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## Ecology and behaviour of the black-billed capercaillie (*Tetrao urogalloides stegmanni*) in the Khentej Mountains, Mongolia

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**Key words:** Black-billed capercaillie, *Tetrao urogalloides*, behaviour, ecology, Mongolia, Gorchij-Terelsh National Park

### Introduction

A common inhabitant of East Siberian larch forests, the Siberian or black-billed capercaillie (*Tetrao urogalloides*) ranges south to the limits of the boreal forests in the northern Mongolian mountains and east to the very coast of the Asian continent (KLAUS et al. 1989). *Tetrao urogalloides* MIDDENDORF (1851) has priority over *T. parvirostris* BONAPARTE (1856). Therefore, we prefer the *T. urogalloides*.

The subspecies *T.u. stegmanni* was first described on the basis of morphological differences by POTAPOV (1985) using specimens collected during Russian expeditions by KOZLOVA (1930). This description was based on 18 males in the collection at the Zoological Institute of Sankt Petersburg. Compared to the nominate and the Kamtschatkan subspecies, the males are larger, of generally darker plumage with a longer, wedge-shaped tail and many lateral white spots on the belly, resembling the Siberian spruce grouse (*Falcapennis falcapennis*). However, knowledge of the ecology and behaviour of this subspecies living at the southernmost edge of its range is very limited (NADLER, WIESNER in KLAUS et al. 1989, BOLD 1984). To expand this knowledge, we carried out field work over three weeks including the “high season” of display (when females appeared on the lek) in the Gorchij-Terelsh National Park in the Khentej Mountains. The field work included photo and video recordings. We describe the aggressive and the courtship behaviour of the Mongolian subspecies as well as the properties of the habitat in the Khentej Mountains. We compare our findings with our earlier studies of the nominate form *T. u. urogalloides* in the Magadan region (62° N) by ANDREEV (1975, 1977, 1979, 2002), KLAUS et al. (1989) and KLAUS & ANDREEV (2001).

### Study area and methods

The study area (about 47° 52' 37" N, 107° 56' 30" E) in the Gorchij-Terelsh National Park is 150 km NE of Ulaan Baatar in the southern part of the Khentej Mountains (main top Asralt Chairchan 2,800 m a.s.l.), minimum temperatures in January -23° down to -43° C, annual total precipitation 250–400 mm depending on the altitude, BOLD 1984, HILBIG 1995).

The Khentej Mountains are the Southern part of the Trans-Baikal coniferous forests eco-region (WWF 2000), which are characterized as Khentej plant-geographical district (Grubov 1982), with dominance of boreal taiga forests (*Larix sibirica* in lower parts, *Pinus sibirica* at elevations of 2000–2200 m a.s.l.). The marginal parts and foothills are part of the Daurian forest steppe eco-region, characterized as Mongolian-Daurian botanical-geographical district with a typical vegetation complex of coniferous forests on northern slopes, mountain steppes, and shrubs on southern slopes and minerotrophic mires in the valleys. The higher parts of the mountains above the timber line are characterized by so-called Golets terrasses as a complex of Kobresia alpine grassland, rocks, and block fields with plants of arctic-alpine distribution pattern. The upper forest belt is characterized by moss-covered cedar forests and cedar-larch mixed forests with *Vaccinium vitis-*

idea. Dwarf birch (*Betula rotundifolia*), spruce (*Picea obovata*), aspen (*Populus tremula*), and birch (*Betula platyphylla*) are pioneer trees after forest fires in coniferous forests. Shrub birches (e.g. *Betula fruticosa*), and willows (*Salix* spp.) dominate valley mires. Larch forests (*Larix sibirica*) are found on shaded slopes at lower elevations. The display ground (lek) under study was located in an old-growth larch forests at the border of open steppe on a south-facing slope in an undulating landscape (fig. 1, 2). A second less typical lek was detected in a 50-year old succession forest of birch (*Betula platyphylla*) that had grown up after a forest fire. In this forest black-billed capercaillies and black grouse (*Tetrao tetrix*) displayed in close proximity to one another.

## Time schedule and methods of observations

The first lek was found on 29 April, 2011, by following the footprints of displaying males in fresh snow. In the early morning of 1 May, a calling male was heard and, on closer approach, five other males were seen nearby on the display arena. During the day, when the birds were absent, a hide was built near the centre of the lek, from which we could make observations and take photographs and videos. The hide was used for two weeks for all observations. We started at 18:00 and ran until 10:00 or 11:00, when display stopped and the birds left the arena. Disturbance of the lekking birds was carefully avoided. During 14–20 May, we made observations at the second lek.

