The Rise and Decline of House Finches in Massachusetts

Thomas R. Hamilton

House Finches (*Carpodacus mexicanus*) illegally released on Long Island, New York, in 1941 are believed to be the progenitors of the eastern population, and the subsequent rapid expansion of this population is well documented (Hill 1993). Although thousands of House Finches were shipped from the west coast to the east, Veit and Lewis (1996) estimate that the entire eastern population is descended from approximately eighty individuals. During the next fifty years, the eastern population relentlessly expanded to the north, south, and west while the western population expanded to the east more slowly (Hamilton 1992a), and by now the two populations have probably met. For a time it appeared to many birdwatchers in eastern North America as though House Finches would overwhelm other passerines, especially at winter feeding stations; however, in recent years many birdwatchers have observed a remarkable decline in the number of House Finches in the East.

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In the winter of 1993-1994 House Finches began appearing at backyard feeding stations in the Washington D.C. area with one or both eyes swollen and covered with a crusty secretion (Kammermeier 1999). The disease, known as mycoplasmal conjunctivitis, is caused by a parasitic bacterium (*Mycoplasma gallisepticum*) that previously was thought to infect only poultry (Dhondt 1998). Because of an increasing number of diseased House Finches reported by participants in the Cornell University Laboratory of Ornithology's FeederWatch Program, it was apparent that a highly infectious disease was spreading through the eastern House Finch population. This presented a unique opportunity to document the spread of an infectious disease through a wild bird population, and soon a group of FeederWatch volunteers and Lab members initiated the House Finch Disease Survey to track the appearance of conjunctivitis-afflicted birds visiting backyard feeding stations (Dhondt 1996). By November 1994 the disease had spread as far north as southern Ontario and along the east coast to New Hampshire. During the following year, diseased birds began appearing as far west as Illinois and as far south as Georgia. In 1996 the disease had crossed the Mississippi and was affecting House Finches in southern Wisconsin and eastern portions of Iowa and Missouri. During 1997 the disease continued its westward expansion, and affected birds were reported in North Dakota, Kansas, and eastern Nebraska (Dhondt 1998). It is possible that mycoplasmal conjunctivitis will

spread to the western House Finch population, and there have been confirmed reports of afflicted birds as far west as Waco, Texas, and Lincoln, Nebraska (Hartup 1999).

Although *M. gallisepticum* appears to primarily affect House Finches in the wild, there have been confirmed reports of mycoplasmal conjunctivitis in American Goldfinches (*Carduelis tristis*), Purple Finches (*Carpodacus purpureus*), and House Sparrows (*Passer domesticus*) (Hartup et al. 1998; Fischer et al. 1997). In a recent study of how the disease may spread to other species, Hartup and his colleagues (2000) found that feeders with diseased House Finches present were more likely to have diseased Goldfinches, Purple Finches, and House Sparrows than feeders without diseased House Finches. In a field study of twenty-three species of songbirds in upstate New York, ten percent of the 196 House Finches examined showed signs of conjunctivitis (eyelid swelling or discharge), but only two percent (four of 169) of the Goldfinches and two percent (one of 45) of the Purple Finches appeared to be affected (Hartup et al. 2000). A more recent analysis of data from the House Finch Disease Survey of the Cornell Laboratory of Ornithology (Hartup et al. 2001) found reports of 675 cases of conjunctivitis in 31 species other than house finches, with seventy-five percent of these cases observed in Goldfinches, Purple Finches, and House Sparrows; however, these represent only two percent of the total number of diseased birds observed. Based on these findings, it appears that the prevalence of *M. gallisepticum* infections in hosts other than House Finches was very low. Some passerine species, however, appear to be nonsymptomatic carriers of *M. gallisepticum,* and there is growing evidence that the pathogen carried by wild birds may pose a threat to the poultry industry (Luttrell et al. 2001).

Mycoplasmal conjunctivitis is a highly contagious, debilitating, often lethal disease for a wild bird because of the serious handicap impaired vision creates for finding food and avoiding predation. Afflicted birds are often lethargic and stay around feeders, living off easily accessible food. My own experience has been that severely afflicted birds are so passive they can easily be approached and picked up. The highly contagious nature of this disease in House Finches was confirmed in a laboratory study using finches that had been infected with *M. gallisepticum*: all the birds developed conjunctivitis within 2-4 weeks, lost weight and usually died (Luttrell et al. 1998). However, in another study of captive House Finches that were known to be disease-free and subsequently exposed to infected birds, seventy-three percent of the birds developed conjunctivitis that resolved after a few weeks, while the other twenty-seven percent suffered for a more prolonged period (Roberts et al. 2001). Even if captive birds can survive infections of *M. gallisepticum,* it is not likely that wild birds could survive very long under more harsh natural environmental conditions — this must be especially true during winter months.

