

Report

To the Participants of an Inquiry

Conducted by
Simon DJ Hicks of Conservation Works (UK charity No. No.1106986)
Part-funded by a Rufford Small Grant

A Fact Finding Mission

Subject:
Collection of eight pairs of lions in the municipal zoo, Addis Ababa

7th to the 14th November 2006



May 2004 SDJ Hicks

Introduction

Two and a half years ago I visited Addis Ababa to evaluate the outcome of a workshop carried out previously to address the decline of an endangered Ethiopian species, the Simian Fox or Ethiopian wolf.

While in the city I visited the 'Lion Zoo' and was captivated by the lions, while being concerned about the size and design of their enclosure.

Now, as Chairman of a small UK registered charity No.1106986, Conservation Works, I look out for small projects that can achieve major results for wildlife conservation. One programme currently in the Conservation Works portfolio is the 'Zoo Counterparts Initiative'. This initiative, supported by the Rufford Foundation in the UK, encourages zoos in Europe to engage in conservation overseas, especially where this involves facilities for holding or breeding animals in captivity.

After a little desk research, my interest in these lions grew and a return visit to Addis Ababa was scheduled. This was to be a fact-finding mission to see if anything could usefully be done for the lions and their conservation.

The following report gives a diary of the meetings I held, a short description of my impressions and findings and my recommendations on how to go forward, for you to consider.

As my visit to Addis Ababa was without an introduction, and I was unaware who was responsible for the zoo, my only option was to start at the zoo and work up from there. I realise that this is an unconventional way to proceed, however I found a warm welcome everywhere I went, almost always without an appointment

For the same reason that I was not commissioned to conduct this inquiry by anyone, there is no single agency to whom I should report, so I am writing this report to you all. This is your project.

Schedule of Meetings

Description of Findings

Date and time (Euro)	Office and Appointment	Name	Notes
Tues 07 Nov			
pm			
Visit:	The Lion Zoo		Clean cages and 14 lions in good condition. One single male in poor condition. One sick cub.
Meeting:	Gate and lion keeper staff	Ato Forgasa Regasa W/T Nigat Coirma W/T Roman Dubale	
Wed 08 Nov			
am			
Visit:	The Lion Zoo		Very helpful meeting with all background questions answered in full. Very loyal to the task, despite lack of a long-term plan.
Meeting:	Zoo Manager Assistant Veterinarian	Ato Muhdin Abdulaziz Ato Yidnekachew Sahlu	
pm			
Visit:	Pact Ethiopia		Point of contact for US residents' initiative for large cat welfare in Addis Ababa.
Meeting:	Director	Mrs Leslie Mitchell	
Visit:	Wildlife Conservation Department		Department of Min of Agriculture that is critical to some of the next steps. Five officers trained at Durrell Wildlife – strong connections with SH
Meeting:	Team Leader Senior Expert	Dr. Kifle Argow Ato Yeneneh Tekla	
Thur 09 Nov			
am			
Visit:	British Embassy		Courtesy call
Meeting:	Consul Assistant	W/T Fetlework	
Visit:	Science Faculty, Dept of Biology, UAA		Introductions made internally. Dr. Gurja expressed interest in the case. He said his laboratory would need some assistance and that he would welcome collaboration.
Meeting:	Animal Ecologist Animal Geneticist	Dr. Kifle Dagne Prof. Afework Bekele Dr. Gurja Belay	
pm			
Visit:	Television Ethiopia		Expressed interest in the possibility of a joint TV production, pending a written outline from SH
Meeting:	Head of Programming	Ato Seifu Seyoum	
Visit:	City Office		Gave advice on municipal and veterinary contacts for zoo
Meeting:	Deputy City Manager	Ato Getacha	
Visit:	The Coffee House		Zoo staff mentioned this regular visitor. He offered his help in any way he can.
Meeting:	Rastafarian singer	Mr. Sydney Salmon	
Fri 10 Nov			
am			
Visit:	Urban Agriculture Dept		Provides veterinary assistance when asked. Helped to map the Government departments involved with the zoo.
Meeting:	Head of Department	Girma Demissie	
Visit:	Arada Sub-City Office		Explained recreational viewpoint. He wants to improve conditions for lions.
Meeting:	Sub-City Manager	Ato Asrat Bekele	
Pm			
Re-visit:	Wildlife Conservation Dept		Attempted to gain access to Palace Zoo. Ato Kura explained this would require a written request with a formal mission.
Meeting:	Senior Expert	Ato Yeneneh Tekla	
Visit:	City Mayor's Office		W/T Kokebe expressed enthusiasm for the initiative and will inform the Mayor
Meeting:	Personal Assistant	W/T Kokebe	
Visit:	City Beautification, Park Development Agency		This department had requested DNA analysis of the lions from the Dept of Biology, UAA, but had not sufficient funds to pay the costs.
Meeting:	Department Head, Admin	Ato Fikadu Sahely	

