs from the environment in colour. The condition of this thrown out earth gives information on whether the den is inhabited at the moment or not. While tunneling the aardvarks close and fold back their big ears. With their technique aardvarks are very quick burrowers — provided the soil is appropriate. ([7, 50, 106])

The entrances of the burrows are frequently located close to tree trunks or termite mounds. This fact is maybe correlated to an open question, namely how aardvarks breathe while tunneling — particularly when the burrow is plugged (see below). HEDIGER suggests aardvarks would hold their breath as diving mammals do and the close proximity to termite mounds or tree trunks might additionally ensure a basal level of fresh-air supply ([54]). ([54, 106])

Aardvarks build three different kinds of burrows. For overnight use after foraging they often dig short tunnels of only a few meters they never use again except if danger threatens them. These are often referred to as ‘camping holes’. Aardvarks might also use empty

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nea).

<sup>6</sup>Personal report of a South African guide.

<sup>7</sup>Black-backed jackal (*Canis mesomelas*) and side-striped jackal (*Canis adustus*).

<sup>8</sup>*Procavia capensis*.

<sup>9</sup>*Sciuridae*.

<sup>10</sup>*Erinaceidae*.

<sup>11</sup>*Lepus spec.*.

<sup>12</sup>*Genetta spec.*.

<sup>13</sup>*Herpestidae*.

<sup>14</sup>*Hystrix africaeaustralis*.

<sup>15</sup>*Reptilia* such as lizards (*Varanus spec.*) and pythons (*Python spec.*).

<sup>16</sup>*Aves*, especially owls (*Strigidae*).

<sup>17</sup>*Chiroptera*.

termite mounds as a temporary refuge. The second kind are their dens which are normally build-up of a straight tunnel ending in a small roundish room. The tunnel generally has a slope of 100%, a diameter of about 40 cm and a length of 1–3 m. The room is the place for sleeping but it is not particularly prepared as known from other animals, except some loose soil covering the ground. It is large enough to allow the armadillo to turn around inside in order to leave the den walking forward<sup>18</sup>. ([7, 21, 32, 47, 50, 53, 54, 69, 106, 128])

The described den represents the typical form. Armadillos return to the same dens repeatedly. They are used by one individual only, apart from mothers with their offspring. Occasionally systems with additional entrances are found. They can have eight or more entrances but they are normally plugged, sometimes with a vent window left open. Also the main tunnel may branch into a few short lateral tunnels. This is the third kind of burrow armadillos dig. They are the permanent refuge-burrows where also the young are born<sup>19</sup>. These long, many-chambered dens can reach a total length of some ten meters<sup>20</sup> and may descend as deep as 6 m. They are, however, mostly build by the females while the males are much less sedentary. In some areas with a great abundance of armadillos some of those well established refuge-burrows might be used by more than two or three individuals — mostly breeding females. ([7, 12, 21, 47, 50, 69, 106, 128])

HEDIGER examined armadillo burrows in the Congo ([54]). He found 27 entrances in an area of 400 m<sup>2</sup>. In a depth of 1.1–1.8 m they had a fork, and often a blind tunnel. The function of them probably is to store earth inside that can be used to plug the entrance (see above and below).

The temperature in the burrow has almost a constant value. GRZIMEK ([50]) reports of measurements taken in northern Congo. A temperature of 24 degrees Celcius has been measured during the whole day. While the outside temperature at night was also 24 degrees Celcius, the daily temperature exceeded 30 degrees Celcius by far. ROUBAND ([106]) and GEIGY ([42]) made corresponding observations. This shows that the armadillo does not have to deal much with changing temperatures and thus explains why armadillos can do without a lagging<sup>21</sup> (cf. chapter 3.1). ([42, 50, 106])

The main enemies of armadillos are lions (*Panthera leo*), leopards (*Panthera pardus*) and hyenas (especially the spotted hyena (*Crocuta crocuta*)). For healthy armadillos are extremely defensive (see below) they get hunt quite seldom, however. Weak individuals, i.e. old and sick ones, also get hunt by cheetahs (*Acinonyx jubatus*) and wild dogs (*Lycan pictus*). RAHM ([106]) reports that pythons (*Python spec.*) occasionally creep in armadillo burrows and eat the offspring. ([21, 47, 50, 106])

In some areas man hunts armadillos for their meat (see chapter 10.1). ([47, 50])

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<sup>18</sup>In contrast to the warthog (*Phacochoerus africanus*) where the adults push themselves into the burrow backwards ([43, 106, 129]).

<sup>19</sup>A female regularly gives birth in the same burrow (see chapter 7.2) ([106]).

<sup>20</sup>Entrances to the same system can be up to 14 m distance from each other ([106]).

<sup>21</sup>A lagging in other mammalian species is realized in the form of a layer of fat under the skin or a massive hair covering.



In order to protect themselves aardvarks mostly close the entrance of their burrow with a pile of soil from inside (cf. above). ([12, 21, 32, 50])

If aardvarks get hunt, they either quickly perform a few jumps and then trot away or dig themselves in (also cf. chapter 9.1.2). They need about ten minutes to completely bury themselves and their extremely thick and tough skin (cf. chapter 3.1) protects them meanwhile. Caught in their den — or if humans dig it up —, aardvarks first dig into the depth and then out to the surface. If flight was not successful or not possible, their last defense is to either stand on their hind legs and tail or to lay on their back and to fight with their front claws. They can get very tempestuous and aggressive. ([12, 47, 50, 100, 106, 128, 129])

Aardvarks bury their faeces. They bury a hollow of about 10 cm with their forefeet and drop their olivaeform faeces inside. Then they cover it up with earth. The faecal pellets measure about 1.2–1.5×2.5 cm. Aardvarks do not defecate in their den but bury their droppings in the close vicinity. That is how aardvarks support the distribution of the so-called ‘*aardvark-cucumber*’ (*Cucumis humifructus*) (see chapter 6.1). A reason why they bury their faeces might be — as it probably counts for the aardwolf (*Proteles cristatus*) — that it stinks of ammonia for it contains the degradation products of the repellent of the eaten termite soldiers. ([33, 50, 54, 91, 106, 129])

The aardvarks emotional language consists of snuffling with the nose held close to the ground and occasional grunting. In extreme fear they might also bleat but usually they are just silent. PÉCAUD describes sounds similar to the ones of hippopotamus (*Hippopotamus amphibius*), however, less noisy ([106]). The digging itself, however, is very noisy. ([12, 21, 69, 91, 106])

## 7.2 Sexual Behaviour

There is not much knowledge about the breeding in free nature. Mating time seems to vary locally. In southern Congo aardvarks mate approximately from April to May and the young are dropped in October or November. By contrast aardvarks in South Africa and Ethiopia already give birth from May to July<sup>22</sup>. SHOSHANI suggests the dependency following the geographical latitude: The closer aardvarks live to the equator the later those populations mate ([47]). ([6, 47, 50, 129])

The male aardvarks stay together with the females during mating time but only for short. During this time they both inhabit the same burrow. Male aardvarks are supposed to be polygamous. ([106])

The oestrus shows through a swelling of the vagina. Sometimes even an efflux gets visible. Glands at the testicles secrete a strong musk and also the vulva has well-developed scent glands. Both sexes have glandular areas on the elbows and hips. Probably they play a role in mating and possibly also in the spacing of individuals (cf. chapter 7.3). ([47, 69, 91])

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<sup>22</sup>EISMANN even reports of a birth in South Africa in January to February ([31]).

a) b)

Figure 7.3: Baby aardvarks: a) taken from [3], b) taken from [108].

The gestation time takes about just under seven months. Aardvarks are monotocous<sup>23</sup>, twins are born quite seldom. The young normally weighs about 2 kg<sup>24</sup> and measures around 55 cm. Although naked it is born already quite mature with its eyes opened and well-developed claws. ([7, 12, 21, 44, 47, 50, 61, 69, 91, 106, 129])

The mother does not prepare a special lair for the birth which takes place in the room of their den (cf. chapter 7.1). The offspring stays there for about two weeks, even during the time its mother is on foraging. Then it starts to accompany its mother for short forays. At that time the mother buries a new den for both of them about once a week. With an age of three months the offspring starts feeding on insects. After six months it begins to become independent of its mother and starts to bury its own den that is only a few meters<sup>25</sup> away from the mother's den at the beginning. The mother again quite usually returns to the den where she dropped her offspring. Mother and offspring are still foraging together. ([12, 47, 50, 69, 91, 106, 129])

With the next mating period the tie between mother and offspring relaxes. Males leave their mothers at that time while females stay longer with them. Sometimes aardvarks are seen with offspring of two age-groups when the female offspring remains with the mother. Males, however, only accompany females in the mating period and stay solitary for the rest of the year. ([47, 50, 69, 106, 129])

The aardvarks reach sexual maturity at an age of about two years.<sup>26</sup> The life span amounts up to 18 years<sup>27</sup> in free nature. ([47, 69, 106])

SHOSHANI reports of a captive female who gave birth to 11 young in its life span of 16 years; a male growing 24 years fathered 18 young ([47]). Comparable data of free ranging aardvarks is not available but it can be estimated at just under one young each year in the adult age.

### 7.3 Social Behaviour

Subject to the elusive life-style of the aardvarks there is not much knowledge about their social behaviour. In zoos frequently some individuals are kept together and they are very tolerant — even if they are of the same sex. They mostly sleep together with an intense skin contact (see chapter 9.2.4). ([106])

<sup>23</sup>They usually give birth to a single young.

<sup>24</sup>VAN AARDE quotes 1.3–1.9 kg ([91]).

<sup>25</sup>5–50 m ([106]).

<sup>26</sup>Deduced from the observation that the offspring stays with its mother for two years.

<sup>27</sup>Expecting  $\pm 10$  years ([21]).

Even though usually solitary in free nature there also exists a social behaviour beyond the sexual behaviour. As discussed in the last section (chapter 7.2), armadillos have well-developed scent glands at their genitals. These are pressed onto the ground while feeding and defecating and they probably play a role in the social communication between the individuals. It is not clear, however, if they can be interpreted as territorial markings. As stated in chapter 7.1, home ranges might overlap if food supply is sufficient. Anyhow, aggression between armadillos have been observed and some were even lethal. ([91])



## Chapter 8

# Maintenance in Captivity

This chapter introduces in short the keeping of aardvarks in zoos. It can be understood as a preparatory chapter for the evaluation of the zoos questionnaire's survey (see chapter 9.2).

The first aardvark kept in a zoo was displayed in London. It was captured in South Africa and arrived in London in 1869. ([50])

The zoos keeping aardvarks today which could be detected during the research of this thesis are mentioned in table 8.1.

Even though aardvarks are nocturnals and sleep during the day, they can — depending on husbandry and atmospheric conditions — change their rhythm and get active by day in some zoos. A great many of zoos, however, keep aardvarks in a house with reversed time period which means their enclosures are illuminated during the night and kept at an artificial night light during the day. As probably all mammals aardvarks have a circadian rhythm. An endogenous clock<sup>1</sup> gets synchronized daily by an entrainment. This is the light regime in the first place<sup>2</sup>. In the night houses of zoos one takes advantage of this and adjusts the endogenous clock of the kept individuals and with it their activity period to adapt it to the visiting hours. ([50, 93])

In order to cover the food requirements of aardvarks in zoos it is impossible to feed them with termites. They can, however, change over to substitute diet quite easily (also cf. chapter 9.2.2). In zoos they are fed with a mixture of hash, eggs, oatmeal and milk. Sometimes worms and ants or fruit are added. Beyond this they get some vitamins to cover their needs for nutrients. In former times also a few drops of formic acid were admixed. ([50, 106])

The breeding of the aardvark in European zoos is organized by the European Studbook Programmes. The data on the Quantum-Conservation Register ([104]) quotes no animals and no zoos are participating in the programme. This, however, is wrong and in contrast

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<sup>1</sup>The supra-chiasmatic nucleus ([93]).

<sup>2</sup>Social contacts e.g. also play a role.

**Europe:**

- Zoo of Antwerp, Belgium
- Zoological Garden Prague, Czech Republic
- Randers Regnskov, Denmark
- (Copenhagen Zoo, Denmark)<sup>a</sup>
- Frankfurt Zoo, Germany
- Zoologischer Garten Saarbrücken, Germany
- Burger's Zoo En Safari, Arnhem, The Netherlands
- Ogród Zoologiczny, Poznan, Poland
- Colchester Zoo, UK
- Suffolk Wildlife Park, UK

**USA:**

- Montgomery Zoo, AL
- San Diego Wild Animal Park, Escondido, CA
- Brookfield Zoo (Chicago Zoological Society), IL
- Lincoln Park Zoological Gardens, Chicago, IL
- Rolling Hills Zoo, Salina, KS
- Detroit Zoological Institute, MI
- Minnesota Zoological Garden, Apple Valley, MN
- Omaha's Henry Doorly Zoo, NE
- Prospect Park Zoo, Brooklyn, NY
- Cincinnati Zoo & Botanical Garden, OH
- Philadelphia Zoological Garden, PA
- Memphis Zoological Garden & Aquarium, TN
- Point Defiance Zoo & Aquarium, Tacoma, WA

**Africa:**

- Lichtenburg Game Breeding Centre, South Africa

**Asia:**

- Ueno Zoological Gardens, Tokyo, Japan
- Shizuoka Nihondaira Zoo, Japan
- Nagoya Higashiyama Zoo, Japan
- Toyohashi Zoo, Japan
- Himeji City Zoo, Japan
- Hiroshima City Asa Zoological Park, Japan

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<sup>a</sup>Copenhagen Zoo does not keep aardvarks any more since the last one died in 1961 but due to a mistake this individual is still listed in the ISIS database ([62]). Since the mistake has not yet been corrected the author decided to itemize the Copenhagen Zoo in this list.

Table 8.1: Zoos keeping aardvarks.

the studbook is very actively co-ordinated. The European Husbandry Guidelines have almost been completed and will be available to both the institutions keeping aardvarks, as well as those looking for a possibility to keep this species in future.

Much more information on the keeping of aardvarks is given in chapter 9.2.





## Chapter 9

# Evaluation of the Game Parks and Zoos Questionnaires' Survey

This chapter evaluates the game parks and zoos questionnaires' survey.

### 9.1 Results of the Game Parks Questionnaire's Survey

The blank form of the questionnaire as well as the answers received can be found in appendix A. The aims of the questionnaires asked are stated in chapter 1.2.

The survey was sent to 158 addressees all over Africa (see table 9.1). 35 answers from six countries<sup>1</sup> were received. This is equivalent to a ratio of 22.2% and thus shows the great amount of cooperation and interest in the countries involved.

A main reason for receiving only little response from Central Africa is that the questionnaire was sent out by email and that this media is sparsely spread in those countries. Regarding most countries only some appropriate addresses of game parks or national departments were found whereas the media is widespread in South Africa and Zambia and a number of addresses could be found rather easily for those countries (cf. table 9.1).

The following subsections will evaluate the information received through the survey. Questions 1, 2 and 22, however, will not be evaluated for they were of administrative nature only.

<b>Country:</b>	<b>No. of mails sent<sup>a</sup>:</b>	<b>No. of completed questionnaires sent back:</b>
<i>Benin:</i>	1	—
<i>Botswana:</i>	3	—
<i>Chad:</i>	1	1
<i>Egypt:</i>	1	—
<i>Ghana:</i>	2	—
<i>Ivory Coast:</i>	2	—
<i>Kenya:</i>	10	—
<i>Liberia:</i>	1	—
<i>Malawi:</i>	8	2
<i>Morocco:</i>	2	1
<i>Mozambique:</i>	1	—
<i>Namibia:</i>	2	—
<i>Nigeria:</i>	2	—
<i>Rwanda:</i>	1	—
<i>South Africa:</i>	54	15
<i>Swaziland:</i>	6	1
<i>Tanzania:</i>	4	—
<i>Togo:</i>	1	—
<i>Uganda:</i>	1	—
<i>Zambia:</i>	53	15
<i>Zimbabwe:</i>	2	—
<i>Total:</i>	158	35
<i>(Embassies and other diplomatic institutions:)</i>	(43)	(13 <sup>b</sup> )

<sup>a</sup>Faulty addresses and reminders (up to two) not counted.  
<sup>b</sup>No. of answers received.

Table 9.1: Statistics on the game parks survey.

**Question 3:** *'Do aardvarks occur in your game park?'***Answer:**      **Frequency:**

<i>definitely yes</i>	26 <sup>a</sup>
<i>probably yes</i> <sup>b</sup>	3 <sup>c</sup>
<i>unknown</i>	(1) <sup>d</sup>
<i>probably no</i>	1 <sup>e</sup>
<i>definitely no</i>	5 <sup>f</sup>

<sup>a</sup>One answer '*probably yes*' was assigned to this item, for question 4 was answered with '*monthly*' in the same questionnaire: Ana Tree Lodge, Lower Zambezi National Park, Zambia (cf. appendix A.24).

<sup>b</sup>Can be understood insofar as aardvarks do exist but are not seen.

<sup>c</sup>Sausage Tree Camp, Lower Zambezi National Park, Zambia (cf. appendix A.27); Protea Safari Lodge, Lusaka National Park, Zambia (cf. appendix A.28); Luamfwa Lodge, South Luangwa National Park, Zambia (cf. appendix A.35).

<sup>d</sup>Chosen twice together with '*probably no*': see footnote *e*.

<sup>e</sup>West Coast National Park, South Africa. The aardvark existed in the past but was probably driven away by farmers and their practices (see appendix A.19).

<sup>f</sup>Morocco in general (cf. appendix A.5); Golden Gate Highlands National Park, South Africa (cf. appendix A.9); Knysna Lake Area, South Africa (cf. appendix A.13); Table Mountain National Park, South Africa (cf. appendix A.18); Wilderness National Park, South Africa (cf. appendix A.20).

Table 9.2: Answers to question 3: *'Do aardvarks occur in your game park?'*

### 9.1.1 Distribution & Activity Rhythm

#### Occurrence of Aardvarks

The answers to question 3 (*'Do aardvarks occur in your game park?'*) are summarized in table 9.2. It can be roughly concluded that the aardvark occurs in 29 of the parks and does not occur in the other 6 parks. More precisely, it has to be said that one of the answers does not apply for a single park but rather for a whole country, namely for Morocco, where the aardvark does not occur at all. The data collected is not extensive enough by far to map nowadays range of the aardvark and no deviating information was found. The absence of aardvarks in Morocco is not surprising as aardvarks mainly live in sub-Saharan Africa (cf. chapter 5.2). The other areas where the aardvark does not occur are only local and go with the demands for the habitat (see chapter 5.1): The Golden Gate Highlands National Park (South Africa, cf. appendix A.9) is situated at a great altitude and lacks termites, the Knysna Lake Area (South Africa, cf. appendix A.13) is an estuary, the Table Mountain National Park (South Africa, cf. appendix A.18) has a rocky soil and the West Coast National Park<sup>2</sup> (South Africa, cf. appendix A.19) and the Wilderness National Park (South Africa, cf. appendix A.20) are coastal areas. Thus the data collected confirm that aardvarks are still widespread as they occur in all the parks that provide an appropriate habitat.

Please note that these six areas<sup>3</sup> where the aardvark does not occur are not taken into consideration in the rest of this chapter.

Three game parks<sup>4</sup> made no statements on questions 4 and following questions for there exist aardvarks but they are never or at least extremely rarely seen. One of those parks<sup>5</sup> does not make night drives at all so it is not surprising that the aardvark is hardly ever sighted there. In the following text the three parks mentioned (cf. footnote 4) will be ignored.<sup>6</sup>

#### Frequency of Aardvark Sightings

The answers to question 4 (*'How frequently is the aardvark sighted in your park (approximately)?'*) are summarized in table 9.3. They show that aardvarks are rarely seen almost everywhere. In most parks they are seen monthly to annually. The location where they

<sup>1</sup>Namely Malawi, Morocco, South Africa, Swaziland, Chad and Zambia (cf. table 9.1).

<sup>2</sup>Note that — even though not an ideal habitat — aardvarks ranged over this park in the past, however (see appendix A.19 and also cf. table 5.1).

<sup>3</sup>Morocco in general (cf. appendix A.5); Golden Gate Highlands National Park, South Africa (cf. appendix A.9); Knysna Lake Area, South Africa (cf. appendix A.13); Table Mountain National Park, South Africa (cf. appendix A.18); Wilderness National Park, South Africa (cf. appendix A.20).

<sup>4</sup>Protea Safari Lodge, Lusaka National Park, Zambia (cf. appendix A.28); Mutemwa Lodge, Sioma Ngwezi National Park, Zambia (cf. appendix A.30); Luamfwa Lodge, South Luangwa National Park, Zambia (cf. appendix A.35).

<sup>5</sup>Mutemwa Lodge, Sioma Ngwezi National Park, Zambia (cf. appendix A.30).

<sup>6</sup>All the questions could have been negated for these parks alternatively.

**Question 4:** 'How frequently is the aardvark sighted in your park (approximately)?'

**Answer:**            **Frequency:**

<i>daily</i>	1 <sup>a</sup>
<i>weekly</i>	3 <sup>b</sup>
<i>monthly</i>	8 <sup>c</sup>
<i>annually</i>	7
<i>almost never</i>	5

<sup>a</sup>Zakouma, Chad (cf. appendix A.22).

<sup>b</sup>Chiawa Camp, Lower Zambezi National Park, Zambia (cf. appendix A.25); Flatdogs Camp, South Luangwa National Park, Zambia (cf. appendix A.31); Kapani Lodge, South Luangwa National Park, Zambia (cf. appendix A.32).

<sup>c</sup>Addo Elephant National Park, South Africa (cf. appendix A.6); Augrabies Falls National Park, South Africa (cf. appendix A.7); Mapungubwe National Park, South Africa (cf. appendix A.15); Mountain Zebra National Park, South Africa (cf. appendix A.16); Malolotja Nature Reserve, Swaziland (cf. appendix A.21); Ana Tree Lodge, Lower Zambezi National Park, Zambia (cf. appendix A.24); Luangwa River Lodge, South Luangwa National Park, Zambia (cf. appendix A.34); Robin Pope Safaris, South Luangwa National Park, Zambia (cf. appendix A.36).

Table 9.3: Answers to question 4: 'How frequently is the aardvark sighted in your park (approximately)?'

**Question 10:** *'Did sightings of the aardvark increase, decrease or stay constant in the past ten years in your park?'*

<b>Answer:</b>	<b>Frequency:</b>
<i>decrease</i>	1 <sup>a</sup>
<i>stay constant</i>	8
<i>increase</i>	2 <sup>b</sup>
<i>cannot tell</i>	13

<sup>a</sup>Liwonde National Park, Malawi (cf. appendix A.3)

<sup>b</sup>Addo Elephant National Park, South Africa (cf. appendix A.6); Chiawa Camp, Lower Zambezi National Park, Zambia (cf. appendix A.25).

Table 9.4: Answers to question 10: *'Did sightings of the aardvark increase, decrease or stay constant in the past ten years in your park?'*

are most frequently seen is Zakouma in Chad — almost every day. This, however, is an absolutely exception. At least two<sup>7</sup> of the three parks<sup>8</sup> that ticked the item *'weekly'* apply the question to the whole park and not only to the area of their camp. Thus it can be concluded that apart from Chad the aardvark is only seen rarely everywhere.

It is also important to mention that the parks where the aardvark is only annually seen or almost never, carry out only relatively few night drives. Six of the parks make night drives daily, but five only irregularly and one does not make night drives at all. In summary it may be said that aardvarks — although abundant — are seen quite seldom. On top of this aardvarks are very shy and cautious so the sightings of aardvarks usually only last for short. That is also the reason why there were only very few positive answers to questions of behaviour.

The answers to question 10 (*'Did sightings of the aardvark increase, decrease or stay constant in the past ten years in your park?'*) are drawn up in table 9.4. The result is that no dramatic changes of the overall population sizes were determined. That is according to the parks, however, and might differ in unprotected areas. The author's impression compiling multiple statements confirms the stable stock abundance also in unprotected areas though.

**Question 5:** *'Do you make night drives in your park?'*

**Answer: Frequency:**

<i>yes</i>	22
<i>no</i>	2

**Question 5a):** *'At which time (mostly)?'*

**Answer: Frequency:<sup>a</sup>**

<i>at early night (shortly after sunset)</i>	17
<i>at deep night (around midnight)</i>	6
<i>at late night (shortly before sunrise)</i>	1

**Question 5b):** *'How often (approx.)?'*

**Answer: Frequency:<sup>a</sup>**

<i>daily</i>	12
<i>weekly</i>	2
<i>monthly</i>	2
<i>irregularly</i>	6

<sup>a</sup>The answer of Robin Pope Safaris, South Luangwa National Park, Zambia (cf. appendix A.36) was not taken into account as they misinterpreted the question.

Table 9.5: Answers to question 5: *'Do you make night drives in your park?'*

### Point of Time of Aardvark Sightings

Question 5 (*'Do you make night drives in your park?'*) (see table 9.5) is not interesting if regarded alone and is only important for the interpretation of questions 4 and 6 above all.

The answers to question 6 (*'When is the aardvark sighted in your park?'*) are quoted in table 9.6. The most interesting result is that aardvarks are active during the deep night in particular.<sup>9</sup> Certainly there are ten ticks for the early night and only one more for the deep night, but one has to consider what time the night drives take place in the corresponding parks. Two parks ticked all three items and apart from them there were the following connections: 8 parks stated that aardvarks would be seen preferably during the early night. 7 of them do their night drives at early night only and one park does not perform night drives at all, so their result is not amazing as they are not out during the deep night. Ten parks, however, stated aardvarks would be mostly seen during the deep night. 5 of them also conduct drives during the deep night and the other five only during the early night but anyhow state the same time so it clearly shows that aardvarks are much more active during the deep night. None of the parks saw the main activity period during late night so it can be concluded that aardvarks are rarely active during dusk and dawn but mostly during the deep night.

COUSINS<sup>10</sup> states that aardvarks are seen *'mainly late at night but it depends on the moon phase we think. Just after full moon — when the darkest part of the night is early we see them in this period from time to time.'* A dependency of the moon phase, however, could not be confirmed by an additional source so it has to remain as a theory for the time being but an investigation of it might bring deeper understanding in the future.

The answers subject to the time frame did not bring any further results so they are not stated in table 9.6.<sup>11</sup>

The answers to the question according to the season when aardvarks are most active are well-balanced. There is no sign for any season being preferred. One has to bear in mind, however, that some parks are not accessible during the rainy season so they state the sight of aardvarks preferably in the dry season which is the winter in the southern hemisphere. This also applies to the question according to the moisture and might be the explanation why there are hardly any quotes for the rainy nights. Keeping in mind that in many areas — especially in Zambia<sup>12</sup> — it's almost always dry during the dry season and always wet during the rainy season the apparent preference for dry nights is put in perspective and

<sup>7</sup>Chiawa Camp, Lower Zambezi National Park, Zambia (cf. appendix A.25); Kapani Lodge, South Luangwa National Park, Zambia (cf. appendix A.32).

<sup>8</sup>Chiawa Camp, Lower Zambezi National Park, Zambia (cf. appendix A.25); Flatdogs Camp, South Luangwa National Park, Zambia (cf. appendix A.31); Kapani Lodge, South Luangwa National Park, Zambia (cf. appendix A.32).

<sup>9</sup>Also see question 19 (cf. table 9.13.)

<sup>10</sup>Robin Pope Safaris, South Luangwa National Park, Zambia (cf. appendix A.36).

<sup>11</sup>The remarks can, however, be found in appendix A.

<sup>12</sup>Where a majority of answers came from (cf. table 9.1).



<b>Question 6:</b> <i>'When is the aardvark sighted in your park?'</i>	
<b>Question 6a):</b> <i>'At which season?'</i>	
<b>Answer:</b>	<b>Frequency:</b>
<i>April to September (winter in the southern hemisphere)</i>	11
<i>October to March (summer in the southern hemisphere)</i>	11
<b>Question 6b):</b> <i>'At which moisture?'</i>	
<b>Answer:</b>	<b>Frequency:</b>
<i>dry night</i>	8
<i>average night</i>	11
<i>rainy night</i>	1
<b>Question 6c):</b> <i>'At which temperature?'</i>	
<b>Answer:</b>	<b>Frequency:</b>
<i>cold night</i>	3
<i>average night</i>	13
<i>warm night</i>	8
<b>Question 6d):</b> <i>'At which time?'</i>	
<b>Answer:</b>	<b>Frequency:</b>
<i>at early night (shortly after sunset)</i>	10
<i>at deep night (around midnight)</i>	11
<i>at late night (shortly before sunrise)</i>	2

Table 9.6: Answers to question 6: *'When is the aardvark sighted in your park?'*

a clear result cannot be found. It is at least true that aardvarks are also active during the rains. CARR<sup>13</sup> states that *'during the rains there is pl[e]nty of evidence of diggings but it's hard to actually see them [the aardvarks] as roads into more remote areas are inaccessible.'*

The question according to the temperature at which aardvarks are most active shows a slight preference for warm nights but as the statements were subjective the author would not accept that as a general law and in contrast has a strong feeling that the activity of aardvarks is hardly dependent on the climate and mainly depends on their urge to feed which is present every single night throughout the year.

Finally, referring to question 6, it has to be stated that the numerical scale to indicate the ratios of the aardvarks main activity periods that would have allowed a more precise analysis was hardly used and therefore is not reproduced in table 9.6. Mostly the scale itself was misinterpreted as a question and mainly answered the way that aardvarks were seen *'rarely'* or *'almost never'*.

The answers to question 9 (*'Did you ever observe an aardvark at daylight in your park?'*) confirm that aardvarks are active during the day only as an exception (cf. table 9.7). It has to be taken into account that the positive answers mostly base on isolated cases whereas the corresponding parks had a number of nocturnal sightings.

The behaviour patterns observed show the regular behaviour predominantly — digging and foraging. In one case a kill by lions was observed which was, however, opportunistic and is a clear exception. Another single case interpreted the behaviour as warming up as it is already reported of GRZIMEK ([50]) and VERHEYEN ([129]) (cf. chapter 7.1).

## 9.1.2 Behaviour

### Interactions with other Species

The answers to question 7 (*'Did you ever observe interactions with other myrmecophagous mammals in your park?'*) are summarized in table 9.8. As already discussed in chapter 6.1 aardvarks are sometimes accompanied by aardwolves (*Proteles cristatus*). BEKARI<sup>14</sup> reports of competition for food with pangolins (*Smutsia temminckii*), civets (*Viverra civetta*) and genets (*Genetta spec.*) and of competition for space with porcupines (*Hystrix africae australis*) and warthogs (*Phacochoerus africanus*). These statements, however, are not verified by observations and do not describe a direct interaction between the species mentioned. The competitions occur but are to the author's opinion of low importance though.

Question 8 (*'Are aardvarks sometimes accompanied by other animals in your park?'*) did not bring any further result than this (cf. table 9.8). As aardvarks are very shy they keep

<sup>13</sup>Kapani Lodge, South Luangwa National Park, Zambia (cf. appendix A.32).

<sup>14</sup>Zakouma, Chad (cf. appendix A.22).

**Question 9:** *‘Did you ever observe an aardvark at daylight in your park?’*

**Answer:      Frequency:**

<i>yes</i>	8 <sup>a</sup>
<i>no</i>	15

**Question 9a):** *‘If so, what did it do?’*

**Answer:**

**Frequency:**

<i>warm up after a cold night</i>	1 <sup>b</sup>
<i>feed on ants and termites</i>	3
<i>something else</i>	

came out of hole and went back in (4.00pm)  
digging  
suspect foraging, then ran to burrow  
caught in a wire snare<sup>c</sup>  
came out of burrow and was instantly  
killed by lions on the track

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<sup>a</sup>Nyika National Park, Malawi (cf. appendix A.4); Augrabies Falls National Park, South Africa (cf. appendix A.7); Bontebok Park, South Africa (cf. appendix A.8); Kapama Game Reserve (cf. appendix A.11); Mountain Zebra National Park, South Africa (cf. appendix A.16); Mount Currie Nature Reserve, Kokstad, South Africa (cf. appendix A.17); Zakouma, Chad (cf. appendix A.22); Kutandala Camp, North Luangwa National Park, Zambia (cf. appendix A.29): not counted, however, for the animal was caught in a wire snare; Kapani Lodge, South Luangwa National Park, Zambia (cf. appendix A.32).

<sup>b</sup>Mount Currie Nature Reserve, Kokstad, South Africa (cf. appendix A.17): *‘lying next to burrow, cold, clear day’*.

<sup>c</sup>This, however, was not counted to the sightings above (not counted at all, also not in the negative sense) (cf. footnote *a*) for the aardvark was out compulsory.

Table 9.7: Answers to question 9: *‘Did you ever observe an aardvark at daylight in your park?’*

**Question 7:** *'Did you ever observe interactions with other myrmecophagous (=ant-eating) mammals in your park?'*

**Answer: Frequency:**

<i>yes</i>	2 <sup>a</sup>
<i>no</i>	22

**Question 7a):** *'If so, what exactly have you observed?'*

Have seen aardwolf following the aardvark and I think it is because they are feeding on the same food.<sup>b</sup>

Juste, on peut vous dire que les mammifères insectivores nocturnes comme le Pangolin terrestre (*Smutsia temminckii*) qui a un regime alimentaire très proche de celui de l'Orycterope, la civette (*Viverra civetta*), la Genette (*Genetta SP*) entrent en compétition alimentaire avec l'Orycterope.

Il ya aussi d'autres formes d'interactions entre Orycterope et dautres espèces: Compétition pour l'espace: Orycterope/Porc-epic; toutes les deux espèces vivent dans des terriers qu'elles creusent de préférence sur des sols ferrugineux sableux...

Interaction entre Orycterope et Phacochère: En effet, le Phacochère vit dans des terriers creusés la plupart par l'Orycterope car le Phacochère n'a pas l'aptitude de creuser un terrier. Il en est de même pour les Hyènes....<sup>c</sup>

<sup>a</sup>Highveld National Park, South Africa (cf. appendix A.10); Zakouma, Chad (cf. appendix A.22).

<sup>b</sup>Highveld National Park, South Africa (cf. appendix A.10).

<sup>c</sup>Zakouma, Chad (cf. appendix A.22).

Table 9.8: Answers to question 7: *'Did you ever observe interactions with other myrmecophagous (=ant-eating) mammals in your park?'*

**Question 8:** 'Are aardvarks sometimes accompanied by other animals in your park?'

**Answer: Frequency:**

<i>yes</i>	1 <sup>a</sup>
<i>no</i>	22

**Question 8a):** 'If so, by which animals?'

aardwolf<sup>b</sup>

**Question 8b):** 'Is there any obvious connection between them?'

They feed on the same food.<sup>c</sup>

<sup>a</sup>Highveld National Park, South Africa (cf. appendix A.10).

