A YEAR'S STUDY OF HOUSE FINCH WEIGHTS

WITH TWO CHARTS

By J. L. PARTIN

March 27, 1932, culminated a year's effort in the weighing of House Finches (*Carpodacus mexicanus frontalis*) at 2151 Balsam Avenue, in the Westwood section of Los Angeles. Over 1000 weighings were made of 800 individuals during the year. Every month is represented except August. Our absence from the station and the extreme scarcity of birds in August are the reasons for this gap. Each bird weighed was banded with a U. S. Biological Survey band.

The purpose of this work was to gather sufficient accurate data on the weights of House Finches to enable us to determine whether there were any marked tendencies for these weights in the aggregate to be influenced by the seasons, the time of day, and the sex and the age of the bird. We were able to devote only week ends and holidays to trapping, yet we feel that sufficient samples were taken to give fairly accurate cross-sections of House Finch life.

The balances used had a sensitivity of one-tenth of a gram, and the set of weights was calibrated by the Los Angeles County Department of Weights and Measures, so that it is reasonable to suppose that the weighing apparatus was accurate enough for our purposes.

We were given helpful suggestions by Mr. Harold Michener early in the study. He suggested that we confine each bird in a dark box for weighing, a plan which was highly satisfactory. The first box used was a cardboard carton, which was early discarded because of its annoying habit of changing its weight with the relative humidity, as much as 1.5 grams in twelve hours, or approximately 7% of the weight of a House Finch. This, of course, necessitated weighing the box after every weight taken, making the time required for each bird excessive. We remedied this inefficiency by making a box 4 x 4 x 8 inches out of 32-gauge sheet aluminum, and counterweighting it so that the weights on the pan indicated the weight of the bird directly. Another precaution taken was to feed the birds only on the days of trapping, so as to give as little artificial food supply as possible.

The territory for a radius of about two miles around the trapping station was, up to six or eight years ago, grain fields for pasture. Consequently, the vacant lots, about 50% of the subdivided land, are covered with wild oats, mustard, radish, etc., during about 75% of the time.

First, the data were investigated for any seasonal influence. To this end, the weights were segregated according to months for the females, males and immatures. These were then averaged, giving a value for each month. Figure 8 is a graphical representation of these values. From April to July the female weights were consistently above those of the males. From July to November there was no consistent superiority of either sex, the combined average being practically constant and relatively low. These periods embrace the breeding and molting seasons. Beginning in December there was a surge upward, reaching a maximum in February. During this phase the male weights were the greater.

In May we had our first immatures, which were about the same in numbers as the adults. Their average weight was 95.5% of the average adult weight for the month of May. In June the same condition continued as to numbers of adults and immatures, but the immatures dropped off about 3% in weight, making their average only 92.8% of the average adult's. In July the immature average jumped

back to 94.8% of the average adult weight for the month, and in September their average climbed to 98% of the average adult weight. To speculate, it seems reasonable to conclude that the drop in weight in June was due to the adaptation of the youngsters to their own support; and finally that by September, the last month of a recorded immature in our notes, the young had about grown up, being only 2% below the average adult weight for the month.

