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Vegetation of a Black Grouse Habitat on a firing Range in Lower Saxony (Germany) (*)

by

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Key words : *Tetrao tetrix*, Black Grouse, Germany, Lower Saxony, Radiotrecking, Heathland, Habitat selection, Habitat management.

SUMMARY

In this study the selection of different types of heathland by black grouse has been analysed. The study area was on a private proving ground, which contains an autochthonous population of about 20 black grouse in spring. They can be mainly found in a narrow strip of open heathland, 9 km long and about 1 km wide, which is surrounded by forest.

The vegetation was mapped and assessed by its suitability as a potential habitat for black grouse. Bearings of three cocks and one hen marked with necklace radio-transmitters have been evaluated (n = 880) from 1998 to 2000. The habitat preferences were tested with use-availability-analyses by NEU *et al.* (1974).

The black grouse preferred areas with *Vaccinium* sp., sparse woods with dwarf shrub undergrowth, fresh burned heathland, areas with old high-grown heather and fields with crops for game. The «typical» middle-aged heathland with few grass and herbs and the northern target areas with high proportion of open ground have been used less than available. No bearings have been on marshland and moor-heathland. Other habitat types have been used as available.

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Introduction

The black grouse habitat in the study area is dominated by open heathland just with very single trees or bushes and seems to be quite homogeneous. But it is possible to distinguish various types of heathland depending on age, structure and plant species composition, which have been created mainly by the use of fire as a management tool and small fires caused accidental. Therefore, the selection of these different types of heathland by the black grouse has been analysed.

Study area

The study area is a narrow strip of open heathland of about 800 ha (9 km long and about 1 km wide), dominated by *Calluna vulgaris*. It is located on a private proving ground, which is situated in the southern part of the «Lüneburger Heide» in Lower Saxony (Germany). The proving ground is about 5300 ha large and is mainly used for ammunition tests. Therefore, it is closed to public access. The autochthonous population of about 20 black grouse in spring has been stable during the last years, gradually becoming dominated by hens. In the north-west, the heathland actually used by the black grouse borders some moorland and wet meadows and in the south it adjoins to the company area. Apart from that, it is surrounded by dense forest.

Heathland management is mainly done by fire and by cutting birch *Betula pendula* and pine *Pinus sylvestris*, creating a mosaic of heathland of different age, structure and plant species composition.

Methods

Aerial photographs have been used to distinguish homogeneous units of vegetation, which have been checked in the field. According to BRAUN-BLANQUET (1964), these homogeneous units have been mapped, classified into different types of vegetation and assessed by their suitability as a potential habitat for black grouse.

From 1998 to 2000 the Institute of Wildlife Research collected telemetric bearings of three cocks and one hen marked with necklace radio-transmitters (**Table I**). One cock (ID1) was radio-tagged three years in a row, another cock (ID4) two years (SODEIKAT *et al.* 2000). They have been caught in the early mating season by small traps beside aviaries occupied with an active mating pair of black grouse (from the breeding stock at the Institute) each. One further cock and one hen had been caught additionally, but the cock was killed by a fox within short time and the transmitter of the hen failed to work, so they provided no evaluable data. With independent bearings and with analysis of

personal observations the use of habitat has been described. Habitat preferences have been tested with habitat use-availability-analyses, using the chi-square goodness-of-fit test and simultaneous confidence intervals (NEU *et al.* 1974; BYERS *et al.* 1984).

Table I : Observation data of four radio-tagged black grouse from 1998 to 2000 used for habitat use-availability-analyses
Données temporelles et numériques relatives à 4 Tétras lyres radio pistés de 1998 à 2000 en vue d'analyses de disponibilité-utilisation de l'habitat.

bird-ID	sex	observation period	bearings (n)
1	male	19.04.98 - 19.09.98	
		17.03.99 - 29.12.00*	**398**
3	male	29.04.98 - 03.08.98	**77**
4	male	17.03.99 – 02.12.00†	**265**
6	female	27.04.00 - 29.12.00*	**140**
			880

* transmitter was still running
† last localisation (killed by unknown predator)

Results & Discussion

The black grouse favoured the southern part of the range that shows an essentially smaller structured mosaic of different types of heathland than the northern areas. The results of the use-availability-analyses are presented in **Table II**.

Ericaceae and their various berries provide an important food source for black grouse in most habitats, especially the bilberry *Vaccinium myrtillus* (KLAUS *et al.* 1990). Regarding the fact that bilberry and cranberry *V. vitis-idaea* only occur in larger amounts in about 5 % of the study area («Heathland with Vaccinium»), it is not surprising that the radio-tagged black grouse prefer these areas just as the sparse woods, where bilberry and cranberry dominate the dwarf shrub undergrowth. The newly burned heathlands are used as leks but they also offer important food resources like herbs as *Rumex acetosella* or regenerating *Calluna vulgaris*-shoots after fire. Predominantly, the black grouse use the smaller burns surrounded by high grown heather as a nearby shelter. In all seasons the black grouse can be observed on or nearby the small fields with crops for game, which have been arranged by the forester and cultivated - among other things - with buckwheat *Fagopyrum esculentum*. In periods with high grown vegetation these fields offer both food and shelter, if vegetation is low, the fields are used as leks as well. Areas with old high-grown heather are favoured mainly by the radio-tagged hen, who bred there successfully in spring 2000. Besides the actual nest three old nests from the previous years were found. This underlines the importance of this area for breeding activities.

