Distribution and principal threats to Caucasian black grouse Tetrao mlokosiewiczi in the Eastern Karadeniz Mountains in Turkey

Author: Baskaya, Sagdan

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Sagdan Baskaya

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In this study, the distribution of and principal threats to Caucasian black grouse *Tetrao mlokosiewiczi* in the Eastern Karadeniz Mountains, Turkey, are examined. A total of 36 observation sites was selected in such a way as to represent the whole range of the study area. Observations were carried out from May 1993 to July 2002. The results show that the Caucasian black grouse is present in the Eastern Karadeniz Mountain from Salarut Yayla in the Ziyaret Mountains in the west to Çukunet Yayla in the Karçal Mountains in the east. Principal threats to the species were determined to be habitat degradation, habitat loss and fragmentation (e.g. intensive forestry practices, wood smuggling, road construction, mountain summer house (yayla) construction, fuel-wood utilization of shrubs, intensive and extensive grazing and hay production), small population size, poaching, egg collection, fox predation and outdoor activities.

Key words: Caucasian black grouse, distribution, Eastern Karadeniz Mountains, Tetrao mlokosiewiczi, status, threats, Turkey

Sagdan Baskaya, Karadeniz Technical University, Faculty of Forestry, 61080 Trabzon, Turkey - e-mail: baskaya@ktu.edu.tr

The Caucasian black grouse *Tetrao mlokosiewiczi* is a breeding bird endemic to the Caucasus region. With the smallest geographic distribution of all Eurasian grouse species, it is listed as Near Threatened (Baillie & Groombridge 1996) and Data Deficient (Hilton-Taylor 2000). Its conservation status needs clarification (see Storch 2000).

Of all the grouse species in the world, the Caucasian black grouse has received the least attention in terms of research. The known distribution of the species ranges from the Black Sea to the Caspian Sea in the Caucasus Mountains in Russia, Georgia, Armenia and Azerbaijan in the north and east, over Little Caucasus in northeastern Turkey in the west to northwestern Iran in the south (Storch 2000; Fig. 1). Two populations are found outside the main Caucasian area; one in the mountains of northern Iran where birds were first recorded in 1975 (Scott 1976), and one in northeastern Turkey where birds were first described in 1884 (Radde 1884 quoted in Kumerloeve 1967). In these areas, the species inhabits the upper mountain forests, subalpine meadows and the alpine zone within an altitudinal distribution of 1,300-3,300 m a.s.l. (Baskaya 1997).

The Caucasian black grouse is the only grouse species represented in Turkey. According to recent liter-

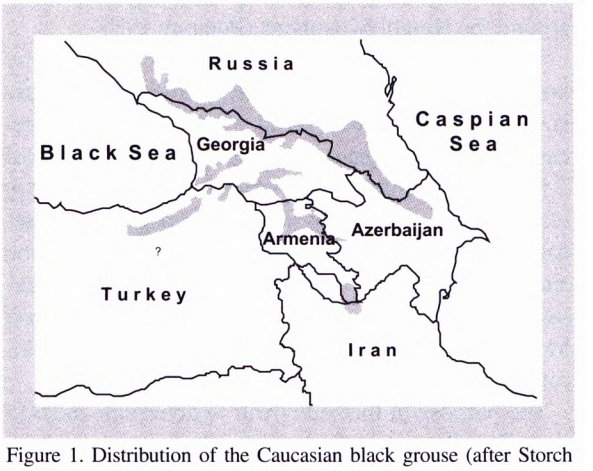

Figure 1. Distribution of the Caucasian black grouse (after Storch 2000).