Sat 11 Nov			
am			
Visit:	Holy Trinity Cathedral		Paid respects to HIM, the original benefactor of the Addis Ababa lions
Visit:	Archaeological Museum		Researching history of lions
Visit:	Ethnological Museum		Researching history of lions
pm			
Visit:	Alert, Tuberculosis Research and Leprosy Hospital		A Swiss veterinarian who assists with emergency lion operations, when requested to attend. Agrees DNA based identification of lions is essential.
Meeting:	Bovine TB PhD student	Dr. Rea Tschopp	
Visit:	Natural History Museum Dept of Biology		Explained that no work has been done on Addis Ababa or Ethiopian lions. He offers to help identify an Ethiopian researcher.
Meeting:	Animal Morphologist	Dr. Solomon Yirga	
Sun 12 Nov	Writing up		
Mon 13 Nov			
am			
Re-visit:	Wildlife Conservation Dept		Final progress report and a final check regarding access to Palace lions. Negative.
Meeting:	Senior Expert	Ato Yeneneh Teka	
Visit:	Tourism Commission		Expressed interest in the initiative and asked to be kept informed.
Meeting:	Commissioner	Dr Ayalew Sisay	
Re-visit:	City Mayor's Office		Agrees to be an active member of the initiative.
Meeting:	Personal Assistant	Mme Kokebe	
pm			
Visit:	History Department		Provided contacts including Prof. Bahru Zewdie, Director, Social Science Forum. Introduction to Mamo, manservant responsible for liquor and guestrooms at the palace, who remembers pet lions.
Meeting:	Chairman, Dept of History and Heritage Management	Dr. Tectlehaimanot Metwe,	
	Palace servant	Ato Mamo Haile	
Telephone:	Historian	Prof. Richard Pankhurst	Can provide information of lions as symbols of rulers and as diplomatic gifts. Glad to help and to be kept informed.
Re-Visited:	The Lion Zoo		Discussed cubs and losses. 15 live births in 14 months. 4 died under 10 days. 4 died before birth. No previous records.
Meeting:	Zoo Manager Assistant Veterinarian	Ato Muhdin Abdulaziz Ato Yidnekachew Sahlu	
Re-Visited:	Arada Sub-City Office		Purpose of visit to ensure access to e-mail correspondence. Difficult for some.
Meeting:		Ato Brahad Demsie	
Telephone:	City Mayor	Mayor Berhane Deressa	Expressed great interest in the initiative, especially in forthcoming millennium.
Tues 14 Nov			
am			
Re-Visited:	The Lion Zoo		Photographed and noted the (indoor) numbers, names and birth dates of all lions.
Meeting:	Zoo Manager Assistant Veterinarian	Ato Muhdin Abdulaziz Ato Yidnekachew Sahlu	
Not traced			
	Mekelle University		It is critical to locate the author of the only paper on the Addis Ababa zoo lions.
	Research PhD, & Author	Dr. Melaku Tefera	
Not Met			
Visit:	Wildlife Conservation Dept		To be included in next visit.
Meeting:	Department Head	Ato Tadesse Hailu	
Visit:	City Beautification & Park Development Agency		To be included in next visit.
Meeting:	General Manager	Ato Musa	
Future Meetings			
Visit:	Ministry of Agriculture		As the Minister responsible for conservation in Ethiopia
Meeting:	Minister	Ato Adisu Legesse	
Visit:	Presidential Palace		It is important to trace any records of the arrival or departure of lions.
Meeting:	Authority on Lion history	General Fresembet	

One of my interviewees described the lion collection as having “nowhere to go”.

