

A translocation experiment using capercaillie *Tetrao urogallus* from central Russia

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As a compensation for damaging parts of the Thuringian capercaillie habitat (reserves in the Network 2000 system, Special protected areas - SPA) by two newly built barrages, an electric power company had to pay for both habitat improvement surrounding the dam and for a translocation experiment to augment the small remnant of the local capercaillie population. Capercaillie were caught in autumn near to Jaroslavl, 300 km N of Moscow, central Russia, using Romanov's fall-down traps attracted with gravel. Birds were kept in aviaries and transported by plane, later by car, in groups of 19 birds to the releasing area (transportation time less than 24 h). Upon arrival birds were measured, weighed, ringed and equipped with transmitters (6 males in 1999, 3 males, 1 female in 2000). Droppings were investigated for parasites. Feather samples were collected for genetic analysis. Birds were released after two weeks of quarantine in pens located within adequate habitats.

By the end of December 1999 17 birds were released and an additional 50 were released between November and December 2000. The sex ratio was biased in favour of males (2:1). The distribution of age classes of males (as estimated by beak depth) resembled natural conditions. By the end of August 2001, one of 8 birds equipped with transmitters was still alive (more than 600 days), two others lost their transmitters and could have been alive (indirect evidence). Male No. 7 moved around in a wide range (7000 ha). In July 2000 he established a stable home range 8-10 km from the releasing site. In the 2001 mating season he left his area several times, returned to the releasing area and later since May 2001, he established a summer home range 9 km S of the former home range but close to the releasing site. The mean survival time of 8 radio tracked birds was >158 days (7 times longer than pen-reared birds released in Thuringia).

Reproduction was observed in four independent cases. Despite the different habitat types (wet pine forests in the lowlands of Russia versus more dry mountain pine-spruce forests in Thuringia), the birds adapted well to a different topography and a different ground vegetation as a nutrient source. Dispersal distances averaged 2.8 km.

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Introduction

Only very few translocation experiments with wild capercaillie (*Tetrao urogallus*) have been reported after the successful reintroduction of this species to Scotland (LEVER 1977, ROMANOV 1988, KLAUS & BERGMANN 1994) and most of the reintroduction experiments with tetraonids raised in captivity in Germany have failed or not yet proved successful (WAGNER 1990, KLAUS & BERGMANN 1994, SCHERF 1995, SCHWIMMER 1998). Although most reintroductions have been poorly documented, the release of birds caught in the wild seems to be the most effective method.

ROMANOV (1988) and PAVLOV (1996) described several examples from Russia. In Kasachstan, about 60 wild capercaillie were released into an isolated forest area (forest steppe zone outside the natural area of the species). Twenty years later, the population was estimated at 700 birds and controlled hunting was allowed. Also wild caught hazel grouse showed long-term survival after release into the Harz Mountains of Germany (BERGMANN et al. 2000). For a more detailed discussion of the problem including quality parameters of released birds, see SCHERZINGER (1991), STARLING (1991), KLAUS (1997), IUCN (1998) and BERGMANN et al. (2000).

An attempt to augment a small population with capercaillie caught in the wild near Jaroslavl in central Russia was started in Thuringia, Germany, in December 1999 (KLAUS & GRAF 2000). As a compensation for damaging parts of the Thuringian capercaillie habitat by two newly built barrages, an electric power company had to pay for both habitat improvement in the surrounding of the dam and for an augmentation experiment in an area with a small remnant of the local capercaillie population.

Methods

Trapping and transportation

Capercaillie were caught in the wild near to Jaroslavl, about 300 km north of Moscow. The habitat of the source population is characterized by wet pine-spruce forests with *Sphagnum* and cotton grass on the ground and secondary forests grown on abandoned farmland dominated by spruce and birch. Trapping was conducted using the method described by ROMANOV (1988): grit is exposed at localities traditionally visited by gravel-collecting birds in autumn and they are captured in fall-down traps when they release the trigger mechanism. The best time for trapping in Russia was September to early November, depending on the snow conditions (birds stop collecting grit just after the formation of a closed snow-cover). The trapped birds were kept in captivity until transportation in late November-December. In 1999, 17 capercaillie (5 females, 12 males) have been transported from Moscow to Berlin and by car to the release site in the Thuringian capercaillie area. In late autumn 2000, 50 birds followed. The sex ratio of all 67 capercaillie was 23 females and 44 males.

