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SHORT REPORT

Lesser Redpolls *Acanthis cabaret* undertake post-breeding and post-juvenile moult during autumn movements

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ABSTRACT

A previous study suggested that Lesser Redpolls *Acanthis cabaret* in northern England moult before migration. Redpolls caught on autumn passage at Easter Inch Moss in the central lowlands of Scotland show a pattern of recoveries consistent with a north-to-south movement. Both adult and first-calendar-year Lesser Redpolls of these northern populations were moulting when they passed through Easter Inch Moss during the autumn migration, which continued into October and late November. These results suggest that Lesser Redpolls in northern Britain leave their breeding grounds and start their autumn migration while moult is in progress.

ARTICLE HISTORY

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Lesser Redpoll *Acanthis cabaret* breed widely throughout the north and west of Great Britain with a presence in 54% of the 10-km squares surveyed for the 2007–11 Bird Atlas (Balmer *et al* 2013). After post-breeding movement and migration, the winter distribution extends into the southwest, with an overall increased occupancy to 67% of 10-km squares (Balmer *et al* 2013). The *Migration Atlas* (Wernham *et al* 2002) categorises the breeding Lesser Redpoll population in Britain and Ireland as short-distance migrants on the basis of ring recoveries, which show a north-to-southeast recovery pattern.

Studies in Northumberland in the 1960s (Evans 1966, 1969) suggested that autumn migration of Lesser Redpolls has a series of distinct phases. After the main period of fledging in July and August, largely local populations of Lesser Redpoll of all ages in northern parts of England gather at feeding sites close to the breeding grounds, where the adults undertake post-breeding moult and juveniles a partial post-juvenile moult, before departing on a southward migration to wintering grounds in southern and eastern Britain or continental Europe in September. In this model, juveniles begin to leave first in early September, with adults, probably adult males in the first instance, departing by the end of September, and by the first days of October all birds have departed. Evans (1966) concluded that they moulted before they migrated, on the grounds that 29% of them were retrapped during the trapping period and that most of the adult moult scores were >40 out of 45. However, in an apparent

contradiction to his main conclusion, he also noted that he did not trap a single adult in completely new plumage. Nevertheless, as a result of Evans' studies it has become axiomatic in the literature that Lesser Redpoll populations in northern Britain complete their main post-breeding and post-juvenile moult on or close to their breeding grounds prior to migrating south (Evans 1966, 1969, Newton 1972, Langslow 1977, Wernham *et al* 2002, Forrester *et al* 2007).

Although northern British populations were unrepresented in the ringing effort at the time the *Migration Atlas* was being prepared, subsequent autumn ringing data, including at Easter Inch Moss & Seafeld Law Local Nature Reserve, West Lothian, in south-central Scotland (55°52'54"N 3°35'52"W), has also shown largely southerly wintering patterns (Duncan 2016, McKay 2016). At Easter Inch Moss, numbers of Lesser Redpolls increase dramatically between late August and November (Figure 1). Both adult and first-year age categories appeared throughout the autumn, although first-calendar-year (1cy) birds arrived in the largest proportions early in September and adults arrived in proportionately larger numbers as passage progressed, peaking in October. Observations of moult in these birds, described below, appear to contradict the assumption that main and post-juvenile moult of Lesser Redpolls in northern Britain is completed before migration.

Lesser Redpolls arriving and trapped at Easter Inch Moss from 2010 to 2012 inclusive were marked with unique British Trust for Ornithology (BTO) metal

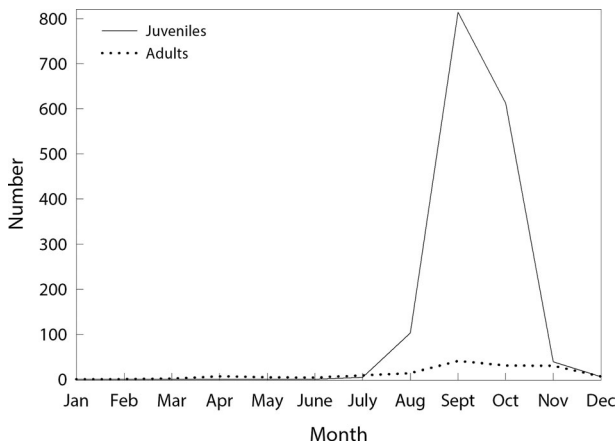


Figure 1. Cumulative trapping events for Lesser Redpolls at Easter Inch Moss 2009–13, by age.

rings (2010, $n = 711$; 2011, $n = 682$; 2012, $n = 292$) and moult codes were recorded. Trapping took place from mid-July, the period just prior to the arrival of passage migrants, to the end of November, which marks the end of the passage period. Thereafter, only a very small number of overwintering birds remained at the site.

