

Use of Black Alder (*Alnus glutinosa*) by Birds in Southern Ontario

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Introduction

Black Alder is a tree which was introduced into Southern Ontario, by European settlers, 200 or more years ago. The original range of this tree includes Great Britain and western and central Europe. In Ontario, Black Alder is considered to be an aggressive exotic species that can dominate a site to exclude all other plant species and remain dominant on the site indefinitely. It is also considered to be a top priority species for control (Urban Forest Associates Inc. 2002).

This tree has been planted at Hurler's Point on Toronto Island and has been collected in Haldimand-Norfolk, Elgin and Oxford Counties (Soper and Heimburger 1982). The author has observed it growing in Halton and Waterloo Regions and Brant, Elgin, Norfolk and Oxford Counties. This tree has been planted, spread and has naturalized in eastern North America, from Illinois to Massachusetts, and south to

New Jersey (More and White 2002). Lauriault (1989) indicates that Black Alder was originally introduced in Canada for the production of charcoal.

The Black Alder can grow into a tree up to 20 m or more in height. In Ontario, the largest Black Alder listed on the Ontario Honour Roll of Trees was 18.4 m tall and 72 cm diameter, measured 1.3 m above the ground (Ontario Forestry Association undated). As with the native alder species, Black Alder seeds are produced in a woody, cone-like catkin which persists after the seeds are shed in late autumn or winter.

The author has observed that Black Alder trees produce thousands of seeds which float on water. McVean (1953) reports that the average number of seeds produced by a Black Alder is 240,000, and that the seeds float for 30 days. This trait aids downstream distribution of seeds of this tree, which thrives in lowland habitats: wetlands, stream, river and lake shores.

There are two native species of alder in Ontario, Speckled Alder, *Alnus incana* spp. *rugosa*, and Green Alder, *Alnus viridis* spp. *crispa*. These are both shrubby species. Speckled Alder is present throughout Ontario, except near the western end of Lake Erie. The Green Alder is distributed across Northern Ontario, but is rare south of 46° N and is absent south of the Canadian Shield. Both species occur across Eurasia (Soper and Heimbürger 1982).

Several bird species are known to consume buds, catkins and /or seeds of the native alder species e.g. Ruffed Grouse (*Bonasa umbellus*), American Woodcock (*Scolopax minor*), Common Redpoll (*Carduelis flammea*), Hoary Redpoll (*C. hornemanni*), Pine Siskin (*C. pinus*) and American Goldfinch (*C. tristis*) (Martin *et al.* 1951). There are only scattered reports of birds using Black Alder in North America e.g. the Pine Grosbeak (*Pinicola enucleator*) was reported to consume Black Alder seeds (Bent 1968).

Birds attracted to the Black Alder in North America include: Great Blue Heron (*Ardea herodias*), Pine Siskin, American Goldfinch, Scarlet Tanager (*Piranga olivacea*), Blue Jay (*Cyanocitta cristata*), grosbeaks, sapsuckers and warblers. Seeds, insects on leaves, shelter, nesting sites and sap are listed as uses of the Black Alder by birds (The Morton Arboretum 2002). A study of birds in north-central Saskatchewan found that the Red-eyed Vireo (*Vireo olivaceus*) was associated with the shrubby Black Alder

habitat present in the stands studied (Kirk and Hobson 2001).

The only detailed reference to Black Alder use by birds in Ontario that I have encountered was reported in (Olbermann and Gordon undated). Black Alder was one of nine or more tree and shrub species planted to widen the treed buffer along a stream located in Oxford County, Ontario. Followup bird surveys revealed that the number of bird species nesting and foraging in the rehabilitated areas was greater than in the control area. An autumn season survey revealed higher numbers of Blue Jay, Song Sparrow (*Melospiza melodia*), Black-capped Chickadee (*Poecile atricapillus*), Cedar Waxwing (*Bombycilla cedrorum*) and Yellow-rumped Warbler (*Dendroica coronata*) present in a wide buffer planting than were present in the narrow buffer and control areas.