<sup>b</sup>Highveld National Park, South Africa (cf. appendix A.10).

<sup>c</sup>Highveld National Park, South Africa (cf. appendix A.10).

Table 9.9: Answers to question 8: 'Are aardvarks sometimes accompanied by other animals in your park?'

distance to any other species.

### Swimming of Aardvarks

Question 16 ('Did you ever observe an aardvark swim in your park?') was always negated (cf. table 9.10). As stated in chapter 7.1 aardvarks are very good swimmers but it seems to be a behaviour not often shown. Perhaps they only swim if there is good reason to do so — as it is the case with lions (*Panthera leo*) e.g..

### Enemies of Aardvarks

The answers to question 17 ('What animals could you observe killing an aardvark in your park?') are quoted in table 9.11. Please note that the question was formulated ambiguously. The question was not meant in the way which animals occur in the corresponding park and which of them might kill aardvarks to the assessment of the person answering the questions, but it was meant the way that the kills stated were really observed. This ambiguity made it necessary to ask many parks again as they stated a lot of kills but in

<b>Question 16:</b> <i>'Did you ever observe an aardvark swim in your park?'</i>	
<b>Answer: Frequency:</b>	
<i>yes</i>	—
<i>no</i>	24

Table 9.10: Answers to question 16: *'Did you ever observe an aardvark swim in your park?'*

<b>Question 17:</b> <i>'What animals could you observe killing an aardvark in your park?'</i>	
<b>Answer:</b>	<b>Frequency:</b>
<i>lion</i>	6 <sup>a</sup>
<i>leopard</i>	2 <sup>b</sup>
<i>cheetah</i>	—
<i>wild dog</i>	—
<i>spotted hyena</i>	2 <sup>c</sup>
<i>python</i>	—
<i>crocodile</i>	—
<i>any others</i>	—
on open road they get knocked by vehicles outside the park <sup>d</sup> snakes <sup>e</sup>	
<sup>a</sup> Addo Elephant National Park, South Africa (cf. appendix A.6); Biyamiti Bush Camp, Kruger National Park, South Africa (cf. appendix A.14); Zakouma, Chad (cf. appendix A.22); Chiawa Camp, Lower Zambezi National Park, Zambia (cf. appendix A.25); Kapani Lodge, South Luangwa National Park, Zambia (cf. appendix A.32): opportunistic kill; Land & Lake Safaris, South Luangwa National Park, Zambia (cf. appendix A.33).	
<sup>b</sup> Kapama Game Reserve (cf. appendix A.11); Robin Pope Safaris, South Luangwa National Park, Zambia (cf. appendix A.36): only seen the feeding, not the kill.	
<sup>c</sup> Addo Elephant National Park, South Africa (cf. appendix A.6); Kapani Lodge, South Luangwa National Park, Zambia (cf. appendix A.32): only seen the feeding, not the kill.	
<sup>d</sup> Augrabies Falls National Park, South Africa (cf. appendix A.7).	
<sup>e</sup> Mapungubwe National Park, South Africa (cf. appendix A.15): I have only seen aardvark die because of snakebite and human killing. (Not in this park but where I have worked on them.).	

Table 9.11: Answers to question 17: *'What animals could you observe killing an aardvark in your park?'*

the end it turned out that they interpreted the question the other way round.

It has also to be mentioned that regarding the most sightings stated only the feeding was observed but not the kill itself. Therefore one has to note that the animals stated in some cases only may have scavenged. The reports show, however, that lions kill aardvarks — at least if they get the chance. It has to be stated that aardvarks are killed relatively seldom due to their careful behaviour and also due to their defensiveness.

Leopards were also stated as enemies of the aardvark. A kill could not be observed but it is quite probabilistic that the leopards really killed the aardvarks themselves in the two cases reported. To be precise, leopards do take over prey of other carnivores but they are only strong enough to do so in the case of a cheetah or a single hyena. They are, however, not able to take over the prey of a lion or a pack of hyenas. Thus, it can be concluded that quite certain leopards also hunt aardvarks if they get the opportunity.

Hyenas are often referred to as necrophagous animals but it clearly has to be stated that they only scavenge to one half at the most and do hunt the majority of their prey on their own. It can be assumed that hyenas also actively hunt aardvarks.

The other species where no kills were reported might also kill aardvarks on occasion as the aardvark fits into their schemes of prey.

Aardvarks might also die on the road as it is often the case with other species and nocturnals in particular and they might also die from snakebites but both — cars and snakes — cannot be classified as enemies of the aardvark. Another species, however, can in some cases be even called a natural enemy, namely humans (see chapter 10.1).

The answers to question 18 (*'When attacked, which reaction of the aardvark could you observe in your park?'*) (cf. table 9.12) confirm the reactions mentioned in chapter 7.1. It has to be noted, however, that some of the answers have to be called into question as in some questionnaires no kills were reported but reactions to attacks described. Indeed these answers do not have to be wrong though as aardvarks possibly successfully escape from a great many of attacks.

## Special Observations

The answers to question 19 (*'Did you ever observe anything special in your park concerning the aardvark?'*) are stated in table 9.13. FOOT<sup>15</sup> reports of aardvarks sightings above 2,200 m which can be called an altitude record (cf. chapter 5.1). The reason why aardvarks are found in these extreme altitudes is that enough termites occur there locally.

The comparatively low abundance of aardvarks in the semiarid Augrabies Falls National Park (South Africa) (cf. appendix A.7) can be explained with the lower distribution of termites in dry areas which again results from the lower amount of plants due to the deficient rains.

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<sup>15</sup>Nyika National Park, Malawi (cf. appendix A.4).

**Question 18:** 'When attacked, which reaction of the aardvark could you observe in your park?'

**Answer:**

**Frequency:**

*it ran away*

10<sup>a</sup>

*it dug itself in*

5<sup>b</sup>

*it kicked*

1<sup>c</sup>

*any other reaction*

it tries to hide the head, at the same time kicks

but is not a strong kicker<sup>d</sup>

no time to react to an opportunistic kill of lions<sup>e</sup>

<sup>a</sup>Nyika National Park, Malawi: 'from us' (i.e. humans) (cf. appendix A.4); Addo Elephant National Park, South Africa (cf. appendix A.6); Augrabies Falls National Park, South Africa (cf. appendix A.7); Highveld National Park, South Africa (cf. appendix A.10); Biyamiti Bush Camp, Kruger National Park, South Africa (cf. appendix A.14); Mapungubwe National Park, South Africa (cf. appendix A.15); Mountain Zebra National Park, South Africa (cf. appendix A.16); Zakouma, Chad (cf. appendix A.22); Ana Tree Lodge, Lower Zambezi National Park, Zambia (cf. appendix A.24); Land & Lake Safaris, South Luangwa National Park, Zambia (cf. appendix A.33).

<sup>b</sup>Highveld National Park, South Africa (cf. appendix A.10); Zakouma, Chad (cf. appendix A.22): '*dans son terrier*'; Chiawa Camp, Lower Zambezi National Park, Zambia (cf. appendix A.25); Flatdogs Camp, South Luangwa National Park, Zambia (cf. appendix A.31); The Wildlife Camp, South Luangwa National Park, Zambia (cf. appendix A.37).

<sup>c</sup>Kutandala Camp, North Luangwa National Park, Zambia (cf. appendix A.29): The aardvark was caught in a wire snare and kicked and swung its tail when the scouts were trying to remove it.

<sup>d</sup>Augrabies Falls National Park, South Africa (cf. appendix A.7).

<sup>e</sup>Kapani Lodge, South Luangwa National Park, Zambia (cf. appendix A.32)

Table 9.12: Answers to question 18: 'When attacked, which reaction of the aardvark could you observe in your park?'



**Question 19:** *'Did you ever observe anything special in your park concerning the aardvark?'*

The sightings were above 7200 feet asl.<sup>a</sup>

The park is in the arid areas and the aardvarks are scarce as compared to wet southern Regions of the country.<sup>b</sup>

Found dung, with glossy parts in it.<sup>c</sup>

Digging and droppings buried in the soil from the digging.<sup>d</sup>

Just seeing them late at night not early evening.<sup>e</sup>

<sup>a</sup>Nyika National Park, Malawi (cf. appendix A.4).

<sup>b</sup>Augrabies Falls National Park, South Africa (cf. appendix A.7).

<sup>c</sup>Mukambi Safari Lodge, Kafue National Park, Zambia (cf. appendix A.23).

<sup>d</sup>Land & Lake Safaris, South Luangwa National Park, Zambia (cf. appendix A.33).

<sup>e</sup>Luangwa River Lodge, South Luangwa National Park, Zambia (cf. appendix A.34).

Table 9.13: Answers to question 19: *'Did you ever observe anything special in your park concerning the aardvark?'*

POTIEK<sup>16</sup> reports of findings of glossy parts in aardvarks dung. This phenomenon reminds one of hyenas. They again have an extremely powerful digestion and they feed on anything they find as easily confirmed by examining their cast. The author e.g. was told of the metallic identification plate of a video camera found in hyenas cast by a field guide in Umfolozi National Park (South Africa). In contrast to the hyenas, however, aardvarks are very selective concerning their food. Thus probably another reason counts. Aardvarks are very quick burrowers as already discussed in chapter 7.1 and they eat a lot of earth while digging (cf. chapter 6.1 and table 9.17). Thus they swallow earth and roots inadvertently because of their hectic way of digging. For the same reason they might swallow materials found in the earth in which they dig and the glossy parts found in the aardvarks dung probably came in that way.

SPRONG & SHAWA<sup>17</sup> report of the fact that aardvarks bury their faeces as already discusses in detail in chapter 7.1.

The statement that aardvarks are seen *'late at night not early evening'*<sup>18</sup> corresponds to the results of question 6 (see chapter 9.1.1).

<sup>16</sup>Mukambi Safari Lodge, Kafue National Park, Zambia (cf. appendix A.23).

<sup>17</sup>Land & Lake Safaris, South Luangwa National Park, Zambia (cf. appendix A.33).

<sup>18</sup>Luangwa River Lodge, South Luangwa National Park, Zambia (cf. appendix A.34).

<b>Question 11:</b> <i>'Did you ever observe an aardvark feeding on mice in your park?'</i>	
<b>Answer: Frequency:</b>	
<i>yes</i>	—
<i>no</i>	24

Table 9.14: Answers to question 11: *'Did you ever observe an aardvark feeding on mice in your park?'*

<b>Question 12:</b> <i>'Did you ever observe an aardvark feeding on other animals than ants, termites and possibly mice in your park?'</i>	
<b>Answer: Frequency:</b>	
<i>yes</i>	—
<i>no</i>	24

Table 9.15: Answers to question 12: *'Did you ever observe an aardvark feeding on other animals than ants, termites and possibly mice in your park?'*

### 9.1.3 Nutrition

#### Special Diet

Question 11 (*'Did you ever observe an aardvark feeding on mice in your park?'*) was denied in all questionnaires (cf. table 9.14). TETHER<sup>19</sup> states he *'find[s] quite a lot on aardvark droppings and ha[s] found no evidence of mice within them'*. Thus it gives the impression that it is nothing but a rumour that aardvarks feed on mice. Pieces of mouse-skeletons found in aardvarks dung ([100]) are probably a by-product of their earth swallowing while digging (cf. chapters 6.1 and 9.1.2). Active killing of mice and also the feeding on their carcasses, however, seem to be very unlikely to the author and it can be called into question whether the aardvarks teeth are fit for feeding on mice at all. It has to be stated, however, that in spite of this captive specimens of *Manis pentadactyla* which have no teeth at all have taken mice and young rats, which were swallowed whole and dealt with in the gizzard-like stomach ([100]).

Question 12 (*'Did you ever observe an aardvark feeding on other animals than ants, termites and possibly mice in your park?'*) was denied in all questionnaires as well (cf.

<sup>19</sup>Kutandala Camp, North Luangwa National Park, Zambia (cf. appendix A.29).

**Question 13:** *'Did you ever observe an aardvark feeding on cucumber in your park?'*

**Answer: Frequency:**

<i>yes</i>	1 <sup>a</sup>
<i>no</i>	23

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<sup>a</sup>Zakouma, Chad (cf. appendix A.22).

Table 9.16: Answers to question 13: *'Did you ever observe an aardvark feeding on cucumber in your park?'*

**Question 14:** *'Did you ever observe an aardvark feeding on fruit or roots in your park?'*

**Answer: Frequency:**

<i>yes</i>	2 <sup>a</sup>
<i>no</i>	22

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<sup>a</sup>Cf. question 13 (see table 9.16): Zakouma, Chad (cf. appendix A.22); Kapani Lodge, South Luangwa National Park, Zambia (cf. appendix A.32): *'but only as part of its digging — they eat a lot of earth and roots'*.

Table 9.17: Answers to question 14: *'Did you ever observe an aardvark feeding on fruit or roots in your park?'*

table 9.15). It can be concluded that the aardvarks' diet is very strict and reported feeding on other insects than termites and ants (cf. chapter 6.1) ([12, 47, 69]) is the clear exception.

Question 13 (*'Did you ever observe an aardvark feeding on cucumber in your park?'*) was negated in all questionnaires but one (cf. table 9.16). BAKARI<sup>20</sup> reports on *'information donnée par les paysans et écolgards sur les indices de présence des certaines graines de Cucurbitacées dans les fécès et leur indice de présence (empreintes) dans les champs'*. The seed mentioned is of the aardvark-cucumber (*Cucumis humifructus*) in all probability. The symbiosis of the aardvark with this cucurbit is described in detail in chapter 6.1.

The answers to question 14 (*'Did you ever observe an aardvark feeding on fruit or roots in your park?'*) brought no new information (cf. table 9.17). The two reported cases refer to the aardvark-cucumber (see above and table 9.16) and the fact that aardvarks feed

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<sup>20</sup>Zakouma, Chad (cf. appendix A.22).

<b>Question 15:</b> <i>'Did you notice a preference regarding the digging into termite mounds?'</i>	
<b>Answer:</b>	<b>Frequency:</b>
<i>preferably from the north</i>	1 <sup>a</sup>
<i>preferably from the west</i>	1 <sup>b</sup>
<i>preferably from the east</i>	—
<i>preferably from the south</i>	—
<i>there seems to be no preference</i>	9
<i>cannot tell</i>	12

<sup>a</sup>Addo Elephant National Park, South Africa (cf. appendix A.6)  
<sup>b</sup>Biyamiti Bush Camp, Kruger National Park, South Africa (cf. appendix A.14).

Table 9.18: Answers to question 15: *'Did you notice a preference regarding the digging into termite mounds?'*

on earth and roots and other things in the earth while digging as already discussed in chapters 6.1 and 9.1.2.

### Digging into Termite Mounds

The answers to question 15 (*'Did you notice a preference regarding the digging into termite mounds?'*) are summarized in table 9.18. They show that there is no strict conspicuous preference for a certain direction as often alleged. However, there is a slight preference for the north-west direction as in conformity to the observations made in the Karoo (see chapter 6.1). Probably certain aspects come together. The termites move there in the evening and the building materials might harden less there what results in easier digging.<sup>21</sup> The same preference was observed by CILLIERS<sup>22</sup>: *'When I followed [the aardvarks] for 3 years it seemed that they pref[er]re[d] the west/north side (where the sun sets and termites might move towards heat) but I did not statistically analyse[] it.'*

#### 9.1.4 Cultural Aspects

Questions 20a, 20b and 21 asked for the name of the aardvark in different languages. The results are not explicitly summarized here but are slipped into table 2.4 (see chapter 2.3).

Questions 20c (*'Does the aardvark play a role in their mysticism?'*) and 20d (*'Does (or*

<sup>21</sup>That aardvarks prefer easier digging is already confirmed by CARR (Kapani Lodge, South Luangwa National Park, Zambia (cf. appendix A.32)): the aardvarks *'do favour sandy soil — easier dig[g]ing'*.

<sup>22</sup>Mapungubwe National Park, South Africa (cf. appendix A.15).

*did) the aardvark play any other role in their life?')* asked for the meaning of the aardvark for the locals. The results are stated in the following.

In many areas the aardvark formerly was and sometimes still is hunted by the native inhabitants (also cf. chapter 10.1). Many reported of that and CARR<sup>23</sup> even states they would taste of pork. Eating aardvarks has a long tradition. BESTER<sup>24</sup> states that the *'aardvark is also depicted in rock art paintings done by the Khoisan (Bushmen) people. These people hunted with bow & arrow and lived in caves. Some of these paintings is estimated at 6,000 years old.'*

Also the Bisa-Bemba eat aardvarks and TETHER<sup>25</sup> reports of their tradition: *'If you put some 'medicine' on top of it's burrow while it is sleeping it will not know you are coming and you can climb into its hole and catch it — however, if the 'medicine' does not work it will hear you coming and bur[y] you alive.'*

The aardvark, however, is not eaten everywhere. The Kunda and Bisa associate the aardvark with witchcraft and do not touch killed aardvarks for they believe they would *'dig to the[ir] home and destroy the[ir] home.'*<sup>26</sup>

Aardvarks also play or played a role in medicine. This counts for the Setswana<sup>27</sup> and the Bisa<sup>28</sup> who create a medicine for luck out of aardvarks. The last-named also create a *'medicine for cultivation of maize field[s] but they mix part of it with potions from trees'*. Also the Griquas, Xhosa and Zulu create a muti<sup>29,30</sup> from aardvarks.

Aardvarks also have a lot of other mystic meanings. For example the Setswana see a mystic relationship between humans and aardvarks (totem)<sup>31</sup>. Furthermore they believe an aardvark *'never looks you in the eye'* and it were a *'bad omen if it does'*.<sup>32</sup>

## 9.2 Results of the Zoos Questionnaire's Survey

There is no central register containing all zoos world-wide. For the European area, however, there is the Quantum-Conservation register ([104]) that lists the addresses of a large number of Zoos. All the American Zoos that are members of to AZA<sup>33</sup> as well as some others are recorded on the American issue of the Quantum-Conservation register ([105]) which lists the addresses and gives statistics on the number of species kept. A database of

<sup>23</sup>Kapani Lodge, South Luangwa National Park, Zambia (cf. appendix A.32).

<sup>24</sup>Karukareb Wildernis Resevaat, Cederberg Wilderness Area, South Africa (cf. appendix A.12).

<sup>25</sup>Kutandala Camp, North Luangwa National Park, Zambia (cf. appendix A.29).

<sup>26</sup>Luangwa River Lodge, South Luangwa National Park, Zambia (cf. appendix A.34).

<sup>27</sup>Highveld National Park, South Africa (cf. appendix A.10).

<sup>28</sup>Land & Lake Safaris, South Luangwa National Park, Zambia (cf. appendix A.33).

<sup>29</sup>A liquid associated with magical power.

<sup>30</sup>Mount Currie Nature Reserve, Kokstad, South Africa (cf. appendix A.17).

<sup>31</sup>Highveld National Park, South Africa (cf. appendix A.10).

<sup>32</sup>Malolotja Nature Reserve, Swaziland (cf. appendix A.21).

<sup>33</sup>American Zoo and Aquarium Association.

the animals kept in zoos does not exist though, except for the ISIS<sup>34</sup> database ([62]) for the European area. There is no other list beyond this one, and internet research is required in order to find out zoos keeping aardvarks. A difficulty with this research is that many zoos have a homepage but most of them do not list the species they keep. The author has found 31 zoos that keep aardvarks or at least there was a strong suspicion that they would keep aardvarks. The questionnaire was sent to those zoos and 13 zoos replied.<sup>35</sup> Three of them do not keep aardvarks but the others filled out the questionnaire. Taking this into consideration, ten zoos of 28 participated in the survey which corresponds to a rate of about 36%. This is quite a good result as zoos receive a great many of questionnaires. It can be assumed that about 30 questionnaires per month are received. That shows clearly that it is possible for zoos to respond only to a small number of the questionnaires, so the rate of 36% can be evaluated as very good. This shows that the questionnaire was special in any way — probably insofar as the aardvark is a species where comparatively little research has been done on. Another reason might be that the thesis at hand was promised to all those who send back the questionnaire, something which is welcome.

Parts of the answers given are confidential so the returned questionnaires will not be quoted in this thesis. The blank form of the questionnaire, however, can be found in appendix B. The aims of the questions asked are stated in chapter 1.4.

The zoos which returned the filled-out questionnaire are given in table 9.19. The following paragraphs will evaluate the information received through the survey. Questions 1, 2 and 20, however, will not be evaluated as they were of administrative nature only.

### 9.2.1 Zoo Population

The results of question 3 (*'How many aardvarks do you keep in your zoo at present?'*) are shown in table 9.19. The ten zoos mentioned keep 25 aardvarks, what corresponds to an average of 2.5 individuals per zoo. One zoo, however, does not keep aardvarks at present so the number is actually higher. Indeed there is only one zoo that keeps a single individual. All the other zoos do at least have one pair of aardvarks. They are kept together in groups mostly (see question 18 below). Most zoos have one or two enclosures for the aardvarks. Question 3a (*'How many enclosures do they have?'*) indicates even more than that. If two enclosures exist, they are either inside and outside or a display and a back holding. Only one zoo has four enclosures. Question 3b (*'How large are the enclosures?'*) inquires the spaciousness of the enclosures and it came out that it varies considerably. Sizes between 25 m<sup>236</sup> and 350 m<sup>2</sup> were reported. It has to be taken into account here that the number of individuals who use the enclosure are quite constant but some zoos display the aardvarks socialised with other animals (cf. question 14 below).

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<sup>34</sup>International Species Information System.

<sup>35</sup>Also two additional zoos replied which, however, did not fill out the questionnaire even though they keep aardvarks. These two zoos are not counted in here.

<sup>36</sup>This was the smallest single enclosure. The smallest of all has a size of 12 m<sup>2</sup> but is in connection with a second larger one (40 m<sup>2</sup>).

<b>Question 3: 'How many aardvarks do you keep in your zoo at present?'</b>	
<b>Zoo:</b>	<b>Answer:<sup>a</sup></b>
<i>Zoo Frankfurt, Germany</i>	1,2
<i>Zoologischer Garten Saarbrücken, Germany</i>	1,1
<i>Ueno Zoological Gardens, Tokyo, Japan</i>	1,1
<i>Nagoya Higashiyama Zoo, Japan</i>	1,1
<i>Ogrod Zoologiczny, Poznan, Poland</i>	— <sup>b</sup>
<i>Colchester Zoo, UK</i>	2,2
<i>Montgomery Zoo, AL, USA</i>	1,1,1
<i>Brookfield Zoo (Chicago Zoological Society), IL, USA</i>	2,3
<i>Omaha's Henry Doorly Zoo, NE, USA</i>	1,1,1
<i>Point Defiance Zoo &amp; Aquarium, Tacoma, WA, USA</i>	0,1
<i>Total</i>	10,13,2

<sup>a</sup>In the common form: males, females(, undetermined).  
<sup>b</sup>Formerly 1,0.

Table 9.19: Answers to question 3: 'How many aardvarks do you keep in your zoo at present?'

Taking this into account it can be resumed that a typical size for a pair of aardvarks kept alone<sup>37</sup> is 40–70 m<sup>2</sup>.

Question 4 ('How old is/was the oldest aardvark in your zoo?') was asked to compare the life expectancy of aardvarks in free nature and in captivity. The life span in free nature is estimated as no aardvark is observed long enough to determine the age of death. Diseases are not treated in free nature what reduces their life expectancy. The stress in the wild is very high as compared to very little stress in zoos<sup>38</sup> and is probably the main reason for the much higher life expectancy of virtually all animals in zoos. Albeit aardvarks are not preyed on too often (cf. chapter 9.1.2), the death of single individuals in the wild lowers the mean life expectancy. The last item is that old aardvarks can survive in zoos as they do not have to go on foraging but once they are too weak in free nature they will either die from hunger or will be killed by predators. Here it counts in particular that aardvarks are solitary whereas some social animals as wild dogs (*Lycaon pictus*) e.g. feed the old members of the group.

The mean life expectancy in the wild is about ten years while single individuals reach up to 18 years (cf. chapter 7.2). In zoos the mean age lies in the late teens to early twenties

<sup>37</sup>I.e. not socialised with other species.

<sup>38</sup>Foraging stress and predator stress do not occur in zoos or at least at a much lower rate. (Surricates e.g. also have predator stress in zoos when birds of prey fly over.)

as discovered with question 4h (*'How old do aardvarks get in your zoo on average?'*). A general dependence of the sex with the life expectancy could not be detected. The oldest individual reported was Somali from the Point Defiance Zoo and Aquarium with an age of just under 30 years<sup>39</sup>. Almost as old and still alive are Kikuyu<sup>40</sup> and Trey<sup>41</sup>. All three individuals mentioned were bred in zoos. Some aardvarks displayed in zoos are also captured wild but in most cases they do not get that old. A reason is probably the stress of getting captured and the transport stress during the long journey.

Question 5 (*'Did you have any breeding success in your zoo?'*) was answered in the affirmative by six zoos. Taking into account that one zoo only keeps a single individual this gives a rate of 67%.

As in the wild (cf. chapter 7.2) aardvarks in zoos do only give birth to a single individual in general. Even though there is a preferred time of the year for the births in the wild (see chapter 7.2) no pattern could be determined for zoos. Evaluating the questionnaires returned (question 5a: *'At which time of the year does the birth take (mostly) place?'*) as well as a precise database with all the 35 individuals that lived in a certain zoo since 1960 clearly showed that births take place during the whole year with no preference for a certain month or season. A certain pattern depending on the geographical latitude could also not be detected. This seems to suggest that the pattern existing in the wild is not intrinsic but triggered by environmental conditions that do not apply to zoos. The author expects this trigger must be the food available. Actually the aardvarks in the wild give birth in the rainy season when most termites are abundant. A dependency of climatic conditions would be conceivable as well as they are constant in many zoos because they keep the aardvarks inside with controlled conditions<sup>42</sup> but seems to be rather unlikely.

Question 5b (*'At which time of the day/night does the birth take (mostly) place?'*) also brought no clear preference. It has to be mentioned here that aardvarks are often kept with reverse light cycle (also cf. chapter 8) and the terms day and night refer to the subjective daytimes<sup>43</sup>. Two zoos saw a preference for the nights while one saw it in the early mornings or even during the day<sup>44</sup>. The data thus bring no evidence for a certain pattern. No comparative data is available for the wild as to the knowledge of the author. It is only known that the birth takes place in the burrow (cf. chapter 7.2). So it remains unclear whether there is a preferred time for the delivery or not but due to the different experiences in zoos it has tendencies to the last-named.

Aardvarks in zoos have given birth to young for many years. This is often interpreted as an indicator showing good conditions in keeping. In former times the offspring, however, mostly died in the first days after birth. After little success zoos tried to hand-rear the young in the 70<sup>ies</sup> for a while but again without success. Not until the early 90<sup>ies</sup>

<sup>39</sup>Jan. 27, 1975 – Nov. 19, 2004.

<sup>40</sup>Born Nov. 19, 1977. Living in Point Defiance Zoo and Aquarium.

<sup>41</sup>Born Jan. 9, 1978. Living in Chicago Zoological Society — Brookfield Zoo

<sup>42</sup>However, it has to be stated that some zoos change the day length and temperature seasonally anyway.

<sup>43</sup>E.g. the term *'day'* describes the light phase which is at night-time actually.

<sup>44</sup>Albeit the main activity is during the night also in the corresponding zoo.



the offspring could be brought up in a reliable way. Today good breeding pairs give birth almost annually. The zoos participating in the survey reported of 18 births and 3 stillbirths<sup>45</sup> (question 5c: *'How many births have you had in the past ten years?'*). Question 5d (*'How many of them grew older than 30 days?'*) showed that 13 of them grew older than 30 days which is a general period after which breeding is called successful. This corresponds to a survival rate of 72% and can thus be assessed as good. Today the offspring is normally left with its mother. Only four of the young were hand-reared as replied to question 5d (*'How many of them were hand-reared?'*). Two of them even were only partly hand-reared. They were left with their mother overnight but removed during the day to avoid the risk of being rolled on by their mother<sup>46</sup>. During the night they were left with the mother to feed the offspring. The other two young were hand-reared because their mothers did not nurse them.

### 9.2.2 Nutrition

The answers to question 6 (*'What diet (food & nutrients) do you feed the aardvarks in your zoo?'*) are shown in table 9.20. The food always consists of meat<sup>47</sup> and fruit together with some nutrients. The fruit are cut in small pieces and the seeds are removed. All components are mixed with milk or water added so that the food gets the consistency of a pulp. Note that this is important as the aardvarks' teeth are not fit for solid food (cf. chapter 6.1). Some zoos feed the commercial mixture Mazuri<sup>®</sup> Insectivore Diet<sup>48</sup> which also covers the same main-ingredients.

Question 6a (*'Do you sometimes feed them food scraps (as sometimes pigs are fed with)?'*) was negated by all zoos. One has to bear in mind again that aardvarks would not be able to feed on food scraps except if they were mashed.

Question 7 (*'How do you feed the food?'*) was answered the same way by all zoos. They all use a bowl. There is at least one zoo that has a fake termite-mound which is used to feed the aardvarks but unfortunately this zoo refused to participate in the survey. The author personally visited this zoo some years ago and spent about two days at the aardvarks display. In this zoo they are not kept in reverse time period so that their activity during

<sup>45</sup>This is a typical portion among zoo animals.

<sup>46</sup>Remember that aardvarks are nocturnal animals.

<sup>47</sup>Please note that horsemeat is fed in zoos commonly due to its low price.

<sup>48</sup>Ingredients of Mazuri<sup>®</sup> Insectivore Diet: Poultry by-product meal, poultry meal, ground brown rice, dried beet pulp, ground wheat, ground soybean hulls, dehulled soybean meal, corn flour, fructose, dried egg product, ground aspen, poultry fat preserved with ethoxyquin, poultry digest, powdered cellulose, dried apple pomace, animal fat preserved with BHA, wheat germ, dried whey, shrimp meal, fish meal, brewers dried yeast, soybean oil, fish oil, lecithin, phosphoric acid, salt, DL-methionine, taurine, potassium chloride, choline chloride, pyridoxine hydrochloride, menadione dimethylpyrimidinol bisulfite (vitamin K), d-alpha tocopheryl acetate (natural source vitamin E), thiamin mononitrate, L-ascorbyl-2-polyphosphate (vitamin C), cholecalciferol (vitamin D3), inositol, biotin, vitamin A acetate, folic acid, ethoxyquin (a preservative), riboflavin, cyanocobalamin (vitamin B12), calcium pantothenate, calcium carbonate, nicotinic acid, ferrous sulfate, copper sulfate, zinc oxide, manganous oxide, calcium iodate, ferrous carbonate, zinc sulfate, cobalt carbonate, sodium selenite ([85]).

**Question 6:** 'What diet (food & nutrients) do you feed the aardvarks in your zoo?'

<b>Answer:</b>	<b>Frequency:</b>
<i>beef hash</i>	3
<i>chicken hash</i>	1
<i>horse hash</i>	1
<i>dry dog food</i>	4
<i>dried shrimps</i>	1
<i>eggs<sup>a</sup></i>	4
<i>oatmeal</i>	3
<i>corn flakes</i>	1
<i>milk</i>	5 <sup>b</sup>
<i>low-fat curd cheese</i>	1
<i>worms<sup>c</sup></i>	5
<i>ants</i>	1
<i>banana</i>	6
<i>pear</i>	1
<i>apple</i>	3
<i>orange<sup>d</sup></i>	2
<i>carrot<sup>e</sup></i>	3
<i>avocado</i>	1
<i>water melon &amp; sugar melon</i>	1
<i>pumpkin</i>	1
<i>sweetpotato (boiled)</i>	1
<i>greens</i>	1
<i>frozen grated vegetables</i>	1
<i>formic acid</i>	2 <sup>f</sup>
<i>vitamins A, B, D, E</i>	2
<i>calcium lactate</i>	1
<i>minerals</i>	2
<i>nutrient yeast</i>	1
<i>bread</i>	1
<i>Mazuri<sup>®</sup> Insectivore Diet</i>	4 <sup>g</sup>

<sup>a</sup>Partly yolk only.

<sup>b</sup>One zoo takes condensed milk and one takes powdered milk.

<sup>c</sup>Namely mealworms.

<sup>d</sup>One zoo puts honey on top.

<sup>e</sup>In one zoo they are boiled.

<sup>f</sup>But only in the past.

<sup>g</sup>Partly mixed with other components.

Table 9.20: Answers to question 6: 'What diet (food & nutrients) do you feed the aardvarks in your zoo?'

**Question 9:** *'What kind of diseases did you have to deal with regarding the aardvarks in your zoo?'*

arthritis in the back leg  
 bacteria infection  
 bedsores<sup>a</sup>  
 broken finger  
 conjunctivitis  
 dental abscesses  
 hepatitis  
 liver trouble  
 osteomyelitis of the jaw  
 skin irritations  
 sporadically uterus ignition initiated by copulation

<sup>a</sup>At the end of the life with about 25 years.

Table 9.21: Answers to question 9: *'What kind of diseases did you have to deal with regarding the aardvarks in your zoo?'*

the visiting hours is quite low. This is also the reason why the author was not able to observe their feeding often enough to answer the question if they were preferably feeding from a certain direction with significance in terms of statistics. He would, however, tend to say there was no preference for a certain direction. If that were the case it would mean that the preference for a certain direction in the wild (cf. chapters 6.1 and 9.1.3) must be acquired and is not an innate behaviour. Again, this is only an assumption and cannot be taken as a fact.

Question 8 (*'Did you ever observe aardvarks kill (and feed on) mice in your zoo?'*) was also denied by all zoos. One zoo even stated that the aardvarks have access to wild mice, but this behaviour was never observed. This again is a hint that confirms the author's hypothesis that it is only a rumour that aardvarks would sometimes feed on mice (cf. chapter 9.1.3).

### 9.2.3 Diseases

The answers to Question 9 (*'What kind of diseases did you have to deal with regarding the aardvarks in your zoo?'*) are listed in table 9.21. It can be summarized that no particular problems with a certain disease were observed as most items rely on single cases. More than that the diseases reported are not unusual among zoo animals and are no specific aardvark diseases. Some of the problems appear with old age and can be regarded as typical diseases of old animals — and some also of old humans, just to mention. The report of bedsores is only a single case and only appeared at high age. Thus it cannot

be said that aardvarks are sensitive in this connection nor could one conclude that the ground in the enclosure was not appropriate.

The answers to question 10 (*'What are the main causes of death regarding the aardvarks in your zoo?'*) clearly show that zoos do not have to deal with a specific aardvark disease. Disregarding stillbirths, most individuals die for reasons of old age. Of course there is also a slight portion of the deaths that is caused from infections. Altogether the causes of death are nothing but the regular ones.

