AN AGING GUIDE
for
Willow Flycatcher Nestlings

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TABLE OF CONTENTS

Acknowledgments

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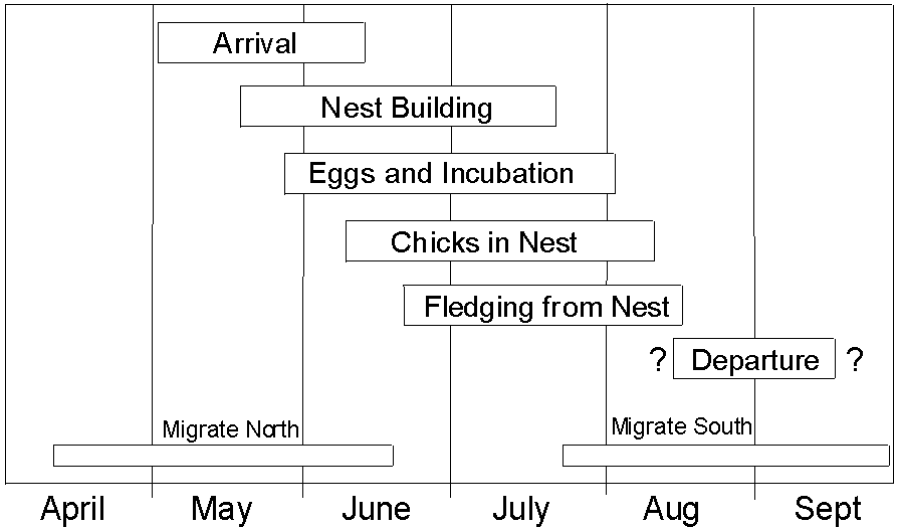


Generalized breeding chronology for the Willow Flycatcher in the Southwest. Extreme dates may occur slightly earlier or later than indicated. Adopted from Sogge et al. (1997).

Willow Flycatcher (left) and Brown-headed Cowbird (right) eggs, approximately life size.

NOTES:

INTRODUCTION

This guide is intended to assist biologists, nest monitors, and banders in correctly aging Willow Flycatcher (*Empidonax traillii*) nestlings. Correctly aging nestlings is valuable for assessing nest productivity, fledging dates, estimating hatching date, and in determining the time window for banding nestlings.

On the back cover is a generalized breeding chronology for the Willow Flycatcher in the Southwest. Once a pair bond is established, the female typically builds a nest within 3-7 days. On average, one egg is laid per day, with four egg clutches taking up to five days to complete. Upon completion of the clutch, females incubate the eggs for about 12 days. All eggs hatch within 24-48 hours of one another, and nestlings fledge within 12-15 days.

The photographs and descriptions are based on nestlings of known hatch dates, with the first day nestlings present being considered day 1, even though they may have hatched the evening before. However, development rates can vary from nest to nest, and nestlings within the same nest may vary in development. Thus, this aging guide should be interpreted as a guide for the average rate of development. Although we present descriptions for each day of growth, users may want to classify nestling age in 2- or 3-day blocks for greater consistency. Furthermore, most of our photographs of, and experience with, the development of flycatcher nestlings is based on the southwestern subspecies (*E. t. extimus*) within Arizona and California; other subspecies in other geographic areas may develop at slightly different rates. Therefore, the only completely accurate method for determining exact age of nestlings is to monitor nests in such a manner as to determine the exact day of hatching. Nestling weights are from King (1955), and may not reflect growth rates in all regions.

We also included a section with photographs and descriptions that will aid biologists in determining the age of Brown-headed Cowbird (*Molothrus ater*) nestlings. The Brown-headed Cowbird is a frequent nest parasite of the Willow Flycatcher and it is important to be able to distinguish nestlings of the two species.