The purpose of the present paper is to document the magnitude of use by birds of a tree which has been present in the southern Ontario landscape for approximately two centuries.

Methods

Detailed notes were kept of the species, numbers, uses and behaviour of birds observed on or immediately adjacent to Black Alder trees.

The observation period ranged between 5 January 2003 and 25 October 2007. Specific use(s) by birds were observed during 163 trips.

More than ninety-five percent of the observations were recorded in the Nith

River valley at Wolverton, Blandford-Blenheim Township, Oxford County. Many observations were near the confluence of Wolverton Creek (a coldwater stream) and the Nith River (17T 538500 4790100 NAD 1983). Black Alder trees line the banks of both Wolverton Creek and portions of the Nith River in this location.

Less frequently, observations were recorded at Glen Morris, Brant County; Otterville, Oxford County; Port Burwell, Elgin County and Blair, Regional Municipality of Waterloo.

Results

Tables 1 through 4 contain a summary of the number of observations of various uses of Black Alder arranged by bird species. Black Alder seeds were observed to be consumed by eight bird species (Table 1). Six bird species were observed to be foraging on or within the boles or snags of Black Alder trees (Table 2). Twenty-seven bird species were recorded foraging for insects on the leaves, twigs and/or branches of Black Alder, (Table 3). Table 4 indicates that 42 species were observed using Black Alder as a foraging perch (e.g. by insectivores which sally out to capture prey), a resting or preening perch, for cover and/or as nest sites.

Discussion

Finches, sparrows and Black-capped Chickadees were observed consuming Black Alder seeds (Table 1). The American Goldfinch and Pine Siskin were observed most frequently extracting

Table 1. Number of Observations of Black Alder Seed Consumption by Bird Species.

Species	Number of observations
Black-capped Chickadee	16
American Tree Sparrow	2
Dark-eyed Junco	5
House Finch	1
White-winged Crossbill	1
Common Redpoll	1
Pine Siskin	22
American Goldfinch	52

Table 2. Number of Observations of Foraging on Black Alder Boles or Snags by Bird Species.

Species	Number of observations
Downy Woodpecker	20
Hairy Woodpecker	2
Pileated Woodpecker	2
White-breasted Nuthatch	10
Brown Creeper	15
Carolina Wren	1

seeds from the Black Alder cones. Mixed flocks of these two species were frequently observed, with flock sizes reaching up to an estimated 300 individuals. Although the observation dates are not reported here in detail, a review of my notes indicates that seed availability and consumption was concentrated

between the end of October and mid-April, with December through late March being the most intensive season of seed consumption.

As noted earlier, several of the bird species listed in Table 1 are known to consume seed of the native alder species also, e.g. American Goldfinch, Common and Hoary Redpoll and Pine Siskin (Martin *et al.* 1951). Root (1988) described alder (species unspecified) seed use by the American Goldfinch. Root also indicates that goldfinches can be members of mixed species flocks containing redpolls, siskins and American Tree Sparrows (*Spizella arborea*).

For those bird species which feed on Black Alder seeds it is an important phenomenon that, although the quantity of seed produced has been found to vary from year to year, both in Europe and the eastern United States, seed crops are generally heavy (McVean 1955, Pizelle 1984).

