

Longevity of a wild bat-eared fox

Jan F. Kamler* & David W. Macdonald

Wildlife Conservation Research Unit, Oxford University, Tubney House, Abingdon Road, Tubney, Abingdon OX13 5QL, U.K.

Received 19 June 2006. Accepted 8 September 2006

Longevity in wild bat-eared foxes (*Otocyon megalotis*) has never been reported. Long lifespans might be rare in most populations due to disease and predation from larger carnivores. While conducting ecological research on bat-eared foxes on private sheep farms near Kimberley, Northern Cape, we documented a wild bat-eared fox to be at least 9 years old. The unusually old age of this fox might have been due to lack of larger carnivores on the study site, including black-backed jackals (*Canis mesomelas*), which might normally predate on, or transmit diseases to, bat-eared foxes.

Key words: bat-eared fox, longevity, *Otocyon megalotis*, South Africa.

Bat-eared foxes (*Otocyon megalotis*) are a common carnivore throughout southern and eastern Africa, and several studies have investigated their behaviour and ecology (Nel 1978; Lamprecht 1979; Malcolm 1986; Mackie & Nel 1989; Pauw 2000; Maas & Macdonald 2004). Despite this, longevity in wild bat-eared foxes has never been reported (Nel & Maas 2004; Clark 2005). Long lifespans might be rare in many populations of bat-eared foxes due to two important causes of mortality: disease and predation by larger carnivores. Bat-eared foxes are prone to several diseases, including rabies (Nel 1993; Thomson & Meredith 1993; Maas & Macdonald 2004), canine distemper (Nel & Maas 2004), and canine parvovirus (Steinel *et al.* 2000). Epizootics of rabies in bat-eared foxes can be so severe, that up to 90% of local populations can die from this disease (Maas & Macdonald 2004). Furthermore, many large carnivores contract and transmit diseases such as rabies, especially African wild dogs (*Lycaon pictus*; Creel & Creel 2002) and black-backed jackals (*Canis mesomelas*; Loveridge & Macdonald 2001), suggesting sympatric populations of larger carnivores can be disease reservoirs for bat-eared foxes.

Bat-eared foxes also are prone to predation by larger carnivores. For example, bat-eared foxes have been killed by African wild dogs (Rasmussen 1996), lions (*Panthera leo*; Eloff 1984), leopards

(*Panthera pardus*; Bothma & Le Riche 1984), cheetahs (*Acinonyx jubatus*; Mills 1984a), brown hyaenas (*Parahyaena brunnea*; Mills 1984b), striped hyaenas (*Hyaena hyaena*; Kruuk 1976), spotted hyaenas (*Crocuta crocuta*; Kruuk 1972), and black-backed jackals (Schaller 1972). In fact, Pauw (2000) indicated predation by black-backed jackals was the greatest threat to young bat-eared foxes.

On 11 August 2005, we captured and radio collared an adult female bat-eared fox as part of an ecological study of this species on a private sheep farm (28°99'S and 24°81'E) near Kimberley, Northern Cape. This female appeared very old at the time of capture, as upper and lower incisors were worn to the gum line, molars and premolars were worn to near the gum line, and all four canines were worn to nubs. On 12 October 2005, this female died of apparently natural causes, and the carcass was recovered from an underground den (deposited in McGregor Museum, Kimberley; MMK/M/7302). One lower canine was removed and sent to Matson's Laboratory (Milltown, Montana, U.S.A) for sectioning and counting of cementum annuli. The results indicated this fox was 9 years and 1 month (assuming birth date of 1 September), with a high degree of confidence (>95% accuracy level). The tooth section was graded as 'A', meaning cementum characteristics very nearly matched those of the standardized cementum aging model for the species and tooth type. Matson's Laboratory has >35 years experience aging mammalian teeth, and previous research has shown these methods to be highly accurate for aging fox species, including grey foxes (*Urocyon cinereoargenteus*; Nicholson & Hill 1981), swift foxes (*Vulpes velox*; Richholt & Carbyn 2003), red foxes (*V. vulpes*; Monson *et al.* 1973), and arctic foxes (*Alopex lagopus*; Bradley *et al.* 1981).

A captive bat-eared fox reportedly lived to 13 years and 9 months (Jones 1982), but we believe an age of 9 years and 1 month in the wild is exceptional for this species. Reasons for the relatively old age of this bat-eared fox on the sheep farm were unclear, but might have been due to absence of larger carnivores, including black-backed jackals, which might normally predate on, or transmit diseases to, bat-eared foxes.

We thank I. Joubert and G. de Witt for allowing us to conduct research on their land. This project was supported by the Wildlife Conservation Society (U.S.A.), British Airways (U.K.), and De Beers Consolidated Mines (South Africa).