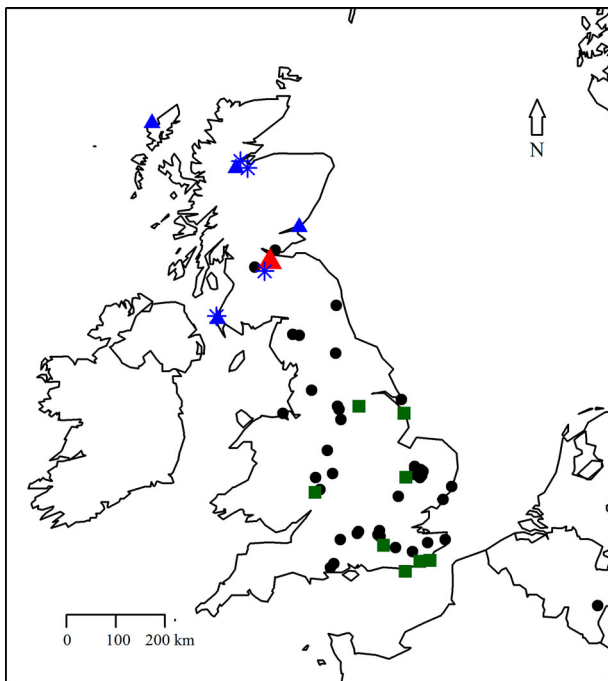


Figure 2. Ringing and recovery locations 2010–14 of Lesser Redpolls either ringed at Easter Inch Moss (location indicated by the large red triangle) or ringed elsewhere and re-encountered at Easter Inch Moss. Each data point represents movement in the year of ringing or subsequent year: blue triangles, birds controlled at Easter Inch in the autumn of the year of ringing; green squares, birds ringed in autumn at Easter Inch and controlled the same autumn; blue asterisks, birds ringed at Easter Inch in autumn and controlled breeding in later years; black circles, other categories of recovery.

Re-encounters of ringed birds and recoveries of birds ringed at Easter Inch Moss suggest that the birds come from, and move on to, a broad geographical area (Figure 2), with the recoveries suggesting a more widely ranging, westerly, winter distribution than described by Evans (1966, 1969). The moult stages of the primary and secondary flight feathers and body feathers were recorded for adults (2+cy) and the body and lesser coverts for 1cy birds, using standard BTO codes (du Feu *et al* 2006).

A large proportion of the adults caught were undertaking active moult of the flight feathers and the majority were undertaking some form of moult throughout most of the passage period (Figure 3). Those undertaking main moult were mostly moulting feathers of the outer primaries and inner secondaries. Birds in their first year were also undertaking partial post-juvenile moult throughout the period of movement, as shown by the presence of moulting body feathers or wing coverts (Figure 4).

These observations differ from Evans' findings in a number of respects and have implications for a more nuanced understanding of moult in the migration ecology of Lesser Redpolls. If the birds had fully completed moult before leaving their breeding areas all, other than local breeders, would have completed moult before reaching Easter Inch Moss and this would be the case for arrivals throughout the passage season. However, most Lesser Redpolls were moulting as they moved through the site. The evidence from ring recoveries and re-encounters suggests that Lesser Redpolls at Easter Inch Moss in autumn are birds originating from a wide range of breeding areas undertaking regular (if unpredictable) movement. Both adult and 1cy birds were present throughout this passage period, although there were proportionately more adults later in the season until the end of October. The period of passage peaked in September (1cy) and October (2+cy) and continued with smaller numbers into November. Both 1cy and adults were undertaking regular moult while on passage through the site. For 1cy birds the peak of post-juvenile moult was September. A proportion of adults were actively moulting flight feathers into October; though most had completed the moult of flight feathers and were in the process of completing the moult of body feathers at that stage.

The presence of individuals or flocks of birds at the study site was transitory. Those birds that were moulting when they arrived at Easter Inch Moss probably moved on before moult was complete, as few ringed birds were subsequently retrapped at the site: almost all had left by the time of the subsequent

