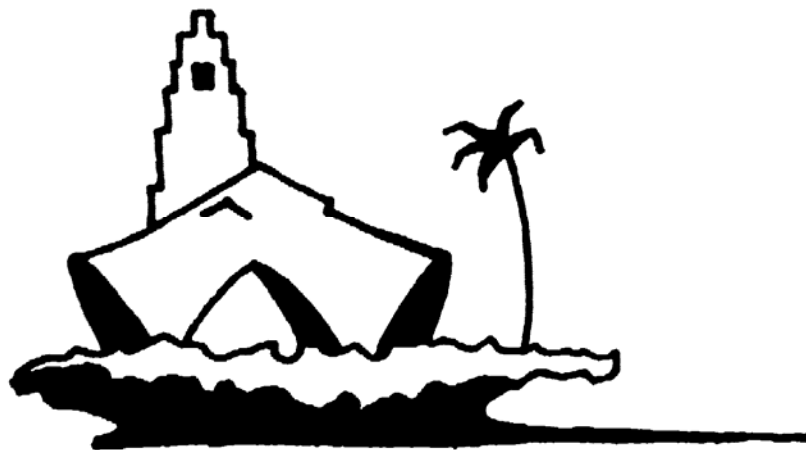


# TERRESTRIAL SCIENCE UPDATE



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# TERRESTRIAL SCIENCE REPORT

Update report for DCCFF

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## Ader's duiker progress and update

### 1. Overview of Ader's duiker surveys and results

Chumbe Island Coral Park (CHICOP) staff have continued to monitor six translocated Ader's duikers (*Cephalophus adersi*) since 1998. The first individual (one female) was translocated in December 1998 in a collaborative project between the Department for Commercial Crops, Fruits and Forestry (DCCFF) and CHICOP. Due to her successful inhabitation of the coral rag forest on Chumbe Island, three males and two females were translocated in February 2000 from Unguja to Chumbe Island (Mwinyi 2000) (see Table 1).

**Table 1: Tag identification of translocated Aders' duiker individuals to Chumbe**

	Male (M) / Female (F)	Date of translocation	Ear tag colour	Tagged ear (left / right)	Breeding condition at the time of translocation
A	F	Dec 1998	None	N/A	Adult
B	M	15 Feb 2000	Yellow	Right	Adult
C	F	15 Feb 2000	None	N/A	Pregnant (possible mate of B)
D	M	17 Feb 2000	Purple	Right	Adult
E	M	21 Feb 2000	Orange	Right	Adult
F	F	22 Feb 2000	White	Left	Adult

Monitoring has been mainly through remote heat- and infra-red sensitive cameras, which were set up in February 2001<sup>1</sup>. Unfortunately due to wear and tear, and what appears to be the increasing non-territoriality of Ader's duikers, the cameras are no longer in use. The cameras were continually mounted in Chumbe's forest for approximately 2.5 years, except for their removal between March and June 2002 and 2003 to prevent damage during the annual heavy rains (April – June).

In addition to remote camera sensing, it was found necessary to survey the island by minimal impact tracking techniques. Such surveys were conducted in August and December 2003 with the assistance of Ali Mwinyi at DCCFF, trackers and members of village conservation committees from Mtende and Kibuteni, south-east Unguja, and CHICOP staff (see Daniels *et al* 2004).

In summary, the photographic evidence accumulated by September 2002 revealed that at least three Aders' duikers were surviving out of the six originally translocated (MacPherson *et. al.* 2002); thought to be two males (left yellow ear tag and right purple ear tag) and one female (no ear tags) (see Figure 1).

Since September 2002, no more Camtrakker photos were developed that gave evidence for Ader's duikers within Chumbe's forest. There was a problem with the speed at which one camera reacted to heat and infra-red sensing. Therefore, the lack of photos may be due to problems with the cameras but also the fact that only three were placed in the 1.3km x 300m area of forest. However, it is likely to also be due to the Ader's duikers no longer behaving in such a territorial manner as seemed evident

<sup>1</sup> Camtrakker equipment and technical training were sourced and provided by Mr Don and Mrs Jenny MacPherson, Wildlife biologists from the Mammal Ecology Research Group (MERG), Royal Holloway; University of London.

from their first year on Chumbe. Such behaviour has been 'expected' from their previous behaviour on Unguja (trackers, *pers. comm.*) but as there has been so little research conducted on Ader's duiker behaviour and ecology it is difficult to know under what circumstances they are territorial. The decline of territorial behaviour may be a positive sign; indicating wider movement within the forest due to a lack of competition for space and food or the need to 'guard' a certain area.