### 9.2.4 Behaviour

Question 11 (*'Did you notice an annual period at the aardvarks in your zoo?'*) was negated by all zoos but one. It has to be stated that most zoos have constant conditions during the whole year. Mostly the aardvarks are kept in a house with reverse time period and controlled temperature and moisture. Some zoos, however, do vary the adjustments seasonally. Nevertheless they did not notice any annual period at the aardvarks. Only one zoo reported that the aardvarks would loose their appetite in summer. Interestingly this zoo has constant conditions throughout the year. Supposing the observer has not overlooked a certain parameter that has not been constant yet, that would mean aardvarks have an internal annual period. Only one zoo has observed this periodicity and thus it should not be over-interpreted but the decline of the aardvarks' appetite in summer might have a good biological sense. That is the summer in the northern hemisphere corresponds to the dry season in their natural habitat and this is the time, when termites become less abundant (cf. chapter 6.1). Hence a reduction of the activities in this time of the year would lower the basal metabolic rate and with it the appetite. That would provoke an adaptation to the changed food supply in the dry season.

If this periodicity is really existing cannot be guaranteed from the data obtained but it would be interesting to do some further investigation on this topic. It has to be noted here, however, that VAN AARDE ET AL. made similar observations in the wild (cf. chapter 7.1).

Question 12 (*'Do the aardvarks in your zoo have the possibility to swim?'*) was denied by all zoos. As a result no conclusions can be drawn concerning the aardvarks' ability to swim nor the reason for the swimming. One zoo, however, stated that *'there was a pool in [the aardvarks] enclosure and [it] often enter[ed] the water and even laid in the water. The deepest place in the pool was about 20 cm.'* This at least confirms the aardvarks' affinity for water although swimming was not possible due to the low water level. So it can be assumed that aardvarks do not only swim if there is an outer pressure forcing them.

The answers to question 13 (*'Are the aardvarks in your zoo a crowd puller or a rather unnoticed species?'*) are summarized in table 9.22. It has to be considered that the data are highly subjective. A zoo's employee would probably not admit that a certain animal is an unnoticed species. There are always some visitors who can be found in front of any display and thus probably no animal would fall into the last category. It can also be

**Question 13:** 'Are the aardvarks in your zoo a crowd puller or a rather unnoticed species?'

<b>Answer:</b>	<b>Frequency:</b>
<i>crowd puller</i>	3
<i>no crowd puller but they are important to attract visitors</i>	4
<i>average importance</i>	1
<i>not unnoticed but a rather low importance</i>	2
<i>unnoticed species</i>	—
<i>cannot tell<sup>a</sup></i>	1

<sup>a</sup>The aardvark is off exhibit.

Table 9.22: Answers to question 13: 'Are the aardvarks in your zoo a crowd puller or a rather unnoticed species?'

assumed that the popularity is more likely overrated than underestimated. In addition to this another aspect is important. The popularity of animals is usually estimated from the number of visitors resting at their enclosures and the time they spend there. Once aardvarks are socialised with other species this answer is distorted. The answers given to question 13 are strongly influenced by this. The zoos rating their aardvarks popularity as 'average' or below are the same zoos that have the aardvarks not socialised with other animals. The same is true the other way round: The zoos rating their aardvarks popularity above 'average' are the same zoos that have the aardvarks socialised with other animals. The only exception is one zoo which made two statements. There the popularity is of 'average' for aardvarks in their enclosure and is high ('crowd puller') if taken on walks (see below, question 16). It can be summarized that the popularity of the aardvarks is strongly dependent on different aspects. One is their socialisation with other animals. Having different species in one and the same display increases their popularity. One reason therefore is that there is more diversity to be observed but also that the chances are higher to see any activity of animals. Another main aspect influencing the aardvarks' popularity is their activity. This again is increased by behavioural enrichment and thus the zoos offering such enrichment can also note a higher aardvarks' popularity.

Question 14 ('Are they socialised with other animals?') brought the result that five of the ten zoos do keep their aardvarks socialised with other animals (cf. table 9.23). This can be rated a very high portion if compared to other animals and is a very pleasing development.

In most cases there were no interactions reported between the species. The springhares (*Pedetes capensis*), however, were often injured because of aardvarks stepping on them. There was also stress between aardvarks and aardwolf because the aardwolf (*Proteles cristatus*) went into the aardvarks' burrows. Apart from this no other trouble was ob-

**Question 14:** *'Are they socialised with other animals?'*

**Answer: Frequency:**

<i>yes</i>	5
<i>no</i>	5

**Question 14a):** *'If yes, with which animals?'*

**Today:**

brush-tailed porcupine (*Atherurus spec.*)

bushbaby (*Galago spec.*)<sup>a</sup>

Egyptian fruit bat (*Rousettus aegyptiacus*)<sup>a</sup>

guenon (*Cercopithecus spec.*)

Hoffman's two toed sloth (*Choloepus hoffmanni*)

white-faced scops owl (*Otus leucotis*)

**In the past:**

aardwolf (*Proteles cristatus*)

springhare (*Pedetes capensis*)

tawny frogmouth (*Podargus strigoides*)

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<sup>a</sup>In two zoos.

Table 9.23: Answers to question 14: *'Are they socialised with other animals?'*

served. The only other interaction observed is that the guenons (*Cercopithecus spec.*) chase the aardvarks away from their nesting sites once the aardvarks come too close 'by barking and nipping at their noses'. It can be concluded that the aardvark in most cases is uncomplicated concerning the socialisation with other animals. Bearing in mind the good impact on the popularity among visitors it can be recommended to socialise aardvarks with other species.

Question 15 ('Did you notice interactions with other animals (e.g. from adjacent enclosures or dogs of visitors)?') was denied by all zoos. It has to be noted, however, that some zoos do not allow dogs and also that some enclosures do not have visible contact to other displays. The only interaction reported is that in one zoo the aardvarks get in touch with the human visitors via a gap in the pane. To the author's opinion the reason therefore might be their well-developed olfactory sense (cf. chapter 3.4) mixed with some curiosity. The curiosity, however, is only existing in captivity or at least it is superimposed by their shy behaviour in the wild. It has to be stated that although aardvarks are extremely shy in free nature they get quite tame in captivity. The author was reported that in one zoo the keeper goes into the display for feeding the aardvarks and they even approach and allow the keeper to pat them. This behaviour is of course dependent on the keeper and the individual but at least it shows that aardvarks loose their extreme caution (cf. chapter 7.1) in captivity. That is not natural as some other species would never allow a keeper into their personal sphere and would attack him or retreat themselves instead.

Question 16 ('Do you offer any behavioural enrichment to the aardvarks in your zoo?') was answered yes by five of the ten zoos. That is a very good result. Of course it would be desirable that all animals in zoos will be offered a behavioural enrichment programme but compared to other species a ratio of 50% is already extremely high. Behavioural enrichment programmes are important to keep the animals busy. In the wild they have to search their food on their own but this becomes more or less unnecessary in captivity. As a result the individuals become very inactive which again leads to some medical problems including stereotypy and to the fact that they are not so attractive for the visitors<sup>49</sup>. The behavioural enrichment programmes reported include the standard idea of scatter feeding and also the use of hole feeders — plastic balls with holes. The aardvarks have to roll them so that the food falls out. Normally they do not empty a ball at once and roll it only a bit and feed on the food fallen out. Therefore the balls are often filled with mealworms for they actively climb out of the holes and because of that the aardvarks get new interest in the ball time and again. Other behavioural enrichment programmes regarding the food requirements are fruit in big pieces (e.g. melons) and crickets and mealworms to search for. Another programme is to allow them to dig. As aardvarks are very good burrowers (cf. chapter 7.1) the zoos have to lay the foundations under their display to prevent their digging themselves free. Some zoos, however, offer them substrate to dig in (soil, sand, wood shavings, ground corn cob) for up to 1 m. To stimulate their burrows some zoos also offer large paper bags, cardboard boxes and plastic barrels. To address their well-developed olfactory sense some zoos spray scents (e.g. perfumes), offer sacks filled with perfumed hay or plant sensory herbs. A special behavioural enrichment programme that

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<sup>49</sup>As they always lie around without showing any behaviour.

also attracts the visitors is to take them outside for walks using a large dog harness and leash as offered by two zoos. The last programme mentioned was to give them showers. It can be resumed that manifold programmes are offered in the zoos. On the whole they represent an excellent behavioural enrichment programme and it would be desirable that all zoos try to put at least some ideas into practice.

Question 17 (*'When are the aardvarks active?'*) showed that as in the wild aardvarks are most active during the night. It has to be mentioned here that most zoos keep the aardvarks on reverse light cycle so that they show their main activity during public viewing. They sleep all night (their day) and part of the day (about 50%), too. It is also important that in most zoos the aardvarks are exhibited indoors, so environmental conditions are fairly constant all year. Bearing that in mind it came out that there is no preference for a certain season. The preferred moisture and temperature both were *'average'*.<sup>50</sup> The time with most activity was the subjective night in all cases. One zoo mentioned that the aardvarks would also be frequently active in the dusk. The results are not surprising and go with the results of table 9.1.1 discussed in chapter 9.6.

Question 18 (*'Do you keep the aardvarks as individuals or in groups?'*) showed that all zoos except one<sup>51</sup> keep their aardvarks in groups. The groups are quite diverse<sup>52</sup> with up to four individuals and virtually any combination of sexes. The only striking feature is that no group has more males than females with the exception of a group only consisting of males. This, however, is typical for zoo animals and is connected to the fact that more females exist and also that a single male can mate with more than one female but not the other way round.

Aardvarks are solitary animals with only little social contacts in the wild (cf. chapter 7.3). In zoos, however, they show to be easily grouped. They even show some social behaviour. Question 18b (*'If in groups, are there any social contacts within the group?'*) was answered with *'yes'* by most zoos. In almost all zoos the aardvarks sleep together with tight body contacts. They also rub their bodies against each others quite often and *'sometimes they stand on their hind food and face each other to scratch bodies'*. Regular mating also has been reported. One zoo stated that the individuals even search each other if they are separated. If a young is present the aardvarks also show a limited play behaviour and the young requests the parents to play again and again.

Question 18c (*'Are the breeding couples always kept together?'*) showed that all zoos follow the same strategy. The female together with the young is separated after the birth or shortly before the birth is due.<sup>53</sup> This strategy is the usual one for animals that live solitary in the wild<sup>54</sup>. What is special about the aardvarks is that apart from births they are always kept together and not separated for sleeping.

<sup>50</sup>However, it has to be stated, that not all zoos itemized *'average'*. In the question concerning the moisture one zoo answered with *'dry'* and one zoo with *'rainy'*. The question about the temperature as well was not always answered with *'average'* but also with *'cold'* and *'warm'* each.

<sup>51</sup>Keeping a single male and a single female.

<sup>52</sup>Namely 2,2; 1,1,1; 1,2; 2,0; 0,2 and 1,1.

<sup>53</sup>Or in one case after suspected pregnancy.

<sup>54</sup>Cf. tigers (*Panthera tigris*) e.g..



Question 19 (*'Did you ever observe anything special in your zoo concerning the armadillo?'*) brought the following results. One zoo stated that there was a close relationship to the keeper while another zoo mentioned that armadillos *'don't seem to warm up to people very well — they will tolerate us and even 'play' with us, but on their own terms.'* Here one has to consider that both statements are very subjective. One keeper might interpret a behaviour as impersonal while another is already pleased if the individual does not retreat itself once the keeper comes into the enclosure. In addition it has to be considered that it is also decisive to which extent the keeper makes an effort. The author would therefore not judge these statements as contradictory.

One zoo stated that the armadillos *'smell everything and seem to focus on holes, crevices, and other small spaces.'* This is rooted in the very well-developed olfactory sense (cf. chapter 3.4) of the armadillos and allows to take advantage by offering them scents as part of a behavioural enrichment programme (cf. above).

A last statement was the following: *'We collect feces from the females and analyze their reproductive hormones. We have determined precise estrous cycle length and gestation period this way. We also use chromosome analysis to determine sex of newborns.'* This is interesting in itself and does not need to be discussed.

Finally it can be concluded that some interesting aspects were discovered in the survey. Due to the little amount of zoos keeping armadillos only few answers were obtained in spite of the good reflux rate. This has the effect that the data cannot be evaluated statistically with large significance. Thus the interesting ideas obtained cannot be regarded as facts but in many items it would be very interesting to do further investigation. The apparent possibility to inquire again specifically cannot be put into practice as the zoos would not answer when asked again and again. Therefore the only possibility is to do some appropriate direct research in future.



## Chapter 10

# Interaction with Man & Significance beyond Biology

This chapter goes beyond the biology of the aardvark and is meant to round up the thesis at hand. It gives a short impulse on what is also connected to the aardvark and should not be left out in a complete overview of the aardvark, as to the author's opinion.

### 10.1 Interaction with Man

Aardvarks play an economic role as they keep the termite populations within tolerable limits. Too much of them in turn could result in destruction of the plants. SHOSHANI reports that in areas where the aardvark was wiped out harvest was badly reduced ([47]). On the other side the dens of aardvarks destroy farmland and harm vehicles as well as galloping horses. ELOFF<sup>1</sup> states that the damage to the land is not of any concern to farmers. KINGDON, however, quotes that many farmers and ranchers would kill aardvarks for the damage they cause to them ([69]). An inquiry<sup>2</sup> among more than 25 agricultural departments in different African countries was run by the author but unfortunately could not bring any final result on these positive and negative economic influences. They seem to be comparatively meaningless on the whole and the African agricultural departments do not collect any data on them. NSIBANDE<sup>3</sup> states that aardvarks would '*currently [...] not cause any damage to farmers crops*' in Swaziland. By contrast they were '*useful since they prey on ants and termites.*' Due to the contradictory sources, however, no concluding

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<sup>1</sup>Personal note to the author.

<sup>2</sup>The following questions were asked:

- Do aardvarks play a role in agriculture?
- Are they useful or destructive?
- If fields are broken up by aardvarks, do the farmers get a compensation payment?
- Are farmers allowed to kill aardvarks? And do they really do it?
- If applicable, did the amount of damage increase, decrease or stay constant in the last ten years?

<sup>3</sup>Personal note to the author.

Figure 10.1: Illustration of Seth in the tomb of Thutmoses III. Taken from [68].

statement is possible. ([12, 47, 69])

Bushmen such as the San and the Hottentots still hunt aardvarks for their meat (also cf. chapter 9.1.4). They also use their skin. ([47])

The teeth of aardvarks are also used as a material for arts and crafts.

Although ostensibly tasting well, there have not been any experiments carried out to domesticate the aardvark yet, as to the knowledge of the author. The main reason is definitely not the diet which can easily be substituted for (cf. chapter 9.2.2). However, another aspect of the aardvarks makes them unattractive for breeders. Namely, that aardvarks give birth to a single young once a year only in contrast to domestic pigs, e.g., which can drop a maximum 12 piglets up to 2.4 times a year.

In addition to a possible food source, the aardvark also plays another role for human beings. They made a mystery of it in many cases. Although not valid finally, the most famous one is the representation of the Egyptian god Seth. In Egyptian mythology gods were often illustrated as human bodies with heads of animals. In the same way Seth is always illustrated with a face resembling that one of an aardvark (cf. figure 10.1). There are other theories as well that claim it would show a donkey e.g., but the strongest similarities exist with the aardvark. The paintings show a face with a long snout and big ears and if one considers that the aardvark was formerly also abundant along the Nile valley (cf. chapter 5.2) this theory is not bizarre at all. ([11, 125])

Besides to this uncertain association the aardvark plays a mystical role in many African cultures, as can be found in the evaluation chapter of the game parks survey (see chapter 9.1.4).

## 10.2 Significance beyond Biology

The aardvark is not only interesting from its biological point of view. It also serves as an inspiration for the name of a series of varied commercial products that shall not be quoted here. It also was the idea behind naming a certain fighter aircraft with an exceptional long nose. The term ‘aardvark’, however, does not always correlate with the animal. It is e.g. also used in Comedy as a funny word without a meaning ([134]). The most popular Comedian using it is probably JOHN CLEESE. He wrote, e.g., a skit together with GRAHAM CHAPMAN in which a fictitious book called ‘*Ethel the Aardvark goes Quantity Surveying*’ plays a minor part ([134]).

At last, the role of the aardvark in the literature for children shall be mentioned here. There exist a lot of books for children where the main figure is an aardvark (e.g. [52, 110]).

This kind of literature can especially be found in the English-speaking area, but some books are also translated into other languages. The aardvark often serves to illustrate books on teaching the Abc, what clearly was inherited from its position as the first word in the alphabet. It is often portrayed in picture books as well. A particularly nice story shall be quoted here where the aardvark is depicted quite realistically and the story is appropriate to its biology ([52]). In the story the aardvark always wakes up just at dusk when the other animals want to go to sleep. Thus it is always sad because it cannot find friends with whom it could explore the world around it. Thus it decides to dig into the depth in order to reach the other side of the world. Doing so, it encounters a female conspecific and makes friends with it. From that moment on the aardvark is happy again.

The story quoted is only one among a series of picture books. Even animated cartoons exist. The most popular one is the aardvark Arthur ([22]) which is also known in Germany. However, it has nothing to do with an aardvark and does not even show similarities to an aardvark. The sole reason for its name is that in one of the first series it joins a spelling contest and wins even though it only learnt the first word on its list that is — guess what — ‘*a-a-r-d-v-a-r-k*’.



## Conclusion & Outlook

The thesis at hand represents the first encyclopaedic description of the biology of the aardvark. A number of books, articles and internet pages have been researched and the most important information on the aardvark has been condensed into this work.

In addition to the literature research a survey was run. African game parks and zoos keeping the aardvark were asked to get some new information on open questions concerning the aardvark. Fortunately a great many of people actively helped by providing their knowledge and thus supported to make this thesis a work of current interest.

In spite of a very good response to the game parks and zoos questionnaires' survey the amount of answers was not great enough to allow to evaluate them statistically with large significance. The main reason therefore is the elusiveness of the aardvark in free nature as well as the low number of individuals kept in zoos world-wide.

Some very interesting results were found evaluating the survey but due to the mentioned lack of significance in terms of statistics these findings could finally not be verified. It would be welcome to do some further research on these points. A lot of approaches for future investigations can be found in the evaluation chapter of the game parks and zoos questionnaires' survey (see chapter 9).

Finally it has to be stated that this thesis does not contain all the knowledge collected on the aardvark which in some aspects goes very deep into detail. This work, however, has to be understood as a means to learn about the different aspects of the aardvark's biology. It presents them in a way that gives a complete overview but nevertheless goes into detail deep enough to understand what is behind. Last but not least this work had the aim to be also accessible — with some effort — to interested laymen.





# Appendix A

## Game Parks Questionnaire

This appendix contains the questionnaire sent to game parks all over Africa as well as the answers that came back. The aims of the questions asked are explained in chapter 1.2 and the evaluation of the game parks questionnaire's survey can be found in chapter 9.1.

### A.1 Blank Form

- 1.) Name of game park: (Please specify:)
  - 1a) Province, country: (Please indicate:)
- 2.) Your name: (Please indicate:)
  - 2a) Your position: (Please indicate:)
- 3.) Do aardvarks occur in your game park? (Please mark with an 'x')
  - definitely yes
  - probably yes
  - unknown
  - probably no
  - definitely no
- 4.) How frequently is the aardvark sighted in your park (approximately)? (Please mark with an 'x')
  - daily
  - weekly
  - monthly
  - annually
  - almost never
- 5.) Do you make night drives in your park? (Please mark with an 'x')
  - yes
  - no
  - 5a) At which time (mostly)? (Please mark with an 'x')
    - at early night (shortly after sunset)
    - at deep night (around midnight)
    - at late night (shortly before sunrise)
  - 5b) How often (approx.)? (Please mark with an 'x')
    - daily
    - weekly
    - monthly
    - irregularly
- 6.) When is the aardvark sighted in your park?

(Please mark with 1=always 2=almost always 3=mostly 4=rarely 5=almost never or 6=never)

- 6a) At which season?  
 – April to September (winter in the southern hemisphere)  
 – October to March (summer in the southern hemisphere)
- 6b) At which moisture?  
 – dry night  
 – average night  
 – rainy night
- 6c) At which temperature?  
 – cold night  
 – average night  
 – warm night
- 6d) At which time?  
 – at early night (shortly after sunset)  
 – at deep night (around midnight)  
 – at late night (shortly before sunrise)  
 – can you give a time frame? (Please specify:)
- 7.) Did you ever observe interactions with other myrmecophagous (=ant-eating) mammals in your park?  
 (Please mark with an 'x')  
 – yes  
 – no  
 7a) If so, what exactly have you observed? (Please specify:)
- 8.) Are aardvarks sometimes accompanied by other animals in your park? (Please mark with an 'x')  
 – yes  
 – no  
 8a) If so, by which animals? (Please specify:)  
 8b) Is there any obvious connection between them? (Please specify:)
- 9.) Did you ever observe an aardvark at daylight in your park? (Please mark with an 'x')  
 – yes  
 – no  
 9a) If so, what did it do? (Please mark with an 'x')  
 – warm up after a cold night  
 – feed on ants and termites  
 – something else (Please specify:)
- 10.) Did sightings of the aardvark increase, decrease or stay constant in the past ten years in your park?  
 (Please mark with an 'x')  
 – decrease  
 – stay constant  
 – increase  
 – cannot tell
- 11.) Did you ever observe an aardvark feeding on mice in your park? (Please mark with an 'x')  
 – yes  
 – no  
 11a) If so, did the aardvark kill the mouse or was it just the carcass? (Please mark with an 'x')  
 – the aardvark killed the mouse  
 – the mouse was already dead  
 – cannot tell
- 12.) Did you ever observe an aardvark feeding on other animals than ants, termites and possibly mice in your park?  
 (Please mark with an 'x')  
 – yes  
 – no  
 12a) If so, what kind of animals? (Please indicate:)  
 12b) And: was it killed by the aardvark or was it a carcass? (Please mark with an 'x')  
 – killed by the aardvark  
 – was already dead  
 – cannot tell
- 13.) Did you ever observe an aardvark feeding on cucumber in your park? (Please mark with an 'x')  
 – yes  
 – no

- 14.) Did you ever observe an aardvark feeding on fruit or roots in your park? (Please mark with an 'x')
- yes
  - no
- 14a) If so, what exactly? (Please specify:)
- 15.) Did you notice a preference regarding the digging into termite mounds? (Please mark with an 'x')
- (Explanation: It is said that aardvarks would preferentially feed from a certain direction and there even exist explanations therefore.)
- preferably from the north
  - preferably from the west
  - preferably from the east
  - preferably from the south
  - there seems to be no preference
  - cannot tell
- 16.) Did you ever observe an aardvark swim in your park? (Please mark with an 'x')
- yes
  - no
- 16a) If so, was there an obvious necessity for doing so? (Please specify:)
- 17.) What animals could you observe killing an aardvark in your park?  
(Please mark with an 'x' or — even better — by the number of times you observed it)
- lion
  - leopard
  - cheetah
  - wild dog
  - spotted hyena
  - python
  - crocodile
  - any others (Please indicate:)
- 18.) When attacked, which reaction of the aardvark could you observe in your park? (Please mark with an 'x')
- it ran away
  - it dug itself in
  - it kicked
  - any other reaction (Please specify:)
- 19.) Did you ever observe anything special in your park concerning the aardvark? (Please specify:)
- 20.) Which folk originally lived in the area of the game park? (Please indicate:)
- 20a) What language do they speak? (Please indicate:)
  - 20b) How do they name the aardvark? (Please indicate:)
  - 20c) Does the aardvark play a role in their mysticism? (Please specify:)
  - 20d) Does (or did) the aardvark play any other role in their life? (Please specify:)
- 21.) What is the official language of your country? (Please indicate:)
- 21a) How do you name the aardvark? (Please indicate:)
- 22.) Do you know any zoos keeping aardvarks? (Please indicate, if possible name including (email-)address:)

## A.2 Blank Form — French Translation

- 1.) Nom de votre parc naturel:
  - 1a) Province, pays:
- 2.) Votre nom:
  - 2a) Votre position:
- 3.) Trouve-t-on des oryctéropes dans votre parc? (veuillez cocher d'une croix <x>)
  - bien sûr
  - sûrement
  - ne sais pas
  - sûrement que non
  - bien sûr que non
- 4.) Dans votre parc, combien de fois aperçoit-on l'oryctérope? (veuillez cochez d'une croix <x>)
  - quotidiennement
  - hebdomadairement
  - mensuellement
  - annuellement
  - presque jamais
- 5.) Dans votre parc, entreprenez-vous en voiture des rondes nocturnes? (veuillez cocher d'une croix)
  - oui
  - non
  - 5a) Si oui, à quels moments? (cochez d'une croix)
    - à la tombée de la nuit (après le coucher du soleil)
    - au milieu de la nuit (vers minuit)
    - en fin de nuit (avant le lever du soleil)
  - 5b) Si oui, dans quelle périodicité? (cochez d'une croix)
    - quotidiennement
    - hebdomadairement
    - mensuellement
    - annuellement
    - irrégulièrement
- 6.) Dans votre parc, quand aperçoit-on l'oryctérope?  
(veuillez noter SVP: 1=toujours 2=presque toujours 3=la plupart du temps 4=rarement 5=presque jamais 6=jamais)
  - 6a) En quelle saison?
    - d'avril en septembre (hiver dans l'hémisphère sud)
    - d'octobre en mars (été dans l'hémisphère sud)
  - 6b) Par quelle hygrométrie?
    - par nuit sèche
    - par nuit moyenne
    - par nuit pluvieuse
  - 6c) Par quelle température?
    - par nuit froide
    - par nuit moyenne
    - par nuit chaude
  - 6d) A quels moments de la nuit?
    - à la tombée de la nuit (après le coucher du soleil)
    - au milieu de la nuit (vers minuit)
    - en fin de nuit (avant le lever du soleil)
    - pouvez-vous cerner un horaire? Si oui, lequel? (veuillez le noter SVP)
- 7.) Dans votre parc, avez-vous déjà remarqué des interactions avec d'autres mammifères insectivores?  
(veuillez cocher d'une croix)
  - oui
  - non
  - 7a) Si oui, qu'avez-vous remarqué? (veuillez le noter SVP)
- 8.) Dans votre parc, les oryctéropes sont-ils parfois accompagnés d'autres animaux? (veuillez cocher d'une croix)
  - oui
  - non
  - 8a) Si oui, par quels animaux? (veuillez le noter SVP)
  - 8b) D'après vous, y aurait-il à cela une explication tangible? (veuillez noter SVP)

- 9.) Dans votre parc, avez-vous déjà observé un oryctérope le jour? (veuillez cocher d'une croix)
- oui
  - non
- 9a) Si oui, que faisait-il? (veuillez cocher d'une croix)
- il se réchauffait après une nuit froide
  - il se nourrissait de fourmis et de termites
  - il faisait autre chose (veuillez le noter SVP)
- 10.) Dans votre parc, avez-vous observé les années précédentes que les oryctéropes étaient en nombre croissant ou en nombre décroissant? (veuillez cocher d'une croix)
- en nombre décroissant
  - en nombre constant
  - en nombre croissant
  - je l'ignore
- 11.) Dans votre parc, avez-vous déjà observé un oryctérope dévorant une souris? (veuillez cocher d'une croix)
- oui
  - non
- 11a) Si oui, est-ce l'oryctérope lui-même qui a tué la souris ou était-ce un cadavre? (veuillez cocher d'une croix)
- l'oryctérope a tué la souris
  - la souris était déjà morte
  - je l'ignore
- 12.) Dans votre parc, avez-vous déjà observé un oryctérope se nourrissant d'autres animaux que de fourmis et termites, de souris par exemple? (veuillez cocher d'une croix)
- oui
  - non
- 12a) Si oui, de quels animaux s'agissait-il? (veuillez noter SVP)
- 12b) Si oui, ont-ils été tués par l'oryctérope ou s'agissait-il de cadavres? (veuillez cocher d'une croix)
- tués par l'oryctérope
  - déjà morts
  - je l'ignore
- 13.) Dans votre parc, avez-vous observé un oryctérope mangeant des concombres (veuillez cocher d'une croix)
- oui
  - non
- 14.) Dans votre parc, avez-vous déjà observé un oryctérope mangeant des fruits ou racines? (veuillez cocher d'une croix)
- oui
  - non
- 14a) Si oui, quoi exactement? (veuillez noter SVP)
- 15.) L'oryctérope fouillant dans un nid de termites, procède-t-il d'après une direction de prédilection? (veuillez cocher d'une croix)
- plutôt du nord
  - plutôt de l'ouest
  - plutôt de l'est
  - plutôt du sud
  - ne semble pas avoir de direction de prédilection
  - je l'ignore
- 16.) Dans votre parc, avez-vous déjà observé un oryctérope nageant? (veuillez cocher d'une croix)
- oui
  - non
- 16a) Si oui, y avait-il une raison visible à cela? (veuillez noter SVP)
- 17.) Dans votre parc, quels animaux avez-vous pu observés tuant un oryctérope? (veuillez cocher d'une croix ou mieux, noter le nombre d'observations si possible)
- lion
  - léopard
  - guépard
  - chien sauvage
  - hyène tachetée
  - python
  - crocodile
  - autres: (veuillez noter SVP)

- 18.) Dans votre parc, quel est le moyen de défense utilisé par l'oryctérope et que vous avez pu observer? (veuillez cocher d'une croix)
- il prend la fuite
  - il s'enterre
  - il donne des coups de pattes
  - autre réactions: (veuillez noter SVP)
- 19.) Dans votre parc, auriez-vous observé ou remarqué quelque chose de spécial concernant un oryctérope? (veuillez noter SVP)
- 20.) Quelle tribu vivait à l'origine à l'emplacement actuel de votre parc? (veuillez noter SVP)
- 20a) Quelle était leur langue? (veuillez noter SVP)
  - 20b) Quel est le nom de l'oryctérope dans cette langue? (veuillez noter SVP)
  - 20c) L'oryctérope y jouait-il un rôle mystique? (veuillez noter SVP)
  - 20d) Joue ou jouait-il un autre rôle, et si oui lequel? (veuillez noter SVP)
- 21.) Quelle langue parle-t-on dans votre pays?
- 21a) Comment s'appelle l'oryctérope dans votre langue?
- 22.) Connaissez-vous des zoos qui hébergent des oryctéropes? (veuillez les noter ci-dessous avec l'adresse e-mail, si possible)

## A.3 Malawi, Liwonde National Park

- 1.) Name of game park: (Please specify:) **Liwonde National Park**  
 1a) Province, country: (Please indicate:) **Southern Region, Malawi**
- 2.) Your name: (Please indicate:) **Darren M. Bruessow**  
 2a) Your position: (Please indicate:) **Managing Director - Chinguni Hills Lodge**
- 3.) Do aardvarks occur in your game park? (Please mark with an 'x')  
 x       – definitely yes  
          – probably yes  
          – unknown  
          – probably no  
          – definitely no
- 4.) How frequently is the aardvark sighted in your park (approximately)? (Please mark with an 'x')  
       – daily  
       – weekly  
       – monthly  
       – annually  
 x       – almost never **We've only seen one individual in the last six years - and that was 3 weeks ago. Had begun to believe they had become locally extinct.**
- 5.) Do you make night drives in your park? (Please mark with an 'x')  
 x       – yes  
       – no  
 5a) At which time (mostly)? (Please mark with an 'x')  
       – at early night (shortly after sunset)  
 x       – at deep night (around midnight)  
       – at late night (shortly before sunrise)  
 5b) How often (approx.)? (Please mark with an 'x')  
 x       – daily  
       – weekly  
       – monthly  
       – irregularly
- 6.) When is the aardvark sighted in your park?  
 (Please mark with 1=always 2=almost always 3=mostly 4=rarely x 5=almost never or 6=never)  
 6a) At which season?  
 x       – April to September (winter in the southern hemisphere) **the only one sighted recently was seen at a water hole after midnight**  
       – October to March (summer in the southern hemisphere)  
 6b) At which moisture?  
 x       – dry night  
       – average night  
       – rainy night  
 6c) At which temperature?  
       – cold night  
       – average night  
 x       – warm night  
 6d) At which time?  
       – at early night (shortly after sunset)  
 x       – at deep night (around midnight)  
       – at late night (shortly before sunrise)  
       – can you give a time frame? (Please specify:)
- 7.) Did you ever observe interactions with other myrmecophagous (=ant-eating) mammals in your park?  
 (Please mark with an 'x')  
       – yes  
 x       – no  
       7a) If so, what exactly have you observed? (Please specify:)
- 8.) Are aardvarks sometimes accompanied by other animals in your park? (Please mark with an 'x')  
 x       – yes  
       – no  
       8a) If so, by which animals? (Please specify:)

- 8b) Is there any obvious connection between them? (Please specify:)
- 9.) Did you ever observe an aardvark at daylight in your park? (Please mark with an 'x')
- yes
  - x - no
- 9a) If so, what did it do? (Please mark with an 'x')
- warm up after a cold night
  - feed on ants and termites
  - something else (Please specify:)
- 10.) Did sightings of the aardvark increase, decrease or stay constant in the past ten years in your park? (Please mark with an 'x')
- x - decrease
  - stay constant
  - increase
  - cannot tell
- 11.) Did you ever observe an aardvark feeding on mice in your park? (Please mark with an 'x')
- yes
  - x - no
- 11a) If so, did the aardvark kill the mouse or was it just the carcass? (Please mark with an 'x')
- the aardvark killed the mouse
  - the mouse was already dead
  - cannot tell
- 12.) Did you ever observe an aardvark feeding on other animals than ants, termites and possibly mice in your park? (Please mark with an 'x')
- yes
  - x - no
- 12a) If so, what kind of animals? (Please indicate:)
- 12b) And: was it killed by the aardvark or was it a carcass? (Please mark with an 'x')
- killed by the aardvark
  - was already dead
  - cannot tell
- 13.) Did you ever observe an aardvark feeding on cucumber in your park? (Please mark with an 'x')
- yes
  - x - no
- 14.) Did you ever observe an aardvark feeding on fruit or roots in your park? (Please mark with an 'x')
- yes
  - x - no
- 14a) If so, what exactly? (Please specify:)
- 15.) Did you notice a preference regarding the digging into termite mounds? (Please mark with an 'x')
- (Explanation: It is said that aardvarks would preferentially feed from a certain direction and there even exist explanations therefore.)
- preferably from the north
  - preferably from the west
  - preferably from the east
  - preferably from the south
  - there seems to be no preference
  - cannot tell
- 16.) Did you ever observe an aardvark swim in your park? (Please mark with an 'x')
- yes
  - x - no
- 16a) If so, was there an obvious necessity for doing so? (Please specify:)
- 17.) What animals could you observe killing an aardvark in your park? (Please mark with an 'x' or — even better — by the number of times you observed it)
- lion
  - leopard
  - cheetah
  - wild dog
  - spotted hyena
  - python



