

GROUSE NEWS



Newsletter of the Grouse Group *of the* IUCN/SSC-WPA Galliformes Specialist Group

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From the Editor

The grouse family has been intensively studied for many years. At the time of WPA's first International Grouse Symposium in 1978, there was already a large amount of knowledge published in the scientific literature. But there were still large gaps in the evidence. After the conference in Whitehorse, Canada, it is obvious that it should be enough experience to move into active management of grouse populations.

In this issue a report on pink ptarmigan is published. If you have observations on similar pink birds get in touch with Karen Wiebe or me, and I will forward it to Karen. Also an article on climate and capercaillie habitat and age determination of hazel grouse is found. In conservation news information on conservation of capercaillie in France is found. In snippets it is a short update of the conference proceedings from the Whitehorse conference.

I will also remind you of the 5th International Black Grouse Conference, Bialowieza, Poland 5th-9st October 2009. Those of you who plan to participate at this conference please notice the deadlines for abstracts and registration found under snippets.

If you know of anybody that has not received Grouse News, or those who would like to have it, please tell me. It is only published electronically, so I need their e-mail addresses. However, if someone does not have e-mail, we may make exceptions and mail a paper copy if not too many. It is also very important that everybody that change address and/or e-mail address send a message to Ilse or Tor Kr. to be sure to receive Grouse News.

Remember that the primary function of Grouse News is to publish interim papers, which the big peer-reviewed journals would usually reject. Hypotheses and new techniques can be described to colleagues in the grouse world without precluding eventual publication of a completed study elsewhere.

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Welcome Grouse, to the Galliformes Specialist Group

Grouse researchers have long been well connected. Close working relationships across countries and continents were intensified when Tim Lovel of the World Pheasant Association (WPA) organised the first International Grouse Symposium in Scotland in 1978. The second IGS followed three years later in 1982, and our triennial IGS series has continued ever since. Now we are looking forward to the 12th IGS in Japan in 2011. These symposia were the principle factor in making the international grouse network such an effective forum that the IUCN-SSC/WPA Grouse Specialist Group was formed in 1993. Around the same time, four other SGs were founded to represent the interests of pheasants, megapodes, cracids, and partridge-quail-francolin at the 'top table' of international conservation.

In the 15 years of its formal existence, the Grouse Specialist Group has grown to a closely-knit network of >130 members from about 30 countries. It has published two Grouse Conservation Action Plans, produces this newsletter and maintains the Grouse website (<http://www.gct.org.uk/gsg/>), has endorsed numerous grouse projects, and provided expert advice on issues of grouse conservation. Still more could be done and indeed needs to be done as the global environmental crisis deepens. Over the years, a growing discrepancy has become apparent between the quite extravagant expectations of IUCN-SSC and the performance of many of its 130 or so SGs. Most of them are run as 'voluntary self-help networks' and cannot realistically deliver properly whilst receiving minimal financial support for their core functions. In early 2008, this led to the idea of merging the existing five SGs for the Galliformes to form a single Galliformes Specialist Group (GSG).

The new GSG will have greater impact in conservation and provide a better representation of all threatened Galliformes and their habitats than would have been possible under the status quo. We hope that some core funding will be found with the help of WPA, so that a paid GSG Support Officer can be put in place soon, at least on a part-time basis, to help in keeping the GSG fully active. The new IUCN quadrennium (2009-12) started with the World Conservation Congress in October 2008, at which a new Chair was elected to head the Species Survival Commission (SSC): Dr Simon Stuart has now set up his office at the University of Bath in UK. Simon has welcomed the idea of the new GSG and recently invited Dr. Peter Garson (University of Newcastle, UK), former Co-Chair of the Pheasant SG, and myself as the former Chair of the Grouse SG, to become Co-Chairs of the new GSG. The Co-Chairs will be supported by an Advisory Board with members representing all the main taxa (including the ecologically similar Tinamous), all their geographic regions, and topical expertise in key areas such as Red List



procedure, conservation breeding and re-introduction. The membership of the new GSG will be invited soon on the basis of active participation in the work of the previous SGs.

So please note that 'GSG' from now on stands for "Galliformes SG", and no longer for "grouse" alone. Nevertheless, the grouse network will persist as the Grouse Group within the GSG. We will maintain our long-established identity by continuing to put out our newsletter, Grouse News, use our Grouse website (although it will be moved to a more convenient domain), and of course, run the International Grouse Symposia. As Chair of the former Grouse SG, I have accepted the SSC's invitation to become one of the founding Co-Chairs of the new GSG, in order to make sure the grouse network, which many "old grousers" feel so connected to, will not dissipate. My vision of the Grouse Group's role within the Galliformes SG is that of a "scientific advisor": There is vast scientific knowledge and a huge published literature on grouse (even though we still claim to understand so little!) compared to the other Galliformes taxa. Grousers can provide reviews and meta-analyses on various topics of grouse ecology and management, such as: re-introduction and re-stocking; the hunting impact and sustainable harvesting; effects of human disturbance; habitat management and restoration; evidence of climate change effects. With more resources becoming available in the new GSG, we can give these issues fresh thought whilst helping to advise our colleagues working on the many threatened Galliformes species worldwide. Perhaps the university folks among us can inspire some of our students to do graduate research on one of these topics.

Finally, some remarks regarding this newsletter: Grouse News will continue in its present format as long as you – its readership – wish to read (and contribute!), and as long as Tor Kristian Spidsö is willing and able to serve as the GN Editor. Grouse News will be distributed for free by email to all "grousers" within the Galliformes SG and to all others who wish to subscribe. A pdf file will also be available for free download from the Grouse website (<http://www.gct.org.uk/gsg/>). However, there will also be a newsletter of the Galliformes SG that will contain summarized grouse information on the basis of GN, and a Galliformes SG website with a link to the Grouse website. Thus, there will be plenty of opportunity to broaden your grouse perspective and find out how galliform you really are!

Ilse Storch, Co-Chair IUCN-SSC/WPA Galliformes Specialist Group

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CONSERVATION NEWS

A strategy for the conservation of capercaillie (*Tetrao urogallus*) in France

Arnaud Hurstel

According to the national policy for the implementation of action plans for threatened species, the French Ministry of Ecology has launched a national strategy for the conservation of capercaillie. This strategy is driven by the Ligue pour la Protection des Oiseaux (BirdLife France) with the help of the Group Tétrás France (French network of regional NGO concerning by capercaillie conservation) and the collaboration of the Office National des Forêts and Réserves Naturelles de France (French network of nature reserves). A survey committee will associate the Office National de la Chasse et de la Faune Sauvage, hunters, forest owners and land managers.

Two subspecies inhabit the country. *Tetrao urogallus major* is present in the Vosges and Jura mountains, and considered as “endangered” according to regional IUCN red list criteria. The population level is about 100 birds in the Vosges (Hurstel & Preiss 2005; Lefranc & Preiss 2008) and about 300 birds in the French Jura (Duriez & Ménoni 2008). *T. u. major* is legally protected in these two areas. *Tetrao urogallus pyrenaicus* is present in the Pyrénées Mountains and is considered as “vulnerable” according to regional IUCN red list criteria, with a population level of about 4000 birds in the French part of the mountain (Duriez & Ménoni, op. cit.). It is still hunted in this area.

The national strategy for the conservation of capercaillie will be followed by an official action plan for the species.

References

- Duriez, O. & Ménoni, E. 2008. Le Grand Tétrás *Tetrao urogallus* en France: biologie, écologie et systématique. - Ornithos 15: 233-243.
- Hurstel, A. & Preiss, F. 2005. The continuous decline of the Capercaillie (*Tetrao urogallus major*) in the Vosges (France). - Poster. The 10th International Grouse Symposium, 26 September – 3 October, Luchon, France.
- Lefranc, N. & Preiss, F. 2008. Le Grand Tétrás *Tetrao urogallus* dans les Vosges: historique et statut actuel. - Ornithos 15: 244-255.

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RESEARCH REPORTS

Pink Ptarmigan

Karen L. Wiebe & Gernot Segelbacher

Introduction

Ptarmigan (*Lagopus spp.*) are well known for their crypsis, having evolved a seasonal pattern of molts and pigmentation that causes plumage colour to shift dramatically from brown in the summer to white in the winter. Ptarmigan males may even stain their white plumage with soil to become less conspicuous as the snow melts in spring (Montgomerie et al. 2001). The application of such pigments, derived either from the environment or bodily secretions such as preening oil, to feathers in order to change their colour is called *cosmetic plumage alteration* (review in Delhey et al. 2007).

