



Brood Size Affects Morphological Development of Juvenile House Sparrows

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Introduction

The House Sparrow, *Passer domesticus*, is the most widely distributed bird in the world.¹ It is small, omnivorous, and tolerates captivity, making it an organism commonly used by avian biologists in their studies of natural selection, circadian rhythms, and as models of passerine behavior and altricial development. Little is known about the timing and patterns underlying the development of adult morphology and behaviors in recently fledged juvenile birds. Our goal was to track the behavioral ontogeny of juvenile House Sparrows, and to define growth patterns of nestlings from variable brood sizes.

Methodology

Subjects at 5 days of age were collected from nests around Lexington during the summer of 2008. They were bled and then hand-reared at UK's Ecological Research Facility.

Measurements of mass, tarsus, as well as feather and shaft length for both the primary and tail feathers were taken daily.



The broods were kept in separate cups on a heating pad. They were fed on re-hydrated cat chow every half hour for 12 hrs, supplemented twice daily with wax worms and crickets.

Once nestlings began to fledge at 10-15 days old, broods were moved to cages & fed hourly. PCR and plumage were used to determine sex.

Results

We found:

1. Linear growth in all traits
2. Negative quadratic of age for body dimensions but positive for feather growth
3. No difference between the sexes
4. Reduced growth of nestlings from larger broods

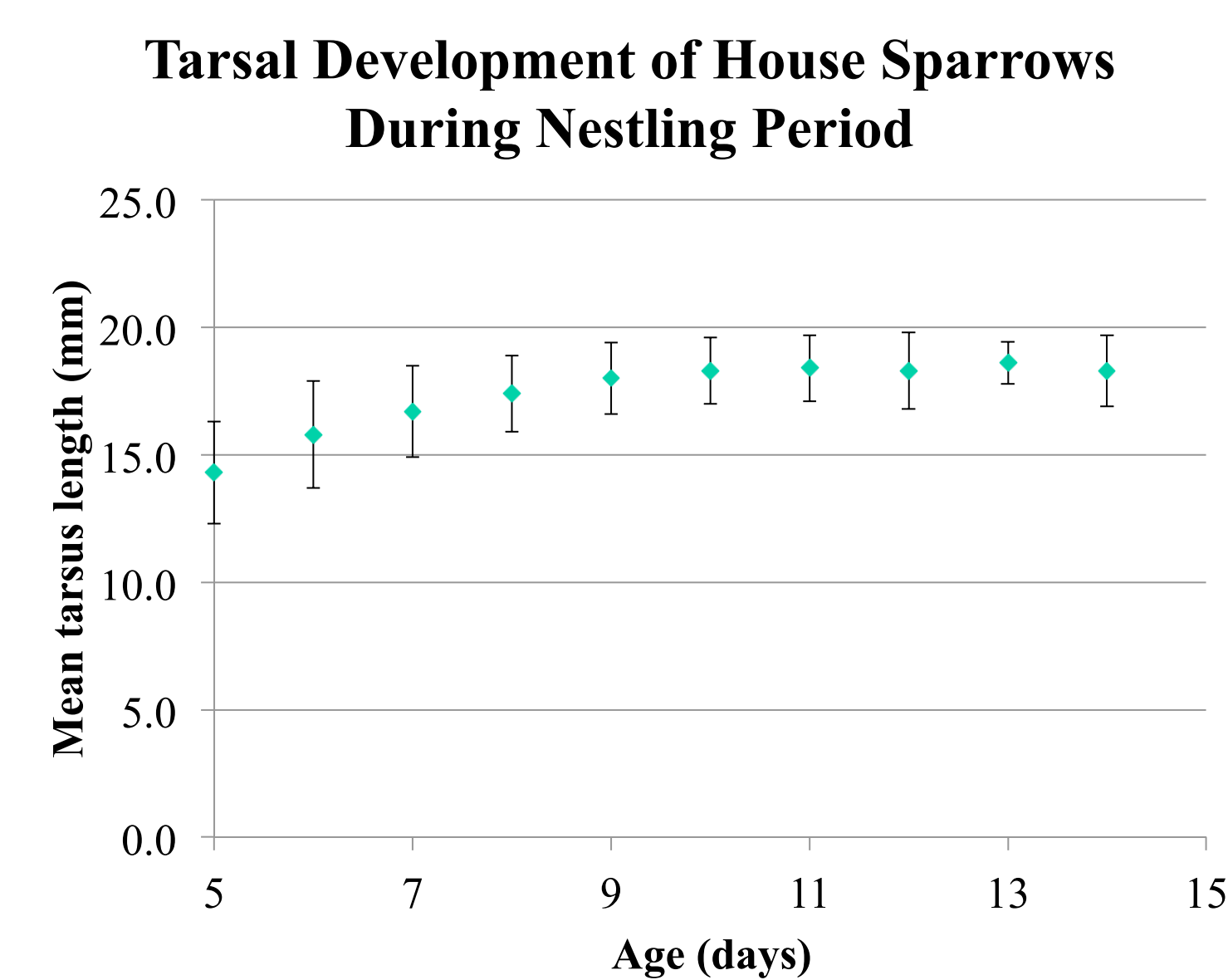
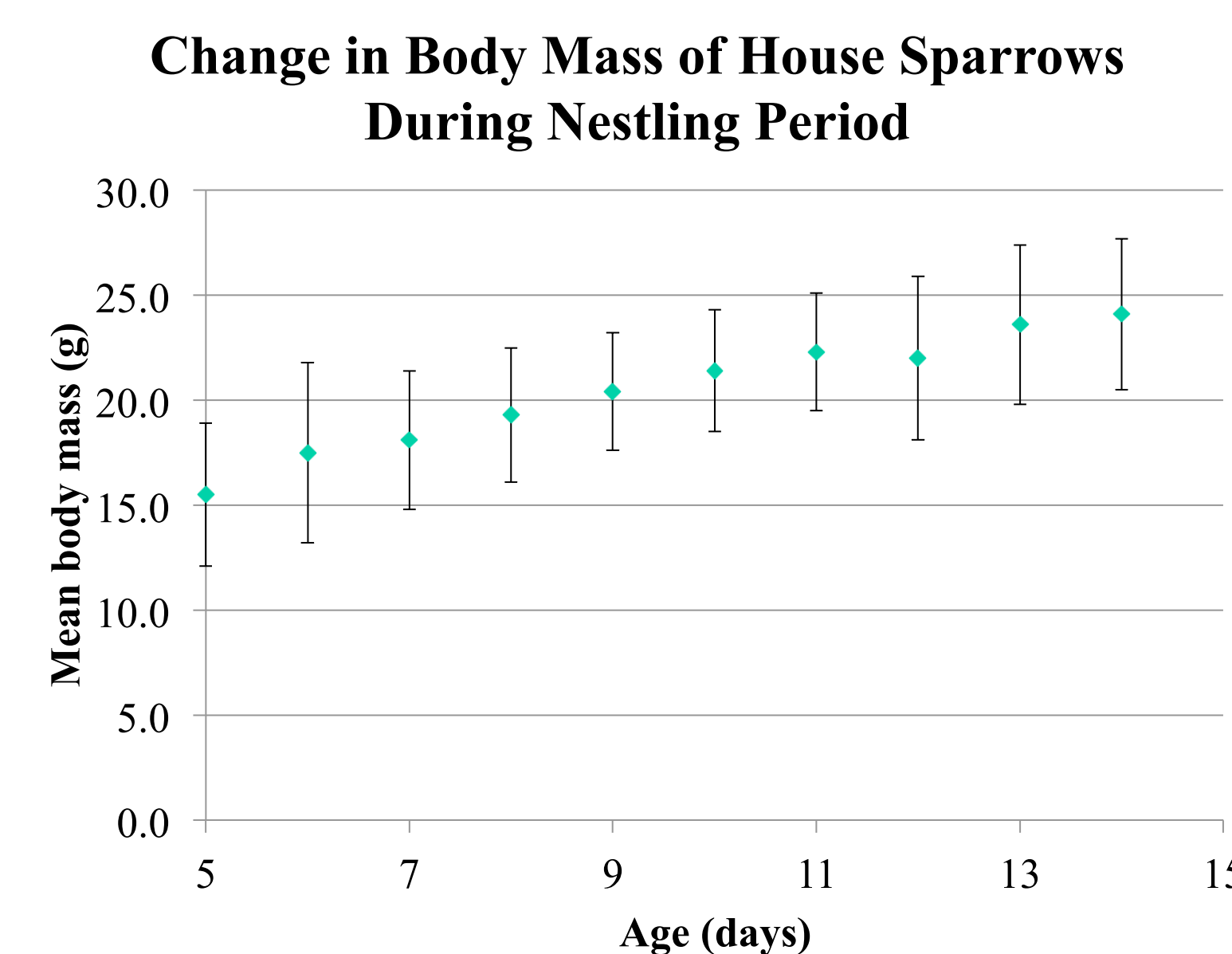


