

## Two problems in Betulaceae along the Niagara River: *Alnus glutinosa* and *Betula cordifolia*

P. M. Eckel

Missouri Botanical Garden, PO Box 299, St. Louis, MO 63166-0299

Over the past several years I have had occasion to take note of the vegetation growing along the Niagara River and its attendant streams. At Buckhorn Island State Park, a multitude of branched twigs on which were attached numerous tough woody little cones occurred floating in shallow water in the Niagara River. Trees on the moist island bank were decorated with pendent male catkins together with those very cones (the female seed factor). Apparently the cones were attached to deciduous branched twigs that fell in their season and floated to a favorable spot where the seeds could germinate on the shore.

The trees, with broadly rounded to emarginate leaves, proved to be of an introduced Eurasian species of Alder (*Alnus*), *A. glutinosa* (L.) Gaertn., or the Black Alder (named for the sticky, glue-like covering on young parts). The native Speckled Alder (*A. rugosa* (Du Roi) Spreng. has acute to acuminate leaves. Speckled Alder favors the quite marshy borders inland to the Niagara River at Buckhorn, whereas the Black Alder is quite happy with the more rough conditions along the river, especially the strong current, which helps in seed dispersal.

The major manuals indicate that Black Alder is not wide-spread in its area of occurrence, so I was surprised to find it colonizing the stony berm at the northwest extremity of the Park. Midway along the eastern shore of Grand Island I found it again colonizing its beaches, and again, on a small natural shoreline on the mainland at the base of the South Grand Island bridge. An extensive population was found in association with at least the lower reaches of the Buffalo River along the great meanders above the Buffalo harbor.

Examination of specimens in the Clinton Herbarium of the Buffalo Museum of Science showed Black Alder was planted in Delaware Park

as long ago as 1886 (Tillie M. Schlegel, Delaware Park, 1886, Buffalo, New York; Elizabeth C. Rochester, 1886, Buffalo Park; Otilie E. Hauenstein, "Park," April 15th, 1888). More recent collections show a disturbing trend: during the 1960's Harold and Rachel Axtel found numerous instances of this species in the Niagara region and along the Niagara River and streams feeding into it: USA: New York: Beaver Island State Park, Erie Co. Near E. Niagara River. "This species has multiplied at this station so that in 1967 several thousand are growing, mostly in about 2 acres, and occasional ones on the shore down the river." Harold & Rachel Axtel. August. 13, 1967; Town of Porter, Niagara Co. New York. "A solitary specimen at edge of vegetation on shore of Lake Ontario, 5 miles E. of the Niagara River Obviously an escape." Harold & Rachel Axtel, Sept. 29, 1967; Canada, Ontario, Humberston Twp., Welland Co. "Escaped & abundant over one or 2 acres beside Holloway Bay Road." Harold & Rachel Axtel, Aug. 6, 1967. Karen Wallace more recently found a specimen along Seneca Creek in West Seneca (9/21/75).

Another station in Canada: Regional Mun. Niagara. "Off the Niagara Parkway about 2 miles N of Miller's Creek; low, soaking ground being eroded by Niagara River," P. M. Eckel, Sept. 10, 1983, herb. no. 53446, can probably be said to be a mother source of seed for *Alnus glutinosa* populations along the Niagara River. These were mature trees that occurred in a horticultural setting and appear planted. If so, it is important that agencies with horticultural obligations in areas beside waterways avoid planting these trees and to remove ones already established. Some thought should also be applied to how major a role government agencies play in creating situations for the invasion of noxious species to occur.

Of particular interest concerning the ongoing relicensing of the New York State Power Authority, is the role that water diversion in both Ontario and New York have in exacerbating water fluctuations in the Niagara River and its tributaries. Already stream flow in this watershed is reduced by lower annual precipitation, intensified in drought years. Conditions along stream margins of exposed moist soil for however limited a time resemble a petrie dish in which all sorts of diaspores can germinate, especially those that tolerate periodic flooding. Care should be made to protect riparian habitats from invasive taxa such as the notorious Purple Loosestrife and *Phragmites communis* that ruin ecosystems. The Black Alder may ultimately prove to be such a species.

