

Status Assessment Survey on Wildlife in Djibouti

Final Report

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Frontispiece (opposite): The authors H.A. Rayaleh and T. Künzel during walking-tour in the beira hills between Ali Sabieh and Assamo in SE Djibouti (photo: S. Künzel)

Front cover: Fumaroles, Lac Abhé (photo: S. Künzel)

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1. Introduction

This report presents data and conclusions on the occurrence and status of larger wildlife in Djibouti obtained from a survey which was executed in Djibouti from mid October 1999 to the end of January 2000. The survey was focused mainly on ungulates. For all bovids a numerical estimate of the population size is given.

Most of the data were collected by searching during drives in a cross-country vehicle. Extensive walking-tours were executed in selected areas, for example, to get more information about the occurrence of the beira antelope in SE Djibouti in the hills between Ali Sabieh and Assamo.

Djibouti is one of the smallest countries in Africa with an area of ca. 23,200 sq km and ca. 0.5 million inhabitants. It is situated in the so-called Afar triangle the northern mouth of the African Rift Valley. This region belongs in a wider geographical sense to the Horn of Africa and is the home of a variety of rare, extremely arid-adapted species of fauna and flora.

A hunting ban established by the Djibouti Government after independence in 1977 makes Djibouti the only country in the Horn of Africa where wildlife is not under the pressure of uncontrolled hunting by military or civilians and/or the effects of civil wars, as has been or still is the case in Somalia, Ethiopia and Eritrea.

The last country wide information on the status of wildlife in Djibouti come from field excursions executed before 1990.

The rediscovery in SE Djibouti of the beira, probably the rarest antelope in the Horn of Africa, gave the motivation for this survey.

Note: All opinions expressed in this report are those of the authors and do not necessarily reflect the views of ZSCSP or any other individual or organisation.

2. Ungulates

2.1 Ungulates seen during the survey

2.1.1 Phacochoerus africanus (Common warthog)

2.1.1.1 Systematic

Kingdon (1997) separates *P.africanus* into 4 subspecies.

A skull found in Foret de Day (altitude ca. 1,350 m, close to the old governor house) has been taxonomically analysed and identified by Kock (pers. communic.) as the subspecies *P.a. aeliani* (Eritrean warthog).

This is the first scientifically confirmed identification of this subspecies for Djibouti (Magin, 2000).

We assume that all warthogs existing in Djibouti north of Golf of Tadjoura belong to *P.a.aeliani*.

2.1.1.2 Distribution

P. africanus is widely distributed in Africa south of Sahara, except the rain forests, southernmost Africa and the Horn south of Djibouti. In the latter area it is replaced by *P. aethiopicus*, the desert warthog.

P.a.aeliani occurs only in Eritrea and Djibouti (IUCN, 1996).

A total of 23 Warthogs (groups of 1 – 6 animals, see App. B) were seen during the survey in the Goda mountains (in the hills around Dittilou, and around the old governor house in Foret de Day).

Other recent records (20 animals in groups of 4 – 6, Pabst, pers. communic., see App. B) come from the area around Bankoualé, which is also located in the Goda mountains.

We assume that *P.a.aeliani* occurs also in other parts of northern Djibouti, for example, in the Mabla mountains NE of Tadjoura, and around Moussa Ali in NW Djibouti.

Grubb (1993) discuss the present existence of the "forgotten warthog" *P. aethiopicus* in northern Kenya and Somalia. This species' distribution range given by Kingdon (1997) signals its possible occurrence in SE Djibouti along the border with Somalia.

In S and SW Djibouti, along the border with Somalia and Ethiopia, the occurrence of warthogs has been reported by local people . If this information is reliable, then the warthogs living in this area should be *P.aethiopicus*. The same opinion is formulated by Magin (2000).

Nevertheless, the Künzels never saw a warthog during their extensive excursions in 1992-96 covering Djibouti south of an imaginary line between Assamo and Ghoubbet, and no warthogs were seen outside the Goda mountains during this survey.

2.1.1.3 Population estimate

We are not in the position to formulate a numerical population estimate, but our findings suggest that the total population of *P.a.aeliani* in Djibouti is small, and restricted to a few places only.

2.1.1.4 Status and threat

P.a.aeliani is assessed as "endangered" in the 1996 IUCN Red List.

In Djibouti warthogs were the target of heavy hunting pressure before the hunting ban took place in 1977, and it seems that the warthog population never recovered from this marked decline. Former French hunters report that the present population of the warthog in Djibouti is only a small fraction of the large population which existed 40 years ago when this species was distributed over many parts of the country.

The maintenance of the hunting ban remains the most important conservation measure.

The population living in the Goda mountains mainly occupies more or less forested areas. The maintenance of this forest vegetation is a necessary condition for the further existence of the warthog population in this area.

For this reason we suggest reintroduction of the alternating closed area system for cattle grazing in the remaining forested areas in the Goda and Mabla mountains (see App. A).

2.1.1.5 Résumé

Systematic

- A skull found during the survey in Foret de Day has been taxonomically identified as belonging to *P.a.aeliani* (Eritrean warthog) which is the first scientific confirmed identification of this subspecies for Djibouti.

Distribution and population estimate

- Eritrean warthogs (23 ex.) were seen during the survey in the Goda mountains only, but the distribution area could at least include the Mabla mountains and Moussa Ali.
- The present small population size of the warthog in Djibouti is only a small fraction of the large population which existed 40 years ago.

Status and threat

- The status of the present population of *P.a.aeliani* seems to be stable at a very low level.
- The further existence of the population in the Goda mountains is dependent on the maintenance of the forest vegetation in this area, which is partly overused by cattle.
- The hunting ban is still the most important conservation measure.
- The conservation measure of alternating closed areas (for cattle) should be reintroduced.

2.1.2 Oreotragus oreotragus (Klipspringer)

2.1.2.1 Systematic

The distribution of the klipspringer in Africa is characterised by strong fragmentation into a large number of more or less isolated populations. In accordance with this fragmentation a large number of subspecies has been proposed in the scientific literature.

Kingdon (1997) subdivides the klipspringer into 7 subspecies.

A skull found near Dittilou in Goda mountains during the survey has been taxonomically analysed and identified by Kock (pers. communic.) as *O. o. somalicus*. This is the first scientifically confirmed identification of this subspecies for Djibouti.

2.1.2.2 Distribution

The klipspringer has a wide distribution in Africa from Ethiopia to S Africa, occupying hillsides sometimes up to 4,000 m (Kingdon, 1997).

Laurent (1989) reported that klipspringer occur north of the Gulf of Tadjoura in the Goda, Dadar and Mabla mountains at altitudes higher than 500 m.

Of the mountainous areas north of the Gulf of Tadjoura, we visited only the Goda mountains. Here we recorded 11 klipspringer around Dittilou and 10 in the hills around the old governor's house in Foret de Day. All the klipspringers observed were single or in groups up to 3 animals, and were found from 700 m – 1,350 m altitude.

Laurent (1989) mentions an additional small population living in the Boura hills in SE Djibouti.

During our walking-tours in the Boura hills we did not find klipspringer. One of the local herdsmen told us that klipspringer formerly lived in the Boura hills, but the last one, seen by him frequently as a single animal, died some time ago.

This information seems reasonable. The Boura hills have much less vegetation cover than the habitats in the Goda mountains where we saw klipspringer.

The klipspringer is not confined to the inner regions of the Goda mountains but also occurs in the lower lying periphery, as shown by observations by Dr. Bredon (pers. communic.) who saw at least 9 klipspringer halfway between Ouea and Foret de Day during a walking-tour in November 1999.

We believe that the klipspringer in Djibouti still inhabits all suitable areas north of the Gulf of Tadjoura, from the Goda to the Mabla mountains, where Laurent (1989) saw this species.

2.1.2.3 Population estimate

A rough estimation of the whole area suitable for klipspringer including the Goda, Dadar and Mabla mountains is ca. 1,000 sq km.

This includes ca. 150 sq km around Foret de Day in the Goda mountains and ca. 50 sq km in the centre of the Mabla mountains which could be regarded as being very favourable for klipspringer, with the remaining 800 sq km less favourable.

East (1998) based on a literature survey found highest densities of 10.0-14.0 animals per sq km within continuous areas of favourable habitat.

Assuming that the density within the 200 sq km of very favourable habitat in the Goda and Mabla mountains is at least one family group (3 animals) per sq km, a total population of 600 klipspringer could occur in these areas. This is probably a minimum estimate.

For areas where no estimates are available East (1998) assumed a density of 0.1 per sq km where the klipspringer is known to be common or abundant within suitable areas, and 0.01 per sq km elsewhere.

Assuming that the remaining 800 sq km of less favourable habitat in the Goda, Dadar and Mabla mountains has a density of one family group (3 animals) per 10 sq km gives a total population of 240 klipspringer for this area.

The total estimated population is ca. 840 klipspringer occurring in suitable areas of the Goda, Dadar and Mabla mountains.

2.1.2.4 Status and threat

At the moment the klipspringer population as a whole does not appear to be in danger in Djibouti. For this species the hunting ban has been and still is the most important conservation measure, but the existence of the klipspringer also depends on the intactness of the vegetation in their mountainous home areas.

If the vegetation in these areas is severely degraded the klipspringer have no chance to migrate to better places, unlike for example the dorcas gazelles. Their fate is to stay until the last of them have died, as may have happened in the case of the klipspringer population in the Boura hills during the last 20 years.

The most dangerous threat is disastrous degradation of the vegetation in the mountains by overstocking with cattle, as it is already the case in some hills around Dittilou.

The only realistic way to maintain the ecosystems in these mountains, including Foret de Day, is a return to old traditional methods of range/forest management, where areas are alternately closed and opened to cattle.

We discussed this problem with a couple of people in Djibouti, and one of our counterparts, Monsieur Omar Habib Abdoulmalik, had the chance to spread this idea in a radio interview in Djibouti.

But much more effort is necessary to give this idea a chance to be realised.

2.1.2.5 Résumé

Systematic

- A skull found during the survey in the hills around Dittilou in Goda mountains has been identified as belonging to the subspecies *O.o.somalicus*. This is the first scientifically confirmed identification of this subspecies for Djibouti.

Distribution and population estimate

- Klipspringer occur in Djibouti probably only in the area of the Goda, Dadar and Mabla mountains along the north coast of the Gulf of Tadjoura.
- Strongholds of its occurrence exist in the centres of the Doda and Mabla mountains.
- The total population is estimated to be ca. 840 animals.

Status and conservation

- The hunting ban has been the most important conservation measure since independence, helping the population to develop and to hold a relatively stable level.
- Uncontrolled overstocking of the home mountains of the klipspringer are a big threat for the ecosystems and so for the klipspringer itself.
- Alternating closed areas is the only way to avoid severe degradation of the mountains which will be disastrous for cattle and for wildlife.

2.1.3 Dorcatragus megalotis (Beira)

2.1.3.1 Distribution

The beira antelope is an arid-adapted endemic to the Horn of Africa. Its distribution ranges from its main area of occupancy in N Somalia (hills along the coast of the Gulf of Aden) through a small area in the Marmar Mountains in Ethiopia to S Djibouti (hills between Assamo and Ali Sabieh, close to the border to Ethiopia). (Kingdon, 1997, Künzel & Künzel, 1998).

The occurrence of the beira antelope in Djibouti was not confirmed until 1993, when the Künzels saw and photographed beiras (Photo 3) in S Djibouti.

Photo 3. *Dorcatragus megalotis* (Beira) in Djibouti (photo: T. Künzel)

During our 1999-2000 survey we saw 14 beiras in 4 family groups (3-4 animals per group) within 3 days.

Three groups were accompanied by calves. The size of the calves was more than 75 % of that of the adults and the male calves had already developed small horns.

The different composition of these 4 groups (see App. C) makes us believe that we saw indeed 4 different groups.

All observations were made west of the road between Assamo and Ali Sabieh in the SE mountains of Arréi, verifying the assumption of Künzel & Künzel (1998) that the range of the beiras is not restricted to the zone east of the road, where they were seen in 1993/94.

During walking-tours we found Beira droppings in many places in the mountains W and E of the road between Assamo and Ali Sabieh.

In the period between 1992-98 the co-author, Monsieur Houssein A. Rayaleh, recorded 46 beiras (group size: 2-9) in the hills of Arréi.

Local herdsmen informed us during our survey that they see beiras nearly every day in the hills east and west of the road between Assamo and Ali Sabieh.

During our visit to the Boura mountains we spent a total of 16 man-hours on walking-tours in the hilltops of Boura, but we did not find beiras, although information by local herdsmen indicated that beiras should occur there.

Kingdon (1997) mapped the distribution of the beira, indicating its occurrence in Djibouti in the region between Ali Sabieh and Assamo and in the Goda mountains. We did not see beiras in the Goda mountains. The local herdsmen in this region do not have a name for beira as they do for the klipspringer.

We assume that the occurrence of beiras in Djibouti is restricted to the hills in the Southeast between Ali Sabieh and Assamo.

2.1.3.2 Population estimate

There are no data available for a statistically sound population estimate.

Künzel & Künzel (1998) estimated the total population of beiras in Djibouti to be ca. 50 animals living in the hills between Assamo and Ali Sabieh, and in the Boura mountains between Assamo and Ali Addé.

Regarding (1) our observation of 4 family groups of beiras in a relatively small area, (2) our finding of beira droppings in many other places in the hills of Arréi, Dadin, and Dég Ouéin, (3) the information of the local herdsmen about their numerous recent beira observations in the hills W and E of the Ali Sabieh – Assamo road, and (4) the 46 beiras recorded by Rayaleh in 1992-98 in the Arréi hills, it seems possible that the population size of *D. megalotis* in SE Djibouti could be substantially higher than assumed by Künzel & Künzel (1998).

Nevertheless, as long as a detailed beira survey has not been executed, we think that an estimation of 50 beiras, regarding the population between Ali Sabieh and Assamo, is still the most reasonable guess.

2.1.3.3 Status and threat

D. megalotis is listed in the 1996 IUCN Red List as "vulnerable".

There is very little recent information available about the beira's status in its former stronghold in the coastal hills along the Gulf of Aden in N Somalia. Simonetta (1988) wrote that "... there was a marked decrease (in N Somalia), at least locally, during the 1975 drought and numbers have not recovered."

Since 1988 the situation in Somalia has been generally not very favourable for wildlife because of the long lasting civil war.

In spite of reports by Moehlman, 2001 (pers. communic.) which indicate that beiras still exist in northern Somalia, the species population might have been suffered a considerable reduction due to the lawless situation resulting from the civil war.

In the light of this scenario the beiras living in Djibouti have a very important role to play in the maintenance of this species' global population in the Horn of Africa.

The beira population in Djibouti, estimated by us to be ca. 50 animals, does not seem to be endangered, at least for the time being. In our opinion, the traditional moderate livestock herding in the hills where the beira occurs does not jeopardise the survival of this species.

The most important factor for the maintenance of the favourable situation for the beira in Djibouti is continued strict observance of the hunting ban.

In the long run it has to be taken into account that local natural disasters like long lasting droughts could be a threat to the small beira population in Djibouti.

Detailed proposed activities for the long term maintenance of the beira antelope in Djibouti are outlined in App. A.

2.1.3.4 Résumé

Distribution and population estimate

- The beiras occur in Djibouti only in a small mountainous area between Ali Sabieh and Assamo, along the border with Ethiopia.
- 4 family groups with a total of 14 beiras were recorded during the survey at an altitude between 900 and 1100 m
- The total population is estimated to be ca. 50 animals.

Status and conservation

- Not endangered in Djibouti in present. But their occurrence in a relatively small area makes them highly dependent on the ecological welfare of this area.
- Beira do not seem to be disturbed by traditional moderate livestock keeping.
- Most important conservation measure is maintenance of the hunting ban.
- Details of proposed conservation activities see under App. A.

2.1.4 Madoqua saltiana (Salt's dikdik)

2.1.4.1 Systematic

The systematics of dikdiks is still very preliminary. Kingdon (1997) subdivides this species into five subspecies, noting that some of them may have even species status. After his distribution map two subspecies could occur in Djibouti: *M.s. saltiana* and *M. s. phillipsi*.

Madoqua saltiana photographed in Djibouti by the first author in 1993 (Photo 4) has been identified by two international mammal experts, Dr. C.P. Groves (Australian National University) and Dr. D.W. Yalden (University of Manchester), as *M.s.saltiana*.

Laurent (1989) in his report about the bovids of Djibouti names the dikdiks as *M.s. swaynei* which seems doubtful. Yalden et al. (1984) reported the occurrence of *M.s.swaynei* as confined to Ethiopia South of the River Wabé Shebelé Valley and adjacent Somalia.

Photo 4. *Madoqua saltiana* (Salt's dikdik) in Djibouti (photo: T Künzel)

2.1.4.2 Distribution

M. saltiana is an arid-adapted endemic to the Horn of Africa having its strongholds in Somalia, Ethiopia, Djibouti and Eritrea (East, 1998).

During the survey in Djibouti we saw only a few dikdiks. The best numbers were found in the wadi between Ali Sabieh and Assamo in S Djibouti.

The total number of *M. saltiana* counted during the survey is 80, from which 73 are regarded as genuine records (see App. D).

M. saltiana occurs in Djibouti from very hot and bushy areas at sea level along the coast as in Khor-Ambado (Künzel, 1994, unpublished) up to relatively cold regions at 1,360 m altitude within Foret de Day (this survey).

The great majority of records of *M. saltiana* reported by Yalden et al. (1984) from all over its distribution range were from altitudes between sea level and 1500 m, with some evidence that it may extend to almost 2000 m.

2.1.4.3 Population estimate

M. saltiana is a predominantly nocturnal species which is able to occupy the most arid areas but avoids excessive overheating by lying up in shade during the day (Simonetta, 1988).

This has to be taken into consideration when survey counts are used to estimate population densities.

The 73 genuine records of dikdiks observed during the survey is ca. 1/10 only of the genuine records of *G.d.pelzelni*, and results in a density of ca. 0.02 dikdiks per sq km in relation to the density of *G.d.pelzelni* of ca. 0.2 per sq km.

Taking into account the above mentioned difficulties in counting dikdiks, and assuming that the number of dikdiks counted during our survey as genuine records underestimates the real number by the factor of at least two, we estimate the density of dikdiks for the whole of Djibouti to be ca. 0.04 animals per sq km.

This is far below the average density of dikdiks of 2.0 per sq km for the species' area of occupancy estimated by East (1998) based on a literature review.

But even Laurent (1989) mentioned a remarkable decline of dikdiks in different places in Djibouti.

Our density estimation of 0.04 related to the 23,200 sq km gives a total population of ca. 900 dikdiks.

2.1.4.4 Status and threat

The status of *Madoqua saltiana* is secure in its whole area of occupancy.

Its density in Djibouti seems to be very low in comparison to other areas, but stable at this relatively low level.

2.1.4.5 Résumé

Systematic

- Photos of dikdiks from Djibouti have been identified by international experts as *Madoqua saltiana saltiana*.

Distribution and population estimate

- Occurs in different ecosystems in Djibouti, from bushy and very hot areas at sea level to relatively cold areas at altitudes of at least 1,360m in Foret de Day, but everywhere in small numbers only.
- Best numbers were seen in the wadi between Ali Sabieh and Assamo in S Djibouti.
- 73 genuine observations were recorded during the whole survey.
- The density for Djibouti is estimated to be 0.04 dikdiks per sq km, and the total population ca. 900.

