

Chapter 1

Portrait of an Endangered Species

Scientific name:	<i>Canis simensis</i> Rüppell, 1835
Sub-species:	<i>C. s. simensis</i> Rüppell, 1835 <i>C. s. citernii</i> de Beaux, 1922
Important synonyms:	<i>Canis semiensis</i> , <i>Simenia simensis</i>
Common names:	Ethiopian wolf, Abyssinian wolf Simien or Simenian fox, red fox Simien jackal, Simenian jackal Ethiopian jackal, red jackal
Indigenous names:	<i>ky kebero</i> , <i>walgie</i> (Amharic) <i>jedalla farda</i> , <i>arouayé</i> (Orominiac)

Conservation Status

The Ethiopian wolf has been rare since it was first recorded by science, and already in 1938 it was listed as requiring protection (Harper 1945). It is one of two canid species listed by the IUCN Red List of Threatened Animals as *endangered*; the other is the North American red wolf *Canis rufus*. Ginsberg and Macdonald (1990) recommended in their Action Plan for the Canidae that the status of the Ethiopian wolf should remain as *endangered* until population levels have stabilized and protection of the different areas where it occurs is secured.

Although the species is very rare and is endangered, it is not listed by CITES, the Convention on International Trade in Endangered Species, since no poaching or legal trade seem to affect it. Thus, the species should not be included in CITES unless it requires protection from trade in the future.

The IUCN has recently revised its Red List categories and provided quantitative criteria to classify each species accordingly (IUCN 1994). The continued decline of the Ethiopian wolf's largest population in the Bale Mountains National Park (BMNP) has prompted the IUCN Canid Specialist Group (CSG) to re-evaluate the species' status based upon the new categories and

criteria (Table 1.1). Classification as *Endangered* did not reflect the current predicament of Ethiopian wolves, and therefore the CSG recommended that the species should be reclassified as *Critically Endangered*, in acknowledgement of its extremely high risk of extinction in the wild. This transfer to a yet more precarious status was effected with no delay. The justification for reclassification was as follows:

Based on direct observation there was a substantial reduction of the BMNP population; a 22–55% population reduction in three years, or 65–75% in five years (Table 1.1, A.1.a). Based on an index of abundance available from the Sanetti Plateau in BMNP (Chapter 2) the average number of wolves sighted has declined steadily for at least the last 10 years with the average number of wolves seen dropping from 8.6 in 1983/1984 to less than one wolf in 1995 (A.1.b). Similarly, the absolute BMNP wolf population size has been estimated six times since 1976. Hillman (1986) estimated 700 wolves. By 1995 the population had declined to 120–160 (Sillero-Zubiri 1995), or by about 80% in the last 10 years. The recent population decline in Bale has been partly due to pathogens (rabies and possibly distemper), human persecution (road kills and shooting) and the population is further threatened by hybridization with domestic dogs (A.1.e).

Table 1.1 IUCN Red List Categories

Critically Endangered (CR). A taxon is Critically Endangered when it is facing an extremely high risk of extinction in the wild in the immediate future, as defined by any of the following criteria:

- A. Population reduction in the form of either of the following:
 - 1. An observed, estimated, inferred or suspected reduction of at least 80% over the last 10 years or three generations, whichever is the longer, based on (and specifying any of the following):
 - (a) direct observation
 - (b) an index of abundance appropriate for the taxon
 - (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
 - (d) actual or potential levels of exploitation
 - (e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.
 - 2. A reduction of at least 80 %, projected or suspected to be met within the next ten years or ten generations, whichever is the longer, based on (and specifying) any of (b), (c), (d) or (e) above.

- B. Extent of occurrence estimated to be less than 100 km or area of occupancy estimated to be less than 10 km, and estimates indicating any of the following:
 - 1. Severely fragmented distribution or known to exist at only a single location.
 - 2. Continuing decline, observed, inferred or projected, in any of the following:
 - (a) extent of occurrence
 - (b) area of occupancy
 - (c) area, extent and/or quality of habitat
 - (d) number of locations or subpopulations
 - (e) number of mature individuals.
 - 3. Extreme fluctuations in any of the following:
 - (a) extent of occurrence
 - (b) area of occupancy
 - (c) number of locations or subpopulations
 - (d) number of mature individuals.

- C. Population estimated to number less than 250 mature individuals and either:
 - 1. An estimated continuing decline of at least 25% within three years or one generation, whichever is longer or
 - 2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals and and population structure in the form of either:
 - (a) severely fragmented (i.e. no subpopulation estimated to contain more than 50 mature individuals)
 - (b) all individuals are in a single subpopulation.