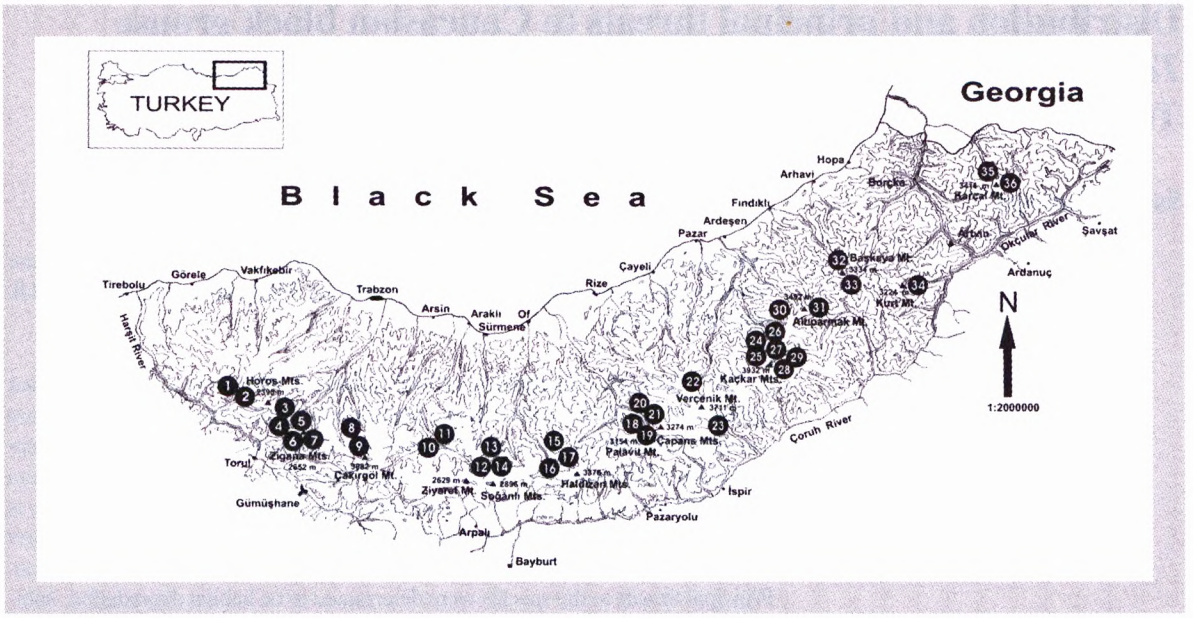

Figure 2. Observation sites and distribution of the Caucasian black grouse (sites 10-36) in the Eastern Karadeniz Mountains.

ature, the species is known to inhabit the area from the Turkish Mount Ziyaret to the Georgian Border in the Eastern Karadeniz Mountains (Baskaya 1997). However, available knowledge is not comprehensive enough to allow a detailed assessment of the distribution, status and principal threats to the species in the region. Scarce and poorly known in Turkey, the Caucasian black grouse seems to be a very local resident at high altitudes in the Eastern Karadeniz Mountains (Radde 1884 quoted in Kumerloeve 1967, Kumerloeve 1961, Beaman, Porter & Vittery 1975, Beaman 1986, Martins 1989, Kirwan & Martins 1994, Kasparek 1992, Baskaya 1997). The southernmost distribution of the species is not precisely known, but it is claimed to be around the Yoncalı Village in Ilıca/Erzurum (Pirselimoglu 1990) and around the Bingöl Mountains (Potapov 1985).

The Caucasian black grouse is fully protected by law in Turkey. The penalty for illegal killing of a grouse is ~ USD 1,000 (Anon. 2002). While 33% of the species' distribution area in northeastern Turkey (a total of 7,500 km^2) is protected, grouse populations are highly scattered and very small in size. Habitat degradation, predation and exploitation exacerbate and contribute to the already bad situation. Populations have even become extinct in some areas such as Hocamezari in the Zigana Mountains, which was considered the westernmost location of the grouse (Pirselimoglu 1990).

The purpose of this study was to determine the current distribution of Caucasian black grouse in the Eastern Karadeniz Mountains and to provide a primary description of the principal threats to the species in the region, in order to establish the groundwork for later research and conservation programmes.

