

Development of the Black Grouse (*Tetrao tetrix* LINNÉ) Populations in Sachsen between 1980 and 2000 (*)

by

TORSTEN KRÜGER¹ & SVEN HERZOG¹

Key words : *Tetrao tetrix*, Black Grouse, Germany, Saxony, Ore mountains, population trends.

SUMMARY

The decrease of Black grouse (*Tetrao tetrix* L.) populations in huge parts of its former Central European range can also be observed for the Erzgebirge («ore mountains», Sachsen, Germany) population. As a basis for any management efforts, an analysis of the reasons for the decrease of populations in this region is indispensable and actually in preparation.

Main basis of such an analysis is the knowledge of population dynamics over a longer period. In this context, the present paper studies the development of Black grouse populations for the Saxon part of the Erzgebirge between 1980 and 1999 using a retrospective as well as a prospective approach.

Black grouse populations in the Erzgebirge are mainly restricted to the tops of the mountains. By own observations, altogether three areas inhabited by Black grouse (Fürstenu, Deutscheinsiedel, Satzung) can be determined.

At the beginning of the study period, only one of these areas was assumed to be certainly inhabited by Black grouse. During the following years, only single animals have been detected in all above mentioned areas. An increase of population sizes can be observed from mid of the 1980s. A maximum of Black grouse population in the Saxon part of the Erzgebirge with about 120 animals (57 lekking cocks) was reached in 1993.

A significant decrease followed since 1995; an actual minimum was reached in 2000 with a total of 13 lekking cocks.

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Introduction

Right from the beginning this century has experienced a decline of Black grouse populations in almost all Central European countries. Vast parts of the former distribution area (GLUTZ VON BLOTZHEIM *et al.* 1973) have been abandoned. According to POPP and MÜLLER (1966) an estimated stock of Black grouse in West Germany of 13000 animals were distributed over all regions of Germany still in 1966. After almost 20 years Black grouse had become extinct in most parts of Germany. In the remaining regions, as for instance in Niedersachsen the population size had decreased from an appreciable stock of 8900 to as few as 157 specimens (KLAUS 1996). This trend has even continued until now despite intensive protective measures as well as the reintroduction to wilderness and conservation programmes. Because of this development Black grouse is threatened from extinction in almost all countries of Central Europe.

In contrast to this, an increase of the stock has been evident in the northern part of the Ore mountains (Erzgebirge, State of Sachsen) since the late 1980s (KRÜGER and HERZOG 2000). This tendency was obvious until 1993 with a subsequent decrease in black grouse stock. Due to lack of data, a complete presentation of the development of black grouse populations in the Ore Mountains since the turn of the century is not possible.

For more profound studies of the causes of decline of the populations living in the Ore mountains precise knowledge of the development of the populations is needed. Therefore this paper aims to investigate and analyse the development of black grouse populations in the entire Ore mountains over the period from 1980 to 2000.

Material and methods

Time and area of investigation

In order to exclude the results from being influenced by short-term fluctuations of populations the period from 1980 to 2000 was chosen for the investigations.

Occurrence of Black grouse (*Tetrao tetrix* L.) in the Ore mountains today are largely confined to the mountainous crests. Based on our own observations, three areas of Black grouse occurrence can be differentiated for the northern (Saxon) part of Ore mountains into four investigation areas close to the border to the Czech Republic: :

1. Investigation area **Fürstenu** (3600 ha) (Fürstenuwalde up to mt. Kahleberg, along the border)

2. Investigation area **Deutscheinsiedel** (900 ha) (along the border east of Deutscheinsiedel)
3. Investigation area **Satzung** (700 ha) (bounds and adjacent state forest along the border)
4. Investigation area **Cunnersdorf** (ca. 30 ha) (village of Rosenthal along the border)

Contact and exchange of animals between the investigation areas as well as between the Saxon and the Bohemian (Czech Republic) part of Black grouse subpopulation is assumed to be possible; thus, we should have in fact one single metapopulation of Black grouse on the crests of the Ore mountains.

