

have prevented the birds from feeding on the floating vegetation.

Between 27 August and 3 September 1973 I saw mixed flocks of Lapland Longspurs and Smith's Longspurs (*C. pictus*) skimming the surface of a large slough, 11 km S Battleford, Saskatchewan, and feeding from floating pondweed, *Potamogeton* sp. On several occasions individuals of both species hovered above the water, possibly feeding although the slightly choppy water prevented me from seeing just what they were doing.

On 18 October 1975 I watched Snow Buntings foraging beside a stand of phragmites (*Phragmites communis*) on the shore of a backwater 4 km E Ste. Agathe, Manitoba. Another individual was perched on a dead *Scirpus* stem over the water surface. Three times it sidled down the stem to probe in the water, possibly for food. I frequently observed this foraging tactic in Snow Buntings during late October, 1974 and 1975, south of Winnipeg, Manitoba. However, in this area most autumn foraging by migrating Lapland Longspurs and Snow Buntings occurs in recently harvested grain fields.

Foraging by finches from floating vegetation has been reported recently in Britain (see Kington 1973, England 1974, Keymer 1975). However, neither Kear (1962) nor Newton (1965) in their comprehensive studies of food selection and foraging ecology of British finches, reported this method of feeding.

Lapland Longspurs reach southern Manitoba in early September on their return from their northern breeding grounds; the first Snow Buntings do not normally arrive until mid-October (Criddle 1922, Sealy pers. observ.). Since small ponds in Manitoba

freeze over by early November in most years, food obtained by landing on floating vegetation is available only temporarily, but may be important during the fall migration. Landolt (1970) did not record this foraging tactic in wintering longspurs in Oklahoma.

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Department of Zoology, University of Manitoba, Winnipeg, Manitoba, R3T 2N2. Accepted for publication 24 June 1976.

EXTERNAL MARKERS OF SOCIAL RANK IN WILLOW PTARMIGAN

ÅSE GJESDAL

Field estimations of the social rank of Willow Ptarmigan (*Lagopus lagopus lagopus*) using methods developed by Schelderup-Ebbe (1922) for domestic fowl and Watson and Jenkins (1968) for Red Grouse (*Lagopus lagopus scoticus*) have rather a low level of precision. Wild birds will meet only a few neighbors except in the winter flocks, where aggression is probably low.

Pair contests were introduced by Allee et al. (1939) and were used by Kolb (1971) with Red Grouse, but such methods are time-consuming. Further, the handling involved may interfere with further studies and perhaps also disturb fertilization because most fighting occurs during the period of territory-gaining just before the fertile period.

If external markers of social rank could be found, rank order could be estimated with minimal disturbance of the birds. Studies could then be performed both on captive and wild birds, and the social rank could be evaluated even for birds that have been shot by hunters. In fowl, comb size has been reported to correlate with social rank and aggression (Collias 1943, Guhl and Ortman 1953). In Red Grouse, however, Kolb (1971) found no correlation of total comb size and social rank. In the present work I have modified the technique for measuring comb size and found that comb size in male Willow Ptarmigan is

related to social rank. Furthermore, I have studied the relationship between plumage darkness and social rank in both sexes.

I hatched 31 ptarmigan of both sexes in incubators at the Wildlife Research Station, University of Tromsø. They were kept in single cages (1 × 1 × 0.8 m) and received pellet feed and water ad libitum. The study took place during the months of March through June 1975, when the birds were one to two years old.

Social rank was determined over two weeks in April and May. The birds were allocated to five single-sex groups of four to nine birds. Each bird met all the

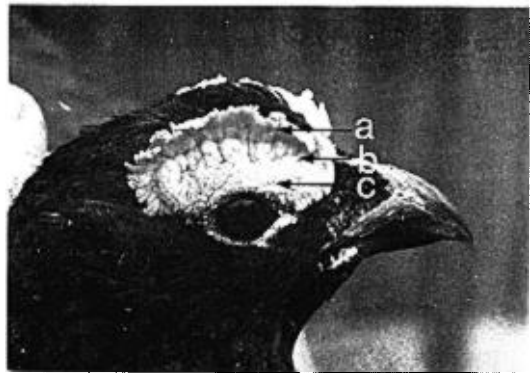


FIGURE 1. Male Willow Ptarmigan's head showing parts of comb: (a) flap; (b) line; (c) plaque.