Method

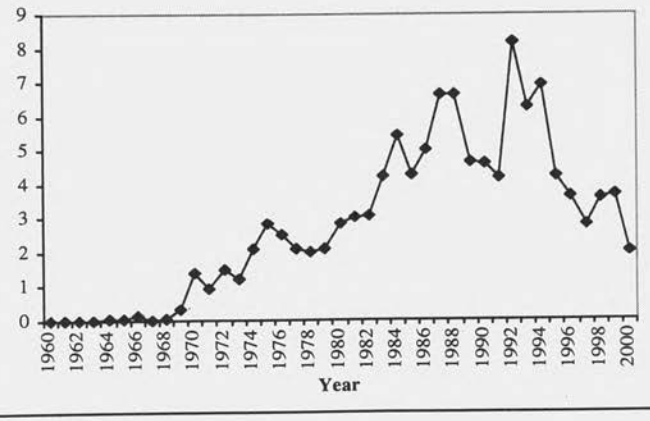
If mycoplasmal conjunctivitis is affecting songbird populations in Massachusetts, then it is likely that a decrease in numbers of birds recorded during annual Christmas Bird Counts (CBC) would correlate with the appearance of the disease. Christmas Bird Counts have been shown to be a reliable method for tracking long-term trends in

some bird populations; however, there are some inherent difficulties in using these data (Hamilton 2000). In order to document changes in the size of the populations of House Finches, American Goldfinches, and House Sparrows in Massachusetts, I researched CBCs for eight count circles — four inland and four coastal — that had been surveyed consistently (with few exceptions) since 1960. The CBC circles I used for this study were Cape Ann, Cape Cod, Marshfield, Quincy, Northampton, Springfield, Worcester, and Central Berkshires — the same areas I used in a previous study of frugivorous population trends in Massachusetts (Hamilton 1997). In order to allow year-to-year comparisons, I calculated total birds per party hour by dividing the total number of birds of each species counted in the eight count circles by the total number of party hours.

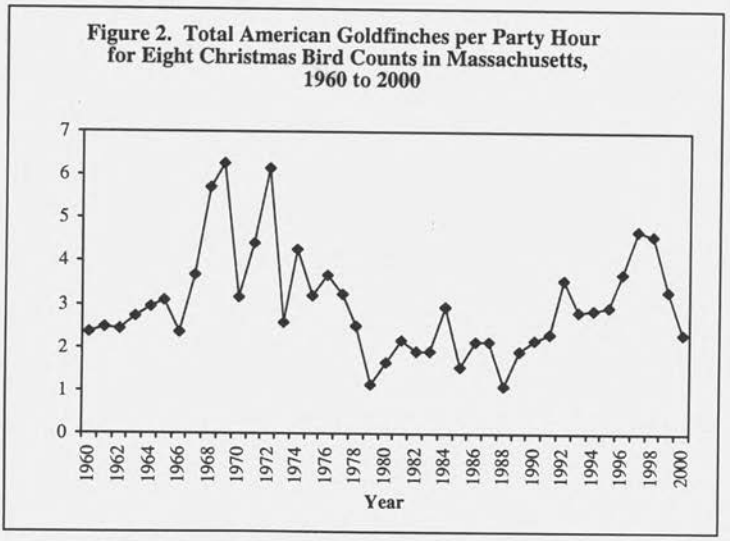
Results

From the data illustrated in Figure 1, the phenomenal increase in the numbers of House Finches from when they were first included in a CBC in 1961 is obvious, as is the decline that occurred soon after the high point of 8.1 birds per party hour in 1992. The general decreasing trend after 1992 is dramatic and includes a decrease of seventy-one percent from the time mycoplasmal conjunctivitis first appeared in Massachusetts in 1994 to the present. To some extent, the curve in Figure 1 resembles an S-shaped growth curve, which is characteristic of an idealized population introduced into an area in which there is abundant food, high reproductive rate, and low predation, thus permitting increasingly rapid expansion until environmental constraints begin to suppress continued growth.

Figure 1. Total House Finches per Party Hour for Eight Christmas Bird Counts in Massachusetts, 1960 to 2000

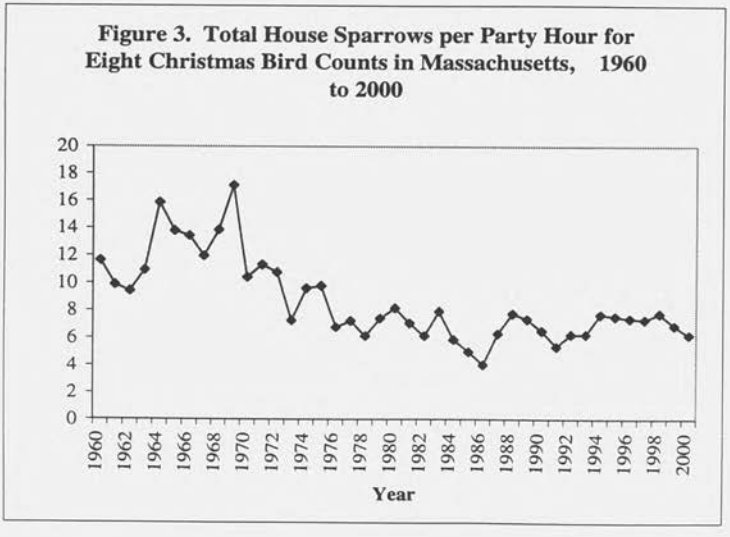


The data in Figure 2 suggest that, with the exception of a few episodic irruptions, the general trend since 1960 for winter populations of American Goldfinches is stable. The counts for 1999 and 2000 may appear to be the beginning of a downward trend,



but the number of birds per party hour is still close to the mean for the forty-year period used in this analysis.

