has established residency in the region. Corvids, however, are often kept in captivity. It is interesting to speculate whether this is an escaped bird, as some have suggested, or whether this is a wild raven that has used adaptive behaviour to live successfully as both a predator and a scavenger in an unlikely environment. The general consensus of opinion of all the observers of this "Etobicoke" raven is that its general attitude, its caution, timidity, nesting, and hunting behaviour indicate that it is a wild bird, not an escapee. Furthermore, is the bird's apparent disappearance in the summer due to a lack of birders making observations or indicative of migration or nesting behaviour?

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Frequency of Winter Bird Occurrence at an Urban Conservation Area

by

Kenneth W. Dance

Introduction

A variety of published information on winter birds in Ontario is beginning to accumulate. Freedman and Riley (1980) reviewed changes in wintering species status during the period 1929–1977. The bird population study published by Campbell and Dagg (1976) included data on wintering birds on five plots in urban and suburban plots. Smith *et al.* (1982) described winter bird communities of urban southern Ontario. Dunn (1986) reported the results of a seven-year bird feeder

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count survey in Ontario. Use of natural winter foods by bird species in an urban park was reported by Dance (1987).

Despite the gradual accumulation of data, detailed information on winter birds assemblages in Canada are still lacking in the literature (Pittaway and Eagles 1980). Particularly absent is site-specific monitoring of winter bird occurrence.

The present paper reports the findings of a study designed to determine the frequency of occurrence of winter bird species during each of six annual census periods at an urban conservation area.

Study area

The study area was a 6.5ha plot within the Mabel Davis Conservation Area, situated in the Town of Newmarket, Regional Municipality of York. A detailed description of habitat is contained in Dance (1984). Upland deciduous forest, shrubby meadow, conifer plantings, floodplain deciduous, and lawn habitats are represented within the plot. Bird feeders were maintained within the plot by the Lake Simcoe Region Conservation Authority. Other feeders were present in residential yards near the plot.

Methods

Bird surveys were conducted according to the Winter Bird-Population Study method outlined in Kolb (1965). The number of individuals of each species observed was recorded. Species observed overhead were also noted. A minimum of 10 counts were completed each year. Extreme survey dates were 20 December and 26 February. The study extended over six successive winters, from December 1982 to February 1988.

Occurrence frequencies were calculated annually for each bird species. Frequencies were simply the number of survey dates when the species was observed divided by the number of survey dates. Calculated frequencies were rounded to the nearest whole number.

Results

Table 1 indicates the survey period and number of survey dates during each year of study. The number of species observed each year on the plot and overhead also appears in Table 1.

Table 2 lists the 30 bird species which were observed on the plot during the six-year study period. Annual plot occurrence frequencies are listed for each of these species. Five additional species, which were not observed on the plot in a particular year but were observed overhead, are listed at the bottom of Table 2. Frequencies of occurrence were not calculated for overhead species.

The bottom of Table 2 indicates the total number of bird species recorded on the plot and overhead during each year. The total number of species recorded in a given year ranged from 18 to 26.

Table 1: Survey period and number of species observed, Mabel Davis Conservation Area, Newmarket, 1983–1988

Survey period	1983 *29/12/82 to 26/2/83*	1984 *30/12/83 to 26/2/84*	1985 *21/12/84 to 17/2/85*	1986 *20/12/85 to 9/2/86*	1987 *21/12/86 to 15/2/87*	1988 *28/12/87 to 21/2/88*
No. of survey dates	10	10	16	22	19	16
No. of species observed on plot	13	19	21	15	16	15
No. of species observed overhead	6	4	5	3	4	4

Discussion

It would be expected that the number of plot visits would have some influence on the survey results. During 1986 and 1987, when the greatest sample effort occurred, the total number of species observed was not greater than in all other years. An examination of the species occurrence percentages does not reveal any obvious anomalies which could be attributed to greater sampling effort during these two years. The number of visits each year exceeded eight, the minimum number which Robbins (1981) recommended be carried out in order to achieve an accurate indication of species occurrence during a particular winter.

Annual occurrence frequency ranged from 0 to 100 per cent. Twenty-three species had an occurrence frequency of 0 in one or more years. Only four species were present during all counts conducted in a single year; Black-capped Chickadee (*Parus atricapillus*) was present during every survey for three years, Mourning Dove (*Zenaida macroura*) and White-breasted Nuthatch (*Sitta carolinensis*) were present during all surveys for two years, and Dark-eyed Junco (*Junco hyemalis*) had a 100% frequency during one year.

The following four species had occurrence frequencies of greater than 0 and less than 100 per cent each of the six years of study: Downy Woodpecker (*Picoides pubescens*), Hairy Woodpecker (*P. villosus*), American Crow (*Corvus brachyrhynchos*), and Northern Cardinal (*Cardinalis cardinalis*).