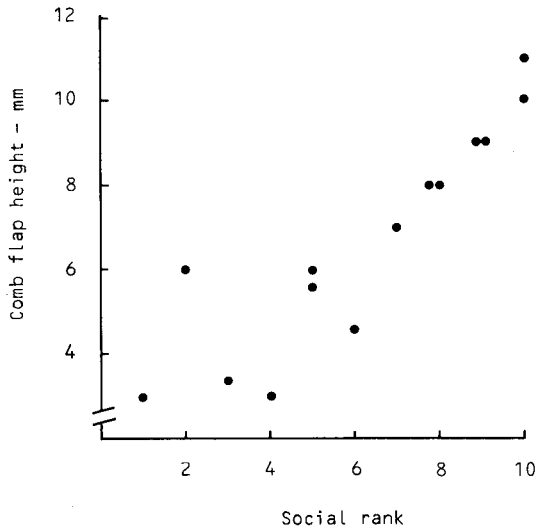


FIGURE 2. The relationship between comb flap height measured in May and social rank in 10 male ptarmigan ($R_s > 0.79$, $P < 0.01$).

others of its group in a series of pair-contests in one or the other's home cage. I had previously established that it made no difference to the outcome whose home cage was used. To evaluate the reliability of social rank determination, 10 pair-contests were repeated 2 weeks later, with identical results. To allow comparison of social rank for birds from different groups, I compared the groups by testing the highest, the lowest, and a medium ranked bird from each of two groups against each other. The rank scores were then adjusted to a common scale for each sex.

Birds who pecked the other without retaliation, or who wore an erect comb and emitted "territorial" vocalizations (Watson 1965), were considered "winners." "Losers" often lay in a corner and uttered high-pitched calls. When these behavioral patterns were not shown, the birds' ranks were considered equal. The rank of a bird was determined by the number of such encounters won.

The comb height of 14 randomly picked captive males was measured at intervals from January to June. The measurement was made to the nearest 0.5 mm by ruler. Willow Grouse combs have a 3- to 9-mm high "plaque" and a 5- to 12-mm serrated "flap," separated by a distinct line (Fig. 1). Both the total height and the flap height were measured. To confirm the reliability of this method, prior to this study two independent observers measured comb and flap heights in 12 males; the results agreed (± 0.5 mm).

In two groups of males (total number 13) and two groups of females (total number 18), plumage darkness was compared for each pair before they met and a rank order for plumage darkness was established within each group. The statistical tests used were Spearman's test for rank correlation and Wilcoxon's two-tailed test for comparison of pairs (Diem and Lentner 1971).

Comb flaps increased in size during the spring, and the mean height reached a maximum of 8.0 mm ($SD \pm 1.3$ mm) in May. At the end of June, mean comb height was significantly smaller (mean 6.7 mm ± 1.8 mm; $0.01 < P < 0.05$). Total comb height

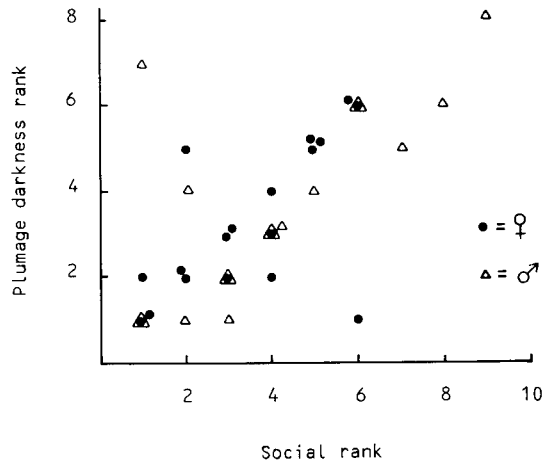


FIGURE 3. Correlation between plumage darkness (abscissa) and rank (ordinate) in 31 birds.

did not correlate with social rank, but there was a positive correlation between the May measurements of the comb flap height and social rank ($R_s > 0.79$; $0.001 < P < 0.01$) as shown in Figure 2. Figure 3 shows the conspicuous correlation observed between relative darkness of the plumage and social rank in both sexes ($R_s > 0.46$; $0.001 < P < 0.01$).

The positive correlation between comb flap height and social rank suggests that comb height provides a good estimate of social rank. Comb flap height might even replace conventional procedures for measuring social rank as this is a much quicker and simpler procedure than observing social encounters, at least in spring when cocks' combs are at their biggest. In agreement with the work of Kolb (1971), I found no significant correlation between total comb height and social rank in male ptarmigan. Since the comb plaque is fixed to the underlying tissue, one would expect size variations to occur mainly in the flap.