Status and conservation

- *M. saltiana* in Djibouti seems not to be in danger, but its population density is very low in comparison to other areas.
- The maintenance of the hunting ban seems to be the most needed conservation measurement.

2.1.5 Gazella dorcas pelzelni (Pelzeln's gazelle)

2.1.5.1 Systematic

Groves (1985) divided the subspecies of *Gazella dorcas* into two groups. Namely those which live in the Saharan region (Saharan group), and those which live along the coasts of Gulf of Aden and Red Sea from northern Somalia to Sinai (Red Sea group).

Investigation of taxonomic characters showed that the Red Sea group form a cline from Sudan, via Eritrea, Djibouti and northern Somalia. The transition between adjacent subspecies is smooth without sharp breaks.

Groves (1985) found the form of horns to be the most immediately noticeable difference between *G.d.pelzelni* and all other dorcas-subspecies: "... its (*G.d.pelzelni*'s) horns are nearly straight, with the tips only slightly inturned; in other dorcas gazelles the horns flare outward and then converge in again towards the tips."

He found that the tip-to-tip distance of the horns is 56 % of its greatest span in *G.d.isabella* (south until N Eritrea), 70 % in *G.d. isabella* (Danakil) and 92 % in *G.d.pelzelni* (Somalia).

Horns of male dorcas gazelles collected during our survey (and in 1998/99 by Dr. P.Bredon, pers. communic.) in Djibouti from specimens found dead in the field are either more or less straight, or show only very slightly inwards turning towards the tips.

Photos made in Djibouti by the first author showing dorcas gazelles have been inspected by Dr. C.P. Groves (Australian University) and Dr. D.W. Yalden (University of Manchester). Both experts identified the gazelles on the photos (see Photo 5) as *Gazella dorcas pelzelni*.

Based on above mentioned investigations and findings we believe that all dorcas gazelles observed during our survey in Djibouti belong to the subspecies *G.d.pelzelni*.

Photo 5. *Gazella dorcas pelzelni* (Pelzeln's gazelle) in Djibouti. (photo: T. Künzel)

2.1.5.2 Distribution

After Yom-Tov et al. (1995) the distribution area of *Gazella dorcas* ranges over N Africa from the sahel zone to the Mediterranean coast and includes parts of Sinai, Israel and Jordan (East, 1992).

The observations of *G.d. pelzelni* recorded during our survey suggest that this gazelle is widely distributed in Djibouti, and can be found in nearly all terrain (Map 1 in App. L). The highest altitude where we have seen dorcas during the survey is 750 m in the hills between Ali Sabieh and Assamo.

A. Laurent (1989) gives 1000 m as the highest altitude for the occurrence of Pelzeln's gazelle in Djibouti. The records mapped in his paper show a distribution similar to our findings. They are of special interest in so far as they show good occurrence of Pelzeln's gazelle in the NE, an area which we could not visit during our survey for security reasons.

We found the highest densities of Pelzeln's gazelles in Grand Bara (SE Djibouti), in the areas of Garab, Koudakoud and Der Ela (W Djibouti) and in the region between Dorra and the western border with Ethiopia (NW Djibouti).

In south Grand Bara, in January 10th, 1999, we counted 130 Pelzeln's gazelles gathered in an area of ca. 6 sq. km. To our knowledge this is the highest congregation of this species ever reported for Djibouti.

All numbers of Pelzeln's gazelles counted during the survey are presented in App. E and H, where double countings, possibly arising from repeated visits to the same area and from likely movements of the gazelles, are marked.

The majority of groups of Pelzeln's gazelles included calves.

Some observations recorded by other observers between 1997-99 in areas which we could not visit during our survey are also included in App. E and Map 1 (App. L), which shows all Pelzeln's records without double countings.

Excluding double countings, a total of 657 Pelzeln's gazelles was recorded as genuine records during the survey, and out of this 599 gazelles were counted during drives in a cross-country vehicle (Table 1, App. E).

Table 1. Data of *Gazella dorcas pelzelni* recorded in the different regions visited during the survey (summation of App. E):

- * = double counting,
- ** = genuine records made during searching drives, and accepted for population estimate
- A = region SE Djibouti along the border with Somalia between Loyada and Assamo
- B = region Gobaad in SW Djibouti along the border with Ethiopia between Dikhil and Lac Abhé
- C = region W Djibouti between Lac Abhé, Ouaidilou and Biida
- D = region south of Golf of Tadjoura between Djibouti city and Grand Bara
- E = region between Tadjoura and Moussa Ali
- F = region between Grand Bara, Gaggadé and Tikibléita

	total	*	genuine	**
A	56	18	38	38
B	63	12	51	48
C	47	17	30	30
D	313	76	237	47
E	184	4	180	180
F	145	24	121	115
total	808	151	657	458

2.1.5.3 Population estimate

The methods used to find and count gazelles during the survey do not allow the application of a statistically well-founded line transect model.

But a large portion of the Pelzeln's gazelles counted during the survey drives with a cross-country vehicle can be used to obtain a minimum estimate of the dorcas population in Djibouti, as follows:

a) Identification of the total length of the survey strip

In order to identify the total length of the survey strip all routes travelled during the survey drives with the cross-country vehicle were drawn on a map with a scale of 1:200.000, and measured using a mechanical measuring wheel (Map 1 in App. L).

This gave a measured distance of 1,027 km as a best estimate of the total length of the survey strip.

Routes travelled several times were included only once in the estimation of the length of the survey strip.

No survey drives along the Route Nationale No.1 were included. In consequence of the war between Ethiopia and Eritrea the road haulage between Djibouti harbour and Ethiopia has increased enormously, resulting in disturbance of wildlife by heavy day and night traffic along this road.

b) Identification of the total width of the survey strip

Assuming that the majority of gazelles observed along the survey strip were not more distant than 500m from the observer in the vehicle, but only a negligibly small number was more distant than 1000m, the width of the survey strip is determined to be 2,000m.

Based on a survey strip of a length of 1,027 km, and a width of 2 km, the resulting area of the survey strip is 2,054 sq. km.

c) Estimate of the density of Pelzeln's gazelles in Djibouti

The number of 599 genuine records of Pelzen's gazelles counted during drives with a cross-country vehicle is the basis for the population estimate.

Out of this 599 genuine records 11 gazelles (GD-Record-No.2,103,106; see App. E) were recorded along the Route Nationale No.1, and therefore are not included in the estimation.

In order to obtain a conservative estimate two assumptions are made: (1) The high concentration of 130 gazelles in southern Grand Bara in January 01, 2000, is not included in the data pool used for the population estimate. We assume that the gazelles which formed this concentration had been attracted from the wider vicinity by very favourable food conditions. (2) The number of gazelles counted within the survey strip is assumed to be the total number of gazelles which occurred there at the time of the survey.

This is a very conservative approach. It is very seldom that all gazelles occurring within a survey strip can be seen during the survey (Buckland et al., 1996), and the width of 2 km chosen for the survey strip has to be regarded as extremely wide.

Therefore, only 458 Pelzeln's gazelles counted in the survey strip of 2,054 sq. km are accepted for the population estimate, resulting in a density of ca. 0.2 gazelles per sq. km.

Based on literature research on population densities of *G.dorcas*, East (1998) postulates densities of 0.2 gazelles per sq. km where the species is known to be common, and 0.02 per sq km elsewhere.

The total area of Djibouti is estimated to be ca. 23,200 sq km (Magin, 1999). Based on the topography of Djibouti, we assume that 1/10th of the country is covered by areas which are not utilised by dorcas gazelles, as for example areas higher than 1000 m.

Taking into account these considerations, we estimate that in an area of 20,880 sq km a total population of ca. 4,000 *G. d. pelzelni* exist in Djibouti. We regard this as a minimum estimate.

2.1.5.4 Status and threat

The status of the world population of *G.dorcas* was assessed as "near threatened " in the 1996 IUCN Red List. After more recent information of a drastical decrease as a result of overhunting, the status of this species was re-assessed as "vulnerable" in view of a population reduction of at least 20 % over the last 10 years (East, 1998).

The status of the sub-species *G.d.pelzelni* has been assessed as "vulnerable" in the 1996 IUCN Red List.

In Djibouti this trend has been stopped and reversed.

G.d.pelzelni was by far the most frequently observed ungulate during our survey in Djibouti.

Consultation with local people and the few available publications (Blot, 1986) indicate that the total population of *G.d.pelzelni* in Djibouti has increased substantially since independence in 1977.

The adaptation of *G.d.pelzelni* to very dry conditions, and to activities of traditional pastoral livestock-keeping, together with the very well functioning hunting ban implemented after independence, have allowed this species to develop a stable population at a relatively high level.

The greatest limitation to further increase of the dorcas population in Djibouti seems to be the high number of livestock. In January 10th, 1999, we counted alone in Grand Bara, north of Mouloud, 15 large herds of goats and sheep.

Although the trade in wildlife is prohibited in Djibouti, juvenile gazelles (most often Pelzeln's) are sometimes offered for sale by the indigenous people in the country side. Pelzeln's gazelles quite often are kept in captivity in the back yards even in Djibouti city.

Captive male dorcas, in particular, sometimes behave very aggressively (territorial) against their keeper after reaching reproductive age. These gazelles then become burdensome and are regarded as dangerous.

Such gazelles, together with other wildlife confiscated by Police, find a new home in the small private wildlife-rescue station of Monsieur J.Pabst, alias Paulus (see *Civettictis civetta pauli* in this report). The confiscated gazelles are kept here in comfortable enclosures together with other species.

The Pelzeln's gazelles kept in the station show that this species is able to breed very successfully in captivity.

2.1.5.5 Résumé

Systematic

- The identification of dorcas gazelles occurring in Djibouti as subspecies *G.d.pelzelni* has been verified by the horn type of male gazelles.

Distribution and population estimate

- Below 800m, *G.d.pelzelni* can be found in nearly all areas/ecosystems in Djibouti.
- A total of 657 genuine records of *G. d. pelzelni* was observed during the survey.
- The highest population densities have been observed in the larger Baras in S and NW Djibouti.
- In the Southern Grand Bara, on an area of ca. 6 sq km, a congregation of 130 Pelzeln gazelles was recorded. This is the largest concentration of this species ever reported from Djibouti.
- The average population density for the whole of Djibouti is estimated to be 0.2 gazelles per sq km, and the total population 4000 gazelles.

Status and conservation

- Out of all ungulates occurring in Djibouti, *G.d.pelzelni* is the least threatened species.
- The stock of *G.d.pelzelni* in Djibouti has substantially increased since independence in 1977, and seems to be stable at a relatively high level.
- The hunting ban implemented after independence is the most important reason for this positive development, and has to be maintained in the future.
- Conservation activities directed especially to *G.d.pelzelni* in addition to the hunting ban, do not seem to be necessary.
- Further increase of the dorcas population in Djibouti seems to be unlikely because of the high number of livestock.
- *G.d.pelzelni* kept under the artificial conditions of a wildlife-rescue station in Djibouti breed without any difficulty.

2.1.6 Gazella Soemmerringi (Soemmerring's gazelle)

2.1.6.1 Distribution

Gazella soemmerringi is an endemic species to the Horn of Africa, occurring from N Kenya to S Sudan, with strongholds in Ethiopia, Eritrea, and Djibouti (East, 1998).

During our survey in Djibouti all records of Soemmerring gazelles have been collected during survey drives using a cross-country vehicle.

Out of a total of 440 Soemmerrings seen during the survey, 190 are regarded as genuine records (App. F+I and Map 2 in App.M).

The distribution pattern of the Soemmerring's seen during our survey resembles that of *G.d.pelzelni* in so far as the majority of Soemmerring's was concentrated in the larger Baras such as the Petit and Grand Bara in the South, Ouaidilou and Biida in the West, and Doda and Doho in the NW. These are the locations where we found also the largest numbers of Pelzeln's gazelles (Map 1+2 in App. L+M).

A. Laurent (1989) writes that *G.soemmerringi* occurs in numerous regions in Djibouti, and mention's AlloI, Doda and the foot hills of Moussa Ali in NW, the coastal plains in NE, Petit and Grand Bara in the South, and the regions around Lac Abhé and Gamarré in the W.

The difference between the distribution of the two gazelles is that dorcas gazelles are more evenly distributed covering more or less the whole country.

While Pelzeln's gazelles occurred mostly in small family groups, it seems to us that the Soemmerring's preferred to be in larger groups when ever possible, at least in this season, and accordingly showed a more patchy distribution.

Quite often single Soemmerring males were seen standing far from the herds, probably after being expelled from female herds by territorial males.

Nearly all herds contained females with calves.

Seasonal differences in the distribution patterns of Soemmerring and dorcas gazelles are indicated in the information presented in Estes (1991) as follows in Table 2:

Table 2. Behavior and distribution pattern of *G. dorcas* and *G. soemmerringi* after Estes (1991).

<i>Species</i>	Food and habitat preferences	Dispersion pattern	Group size	Bisexual aggregation
<i>G. dorcas</i>	Flat, stony open plains, sometimes sand dunes, associated with acacias. A browser, especially on Acacia and other leaves. Reported to eat locusts.	Nomadic, may migrate	Small: 3-40 (up to 60); bachelor herds up to 50;	?
<i>G. soemmerringi</i>	Browser/grazer (?), thornbush, also open, grassy plains in hilly country	Migrates N-S	Seasonally variable: 27 (6-40) wet season; 3.9 (1-9) dry season;	100-200 in rainy season

The largest number of Soemmerring's which we observed gathered in one place were found in Ouaidilou (54 gazelles in 01/11/99) and in Petit Bara (52 gazelles in 29/01/00). These are the largest congregations of Soemmerrings ever reported for Djibouti.

The maximum group size reported by Laurent (1989) was 20 gazelles.

Although the distribution of *G.soemmerringi* in Djibouti is much more patchy and the total number much smaller than that of *G.d.pelzelni*, all these data indicate that this gazelle is also widespread in the country.

Photo 6. *Gazella soemmerringi* in Djibouti (photo: T. Künzel)

2.1.6.2 Population estimate

There are no data available to be used for a statistically sound population estimate, and the patchy distribution of *G.soemmerringi* does not allow us to use an estimation procedure as we did in the case of *G.d.pelzelni*.

Despite this drawback we can get a preliminary idea of the total Soemmerring population in Djibouti using the relationship between all genuine records of 657 Pelzeln and 190 Soemmerring gazelles seen during the survey, resulting in a relation factor of ca. 0.3, and taking into account the patchy distribution of this species.

The relation factor 0.3 is used (1) to estimate the relation between the population sizes of the two species, and (2) as an expression of the patchyness of *G.soemmerringi* in relation to the area inhabited more or less evenly by *G.d.pelzelni*.

Regarding the population size, the relation factor 0.3 means that the size of the Soemmerring population is ca. 30 % of the size of the total dorcas population. Linking up this factor with the estimated total of 4.000 dorcas results in a total Soemmerring population of ca. 1300 gazelles.

Using the relation factor 0.3 to express the patchy occurrence of *G.soemmerringi* means that the area inhabited by *G.soemmerringi* is only 30 % of the area inhabited by *G.d.pelzelni*.

Therefore the estimation of the total population of *G.soemmerringi* as 30 % of 1.300 *G.d.pelzelni* results in ca. 400 Soemmerring gazelles as a minimum.

2.1.6.3 Status and threat

The status of the world population of *G. soemmerringi* is assessed as "vulnerable" in the 1996 IUCN Red List.

G.soemmerringi was formerly the most abundant and widespread of gazelles in the Ogaden, Eritrea and much of Somalia. Its populations in Sudan, Somalia and parts of Ethiopia have been strongly reduced by uncontrolled hunting and degradation of rangeland by overstocking with livestock.(East, 1998, Bolton, 1973).

Even the Soemmerring population in Djibouti has been substantially reduced by hunting before independence in 1977 (Blot, 1986).

Laurent (1989) regards *G. soemmerringi* as occurring in many regions in the country. The highest concentration of Soemmerring's seen by him was 20 gazelles.

Our recent records of strong congregations of Soemmerring's in W Djibouti (54 gazelles in Ouaidilou, 30 gazelles in Biida) and in S Djibouti (51 gazelles in Petit Bara) in comparison to the former records signal a process of successful recovery for this species.

Even the authors of this report, M. Rayaleh, a citizen of Djibouti, and the Künzels who lived in Djibouti from 1992-96, had never before seen such high concentrations of Soemmerring's as during this survey.

The future situation of the Soemmerring population in Djibouti is dependent on the development of the numbers of livestock in the country, but it seems to us that there is still some potential for increasing the Soemmerring population if the hunting ban is maintained.

Nevertheless, Soemmerring's gazelle seems to be one of the most vulnerable ungulates in Djibouti.

The reasons for this are on the one hand their big size and their bright colour, and on the other hand their habit of gathering in large congregations. These attributes make them very attractive to be chased by "wildlife lovers" who do not respect the animals' need for freedom and an undisturbed environment.

Evidence of such chasing which we found during our survey was as follows: (1) "Photo-tourists" in an army helicopter scattered the large congregation in Ouaidilou (information from local herdsman), (2) Gazelle chasing using a cross country car seems to be a type of "sport" for some people. We observed this type of "sport" in Petit Bara. The people using the car broke up the chase when we approached them closely with our own car.

Activities like these can be reduced by publishing articles in newspapers and making TV contributions, as Monsieur H.A.Rayaleh (second author) has done already for our survey findings.

Such educational activities are also needed to convince the people in Djibouti that wildlife conservation will never endanger the traditional activities of livestock keeping.

Most important conservation means for *Gazella soemmerringi* is still the hunting ban.

Further conservation activities proposed for the long term maintenance of Soemmerring's gazelle in Djibouti are outlined in App. A.

2.1.6.4 Résumé

Distribution and population estimate

- The population of *G. soemmerringi* is widespread in Djibouti, but shows a very patchy distribution inhabiting mainly larger baras.
- The highest congregations we found were in Ouaidilou in W Djibouti (54 gazelles), and in Petit Bara in S Djibouti (51 gazelles).
- The number of genuine records of Soemmerring's during the survey is 190.
- The minimum size of the population is estimated as ca. 400 gazelles.

Status and conservation

- Arid adapted endemic to Horn of Africa.
- The population of *G.soemmerringi* in Djibouti shows signs of a recovery after independence in 1977.
- *G. soemmerringi* seems to be one of the most vulnerable ungulates in Djibouti.
- The most important conservation measure is the effective hunting ban.
- We believe that there are good chances that the Soemmerring population can grow up to double the present population size, if the hunting ban is maintained.
- Detailed conservation measures are proposed under App. A.

2.1.7 Litocranius walleri (Gerenuk)

2.1.7.1 Systematic

After Kingdon (1998) two subspecies are listed. A skull found in Grand Bara in Djibouti during the survey has been taxonomically analysed and identified by Kock (pers. communic.) as the subspecies *L.w.sclateri*. This is the first scientifically confirmed identification of this subspecies for Djibouti.

2.1.7.2 Distribution

The gerenuk occurs in E Africa from N Tanzania to Djibouti, where it reaches the northern limit of its continental distribution in the arid thornbush of southern Djibouti. It has strongholds in Kenya and Ethiopia (East, 1998).

The total number of gerenuks seen during our survey is 77, from which 64 are regarded as genuine records (App. G).

