

Perspective

LARGE CARNIVORES AND LIVESTOCK IN NORTHEAST TURKEY: A PRAGMATIC COEXISTENCE

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1. An unexpected land

My name is Josip Kusak and I am a researcher at the University of Zagreb in Croatia. Sometime in spring 2011, I received an interesting email from the president of KuzeyDoğa, a non-governmental organisation for the study and community-based conservation of wildlife and habitats in northeast Turkey (Ak-küçük and Şekercioğlu, 2016). Professor Çağan H. Şekercioğlu explained that they wanted to expand their focus to include research on large carnivores and asked if I would help with capturing and collaring wolves (*Canis lupus*). He told me there were also brown bears (*Ursus arctos*) and Eurasian lynx (*Lynx lynx*) in the area and yet an online search revealed to me an unfamiliar, mostly open landscape, with only a few small, fragmented forest patches. I was intrigued how large carnivores could live in such an apparently 'unsuitable' place. So, I replied, "Yes, I will come in autumn!"

Turkey is the only country in the world that is almost entirely covered by three global biodiversity hotspots (Caucasus, Iran–Anatolian and Mediterranean), and yet its biodiversity and ecosystems are greatly threatened (Şekercioğlu et. al, 2011 a,b; Tarwar, 2015).

Nevertheless in the northeast, where the human population is declining, there is still some potential for the conservation of large mammalian carnivores (Şekercioğlu, 2013a, b).

The Kars–Ardahan mountain plateau is situated at the intersection of the Caucasus and Irano–Anatolian global biodiversity hotspots (Chynoweth et al., 2015; Şekercioğlu, 2012). Its base starts at about 1,900 m and it rises to an elevation of 3,120 m above sea level. Winters are long and cold, with a lot of crystal snow: ideal for winter sports. The name of the main town in the area – Kars, like 'kar' the Turkish word for snow – seems perfect (Fig. 1). Looking out of the plane window as we descended into Kars airport, I saw a large open valley, with dark, square-shaped patches of arable land on the valley bottom. The surrounding hills were mostly oval, but one had a flat top and steep sides, as if it really belonged in Monument Valley in Utah. A river ran below the ruins of an old fortress on the hill above the town.

It was September, the end of summer, and the hills surrounding the plateau were coloured yellow-brown by the short, dry stems of grass left after the grazing of

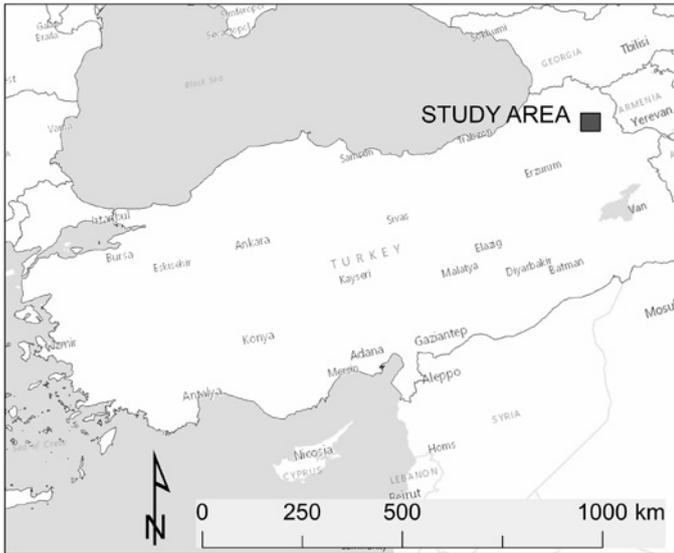


Fig. 1 Location of the study area in north-eastern Turkey, close to the border with Armenia.

many cows and sheep. Only some higher hills were covered with small, dark forest patches. Scattered villages, or rather groups of houses built apparently without much planning and with strange contrasting blue tin roofs, were connected by dirt roads to the two main roads running through the valley (Fig. 2).



Fig. 2 Hamamli, one of many villages on the Kars-Ardahan plateau. Late spring snow is not unusual at altitudes of 2,000–3,000 m. (Photo: Josip Kusak)

2. Learning to look down

After a few days in Kars to prepare our equipment, we moved to the smaller town of Sarıkamış (‘Yellow reed’), named after the former wetlands on which the town was built. This town is bordered to the north-west and south by stands of Scots pine (*Pinus sylvestris*), whose bark peels off in brown scales, exposing young, yellow bark beneath. There are four patches of



Fig. 3 Emrah Çoban, Josip Kusak and Ayşegül Çoban collecting wolf scat on a dirt road at the edge of Sarıkamış-Allahuekber Mountains National Park in 2011.