Assessment of Black grouse

Since 1987 the assessment of the Black grouse stock in the Ore mountains pertained to all investigation areas and was performed by counting the lekking cocks annually. Prior to this, it was merely in the investigation area of *Satzung* that courtship counting was carried out. The number of the lekking cocks is doubled and regarded as the available population (KLAUS *et al.* 1990). Lek counting was run in all investigation areas at the same time, so as to greatly exclude repeated counts of the same animals. The day of counting was May 1st of each year. Furthermore, lek observations were conducted prior to and after the day of counting, to get a more general impression of the situation. In addition, all available data of reproduction and observations other than during the mating and rearing period were examined and evaluated.

Results

In the Ore mountains most relict populations ceased to exist in the period between 1965 and 1980 (SAEMANN 1987, KLAUS 1991, 1993). At the beginning of more regular investigations in 1980 it was merely one area (*Satzung*) being significantly colonised. During the following years only few individuals could be occasionally recorded (**Table I**). Starting from the mid-1980s a slight increase of the population was observable, occasional observations increased, and first lek counts in the investigation areas yielded good results.

Already in 1987 fifteen courting cocks could be verified again in the Ore mountains. Unfortunately, at that time a complete population assessment was not yet possible. Almost complete data exist since 1988 or 1989, with the exception of 1991, when no courtship counting was possible in the Fürstenu investigation area. The development of the populations is illustrated in **Table I** and **Figure 1**. The Black grouse stock of Ore Mountains reached its maximum in 1993 with approximately 120 specimens (57 courting cocks). However, yet in subsequent years, starting from 1995, a rapid decrease was apparent). The animals were no more observed so frequently except for the courtship, and also

detection by finds of e.g. prey residues and droppings declined in the succeeding years. The actual lowest value was recorded in 1998 with 14 courting cocks. The development in the four dispersal areas took a somewhat different course (**Table I**).

In the **Cunnersdorf** investigation area Black grouse could be identified by visual observation (AUGST, oral communication).

In 1992 the first courtship was confirmed. Four courting cocks were recorded in 1994, however, in 1996 already, observations of this kind were missing. Apparently, temporarily favourable habitats had been colonised which, later on, were abandoned. The colonisation most probably originated from an area which formerly served for military exercises, located in the Czech Republic. (AUGST, oral communication).

Regarding **Altenberg/Fürstenau**, data of courtship counts are available only since 1987, having been complete not until 1992. Up to 1993 (24 lekking cocks) an increase is suggested. With 22 courting cocks a quite appreciable number could be confirmed still in 1994, however in subsequent years a decline became obvious (**Table I**).

This decline was yet supplemented by the fact that the cocks courted now more frequently on their own and in the shelter of vegetation-cover than on bare ground (KAFURKE, oral communication). As already indicated, six courting cocks were recorded in 1998.

The longest data series exists for the dispersal area **Satzung**. In this region an increase was likewise obvious from visual observation over the period from 1988 to 1994. In 1994 with 17 courting cocks the highest number was recorded, the stock diminished in subsequent years, and with merely 5 courting cocks achieved its actual minimum in 1998.

In the «Satzung» occurrence, however, neither increase nor decrease are so extreme as in the other areas, except for 1994 when 17 courting cocks were recorded. Assumedly, this is attributable to the comparably intact habitat of the nature reserve Schwarzeheide/Kriegwiese, which has hardly experienced any changes over the past 10 to 15 years and which is understood as the core area of the Satzung Black grouse stock.

A remarkable fluctuation in the Black grouse population size was obvious in the investigation area of **Holzhau/Deutscheinsiedel**. Still in 1985 (SCHULENBURG 1991) any hints as to a presence of this species were absent, however, after a period of four years 15 lekking cocks were registered.