- crocodile
  - any others (Please indicate:)
- 18.) When attacked, which reaction of the aardvark could you observe in your park? (Please mark with an 'x')
- it ran away
  - it dug itself in
  - it kicked
  - any other reaction (Please specify:)
- 19.) Did you ever observe anything special in your park concerning the aardvark? (Please specify:)
- 20.) Which folk originally lived in the area of the game park? (Please indicate:) **Yao tribe - abantu**
- 20a) What language do they speak? (Please indicate:) **Yao**
  - 20b) How do they name the aardvark? (Please indicate:)
  - 20c) Does the aardvark play a role in their mysticism? (Please specify:)
  - 20d) Does (or did) the aardvark play any other role in their life? (Please specify:)
- 21.) What is the official language of your country? (Please indicate:) **Chichewa/English**
- 21a) How do you name the aardvark? (Please indicate:)
- 22.) Do you know any zoos keeping aardvarks? (Please indicate, if possible name including (email-)address:)

## A.4 Malawi, Nyika National Park

- 1.) Name of game park: (Please specify:) **NYIKA NATIONAL PARK**  
 1a) Province, country: (Please indicate:) **MALAWI**
- 2.) Your name: (Please indicate:) **DAVID FOOT**  
 2a) Your position: (Please indicate:) **MANAGING DIRECTOR**
- 3.) Do aardvarks occur in your game park? (Please mark with an 'x')  
**x**      – definitely yes  
           – probably yes  
           – unknown  
           – probably no  
           – definitely no
- 4.) How frequently is the aardvark sighted in your park (approximately)? (Please mark with an 'x')  
           – daily  
           – weekly  
           – monthly  
           – annually  
**x**      – almost never (**twice in last 8 years**)
- 5.) Do you make night drives in your park? (Please mark with an 'x')  
**x**      – yes  
           – no  
 5a) At which time (mostly)? (Please mark with an 'x')  
**x**      – at early night (shortly after sunset)  
           – at deep night (around midnight)  
           – at late night (shortly before sunrise)  
 5b) How often (approx.)? (Please mark with an 'x')  
**x**      – daily  
           – weekly  
           – monthly  
           – irregularly
- 6.) When is the aardvark sighted in your park?  
 (Please mark with 1=always 2=almost always 3=mostly 4=rarely 5=almost never or 6=never)  
 6a) At which season?  
           – April to September (winter in the southern hemisphere)  
**x**      – October to March (summer in the southern hemisphere) **TWICE**  
 6b) At which moisture?  
**x**      – dry night  
           – average night  
           – rainy night  
 6c) At which temperature?  
           – cold night  
           – average night  
**x**      – warm night  
 6d) At which time?  
           – at early night (shortly after sunset)  
           – at deep night (around midnight)  
           – at late night (shortly before sunrise)  
**x**      – can you give a time frame? (Please specify:) **4.00pm and 5.45pm**
- 7.) Did you ever observe interactions with other myrmecophagous (=ant-eating) mammals in your park?  
 (Please mark with an 'x')  
           – yes  
**x**      – no  
 7a) If so, what exactly have you observed? (Please specify:)
- 8.) Are aardvarks sometimes accompanied by other animals in your park? (Please mark with an 'x')  
           – yes  
**x**      – no  
 8a) If so, by which animals? (Please specify:)  
 8b) Is there any obvious connection between them? (Please specify:)

- 9.) Did you ever observe an aardvark at daylight in your park? (Please mark with an 'x')
- x      – yes  
           – no
- 9a) If so, what did it do? (Please mark with an 'x')
- warm up after a cold night
- x      – feed on ants and termites ONCE
- x      – something else (Please specify:) CAME OUT OF HOLE AND WENT BACK IN (4.00PM)
- 10.) Did sightings of the aardvark increase, decrease or stay constant in the past ten years in your park?  
 (Please mark with an 'x')
- decrease
- stay constant
- increase
- x      – cannot tell
- 11.) Did you ever observe an aardvark feeding on mice in your park? (Please mark with an 'x')
- yes
- x      – no
- 11a) If so, did the aardvark kill the mouse or was it just the carcass? (Please mark with an 'x')
- the aardvark killed the mouse
- the mouse was already dead
- cannot tell
- 12.) Did you ever observe an aardvark feeding on other animals than ants, termites and possibly mice in your park?  
 (Please mark with an 'x')
- yes
- x      – no
- 12a) If so, what kind of animals? (Please indicate:)
- 12b) And: was it killed by the aardvark or was it a carcass? (Please mark with an 'x')
- killed by the aardvark
- was already dead
- cannot tell
- 13.) Did you ever observe an aardvark feeding on cucumber in your park? (Please mark with an 'x')
- yes
- x      – no
- 14.) Did you ever observe an aardvark feeding on fruit or roots in your park? (Please mark with an 'x')
- yes
- x      – no
- 14a) If so, what exactly? (Please specify:)
- 15.) Did you notice a preference regarding the digging into termite mounds? (Please mark with an 'x')
- (Explanation: It is said that aardvarks would preferentially feed from a certain direction and there even exist explanations therefore.)
- preferably from the north
- preferably from the west
- preferably from the east
- preferably from the south
- x      – there seems to be no preference
- cannot tell
- 16.) Did you ever observe an aardvark swim in your park? (Please mark with an 'x')
- yes
- x      – no
- 16a) If so, was there an obvious necessity for doing so? (Please specify:)
- 17.) What animals could you observe killing an aardvark in your park?  
 (Please mark with an 'x' or — even better — by the number of times you observed it)
- lion
- leopard
- cheetah
- wild dog
- spotted hyena
- python
- crocodile
- any others (Please indicate:)

- 18.) When attacked, which reaction of the aardvark could you observe in your park? (Please mark with an 'x')
- x       – it ran away (**from us**)
  - it dug itself in
  - it kicked
  - any other reaction (Please specify:)
- 19.) Did you ever observe anything special in your park concerning the aardvark? (Please specify:) **THE SIGHTINGS WERE ABOVE 7200 FEET ASL**
- 20.) Which folk originally lived in the area of the game park? (Please indicate:) **TUMBUKA**
- 20a) What language do they speak? (Please indicate:) **CHITUMBUKA**
  - 20b) How do they name the aardvark? (Please indicate:)
  - 20c) Does the aardvark play a role in their mysticism? (Please specify:)
  - 20d) Does (or did) the aardvark play any other role in their life? (Please specify:)
- 21.) What is the official language of your country? (Please indicate:) **ENGLISH**
- 21a) How do you name the aardvark? (Please indicate:) **AARDVARK**
- 22.) Do you know any zoos keeping aardvarks? (Please indicate, if possible name including (email-)address:)

## A.5 Morocco

- 1.) Nom de votre parc naturel: Haut Commissariat aux Eaux et Forêts et à la Lutte Contre la Désertification
  - 1a) Province, pays: Morocco
- 2.) Votre nom: Mohamed Ribi
  - 2a) Votre position: Le Chef de la division des Parcs et Réserves Naturelles
- 3.) Trouve-t-on des oryctéropes dans votre parc? (veuillez cocher d'une croix <x>)
  - bien sûr
  - sûrement
  - ne sais pas
  - sûrement que non
  - x - bien sûr que non

Je vous informe que l'animal qui vous intéresse<sup>1</sup> n'existe pas au Maroc. A mon avis, il s'agit d'une espèce tropicale.

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<sup>1</sup>L'oryctérope (the aardvark).

## A.6 South Africa, Addo Elephant National Park

- 1.) Name of game park: (Please specify:) **Addo Elephant National Park**  
 1a) Province, country: (Please indicate:) **Eastern cape**
- 2.) Your name: (Please indicate:) **Andries Nel**  
 2a) Your position: (Please indicate:) **Senior field guide**
- 3.) Do aardvarks occur in your game park? (Please mark with an 'x')  
 x      – definitely yes  
           – probably yes  
           – unknown  
           – probably no  
           – definitely no
- 4.) How frequently is the aardvark sighted in your park (approximately)? (Please mark with an 'x')  
           – daily  
           – weekly  
 x      – monthly  
           – annually  
           – almost never
- 5.) Do you make night drives in your park? (Please mark with an 'x')  
 x      – yes  
           – no  
 5a) At which time (mostly)? (Please mark with an 'x')  
 x      – at early night (shortly after sunset)  
           – at deep night (around midnight)  
           – at late night (shortly before sunrise)  
 5b) How often (approx.)? (Please mark with an 'x')  
 x      – daily  
           – weekly  
           – monthly  
           – irregularly
- 6.) When is the aardvark sighted in your park?  
 (Please mark with 1=always 2=almost always 3=mostly 4=rarely 5=almost never or 6=never)  
 6a) At which season?  
 x      – April to September (winter in the southern hemisphere)  
           – October to March (summer in the southern hemisphere)  
 6b) At which moisture?  
 x      – dry night  
           – average night  
           – rainy night  
 6c) At which temperature?  
           – cold night  
 x      – average night  
           – warm night  
 6d) At which time?  
           – at early night (shortly after sunset)  
 x      – at deep night (around midnight)  
           – at late night (shortly before sunrise)  
           – can you give a time frame? (Please specify:)
- 7.) Did you ever observe interactions with other myrmecophagous (=ant-eating) mammals in your park?  
 (Please mark with an 'x')  
           – yes  
 x      – no  
 7a) If so, what exactly have you observed? (Please specify:)
- 8.) Are aardvarks sometimes accompanied by other animals in your park? (Please mark with an 'x')  
           – yes  
 x      – no  
 8a) If so, by which animals? (Please specify:)  
 8b) Is there any obvious connection between them? (Please specify:)

- 9.) Did you ever observe an aardvark at daylight in your park? (Please mark with an 'x')
- x      – yes  
           – no
- 9a) If so, what did it do? (Please mark with an 'x')
- warm up after a cold night
- x      – feed on ants and termites  
           – something else (Please specify:)
- 10.) Did sightings of the aardvark increase, decrease or stay constant in the past ten years in your park?  
 (Please mark with an 'x')
- decrease  
           – stay constant
- x      – increase  
           – cannot tell
- 11.) Did you ever observe an aardvark feeding on mice in your park? (Please mark with an 'x')
- x      – yes  
           – no
- 11a) If so, did the aardvark kill the mouse or was it just the carcass? (Please mark with an 'x')
- the aardvark killed the mouse  
           – the mouse was already dead  
           – cannot tell
- 12.) Did you ever observe an aardvark feeding on other animals than ants, termites and possibly mice in your park?  
 (Please mark with an 'x')
- x      – yes  
           – no
- 12a) If so, what kind of animals? (Please indicate:)
- 12b) And: was it killed by the aardvark or was it a carcass? (Please mark with an 'x')
- killed by the aardvark  
           – was already dead  
           – cannot tell
- 13.) Did you ever observe an aardvark feeding on cucumber in your park? (Please mark with an 'x')
- x      – yes  
           – no
- 14.) Did you ever observe an aardvark feeding on fruit or roots in your park? (Please mark with an 'x')
- x      – yes  
           – no
- 14a) If so, what exactly? (Please specify:)
- 15.) Did you notice a preference regarding the digging into termite mounds? (Please mark with an 'x')
- (Explanation: It is said that aardvarks would preferentially feed from a certain direction and there even exist explanations therefore.)
- x      – preferably from the north  
           – preferably from the west  
           – preferably from the east  
           – preferably from the south  
           – there seems to be no preference  
           – cannot tell
- 16.) Did you ever observe an aardvark swim in your park? (Please mark with an 'x')
- x      – yes  
           – no
- 16a) If so, was there an obvious necessity for doing so? (Please specify:)
- 17.) What animals could you observe killing an aardvark in your park?  
 (Please mark with an 'x' or — even better — by the number of times you observed it)
- x      – lion  
           – leopard  
           – cheetah  
           – wild dog
- x      – spotted hyena  
           – python  
           – crocodile  
           – any others (Please indicate:)

18.) When attacked, which reaction of the aardvark could you observe in your park? (Please mark with an 'x')

- x
- it ran away
  - it dug itself in
  - it kicked
  - any other reaction (Please specify:)

19.) Did you ever observe anything special in your park concerning the aardvark? (Please specify:)

20.) Which folk originally lived in the area of the game park? (Please indicate:)

20a) What language do they speak? (Please indicate:) **Koi san**

20b) How do they name the aardvark? (Please indicate:)

20c) Does the aardvark play a role in their mysticism? (Please specify:)

20d) Does (or did) the aardvark play any other role in their life? (Please specify:)

21.) What is the official language of your country? (Please indicate:) **english**

21a) How do you name the aardvark? (Please indicate:) **aardvark**

22.) Do you know any zoos keeping aardvarks? (Please indicate, if possible name including (email-)address:) **no**



## A.7 South Africa, Augrabies Falls National Park

- 1.) Name of game park: (Please specify:) **Augrabies Falls National Park**  
 1a) Province, country: (Please indicate:) **Northern Cape - RSA**
- 2.) Your name: (Please indicate:) **TULANI ALFRED MLATSHENI**  
 2a) Your position: (Please indicate:) **SECTION RANGER**
- 3.) Do aardvarks occur in your game park? (Please mark with an 'x')
- definitely yes  
 - probably yes  
 - unknown  
 - probably no  
 - definitely no
- 4.) How frequently is the aardvark sighted in your park (approximately)? (Please mark with an 'x')
- daily  
 - weekly  
 - monthly  
 - annually  
 - almost never
- 5.) Do you make night drives in your park? (Please mark with an 'x')
- yes  
 - no
- 5a) At which time (mostly)? (Please mark with an 'x')
- at early night (shortly after sunset)  
 - at deep night (around midnight)  
 - at late night (shortly before sunrise)
- 5b) How often (approx.)? (Please mark with an 'x')
- daily  
 - weekly  
 - monthly  
 - irregularly
- 6.) When is the aardvark sighted in your park?  
 (Please mark with 1=always 2=almost always 3=mostly x 4=rarely 5=almost never or 6=never)
- 6a) At which season?
- April to September (winter in the southern hemisphere)  
 - October to March (summer in the southern hemisphere)
- 6b) At which moisture?
- dry night  
 - average night  
 - rainy night
- 6c) At which temperature?
- cold night  
 - average night  
 - warm night
- 6d) At which time?
- at early night (shortly after sunset)  
 - at deep night (around midnight)  
 - at late night (shortly before sunrise)
- can you give a time frame? (Please specify:) **(At around 8hoo at night about 40 meters away from the road)**
- 7.) Did you ever observe interactions with other myrmecophagous (=ant-eating) mammals in your park?  
 (Please mark with an 'x')
- yes  
 - no
- 7a) If so, what exactly have you observed? (Please specify:)
- 8.) Are aardvarks sometimes accompanied by other animals in your park? (Please mark with an 'x')
- yes  
 - no
- 8a) If so, by which animals? (Please specify:)
- 8b) Is there any obvious connection between them? (Please specify:)

- 9.) Did you ever observe an aardvark at daylight in your park? (Please mark with an 'x')
- yes
  - x - no
- 9a) If so, what did it do? (Please mark with an 'x')
- warm up after a cold night
  - feed on ants and termites
  - something else (Please specify:)
- 10.) Did sightings of the aardvark increase, decrease or stay constant in the past ten years in your park? (Please mark with an 'x')
- decrease
  - stay constant
  - increase
  - x - cannot tell
- 11.) Did you ever observe an aardvark feeding on mice in your park? (Please mark with an 'x')
- yes
  - x - no
- 11a) If so, did the aardvark kill the mouse or was it just the carcass? (Please mark with an 'x')
- the aardvark killed the mouse
  - the mouse was already dead
  - cannot tell
- 12.) Did you ever observe an aardvark feeding on other animals than ants, termites and possibly mice in your park? (Please mark with an 'x')
- yes
  - x - no
- 12a) If so, what kind of animals? (Please indicate:)
- 12b) And: was it killed by the aardvark or was it a carcass? (Please mark with an 'x')
- killed by the aardvark
  - was already dead
  - cannot tell
- 13.) Did you ever observe an aardvark feeding on cucumber in your park? (Please mark with an 'x')
- yes
  - x - no
- 14.) Did you ever observe an aardvark feeding on fruit or roots in your park? (Please mark with an 'x')
- yes
  - x - no
- 14a) If so, what exactly? (Please specify:)
- 15.) Did you notice a preference regarding the digging into termite mounds? (Please mark with an 'x')
- (Explanation: It is said that aardvarks would preferentially feed from a certain direction and there even exist explanations therefore.)
- preferably from the north
  - preferably from the west
  - preferably from the east
  - preferably from the south
  - there seems to be no preference
  - x - cannot tell
- 16.) Did you ever observe an aardvark swim in your park? (Please mark with an 'x')
- yes
  - x - no
- 16a) If so, was there an obvious necessity for doing so? (Please specify:)
- 17.) What animals could you observe killing an aardvark in your park? (Please mark with an 'x' or — even better — by the number of times you observed it)
- lion
  - leopard
  - cheetah
  - wild dog
  - spotted hyena
  - python
  - crocodile

- x           – any others (Please indicate:) (on open roads they get knocked by vehicles outside the park)
- 18.) When attacked, which reaction of the aardvark could you observe in your park? (Please mark with an 'x')
- x           – it ran away  
            – it dug itself in  
            – it kicked
- x           – any other reaction (Please specify:) (it tries to hide the head, at the same time kicks but is not a strong kicker)
- 19.) Did you ever observe anything special in your park concerning the aardvark? (Please specify:) (the park is in the arid areas and the aardvark, are scarce as compared to wet Southern Regions of the country)
- 20.) Which folk originally lived in the area of the game park? (Please indicate:) (COLOUREDS)
- 20a) What language do they speak? (Please indicate:) (Mostly Afrikaans, though there are some that speak English, Xhosa)
- 20b) How do they name the aardvark? (Please indicate:) (aardvark (Afrikaans); antbear (English); ihodi (Xhosa))
- 20c) Does the aardvark play a role in their mysticism? (Please specify:) (no)
- 20d) Does (or did) the aardvark play any other role in their life? (Please specify:) (I have no idea I will find out)
- 21.) What is the official language of your country? (Please indicate:) (There are 11 official languages in the country)
- 21a) How do you name the aardvark? (Please indicate:) (Aardvark; ant bear; ihodi)
- 22.) Do you know any zoos keeping aardvarks? (Please indicate, if possible name including (email-)address:) no but I will find out

## A.8 South Africa, Bontebok Park

- 1.) Name of game park: (Please specify:) BONTBOK PARK
  - 1a) Province, country: (Please indicate:) WESTERN CAPE SOUTH AFRICA
- 2.) Your name: (Please indicate:) ROLAND JANUARIE
  - 2a) Your position: (Please indicate:) SENIOR RANGER
- 3.) Do aardvarks occur in your game park? (Please mark with an 'x')
  - definitely yes
  - probably yes
  - unknown
  - probably no
  - definitely no
- 4.) How frequently is the aardvark sighted in your park (approximately)? (Please mark with an 'x')
  - daily
  - weekly
  - monthly
  - annually
  - almost never
- 5.) Do you make night drives in your park? (Please mark with an 'x')
  - yes
  - no
  - 5a) At which time (mostly)? (Please mark with an 'x')
    - at early night (shortly after sunset)
    - at deep night (around midnight)
    - at late night (shortly before sunrise)
  - 5b) How often (approx.)? (Please mark with an 'x')
    - daily
    - weekly
    - monthly
    - irregularly
- 6.) When is the aardvark sighted in your park?  
(Please mark with 1=always 2=almost always 3=mostly x 4=rarely 5=almost never or 6=never)
  - 6a) At which season?
    - April to September (winter in the southern hemisphere)
    - October to March (summer in the southern hemisphere)
  - 6b) At which moisture?
    - dry night
    - average night
    - rainy night
  - 6c) At which temperature?
    - cold night
    - average night
    - warm night
  - 6d) At which time?
    - at early night (shortly after sunset)
    - at deep night (around midnight)
    - at late night (shortly before sunrise)
    - can you give a time frame? (Please specify:)
- 7.) Did you ever observe interactions with other myrmecophagous (=ant-eating) mammals in your park?  
(Please mark with an 'x')
  - yes
  - no
  - 7a) If so, what exactly have you observed? (Please specify:)
- 8.) Are aardvarks sometimes accompanied by other animals in your park? (Please mark with an 'x')
  - yes
  - no
  - 8a) If so, by which animals? (Please specify:)
  - 8b) Is there any obvious connection between them? (Please specify:)

- 9.) Did you ever observe an aardvark at daylight in your park? (Please mark with an 'x')
- x     – yes  
       – no
- 9a) If so, what did it do? (Please mark with an 'x')
- warm up after a cold night
- x     – feed on ants and termites  
       – something else (Please specify:)
- 10.) Did sightings of the aardvark increase, decrease or stay constant in the past ten years in your park?  
 (Please mark with an 'x')
- decrease  
       – stay constant  
       – increase
- x     – cannot tell
- 11.) Did you ever observe an aardvark feeding on mice in your park? (Please mark with an 'x')
- yes
- x     – no
- 11a) If so, did the aardvark kill the mouse or was it just the carcass? (Please mark with an 'x')
- the aardvark killed the mouse  
       – the mouse was already dead  
       – cannot tell
- 12.) Did you ever observe an aardvark feeding on other animals than ants, termites and possibly mice in your park?  
 (Please mark with an 'x')
- yes
- x     – no
- 12a) If so, what kind of animals? (Please indicate:)
- 12b) And: was it killed by the aardvark or was it a carcass? (Please mark with an 'x')
- killed by the aardvark  
       – was already dead  
       – cannot tell
- 13.) Did you ever observe an aardvark feeding on cucumber in your park? (Please mark with an 'x')
- yes
- x     – no
- 14.) Did you ever observe an aardvark feeding on fruit or roots in your park? (Please mark with an 'x')
- yes
- x     – no
- 14a) If so, what exactly? (Please specify:)
- 15.) Did you notice a preference regarding the digging into termite mounds? (Please mark with an 'x')
- (Explanation: It is said that aardvarks would preferentially feed from a certain direction and there even exist explanations therefore.)
- preferably from the north  
       – preferably from the west  
       – preferably from the east  
       – preferably from the south  
       – there seems to be no preference
- x     – cannot tell
- 16.) Did you ever observe an aardvark swim in your park? (Please mark with an 'x')
- yes
- x     – no
- 16a) If so, was there an obvious necessity for doing so? (Please specify:)
- 17.) What animals could you observe killing an aardvark in your park?  
 (Please mark with an 'x' or — even better — by the number of times you observed it)
- lion  
       – leopard  
       – cheetah  
       – wild dog  
       – spotted hyena  
       – python  
       – crocodile  
       – any others (Please indicate:)

- 18.) When attacked, which reaction of the aardvark could you observe in your park? (Please mark with an 'x')
- it ran away
  - it dug itself in
  - it kicked
  - any other reaction (Please specify:)
- 19.) Did you ever observe anything special in your park concerning the aardvark? (Please specify:) NO
- 20.) Which folk originally lived in the area of the game park? (Please indicate:)
- 20a) What language do they speak? (Please indicate:)
  - 20b) How do they name the aardvark? (Please indicate:)
  - 20c) Does the aardvark play a role in their mysticism? (Please specify:)
  - 20d) Does (or did) the aardvark play any other role in their life? (Please specify:) NO
- 21.) What is the official language of your country? (Please indicate:) ENGLISH
- 21a) How do you name the aardvark? (Please indicate:) AARDVARK
- 22.) Do you know any zoos keeping aardvarks? (Please indicate, if possible name including (email-)address:)

## A.9 South Africa, Golden Gate Highlands National Park

- 1.) Name of game park: (Please specify:) **Golden Gate HNP**
  - 1a) Province, country: (Please indicate:) **Freestate, RSA**
- 2.) Your name: (Please indicate:)
  - 2a) Your position: (Please indicate:)
- 3.) Do aardvarks occur in your game park? (Please mark with an 'x')
  - definitely yes
  - probably yes
  - unknown
  - probably no
  - x** - definitely no
- 4.) How frequently is the aardvark sighted in your park (approximately)? (Please mark with an 'x') N/A
  - daily
  - weekly
  - monthly
  - annually
  - almost never
- 5.) Do you make night drives in your park? (Please mark with an 'x')
  - yes
  - x** - no
  - 5a) At which time (mostly)? (Please mark with an 'x')
    - at early night (shortly after sunset)
    - at deep night (around midnight)
    - at late night (shortly before sunrise)
  - 5b) How often (approx.)? (Please mark with an 'x')
    - daily
    - weekly
    - monthly
    - irregularly

[...]

## A.10 South Africa, Highveld National Park

- 1.) Name of game park: (Please specify:) **Highveld National Park**  
 1a) Province, country: (Please indicate:) **North West, South Africa**
- 2.) Your name: (Please indicate:) **Legari Mamogale 'Abbey'**  
 2a) Your position: (Please indicate:) **Project Manager**
- 3.) Do aardvarks occur in your game park? (Please mark with an 'x')  
 x      – definitely yes  
           – probably yes  
           – unknown  
           – probably no  
           – definitely no
- 4.) How frequently is the aardvark sighted in your park (approximately)? (Please mark with an 'x')  
           – daily  
           – weekly  
           – monthly  
 x      – annually  
           – almost never
- 5.) Do you make night drives in your park? (Please mark with an 'x')  
 x      – yes 'cause the park is still under construction  
           – no  
 5a) At which time (mostly)? (Please mark with an 'x')  
           – at early night (shortly after sunset)  
 x      – at deep night (around midnight)  
           – at late night (shortly before sunrise)  
 5b) How often (approx.)? (Please mark with an 'x')  
           – daily  
           – weekly  
           – monthly  
 x      – irregularly
- 6.) When is the aardvark sighted in your park?  
 (Please mark with 1=always 2=almost always 3=mostly x 4=rarely 5=almost never or 6=never)  
 6a) At which season?  
           – April to September (winter in the southern hemisphere)  
 x      – October to March (summer in the southern hemisphere)  
 6b) At which moisture?  
           – dry night  
 x      – average night  
           – rainy night  
 6c) At which temperature?  
           – cold night  
 x      – average night  
           – warm night  
 6d) At which time?  
           – at early night (shortly after sunset)  
 x      – at deep night (around midnight)  
           – at late night (shortly before sunrise)  
           – can you give a time frame? (Please specify:)
- 7.) Did you ever observe interactions with other myrmecophagous (=ant-eating) mammals in your park?  
 (Please mark with an 'x')  
 x      – yes  
           – no  
 7a) If so, what exactly have you observed? (Please specify:) **Have seen aardwolf following the aardvark and I think it is because they are feeding on the same food.**
- 8.) Are aardvarks sometimes accompanied by other animals in your park? (Please mark with an 'x')  
 x      – yes  
           – no  
 8a) If so, by which animals? (Please specify:) **Aardwolf**  
 8b) Is there any obvious connection between them? (Please specify:) **They feed on the same food**



- 9.) Did you ever observe an aardvark at daylight in your park? (Please mark with an 'x')
- yes
  - x - no
- 9a) If so, what did it do? (Please mark with an 'x')
- warm up after a cold night
  - feed on ants and termites
  - something else (Please specify:)
- 10.) Did sightings of the aardvark increase, decrease or stay constant in the past ten years in your park?  
(Please mark with an 'x')
- decrease
  - stay constant
  - increase
  - x - cannot tell
- 11.) Did you ever observe an aardvark feeding on mice in your park? (Please mark with an 'x')
- yes
  - x - no
- 11a) If so, did the aardvark kill the mouse or was it just the carcass? (Please mark with an 'x')
- the aardvark killed the mouse
  - the mouse was already dead
  - cannot tell
- 12.) Did you ever observe an aardvark feeding on other animals than ants, termites and possibly mice in your park?  
(Please mark with an 'x')
- yes
  - x - no
- 12a) If so, what kind of animals? (Please indicate:)
- 12b) And: was it killed by the aardvark or was it a carcass? (Please mark with an 'x')
- killed by the aardvark
  - was already dead
  - cannot tell
- 13.) Did you ever observe an aardvark feeding on cucumber in your park? (Please mark with an 'x')
- yes
  - x - no
- 14.) Did you ever observe an aardvark feeding on fruit or roots in your park? (Please mark with an 'x')
- yes
  - x - no
- 14a) If so, what exactly? (Please specify:)
- 15.) Did you notice a preference regarding the digging into termite mounds? (Please mark with an 'x')
- (Explanation: It is said that aardvarks would preferentially feed from a certain direction and there even exist explanations therefore.)
- preferably from the north
  - preferably from the west
  - preferably from the east
  - preferably from the south
  - there seems to be no preference
  - x - cannot tell
- 16.) Did you ever observe an aardvark swim in your park? (Please mark with an 'x')
- yes
  - x - no
- 16a) If so, was there an obvious necessity for doing so? (Please specify:)
- 17.) What animals could you observe killing an aardvark in your park?  
(Please mark with an 'x' or — even better — by the number of times you observed it)
- lion
  - leopard
  - cheetah
  - wild dog
  - spotted hyena
  - python
  - crocodile

– any others (Please indicate:)

18.) When attacked, which reaction of the aardvark could you observe in your park? (Please mark with an 'x')

x           – it ran away

x           – it dug itself in

            – it kicked

            – any other reaction (Please specify:)

19.) Did you ever observe anything special in your park concerning the aardvark? (Please specify:)

20.) Which folk originally lived in the area of the game park? (Please indicate:) **African**

20a) What language do they speak? (Please indicate:) **Setswana**

20b) How do they name the aardvark? (Please indicate:)

20c) Does the aardvark play a role in their mysticism? (Please specify:) **Totem**

20d) Does (or did) the aardvark play any other role in their life? (Please specify:) **Yes they used eat the meat and for medicinal purpose.**

21.) What is the official language of your country? (Please indicate:) **English and other 13 languages**

21a) How do you name the aardvark? (Please indicate:)

22.) Do you know any zoos keeping aardvarks? (Please indicate, if possible name including (email-)address:) **n/a**

## A.11 South Africa, Kapama Game Reserve

- 1.) Name of game park: (Please specify:) **Kapama Game Reserve**  
 1a) Province, country: (Please indicate:) **Limpopo Province. South Africa**
- 2.) Your name: (Please indicate:) **Prof D G A Meltzer**  
 2a) Your position: (Please indicate:) **veterinarian**
- 3.) Do aardvarks occur in your game park? (Please mark with an 'x')  
 x       – definitely yes  
          – probably yes  
          – unknown  
          – probably no  
          – definitely no
- 4.) How frequently is the aardvark sighted in your park (approximately)? (Please mark with an 'x')  
       – daily  
       – weekly  
       – monthly  
 x       – annually  
       – almost never
- 5.) Do you make night drives in your park? (Please mark with an 'x')  
 x       – yes  
       – no  
 5a) At which time (mostly)? (Please mark with an 'x')  
 x       – at early night (shortly after sunset)  
       – at deep night (around midnight)  
       – at late night (shortly before sunrise)  
 5b) How often (approx.)? (Please mark with an 'x')  
 x       – daily  
       – weekly  
       – monthly  
       – irregularly
- 6.) When is the aardvark sighted in your park?  
 (Please mark with 1=always 2=almost always 3=mostly x 4=rarely 5=almost never or 6=never)  
 6a) At which season?  
       – April to September (winter in the southern hemisphere)  
 x       – October to March (summer in the southern hemisphere)  
 6b) At which moisture?  
       – dry night  
 x       – average night  
       – rainy night  
 6c) At which temperature?  
       – cold night  
 x       – average night  
       – warm night  
 6d) At which time?  
 x       – at early night (shortly after sunset)  
       – at deep night (around midnight)  
       – at late night (shortly before sunrise)  
       – can you give a time frame? (Please specify:)
- 7.) Did you ever observe interactions with other myrmecophagous (=ant-eating) mammals in your park?  
 (Please mark with an 'x')  
       – yes  
 x       – no  
 7a) If so, what exactly have you observed? (Please specify:)
- 8.) Are aardvarks sometimes accompanied by other animals in your park? (Please mark with an 'x')  
       – yes  
 x       – no  
 8a) If so, by which animals? (Please specify:)  
 8b) Is there any obvious connection between them? (Please specify:)

- 9.) Did you ever observe an aardvark at daylight in your park? (Please mark with an 'x')
- x     – yes  
       – no  
       9a) If so, what did it do? (Please mark with an 'x')
- warm up after a cold night  
       x     – feed on ants and termites  
             – something else (Please specify:)
- 10.) Did sightings of the aardvark increase, decrease or stay constant in the past ten years in your park?  
 (Please mark with an 'x')
- x     – decrease  
       – stay constant  
       – increase  
       – cannot tell
- 11.) Did you ever observe an aardvark feeding on mice in your park? (Please mark with an 'x')
- x     – yes  
       – no  
       11a) If so, did the aardvark kill the mouse or was it just the carcass? (Please mark with an 'x')
- the aardvark killed the mouse  
           – the mouse was already dead  
           – cannot tell
- 12.) Did you ever observe an aardvark feeding on other animals than ants, termites and possibly mice in your park?  
 (Please mark with an 'x')
- x     – yes  
       – no  
       12a) If so, what kind of animals? (Please indicate:)  
       12b) And: was it killed by the aardvark or was it a carcass? (Please mark with an 'x')
- killed by the aardvark  
           – was already dead  
           – cannot tell
- 13.) Did you ever observe an aardvark feeding on cucumber in your park? (Please mark with an 'x')
- x     – yes  
       – no
- 14.) Did you ever observe an aardvark feeding on fruit or roots in your park? (Please mark with an 'x')
- x     – yes  
       – no  
       14a) If so, what exactly? (Please specify:)
- 15.) Did you notice a preference regarding the digging into termite mounds? (Please mark with an 'x')
- (Explanation: It is said that aardvarks would preferentially feed from a certain direction and there even exist explanations therefore.)
- preferably from the north  
           – preferably from the west  
           – preferably from the east  
           – preferably from the south  
       x     – there seems to be no preference  
           – cannot tell
- 16.) Did you ever observe an aardvark swim in your park? (Please mark with an 'x')
- x     – yes  
       – no  
       16a) If so, was there an obvious necessity for doing so? (Please specify:)
- 17.) What animals could you observe killing an aardvark in your park?  
 (Please mark with an 'x' or — even better — by the number of times you observed it)
- x     – lion  
       – leopard  
       – cheetah  
       – wild dog  
       – spotted hyena  
       – python  
       – crocodile  
       – any others (Please indicate:)

- 18.) When attacked, which reaction of the aardvark could you observe in your park? (Please mark with an 'x')
- it ran away
  - it dug itself in
  - it kicked
  - any other reaction (Please specify:)
- 19.) Did you ever observe anything special in your park concerning the aardvark? (Please specify:)
- 20.) Which folk originally lived in the area of the game park? (Please indicate:)
- 20a) What language do they speak? (Please indicate:)
  - 20b) How do they name the aardvark? (Please indicate:)
  - 20c) Does the aardvark play a role in their mysticism? (Please specify:)
  - 20d) Does (or did) the aardvark play any other role in their life? (Please specify:)
- 21.) What is the official language of your country? (Please indicate:) **11 official languages**
- 21a) How do you name the aardvark? (Please indicate:) **aardvark**
- 22.) Do you know any zoos keeping aardvarks? (Please indicate, if possible name including (email-)address:)

## A.12 South Africa, Karukareb Wildernis Reservaat, Cederberg Wilderness Area

- 1.) Name of game park: (Please specify:) **Karukareb Wildernis Reservaat**
  - 1a) Province, country: (Please indicate:) **Western Cape, South Africa**
- 2.) Your name: (Please indicate:) **Beneta Bester**
  - 2a) Your position: (Please indicate:)
- 3.) Do aardvarks occur in your game park? (Please mark with an 'x')
  - definitely yes
  - probably yes
  - unknown
  - probably no
  - definitely no

[...]