Table 2 reveals that species such as the Downy Woodpecker (*Picoides pubescens*) and Brown Creeper (*Certhia americana*) forage on, or in, the boles or snags of Black Alder. It was observed that many of the bole/snag foragers were members of mixed flocks, including the Black-capped Chickadee and

Table 3. Number of Observations of Foraging for Insects on Black Alder Leaves, Twigs and/or Branches by Bird Species

Species	Number of observations		
		Yellow-rumped Warbler	7
Blue-headed Vireo	2	Black-throated Green Warbler	1
Warbling Vireo	3	Palm Warbler	1
Philadelphia Vireo	1	Bay-breasted Warbler	1
Red-eyed Vireo	1	American Redstart	2
Black-capped Chickadee	56	Mourning Warbler	1
Winter Wren	1	Common Yellowthroat	1
Golden-crowned Kinglet	7	Song Sparrow	1
Ruby-crowned Kinglet	10	White-throated Sparrow	4
Blue-gray Gnatcatcher	1	Rose-breasted Grosbeak	1
Gray Catbird	1	Red-winged Blackbird	3
Yellow Warbler	8	Common Grackle	2
Chestnut-sided Warbler	1	Baltimore Oriole	1
Cape May Warbler	1	American Goldfinch	3

kinglets, which moved through and foraged on Black Alder patches together. Table 3 documents the considerable variety of insectivores which were observed foraging on Black Alder leaves, twigs and branches. Vireo, warbler, kinglet and sparrow species, among others, were recorded. Insect taxa observed to be among the prey items included Lepidoptera (moths and butterflies) adults and larvae, adult Plecoptera (stoneflies) and adult Chironomidae (midge flies). Since the alders grow adjacent to or hang over Wolverton Creek and the Nith River, it is not surprising that an abundance of recently emerged aquatic insects is present on these trees.

Black Alder leaves persist on the tree well into November, and insects present among the leaves were frequently gleaned by autumn migrating kinglets. Many of the vireo and warbler species observations with low occurrence numbers were spring migrants feeding on early emerging Chironomids. Insects from Black Alders were also used by autumn migrants. The Black-capped Chickadee was observed most frequently gleaning insects from Black Alder leaves, twigs or branches (56 occasions). This resident species was observed gleaning on Black Alder every month of the year except August.

On many dates, Black-capped Chickadees appeared to be the leaders of mixed species flocks which foraged among the Black Alders, with winter birds and/or migrants joining these

flocks. Examples of mixed flock observations included 5 January 2003, when a flock of Black-capped Chickadee, American Tree Sparrow and American Goldfinch was consuming seeds. On 27 September 2003, a mixed flock including Black-capped Chickadee, White-breasted Nuthatch (*Sitta carolinensis*), Gray Catbird (*Dumetella carolinensis*), Bay-breasted Warbler (*Dendroica castanea*) and White-throated Sparrow (*Zonotrichia albicollis*) was observed. All of these species were gleaning insects from Black Alder trees.

Forty-two bird species were recorded making other uses of Black Alder (Table 4). A variety of duck species was observed feeding and loafing in areas where the tree cover on the adjacent bank was Black Alder. The raptor species observed were either hunting and/or perching in areas where Black Alder was the predominant tree cover.

A great variety of resident song bird species was observed perching in Black Alder. The trees provided cover and several species were observed sallying out from alders to capture insects. A number of other species was observed moving from Black Alder cover to adjacent food sources such as Wild Cucumber (*Echinocystis lobata*), Giant Ragweed (*Ambrosia trifida*) and Riverbank Grape (*Vitis riparia*). Several species, e.g. Black-capped Chickadee and Red-winged Blackbird (*Agelaius phoeniceus*), took Giant Ragweed seeds back to Black Alder branches for "processing" and consumption.