Study area

The Eastern Karadeniz Mountains (40°22' - 41°30' N, 38°54' - 42°30' E; Fig. 2) is the second highest mountainous region in Turkey. There are numerous peaks above 3,000 m a.s.l., and with its 3,932 m high peak, Kackar is the sixth highest mountain in Turkey after the Mount Ararat (5,137 m). The mountain chains usually extend in an east-western direction and glaciers and crater lakes are frequent at the top of the mountains.

Populated areas are usually concentrated at low altitudes along the coastline. Human population density decreases with altitude, and above 1,000 m a.s.l. there are < 50 inhabitants per km^2 (Atalay 1992).

The area receives the highest amount of precipitation in the country with a maximum annual mean of about 2,500 mm at Rize. Precipitation is almost uniformly distributed over all seasons. Mean annual temperatures vary within 8-14°C. The alpine zone is usually covered with snow for more than six months (Atalay 1992) with the snowline at about 2,700 m a.s.l. on the northern and 2,800 m a.s.l. on the southern slopes in the western parts, and 3,000 m a.s.l. on the northern and 3,200 m a.s.l. on the southern slopes in the eastern parts of the area.

The major vegetation types in the region are dune,

pseudomaquis, stream, forest, subalpine and alpine. Dune vegetation type only grow along the coastline up to 10 m a.s.l. Pseudomaquis grow at 0-200 (-500) m a.s.l. along the coastline and main river valleys. Stream vegetation type grow along the riverbanks up to 1,500-2,000 m a.s.l. with a width of about 50-200 m. The largest vegetation type is forest, which starts above the pseudomaquis and climbs up to 1,800-2,000 m a.s.l. on southern and 2,000-2,200 m a.s.l. on northern slopes. In high areas such as the Kaçkar Mountains, it can reach up to 2,300 m a.s.l. on southern and 2,500 m a.s.l. on northern slopes. Forest and alpine zones are separated by a subalpine zone extending over up to 200-400 m a.s.l. (Anşin 1981). Alpine vegetation is the second most extended type after forests, reaching from the treeline at about 2,000 m a.s.l. on southern and 2,200-2,500 m a.s.l. on northern slopes to the top of the mountains.

The Orumcek Forests in Torul, the Firtina Valley Forests in Camlihemsin, the Hatila Valley National Park in Artvin and the Camili and Otingo regions in Borcka are important virgin forest areas in the region. Main tree species are sessile oak *Quercus petrae*, chestnut *Castanea sativa*, oriental hornbeam *Carpinus orientalis*, common hornbeam *Carpinus betulus*, black alder *Alnus glutinosa*, oriental beech *Fagus orientalis*, oriental spruce *Picea orientalis*, Caucasian fir *Abies nordmanniana* and Scots pine *Pinus silvestris*. Oriental spruce, Caucasian fir, Scots pine, oriental beech and common aspen *Populus tremula* are the main tree species of the upper mountain forest vegetation types in the region. Subalpine meadows are dominated by some of the woody taxa (e.g. *Rhododendron* spp., juniper *Juniperus* spp., *Vaccinium* spp., villow *Salix* spp., birch *Betula* spp. and raspberry *Rubus ideaus*) and by herbaceous plants such as windflower *Anemone* spp., aconite *Aconitium* spp., lily *Lilium* spp., milkweed *Euphorbia* spp., *Veratrum* spp. and lady's mantle *Alchemilla* spp. The alpine zone is rich in herbaceous plants such as *Polygonum* spp., betony *Stachys* spp., bent grass *Agrostis* spp., *Nardus* spp., fescue *Festuca* spp., *Poa* spp., *Alchemilla* spp., clover *Trifolium* spp. and some dwarf shrubs, e.g. *Rhododendron caucasicum*, bilberry *Vaccinium myrtillus*, *Vaccinium uliginosum*, and the common juniper *Juniperus communis* ssp. *alpina*, *Daphne glomerata* and *Rosa montana* (Vural 1996).