We have many termite mounds and I often see the aardvark's tracks after it's been around at night, but that's all I'm afraid I can tell you.

The aardvark is also depicted in rock art paintings done by the Khoisan (Bushmen) people. These people hunted with bow & arrow and lived in caves. Some of these paintings is estimated at 6000 years old.

## A.13 South Africa, Knysna Lake Area

- 1.) Name of game park: (Please specify:) **Knysna Lake Area**
  - 1a) Province, country: (Please indicate:) **South Africa**
- 2.) Your name: (Please indicate:) **Peet Joubert**
  - 2a) Your position: (Please indicate:) **Senior Section Ranger**
- 3.) Do aardvarks occur in your game park? (Please mark with an 'x')
  - definitely yes
  - probably yes
  - unknown
  - probably no
  - x - definitely no

My park is a National Estuary. It is a bit too wet for aardvark to survive. I understand they are more probably going to be found in a savanna situation.

## A.14 South Africa, Kruger National Park, Biyamiti Bush Camp

- 1.) Name of game park: (Please specify:) **Kruger National Park**  
 1a) Province, country: (Please indicate:) **Mpumalanga Province, RSA**
- 2.) Your name: (Please indicate:) **Van Rooi Moreku**  
 2a) Your position: (Please indicate:) **Duty manager**
- 3.) Do aardvarks occur in your game park? (Please mark with an 'x')  
 x      – definitely yes  
        – probably yes  
        – unknown  
        – probably no  
        – definitely no
- 4.) How frequently is the aardvark sighted in your park (approximately)? (Please mark with an 'x')  
        – daily  
        – weekly  
        – monthly  
 x      – annually  
        – almost never
- 5.) Do you make night drives in your park? (Please mark with an 'x')  
 x      – yes  
        – no  
 5a) At which time (mostly)? (Please mark with an 'x')  
 x      – at early night (shortly after sunset)  
        – at deep night (around midnight)  
        – at late night (shortly before sunrise)  
 5b) How often (approx.)? (Please mark with an 'x')  
 x      – daily  
        – weekly  
        – monthly  
        – irregularly
- 6.) When is the aardvark sighted in your park?  
 (Please mark with 1=always 2=almost always 3=mostly x 4=rarely 5=almost never or 6=never)  
 6a) At which season?  
        – April to September (winter in the southern hemisphere)  
 x      – October to March (summer in the southern hemisphere)  
 6b) At which moisture?  
        – dry night  
 x      – average night  
        – rainy night  
 6c) At which temperature?  
        – cold night  
        – average night  
 x      – warm night  
 6d) At which time?  
        – at early night (shortly after sunset)  
 x      – at deep night (around midnight)  
        – at late night (shortly before sunrise)  
        – can you give a time frame? (Please specify:)
- 7.) Did you ever observe interactions with other myrmecophagous (=ant-eating) mammals in your park?  
 (Please mark with an 'x')  
 x      – yes  
        – no  
 7a) If so, what exactly have you observed? (Please specify:)
- 8.) Are aardvarks sometimes accompanied by other animals in your park? (Please mark with an 'x')  
 x      – yes  
        – no  
 8a) If so, by which animals? (Please specify:)



- 8b) Is there any obvious connection between them? (Please specify:)
- 9.) Did you ever observe an aardvark at daylight in your park? (Please mark with an 'x')
- yes
  - x - no
- 9a) If so, what did it do? (Please mark with an 'x')
- x - warm up after a cold night
  - feed on ants and termites
  - something else (Please specify:)
- 10.) Did sightings of the aardvark increase, decrease or stay constant in the past ten years in your park? (Please mark with an 'x')
- decrease
  - x - stay constant
  - increase
  - cannot tell
- 11.) Did you ever observe an aardvark feeding on mice in your park? (Please mark with an 'x')
- yes
  - x - no
- 11a) If so, did the aardvark kill the mouse or was it just the carcass? (Please mark with an 'x')
- the aardvark killed the mouse
  - the mouse was already dead
  - cannot tell
- 12.) Did you ever observe an aardvark feeding on other animals than ants, termites and possibly mice in your park? (Please mark with an 'x')
- yes
  - x - no
- 12a) If so, what kind of animals? (Please indicate:)
- 12b) And: was it killed by the aardvark or was it a carcass? (Please mark with an 'x')
- killed by the aardvark
  - was already dead
  - cannot tell
- 13.) Did you ever observe an aardvark feeding on cucumber in your park? (Please mark with an 'x')
- yes
  - x - no
- 14.) Did you ever observe an aardvark feeding on fruit or roots in your park? (Please mark with an 'x')
- yes
  - x - no
- 14a) If so, what exactly? (Please specify:)
- 15.) Did you notice a preference regarding the digging into termite mounds? (Please mark with an 'x')
- (Explanation: It is said that aardvarks would preferentially feed from a certain direction and there even exist explanations therefore.)
- preferably from the north
  - x - preferably from the west
  - preferably from the east
  - preferably from the south
  - there seems to be no preference
  - cannot tell
- 16.) Did you ever observe an aardvark swim in your park? (Please mark with an 'x')
- yes
  - x - no
- 16a) If so, was there an obvious necessity for doing so? (Please specify:)
- 17.) What animals could you observe killing an aardvark in your park? (Please mark with an 'x' or — even better — by the number of times you observed it)
- x - lion
  - leopard
  - cheetah
  - wild dog
  - spotted hyena
  - python

- crocodile
  - any others (Please indicate:)
- 18.) When attacked, which reaction of the aardvark could you observe in your park? (Please mark with an 'x')
- x - it ran away
  - it dug itself in
  - it kicked
  - any other reaction (Please specify:)
- 19.) Did you ever observe anything special in your park concerning the aardvark? (Please specify:) No
- 20.) Which folk originally lived in the area of the game park? (Please indicate:)
- 20a) What language do they speak? (Please indicate:) **Shangaan**
  - 20b) How do they name the aardvark? (Please indicate:) **'Xiyambana' anything to do with digging**
  - 20c) Does the aardvark play a role in their mysticism? (Please specify:) **Can't tell**
  - 20d) Does (or did) the aardvark play any other role in their life? (Please specify:) **Yes**
- 21.) What is the official language of your country? (Please indicate:) **English**
- 21a) How do you name the aardvark? (Please indicate:) **Anteater**
- 22.) Do you know any zoos keeping aardvarks? (Please indicate, if possible name including (email-)address:)
- I don't know any**

## A.15 South Africa, Mapungubwe National Park

- 1.) Name of game park: (Please specify:) **Mapungubwe National Park**
  - 1a) Province, country: (Please indicate:) **Limpopo province, South Africa**
- 2.) Your name: (Please indicate:) **Stefan Cilliers**
  - 2a) Your position: (Please indicate:) **Senior Section Ranger**
- 3.) Do aardvarks occur in your game park? (Please mark with an 'x')
  - definitely yes
  - probably yes
  - unknown
  - probably no
  - definitely no
- 4.) How frequently is the aardvark sighted in your park (approximately)? (Please mark with an 'x')
  - daily
  - weekly
  - monthly
  - annually
  - almost never
- 5.) Do you make night drives in your park? (Please mark with an 'x')
  - yes
  - no
  - 5a) At which time (mostly)? (Please mark with an 'x')
    - at early night (shortly after sunset)
    - at deep night (around midnight)
    - at late night (shortly before sunrise)
  - 5b) How often (approx.)? (Please mark with an 'x')
    - daily
    - weekly
    - monthly
    - irregularly
- 6.) When is the aardvark sighted in your park?  
 (Please mark with 1=always 2=almost always 3=mostly x 4=rarely 5=almost never or 6=never)
  - 6a) At which season?
    - April to September (winter in the southern hemisphere)
    - October to March (summer in the southern hemisphere)
  - 6b) At which moisture?
    - dry night
    - average night
    - rainy night
  - 6c) At which temperature?
    - cold night
    - average night
    - warm night
  - 6d) At which time?
    - at early night (shortly after sunset)
    - at deep night (around midnight)
    - at late night (shortly before sunrise)
    - can you give a time frame? (Please specify:)
- 7.) Did you ever observe interactions with other myrmecophagous (=ant-eating) mammals in your park?  
 (Please mark with an 'x')
  - yes
  - no
  - 7a) If so, what exactly have you observed? (Please specify:)
- 8.) Are aardvarks sometimes accompanied by other animals in your park? (Please mark with an 'x')
  - yes
  - no
  - 8a) If so, by which animals? (Please specify:)
  - 8b) Is there any obvious connection between them? (Please specify:)

- 9.) Did you ever observe an aardvark at daylight in your park? (Please mark with an 'x')
- yes
  - x - no
- 9a) If so, what did it do? (Please mark with an 'x')
- warm up after a cold night
  - feed on ants and termites
  - something else (Please specify:)
- 10.) Did sightings of the aardvark increase, decrease or stay constant in the past ten years in your park? (Please mark with an 'x')
- decrease
  - stay constant
  - increase
  - x - cannot tell
- 11.) Did you ever observe an aardvark feeding on mice in your park? (Please mark with an 'x')
- yes
  - x - no
- 11a) If so, did the aardvark kill the mouse or was it just the carcass? (Please mark with an 'x')
- the aardvark killed the mouse
  - the mouse was already dead
  - cannot tell
- 12.) Did you ever observe an aardvark feeding on other animals than ants, termites and possibly mice in your park? (Please mark with an 'x')
- yes
  - x - no
- 12a) If so, what kind of animals? (Please indicate:)
- 12b) And: was it killed by the aardvark or was it a carcass? (Please mark with an 'x')
- killed by the aardvark
  - was already dead
  - cannot tell
- 13.) Did you ever observe an aardvark feeding on cucumber in your park? (Please mark with an 'x')
- yes
  - x - no
- 14.) Did you ever observe an aardvark feeding on fruit or roots in your park? (Please mark with an 'x')
- yes
  - x - no
- 14a) If so, what exactly? (Please specify:)
- 15.) Did you notice a preference regarding the digging into termite mounds? (Please mark with an 'x')
- (Explanation: It is said that aardvarks would preferentially feed from a certain direction and there even exist explanations therefore.)
- preferably from the north
  - preferably from the west
  - preferably from the east
  - preferably from the south
  - x - there seems to be no preference (Although when I followed them for 3 years it seemed that they preferred the west/north side (where the sun sets and termites might move towards heat) but I did not statistically analysed it.)
  - cannot tell
- 16.) Did you ever observe an aardvark swim in your park? (Please mark with an 'x')
- yes
  - x - no
- 16a) If so, was there an obvious necessity for doing so? (Please specify:)
- 17.) What animals could you observe killing an aardvark in your park? (Please mark with an 'x' or — even better — by the number of times you observed it)
- lion
  - leopard
  - cheetah
  - wild dog
  - spotted hyena
  - python

- crocodile
  - x - any others (Please indicate:) **snakes**  
I have only seen aardvark die because of snakebite and human killing. (Not in this park but where I have worked on them.)
- 18.) When attacked, which reaction of the aardvark could you observe in your park? (Please mark with an 'x')
- x - it ran away
  - it dug itself in
  - it kicked
  - any other reaction (Please specify:)
- 19.) Did you ever observe anything special in your park concerning the aardvark? (Please specify:) No
- 20.) Which folk originally lived in the area of the game park? (Please indicate:) **Bantu people 1220**
- 20a) What language do they speak? (Please indicate:) **Dont know**
  - 20b) How do they name the aardvark? (Please indicate:)
  - 20c) Does the aardvark play a role in their mysticism? (Please specify:)
  - 20d) Does (or did) the aardvark play any other role in their life? (Please specify:)
- 21.) What is the official language of your country? (Please indicate:) **English**
- 21a) How do you name the aardvark? (Please indicate:) **Aardvark**
- 22.) Do you know any zoos keeping aardvarks? (Please indicate, if possible name including (email-)address:) **Brooklyn Zoo**

## A.16 South Africa, Mountain Zebra National Park

- 1.) Name of game park: (Please specify:) **Mountain Zebra National Park**
  - 1a) Province, country: (Please indicate:) **Eastern Cape, South Africa**
- 2.) Your name: (Please indicate:) **Johan de Klerk**
  - 2a) Your position: (Please indicate:) **Section Ranger**
- 3.) Do aardvarks occur in your game park? (Please mark with an 'x')
  - definitely yes
  - probably yes
  - unknown
  - probably no
  - definitely no
- 4.) How frequently is the aardvark sighted in your park (approximately)? (Please mark with an 'x')
  - daily
  - weekly
  - monthly
  - annually
  - almost never
- 5.) Do you make night drives in your park? (Please mark with an 'x')
  - yes
  - no
  - 5a) At which time (mostly)? (Please mark with an 'x')
    - at early night (shortly after sunset)
    - at deep night (around midnight)
    - at late night (shortly before sunrise)
  - 5b) How often (approx.)? (Please mark with an 'x')
    - daily
    - weekly
    - monthly
    - irregularly
- 6.) When is the aardvark sighted in your park?  
(Please mark with 1=always 2=almost always 3=mostly 4=rarely 5=almost never or 6=never)
  - 6a) At which season?
    - 3** – April to September (winter in the southern hemisphere)
    - October to March (summer in the southern hemisphere)
  - 6b) At which moisture?
    - dry night
    - 3** – average night
    - rainy night
  - 6c) At which temperature?
    - cold night
    - 3** – average night
    - warm night
  - 6d) At which time?
    - 3** – at early night (shortly after sunset)
    - at deep night (around midnight)
    - at late night (shortly before sunrise)
    - can you give a time frame? (Please specify:)
- 7.) Did you ever observe interactions with other myrmecophagous (=ant-eating) mammals in your park?  
(Please mark with an 'x')
  - yes
  - no
  - 7a) If so, what exactly have you observed? (Please specify:)
- 8.) Are aardvarks sometimes accompanied by other animals in your park? (Please mark with an 'x')
  - yes
  - no
  - 8a) If so, by which animals? (Please specify:)
  - 8b) Is there any obvious connection between them? (Please specify:)

- 9.) Did you ever observe an aardvark at daylight in your park? (Please mark with an 'x')
- x     – yes  
       – no
- 9a) If so, what did it do? (Please mark with an 'x')
- warm up after a cold night  
       – feed on ants and termites  
 x     – something else (Please specify:) **Digging**
- 10.) Did sightings of the aardvark increase, decrease or stay constant in the past ten years in your park?  
 (Please mark with an 'x')
- x     – decrease  
       – stay constant  
       – increase  
       – cannot tell
- 11.) Did you ever observe an aardvark feeding on mice in your park? (Please mark with an 'x')
- x     – yes  
       – no
- 11a) If so, did the aardvark kill the mouse or was it just the carcass? (Please mark with an 'x')
- the aardvark killed the mouse  
       – the mouse was already dead  
       – cannot tell
- 12.) Did you ever observe an aardvark feeding on other animals than ants, termites and possibly mice in your park?  
 (Please mark with an 'x')
- x     – yes  
       – no
- 12a) If so, what kind of animals? (Please indicate:)
- 12b) And: was it killed by the aardvark or was it a carcass? (Please mark with an 'x')
- killed by the aardvark  
       – was already dead  
       – cannot tell
- 13.) Did you ever observe an aardvark feeding on cucumber in your park? (Please mark with an 'x')
- x     – yes  
       – no
- 14.) Did you ever observe an aardvark feeding on fruit or roots in your park? (Please mark with an 'x')
- x     – yes  
       – no
- 14a) If so, what exactly? (Please specify:)
- 15.) Did you notice a preference regarding the digging into termite mounds? (Please mark with an 'x')
- (Explanation: It is said that aardvarks would preferentially feed from a certain direction and there even exist explanations therefore.)
- preferably from the north  
       – preferably from the west  
       – preferably from the east  
       – preferably from the south  
       – there seems to be no preference  
 x     – cannot tell
- 16.) Did you ever observe an aardvark swim in your park? (Please mark with an 'x')
- x     – yes  
       – no
- 16a) If so, was there an obvious necessity for doing so? (Please specify:)
- 17.) What animals could you observe killing an aardvark in your park?  
 (Please mark with an 'x' or — even better — by the number of times you observed it) n/a
- lion  
       – leopard  
       – cheetah  
       – wild dog  
       – spotted hyena  
       – python  
       – crocodile  
       – any others (Please indicate:)

- 18.) When attacked, which reaction of the aardvark could you observe in your park? (Please mark with an 'x')
- x      – it ran away  
         – it dug itself in  
         – it kicked  
         – any other reaction (Please specify:)
- 19.) Did you ever observe anything special in your park concerning the aardvark? (Please specify:) No
- 20.) Which folk originally lived in the area of the game park? (Please indicate:)
- 20a) What language do they speak? (Please indicate:) **Settlers**
- 20b) How do they name the aardvark? (Please indicate:) **Aardvark**
- 20c) Does the aardvark play a role in their mysticism? (Please specify:) No
- 20d) Does (or did) the aardvark play any other role in their life? (Please specify:) No
- 21.) What is the official language of your country? (Please indicate:) **English, Afrikaans, Isizulu, Isixhosa, Setswana, Tsivenda, Sesotho, Tsepedi, Ndebele, San, Setsonga**
- 21a) How do you name the aardvark? (Please indicate:) **Aardvark, Antbear**
- 22.) Do you know any zoos keeping aardvarks? (Please indicate, if possible name including (email-)address:) No



## A.17 South Africa, Mount Currie Nature Reserve, Kokstad

- 1.) Name of game park: (Please specify:) **Mount Currie Nature Reserve: Kokstad**  
 1a) Province, country: (Please indicate:) **KwaZulu Natal, RSA**
- 2.) Your name: (Please indicate:) **P B Lowry**  
 2a) Your position: (Please indicate:) **Officer in Charge**
- 3.) Do aardvarks occur in your game park? (Please mark with an 'x')  
 x      – definitely yes  
        – probably yes  
        – unknown  
        – probably no  
        – definitely no
- 4.) How frequently is the aardvark sighted in your park (approximately)? (Please mark with an 'x')  
        – daily  
        – weekly  
        – monthly  
        – annually  
 x      – almost never
- 5.) Do you make night drives in your park? (Please mark with an 'x')  
 x      – yes  
        – no  
 5a) At which time (mostly)? (Please mark with an 'x')  
 x      – at early night (shortly after sunset)  
        – at deep night (around midnight)  
        – at late night (shortly before sunrise)  
 5b) How often (approx.)? (Please mark with an 'x')  
        – daily  
        – weekly  
        – monthly  
 x      – irregularly
- 6.) When is the aardvark sighted in your park?  
 (Please mark with 1=always 2=almost always 3=mostly x 4=rarely 5=almost never or 6=never)  
 6a) At which season?  
        – April to September (winter in the southern hemisphere)  
        – October to March (summer in the southern hemisphere)  
 6b) At which moisture?  
        – dry night  
        – average night  
        – rainy night  
 6c) At which temperature?  
        – cold night  
        – average night  
        – warm night  
 6d) At which time?  
        – at early night (shortly after sunset)  
        – at deep night (around midnight)  
        – at late night (shortly before sunrise)  
        – can you give a time frame? (Please specify:)
- 7.) Did you ever observe interactions with other myrmecophagous (=ant-eating) mammals in your park?  
 (Please mark with an 'x')  
        – yes  
 x      – no  
 7a) If so, what exactly have you observed? (Please specify:)
- 8.) Are aardvarks sometimes accompanied by other animals in your park? (Please mark with an 'x')  
        – yes  
 x      – no  
 8a) If so, by which animals? (Please specify:)

- 8b) Is there any obvious connection between them? (Please specify:)
- 9.) Did you ever observe an aardvark at daylight in your park? (Please mark with an 'x')
- x     – yes x 2  
       – no
- 9a) If so, what did it do? (Please mark with an 'x')
- x     – warm up after a cold night lying next to burrow, cold, clear day  
       – feed on ants and termites
- x     – something else (Please specify:) **Suspect foraging in thatch grass then ran to burrow approx. 300m away.**
- 10.) Did sightings of the aardvark increase, decrease or stay constant in the past ten years in your park?  
 (Please mark with an 'x')
- decrease  
       – stay constant  
       – increase
- x     – cannot tell
- 11.) Did you ever observe an aardvark feeding on mice in your park? (Please mark with an 'x')
- yes  
       – no
- x     11a) If so, did the aardvark kill the mouse or was it just the carcass? (Please mark with an 'x')
- the aardvark killed the mouse  
       – the mouse was already dead  
       – cannot tell
- 12.) Did you ever observe an aardvark feeding on other animals than ants, termites and possibly mice in your park?  
 (Please mark with an 'x')
- yes  
       – no
- x     12a) If so, what kind of animals? (Please indicate:)
- 12b) And: was it killed by the aardvark or was it a carcass? (Please mark with an 'x')
- killed by the aardvark  
       – was already dead  
       – cannot tell
- 13.) Did you ever observe an aardvark feeding on cucumber in your park? (Please mark with an 'x')
- yes  
       – no
- x     – no
- 14.) Did you ever observe an aardvark feeding on fruit or roots in your park? (Please mark with an 'x')
- yes  
       – no
- x     – no
- 14a) If so, what exactly? (Please specify:)
- 15.) Did you notice a preference regarding the digging into termite mounds? (Please mark with an 'x')
- (Explanation: It is said that aardvarks would preferentially feed from a certain direction and there even exist explanations therefore.)
- preferably from the north  
       – preferably from the west  
       – preferably from the east  
       – preferably from the south
- x     – there seems to be no preference **but will take note in future**  
       – cannot tell
- 16.) Did you ever observe an aardvark swim in your park? (Please mark with an 'x')
- yes  
       – no
- x     – no
- 16a) If so, was there an obvious necessity for doing so? (Please specify:)
- 17.) What animals could you observe killing an aardvark in your park?  
 (Please mark with an 'x' or — even better — by the number of times you observed it)
- lion  
       – leopard  
       – cheetah  
       – wild dog  
       – spotted hyena

- python
- crocodile
- any others (Please indicate:)
- only Brown hyena present**

- 18.) When attacked, which reaction of the aardvark could you observe in your park? (Please mark with an 'x')
- it ran away
  - it dug itself in
  - it kicked
  - any other reaction (Please specify:)
- 19.) Did you ever observe anything special in your park concerning the aardvark? (Please specify:)
- 20.) Which folk originally lived in the area of the game park? (Please indicate:) **Griquas, Xhosa, Zulu**
- 20a) What language do they speak? (Please indicate:)
- 20b) How do they name the aardvark? (Please indicate:)
- 20c) Does the aardvark play a role in their mysticism? (Please specify:)
- 20d) Does (or did) the aardvark play any other role in their life? (Please specify:) **for muti**
- 21.) What is the official language of your country? (Please indicate:) **13 official languages**
- 21a) How do you name the aardvark? (Please indicate:) **aardvark, Erdvark, Sambane**
- 22.) Do you know any zoos keeping aardvarks? (Please indicate, if possible name including (email-)address:)

## A.18 South Africa, Table Mountain National Park

- 1.) Name of game park: (Please specify:) **TABLE MOUNTAIN NATIONAL PARK**  
 1a) Province, country: (Please indicate:) **WESTERN CAPE PROVINCE - SOUTH AFRICA**
- 2.) Your name: (Please indicate:) **JUSTIN BUCHMANN**  
 2a) Your position: (Please indicate:) **SENIOR SECTION RANGER**
- 3.) Do aardvarks occur in your game park? (Please mark with an 'x')  
 - definitely yes  
 - probably yes  
 - unknown  
 - probably no  
 x - definitely no
- 4.) How frequently is the aardvark sighted in your park (approximately)? (Please mark with an 'x')  
 - daily  
 - weekly  
 - monthly  
 - annually  
 - almost never
- 5.) Do you make night drives in your park? (Please mark with an 'x')  
 x - yes  
 - no  
 5a) At which time (mostly)? (Please mark with an 'x')  
 x - at early night (shortly after sunset)  
 - at deep night (around midnight)  
 - at late night (shortly before sunrise)  
 5b) How often (approx.)? (Please mark with an 'x')  
 - daily  
 - weekly  
 x - monthly  
 - irregularly
- 6.) When is the aardvark sighted in your park? 6  
 (Please mark with 1=always 2=almost always 3=mostly 4=rarely 5=almost never or 6=never)
- [...]
- 20.) Which folk originally lived in the area of the game park? (Please indicate:)  
 20a) What language do they speak? (Please indicate:) **11 OFFICIAL LANGUAGES - THIS AREA HAS BEEN A CITY FOR THE LAST 300+ YEARS.**  
 20b) How do they name the aardvark? (Please indicate:)  
 20c) Does the aardvark play a role in their mysticism? (Please specify:)  
 20d) Does (or did) the aardvark play any other role in their life? (Please specify:)
- 21.) What is the official language of your country? (Please indicate:) **THERE ARE 11 OFFICIAL LANGUAGES**  
 21a) How do you name the aardvark? (Please indicate:)
- 22.) Do you know any zoos keeping aardvarks? (Please indicate, if possible name including (email-)address:) **I AM NOT AWARE OF ANY**

## A.19 South Africa, West Coast National Park

1.) Name of game park: (Please specify:) **West Coast National Park**  
 1a) Province, country: (Please indicate:) **Western Cape, South Africa**

2.) Your name: (Please indicate:) **Karen Chappé**  
 2a) Your position: (Please indicate:) **Conservation Student**

3.) Do aardvarks occur in your game park? (Please mark with an 'x')

- definitely yes
- probably yes
- x** - unknown
- x** - probably no
- definitely no

4.) How frequently is the aardvark sighted in your park (approximately)? (Please mark with an 'x')

- daily
- weekly
- monthly
- annually
- almost never
- x** - never

I am almost positive that we do not have Aardvark in our Park. They do have a historical distribution in this area but I believe farmers and farming practices have driven them away from the area. The West Coast National Park consists mainly of old farm lands where ploughing and other activities could have destroyed Aardvark burrows and potentially their food source too. As a field ranger, I have walked many kilometers through the park and have never come across any sign of an Aardvark or any burrows or excavations. One of the field Rangers, Jan Warnick, has been working here for many years and grew up in the area before it became a National Park, recalls seeing one many years back. I am afraid I cannot confirm this or be any more specific.

You are probably aware that Aardvark are very secretive creatures and tend to avoid areas where they are likely to be disturbed. As such it is very difficult to be certain that they do not occur here at all. However, one would likely find a burrow or an excavation made by an Aardvark if there were any in the area. I have not encountered either of these and as far as they can recall nor have the field rangers.

5.) Do you make night drives in your park? (Please mark with an 'x')

- x** - yes
- no

5a) At which time (mostly)? (Please mark with an 'x')

- at early night (shortly after sunset)
- at deep night (around midnight)
- at late night (shortly before sunrise)

5b) How often (approx.)? (Please mark with an 'x')

- daily
- weekly
- x** - monthly
- x** - irregularly

[...]

20.) Which folk originally lived in the area of the game park? (Please indicate:) **Coloured fisherman and white farmers (Prehistorically the Strandlopers and San or Bushmen)**

20a) What language do they speak? (Please indicate:) **Afrikaans**

20b) How do they name the aardvark? (Please indicate:) **Aardvark**

20c) Does the aardvark play a role in their mysticism? (Please specify:) **No**

20d) Does (or did) the aardvark play any other role in their life? (Please specify:) **No**

21.) What is the official language of your country? (Please indicate:) **South Africa has 11**

21a) How do you name the aardvark? (Please indicate:) **Aardvark or Antbear**

22.) Do you know any zoos keeping aardvarks? (Please indicate, if possible name including (email-)address:)  
**Pretoria Zoo, National Zoological Gardens of South Africa.**

## A.20 South Africa, Wilderness National Park

- 1.) Name of game park: (Please specify:) **Wilderness National Park**
  - 1a) Province, country: (Please indicate:) **Western Cape, South Africa**
- 2.) Your name: (Please indicate:) **Roy Ernstzen**
  - 2a) Your position: (Please indicate:) **Park Manager**
- 3.) Do aardvarks occur in your game park? (Please mark with an 'x')
  - definitely yes
  - probably yes
  - unknown
  - probably no
  - x** - definitely no

[...]

## A.21 Swaziland, Malolotja Nature Reserve

- 1.) Name of game park: (Please specify:) **Malolotja Nature Reserve**  
 1a) Province, country: (Please indicate:) **Swaziland**
- 2.) Your name: (Please indicate:) **Ray Gama**  
 2a) Your position: (Please indicate:) **Park Manager**
- 3.) Do aardvarks occur in your game park? (Please mark with an 'x')  
 x           – definitely yes  
             – probably yes  
             – unknown  
             – probably no  
             – definitely no
- 4.) How frequently is the aardvark sighted in your park (approximately)? (Please mark with an 'x')  
             – daily  
             – weekly  
 x           – monthly  
             – annually  
             – almost never
- 5.) Do you make night drives in your park? (Please mark with an 'x')  
 x           – yes  
             – no  
 5a) At which time (mostly)? (Please mark with an 'x')  
 x           – at early night (shortly after sunset)  
             – at deep night (around midnight)  
             – at late night (shortly before sunrise)  
 5b) How often (approx.)? (Please mark with an 'x')  
             – daily  
             – weekly  
 x           – monthly  
             – irregularly
- 6.) When is the aardvark sighted in your park?  
 (Please mark with 1=always 2=almost always 3=mostly 4=rarely 5=almost never or 6=never)  
 6a) At which season?  
             – April to September (winter in the southern hemisphere)  
             – October to March (summer in the southern hemisphere)  
 6b) At which moisture?  
             – dry night  
             – average night  
             – rainy night  
 6c) At which temperature?  
             – cold night  
             – average night  
             – warm night  
 6d) At which time?  
             – at early night (shortly after sunset)  
             – at deep night (around midnight)  
             – at late night (shortly before sunrise)  
             – can you give a time frame? (Please specify:)
- 7.) Did you ever observe interactions with other myrmecophagous (=ant-eating) mammals in your park?  
 (Please mark with an 'x')  
 x           – yes  
             – no  
 7a) If so, what exactly have you observed? (Please specify:)
- 8.) Are aardvarks sometimes accompanied by other animals in your park? (Please mark with an 'x')  
 x           – yes  
             – no  
 8a) If so, by which animals? (Please specify:)  
 8b) Is there any obvious connection between them? (Please specify:)

- 9.) Did you ever observe an aardvark at daylight in your park? (Please mark with an 'x')
- yes
  - x - no
- 9a) If so, what did it do? (Please mark with an 'x')
- warm up after a cold night
  - feed on ants and termites
  - something else (Please specify:)
- 10.) Did sightings of the aardvark increase, decrease or stay constant in the past ten years in your park? (Please mark with an 'x')
- decrease
  - x - stay constant
  - increase
  - cannot tell
- 11.) Did you ever observe an aardvark feeding on mice in your park? (Please mark with an 'x')
- yes
  - x - no
- 11a) If so, did the aardvark kill the mouse or was it just the carcass? (Please mark with an 'x')
- the aardvark killed the mouse
  - the mouse was already dead
  - cannot tell
- 12.) Did you ever observe an aardvark feeding on other animals than ants, termites and possibly mice in your park? (Please mark with an 'x')
- yes
  - x - no
- 12a) If so, what kind of animals? (Please indicate:)
- 12b) And: was it killed by the aardvark or was it a carcass? (Please mark with an 'x')
- killed by the aardvark
  - was already dead
  - cannot tell
- 13.) Did you ever observe an aardvark feeding on cucumber in your park? (Please mark with an 'x')
- yes
  - x - no
- 14.) Did you ever observe an aardvark feeding on fruit or roots in your park? (Please mark with an 'x')
- yes
  - x - no
- 14a) If so, what exactly? (Please specify:)
- 15.) Did you notice a preference regarding the digging into termite mounds? (Please mark with an 'x')
- (Explanation: It is said that aardvarks would preferentially feed from a certain direction and there even exist explanations therefore.)
- preferably from the north
  - preferably from the west
  - preferably from the east
  - preferably from the south
  - x - there seems to be no preference
  - cannot tell
- 16.) Did you ever observe an aardvark swim in your park? (Please mark with an 'x')
- yes
  - x - no
- 16a) If so, was there an obvious necessity for doing so? (Please specify:)
- 17.) What animals could you observe killing an aardvark in your park? (Please mark with an 'x' or — even better — by the number of times you observed it)
- lion
  - leopard
  - cheetah
  - wild dog
  - spotted hyena
  - python
  - crocodile
  - any others (Please indicate:)



- 18.) When attacked, which reaction of the aardvark could you observe in your park? (Please mark with an 'x')
- it ran away
  - it dug itself in
  - it kicked
  - any other reaction (Please specify:)
- 19.) Did you ever observe anything special in your park concerning the aardvark? (Please specify:)
- 20.) Which folk originally lived in the area of the game park? (Please indicate:)
- 20a) What language do they speak? (Please indicate:) **SiSwati**
  - 20b) How do they name the aardvark? (Please indicate:) ?
  - 20c) Does the aardvark play a role in their mysticism? (Please specify:) **Yes, it never looks you in the eye - bad omen if it does**
  - 20d) Does (or did) the aardvark play any other role in their life? (Please specify:) ?
- 21.) What is the official language of your country? (Please indicate:) **SiSwati, English**
- 21a) How do you name the aardvark? (Please indicate:) **Sambane**
- 22.) Do you know any zoos keeping aardvarks? (Please indicate, if possible name including (email-)address:) **No**

## A.22 Tchad, Zakouma

- 1.) Nom de votre parc naturel: **Parc National de Zakouma**
  - 1a) Province, pays: **Région du Salamat/Guera, pays: Tchad**
- 2.) Votre nom: **Sanda Bakari**
  - 2a) Votre position: **Chef de projet conservation et utilisation rationnelle des écosystèmes soudano-sahéliens (CURESS)**
- 3.) Trouve-t-on des oryctéropes dans votre parc? (veuillez cocher d'une croix <x>)
  - bien sûr
  - sûrement
  - ne sais pas
  - sûrement que non
  - bien sûr que non
- 4.) Dans votre parc, combien de fois aperçoit-on l'oryctéropes? (veuillez cochez d'une croix <x>)
  - quotidiennement
  - hebdomadairement
  - mensuellement
  - annuellement
  - presque jamais
- 5.) Dans votre parc, entreprenez-vous en voiture des rondes nocturnes? (veuillez cocher d'une croix)
  - oui
  - non
  - 5a) Si oui, à quels moments? (cochez d'une croix)
    - à la tombée de la nuit (après le coucher du soleil)
    - au milieu de la nuit (vers minuit)
    - en fin de nuit (avant le lever du soleil)
  - 5b) Si oui, dans quelle périodicité? (cochez d'une croix)
    - quotidiennement
    - hebdomadairement
    - mensuellement
    - annuellement
    - irrégulièrement
- 6.) Dans votre parc, quand aperçoit-on l'oryctéropes? (veuillez noter SVP: 1=toujours x 2=presque toujours 3=la plupart du temps 4=rarement 5=presque jamais 6=jamais)
  - 6a) En quelle saison?
    - d'avril en septembre (hiver dans l'hémisphère sud)
    - d'octobre en mars (été dans l'hémisphère sud) d'octobre à Juin (Cette fourchette de temps correspond à la période d'activités dans le Parc.)
  - 6b) Par quelle hygrométrie?
    - par nuit sèche
    - par nuit moyenne
    - par nuit pluvieuse
  - 6c) Par quelle température?
    - par nuit froide
    - par nuit moyenne
    - par nuit chaude
  - 6d) A quels moments de la nuit?
    - à la tombée de la nuit (après le coucher du soleil) à partir de 17h 30mn
    - au milieu de la nuit (vers minuit)
    - en fin de nuit (avant le lever du soleil) entre 5h et 6h du matin.
    - pouvez-vous cerner un horaire? Si oui, lequel? (veuillez le noter SVP)
- 7.) Dans votre parc, avez-vous déjà remarqué des interactions avec d'autres mammifères insectivores? (veuillez cocher d'une croix)
  - oui
  - non
  - 7a) Si oui, qu'avez-vous remarqué? (veuillez le noter SVP)

Juste, on peut vous dire que les mammifères insectivores nocturnes comme le Pangolin terrestre (*Smutsia temminckii*) qui a un régime alimentaire très proche de celui de l'Oryctérope, la civette (*Viverra civetta*), la Genette (*Genetta SP*) entrent en compétition alimentaire avec l'Oryctérope. Il ya aussi d'autres formes d'interactions entre Oryctérope et d'autres espèces:

Compétition pour l'espace: Orycterope/Porc-epic; toutes les deux espèces vivent dans des terriers qu'elles creusent de préférence sur des sols ferrugineux sableux...