In 1992 and 1993 each a number of 20 cocks could be counted, which were courting jointly in big groups consisting of up to 11 cocks (SCHULENBURG 1991). In the past few years the cocks have been lekking mostly individually and in the shelter of vegetation, a fact pointing to frequent disturbance and a suboptimal to pessimal habitat.

The areas that used to be frequented by Black grouse in the region of Deutscheinsiedel (forest damage plots) are now covered with forest stands which emerged from planting stock of blue spruce (*Picea pungens* Engelm.), sawing of birch as well as other silvicultural measures, the average height of which is now exceeding 4 m in general and thus being no longer appropriate for Black grouse.

Concerning the investigation areas in Ore mountains, as a whole 43 proofs of reproduction could be obtained; 33 of which refer to the time period from 1980 to 1998. Furthermore, these proofs subdivide into 8 finds of nests with eggs and 35 observations of broods.

Based on the available data, reproduction in Black grouse habitats on the German part can be proven for a long period of time. The average value of eggs per nest is 8.1 and of chicks per brood 5.5, which corresponds to values published by KLAUS 1990.

Table I. Results of courtship counts in Ore mountains (from KRÜGER and HERZOG 2000)
Résultats des comptages des coqs en parade dans les Monts métallifères.

Year	Altenberg/ Fürstenauf	Satzung	Deutsch- einsiedel	Cunnersdorf	Total
2000	6	5	2		13
1999	17	7	4		28
1998	6	5	3		14
1997	10	7	2		19
1996	16	11	6	0	33
1995	16	10	6	2	34
1994	22	17	11	4	54
1993	24	10	20	3	57
1992	18	10	20	2	50
1991	no data	11	18	0	29
1990	16	10	15		41
1989	no data	8	15		23
1988	no data	6	8		14
1987	8	3	4		15
1986		2	2		4
1985		2	0		2
1984		2			2
1983		3			3
1982		4			4
1981		2			2
1980		2			2

Table II. Reproduction data of Black grouse occurrences in Ore mountains (modified from Krüger and Herzog 2000)

Relevé des cas avérés de reproduction des Tétrás lyres dans les Monts métallifères.

Year	Month	Day	Area	Place	Nest	Number of eggs	Brood	Number of chicks	Hen	Source (oral communication)
1965	7	2	Satzung	Großer Teich	x	10				DITTRICH
1965	7		Satzung		x	8				DITTRICH
1966	5	8	Satzung		x	1			x	DITTRICH
1967			Satzung	District 43			x		x	DITTRICH
1968	7		Satzung	Kriegwiese			x	4	x	DITTRICH
1972	5	29	Satzung	District 43	x	9			x	DITTRICH
1973	5		Fürstenau	Erdbachtal	x	?				DITTRICH
1976	5		Satzung	Kriegwiese	x	8			x	DITTRICH
1976	7		Satzung	Kriegwiese			x	6	x	DITTRICH
1976	7		Satzung	Kriegwiese			x	9	x	DITTRICH
1989	7	16	Einsiedel	District 18/A			x	2	x	KLUGE
1989	7	11	Fürstenau	Fuchshübel			x	?	x	DREHER
1990	7	20	Einsiedel	District 23			x	3	x	KLUGE
1990	9	6	Fürstenau	Pfarrhöhe			x	4	x	KAFURKE
1990	9	6	Fürstenau	Pfarrhöhe			x	3	x	KAFURKE
1990	6	21	Kahleberg	Biathlon- track	x	6				UHLIG
1991	8	15	Fürstenau	Traugothhöhe			x	3	x	KAFURKE
1991	7	27	Kahleberg	Hochmoor- rand			x	6	x	KAFURKE
1992	6	22	Cunnersdorf	southern Platzheide			x	5	x	DITTRICH
1992	8	10	Cunnersdorf	Kleiner Schafwald			x	5	x	DITTRICH
1992	6	30	Cunnersdorf				x	3	x	DITTRICH
1992	7		Cunnersdorf	Kleiner Schafwald			x	5	x	DITTRICH
1992	8		Fürstenau	Haberfeld			x	?	x	TITTEL
1992	6	21	Kahleberg	Weißeritz- wiesen			x	?	x	KAFURKE
1993	7		Einsiedel	Abt 21 a2			x	3	x	UFER
1993	8		Fürstenau	Haberfeld			x	?	x	TITTEL
1993	5 to 6		Fürstenau	meadow Hofteich			x	6	x	BÜTTNER
1993	7		Fürstenau	Scharspitze			x	?	x	MUCHA
1993	7 to 9		Kahleberg	District 184			x	8	x	HOLZ
1993	8		Kahleberg	Pöbel- knochen			x	5	x	HEINZE
1993	6	29	Kahleberg	Moorweg			x	3	x	DITTRICH
1993	5		Satzung		x	8			x	DITTRICH
1994	8	29	Fürstenau	Haberfeld			x	4	x	KAFURKE
1994	8	21	Fürstenau	Pfarrwasser			x	2	x	KAFURKE
1995	7		Fürstenau	Wüster Teich			x	10	x	WALTHER
1995	8		Kahleberg				x	?	x	WALTHER
1995	8		Kahleberg				x	?	x	WALTHER
1995	8		Kahleberg	Evasteig			x	?	x	WALTHER
1995	8		Kahleberg	Weißeritz meadow			x	?	x	WEINHOLD
1997	7 to 10		Kahleberg	District 78 a3.a4			x	9	x	HEINZE
1998	7		Cunnersdorf	Grosser Schafwald			x	2	x	DITTRICH
1998	10		Kahleberg	Kohlweg			x	6		HEINZE