The fauna of the area is also very rich. The Eastern Karadeniz Mountains are among of the most important bird conservation areas in Turkey (Grimmett, Kasparek, Kılıç & Ertan 1989, Yarar & Magnin 1997) and are traversed by the most important raptor migration route in the western Palearctic. A total of 33 migrant and resident raptor species can be seen in this area. The fauna includes golden eagle *Aquila chrysaetos*, long-legged buzzard *Buteo rufinus*, peregrine *Falco peregrinus*, Caspian snowcock *Tetraogallus caspius*, chukar *Alectoris chukar*, grey partridge *Perdix perdix* (Baskaya 1995), red fox *Vulpes vulpes*, wolf *Canis lupus*, lynx *Lynx lynx*, leopard *Panthera pardus*, brown bear *Ursus arctos*, chamois *Rupicapra rupicapra*, wild goat *Capra aegagrus*, roe deer *Capreolus capreolus*, wild boar *Sus scrofa*, European hare *Lepus europaeus* and mountain salmon *Salmo trutta macrostigma*.

Material and methods

Observations were carried out from May 1993 to July 2002. To determine observation sites and delineate grouse distribution areas, 1:25,000 and 1:100,000-scaled topographical maps were used. In selecting the observation areas, precedence was given to previously recorded sites. As a result, a total of 36 observation sites were selected in such a way as to represent the whole range of the study area (Table 1 and Fig. 2).

Each observation site was visited for between two and eight days at a time as transportation and weather conditions allowed it. Point counts and line transects were used. Point counts were made at sunset and sunrise, when Caucasian black grouse are the most active, from 2-5 observation points in each of the 4-16 km^2 observation sites (see Table 1). Observation points were selected so as to provide good overview. At each point, depending on the topography and vegetation, variable radius (500-2,000 m; < 3,000 m on snow) counts were made and all birds heard or sighted were recorded. Line transect observations were made during times of low grouse activity around noon, e.g., when moving from one observation point to another within an observation site. Transect width varied from 50 to 500 m depending on the topography and vegetation. Vocalisations, sightings and all indirect signs such as footprints on snow, feathers, faeces and dustbaths were used to detect the presence of grouse (see Table 1), as such signs could not be confused with those from other species of the area.

Complementary to the field observations were visits to local hunting club members, foresters, national park chief foresters and park rangers. In addition, local villagers, shepherds and local hunters, who were not members of hunting clubs, were also consulted. There, information on the life style and socio-economic status of villages and forestry and agricultural practices in the area were collected, and their potential effects on the grouse population were evaluated.

Table 1. Observation sites, dates of observation, area (in km^2) of observation sites, maximum number of birds recorded, altitudinal range and principal threats of Caucasian black grouse in Eastern Karadeniz Mountains. The threats include: S) small population size, F) habitat loss/fragmentation, H) habitat degradation, P) poaching, R) predation, E) egg collection and D) disturbance by tourism/leisure activities.