All our gerenuk records are confined to southern Djibouti. The most northerly record comes from N 11°26' E 42°43' in Ouaid south of Ghoubbet.

Highest numbers of *Litocranius walleri* were seen during the survey in SE Gobaad.

Dr. Bredon (pers. communic.) counted in one day in December 1999 a total of 20 gerenuk in the area between Ouadjalé and Djalelo in Petit Bara.

After Laurent (1989) *L. walleri* does not occur in the SSE of Djibouti, and his map does not show any record south of an imaginary line between Ali Sabieh and Djibouti city.

South of this line, in the foot-hills of Boura between Assamo and Ali Addé, we recorded 7 (1,1,5) gerenuks.

Nevertheless, based on the present information we assume that the occurrence of *L. walleri* in Djibouti is restricted to a relatively small zone only, corresponding to ca. 15% (ca. 3500 sq km) of the whole area of Djibouti.

This zone is bordered in the North by an imaginary line from Ghoubbet to Lac Abhé, and in the South by an imaginary line from Guistir to Djibouti city.

2.1.7.3 Population estimate

There are no proper data available which could be used for an accurate density estimation.

East (1998), based on literature research gives estimates of 0.5 gerenuks per sq km for areas where the species is known to be common and 0.05 per sq km elsewhere.

Using the density of 0.05 per sq km as a conservative approach for the gerenuk population which inhabits an area of ca. 3.500 sq km in Djibouti as estimated above, we come to a total population of 175 animals.

We regard this as a reasonable minimum estimate.

2.1.7.4 Status and threat

Regarding its whole distribution range in E Africa the gerenuk is still widespread and not endangered. although it is already eliminated from parts of its historical range (East, 1998, Kingdon, 1997). It is listed in the 1996 IUCN Red List as "conservation dependent".

In Djibouti the hunting ban ensured a certain recovery of the population since independence in 1977, at least until 1989, when Laurent made his observations.

This situation might have changed during the last decade.

The first author has been living in Djibouti from 1992-96. It seems to him, that since then the gerenuk population has declined substantially, at least in the sector between Ouea (S of Arta)

and Grand Bara. In contrast to frequent gerenuk observation in this sector during 1992-96 there were only a few observations during our survey.

In the light of its small area of occupancy in Djibouti and the gerenuk's sensitivity to disturbance it seems to be the most endangered ungulate in the country.

Further conservation activities for the long term maintenance of the gerenuk in Djibouti are outlined in App. A.

2.1.7.5 Résumé

Systematic

- A skull found during the survey in Petit Bara has been taxonomical identified as belonging to the subspecies *L.w.sclateri*. This is the first scientifically confirmed identification of this species for Djibouti.

Distribution and population estimate

- Its area of occupancy covers only 15 % (ca. 3.500 sq km) of Djibouti. This sector is defined to the North by an imaginary line between Ghoubbet and Lac Abhé, and to the South by an imaginary line from Guistir to Hol Hol and Djibouti city.
- Best densities were found in E Gobaad.
- The total of genuine records seen during the survey is 64 animals.
- The total population is estimated to be a minimum of 175 gerenuks, corresponding to a density of 0.05 animals per sq km.

Status and conservation

- After a recovery since independence in 1977 the population seems to have decreased during the last decade.
- Regarding its small area of occupancy in Djibouti and the gerenuk's sensitivity to disturbance it seems to be the most endangered ungulate in the country.
- Detailed conservation activities are proposed in App. A.

2.2 Ungulates probably occurring in Djibouti not seen during the survey

2.2.1 Equus africanus (Wild ass)

The former distribution range of *E. africanus* stretched along the coasts of the Gulf of Aden and the Red Sea, from NW Somalia through northern Ethiopia, Djibouti, Eritrea, Sudan to SE Egypt. (Denzau & Denzau, 1999).

E. africanus is assessed as "critically endangered" in the 1996 IUCN Red List.

The Ethiopian highlands reaching the Red Sea coast in N Eritrea function as a geographical barrier between *E.a.africanus* (Nubian wild ass) north of it and *E.a.somalicus* (Somali wild ass) south of it (Denzau & Denzau, 1999).

The Nubian wild ass seems to be extinct (Yalden et al., 1986).

After Moehlmann (1992) the recent existence of the Somali wild ass is restricted to very small areas in eastern Ethiopia and northern Somalia, counting not more than a few 100 animals, and its occurrence in western parts of Djibouti until ca. 1980 seems to be realistic.

Denzau & Denzau (1999) describe observations of Somali wild ass in eastern Ethiopia, in 1994, directly in front of the border with western Djibouti. They also mention the recent existence of this species on the Ethiopian side of the mountain Moussa Ali, which SE areas belong to Djibouti.

The same authors report that the Somali wild ass hide during the day time in rocky mountainous areas to avoid the hunting pressure, and come down into the valleys for feeding at night only. Denzaus mentions hunting pressure as the most important threat for this species.

Denzaus' sightings of wild asses in the area of the border between Ethiopia and Djibouti have to be taken as strong hints for the current existence of this species in western parts of Djibouti.

Simoneau (1974) describes the very rare occurrence of the wild ass for Djibouti around Moussa Ali and in other northern parts of the country. But it seems, that he never saw a wild ass himself.

Unfortunately, during all our survey activities in Djibouti we have not seen any wild ass, and all information from local people regarding the occurrence of wild ass has been very vague. They gave us the impression that they know nothing about the existence of a wild ass.

Despite this negative result of our survey, we still believe that small numbers of Somali wild ass may exist in Djibouti along the border with Ethiopia. The region north of Lac Abhé and the hills of Moussa Ali are the most promising targets for further investigations.

Our strongest argument for this positive opinion is the undoubted existence of the wild ass in Ethiopia near the Djiboutian border and the realistic possibility that these animals could use the Djiboutian site to avoid hunting pressure in Ethiopia.

2.2.2 Oryx beisa (Beisa oryx)

The beisa oryx occurs in E Africa in partly isolated populations from Tanzania to Ethiopia. Its status is assessed as "lower risk" in 1996 IUCN Red List.

The occurrence of this species in Djibouti was described by Simoneau (1974) for the western region (from Lac Abhé north to the plateau of Gamarré) along the border with Ethiopia, and for Gobaad in SW Djibouti.

Laurent (1989), during his many field excursions in Djibouti, saw oryx on the Gamarré plateau only, and reports a maximum of 12 animals seen in May 1986.

During our survey we did not see oryx antelopes, but members of the Djiboutian armed forces provided a credible report about an excursion in 1987, where 3 oryx were caught alive on the Gamarré plateau and kept in captivity until they died after some months in a garden in Arta.

We assume that the occurrence of *O. beisa* in Djibouti, north of Lac Abhé, along the border with Ethiopia is a sporadic event depending on favourable feeding conditions which attract oryx to cross from adjacent Ethiopia into Djibouti.

2.3 Other ungulates of interest

Species	Information
2.3.1 <i>Equus grevyi</i> (Grevy's zebra)	After Simoneau (1974) periodic occurrence in N Djibouti. Local herdsmen deny the zebra's present existence in Djibouti.
2.3.2 <i>Phacochoerus aethiopicus</i> (Desert warthog)	Hints from local herdsmen about the occurrence of warthogs in southern Djibouti along the border with Somalia could refer to <i>P.a. delameri</i> (see § 2.1.1). A skull of a warthog from this area would clarify the situation.
2.3.3 <i>Tragelaphus strepsiceros</i> (Greater Kudu)	Simoneau (1974) mentions its possible occurrence in SE Djibouti between Assamo and Guistir. A former French hunter reported its occurrence ca. 30 years ago in the same area but on the Ethiopian side. Blot (1986) reported that the last Kudu was shot 1974 in Foret de Day. Local herdsmen deny the Kudu's present existence in Djibouti.
2.3.4 <i>Sylvicapra grimmia</i> (Bush duiker)	Mentioned by Simoneau (1974) as occurring in E and N of Djibouti. One observation mentioned by Blot (1986) for 1981-85 in Foret de Day. The species is not known by local herdsmen.
2.3.5 <i>Ammodorcas clarkei</i> (Dibatag)	Mentioned by Simoneau (1974) as occurring very rarely in SE Djibouti. The species is not known by local herdsmen.
2.3.6 <i>Alcelaphus buselaphus</i> (Hartebeest)	<i>A.b. swaynei</i> was mentioned by Simoneau (1974) as occurring in SE Djibouti around Assamo and Guistir. The species is not known by local herdsmen.

3. Larger non-ungulate mammals

3.1 Larger non-ungulate mammals seen during the survey

3.1.1 Papio hamadryas (Sacred baboon)

The hamadryas baboon occurs in Africa only around the so-called Afar triangle along the southern Red Sea coast between N Somalia and Sudan, ranging through E Ethiopia.

The baboon's special liking for agricultural products leads to conflicts with farmers, and it is listed in the IUCN Red List as near "threatened".

During our survey we saw troops of *Papio hamadryas* in different regions and the troops mainly consisted of large numbers. All troops were with babies.

We found highest densities in the Goda mountains, which signals the preference of this species for hilly areas.

A total of 621 Sacred Baboons was recorded during the survey. In most cases we were not able to count the full number of baboons belonging to one troop. For these cases we assumed a number of 20 per troop, which we regard as a minimum (Table 3).

Comparing the number of baboons and of Pelzeln gazelles counted during the survey, and taking into account that both species are widespread in Djibouti, and that the baboons have their strongholds in mountainous areas, and do not seem to be equally distributed as the Pelzeln gazelles, than we get the impression that the minimum total number of baboons is at least 50 % of the number of Pelzeln gazelles.

Therefore we estimate the total population of *Papio hamadryas* living in Djibouti to be a minimum of 2,000 individuals.

The climate of Djibouti does not allow much agricultural activities, except horticultural projects in the Goda mountains. Which in turn means that the baboons in most parts of the country (except around the gardens) are not regarded by Djiboutian as vermin, and so in general there does not exist a big threat for the baboons in Djibouti. The population seems to be stable at this high level.

Table: 3. Baboons recorded during the survey

PH-Record No.	Date, Time	Position	Site	Number
1	23/10/99 07:20	N 11°04'5" E 42°45'2"	Ouarabaléi (Ali Sabieh – Assamo)	(20)
2	29/10/99 13:10		Balamballéi – Dikhil	(20)
3	08/11/99 12:25	N 11°04'8" E 42°46'6"	Dadin, 820m (Ali Sabieh – Assamo)	150
4	16/11/99 09:40		E Gobaad (Anabo Koma – Dikhil)	28
5	27/11/99 11:45		Hol Hol – Chabelléi	(20)
6	05/12/99 11:15		Arta	(20)
7	06/12/99 09:20		Maraoulé (Tadjoura – Randa)	(20)
8	07/12/99 16:30	N 11°46'2" E 42°39'1"	close to old governors house (Foret de Day)	14
9	08/12/99 13:30		hills E of old governors house (Foret de Day)	20
10	09/12		hills W of old governors house (Foret de Day)	5 troops (100)
11	10/12/99 11:20		Hemallé – Randa	2 troops (40)
12	17/12/99 14:20		Eguer Aléita (Petit Bara – Lac Assal)	(20)
13	19/12/99 17:30	N 12°21'8" E 42°29'7"	Ansé (S of Moussa Ali)	49
14	23/12/99 15:00	N 11°46'9" E 42°41'7"	close to Camp-21 in Dittilou	(20)
15	24/12/99		hills S of Camp-21 in Dittilou	3 troops (60)
16	25/12/99		hills NE of Camp-21 in Dittilou	(20)
Total:				621

3.1.2 Cercopithecus aethiops (Grivet monkey)

The small, longtailed grivet monkey is by far the most numerous and widespread guenon in Africa, and is not threatened (Kingdon, 1997).

The genus name was changed by Groves (1989) to *Chlorocebus*, and Rowe (1996) mentions 22 subspecies from which 4 might be valid species. One of them is *Chlorocebus aethiops aethiops*.

The population of *C. aethiops* in the mountainous areas along the north coast of the Gulf of Tadjoura might have been isolated for a long time, and could have developed into a taxonomically distinguishable subspecies. A scientific investigation has not yet been done.

Photo 7. *Cercopithecus aethiops* (Grivet monkey) in captivity in Djibouti (photo: J.Pabst,

alias Paulus).

According to information from the local population around Tadjoura, Dittilou and Randa the vervet monkey occurs in Djibouti in the Goda and Mabla mountains.

During our survey we observed this monkey in the Goda mountains around the old governor's house in Foret de Day and around Dittilou.

Around Dittilou we saw in one day more than 50 grivet monkeys. In the light of our findings, the estimated total of 150 – 200 grivet monkeys for the whole of Djibouti as mentioned by Baragoita (1999) seems much to low.

After Estes (1991) the grivet monkey is very much dependent on the existence of forested areas, and cannot afford to venture far from the safety of trees.

Table 4: Group size and home range of *Cercopithecus aethiops*

Author	Group Size (x: average)	Home range in ha (x: average)
Struhsaker (1967)	8 – 50 (x: 25) 6 – 21 (x: 11)	18 – 76 ---
Melnick & Pearl (1987)	---	18 – 96 (x: 42 ha)
Fedigan & Fedigan (1988)	5 – 76	---
used in this report	10	100

A rough estimation of the area of the Goda and Mabla mountains where the tree vegetation meets the needs of grivet monkeys, results in a minimum of ca.75 sq km.

After Table 4 we estimate that a minimum group of 10 vervets needs a minimum area of 100 ha (contiguous boundaries with other groups).

From this information and assumptions we estimate a minimum of 750 animals for the total population of *Cercopithecus aethiops* in the Goda and Mabla mountains.

Their status in Djibouti might be stable, but they are not very much liked by the farmers and gardeners in the Goda mountains.

They are often found in the same areas as baboons, which are occasional predators of young vervets. Other serious potential predators could be the caracal, larger eagles such as *Aquila verreauxi*, and the leopard (Estes, 1991). All of these exist in the Goda mountains.

3.1.3 Lepus capensis (Cape hare)

The distribution area of the Cape hare covers nearly the whole of Africa except the inner tropics. This species is not endangered (not mentioned in 1996 IUCN Red List).

This species seems to be very nocturnal, and therefore our observations (Table 5) do not reflect its actual distribution and abundance in Djibouti.

We assume that the Cape hare occurs everywhere in Djibouti except in mountainous areas. It seems to us that it prefers wadis with shrub vegetation rather than open grass plains. We cannot see any danger for this species in Djibouti.

Table 5. Records of *Lepus capensis* observed during the survey

Date	Position	Site	Number
31/10/99	N 10°58'8" E 41°58'7"	in wadi around Sadli (W Gobaad)	4
13/11/99	N 11°20'1" E 42°01'8"	Harrougo (N of Ouaidilao)	1
25/11/99	N 11°19'3" E 43°04'5"	Biidléi	1
13/12/99	N 11°04'0" E 42°52'0"	close to Camp-17 in foot-hills of Boura mountains	1

10/01/00		Handoga (NE Gobaad)	1
total: 8			

3.1.4 Xerus rutilus (Unstriped ground squirrel)

The unstriped ground squirrel is endemic to the Horn of Africa, but everywhere in its distribution range common (Kingdon, 1997). It is not mentioned in 1996 IUCN Red List.

During our survey in Djibouti we did not really search for squirrels, but saw one in Handoga (E Gobaad) and one around Téwo (Hanlé).

Künzel & Künzel (unpublished) during 1992-96 saw squirrels often in Douda wadi (SE of Djibouti city) and in Didjan Der (NE Petit Bara).

We assume that it is widespread in the country, and is not endangered.

3.1.5 Pectinator spekei (Pectinator)

Pectinator spekei is endemic to the Horn of Africa (Kingdon, 1997). It is not endangered (not mentioned in IUCN Red List).

The pectinator can be easily overlooked. During the survey we did not really search for the species, but recorded it in different regions (Table 6).

Photo 8. *Pectinator spekei* (Pectinator) in Djibouti (photo: T. Künzel)

Table 6. Records of *Pectinator spekei* observed during the survey

Date	Position, Altitude	Site	Number
24/10/99		Ouarabaléi (Ali Sabieh - Assamo)	2
26/10/99	N 11°02'4" E 42°46'7"	SW hills of Arréi, 1.040m (Ali Sabieh – Assamo)	1
26/11/99	N 11°05'1" E 42°54'2"	SE of Boura (Ali Addé – Guistir)	3
10/12/99		Garrassou (E of Randa)	6
13/12/99		Boura hills	2
total: 14			

We assume that the species is widespread in Djibouti over all altitudes especially occupying rocky hills and wadis.

3.1.6 Lophiomys imhausi (Maned rat)

The maned rat is confined to the Arabian Peninsula and N Africa, where it ranges from Sudan to Kenya. It is rare and little known (Kingdon, 1997). Not mentioned in IUCN Red List.

Photo 9. *Lophiomys imhausi* (Maned rat) dead on road in Djibouti (photo: T. Künzel)

The occurrence of the maned rat in Djibouti was first described by Kock & Künzel (1999), based on two specimens found in 1993 dead along the road ca. 12 km SW of Ouea.

During our survey we saw one maned rat only. This observation was made in the hills around Dittilou. The maned rat was seen in rocky habitat in the vicinity of hyraxes. The co-occurrence of rock hyraxes and maned rats was mentioned previously by Kingdon (1997).

Two specimens were caught around Dittilou in September 1999 (Magin, 2000).

We assume that the maned rat occurs widely in Djibouti especially in rocky areas, but it is difficult to observe due to its mainly nocturnal activities.

3.1.7 Canis aureus (Common jackal)

The common jackal is not endangered (not listed in IUCN Red List), and its distribution range in Africa covers the whole northern half of the continent from the Mediterranean coast to the Sahel including Tanzania, Kenya and the Horn in East Africa.

In Djibouti the common jackal seems to be the most abundant species among the larger carnivores, and occurs widely.

Photo 10. *Canis aureus* (Common jackal) in Djibouti (photo: T. Künzel)

During our survey we saw a total of 15 individuals (Table 7), most of them in the early morning and late afternoon hours.

The status of the population of *Canis aureus* seems to be stable in Djibouti, but the population suffers when local administrations or private people execute poisoning activities mainly directed to eliminate hyaenas.

Table 7: Records of *Canis aureus* observed during the survey.

Date	Position	Site	Number
24/10/99	N 11°02'3" E 42°47'8"	Deg Ouéin (Ali Sabieh to Assamo)	2
29/10/99 17:15	N 11°06'0" E 41°54'0"	As Bahaltou (SE of Lac Abhé)	1
30/10/99 11:00	N 11°10'5" E 41°52'2"	Lac Abhé	2
31/10/99 07:45 – 09:20		Tammiro to Sadli (W Gobaad)	3
09/11/99 17:30	N 11°33'7"	Anabo Koma (NW Hanlé)	2
24/11/99 12:45	N 11°15'0" E 43°00'0"	Ouahayyi (Hol Hol to Biidléi)	1
25/11/99 07:00	N 11°19'3" E 43°04'5"	Biidléi	2
12/12/99 night	N 11°09'0" E 42°43'0"	SE of Ali Sabieh	voice
21/12/99 17:00	N 12°05'0" E 42°21'6"	Darona (W of Dorra)	1
total: 14			

3.1.8 Canis mesomelas (Black-backed jackal)

The distribution area of the black-backed jackal in Africa covers S Africa, E Africa and the Horn. It is not endangered (Kingdon, 1997), and not listed in the 1996 IUCN Red List.