Discussion

For the northern (Saxon) part of Ore mountains, distinct fluctuations of population development of Black grouse are apparent from the obtained results. In the period from 1980 to 1986 the detected population fluctuated between 4 and 6 animals. It was also in this period when SAEMANN (1987) asserted that this species was to die out in medium term. In the succeeding years until 1993 the population increased to 114 animals and then dropped to 28 animals. In the last year of the observations, i.e. 1999, 56 animals were recorded.

Further investigations are designed, in order to examine the factors of influence known from literature (KLAUS 1990). Here mainly changes of habitat, the development of the populations of the most important predators (*e.g. Sus scrofa, Vulpes vulpes*), factors of disturbance and other influences such as weather are referred to.

Statements on the influence of predators are not possible on the basis of the hunt statistics.

Based on the available results, a considerable influence on the development of Black grouse populations must actually be ascribed to the impact of the weather, although a statistical assessment, using diurnal data of minimum temperature, precipitation and height of snow cover during the winter season point to merely minor relationships.

The medium-term changes of habitat are to be analysed using aerial photographs and data of forest management planning. Long-term habitat changes, which best substantiate the decline of the species prior to the investigation period, are studied with respect to the development of the bog areas. For assessing the possible influence of predators, data referring to kills of the relevant wildlife species are available. Regarding the effect of disturbances, changes in road density and the sign-posting along hiking trails as well tourism characteristics (visitors and overnight stays) in the investigation area are used for analysis.

At the present time of evaluations it can be shown that 90 % of the former bogs have been drained, afforested or subjected to peat utilization since 1830. Consequently, the habitat of Black grouse has diminished markedly due to anthropogenic impacts. This development was reverted from 1979 onwards when extreme forest damage began to occur on an area larger than 10 000 ha on the German and 50 000 ha on the Czech side (LIEBOLT and DRECHSLER 1991). Due to forest decline over vast stretches of territory and the subsequent clearance of the areas, large-scale Black-grouse habitats came into being again. The available observations and population assessments indicate that these areas were colonised in a relatively short time period. Depending on the size of the damaged areas and the forest management performed there, the bare areas were

again grown with trees and the gaps filled again over the past decade, which caused Black grouse to vanish from this area. This is readily apparent from the habitats at Deutscheinsiedel. Still today other areas comprise big potential habitats (Altenberg) for Black grouse, but here too the populations diminished. In this region it are just the considerably increased number of visitors, especially the one-day tourists, as well as the continual checking by the Federal Border Police that could impose stress on the habitats due to disturbances.

