(1966) work and our study are the apparent resolution of the minor proteins through acrylamide electrophoresis and the increased sample size permitting a better assessment of intraracial variation.

Even though most of the subspecies are recognized readily from their breeding distribution (Hanson 1965), the biochemical relationship among subspecies is close. Baker and Hanson (1966) gave several explanations for the close biochemical relationships of *B. canadensis* subspecies including:

> "1. Geese are subjected to very strong selection pressures, keeping the blood proteins within very narrow limits of specificity. . . . 2. A lower rate of mutation for blood proteins exists in *Anser* and *Branta* in comparison with other groups of animals . . . . 3. The genus *Anser* dates back only to the Upper Miocene and the genus *Branta* to the Lower Pliocene; some of the present-day species probably evolved in Pleistocene times and, in the case of *B. canadensis*, some of the races are probably of very recent origin."

All these explanations are quite plausible, especially in view of the conclusion reached by Prager and Wilson (1975) who found that birds have a very slow evolutionary rate based on cytological and anatomical data and the slow rate at which birds have lost the potential for interspecific hybridization—a function of regulatory gene expression. This phenomenon may also in part account for the biochemical relationship among the subspecies of *B. canadensis*.

SUMMARY

Serum proteins from nine subspecies of Canada Geese (*Branta canadensis*) were analyzed through the use of column and slab acrylamide electrophoresis. Variation was minimal within a subspecies, although all the subspecies were closely related. *B. c. leucopareia* appeared to be the most distinct subspecies, while *maxima* and *moffitti* were the most similar. Our preliminary findings suggest that the electrophoresis techniques are sensitive enough to identify some of the subspecies; however, baseline data from breeding ranges of all subspecies are required.

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NORTHERN FINCHES FEEDING FROM FLOATING VEGETATION

SPENCER G. SEALY

On 14 October 1972 I observed several flocks of Lapland Longspurs (*Calcarius lapponicus*) and Snow Buntings (*Plectrophenax nivalis*) feeding from floating vegetation in a large water-filled borrow pit along the southern edge of the Delta Marsh, about 22 km NW Portage la Prairie, Manitoba. Beginning at 1400 I watched for two hours while these finches flew low over the water occasionally skimming its surface and frequently landing for periods of up to four min on floating spike water-milfoil (*Myriophyllum exalbescens*). The birds apparently foraged while on the vegetation but I did not determine whether plant or animal matter from the water was being consumed. Some individuals preened while on the vegetation. The weather was sunny and generally calm.

On 16 October 1972, a windy day with light snowfall, I visited this borrow pit again but saw Snow Buntings foraging only along its shore and in open dry areas among clumps of bulrush (*Scirpus*) at the edge of the marsh. The choppy water that day may 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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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

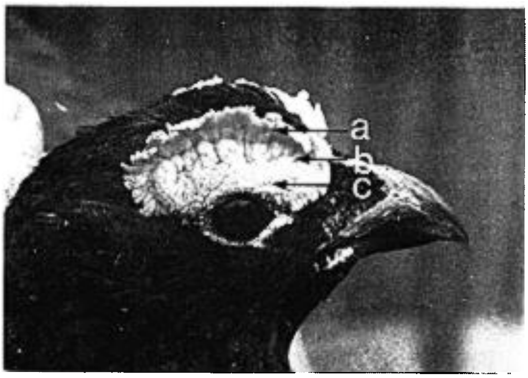

FIGURE 1. Male Willow Ptarmigan's head showing parts of comb: (a) flap; (b) line; (c) plaque.