

wilderness areas and rural landscapes are being rapidly urbanised. Jackal populations adapt to some extent to this change and may persist for a while, but eventually disappear from such areas like other wildlife. There are no other known threats, except for local policies of extirpation and poisoning (for example, Israel).

Commercial use There is no significant trade in jackal products, although skins and tails are occasionally sold.

Occurrence in protected areas Golden jackals are present in all protected areas of India except for those in the high elevation regions of the Himalaya. In East Africa, they occur in the Serengeti-Masai Mara-Ngorongoro complex, as well as numerous other conservation units. Thus they have a wide coverage in terms of protected populations.

Protection status CITES – Appendix II (in India).

Current legal protection Jackals feature on Schedule III of the Wildlife Protection Act (1972) of India and are afforded the least legal protection (mainly to control trade of pelts and tails). However, no hunting of any wildlife is permitted under the current legal system in India. The golden jackal could be considered as a “species requiring no immediate protection” with caution and knowledge that populations throughout its range are likely declining.

Conservation measures taken Besides being represented in a wide array of protected areas covering several landscapes, no species-specific conservation efforts have been undertaken.

Occurrence in captivity

Almost all zoos in India have golden jackals. In March 2000, there were 67 males, 72 females, and 54 unsexed individuals in Indian zoos (Central Zoo Authority India pers. comm.).

Current or planned research projects

P. Moehlman (Tanzania Wildlife Research Institute) is conducting ongoing, long-term studies in the Serengeti, Tanzania.

Y. Jhala (Wildlife Institute of India) is continuing with ongoing studies on wolves, jackals, and striped hyaenas in Bhal and Kutch areas of Gujarat, India.

M. Jaeger (Department of ESPM, University of California at Berkley, USA) is investigating crop damage, densities and ranging patterns of golden jackals in Bangladesh.

Gaps in knowledge

Little quantitative information is available on jackal densities, habitat use, and ranging patterns in relation to

food availability. Information on dispersal, survival and mortality factors of adults, pups and dispersing individuals is needed. Jackal ecology needs to be studied in forested ecosystems of Southeast Asia where a different set of factors are likely to operate affecting food availability, ranging patterns and survival. Aspects of canid diseases in relation to population dynamics of jackals and transmission need to be better understood.

Core literature

Fuller *et al.* 1989; Macdonald 1979a; Moehlman 1983, 1986, 1989; Moehlman and Hofer 1997.

Reviewers: Asir J.T. Johnsingh. **Editors:** Michael Hoffmann, Claudio Sillero-Zubiri.

6.3 Black-backed jackal ***Canis mesomelas* Schreber, 1775** **Least Concern (2004)**

A.J. Loveridge and J.A.J. Nel

Other names

English: silver-backed jackal; **Afrikaans:** rooijakkals; **French:** chacal à chabraque; **German:** schabrakenschakal; **Indigenous names:** Amharic: tikur-jerba kebero (Ethiopia, Eritrea); Shona: hungubwe, gava (Zimbabwe); Ndebele: ikhanka (Zimbabwe); Zulu: mpungutshe, kanka (South Africa); Siswati: mpungutje; Shangaan: impungutshe (South Africa); Tswana: phokojwe (Botswana, South Africa); Venda: phungubwe (South Africa); Sotho: phokobje, phokojoe (South Africa); Herero/Ovambo: ombánji (Namibia); Nama/Damara: Girib, Gireb (Namibia); Kiswaheli: bweha nyekunda (East Africa).

Taxonomy

Canis mesomelas von Schreber, 1775. Die Säugethiere 2(14): pl. 95; text 1776, 3(21): 370. Type locality: “Vorgebirge der guten Hofnung” [“Cape of Good Hope”, South Africa].

Chromosome number: 2n=78 (Wayne 1993).