During the survey we saw only one black-backed jackal (02/11/99: N 11°04'1" E 42°05'9" in S Débné in SW Djibouti).

Like the common jackal, the black-backed suffers from poisoning activities, but we do not think that the species is in danger in Djibouti.

3.1.9 Vulpes rueppelli (Ruppell's fox)

The distribution range of Ruppell's fox in Africa covers the northern part of the continent from central Sahara to the Mediterranean coast, including a small strip along the Red Sea coast to NW Somalia in the South (Kingdon, 1997).

The species status is not known . In the 1996 IUCN Red List it is listed under "data deficient", and its occurrence in Djibouti is not mentioned.

The only record of this small nocturnal fox during the survey is one specimen found dead along the road-side ca.12 km west of Djibouti city.

The Künzels saw during their numerous excursions in S Djibouti between 1992-96 no more than 3 specimens of Rüppell's fox. These observations were always made in the early night time along the roads.

Its population size in Djibouti is probably larger than expected from the number of observations because of its nocturnal activities.

3.1.10 Herpestes sanguinea (Slender mongoose)

This small mongoose occurs in Africa everywhere south of the Sahara except the far South. It is not endangered (not listed in the IUCN Red List):

During our survey we saw the slender mongoose only twice, 1 around Sounnati (SW Djibouti), and 1 around Dittilou in the Goda mountains.

During 1992-96 the Künzels saw this species around Arta, and in the wadis between Ali Sabieh and Hol Hol.

We assume that this species, mostly overlooked in the country, is widespread in Djibouti.

3.1.11 Ichneumia albicauda (White-tailed mongoose)

Widespread in Africa south of Sahara, except the rainforest and SW Africa. This species is not endangered (not listed in the IUCN Red List).

Live specimens of the white-tailed mongoose were seen twice during the survey in the Goda mountains and in SE Djibouti (Tab 8). In both cases this exclusively nocturnal species was observed at night after being attracted by food in the Camp. An additional specimen was found dead along the roadside E of Dikhil in Balamballéi.

Table 8 : Records of *Ichneumia albicauda* observed during the survey.

Date	Position	Site	Number
26/10/99 at night	N 11°02'3" E 42°47'8"	Deg Ouéin (Ali Sabieh to Assamo)	1
09/12/99 at night	N 11°46'2" E 42°39'1"	Foret de Day 1.360 m	1
14/01/00	N 11°07'5" E 42°25'2"	Balamballéi	1 (dead)
total: 3			

Between 1992-96 the Künzels saw the white-tailed mongoose relatively often during late evenings in different places inside Djibouti city.

We assume that the species is widespread in Djibouti, and it seems to be able to adapt itself well to villages and cities.

3.1.12 Hyaena hyaena (Striped hyaena)

The distribution range of the striped hyaena in Africa covers the whole northern part from Sahel to the Mediterranean coast, and parts of E Africa. Over most of this range it has declined and has already disappeared from some areas. Not listed in IUCN Red List.

Information from the local population indicates that the striped hyaena is still widespread in Djibouti, though in small numbers only.

During the survey we saw only one specimen of *Hyaena hyaena* (26/10/99, 17:30, N 11° 12' E 42°41' in Hambokto N of Ali Sabieh).

Although *Hyaena hyaena* is not regarded by the local livestock keepers as being as dangerous as *Crocuta crocuta*, the striped hyaena population suffers equally from poisoning activities.

Its population is in danger being further reduced to very low numbers in Djibouti.

3.1.13 Crocuta crocuta (Spotted hyaena)

The distribution range of the spotted hyaena covers most of non-forested Africa south of the Sahara, except South Africa. It is listed in The IUCN Red List of 1996 as "conservation dependent". Its populations decline in all areas due to its bad name as vermin. This species might not be able to survive outside conservation areas (Kingdon, 1997).

Information which we received during our survey from the local population indicates that *Crocuta crocuta* is still widespread in Djibouti, though in small numbers only.

We saw only one spotted hyaena alive during our survey (09/11/99: N 11°33'7" E 41°56'3", 140m, Agna). The hyaena came close to Camp-26 around 22:00, and was identified in the light of our torchlights and by its characteristic voice.

In the hills of mount Arréi (22/10/99: N 11°03'9" E 42°44'5", 900m) we found a fresh carcass of a spotted hyaena. We assume that this hyaena was a victim of poisoning activities of the local administration.

Our guardian of Camp-6 saw 2 spotted hyaenas close to our Camp in the Dadin hills.

We heard the voice of the spotted hyaena in Biida (SW Djibouti).

This species is vulnerable to poisoning and therefore in danger of being reduced to very low numbers in the country.

3.1.14 Genetta genetta (Common genet)

Genetta genetta is the most widely distributed species of the genus *Genetta* in Africa.

This species becomes very tame in captivity, and can be found in Djibouti offered for sale (illegal) in Djibouti city or Ali Sabieh.

During the survey we saw *G. genetta* only in the forest around Dittilou, where one or two of them nearly every night visited our camp, being attracted by food.

The Künzels found one genet dead along the road side between Ouea and Petit Bara in 1993 (photo 11).

Photo 11. *Genetta genetta* (Common genet) dead along road in Djibouti (photo: S. Künzel)

We assume that *G.genetta* occurs widely in Djibouti and in significant numbers, and that its population is not endangered.

3.1.15 Civettictis civetta (African civet)

Until the recent past 4 subspecies of *C.civetta* have been described by science.

A skull from a civet (run over by a car) collected during the survey in SE Djibouti has been taxonomically investigated by Kock (Kock et al., accepted for publication) and found to belong to a subspecies hitherto unknown to science.

The animal was found on December 12th, 1999, in Douda Wadi (N 11°32' E 43°10'), ca. 5 km SSE of Djibouti city and ca. 2 km from the coast.

In recognition of the efforts of Monsieur Johann Pabst (alias Paulus), Djibouti, to save animals alive for conservation of Djibouti's fauna or dead for scientific studies (as he did with the civet), the new subspecies is named *Civettictis civetta pauli*.

After Kingdon (1997) the African civet occurs in the whole Africa S of the Sahara except S Africa and the Horn of Africa including Djibouti.

Simoneau (1974) reported *C.civetta* from Djibouti. Magin (2000) reports the finding of civet latrines.

3.1.16 Hyracoidea (Hyraxes)

After Kingdon (1997) two species occur possibly in Djibouti: *Heterohyrax brucei* (a bush hyrax) and *Procavia habessinica* (a rock hyrax). Magin (2000) lists *H. brucei* and *P. capensis*, which after Kingdon (1997) is restricted to S Africa.

Neither of these species is endangered (not mentioned in 1996 IUCN Red List).

Hyraxes are widespread and abundant in Djibouti, and were seen during the survey quiet often in rocky areas in altitudes from nearly sea level to ca. 1,400 m in Foret de Day.

3.2 Larger non-ungulate mammals occurring in Djibouti not seen during the survey

3.2.1 Hystrix cristata (Crested porcupine)

Occurs in Africa everywhere north of equator except the Sahara (Kingdon, 1997), and is listed in 1996 IUCN Red List as "near threatened".

During the survey we found one dead porcupine in Dittilou, and found its spines nearly everywhere in the country.

We assume that it is widespread in Djibouti.

3.2.2 Ictonyx striatus (Zorilla)

The zorilla occurs everywhere in Africa south of the Sahara except in the rain forest zone (Kingdon, 1997), and is not endangered (not listed in 1996 IUCN Red List).

This species' occurrence in Djibouti was first mentioned by Simoneau (1974) who stated that it was often seen crossing roads and was quite common around Arta.

During 1992-96 the Künzels (unpublished) found at least two dead zorillas along road sides.

We assume that the zorilla is widespread and not rare in Djibouti, but it is rarely seen because of its nocturnal behaviour.

3.2.3 Mellivora capensis (Ratel)

Widespread in Africa south of the Sahara (Kingdon, 1997), but increasingly rare or totally absent in same areas. Not listed in 1996 IUCN Red List.

One record for Djibouti was mentioned by Welch & Welch (1984). One specimen was brought to the wildlife rescue station of Monsieur Pabst (alias Paulus) in 2000, and still lives there.

We assume that this species is not very numerous in Djibouti.

3.2.4 Felis sylvestris (Wild cat)

The wild cat occurs in Africa everywhere except the Sahara and the rain forest (Kingdon, 1997), and it is not endangered (not mentioned in 1996 IUCN Red List).

The wild cat was not observed during the survey. But in 1992-96 the Künzels (unpublished) found in SE Djibouti a dead specimen run over by a car. The carcass was photographed and the photo inspected by Dr. D.W. Yalden (University of Manchester, U.K.). He wrote: "The thin and rather short tail looks decidedly *lybica* to me. However, in our Catalogue, we suggest *ocreata* might be more appropriate for the race in N.E. Africa, if there is a distinction to be made."

We assume that the wild cat is widespread in Djibouti. A certain threat might arise from hybridisation with domestic cats.

3.2.5 Felis caracal (Caracal)

The caracal occurs everywhere in Africa except the Sahara and the rain forest (Kingdon, 1997), and it is not endangered (not mentioned in 1996 IUCN Red List).

According to Simoneau (1974) the caracal is widespread in Djibouti.

The Künzels (unpublished) in 1992-96 found one dead caracal near Arta in S Djibouti (see Photo 12).

Photo 12. *Felis caracal* (Caracal) dead along road in Djibouti (photo: T. Künzel)

During the survey we did not see the caracal, but received in nearly all areas information from local herdsman about its occurrence.

The caracal is thought by herdsman to prey on young goats and sheep, and it is a victim of poisoning activities.

3.2.6 Panthera pardus (Leopard)

In Africa south of the Sahara the leopard survives in small numbers in many regions in spite of intense persecution (Kingdon, 1997). Only its N African subspecies is listed as "critically

endangered" in the 1996 IUCN Red List, but the species is subject to local depletion through exploitation and loss of habitat.

The international trade in leopard skins is regulated by the CITES convention. This convention has been signed by the Djibouti Government, but the trade in leopard skins in the tourist shops in Djibouti city is still in full swing in public.

During one day around Christmas 1999 the Künzels (unpublished) counted 44 leopard skins in the tourist shops in Djibouti city. The origin of the skins is not known, but certainly they come from other E African countries.

It is high time that the Djiboutian authorities took appropriate action to stop these illegal activities.

Most of these skins are purchased by French military personnel who seem to have no difficulty to smuggle these skins illegal to Europe by uncontrolled military transports.

Simoneau (1974) showed that the leopard occurs in many parts of Djibouti.

The present occurrence of the leopard in Djibouti is confirmed at least for the Goda mountains, where we received many hints from local people about its existence. In the village, called the Colony, in Foret de Day we saw a leopard skin, which seemed to be relatively fresh. This skin was said to be from a leopard which had been trapped and killed in the first half of 1999. The same informant told us that together with the first one a second leopard was caught but escaped from the trap.

Magin (2000) mentions further numerous indications for the existence of the leopard in the Goda mountains.

The leopard is thought by local herdsmen to be very dangerous to their livestock, and therefore is the target for intense persecution. We fear that this species might not be able to survive in Djibouti except in a protected area in the Goda mountains, where a long-planned National Park still waits for its realisation.

3.3 Other larger non-ungulate mammals of interest

Species	Information
3.3.1 <i>Herpestes ichneumon</i> (Ichneumon mongoose)	Mentioned for Djibouti in Simoneau (1974), and occurs in adjacent areas Kingdon (1997). Present existence in Djibouti uncertain.
3.3.2 <i>Helogale parvula</i> (Dwarf mongoose)	Occurs in adjacent areas (Kingdon, 1997). Existence in Djibouti uncertain.
3.3.3 <i>Mungos mungo</i> (Banded mongoose)	Mentioned for Djibouti in Simoneau (1974), and Kingdon (1997). Present existence in Djibouti uncertain.
3.3.4 <i>Proteles cristata</i> (Aardwolf)	Mentioned for Djibouti in Simoneau (1974), and in Kingdon (1997). Present occurrence in Djibouti uncertain.
3.3.5 <i>Genetta tigrina</i> (Blotched genet)	Kingdon (1997) maps its occurrence for Djibouti. Present existence in Djibouti uncertain.
3.3.6 <i>Genetta abyssinica</i> (Ethiopian genet)	Kingdon (1997) maps its occurrence for Djibouti. Present existence in Djibouti uncertain.
3.3.7 <i>Felis serval</i> (Serval cat)	Mentioned for Djibouti in Simoneau (1974), and in Kingdon (1997). Present existence in Djibouti uncertain.

3.3.8 <i>Acinonyx jubatus</i> (Cheetah)	After Kingdon (1997) and Nowell & Jackson (1996) it occurs in Ethiopia in adjacent areas to Djibouti. Cheetahs often offered for sale in Djibouti seem to originate from Ethiopia. Local herdsman report cheetah observations in Djibouti made decades ago. Its present existence in Djibouti is very questionable.
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Appendix A: Some recommendations to maintain the natural heritage of Djibouti, and the possibly role of ZSCSP in this process

General

In the forefront of all our effort regarding the maintenance of the natural resources of Djibouti are placed the people of Djibouti.

Therefore, the elaboration and implementation of strategies and actions for the coexistence of nature and people, emphasising a sustainable development to the benefit of people has to be our logo.

Maintenance and conservation of species and populations of wildlife in Djibouti, and elsewhere, is always tight connected with the activities and traditional culture of the people who are the owner of the land.

No action whatever can be of lasting success without or against these people.

In many cases around the world where natural ecosystems are in danger or where they have been destroyed already the reason for the disaster can be found in the withdrawing from old traditional use and conservation methods.

In the case of Djibouti the most important way to use and maintain the natural ecosystem to the benefit of people and wildlife is to be found in the traditional way of pastoral livestock keeping.

Since hunting is banned by the Djibouti government since independence there does not exist a direct impact of exploitation of wildlife species, accept the direct impact of poisoning activities on predatory species like spotted hyaena and others. Unfortunately even species being rare and harmless for livestock suffer under these activities.

In the following some recommendations are given, emphasising the maintenance of ecosystems and the conservation of ungulates in co-operation with the needs of the local population.

Welch and Welch (1998) reported already on the birds of Djibouti, and propose twenty-nine detailed conservation projects mainly regarding birds and the Bankoualé palm (*Livistonia carinensis*).

Recovering and maintenance of the forest vegetation in Goda mountains

Foret de Day and adjacent areas in Goda mountains are the only region in Djibouti where a natural forest vegetation still covers a wider range.

During our survey we observed that the hills around Dittilou, especially the plateaux on top of many hills, show very strong signs of overstocking with cattle. Many plateaux are more or less free of vegetation, and erosion takes place.

Alike situation can be found in the hills around the old governor house in Foret de Day, and probably in other parts of Goda mountains and in Mabla mountains.

The vegetation/forest in these hills are used by local cattle keepers as feeding grounds for their animals since generations. The current state of degradation of this ecosystems is clearly due to overstocking by cattle.

The sustainable use methods maintaining the vegetation by an alternating closed area system as it has been in operation traditionally by the past generations is abrogated.

To avoid further devastation and to maintain these resources for future generations it is necessary to return to alternating closed area methods.

According strategies and action plans have to be elaborated in co-operation between local traditional units and governmental institutions. NGOs would have to play a very important role in this procedure.

Since long years existing plans about the conservation and development of Foret de Day have to be taken into consideration and adapted to present needs to ensure the conservation of nature within the scope of a sustainable development of the whole region.

Benefiting key species would be *O.oreotragus*, *P.a.aeliani*, *Francolinus ochropectus* (endemic to Djibouti), and other species.

See also the proposition for project No.3 in Welch and Welch (1998).

Use of the old Governor house as a research and conservation centre for Foret de Day and adjacent areas.

The old governor house in Foret de Day should be handed over into the responsibility of an NGO or an other private organisation and should be reconstructed.

Necessary financial means for the reconstruction have to be raised from international conservation organisations.

The building could be used as a centre for conservation, research and public education with special emphasis to the Foret de Day.

Running costs to maintain the building and attached facilities should come partly from the Djibouti government and partly from international organisations, institutions and universities which could use the centre for field research activities.

Establishing of a Managed Resource Protected Area to guaranty the future existence of the beira antelope in Djibouti

The term Managed Resource Protected Area is defined by IUCN as follows: "Area containing predominantly unmodified natural systems, managed to ensure long term protection and maintenance of biological diversity, while providing at the same time a sustainable flow of natural products and services to meet community needs."

The project area should cover the whole region between Ali Sabieh, Guélilé, Assamo, Guistir and Ali Addé in SE Djibouti, including the hills where beiras have been recorded.

The main target of the project should be: The long term maintenance of the ecosystem is guarantied by sustained use methods of traditional life stock keeping with special emphasis to the conservation needs for beira antelopes.

To make such a project successful needs co-operation between at least three Ministries (Environment, Tourism and Agriculture).

The Ministère de l'Environnement should have the responsibility to co-ordinate the project.

From beginning on, the project should search contacts to Ethiopian authorities with the target to establish the project jointly in adjacent areas of Djibouti and Ethiopia. In present the Djibouti government has very good contacts to the Ethiopian government, which makes this target a realistic one.

In the following a preliminary list of project activities is mentioned:

- Installing a working group in Djibouti being responsible for the planning and execution of the project.
Discussion of the project proposal between Djibouti governmental authorities and other groups – the people living in and owning the land of the relevant regions, and formulating a joint plan.
International conservation organisations should make their according expertise available to support the project activities of the Djibouti authorities.
- Establishing project contacts with the Ethiopian authorities, discussing the regional importance of the project, and checking the possibilities of bilateral execution of the project. Main objective of this activity should be the reintroduction of the hunting ban in Ethiopia for the Marmar mountains and the corridor connecting these mountains with the project area in Djibouti.
- Beira surveys in Ethiopia and in Somalia. These surveys should have the objective to identify the species present area of occupancy and to establish contacts to the local population and administration in the beira areas.
- Detailed survey on the beiras in Djibouti.
- Investigation of the socio-ecological situation between beira and domestic livestock occupying the same ecosystem since centuries.

- Elaboration of a sustainable development plan to ensure future economical improvement of the region to the benefit of the inhabitants.
- Elaboration of a beira population viability analysis.

This project has only a chance to be successful when international organisations are willing to help the Djibouti Government with financial means and expertise.

Conservation of Soemmerring's gazelle and gerenuk

Similar activities as outlined above for the beira antelope are necessary to ensure the long term existence of the two ungulates in Djibouti.

The region between Hanlé plain and the western border with Ethiopia (from Lake Abhé in the South to Fodo in the North) would be preferable for the establishment of a Managed Resource Protected Area with special emphasis to the conservation of Soemmerring's gazelle.

The distance from Ethiopian natural reserves to the proposed protected area in Djibouti is only ca. 15 km. Co-operation with Ethiopian authorities could be a beginning of joint conservation activities, hopefully resulting in protected areas on both sides of the border connected by protected corridors where hunting is prohibited.

Surveys on the occurrence, and a population viability analysis taking into consideration the Soemmerring's on both sides of the border should be encouraged.

The Gobaad plane and adjacent areas between Dikhil and Lake Abhé would be preferable for the installation of a Managed Resource Protected Area with special emphasis to the conservation of the gerenuk.