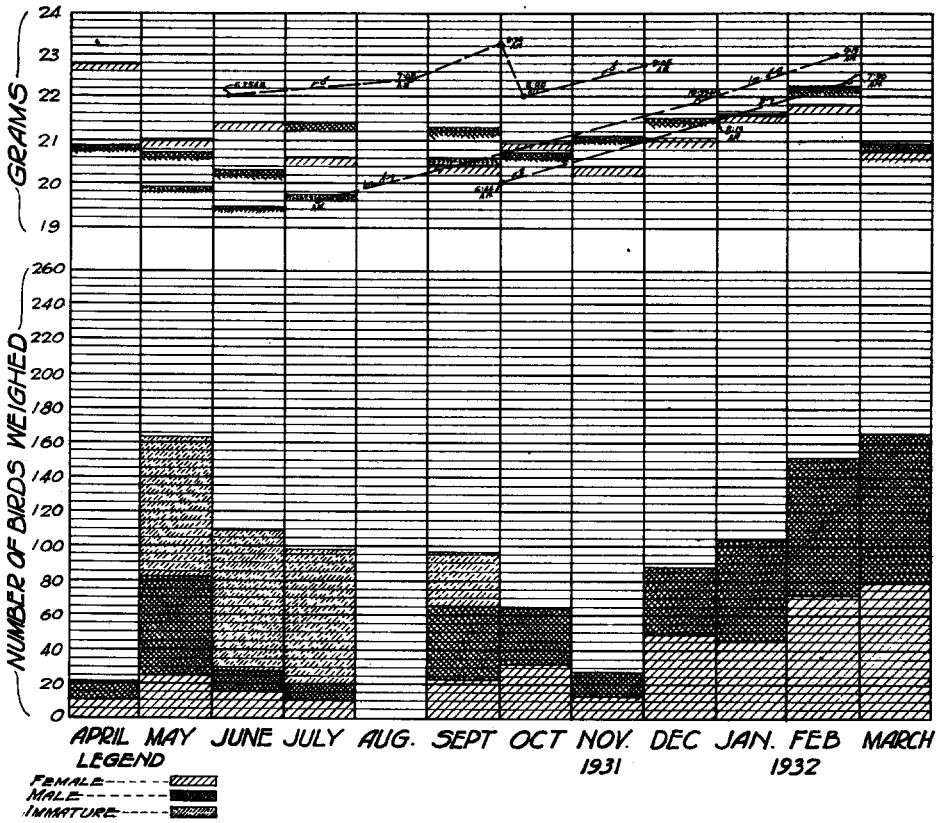

Fig. 8. CHART SHOWING SEASONAL VARIATION IN WEIGHTS OF HOUSE FINCHES, BASED ON ONE YEAR'S RECORD. ALL THE BIRDS WERE CAPTURED AT 2151 BALSAM AVENUE, LOS ANGELES, CALIFORNIA.

Three individual records, chosen because of the close agreement in the hour of weighing in each case, have been plotted on figure 8 also. These emphasize still further the low and high for summer and winter, respectively.

The data were arranged according to hour of day of weighing. For the sake of facility only six periods were recognized: Forenoon 6 to 8, 8 to 10, and 10 to 12; afternoon 12 to 2, 2 to 4, and 4 to 6. The averages for the six periods are shown in figure 9. Here we find the male and female curves ascending fairly uniformly until mid-day. There the curves cease their good behavior and zigzag across each other for the rest of the day. The heavy broken line was drawn through the average of the male and female weights for each period, and indicates a maximum for the day occurring in the 2 to 4 p. m. period. But in fairness to the 4 to 6 period

it might be explained that the December and January captures for this period, because of the early nightfall, were practically negligible. Since birds trapped during the other periods of these months were heavier than for previous months, it seems possible that had the 4 to 6 period received a more proportionate share of weights for these months the average might have been higher. A comparison of the adult and immature curves indicates the latter to be the reverse of the former; that is,

