

Report from the survey of Ader's Duikers on Chumbe Island, 5-6th June 2009



**CHUMBE ISLAND
CORAL PARK**
Zanzibar Tanzania

Introduction

The Ader's duiker (*Cephalophus adersi*) ranks as one of the most threatened antelope species in the world (Finnie 2001), and the last remaining population is thought to reside in Zanzibar. A survey carried out on Zanzibar in 1999 suggested that there were less than 500 individuals remaining of the Ader's duiker species. However, some sources report that there are two small populations still existing in Kenya on the East African mainland: one at Arabuko-Sokoke, and the other in Boni-Dodori near the Somali border, where the animals were trapped by a monitoring camera (Ian Gordon, personal communication, 2008).

While the Ader's duiker is fully protected by Zanzibari law, their numbers still continue to decline due to pressure from habitat loss and illegal hunting. The Department of Forestry under the Ministry of Agriculture, Livestock and the Environment, Zanzibar is now working on a long-term survival strategy (Lanshammar, 2007 a).

In order to improve the future for this threatened species a small breeding population was introduced to the fully protected forest reserve on Chumbe Island. A total of 6 Ader's Duikers were translocated from the Mtende Region to Chumbe Island – in December 1998 one female, in February 2000, three males and two females (MacPherson et al., 2002). This translocation was supervised by Prof. Henning Wiesner, the Director of Zoo Munich-Hellbrunn. Initially, a monitoring system with both cameras and ear tags was established, but since 2002 this system has not been in function and the only ongoing monitoring has been direct observations of non-tagged animals (Daniels, 2004). The numbers of sightings have been more frequent in the last 2-3 years and even juveniles have been observed on two occasions. An increase in population size would be a good indicator for a healthy population so it is important to find a better monitoring system for the closed eco-system on the island (Lanshammar, 2007 a).

In order to estimate the population size a so called "drive" was carried out in September 2007. This method is considered a good and reliable way to estimate population size of the Ader's Duikers on Chumbe Island and it was planned and carried out together with experts from both Zanzibar and Europe. The event was planned well in advance and a group of five very experienced trackers from the central parts of Zanzibar were invited to Chumbe Island along with an expert from the Department of Forestry, Mr. Ali Mwinyi (many of the invited people had been involved in the initial translocation and in previous monitoring activities).

The method for this kind of “drive” is as follows; a number of people sit quietly in a line across the island, in the middle of the island – where it is about 100-150 meters wide. Meanwhile, a number of people walk in a line through the forest making noise (arranged across the island, from one end of the island to the other) in order to drive the animals in front of them. Eventually the animals “driven” in front of the walkers will run through the line of people sitting – all duikers passing the line would then be counted by the “sitters”. All sitters were to sit facing the west side of the island and only count the animals that passed in front of them (in order to minimize the risk of any animal being counted more than once and to minimize the risk of being blinded by the rising sun in the east). During the drive in 2007 twelve persons were assigned as sitters and nine as walker. The experienced trackers were divided among the two groups. The drive concluded that the population of Ader’s Duikers on Chumbe Island consisted of at least 6 animals (Lanshammar, 2007 b).

In addition to the drive, a monitoring system based on random animal sightings as well as monitoring cameras is in use. Random sightings have been recorded by head ranger Omari Nyange since August 2005 including data such as time of the observation, area (part of the island) and the number of animals (Lanshammar, 2009). In 2008 this

monitoring system was complemented by a digital monitoring system including motion and temperature-sensitive monitoring cameras. These cameras were funded by Zoo Munich-Hellbrunn and the ambition of the cameras was to establish a basis from which different individuals can be identified and distinguished. From that information the population size and the general health of the population can be estimated (Lanshammar, 2008). Unfortunately the cameras have failed to give us this detailed



Mr. Ali Mwinyi and head ranger Omari Nyange getting ready for the drive

information, due to difficulties in identification of individuals, so on and a half year after the last drive across the island it was decided that it was time to carry out this operation once again. To get a new estimation of the population size and its health, a group of six experienced trackers including Mr. Ali A. Mwinyi from the Department of Forestry, Pandu Ame Vuaa (Jambiani), Ame Ali (Jambiani) Hassan Makame-Beka (Jambiani), Mussa Kheri (Jambiani), Suleiman Mussa Jecha-Gwae (Kibuteni) were invited along with six volunteers to assist the Chumbe rangers carry out a duiker drive on the 6th of June 2009.

Method

The same method as described above, with some minor modifications based on experience from the last drive (Lanshammar, 2007 b). The six experienced trackers were assigned as sitters, as they are trained to spot animals even in a dense forest. The number of sitters was also reduced to avoid a too dense line of people that would hinder the animals to pass through. Twelve persons, a mix of Chumbe staff and volunteers, were assigned to be walkers. The sitters were in their position on the middle of the island at 8:30 am and the walkers started to walk from the southern tip of the island at 8:45 am and drove all animals in front of them towards the sitters in middle of the island. When the walkers reached the line of sitters they left the forest and walked, by the beach, to the northern tip of the island. At this point, all animals that exist on Chumbe should be somewhere in the northern region of the island. To get the final count, the walkers therefore resumed the noisy walk from the northern tip, heading towards the sitters. It was assumed that the counted number of animals would be higher the second time since then all the animals would be included. This is also the reason behind placing the trackers in the middle of the island and not in one of the ends. The whole drive was finished by 11:40 and in total took around 3 hours.

List of participants in the “drive” (in this order from west to east):

Sitters: 1. Mussa Jecho, 2. Ameir Ali, 3. Ali Mwinyi, 4. Pandu Ameir Vuua, 5. Mussa, 6. Pandu Ameir.

