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Note

A disjunct population of American Hazelnut (*Corylus americana*): a new plant species for the Ottawa district

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Abstract

A previously unknown population of American Hazelnut (*Corylus americana*), a native shrub species, has been discovered in the Ottawa district. This location is disjunct from the species' nearest known populations. Although American Hazelnut is not a particularly conspicuous species, it was found in a relatively well documented area. The location includes remnant vegetation from the Constance Bay Sandhills, a former savannah habitat, including other species whose occurrence in the region is disjunct. American Hazelnut is strongly affiliated with savannahs and related habitats across Ontario and the upper midwest of the United States.

Key words: American Hazelnut; *Corylus americana*; Constance Bay; Ottawa; savannah; sand barren; plant distribution; plant dispersal

On 15 September 2019, A.L.B., O.J.C., and J.D.M. were exploring the inaccurately but recently named "Torbolton Forest" in the northwestern corner of the City of Ottawa, historically known as the Constance Bay Sand Hills. The Ottawa Field-Naturalists' Club Conservation Committee has an ongoing focus on the biodiversity of the Constance Bay area, which is home to a disproportionally large number of the Ottawa district's rare and unusual species. J.D.M. noted jagged leaf margins and hairy petioles on a large shrub along an informal trail. On further examination, the leaves, twigs, buds, petioles, and fruit (Figure 1) were all found to be consistent with American Hazelnut (*Corylus americana* Walter). On 22 September 2019, O.J.C., A.L.B., and Elsa Clarkin located numerous individual plants of American Hazelnut in an ovoid area ~300 m by 200 m. Records of all individual plants along with photo vouchers were added to iNaturalist (2021) and two specimens were deposited in the herbarium of the Canadian Museum of Nature (CAN 11014722 and CAN 11014723). On 28 September 2019, O.J.C. and J.D.M. conducted a further survey, locating additional individuals in the same general area. On 19 April 2020, A.L.B. documented a shrub with spring catkins, further confirming the identification (Figure 1c). Overall, several dozen individuals were found; however, only a small number of these had attained a large enough size to flower or fruit. Many individuals were short with evidence of deer grazing (Figure 1d); the closed canopy of the pine plantation likely contributes to their suppression.

American Hazelnut has not been reported previously from Constance Bay in various inventories (e.g., Porsild 1941; White 1979). In Ontario, American Hazelnut is known primarily from southern Ontario, where it is found from southern Lake Huron across to and along the north shore of Lake Ontario, and at a few sites along the St. Lawrence River valley as far as Cornwall; it is also found around the shores of Lake of the Woods in northwestern Ontario (Soper and Heimburber 1982). Soper and Heimburger (1982) show no occurrences closer to Ottawa than Cornwall, and no occurrences outside the Great Lakes–St. Lawrence watershed (Figure 2). The only records from Quebec are south of Montreal (Sabourin 2009). The shrub has not appeared in more recent regional inventories, such as Brunton's (2005) extensive flora, and this occurrence has not previously been reported to iNaturalist. More widely, American

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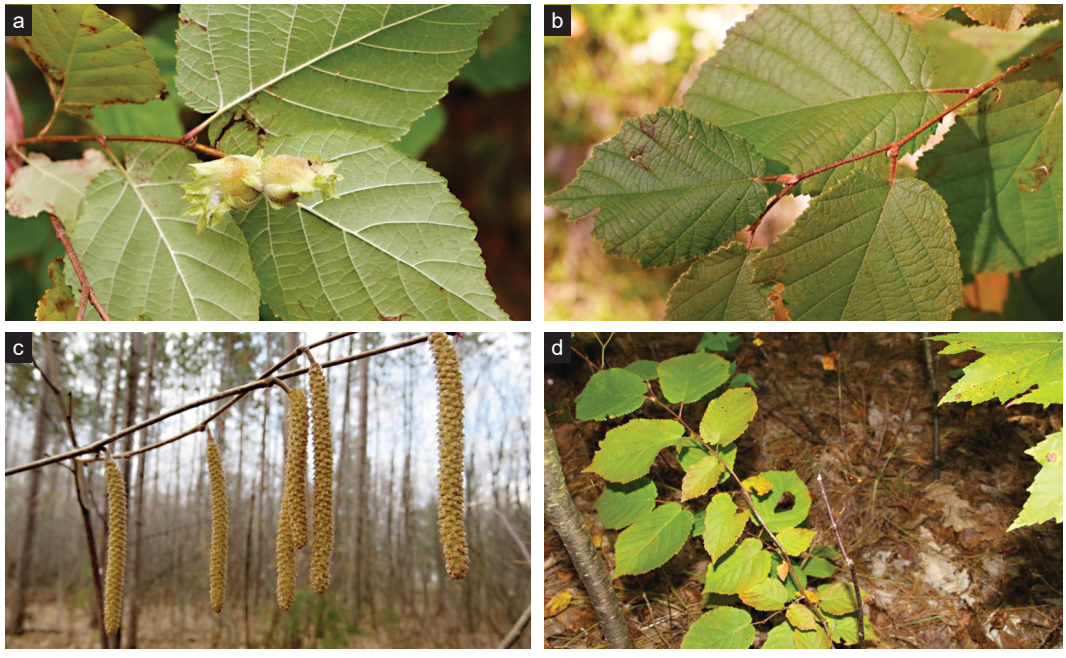