Interaction entre Orycterope et Phacochère: En effet, le Phacochère vit dans des terriers creusés la plupart par l'Orycterope car le Phacochère n'a pas l'aptitude de creuser un terrier. Il en est de même pour les Hyènes....

8.) Dans votre parc, les oryctéropes sont-ils parfois accompagnés d'autres animaux? (veuillez cocher d'une croix)

- oui

- non

8a) Si oui, par quels animaux? (veuillez le noter SVP)

8b) D'après vous, y aurait-il à cela une explication tangible? (veuillez noter SVP)

9.) Dans votre parc, avez-vous déjà observé un oryctéropes le jour? (veuillez cocher d'une croix)

- oui

- non

9a) Si oui, que faisait-il? (veuillez cocher d'une croix)

- il se réchauffait après une nuit froide

- il se nourrissait de fourmis et de termites

- il faisait autre chose (veuillez le noter SVP)

«Il est assez délicat de répondre à ces questions: l'oryctéropes est un animal aux moeurs nocturnes.

Sa rencontre dans la journée est exceptionnelle quelque fois à 17 heures. Il constitue une proie assez facile aux grands prédateurs qui sont les lions et autres carnivores...».

10.) Dans votre parc, avez-vous observé les années précédentes que les oryctéropes étaient en nombre croissant ou en nombre décroissant? (veuillez cocher d'une croix)

- en nombre décroissant

- en nombre constant

- en nombre croissant

x - je l'ignore (Aucun inventaire spécifique à cette espèce n'a été entrepris pour estimer la dynamique de cette population).

11.) Dans votre parc, avez-vous déjà observé un oryctéropes dévorant une souris? (veuillez cocher d'une croix)

- oui

x - non

11a) Si oui, est-ce l'oryctéropes lui même qui a tué la souris ou était-ce un cadavre? (veuillez cocher d'une croix)

- l'oryctéropes a tué la souris

- la souris était déjà morte

- je l'ignore

12.) Dans votre parc, avez-vous déjà observé un oryctéropes se nourrissant d'autres animaux que de fourmis et termites, de souris par exemple? (veuillez cocher d'une croix)

- oui

x - non

12a) Si oui, de quels animaux s'agissait-il? (veuillez noter SVP)

12b) Si oui, ont-ils été tués par l'oryctéropes ou s'agissait-il de cadavres? (veuillez cocher d'une croix)

- tués par l'oryctéropes

- déjà morts

- je l'ignore

13.) Dans votre parc, avez-vous observé un oryctéropes mangeant des concombres (veuillez cocher d'une croix)

x - oui «(information donnée par les paysans et écogardes sur les indices de présence des certaines graines de Cucurbitacées dans les fécès et leur indice de présence (empreintes) dans les champs...»

- non

14.) Dans votre parc, avez-vous déjà observé un oryctéropes mangeant des fruits ou racines? (veuillez cocher d'une croix)

x - oui «(se référer à la réponse précédente...»

- non

14a) Si oui, quoi exactement? (veuillez noter SVP)

15.) L'oryctéropes fouillant dans un nid de termites, procède-t-il d'après une direction de prédilection? (veuillez cocher d'une croix)

- plutôt du nord

- plutôt de l'ouest

- plutôt de l'est

- plutôt du sud

- ne semble pas avoir de direction de prédilection

x - je l'ignore

- 16.) Dans votre parc, avez-vous déjà observé un oryctérope nageant? (veuillez cocher d'une croix)  
 – oui  
 x – non  
 16a) Si oui, y avait-il une raison visible à cela? (veuillez noter SVP)
- 17.) Dans votre parc, quels animaux avez-vous pu observés tuant un oryctérope?  
 (veuillez cocher d'une croix ou mieux, noter le nombre d'observations si possible)  
 x – lion  
 – léopard  
 – guépard  
 – chien sauvage  
 – hyène tachetée  
 – python  
 – crocodile  
 – autres: (veuillez noter SVP)
- 18.) Dans votre parc, quel est le moyen de défense utilisé par l'oryctérope et que vous avez pu observer? (veuillez cocher d'une croix)  
 x – il prend la fuite  
 x – il s'enterre (**dans son terrier**)  
 – il donne des coups de pattes  
 – autre réactions: (veuillez noter SVP)
- 19.) Dans votre parc, auriez-vous observé ou remarqué quelque chose de spécial concernant un oryctérope? (veuillez noter SVP) RAS
- 20.) Quelle tribu vivait à l'origine à l'emplacement actuel de votre parc? (veuillez noter SVP) **«Arabe salamat, koulfei, Goula...».**  
 20a) Quelle était leur langue? (veuillez noter SVP) **Arabe locale**  
 20b) Quel est le nom de l'oryctérope dans cette langue? (veuillez noter SVP) **«ABOUNDOULLAF»**  
 20c) L'oryctérope y jouait-il un rôle mystique? (veuillez noter SVP)  
 20d) Joue ou jouait-il un autre rôle, et si oui lequel? (veuillez noter SVP)
- 21.) Quelle langue parle-t-on dans votre pays? **«Français et l'Arabe locale».**  
 21a) Comment s'appelle l'oryctérope dans votre langue? **«Voir réponse 20b»**
- 22.) Connaissez-vous des zoos qui hébergent des oryctéropes? (veuillez les noter ci-dessous avec l'adresse e-mail, si possible) RAS

## A.23 Zambia, Kafue National Park, Mukambi Safari Lodge

- 1.) Name of game park: (Please specify:) **KAFUE NATIONAL PARK**  
 1a) Province, country: (Please indicate:) **ZAMBIA**
- 2.) Your name: (Please indicate:) **Susan Potiek**  
 2a) Your position: (Please indicate:) **temp. assistant manager Mukambi Safari Lodge**
- 3.) Do aardvarks occur in your game park? (Please mark with an 'x')  
**x**      – definitely yes  
           – probably yes  
           – unknown  
           – probably no  
           – definitely no
- 4.) How frequently is the aardvark sighted in your park (approximately)? (Please mark with an 'x')  
           – daily  
           – weekly  
           – monthly  
**x**      – annually  
           – almost never
- 5.) Do you make night drives in your park? (Please mark with an 'x')  
**x**<sup>1</sup>      – yes  
           – no  
 5a) At which time (mostly)? (Please mark with an 'x')  
           – at early night (shortly after sunset)  
**x**      – at deep night (around midnight) 22.00 Hrs  
           – at late night (shortly before sunrise)  
 5b) How often (approx.)? (Please mark with an 'x')  
           – daily  
           – weekly  
           – monthly  
**x**      – irregularly
- 6.) When is the aardvark sighted in your park?  
 (Please mark with 1=always 2=almost always 3=mostly 4=rarely 5=almost never or 6=never) 5  
 6a) At which season?  
           – April to September (winter in the southern hemisphere)  
**x**      – October to March (summer in the southern hemisphere)  
 6b) At which moisture?  
           – dry night  
**x**      – average night  
           – rainy night  
 6c) At which temperature?  
           – cold night  
**x**      – average night  
           – warm night  
 6d) At which time?  
           – at early night (shortly after sunset)  
**x**      – at deep night (around midnight)  
           – at late night (shortly before sunrise)  
           – can you give a time frame? (Please specify:)
- 7.) Did you ever observe interactions with other myrmecophagous (=ant-eating) mammals in your park?  
 (Please mark with an 'x')  
**x**      – yes  
           – no  
 7a) If so, what exactly have you observed? (Please specify:)
- 8.) Are aardvarks sometimes accompanied by other animals in your park? (Please mark with an 'x')  
**x**      – yes  
           – no  
 8a) If so, by which animals? (Please specify:)

- 8b) Is there any obvious connection between them? (Please specify:)
- 9.) Did you ever observe an aardvark at daylight in your park? (Please mark with an 'x')
- yes
  - x - no
- 9a) If so, what did it do? (Please mark with an 'x')
- warm up after a cold night
  - feed on ants and termites
  - something else (Please specify:)
- 10.) Did sightings of the aardvark increase, decrease or stay constant in the past ten years in your park? (Please mark with an 'x')
- decrease
  - stay constant
  - increase
  - x - cannot tell
- 11.) Did you ever observe an aardvark feeding on mice in your park? (Please mark with an 'x')
- yes
  - x - no
- 11a) If so, did the aardvark kill the mouse or was it just the carcass? (Please mark with an 'x')
- the aardvark killed the mouse
  - the mouse was already dead
  - cannot tell
- 12.) Did you ever observe an aardvark feeding on other animals than ants, termites and possibly mice in your park? (Please mark with an 'x')
- yes
  - x - no
- 12a) If so, what kind of animals? (Please indicate:)
- 12b) And: was it killed by the aardvark or was it a carcass? (Please mark with an 'x')
- killed by the aardvark
  - was already dead
  - cannot tell
- 13.) Did you ever observe an aardvark feeding on cucumber in your park? (Please mark with an 'x')
- yes
  - x - no
- 14.) Did you ever observe an aardvark feeding on fruit or roots in your park? (Please mark with an 'x')
- yes
  - x - no
- 14a) If so, what exactly? (Please specify:)
- 15.) Did you notice a preference regarding the digging into termite mounds? (Please mark with an 'x')
- (Explanation: It is said that aardvarks would preferentially feed from a certain direction and there even exist explanations therefore.)
- preferably from the north
  - preferably from the west
  - preferably from the east
  - preferably from the south
  - there seems to be no preference
  - x - cannot tell
- 16.) Did you ever observe an aardvark swim in your park? (Please mark with an 'x')
- yes
  - x - no
- 16a) If so, was there an obvious necessity for doing so? (Please specify:)
- 17.) What animals could you observe killing an aardvark in your park? (Please mark with an 'x' or — even better — by the number of times you observed it)
- lion
  - leopard
  - cheetah
  - wild dog
  - spotted hyena
  - python

- x           – crocodile  
x           – any others (Please indicate:) **never seen**
- 18.) When attacked, which reaction of the aardvark could you observe in your park? (Please mark with an ‘x’)
- it ran away
  - it dug itself in
  - it kicked
- x           – any other reaction (Please specify:) **never seen**
- 19.) Did you ever observe anything special in your park concerning the aardvark? (Please specify:) **Found dung, with glossy parts in it.**
- 20.) Which folk originally lived in the area of the game park? (Please indicate:) **I Think: Bemba or Lozi**
- 20a) What language do they speak? (Please indicate:) **Bemba / Lozi**
  - 20b) How do they name the aardvark? (Please indicate:) **?**
  - 20c) Does the aardvark play a role in their mysticism? (Please specify:) **?**
  - 20d) Does (or did) the aardvark play any other role in their life? (Please specify:) **?**
- 21.) What is the official language of your country? (Please indicate:) **English**
- 21a) How do you name the aardvark? (Please indicate:) **aardvark**
- 22.) Do you know any zoos keeping aardvarks? (Please indicate, if possible name including (email-)address:) **no**

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<sup>1</sup>Inconsistent with the next answers and therefore evaluated as ‘yes’ in chapter 9.1.

## A.24 Zambia, Lower Zambezi National Park, Ana Tree Lodge

- 1.) Name of game park: (Please specify:) LOWER ZAMBEZI NATIONAL PARK  
1a) Province, country: (Please indicate:) ZAMBIA
- 2.) Your name: (Please indicate:) YOUSUF ZUMLA  
2a) Your position: (Please indicate:) CHAIRMAN
- 3.) Do aardvarks occur in your game park? (Please mark with an 'x')
  - definitely yes
  - x - probably yes
  - unknown
  - probably no
  - definitely no
- 4.) How frequently is the aardvark sighted in your park (approximately)? (Please mark with an 'x')
  - daily
  - weekly
  - x - monthly
  - annually
  - almost never
- 5.) Do you make night drives in your park? (Please mark with an 'x')
  - x - yes
  - no
  - 5a) At which time (mostly)? (Please mark with an 'x')
    - x - at early night (shortly after sunset)
    - at deep night (around midnight)
    - at late night (shortly before sunrise)
  - 5b) How often (approx.)? (Please mark with an 'x')
    - x - daily
    - weekly
    - monthly
    - irregularly
- 6.) When is the aardvark sighted in your park?  
(Please mark with 1=always 2=almost always 3=mostly x 4=rarely 5=almost never or 6=never)
  - 6a) At which season?
    - x - April to September (winter in the southern hemisphere)
    - October to March (summer in the southern hemisphere)
  - 6b) At which moisture?
    - dry night
    - x - average night
    - rainy night
  - 6c) At which temperature?
    - cold night
    - x - average night
    - warm night
  - 6d) At which time?
    - x - at early night (shortly after sunset)
    - at deep night (around midnight)
    - at late night (shortly before sunrise)
    - can you give a time frame? (Please specify:)
- 7.) Did you ever observe interactions with other myrmecophagous (=ant-eating) mammals in your park?  
(Please mark with an 'x')
  - yes
  - x - no
  - 7a) If so, what exactly have you observed? (Please specify:)
- 8.) Are aardvarks sometimes accompanied by other animals in your park? (Please mark with an 'x')
  - yes
  - x - no
  - 8a) If so, by which animals? (Please specify:)



- 8b) Is there any obvious connection between them? (Please specify:)
- 9.) Did you ever observe an aardvark at daylight in your park? (Please mark with an 'x')
- yes
  - x - no
- 9a) If so, what did it do? (Please mark with an 'x')
- warm up after a cold night
  - feed on ants and termites
  - something else (Please specify:)
- 10.) Did sightings of the aardvark increase, decrease or stay constant in the past ten years in your park? (Please mark with an 'x')
- decrease
  - x - stay constant
  - increase
  - cannot tell
- 11.) Did you ever observe an aardvark feeding on mice in your park? (Please mark with an 'x')
- yes
  - x - no
- 11a) If so, did the aardvark kill the mouse or was it just the carcass? (Please mark with an 'x')
- the aardvark killed the mouse
  - the mouse was already dead
  - cannot tell
- 12.) Did you ever observe an aardvark feeding on other animals than ants, termites and possibly mice in your park? (Please mark with an 'x')
- yes
  - x - no
- 12a) If so, what kind of animals? (Please indicate:)
- 12b) And: was it killed by the aardvark or was it a carcass? (Please mark with an 'x')
- killed by the aardvark
  - was already dead
  - cannot tell
- 13.) Did you ever observe an aardvark feeding on cucumber in your park? (Please mark with an 'x')
- yes
  - x - no
- 14.) Did you ever observe an aardvark feeding on fruit or roots in your park? (Please mark with an 'x')
- yes
  - x - no
- 14a) If so, what exactly? (Please specify:)
- 15.) Did you notice a preference regarding the digging into termite mounds? (Please mark with an 'x')
- (Explanation: It is said that aardvarks would preferentially feed from a certain direction and there even exist explanations therefore.)
- preferably from the north
  - preferably from the west
  - preferably from the east
  - preferably from the south
  - there seems to be no preference
  - x - cannot tell
- 16.) Did you ever observe an aardvark swim in your park? (Please mark with an 'x')
- yes
  - x - no
- 16a) If so, was there an obvious necessity for doing so? (Please specify:) NO
- 17.) What animals could you observe killing an aardvark in your park? (Please mark with an 'x' or — even better — by the number of times you observed it)
- lion
  - leopard
  - cheetah
  - wild dog
  - spotted hyena
  - python

- crocodile
  - any others (Please indicate:)
- 18.) When attacked, which reaction of the aardvark could you observe in your park? (Please mark with an 'x')
- x
- it ran away
  - it dug itself in
  - it kicked
  - any other reaction (Please specify:)
- 19.) Did you ever observe anything special in your park concerning the aardvark? (Please specify:) NO
- 20.) Which folk originally lived in the area of the game park? (Please indicate:)
- 20a) What language do they speak? (Please indicate:)
  - 20b) How do they name the aardvark? (Please indicate:)
  - 20c) Does the aardvark play a role in their mysticism? (Please specify:)
  - 20d) Does (or did) the aardvark play any other role in their life? (Please specify:)
- 21.) What is the official language of your country? (Please indicate:) ENGLISH
- 21a) How do you name the aardvark? (Please indicate:)
- 22.) Do you know any zoos keeping aardvarks? (Please indicate, if possible name including (email-)address:) NO

## A.25 Zambia, Lower Zambezi National Park, Chiawa Camp

- 1.) Name of game park: (Please specify:) LOWER ZAMBEZI NATIONAL PARK  
1a) Province, country: (Please indicate:) SOUTH EASTERN ZAMBIA
- 2.) Your name: (Please indicate:) GRANT CUMINGS  
2a) Your position: (Please indicate:) OWNER MANAGER OF CHIAWA CAMP
- 3.) Do aardvarks occur in your game park? (Please mark with an 'x')
- x - definitely yes
  - probably yes
  - unknown
  - probably no
  - definitely no
- 4.) How frequently is the aardvark sighted in your park (approximately)? (Please mark with an 'x')
- daily
  - weekly
  - x - monthly WE SEE THEM 2-3 TIMES PER ANNUM BUT BETWEEN ALL LODGES THEY ARE SEEN SAY EACH MONTH
  - annually
  - almost never
- 5.) Do you make night drives in your park? (Please mark with an 'x')
- x - yes
  - no
- 5a) At which time (mostly)? (Please mark with an 'x')
- x - at early night (shortly after sunset)
  - at deep night (around midnight)
  - at late night (shortly before sunrise)
- 5b) How often (approx.)? (Please mark with an 'x')
- x - daily
  - weekly
  - monthly
  - irregularly
- 6.) When is the aardvark sighted in your park?  
(Please mark with 1=always 2=almost always 3=mostly 4=rarely 5=almost never or 6=never)
- 6a) At which season?
- 2 - April to September (winter in the southern hemisphere)
  - 5 - October to March (summer in the southern hemisphere) BUT MOST LODGES ARE CLOSED AT THIS TIME
- 6b) At which moisture?
- 2 - dry night
  - average night
  - rainy night
- 6c) At which temperature?
- cold night
  - 2 - average night
  - warm night
- 6d) At which time?
- 2 - at early night (shortly after sunset)
  - 4 - at deep night (around midnight) BUT THIS IS BECOZ MOST DRIVES ARE BACK IN CAMP BY 8PM
  - at late night (shortly before sunrise)
  - can you give a time frame? (Please specify:) I AM SURE MORE AARDVARKS WUD BE SEEN IF WE STAYED OUT LATER AT NIGHT AND MAYBE WE WUD SEE MORE IN THE WET SEASON BUT WE DO NOT OPERATE THAT TIME OF YEAR.
- 7.) Did you ever observe interactions with other myrmecophagous (=ant-eating) mammals in your park?  
(Please mark with an 'x')
- yes
  - x - no
- 7a) If so, what exactly have you observed? (Please specify:)
- 8.) Are aardvarks sometimes accompanied by other animals in your park? (Please mark with an 'x')
- yes
  - x - no BUT SOMETIMES LEOPARD AND LIONS SEEN STALKING THEM

- 8a) If so, by which animals? (Please specify:)
- 8b) Is there any obvious connection between them? (Please specify:)
- 9.) Did you ever observe an aardvark at daylight in your park? (Please mark with an 'x')
- yes
  - x - no **BUT PANGOLIN IN THE DAY HAS BEEN SEEN**
- 9a) If so, what did it do? (Please mark with an 'x')
- warm up after a cold night
  - feed on ants and termites
  - something else (Please specify:)
- 10.) Did sightings of the aardvark increase, decrease or stay constant in the past ten years in your park? (Please mark with an 'x')
- decrease
  - x - stay constant
  - increase
  - cannot tell
- 11.) Did you ever observe an aardvark feeding on mice in your park? (Please mark with an 'x')
- yes
  - x - no
- 11a) If so, did the aardvark kill the mouse or was it just the carcass? (Please mark with an 'x')
- the aardvark killed the mouse
  - the mouse was already dead
  - cannot tell
- 12.) Did you ever observe an aardvark feeding on other animals than ants, termites and possibly mice in your park? (Please mark with an 'x')
- yes
  - x - no
- 12a) If so, what kind of animals? (Please indicate:)
- 12b) And: was it killed by the aardvark or was it a carcass? (Please mark with an 'x')
- killed by the aardvark
  - was already dead
  - cannot tell
- 13.) Did you ever observe an aardvark feeding on cucumber in your park? (Please mark with an 'x')
- yes
  - x - no
- 14.) Did you ever observe an aardvark feeding on fruit or roots in your park? (Please mark with an 'x')
- yes
  - x - no
- 14a) If so, what exactly? (Please specify:)
- 15.) Did you notice a preference regarding the digging into termite mounds? (Please mark with an 'x') (Explanation: It is said that aardvarks would preferentially feed from a certain direction and there even exist explanations therefore.)
- preferably from the north
  - preferably from the west
  - preferably from the east
  - preferably from the south
  - x - there seems to be no preference
  - cannot tell
- 16.) Did you ever observe an aardvark swim in your park? (Please mark with an 'x')
- yes
  - x - no
- 16a) If so, was there an obvious necessity for doing so? (Please specify:)
- 17.) What animals could you observe killing an aardvark in your park? (Please mark with an 'x' or — even better — by the number of times you observed it)
- x - lion
  - x - leopard
  - cheetah
  - wild dog
  - spotted hyena

- python
- crocodile
- any others (Please indicate:)

18.) When attacked, which reaction of the aardvark could you observe in your park? (Please mark with an 'x')

- x        - it ran away
- x        - it dug itself in
- it kicked
- any other reaction (Please specify:)

19.) Did you ever observe anything special in your park concerning the aardvark? (Please specify:) NO

20.) Which folk originally lived in the area of the game park? (Please indicate:) GOBA PEOPLE

20a) What language do they speak? (Please indicate:) GOBA

20b) How do they name the aardvark? (Please indicate:) GWIBA

20c) Does the aardvark play a role in their mysticism? (Please specify:) NO MAGIC BUT IS EATEN BY THE PEOPLE  
IF THEY ARE LUCKY ENOUGH TO CATCH ONE

20d) Does (or did) the aardvark play any other role in their life? (Please specify:) NO

21.) What is the official language of your country? (Please indicate:) ENGLISH

21a) How do you name the aardvark? (Please indicate:) AARDVARK

22.) Do you know any zoos keeping aardvarks? (Please indicate, if possible name including (email-)address:) SAN DIEGO WILD  
ANIMAL PARK, USA. THE EDUCATIONAL DEPARTMENT DEFINITELY HAS AT LEAST ONE!

## A.26 Zambia, Lower Zambezi National Park, Chiawa Camp

- 1.) Name of game park: (Please specify:) **Lower Zambezi National Park**  
 1a) Province, country: (Please indicate:) **Chiawa, Zambia**
- 2.) Your name: (Please indicate:) **Garth Hovell**  
 2a) Your position: (Please indicate:) **Head Guide**
- 3.) Do aardvarks occur in your game park? (Please mark with an 'x')  
 x      – definitely yes  
           – probably yes  
           – unknown  
           – probably no  
           – definitely no
- 4.) How frequently is the aardvark sighted in your park (approximately)? (Please mark with an 'x')  
 x      – daily  
           – weekly  
           – monthly  
           – annually  
           – almost never
- 5.) Do you make night drives in your park? (Please mark with an 'x')  
 x      – yes  
           – no  
 5a) At which time (mostly)? (Please mark with an 'x')  
 x      – at early night (shortly after sunset)  
           – at deep night (around midnight)  
           – at late night (shortly before sunrise)  
 5b) How often (approx.)? (Please mark with an 'x')  
 x      – daily  
           – weekly  
           – monthly  
           – irregularly
- 6.) When is the aardvark sighted in your park?  
 (Please mark with 1=always 2=almost always 3=mostly 4=rarely 5=almost never or 6=never) 4  
 6a) At which season?  
 x      – April to September (winter in the southern hemisphere)  
           – October to March (summer in the southern hemisphere)  
 6b) At which moisture?  
 x      – dry night  
           – average night  
           – rainy night  
 6c) At which temperature?  
 x      – cold night  
 x      – average night  
 x      – warm night  
 6d) At which time?  
 x      – at early night (shortly after sunset)  
           – at deep night (around midnight)  
           – at late night (shortly before sunrise)  
           – can you give a time frame? (Please specify:)
- 7.) Did you ever observe interactions with other myrmecophagous (=ant-eating) mammals in your park?  
 (Please mark with an 'x')  
 x      – yes  
           – no  
 7a) If so, what exactly have you observed? (Please specify:)
- 8.) Are aardvarks sometimes accompanied by other animals in your park? (Please mark with an 'x')  
 x      – yes  
           – no  
 8a) If so, by which animals? (Please specify:)

- 8b) Is there any obvious connection between them? (Please specify:)
- 9.) Did you ever observe an aardvark at daylight in your park? (Please mark with an 'x')
- yes
  - x - no
- 9a) If so, what did it do? (Please mark with an 'x')
- warm up after a cold night
  - feed on ants and termites
  - something else (Please specify:)
- 10.) Did sightings of the aardvark increase, decrease or stay constant in the past ten years in your park? (Please mark with an 'x')
- decrease
  - stay constant
  - x - increase
  - cannot tell
- 11.) Did you ever observe an aardvark feeding on mice in your park? (Please mark with an 'x')
- yes
  - x - no
- 11a) If so, did the aardvark kill the mouse or was it just the carcass? (Please mark with an 'x')
- the aardvark killed the mouse
  - the mouse was already dead
  - cannot tell
- 12.) Did you ever observe an aardvark feeding on other animals than ants, termites and possibly mice in your park? (Please mark with an 'x')
- yes
  - x - no
- 12a) If so, what kind of animals? (Please indicate:)
- 12b) And: was it killed by the aardvark or was it a carcass? (Please mark with an 'x')
- killed by the aardvark
  - was already dead
  - cannot tell
- 13.) Did you ever observe an aardvark feeding on cucumber in your park? (Please mark with an 'x')
- yes
  - x - no
- 14.) Did you ever observe an aardvark feeding on fruit or roots in your park? (Please mark with an 'x')
- yes
  - x - no
- 14a) If so, what exactly? (Please specify:)
- 15.) Did you notice a preference regarding the digging into termite mounds? (Please mark with an 'x')
- (Explanation: It is said that aardvarks would preferentially feed from a certain direction and there even exist explanations therefore.)
- preferably from the north
  - preferably from the west
  - preferably from the east
  - preferably from the south
  - x - there seems to be no preference
  - cannot tell
- 16.) Did you ever observe an aardvark swim in your park? (Please mark with an 'x')
- yes
  - x - no
- 16a) If so, was there an obvious necessity for doing so? (Please specify:)
- 17.) What animals could you observe killing an aardvark in your park? (Please mark with an 'x' or — even better — by the number of times you observed it)
- x - lion
  - leopard
  - cheetah
  - wild dog
  - spotted hyena
  - python

- crocodile
  - any others (Please indicate:)
- 18.) When attacked, which reaction of the aardvark could you observe in your park? (Please mark with an 'x')
- x - it ran away
  - it dug itself in
  - it kicked
  - any other reaction (Please specify:)
- 19.) Did you ever observe anything special in your park concerning the aardvark? (Please specify:) **No**
- 20.) Which folk originally lived in the area of the game park? (Please indicate:) **Goba/Nsenga**
- 20a) What language do they speak? (Please indicate:) **Goba**
  - 20b) How do they name the aardvark? (Please indicate:) **Gweba**
  - 20c) Does the aardvark play a role in their mysticism? (Please specify:) **No**
  - 20d) Does (or did) the aardvark play any other role in their life? (Please specify:) **food**
- 21.) What is the official language of your country? (Please indicate:) **English**
- 21a) How do you name the aardvark? (Please indicate:) **Aardvark**
- 22.) Do you know any zoos keeping aardvarks? (Please indicate, if possible name including (email-)address:) **No**



## A.27 Zambia, Lower Zambezi National Park, Sausage Tree Camp

- 1.) Name of game park: (Please specify:) **Sausage Tree Camp**
  - 1a) Province, country: (Please indicate:) **Lower Zambezi National Park, Zambia**
- 2.) Your name: (Please indicate:) **Tammy Miller**
  - 2a) Your position: (Please indicate:) **Assistant Manager/Reservations Manager**
- 3.) Do aardvarks occur in your game park? (Please mark with an 'x')
  - definitely yes
  - probably yes
  - unknown
  - probably no
  - definitely no
- 4.) How frequently is the aardvark sighted in your park (approximately)? (Please mark with an 'x')
  - daily
  - weekly
  - monthly
  - annually
  - almost never
- 5.) Do you make night drives in your park? (Please mark with an 'x')
  - yes
  - no
  - 5a) At which time (mostly)? (Please mark with an 'x')
    - at early night (shortly after sunset)
    - at deep night (around midnight)
    - at late night (shortly before sunrise)
  - 5b) How often (approx.)? (Please mark with an 'x')
    - daily
    - weekly
    - monthly
    - irregularly
- 6.) When is the aardvark sighted in your park?  
(Please mark with 1=always 2=almost always 3=mostly 4=rarely 5=almost never or 6=never)
  - 6a) At which season?
    - 6 - April to September (winter in the southern hemisphere)
    - 6 - October to March (summer in the southern hemisphere)
  - 6b) At which moisture?
    - dry night
    - average night
    - rainy night
  - 6c) At which temperature?
    - cold night
    - average night
    - warm night
  - 6d) At which time?
    - at early night (shortly after sunset)
    - at deep night (around midnight)
    - at late night (shortly before sunrise)
    - can you give a time frame? (Please specify:)
- 7.) Did you ever observe interactions with other myrmecophagous (=ant-eating) mammals in your park?  
(Please mark with an 'x')
  - yes
  - no
  - 7a) If so, what exactly have you observed? (Please specify:)
- 8.) Are aardvarks sometimes accompanied by other animals in your park? (Please mark with an 'x')
  - yes
  - no
  - 8a) If so, by which animals? (Please specify:)

- 8b) Is there any obvious connection between them? (Please specify:)
- 9.) Did you ever observe an aardvark at daylight in your park? (Please mark with an 'x')
- yes
  - x - no
- 9a) If so, what did it do? (Please mark with an 'x')
- warm up after a cold night
  - feed on ants and termites
  - something else (Please specify:)
- 10.) Did sightings of the aardvark increase, decrease or stay constant in the past ten years in your park? (Please mark with an 'x')
- decrease
  - stay constant
  - increase
  - x - cannot tell
- 11.) Did you ever observe an aardvark feeding on mice in your park? (Please mark with an 'x')
- yes
  - x - no
- 11a) If so, did the aardvark kill the mouse or was it just the carcass? (Please mark with an 'x')
- the aardvark killed the mouse
  - the mouse was already dead
  - cannot tell
- 12.) Did you ever observe an aardvark feeding on other animals than ants, termites and possibly mice in your park? (Please mark with an 'x')
- yes
  - x - no
- 12a) If so, what kind of animals? (Please indicate:)
- 12b) And: was it killed by the aardvark or was it a carcass? (Please mark with an 'x')
- killed by the aardvark
  - was already dead
  - cannot tell
- 13.) Did you ever observe an aardvark feeding on cucumber in your park? (Please mark with an 'x')
- yes
  - x - no
- 14.) Did you ever observe an aardvark feeding on fruit or roots in your park? (Please mark with an 'x')
- yes
  - x - no
- 14a) If so, what exactly? (Please specify:)
- 15.) Did you notice a preference regarding the digging into termite mounds? (Please mark with an 'x')
- (Explanation: It is said that aardvarks would preferentially feed from a certain direction and there even exist explanations therefore.)
- preferably from the north
  - preferably from the west
  - preferably from the east
  - preferably from the south
  - there seems to be no preference
  - x - cannot tell
- 16.) Did you ever observe an aardvark swim in your park? (Please mark with an 'x')
- yes
  - x - no
- 16a) If so, was there an obvious necessity for doing so? (Please specify:)
- 17.) What animals could you observe killing an aardvark in your park? (Please mark with an 'x' or — even better — by the number of times you observed it)
- lion
  - leopard
  - cheetah
  - wild dog
  - spotted hyena
  - python

- crocodile
  - any others (Please indicate:)
- 18.) When attacked, which reaction of the aardvark could you observe in your park? (Please mark with an 'x')
- it ran away
  - it dug itself in
  - it kicked
  - x - any other reaction (Please specify:) **Have never seen...**
- 19.) Did you ever observe anything special in your park concerning the aardvark? (Please specify:) **No, sorry**
- 20.) Which folk originally lived in the area of the game park? (Please indicate:) **Nsenga People**
- 20a) What language do they speak? (Please indicate:) **Nsenga**
  - 20b) How do they name the aardvark? (Please indicate:) **Not sure...**
  - 20c) Does the aardvark play a role in their mysticism? (Please specify:) **No**
  - 20d) Does (or did) the aardvark play any other role in their life? (Please specify:) **No**
- 21.) What is the official language of your country? (Please indicate:) **English**
- 21a) How do you name the aardvark? (Please indicate:) **Aardvark**
- 22.) Do you know any zoos keeping aardvarks? (Please indicate, if possible name including (email-)address:)

## A.28 Zambia, Lusaka National Park, Protea Safari Lodge

- 1.) Name of game park: (Please specify:) **Lusaka National Park**
  - 1a) Province, country: (Please indicate:) **Zambia**
  
- 2.) Your name: (Please indicate:) **Mauro Guardigli**
  - 2a) Your position: (Please indicate:) **General Manager**

[...]