Observation Sites			Dates	Area	Max. No. of Birds	Min-Max. Elevation Range	Threats[1]						
No	Location	Mountain					S	F	H	P	R	E	D
1	Damlıköy Yayla (1600 m)	Horos Mts. (up to 2396 m)	11-14 July 1997	6	-	-	-	-	-	-	-	-	-
2	Erikbeli Yayla (1650 m)		18-21 Sept. 1996	5	-	-	-	-	-	-	-	-	-
3	Zal Yayla (2100 m)	Zigana Mts. (up to 2652 m)	8-11 June 1996	11	-	-	-	-	-	-	-	-	-
4	Balihor Yayla (1750 m)		26-28 April 1995	5	-	-	-	-	-	-	-	-	-
5	Zigana Yayla (2000 m)		27-28 Feb. 1996	7	-	-	-	-	-	-	-	-	-
6	Alas Yayla (2300 m)		8-11 Dec. 1995	10	-	-	-	-	-	-	-	-	-
7	Değirmitaş Yayla (2150 m)		15-17 Nov.1996	8	-	-	-	-	-	-	-	-	-
8	Fırınoba Yayla (2350 m)	Çakırgöl Mt. (up to 3082 m)	8-11 May 1998	7	-	-	-	-	-	-	-	-	-
9	Deveboynu Yayla (2500 m)		8-11 August1997	8	-	-	-	-	-	-	-	-	-
10	Salarut Yayla (2050 m)	Ziyaret Mt. (up to 2629 m)	13-16 Oct. 1995	9	5 ♂, 3 ♀	1600-2100	+	+	+	+	+	?	-
11	Demirtaş Yayla (2100 m)		22-24 Sept. 1995	11	8 ♂, 3 ♀	1500-2100	+	+	+	+	+	?	-
12	Ablaryas Yayla (2050 m)	Soğanlı Mts. (up to 2896 m)	7-13 May 1993	4	6 ♂, 2 ♀	1400-2000	-	+	+	+	+	+	+
13	Mahtalar Yayla (2200 m)			5	12 ♂, 4 ♀	1400-2150	-	+	+	+	+	+	+
14	Koğuktaş Hill (2247 m)			8	38 ♂, 24 ♀	1400-2240	-	-	+	?	+	?	+
14	Koğuktaş Hill (2247 m)		10-14 May 1994	8	44 ♂, 17 ♀	1300-2240							
15	Yente Yayla (2350 m)	Haldizan Mts. (up to 3376 m)	11-12 July 1998	7	11 ♂, 3 ♀	1500-2300	-	-	+	+	+	?	+
16	Multat Yayla (2200 m)		30 July-6 August 1995	8	8 ♂, 2 ♀	1500-2400	+	+	+	+	+	+	+
17	Arpaözü (2400 m)			9	12 ♂, 5 ♀	1700-2300	+	+	+	+	+	+	+
18	Zorkar Yayla (2600 m)	Palavit Mt. (up to 3154 m)	18-20 May 1996	12	54 ♂, 41 ♀	1600-3000							
18	Zorkar Yayla (2600 m)		20-23 April 1997	12	58 ♂, 32 ♀	1700-2800	-	+	+	+	+	+	+
18	Zorkar Yayla (2600 m)		29-30 May 2002	12	4 ♂, 3 ♀	2000-2500							
19	Leciş Yayla (2650 m)		18-21 Oct. 1996	7	18 ♂, 11 ♀	1700-2800	-	+	+	+	+	+	-
19	Leciş Yayla (2650 m)		31 May-4 June 1996	7	28 ♂, 15 ♀	1700-2800							