On 17 Jan 2009, I (KW) travelled with a group of birdwatchers to Creighton, Saskatchewan, Canada in order to see some of the large flocks of Willow Ptarmigan (*L. lagopus*) that regularly overwinter there. We enjoyed the hospitality of our hosts who had flocks of 20-30 ptarmigan coming to their yard daily to eat grain spilled from birdfeeders. My attention was piqued by one bird that seemed to have a faint, but distinct, pinkish tinge to its feathers. I didn't manage to get a good photograph but our friends confirmed that they had noticed similar pinkish bird(s) in their yard previously and sent me some photographs they had taken about two weeks earlier (Figure 1, 2).



Figure 1. Willow ptarmigan with pink-tinged plumaged observed at Creighton, Saskatchewan, early January 2009. Photos kindly provided by Harvey Schmidt.

Pink ptarmigan seemed improbable, but a literature search revealed several sources which seemed to confirm their existence. Pinkish ptarmigan were described in freshly shot willow grouse in Germany in 1829 (in Höhn & Singer 1980) but a number of references refer to different field observations and museum skins in Europe and North America (see Höhn & Singer 1980). Unfortunately, the records are anecdotal and little is recorded about the number of pink ptarmigan, or the time of year, or places they were seen. In addition, we found the following quotes about ptarmigan in North America:



"..We saw rock and willow ptarmigan...some with a distinct pinkish cast to their feathers..." -Bob Sundstrom, tour guide leader for Victor Emanuel Nature Tours in a trip report from Churchill, Manitoba, 3-9 Nov, 2008 (posted on the internet at ventbird.com)

".... in fall, they (willow ptarmigan) possess a perceptible, though faint tinge of pink; but this soon fades out" (Grinnell 1914).

"In winter both sexes are white, faintly tinged with pink..." (description of rock ptarmigan in Robbins et al. 1966).



Figure 2. Willow ptarmigan with pink-tinged plumaged observed at Creighton, Saskatchewan, early January 2009. Photos kindly provided by Harvey Schmidt.

Hypotheses

Apparently, pinkish ptarmigan (*L. lagopus* and *L. muta* and *L. leucurus*) have been noted by others in North America and Europe, yet the cause and possible function of this coloration is unknown. Observations suggest the colour is brightest in fall after molt, but fades overwinter. Possible proximate explanations for such colour include:

- 1) It is an artefact of ambient light
- 2) Cosmetic plumage alteration: the feathers are white but carotenoids in preen gland oil stain them light pink
- 3) Carotenoids are deposited in the feathers as they grow, but the colour gradually wears away or fades away after exposure to sunlight.

The first hypothesis can probably be discounted as people have noticed "pink" ptarmigan standing beside white birds in the same flock, at the same time and the same light conditions. The second option is believed to occur in several species of birds such as Great White Pelicans (*Pelecanus onocrotalus*) in which orange-red preen gland secretions are linked to pink-flushed breeding plumage (Stegmann 1956). Höhn & Singer (1980) found that the preen gland oil of 11 pinkish willow ptarmigan appeared colourless. However, circulating carotenoids in a bird's bloodstream and in preen oil are dependent on diet, which in turn may depend on the season. Hence, if ptarmigan have a relatively carotenoid-rich diet such as insects and berries in fall when they are moulting into white plumage, preen gland oil could stain the feathers in fall. As the diet shifts overwinter to a lower quality diet of twigs and buds, the preen gland oil may become colourless and the plumage colour would lose its pinkish caste. Since it is possible that Höhn & Singer (1980) sampled preen gland oil when carotenoids were no longer at high concentrations in the blood, the second hypothesis can't be ruled out. The third hypothesis seems to be true for other birds such as Elegant Terns (*Sterna elegans*) in which the pink flush is caused by red carotenoids deposited loosely



in the feathers (Hudon & Brush 1990, Montgomery 2006). Delhey et al. 2007 conclude that the records in ptarmigan are most likely not due cosmetics, but they suggest an internal origin as the degree of pink flushing seems to be maximal in freshly molted feathers and fades afterward. Although nothing is known about the origin of the pigments it is believed that carotenoids are responsible for the pinkish colour.

Future Observations

We bring these observations forward mainly to generate interest and awareness among fellow ptarmigan lovers and urge you to keep detailed field notes of any pinkish birds you see. Because carotenoids are derived from the bird's diet, it is important to note the location, time of year, and probable food sources available to pink birds. It would be interesting to know if the proportion of pink birds in a population varies geographically, or could be related to an individual's age, sex, or body condition. Finally, if any pink feathers can be recovered from birds, it would be good to have them analyzed in a laboratory to see the type of carotenoids involved, and where in the feather they are located depending on whether they come from preen gland oil, or are imbedded in the protein matrix of the feather itself.

References

- Delhey, K., Peters, A. & Kempenaers, B. 2007. Cosmetic coloration in birds: occurrence, function and evolution. - *American Naturalist* 169: 145-158.
- Grinnell, J. 1914. The willow ptarmigan. - In Ingersoll, E. (ed.). *Alaskan bird life as depicted by many writers*. - National Association of Audubon Societies Publishing, page 64.
- Höhn, E. O. & Singer, P. 1980. Über die Rosafärbung bei Schneehühner. - *Journal für Ornithologie* 121: 287-288.
- Hudon, J. & Brush, A. H. 1990. Carotenoids produce flush in the elegant tern plumage. - *Condor* 92: 798-801.
- Montgomery, R. 2006. Analyzing colors. - In Hill, GE & McGraw, K.J. (Eds). *Bird Coloration*. Harvard University Press.
- Montgomery, R., Lyon, B. & Holder, K. 2001. Dirty ptarmigan: behavioural modification of conspicuous male plumage. - *Behavioral Ecology* 12: 429-438.
- Robbins, C.S., Bruun, B. & Zim, H.S. 1966. *Birds of North America (a golden field guide)*. - Golden Press, New York.
- Stegmann, B. 1956. Über die Herkunft des flüchtigen rosenroten Federpigments. - *Journal für Ornithologie* 97: 204-205.

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Capercaillie habitat benefits from an unusual climatic event in Scotland

Mark Hancock

Studies have shown that a key component of the habitat for western capercaillie *Tetrao urogallus* is forest ground vegetation with abundant bilberry *Vaccinium myrtillus* (Storch 1994; Baines *et al.* 2004; Summers *et al.* 2004). In Scotland, a small and threatened capercaillie population survives, and was recently aided by a major European Union funded conservation project (Kortland 2003). Scottish capercaillie mainly inhabit Scots pine *Pinus sylvestris* forests, where bilberry abundance is thought to be commonly reduced by competition with heather *Calluna vulgaris*, a species that thrives in the oceanic climate of Scotland. Also, heather grows most vigorously at higher light levels than bilberry, and is consequently favoured by the open structure of many Scottish pinewoods, which partly results from their history of exploitation and over-grazing by deer and livestock (Parlane *et al.* 2006).

However, after heather is burnt, cut or trampled by animals, there is sometimes a phase of increased bilberry abundance (Hobbs & Gimingham 1984, Welch 1984). This observation led RSPB, managers of a key Scottish capercaillie site, Abernethy Forest, in the Cairngorms National Park, to test these forms of management. A series of management trials and experiments were set up, using prescribed fire, cattle and mowing, and the effects on bilberry abundance and capercaillie use were measured (Hancock 2003). These trials have given promising results, and methods like prescribed fire and mowing are now being



used, and further evaluated, at a large scale at Abernethy, in order to promote increased bilberry, improve capercaillie brood habitat, and increase Scots pine regeneration (Hancock *et al.* 2005, & in press).

However, the most dramatic, and large-scale change in the ground vegetation at Abernethy that has taken place in recent years, has not been the result of management. Instead, it followed an unexpected climatic event, which caused widespread heather die-back in the Abernethy area, and other parts of the Scottish Highlands, in February 2003 (Hancock 2008). In long-term monitoring areas at Abernethy, about a third of the heather was killed. This was a major impact, given that heather is a dominant plant with (prior to die-back) an average of 60-90% cover over much of the site. Moreover, there was negligible recovery of heather over the subsequent three growing seasons. Die-back was more severe where the topography was flatter or more north-facing, and where heather stems were longer. Thus, there was a strong spatial pattern in the die-back.