*To whom correspondence should be addressed.
E-mail: jankamler@hotmail.com

REFERENCES

- BOTHMA, J.D.P. & LE RICHE, E.A.N. 1984. Aspects of the ecology and the behaviour of the leopard *Panthera pardus* in the Kalahari desert. *Koedoe* 27(Suppl.): 259–279.
- BRADLEY, J.A., SECORD, D. & PRINS, L. 1981. Age determination of the arctic fox (*Alopex lagopus*). *Can. J. Zool.* 59: 1976–1979.
- CLARK, H.O. 2005. *Otocyon megalotis*. *Mamm. Species* 766: 1–5.
- CREEL, S. & CREEL, N.M. 2002. The African wild dog: behavior, ecology, and conservation. Princeton University Press, Princeton, New Jersey.
- ELOFF, F.C. 1984. Food ecology of the Kalahari lion *Panthera leo vernayi*. *Koedoe* 27(Suppl.): 249–258.
- JONES, M.L. 1982. Longevity of captive mammals. *Der Zool. Gart. Neue Folge Jena* 52: 113–128.
- KRUUK, H. 1972. The spotted hyena. University of Chicago Press, Chicago.
- KRUUK, H. 1976. Feeding and social behaviour of the striped hyaena (*Hyaena vulgaris* Desmarest). *E. Afr. Wildl. J.* 14: 91–111.
- LAMPRECHT, J. 1979. Field observations on the behaviour and social system of the bat-eared fox *Otocyon megalotis* Desmarest. *Z. Tierpsychol.* 42: 260–284.
- LOVERIDGE, A.J. & MACDONALD, D.W. 2001. Seasonality in spatial organization and dispersal of sympatric jackals (*Canis mesomelas* and *C. adustus*): implications for rabies management. *J. Zool., Lond.* 253: 101–111.
- MAAS, B. & MACDONALD, D.W. 2004. Bat-eared foxes. In: D.W. Macdonald & C. Sillero-Zubiri (Eds), *Biology and conservation of wild canids* (pp. 227–242). Oxford University Press, Oxford.
- MACKIE, A.J. & NEL, J.A.J. 1989. Habitat selection, home range use, and group size of bat-eared foxes in the Orange Free State. *S. Afr. J. Wildl. Res.* 19: 135–139.
- MALCOLM, J.R. 1986. Socio-ecology of bat-eared foxes (*Otocyon megalotis*). *J. Zool., Lond.* 208: 457–467.
- MILLS, M.G.L. 1984a. Prey selection and feeding habits of the large carnivores in the southern Kalahari. *Koedoe* 27(Suppl.): 281–294.
- MILLS, M.G.L. 1984b. The comparative behavioural ecology of the brown hyaena *Hyaena brunnea* and the spotted hyaena *Crocuta crocuta* in the southern Kalahari. *Koedoe* 27(Suppl.): 237–247.
- MONSON, R.A., STONE, W.B. & PARKS, E. 1973. Ageing red fox (*Vulpes fulva*) by counting annular cementum rings of their teeth. *New York Fish Game J.* 20: 54–61.
- NEL, J.A.J. 1978. Notes on the food and foraging behaviour of the bat-eared fox, *Otocyon megalotis*. *Bull. Carnegie Mus. Nat. Hist.* 6: 132–137.
- NEL, J.A.J. 1993. The bat-eared fox: a prime candidate for rabies vector? *Onderstepoort J. Vet. Res.* 60: 395–397.
- NEL, J.A.J. & MAAS, B. 2004. Bat-eared fox. In: C. Sillero-Zubiri, M. Hoffmann & D.W. Macdonald (Eds), *Canids: foxes, wolves, jackals and dogs. Status survey and conservation action plan* (pp. 183–189). IUCN/SSC Canid Specialist Group, Gland, Switzerland, and Cambridge, U.K.
- NICHOLSON, W.S. & HILL, E.P. 1981. A comparison of tooth wear, lens weights, and cementum annuli as indices of age in the gray fox. In: J.A. Chapman & D. Pursley (Eds), *Proceedings of the worldwide furbearer conference* (pp. 355–367). R.R. Donnelley & Sons, Falls Church, Virginia.
- PAUW, A. 2000. Parental care in a polygynous group of bat-eared foxes, *Otocyon megalotis* (Carnivora: Canidae). *Afr. Zool.* 35: 139–145.
- RASMUSSEN, G.S.A. 1996. Predation on bat-eared foxes *Otocyon megalotis* by Cape hunting dogs *Lycaon pictus*. *Koedoe* 39: 127–129.
- RICHHOLT, M. & CARBYN, L. 2003. Using tooth sectioning to age swift fox. In: M.A. Sovada & L. Carbyn (Eds), *The swift fox: ecology and conservation of swift foxes in a changing world* (pp. 161–165). Canadian Plains Research Center, University of Regina, Saskatchewan, Canada.
- SCHALLER, G.B. 1972. The Serengeti lion: a study of predator–prey relations. University of Chicago Press, Chicago.
- STEINEL, A., MUNSON, L., VAN VUUREN, M. & TRUYEN, U. 2000. Genetic characterization of feline parvovirus sequences from various carnivores. *J. General Virol.* 81: 345–350.
- THOMSON, G.R. & MEREDITH, C.D. 1993. Rabies in bat-eared foxes in South Africa. *Onderstepoort J. Vet. Res.* 60: 399–403.

Corresponding editor: G.I.H. Kerley