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A Case of Arrested Molt in the Bobolink

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ABSTRACT

Molt is an energetically expensive activity. Many long-distance migrants employ facultative molt suspension to separate the timing and energy requirements of molt from migration. However, a permanent break in the molt cycle, arrested molt, can occur particularly if a bird's resources are depleted. We document a possible first case of arrested molt in a male Bobolink (*Dolichonyx oryzivorus*). The bird displayed a mixture of basic and alternative plumage throughout June, a time when conspecifics are in full alternate plumage.

INTRODUCTION

Molt, migration, and breeding are the three most energetically expensive activities in a migratory bird's annual cycle (King 1980, Walsberg 1983). These three events are generally separated in time to prevent excessive energetic stress (Payne 1972). However, there may not be enough time or resources available between breeding and migration for a bird to complete its molt. Therefore, many long-distance migrants employ molt suspension, a temporary interruption in the molt sequence before migration that is later resumed after migration at the point of suspension (Mead and Watmough 1976, Berthold and Querner 1982, Norman 1991). Molt suspension is a facultative strategy, varying both inter- and intra-specifically in terms of timing, sequence, geographic occurrence, and proportion of individuals adopting the strategy (Mead and Watmough 1976, Berthold and Querner 1982). For example, a late-breeding bird may molt later than earlier-breeding conspecifics, and thus may molt fewer feathers before suspension as compared to conspecifics (Yunick 1976, Berthold and Querner 1982). Similarly, adverse weather conditions or food shortages may slow or suspend the progress of molt until conditions are favorable again (Ault et al. 1976, Senar 1988). Molt suspension implies that molt resumes once energy investment in migration or breeding has been completed. However, if resources are insufficient, arrested molt may occur. Arrested molt is a permanent break in the molt sequence (Mead and Watmough 1976, Norman 1991). Suspended and arrested molt can be difficult to detect in most species because it requires capture of a bird to document the progress of molt. However, for sexually dimorphic species that undergo two complete molts per year, with males acquiring a female-like basic plumage, the appearance of a molting male may provide evidence of suspended or arrested molt without the need for capture. Here we report a possible case of arrested molt in a Bobolink (*Dolichonyx oryzivorus*). To our knowledge, arrested molt has never been documented in this species.

METHODS AND RESULTS

While conducting a mark-recapture study of Bobolinks in Warren County, west-central Indiana, we encountered an individual with unusual plumage for the time of year (Fig. 1). We observed this bird on 7, 16, and 22 Jun 2004. At this time, all birds should be in full breeding condition and full alternate plumage. This individual, however, displayed a mixture of basic and alternate plumage patterns. The black underparts and face were extensively tipped with buff. The sides and flanks, in contrast, were ochre yellow with dull black streaks. The nape was dull maize yellow. The wings and tail were dull black. Overall, the plumage coloration was much duller than expected in alternate plumage males and females. In addition, the legs, feet, and bill were flesh-colored with only the tip of the culmen showing gray. We

did not notice a change in these features over subsequent sightings. Another notable feature of this bird was its lack of breeding behavior. At each encounter, the bird was perched quietly on the lowest strand of a barbed wire fence. It showed no signs of territorial defense or courtship and did not sing. It was observed in proximity to, but ignored by, territorial males. Unfortunately, we were unable to capture this individual for a closer inspection.

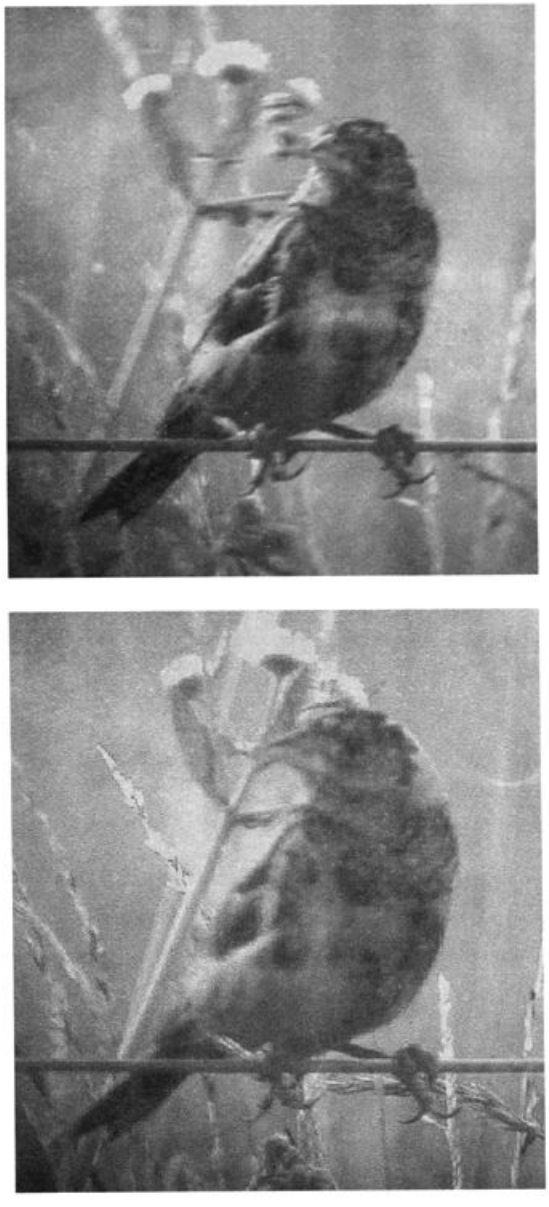

Fig. 1. Male Bobolink displaying possible arrested molt at Warren County, IN, 22 Jun 2004. Patches of yellow basic plumage are mixed with buffy-edged black alternate plumage. Photos by DMS.