Again, a tight co-operation with Ethiopian authorities and execution of wildlife research activities as surveys on gerenuk and a population viability analysis covering both sides of the border are the most promising approaches.

We would like to mention again that Djibouti has not the financial means and the expertise to cover these, and in other reports proposed projects, without substantial support from outside.

The international donor community, interested national and international conservation organisations have to be ready to help Djibouti to maintain a natural heritage which is of importance not only for Djibouti but for the whole region.

Future conservation activities of ZSCSP in Djibouti.

According to above outlined recommendations and opinions, the authors of the report encourage the Zoological Society for the Conservation of Species and Populations (ZSCSP) to continue and possibly to intensify their engagement in co-operation with Djibouti governmental authorities and private organisations and personalities.

In all fields of conservation recommended, especially with regard to beira antelope and to Djibouti francolin, ZSCSP should be in the position to find financial means and manpower to support the effort of the Djibouti Government in this field.

Most appropriate partners for future joint activities of ZSCSP in Djibouti could be the Office de Tourisme et Artisanat, the Direction de l'Environnement and an NGO which still has to be established.

In many discussions with the Directors of the two governmental institutions mentioned, Monsieur Mohamed Ali Moumin (Environnement), and Monsieur Mohamed Abdillahi Wais (Tourisme), both gentlemen expressed their hope and sincere willingness for future co-operation with ZSCSP in the field of conservation.

Appendix B: Chronology of the records of *Phacochoerus africanus*
(PA-Records)

PHACOCHOERUS AFRICANUS (Common warthog)

Sub-Survey No. 5 (05/12 – 13/12/99)

07/12/99

Walking-tour (09:30 – 16:10) in Foret de Day, N of Camp-15 (N 11°46'2" E 42°39'1", 1.360m, close to the old governor house).

- 14:40, N 11°46'9" E 42°39'9", 1.240m PA-Record-No.1: 5 P. africanus

08/12/99

Walking-tour (08:00 – 16:50) in Foret de Day, E of Camp-15.

- 15:30, close Camp-15 PA-Record-No.2: 3 P. africanus
(2,1)

Sub-Survey No. 6 (17/12 – 26/12/99)

24/12/99

Walking-tour (08:00 – 16:30) from Camp-21 (N 11°46'9" E 42°41'7") in the hills around Dittilou and back to Camp-21.

- during walking-tour PA-Record-No.3: 12 P. africanus

25/12/99

Walking-tour (09:00 – 14:00) in the hills NE of Camp-21.

- 11:50, in 700m altitude PA-Record-No.4: 3 P.africanus

Observations of *P. africanus* recorded by Monsieur J. Pabst, alias Paulus (Director of a private wildlife rescue station in Djibouti)

August 2000

- around Bankoualé in Goda mountains PA-Record-No.5: 20 P.africanus
(4,5,5,6)

Appendix C: Chronology of the records of *Dorcatragus megalotis*

(DM-Records)

DORCATRAGUS MEGALOTIS (Beira)

Sub-Survey-No. 7. (31/12/99 – 04/01/00)

01/01/00

Walking-tour (07:30 – 14:30) from Camp-22 (N 11°04'6" E 42°45'2", 820m, south of the hill Ouarabaléi in SE Arréi) in the hills of SE Arréi

- 08:45, N 11°03'8" E 42°44'4", 960m (SE Arréi) DM-Record-No.1: 3 D. megalotis
(ad.: 1 male + 1 female, juv.: 1 male)

- 09:50, N 11°04'2" E 42°43'8", 920m (SE Arréi) DM-Record-No.2: 4 D. megalotis
(ad.: 1 male + 2 femals, juv.: 1 female)

02/01/00

Walking-tour (07:40 – 14:00) from Camp-22 in the hills of SE Arréi

- 11:45, N 11°04' E 42°44'9", 950m (SE Arréi) DM-Record-No.3: 3 D. megalotis
(ad.: 1 male + 2 females)

03/01/00

Walking-tour (08:20 – 13:30) from Camp-22 in the hills of SE Arréi

- 10:20, N 11°04'4" E 42°43'3", 1020m, (SE Arréi) DM-Record-No.4: 4 D. megalotis
(ad.: 1 male + 2 females, juv.: 1 male)

Beira observations recorded by Houssein A. Rayaleh (co-author of this report) from 1992-98 in the hills between Ali Sabieh and Assamo (M. Rayaleh has been working as teacher in Assamo from 1990-92)

1992

- January-Mai DM-Record-No.5: 5 D. megalotis

1992/93

- December 92-Mai 93 (Arréi) DM-Record-No.6: 3 D. megalotis

1996

- December (Arréi) DM-Record-No.7: 5 D. megalotis
(2,3)

1997

- January-February (Arréi) DM-Record-No.8: 17 D. megalotis
(5,3,9)

- April (Arréi) DM-Record-No.9: 7 D. megalotis
(2,2,3)

1998

- December (Arréi) DM-Record-No.10: 9 D. megalotis
(6,3)

Appendix D: Chronology of the records of Madoqua saltiana (MA-Records)

MADOQUA SALTIANA (Salt's dikdik)

* = double counting

Day Trip

15/10/99

Searching drive from Djibouti city to Petit Bara (14:15-16:15: walking tour in Didjan Der in Petit Bara), Grand Bara, Ali Sabieh and back to Djibouti city

- during-walking tour in Didjan Der MS-Record-No.1: 3 M. saltiana

Sub-Survey-No.1. (21/10 – 26/10/99)

25/10/99

07:30 – 13:45 walking-tour from Camp-2 (N 11°02'3" E 42°47'8" in Dég Ouéin) in the hills along the road between Ali Sabieh and Assamo.

- 07:30, close to Camp-2 MS-Record-No.2: 1 M. saltiana

Sub-Survey-No.2. (29/10 – 03/11/99)

31/10/99

Searching drive from Camp-4 (N 10°59'7" E 42°01' in Airo Lé Gabé) to Sadli (08:50-11:20 walking tour in Wadi Sadli) and Diksa Deré (Camp-5: N 11°05'8" E 42°12'8")

- during walking-tour in Wadi Sadli MS-Record-No.3: 3 M. saltiana
(1,2)

- 15:13, N 11°05'2" E 42°15'2" (Handoga in NE Gobaad) MS-Record-No.4: 1 M. saltiana

01/11/99

Searching drive from Camp-5 to Airoli, Ouaidilou, Camp-5, Dikhil and back to Camp-5

- 10:30, close to Camp-5 MS-Record-No.5: 2 M. saltiana

03/11/99

Searching drive from Camp-5 to Dikhil and Djibouti city

- 07:40, N 11°05'2" E 42°15'2" (Handoga in NE Gobaad) MS-Record-No.6: 1 M. saltiana*

Sub-Survey-No.3. (07/11 – 16/11/99)

11/11/99

Searching drive from Camp-7 (N 11°33'7" E 41°56'3" in Agna) to foot-hills of Aoudali Dadda (09:00-16:45 walking-tour from the lowland around Agna in 150m to 850m) and back to Camp-7

- 14:00 during walking-tour, N 11°28'1" E 41°53'9", 850m MS-Record-No.7: 4 M. saltiana

13/11/99

Searching drive from Camp-8 (N 11°33'4" E 42°06'5" in S Yaguer) to Yoboki, Hanlé, Aba, Ouaidilou (Camp-9: N 11°19'2" E 42°02'), Adaitou and back to Camp-9

- 13:19, N 11°23'7" E 41°59' (Aba) MS-Record-No.8: 2 M. saltiana
- 14:27, N 11°21'2" E 42°01'5", 500m, (E Amailé) MS-Record-No.9: 3 M. saltiana

Sub-Survey-No.4. (24/11 – 27/11/99)

24/11/99

Searching drive from Djibouti city to Hol Hol, Biidléi, Ouambarka Ouahayyi and to Aérodrôme (Camp-12: N 11°19'3" E 43°05'4")

- 13:03, N 11°19' E 43°00' (Djadjabodka Ouahayyi) MS-Record-No.10: 1 M. saltiana
- 16:20, N 11°18' E 43°06" (Biidléi) MS-Record-No.11: 1 M. saltiana

26/11/99

Searching drive from Camp-13 (N 11°05'1" E 42°54' 2" in W Qorrotalé) to Guistir, Dawwanban, Guistir, Assamo and Camp-14 (N 11°09' E 42°43' in S of Ali Sabieh)

- 09:30, N 15°03' E 42°55' (SE Gamadda Bourá) MS-Record-No.12: 2 M. saltiana
- 14:40, N 10°59' E 42°53' (W Hadádou) MS-Record-No.13: 2 M. saltiana

Sub-Survey-No.5. (05/12 – 13/12/99)

07/12/99

Walking-tour (09:30-16:10) from Camp-15 (N 11°46'2" E 42°39'1", 1360m in Foret de Day) in the hills and back to Camp-15

- 16:00 during walking tour, close to Camp-15 MS-Record-No.14: 1 M. saltiana

11/12/99

Searching drive from Tadjoura to Ali Sabieh (Camp-16: N 11°09' E 42°43') and walking-tour in Iddeita (11:50-13:30)

- 15:15, N 11°26' E 42°38' (Kourani Bour) MS-Record-No.15: 2 M. saltiana

12/12/99

Searching drive from Camp-16 to Assamo and Boura (Camp-17: N 11°04' E 42°52', 630m) and walking-tour to the top hills of Boura (13:30-16:30)

- 10:00, N 11°02' E 42°48' (Dég Ouéin) MS-Record-No.16: 11 M. saltiana
(3,1,3, 4)
- 11:20-40, N 11°02' E 42°52' (S Boura) MS-Record-No.17: 5 M. saltiana
(1,2,1,1)
- 13:40 during walking-tour, close to Camp-17 MS-Record-No.18: 2 M. saltiana

13/12/99

Walking-tour (07:40 – 12:05) from Camp-17 to the top hills of Boura and searching drive from Camp-17 to Ali Addé, Hol Hol and Djibouti

- 07:50 during walking-tour, close to Camp-17 MS-Record-No.19: 1 M. saltiana*

Sub-Survey-No.6. (17/12 – 26/12/99)

18/12/99

Searching drive from Tadjoura to Randa, As Dora, Assa Geila and Ansé (Camp-18: N 12°21'8" E 42°29'7")

- | | | |
|--|--------------------|----------------------|
| - 10:40, N 11°58'1" E 42°35'1", 800m, (N Boulla Ali) | MS-Record-No.20: 2 | M. saltiana |
| - 11:50-12:20, N 12°04' E 42°38'5" (Essalou) | MS-Record-No.21: 5 | M. saltiana
(3,2) |
| - 15:10, N 12°09' E 42°39' (Tahtahou) | MS-Record-No.22: 1 | M. saltiana |
| - 17:00, N 12°21'8" E 42°29'7" (Camp-18 in Ansé) | MS-Record-No.23: 5 | M. saltiana |

19/12/99

Searching drive from Camp-18 to Margoita (N 12°24'5" E 42°27'2" in foot hills of Moussa Ali and most northerly position), Madgoul (12:00-17:00 walking tour in Foret de Madgoul) and back to Camp-18

- | | | |
|---------------------------|--------------------|-------------|
| - 17:20, close to Camp-18 | MS-Record-No.24: 2 | M. saltiana |
|---------------------------|--------------------|-------------|

22/12/99

Searching drive from Doda (Camp-20: N 12°05'0" E 42°21'6" in N Darona) to Doho, Gamroita, Mounkour, Danis, Doda, Dorra, Randa and Tadjoura

- | | | |
|------------------------------------|--------------------|-------------|
| - 16:06, between Dorra and As Dora | MS-Record-No.25: 2 | M. saltiana |
|------------------------------------|--------------------|-------------|

23/12/99

Searching drive from Tadjoura to Dittilou (Camp-21: N 11°46'9" E 42°41'7") and walking-tour (14:00-17:00) in the hills around Dittilou

- | | | |
|---|--------------------|--------------|
| - 16:30 during walking-tour, close to Camp-21 | MS-Record-No.26: 2 | M. saltiana* |
|---|--------------------|--------------|

24/12/99

Walking-tour (08:00-16:30) from Camp-21 in the hills around Dittilou and back to Camp-21

- | | | |
|-----------------------|--------------------|-------------|
| - during walking-tour | MS-Record-No.27: 6 | M. saltiana |
|-----------------------|--------------------|-------------|

Sub-Survey-No.8. (09/01/00 – 14/01/00)**11/01/00**

Searching drive from SE Ouaidilou (Camp-24: N 11°14'8" E 42°05'2") to NW Ouaidilou, Adaitou, Guinni Bad and Biida (Camp-24: N 11°22'5" E 41°51'9", 480m)

- | | | |
|---|--------------------|-------------|
| - 11:45, N 11°20'3" E 41°56'8" (S Amaile) | MS-Record-No.28: 2 | M. saltiana |
|---|--------------------|-------------|

13/01/00

Searching drive from NW Grand Bara (Camp-26: N 11°15'4" E 42°27'9") to Hahailé, Gaggadé, Der Ela and Tikibléita (Camp-27: N 11°49' E 42°06'3")

- | | | |
|---|--------------------|-------------|
| - 08:45, N 11°17' E 42°26' (Afti Garbo) | MS-Record-No.29: 2 | M. saltiana |
|---|--------------------|-------------|

Sub-Survey-No.9. (23/01/00 – 26/01/00)**24/01/00**

Searching drive from Tadjoura to Dittilou (Camp-28: N 11°46'9" E 42°41'7") and walking-tour (11:30-16:30) in the hills around Dittilou

- | | | |
|---|--------------------|--------------|
| - 11:45 during walking-tour, close to Camp-28 | MS-Record-No.30: 3 | M. saltiana* |
|---|--------------------|--------------|

Appendix E: Chronology of the records of *Gazella dorcas* (GD-Records)

GAZELLA DORCAS PELZELNI (Pelzeln's gazelle)

- * = double counting
 ** = genuine records observed during drives with cross-country vehicle, and accepted for population estimate (genuine records observed during walking tours are unmarked)

Day Trip

14/10/99

Searching drive from Djibouti city to PK-20 (14 – 18:00 walking-tour south of PK-20) and back to Djibouti city

- during walking-tour, N 11°32' E 43°02' (S of PK 20) GD-Record-No.1: 6 G.d.pelzelni
(2,2,2)

Day Trip

15/10/99

Searching drive from Djibouti city to Petit Bara (14:15 – 16:15 walking-tour in Didjan Der in NE Petit Bara), Grand Bara, Ali Sabieh and back to Djibouti city

- 14:00, N 11°21'5" E 42°45' (SE Petit Bara, south of main road) GD-Record-No.2: 2 G.d.pelzelni

- during walking-tour, N 11°22' E 42°44' (Didjan Der) GD-Record-No.3: 11 G.d.pelzelni
(5,3,1,2)

Day Trip

17/10/99

Searching drive from Djibouti city to Petit Bara (12:00 – 16:15 walking-tour in Djalelo in SE Petit Bara) and back to Djibouti city

- during walking-tour, N 11°21' E 42°47'5" (Djalelo) GD-Record-No.4: 23 G.d.pelzelni
(2,2,3,3,2,1,1,1,3,1,2,2)

Sub-Survey-No.1. (21/10 – 26/10/99)

26/10/99

Searching drive from Dég Ouéin (Camp-2: N 11°02'3" E 42°47'8") to Ali Sabieh and Djibouti city

- 17:30, N 11°13'5" E 42°41' (Hambokto in SE Grand Bara) GD-Record-No.5: 6 G.d.pelzelni *

Sub-Survey-No.2. (29/10 – 03/11/99)

29/10/99

Searching drive from Djibouti city to Dikhil, As Ela and Lac Abhé (Camp-3: N 11°09'4" E 41°53'8")

- 11:20, N 11°20'5" E 42°44' (SE Petit Bara, south of main road) GD-Record-No.6: 1 G.d.pelzelni *

- 17:15-35, N 11°08' E 41°53'5" (Adle Dikil in NW Gobaad) GD-Record-No.7: 12 G.d.pelzelni**
(2,5,1,4)

30/10/99

Walking tour along E coast of Lac Abhé (07:20 – 11:00) and searching drive from Camp-3 to Gobaad (Camp-4: N 10°59'7" E 42°01')

- during walking-tour, N 11°11'3" E 41°52'5" (East coast Lac Abhé) GD-Record-No.8: 3 G.d.pelzelni (2,1)
- 16:15, N 11°02'2" E 41°57'3" (Kouta Bouyya in W Gobaad) GD-Record-No.9: 1 G.d.pelzelni**

31/10/99

Searching drive from Camp-4 to Sadli (08:50-11:20 walking-tour in Wadi Sadli) and Diksa Deré (Camp-5: N 11°05'8" E 42°12'8")

- 08:12 - 09:20, N 10°58'8" E 41°58'7" (Sadli in W Gobaad) GD-Record-No.10: 5 G.d.pelzelni** (2,3)
- 14:45 - 55, N 11°02'6" E 42°15'1" (between Diksa and Anabo Koma in E Gobaad) GD-Record-No.11: 6 G.d.pelzelni * (2,2,2)

01/11/99

Searching drive from Camp-5 to Airoli, Ouaidilou, Camp-5, Dikhil and back to Camp-5

- 10:30, N 11°05'8" E 42°12'8" (N of Diksa Deré in NE Gobaad) GD-Record-No.12: 3 G.d.pelzelni**
- 16:00, N 11°04'5" E 42°19'3" (Daba Der in E Gobaad) GD-Record-No.13: 8 G.d.pelzelni** (1,1,4,2)
- 17:57, N 11°05'5" E 42°16' (Bouh Barré in E Gobaad) GD-Record-No.14: 4 G.d.pelzelni *

02/11/99

Searching drive from Camp-5 to As Ela, Débné, As Ela, Dikhil and back to Camp-5

- 08:20 - 35, N 11°03'1" E 42°16'3" (close Anabo Koma in E Gobaad) GD-Record-No.15: 11 G.d.pelzelni** (3,3,2,3)
- 12:17, N 11°01'7" E 42°09' (E As Ela in Gobaad) GD-Record-No.16: 2 G.d.pelzelni**

03/11/99

Searching drive from Camp-5 to Dikhil and Djibouti city

- 07:40, N 11°06'5" E 42°17' (Handoga in NE Gobaad) GD-Record-No.17: 6 G.d.pelzelni**

Day Trip**05/11/99**

Searching drive from Djibouti city to Doralé, Khor-Ambado and back to Djibouti city

- 10:00, N 11°35' E 43°02' (Khor-Ambado) GD-Record-No.18: 6 G.d.pelzelni** (2,3,1)

Sub-Survey-No.3. (07/11 – 16/11/99)**07/11/99**

Searching drive from Djibouti city to Ali Sabieh and Dadin (Camp-6: N 11°05'7" E 42°45'4")

- 17:00, N 11°05'7" E 42°45'4" (Ouannanné: Ali Sabieh – Assamo) GD-Record-No.19: 1 G.d.pelzelni *

08/11/99

Walking-tour (07:20 – 13:50) from Camp-6 to the tops of Dadin hills

- 07:20, N 11°05'7" E 42°45'4" (Ouannané: Ali Sabieh – Assamo) GD-Record-No.20: 3 G.d.pelzelni**

