

OBSERVATIONS ON NESTING BEHAVIOR OF THE HOUSE FINCH

By FRED G. EVENDEN

A search of the literature pertaining to the House Finch (*Carpodacus mexicanus*) reveals little detail on the nesting of this species. Hence, I am presenting here a summary of observations on nesting activities of the House Finch in Sacramento, California, for the five-year period from 1950 to 1954.

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DESCRIPTION OF AREA

The observation area was a residential development of small one-story homes which had been in existence for approximately eleven years at the start of the record period. Neighborhood trees included ash, silver maple, poplar, sycamore, paper birch, and acacia, none of which exceeded 30 feet in height. On the 60×80-foot lot on which the finch observations were made, there was a wide variety of shrubs, including English laurel, arbor vitae, cypress, camellia, privet, photinia, lilac, myrtle, firethorn, cotoneaster, and oleander. Vines included variegated ivy, wisteria, morning glory, trumpet vine, moon flower, and rose. Other homes in the area were similarly landscaped.

NEST SITES AND NEST MATERIALS

The choice of nesting site was variegated ivy in 36 out of 48 nesting attempts. Seven of the remaining 12 nests were in wisteria, three in climbing roses, one in a myrtle hedge, and one in a cypress overhung and entangled with wisteria vines. The myrtle hedge site was the only one not providing a vine-type growth. Nests were placed at heights of six to nine feet above the ground, with the majority between seven and eight feet. Most of the ivy nest sites were under overhanging roofs. These sites were typical of others in the neighborhood.

Plant species used in nests varied in the course of the nesting season, although there was a similarity in nest construction materials. Nest bases and sides of cups were composed of dry grass stems, rootlets, hemp string, mosses, sprigs of flowering alyssum and green ash samarae (apparently harvested by the birds), along with small bits of fresh prunings from myrtle, privet, or arbor vitae. The final cup lining was of much finer materials, including cotton string, cotton, wool, fine grass, or rootlets and almost always down, lint, and hair. Early in the season, in March and April, nest construction could occupy as long as two to three weeks, the chief cause for delay appearing to be weather conditions and competition with House Sparrows (*Passer domesticus*) for nest sites. The shortest nest-construction time observed was two days, recorded in early July. Both adults participate in nest construction, as recorded by Grinnell and Linsdale (1936:120), but the proportion of participation varied with the pair. One to four days' time elapsed between completion of the nest and the beginning of egg laying, with the greatest time lapses coming early in the nesting season.

EGG LAYING

Eggs were laid in the early morning hours in all instances where verification was possible. Once egg laying began, an egg was laid each morning until the clutch was com-

pleted. A typical example from continual daily observations is ivy nest 5 for 1952: April 22, no eggs; April 23, 7:30 a.m., 1 egg, and 6 p.m., 1 egg; 24, 7:30 a.m., 2 eggs, and 6:15 p.m., 2 eggs; 25, 7:15 a.m., 3 eggs, and 6 p.m., 3 eggs; 26, 5:45 a.m., 3 eggs, and 7:40 a.m., 4 eggs. A laying day apparently would be skipped occasionally by the female because of early morning disturbance by cats, House Sparrows, or the observer.

Egg-laying dates reported in the literature range from March 25, in Fresno County, California (Arnold, 1937:35), to mid-June, in central Baja California (Bancroft, 1930:

Table 1

Monthly Distribution of All Clutches Recorded

Month	First egg laid	Last egg laid (completed sets only)
April	8	5
May	11	8
June	9	10
July	2	2
Totals	30	25

35). For Butte County, California, a comparable nearby area, Davis (1933:152) reported egg laying from April 16 through May 9. The earliest record of egg laying in this study was April 15, 1954, and the latest July 17, 1951. Thirty of the 48 nests started proceeded into the egg laying stage, and in 25, clutches were completed. Table 1 gives the monthly distribution of start and end of egg-laying in these 30 nests.