Table II: Habitat use-availability-analyses (NEU et al. 1974) for the four radio-tagged black grouse in the study area from 1998 to 2000.
Analyses de disponibilité-utilisation de l'habitat (NEU et al. 1974) relatives aux 4 Tétras lyres radio pistés dans l'aire d'étude de 1998 à 2000.
(J.sp.: *Juncus* sp., M.c.: *Molinia caerulea*, E.t.: *Erica tetralix*, C.e.: *Calamagrostis epigejos*, Vaccinium: *V. vitits-idaea* and *V. myrtillus*)

Vegetation	area (ha)	bearings expected	bearings observed	habitat use**
Woods	38,39	40,86	80	+
Marshland (J.sp., M.c.)	4,51	4,80	0	-
Moor-heathland (with M.c., E.t.)*	3,95	4,20	0	-
Fresh burned heathland	10,42	11,09	38	+
Young heathland	101,67	108,22	118	=
Heathland*	251,20	267,37	210	-
Gras-heathland*	66,35	70,62	80	=
Heathland with *Vaccinium* sp.*	42,66	45,40	86	+
Heathland with *Erica tetralix**	47,47	50,52	42	=
Heathland with open ground*	101,58	108,12	25	-
Old heathland	31,53	33,56	64	+
Degenerate grass-heathland*	81,92	81,19	67	=
Dense spots of C.e. or M.c.	12,33	13,12	8	=
Fields with crops for game	7,01	7,46	38	+
Other	3,24	3,45	0	-
	804,23	**856**	**856**	
(structures not included in the use-availability-analyses)			(24)	
			880	

* middle-aged or mixed-aged heather
** + : preferred, - : avoided, = : used as available ($\alpha = 0,05$)

The black grouse avoid areas with unsuitable structure like the marshland that is characterised by backwater, rushes and *Molinia caerulea*. Surprisingly, the birds use dense spots of *Calamagrostis epigejos* or *Molinia caerulea* whereas their structure is also called to be unsuitable (PORKERT 1980; CLEMENS 1990). In our study area these spots are not very large so far and all bearings have been at the edge of these areas.

The avoided marshland and the moor-heathland cover only small areas less than 5 ha each with no observed bearings on them. However, it is not sure whether they are really avoided or whether there would be some bearings if the total number of bearings would increase. Moor-heathland, for example, is used by black grouse in other habitats as in the Belgian «Hautes-Fagnes» (KEULEN *et al.* 1997). Subsequent analyses will deal with this problem using other confidence intervals for use-availability-analyses.

In our study area only two habitat types have been definitely avoided (utilisation less than available) by the black grouse. The «typical» middle-aged heathland provides only few grasses and herbs and no berry shrubs, therefore it offers no food sources apart from *Calluna vulgaris*. The heathland with higher

percentage of open ground is situated in the north of the study area and serves as a main target area. As a consequence the surface is changing, sandy holes in the ground neighbour patches of heather of all ages. Only one cock had been there for a certain period, sometimes accompanied by a hen.

Beside the habitat types analysed above, the black grouse used some further structures such as unsurfaced sandy roads (13 bearings), where especially the hens can often be observed, searching probably for stomach stones or herbs at the wayside. Other observations were made on the fire prevention lane (2), some «high seats» like signs and posts (6) and even in the forest (3).

As the previous results submit the black grouse use a broad spectrum of different habitat types even in apparently homogeneous areas. Therefore, it is important to manage heathland-dominated habitats to create a mosaic of different structures, reaching from fresh-burned heather as lek to old high-grown heather as breeding area, particular emphasis placed on berry shrubs like bilberry.

REFERENCES

BRAUN-BLANQUET, J. (1964): Pflanzensoziologie. Grundzüge der Vegetationskunde. Wien, New York.

BYERS, C.R., R.K. STEINHORST & P.R. KRAUSMAN (1984): Clarification of a technique for analysis of utilisation-availability data. J. Wildl. Manag. 48(3): 1050-1053.

CLEMENS, T. (1990): Birkwild. Moorschutz = Artenschutz. Ein Pilotprojekt in Niedersachsen. Jordsandbuch Nr. 8, Niederelbe-Verlag, Otterndorf. 327 pp.

KEULEN, C., S. HOUBART & J.-C. RUWET (1997): Les arènes de parade des tétras lyre (*Tetrao tetrix*) dans les Hautes-Fagnes de Belgique: Caractéristiques paysagères et propositions de gestion. *Cahiers d'Ethologie* 17(2-3-4): 387-529.

