

## RESEARCH REPORTS

### Inter-specific aggression between red grouse, ptarmigan and pheasant Adam Watson

Fights or other aggressive encounters between grouse species or between grouse and pheasants have seldom been recorded. Below, I describe some encounters between red grouse *Lagopus lagopus scoticus* and ptarmigan *Lagopus muta*, and between red grouse and pheasants *Phasianus colchicus*. They throw light on inter-specific behaviour in relation to habitat.

#### Red grouse and ptarmigan

In Scotland, Gordon (1912) described red grouse and ptarmigan showing inter-specific aggression over patches of their food plant, ling *Calluna vulgaris*, in deep snow. When both species fed close together on days with deep snow in north-east Scotland, I reported occasional "brief disputes in which one bird avoids another or drives it from a patch of snow-free vegetation" (Watson 1972). These instances occurred when ptarmigan had left their usual alpine habitat above 760 m altitude and moved downhill into typical habitat for red grouse around 600–700 m, and when snow was not so deep as to cause the red grouse to leave. Most disputes were over small patches of ling projecting above the snow.

Out of a total of 33 such encounters that I observed on upper moorland near Braemar in Aberdeenshire (excluding repeated encounters by the same individuals within the observation period), a cock red grouse displaced a cock ptarmigan in 20 cases, both cocks withdrew in three, and a cock ptarmigan displaced a cock red grouse in 10. This suggests a slight advantage to red grouse, but all encounters were in habitat typical for red grouse, though atypical for ptarmigan. Cocks also displaced hens within species, and hens displaced hens within species, but I saw no instance where a cock (or hen) of one species displaced a hen (or cock) of the other species from food.

Each encounter usually lasted 1–2 seconds, during which one bird threatened and the other withdrew. If one was already at the food, it sometimes kept an approaching bird away by threatening, but withdrew if the other showed more aggression. Sometimes the threatened bird did not withdraw and an encounter lasting up to 5–10 seconds resulted, but this was unusual. Seven such brief encounters were on packed snow devoid of food, where birds came within about 0.5 m, and only two of these were won by red grouse. This suggests a slight advantage to ptarmigan, which in such a situation were far less conspicuous in their white winter plumage than red grouse in their dark feathering, and where the packed snow devoid of food bore more resemblance to alpine land than to moorland.

Watson (1972) noted that cocks of both species "sometimes interact when both have territories on the same area, with ground songs, flight songs directed towards a cock of the other species, and occasionally prolonged 'walking-in-line' encounters, facing and fighting". As in territorial interactions within species, encounters were fairly evenly matched, and no cock won in the sense of driving away the cock of the other species. All these territorial inter-specific encounters were in February–May.

An example was on 2 April 1964, when a cock ptarmigan and a cock red grouse 'walked-in-line' for two minutes, with much crowing on the ground and postures of attack intention and escape intention. This was at 750 m on Meall Odhar south of Braemar, where alpine and moorland zones meet. When disturbed by me, the two cocks flew off together but separated a few seconds later. On the nearby hill the Cairnwell at 750 m on 1 May 1965, I saw a cock grouse and a cock ptarmigan giving an aerial song each, in response to one another. The grouse responded to the appearance of the ptarmigan about 50 m away on the hillside below, by flying towards the ptarmigan, whereupon the ptarmigan then flew towards the grouse. After a minute when both stood alert at 9 m apart, they walked away at the same moment. In this case, the territorial cock grouse and the territorial cock ptarmigan occupied the same ground.

An interesting autumn case was at Meall Odhar on 17 September 1988, a year when both species occurred at high density there. Encounters took place on the lower third of the slope, where small patches of tall ling that afforded habitat for red grouse occurred like islands in the midst of short vegetation suitable for ptarmigan habitat. All ground below held tall ling suited to red grouse, and all ground above was entirely ptarmigan habitat. While I watched a loose flock of 14 ptarmigan of both sexes, some feeding and some resting, six standing ptarmigan cocks gave frequent crowing calls indicating attack intention, three of them made brief song flights and then rejoined the flock, and several at times showed 'jumping' (Watson 1972).