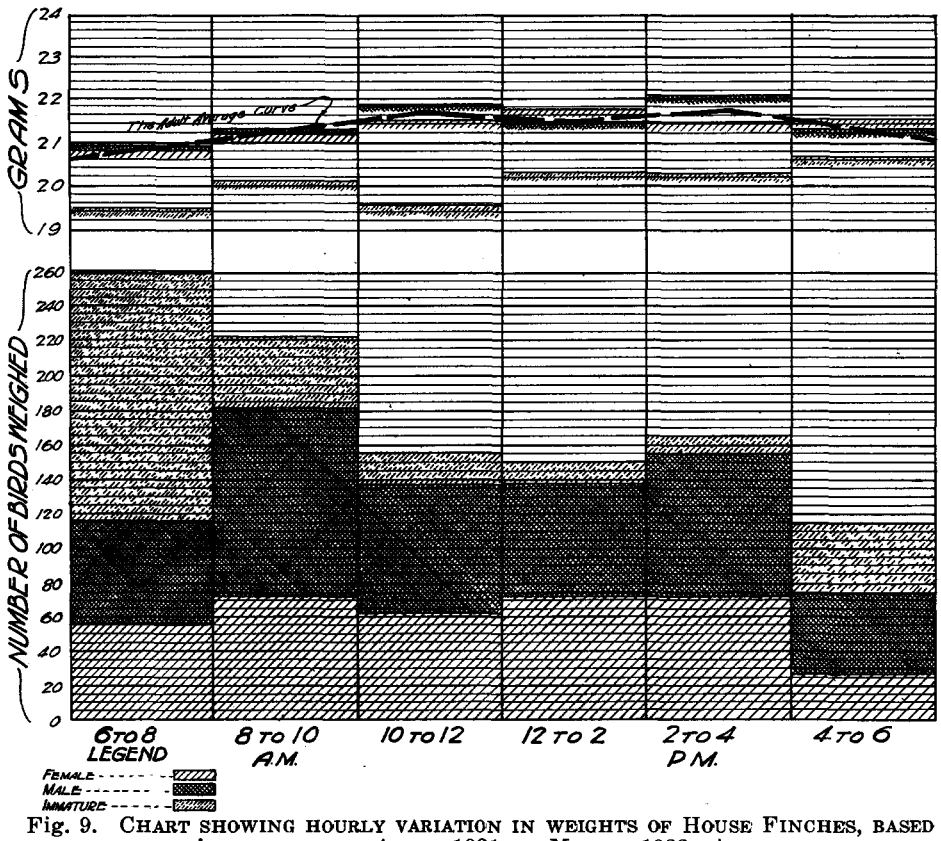

Fig. 9. CHART SHOWING HOURLY VARIATION IN WEIGHTS OF HOUSE FINCHES, BASED ON ONE YEAR'S RECORD, FROM APRIL, 1931, TO MARCH, 1932. ALL THE BIRDS WERE CAPTURED AT 2151 BALSAM AVENUE, LOS ANGELES, CALIFORNIA.

the morning weights of the immatures are erratic, while in the afternoon there is a fairly consistent gain with time, the maximum occurring during the 4 to 6 period. Further, it may be seen that the 6 to 8 a. m. average of the immatures was 19.48 grams or 93.4% of the adult average, 20.85 grams, for the same period, and that the immature maximum of 20.46 grams was 94.8% of 21.58 grams, the adult maximum.

The location of the trapping station as another possible influence upon bird weights is indicated by the following experience: On February 22, 1932, we weighed the birds captured at the Michener station at 418 North Hudson Avenue, Pasadena. Sixteen House Finches were among the captives, six females and ten males. On the previous day we had, by coincidence, weighed sixteen House Finches at our own station. A comparison of these weights shows the Pasadena House Finches about

7% lighter than those of Westwood. The two days' weighing does not necessarily establish the fact, but it does seem to indicate a possible tendency toward regional variation.

To summarize the whole problem, we feel safe in concluding that:

1. There is a seasonal variation in the weight of the House Finch; the minimum average for adults occurs during November, and is about 93.7% of the maximum, which occurs in February, while there is a tendency for a low average weight all along from May to November.

2. Immatures average lightest in June, being about 92.8% of the adult average for that month, and reach 98% of the adult average weight in September.

3. There is a daily variation in the weight of the House Finch, with a decidedly uniform increase for adult birds during the morning, breaking away from a smooth curve in the afternoon, but reaching a maximum during the latter period. The average daily fluctuation for the adults amounts to about 3.5%.

4. Immatures are more erratic in weight in the forenoon but tend toward a smooth curve in the afternoon, reaching a maximum near the close of day, with a differential of about 5% between a. m. and p. m. weights.

5. The females average heavier during the breeding season than the males, while the males are heavier during the pre-nuptial season, November to March.

6. There is a strong indication that territorial variations occur in bird weights, possibly because of variations in food supply, or in hereditary influences, or in both.

A copy of Dr. Jean M. Linsdale's report on Variations in the Fox Sparrow (*Passerella iliaca*) with Reference to Natural History and Osteology (Univ. Calif. Publ. Zool., 30, 1928) has come to our attention since this paper was first prepared, and it is interesting to compare observations regarding weight variations of the two species.

Linsdale says that female Fox Sparrows on the average, irrespective of age, season, or locality, are about 98% as heavy as the average male. We find that female House Finches, irrespective of season or time of weighing, are about 99% as heavy as the average male.

He also observes that the female Fox Sparrows tend to be heavier than the males during the breeding season. On this point we again find the two species in accord. See figure 8, months of April, May and June.

Linsdale further observes that the age of Fox Sparrows more than one month old is apparently of little importance in influencing weight. On this point we have insufficient data for individual birds to be conclusive, but basing our judgment on averages for immatures we would say that more than a month is necessary for the House Finch to acquire its mature weight.

With regard to our own study, we wish to acknowledge helpful suggestions derived from articles by Mr. C. L. Whittle, of Massachusetts, in volumes II, III, and IV of the Bulletin of the Northeastern Bird-banding Association, on bird weights. We found on article by Dr. W. H. Bergtold (Auk, XXX, 1913, pp. 65-69) on weights of House Finch nestlings most instructive. We are much indebted to Mr. and Mrs. Harold Michener for their stimulating advice. And especially do we wish to say that the investigation was one of interest to the late J. Eugene Law, receiving every encouragement from him up almost to the time of his death.

Los Angeles, California, December 4, 1932.