(Photo: Çağan H. Şekercioğlu)

such forest covering a total of about 330 km². Part of the northern patch is included in Sarıkamış-Allahuekber Mountains National Park, which was established mainly as a memorial park to commemorate the First World War Battle of Sarıkamış.

I got to know the area better after some days of travelling around. During the subsequent decade of working there I have acquired much better insights. My small field crew – biologist Emrah Çoban and his girlfriend (later wife) veterinarian Ayşegül – needed to learn techniques for working with wolves. At first, the main challenge for me was to make them look down. Locating wolves means searching for footprints, scats and scratch marks on the ground (Fig. 3). Being primarily ornithologists, my new colleagues would spot any bird, big or small, on a tree or in the air, but they would step on or drive over wolf scat without seeing it! I would then say, ‘It’s just a bird! Forget birds – keep your eyes on the ground!’

Those days are far behind us now. My Turkish friends have mastered fieldwork techniques for studying large carnivores including capturing, collaring and tracking. Over the years, our work gradually expanded from wolves to lynx and bears (Chynoweth et al., 2015; Şekercioğlu 2013 a, b). During a 10-year period, we captured 29 wolves, 68 bears and 15 lynxes for GPS tracking. Thanks to our long-term, intensive monitoring with camera traps, we registered the first known occurrence of a racoon dog (*Nyctereutes procyonoides*) in Turkey (Naderi et al., 2020).

Sometimes with my colleagues and sometimes alone, I have driven many kilometres of forest roads, visited a multitude of valleys, hills and forest patches (Fig. 4), and enjoyed views of steep canyons with clear, swift-flowing streams. All this was under the ‘pretence’ of identifying suitable places for traps and remote cameras, searching for signs of wolves, bear dens, day beds, dropped collars, lost signals and dead animals.

We have analysed habitat types, topography, prey base, human presence and activity. We have not yet determined the density of wolves and bears, but my impression is that it is similar to that in good habitats with high abundance of wild ungulates, even though wild boars were the only species of wild ungulate prey available to wolves. From diet analysis, we learned that wolves eat mostly domestic animals during grazing periods (Capitani et al., 2016), but the ratio between predation and scavenging is still unknown. Livestock is kept in stables during the winter when the diet of wolves includes village dogs. The effect of livestock husbandry and seasonal changes on the ecology of wolves in the area have not yet been studied.



Fig. 4 Beside Scots pine, small stands of Eurasian aspen (*Populus tremula*) grow at lower elevations and on south-facing slopes. (Photo: Josip Kusak)

3. Two types of bears

Sarıkamuş town garbage dump is open, smoky, smelly and generally unpleasant, but is a rather important habitat component for some bears. It is situated one kilometre west of the town, next to the main road and 200 metres from the edge of the forest. In summer, we observed up to 20 bears feeding at the dump (Fig. 5), as well as some wild boars (*Sus scrofa*) and even wolves. Numerous stray dogs live at the



Fig. 5 Ten bears feeding in Sarıkamuş garbage dump in 2011. (Photo: Josip Kusak)

dump. During the evening, cars full of curious spectators from the town visit the dump to watch bears and other wildlife. It seems that local people do not consider this situation to be a problem. Garbage-feeding bears get accustomed to utilising human food sources (‘food-conditioned’) and also seem to become rather tolerant of close encounters with people (‘human habituated’). Attacks by bears on people are rare in the Sarıkamuş area and there is no record of a bear attacking a human at the garbage dump.

We identified two remarkably distinct behavioural strategies of bears. Whereas some individuals regularly fed on garbage and remained sedentary year-round, other bears never visited the dump and instead migrated around 70–90 km in autumn to feed in the nearest oak forest before returning to Sarıkamuş to hibernate. This is the first documented seasonal migration of brown bears in the world (Cozzi et al., 2016).

4. The importance of water

In spring and early summer, melting snow from the highest peaks feeds the many streams that cascade through the forests and rejuvenates the grass under the sparse pine canopies. Cattle and sheep are brought to high mountain pastures soon after snowmelt and stay there until the following winter. This dynamic seems to depend on one major factor: water. If there is water from melting snow and spring rains, the grass will be green and there will be drinking water for livestock. But we have already witnessed a lack of water in mid-summer in some years due to insufficient snow accumulation during winter.

It seems that global climatic change, with more extreme weather fluctuations, will not only adversely affect the local skiing business, but is already impacting the entire ecosystem and the people depending on it. Due to uncertainties in the water supply, locals have started building small, illegal dams on more and more streams in the area. Lake Kuyucuk, a Ramsar site in Arpaçay district, completely dried out in late summers of 2014, 2017, 2018, 2019 and 2020 because all the streams feeding it had been dammed illegally to secure water for livestock.



