

The Summer Bird Community in a Late-Successional Beech-Maple Forest in Ohio¹

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ABSTRACT. We studied the summer bird community in an unfragmented, late-successional, 61 ha beech-maple forest at the James H. Barrow Field Station in Portage County, Ohio. Birds were surveyed by making 30 counts along either of two trails in June and July of 1992, and recording all individuals seen or heard. During the survey period, we made 958 observations of 29 species. The five most common species, acadian flycatcher (*Empidonax vireescens*), wood thrush (*Hylocichla mustelina*), red-eyed vireo (*Vireo olivaceus*), hooded warbler (*Wilsonia citrina*), and northern cardinal (*Cardinalis cardinalis*) accounted for over 50% of the observations made. Of the 15 Neotropical migrants found, seven have experienced population declines in the eastern United States between 1978 and 1987, and eight are considered to be area-sensitive. The beech-maple forest we surveyed is likely to be a regionally important natural area, for it provides breeding habitat for many declining and area-sensitive bird species that would not be consistently present in smaller, more disturbed forests.

OHIO J. SCI. 97 (1): 14-16, 1997

INTRODUCTION

In recent decades, populations of many forest birds in the eastern United States have been decreasing (Robbins, Sauer, et al. 1989; Sauer and Droege 1992). One reason for the decline may be habitat loss and fragmentation on the breeding grounds (Robinson et al. 1995). Fragmentation results in both a net loss of a given habitat and the reduction in size of those parcels of habitat that remain (Meffe and Carroll 1994, Primack 1995). Small forest patches may not meet the area requirements of forest-interior species (Galli et al. 1976, Martin 1981). In addition, small forest remnants may be more susceptible to nest predation (Wilcove 1985) and nest parasitism by brown-headed cowbirds (*Molothrus ater*) (Brittingham and Temple 1983). We examined the bird community in an unfragmented, late-successional, 61 ha beech-maple forest to determine the extent to which the habitat was used by decreasing and/or area-sensitive forest birds. An area-sensitive species is one that has a greater probability of occurrence with increasing size of the habitat.

MATERIALS AND METHODS

This study was conducted at Hiram College's James H. Barrow Field Station in Portage County, Ohio. Specifically, bird counts were performed in an approximately 60 ha, late-successional beech-maple forest. Dominant tree species within the forest include *Acer saccharum*, *Fagus grandifolia*, *Prunus serotina*, *A. rubrum*, *Carya cordiformis*, and *Fraxinus americana*. Very little human disturbance occurs within the

forest boundaries with the exception of two trails, two unmaintained roads, and a low-maintenance maple sugaring operation. There is also an underground utility corridor that bisects the area.

Thirty bird counts were conducted between 23 June and 31 July 1992. Counts involved tallying the total number of birds of each species seen or heard within 35 m of the surveyor while walking along either of two trails. This distance was chosen to reduce the possibility of double counting birds during individual counts. Ten counts were conducted during each of three time periods: 6:00 AM, 1:00 PM, or 6:00 PM. Counts took approximately one hour to complete.

Approximately three counts were performed each week along the 3.1 km "Ruth E. Kennedy Memorial Trail," and two counts were done each week along the 2.7 km "Cross-country Trail." Although both of the trails go through other habitat types (e.g. cropland, early successional forest, late-successional pine), birds were only counted if they were seen or heard while we were traveling through late-successional beech-maple forest. The Ruth E. Kennedy Memorial Trail courses through a 17 ha patch of continuous beech-maple forest that has never been harvested. The Cross-country Trail traverses approximately 44 ha of continuous beech-maple forest that was selectively harvested in 1926 and 1956. The 44 ha forest is adjacent to the 17 ha forest, and for data analysis were treated as a single patch of late-successional beech-maple forest.

RESULTS AND DISCUSSION

We made 958 observations of 29 species during the 30 counts (Table 1). Of the 29 species, 15 were Neotropical migrants and 14 were year-round residents. The five most common species, in decreasing order of abundance, were red-eyed vireo, acadian flycatcher, wood thrush, northern cardinal and hooded warbler. These species accounted for over 50% of the observations made.

¹Manuscript received 12 September 1996 and in revised form 7 February 1997 (#96-23).

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TABLE 1

Species detected during summer bird counts in the late-successional beech-maple forest at the James H. Barrow Field Station in Portage County, Ohio. Names and sequence of species are based on The A. O. U. Check-list of North American Birds (1983).

