

Monitoring of some feeding behavior of foxes inhabiting Kharga Oasis, Western Desert, Egypt

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Abstract

Foxes are one of the most abundant carnivores in Egypt. However, most studies of dietary composition of the fox populations are based on the analysis of stomach contents only. In this study, camera trap was used to observe the feeding behaviors of wild foxes inhabiting the Kharga oasis by using different types of food as lures. In Egypt, most people co-existing with foxes consider them to be a threat. Primarily, foxes are believed to kill and transmit diseases to domestic animals. In this study, camera trap footage revealed that foxes typically forage as solitary individuals, and when there is variation in the type of food available the foxes usually select the lightest food item they can carry and run away from the site. In this study, the favorite food item for foxes was chicken or bones, rather than tomatoes and soft food, but foxes never ate spoiled chicken carcasses and rather deposited scent marks on top of them.

Keywords: Foxes, feeding behavior, camera trap, Kharga Oasis.

INTRODUCTION

Many methodologies for studying wildlife have been developed in general; methods are selected according to the environment, the group of species of interest (Danielsen et al., 2003). Invasive methods have a direct impact on the animal (e. g. live trapping, killing for specimens, etc.), while non-invasive methods do not require capturing and handling animals (e.g. transect surveys, sign surveys, camera-trapping, etc.), (Ancrenaz et al., 2012). Foxes are one of the most widely distributed carnivore groups in the world. Foxes are a member of the canid family, and have one of the most diverse diets (they are mainly carnivorous but are generally classed as omnivorous). In Egypt, foxes are the most abundant carnivore, being able to survive in a variety of habitats ranging from the barren temperate deserts to the densely populated cities. Its extreme adaptability makes it particularly difficult to draw general conclusions regarding many aspects of biology, the parameters of which tend to vary locally (Basuony et al. 2005).

The feeding habits of red foxes and gray foxes have been widely studied throughout North America. Many of these studies have resulted from concerns over fox depredations on livestock and game species (Hockman & Chapman 1983). In Egypt, Basuony et al. (2005) studied dietary composition of the red fox in different habitats based on the analysis of stomach contents, and found that the red fox is an opportunistic omnivore, capable of adapting to a great variety of dietary compositions. The outstanding adaptability of this carnivore is clearly manifested in its ability to feed on a great variety of food items, which allows it to survive in a great variety of environmental settings (Osborn & Helmy, 1980) In wild carnivores, the availability of food is typically unpredictable both in space and time, so they have to use specific skills to locate and exploit food resources (Lindburg, 1998; Bashaw et al., 2003). However, available information on diet and feeding habits of the foxes and other wild carnivores in Egypt is very limited in the literature (Osborn & Helmy, 1980; Basuony, 1998; Basuony et al., 2005).

Camera-trapping is a useful and widely used tool to study wildlife. It is generally regarded as non-invasive, it can be used to study activity patterns and certain aspects of species' behavior can also be easily determined (O'Connell *et al.*, 2011; Ancrenaz *et al.*, 2012). So the objective of this study was to record and understand the feeding behavior of desert foxes and produce images of foxes living in Kharga Oasis.

Material and Method

In this study, the Crenova Trail Camera was used to observe the feeding behaviors of wild foxes inhabiting the Kharga. The camera was set for a period of one month in the trunk of an old palm tree in the sand dunes area. The site was near the area of Old Palms Farm which had been abandoned by people over many years. The nearest village is roughly 20 km from the site. Different

type of food items were used to attract animals to the camera traps, including cakes, bread, tomato, cooked chicken bones and eight dead chickens (six fresh and two spoiled). The analysis was made of all recorded photos and video (the video length ranged between ten to fifteen seconds) to investigate fox behaviors.

RESULT AND DISCUSSION

Foxes become more nocturnal (active at night) in areas with a lot of people and are generally crepuscular (out in the early morning and evening) but can be out at any time of the day. At the study site (Fig.1) camera traps consistently yielded unambiguous evidence of fox presence. This suggests that camera trapping may be the most effective method for detecting red foxes at low or moderate densities (Glen and Dickman 2003). In this research foxes usually appeared at camera traps as solitary individuals, though were sometimes recorded as pairs. Individual foxes could be easily distinguished using the coloration of the tail tip (Fig.1).



