

THE TIMING OF FALL MIGRATION AND MOLT IN LEAST FLYCATCHERS

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Studies in southern Ontario and Kansas showed that in those localities most adult Least Flycatchers (*Empidonax minimus*) migrate south in July and early August, more than a month before the young-of-the-year (Hussell et al., 1967; Ely, 1970). In neither place were any adults reported after the end of August. Clench (1969), however, reported little difference in the timing of migration in the two age classes in southwestern Pennsylvania where migration peaked in early September and adults were present until the end of the month.

Postnuptial molt of the flight feathers takes place after the southward migration (Dwight, 1900; Johnson, 1963) and Least Flycatchers of unspecified age have been reported in Mexico in July and in Guatemala by 13 August (Hussell et al., 1967). To elucidate further fall migration patterns and postnuptial molt of Least Flycatchers, this paper presents the results of a study of specimens in eight museum collections.

METHODS

Least Flycatchers taken between 3 July and 30 October were included in the analysis. Specimens with inexact dates or whose locality I could not identify were excluded, as were a few that I judged to have been misidentified.

Immatures are birds with completely grown flight feathers and hatched in the year they were collected, whereas adults include all older birds (equivalent to Hatching Year and After Hatching Year, respectively, in banding terminology). Skull pneumatization ("ossification") was rarely recorded by the collector, so I determined the age of flycatchers on the basis of color and wear of the greater wing coverts and wear of the remiges and rectrices. Prior to molt of flight feathers in September, adults have more or less narrow whitish wing bars formed by the worn tips of the greater coverts and have moderate to heavy wear on the tips of the flight feathers, particularly the outer primaries. Immatures have broad buffy wing bars and show little or no wear of the flight feathers. Adults molt flight feathers in September and October and subsequently acquire buffy wing bars and unworn remiges and rectrices similar to those of immatures. By this time, however, the wing bars of some immature birds are beginning to fade and show some signs of wear. After 20 September age determination by plumage alone is unreliable, except in those adults molting flight feathers; so I called some non-molting birds "probable" adults or immatures.

Of the 492 specimens whose ages I determined, 200 were judged to be adults or probable adults and 292 were immatures or probable immatures. They were tabulated according to age, geographic region and date of collection (Table 1, Figs. 1, 2). Most of the breeding range is

TABLE I.
Numbers and localities of adult and immature Least Flycatcher specimens.

Region ¹	No. of specimens of age ² :		% adult	Specimen localities ³
	Ad.	Im.		
NE	69	132	34	Conn. 0-6, Ill. 0-8, Mass. 1-2, Mich. 10-28, New Brunswick 4-5, N.J. 2-14, N.Y. 4-10, Nova Scotia 4-4, Ontario, 25-39, Penn. 5-7, Quebec 12-6, Vt. 0-1, Wisc. 2-2.
NW	69	65	51	Alberta 12-12, Brit. Columbia 0-4, Id. 5-9, Manitoba 7-15, Minn. 2-0, Mont. 5-3, N.D. 31-14, Northwest Territories 1-0, Saskatchewan 5-6, Wyo. 0-1, Yukon 1-0.
SE	4	44 (1)	8	D.C. 0-3, Ga. 0-2, Ky. 0-2, Md. 0-2, Miss. 2-22, N.C. 0-9, Va. 1-3, W.V. 1-1.
SW ⁴	14	18	44	Ark. 0-1, Calif. 0-1, Kans. 1-1, Okla. 0-1, Tex. 13-14.
MEX ⁵	22 (2)	17 (14)	56	Campeche 0-3, Chiapas 7-3, Coahuila 2-0, Guerrero 3-5, Hidalgo 1-0, Mexico 0-1, Michoacan 1-0, Morelos 1-0, Nuevo Leon 0-1, Oaxaca 3-3, Veracruz 4-0, Yucatan 0-1.
CENT	22 (3)	16 (10)	58	Canal Zone 0-1, El Salvador 1-0, Guatemala 21-14, Honduras 0-1.

¹ See Figure 1 for locations.

² Ad.—adult or probable adult. Im.—immature or probable immature. The number of “probables” in any total is given in parentheses.

³ Number of Ad. and probable Ad. followed by number of Im. and probable Im. for each state, province, or country.

⁴ 1 Im. on Pacific Ocean at 34°N 121°W is included with California.