Walkers from north to south: 1. Omari Nyange, 2. Makame, 3. Juma Salum, 4. Khamis Khalfan, 5. Ali (Police), 6. Shaabani Pande, 7. Jo Fox, 8. Rob Higham, 9. Will, 10. Hisdory, 11. Matt, 12. Josefine Larsson.

Walkers from south to north: 1. Omari Nyange, 2. Makame, 3. Juma Salum, 4. Khamis Khalfan, 5. Ali (Police), 6. Juma (Police), 7. Jo Fox, 8. Rob Higham, 9. Will, 10. Hisdory, 11. Matt, 12. Josefine Larsson

Results

Four animals were spotted by the sitters, two on the drive from the south and four driven from the north to the south. On the first drive, walking from south to north, one animal passed between sitters number two and three and one between number



The participants of the Duiker drive on Chumbe Island in June 2009

four and five. On the second drive, from north to south, one animal passed by sitter number six and one between sitters number four and five and two animals turned around in front of sitters number one and two (Figure 1 and 2). Two of these animals are expected to be the same two that were driven from the south and the other two were expected to origin from the north part of the island, therefore a total of four animals. The two animals that turned around, close to the line of sitters, were expected to stay and hide in the northern part on the island, not running through the line at a later point, hence were counted as two separate individuals, included in the population of four (Mwyini 2009 pers. comm.). Two of the animals were identified as males, through observation of testicles; the other two were not identified.



Figure 1. The first drive (walkers from south to north): Sitter (circle) is numbered from east to west. One duiker (arrow) passed between sitters number 2 and 3 and another between sitters 4 and 5.

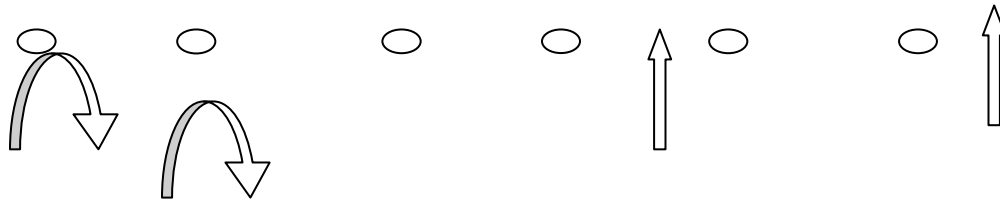


Figure 2. The second drive (walkers from north to south): Sitters (circle) are numbered from east to west. One duiker (arrow) passed between sitters (circle) number 4 and 5 and another outside sitter number 6. Two duikers ran toward sitters' number 1 and 2 but turned around.

Discussion and recommendations

Drive

Despite the improvements to the method, we still faced some problems and more adjustments are needed to achieve the “perfect drive”. As parts of the forest are very dense and difficult to pass, the line of walkers is not completely tight all the time, whereas the Duikers could pass through these gaps. To avoid any individuals escaping, the number of walkers should be increased to at least 17 people but preferably between 20 to 30 persons in order to keep a tight line. To maintain an organised straight line, it is important that the walkers keep their position. This can be controlled by checking that one always have the same persons on ones left and right side throughout the whole drive, therefore a constant communication between the walkers is crucial. The persons walking on the edge of the line (close to the edge of the island) should communicate to stretch or tighten the line as the island goes wider or narrower. Another suggestion is to have one

extra person that walks behind and across the line to help the walkers communicate and to control the line. At least one or two compasses within the group would be useful to maintain direction in an environment which can become disorientating. It would also be very useful if the walkers had some experience of the forest and the method, hence it would be a good idea to invite the same people to the next drive. The set up with only six very experienced trackers as sitters was successful and should be kept that way.

Population

The estimated population size can be considered fairly low which can be due to a number of factors:

- Not counting the whole population due to flaws in the methods used, as discussed above
- Habituation - the duikers are getting used to people so it may be that they hide instead of run away
- Breeding related problems do to inbreeding or skewed sex distribution.

It is very important to find out if and why the population is not growing. We know from sightings of juveniles that the Chumbe population has successfully bred in the past (Nyange 2009, pers. comm.). However, the animals observed this time included adults only, which might indicate a slowdown in regeneration, something that can be attributed to a number of reasons. Duikers in large populations either live in pairs or groups of one male with three females. The males are very competitive over the females and the male to male mating battles can cause severe injuries to the males, which can reduce their life span and reproductive success. The female Duiker gives birth, maximum, once a year and only one offspring at a time (Mwniyi, 2009, pers. comm.). With this as a background, our observed pattern of two identified males out of four individuals might be one possible reason for a non- or slow growing population on Chumbe. As the two other individuals where not identified, we can only hope that at least one them was a female which still is too few females to make the population grow. This population is of high importance because, if managed successfully, it would act as a gene bank for this highly endangered species. Therefore, based on the information we have now, another translocation of a female should be considered. However, translocations causes a lot of stress to the translocated animals as well as to the existing population (Mwyini, 2009, pers. comm.) so additional research and planning would have to be made before any action can be taken. An excellent way to get more information about this issue is to conduct DNA analysis using DNA from the faeces. This kind of analysis will give us information about the number of individuals, the sex distribution and the genetic status of the population, such as inbreeding.

In conclusion the drive was successful and we have managed to improve the method even though further improvements are preferred. Since this activity may cause a lot of stress to the animals (which are very sensitive to stress) one should weigh up the usefulness of the information we might achieve against the stress imposed on the animals before conducting yet another drive, and a time span of at least 6 months can be recommended.

Acknowledgment

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