Figure 3 suggests that House Sparrows have been in a general decline for about thirty years. The more recent decrease in House Sparrows is well within the range of fluctuations that have occurred over the last fifteen years. As is the case with Goldfinches, there does not appear to be a correlation between the appearance of mycoplasmal conjunctivitis and changes in the size of the winter House Sparrow population.



Discussion

The graph in Figure 1 indicates that the decline in House Finches started at about the time mycoplasmal conjunctivitis-afflicted birds began to appear at feeding stations. This bacterium is highly contagious and it is likely that the disease is transmitted to healthy birds when they come into contact with an infected bird or with an object touched by a diseased bird. Although *M. gallisepticum* can be transmitted from parent House Finches to their nestlings (Hartup 1999), it is probable that the disease is more widely spread when the birds congregate at feeding stations. It is possible that tube-type feeders are an important agent of transmission, because as a finch reaches into the feeder to extract a seed, it is likely to come into contact with the sides of the opening. This then affords the opportunity for some of the bacteria to be deposited in an area that is bound to be visited by an uninfected bird. If this is indeed the primary mode of transmission, then platform-like feeders would appear to reduce the possibility of transmission of *M. gallisepticum*. Hartup and his colleagues (1998) found an increase in the frequency of infection associated with cooler months from September through March, and with feeding stations that use tube-type feeders. They suggested that the use of raised platform-type feeders may have some protective value against spread of conjunctivitis. However, in poultry, *M. gallisepticum* is known to be spread by inhalation of contaminated airborne particles and by direct contact (Fisher et al. 1997), and it is quite possible that this mode of transmission may occur in House Finches. This may be especially significant during winter months when House Finches congregate in dense flocks on platform feeders that have been contaminated with feces and discarded seed coats.

Theoretically, when a contagious disease emerges in a dense population, it would be expected to disperse quickly though the population and subsequently affect large numbers of individuals. As the population becomes less dense, fewer healthy individuals will contract the disease, and the population will be established at a lower density. The pathogenic organism, *M. gallisepticum,* has indeed spread rapidly through the eastern House Finch population and can be transmitted by direct or indirect contact with other birds. However, in recent years, anecdotal observations suggest that the proportion of affected birds in Massachusetts has decreased as the population became less dense. These observations are supported by a study that showed that areas in which House Finch population densities were initially low failed to show significant declines when the disease appeared in the population (Hochachka and Dhondt 2000).

It is possible that in recent years House Finches have become less dependent on backyard feeding stations and are now more elusive during the winter, thus resulting in their being undercounted in Christmas Bird Counts, creating the illusion that the House Finch population is in decline. There is evidence that House Finches are developing a tendency to migrate to the south in the winter (Hamilton and Novis 1994; Hamilton 1992b), although in the past they have presumably been replaced by other finches from the north. If larger numbers of finches are indeed migrating out of Massachusetts in the winter and are not being replaced by birds from the north, then this could account for the reduced numbers seen during CBCs. However, it should be

noted that the decline of House Finches in Massachusetts has also been documented by summer Breeding Bird Surveys that show a dramatic decline in the number of breeding finches since 1996 (Sauer et al. 2001).

Conclusions

The appearance of mycoplasmal conjunctivitis appears to be correlated with the decrease in the winter House Finch population in Massachusetts. It is likely that birdfeeders are an important mechanism by which the causative bacteria are transferred to uninfected birds. There is evidence that other songbirds are infected with the bacteria; however, they are either asymptomatic or they manifest the disease at a much lower rate than House Finches. Bird feeders should be cleaned and disinfected every time they are refilled in order to reduce the probability that feeders are the source of infection. If mycoplasmal conjunctivitis remains endemic in the House Finch population, it is likely that the size of the House Finch population will stabilize at a level that is significantly lower than the peak reached in 1992.

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News from MassWildlife

Quabbin Access - Eagle-watchers are once again enjoying the view of Quabbin Reservoir and the Prescott Peninsula afforded by access to the Enfield Lookout. The Metropolitan District Commission (MDC) advises that sections of the Quabbin Reservation have been reopened to the public including the area between Gate 3A and Gate 5 in Belchertown, portions of the Quabbin Park in Ware and access to the MDC Administration Building and the Quabbin Visitor Center in Belchertown. The main and middle entrances to Quabbin Park off Route 9 are also open, although vehicle traffic is prohibited on the roadways across the Winsor Dam and Goodnough Dike. Pedestrian access on these roads is permitted. Still closed are areas between Gates 40 and 50 and the area in Quabbin Park south of the Administration Road between the main and middle entrances.