WILLOW FLYCATCHER NESTS AND EGGS

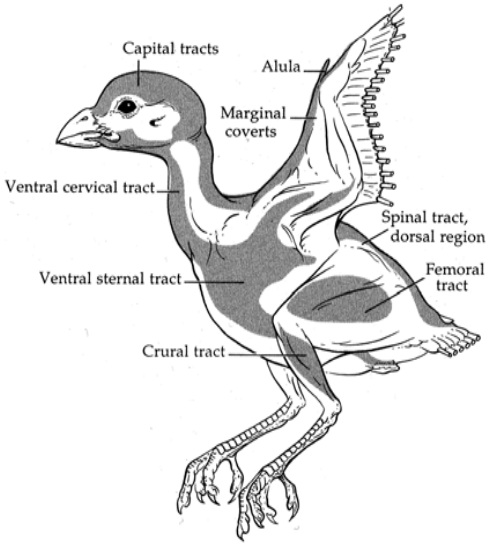
Willow Flycatcher nests are compact, open cup nests typically placed in the fork of a slender branch, supported by small vertical stalks. Nests are generally about 8 cm wide by 8 cm high (excluding dangling material, which can be over 30 cm in length). Within the southwestern U.S., lower elevation nests seldom have material dangling underneath (below, left); higher elevation nests typically do (below, right).

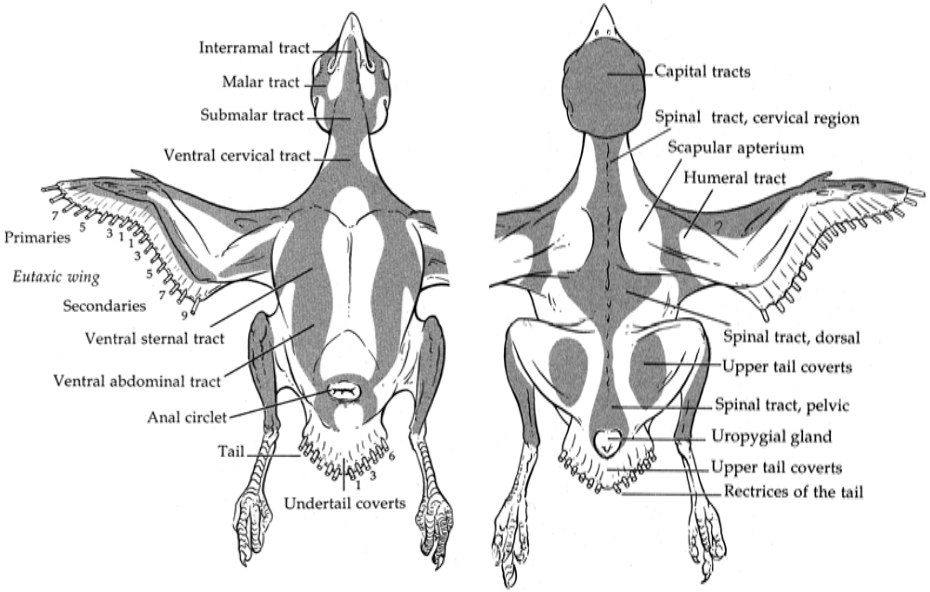
Willow Flycatcher eggs (typically 3-4 eggs, 1st clutch) are light tan with dark brown markings around the thicker end of the egg (above, left). Brown-headed Cowbird's eggs are distinct from those of the flycatchers, being larger and heavily speckled with dark brown markings (above, right; see back cover for life size picture of eggs).

Low elevation nest (left), high elevation nest (right); Photos by USGS

NOTES:

FEATHER TRACTS (From Proctor 1993):





WILLOW FLYCATCHER NESTLINGS

DAY 1

Altricial. The nestling is covered in gray down over the crown, spinal, and wing tracts; however, the down is translucent and the overall appearance of the chick is a fleshy pink color. The gape and the edge of the mouth are a pale yellow. The horny sheath that covers the bill is a buffy orange. Motor skills are limited to pedaling the legs and grasping with the toes. It makes a faint weep-weep-weep, without opening its beak. It typically lies in an embryonic position and rarely holds its head up.