Description

The black-backed jackal is somewhat fox-like in appearance, with a long, pointed muzzle. Diagnostic features include the dark saddle, black, bushy tail and reddish flanks and limbs; males are slightly larger and heavier than females (Table 6.3.1). The ears are large, erect, pointed and constantly mobile. The overall body colour is rufous brown, the colour gaining its greatest intensity on the ears, rump and flanks. A black stripe midway up each flank slopes obliquely from behind the shoulder to the top of the rump; the dark saddle is broadest at the shoulders and tapers to a narrow point at the base



Black-backed jackal, age and sex unknown. Etosha National Park, Namibia.

Chris and Tilde Stuart

Table 6.3.1. Body measurements for the black-backed jackal from the former Cape Province, South Africa (Stuart 1981).

HB male	785mm (690–900) n=65
HB female	745mm (650–850) n=42
T male	326mm (270–395) n=70
T female	316mm (260–381) n=45
HF male	160mm (130–185) n=66
HF female	156mm (140–180) n=43
E male	109mm (90–132) n=68
E female	104mm (80–120) n=41
WT male	8.1kg (5.9–12.0) n=59
WT female	7.4kg (6.2–9.9) n=42

of the tail. Anterior to this stripe, just behind the shoulder is a small vertical stripe, diffuse in some individuals. Above the side markings, the back is marbled black and white giving an overall silver appearance in mature animals (hence their alternative name of silver-backed jackal). Juveniles and subadults have similar markings but these are drabber and only gain their full intensity at around two years of age. In the drier west and Namib coast in southern Africa the winter coat is a deep reddish brown (especially in males). The bushy tail is dark brown to black with a distinctive black subcaudal marking. The markings, especially the side and shoulder stripes, are unique to each individual and can be used for identification purposes. Hair on the face is 10–15mm, lengthening to 30–40mm on the rump. Guard hairs on the saddle in the shoulder region are *c.* 60mm decreasing to 40mm at the base of the tail; on the tail they reach 70mm.

Skull elongated, braincase pear-shaped, rostrum narrow, supra-occipital crest well developed, bullae

rounded, zygomatic arches broad and well developed, and post-orbital bars incomplete. Dental formula is $3/3-1/1-4/4-2/3=42$. Outer upper incisors larger, more pointed and caniniform than others. Upper canines long, curved and pointed, with a sharp ridge on their posterior faces (Skinner and Smithers 1990).

In southern Africa black-backed jackals differ in size in different areas. Recorded mean mass of males from different regions include: 8.4kg (n=123) for KwaZulu-Natal (Rowe-Rowe 1978), 8.2kg (n=12) in the former Transvaal (Rautenbach 1982), and 9.7kg (n=7) for the Skeleton Coast of Namibia (Stutterheim *in litt.*). Average weight in East Africa is 8.5kg (Kingdon 1977).

Subspecies As many as six (Allen 1939) subspecies have been recognised. Coetzee (1977) listed five, while Meester *et al.* (1986) assigned all southern African material to the nominate subspecies, mentioning the two remaining subspecies from East Africa. However, considering the regional variation in the species, Kingdon's (1997) recognition of only two, geographically isolated subspecies is followed here.

- *C. m. mesomelas* (southern Africa)
- *C. m. schmidtii* (East Africa).

Similar species Both side-striped jackals (*Canis adustus*) and golden jackals (*Canis aureus*) occur in sympatry with the black-backed jackal in parts of East Africa, and the side-striped jackal occurs in sympatry with this species in parts of Zimbabwe, Botswana and South Africa. Both the side-striped jackal and golden jackal typically lack the prominent dark saddle, although this is sometimes apparent in the golden jackal. They also lack the reddish flanks and limbs. The side-striped jackal has a whitish