While processing a box full of leafy twig specimens of *Betula* collected in the Niagara River gorge long ago, I had occasion to identify sterile material of *Betula alleghaniensis* (= *B. lutea*) and *B. papyrifera*, the familiar white-barked Paper Birch, both rather fragile and relatively ephemeral trees typical of the riparian forest at the base of the Niagara Gorge. The first species is noted for its dark bark and numerous pairs of veins on either side of the leaf midrib, the latter white bark and with fewer veins. To this useful character might be added that the Yellow Birch has longish hairs mostly lying parallel to the main vein on the underside of the leaf, and crinkly hairs in the vein axils. Paper Birch has shorter, straight hairs in a fringe perpendicular to the main vein, especially in the vein axils.

Two anomalous specimens of *Betula*, were distinctive in that although the leaves had fewer vein pairs and were from white-barked trees, and so like the Paper Birch, however the leaf bases were cordate, rather than with the cuneate base of the Yellow Birch. The hairs along the main vein below were both long and parallel and also short and perpendicular. One specimen was also uncharacteristically pubescent on the underside of the leaf.

These two specimens would key to *Betula cordifolia* in the Britton and Brown manual (Gleason 1952). This species bears no mention by Fernald (1950) and it does not occur in the Ontario

checklist by Morton and Venn (1990) at all, not even a mention. Gleason indicated this species was a hybrid between the two species of Birch discussed above.

Voss (1985) indicated *B. cordifolia* has differences in chromosome number in northern populations, but included the taxon in *B. papyrifera* in his Michigan flora. Since Mitchell and Tucker (1997) include the taxon on the New York State flora, it is included here in the checklist of species growing in the Niagara Frontier Region, as defined by Zenkert (1934).

Specimens of *Alnus glutinosa* and *Betula* spp. are deposited in the Clinton Herbarium (BUF) of the Buffalo Museum of Science.

*Betula cordifolia* Regel.: USA, New York, Niagara Co., City of Niagara Falls, base of the gorge of the Niagara River, just upstream from DeVeaux (Whirlpool) stone steps, downstream of the Whirlpool basin. River's edge, P. M. Eckel, September 5, 1988. Canada, Ontario, Regional Municipality of Niagara, Whirlpool Ravine, upstream from Niagara Glen adjacent to the Niagara River Boulevard, water's edge, base of the gorge of the Niagara River; P. M. Eckel, June 10, 1988.

Grateful acknowledgement is made to Dr. John Grehan, Director of Science and Collections at BUF for herbarium access.

#### Literature Cited

- Fernald, Merrit Lyndon. 1950. Gray's Manual of Botany. ed. 8. American Book Co., New York.
- Gleason, Henry A. 1952. The New Britton and Brown Illustrated Flora of the Northeastern United States and Adjacent Canada. 3 Vols. New York Botanical Garden. New York.
- Mitchell, Richard S. & Gordon C. Tucker. 1997. Revised Checklist of New York State Plants. New York State Museum Bulletin 490.
- Morton, J. K. & Joan M. Venn. 1990. A Checklist of the Flora of Ontario Vascular Plants. University of Waterloo Biology Series No. 34. Obtainable from Department of Biology, University of Waterloo, Waterloo, Ontario, Canada, N2L 3G1.
- Voss, Edward G. Michigan Flora. 1985. Part II. Dicots (Saururaceae-Cornaceae). Cranbrook Institute of Science Bulletin 59 and University of Michigan Herbarium, Ann Arbor.
- Zenkert, Charles A. 1934. Flora of the Niagara Frontier Region. Bull. of the Buff. Soc. of Nat. Sci. Vol.16. Buffalo, New York.