Paradoxically, this heather die-back event, which would have caused a lot of concern at many sites, was generally seen as favourable to the management objectives at Abernethy. This is because it has probably been the main cause of increased bilberry abundance over large areas. There was a doubling of bilberry cover in the forest over three years, which was strongly correlated with the fine-scale pattern of heather die-back. Thus, an unexpected climatic event appears to have improved the habitat for capercaillie, just when a major phase of management was being developed to do the same job.

Analysing the pattern of die-back in relation to a range of other data available for the site, suggested that die-back followed severe winter desiccation, caused by extreme low humidity conditions (down to 6%), combined with low temperatures, lack of snow cover, and vulnerability of heather due to its age. Perhaps appropriately, in an era of climate change, unexpected parallels can be seen between these changes and those seen previously at more southerly, lowland sites in the English and Dutch heathlands.

The climate of the Cairngorms, along with many other areas of upland Britain, is predicted to change towards warmer, wetter winters (see Hancock 2008 for references). This might be expected to favour heather. But the weather is also predicted to become more variable. Since the early 1980s, winter humidity minima in the area have become eight times more variable. Heather die-back seen at Abernethy in 2003 shows how such increased climatic variability could have a more powerful effect than the expected changes in mean climatic conditions, and contribute to major, unexpected, vegetation changes in important wildlife habitats.

For further information, please see Hancock (2008), available free online at <http://www.tandf.co.uk/journals/tped>. This article includes a time series of photographs illustrating an example area within Abernethy forest, changing from heather to bilberry abundance over a four-year period spanning the natural heather die-back episode.

References

- Baines, D., Moss, R. & Dugan, D. 2004. Capercaillie breeding success in relation to forest habitat and predator abundance. – *Journal of Applied Ecology* 41: 59-71.
- Hancock, M. 2003. Experimental burning, cutting and cattle grazing in a Scottish native pinewood important for western capercaillie *Tetrao urogallus*. – *Grouse News* 26: 9-10.
- Hancock, M. 2008. An exceptional *Calluna vulgaris* winter die-back event, Abernethy Forest, Scottish Highlands. – *Plant Ecology & Diversity* 1: 89-103.
- Hancock, M.H., Summers, R.W., Amphlett, A. & Willi, J. In press. Testing prescribed fire as a tool to promote Scots pine *Pinus sylvestris* regeneration. – *European Journal of Forest Research*.
- Hancock, M., Egan, S., Summers, R., Cowie, N., Amphlett, A., Rao, S. & Hamilton, A. 2005. The effect of experimental prescribed fire on the establishment of Scots pine *Pinus sylvestris* seedlings on heather *Calluna vulgaris* moorland. – *Forest Ecology and Management* 212: 199-213
- Hobbs, R.J. & Gimingham, C.H. (1984) Studies on fire in Scottish heathland communities: II. Post-fire vegetation development. – *Journal of Ecology* 72: 223-240.
- Kortland, K. 2003. Scottish Capercaillie *Life* Project. – *Grouse News* 25: 8-9.
- Parlane, S., Summers, R.W., Cowie, N.R. & van Gardingen, P.R. 2006. Management proposals for bilberry in Scots pine woodland. – *Forest Ecology and Management* 222: 272-278.
- Storch, I. (1994) Habitat and survival of Capercaillie *Tetrao urogallus* nests and broods in the Bavarian alps. – *Biological Conservation* 70: 237-243.
- Summers, R.W., Proctor, R., Thornton, M., & Avey, G. 2004. Habitat selection and diet of the Capercaillie *Tetrao urogallus* in Abernethy Forest, Strathspey, Scotland. – *Bird Study* 51: 58-68.
- Welch, D., 1984. Studies in the grazing of heather moorland in north-east Scotland. III. Floristics. – *Journal of Applied Ecology* 21: 209-225.

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Age determination of hazel grouse in the south-western limit of its European range.

Marc Montadert & Patrick Léonard

Summary

We studied age criteria to distinguish two age class (immature and > 1 year-old) of hazel grouse in southeast French Alps at the south-western limit of the world species range. The classical age criteria of the ninth and first primary feathers developed in northern populations need to be adapted to indicate accurately the age of studied population. The number of dark bars on the ninth primary appeared to be inefficient as distribution of dark bar numbers overlapped widely between both age classes. Most individuals could be accurately aged using classical first primary criteria, (i.e. width of the tip clear band) completed by an additional one: presence (immature) versus absence (adult) of dark spots in the clear band.

Introduction

Since precursor works of Stenman & Helminen (1974) in Finland and Gaidar & Zhitkov (1974) in Russia, age determination of living hazel grouse *Bonasa bonasia* is based on pattern of the first and ninth primary feathers :

- Width of the clear band of the tip of the first primary: P1 > 2mm for juveniles, ≤ 2mm for adults >1 year old.
- Number of dark bars on 9th primary P9: ≥ 7-8 bars for juveniles, < 7-8 bars for adults.

These age characteristics have been determined in populations belonging to *B. b. bonasia* one of the four subspecies ranging from West Europe to Japan i.e. *B. b. rupestris*, *b. bonasia*, *b. sibirica*, *b. vicinitas*. Yet, Bonczar & Swenson (1992) while comparing these age criteria in four European populations, pointed out that populations varied in feather patterns and then in accuracy of age diagnostic. Juveniles and adults of the Russian population was easily separated by the P9 criteria with a 7 bars threshold when in Finland and Sweden, the diagnostic was more accurate at an 8 bars threshold. The P1 criteria was the best criteria for northern population of *B. b. bonasia* but, in *B. b. rupestris* individuals examined in south Poland, it was unreliable as all individuals had a juvenile-like P1.

As all west European populations are belonging to *rupestris* subspecies, it appeared necessary to check for age criteria in this part of the species range.

Materials

During a telemetry study of Hazel Grouse in South French Alps we captured, weighted and examined 97 hazel grouse in autumn (mid-August to October) and spring (March to April) between 1998 and 2006, (see Montadert & Léonard (2003) for more details on locations and habitat description). This region is located at the south-eastern limit of the species range and was recently colonized by hazel grouse since the fifties.

Among this sample, the plumage pattern of 38 juveniles of known age was checked to test for P1 and P9 criteria. These juveniles were captured from mid-August to beginning of September when general appearance (light weight, state of moult) made age recognition unmistakable.

Twelve other individuals captured in September-October were determined as juveniles following criteria achieved on 38 juveniles of know age. Forty-seven individuals were assigned to be adults using plumage criteria among with 25 captured in autumn.

As no juveniles in autumn were heavier than 400 gr. we considered that 11 adults of more than 400 gr. in autumn were proved as adults. Two other complete carcasses of adult-like plumage individuals have been examined to search for bursa fabricius.

Eight individuals from North French Alps, a region always inhabited by hazel grouse, have also been examined to control criteria validity in another part of the alpine range.

Results

Weight.

In August most of the juvenile hazel grouse were distinguishable from adults by weight, with a weight of usually less or equal to 310 gr. Only 3 of 22 juveniles captured between 23 and 27 august weighted 350, 370 and 380 gr. respectively, which is in the range of summer weight of 4 adult females, but still significantly lower (Mann-Whitney Test, W = 8.5, P = 0.012, Table 1).

Later in September-October, weights of juveniles were still statistically lower than adult (Mann-Whitney Test, W = 56, P < 0.001) but a large overlap of adult and juvenile weights between 370 and 400 gr. prevented use of weight for age diagnostic in autumn (Figure 1).



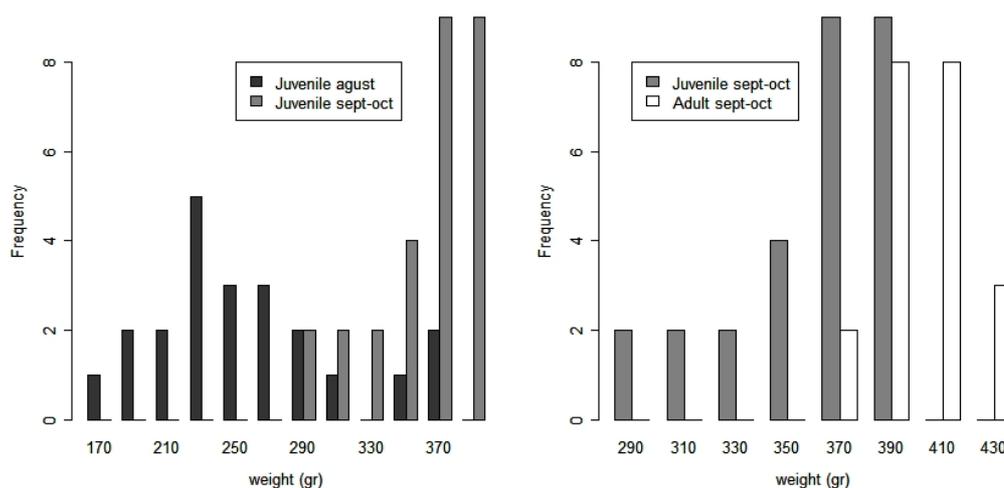


Figure 1. Distribution of juvenile and adult weights of hazel grouse in autumn in South French Alps.