Variability in annual occurrence frequency is highlighted by such species as Mourning Dove, Blue Jay (*Cyanocitta cristata*), European Starling (*Sturnus vulgaris*), American Tree Sparrow (*Spizella arborea*), Pine Grosbeak (*Pinicola enucleator*), Purple Finch (*Carpodacus purpureus*), Pine Siskin (*Carduelis pinus*), and American Goldfinch (*C. tristis*). These species were completely absent on the plot

Table 2: Frquency of winter bird species occurrence, Mabel Davis Conservation Area, Newmarket, 1983–1988

Species observed on study plot	Frequency of occurrence (%)					
	1983	1984	1985	1986	1987	1988
Sharp-shinned Hawk	0	0	0	0	5	0
Cooper's Hawk	0	10	6	23	16	0
Red-tailed Hawk	0	0	6	5	0	0
American Kestrel	0	10	0	0	0	0
Mourning Dove	0	100	69	95	100	38
Eastern Screech-Owl	0	0	0	0	0	6
Great Horned Owl	0	10	13	0	0	0
Downy Woodpecker	40	70	31	68	53	25
Hairy Woodpecker	70	60	31	77	74	81
Pileated Woodpecker	0	20	0	0	0	31
Blue Jay	0	40	25	14	0	13
American Crow	20	30	13	9	47	25
Black-capped Chickadee	100	90	94	100	100	94
Red-breasted Nuthatch	0	0	6	0	0	0
White-breasted Nuthatch	70	80	94	100	100	94
Brown Creeper	0	10	0	0	0	0
Golden-crowned Kinglet	20	0	0	0	0	0
Cedar Waxwing	0	10	19	0	5	0
Northern Shrike	10	0	6	5	0	0
European Starling	20	40	0	0	5	0
Northern Cardinal	10	30	31	59	26	81
American Tree Sparrow	0	20	44	64	0	6
Dark-eyed Junco	10	80	88	95	100	75
Pine Grosbeak	0	0	0	41	0	6
Purple Finch	40	0	63	0	58	0
White-winged Crossbill	0	0	13	0	0	0
Pine Siskin	0	0	13	0	58	25
American Goldfinch	0	10	69	32	21	13
Evening Grosbeak	10	0	13	0	0	0
House Sparrow	10	10	0	0	5	0
Species observed overhead						
Canada Goose	+	+	+			
Mallard	+	+	+	+	+	+
gull sp.	+	+	+		+	+
Rock Dove	+	+	+	+	+	+
Blue Jay					+	
European Starling		+	+		+	
Common Grackle	+					
American Goldfinch	+					
Number of species (including overhead)	19	23	26	18	20	19

some years and were present during 40 per cent or more of the surveys in other years.

On this urban plot there are a small number of winter bird species which can be expected to occur with a degree of regularity. There are other groups of species, such as raptors and winter finches, which occur more sporadically. The raptors and certain winter finches (e.g., American Goldfinch, Pine Siskin) feed over a considerable area (Dunn 1986) and the study plot probably represents only a small portion of their winter feeding range, thus the probability of recording them on a particular count is less than that for a species which may remain on and adjacent to the plot all winter.

Weather is suspected to have influenced the frequency of observation of some species. The winter of 1983 was very mild and snow cover on the ground was minimal. The Mourning Dove is known to be dependent on feeders when overwintering in southern Ontario (Armstrong and Noakes 1983). During the mild winter of 1983 the Mourning Dove was not observed on the plot. During more severe winters (1984, 1986, and 1987) this species occurred during all but one survey. This finding is not unexpected since Dunn *et al.* (undated) have stated that during winters with limited snow cover Mourning Doves eat exposed corn and seed in fields instead of visiting feeders.

Annual variability in population size may also be expected to have some effect on the probability of observing a species routinely on the plot during a particular year. Winter finch numbers are known to vary dramatically between years. Irruptions can occur when high numbers of birds and poor food crops occur. During the winter of 1985 an irruption of winter finches was documented in Ontario (Mills 1986). During this winter the highest annual frequencies for the following species were recorded on the study plot: Purple Finch, White-winged Crossbill (*Loxia leucoptera*), American Goldfinch, and Evening Grosbeak (*Coccothraustes vespertinus*).

Findings of the present study suggest that the occurrence of many winter bird species in small urban habitat islands will be quite variable. A group of approximately 10 species occurred on the plot with a consistent annual frequency of 20 per cent or greater. Another 20 species visited the site on an infrequent basis. Eleven species were observed on the plot during only one or two years of the six-year study period.

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Intraspecific Aggression and Nest-Site Tenacity by European Starlings

by

A. P. Sandilands

Introduction

Most authors consider the European Starling (*Sturnus vulgaris*) to exhibit minimal territorial defence. Bent (1950) reported that starlings frequently construct nests in close proximity to each other with no signs of aggression and that they occasionally nest colonially or semi-colonially. He did, however, cite two instances of aggression during feeding. Feare (1984) concluded that starlings were not territorial and that they frequently nested colonially with much social interaction. In his study area (located in England) males defended the area within 0.5m of the nest cavity, but early in the egg-laying stage other males within 10m were chased off. The most aggressive behaviours he described were birds staring at each other, stabbing with the bill, or the "fly-up". This latter behaviour involves two birds kicking and stabbing at each other in flight. These aggressive acts usually occur while feeding. Kessel (1950) studied the actions of a polygamous male which was involved with a total of five

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