20	Büyük Yayla (2700 m)	Çapans Mts. (up to 3274 m)	22-27 May 1998	12	46 ♂, 27 ♀	1700-2800	-	+	+	+	+	+	+
21	Çamlık Yaylası (2650 m)		18-19 July 2002	11	29 ♂	1500-2950	-	+	+	+	+	+	+
22	Kito Yayla (2000 m)	Verçenik Mt. (up to 3709 m)	8-11 August 1998	9	36 ♂, 9 ♀	1700-2300	-	+	+	+	+	+	+
23	Yedigöl (1900 m)		15-19 August 1997	10	4 ♂	1800-2000	+	+	+	+	+	+	+
24	Aşağı Kavron Yayla (1900 m)	Kaçkar Mts. (up to 3932 m)	26-30 May 1995	11	22 ♂, 16 ♀	1800-3000	-	+	+	+	+	+	+
25	Yukarı Kavron Yayla (2250 m)		23-26 Feb. 1995	5	4 ♂	1900-3200							
25	Yukarı Kavron Yayla (2250 m)		25-30 August 1995	12	8 ♂, 3 ♀	1900-3200	+	+	+	+	+	+	+
25	Yukarı Kavron Yayla (2250 m)		28 July-3 Aug. 1996	12	11 ♂, 5 ♀	1900-3300							
25	Yukarı Kavron Yayla (2250 m)		11-14 Oct. 1996	5	3 ♂, 1 ♀	1800-2300							
26	Aşağı Ceymakçur Yayla (2000 m)		15-18 March 1996	8	14 ♂, 6 ♀	1900-2200	-	+	+	+	+	+	+
27	Yukarı Ceymakçur Yayla (2200 m)		17-20 Nov. 1995	7	2 ♂	1900-2300	+	+	+	+	+	+	+
27	Yukarı Ceymakçur Yayla (2200 m)		20-23 June 1997	9	5 ♂, 2 ♀	1800-3000							
28	Hastaf Yayla (2400 m)		27 June-4 July 1998	6	1 ♀	2800-3000	+	-	+	-	+	?	+
29	Olgunlar (2000 m)		18-22 June 1996	15	18 ♂, 7 ♀	2000-3200							
29	Olgunlar (2000 m)		14-20 August 1996	15	14 ♂, 12 ♀	2000-3200	+	+	+	-	+	?	+
29	Olgunlar (2000 m)		18-21 July 1997	15	10 ♂, 9 ♀	2000-3200							
30	Yukarı Kaçkar Yayla (2400 m)	Altıparmak Mt. (up to 3492 m)	24-30 June 1997	12	17 ♂, 6 ♀	2000-3000	-	+	+	+	+	+	+
31	Karagöl (2650 m)		25-29 July 1997	7	9 ♂, 5 ♀	1800-3000	+	+	+	+	+	?	-
32	Horhat Yayla (2400 m)	Baskaya Mt. (up to 3334 m)	14-15 July 1999	7	8 ♂, 3 ♀	1700-3000	+	+	+	+	+	?	+
33	Yüksekoba Yayla (2100 m)			9	7 ♂, 4 ♀	1800-2500	+	+	+	+	+	?	+
34	Cevizli Yayla (2000 m)	Kurt Mt. (up to 3224 m)	22-23 August 1999	13	14 ♂, 7 ♀	1500-3100	+	+	+	+	+	+	+
35	Çamdalı Yayla (1700 m)	Karçal Mt. (up to 3414 m)	4-6 August 2000	15	15 ♂, 7 ♀	1500-2750	+	+	+	+	+	+	+
36	Çukunet Yayla (2150 m)		9-10 July 2000	16	17 ♂, 6 ♀	1750-3000	+	+	+	+	+	+	+