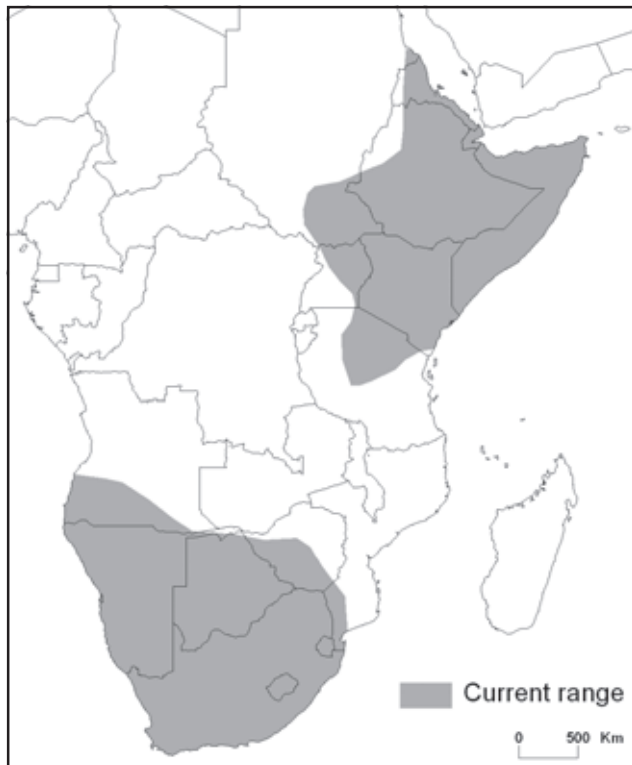
stripe along the flanks and a characteristic white-tipped tail, while the golden jackal is sand-coloured and has cream-coloured underparts.

Distribution

Current distribution The black-backed jackal has a disjunct distribution range, and is found in two separate populations, one in East Africa, and the other in southern Africa (Figure 6.3.1). Ansell (1960) notes that this species is entirely absent from Zambia and it is absent through much of central and equatorial Africa. The disjunct distribution of this species is similar to that of other endemic African species adapted to dry conditions (e.g., aardwolf *Proteles cristatus*, bat-eared fox *Otocyon megalotis*, dik-dik *Madoquakirkii*). The two black-backed jackal ranges are separated by as much as 1,000km and their discontinuous distribution suggests that regions of dry *Acacia* bush and savannah, the preferred habitat of this species, once connected south-west Africa and the Horn of Africa.

Historical distribution Fossils of black-backed jackals have been found in deposits in South Africa dating to at least two million years ago (Hendey 1974), but fossil remains have never been found north of Ethiopia suggesting that they have always been restricted to sub-Saharan Africa.

Figure 6.3.1. Current distribution of the black-backed jackal.



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Range countries Angola, Botswana, Djibouti, Eritrea, Ethiopia, Kenya, Lesotho, Mozambique, Namibia, Somalia, South Africa, Sudan, Swaziland, Tanzania, Uganda, Zimbabwe (Coetzee 1977; Kingdon 1977; Skinner and Smithers 1990).

Relative abundance

Regional estimates of abundance are not available. However, black-backed jackals are generally widespread, and, in Namibia and South Africa, they are common in protected areas where suitable habitat occurs. They occur in many livestock producing areas, where they are considered vermin, but despite strenuous control measures in many farming areas of southern Africa this species is still relatively abundant.

Estimated populations/relative abundance and population trends

In the Drakensberg Mountains of South Africa, Rowe-Rowe (1982) found densities of 1 jackal/2.5–2.9km², while J.A.J. Nel *et al.* (unpubl.) recorded linear densities along the Namib Desert Coast of Namibia that varied from 0.1–0.53 jackal/km² along food-scarce beaches along the Skeleton Coast, to 7.0–9.0/km² at the food-rich seal rookery at Cape Cross, reaching a maximum of 16.0–32.0/km² along the centre of the seal rookery.

