Black-backed Three-toed Woodpecker on stripped tree *–Photo by David Wilcove*

WINTERING WOODPECKERS IN AN URBAN ENVIRONMENT

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INTRODUCTION

The discovery of a male Black-backed Three-toed Woodpecker *(Picoides arcticus)* by David Freeland on December 21, 1975, in an urban residential area of Buffalo prompted the authors to explore the area. Three weeks of searching gradually revealed more than two dozen diseased elm trees (principally *Ulmus americana* L.) where woodpeckers were stripping off the outer bark and exposing the lighter, somewhat orange inner bark. The numbers of woodpeckers in this area seemed especially high. By watching these trees carefully, the authors found the Black-backed Three-toed Woodpecker doing its share of vigorous stripping (a typical habit), sometimes alone, sometimes in the company of Downy Woodpeckers *(P. pubescens)* and Hairy Woodpeckers *(P. villosus)*. The intensity of the stripping activity and the concentrations of woodpeckers on these stripped trees raised questions that only a population study might answer. A study area, which included the stripped trees, was laid out; the trees were mapped and numbered, and weekly woodpecker counts were initiated.

THE STUDY AREA

The study area lies immediately north of Delaware Park in Buffalo on either side of Delaware Avenue and includes 153.2 acres (62 hectares) of residential neighborhood. The density of housing varies; for example, the northern section 40.8 acres (16.5 hectares) contains 151 houses with small yards; the southern portion near the part 61.3 acres (24.8 hectares) contains 98 houses with spacious, well-planted grounds. About 80 meters north of Delaware Park is the heart of the study area, the intersection of Meadow Road and Middlesex Avenue where there is a wooded lot on the northwest corner and an evergreen garden on the southeast corner. In this area, the authors saw the Black-backed Three-toed Woodpecker on many occasions. The corner was the center of intense woodpecker activity during January and early February.

In order to learn the relative abundance of various tree types in the entire study area, a four kilometer loop was plotted. Along this loop, trees which stand on the grass strips between the sidewalks and

the street, or are located in front yards, were counted. 45% of the trees counted were elms *(Ulmus spp.)* of which 18.5% were marked for removal because of Dutch elm disease. A total of 30 elms (only 8.5%) were stripped by the woodpeckers, which had removed at least 20% of the bark on the limbs of each tree. The remaining 55% of all trees counted included the following groups, in descending order of abundance: spruces *(Picea spp.)*, oaks *(Quercus spp.)*, maples *(Acer spp.)*, poplars *(Populus spp.)*, pines *(Pinus spp.)*, ashes *(Fraxinus spp.)*, hemlocks *(Tsuga spp.)*, birches *(Betula spp.)*, beeches *(Fagus spp.)*, willows *(Salix spp.)*, and sycamores *(Platanus spp.)*.

Most of the stripped trees were *Ulmus americanus* L., all of which were infected with disease. Pieces of bark from these trees showed egg canals and channeling patterns of the lesser European elm bark beetle *(Scolytus multistriatus* Marsh.), principal vector of the Dutch elm fungus *(Ceratocystis ulmi* Buism) (Boyce, 1961). The fungus is introduced into healthy elms by the adult beetles which feed in twig crotches. The beetles, which concentrate their egg-laying in a few trees rather than infesting a great many, bore galleries parallel to the grain of the wood and lay their eggs along the sides. The larvae tunnel perpendicularly to the egg galleries forming the characteristic engraved pattern found in infected bark. The larvae overwinter and then pupate in spring at the end of the larvae tunnels. In May they emerge through small holes in the bark (Anderson, 1960). The authors were able to collect both larvae and adult beetles which were preserved for reference.