Measuring, marking and releasing

Just after their arrival, all birds were measured (beak depth, length of primaries and tail, body weight) in order to estimate their age composition. All birds (17 in 1999, 50 in 2000) were ringed and in 1999, 4 males older than 3 years (beak depth > 26 mm, Linden 1981) and two males younger than 3 years (beak depth < 26 mm) were equipped with necklace transmitters (Holohil, Canada). In late December 2000, three more males and one female were radioed. Droppings were investigated for para-

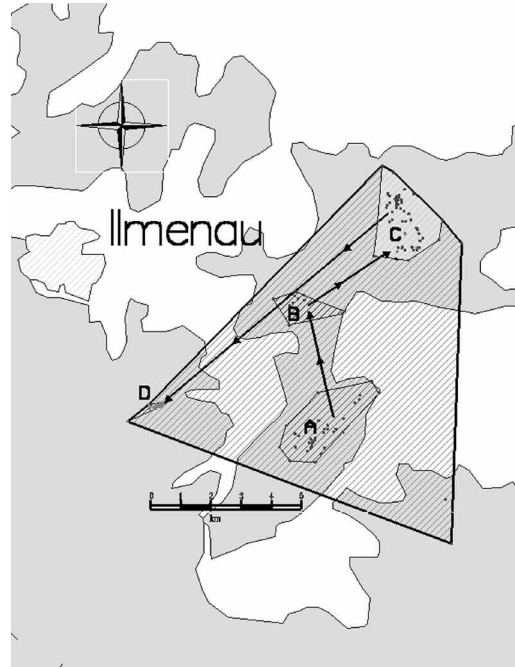


Fig. 1 Movements of male No. 7: A - release area used in January 2000; B - wintering area (used alternatively with A up to end of March), in April and May longer excursions within the big area followed, C - home range used from June 2000 to spring 2001, D - moulting area, used in summer 2001. - *Raumnutzung von Hahn 7: A - Areal nach Freilassung, Januar 2000; B - Überwinterungsareal, im Wechsel mit Gebiet A bis Ende März 2000 benutzt; im April und Mai schlossen sich größere Exkursionen im großen Gebiet an; C - Wohngebiet von Juni 2000 bis Frühjahr 2001; D - Mauergebiet im Sommer 2001.*

sites and high contamination by cestodes, ascarids and coccids was found in nearly all birds (unpublished results). We assume that the long-term stress during several weeks of captivity contributed to this high level of parasitism. On the morning after arrival, the birds were transferred to aviaries located in suitable habitats dominated by old pine and spruce with well developed ground vegetation dominated by bilberry in the mountain forests (800 m a. s. l.). Due to veterinary regulations of the European Union the birds had to be kept in the aviaries for two weeks. In December 1999, snow cover at the releasing ground was 30-50 cm high. Heavy snowfall during the following days caused the nets covering the aviaries to break and all grou-

se of the first group escaped by December 27 in 1999. In November and December 2000, all 50 birds were released after 2 weeks of quarantine.

Results and discussion

Sex ratio, age distribution, morphological data

Altogether, 67 birds (44 males, 23 females) were released between December 1999 and December 2000. According to the beak depth, 35 % of the males were yearlings, 30 % two-year-olds and 35 % three-year-olds, or older.

Life history of single birds

Of the six males equipped with transmitters in 1999, two were killed by foxes within the first two weeks and two others lost their transmitters during this time. Therefore, we obtained data from only two males during 2000, both younger than three years. These and some females and males without radios observed occasionally were found to be very sedentary, having their centres of activity close to the place of release. Both surviving radioed males stayed close to the release site for about two weeks. Then male

No. 7 moved four km crossing open fields to a wet forest patch (100 ha) with taiga-like structure and tree composition (birch, pine, spruce), 4 km at the foot of the mountains. A few days later, male No. 6 followed to the neighbouring patch. He was recorded last time in May 2000, then he disappeared.