Table 4. Number of Observations of Other Uses* of Black Alder by Bird Species

Species	Number of observations of uses		
Canada Goose	C (5)	American Robin	P (9), N (2)
Wood Duck	C (2)	Gray Catbird	P (1)
American Black Duck	C (4)	European Starling	P (1)
Mallard	C (1)	Cedar Waxwing	P (7), F (1)
Common Merganser	C (6)	Yellow Warbler	P (3), N (2)
Wild Turkey	C (2)	Common Yellowthroat	P (3)
Great Blue Heron	P (1)	Song Sparrow	P (9)
Turkey Vulture	P (1)	White-throated Sparrow	P (5)
Osprey	P (1), F (1)	Dark-eyed Junco	P (4)
Bald Eagle	F (1)	Northern Cardinal	P (6)
Red-tailed Hawk	P (1), F (1)	Rose-breasted Grosbeak	P (4)
American Woodcock	C (1)	Red-winged Blackbird	P (13)
Mourning Dove	P (2)	Common Grackle	P (5)
Ruby-throated Hummingbird	P (1)	Brown-headed Cowbird	P (2)
Belted Kingfisher	P (1)	Baltimore Oriole	N (1)
Red-bellied Woodpecker	P (1)	Purple Finch	P (1)
Least Flycatcher	P (3)	Pine Siskin	P (1)
Eastern Phoebe	P (7), F (1)	American Goldfinch	P (5), N (1)
Blue Jay	P (6)		
American Crow	P (4)		
Tree Swallow	P (1)		
Barn Swallow	P (1)		
Black-capped Chickadee	P (11), N (1)		
Winter Wren	C (1)		

Legend

- Other uses include: foraging territory (F), perching (P), provision of cover (C), nest sites (N).
- Number in brackets indicates number of observations of each use type.

Black Alder trees or snags were used as nest sites by Black-capped Chickadee, American Robin (*Turdus migratorius*), Yellow Warbler (*Dendroica petechia*), Baltimore Oriole (*Icterus galbula*) and American Goldfinch. In Europe, a variety of bird species have been documented to nest in cavities located in Black Alder trees. Wesolowski (1995) found that in an eastern Polish forest, bird nest cavities were more abundant in Black Alder than in five other tree species studied. All six tree species hosted some nest cavities. The bird taxa using the cavities in trees studied included tit species (*Parus*), flycatchers species (*Ficedula*), a nuthatch, European Starling (*Sturnus vulgaris*) and the Great Spotted Woodpecker (*Dendrocopos major*). Of the nest cavities present in the Black Alders, 8.5% were subsequently lost due to injury compartmentalization (wounds sealed over by tree tissue growth).

In Scotland, the Common Goldeneye (*Bucephala clangula*) and Gray Wagtail (*Motacilla cinerea*) were reported to nest in old stands of Black Alder where these bird species sought holes to nest in (Wild Scotland 2006). Stanevicius and Balevicius (2005) found Black Alder sticks in nests of Marsh Harrier (*Circus aeruginosus*) at three sites located in Lithuania.

Additional observation effort during the breeding season in Southern Ontario would undoubtedly confirm nesting of more bird species in Black Alders.

Characteristics of Black Alder of Benefit to Birds

Seed Production and Availability

The abundant and reliable seed production provides a food source during the late autumn through early spring period. Since seeds are held in cones, this food source is protected from snow until the seeds are eaten or fall out of the cone. Dark-eyed Juncos (*Junco hyemalis*) were observed foraging on seeds which had fallen onto snow. One example of interesting seed foraging behaviour was an observation, on 19 November 2005, involving a single American Tree Sparrow flying to several groups of twigs that had seed catkins attached, landing on the twigs and shaking the seed cones by quivering its body. I did not, however, observe the Tree Sparrow retrieving any seeds, which would have been shaken loose. This type of behaviour, involving seeds knocked from birch catkins, has been described for Common Redpolls (Brooks 1978).

Since Black Alder seeds float, they continue to be a food source when deposited among flood debris. American Goldfinches were observed feeding on windrows of seeds deposited on logs as melt water receded, on 24 March 2003.

Nutrient Value of Catkins

Martin *et al.* (1951) reported that nutrient content of the catkins from an unspecified alder species was 8% protein, 7% fat and 25% sugar and starch.

The values for alder catkins were all greater than those for cauliflower (*Brassica oleracea* var. *botrytis*). Ruffed Grouse are known to consume alder catkins.

