A novel record of aardwolf *Proteles cristata* feeding behaviour

Terrestrial members of the order Carnivora show great variation in their diet; some specialising on vertebrates, invertebrates, or plant matter, whereas others are omnivores or scavengers (Bekoff *et al.,* 1984). The aardwolf *Proteles cristata* is a highly specialised myrmecovore (Skinner and Chimimba 2005). We present a first report of a wild aardwolf preying on a vertebrate – captive geese *Anser anser domesticus*.

The aardwolf is the smallest extant member of the hyaenidae weighing between 5-10kg (Skinner and Chimimba, 2005). Aardwolves feed primarily on nastute harvester termites (genus *Trinervitermes*), and have evolved many anatomical and morphological adaptations to exploit this niche (Anderson *et al.,* 1992, 2004). When termite availability decreases in winter, aardwolves can lose 20% of their body weight (Anderson, 2004). During such periods, aardwolves become less active to conserve energy and supplement their diet with pigmented harvester termites *Hodotermes mossambicus* (Richardson, 1987a). Consequently, it is commonly believed that the aardwolf is unable to feed on anything other than social insects (Richardson, 1987b; Anderson *et al.*, 1992; Anderson, 2004). More recent studies however, show they occasionally take larger invertebrate items such as beetles, scorpions and sun spiders, and these items are taken infrequently throughout the year (Matsebula *et al.*, 2009; de Vries *et al.*, 2011).

No published records of aardwolves consuming vertebrate prey exist prior to the one we report here. An aardwolf killed two captive geese at Mankwe Wildlife Reserve (MWR), Mogwase, North West Province, South Africa (25°13S; 27°18E), at 07h00, on10 June 2012. The weather was clear and bright, and the temperature was a minimum of 0°C; the previous evening coincided with the first frost of the winter. The geese (n = 16) were housed in a 10x4m pen for the night, enclosed by a chained gate. However, the aardwolf was able to gain access via the gap between the gate and the fence. Lynne MacTavish (LM) was alerted by a farm worker that an aardwolf was attacking her geese . When LM arrived, the aardwolf had already killed and partially eaten one adult goose (4kg) (Fig. 1), and had the head of a second in its mouth, appearing to suffocating it. The goose that was held by the aardwolf was flapping vigorously. As LM approached the aardwolf started snarling, only releasing the second goose once LM approached to within 5m. The second goose died shortly afterwards. The aardwolf appeared reluctant to leave the area, allowing LM to take some pictures on her camera phone (Fig. 2). The image was authenticated by P. Richardson of the IUCN/SSC Hyaenidae specialist group. Figure 1 shows the remains of the first adult goose that was attacked illustrating that a large proportion of the abdomen and inner legs were consumed.

Figure 1. First goose killed and partially eaten by aardwolf at Mankwe Wildlife Reserve, South Africa. Taken by Lynne MacTavish (10/06/2012).

Figure 2. Image of aardwolf taken by Lynne MacTavish after attacking captive geese, North West Province, South Africa (10/06/2012).

Anderson (2004) asserted that the anatomical and morphological adaptions found in aardwolves render them unable to feed on anything but termites. All other scientific reports on aardwolf foraging and diet agree that they are obligate insectivores (e.g. Richardson, 1987a; Matsebula *et al.*, 2009; de Vries *et al.*, 2011) and pose no risk to livestock (Kok, 1996). Our observation shows that aardwolves are capable of exploiting alternative food sources and occasionally do so. There have also been historic anecdotal accounts of similar behaviour (Estes, 1992; Nowak, 1991). A captive juvenile is reported to have killed a number of birds (Kingdon, 1977 cited in Nowak, 1991) and Estes (1992) cited Bothma & Nel (1980) by mentioning that aardwolves have eaten small rodents, carrion, eggs, birds and baby tortoises. However, these appear to have been dismissed by scientists recently (e.g. Richardson, 1987a; Matsebula *et al.*, 2009; de Vries *et al.*, 2011), possibly due to a lack of supporting evidence (Richardson pers. comm.).

We suspect that such behaviour happens infrequently and has gone unrecorded by science to date. It is possible that studies investigating aardwolf diet using scat and stomach analysis have not detected vertebrate remains because the aardwolves ate only the easily digestible parts that left little trace of the vertebrate component in the scats, but Fig. 2 indicates that some feathers are likely to have been consumed making this explanation unlikely (see Klare *et al.*, 2011). Furthermore, aardwolves are common on farmland throughout Southern Africa (Mills and Hofer, 1998) and are likely to encounter farms and domestic poultry frequently, suggesting that if poultry predation was typical, one would expect many more records to exist. On the contrary, other studies have followed aardwolves in farmland settings in Southern and Eastern

Africa for extended periods and never witnessed any form of predation on vertebrates (Richardson and Holekamp pers. comm.). Therefore, we argue that predation on vertebrates by aardwolves is extremely rare based on the reasonable number of studies that have investigated aardwolf diet (e.g. Richardson, 1987a; Kok, 1996; Matsebula *et al.*, 2009; de Vries *et al.*, 2011), and because the aardwolf is poorly adapted to exploit free-living vertebrate prey (Anderson, 2004).

The unnatural circumstances surrounding this predation event may help explain why such behaviour has not been seen before. Firstly, the attack took place in winter, when the aardwolf's primary food is limited (Richardson, 1987a), and it thus apparently sought alternative food sources. Secondly, the aardwolf was faced with numerous large prey items in a confined space. Having killed and partially eaten one goose it attempted to kill another in response to overstimulus of super-abundant prey (Kruuk, 1972; O'Donoghue *et al.*, 1998), where they kill more than they eat. Such behaviour is often reported in carnivores faced with multiple prey that are unable to escape due to features of the landscape (e.g. Del Giudice, 1998; Short *et al.*, 2002). This therefore is the first scientific record of aardwolves participating in surplus killing. Such an explanation for this observation seems plausible when one considers the timing of the event.

We believe the observation is atypical behaviour brought about through a temporal limit in prey whilst encountering super-abundant prey in a confined unnatural environment. This also highlights that much remains to be learned about the basic behaviour and diet of carnivores and that even specialist carnivores have the behavioural plasticity to exploit unusual prey items when prey become scarce.

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