The 25 completed nests held a total of 110 eggs for an average clutch of 4.4 eggs. Similar clutch sizes are reported in the literature (Arnold, 1937:35; Grinnell and Linsdale, 1936:120; Keeler, 1890:173). Relationship of completed clutch size to time of laying in each nest is indicated in table 2.

Table 2

Records of Clutch Size

Month	4 eggs	5 eggs	6 eggs	Totals
April	4	1	0	5
May	3	3	1	7
June	7	4	0	11
July	2	0	0	2
Totals	16	8	1	25

INCUBATION AND HATCHING

Early in the laying period, the female could be found at the nest only early and late in the day. But she remained on the nest increasingly longer as the end of the egg-laying period approached and sometimes began incubation the day before the last egg of the clutch was laid. Very little was seen of the male until the young were hatched, and although he stayed in the area during the day, there is evidence that he joined with other males in flights to a night roost. The roost is known to have been $1\frac{1}{2}$ miles from the nest site in at least one instance.

The only valid way to determine incubation periods is "by counting the time from the laying of the last egg to the hatching of the last egg, when all eggs hatch" (Nice, 1953:81). Some eggs hatched in 20 of the 48 nests, but in only 11 did all eggs hatch.

On the basis of these 11 nests, incubation periods were 12 days (2 nests), 13 days (6 nests), 14 days (2 nests), and 16 days (1 nest). The two 12-day incubation periods were both nests of mid-to-late June, and the 16-day period was for a nest of late April and early May. The average incubation period for the 11 nests was 13.27 days. Six of the nine not-so-valid incubation records provided enough authentic data to indicate an average incubation period of 13.17 days with extremes of 12 and 14 days.

The period over which eggs hatched seemed to vary considerably. This nest-to-nest variance ranged from one or two young hatched per day for three days to five young hatched in one day. In only one instance was a day skipped in the course of the hatching period, and in this case one egg had disappeared in the course of incubation. The earliest record date of hatching was May 1, 1954, and the latest July 29, 1951. Circumstantial evidence indicates that generally the first egg laid also hatched first. Hatching apparently occurred during both night and daylight hours. Significant differences in size of young in the nest were observed infrequently. The female carried egg shells at least 20 feet from the nest almost immediately after the young hatched from them, or, as in one case, one part was carried away while the young was still in the other part of the shell.

NESTLING PERIOD

Little parental activity took place at the nests until the young were at least one or two days old. The first few days after the young hatched, the female stayed on the nest most of the time, particularly during inclement weather and in the cool hours of morning and evening.

Young in only six of the 11 nests used in calculating incubation periods left their nests without outside disturbance. Keeler (1890:176) gave two weeks as the nestling period. However, figuring from the dates of the first and last egg hatched to the earliest and latest departures of young birds in these six nests, residence of individual young varied from 11 to 19 days within one nest, with nest averages ranging from 13.2 to 17.0 days; the overall average was 15.1 days. Nestling periods from nine not-so-valid nest records varied from 12 to 18 days within one nest, with a range of nest averages of 13.7 to 15.8 days; the overall average was 14.8 days. The earliest fledgling flight recorded was on May 12, 1954, and the latest on August 12, 1951.

In the course of the growth period the young were fed by both parents. One record in the literature (Keeler, 1890:175) is contrary to this, indicating no male aid in care of the young. Fecal sacs were carried away from the nest for a number of days, with no accumulation of excreta on the nest rim until sometime in the second week of nestling life. The young were rather quiet at feeding times for the first seven or eight days, but they became extremely noisy while being fed in the last three to five days of nest residence. This noise served as an indication of approaching departure from the nest and, as will be discussed later, also served to let neighborhood cats know the nest location.