FIGURE 1. American Hazelnut (*Corylus americana*). a. Fruit and leaves, b. hairy twigs and petioles, and c. catkins, Constance Bay, Ottawa District, 15 September 2019, 26 September 2020, and 19 April 2020, respectively. The hairy twigs, petioles, and catkins of American Hazelnut distinguish it from the common and widespread Beaked Hazel (*Corylus cornuta*). d. Most of the individual American Hazelnut plants were found to be short, with evidence of browsing (26 September 2020). Photos: a. b, d. J. Mueller. Photo: c. A. Bélair.

Hazelnut is found across much of the eastern and mid-western United States (Catling and Small 2000).

American Hazelnut occurs in many situations, but is typically in upland areas that are dry and well drained, in habitats that are open or have a partial tree canopy (Soper and Heimburger 1982; Hilty 2018). This is in contrast to the typical habitat of its more familiar relative, Beaked Hazelnut (*Corylus cornuta* Marshall), which is common in the Ottawa district in moist forest understories. Among other differences, Beaked Hazelnut has glabrous leaves and twigs (Soper and Heimburger 1982). The ubiquity and familiarity of Beaked Hazelnut to local naturalists and, conversely, the lack of local familiarity with American Hazelnut, may have played a role in the lack of documentation of American Hazelnut until now.

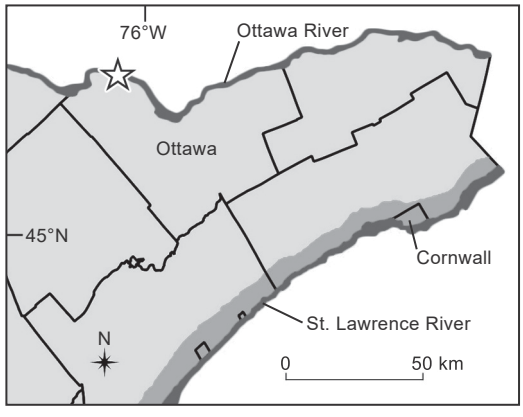

FIGURE 2. American Hazelnut is considered to be a native plant in a narrow band (dark grey) along the north shore of Lake Ontario (not shown) and the St. Lawrence River, from west of Kingston (not shown) to east of Cornwall (modified from Soper and Heimburger 1982). The new population at the Constance Bay Sandhills described here (indicated by the star) is disjunct and local.

Given the location of the shrubs, American Hazelnut is presumably native to the site as a relic of the original habitat. Today's "Torbolton Forest" is a plantation on the site of the Constance Bay Sandhills, a complex of savannah and sand barren vegetation that has been documented as having many regionally rare or unique plant species (e.g., Porsild 1941; White 1979). However, the establishment of extensive pine plantations, combined with development and sand extraction, have reduced the extent of the savannah habitat to 1% of its original area (Catling *et al*. 2010). The fraction that persists is largely the result of a single, experimentally restored clearing in the plantation, while other vegetation persists in

narrow openings created by roads and trails (Catling and Kostiuk 2010). Because of the extent of habitat destruction, there has been speculation that species may have disappeared from the sandhills before being documented (Catling and Brunton 2010). One species, Beach Heather (*Hudsonia tomentosa* Nuttall), is presumed extirpated (Catling *et al.* 2010).

The discovery of a disjunct population of a southern, savannah-associated species at Constance Bay is not without precedent. While there are other sand barrens in the middle Ottawa valley that share some characteristics with the Constance Bay Sandhills, the sandhills have a distinct, southern floristic component (Carbyn and Catling 1995). Other southern species with a disjunct occurrence at Constance Bay include Butterfly Milkweed (*Asclepias tuberosa* L.), which is next encountered on granite barrens in the Frontenac Axis (Catling and Brownell 1999), and Hairy Puccoon (*Lithospermum caroliniense* (J.F. Gmelin) MacMillan), where the next-closest known locality is Sandbanks Provincial Park (Crowder *et al.* 1997). In addition to American Hazelnut, there are 13 "regionally significant" plant species found on the Constance Bay peninsula, but nowhere else in the City of Ottawa (Brunton 2005). Of these, all are associated with dry sandy habitats, and one is the extirpated Beach Heather (see Tables 1 and 2).