Fig. 7 Geese are the main kind of poultry raised by villagers, with goose meat being one of the well-known delicacies of the area. (Photo: Josip Kusak)

5. Livestock husbandry and protection

Wild ungulate grazers have been almost completely replaced by domestic animals. In a decade of camera trapping, we documented the occurrence of roe deer (*Capreolus capreolus*) on only four occasions! In Kars province alone, about 850,000 heads of livestock are registered: mostly cattle, sheep, some horses, and donkeys. The total number of dogs, including sheep dogs as well as strays in villages, towns, and garbage dumps, may be 30,000 to 40,000. Donkeys and horses are used as work animals. Most of the time they are

left unguarded on open pastures close to the villages during the day and in stables at night (Fig. 6). Raising geese is also widespread (Fig. 7), with goose meat being one of the well-known delicacies of the area.

Cattle herds and sheep flocks usually consist of several hundred animals (Fig. 9). They are taken to summer villages and camps after the snow melts. There, they graze on mountain slopes as far and as



Fig. 6 Although not common, it is possible to see Turkish ‘cowboys’ herding free-grazing horses. (Photo: Josip Kusak)



Fig. 8 A cattle herd crossing overgrazed pasture while returning to the village for the night. *(Photo: Josip Kusak)*

high as they can reach during the day and are always gathered in guarded pens overnight (Fig. 8). Livestock is also allowed to graze in forest patches, including forests inside the Sarikamiş-Allahuekber Mountains National Park (front cover). All snow melts by mid-July and streams at higher elevations dry out. If water has not been secured by owners, livestock must move to lower elevations at this time. Remaining grass is



Fig. 10 Two wolves (one collared for GPS tracking) feeding on a cow carcass which was dumped at the roadside by villagers. *(Photo: Josip Kusak)*

cut for hay. Forest understory vegetation persists only on steep and rocky places, where cattle and sheep cannot reach it.

Domestic animals which die on pastures or in stables are left on pastures or in the forest. Carcasses left on open pastures are usually eaten by scavenging birds, those left in or close to forest are eaten by bears or wolves (Fig. 10), while there are many village dogs



Fig. 9 Sheep flock accompanied by shepherds and a Karaman dog. *(Photo: Josip Kusak)*



Fig. 11 Red foxes are commonly seen on open pastures, but rarely observed or documented by our automatic cameras in forests around Sarıkamış area. (Photo: Josip Kusak)

which feed on the carcasses left close to human habitation. This is illustrative of local people's views of and relationship to nature. Wolves and bears have always been present in the area. If they eat a cow which died, then they will not have to attack and kill another one. At the same time, for the owner, the problem of how to dispose of the carcass is solved.

Wild boars are a common occurrence and villagers consider them to be the main problem animal, since they damage fields and crops. It seems that locals use any opportunity to shoot wild boar to reduce the damage they cause. We found that bears also fed in fields, but we did not document any cases of them being shot there. All three large carnivore species are legally protected, but there are no management plans, monitoring programmes or damage compensation schemes. Livestock owners might obtain compensation if it can be proven that their livestock was attacked by a rabid wild animal. Rabies is present in the

area, with foxes (*Vulpes vulpes*; Fig. 11) being the main source of infection for domestic animals (WHO, 2018).

Cattle and sheep are generally well-guarded using traditional methods as well as some new ones. Shepherds often carry guns (Fig. 12). Thirty-four percent of our collared wolves died due to human causes within one year of tracking and another 23% had an unknown fate (Kusak et al., 2018). Some GPS-tracked wolves were shot in grazing areas and some on the edge of villages or even within villages during winter.

6. Livestock guarding dogs

Livestock guarding dogs (LGDs) are present on pastures and when livestock is gathered in pens at night. They are used for guarding sheep and cattle which graze near or inside forests (Figs. 13 and 14). Some cattle herds grazing at least a kilometre away



Fig. 12 Armed shepherds guarding sheep in 2013. (Photo: Josip Kusak)



Fig. 13 Livestock guarding dogs and shepherds accompanying a cattle herd. (Photo: Josip Kusak)



Fig. 14 The Kangal Shepherd Dog is the most common breed of LGD used in the Kars-Ardahan area. (Photo: Josip Kusak)

from forest can be seen accompanied by shepherds without LGDs, but sheep flocks are always accompanied by both dogs and shepherds. LGDs accompany livestock day and night together with one or more shepherds who control them. Herding dogs were not used.