- D. Population estimated to number less than 50 mature individuals.

- E. Quantitative analysis showing the probability of extinction in the wild is at least 50% within 10 years or 3 generations, whichever is the longer.

Source: IUCN. 1994. IUCN red list categories. IUCN Species Survival Commission, Gland, Switzerland, 21 pp.

Although the area of occurrence for the species is larger than 100 km² it is severely fragmented, with wolf populations known from only five small isolated mountain ranges (B.1). At least two other populations have become extinct in the last 100 years (B.2.d), and the number of mature animals in BMNP has declined (B.2.e).

While the global population is currently estimated at 400 adults, only a fraction, probably less than the IUCN stipulated 250, are breeders (C). The current total estimate indicates a decline of at least 25% in the last three years (C.1), distributed in 5–7 populations of less than 100 breeders each (C.2.a). Finally, Vortex (Lacy 1993) simulations for the Bale Mountains population when using population parameters from the 1988–1992 study, always led to population extinction, since the population growth rate was negative during that period (E; Chapter 6). However, more refined population viability analysis is required.

Legal Status

The Ethiopian wolf is officially protected in Ethiopia. The Wildlife Conservation (amendment) Regulations 1974, include the species in Schedule VI: This states that the species “may only be hunted with special permit for scientific purposes – only to be issued by the Minister of Agriculture” (Negarit Gazette 1974). No such permits have been granted in the last 15 years. No poaching, sport hunting and/or trade of live animals has been reported, although concern existed in the past of occasional sport hunters shooting and killing wolves unlawfully (Sillero-Zubiri 1989, Gottelli and Sillero-Zubiri 1990). Sport hunting in Ethiopia has been banned since 1993.

Occurrence in Protected Areas

Wolf populations and suitable habitat in Bale and Simien mountains are directly protected by inclusion in the BMNP and Simien Mountains National Park (SMNP) respectively. Over 1,000 km² of afroalpine habitats are included within BMNP, which is the largest range of afroalpine habitat in the continent, and the current wolf population is almost entirely restricted to the National Park, where until recently there was little human persecution. A different situation applies to the smaller SMNP, only 180 km² in size, a third of the afroalpine habitats in the Simien massif (Chapter 2). The activities of cowherds and farmers within the SMNP boundaries had an adverse effect on the wolf population and prey base. Most of the remaining wolf

population in Simien may occur outside the SMNP (Hurni 1995). There are plans to extend the park boundaries to include at least part of that range.

Populations in west Bale Region (Somkaro/Korduro range) and Arsi Mountains (Mount Kaka and Mount Chilalo) are included within Hunting Areas under the jurisdiction of EWCO, and at least in theory they are afforded some protection.

Wolves also occur in an area proposed for protection, the Guassa range in Menz, Shoa Region. The afroalpine grasslands in Menz has been traditionally protected by the local Amhara people for the sustainable use of *Festuca* tussock grass as a communal resource (Mateos and Leykun 1992, Sillero-Zubiri 1995, Zelealem Tefera 1995). Access to the range is monitored and restricted, resulting in an abundant resident wildlife.

Taxonomy

The Ethiopian wolf belongs to the Order Carnivora, Infraorder Canoidea, Family Canidae, Subfamily Caninae (Wozencraft 1989). One of four *Canis* species





Ethiopian wolves in the afroalpine habitat of Sanetti Plateau.

in Africa, it is readily distinguishable from jackals (*C. aureus*, *C. mesomelas*, *C. adustus*) by its larger size, relatively longer legs, distinctive reddish coat and white markings (Sillero-Zubiri and Gottelli 1994). Clutton-Brock *et al.* (1976) noted that the Ethiopian wolf was the most distinct of seven *Canis* species, but suggested close affinity with the side-striped jackal (*Canis adustus*) and some South American zorros (*Dusicyon spp.*).

Gray (1868) classified the species in a separate genus *Simenia*, a taxonomy followed by Allen (1939). A recent phylogenetic analysis using a mitochondrial DNA sequence suggested that *C. simensis* is a distinct species, more closely related to the grey wolf (*C. lupus*) and the coyote (*C. latrans*) than to any African canid (Gottelli *et al.* 1994; Chapter 5). The Ethiopian wolf may be an evolutionary relict of a grey wolf-like ancestor which invaded northern Africa from Eurasia where fossils of wolf-like canids are known from the late Pleistocene (Kurtén 1968).