Habitat

Black-backed jackals are found in a wide variety of habitats including arid coastal desert (Dreyer and Nel 1990), montane grassland (Rowe-Rowe 1982), arid savannah and scrubland (Skinner and Smithers 1990), open savannah (Wyman 1967; Kingdon 1977; Lamprecht 1978; Moehlman 1983; Fuller *et al.* 1989; Estes 1991), woodland savannah mosaics (Smithers 1971; Loveridge and Macdonald 2002) and farmland. In general, black-backed jackals show a preference for open habitats tending to avoid dense vegetation (Pienaar 1969). In KwaZulu-Natal, they are recorded from sea level to more than 3,000m a.s.l. in the Drakensberg, and in localities receiving more than 2,000mm of rainfall (Rowe-Rowe 1982, 1992). Where more than one jackal species occur in sympatry the habitat is partitioned. The trend is for black-backed jackals to use either the open grassland (when sympatric with side-striped jackal; Loveridge and Macdonald 2000) or wooded savannah (when sympatric with golden and side-striped jackals; Fuller *et al.* 1989). In western Zimbabwe habitat partitioning was mediated by aggressive encounters in which black-backed jackals displaced side-striped jackals from grassland habitats (Loveridge and Macdonald 2002).

Food and foraging behaviour

Food Black-backed jackals are generalist feeders. Diet varies according to food availability (Skinner and Smithers 1990; Loveridge and Macdonald 2003), and, when occurring in sympatry with other carnivores sharing the

same prey base, food resources are partitioned (Bothma *et al.* 1984). Dietary items typically include small- to medium-sized mammals (e.g., murids, springhares, young ungulates), reptiles, birds and birds' eggs, carrion and human refuse (Roberts 1922; Stuart 1976, 1981; Kingdon 1977, 1997; Ferguson 1980; Rowe-Rowe 1983; Dreyer and Nel 1990; Skinner and Smithers 1990; Kok 1996), as well as invertebrates and plants (Bothma 1971b), beached marine mammals, seals, fish and mussels on coasts (Nel and Loutit 1986; Avery *et al.* 1987; Oosthuizen *et al.* 1997). Invertebrates, such as termites and insects, are commonly eaten (Kingdon 1997; Loveridge 1999).

Foraging behaviour Pairs and small foraging groups are often seen foraging together. Groups of between 8 and 10 aggregate at large carcasses of herbivores, and more than 80 have been recorded at seal colonies on the Namib Desert coast (Oosthuizen *et al.* 1997). Such aggregations are accompanied by aggressive behaviour between territorial individuals. However, in the south-western Kalahari, where antelope carcasses are uncommon, groups of up to 15 pairs feed in succession without much overt aggression (J.A.J. Nel unpubl.). Mated black-backed jackal pairs will often cooperate in the capture of prey resulting in a higher success rate (Lamprecht 1978; Loveridge 1999). In Botswana, McKenzie (1990) found that, on occasion, they form 'packs' in order to hunt adult impala (*Aepyceros melampus*), and other authors have recorded them taking adult antelope (Van Lawick and van Lawick-Goodall 1970; Sleicher 1973; Lamprecht 1978). On the Namib Desert coast they patrol beaches for beached marine refuse and move along sheltered paths in-between food-rich patches; the top of coastal hummocks are used as feeding sites (Dreyer and Nel 1990). In this environment, they frequently occur in association with brown hyaenas (*Parahyaena brunnea*), following from a distance in the hope of securing the odd food item. The large, mobile ears are used to locate invertebrate and small mammalian prey. A leap, followed by an accurate pounce is employed to capture prey located in this fashion, after the manner of a red fox (*Vulpes vulpes*). They are largely nocturnal, but activity periods may extend well into daylight hours in areas where they are free from persecution.

Damage to livestock or game This species will prey on livestock (especially juvenile goats and sheep) and is thus considered vermin in many livestock producing regions (Van der Merwe 1953). However, such predation is usually localised and not extensive (Shortridge 1934; Roberts 1951; Smithers 1971; Rowe-Rowe 1975; Lawson 1989). In certain areas losses of up to 3.9% can result, or up to 18% on specific farms, which entail a high economic loss to farmers (Brand 1993). Where controlled herding is practiced, e.g., southern Namibia, losses amount to only 0.3–0.5% (Brown 1988).