Weight of juveniles from mid-August to end of October showed a steep increase in August. The first winter weight of juveniles was achieved rapidly in September and then remained stable (Spearman correlation, $\rho = 0.2037$, $P = 0.30$). Adult weight in September-October was stable during the period (Spearman correlation, $\rho = 0.17$, $P = 0.45$). The 4 adult weights in August corresponded to 4 females with broods and was lower than adult weight in September-October (Mann-Whitney Test, $W = 0$, $P = 0.002$) (Figure 2, Table 1).

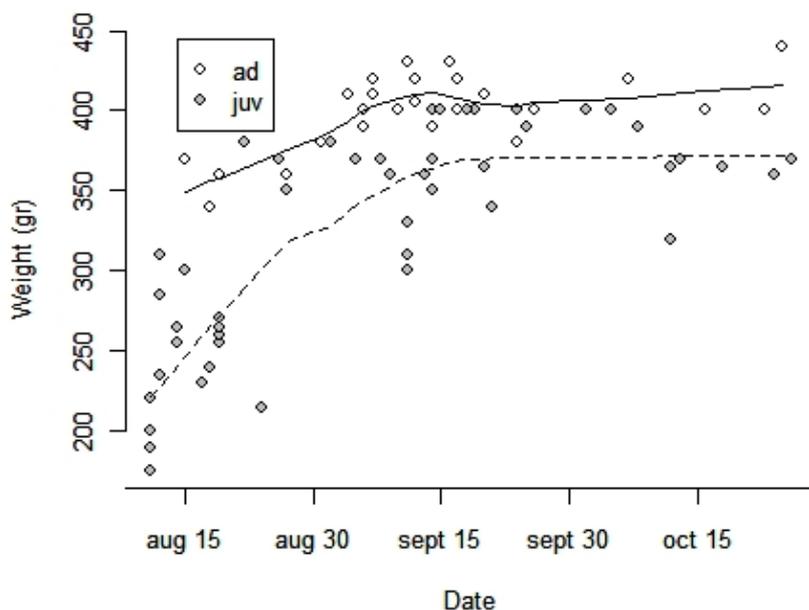


Figure 2. Weigh variation of juvenile and adult hazel grouses in autumn in South French Alps. Continuous and dotted lines are smooth curves fitted to the data of adult and juvenile respectively.

Table 1. Autumn weight of juvenile and adult hazel grouses in South French Alps.

	N	Mean \pm sd	Min.	Max.
Adult in Sept-October	21	407 \pm 16	380	440
Adult female in August	4	358 \pm 13	340	370
Juvenile in Sept-October	28	366 \pm 31	300	400
Juvenile in August	22	261 \pm 54	175	380



Plumage pattern.

The P9 criteria was checked on the 35 juveniles of known age (56 wings examined) and compared to adults (77 wings of 47 individuals) (Figure 3a). The P9 criteria were clearly inefficient to separate juvenile from adult. Only wings with more than 8 bars could be definitely assigned to juveniles but they represented only 9% of juvenile wings.

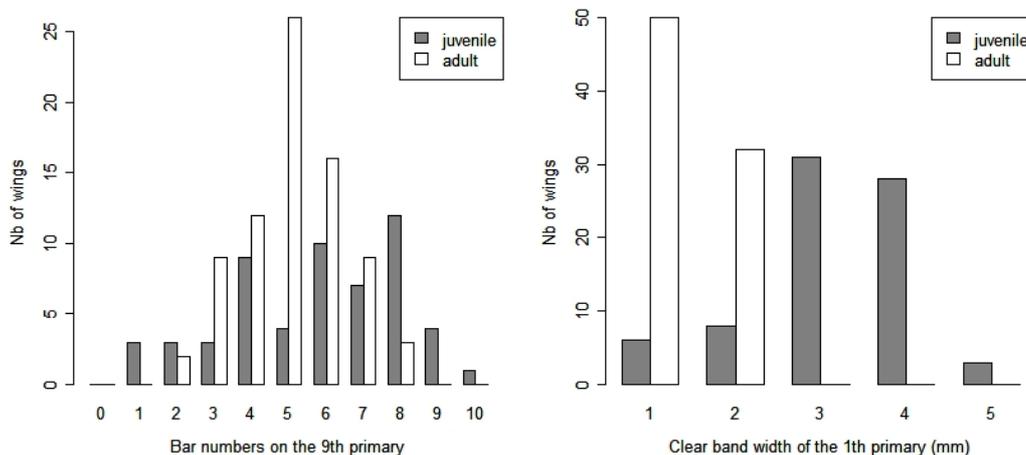


Figure 3. Primary feather patterns of juvenile and adult hazel grouse in South French Alps. (a) Distribution of the number of dark bars on the ninth primary. (b) Distribution of clear band width on the tip of the first primary.

Furthermore, as already mentioned by Bonczar & Swenson (1992), the number of dark bars could differ between wings of the same individual, leading some to be adult-like in one side and juvenile on the other! Difference in bar number between the two wings tended to be higher in juveniles (mean=1.4, n=25) than in adults (mean=0.88, n=26) (Mann-Whitney Test, $W = 421.5$, $P = 0.06$) (Figure 4).

P1 criteria appeared much more accurate. All wings with clear band of more than 2 mm width could be rightly assigned as juvenile. All adult wings had a clear band width of less or equal to 2 mm (Figure 3b). Two adults of known age controlled by absence of bursa fabricius had 5 and 3 P9 dark bars respectively, and a P1 band width < 2 mm.

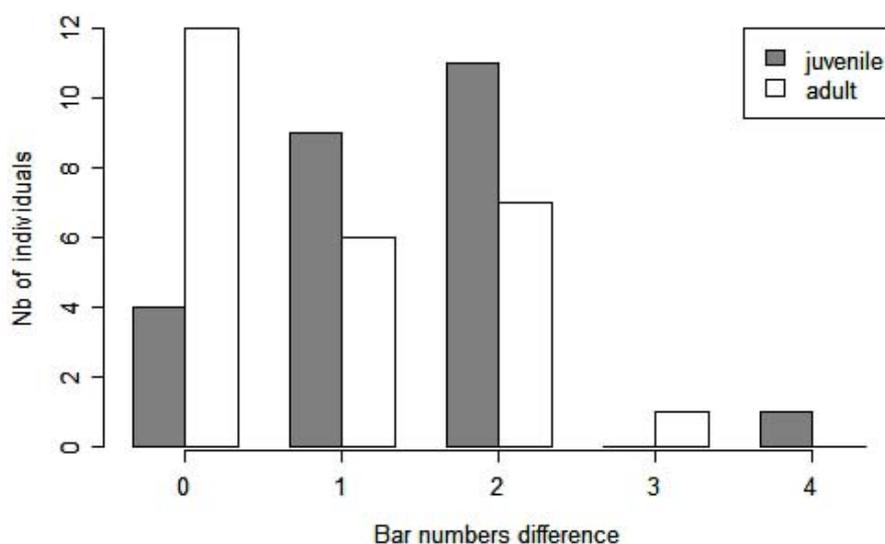


Figure 4. P9 bar number difference between both wings of the same individual in juvenile and adult hazel grouse in South French Alps.



However, using only the P1 band width criteria on both wings, 16 % of juveniles and 15% of adults should have been wrongly age determined. Careful check of clear band pattern of P1 revealed other characteristics useful to complete age diagnostic. Juveniles clear band limit was irregularly and fuzzy delimited and presented small dark spots. Adult clear band limit was regularly and sharply delineated without dark spots (See Figure 5, for typical pattern). Using the P1 spot criteria enhance strongly the predictive value of age diagnostic (Table 2). Only 2 of 38 juveniles (5%) and 6% of adults were finally wrongly assigned.

Table 2. Distribution of adult and juveniles hazel grouses with both wings examined according to P1 age criteria. Numbers of individuals in brackets.