Weight Range: 1.4-2.2 grams

1-day-old nestlings; Photos by Sean Rowe

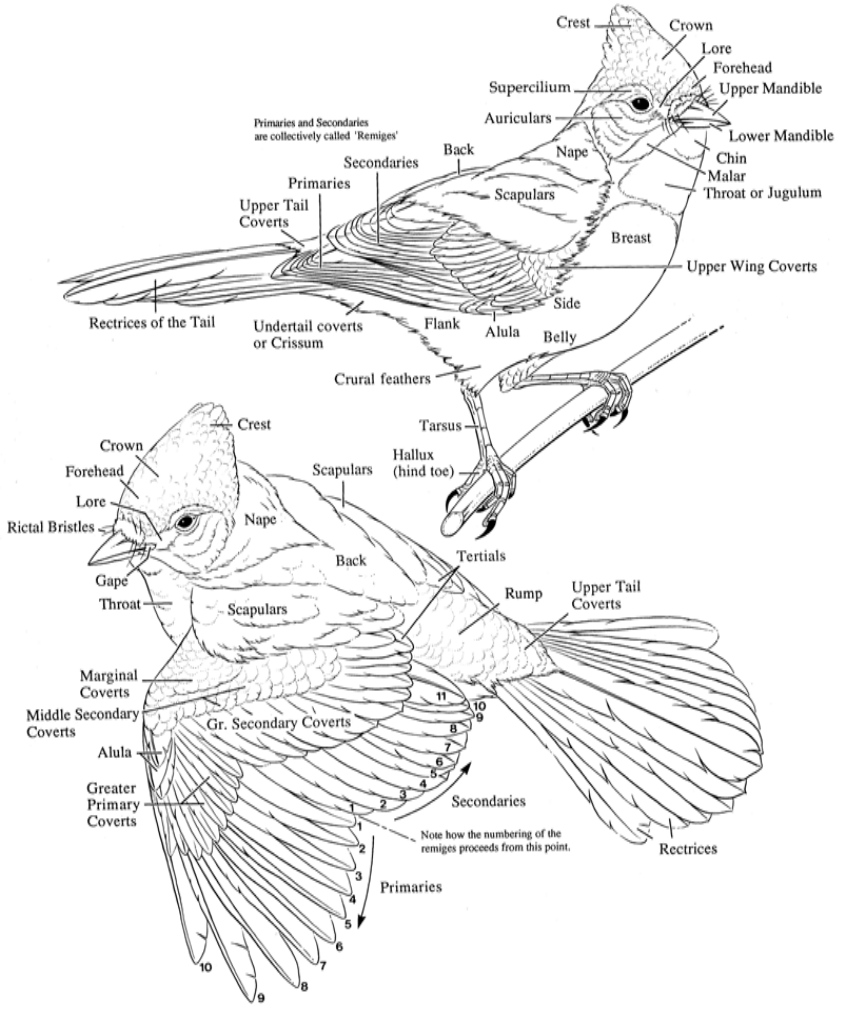
DAY 2

The feather papillae start to become visible along the neck (cervical region along the ventral tract) and on the wings where the secondaries emerge. Light and sparse gray down surrounds the eyes, wings and legs, covering approximately 30% of the body. The nestling continues to lie in the embryonic posture and rarely holds its head upright.

Weight Range: 2.0-3.0 grams

2-day-old nestlings; Photo by Sean Rowe

TOPOLOGY (From Proctor 1993):



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DAY 3

The feather papillae are visible and dark, especially on the wing. The feather sheaths for the secondaries are either about to break through the surface or have extended to less than 0.5 mm through the skin. The nestling rests on its abdomen with its legs and feet extended forward. It is able to lift its head and open its gape briefly. The yolk sac is visible through the abdomen wall.
Weight Range: 3.3-4.6 grams

3-day-old nestling; Photo by Sean Rowe

DAY 4

Sheaths begin emerging through the ventral, sternal, spinal, and humeral feather tracts. Sheaths of the flight feathers are distinct and pointed. Primaries begin to emerge and feather sheaths of the secondaries are lengthening. When looking into the nest you will typically see the nestling's backside with dark gray feather sheaths emerging in a thin line along the spinal tract. **No Picture.**