KLAUS, S., H.-H. BERGMANN, C. MARTI, F. MÜLLER, O.A. VITOVIC & J. WIESNER (1990): Die Birkhühner. A. Ziemsen Verlag, Wittenberg Lutherstadt. 288 pp.

NEU, C.W., C.R. BYERS & J.M. PEEK (1974): A technique for analysis of utilisation-availability data. J. Wildl. Manag. 38(3): 541-545.

PORKERT, J. (1980): Vergrasung des Waldbodens als Birkwildproblem. Beih. Veröff. Naturschutz Landschaftspflege Bad.-Württ. 16: 75-95.

SODEIKAT, G., GRÜNTJENS, T. & K. POHLMEYER (2000): Lebensraumnutzung von Birkhühnern und Telemetrie an Wildfängen auf der Rheinmetall-Schießbahn im östlichen Niedersachsen. In: *«Sicherung und Entwicklung von Lebensräumen für das Birkhuhn im Mittelgebirge»*. Conference 14.-16.04.00 Altenberg/Erzgebirge. (in press)

ZUSAMMENFASSUNG : Vegetation eines Birkhuhn-Lebensraumes auf einem Schießplatz in Niedersachsen (Deutschland)

In dieser Untersuchung wurde die Selektion verschiedener Heidetypen durch Birkhühner untersucht. Das Untersuchungsgebiet liegt auf einem privaten Schießplatz, der eine autochthone Frühjahrspopulation von etwa 20 Birkhühnern beherbergt. Diese halten sich im wesentlichen in der Schießbahn, einem 9 km langen und ca. 1 km breiten, von Forst umgebenen offenen Heidestreifen auf.

Die Vegetation wurde kartiert und nach ihrer strukturellen Eignung als potentielles Birkwildhabitat bewertet. Peilungen von drei mit Halsbandsendern markierten Hähnen und einer Henne aus den Jahren 1998 bis 2000 wurden analysiert (n = 880). Die Habitatpräferenzen wurden mit einer Habitatnutzungsanalyse nach NEU *et al.* (1974) ausgewertet.

Die Birkhühner bevorzugten Flächen mit *Vaccinium* sp., lichte Gehölze mit Unterwuchs aus Zwergst räuchern, frische Brandflächen, Flächen mit alter, hochgewachsener Heide und Wildäcker. Die «typische» mittelalte Heide mit wenig Gras und Kräutern sowie die nördlichen Zielgebiete mit größeren Offenbodenflächen wurden gemieden (d.h. nicht dem Angebot entsprechend genutzt), keine Peilungen lagen im Binsen-Pfeifengras-Sumpf und in der Moorheide. Andere Habitattypen wurden dem Angebot entsprechend genutzt.

RESUME : Faciès végétaux préférés dans l'habitat du Tétras lyre sur un champ de tir en Basse-Saxe (Allemagne du Nord).

Cette étude analyse les préférences des tétras lyres pour différents types de bruyère dans un paysage apparemment uniforme en Basse Saxe, Allemagne du Nord. Elle a été réalisée sur un champ de tir privé abritant au printemps une population autochtone de quelque 20 tétras. Ceux-ci se rencontrent principalement sur une bande étroite de lande à bruyère ouverte, longue de 9 km et large de 1 km environ, entourée de forêts.

La végétation a été cartographiée et évaluée quant à son attractivité comme habitat potentiel pour le tétras lyre. Les données (n=880) récoltées grâce à trois coqs et une poule équipés de colliers dotés d'un émetteur radio ont été consignées de 1998 à 2000. Les préférences quant à l'habitat ont été soumises à une analyse de disponibilité-utilisation de NEU *et al.* (1974). Celle-ci montre que les tétras préfèrent les zones où ils trouvent des plages de *Vaccinium sp.*, les boisements clairsemés riches d'un sous-bois de buissons bas, des plaques de bruyères récemment incendiées, les peuplements âgés de bruyères hautes ainsi que les parcelles proches cultivées en faveur du gibier. Par contre, le faciès habituel et monotone de bruyère de hauteur moyenne, pauvre en herbes et en pousses, ainsi que les paysages plus dénudés de la zone d'impact des tirs sont moins utilisés. Aucun contact n'a été enregistré pour les marais et pour les landes herbeuses.

La conclusion, quant à la gestion de l'habitat en faveur du tétras lyre, est qu'il faut aménager les bruyères de façon à créer une mosaïque de différentes structures allant des parcelles incendiées favorables aux parades en groupe à des massifs de bruyère haute et touffue favorables à la nidification, sans oublier les buissons à baies comme les myrtilles et airelles.

Mots-clés : *Tetrao tetrix*, Tétras lyre, Allemagne, Basse-Saxe, Radiorepérage, Bruyère, Sélection de l'habitat, Gestion de l'habitat.