Although time did not permit detailed analysis of feather growth, it was noted that growth rates varied from young to young, nest to nest, month to month, and year to year. For example, contrary to the recorded appearance of remiges at an age of 3 days (Keeler, 1890:175), none was seen on young known to be 4 and 5 days of age (June 13); remiges $1\frac{1}{2}$ inches long and bursting their sheaths were found on young at 8 days old (June 4); remiges $\frac{1}{2}$ inch long and sheathed were found on young 8 days old (May 18); regimes still sheathed were found on young 9 days old (August 7); and remiges which had burst along half their lengths were found on young 10 days old (June 30).

The observer had an opportunity to see and measure the initial flight attempts of nestling birds on a number of occasions. The young never returned to the nest from

such a flight, although they would roam into the vines adjacent to the nest and return to their nest prior to such flight. Some measurements of these flights are given in table 3. The average distance of the initial flights was 49.3 feet, and their average altitude gain was 1.6 feet.

Table 3
First Flights of Fledglings

Date	Nest height	Flight distance	Height at end of flight	Height gain or loss
June 10, 1951	7 feet	17 feet	9 feet	+ 2 feet
	7	90	12	+ 5
	7	18	9	+ 2
	7	12	0	- 7
June 25, 1951	7	125	0	- 7
May 26, 1952	6½	35	12½	+ 6
	6½	35	13½	+ 7
	6½	65	9½	+ 3
July 5, 1953	7	35	16	+ 9
June 21, 1954	7	20	13	+ 6
	7	125	7	0
	7	15	0	- 7

OVERLAPPING OR "DOUBLE" NESTINGS

The designation "double" nesting is used here to refer to nesting activities under way simultaneously at two nests by one pair of finches. Two definite records of double nesting were obtained and several others were suspected. In 1951, ivy nests 4 and 5, which were approximately 16 feet apart, were observed by the writer to be maintained by the same female and presumably by the same male, as follows: Nest 4 had six eggs laid by May 15 and five young hatched by May 29. Four of the young departed on June 10 and one on June 13. This nest had a 14-day incubation period which was longer than the average for the season, probably because the female left the nest unattended much of the time in the last few days of incubation while she laid eggs in and incubated the clutch in nest 5. The successful outcome of nest 4 was undoubtedly aided by warm temperatures in the last half of May. The United States Weather Bureau maximum and minimum temperature readings at the Sacramento Airport (3.5 miles southwest of the study site) were as follows on the days preceding and overlapping of incubation in the two nests: May 24, 89° F. and 51°; May 25, 100° and 58°; May 26, 99° and 66°; May 27, 79° and 58°; May 28, 89° and 51°; May 29, 84° and 52°. The average daily temperatures were from 2° to 18° above normal. On a number of occasions the female was observed to feed the young in nest 4 at 15 to 20 minute intervals and then fly to nest 5 to sit on those eggs for a short period. The incubation period was 13 days in this nest, which was normal for the season. Temperatures for the incubation period from May 27 through June 9, 1951, ranged from a maximum of 91° F. to a minimum of 47° F., with the average daily temperatures from 7° below normal to 5° above normal for the season. This second nesting was timed nicely in that the second clutch hatched the day before four of the five young had left nest 4, thus keeping the adults busy feeding young in only one nest at a time. The part played by the male in this double nesting was not determined accurately.

In 1952, ivy nests 5 and 7, which also were approximately 16 feet apart, were also observed to be maintained by a single female, as follows: Nest 5 held four eggs by

April 26, and three young hatched by May 10. All three young left this nest on May 26. Nest 7 held four eggs by May 16 and four young hatched by May 30. Both nests had 14-day incubation periods. More extensive observations of this double nesting than of the one witnessed in 1951 indicate that the male did much of the feeding of the young at nest 5 while the female was on nest 7. However, the young in nest 5 were left unattended for long hours once incubation began in nest 7 on May 16. After May 15, there was no adult on nest 5 even as early as 6:30 or 7:00 a.m. or as late as 10:30 or 11:00 p.m.; the female was on nest 7 at these times. The male of this pair probably joined other House Finches observed in the area in evening flights to a roost previously mentioned in this paper. Young from nest 5 departed a few days prior to the hatching of the young in nest 7. Completion of activities at nest 7 was early enough in the season that there was a possibility that this pair could have raised a third brood in 1952.