A cock red grouse on a ling-covered hillock surrounded by ptarmigan habitat walked up to a hen ptarmigan, which ran out of his way. At once a cock ptarmigan, croaking loudly in a song flight, flew towards the cock red grouse. As soon as the cock ptarmigan started his song flight, the cock red grouse



ran off the hillock top into a groove where it crouched submissively. The cock ptarmigan walked away, evidently having not seen the crouching red grouse. Next the cock red grouse rose from the groove and gave a beck on the ground. The ptarmigan immediately ran to the spot, whereupon the cock red grouse walked away without pursuit by the ptarmigan, and did not return.

Red grouse are con-specific with willow grouse. In an Alaskan hill valley where willow grouse and ptarmigan occupied territories on the same area, Moss (1972) recorded interactions between cocks of the two species shortly after they had taken territories in spring. Interactions ranged from a cock responding to a call by another cock, to one case of fighting. On all nine occasions when Moss could decide a clear outcome, a willow grouse dominated a ptarmigan, although on four of them the ptarmigan initiated the dispute. In this case, however, willow grouse could take territories sooner because their habitat at lower altitude became snow-free earlier, whereas ptarmigan tended to take temporary territories close to willow grouse until the snow had melted on the higher ground. Hence it could be argued that ephemeral conditions of habitat caused ptarmigan to be less aggressive than they might have been if the alpine land higher up had been snow-free.

Willow grouse and red grouse are larger and heavier than ptarmigan in the same region. However, although cock and hen black grouse *Tetrao tetrix* exceed the size and weight of cock red grouse, cock red grouse dominated cock and hen black grouse in 11 out of 12 observed encounters in the wild on moorland in north-east Scotland (Parr, Watson & Moss 1993). In Glen Esk I once saw a captive cock red grouse being put into a nearby greyhen's cage in a garden during April 1960. He immediately attacked and pecked the greyhen, which crouched in a submissive posture and died within a minute, presumably of shock.

### Red grouse and pheasant

Aggression by a bird displacing a bird of another species from food is fairly common, such as with passerine species at garden bird-tables and other situations with copious food. At Kerloch moor near Banchory, west of Aberdeen, I observed five such encounters between cock red grouse and cock pheasants on oat-ricks in fields adjacent to moorland. The red grouse was victor in four.

Also at Kerloch I observed a prolonged encounter between a cock red grouse and a cock pheasant on 14 April 1964. This was at 150 m altitude on a part of the moor that adjoined fields and that was completely occupied by red grouse territories, but also held two cock pheasants and two hens. The pheasants were usually in two patches of tall ling mixed with tall rushes (*Juncus effusus* and other tall *Juncus* species) or in tall bog myrtle *Myrica gale* with rushes. On this occasion the two cock pheasants had been together in an aggressive encounter on short ling for 20 minutes. They were still showing threat postures, and as they walked stiffly on to a prominent rise in the ground, a back-tabbed cock red grouse which had a territory there flew in, becking loudly as he landed, and at once attacked the cock pheasant that was the nearer of the two. He chased the pheasant for the next 11 minutes, continually attacking it and giving loud calls signifying attack and attack intention. The pheasant ran on, frequently jumping out of range, but five times flew away for 5–10 m after strong attacks.

It also turned to face the red grouse five times, giving a purring call that cock pheasants use in aggressive encounters, and showing a threat posture with its tail raised and body lowered. The two then fought, beating their wings and jumping off the ground, but although the pheasant removed a feather from the red grouse's breast, it withdrew each time. It next flew 50 m towards the centre of the red grouse's territory and was again attacked. Finally it flew 150 m to land at least 100 m outside the red grouse's territory, in the bog where it usually lived. The cock red grouse also flew to land becking loudly near the pheasant, outside the grouse's previously observed territorial boundary. That red grouse clearly had an advantage, even though the cock pheasant was bigger.

Meanwhile the second cock pheasant had crept out of sight in tall ling and crowed loudly when it had gone 100 m away from the other two birds. The first pheasant answered the call immediately, but no further interaction with a red grouse took place, although the two pheasants were now in places within the territories of two cock red grouse.