The Wildlife Conservation Department wants to keep breeding the lions, because they are endemic and may be extinct in the wild. The zoo staff reiterate this and follow their instructions faithfully, aware of their responsibility to keep the pedigree pure.

Unfortunately, there is nowhere for the progeny to go. Because of their exclusivity to Ethiopia, they cannot be sent out of the country. Neither is there room nor money to build extra accommodation at the Lion Zoo. Even if there were, because of the rate of breeding, the same problem would arise as soon as capacity had been reached.

Reintroduction is not considered a potential because of the risk of the exclusively black-maned lions breeding with blond species, and it is imperative not to lose the genes of what some suggest should be called ‘Abyssinian Lion’, *Panthera leo abyssinicus*.

Within the above scenario, I soon realised that there were major assumptions being made with correspondingly major gaps in the available knowledge

1. Endemism

Firstly, what is meant by “endemic to Ethiopia”? Accurately speaking, it means living *only* within the borders of Ethiopia. ‘Indigenous’, on the other hand, means living naturally within the borders of Ethiopia – and elsewhere. As you are aware, historically, geographically and politically, the shape of what is now called Ethiopia has changed dramatically over centuries, and even more so over millennia.

These black maned lions, knowing nothing of the tidal changes swirling around the topography of your borders, have inhabited their preferred ecosystem within a habitual range. It will have been delineated, for more than thirty thousand years, by factors such as climate, the availability of prey, conditions for breeding, and territories formed between members of their species.

They may live, or have lived, within the borders of modern Ethiopia, or they may straddle one or more of the borders. They may naturally hybridise with populations of lions that look slightly different, on the other side of the border, or where the borders meet, or on your side of the border.

2. Provenance

So, taking another approach, where do these lions come from? Some anecdotal information suggests that, acting on the orders of Emperor Haile Selassie, they were collected by hunters in the province of Welega, in the West.

Dr. Solomon at the Natural History Museum, Department of Biology, Addis Ababa University, however, doubts this, knowing only of reports of black maned lions in Bale in the South, and Babile near Harer, in the East. Ato Mamo told me, without hesitation, that ‘Tojo’, the Emperor’s favourite lion, came from the Ogaden, placing them somewhere in the South East.

The only scientific paper published on Addis Ababa lions that I have come across so far suggests that they are the same subspecies as the Barbary Lion, (*P. l. leo*) of the Atlas mountains (Melaku Tefera, 2002. *Phenotypic and reproductive characteristics of lions (Panthera Leo) at Addis Ababa Zoo*. Mekelle University). As the Atlas range is 2,500 kilometres (1,600 miles) north of Ethiopia, this would be quite a leap.

North, South, Southeast, East or West? That is the choice we have at present.

3. Sub-species

If we don’t know where they came from, do we in fact know what sub-species of lions they are? The males all have black manes. It meets between the front legs and, when they attain the age of about five years, it passes down the stomach to the loins, considered by many to be a mark of the Barbary Lion, popularly declared extinct in the wild in 1922, but allegedly still around in Algeria in the 1950’s. Yet these lions are not overlarge and sources of ‘soft science’ accredit the Barbary Lion of Roman fame with greater length and body weight, though shorter in leg, than its southern counterpart.

Melaku (2002) says in his paper, “the Addis Ababa Zoo lions are not described in (any) literature. There has been no systematic study on the number and survival, but contemporaneously they do not exist in the wild. Hunting for their mane had undoubtedly led them to extinction. “Later, on the basis of their physical appearance, he makes the assertion, “the Addis Ababa Zoo lions could be either surrogate of Barbary, Cape, hybrid or a distinct subspecies”. He concludes that the Addis Ababa lions appear to be an endangered species, on the verge of extinction.

The fact is, however, we do not know what sub-species of lion is at the Addis Ababa Lion Zoo.

4. Status in the Wild

Until we know what sub-species we have at the zoo, we cannot search the records to see if the same animal survives in the wild in any number. Even if we knew its sub-species, there is nowhere to look. At present, there are no available scientific records, photographs or artists' impressions of Ethiopian lions in the wild because, as Dr Solomon has told us, no field research has been carried out on lions in Ethiopia, and Dr Rea confirms that she knows of no-one specialising on the lion, nor even a good amateur monograph.