The Ethiopian wolf is often called the Simien or Simenian fox but is not closely linked to the fox (*Vulpes* – subfamily Vulpinae) group (Clutton-Brock *et al.* 1976). Gervais (1855), Gray (1868) and Rothschild (1901) preferred to call it the Abyssinian wolf. Throughout Ethiopia it is known by its Amharic names, “*ky kebero*” or “*kebero*”, which translate as red jackal or jackal. In southern Ethiopia it is also known by the Oromo names “*jedalla farda*”, or horse’s jackal in the Bale Mountains, and “*arouayé*”, or reddish, in Arsi Mountains (J. Malcolm, pers. comm.). In Gojjam it may be known as “*walgie*”, meaning trickster (von Heuglin 1863). Other vernacular English names include Simien jackal, simenian jackal, red fox and Ethiopian jackal (e.g. Clutton-Brock *et al.* 1976, Sheldon 1992). The French name is “*loup d’Abyssinie*” (Gervais 1855), the German “*Abessinische wolf*” or “*Abessinischen fuchs*” (Emmrich 1985) and the Italian “*volpe rossa*” (de Beaux 1922).

De Beaux (1922) considered populations from opposite sides of the Rift Valley to be taxonomically distinct, describing the southern subspecies *C. s. citernii* based on the bright red coloration of some specimens. The two subspecies are currently accepted, based not on coloration but on skull structure, with the nasal bones from wolves southeast of the Rift Valley consistently longer than those from the typical race northwest of the Rift (Yalden *et al.* 1980).

Morphology

The Ethiopian wolf has long legs and a long muzzle, resembling a coyote (*Canis latrans*) in conformation and size. It has an elongated skull with a slender protracted nose and small and widely spaced teeth, especially the premolars. The adult pelage is soft and short, of a distinctive bright tawny rufous colour with a dense whitish to pale ginger underfur. The coat is lighter in juveniles, and turns to yellowish in females during the breeding season.

The throat, chest, a band around the ventral part of the neck, the underparts and inside of limbs are white, with the outline between the red coat and the white markings sharp and well defined. The ears are pointed and broad, their dorsal surface red fringed with long white hairs growing inward from the edge. The tail is a thick black brush with the proximal third white underneath.

Male Ethiopian wolves are significantly larger than females. In BMNP males were 20% larger than females in body mass and 7% larger on body dimensions. Adult males have a mean mass of 16.2 kg (14.2–19.3 kg) and females 12.8 kg (11.2–14.15 kg). For a detailed description of the species’ morphology and craniometry refer to Sillero-Zubiri and Gottelli (1994).

Habitat Requirements

The Ethiopian wolf is a very localised endemic species and is confined to some isolated pockets of afroalpine grasslands and heathlands (Chapter 2), where they prey on afroalpine rodents (Sillero-Zubiri and Gottelli 1995a). In BMNP rodent biomass varies several-fold between different habitats, and the abundance of these prey is closely correlated with that of wolves, which appear to utilize all suitable habitat (Sillero-Zubiri *et al.* 1995a, 1995b). Short vegetation is preferred, with afroalpine herbaceous communities providing the optimal habitat for the species. Wolves are also present in montane grasslands, ericaceous heathland and

secondary *Helichrysum* dwarf-scrub. In BMNP wolves are occasionally seen on barren peaks and lava flows.

Biology

Diet and Foraging Behaviour

Although Ethiopian wolves live in close-knit territorial packs they forage and feed alone on small prey, contradicting the general association in larger carnivores between grouping and cooperative hunting. In BMNP the wolves feed almost exclusively upon diurnal small mammals of the high altitude afroalpine grassland community, such as the giant molerat (*Tachyoryctes macrocephalus*, 300–930 g), a rare root-rat endemic to Bale Mountains, and other endemic species such as grass rats *Arvicanthis blicki*, *Lophuromys melanonyx*, and Starck's hare *Lepus starcki* (Morris and Malcolm 1977, Yalden 1988, Yalden and Largen 1992, Sillero-Zubiri and Gottelli 1995a). Rodents accounted for nearly 96% of all prey occurrences in faeces, with 87% belonging to the first three species listed above. Other prey species included *Otomys typus*, *Lophuromys flavopunctatus*, and occasionally goslings and eggs, rock hyrax (*Procapra capensis*), and mountain nyala calf (*Tragelaphus buxtoni*). In locations where the giant molerat is absent it is replaced in the diet by the smaller common molerat, *Tachyoryctes splendens* (Sillero-Zubiri 1995, Malcolm in press). In the Simien mountains wolves feed upon *Arvicanthis abyssinicus* (Müller 1977). Undigested *Carex monostachya* leaves were found in 4% of the faeces, probably ingested to assist digestion or for parasite control.