We do have aardvarks in the reserve but we have never seen one.

## A.29 Zambia, North Luangwa National Park, Kutandala Camp

- 1.) Name of game park: (Please specify:) **North Luangwa National Park**  
 1a) Province, country: (Please indicate:) **Northern Province, Zambia**
- 2.) Your name: (Please indicate:) **Rod Tether**  
 2a) Your position: (Please indicate:) **Owner - Kutandala Camp**
- 3.) Do aardvarks occur in your game park? (Please mark with an 'x')  
 x      – definitely yes  
           – probably yes  
           – unknown  
           – probably no  
           – definitely no
- 4.) How frequently is the aardvark sighted in your park (approximately)? (Please mark with an 'x')  
           – daily  
           – weekly  
           – monthly  
           – annually  
 x      – almost never
- 5.) Do you make night drives in your park? (Please mark with an 'x')  
 x      – yes **very seldom**  
           – no  
 5a) At which time (mostly)? (Please mark with an 'x')  
           – at early night (shortly after sunset)  
 x      – at deep night (around midnight)  
           – at late night (shortly before sunrise)  
 5b) How often (approx.)? (Please mark with an 'x')  
           – daily  
           – weekly  
           – monthly  
 x      – irregularly
- 6.) When is the aardvark sighted in your park?  
 (Please mark with 1=always 2=almost always 3=mostly 4=rarely 5=almost never or 6=never)  
 6a) At which season?  
 5      – April to September (winter in the southern hemisphere)  
 4      – October to March (summer in the southern hemisphere)  
 6b) At which moisture?  
           – dry night  
           – average night  
           – rainy night  
 6c) At which temperature?  
           – cold night  
           – average night  
 x      – warm night  
 6d) At which time?  
           – at early night (shortly after sunset)  
 x      – at deep night (around midnight)  
           – at late night (shortly before sunrise)  
           – can you give a time frame? (Please specify:)
- 7.) Did you ever observe interactions with other myrmecophagous (=ant-eating) mammals in your park?  
 (Please mark with an 'x')  
           – yes  
 x      – no  
 7a) If so, what exactly have you observed? (Please specify:)
- 8.) Are aardvarks sometimes accompanied by other animals in your park? (Please mark with an 'x')  
 x      – yes  
           – no  
 8a) If so, by which animals? (Please specify:)

- 8b) Is there any obvious connection between them? (Please specify:)
- 9.) Did you ever observe an aardvark at daylight in your park? (Please mark with an 'x')
- x     – yes  
       – no
- 9a) If so, what did it do? (Please mark with an 'x')
- warm up after a cold night  
       – feed on ants and termites  
 x     – something else (Please specify:) **an aardvark was found with a wire snare around it's leg during daylight - it was caught by scouts and the snare removed**
- 10.) Did sightings of the aardvark increase, decrease or stay constant in the past ten years in your park? (Please mark with an 'x')
- decrease  
       – stay constant  
       – increase  
 x     – cannot tell
- 11.) Did you ever observe an aardvark feeding on mice in your park? (Please mark with an 'x')
- x     – yes  
       – no
- 11a) If so, did the aardvark kill the mouse or was it just the carcass? (Please mark with an 'x')
- the aardvark killed the mouse  
       – the mouse was already dead  
       – cannot tell
- 12.) Did you ever observe an aardvark feeding on other animals than ants, termites and possibly mice in your park? (Please mark with an 'x')
- x     – yes  
       – no
- 12a) If so, what kind of animals? (Please indicate:) **\*\*\*\* I find quite a lot on Aardvark droppings and have found no evidence of mice within them \*\*\*\***
- 12b) And: was it killed by the aardvark or was it a carcass? (Please mark with an 'x')
- killed by the aardvark  
       – was already dead  
       – cannot tell
- 13.) Did you ever observe an aardvark feeding on cucumber in your park? (Please mark with an 'x')
- x     – yes  
       – no
- 14.) Did you ever observe an aardvark feeding on fruit or roots in your park? (Please mark with an 'x')
- x     – yes  
       – no
- 14a) If so, what exactly? (Please specify:)
- 15.) Did you notice a preference regarding the digging into termite mounds? (Please mark with an 'x')
- (Explanation: It is said that aardvarks would preferentially feed from a certain direction and there even exist explanations therefore.)
- preferably from the north  
       – preferably from the west  
       – preferably from the east  
       – preferably from the south  
 x     – there seems to be no preference  
       – cannot tell
- 16.) Did you ever observe an aardvark swim in your park? (Please mark with an 'x')
- x     – yes  
       – no
- 16a) If so, was there an obvious necessity for doing so? (Please specify:)
- 17.) What animals could you observe killing an aardvark in your park? (Please mark with an 'x' or — even better — by the number of times you observed it)
- lion  
       – leopard  
       – cheetah  
       – wild dog

- spotted hyena
  - python
  - crocodile
  - any others (Please indicate:)
- 18.) When attacked, which reaction of the aardvark could you observe in your park? (Please mark with an 'x')
- it ran away
  - it dug itself in
  - x - it kicked (when the scouts were trying to remove the snare it kicked aggressively and swung its tail)
  - any other reaction (Please specify:)
- 19.) Did you ever observe anything special in your park concerning the aardvark? (Please specify:) NO
- 20.) Which folk originally lived in the area of the game park? (Please indicate:) **Senga/ Bisa-Bemba**
- 20a) What language do they speak? (Please indicate:) **Senga/ Bisa-Bemba**
- 20b) How do they name the aardvark? (Please indicate:) **(godi/ inengo)**
- 20c) Does the aardvark play a role in their mysticism? (Please specify:) (Senga - none but they are aware of what they eat and how.  
Bisa-Bemba - if you put some 'medicine' on top of it's burrow while it is sleeping it will not know you are coming and you can climb into its hole and catch it - however if the 'medicine' does not work it will hear you coming and burry you alive)
- 20d) Does (or did) the aardvark play any other role in their life? (Please specify:) No
- 21.) What is the official language of your country? (Please indicate:) **English**
- 21a) How do you name the aardvark? (Please indicate:) **Aardvark**
- 22.) Do you know any zoos keeping aardvarks? (Please indicate, if possible name including (email-)address:) No

## A.30 Zambia, Sioma Ngwezi National Park, Mutemwa Lodge

1.) Name of game park: (Please specify:) **Sioma Ngwezi National Park**  
1a) Province, country: (Please indicate:) **Zambia**

2.) Your name: (Please indicate:) **Penny Johnson**  
2a) Your position: (Please indicate:)

3.) Do aardvarks occur in your game park? (Please mark with an 'x')  
x           – definitely yes  
             – probably yes  
             – unknown  
             – probably no  
             – definitely no

[...]

5.) Do you make night drives in your park? (Please mark with an 'x')  
             – yes  
x           – no

[...]

In western zambia, there are no fences, so the game can go anywhere. The game has also been poached quite a bit in past times and is very skittish.  
We do definitely get Aardvark in and around the Sioma Ngwezi National Park. We have seen them, but not often.



## A.31 Zambia, South Luangwa National Park, Flatdogs Camp

- 1.) Name of game park: (Please specify:) **South Luangwa National Park**  
 1a) Province, country: (Please indicate:) **Eastern Province, Zambia**
- 2.) Your name: (Please indicate:) **Jessica Salmon**  
 2a) Your position: (Please indicate:) **Director**
- 3.) Do aardvarks occur in your game park? (Please mark with an 'x')  
 x       – definitely yes  
          – probably yes  
          – unknown  
          – probably no  
          – definitely no
- 4.) How frequently is the aardvark sighted in your park (approximately)? (Please mark with an 'x')  
 x       – daily  
          – weekly  
          – monthly  
          – annually  
          – almost never
- 5.) Do you make night drives in your park? (Please mark with an 'x')  
 x       – yes  
          – no  
 5a) At which time (mostly)? (Please mark with an 'x')  
 x       – at early night (shortly after sunset)  
          – at deep night (around midnight)  
          – at late night (shortly before sunrise)  
 5b) How often (approx.)? (Please mark with an 'x')  
 x       – daily  
          – weekly  
          – monthly  
          – irregularly
- 6.) When is the aardvark sighted in your park?  
 (Please mark with 1=always 2=almost always 3=mostly 4=rarely 5=almost never or 6=never)  
 6a) At which season?  
 1       – April to September (winter in the southern hemisphere)  
 4       – October to March (summer in the southern hemisphere)  
 6b) At which moisture?  
 1       – dry night **here's its either dry or not**  
 1       – average night ditto  
          – rainy night (**we have difficulty with access in the rains**)  
 6c) At which temperature?  
 1       – cold night  
 1       – average night  
 1       – warm night  
 6d) At which time?  
       – at early night (shortly after sunset)  
 2       – at deep night (around midnight)  
       – at late night (shortly before sunrise)  
       – can you give a time frame? (Please specify:) **not many people are driving in the park after around 10pm but that is when I have seen the most of the aardvark I have seen. A film crew who worked here filming leopard saw most in deep night.**
- 7.) Did you ever observe interactions with other myrmecophagous (=ant-eating) mammals in your park?  
 (Please mark with an 'x')  
 x       – yes  
          – no  
 7a) If so, what exactly have you observed? (Please specify:)
- 8.) Are aardvarks sometimes accompanied by other animals in your park? (Please mark with an 'x')  
 – yes

- x           – no **not that I've seen**  
 8a) If so, by which animals? (Please specify:)  
 8b) Is there any obvious connection between them? (Please specify:)
- 9.) Did you ever observe an aardvark at daylight in your park? (Please mark with an 'x')  
 – yes  
 x           – no  
 9a) If so, what did it do? (Please mark with an 'x')  
 – warm up after a cold night  
 – feed on ants and termites  
 – something else (Please specify:)
- 10.) Did sightings of the aardvark increase, decrease or stay constant in the past ten years in your park?  
 (Please mark with an 'x')  
 – decrease  
 x           – stay constant  
 – increase  
 – cannot tell
- 11.) Did you ever observe an aardvark feeding on mice in your park? (Please mark with an 'x')  
 – yes  
 x           – no  
 11a) If so, did the aardvark kill the mouse or was it just the carcass? (Please mark with an 'x')  
 – the aardvark killed the mouse  
 – the mouse was already dead  
 – cannot tell
- 12.) Did you ever observe an aardvark feeding on other animals than ants, termites and possibly mice in your park?  
 (Please mark with an 'x')  
 – yes  
 x           – no  
 12a) If so, what kind of animals? (Please indicate:)  
 12b) And: was it killed by the aardvark or was it a carcass? (Please mark with an 'x')  
 – killed by the aardvark  
 – was already dead  
 – cannot tell
- 13.) Did you ever observe an aardvark feeding on cucumber in your park? (Please mark with an 'x')  
 – yes  
 x           – no (**don't have any**)
- 14.) Did you ever observe an aardvark feeding on fruit or roots in your park? (Please mark with an 'x')  
 – yes  
 x           – no  
 14a) If so, what exactly? (Please specify:)
- 15.) Did you notice a preference regarding the digging into termite mounds? (Please mark with an 'x')  
 (Explanation: It is said that aardvarks would preferentially feed from a certain direction and there even exist explanations therefore.)  
 – preferably from the north  
 – preferably from the west  
 – preferably from the east  
 – preferably from the south  
 – there seems to be no preference  
 x           – cannot tell
- 16.) Did you ever observe an aardvark swim in your park? (Please mark with an 'x')  
 – yes  
 x           – no  
 16a) If so, was there an obvious necessity for doing so? (Please specify:)
- 17.) What animals could you observe killing an aardvark in your park?  
 (Please mark with an 'x' or — even better — by the number of times you observed it)  
 – lion  
 – leopard  
 – cheetah  
 – wild dog

- spotted hyena
- python
- crocodile
- any others (Please indicate:)

18.) When attacked, which reaction of the aardvark could you observe in your park? (Please mark with an 'x')

- x - it ran away
- it dug itself in
- it kicked
- any other reaction (Please specify:)

19.) Did you ever observe anything special in your park concerning the aardvark? (Please specify:) **they are special in themselves**

20.) Which folk originally lived in the area of the game park? (Please indicate:) **Kunda**

20a) What language do they speak? (Please indicate:) **Chinyanja**

20b) How do they name the aardvark? (Please indicate:) **Mpendwa**

20c) Does the aardvark play a role in their mysticism? (Please specify:) **no**

20d) Does (or did) the aardvark play any other role in their life? (Please specify:)

21.) What is the official language of your country? (Please indicate:) **English**

21a) How do you name the aardvark? (Please indicate:) **Orycteropus afer or aardvark**

22.) Do you know any zoos keeping aardvarks? (Please indicate, if possible name including (email-)address:) **no happily**

## A.32 Zambia, South Luangwa National Park, Kapani Lodge

- 1.) Name of game park: (Please specify:) SOUTH LUANGWA NATIONAL PARK  
 1a) Province, country: (Please indicate:) EASTERN PROVINCE ZAMBIA
- 2.) Your name: (Please indicate:) CHRISTINA CARR - NORMAN CARR SAFARIS (WITH ADVICE FROM ABRAHAM BANDA - MANAGER AND SENIOR GUIDE AND WILLIE SHUMA SAFARI MANAGER - KAPANI LODGE - THESE 2 HAVE OVER 30 YEARS EXPERIENCE BETWEEN THEM!)  
 2a) Your position: (Please indicate:)

- 3.) Do aardvarks occur in your game park? (Please mark with an 'x')

x      - definitely yes  
           - probably yes  
           - unknown  
           - probably no  
           - definitely no

- 4.) How frequently is the aardvark sighted in your park (approximately)? (Please mark with an 'x')

x      - daily  
           - weekly  
           - monthly  
           - annually  
           - almost never

BUT PLEASE NOTE SIGHTINGS ARE VERY DEPENDANT ON PARTICULAR AREAS - IT IS HARD TO TALK ABOUT SIGHTINGS IN THE PARK IN GENERAL - SOME AREAS ON THE WEST BANK OF THE RIVER LUAGWA HAVE LOTS OF SIGHTINGS AND SOME AREAS NONE AT ALL

- 5.) Do you make night drives in your park? (Please mark with an 'x')

x      - yes  
           - no

- 5a) At which time (mostly)? (Please mark with an 'x')

x      - at early night (shortly after sunset)  
           - at deep night (around midnight)  
           - at late night (shortly before sunrise)

- 5b) How often (approx.)? (Please mark with an 'x')

x      - daily  
           - weekly  
           - monthly  
           - irregularly

- 6.) When is the aardvark sighted in your park?

(Please mark with 1=always 2=almost always 3=mostly 4=rarely 5=almost never or 6=never)

- 6a) At which season?

- April to September (winter in the southern hemisphere)  
 - October to March (summer in the southern hemisphere)

- 6b) At which moisture?

- dry night  
 - average night  
 - rainy night

- 6c) At which temperature?

- cold night  
 - average night  
 - warm night

- 6d) At which time?

- at early night (shortly after sunset)  
 - at deep night (around midnight)  
 - at late night (shortly before sunrise)  
 - can you give a time frame? (Please specify:)

AGAIN - SORRY HARD TO SPECIFY - MOST SIGHTINGS ARE BEWTEEN JUNE AND NOV BUT THAT'S ONLY BECAUSE OF ACCESSIBILITY - DURING THE RAINS THERE IS PLANTY OF EVIDENCE OF DIGGINGS BUT IT'S HARD TO ACTUALLY SEE THEM AS ROADS INTO MORE REMOTE AREAS ARE INACCESSIBLE

- 7.) Did you ever observe interactions with other myrmecophagous (=ant-eating) mammals in your park?

(Please mark with an 'x')

x      - yes  
           - no

- 7a) If so, what exactly have you observed? (Please specify:)

- 8.) Are aardvarks sometimes accompanied by other animals in your park? (Please mark with an 'x')
- yes
  - x - no NEVER SEEN
- 8a) If so, by which animals? (Please specify:)
- 8b) Is there any obvious connection between them? (Please specify:)
- 9.) Did you ever observe an aardvark at daylight in your park? (Please mark with an 'x')
- x - yes
  - no
- 9a) If so, what did it do? (Please mark with an 'x')
- warm up after a cold night
  - feed on ants and termites
  - x - something else (Please specify:) IT WAS EMERGING LATE AFTERNOON FROM IT'S BURROW AND WAS INSTANTLY EATEN BY LIONS WHO HAPPENED TO BE ON THE TRACK NEARBY - AN OPPORTUNISTIC KILLING - THEY WERE NOT HUNTING IT
- 10.) Did sightings of the aardvark increase, decrease or stay constant in the past ten years in your park? (Please mark with an 'x')
- decrease
  - stay constant
  - increase
  - x - cannot tell
- 11.) Did you ever observe an aardvark feeding on mice in your park? (Please mark with an 'x')
- yes
  - x - no
- 11a) If so, did the aardvark kill the mouse or was it just the carcass? (Please mark with an 'x') N/A
- the aardvark killed the mouse
  - the mouse was already dead
  - cannot tell
- 12.) Did you ever observe an aardvark feeding on other animals than ants, termites and possibly mice in your park? (Please mark with an 'x')
- yes
  - x - no
- 12a) If so, what kind of animals? (Please indicate:)
- 12b) And: was it killed by the aardvark or was it a carcass? (Please mark with an 'x')
- killed by the aardvark
  - was already dead
  - cannot tell
- 13.) Did you ever observe an aardvark feeding on cucumber in your park? (Please mark with an 'x')
- yes
  - x - no
- 14.) Did you ever observe an aardvark feeding on fruit or roots in your park? (Please mark with an 'x')
- x - yes BUT ONLY AS PART OF ITS DIGGING - THEY EAT A LOT OF EARTH AND ROOTS
  - no
- 14a) If so, what exactly? (Please specify:)
- 15.) Did you notice a preference regarding the digging into termite mounds? (Please mark with an 'x')
- (Explanation: It is said that aardvarks would preferentially feed from a certain direction and there even exist explanations therefore.)
- preferably from the north
  - preferably from the west
  - preferably from the east
  - preferably from the south
  - x - there seems to be no preference EXCEPT THEY DO FAVOUR SANDY SOIL - EASIER DIGGING
  - cannot tell
- 16.) Did you ever observe an aardvark swim in your park? (Please mark with an 'x')
- yes
  - x - no
- 16a) If so, was there an obvious necessity for doing so? (Please specify:)
- 17.) What animals could you observe killing an aardvark in your park?  
(Please mark with an 'x' or — even better — by the number of times you observed it)

- x           – lion ONE INSTANCE ACTUALLY OBSERVED  
               – leopard  
               – cheetah  
               – wild dog
- x           – spotted hyena FEEDING ON CARCASS BUT COULD HAVE BEEN SCAVENGING - THEY DID NOT NECESSARILY MAKE THE KILL  
               – python  
               – crocodile  
               – any others (Please indicate:)
- 18.) When attacked, which reaction of the aardvark could you observe in your park? (Please mark with an 'x')
- it ran away  
               – it dug itself in  
               – it kicked
- x           – any other reaction (Please specify:) IT DID NOT REACT AT ALL TO THE LION ATTACK - IT DIDN'T HAVE TIME
- 19.) Did you ever observe anything special in your park concerning the aardvark? (Please specify:)
- 20.) Which folk originally lived in the area of the game park? (Please indicate:)
- 20a) What language do they speak? (Please indicate:) BISA - (A Bantu language, one of about 70 in this country and also Kunda
- 20b) How do they name the aardvark? (Please indicate:) Bisa - Pendwa in kunda - gwenu gwenu
- 20c) Does the aardvark play a role in their mysticism? (Please specify:) NONE KNOWN - IF I FINDOUT I'LL LET YOU KNOW
- 20d) Does (or did) the aardvark play any other role in their life? (Please specify:) THEY ARE GOOD EATING - LIKE PORK. PEOPLE DIG THEM OUT OF THEIR BURROWS
- 21.) What is the official language of your country? (Please indicate:) ENGLISH IN THE OFFICIAL LANGUAGE - THERE ARE 7 MAIN TRIBAL LANGUAGES WITH AT LEAST 70 DIALECTS
- 21a) How do you name the aardvark? (Please indicate:)
- 22.) Do you know any zoos keeping aardvarks? (Please indicate, if possible name including (email-)address:) NOT KNOWN

## A.33 Zambia, South Luangwa National Park, Land & Lake Safaris

- 1.) Name of game park: (Please specify:) **South Luangwa National Park**  
 1a) Province, country: (Please indicate:) **Zambia**
- 2.) Your name: (Please indicate:) **Mark Sprong / Godfrey Shawa**  
 2a) Your position: (Please indicate:) **Directors**
- 3.) Do aardvarks occur in your game park? (Please mark with an 'x')  
 x      – definitely yes  
           – probably yes  
           – unknown  
           – probably no  
           – definitely no
- 4.) How frequently is the aardvark sighted in your park (approximately)? (Please mark with an 'x')  
           – daily  
           – weekly  
           – monthly  
 x      – annually  
           – almost never
- 5.) Do you make night drives in your park? (Please mark with an 'x')  
 x      – yes  
           – no  
 5a) At which time (mostly)? (Please mark with an 'x')  
 x      – at early night (shortly after sunset)  
           – at deep night (around midnight)  
           – at late night (shortly before sunrise)  
 5b) How often (approx.)? (Please mark with an 'x')  
           – daily  
           – weekly  
           – monthly  
 x      – irregularly
- 6.) When is the aardvark sighted in your park?  
 (Please mark with 1=always 2=almost always 3=mostly x 4=rarely 5=almost never or 6=never)  
 6a) At which season?  
           – April to September (winter in the southern hemisphere)  
 x      – October to March (summer in the southern hemisphere)  
 6b) At which moisture?  
           – dry night  
 x      – average night  
           – rainy night  
 6c) At which temperature?  
           – cold night  
 x      – average night  
           – warm night  
 6d) At which time?  
 x      – at early night (shortly after sunset)  
           – at deep night (around midnight)  
           – at late night (shortly before sunrise)  
           – can you give a time frame? (Please specify:)
- 7.) Did you ever observe interactions with other myrmecophagous (=ant-eating) mammals in your park?  
 (Please mark with an 'x')  
           – yes  
 x      – no  
 7a) If so, what exactly have you observed? (Please specify:)
- 8.) Are aardvarks sometimes accompanied by other animals in your park? (Please mark with an 'x')  
 x      – yes  
           – no  
 8a) If so, by which animals? (Please specify:)

- 8b) Is there any obvious connection between them? (Please specify:)
- 9.) Did you ever observe an aardvark at daylight in your park? (Please mark with an 'x')
- yes
  - x - no
- 9a) If so, what did it do? (Please mark with an 'x')
- warm up after a cold night
  - feed on ants and termites
  - something else (Please specify:)
- 10.) Did sightings of the aardvark increase, decrease or stay constant in the past ten years in your park? (Please mark with an 'x')
- decrease
  - stay constant
  - increase
  - x - cannot tell
- 11.) Did you ever observe an aardvark feeding on mice in your park? (Please mark with an 'x')
- yes
  - x - no
- 11a) If so, did the aardvark kill the mouse or was it just the carcass? (Please mark with an 'x')
- the aardvark killed the mouse
  - the mouse was already dead
  - cannot tell
- 12.) Did you ever observe an aardvark feeding on other animals than ants, termites and possibly mice in your park? (Please mark with an 'x')
- yes
  - x - no
- 12a) If so, what kind of animals? (Please indicate:)
- 12b) And: was it killed by the aardvark or was it a carcass? (Please mark with an 'x')
- killed by the aardvark
  - was already dead
  - cannot tell
- 13.) Did you ever observe an aardvark feeding on cucumber in your park? (Please mark with an 'x')
- yes
  - x - no
- 14.) Did you ever observe an aardvark feeding on fruit or roots in your park? (Please mark with an 'x')
- yes
  - x - no
- 14a) If so, what exactly? (Please specify:)
- 15.) Did you notice a preference regarding the digging into termite mounds? (Please mark with an 'x')
- (Explanation: It is said that aardvarks would preferentially feed from a certain direction and there even exist explanations therefore.)
- preferably from the north
  - preferably from the west
  - preferably from the east
  - preferably from the south
  - there seems to be no preference
  - x - cannot tell
- 16.) Did you ever observe an aardvark swim in your park? (Please mark with an 'x')
- yes
  - x - no
- 16a) If so, was there an obvious necessity for doing so? (Please specify:)
- 17.) What animals could you observe killing an aardvark in your park? (Please mark with an 'x' or — even better — by the number of times you observed it)
- x - lion
  - leopard
  - cheetah
  - wild dog
  - spotted hyena
  - python



- crocodile
- any others (Please indicate:)

18.) When attacked, which reaction of the aardvark could you observe in your park? (Please mark with an 'x')

- x
- it ran away
  - it dug itself in
  - it kicked
  - any other reaction (Please specify:)

19.) Did you ever observe anything special in your park concerning the aardvark? (Please specify:) DIGGING AND DROPPINGS BURIED IN THE SOIL FROM THE DIGGING

20.) Which folk originally lived in the area of the game park? (Please indicate:) BISA PEOPLE

20a) What language do they speak? (Please indicate:) CHINYANJA

20b) How do they name the aardvark? (Please indicate:) IMPENDWA

20c) Does the aardvark play a role in their mysticism? (Please specify:) MEDICINE FOR CULTIVATION OF MAIZE FIELD BUT THEY MIX PART OF IT WITH POTIONS FROM TREES

20d) Does (or did) the aardvark play any other role in their life? (Please specify:) MEDICINE FOR LUCK

21.) What is the official language of your country? (Please indicate:) ENGLISH

21a) How do you name the aardvark? (Please indicate:) ANTEATER OR ANT BEAR

22.) Do you know any zoos keeping aardvarks? (Please indicate, if possible name including (email-)address:) NO

## A.34 Zambia, South Luangwa National Park, Luangwa River Lodge

- 1.) Name of game park: (Please specify:) **South Luangwa National Park**  
1a) Province, country: (Please indicate:) **Zambia Eastern Province**
- 2.) Your name: (Please indicate:) **Barry**  
2a) Your position: (Please indicate:) **Upper Lupande GMA opposite Luangwa Wafwa Oxbow lagoon**
- 3.) Do aardvarks occur in your game park? (Please mark with an 'x')  
x      – definitely yes  
          – probably yes  
          – unknown  
          – probably no  
          – definitely no
- 4.) How frequently is the aardvark sighted in your park (approximately)? (Please mark with an 'x')  
          – daily  
          – weekly  
x       – monthly  
          – annually  
          – almost never
- 5.) Do you make night drives in your park? (Please mark with an 'x')  
x       – yes  
          – no  
5a) At which time (mostly)? (Please mark with an 'x')  
          – at early night (shortly after sunset)  
x       – at deep night (around midnight)  
          – at late night (shortly before sunrise)  
5b) How often (approx.)? (Please mark with an 'x')  
          – daily  
          – weekly  
x       – monthly  
          – irregularly
- 6.) When is the aardvark sighted in your park?  
(Please mark with 1=always 2=almost always 3=mostly 4=rarely 5=almost never or 6=never) 4  
6a) At which season?  
          – April to September (winter in the southern hemisphere)  
          – October to March (summer in the southern hemisphere)  
6b) At which moisture?  
          – dry night  
          – average night **VARIES**  
          – rainy night  
6c) At which temperature? **VARIES**  
          – cold night  
          – average night  
          – warm night  
6d) At which time?  
          – at early night (shortly after sunset)  
x       – at deep night (around midnight) **after 8pm usually**  
          – at late night (shortly before sunrise)  
          – can you give a time frame? (Please specify:)
- 7.) Did you ever observe interactions with other myrmecophagous (=ant-eating) mammals in your park?  
(Please mark with an 'x')  
          – yes  
x       – no **NOT long enough as they tend to be shy**  
7a) If so, what exactly have you observed? (Please specify:)
- 8.) Are aardvarks sometimes accompanied by other animals in your park? (Please mark with an 'x')  
          – yes  
          – no  
8a) If so, by which animals? (Please specify:)

- 8b) Is there any obvious connection between them? (Please specify:)
- 9.) Did you ever observe an aardvark at daylight in your park? (Please mark with an 'x')
- yes
  - x - no
- 9a) If so, what did it do? (Please mark with an 'x') N/A
- warm up after a cold night
  - feed on ants and termites
  - something else (Please specify:)
- 10.) Did sightings of the aardvark increase, decrease or stay constant in the past ten years in your park? (Please mark with an 'x')
- decrease
  - x - stay constant
  - increase
  - cannot tell
- 11.) Did you ever observe an aardvark feeding on mice in your park? (Please mark with an 'x')
- yes
  - x - no
- 11a) If so, did the aardvark kill the mouse or was it just the carcass? (Please mark with an 'x')
- the aardvark killed the mouse
  - the mouse was already dead
  - cannot tell
- 12.) Did you ever observe an aardvark feeding on other animals than ants, termites and possibly mice in your park? (Please mark with an 'x')
- yes
  - x - no
- 12a) If so, what kind of animals? (Please indicate:) N/A
- 12b) And: was it killed by the aardvark or was it a carcass? (Please mark with an 'x') N/A
- killed by the aardvark
  - was already dead
  - cannot tell
- 13.) Did you ever observe an aardvark feeding on cucumber in your park? (Please mark with an 'x')
- yes
  - x - no
- 14.) Did you ever observe an aardvark feeding on fruit or roots in your park? (Please mark with an 'x')
- yes
  - x - no
- 14a) If so, what exactly? (Please specify:)
- 15.) Did you notice a preference regarding the digging into termite mounds? (Please mark with an 'x')
- (Explanation: It is said that aardvarks would preferentially feed from a certain direction and there even exist explanations therefore.)
- preferably from the north
  - preferably from the west
  - preferably from the east
  - preferably from the south
  - there seems to be no preference
  - x - cannot tell
- 16.) Did you ever observe an aardvark swim in your park? (Please mark with an 'x')
- yes
  - x - no
- 16a) If so, was there an obvious necessity for doing so? (Please specify:)
- 17.) What animals could you observe killing an aardvark in your park? (Please mark with an 'x' or — even better — by the number of times you observed it)
- lion
  - leopard
  - cheetah
  - wild dog
  - spotted hyena
  - python

- crocodile
  - any others (Please indicate:) **never witnessed such a kill**
- 18.) When attacked, which reaction of the aardvark could you observe in your park? (Please mark with an 'x')
- it ran away
  - it dug itself in
  - it kicked
  - any other reaction (Please specify:) **never witnessed an attack**
- 19.) Did you ever observe anything special in your park concerning the aardvark? (Please specify:) **just seeing them late at night not early evening**
- 20.) Which folk originally lived in the area of the game park? (Please indicate:)
- 20a) What language do they speak? (Please indicate:) **Kunda and Bisa**
  - 20b) How do they name the aardvark? (Please indicate:) **Mphendwa**
  - 20c) Does the aardvark play a role in their mysticism? (Please specify:) **once it is killed locals will not touch it as its assoicated with witchcraft...and will dig to there home and destoy there home**
  - 20d) Does (or did) the aardvark play any other role in their life? (Please specify:) **make holes for porcupine and Hyenas hence the associating with witchcraft**
- 21.) What is the official language of your country? (Please indicate:) **English / Nyanja**
- 21a) How do you name the aardvark? (Please indicate:) **Aardvark**
- 22.) Do you know any zoos keeping aardvarks? (Please indicate, if possible name including (email-)address:) **NO**

## A.35 Zambia, South Luangwa National Park, Luamfwa Lodge

- 1.) Name of game park: (Please specify:) **South Luangwa National Park**
  - 1a) Province, country: (Please indicate:) **Eastern Province, Zambia**
- 2.) Your name: (Please indicate:) **Jacky Vlachos**
  - 2a) Your position: (Please indicate:) **Manager**

I have not replied to your questionnaire as I have never seen an aardvark in our area of the South Luangwa National Park, Zambia. They do exist but in the past 15 years have not seen one.