## Results and discussion

### Time schedule of activity on the arena

The first female visited the lek on 3 May and two more females were seen feeding nearby, indicating that the “high season” was approaching. On May 5 and 6 fresh snow covered the ground and trees. One female was noted feeding on larch trees. Two males were actively displaying on the ground. On 6 May the males were highly active, displaying in deep snow, and on 7 May, the first



Fig. 1: The forest landscape dominated by Siberian larch near to the lek is fragmented and bordered by open grassland (30.4.2011, Gorchij-Terelsh National Park, Khentej, photo by K.H. Schindlatz).

female was seen in copulation posture, with wings touching the ground close to the circling male. Two other females were feeding on the ground nearby. The distances between males and females dropped to only 1–2 m indicating their readiness to copulate. A first copulation was recorded on 7 May (8:08 a.m.), the next on 8 (5:32 a.m.) and 9 May (7:01 a.m.), all by the dominant male. Fights between males have been rarely described in the literature. One example of four fights observed on 13 May was documented by photography. After the period of copulations, male activity dropped to much lower levels.

### Morphology

In addition to the differences reported by POTAPOV (1985), the plumage of female *T. u. stemanni* is browner than the grey plumage of the females from northeastern Siberia (fig. 3). The tarsal feathers were shorter, so that the toes were easily visible (fig. 4), which is not the case in the nominate form (fig. 5). The wedge-shaped tail of males is more tipped (fig. 6).

### Habitat of the lek surroundings

The lek was found in a relatively flat part of a slope, the southern part of which borders on open grass land (steppe), whereas the pure old-growth larch forest extends into the shady northern part of the hill. The larch forest was uneven-aged, with dead trees and only a few remnants of old cut trees. The birds were seen feeding during the spring season, both in the crowns of larch trees and on the ground in and around the arena. Most preferred was the border of the larch forest, because freshly sprouting grass and forbs were more common at the open southern edge. Fig. 2 shows an example of the feeding ground, about 200 m from the lek.

Lek No. 2 with four displaying males was a secondary habitat, a succession forest of a 40–50 year old birch stand, resembling the situation in Kamchatka (KLAUS et al. 1989).



Fig. 2: Two male black-billed capercaillie on their feeding ground 200 m from the lek near the border of larch taiga (3.5.2011, Gorchij-Terelsh National Park, Khentej, photo by K.H. Schindlatz).



Fig. 3: The female plumage of the Mongolian subspecies is browner than that of the nominate form. They also lack the reddish-brown patch on the breast typical for female common capercaillie (7.5.2011 Gorchij-Terelsh National Park, Khentej, photo by K.H. Schindlatz).



Fig. 4: Male of the Mongolian subspecies. Tarsal feathers are shorter and toes visible (7.5.2011, Gorchij-Terelsh National Park, Khentej, photo by K.H. Schindlatz).



Fig. 5: Very long tarsal feathers covering the toes of a female of the nominate subspecies (Magadan region, photo by S. Klaus).

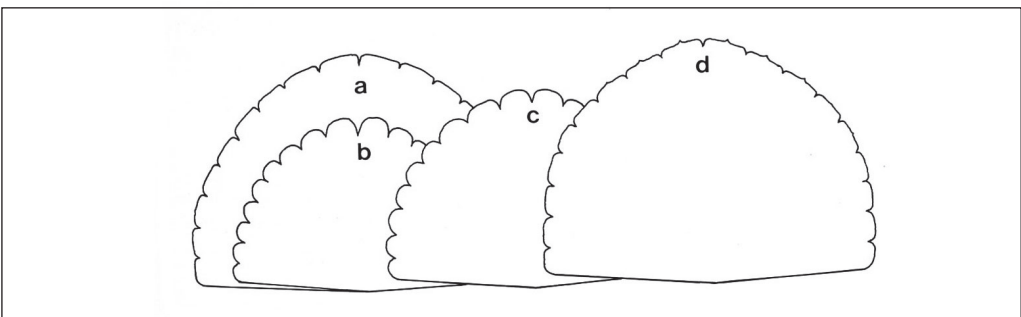


Fig. 6: Tail forms of subspecies males of the black-billed capercaillie: a – *T. u. urogalloides* (adult), b – *T. u. urogalloides* (juv.), c – *T. u. kamtschaticus*, d – *T. u. stegmanni* (ANDREEV in KLAUS et al. 1989).

