

Aging Guide for Least Flycatcher chicks In the Beaverhill Natural Area



Beaverhill Bird Observatory

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Abstract

The Least Flycatcher is a small insectivorous passerine. One Least Flycatcher nest was studied to create an aging guide for this species within the Beaverhill Natural Area. Three Least Flycatcher chicks were measured daily. Their wing chord, body length, and weight were recorded, along with photographs. With only three chicks to examine, all measurements varied with the relative age of the young. Future studies will be necessary to determine the accuracy of these measurements when used for aging Least Flycatchers in the Beaverhill Natural Area. A combination of photographs and measurements may still be used to accurately age young chicks and band them at an appropriate age.

Introduction

The Least Flycatcher (*Empidonax minimus*) is a small insectivorous songbird. This neotropical migrant breeds in North America and winters in Central America (Tarof & Briskie 2008). This paper examines the breeding biology of individuals that breed locally in the Beaverhill Natural Area, and aims to create a guide for the aging of Least Flycatcher chicks. Aging guides have been used to accurately determine the age of chicks without known hatch dates in order to band them at the appropriate age to avoid risk of early fledging. Aging guides have been created for a number of songbird species, but little research has been done on the development of Least Flycatchers. Aging guides have been proven to be accurate for House Wrens when measurements of wing chord, body length, and mass were combined with photographs of nestlings (Brown et al. 2013), so these measurements were also used in this guide for aging flycatchers. Future studies will examine the accuracy of these measurements when used to age Least Flycatcher chicks.

The study nest was located near the Beaverhill Bird Observatory (BBO) within the Beaverhill Natural Area. The BBO is a bird research station that has been operating since 1984. This location is mixed age aspen and poplar forest in the aspen parkland region. The Least Flycatcher is one of the most common nesting birds in the Beaverhill Natural Area, making it an ideal candidate for nestling studies. In 2016, 13 Least Flycatcher nests were found in the Beaverhill Natural Area, and in 2017, 8 were found. Minimal information was available to determine the age of Least Flycatcher chicks, and BBO was an ideal location to create an aging guide.

The Least Flycatcher is one of many insectivorous species that are declining in abundance (BirdLife International 2016, DeSante et al. 2015, and Environment Canada 2014). It is a species that may be at risk in the future, and valuable information may be gained by studying them. The Least Flycatcher is a species of Least Concern according to the IUCN Red List (BirdLife International 2016). However, their preferred habitat, mature deciduous forest, is declining. In addition, aerial insect numbers are declining and Least Flycatchers may be among the species affected, since their diet consists of flies, ants, beetles, mosquitos, and butterflies (Tarof & Briskie 2008). This genus is known for its “hawking” behaviour where they fly out from a perch and catch insects while hovering (Tarof & Briskie 2008). Safe banding of Least Flycatcher chicks could contribute to our knowledge of them, and therefore their conservation. Other banding programs at the BBO reveal that Least Flycatchers breeding in the Beaverhill Natural Area travel through Mexico and to overwinter in Guatemala (BBO unpublished band

recoveries). Banding of Least Flycatcher chicks could increase knowledge about the natal fidelity of this species.

Methods

This study was performed within The 410 ha Beaverhill Natural Area. This natural area contained grasslands, wetlands, and mixed age aspen and poplar forest. In 2017, only one Least Flycatcher nest was found in a location accessible to staff to perform this study. The study nest was located within mixed age aspen poplar forest, over 100 meters from grassland habitat, but within 20m of walking trails. The nest was discovered on July 9th, and chicks hatched on July 12th. The nest was located at a height of 1.3m off the ground, in the fork of a 5m tall aspen tree. Four eggs were laid in the nest.

After discovery, the nest was checked every day to determine the hatch date of the chicks. On and after the hatch date, measurements and photographs were taken of individual chicks, except on days where wet weather or other circumstances prevented data from being recorded safely. Three chicks were used in this study to obtain as large a sample size as possible. The fourth chick remained in the nest at all times so the parent would not abandon the nest during the time the other chicks were removed for measuring.

To perform measurements, chicks were moved about 10m away from the nest to minimize disturbance. The three chicks were marked with red, purple, and green washable/non toxic marker on one foot, respectively, so they could be distinguished. The marker was reapplied each day because it wore off quickly. Several measurements were taken each day including wing chord in millimeters with a pair of calipers, length from tip of bill to tail in millimetres with a ruler, and mass in grams using a small laboratory scale. Other relevant observations were made about the stage of feather growth each day. These measurements were chosen because they were recommended by Jongsomjit et al. (2007) to be accurate and easy to obtain. Observations ended at Day 12 to prevent early fledging. On Day 12, chicks were very active when placed outside the nest, and they could be expected to fledge naturally as early as Day 14 (Harrison 1984).

