Journal of Avian Biology

JAV-00866
Hope, S. F., Stabile, F. A. and Butler, L. K. 2015. Urban living alters moult dynamics in a passerine. – J. Avian Biol. doi: 10.1111/jav.00866

Supplementary material

APPENDIX 1

Table A1. Results of ANCOVAs testing for differences in moult onset and duration between two populations of Carolina Chickadees: one in a contiguous forest habitat and one in a fragmented forest habitat. Comparisons were made in three feather tracts: primary (wing), secondary (wing), and rectrix. A significant effect ($\alpha = 0.05$) of habitat or year indicates a difference in moult onset (y-intercept), while a significant interaction between habitat or year and percent moult complete indicates a difference in moult duration (slope of the best-fit line).

Tract Factor	Factor DF	Error DF	*F*	*p*
Primaries		38		
Habitat (fragmented or contiguous)	1		0.1	0.81
Year (2010, 2012, or 2013)	2		15.0	<0.0001
% Moult complete	1		187.8	<0.0001
Habitat x Year	2		0.4	0.66
Habitat x % Moult complete	1		0.2	0.64
Year x % Moult complete	2		0.5	0.63
Habitat x Year x % Moult complete	2		1.1	0.35
Secondaries		18		
Habitat (fragmented or contiguous)	1		0.8	0.39
Year (2010 or 2012)	1		1.0	0.34
% Moult complete	1		51.0	<0.0001
Habitat x Year	1		0.1	0.75
Habitat x % Moult complete	1		0.2	0.63
Year x % Moult complete	1		0.2	0.63
Habitat x Year x % Moult complete	1		0.3	0.57
Rectrices		15		
Habitat (fragmented or contiguous)	1		0.2	0.63
Year (2010 or 2012)	1		2.4	0.14
% Moult complete	1		40.0	<0.0001
Habitat x Year	1		0.1	0.92
Habitat x % Moult complete	1		0.1	0.98
Year x % Moult complete	1		0.8	0.40
Habitat x Year x % Moult complete	1		0.1	0.75

Table A2. Results from three full-factorial ANCOVAs testing for differences in moult onset and duration between two populations of Carolina chickadees: one in the forest (contiguous and fragmented habitats combined) and one in an urban location. Comparisons were made in three feather tracts: primary (wing), secondary (wing), and rectrix. A significant effect ($\alpha = 0.05$) of location or year indicates a difference in moult onset (y-intercept), while a significant interaction between location or year and percent moult complete indicates a difference in moult duration (slope of the best-fit line). For rectrix moult, "pair" was included in the model as a random factor because statistical significance of the "population" term in this model differed from the same model without "pair" included as a random factor.

Tract Factor	Factor DF	Error DF	*F*	*p*
Primaries		67		
Population (forest or urban)	1		10.1	<0.01
Year (2010, 2012, or 2013)	2		12.2	<0.0001
% Moult complete	1		407.3	<0.0001
Population x Year	2		4.7	0.01
Population x % Moult complete	1		0.1	0.91
Year x % Moult complete	2		1.3	0.28
Population x Year x % Moult complete	2		0.9	0.40
Secondaries		39		
Population (forest or urban)	1		7.3	0.01
Year (2010, 2012, or 2013)	2		4.4	0.02
% Moult complete	1		93.3	<0.0001
Population x Year	2		1.0	0.38
Population x % Moult complete	1		0.1	0.91
Year x % Moult complete	2		1.0	0.39
Population x Year x % Moult complete	2		0.4	0.66
Rectrices		31		
Population (forest or urban)	1		3.0	0.10
Year (2010, 2012, or 2013)	2		4.3	0.02
% Moult complete	1		42.7	<0.0001
Population x Year	2		1.2	0.32
Population x % Moult complete	1		0.3	0.62
Year x % Moult complete	2		3.1	0.06
Population x Year x % Moult complete	2		0.5	0.59

Table A3. Results of three ANCOVAs that ignore inter-annual variation in moult dynamics (by pooling 2010, 2012, and 2013; see Table S1, above) within populations of Carolina chickadees: one in a contiguous forest habitat and one in a fragmented forest habitat. Comparisons were made in three feather tracts: primary (wing), secondary (wing), and rectrix. A significant effect ($\alpha = 0.05$) of habitat indicates a difference in moult onset (y-intercept), while a significant interaction between habitat and percent moult complete indicates a difference in moult duration (slope of the best-fit line). As in other species, molt timing varies significantly among years in this species. The model reported in Table A1 both shows this effect and controls for it as a factor influencing population differences in moult dynamics; the model below does not.

Tract Factor	Factor DF	Error DF	*F*	*p*
Primaries		46		
Population (fragmented or contiguous)	1		0.1	0.86
% Moult complete	1		159.6	<0.0001
Population x % Moult complete	1		0.2	0.65
Secondaries		28		
Population (fragmented or contiguous)	1		0.1	0.99
% Moult complete	1		76.5	<0.0001
Population x % Moult complete	1		0.4	0.56
Rectrices		24		
Population (fragmented or contiguous)	1		0.1	0.83
% Moult complete	1		42.0	<0.0001
Population x % Moult complete	1		1.2	0.29

Table A4. Results of three ANCOVAs that ignore significant inter-annual variation in moult dynamics (by pooling 2010, 2012, and 2013; see Table S2, above) within and between two populations of Carolina Chickadees: one in the forest (contiguous and fragmented habitats combined) and one in an urban location (all three years of the study combined). Comparisons were made in three feather tracts: primary (wing), secondary (wing), and rectrix. A significant effect ($\alpha = 0.05$) of location indicates a difference in moult onset (y-intercept), while a significant interaction between location and percent moult complete indicates a difference in moult duration (slope of the best-fit line). For secondary moult, "pair" was included in the model as a random factor because statistical significance of the "population" term in this model differed from the same model without "pair" included as a random factor. As in other species, molt timing varies significantly among years in this species. The model reported in Table A2 both shows this effect and controls for it as a factor influencing population differences in moult dynamics; the model below does not.

Tract Factor	Factor DF	Error DF	*F*	*p*
Primaries		75		
Population (forest or urban)	1		5.9	0.02
% Moult complete	1		328.0	<0.0001
Population x % Moult complete	1		0.1	0.76
Secondaries		46		
Population (forest or urban)	1		3.3	0.08
% Moult complete	1		100.5	<0.0001
Population x % Moult complete	1		0.1	0.87
Rectrices		40		
Population (forest or urban)	1		3.6	0.07
% Moult complete	1		76.5	<0.0001
Population x % Moult complete	1		0.9	0.35