## Territorial behaviour of males including combats

Because of the position of the hide, most observations were focussed on one dominant male with 3 females visiting his territory. Territory size was about 30 x 30 m, similar to black grouse territories and typical for this species. Three to four other males were displaying at distances of 30–40 m of each other. A stump of an old larch (1 m diameter) was the preferred centre of the male under observation. Normally, around 18:30 most males arrived at the lek by flight, landing in larch trees and some (not all) started singing from trees for about 1–2 hours. With increasing darkness they stopped singing and rested up to the start of morning activity in the early dawn. Morning activity lasted up to 10:00 or 11:00 during the high season. Females arrived at the lek in late evening or early morning mainly by flight.

Activity and general behaviour of the Mongolian subspecies did not differ from the description of the nominate subspecies (ANDREEV 2002). After a silent phase during the dark hours of the night, males started displaying in the early morning from their resting tree, flew to the ground and continued singing with only short interruptions for several hours. One typical example of the varying activity during the whole display season from a lek near Magadan (Omchik Valley) is shown in fig. 7.

During the high season (18–23 May) the evening song activity varied between 2 and 3.5 hours. The duration of morning activity was about 6 hours and dropped down after the last copulation had occurred (25 May). The sum of morning and evening song activity culminated to 6–9 hours per day during the presence of females. The activity pattern in the Khentey Mountains was similar, but the peak of activity occurred about one week earlier than in the Magadan region. The exact times of daily periods of activity at Khentey were not documented throughout the study period.

The typical posture and coloration of the displaying male is shown in the figs. 4 and 9, demonstrating the black bill, the smaller reddish eye combs, the white patches on the wing covers and tail,

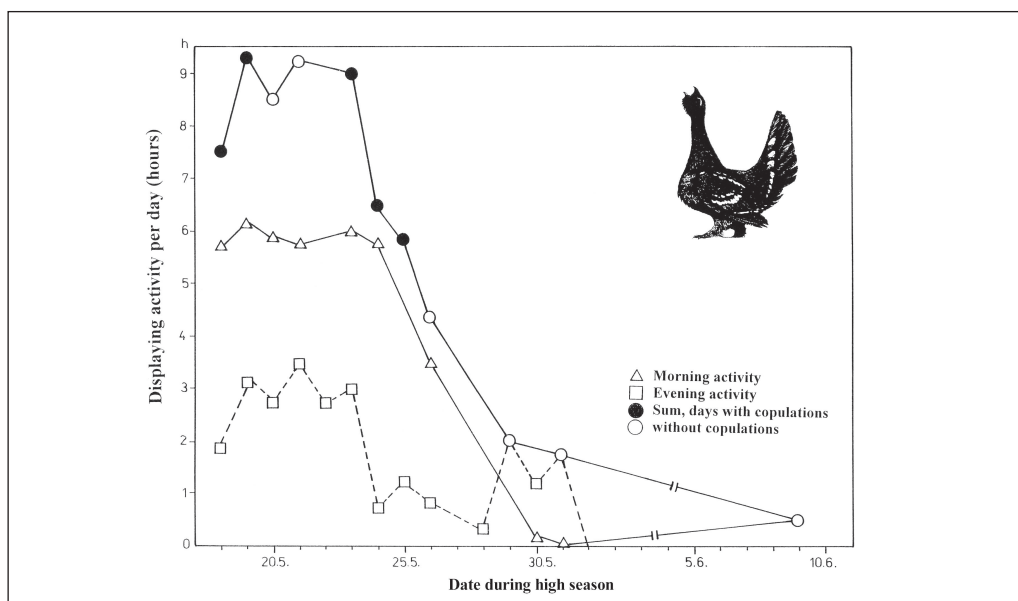


Fig. 7: Activity pattern of a dominant male on a lek in Omchik Valley (Magadan region, 62° N) during the whole display season (May 18 – June 19, 1994). Dates of copulations (filled dots) are indicated in the upper curve (morning and evening activity combined).

and the typical shape of the expanded breast – all these features differed from the male common capercaillie (*Tetrao urogallus*) (KLAUS et al. 1989). The females are more similar to black grouse females, because the red-brownish patch on the breast is missing (fig. 3). The castanet-like song, a continuous clapping with an accelerating phase is much louder than in *T. urogallus* and can be heard up to 1.5 km, depending on the weather conditions. As in the common capercaillie, flutter-jumps (> 2 m high and 8–10 m wide were measured) are common to attract females at larger distances by the strong sound of the wings and sometimes by breaking twigs and branches. These jumps produce two loud wing-drumming sounds during the rise and the landing phase, separated by a short gliding similar to *T. urogallus*.

