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Livestock guarding behaviour of Kangal dogs in their native habitat

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ABSTRACT

Kangal Shepherd Dog is one of the endemic large dog breeds in Anatolia, Turkey. It is bred in different regions of Turkey as well as in different countries as a livestock guarding dog (LGD). Being one of the most popular and common LGD breeds, basic behavioural traits and the effectiveness of Kangals have been subjected to several studies. However, most of the behavioural data originate from surveys conducted with LGD users and there is a lack in the literature of studies which focus on direct observation and recording of guarding behaviours of Kangals.

The present study investigated 10 sheep flocks guarded by Kangal dogs in their natural habitat, in Sivas, Turkey, by recording the movements of dogs, sheep and shepherd using GPS-receivers in the pasture. We collected instantaneous geographical position and speed data to assess to what extent the movement data overlaps with the behavioural data present in the literature about the livestock guarding behaviour of Kangals.

The mean speeds of the sheep, the shepherd and dogs were lower in the night, compared to that in the daytime. The shepherd stayed, on average, closer to the herd in the night compared to the dogs. Both the shepherd and the dogs preferred to be closer to the herd at night, compared to the daytime. Dogs moved farther away from the herd than did the shepherd in the night. Our results indicating that Kangal dogs generally established a closer relationship with shepherd rather than the sheep may imply an anthropogenic disruption in one of the three behavioural components of LGDs, namely in the attentiveness of Kangals.

To the best of our knowledge, the present study is the first one to collect geographical data regarding the livestock guarding behaviour of Kangal dogs in their native habitat. Hence, our results and any future studies on this matter will contribute to a better understanding of livestock guarding behaviour of Kangal dogs and lead to more efficient breeding practices and training programs in this respect.

1. Introduction

Livestock guarding dogs (LGDs), which have been bred for millennia to protect sheep and other livestock from predators and thieves (reviewed in Smith et al. (2000) and Gehring et al. (2010)). Sheep were domesticated in the Neolithic period (around 10.000 BCE) in the Middle East and Asia, and are raised for their meat, milk and wool (Cottle, 2010). Since the sheep herd generally graze overnight in the pasture, its protection from the predators is an essential issue in pasture-based sheep farming. LGDs have been used against predators such as coyotes, feral and domestic dogs, foxes, wolfs, bears, jackals, hyaenas and big cats (Smith et al., 2000). Depending on the breed, LGD can reduce the damage caused by predators by up to 70–80% (Coppinger et al., 1988a, 1987). Besides guarding against depredation, it has been reported that LGDs can protect livestock from wildlife-transmitted diseases including brucellosis, tuberculosis, keratoconjunctivitis and neosporosis by deterring wild ungulates (Gehring et al., 2010; Vercauteren et al., 2008).

LGDs also play currently a crucial role for wildlife conservation by mitigating human-wildlife conflict (Gehring et al., 2010). Ecologists emphasize that large carnivores are essential for the maintenance of biodiversity and ecosystem functions, and that their habitats should be maintained and restored wherever possible (Ripple et al., 2014). In recent centuries, one of the most critical threats facing large carnivores as well as other wildlife species is human–wildlife conflict and livestock depredation is one of the pivotal sources of this conflict (Dickman, 2010). As Smith et al. (2000) reported in their review, LGDs can reduce the depredation by 11–100%. Especially combined with other non-lethal precautions such as fencing and shepherding, using LGDs is a prominent method for mitigating human–wildlife conflict (Breitenmoser et al., 2005; Gehring et al., 2010; Shivik, 2006; Smith et al., 2000)

Early in the twentieth century, due to decline and even extirpation of predators in many areas, much of the millennia-old tradition and

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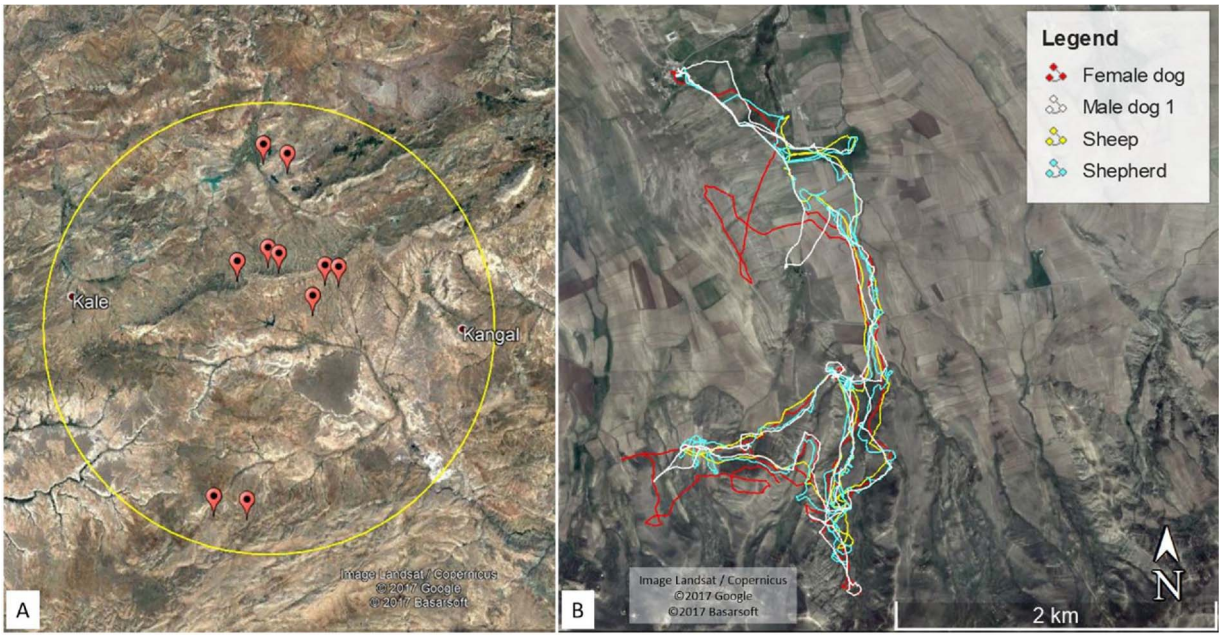

