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## The First Prebasic Molt in Snow Buntings

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In a recent paper in *North American Bird Bander*, Pyle (1997a) described molt patterns in 288 species of North American passerines. Based on examination of 15 museum specimens he stated that in Snow Buntings (*Plectrophenax nivalis*), all 10 greater coverts were replaced in all individuals during the first prebasic molt. This conclusion differs from that of others who have studied molt of Snow Buntings.

I studied molt of Snow Buntings during four seasons of fieldwork on Devon Island, Northwest Territories, Canada, from 1966 to 1969 (Hussell 1972). I examined 51 juvenile Snow Buntings on dates ranging from 25 July to 23 August; 41 of them were undergoing their first prebasic molt. Thirty-three juveniles, of which 23 were in molt, were collected and are preserved in the University of Michigan Museum of Zoology.

I described the first prebasic molt by classifying it into seven stages from 0 (molt not started) to 6 (molt complete). None of the stages involved molt of the greater coverts or tertials because I never saw any molt of those feathers. I examined juveniles in all stages from 0 to 5. By molt stage 5 the new lesser and median wing coverts were fully grown and most of the feathers of the body plumage were at least three-quarters grown.

Since molt of the greater coverts, when it occurs in passerines, usually overlaps that of the lesser and median coverts (Pyle 1997b: 207), I concluded that no greater coverts were molted in the first prebasic molt. I said: "The remiges, rectrices, primary coverts, greater secondary coverts and alula are not molted. ... No evidence of replacement of any of these feathers was found in Snow Buntings ... on Devon Island" (Hussell 1972: 351-352).

In northeast Greenland, the inner greater coverts and tertials were sometimes molted (Asbirk and Franzmann 1978, quoted by Cramp and Perrins 1994: 137, and Lyon and Montgomerie 1995: 17; although the latter authors indicate that the tertials are always molted). Pyle (1997b: 603) says that the first prebasic molt usually includes most or all median coverts and apparently most or all greater coverts, but no tertials or rectrices, while noting that in European populations some outer greater coverts can be retained and the tertials can be replaced.

What could explain these discrepancies? There are at least three possibilities. First, it is possible (though, I think, very unlikely) that the Snow Buntings studied by me and others on the breeding grounds had arrested or not completed their molts and that they subsequently did molt their greater coverts. I think this is unlikely because such a molt pattern would be unusual in an arctic breeding passerine with very limited time for the juveniles to molt between fledging and southward migration. A molt that is limited to the body plumage and lesser and median coverts, as was observed on Devon Island and elsewhere, would save time and energy. Moreover Lapland Longspurs (*Calcarius lapponicus*) show the same molt patterns as Snow Buntings on Devon Island (Hussell 1972: 352) and there is no other evidence that the longspurs replace their greater coverts in the first prebasic molt (Pyle 1997a,b).

Second, molt appears to be somewhat flexible among populations. Southern populations and early-hatched individuals often have a more extensive first prebasic molt than northern populations and late-hatched birds (Pyle 1997b, Jenni and Winkler 1994). There are some published accounts indicating that molt in Snow Buntings and Lapland Longspurs may proceed

more slowly in Alaska than in the Canadian high-arctic (Hussell 1972: 351). Such differences could account for a more extensive prebasic molt in some populations than in others. If the specimens examined by Pyle (1997a) were from low-arctic or resident populations their molt patterns may have differed substantially from those observed on high-arctic breeding grounds.

Finally, Pyle (1997a) may have been mistaken: the greater coverts on the specimens he examined may have been unmolted juvenal feathers. Young Snow Buntings on Devon Island started their prebasic molt when 20-25 days old, before completion of the growth of the remiges and rectrices (Hussell 1972: 351). Given this compressed schedule, it is likely to be difficult to judge whether or not a fully grown feather in a fall or winter bird had been replaced. Pyle (1997a: 89) noted that "molt limits were difficult to infer in this species," presumably indicating that he could not detect contrasts among the greater coverts or between the greater coverts and other feathers. Likewise, he may have had difficulty deciding whether all or none of the greater coverts had been molted.

Peter Pyle commented on a draft of this note as follows, "I have looked through my specimen data and would guess that your option three is correct. My notes indicate that I had originally inferred that the greater coverts I saw on the specimens were juvenal and that none had been replaced but, for some later reason, I doubted this and inferred that they had all been replaced. As I recall, the feathers looked very resilient compared to juvenal greater coverts in other species and showed no apparent contrasts with the median coverts, leading me to conclude in the end that they were not juvenal feathers. Also, many sparrows, warblers, vireos, etc., replace their greater coverts all at once and quite rapidly. The differences between juvenal and first-basic coverts on specimens of these species were small, making it difficult to tell if all had been retained or all had been replaced during the first prebasic molt."

In summary, there is evidence that juvenile Snow Buntings do not molt any of the greater coverts during the first prebasic molt, at least in North American high-arctic populations, contrary to the information given by Pyle (1997a, b). Banders

should always be alert to possible variation from the normal pattern of molt. However, in hatch-year/second-year Snow Buntings they should normally expect to find unmolted juvenal greater coverts with no detectable molt limits. A general caveat is that patterns and timing of molt inferred from examination of birds that have completed their molts are best confirmed by detailed study of molt in birds that are actively molting. More such studies are needed.

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