**Combats** at the territory border have been rarely described but were observed four times in our study area. One example (May 13) is shown in fig. 8. In this case a serious combat occurred. At the start both rivals approached, walking side by side along a territorial border 2–3 m apart. When reaching a short distance of 1–2 m they started to take a frontal position, continued singing with bill wide open, tail and crest feathers erected and wings touching the ground. They stopped calling and began intense threat behaviour when they approached to a very short distance (0.7–1 m) from each other. They started head bowing with erect neck and head feathers. Then a short fight was seen with use of bills and wings, both of them tried to hit their opponents. In one case in Magadan region a cock has been recorded to be seriously wounded on its head (ANDREEV unpublished). In most cases the conflict at the border was reduced to threatening, walking side by side along the territorial border facing each other and bowing.

#### Courtship behaviour and copulation

The first female was observed at the lek on 3 May. On 7 May the courtship behaviour culminated when 3 females with small red combs were on the ground close to the courting male (distances



Fig. 8: Two males in aggressive posture just before fighting. On the left, a 2 year old cock which is seen from many white undertail spots and the posture with elongated neck indicating some fear, the cock on the right is over 4 years old with thicker neck in aggressive posture (13.5.2011, Gorchij-Terelsh National Park, Khentej, photo by K.H. Schindlatz).

male-females 0.5–2 m). Two of them showed readiness to copulate by crouching down and touching the ground with their wings (fig. 9). In one case, the copulation was seen. The male stopped singing for 5 s and continued display after the very rapid (2 s) copulation. As in the common capercaillie, after copulation the female shook her body and started preening her plumage, leaving the lek after a while. In Omchik (Magadan area) copulation occurred on a small spot of frozen snow late in the morning (fig. 10). Often as in the common capercaillie, a long time of song activity occurred before the cock was ready to copulate. We observed only one copulation per day. No aggression between females – a common behaviour in *Tetrao urogallus* and *T. tetrix* – has been recorded, neither in the Khentej nor in the Magadan area. Very often the females were in very close contact (0.5 to 1 m) to each other and to the singing male (fig. 9). At the end of the morning display the birds left the arena and walked to the nearby feeding grounds 200–300 m away.

## Conclusions

Our observations on the southern most range of the Siberian capercaillie confirm the relatively small differences in morphology described by POTAPOV (1985). In addition, the generally milder climate apparently has caused reduction of the length of tarsal feathers. A similar reduction has been observed in the hazel grouse *Bonasa bonasia* (BERGMANN et al. 1996). The milder climate and often missing snow cover allowed the birds to begin feeding on ground vegetation much earlier and copulations occurred 7–10 days earlier than in the Omchik valley/Magadan region (May 18 to 25) and 3–4 days earlier than in a study area in the Kolyma area (ANDREEV unpublished).

The preservation of old-growth forests of larch and mixed forests with larch and cedar form necessary conditions for the survival of a viable population of this “umbrella species” of the avifauna of the northern Mongolian taiga. Future studies should help to answer the question if the naturally



Fig. 9: Intensive courtship: A female ready to copulate with wings touching the ground (7.5.2011, Gorchij-Terelsh National Park, Khentej, photo by K.H. Schindlatz).





Fig. 10: Mounting male, just before copulation (13.5.1994, Omchik valley, Magadan, photo S. Klaus).

fragmented pattern of forest distribution in parts of the Mongolian mountains causes a lower density and smaller leks of the black-billed capercaillie as compared with the closed taiga of northern and north-eastern Siberia. The system of national parks and other nature reserves in Mongolia (WWF 2000) form a substantial precondition for the protection of this impressive and large woodland grouse and other forest birds of the Mongolian avifauna.

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### Summary

During one field season (29 April – 20 May 2011) territorial and courtship behaviour of the black-billed capercaillie at one lek (6 males, 3 females) was studied 150 km north-east of Ulan-Bataar in the Gorchij-Terelsh National Park. The lek was found in an old-growth forest of Siberian larch, only 200 m from the southern edge of the forest with transition to open grassland, where the birds preferred to feed on the first shoots of grass and forbs. The first female was visiting the arena on 3 May, copulations occurred on 7, 8 and 9 May. Fighting between males was observed 4 times. One serious combat was documented and described. In contrast to common capercaillie, aggression between females was never observed. The milder climate and often missing snow cover allowed the birds much earlier to feed on ground vegetation and copulations occurred one week earlier as in the Magadan region. The protection of old-growth forest is basic for conservation of the Mongolian subspecies of *T. urogalloides*.

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