Clear band width of both wings	Adult				Juvenile					
	≤ 2 mm		> 2 mm		≤ 2 mm			> 2 mm		
	100% (35)		0%		16% (6)			84% (32)		
Presence of dark spots in clear band	No spot	Spots only in one wing	Spots in two wings	-	No spot	Spots only in one wing	Spots in two wings	No spot	Spots only in one wing	Spots in two wings
	97% (34)	3% (1)	0	-	33% (2)	0	66% (4)	0	0	100% (32)

Figure 6 shows a key to age determination of hazel grouse in South French Alps. This third criterion was not mentioned in previous work on age criteria of northern populations but appeared essential to achieve a valid age diagnostic for our studied population.

Plumage pattern of hazel grouse in North Alps.

We examined 8 individuals (1 juvenile and 7 adults) of known age based on birds weight in September-October (individuals of less than 370 gr. or more than 400 gr. were classified as juvenile and adult respectively). All 7 adults had less than 8 dark bars on the ninth primary and a clear band width of less than 2 mm without dark spots. The juvenile had 8 dark bars on P9 and a typical large (3 mm) and spotty clear band on P1.

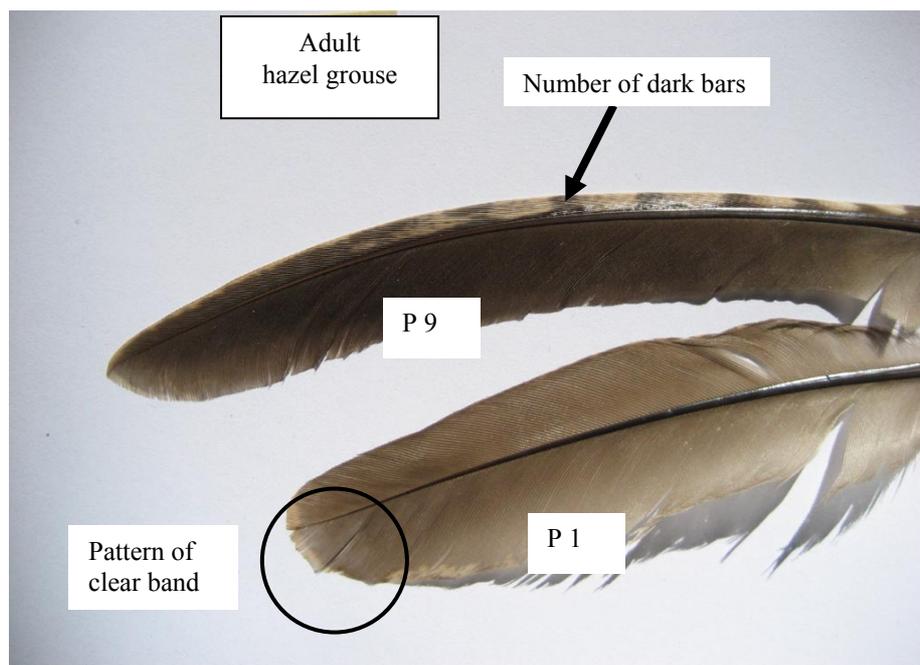
Conclusion

Present work revealed that French Alpine hazel grouse population should be adequately aged with first primary pattern. Yet, validity of these age criteria in other West European populations remains to be tested.

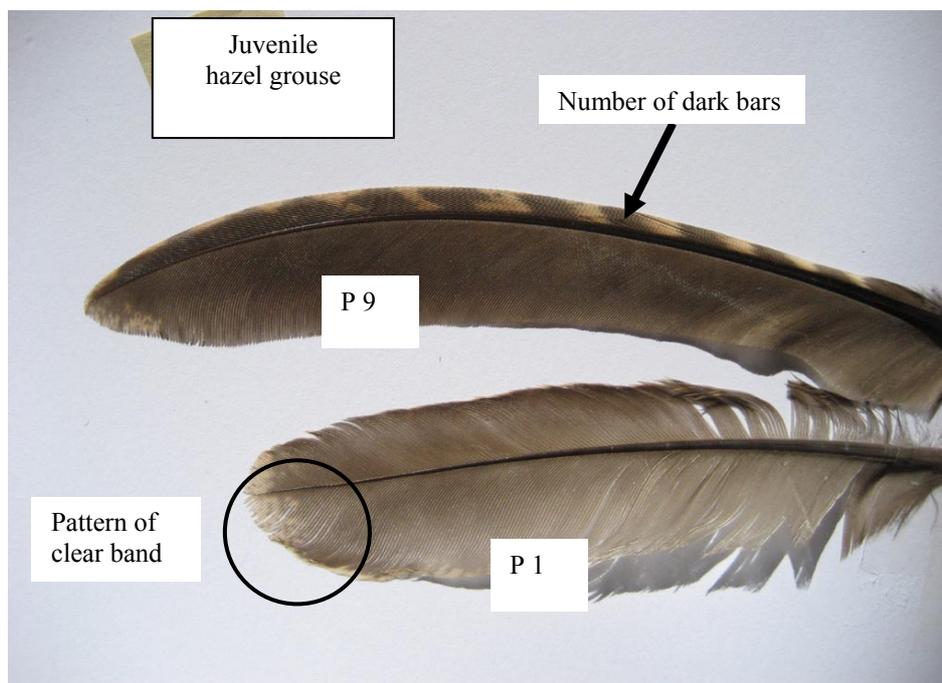
Acknowledgements

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P 9: always less than eight dark bars. **P 1:** Clear band width ≤ 2 mm with regular and clear limit. Absence of dark spots in clear band.



P 9: sometime ≥ 8 dark bars. **P 1:** Clear band width ≥ 2 m with irregular and fuzzy limit. Presence of small dark spots in clear band

Figure 5. Picture of typical pattern of first and ninth primary of hazel grouse in South French Alps.