Physical Structure of the Tree

The layered and relatively dense structure of the branches, twigs and leaves, and long seasonal persistence of leaves, creates several “benefits” for birds. Cover from predators is provided. Surfaces available for insect colonization are extensive, but are open enough for birds to forage. Black-capped Chickadees and Downy Woodpeckers present in an oak-hickory forest during winter were found to concentrate foraging on small live branches and twigs (Brawn *et al.*, 1982). The structure of Black Alder provides an abundance of small branches and twigs. The present study found (Table 3) that the Black-capped Chickadee was frequently observed on Black Alder leaves, twigs and /or branches.

Robinson and Holmes (1984) studied a northern deciduous forest where native alders were an acknowledged component of the “multilayered” leaf distribution of successional tree species. Several vireo and wood warbler species were studied. These authors found that the different ways that forest birds searched for and captured prey appeared to be influenced by the arrangement of leaves, branching patterns and other parameters of foliage structure. The dense leaf and twig structure of Black Alder hanging over Wolverton Creek and the Nith River

attracted insects which provided food for a variety of migrant vireo, warbler and sparrow species, among others. The migrant vireo and warbler species would be familiar with native alder species present in the breeding range of many of these birds.

The fissured bark of larger diameter Black Alders provides cover for insects and other arthropods which attracted a variety of resident and migrant bark gleaning bird species. Downy Woodpecker, Brown Creeper and White-breasted Nuthatch were most frequently observed gleaning on boles.

The persistence of Black Alder leaves on trees into mid- and late-November provides cover when most other trees have lost their leaves, a foraging substrate which is used by Black-capped Chickadees and other leaf gleaners.

Examination of a sample of Black Alder cones in March of 2004 and 2005 revealed that seeds were still present. The availability of this food source throughout the entire winter is important and has been commented on by others. Dunn and Tessaglia-Hymes (1990) indicate that alder (species unspecified) seeds play an important role in the winter diets of redpolls, Pine Siskins and American Goldfinch. According to these authors, American Goldfinches rely on weed seeds until snow covers these sources, then alder and birch seeds, which are suspended high above the ground, become important.

The tops of mature Black Alders frequently break off, leaving snags that were observed to be used as perches by a variety of large birds, as foraging sites for birds seeking wood-boring insects, and as nest sites by Black-capped Chickadees.

Other Roles of Black Alder

From a broader ecological perspective, Black Alders assist in the restoration of poor quality soils by fixing nitrogen, and by stabilizing stream and river margins through the rapid colonization of eroding and slumping banks. The root systems and dense stem structure of Black Alder saplings reduce the erosive forces of flood waters.

The distribution of Black Alder in the landscape is usually clumped or linear, being associated with moist soils. In the present study area (the valleys of streams and rivers that flow south into Lake Erie), Black Alder is concentrated along known bird migration routes and bird overwintering habitats. The tree species, thus, plays a significant role in the provision of food and cover to migrating and overwintering birds.

Beneficial Role of Birds for the Black Alder

There is evidence that birds play a role in dispersing the seeds of Black Alder. Perhaps the most interesting finding in

this regard is the conclusion that birds may have played a significant role in dispersing Black Alder seed from western France to the British Isles several thousand years ago (Chambers and Elliott 1989).

Summary

Over a period of two hundred years or more, dozens of bird species have adapted to using the introduced Black Alder tree for food and cover in Southern Ontario. Seed consumption by winter flocks of several hundred American Goldfinch and Pine Siskin is one major use which is documented here. Insectivores forage extensively among Black Alders during the spring and autumn migrations. Dozens of bird species were observed using the Black Alder as a preening, singing or resting perch. Five breeding bird species were observed nesting in Black Alder trees or snags.

A number of physical characteristics of the Black Alder seem to affect its benefits for birds. The occurrence of Black Alder in stream and river valleys that are key migration and overwintering habitats contributes to this tree's strategic role in bird ecology. Birds in turn benefit the tree by dispersing the seeds of Black Alder following consumption.

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