Male No. 7 was followed until August 2001. At first, he established a winter home range of about 480 ha (end of December to end of March) 4 km north of the release site. In April and May, extended excursions were observed covering an area of about 7000 ha. This behaviour is typical for subadult cocks (LARSEN et al. 1982).

In April, longer movements of several km were observed frequently (fig. 1). We were unable to detect any displaying activity during the whole period between April and October 2000, possibly due to young age, and/or long-term stress after catching accompanied by loss of body weight, translocation and adaptation to the new site. The lack of using a display ground in spring also was inferred by frequent changes of his position. Feeding was observed in spruce and pine, including the staminate flowers of both

Table 1: Survival and mobility of capercaillie. - *Überleben und Mobilität freigesetzter Auerhühner.*

individual	survival	number of localisations	home range	maximum distance to release site	maximum distance between 2 localisations	mean distance between 2 localisations
No.	(days)		(ha)	(m)	(m)	(m)
No. 2	12	7	38,5	680	730	410
No. 3	10	6	19,5	930	950	290
No. 6	143	12	431	4600	2830	809
No. 7	612	109	456	9625	10150	1178
No. 8	100	4	75	2100	1520	1210
No. 9	126	6	30	950	940	515
No. 10	127	12	190	1470	1810	825
No. 11	136	5	70	3000	1900	1633
mean	158	20	209	2920	2604	859
S. D.	178	34	173	2816	2922	428
comments:						
No. 2 - female home range calculations; No. 6 - 11 (n=6);						
No. 3 - 11 cocks. Note added in proof: No. 7 was alive in March 2002						

species. He started to moult in mid-May, similar to native males of Thuringian capercaillie. In late June 2000, male No. 7 moved to a forest 8-10 km north of the release site. There he occupied a home range until spring 2001. He was frequently in contact with three other males released in December 2000. Then he moved several times to the release area and back. In June 2001, he went to a summer home range, 8-10 km S of the wintering area, but only 4 km from the release site. He stayed there from the moulting time until the end of August 2001, when the transmitter stopped working. In March 2002 he was found again near to the site of release.

Survival

Survival was calculated for 8 birds equipped with transmitters. Two males were killed by fox and/or marten after 10 and 12 days. Four birds from the end of 2000 were killed during March and April 2001 (3 by fox, one by goshawk). The mean survival time was >158 days ($n = 8$), seven times longer than released capercaillie raised in captivity (mean survival: 26 days in the same habitats in Thuringia, SCHERF 1995, SCHWIMMER 1998, SCHWIMMER & KLAUS 2000).

Reproduction

In summer 2000 a yearling male was found to be killed by a fox within the release area. Genetic analysis (*Segelbacher*, unpubl.) revealed a genetic relationship with a capercaillie released in end of 1999. In spring 2001, egg shells of a successful clutch were found and two broods were observed at different locations.

Sizes of home ranges, movements

Home range sizes were calculated only for birds surviving longer than 3 months ($n = 6$). From these a mean of the home range of 209 hectares was calculated for all six birds. For four birds - one female and 3 males released in December 2000, a mean size of the winter home range of 127 hectares was determined. The female of this group used an area of only 75 ha.

During different times, male No. 7 used several home ranges varying in size between 400 and 500 ha, all within a total area of 7,000 ha.

The maximum distances between release site and localisation points varied between 680 m and 9,625 m (mean 2,920 m, $n = 8$, table 1). The maximum distances between two successive localisations varied between 730 m and 10,150 m (mean 2,604 m). These relative long distances were probably caused by longer intervals between single localisations. The mean of distances between two successive localisations varied between 290 and 1633 m for six birds (mean 860 m). Home range sizes and mobility of translocated birds were similar to native capercaillie (WEGGE & LARSEN 1987, ROLSTAD 1989 and STORCH 1993).