⁵ 1 Ad. on Pacific Ocean at 15°N 102°W is included with Guerrero.

within the regions NE and NW whereas the wintering area is in Mexico and Central America (Fig. 1).

The last primary molted on each wing was recorded for adult specimens molting remiges and rectrices.

RESULTS

The timing of occurrence of Least Flycatchers in the six geographic areas is shown in Figure 2. Many adults were taken in North America in July, but few were collected in August and only one after 21 August. Adults were collected outside the breeding range in Kansas and Texas as early as 19 July, in Mexico by 3 August, and in Guatemala by 13

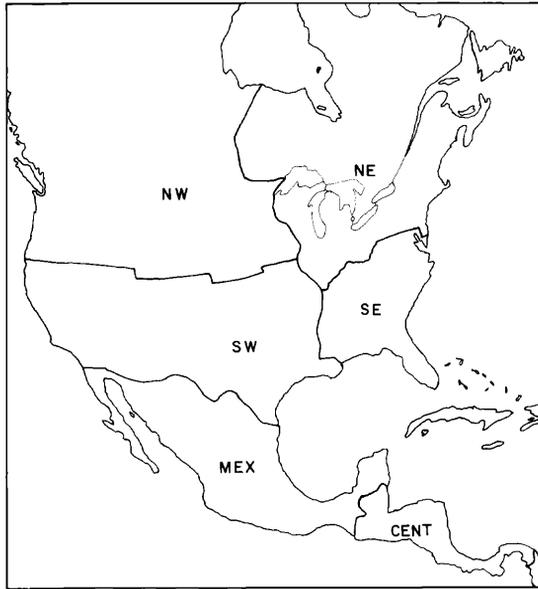


FIGURE 1. Six regions of North and Central America used in analysis of Least Flycatcher migration.

August. By contrast, immatures from NE and NW were collected mainly from mid-July until late September. The earliest immature in Mexico was collected on 11 September and the first probable immature in Guatemala on 12 September. Specimen dates indicate peak occurrence of migrant adults and immatures in the SW region (mainly Texas) in early August and mid-September, respectively. In Mexico, maximum numbers of adults appear in the first half of August, whereas most immatures arrive in late September or early October.

Specimen data are undoubtedly biased because collecting is nonrandom in space and time and because certain age or sex groups may be selected by collectors. A strong bias in favor of one age group of Least Flycatchers in the fall seems unlikely, however, and if such a bias exists it is unlikely that its strength would vary significantly with the time during the season or the geographic location. If this assessment is correct, the percentages of adults and immatures in each region (Table 1) strongly suggest a different usual migration route for adults and immatures. Adults make up a considerably greater proportion of the totals in the NW and SW regions than they do in the NE and SE.

Of the 14 adult specimens molting flight feathers, 12 came from Guatemala, and the other two were taken in Mexico (Guerrero and Chiapas). Progress of the primary molt, which essentially spans the entire molt of the flight feathers, is shown in Figure 3. Molt of the rectrices, which was almost simultaneous, started early in the primary molt, and growth was