09/11/99

Searching drive from Camp-6 to Ali Sabieh, Dikhil, Yoboki, and Agna (Camp-7: N 11°33'7" E 41°56'3")

- 09:18, N 11°12'8" E 42°37'8" (SE Grand Bara) GD-Record-No.21: 25 G.d.pelzelni *
(8,14,3)

- 14:50, N 11°32'5" E 42°00'5" (Gabol Damoum in NW Hanlé) GD-Record-No.22: 7 G.d.pelzelni**

- 17:00, N 11°33'7" E 41°56'3" (Anabo Koma in NW Hanlé) GD-Record-No.23: 1 G.d.pelzelni *

10/11/99

Searching drive from Camp-7 to Hombola, As Komali and back to Camp-7

- 09:10 -55, N 11°31' E 41°56'5" - N 11°34'5" E 41°50'6" (Agna - Hombola in NW Hanlé)
GD-Record-No.24: 16 G.d.pelzelni**
(1,13,1,1)

- 11:00 – 30, Hombola - Agna and retour to Camp-7 GD-Record-No.25: 9 G.d.pelzelni *
(1,1,3,3,1)

- 12:00, N 11°33'7" E 41°56'3" (Anabo Koma: NW Hanlé), 150m GD-Record-No.26: 2 G.d.pelzelni**

11/11/99

Searching drive from Camp-7 to foot-hills of Afakkaloma (09:00-16:45 walking-tour from the lowland around Agna in 150m to top of Aoudali Dadda in 850m) and back to Camp-7

- 09:00, beginning of walking-tour, N 11°29'5" E 41°55'8" (foot-hills of Afakkaloma in N Hanlé)
GD-Record-No.27: 6 G.d.pelzelni

12/11/99

Searching drive from Camp-7 to Yoboki, Gaggadé and back to Dirablou (Camp-8: N 11°33'4" E 42°06'5")

- 08:00, N 11°33'7" E 41°56'3" (Anabo Koma in NW Hanlé) GD-Record-No.28: 2 G.d.pelzelni *

- 08:40, N 11°32'7" E 42°00'5" (Gabol Damoum: NW Hanlé) GD-Record-No.29: 4 G.d.pelzelni *
(3,1)

- 09:45, N 11°33'5" E 42°06'4" (Badouga in S Yaguer) GD-Record-No.30: 3 G.d.pelzelni *
(1,2)

- 13:46, N 11°30'7" E 42°14'9" (Halima Daar in NW Gaggadé) GD-Record-No.31: 2 G.d.pelzelni*

- 15:15, N 11°32' E 42°13'3" (Halima Daar in NW Gaggadé) GD-Record-No.32: 2 G.d.pelzelni*
(1,1)

- 16:28 - 45, N 11°33'4" E 42°06'6" (Badouga in S Yaguer) GD-Record-No.33: 5 G.d.pelzelni**
(2,3)

13/11/99

Searching drive from Camp-8 to Yoboki, Hanlé, Aba, Ouaidilou (Camp-9: N 11°19'2" E 42°02'), Adaitou and back to Camp-9

- 07:45, N 11°32' E 42°06' (Arho Daar: NW Babba Alou) GD-Record-No.34: 2 G.d.pelzelni**
(1,1)

- 17:45, N 11°15' E 42°02' (Adaitou) GD-Record-No.35: 2 G.d.pelzelni **

14/11/99

Searching drive from N Ouaidilou (Camp-9) to Adaitou, Guinni Bad and back to Adaitou (Camp-10: N 11°15' E 42°03'6")

- | | | |
|--|--------------------|-------------------------|
| - 07:50, N 11°19'2" E 42°02' (N Ouaidilou) | GD-Record-No.36: 7 | G.d.pelzelni**
(1,6) |
| - 12:33, N 11°22'9" E 41°52'9" (Biida) | GD-Record-No.37: 2 | G.d.pelzelni *
(1,1) |

15/11/99

Searching drive from E Adaitou (Camp-10) to Le Ado, Lac Abhé and back to Sounnati (Camp-11: N 11°14'6" E 41°59'5")

- | | | |
|---------------------------------------|--------------------|----------------|
| - 11:21, N 11°15'6" E 41°54' (Le Ado) | GD-Record-No.38: 7 | G.d.pelzelni** |
|---------------------------------------|--------------------|----------------|

Sub-Survey-No.4. (24/11 - 27/11/99)

24/11/99

Searching drive from Djibouti city to Hol Hol, Biidléi, Ouambarka Ouahayyi and back to Aérodrome (Camp-12: N 11°19'3" E 43°04'5")

- | | | |
|---|---------------------|-------------------------------|
| - 11:15, N 11°26'7" E 43°03'5" (Goumarré) | GD-Record-No.39: 2 | G.d.pelzelni** |
| - 12:00, N 11°21' N 42°58'5" (Daba Horróné) | GD-Record-No.40: 1 | G.d.pelzelni** |
| - 13:00, N 11°19' E 43°00' (Ouahayyi) | GD-Record-No.41: 2 | G.d.pelzelni**
(1,1) |
| - 14:15 - 35, N 11°19'3" E 43°04'5" (Biidléi) | GD-Record-No.42: 12 | G.d.pelzelni**
(1,1,5,3,2) |

25/11/99

Searching drive from Camp-12 to Kabah Kabah, Rohalé, Ali Addé and Camp-13 (N 11°05'1" E 42°54'2")

- | | | |
|--|---------------------|----------------|
| - 07:30, N 11°19'3" E 43°04'5" (Biidléi) | GD-Record-No.43: 11 | G.d.pelzelni * |
| - 13:30, N 11°15'03" E 43°03' (Beyya Addé) | GD-Record-No.44: 2 | G.d.pelzelni** |

27/11/99

Searching drive from Camp-14 (N 11°09' E 42°43') to Hol Hol and Djibouit city

- | | | |
|---|--------------------|-------------------------|
| - 08:05, N 11°09' E 42°43' (W Querka) | GD-Record-No.45: 3 | G.d.pelzelni**
(1,2) |
| - 09:30, N 11°13' E 42°48' (Hoch Barré: N Querka) | GD-Record-No.46: 5 | G.d.pelzelni**
(3,2) |

Day Trip

30/11/99

Searching drive from Djibouti city to Damerdjog, Goumbourta Atar, Goubad, Biidléi, Hol Hol and Djibouti city

- | | | |
|---|--------------------|---------------------------|
| - 12:25, N 11°24' E 43°10' (SW Déidéi Quein) | GD-Record-No.47: 4 | G.d.pelzelni**
(3,1) |
| - 14:50, N 11°19' E 43°05' (Biidléi) | GD-Record-No.48: 6 | G.d.pelzelni *
(4,1,1) |

Sub-Survey-No.5. (05/12 – 13/12/99)**05/12/99**

Searching drive from Djibouti city to Tadjoura

- 11:50, N 11°26' E 42°45' (Quaid) GD-Record-No.49: 1 G.d.pelzelni *
- 15:00, N 11°47' E 42°51'5 (W Tadjoura) GD-Record-No.50: 3 G.d.pelzelni**

11/12/99

Searching drive from Tadjoura to Ali Sabieh (Camp-16:), and walking-tour in Iddeita (11:50-13:00)

- during walking-tour, N 11°40' E 42°36' (Iddeita) GD-Record-No.51: 9 G.d.pelzelni
(2,1,3,1,2)
- 14:25, N 11°34' E 42°32' (E Eguer Aléita) GD-Record-No.52: 8 G.d.pelzelni**
(3,5)

12/12/99

Searching drive from Camp-16 to Assamo and Boura (Camp-17: N 11°04' E 42°52')

- 08:10 - 20, N 11°08' E 42°43'5" (N of Arréi) GD-Record-No.53: 3 G.d.pelzelni **
(2,1)
- 16:30, N 11°04' E 42°52' (Boura) GD-Record-No.54: 1 G.d.pelzelni**

13/12/99

Searching drive from Boura (Camp-17) to Ali Addé, Hol Hol and Djibouti city

- 15:30, N 11°32' E 43°06' (SE of Hayyabléi) GD-Record-No.55: 8 G.d.pelzelni**
(2,4,2)

Sub-Survey-No.6. (17/12 – 26/12/99)**17/12/99**

Searching drive from Djibouti city to Tadjoura

- 14:20, N 11°29" E 42°33' (Eguer Aléita) GD-Record-No.56: 3 G.d.pelzelni*
- 15:25, N 11°38' E 42°35' (N Afai) GD-Record-No.57: 1 G.d.pelzelni *

18/12/99

Searching drive from Tadjoura to Randa, As Dora, Assa Gaila and Ansé (Camp-18: N 12°21'8" E 42°29'7")

- 12:30, N 12°04' E 42°38'5" (Essalou) GD-Record-No.58: 6 G.d.pelzelni**
- 13:55 - 14:50, N 12° 18'3" E 42°34'3" (Gourroumda - Yangoulli) GD-Record-No.59: 24 G.d.pelzelni**
(1,6,8,2,2,5)
- 17:00, N 12°21'8" N 42°29'7" (Ansé) GD-Record-No.60: 4 G.d.pelzelni*
(3,1)

19/12/99

Searching drive from Camp-18 to Margoita (N 12°24'5" E 42°27'2" = most northerly position) and Madgoul (12:00 - 17:00: Walking-tour in the Foret de Madgoul) and retour to Camp-18

- 09:00, N 12°24' E 42°28'5" (Margoita) GD-Record-No.61: 2 G.d.pelzelni**

20/12/99

Searching drive from Camp-18 to Foret de Madgoul (09 h 00 - 13 h 15: walking-tour in the foret), Garoba, Kadda Robmalé, and Adda Lé Bahari (Camp-19 (N 12°18'3" E 42°23'8"))

- 08:20, N 12°21'8" E 42°29'7" (Ansé)	GD-Record-No.62: 5	G.d.pelzelni**
- 14:40, N 12°21'3" E 42°24'4" (Inanissé)	GD-Record-No.63: 8	G.d.pelzelni** (2,4,1,1)
-15:30, N 12°21' E 42°22'7" (Kadda Robmalé)	GD-Record-No.64: 9	G.d.pelzelni** (2,3,2,2)
- 15:55, N 12°18'5" E 42°23'9" (Adda Lé Bahari)	GD-Record-No.65: 7	G.d.pelzelni** (5,1,1)

21/12/99

Searching drive from Camp-19 to Andabba and Dorra (Camp-20: N 12°06'2" E 42°18'6")

- 09:50, N 12°13'7" E 42°26'7" (E Aidérali)	GD-Record-No.66: 7	G.d.pelzelni**
- 12:25, N 12°09' E 42°25'7" (Goura)	GD-Record-No.67: 1	G.d.pelzelni**
- 01:05, N 12°09' E 42°24'2" (Goura)	GD-Record-No.68: 1	G.d.pelzelni**
- 15:25, N 12°07'2" E 42°23'6" (Doda)	GD-Record-No.69: 4	G.d.pelzelni** (2,2)
- 15:50, N 12°08' E 42°22'9" (Doda)	GD-Record-No.70: 8	G.d.pelzelni** (5,3)
- 17:00, N 12°05' E 42°21'6" (N Darona)	GD-Record-No.71: 7	G.d.pelzelni** (4,3)

22/12/99

Searching drive from Doda (Camp-20) to Doho, Gamroita, Mounkour, Danis, Doda, Dorra, Randa and Tadjoura

- 09:20, N 12°06'2" E 42°18'6" (SE Doho)	GD-Record-No.72: 18	G.d.pelzelni** (5,2,4,1,2,3,1)
- 10:00, N 12°06'4" E 42°16'9" (S Doho)	GD-Record-No.73: 8	G.d.pelzelni** (5,2,1)
- 10:40, N 12°06'7" E 42°16'5" (SW Doho)	GD-Record-No.74: 5	G.d.pelzelni** (1,1,3)
- 11:20, N 12°07'8" E 42°14'2" (Gamroita)	GD-Record-No.75: 4	G.d.pelzelni** (3,1)
- 12:20 - 14:10, N 12°09'3" E 42°14'7" (Danis)	GD-Record-No.76: 16	G.d.pelzelni** (1,1,2,1,3,1,2,1,3,1)
- 14:40, N 12°08'7" E 42°21'3" (N Ouadar Ouelli)	GD-Record-No.77: 31	G.d.pelzelni** (5,10,6,2,4,2,2)
- 15:22, N 12°06'8" E 42°25'6" (S Badou)	GD-Record-No.78: 3	G.d.pelzelni** (1,2)
- 16:05, N 11°58'6" E 42°33' (S Assabaitou)	GD-Record-No.79: 3	G.d.pelzelni**

Sub-Survey-No.7. (31/12/99 - 04/01/00)**31/12/99**

Searching drive from Djibouti city to Ali Sabieh and Ouarabaléi (Camp-22: N 11°04'6" E 42°45'2")

- 12:47, N 11°19' E 42°39'8" (Iskoutir close NE Grand Bara)	GD-Record-No.80: 2	G.d.pelzelni *
- 13:15, N 11°15' E 42°42' (SE Grand Bara)	GD-Record-No.81: 7	G.d.pelzelni* (3,4)

Sub-Survey-No.8. (09/01/00 – 14/01/00)**09/01/00**

Searching drive from Djibouti city to Ali Sabieh (Camp-23: N 11°09' E 42°43')

- 16:00, N 11°19' E 42°41' (Kourtimaléi in NE Grand Bara)	GD-Record-No.82: 4	G.d.pelzelni *
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10/01/00

Searching drive from Ali Sabieh (Camp-23) to Dikhil, SE Gobaad and Ouaidilou (Camp-24: N 11°14'8" E 42°05'2")

- 09:25, N 11°12'7" E 42°36'2" (SW Grand Bara)	GD-Record-No.83: 130	G.d.pelzelni
- 10:25, N 11°11'2" E 42°30'2" (Mouloud in SW Grand Bara)	GD-Record-No.84: 20	G.d.pelzelni** (13,1,1,5)
- 11:15, N 11°11'6" E 42°28'4" (Mindil in SW Grand Bara)	GD-Record-No.85: 3	G.d.pelzelni**

11/01/00

Searching drive from SE Ouaidilou (Camp-24) to Ouaidilou, Adaitou, Guinni Bad and Biida (Camp-25: N 11°22'5" E 41°51'9")

- 08:00, N 11°14'8" E 42°05'2" (S Ouaidilou)	GD-Record-No.86: 7	G.d.pelzelni * (2,1,4)
- 12:30, N 11°22'5" E 41°51'9" (Biida)	GD-Record-No.87: 8	G.d.pelzelni * (6,2)

12/01/00

Searching drive from Biida to Guinni Bad, Dikhil and NW Grand Bara (Camp-26: N 11°15'4" E 42°27'9")

- 08:10, N 11°22'5" E 41°51'9" (Biida)	GD-Record-No.88: 14	G.d.pelzelni**
- 14:30, N 11°07" E 42°17'9" (Chekhéiti)	GD-Record-No.89: 2	G.d.pelzelni *

13/01/00

Searching drive from NW Grand Bara (Camp-26) to Hahailé, Gaggadé, Der Ela and Tikibléita (Camp-27: N 11°49' E 42°06'3")

- 09:45, N 11°18'7" E 42°21'7" (Ourrabba)	GD-Record-No.90: 2	G.d.pelzelni**
- 11:10, N 11°25'2" E 42°18' (S Gaggadé)	GD-Record-No.91: 1	G.d.pelzelni**
- 11:45, N 11°28'2" E 42°15'3" (W Gaggadé)	GD-Record-No.92: 1	G.d.pelzelni **
- 13:05, N 11°32'1" E 42°13'2" (Halima Daar in Gaggadé)	GD-Record-No.93: 2	G.d.pelzelni **
- 14:20 - 40, N 11°38' E 42°12'8" (E Garab)	GD-Record-No.94: 35	G.d.pelzelni** (11,2,1,5,5,9,2)

- 15:00, N 11°43'9" E 42°09'3" (NE Der Ela)	GD-Record-No.95: 6	G.d.pelzelni** (2,4)
- 16:30, N 11°49' E 42°06'3" (N Tikibléita)	GD-Record-No.96: 2	G.d.pelzelni**

14/01/00

Searching drive from Tikibléita to Der Ela, Gaggadé, Kollobita, Yoboki, Dikhil and Djibouti city

- 09:20, N 11°49'5" E 42°05'9" (N Tikibléita)	GD-Record-No.97: 1	G.d.pelzelni*
- 10:50, N 11°43' E 42°09' (NW Der Ela)	GD-Record-No.98: 8	G.d.pelzelni**
- 11:34, N 11°41' E 42°09' (Koudakoud – W Garab)	GD-Record-No.99: 15	G.d.pelzelni**
- 12:00, N 11°35' E 42°15' (Dali)	GD-Record-No.100: 11	G.d.pelzelni**
- 14:30, N 11°08' E 42°26' (Balamballéi in SW Grand Bara)	GD-Record-No.101: 4	G.d.pelzelni *

Sub-Survey-No.9. (23/01/00 – 26/01/00)**23/01/00**

Searching drive from Djibouti city to Tadjoura

- 17:30, N 11°37' E 42°33' (N Afai)	GD-Record-No.102: 2	G.d.pelzelni**
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Day Trip**29/01/00**

Searching drive from Djibouti city to Ali Sabieh and back to Djibouti city

- N 11°24'5" E 42°45'5" (Balambal)	GD-Record-No.103: 6	G.d.pelzelni
- N 11°20'8" E 42°44' (SE Petit Bara)	GD-Record-No.104: 13	G.d.pelzelni *
- N 11°20' E 42°40' (Iskoutir close NE Grand Bara)	GD-Record-No.105: 7	G.d.pelzelni* (5,2)
- Ouea (S of Arta)	GD-Record-No.106: 3	G.d.pelzelni (2,1)
- S of PK-20	GD-Record-No.107: 2	G.d.pelzelni *

Records of *Gazella dorcas pelzelni* in areas not visited during our survey

Recorder: Dr. Philippe Bredon (Hospital National "Pelletier", Djibouti)

1999

- Tadjoura to Obock	GD-Record-No.108: 5	G.d.pelzelni
- Obock to Ras Siyyan	GD-Record-No.109: 10	G.d.pelzelni
- Obock to Egahlou	GD-Record-No.110: 10	G.d.pelzelni

2000

- January, N 11°35' E 42°27' (W Garraito: SE Lac Assal)	GD-Record-No.111: 21	G.d.pelzelni
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Recorder: Mr. Houssein A. Rayaleh (second author)**1998**

- 23/12, Hagande: Sakalol to Harralol	GD-Record-No.112: 7	G.d.pelzelni
- December, Obock to Godoriya	GD-Record-No.113: 16	G.d.pelzelni

Appendix F: Chronology of the records of *Gazella soemmerringi* (GS-Records)

GAZELLA SOEMMERRINGI (Soemmerring's gazelle)

* = double counting

** = genuine record

Sub-Survey-No.2 (29/10 – 03/11/99)

29/10/99

Searching drive from Djibouti city to Dikhil, As Ela and Lac Abhé (Camp-3: N 11°09'4" E 41°53'8")

- 11.20, N 11°21' E 42°44' (SE Petit Bara) GS-Record-No.1: 4 G.soemmerringi *

01/11/99

Searching drive from Camp-5 (N 11°05'8" E 42°12'8", N Diksà Deré) to Airoli, Ouaidilou, Camp-5, Dikhil and back to Camp-5