Adaptations

Black-backed jackals are relatively unspecialised canids and well suited for an opportunistic lifestyle in a wide variety of habitats. They have a well-developed carnassial shear with a longer premolar cutting blade than other jackal species, an indication of a greater tendency towards carnivory (Van Valkenburgh 1991; Van Valkenburgh and Koepfli 1993). Examination of kidney structure suggests that this species is well adapted to water deprivation (Loveridge 1999) which may explain its presence in the drier parts of the African continent. Black-backed jackals are wary of unfamiliar objects and young follow the example of adults by avoiding poisoned baits (coyote getters) in control operations (Brand 1993; Brand and Nel 1996); here, as well as during foraging and selecting prey, social learning seems to play a role (Nel 1999).

Social behaviour

The monogamous mated pair is the basis of social structure in this species. The pair bond appears to be life-long in most cases, and if one member of a pair dies the other often will lose its territory (Moehlman 1978, 1979; Estes 1991). Black-backed jackals are territorial using faeces and urine to demarcate their territorial boundaries (Kingdon 1977; Ferguson *et al.* 1983; Skinner and Smithers 1990). Territories are spatially and temporally relatively stable, and intruders are aggressively expelled by territory holders. In Hwange National Park, Zimbabwe, a mated pair of black-backed jackals held the same territory for at least four years (Loveridge 1999). Water sources are shared with intruders but these perform submissive behaviour to territory holders, and even their pups (J.A.J. Nel unpubl.). Density and group size is dependent on food biomass and dispersion (J.A.J. Nel *et al.* unpubl.).

Recorded home range sizes vary across the range of the species. In South Africa, home range size averaged 18.2km², (n=14) in the Giants Castle Game Reserve in the KwaZulu-Natal Drakensberg (Rowe-Rowe 1982). In the more arid south-western Kalahari, ranges were smaller, with adult ranges varying from 2.6–5.2km², (mean 4.3km², n=7) and subadult ranges from 4.0–8.8km², (mean 6.3km², n=4) (Ferguson *et al.* 1983). In Zimbabwe, home ranges were largest in the cold, dry season (ca 1.0km² and 1.3km², n=3 and 6 respectively) and smaller in the hot dry season (ca 0.3km² and 0.6km², n=4) (Loveridge and Macdonald 2001), while in the Rift Valley in Kenya, home ranges varied between 0.7–3.5km², with a mean of 1.8km² (Fuller *et al.* 1989). Interestingly, at Cape Cross Seal Reserve on the Namibian coast, average home range size varied from 7.1–24.9km² (n=4). Here jackals did not defend their ranges and were not territorial (Hiscocks and Perrin 1988), whereas in all other cases ranges were defended and mutually exclusive for pairs.

The black-backed jackal is a very vocal species. A high-pitched, whining howl is used to communicate with group

members and is often used to call the group together in the early evening; this may also function in territorial advertisement (Moehlman 1983; Estes 1991). Howling often stimulates the same behaviour in adjacent territories or in nearby individuals. A three- to five-syllable alarm call, consisting of an explosive yelp followed by a series of shorter high-pitched yelps, is used when disturbed and may be frantic and prolonged when mobbing leopard (*Panthera pardus*). A low-pitched, gruff bark is used to warn pups of intruders near the den, and whines are used to call to pups. Kingdon (1997) notes the use of a 'clattering distress call' and a loud yelp when alarmed. Interestingly, black-backed jackals are much less vocal where they occur alongside the golden jackal, which is the only jackal species heard to howl in East Africa (Kingdon 1977, 1997).