Table 1. Results of repeated measures ANOVA on morphological variables of nestling house sparrows reared in captivity.

	Mass	Tarsus	Primary feather	Tail feather
Age	1.3 ± 0.2**	1.2 ± 0.07**	2.4 ± 0.3**	1.1 ± 0.3**
Age*Age	-0.02 ± 0.009**	-0.04 ± 0.003**	0.02 ± 0.01	0.06 ± 0.01**
Sex (m – f)	0.7 ± 0.6	0.4 ± 0.4	1.0 ± 1.1	0.5 ± 1.1
Natal brood size	-0.8 ± 0.4*	-0.5 ± 0.2*	-0.9 ± 0.6	-0.8 ± 0.7

* P < 0.05
** P < 0.001

Discussion

- Body dimensions reach adult size sooner than do feathers, especially the tail
- Lack of evidence of sex differences is not consistent with data from the field. Captivity may change biology or obscure such differences
- Despite unlimited food in captivity, brood size reduced growth. This suggests residual effects on development from events occurring at very early ages.
- The study is continuing in order to measure aspects of behavioral development, such as acquisition of foraging skills. We will test whether early differences in growth also impact these later milestones in a bird's life.



Works Cited

1. Anderson, TR. 2006. *Biology of the Ubiquitous House Sparrow*. Oxford University Press: New York, NY.