**Figure 1: Examples of Aders' duiker photographs taken by the camtrakkers showing an individual with a yellow, left ear tag and one with a right, purple tag**



Results of territory surveys conducted by Omari Nyange and two trackers / hunters in August 2003 can be summarised as follows: -

- A total of three individuals were observed in comparison to six observed in 2001, soon after their translocation
- Main territory signs were scent marks on the trees, of which there were fewer than in 2001: 13 marks in 2001 and 9 in 2003
- Only two piles of recent faecal pellets were found. Others were observed, between one week and one month old
- Signs showed that the individuals were moving around within the forest, i.e. seemingly not remaining in certain territories

In December 2003, a team of 3 - 5 people sat quietly across the forest (about midway in a north-south direction) whilst about 3 – 4 trackers and / or CHICOP rangers drove the duikers towards them. The same was repeated in the other half (south) of the forest just after the north section was completed. The overall summary of these surveys, which were undertaken over a 4-day period, was that the following individuals were living successfully within the forest rag habitat on Chumbe Island:-

- 1 juvenile (unknown sex)
- 2 subadults (1 male, 1 unknown sex)
- 3 adults (1 female, 1 male, 1 unknown sex)

However, the trackers that assisted with these surveys believe that three Aders' duikers remain on Chumbe, and that these are from a new generation that has been born on Chumbe since the translocation of individuals in Feb 2000. The main discretion is that none of the observed Ader's duikers in December 2003 had ear tags. This would either imply that the tags had been lost (which is very unlikely as they are used for cattle and usually last for many years) or that the sighted individuals were infact from a new generation, as the trackers thought.

Results of territory surveys conducted by Omari Nyange with the trackers and hunters in December 2003 are as follows. Only three new scent marks were observed. However, it should be noted that time spent on this type of survey was limited during December 2003 as the priority was given to surveys that hoped to result in physical sightings of living individuals: -

The report, Daniels *et al* 2004, was sent to DCCFF in February 2004. It is also available from CHICOP. This gives a more complete analysis of the results from August and December 2003.

## **2. Summary of future monitoring for Ader's duikers on Chumbe**

The Camtrakkers are no longer in use within Chumbe's forest as they were not producing any results and are in need of repairs. Due to the lack of ear tags observed, the Camtrakkers would also not be useful as their purpose is to identify individuals. Without tags, photos would not distinguish between different duikers and CHICOP would not know whether the same duiker was being photographed, or if it was different individuals.

In order for future monitoring of the Ader's duikers on Chumbe, the first key is to find a method that can be used to identify individual Ader's duikers. This problem is being currently considered by both CHICOP and Don and Jenny MacPherson. It is hoped that a solution will be forthcoming in the near future. In the meantime, there has been an offer for Chumbe to borrow a number of camera traps (dependant on external funding). This would mean that the forest could literally be flooded with camera traps for a few months in the hope that the duikers will be photographed and CHICOP will have a better understanding of the current population. However, once again this is dependent on finding a way to tag the duikers, whether permanently or temporarily.

From the previous surveys, all duikers observed on Chumbe appeared in good health. The exact numbers are not known but it is hoped that a period without monitoring may be of benefit for the duikers. This means that they will not be disturbed for a significant period of time because the cameras will not need to be checked, films changed etc.

### **3. Additional surveys relevant to Ader's duikers**

#### ***Python***

Originally, in the early 1990's, a python inhabited Chumbe Island. Although this was mistakenly killed by the rangers (who were much less trained and environmentally aware in those days), another python of a similar size was brought over to Chumbe to maintain the natural ecosystem that was in place before CHICOP began. The rangers had learnt from the first instance not to kill this python but it was not seen again after a few years.

Considering that the surveys described above indicate that the number of Ader's duikers on Chumbe have declined, CHICOP decided to eliminate all possibilities for this. The first survey was to find out whether the python was still present on the island. Ali Mwinyi and Shabani Imani (respectively employed by DCCFF and Jozani Forest) came to Chumbe between 3rd and 5th July 2004 to conduct a python survey of the entire forest. The results were negative, with neither evidence or sighting of a python.

This was the result that CHICOP had expected as Omari frequently visits the forest to check various ecological aspects and has not seen any sign of a python since the translocation of the duikers was first proposed. However, it was good news to have official confirmation of the python status.