Others have noted that woodpeckers sometimes produce spectacular evidence of their debarking activity and are regarded as effective in keeping boring beetles under control (Anderson, 1960). Analysis of woodpecker stomachs (Eaton, 1914), has shown that larvae of woodboring beetles make up the diet of the three species of woodpeckers as follows: Downy, 14%; Hairy, 31%; Black-backed Three-toed, 64%. It must be noted that these figures were obtained prior to the spread of the Dutch elm disease and the beetles that carry the fungus.

Since 1951 the city of Buffalo has controlled the Dutch elm disease by the prompt removal of diseased trees which are concentration points for the elm bark beetle. However, because of extensive cutbacks in funds, this program has been discontinued, and some 3,280 trees marked for removal in 1974-1975 are still standing. Of

the 30 elms stripped by woodpeckers in the study area, only five, on private property, were not marked by the city. All of these stripped trees were apparently heavily infested by bark beetles and were a good food supply for the woodpeckers. Examination of the trees by Arthur B. Budington, forest pathologist, revealed no correlation between the species of elm, its size or location, and its desirability to the woodpeckers, despite the fact that the birds chose only 8.5% of the elms on which to concentrate their feeding activities.

METHODS

Woodpecker counts were done on weekends at various times of day depending on weather and convenience. Occasionally two counts were made on the same weekend, one in the morning and one in the afternoon, to see if the time of day was significant. When temperatures were well below freezing, the birds appeared to work rapidly from dawn to dusk; in milder temperatures their activity was more random and apparently independent of the time of day. During the count the observers walked the four kilometer loop, noting the number of woodpeckers heard and seen, and noting the numbers of the stripped trees on which the birds were feeding. A record of weather conditions during the counts was kept. Since the Black-backed Three-toed Woodpecker showed up on only seven of the sixteen counts, this species has been omitted from all graphs and tables except those showing total number of woodpeckers per count day.

To compare number of woodpeckers in the study area with that of other parts of the city, two control areas (whose total area was slightly less than that of the study area) were chosen representing a residential and park-like environment similar to that of the study area but containing a greater diversity of tree species, with a much lower percentage of elms. The authors found only 0 to 3 woodpeckers in the control areas on any one count day.

RESULTS

The graph in Figure One summarizes the results of the woodpecker counts made in the study area. Maximum counts of Hairy Woodpeckers were obtained on 24 January and 13 February. For the Downy Woodpecker the highest tally came on 22 February. The highest total of all woodpecker species was on 24 January. Woodpecker numbers fluctuated from count to count. Note, however, the comparatively high total counts obtained on 24 January, 22 Febru-