In both sexes the darkness of the plumage correlated significantly with social rank. The results indicated that the rank order within a group can be roughly estimated by a rapid comparison of the colors of the birds. Such a possibility has been suggested for *Lagopus mutus* by MacDonald (1970).

Both comb flap height (Stokkan and Gjesdal, unpubl.) and the development of the breeding plumage (Stokkan, unpubl.) in male ptarmigan are stimulated by androgens. Furthermore, injection of androgen increases the social rank of male ptarmigan (Watson 1970). It is therefore likely that social rank, comb flap height and feathering darkness are all secondary androgen effects.

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NEWS AND NOTES

47TH ANNUAL MEETING OF THE C.O.S.

The Cooper Ornithological Society held its 47th Annual Meeting 18-22 May 1977, at Idaho State University, Pocatello. Charles H. Trost was Chairperson of the Committee on Arrangements, and Robert D. Ohmart was Chairperson of the Committee on Scientific Program.

The following were elected as officers of the Society: Stephen M. Russell, President; J. David Ligon, Vice-President; Paul H. Baldwin, Secretary; Ronald A. Ryder, Assistant Secretary; Jane R. Durham, Treasurer; James G. Miller, Assistant Treasurer. Peter Stettenheim was elected Editor of *The Condor*, and Ralph J. Raitt was elected Editor of *Pacific Coast Avifauna*. Three new members of the Board of Directors, Luis F. Baptista, James R. King, and Robert T. Orr, were elected by ballot to replace William R. Dawson, Oliver P. Pearson, and Edgar N. Stone. Robert T. Orr (Chairperson), Oliver P. Pearson, and Edgar N. Stone were elected to the Investment Committee.

Officers of the Council elected were James R. King, President; M. Dale Arvey, Vice-President; and Jennifer M. White, Secretary. New Council members elected by ballot were Alan H. Brush, George L. Hunt, and Stephen I. Rothstein for 3-year terms; Joel L. Cracraft for a 2-year term, and Charles H. Trost for a 1-year term.

The Council voted to hold the 48th Annual Meeting of the Society at Arizona State University, Tempe, during the 3rd week of May 1978, and the 49th Annual Meeting at California State University, Humboldt, in Arcata the 3rd week of June 1979.

Sixty-one papers were presented at the scientific sessions. A list of the papers can be had from the Secretary.

The Harry R. Painton Award went to H. Rahn and A. Ar for their outstanding paper, "The avian egg: Incubation time and water loss," published in *The Condor*, vol. 76, No. 2. The A. Brazier Howell Award went to Carol Vleck, University of California, Los Angeles, for her presentation of a paper entitled "Oxygen consumption of avian embryos." The Frances F. Roberts Award went to Larry Clark, Northern Arizona University, for the paper, "Development of endothermy and metabolism of nestling Piñon Jays."

The following resolution was proposed by the Resolutions Committee and approved:

Whereas, The Cooper Ornithological Society held its 47th annual meeting at Idaho State University in Pocatello from 18-22 May 1977, hosted by the Department of Biology, the Idaho Museum of Natural History, the Portneuf Valley and Snake River Audubon Societies;

Whereas, The local committee, ably chaired by Dr. Charles Trost, and supported by I.S.U. President Dr. Myron Coulter, superbly arranged varied and stimulating activities, including an outstanding art exhibit; excellent food, drink and accommodations; evening programs, field trips, and invigorating weather; and

Whereas, The scientific program committee, chaired by Dr. Robert Ohmart, performed outstanding service in assembling a stimulating array of technical papers; therefore,

Resolved, That the Cooper Ornithological Society congratulate and extend sincere appreciation to all those organizations and individuals who worked long and hard together to make this a successful and smoothly functioning meeting.

NOMINEES FOR C.O.S. BOARD OF DIRECTORS

The Nominating Committee appointed by the Board of Directors, consisting of R. P. Balda (chairperson), R. B. Payne, and R. J. Raitt, proposes to the C.O.S. electorate for 3-year terms, starting 1978, on the Board of Directors: *Charles T. Collins*, *Robert D. Ohmart*, and *Kenneth C. Parkes*. They will replace retiring Directors Russell P. Balda, Thomas R. Howell, and J. David Ligon. Procedures for election of Directors may be found in the C.O.S. bylaws (*Condor* 69:613-620).

NOMINEES FOR THE C.O.S. COUNCIL

The Nominating Committee appointed by the President of the Council, consisting of J. L. Cracraft, D. A. Jenni, and M. L. Morton (chairperson) proposes for 3-year terms, starting 1978, on the Council: *F. Lynn*