Results and discussion

Distribution of Caucasian black grouse in the Eastern Karadeniz Mountains

The observations made during this study revealed that Caucasian black grouse were present over a large portion of the Eastern Karadeniz Mountains from Salarut Yayla in Ziyaret Mountain in the west to Cukunet Yayla in Karcal Mountain in the east (see Table 1 and Fig. 2). No sightings were made west of Salarut Yayla in the Ziyaret Mountains (Sites 1-9 in Fig. 2). It is noticeable that all sites visited east of Salarut Yayla were populated by Caucasian black grouse, although their population density varied significantly at the various sites, indicating a scattered but continuous distribution of the species in the region (see Table 1 and Fig. 2). Observed bird densities ranged between 0.4 birds per km^2 in Yedigöl Yayla and 7.75 birds per km^2 in Koguktas and Zorkar

Yaylas. On average, the study area had an observed population density of 3.9 birds per km^2.

In general, almost all previous reports in the literature correspond well with the results of the present study. The previous reports included sites such as Sivrikaya (site 18; Martins 1989, Temple-Lang & Cocker 1991, Atkinson, Humpage, Jowitt, Ogurlu & Rowcliffe 1995, Kirwan & Martins 1994, Green & Moorhouse 1995, Baskaya 1997), the Kackar Mountains (site 25; Beaman 1986, Pirselimoglu 1990, Atkinson et al. 1995, Kasparek 1992, Green & Moorhouse 1995, Baskaya 1997), Sarıgol (to the south of site 31; Martins 1989), the mountainous areas between Erzurum and Rize (site 18-30; Kumerloeve 1961, Kasparek 1992, Atkinson et al. 1995, Green & Moorhouse 1995, Baskaya 1997), Ablaryas (site 12), Yaylaonu (to the north of site 13), Pladimezrasi (site 15; Atkinson et al. 1995), Samistal Yayla (to the west of site 25), Sultan Murat Yayla (to the east of site 13), Uzungol (to the east of site 13), Uzuntarla (to the north of site 12), Arpaozu (site 17; Pirselimoglu 1990), Kirklar Mount (to the east of site 17; Pirselimoglu 1990, Atkinson et al. 1995, Baskaya 1997), and the Balikli-Maden/Savsat Wildlife Preservation Areas (to the east of site 36; Anon. 1982; see Fig. 2).

The westernmost recorded area for Caucasian black grouse was previously at Ablaryas in the Soganlı Mountains (Site 12 in Fig. 2; Atkinson et al. 1995). With the present study, the known range of Caucasian black grouse was extended by approximately 25 km westward to Salarut Yayla in the Ziyaret Mountains (Site 10 in Fig. 2). According to Pirselimoglu (1990), local people claimed to have seen Caucasian black grouse at some locations in the Zigana Mountains, mainly in Hocamezari, beyond the westernmost distribution point in Salarut Yayla recorded in this study (Site 10 in Fig. 2). However, my observations at five points in the Zigana Mountains yielded no sign of the grouse. In my study, grouse were also observed in two different localities in the eastern part of the region around Balci, which has been reported to have no populations of the species (Atkinson et al. 1995). My first observation site at CamdalıYayla (Site 35 in Fig. 2) was approximately 4 km northeast of Balci, and the second at Cukunet Yayla (Site 36 in Fig. 2) was 5 km southeast of Balci. The account by Atkinson et al. (1995), however, is somewhat misleading, as it may refer to the village of Balci itself, which is located in the mid-forest zone, whereas the grouse inhabits areas from the upper forest zones to the alpine zone at above approximately 1,800-2,000 m a.s.l. in the region. The altitudinal distribution of the species ranges from as low as 1,300 m a.s.l. in Koguktas Hill (Site 14 in Fig. 2) to as high as 3,300 m a.s.l. in Yukari Kavron Yayla (Site 25 in Fig. 2), with the main distribution being at about 1,700-2,700 m a.s.l. (see Table 1). Similar reports concerning the altitudinal distribution of the species prevail in the literature. Cramp & Simmons (1980), Kumerloeve (1961) and Storch (2000) reported this range as 1,500-3,000 m a.s.l., Potapov (1985) as 1,500-3,300 m a.s.l., Klaus, Wiesner & Vitovich (1988, 1990) as 2,000-2,800 m a.s.l. and Baskaya (1997) as 1,300-3,300 m a.s.l.

The current distribution area of the species in the Eastern Karadeniz Mountains covers a land area of about 7,500 km^2 above ~1,500 m a.s.l.. Of this area, 33% (~3,400 km^2) is protected. The protected areas include Kackar, the Hatila Valley, the Karagol-Sahara National Parks, the Uzungol Nature Park, Posof, Balıklı and Maden, the Çoruh Valley, Vercenik Mount, the Kackar Mountains, the Karcal Mountains Wildlife Preservation Areas, Camlıhemsin-Cayeli-Hemsin, the Capans Mountains and Posof No-Hunting Areas and the Camili Biodiversity and Natural Resources Management Area. Of these, Posof and the Balikli-Maden/Savsat Caucasian black grouse preservation area were established in 1982 and later reorganised and renamed as the Wildlife Preservation Area in 1996 (Anon. 1982, Anon. 1996).