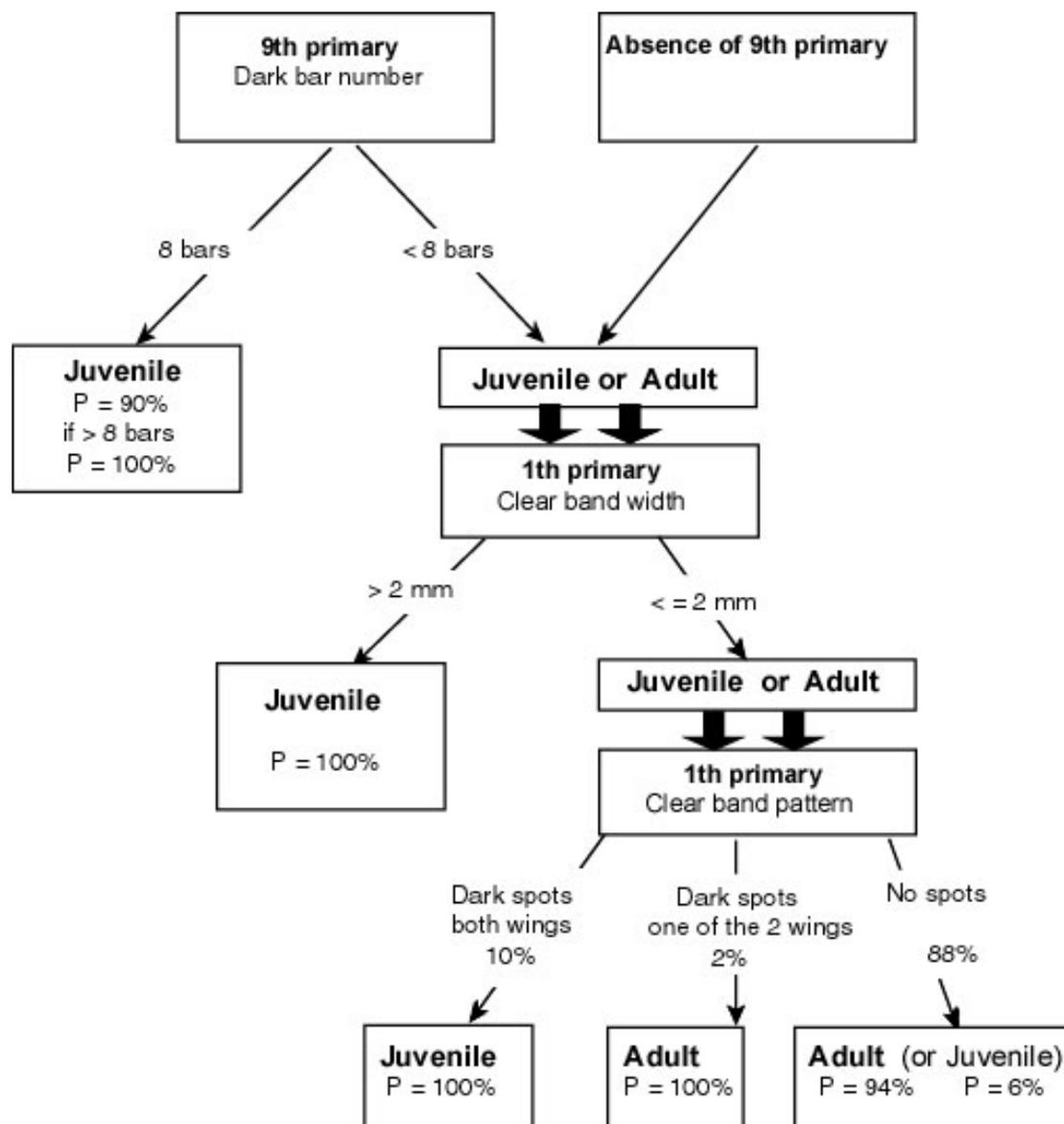


Figure 6. Determination tree of hazel grouse age in South French Alps. *P* give probability of right diagnostic for each final block (for instance an individual with ≥ 8 bars on the ninth primary have 90% probability to be a juvenile). Percentage indicated on arrows give the proportion of individuals showing this pattern.

References

- Bonczar, Z. & Swenson, J.E. 1992. Geographical variation in spotting patterns on Hazel Grouse *Bonasa bonasia* primary feathers: consequences for age determination. - *Ornis Fennica* 69: 193-197.
- Gaidar, A.A. & Zhitkov, B.M. 1974. Method of determining age of Hazel hen. - *Soviet Journal of Ecology* 5: 290-291.
- Montadert, M. & Léonard, P. 2003. Survival in an expanding hazel grouse *Bonasa bonasia* population in the southeastern French Alps. - *Wildlife Biology* 9: 357-364.
- Stenman, O. & Helminen, M. 1974. Aging method for hazel grouse (*Tetrastes bonasia*) based on wings (In Finnish with English summary). - *Suomen Riista* 25: 90-96.

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Are forest and grassland grouse on different life history tracks?

Michael A. Patten

Life history theory predicts an inverse relationship between fecundity and survivorship, traits that cannot be maximized simultaneously, leading to a tradeoff (Partridge & Sibly 1991, Zera & Harshman 2001, Roff 2002). This well established tradeoff is the rule in birds (Ricklefs 1983). Body size and life span also tend to be correlated positively in birds (Lindstedt & Calder 1976, Sæther 1989). Moreover, such patterns tend to have a strong phylogenetic signal (Sæther 1989, Brawn et al. 1995)—birds within a particular taxonomic order or family tend to exhibit similar patterns in life history traits.

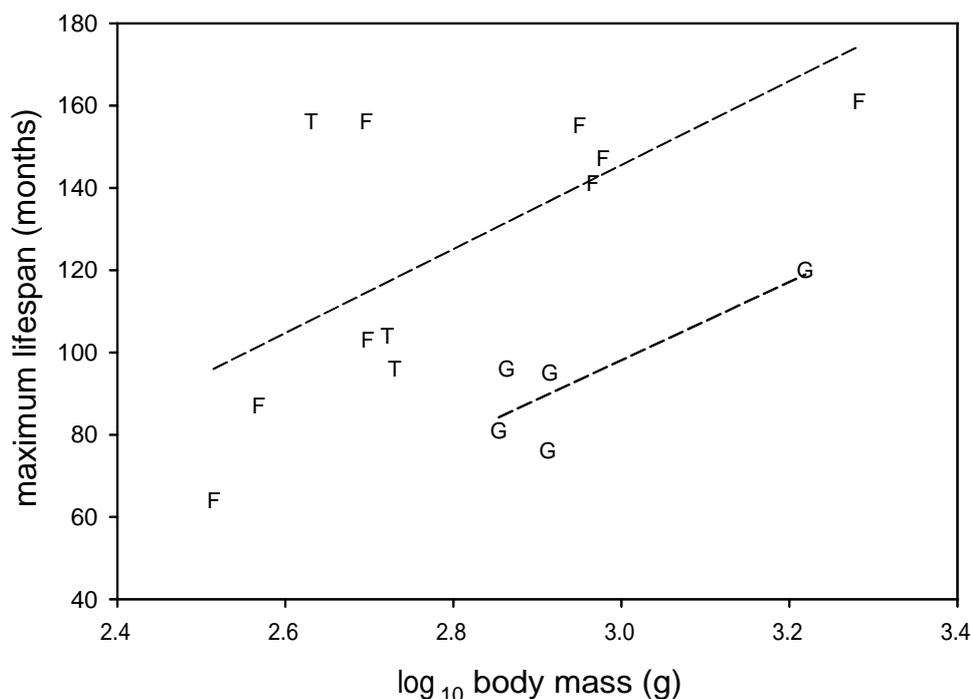


Figure 1. Maximum life span as a function of body mass for forest (F), tundra (T), and grassland (G) species of grouse. Note how tundra species—the ptarmigan (*Lagopus* spp.)—clump with the forest species whereas the grassland species have a separate but parallel relationship.

The grouse (Phasianidae: Tetraoninae) are characterized by large body size, high annual reproductive output, and, for their size, short life span. Because the grouse comprise a distinct subfamily (or a family, depending on one's taxonomy), it might be expected that all species have the same relationship between body size and life span. Yet I discovered that this was not the case while researching background for a note on life span in the lesser prairie-chicken *Tympanuchus pallidicinctus* (Wolfe, Sakoda, and Patten in prep.) and specifically how a published claimed maximum (Clapp et al. 1982) is almost certainly erroneous. For this background research I compiled a table of published maximum life spans for most grouse species (and because of their striking morphological distinctness I treated Attwater's prairie-chicken, *Tympanuchus cupido attwateri*, and the red grouse, *Lagopus l. scoticus*, separately). When plotted against body size an interesting pattern emerged (Figure 1): maximum life span was related positively to mean body size, but only if grouse of forest or tundra habitats ($r^2 = 0.45$) were treated separately from grouse of temperate grassland habitats ($r^2 = 0.71$). For each group, slopes of regression lines were similar, but intercepts differed markedly (forest/tundra: $y = 102.1x - 160.9$; grassland: $y = 95.1x - 187.1$). But why?

Such a difference in intercepts suggests that species in each group of species have distinct evolutionary histories. It is possible that the forest and tundra grouse and the grassland grouse differ in their evolutionary history. *Centrocercus* (the sage-grouse) and *Tympanuchus* (the prairie-chickens)—the grassland grouse—form a clade with *Dendragapus* (the blue grouse complex), a forest grouse, yet separate from other species of forest and tundra grouse (Drovetski 2002), meaning that they share a



phylogenetic history. Yet this common phylogenetic history is perhaps an unsatisfying explanation inasmuch as the blue grouse complex shares a life history pattern with its fellow forest grouse, not with the grassland grouse with which it shares a clade. Accordingly, even though prior research has suggested a role for habitat in grouse life history (e.g., Jönsson et al. 1990), we may need to look elsewhere for a fuller explanation of the prevailing pattern.

Looking beyond habitat preference, then, it is possible that an explanation lies more in differences in breeding system. Grouse species can be grouped into three types of breeding system or “social structure” (Wiley 1974, Wittenberger 1978): promiscuous species that lek, promiscuous species with dispersed males, and species that form pair bonds. Re-plotting body mass against maximum life span with new labels for these three groups yields a comparable pattern with parallel slopes for lekking species (Figure 2 $y = 143.0x - 318.5$, $r^2 = 0.58$) versus dispersed or paired species ($y = 137.3x - 255.4$, $r^2 = 0.37$), but, as before, intercepts differ markedly. We again see separate life history tracks, but this time the difference is driven by breeding system. Moreover, in either case the expected pattern—derived from life history theory—of a positive relationship between body size and life span would appear weaker ($y = 69.3x - 66.9$, $r^2 = 0.17$) had we lumped all grouse species together irrespective of habitat or breeding system, as has been done in prior studies (e.g., Zammuto 1986).