#### ***Vegetation***

Suitable vegetation for the Ader's duiker's diet was obviously a great consideration before their translocation to Chumbe. An extensive and comprehensive survey was conducted by Dr David Aplin to assess appropriate vegetation species and distribution on Chumbe in February 1998 (Aplin 1998). As a result of his survey (and in retrospect, after the successful survival of the first translocated Ader's duiker later the same year), it was agreed that there was a suitable number and abundance of food plant species to sustain a small population of duikers on Chumbe.

It is possible that the dry weather seasonally reduces the abundance of plants available for the Ader's duikers on Chumbe. In light of this, and considering that the vegetation survey was conducted over five years ago, CHICOP requested that Dr David Aplin return and complete another survey using the same technique as before. Dr Aplin has agreed to this and will also train CHICOP rangers in the survey techniques and species identification so that they can continue this as a monitoring exercise in the future.

Dr Aplin was due to come to Chumbe in November 2004 but due to unforeseen circumstances at his workplace in Europe, had to postpone. CHICOP will keep

DCCFF informed as to when Dr Aplin will come to survey the vegetation on Chumbe once again.

#### 4. References available

Aplin, D (1998) The report of the botanical survey of food plants of the Ader's duiker (*Cephalophus adersi*) for its proposed reintroduction on Chumbe Island Nature Reserve, Zanzibar, East Africa. Funded by World Wide Fund for Nature. February 1998

Daniels, C; Mwinyi, A & Nyange, O (2004) Monitoring of translocated Ader's duiker (*Cephalophus adersi*) on Chumbe Island, Zanzibar, and their longterm future. Paper presented at the International symposium on duiker and dwarf antelope in Africa, Zanzibar, Tanzania, 17<sup>th</sup> – 20<sup>th</sup> February 2004

MacPherson, J; MacPherson, D & Carter, E (2002) A study of the ecology and effects of a re-introduced population of Aders' duiker (*Cephalophus adersii*) on Chumbe Island, Zanzibar. Unpublished report, held by CHICOP, Zanzibar

Mwinyi, Ali A (2000) Ader's duiker, *Cephalophus adersi*, capture and translocation from Unguja Island to Chumbe Island, Zanzibar, Tanzania. A report for the Chumbe Island Conservation Project and Commission for Natural Resources, Zanzibar. March 2000

## Indian House Crow Eradication Programme

The Indian House Crows (*Corvus splendens*, Kiswahili: Kunguru) have significantly increased their numbers on Chumbe since approximately 1997. This species was introduced to Zanzibar in 1891 when Sir Gerald Portal sent a request to the Indian Government in Bombay for 50 scavenger birds to control garbage in Stonetown. By 1917 their population had increased so much that they were considered pests in Stonetown. Indian House Crows not only scavenge on garbage, small rodents, grains, fruits, crops etc. but they also out-compete many species for food and nesting sites and directly feed on chicks and eggs of other bird species. Previous eradication programmes have been attempted in Zanzibar's main island but have been mostly unsuccessful. It is hoped that, in contrast, the population on Chumbe Island can be controlled and / or eradicated. CHICOP are now undertaking an Indian House Crow eradication programme.

It is likely that the increase in Indian House Crow population has meant that the Roseate Terns no longer breed on Chumbe. Roseate terns (*Sterna dougallii*) were observed breeding on Chumbe in 1995 and although they have since re-visited Chumbe almost every year since, they have not returned to breed on this island.

After discussing possible eradication methods with Alawi Hija at the Department of Environment, it was decided that the best method to cull the crows was to shoot them. August 2003 was the first time Mzee Mcha came to Chumbe and shot some of the crows. He has since returned three times (see Table 2). The number of crows seemed to decline after Mr Mcha's third visit but there was a large time period between this and his fourth visit as Mr Mcha was very busy with other work. As a result, the greatest number of crows were shot in the most recent visit (September 2004).

**Table 2: Record of Mzee Mcha's visit to Chumbe Island to eradicate the Indian House Crows**

Date of visit	No. days on Chumbe	No. crows shot	Period since last visit
Aug 2003	3	14	1 <sup>st</sup> visit
27 <sup>th</sup> Sep 2003	3	8	1 month
7 <sup>th</sup> Dec 2003	3	14	2.5 months
16 <sup>th</sup> Sep 2004	4	19	9 months

It will be necessary for Mr Mcha to visit Chumbe Island on a more frequent basis, i.e. every 1 – 2 months, perhaps for a day only. This should keep the crows in shock so they don't return. Mr Mcha recommends that this is the only way, otherwise the crows will keep coming back if his visits are too infrequent.