Along with measurements, photographs were taken daily to document the chicks during growth. Photographs were taken from lateral and dorsal perspectives, and are included in the aging guide in the appendix of this document.

Results

Based on a sample of three Least Flycatcher chicks from one nest, the average wing chord of chicks on day three, the first day all measurements were taken, was 8.8mm (+/- 0.5 SD). The average body length of chicks was 33.5mm (+/- 0.7 SD). The average weight of the three chicks on Day 3 was 3.07 grams (+/- 0.49 SD). By Day 12 the average wing chord of chicks was 38.9mm (+/- 0.6 SD). The average body length of chicks was 73.0mm (+/- 3.6 SD). The average weight of the three chicks on Day 3

was 10.53 grams (+/- 1.01 SD). The average wing chord, body length, and weight of chicks on each day is included within the aging guide attached as an appendix.

Significant changes recorded included information about chicks eyes opening and feather development. Nestling eye opening was first noticed on Day 6 and all chicks had open eyes by Day 7. Pin feathers were first visible under the skin on Day 3 and feathers were seen unsheathing on Day 7.

Discussion

Other studies have found aging small songbirds to be accurate using photos and measurements. Whether these measurements can be accurately used to age Least Flycatcher chicks is still unknown. Measurements used in this study were recommended by Jongsomjit et al. (2007) and Cicon (2015). They were used because these measurements have been found to be accurate for others passerines, such as House Wrens (Brown et al. 2013). Wing chord, body length, and weight were chosen for reliability and speed of measurement. Jongsomjit et al. (2007) notes that certain parts of chicks grow regardless of environmental conditions because they are so important for survival. Future studies such as this one will make it possible to determine if these measurements can be used to accurately age Least Flycatcher chicks in the Beaverhill Natural Area.

Photographs of the chicks were paired with measurements taken because photographs have been found to allow for accurate aging of other passerine species. Using photographs for aging House Wrens allowed for correct aging within one day of 88.4% of chicks examined by novice birders (Brown et al. 2013). They found measurements to be less accurate than photographs when used for aging chicks due to variability in chick growth due to environmental conditions, or other factors such as position of chick in nest. For this study both measurements and photographs were taken, since the accuracy of either aging methods was unknown for Least Flycatchers.

With a sample size of only three chicks, variation within the measurements taken was high. The standard deviations of wing chord, body length, and weight, were quite high throughout the growth of the three Least Flycatcher chicks. Wing chord was the most reliable characteristic, with the highest standard deviation being 1.6 on Day 8. Body length had varying consistency as the chicks grew, with the highest standard deviation being 4.6 on Day 4. However, weight varied widely, with the highest standard deviation being 1.01 on Day 12. Weight would vary widely since chicks grow certain parts on schedule before gaining weight, and some chicks could be in a better position to do so. Standard deviation of weight increased as the chicks aged, whereas standard deviations of body length and wing chord varied but did not increase or decrease significantly over time. Body mass was the least reliable characteristic for aging Least Flycatcher chicks. Jongsomjit et al. (2007) found weight to be the least accurate measurement for aging House Wrens because environmental factors can cause weight to fluctuate, and this is likely true for other passerines, including the Least Flycatcher.

This study relied on methods used to age House Wrens in Jongsomjit et al. (2007) and Cicon (2015). However, Least Flycatchers and House Wrens are not closely related, and differences in growth

between Least Flycatchers and House Wren chicks were clear. House Wrens remain naked for much longer, but Least Flycatchers were rapidly covered in down feathers. This is significant because it reflects the differences in nest types. House Wren chicks are protected from weather in a cavity nest, so their environment better regulates their temperature. Least Flycatchers are exposed in an open cup nest, so they need body feathers to protect them quickly from environmental variation. Pin feathers began unsheathing in Day 7 for Least Flycatchers and Day 6 for House Wrens in a study by Cicon (2015). Eyes took two more days to open in Least Flycatchers than in House Wrens. Wing chord and body length remained similar in the two species until day 5, but Least Flycatcher chicks weighed slightly more than House Wrens at every age recorded, reflecting differences in species. Overall, measurements of Least Flycatcher chicks had a much higher standard deviation than measurements of House Wren chicks, indicating that it may be less accurate to age Least Flycatcher chicks with measurements than House Wrens, but additional study is needed.

This study also determined that Least Flycatcher nests can be exposed to some disturbance without causing parents to abandon chicks. In this study one chick was always left in the nest to prevent abandonment, and the brief but regular removal of all other chicks did not cause observed effects from the parent birds. It is valuable to know that Least Flycatcher nests may be studied in future without causing undue harm. However, this aging guide will allow banders to determine an appropriate banding age without needing to disturb chicks unnecessarily.