Melaku names, in all, four subspecies of lion occurring in Ethiopia. He does not mention if any of these have black manes.

5. Status in Captivity

There are eight pairs of lions habitually maintained at the zoo. In a fourteen-month period they have produced fifteen cubs. Cubs that do not die from sickness or poor parenting, are used to replace adult pairs or transferred to the Palace Zoo. Surplus cubs are euthanized.

Until these animals have been identified, it cannot be ascertained whether the taxon of the Addis Ababa lion exists in other collections.

Of at least equal concern among those interviewed is that the relationship of one animal to another is unknown. No studbook exists and records of pairings and breeding are minimal, making management of a breeding programme virtually impossible without DNA 'fingerprinting'.

There is considerable concern that the lion *collection* at the zoo may be heading for extinction through inbreeding. However, they continue to breed prolifically. Estimates of the number of generations of lions to be held since the original founders were collected from the wild could vary from as few as two or three generations to as many as eight to ten generations or even more, depending on their average life span at the zoo and how long ago the first founders of this group were collected.

Zoo staff, bound by a motive for pure breeding to preserve the Emperor's and the country's unique family of lions, are adamant that there have been no introductions to the group. Dr. Solomon, however, has an idea that when revolution occurred in 1974, soldiers of the communist Derg, who invaded the Emperor's palace, were unable to manage the lions and some were transferred to the zoo.

6. Identification by DNA analysis

Further to my visit I have spoken at some length with Dr. Nobuyuki Yamaguchi, a zoologist who has been working on the evolution and conservation of the lion (he wishes to make clear that he is not, himself, a geneticist), at the Wildlife Conservation Research Unit, Oxford University, and has authored or co-authored many scientific papers on the subject. We are lucky that a great deal of work has already been done on the intra relationships of lion subspecies, including lions from Ethiopia and Sudan, using DNA based methods of identification, with which comparisons can, if required, be made.

Prof. Yamaguchi believes that, while a DNA test is unlikely to produce many surprises, we need to isolate the intra-specific phylogenetic variation that identifies the lions in Addis Ababa Zoo for comparison with the variants of other lion sub-species, e.g., the East African Lion, *Panthera leo nubica* and, for the sake of speculation, the Barbary Lion, *P. l. leo*.

He warns that, while not disregarding the possibility of genetic influence, other factors, including climate, cause mane growth on the head, front quarters – and on the belly. It has been shown that any male lion removed to captivity in a cold climate will develop such characteristics. Using morphological (physical) factors alone to identify sub-species is therefore an unsafe way to identify the Addis Ababa lions.

From everyone I have spoken to so far, I can be fairly sure that no samples have ever been taken from these lions for DNA analysis. You have all, without exception, agreed that this is now a priority.

7. Summary

In summary, we don't know if these lions are 'endemic', that is, found only in modern Ethiopia. We don't, in fact, know where the forbears of these lions were originally collected. We don't know what is their sub-species and therefore we certainly don't know whether they are vulnerable, endangered, critically endangered, or even extinct in the wild (IUCN categories of relative endangerment).

As for the history of the collection, we believe that the founders were collected at least 59 years ago, when two females and five males were established at the new 'Lion Cage' by Emperor Haile Selassie in 1948 (Melaku). However, at least one conflicting reference states that invading Italians shot all the King's lions in 1939, a decade previously. More information is clearly required.

Meanwhile the lions continue to breed with unfortunate consequences for many of the cubs. This will inevitably be affecting the morale of zoo staff, who do a good job in the circumstances and have ensured that the opportunity still exists to consider a future for the Addis Ababa lions. For this result, at very least, their efforts should be commended.

Recommendations

I believe that we should be taking a short, medium and long-term view, if possible at the same time.

1. Short term – within the next twelve months:

Recommendation 1a. I would like to recommend that a **request for assistance is made to the Conservation Breeding Specialist Group (CBSG), Species Survival Commission, and World Conservation Union (IUCN).**

The CBSG conducts 'Process Workshops'. One such workshop is the Population and Habitat Viability Assessment (PHVA). The PHVA follows a well-tried workshop method combining small population science and a facilitation formula that narrows down conservation problems to a stage where they can be prioritised for action. Five officers of your Conservation Wildlife Department have already undertaken training as PHVA facilitators and, if this workshop is recommended by CBSG as the appropriate solution, they would be able to assist in the process.