Species	# of Counts Detected ¹	Mean # of Individuals per Count ¹
Ruby-throated hummingbird, <i>Archilochus colubris</i> , M ²	3	0.10
Red-bellied woodpecker, <i>Melanerpes carolinus</i> , R ³	7	0.33
Downy woodpecker, <i>Picoides pubescens</i> , R	14	0.83
Hairy woodpecker, <i>Picoides villosus</i> , R	1	0.03
Northern flicker, <i>Colaptes auratus</i> , R	1	0.03
Pileated woodpecker, <i>Dryocopus pileatus</i> , R	5	0.23
Eastern wood-pewee, <i>Contopus virens</i> , M	17	1.23
Acadian flycatcher, <i>Empidonax virens</i> , M	30	3.97
Great crested flycatcher, <i>Myiarchus crinitus</i> , M	8	0.40
Blue jay, <i>Cyanocitta cristata</i> , R	4	0.13
American crow, <i>Corvus brachyrhynchos</i> , R	7	0.43
Black-capped chickadee, <i>Parus atricapillus</i> , R	17	2.03
Tufted titmouse, <i>Parus bicolor</i> , R	18	1.60
White-breasted nuthatch, <i>Sitta carolinensis</i> , R	21	1.40
Blue-gray gnatcatcher, <i>Poliottila caerulea</i> , M	1	0.03
Veery, <i>Catharus fuscescens</i> , M	8	0.47
Wood thrush, <i>Hylocichla mustelina</i> , M	25	3.80
American robin, <i>Turdus migratorius</i> , R	3	0.23
Gray catbird, <i>Dumetella carolinensis</i> , M	8	0.30
Cedar waxwing, <i>Bombycilla cedrorum</i> , R	1	0.03
Red-eyed vireo, <i>Vireo olivaceus</i> , M	28	4.97
American redstart, <i>Setophaga ruticilla</i> , M	6	0.20
Ovenbird, <i>Seiurus aurocapillus</i> , M	6	0.47
Hooded warbler, <i>Wilsonia citrina</i> , M	26	2.87
Scarlet tanager, <i>Piranga olivacea</i> , M	13	0.80
Northern cardinal, <i>Cardinalis cardinalis</i> , R	29	3.77
Rose-breasted grosbeak, <i>Pheucticus ludovicianus</i> , M	8	0.33
Indigo bunting, <i>Passerina cyanea</i> , M	2	0.10
American goldfinch, <i>Carduelis tristis</i> , R	13	0.80

¹n=30 counts.

²M=Neotropical migrant.

³R=Year-round resident.

The late-successional beech-maple forest at the James H. Barrow Field Station in Portage County, Ohio, provides habitat for migrant and resident species that are declining and/or area-sensitive. Of the 15 Neotropical migrant species found, seven have experienced significant population declines in the eastern United States between 1978-1987 including acadian flycatcher, veery, wood thrush, gray catbird, ovenbird, scarlet tanager, and rose-breasted grosbeak (Robbins, Sauer, et al. 1989). Moreover, between 1980-1994, five species of Neotropical migrants, eastern wood pewee, acadian flycatcher, wood thrush, American redstart, and indigo bunting, have shown significant decreases in populations within Ohio (Sauer et al. 1996). Eight species of Neotropical migrants are considered to be area-sensitive: acadian flycatcher, blue-gray gnatcatcher, veery, wood thrush, red-eyed vireo, ovenbird, scarlet tanager, and rose-breasted grosbeak (Askins et al. 1987; Robbins, Dawson, and Dowell 1989).

One reason for the diverse assemblage of species present may be the size of the forest, for as area increases

more species will meet their habitat requirements (Whitcomb et al. 1981, Lynch and Whigham 1984). For example, in a study of forest birds in Maryland, Robbins, Dawson, and Dowell (1989) found that the probability of occurrence for acadian flycatchers in forest patches of approximately 15 ha was <0.3. In the present study, acadian flycatchers were present during all counts. Blake and Karr (1987) suggested that small forest patches contain a random subset of species found within larger patches. Small patches typically are able to support only generalist species, such as farmland birds (Ambuel and Temple 1983). Larger patches, such as the one examined during the present study, contain a similar assemblage, but also include area-sensitive species (Blake 1991).

The relatively high species richness detected in this study may also be due to the absence of other avian species that may reduce reproductive success. The brown-headed cowbird, an obligate brood parasite, was not present in the forest. This species has been implicated as a factor in the decrease of forest birds (Brittingham and Temple 1983). Two of the major avian nest predators,

American crow and blue jay (Dobkin 1994), were uncommon. In some habitats, birds from surrounding patches may actively exclude species and prevent them from nesting (Wiens 1989). Such competitors may include species associated with farmland such as European starling, *Sturnus vulgaris*; common grackle, *Quiscalus quiscula*; and red-winged blackbird, *Agelaius phoeniceus* (Ambuel and Temple 1983). None of these three species were detected during this study.

There are several problems with the study. Counts were not always conducted at the time of day when the probability of detecting the greatest number of birds was highest. Specifically, counts conducted at 1:00 PM or 6:00 PM may not have detected as many birds or species as counts made at 6:00 AM. Thus, the number of counts that a species was located and the mean number of individuals per count may be underestimated. Moreover, no attempt was made to survey nocturnal species such as owls. Surveys began in the middle of the breeding season. Thus, it is possible that the abundance of early-nesting species was underestimated. Although both trails go through late-successional beech-maple forest, one trail goes through previously unharvested forest, while the other trail goes through forest that has been selectively cut. Consequently, there may be differences in species presence and abundance depending upon whether the beech-maple forest had been harvested. However, because we only have one unharvested area and one selectively cut area, we did not feel that it was appropriate to investigate differences between sites.

In the future, it would be important to examine the nesting success of declining and/or area-sensitive species within the beech-maple forest to determine if the habitat acts as a "source" population for other forest remnants. Moreover, we would be interested in comparing species diversity in the late-successional beech-maple forest with the other habitat types present at the James H. Barrow Field Station.

ACKNOWLEDGEMENTS. We thank Mary C. Garvin and two anonymous referees for reviewing earlier drafts of this manuscript. This undergraduate research project was supported through funds awarded to Hiram College by the Howard Hughes Medical Institute (HHMI #71191-528401).

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