Fig.1. Different individuals with different tail tip ending recorded by camera traps in study site.

The feeding activity of foxes was recorded in this study at different times during the day, with the most foraging activity between three pm (Fig. 2) to early morning next day. The most feeding activity was recorded between nine pm. to eleven pm. at night (Fig .3). Doncaster and Macdonald (1997) studied the activity patterns of red foxes living and breeding in urban areas of Oxford, U.K., and the interactions between individuals, using radio-tracking data on 17 adults fox. They found that foxes were nocturnal and active during the night for a mean of 6h 52min ± 10 min, irrespective of the time of year. Dell'Arte and Leonardi (2007), suggested that habitat selection of foxes was influenced by water availability and irrigated tree plantations that modify soil textures to allow digging of dens. They suggest that the choice of denning sites by foxes depends on persisting harsh conditions and human activities. Red foxes, in most cases, create monogamous pairs or social groups; however, social relationships are intimate only in the breeding and reproductive period (Cavallini 1996).



Fig. 2. A fox takes foraging on early in morning, before leaving the site with the food item.

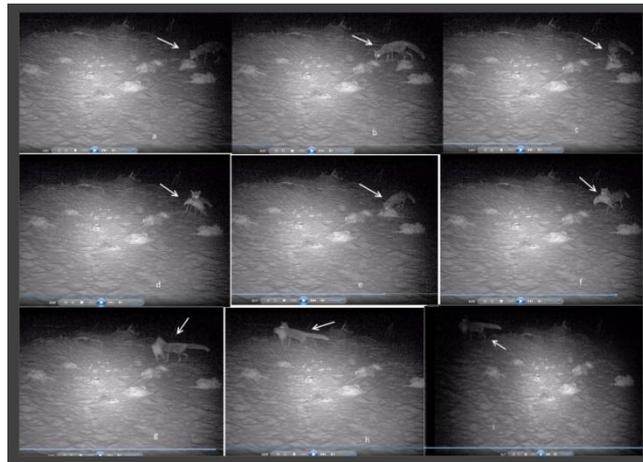


Fig.3. A fox choosing a chicken carcass by smell (a&b). The fox tries to carry the chicken away in his mouth (c,d&e), before leaving the site with it(f,g,h&i).

In most video recorded in this research, foxes usually take the food item away (Fig 3) unless the food is in small parts (Fig. 4). In (Fig. 5), A fox try to take a tomato but but becomes spooked by the camera. The feeling of fear from camera light was recorded on many occasions (15.7%) but in all cases the foxes didn't leave the site unless it had finished eating or taking food away. Along with habitat shift some modification in fox ecology occurred during this study. There is some evidence that foxes reduced their fear of humans and started to use artificial structures as shelters and included garbage and poultry into their diet (Paneic and Bresnqski, 2002). Foxes expanded their habitat from mid-field afforested areas to adjacent open arable fields, often in the vicinity of human settlements (Panek and Breslglski, 2002). Lucherini and Crema, (1994) reported that, foxes use a variety of foraging strategies depending on their food spectrum, they are opportunistic carnivores with a wide trophic niche. They exploit various food sources of which vegetables or fruit can make up large parts. Such food is persistently searched for, and sometimes skillfully exploited, especially by animals living in or near settlement areas (Contesse et al., 2004). Kistler et al. (2009) studied four different feeding enrichments in a group of four red foxes housed in a near-to-natural outdoor enclosure to test for their effects on foraging and feeding activity and on behavioural diversity compared to conventional feeding. Their results indicate that feeding enrichments based on natural activity patterns and feeding strategies can effectively stimulate species-specific behavior.



Fig. 4. Two foxes eat chicken bones (a&b), and one of them looks to camera (c).