Moorland is marginal for pheasants, which occur there at low density and only in places with good cover from mires with tall rushes *Juncus* spp., patches of young trees or scrub, or tall ling. Such places are usually little frequented by red grouse in winter and spring, although they are often within the territories of cock red grouse. Red grouse often go to rushy mires with their small young, but rarely show territorial behaviour in summer except at dusk and dawn. Interestingly, two hen pheasants nested in ling swards only 15 cm high, even though taller rushes and ling abounded nearby.

### Conclusion

A high proportion of inter-specific aggressive encounters involving grouse species involved the two species not being tested for dominance in a neutral situation, because of differences in habitat. There was



interesting evidence suggesting that the outcome of such encounters may be associated with the habitat in which the encounter takes place, rather than by inherent behaviour where one species always dominates another. Of course a bird living in typical habitat for the species is likely to be more dominant or in better physical condition than a bird of the same species in atypical habitat. Likewise this may help explain why it is likely to be at an advantage over an individual of a different species in the same atypical habitat. The hypothesis could be tested by other observations now and in future.

### References

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## Ecology and conservation of the Cantabrian capercaillie inhabiting Mediterranean Pyrenean oak forests. A new Ph. D. project.

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Capercaillie *Tetrao urogallus* is usually considered a conifer forests dweller depending on bilberry (Storch 1993, 1995, Selås 2000, 2001). However at the southern limits of its distribution some populations inhabit deciduous forests, with the most representative in the Cantabrian Mountains, northwest Spain. In this area the Cantabrian capercaillie subspecies is found *Tetrao urogallus cantabricus* that is isolated, endangered and listed as the most endangered subspecies according to the IUCN criteria (Storch et al. 2006). As elsewhere Cantabrian capercaillie has been closely related to bilberry (Castroviejo 1975, Martínez 1993, Obeso & Bañuelos 2003) and mainly inhabiting beech *Fagus sylvatica*, birch *Betula pubescens* and sessile oak *Quercus petraea* montane forests (Quevedo et al. 2006). However, in 2000 a remnant nucleus of this subspecies was discovered in the Mediterranean region bordering the Eurosiberian region at the very southern slope of the Cantabrian Mountains (42° 39'N) inhabiting Pyrenean oak *Quercus pyrenaica* forests.

Half of the total area is forested. Dominant forests are natural (more than 50 years old) and post-fire Pyrenean oak interspersed with Scots pine *Pinus sylvestris* plantations (less than 50 years old). Pyrenean oak covers 25,483ha (30%), Scots pine plantations 11,132ha (10%) and heather *Erica australis*, grassland and riparian lowland forest occupy the rest of the natural landscape. Bilberry *Vaccinium myrtillus* is completely absent or too scarce (<0.5% of the total ground cover of the forest) to be considered as a key resource for capercaillie as it is in other populations in the Cantabrian Mountains (Blanco-Fontao et al 2009) and elsewhere (Storch 1993, Selås 2003). This almost complete absence of bilberry may have important consequences for the ecology of this population. However, opposite to the general declining Cantabrian trends (see Bañuelos & Quevedo 2008), this capercaillie nucleus seems to have been relatively stable since it was discovered. It is supposed to constitute close to 10% of the total Cantabrian capercaillie population which makes this population an important conservation target for the Cantabrian capercaillie future. In addition this population could now be the southernmost distribution limit of capercaillie in the Western Palaearctic, since the population of the Greece in Mount Athos might have become extinct (Xirouhakis pers. com.).

However, this Mediterranean capercaillie population may become threatened because of the current wind power projects. Seven wind farms are presently being developed in the area, 3 of them are finished and 4 in working process. No legal protection regulations protect this area and it has not been contemplated in the Recovery Plan for Cantabrian Capercaillie (Junta de Castilla y León) as suitable habitat. Consequently this original habitat is completely unprotected against any threat in the form of big human infrastructures such as wind farms. Because of its peculiar habitat in the Mediterranean region make it will be of great interest to study the ecology of this population to implement locally adapted and effective conservation measures (Blanco-Fontao et al. 2009).

A PhD project is being developed on this Mediterranean capercaillie nucleus focusing on its ecology, population trends, habitat selection and human disturbances, especially related to wind power development in the area.