Wolves are most active during the day; peaks of foraging activity suggest that they synchronize their



Starck's hare, an endemic mammal in the Bale Mountains preyed upon by Ethiopian wolves.

activity with that of rodents above the ground (Sillero-Zubiri *et al.* 1995a, 1995b). Digging prey out is common, and is the most favoured technique to catch giant molerats, with the effort varying from a few scratches at a rat hole to the total destruction of a set of burrows leaving conspicuous mounds of dirt (Morris and Malcolm 1977). Sometimes digging serves to reach a nest of grass-rats. Kills are often cached and later retrieved (Sillero-Zubiri and Gottelli 1995a).

Although the Ethiopian wolf is a pre-eminent rodent hunter it is also a facultative, cooperative hunter. Occasionally small packs have been seen chasing and killing young antelopes, lambs, and hares. Wolves will take carrion – a sheep carcass is the most successful bait for trapping (Sillero-Zubiri 1996). In areas of grazing in the Web Valley wolves are often seen foraging among herds of cattle, a tactic that may aid in ambushing rodents out of their holes, by using the herd as a mobile hide (Sillero-Zubiri and Gottelli 1995a).

Spatial Organization and Social Structure

Ethiopian wolves live in discrete and cohesive social packs that communally share and defend an exclusive territory. In optimal habitat packs consisted of 3–13 adults (mean = 6), containing 3–8 related adult males, 1–3 adult females, 1–6 yearlings and 1–6 pups (Sillero-Zubiri and Gottelli 1995b). Pack adult sex ratio was biased toward males 2.6:1. In an area of lower prey productivity wolves lived in pairs or small groups (mean = 2.7) and adult sex-ratio was 1:1. Wolves in Simien appeared to be less social. Only 22% of 38 wolf sightings reported were two animals (Müller 1973 in Nievergelt 1981).

Wolves congregate for social greetings and border patrols at dawn, noon and evenings, and rest together at



A giant molerat, a frequent item in the Ethiopian wolf's diet.

night. They break up to forage individually in the morning and early afternoon. Wolves sleep in the open, curled up, with nose beneath the tail. Several animals may sleep close together. They do not use dens to rest at night, and during the breeding season only pups and nursing females use the den. In BMNP there is little nocturnal activity, with wolves seldom moving far from their evening resting site. They may become more crepuscular and nocturnal where human interference is severe (e.g. Simien: Brown 1964a, Somkaro and Kaka: pers. obs.).

During the breeding season social gatherings are more common and take place next to the den. Intense, energetic, and noisy greetings occur primarily when groups assemble or before tandem-marking patrols and seem to be an important component in keeping cohesion and friendly relations within the pack. Other common interactions are food sharing, allo-grooming, nibbling, and playing, which involves chasing, ambushing, and mock fighting. Strong affiliative ties are developed between siblings during the first months of their life. Vicious play-fighting during the first weeks outside the den may determine the establishment of rank between siblings. Hierarchies among pack members are well established with frequent displays of dominance and subordination. A dominance rank develops among adults of each sex; shifts in rank may occasionally take place in males but not among females.

Annual home ranges of eight packs in optimal habitat monitored for four years averaged 6.4 km² and home ranges in an area of lower prey biomass averaged 13.4 km², with some overlap between home ranges. An additional 4–7% of the population was composed of non-resident females, inhabiting larger ranges (mean 11.1 km²). Home ranges overlapped extensively between members of the same pack, whereas home ranges of neighbouring packs were largely discrete, forming a mosaic of packs occupying all available



A pack patrolling and scent marking their territory border.

habitat. Pack home ranges were stable in time, drifting only during major pack readjustment after the disappearance of a pack or significant demographic changes (Sillero-Zubiri and Gottelli 1995b).

Scent marking of territory boundaries, via urine posts, scratching, and faeces, and vocalizations, are common and function in advertising and maintaining territories (Sillero-Zubiri 1994). Packs patrol and scent-mark their territory boundaries at dawn, evening, and often at noon. Tandem-marking trips are regularly carried out by the whole pack including subadults and juveniles but more often only adults of both sexes take part, led by one of the dominant pair, usually the female. All wolves, independent of social rank, scent-mark objects with raised leg urinations and scratches. Vocalizations and deposition of faeces on conspicuous sites (such as mounds, rocks, bushes) also play a role in territory defence. Aggressive interactions with neighbouring packs are common. They are highly vocal and always end with the smaller group fleeing from the larger. Home range overlap and aggressive encounters between packs are highest during the mating season.