FIGURE 1

STUDY PERIOD DATA

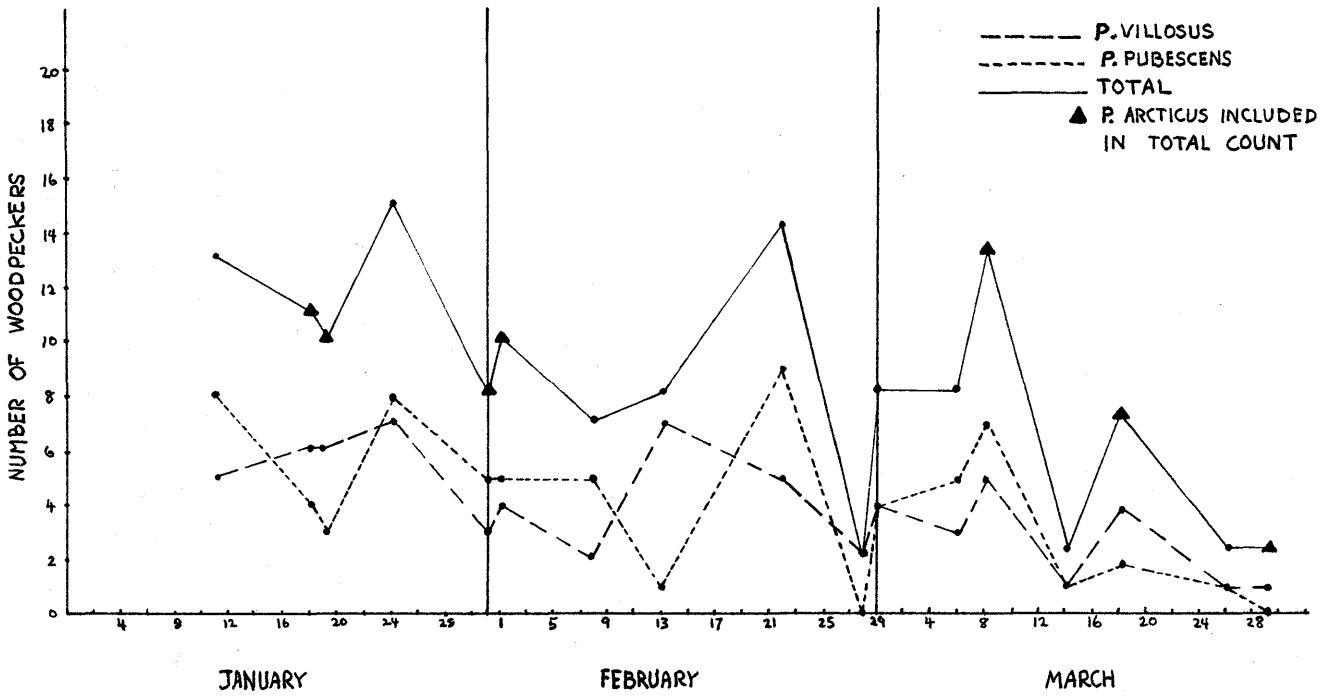

FIGURE 2

A = % OF ALL WOODPECKERS ON STRIPPED TREES
B = % OF FEEDING WOODPECKERS ON STRIPPED TREES
C = % OF FEEDING WOODPECKERS ON ELMS

DATE	A	B	C
1-11	92	92	100
1-17	91	91	91
1-18	90	90	100
1-24	67	91	91
1-31	25	40	80
2-1	100	100	100
2-8	86	100	100
2-13	87	100	100
2-22	80	85	100
2-28	0	0	100
2-29	25	25	87
3-6	75	75	100
3-8	77	83	100
3-14	100	100	100
3-18	43	43	100
3-26	0	0	50
3-29	0	0	50

ary, and 8 March, indicating that approximately the same number of woodpeckers was present in the study area throughout January, February, and into early March. Following 8 March, the numbers of woodpeckers declined dramatically. The onset of warm spring weather probably triggered the withdrawal of the woodpeckers from the study area. The Hairy Woodpecker does not breed locally, and the Downy does so only uncommonly. The large numbers of both species that occurred in the study area during the study period represented wintering birds. The number fluctuations during January and February can be attributed to temporary weather changes. For example, the high count of 24 January was preceded by a record low temperature on the 23rd. The dramatic decline in numbers on 28 February may well have been caused by the balmy, spring-like weather which moved into the area on 25 February. In short, cold weather may have caused the birds to concentrate their activities heavily on feeding, whereas in warmer weather they tended to wander more, and were less intense about procuring food.

The chart in Figure Two summarizes the relationship between the woodpeckers and the stripped elms. Column A lists the percentages of all woodpeckers on a given day which were observed on stripped elms. The average of column A is about 59%. Therefore, well over