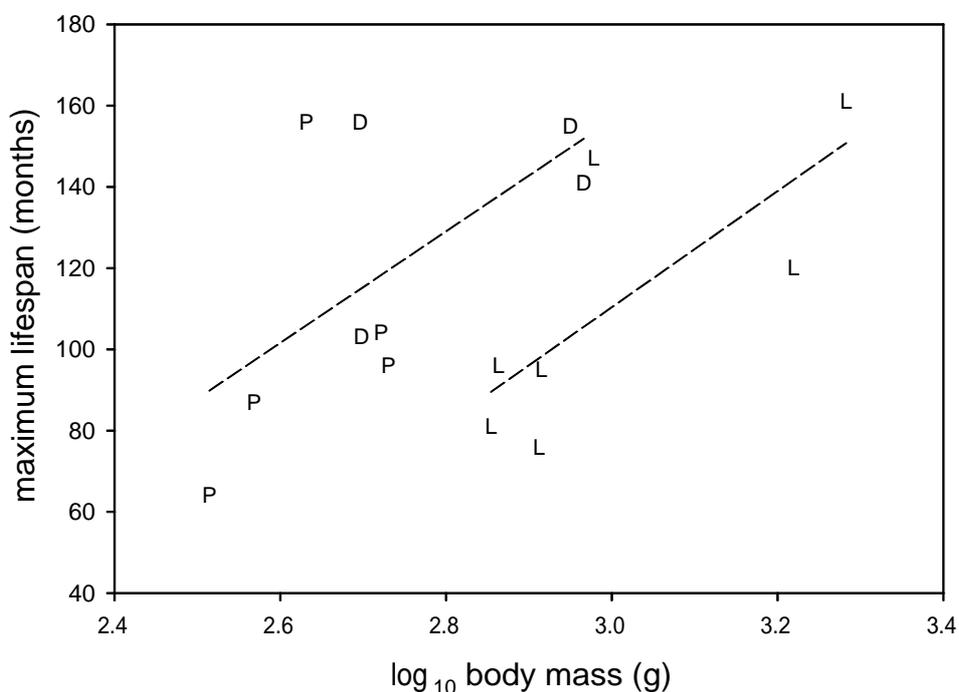


Figure 2. Maximum life span as a function of body mass for grouse species that form leks (L), have dispersed males during courtship (D), and form pair bonds (P). The resultant split pattern resembles that in Figure 1, but in this case the division is between lekking species and dispersed/paired species.

If the evolution of lekking caused a shift to a parallel track in the relationship between body size and life span, what about shifts in other life history traits related to body size? Another key prediction from theory is that clutch size should decrease with increased body size. Prior work has reported such a pattern across North American gamebirds (Zammuto 1986), including grouse, and across galliforms in general (Kolm et al. 2007). For the Tetraoninae alone, plotting clutch size against body mass yields an exceedingly weak negative relationship ($y = -1.2x + 11.6$, $r^2 = 0.02$), yet separating the subfamily by breeding system better yields the stronger negative relationships predicted by theory (Figure 3; dispersed/paired: $y = -2.1x + 13.4$, $r^2 = 0.03$; lekking: $y = -7.8x + 32.3$, $r^2 = 0.45$), although in this case slopes are not parallel and only lekking species exhibit a convincingly strong pattern. The weak relationship in dispersed/paired species is to a considerable extent driven by two species, the Chinese grouse (*Bonasa sewerzowi*) and the white-tailed ptarmigan (*Lagopus leucurus*), both of which have smaller clutch sizes than expected for their size.



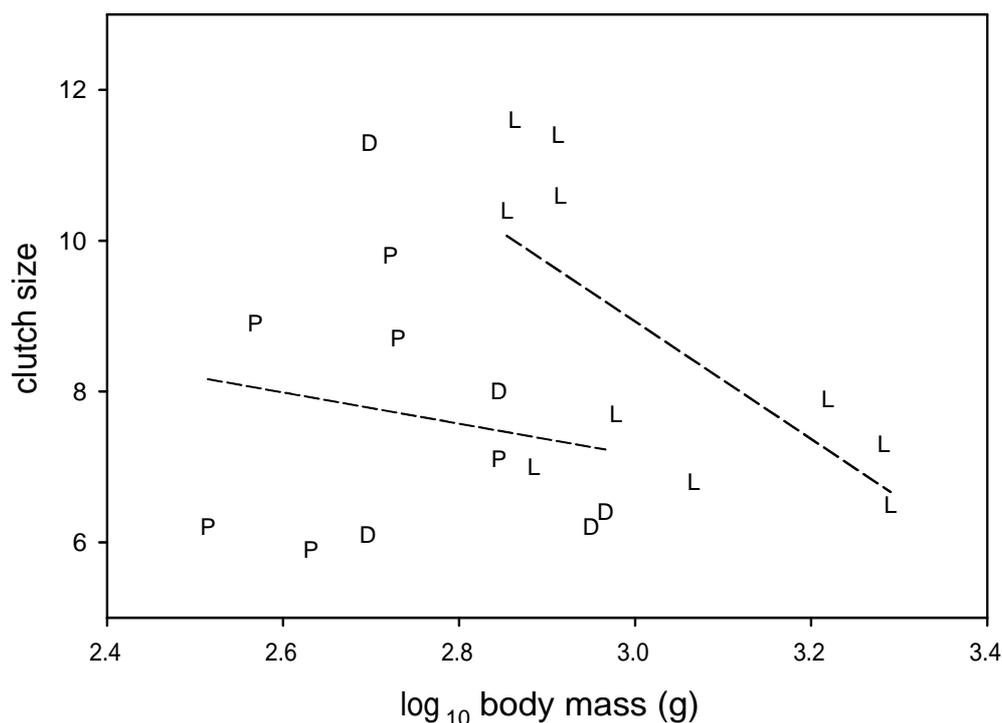


Figure 3. Mean clutch size as a function of body mass for grouse species that form leks (L), have dispersed males during courtship (D), and form pair bonds (P). In this case lekking species exhibit the strong negative association predicted by life history theory, but species with the other breeding systems exhibit only a weak association.

Life history theory predicts tradeoffs between clutch size and the extent to which males help rear young, in that “Females could be expected to adjust clutch size or other life history traits (e.g. seasonal timing of reproduction) in relation to the level of anticipated male parental care” (Svensson & Sheldon 1998). In the Tetraoninae, however, this pattern does not hold. Males of species that disperse during courtship provide no parental care, so in this respect they do not differ from males of species that lek. If we separate grouse by extent of male parental care (Wiley 1974, Wittenberger 1978), we continue to see a strong negative relationship for species with no care (Figure 4; $y = -4.3x + 21.2$, $r^2 = 0.15$) but the relationship for species that pair bond, and in which males provide at least some care, is positive (Figure 4; $y = 3.4x - 1.2$, $r^2 = 0.07$)! Evidently, the degree to which males assist in nest defense or chick-rearing does not provide a good explanation of clutch size variation relative to body mass, at least in light of life history theory.



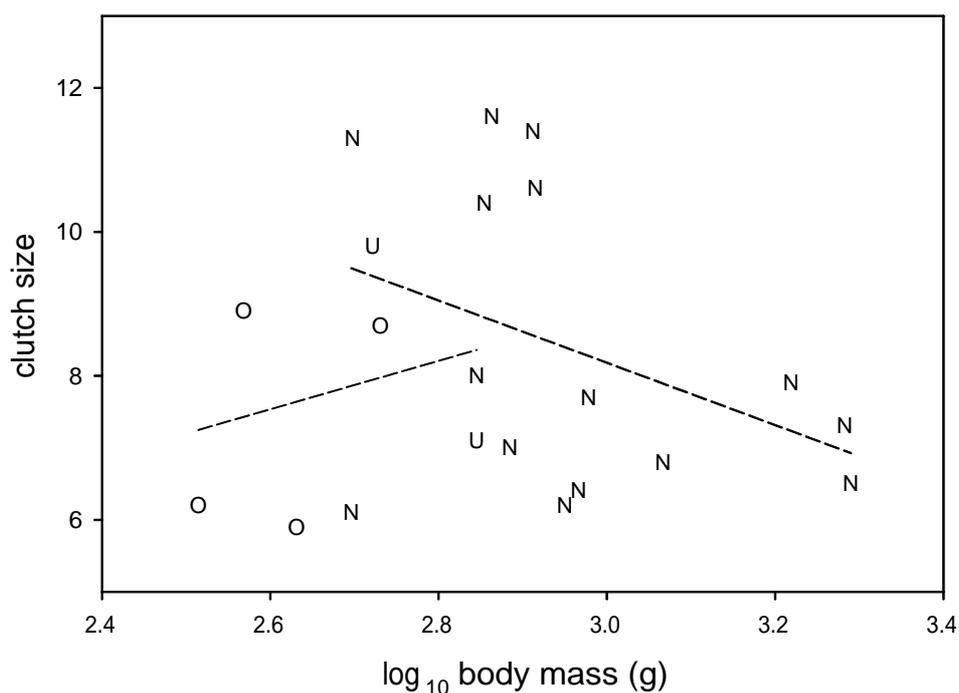


Figure 4. Mean clutch size as a function of body mass for grouse species in which males never provide parental care (N) versus species that occasionally (O) or usually (U) provide at least some care, including nest guarding.