Reproduction and denning behaviour

Mating in this species is accompanied by increased vocalisation and territoriality in both sexes (Bernard and Stuart 1992; Loveridge and Macdonald 2001). The dominant individuals within the territory prevent same sex subordinates from mating by constant harassment. As with other canids, there is a copulatory tie after mating. In southern Africa mating generally occurs from late May to August and, following a gestation period of about 60 days, births occur from around July to October (Stuart 1981; Bernard and Stuart 1992). However, in the KwaZulu-Natal Drakensberg, Rowe-Rowe (1978) recorded a peak in births in July. Bernard and Stuart (1992) suggested that summer births are timed to coincide with the reproductive season of important prey like vlei rat (*Otomys irroratus*) and four-striped grass mouse (*Rhabdomys pumilio*), and winter births with an increase in the availability of ungulate carcasses at the end of winter.

Litter size is typically between one and six, and pups are born in modified termitaria or other convenient burrows, often with multiple entrances. The same den sites may be used from year to year. Pups first emerge from the den at three weeks, are weaned at 8–9 weeks, and are completely independent of the den at 14 weeks (Moehlman 1978).

Alloparental care, where young from previous years may remain within the territory to act as 'helpers', is well documented for this species (Moehlman 1978). Alloparents feed pups by regurgitation and guard them when the parents are foraging. One 'helper' may increase the average number of pups surviving per mated pair from one to three, and two 'helpers' further increases survival to four pups (Moehlman 1979, 1983).

Pups reach sexual maturity at about 11 months (Ferguson *et al.* 1983), and even at this early age they can disperse distances of more than 100km (Bothma 1971c).

Competition

Black-backed jackals compete to a small degree with many small carnivores, but this species' generalist habits

ensure that such competition is rarely intense and food resources are partitioned (Bothma *et al.* 1984). They also compete for carrion with other scavengers, particularly hyaenas, lion and vultures. Wyman (1967) found that this species was much more common than golden jackals at large carnivore kills in the Ngorongoro crater, Tanzania, despite being less numerous in the area, while Estes (1991) notes that black-backed jackals are more likely to attempt to feed on lion and hyaena kills than other jackal species. Competition for resources with side-striped jackals has been recorded in western Zimbabwe. In this case black-backed jackals aggressively displaced side-striped jackals from prime grassland habitat, despite being around 3kg smaller. Indeed, black-backed jackals are reputed to be more aggressive than other species of jackal (Kingdon 1977; Skinner and Smithers 1990; Estes 1991) and Estes (1991) mentions that pups of this species become 'quarrelsome and unsociable' and are more likely to emigrate than golden jackal pups.

Mortality and pathogens

Natural sources of mortality Natural predators include leopard (Turnbull-Kemp 1967; A. Loveridge pers. obs) and spotted hyaena (*Crocuta crocuta*) which may prey on unprotected pups (Van Lawick and van Lawick-Goodall 1970). Estes (1967) observed 11 jackals taken by a leopard over the course of three weeks, and they may be a favourite prey item of leopard in some areas (Kingdon 1977). Interestingly, a golden jackal was seen killing a litter of four black-backed jackal pups (about 5–6 weeks old) while the adults were away hunting (O. Newman and A. Barrett pers. comm.). Other predators include birds of prey; Van Lawick and van Lawick-Goodall (1970) observed a martial eagle (*Polemaetus bellicosus*) fly away carrying a subadult black-backed jackal.

Persecution Snaring and road accidents may be the commonest cause of jackal mortality in areas of high human density.

Hunting and trapping for fur Hunting and trapping for skins occurs in some areas of southern Africa but is not a widespread industry.

Road kills see Persecution.

Pathogens and parasites Black-backed jackals succumb to diseases of domestic dogs, such as babesiosis and distemper (Kingdon 1977; Van Heerden 1980). Jackals are significant vectors of rabies in central southern Africa (Foggin 1988; Bingham and Foggin 1993). In some areas rabies control is undertaken by culling of wildlife, especially jackals, and is thus a major cause of mortality. Recent work suggests that culling is ineffective and rabies is less prevalent in areas where jackal populations are stable,

such as national parks. Oral vaccination is the most effective method of rabies control.