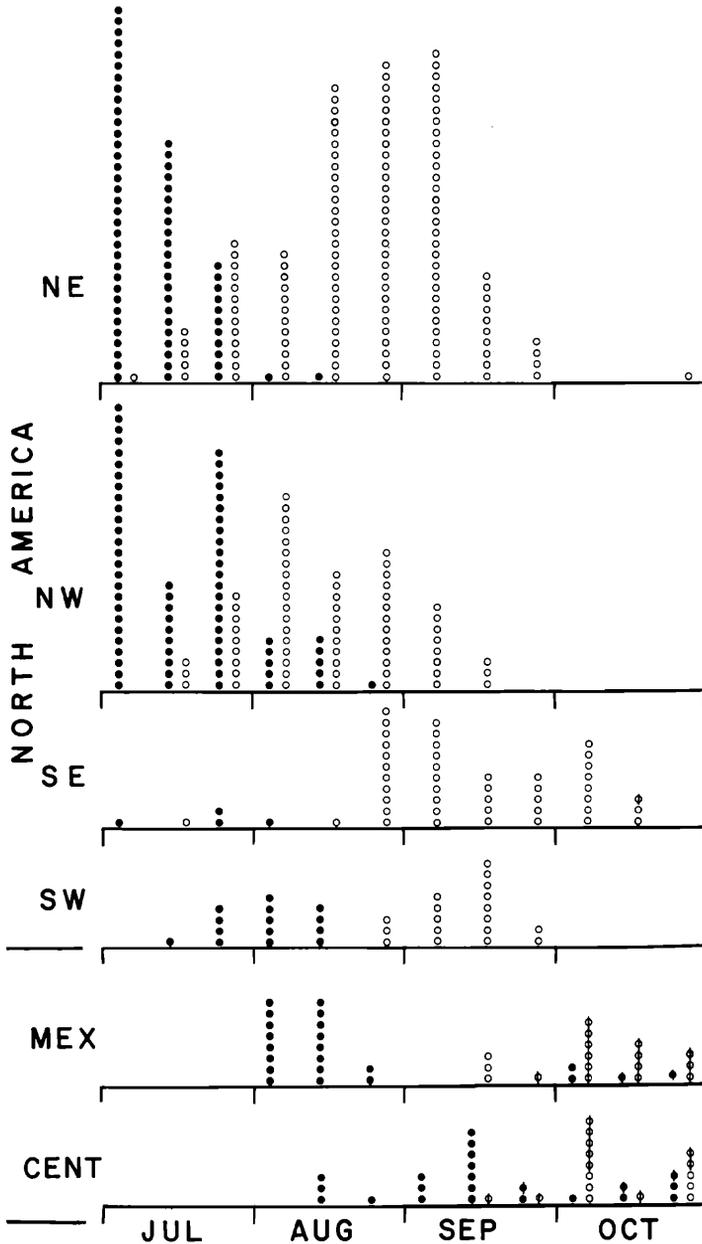


FIGURE 2. Timing of occurrence of adult and immature Least Flycatchers in six regions. Solid circle = Ad.; open circle = Im.; solid circle with vertical line = probable Ad.; open circle with vertical line = probable Im. Columns represent consecutive 10-day periods, 3 July through 30 October, all years combined. For each period, data for Im. are placed immediately to the right of those for Ad.

dispersal. It seems likely that once breeding is terminated the adults leave their nesting area, but do not migrate. They may even move in the migratory direction. Later, during the autumn they begin the normal nocturnal flights at the same time as the immatures." Contrary to Ralph's opinion, the evidence presented here shows that the results from Long Point and Hays as well as the recent Powdermill data are consistent with the pattern of southward migration across the continent indicated by the study skin data.

The small percentage of adults in the SE region indicates that they probably tend to follow a relatively narrow corridor around the western side of the Gulf of Mexico, a conclusion supported by the large numbers of adults in Texas in late July and early August (Table 1, Fig. 2). The more westerly route of adults is also indicated by Ely's (1970) Kansas sample which consisted of 18 adults and 11 immatures (62% adult) caught between 16 July and 18 October. On the Atlantic coast, only two adults were among 110 Least Flycatchers (2% adults) netted at the Kalbfleish Station, Huntington, Long Island, during autumn migration (Phillips et al., 1966), but this may be due to a local coastal effect which is common to many species (Murray, 1966; Ralph, 1971).

The departure of adult Least Flycatchers from the breeding grounds must occur immediately after the young become independent. Among 36 Ontario nest records (Ontario Nest Records Scheme) that list the presence of young, the median date for the latest record of young is 3 July; moreover 80% of such records occur by 12 July and 90% by 25 July. One notably late record occurred on 8 August, at a time when many adults are already in Mexico. Specimens of 15 flying young from Michigan and Ontario, which have incompletely grown flight feathers, were taken 8 July to 4 August, with a median date of 23 July.

Occurrence of adults at Long Point in early July suggests the possibility that unsuccessful breeders move south upon termination of their final nesting attempt. More detailed information on disappearance of the adults from the nesting grounds in relation to independence of the young would be of interest.

The molt of adults in Mexico and Guatemala is evidently quite rapid. Thus for the Least Flycatcher Johnson's (1963) conclusion that the early fall migration of adult flycatchers is associated with a protracted molt on the wintering grounds needs to be revised.

SUMMARY

An analysis of 492 Least Flycatcher specimens taken between 3 July and 30 October showed that adults start fall migration in early July and begin to arrive on the wintering grounds in August, whereas the migration of immatures takes place a month or more later. The distribution of specimens indicates a more westerly route for adults than for immatures. Adults molt flight feathers in the winter quarters in September and October.

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