I conclude that although it appears that species of grassland grouse are on a different life history track from species of forest and tundra grouse, the underlying cause is not one of habitat differentiation. Rather, evolution of lekking in some grouse has led to divergent life histories. Expected relationships hold for both life span and clutch size, but these relationships are on roughly parallel tracks associated with breeding system. Expected relationships are not evident, by contrast, relative to the extent of male parental care. Clearly, more work is needed in teasing apart life history divergence within the Tetraoninae. Life history theory, both in terms of predicted tradeoffs and directions of associations, has been supported by various empirical studies in the grouse (e.g., Wiley 1974, Zammuto 1986, Jönsson et al. 1991, Patten et al. 2005, Kolm et al. 2007). It remains to be determined, however, if patterns hold throughout the subfamily or if evolution has produced divisions within the subfamily.

References

- Brawn, J.D., Karr, J.R. & Nichols, J.D. 1995. Demography of birds in a Neotropical forest: Effects of allometry, taxonomy, and ecology. – *Ecology* 76: 41–51.
- Clapp, R.B., Klimkiewicz, M.K. & Kennard, J.H. 1982. Longevity records of North American birds: Gaviidae through Alcidae. – *Journal of Field Ornithology* 53: 81–124.
- Drovetski, S.V. 2002. Molecular phylogeny of grouse: Individual and combined performance of W-linked, autosomal, and mitochondrial loci. – *Systematic Biology* 51: 930–945.
- Jönsson, K. I., Angelstam, P. K. & Swenson, J. E. 1991. Patterns of life-history and habitat in Palaearctic and Nearctic forest grouse. – *Ornis Scandinavica* 22: 275–281.
- Kolm, N., Stein, R.W., Mooers, A.Ø., Verspoor, J.J. & Cunningham, E.J.A. 2007. Can sexual selection drive female life histories? A comparative study on Galliform birds. – *Journal of Evolutionary Biology* 20: 627–638.
- Lindstedt, S.L. & Calder, W.A. 1976. Body size and longevity in birds. – *Condor* 78: 91–94.
- Lucchini, V., Höglund, J., Klaus, S., Swenson, J. & Randi, E. 2001. Historical biogeography and a mitochondrial DNA phylogeny of grouse and ptarmigan. – *Molecular Phylogenetics and Evolution* 20: 149–162.
- Partridge, L. & Sibly, R. 1991. Constraints in the evolution of life histories. – *Philosophical Transactions of the Royal Society of London, Series B* 332: 3–13.



- Patten, M.A., Wolfe, D.H., Shochat, E. & Sherrod, S.K. 2005 Habitat fragmentation, rapid evolution and population persistence. – *Evolutionary Ecology Research* 7: 235–249.
- Ricklefs, R.E. 1983. Comparative avian demography. – *Current Ornithology* 1: 1–32.
- Roff, D.A. 2002. Life history evolution. – Sinaur Associates, Sunderland, Massachusetts, 2nd edition.
- Sæther, B.-E. 1989. Survival rates in relation to body weight in European birds – *Ornis Scandinavica* 20: 13–21.
- Svensson, E. & Sheldon, B.C. 1998. The social context of life history evolution. – *Oikos* 83: 466–477.
- Wiley, R.H. 1974. Evolution of social organization and life-history patterns among grouse. – *Quarterly Review of Biology* 49: 201–227.
- Wittenberger, J.F. 1978. The evolution of mating systems in grouse. – *Condor* 80: 126–137.
- Zammuto, R.M. 1986. Life histories of birds: Clutch size, longevity, and body mass among North American game birds. – *Canadian Journal of Zoology* 64: 2739–2749.
- Zera, A.J. & Harshman, J.G. 2001. The physiology of life history trade-offs in animals. – *Annual Review of Ecology and Systematics* 32: 95–106.

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SNIPPETS

5th European Conference on black grouse 5th – 9th October 2009.

The Polish Society for Birds Protection (Polskie Towarzystwo Ochrony Ptaków (PTOP)) is pleased to invite you to the 5th European Conference Black Grouse Endangered Species. The conference will be held in Białowieża, Poland, between 5th and 9th October 2009. We hope that the conference will be a great opportunity to discuss the present situation of the black grouse in Europe and further initiatives concerning the protection of this species and its habitats. The official language of the conference will be English.

Registration before 31st July the conference fee will be 100 Euro, and after 31st July it will be 120 Euro. Student fee is 50 and 60 Euro respectively and accompanying persons 40 and 50. The final registration deadline is 31st August.

A field excursion on Wednesday 7th October will visit two black grouse refuges Rabinówka and Krynki. A visit in the Gallery of the Forest Headquarter Krynki and Mosque in Kruszyniany is also scheduled. Good hiking boots are recommended.

Anna Suchowolec, The Polish Society for Birds Protection (Polskie Towarzystwo Ochrony Ptaków (PTOP)), Ciepła 17, 15-471, Białystok, Poland. blackgrouse@ptop.org.pl

Proceedings of the 11th Conference in Whitehorse, Canada 2008

Proceedings of the 11th International Grouse Symposium will be printed as a special volume of Studies in Avian Biology on the Ecology, Conservation and Management of Grouse. So far 18 of the 40 manuscripts that have been proposed for consideration for the volume are received. If you are still working on your manuscript, remember that it must be properly formatted for Studies in Avian Biology. The set of instructions is posted on the website of the Cooper Ornithological Society: <http://www.cooper.org/publications/sab.htm>.

Download the Instructions for Authors and be sure to follow them closely in preparation of your manuscript. Target page limits for manuscripts will be 30 pages of text (7500 words), including the title page, abstract through literature cited, and figure legends. Please embed the figures in the manuscript and do not send them separately. It would be helpful if you would include the surname of the first (or corresponding) author in the filename.

Submit your manuscripts to Brett K. Sandercock at bsanderc@ksu.edu who will reply with acknowledgement of receipt. If you have not yet heard from us you can check the list below to confirm that your manuscript has been received. Feel free to get in touch if you have any questions that are not addressed by the instructions above. Thanks for your interest in the volume, and we'll keep you posted as the reviews start to come in.

Of the 18 mss submitted so far a total of 14 mss are from North America, 3 from Europe, and 1 from Asia. The manuscripts are covering a wide range of subjects of grouse biology and ecology.

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Per Wegge Jubilee Symposium

Evenstad, Norway, 5th – 8th August 2009

Per Wegge will become 70 years old this autumn. This year he has worked with woodland grouse at Varaldskogen for 30 years. On behalf of his present and former students I will welcome you to Hedmark University College, Evenstad 5th – 8th August.

Per will teach us what he has learnt about capercaillie and black grouse during those 30 years, and he will tell us what he now is most curious to know more about. Then we will have 5 sessions following up his interests. The themes are:

- Effects of climate change on boreal forest grouse
- Natural and man-made forest succession and boreal forest grouse
- Effect of hunting on grouse – what do we know?
- Role of predation on grouse and implications for management
- Temporal and spatial variation in grouse population dynamics - implications for future management

We will have keynote speakers on the themes. After the talks we will like to drink coffee and discuss posters of the theme for a short time before we will discuss the theme. We will have a prepared chairman, and we will ask 3 experts to be in a discussion panel.



It is planned to make a special issue in a scientific journal. Tomas Willebrand is willing to be the editor. We will ask for posters on the different themes. If we also get papers on the themes, that will be perfect. We hope that the discussions will be extremely interesting, and will therefore ask the chairmen in cooperation with the panel members to produce papers based on the discussions.

I really get excited when I think about this event. I think it will become both interesting and fun. I am just sorry that we cannot accommodate more than 70 persons. But those 70 will be great grouse! More information and registration: Contact Lasse Asmyhr lasse.asmyhr@hihm.no.

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