- 11.52, N 11°17' E 42°03'8" (Ouaidilou) GS-Record-No.2: 54 G.soemmerringi**
(6,8,9,20,11)

Sub-Survey-No.3 (07/11 – 16/11/99)

09/11/99

Searching drive from Camp-6 (N 11°05'7" E 42°45'4", Dadin) to Ali Sabieh, Dikhil, Yoboki and Agna (Camp-7: N 11°33'7" E 41°56'3")

- 09.18, N 11°12'8" E 42°37'8" (SE Grand Bara) GS-Record-No.3: 24 G.soemmerringi*
(19,4,1)

13/11/99

Searching drive from Camp-8 (N 11°33'4" E 42°06'5", Babba Alou) to Yoboki, Hanle, Aba, Ouaidilou, Adaitou and back to N Ouaidilou (Camp-9: N 11°19'2" E 42°02')

- 15.45, N 11°15' E 42°02' (Adaitou) GS-Record-No.4: 33 G.soemmerringi *
(1,32)

14/11/99

Searching drive from Camp-9 to Adaitou, Guinni Bad, Biida and back to Adaitou (Camp-10: N 11°15' E 42°03'6")

- 08.15-08.53, N 11°15' E 42°02' (Adaitou) GS-Record-No.5: 34 G.soemmerringi*
(1,32,1)

- 09.25, N 11°15'5" E 42°03' (SE Guinni Bad) GS-Record-No.6: 3 G.soemmerringi*

- 11.51-12.49, N 11°21'4" E 41°55'5" - N 11°22'9" E 41°52'9" (Biida)
GS-Record-No.7: 30 G.soemmerringi**
(18,1,9,2)

Return journey

- 15.10, N 11°18' E 42°00'3" (Guinni Bad) GS-Record-No.8: 2 G.soemmerringi*
(1,1)
- 16.30, N 11°14'1" E 42°01'9" (W Adaitou) GS-Record-No.9: 23 G.soemmerringi*

15/11/99

Searching drive from Camp-10 to Le Ado, Lac Abhé and back to Alaila (Camp-11: N11°14'6" E 41°59'5")

- 07.40, close Camp-10 (E Adaitou) GS-Record-No.10: 5 G.soemmerringi*
- 07.56, W Adaitou GS-Record-No.11: 22 G.soemmerringi*
- 08.05 - 09.19, N 11°14'4" E 41°59'5" (Adaitou to Madra) GS-Record-No.12: 12 G.soemmerringi*
(1,1,7,2,1)
- 10.09, N 11°14'7" E 41°56' (Sounnati) GS-Record-No.13: 2 G.soemmerringi*
- 11.21, N 11°15'6" E 41°54' (Le Ado) GS-Record-No.14: 3 G.soemmerringi**

Return journey

- 16:40, N 11°14'5" E 41°59'3" (Sounnati to Alaila) GS-Record-No.15: 11 G.soemmerringi*
(7,4)

16/11/99

Searching drive from Camp-11 (Alaila) to Dhikil and Djibouti

- 12.23, N 11°07'5" E 42°24' (Balamballéi) GS-Record-No.16: 3 G.soemmerringi*

Sub-Survey-No.6 (17/12 – 26/12/99)**18/12/99**

Searching drive from Tadjoura to Randa, As Dora, Assa Gaila and Ansé (Camp-18: N 12°21'8" E 42°29'7")

- 10.48, N 12°02' E 42°37' (Aila Adou) GS-Record-No.17: 4 G.soemmerringi**

21/12/99

Searching drive from Adda Lé Bahari (Camp-19: 12°18'3" E 42°23'8") to Andabba, Dorra, Doda and Ouadar Ouéli (Camp-20: N 12°05' E 42°21'6")

- 15.50, N 12°08' E 42°22'9 (Doda) GS-Record-No.18: 10 G.soemmerringi**
(9,1)
- 17.00, N 12°06'2" E 42°21'6" (Ouadar Ouéli) GS-Record-No.19: 6 G.soemmerringi**

22/12/99

Searching drive from Camp-20 to Doho, Gamroita, Mounkour, Danis, Doda, Dorra, Randa and Tadjoura

- 10.00, N 12°06'4" E 42°16'9" (Doho) GS-Record-No.20: 1 G.soemmerringi**
- 14.40, N 12°08'7" E 42°21'3" (Ouadar Ouéli) most northerly GS-Record
GS-Record-No.21: 1 G.soemmerringi*

Sub-Survey-No.7 (31/12/99 – 04/01/00)**31/12/99**

Searching drive from Djibouti city to Ali Sabieh and to Ouarabaléi (Camp-22: N 11°04'6" E 42°45'2")

- 13.30, N 11°15' E 42°42' (SE Grand Bara) GS-Record-No.22: 10 G.soemmerringi*

Sub-Survey-No.8 (09/01 – 14/01/00)

10/01/00

Searching drive from SE Ali Sabieh (Camp-23: N 11°09' E 42°43') to Dikhil, SE Gobaad and Ouaidilou (Camp-24: N 11°14'8" E 42°05'2")

- 09.25, N 11°12'7" E 42°36'2" (S Grand Bara) GS-Record-No.23: 17 G.soemmerringi**
(15,2)

- 10.25 – 11.15, N 11°11'6" E 42°28'4" (SW Grand Bara) GS-Record-No.24: 10 G.soemmerringi**
(3,1,6)

- 16.05, N 11°10'6" E 42°09'2" (Airoli) GS-Record-No.25: 1 G.soemmerringi**

11/01/00

Searching drive from Camp-24 to Ouaidilou, Adaitou, Guinni Bad, Der Ballaa and Biida (Camp-25: N 11°22'5" E 41°51'9")

- 08.30, Ouaidilou GS-Record-No.26: 6 G.soemmerringi*
(1,5)

- 09.50, N 11°14'7" E 42°01'6" (Adaitou) GS-Record-No.27: 29 G.soemmerringi*
(1,5,23)

- 11.45, N 11°20'3" E 41°56'8" (Der Ballaa) GS-Record-No.28: 1 G.soemmerringi*

- 12.30, N 11°16'2" E 41°53'0" (Biida) GS-Record-No.29: 18 G.soemmerringi*

12/01/00

Searching drive from Biida (Camp-24: N 11°22'5" E 41°51'9") to Guinni Bad and Dikhil

- 08.10, Biida GS-Record-No.30: 1 G.soemmerringi*

- 11.15, N 11°16'9" E 42°00'6" (Guinni Bad) GS-Record-No.31: 6 G.soemmerringi*

13/01/00

Searching drive from Camp-26 (N 11°15'4" E 42°27'9", NW Grand Bara) to Hahailé, Gaggadé, Der Ela and Tikibléita (Camp-27: N 11°49' E 42°06'3")

- 09.05, N 11°17'0" E 42°26'0" (Hahailé) GS-Record-No.32: 3 G.soemmerringi**
(1,2)

Day Trip

29/01/00

Searching drive from Djibouti city to Petit Bara, Grand Bara, Ali Sabieh and back to Djibouti city

- N 11°21' 0" E 42°45'0" (SE Petit Bara) GS-Record-No.33: 51 G.soemmerringi**
(29,8,3,1,9,1)

Appendix G: Chronology of the records of *Litocranius walleri*
(LW-Records)

LITOCRANIUS WALLERI (Gerenuk)

* = double counting

Sub-Survey-No. 2. (29/10 – 03/11/99)

29/10/99

Searching drive from Djibouti city to Dikhil, As Ela and Lac Abhé (Camp-3: N 11°09'4" E 41°53'8")

- 15:15, N 11°02'5" E 42°15' (E Gobaad) LW-Record-No.1: 3 L. walleri

01/11/99

Searching drive from Camp-5 (N 11°05'8" E 42°12'8" in N Diksa Deré) to Airoli, Ouaidilou, Camp-5, Dikhil and back to Camp-5

- 06:40, close to Camp-5 LW-Record-No.2: 1 L.walleri*

- 08:15, N 11°07'9" E 42°10'6" (S Moudoud Lé Koma) LW-Record-No.3: 1 L.walleri

02/11/99

Searching drive from Camp-5 to As Ela, Débné, As Ela, Dikhil and back to Camp-5

- 07:30, close to Camp-5 LW-Record-No.4: 3 L.walleri

- 07:45, N 11°06' E 42°16' (Handoga) LW-Record-No.5: 7 L.walleri*

- 08:35, N 11°02'5 E 42°15 (Diksa in E Gobaad) LW-Record-No.6: 12 L.walleri
(3,1,1,1,6)

- 09:55, N 11°04'1" E 42°05'9", 380m (Dagadlé in S Débné) LW-Record-No.7: 1 L.walleri

03/11/99

Searching drive from Camp-5 to Dikhil and Djibouti city

- 07:45, N 11°06' E 42°16' (Handoga) LW-Record-No.8: 13 L.walleri
(7,6)

Sub-Survey-No. 3. (07/11 – 16/11/99)

16/11/99

Searching drive from Camp-11 (N 11°14'6" E 41°59'5" in Alaila) to Dikhil and Djibouti

- 08:55, Handoga LW-Record-No.9: 4 L.walleri*

Sub-Survey-No. 5. (05/12 – 13/12/99)

11/12/99

Searching drive from Tadjoura to Ali Sabieh (Camp-16: N 11°09' E 42°43') and walking-tour in Iddeita (11:50 - 13:13)

- 15:15, N 11°25' E 42°39' (W Balambal) LW-Record-No.10: 4 L.walleri

- 15:50, N 11°26' E 42°43' (Qaid) LW-Record-No.11: 3 L.walleri

12/12/99

Searching drive from Camp-16 to Assamo and Boura (Camp-17: N 11°04' E 42°52', 630m) and walking-tour to the top hills of Boura (13:30-16:30)

- 13:35, close to Camp-17 LW-Record-No.12: 1 L.walleri

13/12/99

Walking-tour (07:40 – 12:05) from Camp-17 to the top hills of Boura and searching drive from Camp-17 to Ali Addé, Hol Hol and Djibouti

- 13:20, close to Camp-17 LW-Record-No.13: 1juv L.walleri

Sub-Survey-No. 7. (31/12 /99 – 04/01/00)

31/12/99

Searching drive from Djibouti city to Ali Sabieh and to Ouarabaléi (Camp-22: N 11°04'6" E 42°45'2")

- 12:15, N 11°15'1" E 42°41' (Elka Hadad in SE Grand Bara) LW-Record-No.14: 4 L.walleri
(3,1)

Sub-Survey-No. 8. (09/01 – 14/01/00)

10/01/00

Searching drive from SE Ali Sabieh (Camp-23: N 11°09' E 42°43') to Dikhil, SE Gobaad and Ouaidilou (Camp-24: N 11°14'8" E 42°05'2")

- 10:20, N 11°11'2" E 42°30'2" (SW Grand Bara) LW-Record-No.15: 4 L.walleri
(3,1)

- 16:05, N 11°10'6" E 42°09'2" (Airoli) LW-Record-No.16: 1 L.walleri

14/01/00

Searching drive from Tikibléita (Camp-27: N 11°49' E 42°06'3") to Der Ela, Gaggadé, Kollobita, Yoboki, Dikhil and Djibouti city

- 16:00, N 11°08' E 42°26' (Balamballéi) LW-Record-No.17: 2 L.walleri

- 17:00, N 15°21' E 42°40' (Iskoutir) LW-Record-No.18: 3 L.walleri

- 17:30, N 11°24' E 42°45' (E Balambal) LW-Record-No.19: 1 L.walleri*

DayTrip

29/01/00

Searching drive from Djibouti city to Ali Sabieh and back to Djibouti city

- N 11°24'5" E 42°45'5" (Balambal) LW-Record-No.20: 4 L.walleri

- N 11°20' E 42°40' (Iskoutir) LW-Record-No.21: 4 L.walleri

***Litocranius walleri* observations recorded by Dr. Philippe Bredon (Hospital National "Pelletier"), Djibouti city**

1999

- Gued Djia- Djalelo in SE Petit Bara
- Ouadjalé in NW Petit Bara

LW-Record-No.22: 20 L.walleri
LW-Record-No.23: 6 L.walleri

Appendix H: Records of *Gazella dorcas* sorted after areas surveyed

- * = double counting (in consideration of more than one visit per area and possibly movement of the animals)
** = genuine records made during searching drives and used for population estimation (genuine records made during walking-tours are unmarked)
() = No. of record (GS-Record-No., see App. E)

A) Region SE Djibouti along the border with Somalia between Loyada and Assamo

	Quan-nanné	N of Arréi	Boura	W Quer-ka	Hoch Barré	Gouma-rré	Daba Horroné	Ouahayyi	Beyya Addé	Biidléi	Dédéi Ouein	total
07/11	(19) 1*											
08/11	(20) 3**											
24/11						(39) 2**	(40) 1**	(41) 2**		(42) 12**		
25/11									(44) 2**	(43) 11*		
27/11				(45) 3**	(46) 5**							
30/11										(48) 6*	(47) 4**	
12/12		(53) 3**	(54) 1**									
total	4	3	1	3	5	2	1	2	2	29	4	56
*	1									17		18
genuine	3	3	1	3	5	2	1	2	2	12	4	38
**	3	3	1	3	5	2	1	2	2	12	4	38

B) Region Gobaad in SW Djibouti along the border with Ethiopia between Dikhil and Lac Abhé

	E coast L. Abhé	Adle Dikil	Kouta Bouyya	Sadli	E of As Ela	N of Diksa Deré	Hando-ga	Che-khéiti	Anabo Koma	Bouh Barré	N Daba Dér	total
29/10		(7) 12**										
30/10	(8) 3		(9) 1**									
31/10				(10) 5**					(11) 6*			
01/11						(12) 3**				(14) 4*	(13) 8**	
02/11					(16) 2**				(15) 11**			
03/11							(17) 6**					
12/01								(89) 2*				
total	3	12	1	5	2	3	6	2	17	4	8	63
*								2	6	4		12
genuine	3	12	1	5	2	3	6		11		8	51
**		12	1	5	2	3	6		11		8	48

C) Region W Djibouti between Lac Abhé, Ouaidilou and Biida

	Adai-tou	Ouai-dilou	Biida	Le Ado	total
13/11	(35) 2**				
14/11		(36) 7**	(37) 2*		
15/11				(38) 7**	
11/01		(86) 7*	(87) 8*		
12/01			(88) 14**		
total	2	14	24	7	47
*		7	10		17
genuine	2	7	14	7	30
**	2	7	14	7	30

D) Region south of Golf of Tadjoura between Djibouti city and Grand Bara

	Region: Djibouti – Petit Bara						Region: Petit Bara			Region: Grand Bara				Region: all round the Ghoubbet			total
	Khor Ambado	S of PK -20	SE of Hayyabléi	S of Arta	Quaid	Balambal	SE Petit Bara	Didjan Der	Djalelo	NE Grand Bara	SE Grand Bara	Ham-bokto	SW Grand Bara	Eguer Aléita	N Afai	Iddéita	
14/10		(1) 6															
15/10							(2) 2	(3) 11									
17/10									(4) 23								
26/10												(5) 6*					
29/10							(6) 1*										
05/11	(18) 6**																
09/11												(21) 25*					
05/12					(49) 1*												
11/12														(52) 8**		(51) 9	
13/12			(55) 8**														
17/12														(56) 3*	(57) 1*		
31/12									(80) 2*	(81) 7*							
09/01									(82) 4*								
10/01												(83) 130 (84) 20** (85) 3**					
14/01												(101) 4*					
23/01														(102) 2**			
29/01		(107) 2*		(106) 3		(103) 6	(104) 13*		(105) 7*								
total	6	8	8	3	1	6	16	11	23	13	32	6	157	11	3	9	313
*		2			1		14			13	32	6	4	3	1		76
genuine	6	6	8	3		6	2	11	23				153	8	2	9	237
**	6		8										23	8	2		47

E) Region between Tadjoura and Moussa Ali

	Region: Southern vicinity of Moussa Ali								Region: W of Dorra								total		
	W of Tadjoura	Essalou	Gourroumda to Yangoulli	Ansé	Margoi-ta	Inanis-sé	Kadda Rob-malé	Adda Lé Bahari	E Aidé-rali	Goura	Doda	N Daro-na	Doho	Gam-roita	Danis	N Ouadar Ouéli		S Badou	E Assab-aitou
05/12	(50) 3**																		
18/12		(58) 6**	(59) 24**	(60) 4*															
19/12					(61) 2**														
20/12				(62) 5**		(63) 8**	(64) 9**	(65) 7**											
21/12									(66) 7**	(67) 1** (68) 1**	(69) 4** (70) 8**	(71) 7**							
22/12												(72) 18** (73) 8** (74) 5**	(75) 4**	(76) 16**	(77) 31**	(78) 3**	(79) 3**		
total	3	6	24	9	2	8	9	7	7	2	12	7	31	4	16	31	3	3	184
*				4															4
genuine	3	6	24	5	2	8	9	7	7	2	12	7	31	4	16	31	3	3	180
**	3	6	24	5	2	8	9	7	7	2	12	7	31	4	16	31	3	3	180

F) Region between Grand Bara, Gaggadé and Tikibléita

	Region: N Hanlé					Region: Gaggadé – Der Ela – Tikibléita											total
	Gabol Damoum	Anabo Koma	Agna - Hombola	N of Afak-kaloma	Arho Daar	Badou-ga	Ouar-raba	S Gag-gadé	W Gag-gadé	Halima Daar	Dali	E Garab	W Garab to Kouda-koud	NE Der Ela	NW Der Ela	N of Ti-kibléita	
09/11	(22) 7**	(23) 1*															
10/11		(26) 2**	(24) 16** (25) 9*														
11/11				(27) 6													
12/11	(29) 4*	(28) 2*					(30) 3* (33) 5**			(31) 2* (32) 2*							
13/11					(34) 2**												
13/01								(90) 2**	(91) 1**	(92) 1**	(93) 2**		(94) 35**		(95) 6**		(96) 2**
14/01												(100) 11**	(99) 15**		(98) 8**	(97) 1*	
total	11	5	25	6	2	8	2	1	1	6	11	35	15	6	8	3	145
*	4	3	9			3				4						1	24
genuine	7	2	16	6	2	5	2	1	1	2	11	35	15	6	8	2	121
**	7	2	16		2	5	2	1	1	2	11	35	15	6	8	2	115

Appendix I: Records of Gazella soemmerringi sorted after areas surveyed

- * = double counting (in consideration of more than one visit per area and possibly movement of the animals)
 ** = genuine records made during searching drives
 () = No. of record (GS-Record-No., see App. F)

A) S Djibouti

	29/10	09/11	16/11	31/12	10/01	13/01	29/01	total
Balamballéi			(16) 3*					
Hahailé						(32) 3**		
SW Grand Bara					(24) 10**			
S Grand Bara					(23) 17**			
SE Grand Bara		(3) 24*		(22) 10*				
Petit Bara	(1) 4*						(33) 51**	
total	4	24	3	10	27	3	51	122
**					27	3	51	81

B) W Djibouti

	01/11	13/11	14/11	15/11	10/01	11/01	12/01	total
Büida			(7) 30**			(29) 18*	(30) 1*	
Der Ballaa						(28) 1*		
Guinni Bad			(6) 3* (8) 2*				(31) 6*	
Adaitou		(4) 33*	(5) 34* (9) 23*	(10) 5* (11) 22* (12) 12*		(27) 29*		
Ouaidilou	(2) 54**					(26) 6*		
Sounnati				(13) 2* (15) 11*				
Le Ado				(14) 3**				
Airoli					(25) 1**			
total	54	33	92	55	1	54	7	296
**	54		30	3	1			88