Conclusion

This aging guide will be most valid for aging chicks within the Beaverhill Natural Area, as resources, location within geographic range, or varied environments could result in different growth rates for chicks in other areas (Brown et al. 2013). This document should be updated whenever nests are available to increase sample size and thus reliability of the data. Future studies should repeat these measurements to increase the sample size and therefore accuracy of the measurements recorded. In 2016 and 2017, only one Least Flycatcher nest was found in each year that was accessible to staff. Therefore either multiple sites must be searched or data must be collected over multiple years. Collecting data over multiple years in the same place should help keep influence of environmental factors relatively constant (such as food availability and weather events, parasites, habitat suitability, and predation).

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Appendix

Aging Guide

Day 1 (Hatch Day)



Body length (mm): 27.5 +/- 0.7 SD

Visual Indicators: Eyes closed. Down ~4mm long.

Day 2



No measurements taken.

Visual Indicators: Eyes closed, covered in down.

Day 3



Wing chord (mm): 8.8 ± 0.5 SD

Body Length (mm): 33.5 ± 0.7 SD

Mass (g): 3.07 ± 0.49 SD

Visual Indicators: Eyes closed. Pins visible under skin on back and back of head. Quiet peeping.

Day 4



Wing chord (mm): 10.3 ± 0.9 SD

Body Length (mm): 38.7 ± 4.6 SD

Mass (g): 3.90 ± 0.62 SD

Visual Indicators: Eyes closed. Pins visible under skin on back and back of head. Quiet peeping.

Day 5



Wing chord (mm): 13.0 +/- 0.9 SD

Body Length (mm): 43.7 +/- 2.9 SD

Mass (g): 6.07 +/- 0.61 SD

Visual Indicators: Eyes closed. Pins visible under skin on back and back of head. Quiet peeping

Day 6



Wing chord (mm): 13.7 +/- 0.6 SD

Body Length (mm): 45.7 +/- 2.5 SD

Mass (g): 6.60 +/- 0.56 SD

Visual Indicators: One chick of three opening eyes. Pins exiting skin. Quiet peeping

Day 7



Wing chord (mm): 15.0 +/- 0.2 SD

Body Length (mm): 48.3 +/- 2.5 SD

Mass (g): 7.87 +/- 0.38 SD

Visual Indicators: Eyes open, pins unsheathing. Quiet peeping

Day 8



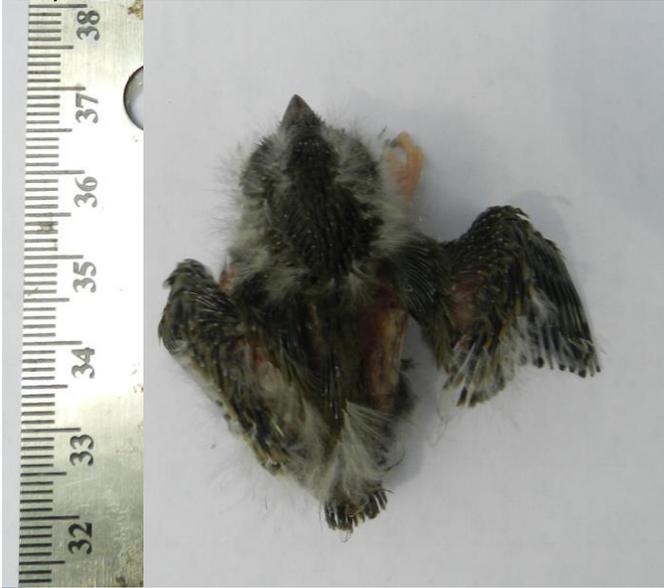
Wing chord (mm): 25.0 +/- 1.6 SD

Body Length (mm): 51.8 +/- 2.4 SD

Mass (g): 8.67 +/- 0.67 SD

Visual Indicators: Eyes open, pins unsheathing. Quiet peeping. Gape present.

Day 9



Wing chord (mm): 29.0 +/- 2.4 SD

Body Length (mm): 56.3 +/- 1.8 SD

Mass (g): 9.87 +/- 0.78 SD

Visual Indicators: Eyes open, pins unsheathing. Quiet peeping. Buffy tips visible on median and greater coverts.

Day 10



Wing chord (mm): 32.6 +/- 1.2 SD

Body Length (mm): 57.6 +/- 1.5 SD

Mass (g): 9.43 +/- 0.75 SD

Visual Indicators: Eyes open, peeping. Showing some olive body feathers.

Day 11



Wing chord (mm): 36.5 +/- 0.6 SD

Body Length (mm): 64.7 +/- 1.2 SD

Mass (g): 10.47 +/- 0.91 SD

Visual Indicators: Eyes open, peeping loud. Overall olive body feathers.

Day 12



Wing chord (mm): 38.9 +/- 0.6 SD

Body Length (mm): 73.0 +/- 3.6 SD

Mass (g): 10.53 +/- 1.01 SD

Visual Indicators: Eyes open, running around on ground during measurements, feathers getting long.