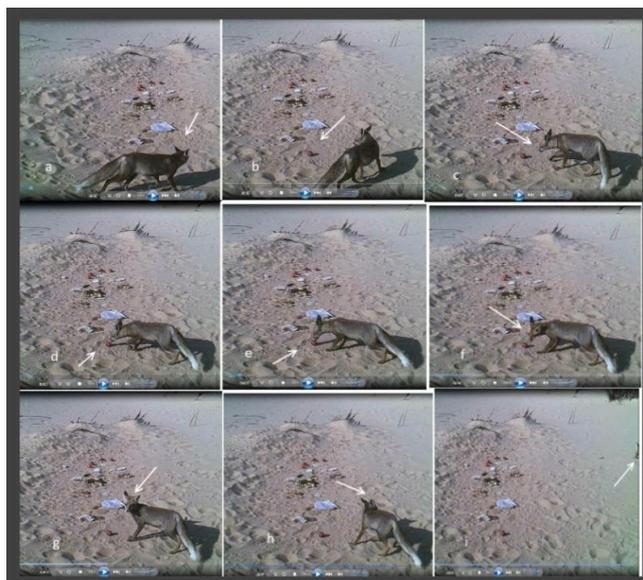


Fig.5. A fox tries to take a tomato (a ,b,c,d,& f), but becomes scared of the camera (e,f &g) and runs away(h)but still around(i).

This study confirms that when there is a variety of food items available, foxes will try to carry the lightest one it can carry and run away (Fig.6), but with decreasing food choice this behavior ceases. The favorite food for foxes was chicken or bones, rather than tomatoes and soft food. Basuony et al., 2005, sampled foxes inhabiting the Western-Desert oases of Bahariya, Farafra, Dakhla and Kharga. Their finding was that Palm dates occurred more frequently in the stomach contents of the oases foxes than any other food item, while birds (chicken and pigeons) and mammals were found in the stomach contents in equal percentages (13.33%). Goldyn et al. (2003), Fox adaptation to anthropogenic food sources and change in den site selection are discussed as main factors responsible for the occupation of farmland and in consequence, for the increase of fox densities in Poland. Jankowiak et al.(2008) found that the extra food provided by humans probably caused a rapid increase of fox population density in farmland areas and foxes probably learned to use poultry as major food items. Favourable trophic conditions caused the foxes to switch from traditional den habitat to new ones. Dell'Arte and Leonardi,(2005) in their study confirmed that in this arid environment, habitat composition per se affected a generalist predator less than the dispersion of its main prey. In addition, the patchy distribution of resources can assume a role in the spacing and feeding behaviours of foxes only in relation to clumped alternative prey types. Jackals like most predators, scavenge rather than hunt since hunting is both energetically expensive and at times even dangerous. Several authors have observed that variations in fox diet are related to the abundance of potential prey species in various habitats (Kolb and Hewson 1979; Leckie et al. 1998; Sidorovich et al. 2006). In Belarus, foxes preyed mainly on rodents in rich (in terms of food diversity and availability) habitats, while in areas of poor food supply, they foraged mainly on carrion in winter or fruits in warm period (Sidorovich et al. 2006). Baltrunaite(2002), found that red foxes respond to seasonal variation in availability of food, indicating dietary opportunism.



Fig.6. A fox tries to carry the chicken carcass (a) but it was heavy so it selected the lighter (c &d) one.

When locating dead chickens, foxes start to smell the chicken before carrying it away. When the chicken carcass is spoiled, foxes deposited scent marks on top of the carcass (e.g. urine or faeces), and this behaviour was recorded twice (Fig.7 &8). That confirm the suggestion of Henry (1977) that urine marking may function as a type of "bookkeeping system" during the fox's scavenging behavior. Specifically, the hypothesis was advanced that red foxes urine mark inedible food remnants, and when the same or a different fox re-investigates this marked item, the urine mark signals "no food" and the food remnant is investigated for only a short period of time.



Fig.7. A fox smelling the chicken carcass (a&b) before defecating on top of the spoiled one (c,d,&f).



Fig.8. A fox urinating on a spoiled chicken carcass.

CONCLUSION

Few studies have investigated the feeding behaviors of wild foxes in their natural habitats, especially in Egypt. In this research we demonstrated that foxes use their sense of smell not only to search for food but can detect the difference between fresh and spoiled food. Egyptian foxes still need further research study in future to understand their behavior in Egyptian habitats since many people see wild foxes as threatening if in a village area. With education, these fears can be abated.

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