Weight Range: 4.5-6.5 grams

DAY 5

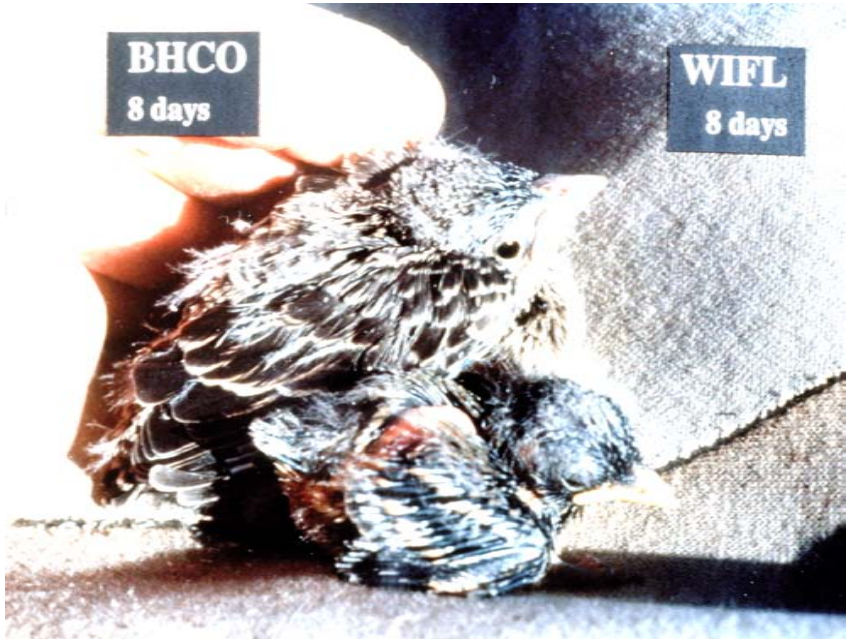
Quills are lengthening into pin feathers along all the feather tracts. The sternal apterium is distinct. The eyes are open. The sheaths of the retrices are approximately 1 mm in length.

Weight Range: 6.3-8.1 grams

5-day-old nestling; Photo by Sean Rowe

DAYS 7-9

All feather sheaths, except those on the forehead, are partly opened, and the cowbird nestling has the general appearance of being fully feathered. The sheaths of the wing feathers begin to open. The egg tooth is no longer very distinct. Preening activity first appears during the 6th-7th day.



8-day-old cowbird and Willow Flycatcher nestling; Photo by Jim Sedgwick

DAY 10-11

The nestling usually fledges at this age. The feathers have grown considerably, but a bare space is still visible between the feather tracts and abdomen, and down is still present around the head. The flight feathers are not entirely free from their sheaths. The spaces around the eyes and chin are still bare and the tail is very small and short. The under-parts are streaked.

DAYS 3-4

The down has grown in considerably where it is present. The abdominal and neck feathers are beginning to show through the skin, and a small amount of down on the lower end of the legs is visible. The sheaths of all primaries, secondaries and tertials extrude through the skin approximately 4 mm. The covert and ventral wing tracts are pierced through the skin approximately 1-2 mm. The eyes are still closed.

DAYS 5-6

The eyes are now fully open, and the nestling begins to assume a sitting position. Contour feathers cover all but the head, abdominal, leg, and uropygial areas (although the sheaths should be apparent), but down feathers can still be seen. The sheaths of the retrices begin to show.

6-day-old cowbird nestling; Photo by Jim Sedgwick

DAY 6

Little change from day five. The pinfeathers begin to erupt at the tips, especially on the pectoral and abdominal regions. Flaps wings frequently. **No Picture.**

Weight Range: 8.1-9.5 grams

DAY 7

Most contour feathers have broken through their sheaths and protrude 1-2 mm at the tips. Secondary feathers protrude up to 1 mm from sheath, and primary sheaths are just beginning to rupture. Inner rectrices may begin to show (about 1 mm long). Head mostly covered with quills.

Weight Range: 9.6-11.0 grams

Earliest banding age: Before banding, visually check that the bird band will not slip over ankle and squeeze-close the foot (after banding, physically check band fit again). If nestlings are underdeveloped, they should be banded on a later day.