The crows have not only affected the Roseate Tern breeding but also attack the nests of the red-eyed doves (*Streptopelia semitorquata*, Kiswahili: Hua), feeding on both the eggs and chicks. Crows are found over the whole of Chumbe Island but tend to congregate around areas where there are Dove chicks and eggs.

The next visit for Mr Mcha is planned for 10th – 12th November 2004. CHICOP will request Mr Mcha's return on a regular basis after this until there is total eradication of the Indian House Crows.

## **Bird surveys**

### **1. SIT project**

There was a bird survey undertaken by a SIT student (student: Hart Webb, supervisor: Alawi Hija) on Chumbe Island in November 2003. It is hoped that a project of a similar type will be conducted November 2004 by another SIT student and that results can be compared from each year.

There is a large problem with these SIT studies, which is the short time period of only three weeks. Therefore, any results from such a study must take into account the lack of seasonal data and species that may not have been identified in that short period of time.

The baseline bird species list for Chumbe Island (1995), which was based on 5-months' observation, noted a total of 75 species "of which three may have been misidentified". The SIT project in November 2003 identified a total of 34 species, including 12 migratory species, and 6 species sighted offshore, over a 20-day study period (see Table 3). Note there are five additional species on Hart's list that were not observed during the 1995 baseline studies.

Hart's SIT study noted that Indian House Crows were seen or heard at any time and at most of her observation sites (which were centred mainly around the southern area of the island as the rest of it is too densely forested to make good observations). Groups of 15 – 20 crows were seen on a daily basis, with two separate observations of groups of 30. There was another SIT study in April 2000, when there were no more than 8 Indian House Crows observed together at any one time (Skillings 2000). Such statistics (although based on short-term observations) indicate a four-fold increase over the past three years. This gives stronger pressure towards the eradication programme on Chumbe.

Hart also noted that bird activity depends upon water availability. Chumbe had experienced a very dry period in August – October due to unusually short rains. This may have affected the number of migrant species, particularly from Palearctic regions.

It would be useful for students to undertake a similar study in April to allow some extent of seasonal comparison. This will be encouraged in the future but is dependent on student interest within the SIT groups, which come to Zanzibar twice a year. Alternatively a local expert could be brought to Chumbe to undertake such a study on a regular basis throughout the year. This is probably a more favourable conclusion and if a suitable ornithologist could be identified, CHICOP would like to discuss this proposal in the near future.

**Table 3: Species list from SIT study, November 2003**

<b>Latin name</b>	<b>Common name</b>	<b>Status</b>
<i>Actitis hypoleucos</i>	Common sandpiper	M
<i>Andropadus importunus</i>	Sombre bulbul	
<i>Anous stolidus</i>	Brown noddy	O
<i>Apus affinis</i>	Little swift	
<i>Ardea goliath</i> *	Goliath heron	V, O
<i>Bubulcus ibis</i>	Cattle egret	
<i>Casmerodius albus</i> *	Great egret	V, O
<i>Centropus superciliosus</i>	White-browed coucal	
<i>Ceryle rudis</i>	Pied kingfisher	
<i>Charadrius hiaticula</i>	Ringed plover	M
<i>Charadrius leschenaultii</i>	Greater sandplover	M
<i>Cinnyris bifasciata</i>	Purple-banded sunbird	
<i>Corvus splendens</i> *	Indian house crow	
<i>Cossypha natalensis</i>	Red-capped robin chat	
<i>Cyanomitra veroxii</i>	Mouse-coloured sunbird	
<i>Egretta dimorpha</i>	Dimorphic egret	
<i>Egretta garzetta</i>	Little egret	
<i>Halcyon senegaloides</i>	Mangrove kingfisher	
<i>Haliaeetus vocifer</i>	African fish eagle	
<i>Hirundo rustica</i>	European swallow	M, V
<i>Ispidina picta</i>	Pygmy kingfisher	V
<i>Larus fuscus</i> *	Lesser black-backed gull	M, V, O
<i>Larus hemprichii</i>	Sooty gull	M, V, O
<i>Muscicapa striata</i>	Spotted flycatcher	M
<i>Numenius phaeopus</i>	Whimbrel	M
<i>Phalacrocorax africanus</i>	Long-tailed cormorant	V, O
<i>Pluvialis squatarola</i>	Grey plover	M
<i>Sterna fuscata</i>	Sooty tern	M
<i>Sterna hirundo</i>	Common tern	M
<i>Streptopelia capicola</i> *	Ring-necked dove	
<i>Streptopelia semitorquata</i>	Red-eyed dove	
<i>Sula dactylatra</i>	Masked booby	M, V, O
<i>Terpsiphone viridis</i>	Paradise flycatcher	

