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Plasticity in the Swainson's Thrush (*Catharus ustulatus*) First Pre-basic Molt

Molt is a key component of the annual cycle of all birds (Dawson 2006). It functions to replace worn or damaged feathers thereby maintaining their usefulness; e.g., flight and thermoregulation (Payne 1972, Ginn and Melville 1983, Jenni and Winkler 1994). The timing of the various molts for any species, population or individual is often constrained by seasonal abundance of food and other events in the annual cycle, such as breeding and migration (Payne 1972). To understand the evolution and constraints on life history events across the annual cycle, it is necessary to document the timing, extent and variation of these events.

The Swainson's Thrush (*Catharus ustulatus*) breeds across the forested northern regions of North America and winters from Mexico to Bolivia (Mack and Yong 2000). These long-distance migrants undergo a single molt per year (Pyle 1997). In the hatching year, the young leave the nest with their juvenile plumage and shortly thereafter undergo their partial first pre-basic molt prior to or during the early autumn migration, i.e. July to October (Pyle 1997). This molt involves just the body and head feathers and zero to four inner greater coverts, whereas the adult pre-basic molt is complete (Pyle 1997).

During a recent study (7-10 Jan 2013) of the winter ecology and migratory connectivity of Swainson's Thrushes in Sumaco, Ecuador (0.67167 S, 77.59812 W, WGS 1984), we encountered four second-year individuals out of 29 captured and banded presumably undergoing their partial first pre-basic molt. In two cases, we found extensive molt on the flanks, head, lesser and median coverts, with two to four inner greater coverts. In the other two, molt was limited to the flanks. This is unusual timing for the first pre-basic molt of this and most other migrant thrush species (Family Turdidae), as it typically occurs on or near the breeding grounds (Svensson 1992, Jenni and Winkler 1994, Pyle 1997).

Although the first pre-basic in the Swainson's Thrush can occur during post-fledging dispersal or early migration, it has not been documented on their Neotropical wintering grounds (Galindo et al. 1963, Wilson et al. 2008). The observation of the first pre-basic molt outside the natal grounds has been inferred from the presence of fewer retained juvenile wing coverts on individuals captured during spring migration than autumn migration (Collier and Wallace 1989). Stable isotope evidence demonstrates that feather isotope values from juveniles match that of adults with northern latitude signatures (Wilson et al. 2008).

The delay of the first pre-basic molt to the wintering grounds may simply be poorly documented due to limited winter banding efforts. These four individuals may have been from late clutches resulting in a trade-off between molt and migration.

Clutch initiation dates and thus, the age of fledglings prior to migration, varies with both the arrival date of parents to the breeding grounds and from nest failure (Morton and Pereyra 1994, Bojarinova et al. 1999, Verhulst and Nilsson 2008). Predation is the most common source of nest failure (Ricklefs 1969, Martin and Roper 1988). For example, the congeneric Hermit Thrush (*C. gutatus*) had extremely high nest predation rates (80 to 93%), the lowest amongst 13 species studied in Arizona (Martin and Roper 1988, Martin 1993). Thus, hatching-year birds may defer the first pre-basic molt until they arrive on their winter quarters due to time constraints or lower resource availability on the breeding grounds (Butler et al. 2006).

These four Swainson's Thrushes demonstrate that this species shows greater flexibility in the timing of first pre-basic molt than previously recognized. This molt may not be as constrained as the complete adult pre-basic molt (Pyle 1997). Although adults may not exhibit the same degree of plasticity, they often complete their pre-basic molt during post-breeding dispersal or early migration (Cherry 1985, Winker et al. 1992). Deferred molt in the Swainson's Thrush may reflect adaptations to short breeding and molting periods at high latitudes and elevations. In some cases, individuals may defer molt until arrival on the wintering grounds (i.e., the first pre-basic molt) or to molt after migration commences (i.e., the adult pre-basic molt), especially when nest predation results in late clutches.

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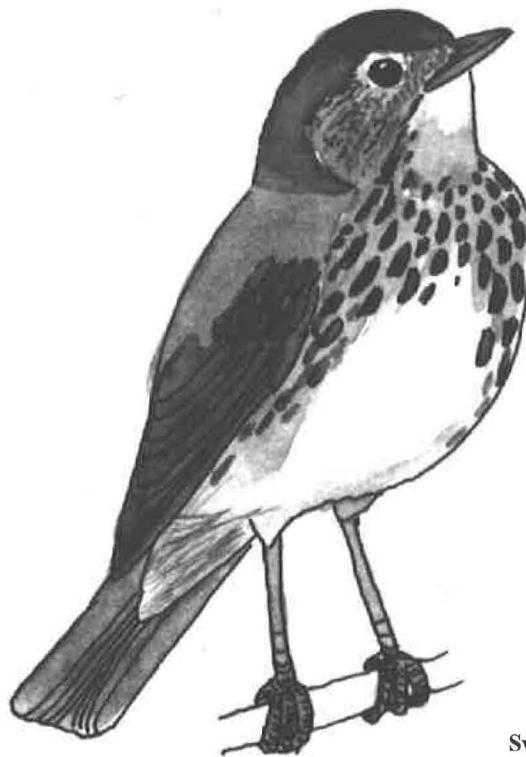
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