Principal threats and pressures facing Caucasian black grouse

Habitat degradation and poaching are the most important factors affecting wildlife populations in Turkey (Baskaya & Serez 1998). In addition to these, habitat loss and fragmentation, small population size, egg collection, fox predation and outdoor activities are the other major threats to Caucasian black grouse populations in the Eastern Karadeniz Mountains (see Table 1). Factors leading to habitat degradation in the Caucasus are cattle grazing and shepherding (see overview in Storch 2000). But several other factors also contribute to the habitat degradation in Turkey. These include the ever increasing intensive forestry practices such as clear-cutting, fuelwood utilization of trees and shrubs, as well as overgrazing, hay production, conversion of forestlands into farmlands, wood smuggling, road construction, construction of yayla houses (high mountain summer village houses) and upland settlements.

Though the population density in the region decreases with altitude and human settlements are very scattered in the uplands, the presence of humans is widespread. Traditional yayla life, which used to be a life style of vital importance for the local people, has made a comeback during the last several decades. Livestock is grazing in the subalpine zone during the breeding season of the grouse, and hay production is a common practice in all alpine meadows. As a result of all these factors,

availability and quality of food and cover have declined in Caucasian black grouse habitats above 1,300 m a.s.l. Degraded forest areas in the region are being covered by shrub genera such as *Rhododendron*, *Vaccinium*, *Salix* and *Betula*. This seems to be favouring the extension of grouse habitats, but in reality it does not; especially in the late autumn, winter and early spring the grouse become more exposed and, thus, vulnerable to predation.

Degradation, loss and fragmentation of habitats may have resulted in isolated grouse populations in the region. These are particularly vulnerable to extinction due to their small size and threats such as predation, poaching and egg collection.

Hunting of Caucasian black grouse has never played an important cultural or economic role (see Storch 2000). However, poaching of the species has developed into a serious threat since the early 1980s (Baskaya 1997; see also Storch 2000). At every observation site, hunters from urban and rural areas were common, with hunters living in the villages near or in grouse habitats profiting the most on the kills. Moreover, egg collection by shepherds and local hunters was a regular practice at many sites. Some collectors claimed to have taken 50-200 grouse eggs per breeding season.

Predation of chicks by shepherd dogs was determined at several observation points. However, this may not be as serious a threat as that reported elsewhere (see Storch 2000). Fox predation, on the other hand, may even be more serious, given that 2-7 foxes were seen at almost all observation sites. In this regard, raptor species such as golden eagle and long-legged buzzard may also be important. Their role should be substantiated through further research.

Disturbance caused by outdoor activities (i.e. hikers, climbers, campers, wildlife photographers and berry-pickers) in the Kackar National Park (Baskaya 2002) and grouse watching at the lek in the Sivrikaya Province (Zorkar Yayla, Lecis Yayla, Buyuk Yayla and Camlık Yayla) have also become a major concern for the grouse populations. Similar disturbances are also common in other easily accessible places.

Conclusions

Due to the nature of the Caucasian black grouse's treeline habitats, the species is patchily distributed and occurs in distinct local populations. The fragmentation of the populations probably has been further increased by human activities. At present, the distribution of the species in the region is scattered, but local populations still appear to be well connected. Based on my observations, I suggest that Caucasian black grouse in the Eastern Karadeniz Mountains are distributed in a metapopulation pattern. Future population genetic research (e.g. Segelbacher & Storch 2002) may assess the validity of this assumption.

The grouse populations in the Eastern Karadeniz Mountains are negatively affected by several anthropogenic factors that might threaten the metapopulation's long-term survival. As a first step to maintaining viable grouse population levels throughout the Turkish range of the species, basic information on the distribution, population, trend and threats need to be obtained to clarify the species' conservation status. Then, this information should be used to design and implement a conservation and management plan for the species in Turkey. Establishing a ranger system to fight illegal hunting, strengthening the existing protected area network through the creation of new reserves and habitat corridors, and designing and implementing education and public awareness campaigns appear to be the most urgent measures.

This study may serve as a basis for future research to clarify the Caucasian black grouse's status in Turkey, and thus, hopefully, presents a first step towards the species' conservation.

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