\* Species that were noted during this study but not previously on the 1995 baseline species list  
M = Migratory species; V = Vagrant species (only seen 1 – 2 times); O = Observed offshore only

## 2. Alawi Hija Roseate Terns

Alawi Hija has recently been in touch with CHICOP regarding undertaking surveys on Chumbe as part of a Zanzibar seabirds project. As a result, Alawi Hija and two colleagues visited Chumbe on 3rd October 2004, to survey the island for Roseate Tern breeding sites and to make a record of seabirds observed on and around the intertidal area. CHICOP is awaiting a report from Alawi Hija with regard to this visit.

## **Proposed collaborative studies with DCCFF**

### **1. Vegetation surveys and re-establishing monitoring plots**

There are a number of vegetation surveys and monitoring plots that CHICOP would like to undertake and re-establish. As previously discussed with DCCFF 31st March and 22nd June 2004, this would require some expertise from DCCFF and Department of Environment (Saidi Fakhi and Hamza Zubeir) staff.

Firstly, there were permanent vegetation plots set up in 1995 by Dr Ursula Köhler. It would be good timing to re-establish and survey these plots with a ten-year time period coming up. CHICOP would need assistance with identifying species in these plots, which would be tagged for future, more frequent monitoring. It would also be of great help for Government staff to assist with survey techniques, which are already established. These surveys could be conducted alongside increasing ranger knowledge e.g. about medicinal (and other interesting) information on plants found along the forest trail so that this can be explained to the guests.

The general information that should be gathered in the forest should incorporate the following aspects...

- Identification and distribution of floral species, mainly in reference to medicinal plants and food plants for Ader's duiker (although more specific study and training will be undertaken by Dr Aplin)
- More thorough identification of species along the guest trail, including a full species inventory, medicinal uses of any relevant plants, any other interesting information that rangers can pass on to guests
- Re-establish monitoring sites (and increase to other areas in the forest e.g. along a transect perpendicular to the forest trail to monitor any effects from the trail)
- If DCCFF are involved with initiating these assessments, it would be requested that they should also train CHICOP rangers so they can do the survey themselves in the future, and on a regular basis

It is proposed that vegetation for the above purposes is studied in two ways...

- Stratified random sampling...
  - Establish approximately five, 20 x 20m areas throughout Chumbe Island to formulate a species list
  - Divide Chumbe into 13 zones (from north to south) and assess three, 5m x 5m areas in each 'zone' for percentage cover of each species
- Permanent plots...
  - Following methods and plots setup in 1995, assess the following in five, 5m x 5m vegetation plots: % bare rock; number and species of tree and sapling species >5m height; GBH (girth at breast height); number of shoots; observation of dead wood on living trees; flowers, fruits, leaf fall; termite presence; damaged leaves; creepers; saplings <5m; shrubs; herbs

### **2. Jozani forest and Chumbe Island education exchange visit**

During discussions with DCCFF for the above proposed vegetation surveys in March and June 2004, CHICOP also discussed the possibility of an exchange visit between

Chumbe Island and Jozani rangers. CHICOP are still very interested in organising this exchange and an appropriate time may be end October – early December 2004, which is Chumbe's low season. This should involve as many of CHICOP's guiding rangers as possible (four in total) and may therefore require two separate visits due to ranger commitments on Chumbe.

It is recommended that further discussions take place between CHICOP and Jozani forest personnel as this trip has already been approved by the DCCFF Director. A detailed agenda should be prepared and approved by the Director prior to either visit. The main outcomes are proposed as follows...

- Exchange information about medicinal plants and other plants common to Chumbe and Jozani, particularly on the guest trails i.e. more information to be able to tell the guests
- Exchange information on dealing with guests and methods used in guiding guests through the forests
- Discuss and exchange ideas and monitoring techniques for surveying each area

Follow-up will be made with each CHICOP ranger that takes part in the exchange such as through discussion groups, and / or requesting that they write a summary of what they have learnt and how it will benefit them in the future. This should ensure that all rangers have benefitted and learnt from their experience.