## A.36 Zambia, South Luangwa National Park, Robin Pope Safaris

- 1.) Name of game park: (Please specify:) **South Luangwa National Park**  
 1a) Province, country: (Please indicate:) **Eastern Province, Zambia**
- 2.) Your name: (Please indicate:) **Simon Cousins**  
 2a) Your position: (Please indicate:) **Operations Manager**
- 3.) Do aardvarks occur in your game park? (Please mark with an 'x')  
 x           – definitely yes  
               – probably yes  
               – unknown  
               – probably no  
               – definitely no
- 4.) How frequently is the aardvark sighted in your park (approximately)? (Please mark with an 'x')  
               – daily  
               – weekly  
 x           – monthly  
               – annually  
               – almost never
- 5.) Do you make night drives in your park? (Please mark with an 'x')  
 x           – yes  
               – no  
 5a) At which time (mostly)? (Please mark with an 'x')  
               – at early night (shortly after sunset)  
               – at deep night (around midnight)  
               – at late night (shortly before sunrise)
- Mainly late at night but it depends on the moon phase we think. Just after full moon - when the darkest part of the night is early we see them in this period from time to time.
- 5b) How often (approx.)? (Please mark with an 'x')  
               – daily  
               – weekly  
 x           – monthly  
               – irregularly
- 6.) When is the aardvark sighted in your park? 4  
 (Please mark with 1=always 2=almost always 3=mostly 4=rarely 5=almost never or 6=never)
- 6a) At which season? **All seasons**  
               – April to September (winter in the southern hemisphere)  
               – October to March (summer in the southern hemisphere)
- 6b) At which moisture? **Been seen on all occasions**  
               – dry night  
               – average night  
               – rainy night
- 6c) At which temperature? **All**  
               – cold night  
               – average night  
               – warm night
- 6d) At which time?  
               – at early night (shortly after sunset)  
               – at deep night (around midnight)  
               – at late night (shortly before sunrise)  
               – can you give a time frame? (Please specify:)
- Been seen on all occasions - please see above answer re moon phases. Like darkest times as we can understand.**
- 7.) Did you ever observe interactions with other myrmecophagous (=ant-eating) mammals in your park?  
 (Please mark with an 'x')  
               – yes  
 x           – no but pangolins do occur here - up in the hills - v. rarely seen  
 7a) If so, what exactly have you observed? (Please specify:)
- 8.) Are aardvarks sometimes accompanied by other animals in your park? (Please mark with an 'x')

- yes  
 - no **never recorded**  
 8a) If so, by which animals? (Please specify:)  
 8b) Is there any obvious connection between them? (Please specify:)
- 9.) Did you ever observe an aardvark at daylight in your park? (Please mark with an 'x')
- yes  
 - no **never seen**  
 9a) If so, what did it do? (Please mark with an 'x')
  - warm up after a cold night
  - feed on ants and termites
  - something else (Please specify:)
- 10.) Did sightings of the aardvark increase, decrease or stay constant in the past ten years in your park? (Please mark with an 'x')
- decrease  
 - stay constant  
 - increase  
 - cannot tell
- 11.) Did you ever observe an aardvark feeding on mice in your park? (Please mark with an 'x')
- yes  
 - no  
 11a) If so, did the aardvark kill the mouse or was it just the carcass? (Please mark with an 'x')
  - the aardvark killed the mouse
  - the mouse was already dead
  - cannot tell
- 12.) Did you ever observe an aardvark feeding on other animals than ants, termites and possibly mice in your park? (Please mark with an 'x')
- yes  
 - no  
 12a) If so, what kind of animals? (Please indicate:)  
 12b) And: was it killed by the aardvark or was it a carcass? (Please mark with an 'x')
  - killed by the aardvark
  - was already dead
  - cannot tell
- 13.) Did you ever observe an aardvark feeding on cucumber in your park? (Please mark with an 'x')
- yes  
 - no
- 14.) Did you ever observe an aardvark feeding on fruit or roots in your park? (Please mark with an 'x')
- yes  
 - no  
 14a) If so, what exactly? (Please specify:)
- 15.) Did you notice a preference regarding the digging into termite mounds? (Please mark with an 'x') (Explanation: It is said that aardvarks would preferentially feed from a certain direction and there even exist explanations therefore.)
- preferably from the north  
 - preferably from the west  
 - preferably from the east  
 - preferably from the south  
 - there seems to be no preference  
 - cannot tell
- 16.) Did you ever observe an aardvark swim in your park? (Please mark with an 'x')
- yes  
 - no  
 16a) If so, was there an obvious necessity for doing so? (Please specify:)
- 17.) What animals could you observe killing an aardvark in your park? (Please mark with an 'x' or — even better — by the number of times you observed it)
- lion  
 - leopard **saw it eating one. Did not see it kill the animal**  
 - cheetah

- wild dog
- spotted hyena
- python
- crocodile
- any others (Please indicate:)

- 18.) When attacked, which reaction of the aardvark could you observe in your park? (Please mark with an 'x') **See above**
- it ran away
  - it dug itself in
  - it kicked
  - any other reaction (Please specify:)
- 19.) Did you ever observe anything special in your park concerning the aardvark? (Please specify:)
- 20.) Which folk originally lived in the area of the game park? (Please indicate:) **Kunda People**
- 20a) What language do they speak? (Please indicate:) **Nyanja**
- 20b) How do they name the aardvark? (Please indicate:) **Pendwa**
- 20c) Does the aardvark play a role in their mysticism? (Please specify:) **None that I know**
- 20d) Does (or did) the aardvark play any other role in their life? (Please specify:) **As Above**
- 21.) What is the official language of your country? (Please indicate:) **English**
- 21a) How do you name the aardvark? (Please indicate:) **Aardvark**
- 22.) Do you know any zoos keeping aardvarks? (Please indicate, if possible name including (email-)address:) **None**



## A.37 Zambia, South Luangwa National Park, The Wildlife Camp

- 1.) Name of game park: (Please specify:) **south Luangwa national park**  
 1a) Province, country: (Please indicate:) **eastern province - zambia**
- 2.) Your name: (Please indicate:) **patsy Hahn**  
 2a) Your position: (Please indicate:) **director - The Wildlife camp**
- 3.) Do aardvarks occur in your game park? (Please mark with an 'x')  
**x**      - definitely yes  
           - probably yes  
           - unknown  
           - probably no  
           - definitely no
- 4.) How frequently is the aardvark sighted in your park (approximately)? (Please mark with an 'x')  
           - daily  
           - weekly  
           - monthly  
**x**      - annually  
           - almost never
- 5.) Do you make night drives in your park? (Please mark with an 'x')  
**x**      - yes  
           - no  
 5a) At which time (mostly)? (Please mark with an 'x')  
**x**      - at early night (shortly after sunset)  
           - at deep night (around midnight)  
           - at late night (shortly before sunrise)  
 5b) How often (approx.)? (Please mark with an 'x')  
**x**      - daily  
           - weekly  
           - monthly  
           - irregularly
- 6.) When is the aardvark sighted in your park?  
 (Please mark with 1=always 2=almost always 3=mostly 4=rarely **x** 5=almost never or 6=never)  
 6a) At which season?  
           - April to September (winter in the southern hemisphere)  
**x**      - October to March (summer in the southern hemisphere)  
 6b) At which moisture?  
**x**      - dry night  
           - average night  
           - rainy night  
 6c) At which temperature?  
           - cold night  
           - average night  
**x**      - warm night  
 6d) At which time?  
           - at early night (shortly after sunset)  
**x**      - at deep night (around midnight)  
           - at late night (shortly before sunrise)  
           - can you give a time frame? (Please specify:)
- 7.) Did you ever observe interactions with other myrmecophagous (=ant-eating) mammals in your park?  
 (Please mark with an 'x')  
           - yes  
**x**      - no  
 7a) If so, what exactly have you observed? (Please specify:)
- 8.) Are aardvarks sometimes accompanied by other animals in your park? (Please mark with an 'x')  
**x**      - yes  
           - no  
 8a) If so, by which animals? (Please specify:)

- 8b) Is there any obvious connection between them? (Please specify:)
- 9.) Did you ever observe an aardvark at daylight in your park? (Please mark with an 'x')
- yes
  - x - no
- 9a) If so, what did it do? (Please mark with an 'x')
- warm up after a cold night
  - feed on ants and termites
  - something else (Please specify:)
- 10.) Did sightings of the aardvark increase, decrease or stay constant in the past ten years in your park? (Please mark with an 'x')
- decrease
  - stay constant
  - increase
  - x - cannot tell
- 11.) Did you ever observe an aardvark feeding on mice in your park? (Please mark with an 'x')
- yes
  - x - no
- 11a) If so, did the aardvark kill the mouse or was it just the carcass? (Please mark with an 'x')
- the aardvark killed the mouse
  - the mouse was already dead
  - cannot tell
- 12.) Did you ever observe an aardvark feeding on other animals than ants, termites and possibly mice in your park? (Please mark with an 'x')
- yes
  - x - no
- 12a) If so, what kind of animals? (Please indicate:)
- 12b) And: was it killed by the aardvark or was it a carcass? (Please mark with an 'x')
- killed by the aardvark
  - was already dead
  - cannot tell
- 13.) Did you ever observe an aardvark feeding on cucumber in your park? (Please mark with an 'x')
- yes
  - x - no
- 14.) Did you ever observe an aardvark feeding on fruit or roots in your park? (Please mark with an 'x')
- yes
  - x - no
- 14a) If so, what exactly? (Please specify:)
- 15.) Did you notice a preference regarding the digging into termite mounds? (Please mark with an 'x')
- (Explanation: It is said that aardvarks would preferentially feed from a certain direction and there even exist explanations therefore.)
- preferably from the north
  - preferably from the west
  - preferably from the east
  - preferably from the south
  - there seems to be no preference
  - x - cannot tell
- 16.) Did you ever observe an aardvark swim in your park? (Please mark with an 'x')
- yes
  - x - no
- 16a) If so, was there an obvious necessity for doing so? (Please specify:)
- 17.) What animals could you observe killing an aardvark in your park? (Please mark with an 'x' or — even better — by the number of times you observed it)
- lion
  - leopard
  - cheetah
  - wild dog
  - spotted hyena
  - python

- crocodile
  - any others (Please indicate:)
- 18.) When attacked, which reaction of the aardvark could you observe in your park? (Please mark with an 'x')
- it ran away
  - x - it dug itself in
  - it kicked
  - any other reaction (Please specify:)
- 19.) Did you ever observe anything special in your park concerning the aardvark? (Please specify:)
- 20.) Which folk originally lived in the area of the game park? (Please indicate: **bemba**)
- 20a) What language do they speak? (Please indicate: **chinyanja**)
  - 20b) How do they name the aardvark? (Please indicate: **mphendwa**)
  - 20c) Does the aardvark play a role in their mysticism? (Please specify: **no**)
  - 20d) Does (or did) the aardvark play any other role in their life? (Please specify: **no**)
- 21.) What is the official language of your country? (Please indicate: **english/chinyanja**)
- 21a) How do you name the aardvark? (Please indicate: **mphendwa**)
- 22.) Do you know any zoos keeping aardvarks? (Please indicate, if possible name including (email-)address:) **no**



# Appendix B

## Zoos Questionnaire

This appendix contains the questionnaire sent to zoos keeping aardvarks. The aims of the questions asked are explained in chapter 1.4. The answers contain a number of confidential information and therefore are not quoted here. The resulting findings, however, are discussed in the evaluation in chapter 9.2.

The zoos who participated in the survey are as follows:

- Zoo Frankfurt, Germany
- Zoologischer Garten Saarbrücken, Germany
- Ueno Zoological Gardens, Tokyo, Japan
- Nagoya Higashiyama Zoo, Japan
- Ogród Zoologiczny, Poznan, Poland
- Colchester Zoo, UK
- Montgomery Zoo, AL, USA
- Brookfield Zoo (Chicago Zoological Society), IL, USA
- Omaha's Henry Doorly Zoo, NE, USA
- Point Defiance Zoo & Aquarium, Tacoma, WA, USA

### B.1 Blank Form

- 1.) Name of zoo: (Please specify:)
  - 1a) Country: (Please indicate:)
- 2.) Your name: (Please indicate:)
  - 2a) Your position: (Please indicate:)
- 3.) How many aardvarks do you keep in your zoo at present (males, females, undetermined)? (Please specify:)
  - 3a) How many enclosures do they have? (Please specify:)
  - 3b) How large (how many square meters) are the enclosures? (Please specify:)
- 4.) How old is/was the oldest aardvark in your zoo?
  - 4a) age: (Please specify:)
  - 4b) date (at least year) of birth: (Please specify:)
  - 4c) if applicable date (at least year) of death: (Please specify:)

- 4d) name: (Please indicate:)
- 4e) sex: (Please specify:)
- 4f) where was it from (bred in your zoo, captured wild, ...): (Please specify:)
- 4g) ISIS-ID if existing: (Please indicate:)
- 4h) How old do aardvarks get in your zoo on average? (Please specify:)
- 5.) Did you have any breeding success in your zoo? (Please mark with an 'x')
- yes
  - no
- 5a) At which time of the year does the birth take (mostly) place? (Please mark with an 'x')
- April to September (summer in the northern hemisphere)
  - October to March (winter in the northern hemisphere)
  - no preference
  - cannot tell
- 5b) At which time of the day/night does the birth take (mostly) place? (Please mark with an 'x')
- during the day
  - during the night
  - no preference
  - cannot tell
- 5c) How many births have you had in the past ten years? (Please specify:)
- 5d) How many of them grew older than 30 days? (Please specify:)
- 5e) How many of them were hand-reared? (Please specify:)
- 6.) What diet (food & nutrients) do you feed the aardvarks in your zoo? (Please mark with an 'x')
- hash
    - beef
    - pork
  - eggs
  - oatmeal
  - milk
  - worms
  - ants
  - cucumber
  - fruit (which ones) (Please specify:)
  - formic acid
  - vitamin A
  - vitamin D
  - anything else (Please specify:)
- 6a) Do you sometimes feed them food scraps (as sometimes pigs are fed with)? (Please mark with an 'x')
- yes
  - no
- 7.) How do you feed the food? (Please mark with an 'x')
- in a fake termite-mound
  - in a bowl
  - in holes in the ground
  - in another way (Please specify:)
- (Explanation for the next two questions: It is said that aardvarks would preferably feed from a certain direction and there even exist explanations for this.)
- 7a) If a fake termite-mound is used, can they feed from any direction? (Please mark with an 'x')
- yes
  - no
- 7b) If a fake termite-mound is used, do they preferably feed from one side? (Please mark with an 'x')
- preferably from the north
  - preferably from the west
  - preferably from the east
  - preferably from the south
  - there seems to be no preference
  - cannot tell
- 8.) Did you ever observe aardvarks kill (and feed on) mice in your zoo? (Please mark with an 'x')
- yes
  - no
- 9.) What kind of diseases did you have to deal with regarding the aardvarks in your zoo? (Please indicate:)
- 10.) What are the main causes of death regarding the aardvarks in your zoo? (Please indicate:)

- 11.) Did you notice an annual period at the aardvarks in your zoo? (Please mark with an 'x')
- yes
  - no
- 11a) If yes, what exactly did you notice? (Please specify:)
- 11b) Do you have constant conditions during the whole year? (Please mark with an 'x')
- yes
  - no
- 11c) If no, what is not constant? (Please specify:)
- 12.) Do the aardvarks in your zoo have the possibility to swim? (Please mark with an 'x')
- yes
  - no
- 12a) Do they use it? (Please mark with an 'x')
- yes
  - no
  - cannot tell
- 12b) What seems to be the purpose? (Please mark with an 'x')
- cool down
  - get to another part of the enclosure
  - flight after trouble with conspecifics
  - any other reason (Please specify:)
  - cannot tell
- 13.) Are the aardvarks in your zoo a crowd puller or a rather unnoticed species? (Please mark with an 'x')
- crowd puller
  - no crowd puller but they are important to attract visitors
  - average importance
  - not unnoticed but a rather low importance
  - unnoticed species
  - cannot tell
- 14.) Are they socialised with other animals? (Please mark with an 'x')
- yes
  - no
- 14a) If yes, with which animals? (Please indicate:)
- 14b) If yes, have you observed any interactions between the species? (Please specify:)
- 15.) Did you notice interactions with other animals (e.g. from adjacent enclosures or dogs of visitors)? (Please specify:)
- 16.) Do you offer any behavioural enrichment to the aardvarks in your zoo? (Please mark with an 'x')
- yes
  - no
- 16a) If yes, what exactly do you do? (Please specify:)
- 17.) When are the aardvarks active?  
(Please mark with 1=always 2=almost always 3=mostly 4=rarely 5=almost never or 6=never)
- 17a) At which season?
- April to September (summer in the northern hemisphere)
  - October to March (winter in the northern hemisphere)
- 17b) At which moisture?
- dry
  - average
  - rainy
- 17c) At which temperature?
- cold
  - average
  - warm
- 17d) At which time?
- during the day
  - during the night
  - at day and night
  - can you give a time frame? (Please indicate:)
- 18.) Do you keep the aardvarks as individuals or in groups? (Please mark with an 'x')
- as individuals
  - in groups

- 18a) If in groups, how large are the groups? (Please indicate, including sexes:)
- 18b) If in groups, are there any social contacts within the group? (Please specify:)
- 18c) Are the breeding couples always kept together? (Please mark with an 'x')
- always together
  - separated after detected pregnancy
  - separated after birth of offspring
  - any other strategy (Please specify:)
- 19.) Did you ever observe anything special in your zoo concerning the aardvark? (Please specify:)
- 20.) Do you know any non-ISIS-zoos keeping aardvarks? (Please indicate, if possible name including (email-)address:)  
(These are the ISIS-zoos which keep aardvarks:
- Europe:
- Zoo of Antwerp, Belgium
  - Burger's Zoo En Safari, Arnhem, The Netherlands
  - Colchester Zoo, UK
  - Frankfurt Zoo, Germany
  - Suffolk Wildlife Park, UK
  - Zoological Garden Prague, Czech Republic
  - Randers Regnskov, Denmark
- USA:
- Brookfield Zoo (Chicago Zoological Park), IL
  - Lincoln Park Zoological Gardens, Chicago, IL
  - Cincinnati Zoo & Botanical Garden, OH
  - Detroit Zoological Institute, MI
  - Memphis Zoological Garden & Aquarium, TN
  - Minnesota Zoological Garden, Apple Valley, MN
  - Montgomery Zoo, AL
  - Omaha's Henry Doorly Zoo, NE
  - Philadelphia Zoological Garden, PA
  - Rolling Hills Zoo, Salina, KS
  - Point Defiance Zoo & Aquarium, Tacoma, WA
- Other regions:
- Ueno Zoological Gardens, Tokyo, Japan)



## B.2 Blank Form — German Translation

- 1.) Name des Zoos: (Bitte angeben:)
  - 1a) Land: (Bitte angeben:)
- 2.) Ihr Name: (Bitte angeben:)
  - 2a) Ihre Funktion/Stellung: (Bitte angeben:)
- 3.) Wie viele Erdferkel halten Sie derzeit in Ihrem Zoo (männliche, weibliche, unbestimmte)? (Bitte angeben:)
  - 3a) In wie vielen Gehegen sind sie untergebracht? (Bitte angeben:)
  - 3b) Wie groß (wie viele Quadratmeter) sind die Gehege? (Bitte angeben:)
- 4.) Wie alt ist bzw. war das älteste Erdferkel in ihrem Zoo?
  - 4a) Alter: (Bitte angeben:)
  - 4b) Geburtsdatum (zumindest Geburtsjahr): (Bitte angeben:)
  - 4c) Ggf. Todesdatum (zumindest Todesjahr): (Bitte angeben:)
  - 4d) Name: (Bitte angeben:)
  - 4e) Geschlecht: (Bitte angeben:)
  - 4f) Woher kam es (Nachzucht des eigenen Zoos, Wildfang, ...): (Bitte angeben:)
  - 4g) Ggf. ISIS-ID: (Bitte angeben:)
  - 4h) Wie alt werden Erdferkel im Schnitt in ihrem Zoo? (Bitte angeben:)
- 5.) Haben Sie Zuchterfolge in Ihrem Zoo? (Bitte mit einem 'x' markieren)
  - ja
  - nein
  - 5a) Zu welcher Jahreszeit finden die Geburten (meistens) statt? (Bitte mit einem 'x' markieren)
    - April bis September (Sommer auf der Nordhalbkugel)
    - Oktober bis März (Winter auf der Nordhalbkugel)
    - keine bevorzugte Jahreszeit
    - unbekannt
  - 5b) Zu welcher Tages- bzw. Nachtzeit finden die Geburten meistens statt? (Bitte mit 'x' markieren)
    - während des Tages
    - während der Nacht
    - keine bevorzugte Zeit
    - unbekannt
  - 5c) Wie viele Geburten hatten Sie in den letzten zehn Jahren? (Bitte angeben:)
  - 5d) Wie viele von ihnen wurden älter als 30 Tage? (Bitte angeben:)
  - 5e) Wie viele von ihnen waren Handaufzuchten? (Bitte angeben:)
- 6.) Welches Futter (Nahrungsmittel und Nahrungsergänzungsmittel) erhalten die Erdferkel in Ihrem Zoo? (Bitte mit einem 'x' markieren)
  - Hackfleisch
    - Rind
    - Schwein
  - Eier
  - Haferflocken
  - Milch
  - Würmer
  - Ameisen
  - Gurken
  - Früchte (welche?) (Bitte angeben:)
  - Ameisensäure
  - Vitamin A
  - Vitamin D
  - etwas anderes (Bitte angeben:)
  - 6a) Füttern Sie ihnen manchmal Speisereste (wie man das bei Schweinen manchmal tut)? (Bitte mit einem 'x' markieren)
    - ja
    - nein
- 7.) Wie füttern Sie die Nahrung? (Bitte mit einem 'x' markieren)
  - in einem nachgemachten Termitenhügel
  - in einer Schüssel
  - in Löchern im Boden
  - auf eine andere Art (Bitte angeben:)
 (Erklärung für die beiden folgenden Fragen: Es wird oft behauptet, dass Erdferkel zum Fressen

vorzugsweise aus einer bestimmten Himmelsrichtung in die Termitenhügel eingraben würden und es gibt sogar Erklärungsversuche hierfür.)

7a) Falls Sie einen nachgemachten Termitenhügel verwenden, können die Erdferkel aus jeder Richtung daran fressen? (Bitte mit einem 'x' markieren)

- ja
- nein

7b) Falls Sie einen nachgemachten Termitenhügel verwenden, fressen die Erdferkel bevorzugt aus einer bestimmten Richtung? (Bitte mit einem 'x' markieren)

- vorzugsweise von Norden
- vorzugsweise von Westen
- vorzugsweise von Osten
- vorzugsweise von Süden
- es scheint keine bevorzugte Richtung zu geben
- unbekannt

8.) Haben Sie in Ihrem Zoo je beobachtet, dass ein Erdferkel eine Maus getötet (und gefressen) hat? (Bitte mit einem 'x' markieren)

- ja
- nein

9.) Welche Krankheiten kamen bei den Erdferkeln in Ihrem Zoo vor? (Bitte angeben:)

10.) Was sind die häufigsten Todesursachen der Erdferkel in Ihrem Zoo? (Bitte angeben:)

11.) Haben Sie eine Jahresperiodik bei den Erdferkeln in Ihrem Zoo beobachten können? (Bitte mit einem 'x' markieren)

- ja
- nein

11a) Falls ja, was genau haben Sie beobachtet? (Bitte angeben:)

11b) Haben Sie konstante Bedingungen während des gesamten Jahres? (Bitte mit 'x' markieren)

- ja
- nein

11c) Falls nein, was ist nicht konstant? (Bitte angeben:)

12.) Haben die Erdferkel in Ihrem Zoo die Möglichkeit zu schwimmen? (Bitte mit einem 'x' markieren)

- ja
- nein

12a) Nutzen sie diese Möglichkeit? (Bitte mit einem 'x' markieren)

- ja
- nein
- unbekannt

12b) Was scheint der Grund zu sein? (Bitte mit einem 'x' markieren)

- Abkühlung
- um zu einem anderen Teil des Geheges zu gelangen
- Flucht nach Konflikt mit Artgenossen
- ein anderer Grund (Bitte angeben:)
- unbekannt

13.) Wie beliebt sind die Erdferkel in Ihrem Zoo? (Bitte mit einem 'x' markieren)

- Publikumsmagneten
- kein Publikumsmagnet, jedoch eine eher beliebte Art
- durchschnittliche Bedeutung
- nicht bedeutend, jedoch auch nicht unbeachtet
- unbeachtete Art
- unbekannt

14.) Sind die Erdferkel mit anderen Tieren vergesellschaftet? (Bitte mit einem 'x' markieren)

- ja
- nein

14a) Falls ja, mit welchen Tieren? (Bitte angeben:)

14b) Falls ja, haben Sie Interaktionen zwischen den Arten beobachtet? (Bitte angeben:)

15.) Haben Sie Interaktionen mit anderen Tieren beobachtet (beispielsweise Tiere von angrenzenden Gehegen oder Hunde der Zoobesucher)? (Bitte angeben:)

16.) Haben Sie ein Beschäftigungsprogramm (behavioural enrichment) für die Erdferkel in Ihrem Zoo? (Bitte mit einem 'x' markieren)

- ja

– nein

16a) Falls ja, wie genau sieht das Beschäftigungsprogramm aus? (Bitte angeben:)

17.) Wann sind die Erdferkel aktiv?

(Bitte mit 1=immer 2=fast immer 3=meistens 4=selten 5=fast nie oder 6=niemals markieren)

17a) Zu welcher Jahreszeit?

- April bis September (Sommer auf der Nordhalbkugel)
- Oktober bis März (Winter auf der Nordhalbkugel)

17b) Bei welcher Feuchtigkeit?

- trocken
- durchschnittlich
- regnerisch

17c) Bei welcher Temperatur?

- kalt
- durchschnittlich
- warm

17d) Zu welcher Tages- bzw. Nachtzeit?

- während des Tages
- während der Nacht
- während Tag und Nacht
- Können Sie einen Zeitrahmen nennen? (Bitte angeben:)

18.) Halten Sie die Erdferkel alleine oder in Gruppen? (Bitte mit einem ‘x’ markieren)

- alleine
- in Gruppen

18a) Falls in Gruppen, wie groß sind die Gruppen? (Bitte angeben, inklusive Geschlechtern:)

18b) Falls in Gruppen, gibt es soziale Kontakte innerhalb der Gruppen? (Bitte angeben:)

18c) Werden die Zuchtpaare immer zusammen gehalten? (Bitte mit einem ‘x’ markieren)

- immer zusammen
- Trennung nach Feststellung einer Schwangerschaft
- Trennung nach der Geburt des Nachwuchses
- eine andere Strategie (Bitte angeben:)

19.) Haben Sie je eine besondere Beobachtung bei den Erdferkeln in Ihrem Zoo gemacht? (Bitte angeben:)

20.) Kennen Sie Nicht-ISIS-Zoos, die Erdferkel halten? (Bitte angeben, falls möglich mit (email-)Adresse:)

(Dies sind die ISIS-Zoos, die Erdferkel halten:

Europa:

- Zoo of Antwerp, Belgien
- Burger’s Zoo En Safari, Arnhem, Niederlande
- Colchester Zoo, UK
- Frankfurt Zoo, Deutschland
- Suffolk Wildlife Park, UK
- Zoological Garden Prague, Tschechische Republik
- Randers Regnskov, Dänemark

USA:

- Brookfield Zoo (Chicago Zoological Park), IL
- Lincoln Park Zoological Gardens, Chicago, IL
- Cincinnati Zoo & Botanical Garden, OH
- Detroit Zoological Institute, MI
- Memphis Zoological Garden & Aquarium, TN
- Minnesota Zoological Garden, Apple Valley, MN
- Montgomery Zoo, AL
- Omaha’s Henry Doorly Zoo, NE
- Philadelphia Zoological Garden, PA
- Rolling Hills Zoo, Salina, KS
- Point Defiance Zoo & Aquarium, Tacoma, WA

Andere Regionen:

- Ueno Zoological Gardens, Tokyo, Japan)



# Abbreviations

<b>approx.</b>	<b>approximately</b>
<b>asl</b>	<b>above sea level</b>
<b>AZA</b>	<b>American Zoo and Aquarium Association</b>
<b>bzw.</b>	<b>respectively (German: beziehungsweise)</b>
<b>cf.</b>	<b>confer</b>
<b>Co.</b>	<b>company</b>
<b>e.g.</b>	<b>for instance (Latin: exempli gratia)</b>
<b>ggf.</b>	<b>if applicable (German: gegebenenfalls)</b>
<b>h.c.</b>	<b>honorary (Latin: honoris causa)</b>
<b>i.e.</b>	<b>that is (Latin: id est)</b>
<b>ID</b>	<b>identification</b>
<b>ISIS</b>	<b>International Species Information System</b>
<b>IUCN</b>	<b>International Union for the Conservation of Nature and Natural Resources</b>
<b>Ltd</b>	<b>limited</b>
<b>Myr</b>	<b>million years</b>
<b>n/a</b>	<b>not applicable</b>
<b>Pty</b>	<b>proprietary</b>
<b>ras</b>	<b>nothing to report (French: rien à signaler)</b>
<b>re</b>	<b>regarding (Latin: re)</b>
<b>SVP</b>	<b>please (French: s'il vous plaît)</b>
<b>unk</b>	<b>unknown</b>
<b>v.</b>	<b>very</b>



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## Acknowledgements

Finally I want to thank everybody who made this thesis possible. My greatest thanks go to PROF. DR. DR. H.C. VOLKER STORCH and PROF. DR. THOMAS BRAUNBECK who accepted the topic of this work and supported me to write it by means of positive and constructive criticism. I am more than glad that they enabled my writing the thesis on this interesting mammal.

Additional thanks go to my employer WITTENSTEIN motion control GmbH who approved my part-time working for the first months, something which was necessary in order to make the thesis possible.

Furthermore I want to thank DIPL.-BIOL. SANDRA REICHLER for advice with respect to questions of keeping and zoos in general. I also want to thank DR. ULRIKE ASCHERMANN-HENGER who kindly revised my thesis linguistically with exceptional effort. JACQUELINE BECK-BONHOMME and CAROLINE BECK translated my game parks questionnaire into French what I am grateful for. Another linguistic help was provided by LEO ([77]). The professional layout was made possible by L<sup>A</sup>T<sub>E</sub>X([71]).

I am very proud I got a great many people enthusiastic about my thesis on the aardvark. I received a lot of valuable information from people who know the aardvark from their daily work. Employees in game parks and wildlife departments all over Africa were very helpful and I am thankful for receiving such a positive response. I want to name in person — without titles — from Chad: SANDA BAKARI. From Ghana: JOSHUA AWUKU-APAW. From Liberia: BEN TURTUR DONNIE. From Malawi: DARREN M. BRUES-SOW and DAVID FOOT. From Mali: UTE BÖTTCHER. From Morocco: MOHAMED RIBI and HEIDI BELOUD. From South Africa: BENETA BESTER, JUSTIN BUCHMANN, KAREN CHAPPÉ, STEFAN CILLIERS, ROY ERNSTZEN, ROLAND JANUARIE, PEET JOUBERT, JOHAN DE KLERK, MANDY LENNITCH, PATRICK LOWRY, LEGARI MAMOGALE ‘ABBEY’, D G A MELTZER, TULANI ALFRED MLATSHENI, LUCIUS MOOLMAN, ANDRIES NEL, PHANUEL NKUNA, MOREKU VAN ROOI, ALBERT SMITH, STEVEN SMITH and JOHAN TALJAARD. From Swaziland: RAY GAMA. From Tanzania: SELEMANI KIU-RE. From Zambia: ABRAHAM BANDA, BARRY, CHRISTINA CARR, SIMON COUSINS, GRANT CUMINGS, FRITS ELOFF, MAURO GUARDIGLI, PATSY HAHN, GARTH HOVELL, PENNY JOHNSON, TAMMY MILLER, SUSAN POTIEK, JESSICA SALMON, GODFREY SHAWA, WILLIE SHUMA, MARK SPRONG, ROD TETHER, JACKY VLACHOS and YOUSUF ZUMLA.

I also received support from zoos. For their useful information I personally want to thank — again without titles — M. BRAUNE, EMILY BRICKELL, VACLAV CESKA, KOICHI CHAYA, CAROLYN COX, RÜDIGER DMOCH, DIANE GIERHAHN, TERRY HORNSEY, TAKAHISA HOSODA, KAZUYOSHI ITOH, HEINER KLÖS, LARRY KVAMME, KEN NAUGHER, MANDI OLSEN, J. M. SPENCE, MIKKEL STELVIG, EWA TRZÊSOWSKA and PIERRE DE WIT.

Ambassadors, honorary consuls and other employees of diplomatic institutions were quite supporting. They helped me with great commitment to make contacts. I personally thank — without mentioning titles — for Egypt: MAREN LAUK. For Guinea: GUNTER DEWALD. For Malawi: KLAUS KAFTAN. For Mali: GEORG SCHMIDT. For Morocco: HERMANN FICKINGER. For South Africa: PIETER PRETORIUS. For Swaziland: VOLKER STOLTZ. For Tanzania: MR. ANGOVI. For Togo: HELMUT FOHS. For Zambia: PETER CHANDA.

I also want to express my gratitude to all the people who supported me in any other way. I want to explicitly mention NOLINE ACKERMANN, TERRY HARNWELL, GERTRUD JAUSS, MICHAEL KNÖTHIG, N. NKAMBULE, L. M. NSIBANDE, JOHANN SCHNEPPELT, ZAC TCHOUNDJEU, the pupils of the primary school in Unterbalbach and the pupils of the 6th grade of the secondary modern school '*Turmbergschule*' in Königshofen.

With handing in this thesis the corresponding file will be sent out to all the people mentioned above as well as to some others. This acts as a token of my thanks on one hand and as a means of spreading my thesis amongst a broad mass of interested people on the other hand. Moreover I explicitly state that it is allowed and even desired to forward my thesis or to load it into the Web. This shall ensure the distribution of my work.

This is the first encyclopaedic description of the biology of the aardvark and I want to make it available to as many people interested as possible. So finally let me thank everyone who helps to spread this thesis.

# Abstract

The thesis at hand represents the first encyclopaedic description of the biology of the aardvark (*Orycteropus afer*). This extraordinary mammal resembles no other animal on earth. The aardvark is the only recent representative of the order *Tubulidentata* and represents the last survivor of the primeval hoofed animals (*Protungulata*) and thus is rightly called a 'living fossil'. Numerous books, articles and internet pages have been researched and the most important information on the aardvark has been condensed into this work. In addition to the literature research a survey was run. African game parks and zoos keeping the aardvark were successfully asked in order to obtain some new findings on open questions concerning the aardvark. This work has to be understood as a means to learn about the different aspects of the aardvark's biology. It presents them in a way that gives a complete overview but nevertheless goes into detail deep enough to understand what is behind.

## DIE BIOLOGIE DES ERDFERKELS (ORYCTEROPUS AFER) **Zusammenfassung**

Die vorliegende Arbeit stellt die erste umfassende Beschreibung der Biologie des Erdferkels (*Orycteropus afer*) dar. Dieses sehr eigentümliche Säugetier ähnelt keinem anderen Tier. Das Erdferkel ist der einzige rezente Vertreter der Ordnung *Tubulidentata* und stellt den letzten Überlebenden der Urhuftiere (*Protungulata*) dar. Daher wird es zurecht als 'lebendes Fossil' bezeichnet. Eine Reihe Bücher, Artikel und Internetseiten wurden durchforscht und die wichtigsten Informationen über das Erdferkel wurden in dieser Arbeit zusammengefasst. Über die Literatur-Recherche hinaus wurde auch eine Umfrage gestartet. Neue Erkenntnisse konnten dadurch gewonnen werden, dass offene Fragen bezüglich der Erdferkel erfolgreich Nationalparks in Afrika und Zoos, die Erdferkel halten, gestellt wurden. Diese Arbeit soll als Mittel angesehen werden, die unterschiedlichen Aspekte der Biologie des Erdferkels zu verstehen. Sie werden auf eine Weise dargestellt, die sowohl einen kompletten Überblick verschafft als auch weit genug für tieferes Verständnis ins Detail geht.