Fig. 1. Map of the study area. Fig. 1A. Red pins on the map are approximate locations of the herds at the time of the data collection. The yellow circle has a radius of 35 kilometres and its centre is located at the geographical coordinates of latitude 39° 14′ 29.92″ N and longitude 37° 02′ 22.80″ E. Fig. 1B. GPS traces of one herd shown on the map. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

knowledge of using LGDs was lost. In the last decades, with the re-establishment of carnivore populations, producers started to face the threat of livestock damages due to predation again. Consequently, the need for LGDs has re-emerged and their popularity increased especially in the USA and Europe (Gehring et al., 2010; Ripple et al., 2014; Smith et al., 2000). Among about 50 LGD breeds originating from several countries (Landry, 1999), Pyrenees (France, Spain), Kangal (Turkey), Komondor (Hungary), Maremma (Italy) and Shar (ex-Yugoslavia) are recently the most common breeds used for protection of livestock (Andelt, 2004; Coppinger et al., 1988b; Green and Woodruff, 1988; Landry, 1999; van Bommel, 2010).

LGDs are mostly large breed dogs, which are kept with livestock from an early age so that they develop a strong bond towards the livestock. This strong bond leads to constitution of "guarding dog behaviour" which has three basic and overlapping components: trustworthiness, attentiveness and protection (Coppinger and Coppinger, 2007; Coppinger et al., 1988b, 1983). The guarding behaviour of dogs is instinctive and its above mentioned basic components (namely, trustworthiness, attentiveness and protection) represent breed-specific variation (Andelt, 2004; Coppinger and Coppinger, 2007; Coppinger et al., 1988b). Evaluations and comparisons among different breeds of LGDs have been made regarding their effectiveness and these three basic behavioural traits (Andelt, 1999; Coppinger et al., 1988b; Green and Woodruff, 1988, 1990). While each breed has its own behavioural characteristics and its strong and weak traits, Kangals have been rated lower in attentiveness and trustworthiness compared to Maremmas, Shars and Great Pyreness (Andelt, 1999; Coppinger et al., 1988b). However, being an "aggressive" breed, they can be advantageous as an LGD in areas where bigger predators like wolfs, bears and big cats are present (Green and Woodruff, 1990). In this context, the results obtained by the studies concerning the behavioural characteristics of different LGD breeds would be important for choosing the right breed for the right conditions. In the present study, we focused on the guarding behaviour of the Kangal dogs in their native habitat. Kangal dogs are one of the most popular endemic large dog breeds in Anatolia, Turkey. Although the name refers to the Kangal district of Sivas, a city in Central Anatolia, it is extensively bred in different regions of Turkey as well. Kangal dog breed has been recognized by the Federation Cynologique Internationale (FIC) in 1989 as "Anatolian Shepherd Dog (*Coban Kopegi*)".

Being one of the most popular and common LGD breeds, basic behavioural traits and the effectiveness of Kangals as an LGD have been subjected to several studies (Andelt, 1999, 1992; Coppinger et al., 1988b; Green and Woodruff, 1988, 1990; Marker et al., 2005; Potgieter et al., 2013; Van Bommel and Johnson, 2012). Most of these studies are focused on the abovementioned three basic behavioural traits and general or perceived effectiveness of the dogs. Most of the behavioural data originate from surveys conducted with LGD users (mostly farmers). Yet, there is a lack in the literature of studies which focus on direct observation and recording of guarding behaviours.

In the rural regions surrounding the City of Sivas in Turkey, where Kangals originate from, predators have always existed and been a source of threat for sheep farmers, although their impact has somewhat diminished in recent decades due to wildlife damage in the region. Yet, Kangals were continually needed to a certain extent and the tradition of using LGDs continued uninterruptedly for many centuries unlike in the USA and many European countries. Being the main subject of an ancient tradition made the Kangal dogs a source of pride for the communities living in the region. Hence, we hypothesized that some part of the traditional knowledge could have been influenced by the abovementioned pride as a result of which behavioural traits of Kangals could have been partially exaggerated. There is a large number of anecdotal statements about the guarding behaviour of Kangal dogs during their duty in their native region. These are mostly based on empirical and non-scientific observations of breeders and hobbyists. Moreover, several myths are diffused into the traditional knowledge about Kangal dogs; for example, it is often speculated that Kangals will not cross-breed with any other dog breed (van Bommel, 2010).

Against this background, our aim was to collect quantitative data regarding the guarding behaviour of the Kangals in their native habitat while "on duty". More specifically, the research question that we attempt to answer in the present study is to what extent the movement data overlaps with the behavioural data present in the literature about the guarding behaviour of Kangals.

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