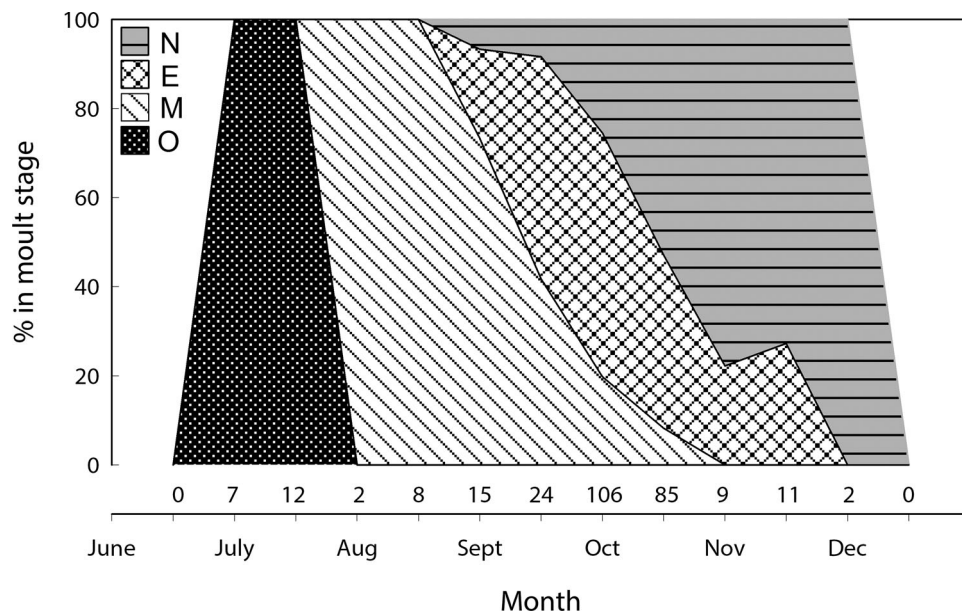


Figure 3. The progression of moult stages of adult birds through the period of passage, expressed as cumulated percentages in half-monthly periods. BTO moult codes are: O: old (post-breeding moult of primaries, secondaries or body not yet started, no active moult); M: moulting (active post-breeding moult of primaries or secondaries in progress); E: ending (post-breeding moult of primaries and secondaries complete but body feathers still growing); N: new (all primaries, secondaries and body tracts grown, no active moult). Total sample sizes for each period are given above the month axis.

trapping session and later ring re-encounters suggest that the birds had proceeded south. But in the light of recent ring-recovery data the post-breeding movements of northern populations appear increasingly complex, according to latitude. Birds ringed by Barker & Butterworth at Bettyhill (58°31'N 4°13'W) and Tongue

(58°28'N 4°20'W) in the northern Highlands in spring were recovered wintering in Fochabers, Moray (57°34'N 3°5'W), in the northeast of Scotland, having made a 125-km south-southeasterly movement (Alastair Young, unpublished data presented to the 2015 Scottish Ringers' Conference). However, a Lesser

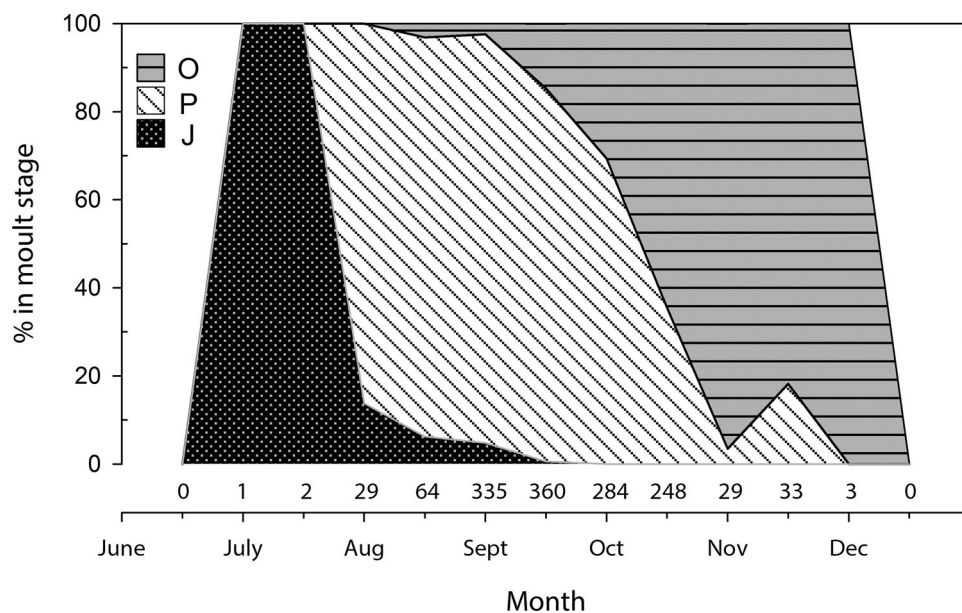


Figure 4. The progression of moult stages of 1cy birds through the period of passage, expressed as cumulative percentages in half-monthly periods. BTO moult codes are: J: juvenile (in or growing in juvenile plumage, no active moult); P: post-juvenile moult (partial post-juvenile body or covert moult in progress); O: old (partial post-juvenile moult of body and wing coverts completed, no active moult). Total sample sizes for each period are given above the month axis.

Redpoll ringed wintering at the same site in Fochabers in February 2015 was re-encountered during the next annual cycle at Easter Inch Moss in October (192 km south).

In conclusion, on the basis of the observations from Easter Inch Moss and a re-interpretation of Evans' (1966) findings it appears that Lesser Redpolls start to moult on or near their breeding grounds, adults apparently undertaking the greater part of the main moult at that stage, but leaving the breeding grounds before completion and continuing during migration or movement. First-calendar-year birds appear to move and moult simultaneously. The study has assumed moult was active and it was not possible to ascertain whether or not moult was suspended during such movements.

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