Conclusions about releases

Our results on the translocation of capercaillie from the wild showed a longer mean survival time (seven times greater) for the translocated birds compared with capercaillie raised in breeding stations. They showed a remarkably high tendency to stay within the area of release (maximum distance 10 km) and were able to adapt to the topography of the landscape and to differences in food supply. Great mobility was observed during the displaying period (April - May), when the one radio-marked male carried out "excursions" in the surroundings, possibly in search of neighbouring leks. Up to date, traditional leks have not been found in this area, but successful reproduction was observed in four independent cases.

The physiological conditions of the released birds must be improved. This can be done by shortening the stay in captivity after trapping (from 1-2 months to 1-2 weeks), and shortening the time of quarantine at the site of release or, much better, abolishing it.

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Zusammenfassung - Ein Translokations-Experiment mit Auerhühnern *Tetrao urogallus* aus Zentralrussland

Im Rahmen von Ausgleichsmaßnahmen für Eingriffe (Bau des Pumpspeicherwerks Goldisthal und der Talsperre Leibis) in z.T. als SPA-Gebiet geschützte Lebensräume des Auerhuhns in Thüringen werden neben Maßnahmen zur Habitatoptimierung bestandsstützende Maßnahmen mit Wildfangvögeln aus Russland (Raum Jaroslawl, 300 km N Moskau) durchgeführt. Die ab September 1999 mit Romanov-Fallen an Kiesschüttungen gefangenen Auerhühner wurden in Volieren gesammelt und in Gruppen zu je 19 Individuen nach Deutschland geflogen. Nach Ankunft (< 24 h Transportzeit) wurden die Vögel gemessen, gewogen, beringt und einige besendert (Dezember 1999: 6 Hähne, Dezember 2000: 3 Hähne, 1 Henne). Losung wurde parasitologisch untersucht und Federproben für genetische Analysen gesammelt. Dann folgten eine zweiwöchige Quarantäne (nach EU-Veterinärbestimmungen gefordert) und medikamentöse Behandlung gegen Kokzidien in Eingewöhnungsvolieren, die vorher in geeigneten Habitaten errichtet worden waren. Ende 1999 wurden 17, von November bis Dezember 2000 50 weitere Hühner ausgesetzt. Die Geschlechterverteilung war zugunsten der Hähne verschoben (2:1). Die Altersverteilung der Hähne (nach Schnabelhöhe) entspricht Erwartungswerten für eine natürliche Population und beweist u. a., dass die freigesetzte Gründerpopulation aus der Wildbahn stammt. Von allen auswertbaren Sendervögeln ($n = 8$) lebte Ende August 2001 noch mindestens Hahn 7 (600 Tage). Dieser ca. 3-jährige Hahn ist von Dezember 1999 bereits 20 Monate unter ständiger Kontrolle. Nach 6-monatiger "Wanderphase" in einem 7.000 ha großen "Suchraum" etablierte er ab Juli 2000 rund 10 km vom Auslassungsort ein festes Wohngebiet, das er aber zur Balzzeit 2001 mehrfach verließ. Das diesjährige Übersommerungsgebiet liegt ca. 9 km südlich des vorjährigen, jedoch nahe dem Freilassungsort.

Die mittlere Überlebensdauer aller acht Sendervögel betrug 158 Tage und war siebenfach höher als die der in Thüringen freigesetzten Zuchtvögel. Im Aussetzungsgebiet wurde bisher keine Balz, aber viermal erfolgreiche Fortpflanzung nachgewiesen.

Trotz anderer Habitats (Flachland, feuchte *Sphagnum*-Kiefernwälder) in der mittleren Taigazone blieben die Vögel im Thüringer Bergland sehr ortstreu (Mittel der maximalen Entfernungen vom Freilassungsort 2,8 km) und ernährten sich offenbar problemlos. Das Translokationsexperiment soll Ende 2001 fortgesetzt und mehr Vögel zur Erfolgskontrolle besendert werden.

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