The most common type of LGD in the area is a traditional Turkish breed, known locally as the Kangal or Karaba and internationally as the Anatolian Shepherd Dog (Fig. 14). Kangals are large dogs, taller and heavier than the average wolf from the area. Owners usually cut their ears so that wolves cannot bite and tear them. They also equip them with spiked collars (Fig. 16). Other Turkish breeds, such as the Anatolian Mastiff (Fig. 17), which is even larger than the Kangal, Karaman (Fig. 9), Akbash (Fig. 15), Koyun and Kars (Caucasian) Shepherd Dog (Fig. 19), were rarely observed guarding livestock in the Sarikamış area. Kangal/Karabash and Akbash breeds are generally the most

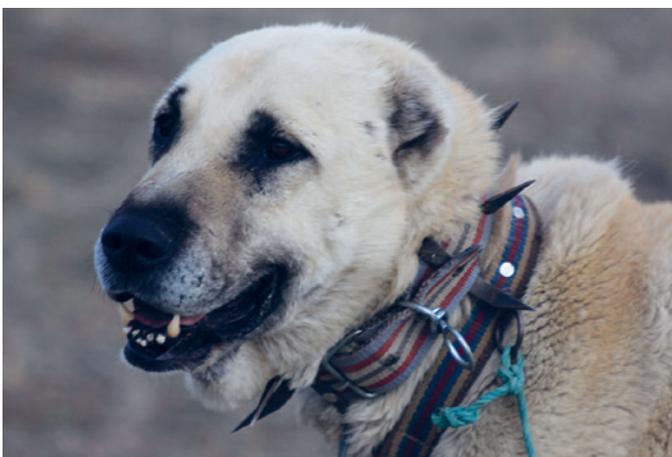


Fig. 16 Kangal Shepherd Dog with spiked collar and cropped ears, ready to face wolves or bears.

(Photo: Josip Kusak)



Fig. 15 The Akbash is rarely seen in the Sarikamış area.

(Photo: Josip Kusak)

known and common breeds, while the others are in decline in Turkey (Yilmaz et al., 2015).

We have not studied the ratio of number of dogs to livestock and shepherds systematically, but it seems that, on average, for every 100 head of livestock there are three to five LGDs, mostly males, and one shepherd. LGDs move with herds and flocks, check the surrounding area, and frequently scent mark. We documented with camera traps that the same scent-marking sites are used by both LGDs and wolves. It is almost impossible to approach a flock or herd on open pastures or even in the forest. LGDs detect intruders at a far distance by sight or smell, start barking and run towards the intruder. If they threaten a person on foot, shepherds control them by whistling or shouting commands.

Determining the actual extent of losses to predators would be tricky since there is no damage compensation system. In my home country of Croatia,



Fig. 17 The Anatolian Mastiff was seldom used as a guarding dog, but more often as a pet.

(Photo: Josip Kusak)



Fig. 18 Livestock guarding dogs are commonly used to guard cattle, with shepherds always accompanying herds.

(Photo: Josip Kusak)

before damage compensation started, livestock owners in traditional wolf range seemed reluctant to admit losses to wolves, perhaps because this would imply that they had not taken good care of their property.

We did not hear about any problems with LGDs or dogs in general. Sarikamış is full of stray dogs which

sleep on the streets and sidewalks and feed on garbage, but nobody seemed to be concerned by this and this is typical in the rest of the country.

7. Times of change

The ecosystem of the Kars-Ardahan mountain plateau is dominated by humans and is far from being an untouched wilderness. The presence of large carnivores does not always indicate a pristine, intact ecosystem (Linnell et al., 2000) and this seems to be the case on the Kars-Ardahan mountain plateau. Agropastoral communities have inhabited the region for millennia and the impact of current and past human activity is ubiquitous across the landscape (Chynoweth et al., 2016). Nevertheless, large carnivores still manage to fit in by finding a balance between the natural and dominant anthropogenic components of their ranges. Local people regard them as just one of many unpleasant parts of nature, like summer storms or long cold winters, which need to be considered and endured. During conversations with villagers, we did not hear many complaints about wolves or bears. Guarding livestock against wolf and bear attacks was considered common sense.



Fig. 19 Long-haired Kars (Caucasian) Shepherd Dog and Koyun were sometimes seen guarding sheep flocks.

(Photo: Josip Kusak)

The relationship between humans and large carnivores is dynamic and has been fine-tuned over millennia of coexistence. However, this relationship is now facing new challenges which have emerged on both local and global scales. On the local scale, the challenge is unmanaged garbage, while on the global scale are the unfolding consequences of climate change, such as lack of snow and drinking water.

Turkey is at the intersection of three biodiversity hotspots and at the continental confluence of Europe

and Asia (Şekercioğlu et al., 2011a). The biodiversity across taxa in Turkey is extraordinary and deserves proper study and understanding for the purpose of conservation and management. Turkey has a unique opportunity to lead the larger region in biodiversity conservation by establishing a group of experts to design and implement wildlife management plans (Chynoweth et al., 2016). Studies of large carnivores in Sarıkamış are therefore much needed and are ongoing.

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