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ZUSAMENFASSUNG : Entwicklung der Birkhuhnbestände (*Tetrao tetrix* Linné) in Sachsen zwischen 1980 und 2000

Der Rückgang der Birkhuhnbestände (*Tetrao tetrix* L.) in großen Teilen des ehemaligen Verbreitungsgebietes in Mitteleuropa betrifft auch die Population des Erzgebirges. Als Grundlage für Managementmassnahmen ist eine Analyse der Ursachen des Rückganges der Populationsumfänge in dieser Region unabdingbar und befindet sich derzeit in Vorbereitung.

Wesentliche Basis einer solchen Analyse ist die Erfassung der Populationsdynamik über einen längeren Zeitraum. Die vorliegende Arbeit untersucht in diesem Zusammenhang die Entwicklung des Birkhuhnbestandes im sächsischen Erzgebirge in der Periode zwischen 1980 und 1999 sowohl retro- als auch prospektiv.

Das Vorkommen des Birkhuhns im Erzgebirge ist im wesentlichen auf die Kammlagen beschränkt. Aufgrund eigener Beobachtungen lassen sich für den sächsischen Teil des Erzgebirges insgesamt drei Areale mit Birkhuhnorkommen (Fürstenu, Deutscheinsiedel, Satzung) abgrenzen.

Zu Beginn des Untersuchungszeitraumes im Jahre 1980 galt nur noch ein Areal als sicher besiedelt. Während der folgenden Jahre konnten in allen Untersuchungsgebieten lediglich einzelne Individuen nachgewiesen werden bzw. gelangen keine sicheren Nachweise zur Art. Ab Mitte der 1980er Jahre war dann eine Bestandeszunahme zu beobachten.

Einen Höchststand im Beobachtungszeitraum erreichte die Birkhuhnpopulation im sächsischen Erzgebirge im Jahr 1993 mit etwa 120 Exemplaren (57 balzende Hähne). Ab etwa 1995 war dann wieder eine deutliche Abnahme zu registrieren. Ein aktueller Tiefpunkt wurde mit den im Jahr 2000 gezählten 13 balzenden Hähnen erreicht.

Schlüsselwörter : *Tetrao tetrix*, Birkhuhn, Deutschland, Sachsen, Erzgebirge, Populationsdynamik

RESUME : Evolution des populations du Tétrasyre (*Tetrao tetrix*) dans les monts métallifères en Saxe (Allemagne) de 1980 à 2000

Le déclin généralisé des populations du Tétrasyre (*Tetrao tetrix*) concerne aussi la population des Monts Métallifères en Allemagne. Une analyse des raisons de ce déclin est indispensable avant tout effort de conservation et est en préparation.

La base essentielle d'une telle analyse est la connaissance de la dynamique des populations sur une longue période. Dans ce contexte, nous présentons dans cette communication le développement des populations du Tétrasyre de 1980 à 1999 pour la partie saxonne des Monts métallifères.

Dans cette région, les Tétràs sont confinés aux parties les plus élevées des montagnes. On a pu circonscrire trois aires principales actuellement occupées : Fürstenau, Deutscheinsiedel et Satzung.

Au début de notre période d'étude, un seul de ces trois sites était connu avec certitude comme abritant des Tétràs lyres. Pendant les années qui ont suivi, on n'a observé sur l'ensemble des zones concernées que des individus isolés. Une augmentation de la population s'est manifestée depuis le milieu des années '80. La population de la partie saxonne des Monts métallifères a atteint un maximum de quelque 120 individus en 1993, dont 57 coqs paradant aux arènes. Une diminution marquée a suivi depuis 1995, avec un minimum de 13 coqs pour les trois sites en 2000.

Mots-clés: *Tetrao tetrix*, Tétràs lyre, Allemagne, Saxe, Monts métallifères, évolution des populations.