Dispersal movements are tightly constrained by the scarcity of suitable unoccupied habitat. Males do not disperse and are recruited into multi-male philopatric packs; two-thirds of the females disperse at two years of age and become 'floaters', occupying narrow ranges between pack territories until a breeding vacancy becomes available. Breeding females typically are replaced after death by a resident daughter, resulting in a high potential for inbreeding. Extra-pack copulations and resulting multiple-paternity may be the mechanism by which this problem is circumvented among Ethiopian wolves (Sillero-Zubiri *et al.* 1996b).

Mating System

Most matings in BMNP occur between August and November. The receptive period of females in any given area is synchronized to less than two weeks. Courtship may take place between adult members of a pack or with members of neighbouring packs. After a short courtship, which primarily involves the dominant male accompanying the female constantly, wolves copulate over a period of 3 to 5 days. Copulation involves a tie lasting up to 15 min. Other males may stand by a mating pair with no signs of aggression. Mate preference is shown, with the female discouraging attempts from all but the pack's dominant male, either by defensive snarls or by moving away. In contrast, she is receptive to any visiting male from neighbouring packs. Up to 70% of matings ($n = 30$) involved males from outside the pack (Sillero-Zubiri *et al.* 1996a).



A male Ethiopian wolf feeding a pup.

The dominant female of each pack may give birth once a year between October and December, with only about 60% of dominant females breeding successfully each year (Sillero-Zubiri *et al.* 1996a). Gestation lasts 60–62 days. Pups are born with their eyes closed and without teeth, in a den dug by the female in open ground, under a boulder or inside a rocky crevice. The pups natal coat is charcoal gray with a buff patch on the chest and inguinal regions. Two to six pups emerge from the den after 3 weeks. At this time, the dark natal coat begins to be replaced by the pelage typical of the species. Pups are regularly shifted between dens, up to 1,300 m apart (Sillero-Zubiri and Gottelli 1995b).

All pack members guard the den, chase potential predators, and regurgitate or carry rodent prey to feed the pups. Subordinate females may assist the dominant female in suckling the pups. At least 50% of extra nursing females showed signs of pregnancy and may have lost or deserted their own offspring before joining the dominant female's den (Sillero-Zubiri *et al.* submitted).

Development of the young is divisible into three stages: (1) early nesting (week 1 to week 4), when the young are entirely dependent on milk; (2) mixed nutritional dependency (week 5 to week 10), when milk is supplemented by solid foods regurgitated by all pack members until pups are completely weaned; and (3) post-weaning dependency (week 10 to 6 months), when the pups subsist almost entirely on solid foods supplied by helpers. Adults have been observed providing food to juveniles up to one year old. Juveniles will join adults in territorial patrols as early as 6 months of age, but will not urinate with raised leg until 11 months if male or eighteen months if female. Full adult appearance is attained at two years and both sexes become sexually mature during their second year.

Cultural and Economic Significance

The Ethiopian wolf does not play a major role in mankind's culture or economy. So far as we know, there is no mention of it in the culture or folklore of Ethiopia. Some indication of the interest that wolves may have held for indigenous people is to be found in their local names. For instance, the name 'jedalla farda' given by the Oromo people in southern Ethiopia means 'horse's jackal', referring to the reported habit of wolves following mares and cows about to deliver and eating the afterbirth. However, the Ethiopian wolf has been recognized by Ethiopian peoples for a very long time. For example the earliest reference to the species uncovered dates to the 13th century or earlier, referring to "*Ethiopicus lupis*" as a docile carnivore that never attacks men (Barber 1993). More recently, the government has used the wolf and other endemic species as national symbols. For instance, the Ethiopian wolf has illustrated two series of postage stamps.

There is no indication of exploitation for furs or other purposes, although a report from Simien suggested that the wolf's liver is used as a medicament (Staheli 1975). No poaching or trade in live animals seem to involve the Ethiopian wolf. Similarly, we have found no mention or evidence of Ethiopian wolves being kept as pets. The only possible indication of a wolf ever being kept in captivity was the mention of a female 'wolf' kept in a private collection by Harar's Postmaster and offered to the National Zoo in Washington (Anon. 1904), although it is not known whether it referred to an Ethiopian wolf or some other carnivore (many Ethiopians refer to African wild dogs *Lycan pictus* as wolves).



Ethiopian commemorative stamps featuring the Ethiopian wolf.