Other evidence of double nestings was derived from a female first trapped and banded on March 17, 1953. On the morning of May 10, 1953, with young hatching in her nest at the front of the house, she laid an egg when trapped again at the rear of the house. Keeler (1890:172) stated that two broods are raised in a season, but he did not indicate whether he witnessed any double nestings.

NEST MORTALITY

Competition between House Finches and House Sparrows for nesting sites was particularly strong early in the season. The observer tore down finch nests made over or destroyed by sparrows. After continual discouragement of the sparrows by the observer, they nested elsewhere, but they often harassed or even moved in to take over finch nests containing eggs, and, in one instance, a nest containing one nestling. Similar harassment by House Sparrows has been recorded elsewhere (Abbott, 1929:225; Gilman, 1908:149). Neighborhood cats accounted for almost the entire loss of young indicated in the mortality figures of table 4.

Table 4
Records of Nest Losses

Year	Nests started	Abandoned or destroyed		Productive		Numbers of young		Per cent fledging success based on total eggs	
		Nests	Eggs	Nests	Eggs	Hatched	Fledged	Laid*	Hatched
1950	1	1	2	0	0	0	0	0	0
1951	9	5	12	4	19	17	16	84	94
1952	15	6	3	9	40	28	16	40	57
1953	13	7	0	6	25	19	15	60	79
1954	10	4	0	6	26	16	10	39	62
Totals	48	23	17	25	110	80	57	52	70

* Based on egg totals in completed nests.

Brown-headed Cowbirds (*Molothrus ater*) were present but did not parasitize finch nests in this area, although such parasitism has been recorded elsewhere (Hanna, 1933:205; Robertson, 1931:205).

Of the 48 nestings attempted, 23 or 48 per cent were failures (table 4). One of these was abandoned because of continued inclement weather (1950), five because of pressure from House Sparrows, and eight because of disturbance by cats. Nine were destroyed by House Sparrows. House Sparrow pressure consisted of persistent annoyance of the finches by one to several pairs of sparrows. It included chasing the finches, and even entering a finch nest to tear it apart or to add their own material to it. Ordinarily nests destroyed by House Sparrows were completely rebuilt for their own use.

Losses from 25 nests which were productive are summarized in table 4. Fledging success, based on the total of 110 eggs laid in completed nests, was 52 per cent. This is lowered to 45 per cent if the total number of eggs is raised to 127 to include those in unsuccessful nests. Of the young hatched, 70 per cent were fledged.

BANDING RECORDS

All the young in this study were banded, as were many of the adults. Returns and recoveries were few, however. One finch, which died of poisoning 23 months after banding in the nest, was found within a few city blocks of its nest-place. One adult female was caught in February at a night roost in ivy within a few feet of her own nests of the previous summer. A young male banded as a nestling was retrapped 13 months later within 40 feet of its birthplace. Repeats and retraps were frequent following nesting seasons. These few banding records indicate that at least some of the House Finches are resident even though they may join with others from a wide area at night roosts some distance from their nesting areas.

SUMMARY

Results of 48 nesting attempts by House Finches at Sacramento, California, are recorded. Egg laying occurred from April 15 through July 17. The majority of the nests were seven to eight feet above the ground in ivy vines. Completed clutches averaged 4.4 eggs. Only 11 nests had all eggs hatch after an average incubation period of 13.3 days (range, 12 to 16 days). Eighty young hatched from a total of 110 eggs in 25 nests. Hatching rate varied from one or two young per day for three days to five young in one day. The young remained in the nest from 11 to 19 days, with 15.1 days being the average. There was a 52 per cent fledging success based on 110 eggs laid, and a 70 per cent fledging success based on 80 young hatched. Two detailed records of overlapping or "double" nestings are discussed.

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