C) NW Djibouti

	18/12	21/12	22/12	total
Aila Adou	(17) 4**			
Doda		(18) 10**		
Ouadar Ouéli		(19) 6**	(21) 1*	
Doho			(20) 1**	
total	4	16	2	22
**	4	16	1	21

Appendix J: Records of *Francolinus ochropectus* (Djibouti francolin) and some other birds of interest

Species	Records and comments
<i>Struthio camelus</i> (Ostrich)	Family with 3 imm., N Diksa Déré in NE Gobaad 1 male + 1 female, near Anabo Koma in NW Hanlé 1 male, Guinni Bad 2 females, Guinni Bad 1 male, between Boura and Goondalé Madobé 1 male, Doho 1 male, Biida The ostrich population in Djibouti is strong retrogressive in Djibouti. Djibouti Government should take rigorous action against the trade with ostrich eggs in Djibouti city.
<i>Egretta ardesiaca</i> (Black heron)	Often seen in the harbour area. (Maximum 8 birds) First recorded in Djibouti 1998 by Magin (pers. communic.)
<i>Ciconia nigra</i> (Black stork)	7, resting along little streams in <i>Acacia nilotica</i> forest of Madgoul The first record of this species resting in inland areas. All formerly records come from migrating birds crossing southern Red Sea (Welch & Welch, 1992; Laurent, 1990).
<i>Ciconia ciconia</i> (White stork)	4, feeding in accompaniment with sheep, goats and arabian bustards The first record of this species resting in inland areas. All other records come from birds crossing southern Red Sea (Welch & Welch, 1992).
<i>Leptoptilos crumeniferus</i> (Marabou stork)	1, Le Ado Less than 3 records after Welch & Welch (1998)
<i>Circus macrourus</i> (Pallid harrier)	1 male, Sadli in W Gobaad Globally threatend. Migrant in Djibouti (Welch & Welch, 1998).
<i>Aquila verreauxii</i> (Verreaux's eagle)	1, SE of Aoudali Dadda, 1, around old governor house in Foret de Day 2, around Dittilou One of the most rare breeding birds of Djibouti (Magin, 2000)
<i>Hieraaetus fasciatus</i> (Bonelli's eagle)	23, has been seen in all regions of Djibouti. Djibouti is the only country in E Africa where this species is known to occur. In surrounding areas Bonelli's eagle is replaced by the closely related African hawk eagle, <i>Hieraaetus spilogaster</i> , (Welch & Welch, 1998).
<i>Francolinus ochropectus</i> , (Djibouti francolin)	Called regularly in morning and evening time around our camps in Foret de Day and in Dittilou. Less often seen (8 in Foret de Day, 12 around Dittilou). Most effective method for a population estimate should be based on call recording around statistically selected camps. Sight records are very arbitrarily. Endemic to Djibouti (Dorst & Jouanin, 1954), and restricted to well-vegetated areas of Goda and Mabla massifs. Preliminary population estimate for the Goda massifs result in ca. 750 bird (Welch & Welch, 1998)
<i>Neotis heuglinii</i> (Heuglin's bustard)	SE of Aoudali Dadda, 850 m Adaitou Endemic to the wider Horn of Africa (Urban et al., 1986). In Djibouti rarer than Arabian bustard.
<i>Ardeotis arabs</i>	N of Tammiro in W Gobaad

(Arabian bustard)	<p>Sadli in W Gobaad Handoga in NE Gobaad Adaitou Biidlei in SE Djibouti Adda Lé Bahari in NW Djibouti Andabba in NW Djibouti Doda Danis</p> <p>Arabian bustard appears to be widespread in Djibouti but throughout much of its world range it has suffered heavy persecution and population have been severely reduced (Welch & Welch, 1998).</p>
Clamator jacobinicus (Jacobin cuckoo)	<p>1, Siid Haroun in SW of Hol Hol;</p> <p>Vagrant with less than 3 records (Welch & Welch, 1998).</p>
Nectarinia venusta (Variable sunbird)	<p>3, SE Arréi hills, 840 m.</p> <p>First recorded by Künzel, 1995 (unpublished), in hills between Ali Sabieh and Assamo. Until now not recorded by other observers. But seems to occur regularly in the mentioned area. Occurs in adjacent Somalia near Assamo (Ash and Miskell, 1998)</p>
Bucanetes githagineus (Trumpeter finch)	<p>2, N of Fort Tikibléita</p> <p>Djibouti is the only country in E Africa where this species is known to occur. It occurs in N Africa and the Arabian peninsula (Welch & Welch, 1998).</p>

Appendix K: Time table of survey activities

13/10/99

Arrival in Djibouti

14/10/99: Day Trip

Searching drive from Djibouti city to PK-20 (20 km W of the city). Walking-tour (14 – 18:00) around a small water reservoir S of PK 20. Back to Djibouti city.

15/10/99: Day Trip

Searching drive from Djibouti city to Petit Bara, Grand Bara, Ali Sabieh and back to Djibouti city. Walking-tour (14:15 – 16:15) in Didjan Der (E Petit Bara).

17/10/99: Day Trip

Searching drive from Djibouti city to Petit Bara and back to Djibouti city. Walking-tour (12:00 – 16:15) in the area between Djalelo and Gued Djia (E Petit Bara).

21 – 26/10/99: Sub-Survey No.1

Main purpose of the sub-survey is to find the Beiras in the hills between Ali Sabieh and where they have been observed in 1993/94 (Künzel and Künzel, 1998). No Beiras recorded during Sub-Survey No.1.

21/10

Searching drive from Djibouti city to the hills between Ali Sabieh and Assamo. Camp-1 (N 11°04'5" E 42°45'2", 785m) in wadi near the hill Ouarabalei.

22/10

Walking-tour (07:20 – 16:00) in the hills W of Camp-1.

23/10

Walking tour (08:05 – 14:30) in the hills SE of Camp-1.

24/10

Walking-tour (07:30 – 14:05) to the top of Ouarabalei. Break Camp-1 and searching drive to the hills of Deg Ouein. Camp-2 (N 11°02'3" E 42°47'8", 710m).

25/10

Walking tour (07:30 – 13:45) in the hills of Deg Ouein E of the road between Ali Sabieh and Assamo.

26/10

Walking tour (07:45 – 14:30) in the hills of Deg Duein W of the road between Ali Sabieh and Assamo. Break Camp-2 and searching drive to Ali Sabieh and Djibouti city.

29/10 – 03/11/99: Sub-Survey No.2

Main purpose of the fieldwork is to survey the Gobaad plane and the far SW of Djibouti around Lac Abhé.

29/10

Searching drive (09:00 – 18:30) from Djibouti city to Dikhil, As Ela and Lac Abhé (Camp-3: N 11°09'4" E 41°53'8", 220m)

30/10

Walking-tour (07:20 – 11:00) along the east coast of Lake Abhé. Break Camp-3. Searching drive (15:30 – 16:45) to Kouta Bouyya in W Gobaad (Camp-4: N 10°59'7" E 42°01'0", 320m)

31/10

Break Camp-4 and searching drive (07:45 – 08:40) to Airo Lé Gabé and to Sadli in W Gobaad. Walking-tour (08:50 – 11:20) in wadi Sadli. Searching drive (12:05 – 16:40) in direction E to As Ela, Diksa, Anabo Koma, Handoga and Diksa Deré (Camp-5: N 11°05'8" E 42°12'8", 400m).

01/11

Searching drive (06:40 – 18:30) from Camp-5 to Airoli, Ouaidilou, back to Camp-5, Dikhil and back to Camp-5.

02/11

Searching drive (07:20 – 16:00) from Camp-5 to Handoga, Diksa, As Ela, Assa Koma in S Débné, As Ela, Diksa, Dikhil and back to Camp-5.

03/11

Break Camp-5. Searching drive (07:20 – 13:00) to Handoga, Diksa, Dikhil and Djibouti city.

05/11/99: Day Trip

Searching drive from Djibouti city to Doralé, Khor-Ambado and back to Djibouti city.

07/11 – 16/11/99: Sub-Survey No.3

Main purpose of the fieldwork is to survey the Baras along the western border with Ethiopia north of Lake Abhé.

07/11

Searching drive from Djibouti city to the hills between Ali Sabieh and Assamo. Camp-6: N 11°05'7" E 42°45'4", 740m in S Dadin hills.

08/11

Walking-tour (07:20 – 13:50) in Dadin hills to the place where the Künzels saw 2 groups of Beiras (3 and 6 animals) in April and Mai 1993. No Beiras recorded.

09/11

Break Camp-6. Searching drive (07:20 – 17:00) from Dadin hills to Ali Sabieh, Grand Bara, Dikhil, Yoboki and Agna in N Hanle (Camp-7: N 11°33'7" E 41°56'3").

10/11

Searching drive (07:20 – 16:00) around Agna and in direction to the border of Ethiopia until the road is blocked ca.10 km west of the border. Back to Camp-7.

11/11

Walking tour (09:00 – 16:45) from the lowlands (170m) around Agna to the plateau (850mm) between Afakkaloma and Aoudali Dadda. Retour to Camp-7.

12/11

Break Camp-7. Searching drive (08:00 – 16:45) from Agna to Yoboki. North of the town we cross the hills between Hanlé and Gaggadé. Searching drive in Gaggadé. Camp-8 (N 11°33'4" E 42°06'5", 330 m) in the hills of SW Yaguer.

13/11

Break Camp-8. Searching drive (07:20 – 17:00) to Yoboki, crossing Hanlé and enter the hills Amaile. Short after Aba the road which leads to the Plateau Kadda Gamarri near the Ethiopian border is blocked. We continue our searching drive to Ouaidilou (Camp-9: N 11°19'2" E 42°02', 420 m).

14/11

Break Camp-9. Searching drive (07:50 – 17:00) to Adaitou, Guinni Bad, Biida and retour to Adaitou (Camp- 10: N 11°15' E 42°03'6", 420 m).

15/11

Break Camp-10. Searching drive (07:40 – 16:50) to Sounnati, Le Ado until Lac Abhé, and return to Madra (Camp-11: N 11°14'6" E 41°59'5", 420 m).

16/11

Break Camp-11. Searching drive (06:45 – 15:00) to Adaitou, Airoli, Diksa Deré, Handoga, Dikhil, Grand Bara, Petit Bara and Djibouti city.

19/11/99: Day Trip

Searching from Djibouti city to Gaanka (25 km W of Djibouti city), and walking-tour (07:30 – 14:30) to Hidka Ambado

24/11 – 27/11/99: Sub-Survey No.4

Main purpose of the fieldwork is to survey the region along the border to Somalia in SE Djibouti.

24/11

Searching drive (10:10 – 16:45) from Djibouti city to Hol Hol, Biidléi, Ouambarka Ouahayyi, Biidléi. Camp-12 (N 11°19'3" E 43°04'5", 230m) close to Aérodrome.

25/11

Break Camp-12. Searching drive (08:10 – 16:30) to Fort Kabah Kabah. Road along the border with Somalia is impassable short after the Fort. Return to the Fort and continuation to Rohalé, Ali Addé and to the hills E of Boura (Camp-13: N 11°05'1" E 42°54'2", 520m).

26/11

Break Camp-13. Searching drive (08:00 - 18:30) to Fort Guistir and Wadi Dawwanban. This time we try to reach Kawa Kawa from the other site. Also from here the road along the border with Somalia is impassable. Return to Guistir and continuation to Assamo and Ali Sabieh. Camp-14 (N 11°09' E 42°43', S of Ali Sabieh).

27/11

Break Camp-14. Searching drive (08:05 – 17:00) to Querka, Hol Hol, Daba Horróné, Chabelléi and Djibouti.

29/11/99: Day Trip

Searching drive (07:30 – 14:00) from Djibouti city to Damerdjog, Loyada and back to Djibouti city. Walking-tour (08:30 – 13:00) between Damerdjog and Loyada.

30/11/99: Day Trip

Searching drive from Djibouti city to Damerdjog, Goumbourta Atar, Goubad, Biidlei, Hol Hol, Chabelléi and back to Djibouti city.

01/12/99: Day Trip

Searching drive (08:00 – 14:00) from Djibouti city to PK-20, water reservoir S of PK-20, Arta and back to Djibouti city.

05/12 – 13/12/99: Sub-Survey No.5

05/12

Searching drive (10:05 – 15:30) from Djibouti city to Tadjoura (lodging for the night).

06/12

Searching drive (08:45 – 15:15) from Tadjoura to Randa and Foret de Day. Camp-15 (N 11°46'2" E 42°39'1", 1.360m) close to the old governor's house.

07/12

Walking-tour (09:30 – 16:10) in the hills N of Camp-15.

08/12

Walking-tour (08:00 – 16:50) in the hills E of Camp-15.

09/12

Walking-tour (08:00 – 16:00) in the hills W of Camp-15.

10/12

Break Camp-15. Searching drive (09:00 – 16:00) to Randa and Tadjoura (lodging for the night).

11/12

Searching drive (08:30 – 18:00) to Randa and around Ghoubbet (western end of Golf of Tadjoura) to Ali Sabieh. Camp-16 (N 11°09' E 42°43') S of Ali Sabieh.

12/12

Break Camp-16. Searching drive (07:50 – 12:30) to Assamo and Boura. Camp-17 (N 11°04' E 42°52") in Boura. Walking-tour (13:30 – 16:30) to the top of NE Boura hills.

13/12

Walking-tour (07:40 – 12:00) to the top of SW Boura hills. Break Camp-17. Searching drive to Ali Addé, Hol Hol, Chabelléi and Djibouti city.

17/12 – 26/12/99: Sub-Survey No.6

17/12

Searching drive (10:00 – 16:30) from Djibouti city to Tadjoura (lodging for the night).

18/12

Searching drive (08:40 – 17:00) from Tadjoura to Randa, As Dora, Assa Gaila, Yangoulli and Ansé. Camp-18 (N 12°21'8" E 42°29'7", 480m).

19/12

Searching drive (08:15 – 11:30) through Ansé to Margoita in the foot hills of Moussa Ali (most northerly position: N 12°24'5" E 42°27'2", 520m) and to the Foret de Madgoul. Walking-tour (12:00 – 17:00) in the forest. Back to Camp-18.

20/12

Break Camp-18. Searching drive to the Foret de Madgoul. Walking-tour (09:00 – 13:15:00) in the forest. Searching drive (14:10 – 17:00) from Foret de Madgoul to Kadda Robmalé and Adda Lé Bahari (Camp-19: N 12°18'3" E 42°23'8", 250m).

21/12

Break Camp-19. Searching drive (08:50 – 17:00) to Dorra, Goura, Doda and Darona (Camp-20: N 12°05'0 E 42°21'6", 200m).

22/12

Break Camp-20. Searching drive (08:35 – 19:30) to Doho, Gamroita, Mounkour, Danis, Doho, Dorra, Randa and Tadjoura (lodging over night).

23/12

Searching drive (09:00 – 13:00) from Tadjoura to Dittilou. Camp-21 (N 11°46'9" E 42°41'7") close to Dittilou. Walking-tour (14:00 – 17:00) in the hills NW of Camp-21.

24/12

Walking-tour (08:00 – 16:30) to the hills NW of Dittilou reaching Cascade and back to Camp-21.

25/12

Walking-tour (09:00 – 14:00) in the the hills NE of Camp-21. Break Camp-12. Searching drive (16:00 – 17:30) to Tadjoura (lodging over night).

26/12

Searching drive (08:10 – 11:00) from Tadjoura to Djibouti city.

31/12/99 – 04/01/00: Sub-Survey No.7

Main purpose of the sub-survey is to find the Beiras in the hills between Ali Sabieh and Assamo where they have been observed in 1993/94 (Künzel and Künzel, 1998). 14 Beiras recorded during Sub-Survey No.7.

31/12

Searching drive (11:00 – 14:00) from Djibouti city to Petit Bara, Grand Bara, Ali Sabieh and to Ouarabaléi between Ali Sabieh and Assamo. Camp-22 (N 11°04'6" E 42°45'2, 820m).

01/01/2000

Walking-tour (07:30 – 14:30) in Arréi hills W of Camp-22.

02/01/00

Walking-tour (07:40 – 16:00) in Arréi hills S of Camp-22.

03/01/00

Walking-tour (08:20 – 13:30) in Arréi hills W of Camp-22.

04/01/00

Break Camp-22. Searching drive (08:00 – 11:30) to Ali Sabieh, Grand Bara, Petit Bara and Djibouti city.

09/01/00 – 14/01/00: Sub-Survey No.8

09/01

Searching drive (13:00 – 17:00) from Djibouti city to Petit Bara, Grand Bara and Ali Sabieh. Camp-23 (N 11°09' E 42°43') in S of Ali Sabieh.

10/01

Break Camp-23. Searching drive (08:30 – 16:45) from Camp-23 to Ali Sabieh, Grand Bara, Dikhil, Handoga, Diksa Deré, Airoli and Ouaidilou. Camp-24 (N 11°14'8" E 42°05'2", 440m) in S Ouaidilou.

11/01

Break Camp-24. Searching drive (08:00 – 16:15) to Adaitou, Guinni Bad, Der Ballaa, Biida. We dry to reach Marmar but the road is impassable in 7 km distance to the border with Ethiopia. Return to Biida (Camp-25: N 11°22'5" E 41°51'9", 480m).

12/01

Break Camp-25. Searching drive (08:10 – 17:00) from Biida to Der Ballaa, Guinni Bad, Adaitou, Airoli, Diksa Deré, Handoga, Anabo Koma, Dikhil, NW Grand Bara and to Gaissa Baddata (Camp-26: N 11°15'4" E 42°27'9").

13/01

Break Camp-26. Searching drive (08:15 – 16:30) to Ourraba, Gaggadé, Halima Daar, Garab, Der Ela and to Tikibléita. Camp-27 (N 11°49' E 42°06'3", 340m) in NW of Tikibléita.

14/01

Break Camp-27. Try to reach Nagag, but the road is impassable in ca. 12 km distance to the border with Ethiopia. Return to Tikibléita, Koudakoud and N Gaggadé. Cross the hills between Gaggadé and Yoboki. Continuation to Grand Bara and Djibouti city.

23/01/00 – 26/01/00: Sub-Survey No.9

23/01

Searching drive (14:00 – 17:30) from Djibouti city to Tadjoura (lodging over night).

24/01

Searching drive (08:30 – 10:30) from Tadjoura to Dittilou. Camp-28 (N 11°46'9" E 42°41'7") close to Dittilou. Walking-tour (11:30 – 17:00) in the hills NW of Camp-28.

25/01

Walking-tour (08.10 – 12:30) in the hills N of Camp-28. Break Camp. Searching drive to Tadjoura and Djibouti city.

29/01/99: Day Trip

Searching drive from Djibouti city to Petit Bara, Grand Bara, Ali Sabieh and back to Djibouti city.

30/01/00

Flight back to Germany

**Appendix L: Map 1. Survey routes, and genuine records of
Gazella dorcas**

Details of records see under App. E.

Appendix M: Map 2. Survey routes, camp sites, and genuine records of Gazella soemmerringi

Details of camp sites and records see under App.K and F.

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