FIGURE 3

ANALYSIS OF CHRISTMAS BIRD COUNT DATA FOR TWO AREAS 1970-1976

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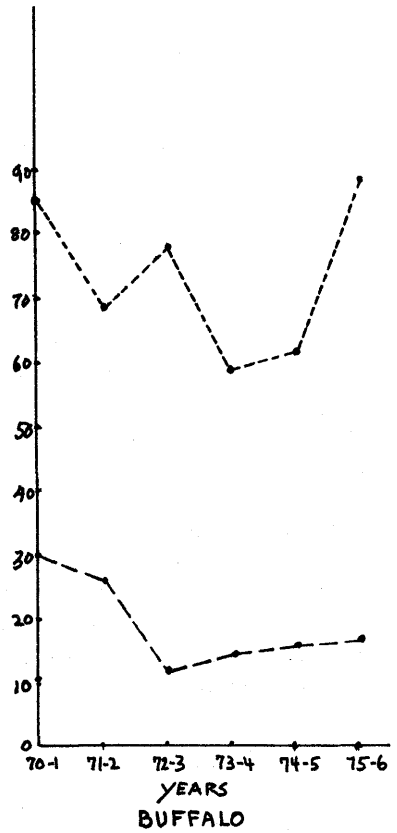

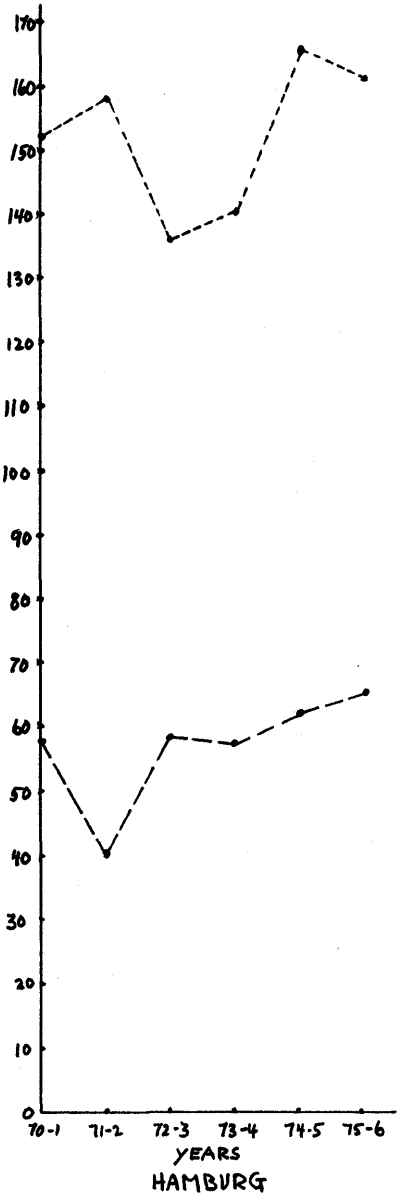

half of all woodpeckers recorded in this study were concentrated on the stripped elms, which constituted only 8.5% of the total elms.

The figures in column A include a number of woodpeckers that were observed flying over the study area. If the data are restricted to only those woodpeckers observed feeding (*i.e.*, to the exclusion of those flying over), a slightly higher set of percentages results, as shown in column B. On seven of the sixteen days, at least 90% of the feeding woodpeckers were observed on the stripped elms. The average of column B is about 63%.

On 28 February only two woodpeckers were counted in the study area. On 26 March there were only two and one woodpeckers respectively. All three counts are extremely low, and the possibility for discrepancies in the percentages is high; the whereabouts of a single woodpecker on any one of these days would drastically change the results.

Even those woodpeckers which did not feed on the stripped trees preferred elms. In column C are listed the percentages of feeding woodpeckers on elms of any kind. The average of this column is about 90%, suggesting that the larvae of the elm bark beetles make up a large proportion of the birds' diets.

CONCLUSIONS

1. Woodpecker numbers reflect a concentration rather than an actual population increase. Examination of Christmas Bird Count data over a six year period for Buffalo and Hamburg, New York, reveals no significant increases in woodpecker populations on a regional basis. (Figure 3). Control area data also show no widespread woodpecker population increases.

2. Since the elm bark beetle selects a limited number of host trees in which to lay its eggs, a small number of elms will have proportionately more larvae food. The woodpeckers concentrated on these select trees since they offered the most food.

3. In winter, the elm bark beetle may account for a higher percentage of an *urban* woodpecker's diet than was previously supposed.

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