Longevity Haltenorth and Diller (1980) give longevity as 10–12 years in the wild, although Rowe-Rowe (1992) states that few appear to live beyond seven years.

Historical perspective

Black-backed jackal livestock predation resulted in the formation of ‘hunting clubs’ in many farming districts of South Africa in the early to middle part of the last century (Van der Merwe 1954). Despite strenuous control measures (use of dogs, poison, shooting and gassing) this species was never eradicated and continues to occur in these areas today. Jackals appear regularly in African folklore, especially as an allegorical vehicle for greed or cunning.

Conservation status

Threats No major threats, but black-backed jackals are persecuted for their role as livestock killers and as rabies vectors. Population control efforts appear largely ineffective and probably only succeed in producing a temporary reduction in local numbers.

Commercial use There is no significant trade in jackal products, although body parts are used in traditional African medicine.

Occurrence in protected areas

- *Angola*: Iona National park;
- *Botswana*: Kgalagadi Transfrontier Park, Central Kalahari Game Reserve, Moremi Game Reserve, Chobe National Park;
- *Ethiopia*: Awash National Park, Mago National Park, Nechisar National Park, Omo National Park;
- *Kenya*: Masai Mara;
- *Lesotho*: Sehlabathebe National Park;
- *Mozambique*: Gorongosa National Park;
- *Namibia*: Skeleton Coast National Park, Namib-Naukluft National Park, Etosha National Park, Waterberg National Park;
- *Somalia*: unknown;
- *South Africa*: Augrabies Falls National Park; Kgalagadi Transfrontier Park, Karoo National Park, Kruger National Park, Ukahlamba-Drakensberg Park, Hluhluwe-Umfolozi Game Reserve, Suikerbosrand Nature Reserve, Tankwa Karoo National Park, Mountain Zebra National Park, Namaqua National Park;
- *Tanzania*: Serengeti National Park, Selous Nature Reserve;
- *Uganda*: Kidepo National Park, Queen Elizabeth National Park;
- *Zimbabwe*: Hwange National Park.

Protection status CITES – not listed.

Current legal protection Black-backed jackals have no legal protection outside protected areas

Conservation measures taken None.

Occurrence in captivity

Black-backed jackals have been maintained in captivity for use in experiments testing rabies vaccine (Bingham *et al.* 1995).

Current or planned research projects

S. Kaunda (Wildlife Conservation Research Unit, University of Oxford, United Kingdom) is currently undertaking ecological work on this species in Botswana.

S. Gowtage-Sequeira (Zoological Society London, United Kingdom) is studying the transmission of canid pathogens such as rabies and canine distemper between carnivores (black-backed jackals and brown hyaenas) on the Namibian coast.

M.J. Somers (Department of Zoology, University of Transkei, South Africa) is studying the ecology and intraguild relations among small carnivores along the Transkei Wild coast.

Other projects include ongoing monitoring by P. Moehlman in the Serengeti, an ecological study by L. Frank as part of the Laikipia Predator Project in Kenya, investigations into problem-animal control by R. Harrison-White in South Africa, and veterinary-related work by J. Bingham and C. Foggin.

Gaps in knowledge

A large amount of research focusing on the behaviour and ecology of this species has been undertaken, particularly in the last 25 years. In the last decade, however, the emphasis has generally shifted to the role that the animal plays as a vector of rabies, and as a problem animal. The study of Loveridge (1999) may provide a model for future research, whereby funds and efforts are directed towards better understanding their role, for example, in disease transmission and livestock predation, and ecological, behavioural and other data are gathered concurrently. In many settled areas this species, together with the caracal (*Caracal caracal*), represent the top predators in many ecosystems, yet their roles are poorly understood.

Core literature

Ferguson 1980; Lamprecht 1978; Loveridge and Macdonald 2001, 2002; Moehlman 1983, 1987; Rowe-Rowe 1982; Skinner and Smithers 1990.

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