PHVA participants, usually no more than 40, are selected for the contribution they can make at the workshop and for the application of the recommendations arising from the workshop. The process is extremely intensive and finishes with clear recommendations and the 'action steps' necessary to achieve them. Each action step is 'signed off' by the person responsible for seeing its satisfactory conclusion, with a timetable, a budget and a source of funding.

The process begins by filtering multiple and confused issues into identified problems, then goals. For most participants, therefore, this is as much a learning process as a decision making one. The responsibility for seeing that the process works is split between several sub-groups, each with its own facilitator. Each sub-group will have its own perspective of the project with which to grapple and come up with a set of recommendations.

If CBSG recommends that the PHVA process is utilised for the Addis Ababa Lions, the sub-groups could, for example, represent a captive breeding programme; an ecological management plan; a conservation awareness campaign; a historical, heritage and tourism campaign; and a small population management plan.

This last sub-group will be particularly important for settling fears about inbreeding in the collection, and will make use of a computer software programme called 'Vortex', into which everything known about the history, numbers, breeding, and relationships of the animals is fed. To this can be added available habitat, human pressure, prey densities and any conceivable stochastic (chance or occasional) events that could affect a management plan for the species. Vortex then implicates the critical factors that need to be addressed in order to ensure a sustainable future for the species.

The 'Habitat' part of a PHVA may have to wait until a little later, when something is known about the lions' range and status in the wild – for which recommendations will, undoubtedly, ensue from this workshop.

Because of its importance, a small population management planning group would need as much relevant information as possible to be collected together *before* the workshop assembles.

Recommendation 1b. As has been shown in 1 to 6 above, the relevant information does not exist at this point, and my next recommendation, integral to the first, is to **carry out mitochondrial DNA-based analysis of the lions in the collection** in order to confirm the sub-species of these lions, and their intra-specific phylogenetic relationship within it. By this means, and with DNA records to hand of animals held in captivity elsewhere, a captive breeding programme can be contemplated. As this procedure requires only ten to twenty hairs from each animal, this is conceivable.

Identifying relationships *within* the group requires a different procedure, nuclear DNA-based examination, requiring 5 mls of blood to be drawn from each animal. While the possibility of this will be investigated prior to the workshop, there may be other opportunities later when any relocation of the animals has been agreed.

Other preparations can usefully be made prior to the workshop, including **a historical search for dates and origins of lion arrivals at the palaces or the zoo.**

Recommendation 1c. Utilise the opportunity to create a **Conservation Awareness Master plan for the country**, using the symbol of Ethiopia, and its conservation as a living species, as the focus. Action steps to be decided by Workshop.

Recommendation 1d. **Motivate a history, heritage, tourism machine** to move this story into the mainstream – and keep it there, and taking full advantage of Millennium Year. Action steps to be decided by Workshop.

2. Medium Term – two to five years

2a. Put a Captive Breeding Programme, including recommendations for captive habitation, into full effect. Action steps to be decided by Workshop.

2b. Complete ecological and species' range surveys needed to draft and implement a Species Management Plan. Action steps to be decided by Workshop.

3. Long Term – five years and beyond

Draw together all strands, 1 and 2 above, to plan and drive a coherent and sustainable wildlife, ecological, agronomic and heritage conservation strategy into the future. This will see a conservation breeding programme that i.) provides a resource for reintroduction to protected areas, ii.) ensures the survival of a genetically healthy population nucleus, iii.) acts to draw the attention of the public to conservation issues and iv.) exhibits the lions in a way that meets the needs of the species, is a source of pride for Ethiopians, and reflects the importance of Ethiopian lions to the culture of the people, to the capital city and to the nation.

Acknowledgements

I should like to thank all those named in the schedule of meetings above, for your willingness to give me your time without any prior warning, and for your trust in the sharing of information, some of it sensitive; Professor 'Nobby' Yamaguchi at WildCRU for your extraordinary patience and attention to my e-mail; and Ato Demoz Beyene who met me at the airport and was my trusted driver, guide, advisor and friend throughout my stay.



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