DISCUSSION

Dwight (1900) reviewed Bobolink molts and plumages. Bobolinks are one of the few songbirds that undergo two complete molts per year. Sexes are similar in basic plumage, being mostly ochre or maize yellow with black streaking extending from the sides to the undertail coverts. After a complete prealternate molt, male plumage becomes mostly black, though buffy feather tips initially persist until they are abraded by early May. These buffy feather tips persist the longest on the belly, flanks, and undertail coverts. Females and basic plumage males have flesh-colored legs, feet, and bills that change to black in alternate-plumage males. Prebasic molt, which begins in late July after breeding, typically ends by early October on the breeding grounds (Martin and Gavin 1995). Similarly, prealternate molt begins on the wintering grounds in late January and normally ends in March or April (Martin and Gavin 1995). Molt begins along the midline of the body and spreads outwards, with concurrent molt of primaries, secondaries, and then rectrices (Jones 1930). During molt, males may display patches of yellow body feathers (pers. obs.).

Molt suspension has been noted in the Bobolink (Pyle 1997). Two of 24 fall adult males examined by Pyle (pers. comm.) had retained worn secondaries during migration, whereas the remainder had completed molt. Furthermore, some spring migrants captured on the Farallon Islands off the coast of California retained tracts of basic plumage (P. Pyle pers. comm.). During the course of our study, we observed both sexes molting rectrices as late as mid-June (unpub. data). The bird in question seems to have extensive suspended prealternate molt, or more likely, given the late date, arrested molt. Bobolinks arrive in Indiana between late April and early May, and finish breeding by mid-June. Although this bird suspended molt in favor of migration, clearly it was not breeding, and presumably would have had over a month between its arrival and our observations in which to restore its energy supply and finish molting. Why did this bird not resume molt after migration?

Although total energy expenditure is difficult to measure (King 1980), most studies on songbirds

have found that the metabolism of molting birds is 5-30% greater than in non-molting birds (Payne 1972). Molt triggers a variety of physiological responses including increased amino acid metabolism, modification of water balance, increased blood volume, increased oxygen consumption, and even decreased immune response (Lustick 1970, King 1980, Walsberg 1983, Sanz et al. 2004). However, the energy requirements of molt still are relatively small compared to the energy required to migrate and breed (Payne 1972). Although migration can drain stored body fat, some birds such as *Agelaius* blackbirds actually show net fat deposition during molt by depositing fat early and late in the molt sequence (Payne 1972). Furthermore, male Orphean Warblers (*Sylvia hortensis*) that were experimentally prevented from breeding molted weeks earlier than breeders (Berthold and Querner 1982). Given this evidence, it is curious why a non-breeding bird would not have completed molt weeks after migration. It may be that it was a first-year bird, or a subordinate individual that was unable to compete successfully for food resources. However, we never saw aggressive interactions. The bird may have been infected and thus putting its energy into an immune response (Sanz et al. 2004). Alternatively, the arrested molt may not have been related to energy investment at all, but rather to a genetic or hormonal disorder that affected the secondary sexual characteristics. This last point implies the possibility of gynandromorphy.

Gynandromorphy is the expression of both male and female plumage, body size, or gonads in a single individual (Crew and Munro 1938, Lowther 1977, Graves et al. 1996). Birds with genetically controlled plumage characteristics are typically bilaterally gynandromorphic with a sharp demarcation of the sexual characteristics through the midline of the body (Crew and Munro 1938, Lowther 1977). The sex of the plumage on a side reflects the underlying gonad on that side. However, species with hormonal regulation of sexual characteristics may display a mosaic condition–that is, elements of both sexes on one or both sides (Crew and Munro 1938, Parrish et al. 1987, Graves et al. 1996). The lack of breeding behavior of the bird in question could be the result of a hormonal imbalance that may have interfered with normal behavior. However, gynanders have been reported to breed successfully (Crew and Munro 1938). Although gynandromorphy has been recorded most frequently in members of the families Fringillidae, Emberizidae, Parulidae, and Icteridae (Patten 1993), it is still a rare condition. The symmetry of the molt and the consistency of the plumage with typical Bobolink molt patterns strongly suggests that arrested molt is more likely than gynandromorphy.

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Some Evidence of Winter Site Fidelity in Cooper's Hawks

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ABSTRACT

We report three recoveries of Cooper's Hawks banded in Lansing, MI, that suggest winter site fidelity, and one additional recovery that suggests breeding near the wintering location.

INTRODUCTION

Cooper's Hawks *(Accipiter cooperii)* commonly breed in urban/suburban environments in the Midwest (Rosenfield and Bielefeldt 1993, Kielb 1994, Rosenfield et. al. 1996, Kapler and Conrads 1997) and are also common winter residents, utilizing prey attracted to bird feeders (Dunn and Tessaglia 1994). However, little is known about Cooper's Hawk winter ecology and behavior, and there is no information on fidelity to wintering areas (Rosenfield and Bielefeldt 1993). Here we report band recoveries that provide evidence of winter site fidelity.

METHODS

According to banding records provided by the Bird Banding Laboratory (BBL), Knutsen banded 45 Cooper's Hawks in or near Lansing, MI. With the exception of a single bird banded in 1963, all were banded between 1979 and 1996. Most bandings took place during the period October through March (Fig. 1). Birds were trapped for banding using automatic bownets designed by Knutsen (patented on 24 Jun 1958, Patent #2,839,867), with European Starlings *(Sturnus vulgaris)* and Rock Pigeons *(Columba livia)* used as lures. Of the 45 banded, females predominated ($n = 28$, Fig. 1), with equal numbers of adult and immature females.