7-day-old nestling; Photo by USGS

DAY 8

Photo by USGS

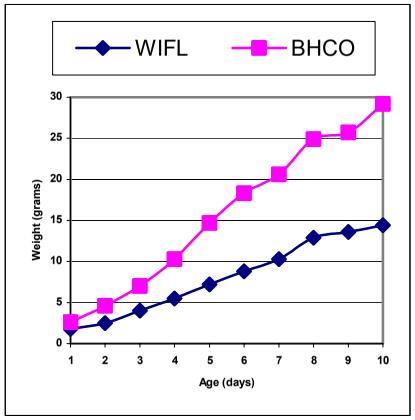
More of the feathers have erupted through the sheaths. Wing bars may be visible. Most of the body appears covered by feathers, giving nestlings the color of their plumage. Sheaths along most of the feather tracts are still visible. Legs are primarily exposed skin with little feather cover. Generally more active; legs and feet drawn under the nestling to support the body. Nestlings can perch erect and look around alertly, and are able to fold wings. ***Weight Range: 12.1-13.6 grams***

Banding age.

8-day-old nestling; Photo by Sean Rowe

BROWN-HEADED COWBIRDS

DAYS 1-2



Willow Flycatcher (WIFL) and Brown-headed Cowbird (BHCO) nestling's average weight gain for the first ten days after hatching.

Altricial. On the first day, cowbird nestlings are covered in a dirty grayish down on the crown and wing tracts, but not on the ventral, spinal or neck areas. At this age it is difficult to distinguish cowbird nestlings from flycatcher nestlings (if they are approximately the same age). The most distinguishing feature is the mouth and bill color: a cowbird nestling's mouth is a dark pink/red as opposed to a more pale pink in the flycatcher, and the bill edge is a paler yellow. The rectal flanges (gape) of the cowbird may be pale white, while the flycatcher's is yellow, but the western cowbird subspecies's rectal flanges can be yellowish. After the first day, the cowbird nestling increases weight at a quicker rate than the flycatcher (graph, above); within a few days the size difference between the two nestling species becomes apparent.

Brown-headed Cowbird laying on top of a Willow Flycatcher nestling and egg. Both nestlings are approximately 2-3 days old. Photo by Ian Tait

DAY 12

Nestling appears fully feathered with only the tail visibly underdeveloped. Some down feathers still visible around the eyes. Much wing flapping. Nestlings may leave the nest around this time.

Photo by George Andrejko

Day 13-18

After leaving the nest, fledglings stay in a family group, usually near the nest, but venturing farther away as days go by. Buffy wing bars, short tail, "ruffled" appearance, and wobbly flight make fledglings distinguishable from adults. They give audible “peep” as a begging call. May return to the nest at night, especially in the first several days after fledging.

Willow Flycatcher fledgling, 1 or 2 days post-fledging; Photo by Sean Rowe

DAY 9

Wing bars are now well defined (buffy color). Spinal feather tract well developed with sheaths at base of feathers barely visible. Two-tone buff and slate color of secondary feathers starting to be visible. Stomach still largely barren of feathers. Birds are now erect most of the time.

Weight Range: 12.6- 14.5 grams

Photo by USGS

Banding age.

9-day-old nestling; Photo by USGS

DAY 10

Photo by Sean Rowe

The nestling is mostly feathered dorsally, less so ventrally, where sheaths are still prominent. "Wisps" of downy feathers visible on head and back. Upper wing coverts almost completely cover the flight feather sheaths, making the wing appear whole. Wing bars are well defined. Nestlings now perch erect frequently, and are generally more active.

Weight Range: 13.5-15.20 grams

Latest banding age (but nestlings should be banded earlier if possible) *Birds at this age may attempt to fly when nest is accessed: **use caution**. Try to access nest early in the morning; if nestlings are perched on the rim of the nest, do not approach – they will jump.

10-day-old nestling; Photo by USGS

DAY 11

Body is completely covered by feathers with few or no quills showing. Birds actively preening, often perched on side of nest.

Weight Range: 13.9-16.0 grams

Birds at high risk of jumping out of nest. Use caution when near the nest.

Photo by USGS

10- or 11-day-old nestling; Photo by USGS