

Growth in the Eastern House Finch Population, 1962 - 1971

Carl E. Bock and Larry W. Lepthien*

Has the House Finch been evolving into a very different creature in its new range?

The House Finch (*Carpodacus mexicanus*) is a common and familiar native of western North America. In 1940 it achieved new status when it was released and became a breeding bird on Long Island, New York. Elliott and Arbib (1953) traced the history of the introduction, estimating the population to be about 280 individuals by 1951; they concluded that (p. 37) "this adaptable and colorful bird is a securely established resident of the Eastern United States." Since then numerous records in *Audubon Field Notes* and *American Birds* have documented the gradual expansion of breeding and winter records in the East (e.g., Paxton, 1974).

Analysis of Christmas Bird Count data for 1962 to 1971 was made to document and quantify the rate of population growth of the House Finch during its third decade east of the Mississippi (see Bock and Lepthien, 1974, for techniques of data storage and retrieval). For this study, Christmas Bird Counts were sorted by 5 degree blocks of latitude and longitude, and an average number of birds observed per party-hour was computed for each block for each of the 10 years. From these data computation could be made of overall population growth and winter range expansion.

Figure 1 shows the change in abundance of eastern House Finches from 1962 through 1971. The increase, though not continuous, was nearly ten-fold during the period. A curve with best fit to our data is also shown. This is an exponential curve with the formula shown in the figure; from a statistical standpoint this curve "fits" the data well (coefficient of determination=0.91 out of a maximum 1.00).

Figure 2 is one of ten maps showing the relative abundance of House Finches by latitude-longitude blocks, this one is based on data in the 1971-72

count. While birds were still extremely scarce in the Southeast, Figure 2 does show the winter proximity of some eastern and some western House Finches by 1971.

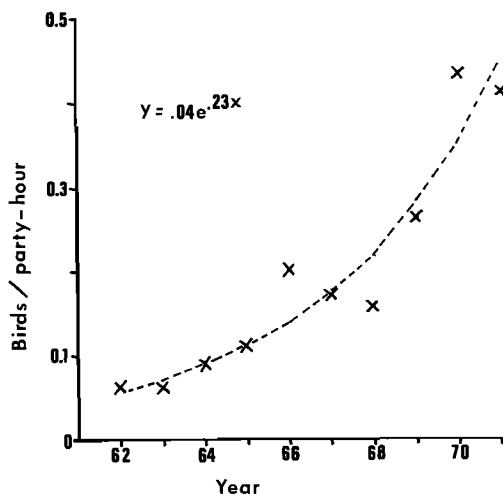


Fig. 1. Abundance of eastern House Finch 1962-1971

DISCUSSION

Ecologists are very much interested in the rates at which populations grow in essentially unlimited environments because this gives a clue to a species' maximum potential for increase. For eastern

*Department of Environmental, Population, and Organismic Biology, University of Colorado, Boulder, Colorado 80302.

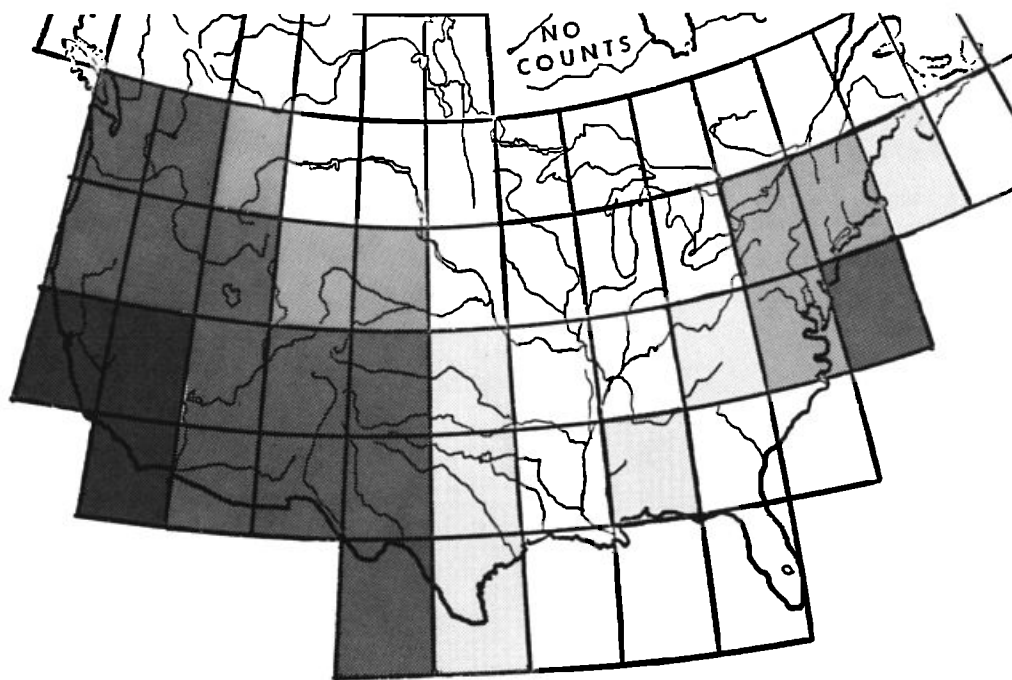


Fig. 2. Abundance of House Finch in 1971 by 5° blocks of latitude-longitude.

House Finches the instantaneous rate of increase ("r"-see Slobodkin, 1962) was 0.23. This is a very respectable rate and a tribute to the success of the House Finch in its new habitat. However, that rate of increase is only an average. The population seems to have declined between 1966 and 1968, and again, slightly, in 1971 (Fig. 1).

We have no completely satisfactory explanation for the apparent declines during a period of otherwise rapid growth. However, it is the increases rather than the declines which are most impressive. In fact, there would have been reason to predict that the House Finch could not establish itself at all in the East, were evidence to the contrary not so overwhelming. Salt (1952) conducted a thorough study of the physiology of the three *Carpodacus* finches in North America. He discovered that the House Finch is a species highly adapted to breeding in regions with warm arid climates. He suggested that increasing air moisture was the major factor limiting the eastward expansion of native House Finch breeding populations. How, then, can a population be growing, let alone surviving, in an area with summer humidity as notorious as that of the eastern United States? There may be some significance to the fact that eastern House Finches declined in 1967 (Fig. 1), a wet year which marked the end of a prolonged (5-or 6-year) drought in much of the East. However, the population grew rapidly from 1968 to 1970 when moisture conditions were more or less normal. One very intriguing possibility is that the

House Finch has been evolving into a physiologically very different creature in its new range. This is a field ripe for further investigation. Meanwhile the species continues to expand its range, perhaps eventually to contact parent populations in the West.

ACKNOWLEDGMENTS

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