Age Determination of the Spot-breasted Wren and the White-breasted Wood-Wren Using Molt Limits

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ABSTRACT

The Spot-breasted Wren (Pheugopedius maculipectus) *and the White-breasted Wood-Wren* (Henicorhina leucosticta) *undergo a partial preformative molt resulting in molt limits each between juvenal and formative feathers within and between the lesser, median and greater coverts, alula, and tertials. These two wrens do not replace secondaries or primaries, and only some White-breasted Wood-Wrens molt rectrices. Their definitive prebasic molt is complete, and, if present, their prealternate molt is limited to body feathers. These patterns combined allow the identification of first-cycle (HY or SY) individuals as those showing molt limits within the above-mentioned wing-feather tracts. Description of molt patterns enhances our ability to correctly age birds and, therefore, helps increase knowledge of the biology, age structure and population dynamics of these and other poorly known Neotropical species.*

RESUMEN – ***Determinación de la edad en el chivirín moteado y el chivirín pecho blanco usando el patrón de muda preformativa.***

El chivirín moteado (Pheugopedius maculipectus) *y el chivirín pecho blanco (Henicorhina leucosticta) presentan una muda preformativa parcial, que da como resultado límites de muda en las cobertoras pequeñas, medianas y mayores, el alula y las terciarias. Estos dos chivirines no reemplazan primarias ni secundarias, y solo algunos individuos del chivirín pecho blanco mudan rectrices. La muda prebásica definitiva de estas especies es completa, mientras que la muda prealterna, si sucede, se limita a las plumas del cuerpo. La combinación de estos patrones permite identificar directamente como ave en su primer ciclo (HY o SY) a cualquier individuo que muestre límites de muda simétricos en el ala. La descripción de los patrones de muda incrementa nuestra capacidad para determinar correctamente la edad de las aves y por lo tanto, permite mejorar el conocimiento de la biología, estructura de edades y dinámica poblacional de éstas y otras aves Neotropicales poco conocidas.*

INTRODUCTION

Age is a fundamental parameter that influences many aspects of avian biology, including morphology (Alatalo et al. 1984), plumage (Rohwer 1978), behavior (Greenberg and Gradwohl 1997), survivorship (Saracco et al. 2010), and developmental processes such as molt (Jenni and Winkler 1994). Therefore, ageing birds is a basic operation in many ornithological studies.

In the majority of passerine species, criteria based on preformative molt patterns are the most powerful ageing techniques because of their reliability and temporal applicability (Pyle 1997, Guallar et al. 2009). Molt extent is a cyclic specific discrete character, which can be used to seperate birds in their first cycle from birds of subsequent cycles. Most passerines can be aged for a period of approximately one year solely on the basis of their partial or incomplete molt extent. From then on they acquire full somatic maturation, and it is impossible to distinguish if they are in their second or subsequent annual cycles (Pyle 1997, Wolfe et al. 2010). Other ageing techniques can have a shorter temporal applicability or are less reliable. For example, skull pneumatization in most passerines completes before six months (Pyle 1997), and tongue marks normally fade away in a few months, although sometimes these characteristics can be present throughout a lifetime for certain groups (Svensson 1992, Pyle 1997).

The extent of a molt episode along with the plumage it produces and the number and timing of molt episodes in a species' annual cycle are the main factors to be taken into account when using molt patterns to age passerines (Guallar et al. 2009). The first molt episode after the growth of juvenal plumage (preformative molt according to Howell et al. 2003 molt terminology) is usually partial or incomplete (Pyle 1997). This characteristic makes it a very useful molting episode for subsequent age determination because it is characterized by the presence of molt limits, which are revealed by the contrast between two feather generations (Froehlich 2003). However, when the preformative molt is complete as, for example, in the Bushtit (*Psaltriparus minimus*), molt limits cannot be used to age birds, and other criteria such as skull pneumatization must be utilized (Pyle 1997).

Here we describe the preformative molt pattern (including extent and individual frequency of feather replacement) of the Spot-breasted Wren (*Pheugopedius maculipectus)* and the White-breasted Wood-Wren (*Henicorhina leucosticta)*, and apply molt limits to help age these monochromatic species of Middle America, for which little is known of molting strategies (Ryder and Wolfe 2010).

METHODS

We gathered molt data from 34 study specimens (19 Spot-breasted Wrens and 15 White-breasted Wood-Wrens) in Colección Nacional de Aves and Museo de Zoología Alfonso Herrera from Universidad Nacional Autónoma de México and the Museum of Vertebrate Zoology from Berkeley, CA, and eight live birds, six that were mist-netted at Los Tuxtlas Biosphere Reserve in Veracruz state (two Spot-breasted Wrens and four White-breasted Wood-Wrens), Mexico (18° 35' 7" N, 95° 4' 30" W), and two White-breasted Wood-Wrens at Las Cruces Biological Station, Costa Rica (8° 47' 7" N, 82° 57' 32" W). All of the study specimens correspond to birds in formative plumage (Howell et al. 2003), whereas four of our live captures were adults.

The age of specimens was based exclusively on the retention of juvenal feathers (Svensson 1992, Jenni and Winkler 1994, Pyle 1997). For ageing live birds we also used incomplete skull pneumatization and, in Spot-breasted Wrens, iris color, which is dull brown in hatch-year birds and reddish in older individuals (Guallar et al. 2009, Wolfe et al. 2009; this study) to confirm age.

We scored non-active molt following the method proposed by Gargallo (2000), which organizes the wing and body feather tracts as follows:primaries, secondaries, tertials, alula feathers, greater coverts (including the carpal) and primary coverts are scored individually, lesser and median coverts are scored as complete tracts according to the percentage of feathers molted within the tract (0: 0%, 1: >0-10%, 2: >10-30%, 3: >30-60%, 4: >60-90%, 5: >90%), scapulars, upper parts, underparts, head, upper and under tail coverts (the six body tracts considered) are scored like the lesser and median coverts above.

We also noted the presence of active molt and the month of occurrence, as well as the number of feather generations.

RESULTS

The preformative molt of the Spot-breasted Wren and the White-breasted Wood-Wren includes all of the body feathers and scapulars, and a variable number of lesser, median, and greater coverts, alula feathers, and tertials. The molt of White-breasted Wood-Wrens may also include some rectrices. None of the individuals that we examined had replaced primaries, secondaries, or primary coverts (Table 1).

The prebasic molt of these two species is complete. Both the preformative molt and the prebasic molt finish in late October, although some individuals may finish in November.

In first-cycle Spot-breasted Wrens, we found molt limits within the greater coverts in 33% of the birds of our sample, the alula feathers in 71%, and tertials in 24% (Fig. 1A, Table 1). The retained juvenal feathers are reddish while the formative and basic