The presence of American Hazelnut in this area of former savannah habitat is, thus, not unexpected. American Hazelnut is known as a historically significant component of oak savannahs and as a component of thickets in tallgrass prairies (Packard 1997). In one analysis, American Hazelnut was present 79% of the time among dry sand savannah sites in the Great Lakes region (Will-Wolf and Stearns 1999) and in another, it was present in 77% of Jack Pine (*Pinus banksiana* Lambert) barrens in the northern Great Lakes region (Pregitzer and Saunders 1999), both habitats with which the Constance Bay Sandhills have some affinity (i.e., habitats share origins, structure, and ecological processes; Carbyn and Catling 1995). American Hazelnut's occurrences to the south of Ottawa include its presence in savannah remnants of the Rice Lake Plains (Catling 2008) and along the Trent River (Catling and Catling 1993). In the Ojibway Prairie Provincial Nature Reserve in Windsor, Ontario (one of the few large remaining examples of this habitat in Ontario), three shrub species resist periodic burns to form small thickets: Gray Dogwood (*Cornus racemosa* Lamarck), Sassafras (*Sassafras albidum* (Nuttall) Nees), and American Hazelnut. Of these, the hazelnut is the most frequent and most prominent (J.D.M. pers. obs.).

The dispersal of American Hazelnut to the Constance Bay Sandhills could have occurred in a number of ways. In general, the extent of prairie and savannah vegetation is believed to have expanded substantially during the hypsithermal period, c. 8000–5000 BCE (before current era i.e., before Christ; Rodger 1998). American Hazelnut may have advanced with the rest of this plant community at that time. If the shrub arrived after the savannah at Constance Bay was established, its dispersal may have been facilitated by Indigenous peoples (Reznicek 1983; MacDougall 2003). In general, savannah communities in Ontario were often occupied or used by Indigenous peoples for various purposes (Bakowski and Riley 1994). This site is near the Ottawa River, a known trade route. Although many of the disjunct species found at Constance Bay (Table 1) are not noted for their use

Table 1. Regionally significant plant species recorded from the Constance Bay peninsula, but not recorded from elsewhere in the Ottawa area, based on Brunton (2005).

Scientific name	Common name
Asclepias tuberosa L.	Butterfly Milkweed
Carex siccata Dewey	Dry-spike Sedge
Cyperus houghtonii Torrey	Houghton's Flatsedge
Cyperus lupulinus (Sprengel) Marcks	Hop Flatsedge
Epigaea repens L.	Trailing Arbutus
Helianthemum canadense (L.) Britton	Canada Frostweed
Hudsonia tomentosa Nuttall	Beach Heather
Lechea intermedia Leggett ex Britton	Large-pod Pinweed
Lithospermum caroliniense (J.F. Gmelin) MacMillan	Golden Puccoon
Oenothera oakesiana (A. Gray) J.W. Robbins ex S. Watson	Oakes' Evening-primrose
Polygonnum articulatum L.	Northern Jointweed
Prunus pumila var. *susquehanae* (Wildenow) H. Jaeger	Susquehanna Sand Cherry
Viola sagittata Aiton	Arrow-leaved Violet

TABLE 2. Plant species considered characteristic of tallgrass prairie and/or savannah* that are recorded from Constance Bay. Species also considered "regionally significant" or "regionally uncommon"† are highlighted in bold. A number of species overlap with Table 1.

Scientific name	Common name
Andropogon gerardi Vitman	**Big Bluestem**
Anemone cylindrica A. Gray	Tall Thimbleweed
Asclepias tuberosa L.	**Butterfly Milkweed**
Bromus kalmii A. Gray	**Kalm's Brome Grass**
Carex richardsonii R. Brown	**Richardson's Sedge**
Carex siccata Dewey	**Dry-spike Sedge**
Ceanothus americanus L.	**New Jersey Tea**
Ceanothus herbaceus Rafinesque	Prairie Redroot
Comandra umbellata (L.) Nuttall	Bastard Toadflax
Cyperus lupulinus (Sprengel) Marcks	**Hop Flatsedge**
Desmodium canadense (L.) de Candolle	Canada Tick-trefoil
Elymus canadensis L.	**Canada Wild Rye**
Helianthemum canadense (L.) Britton	**Canada Frostweed**
Helianthus divaricatus L.	Woodland Sunflower
Lechea intermedia Leggett ex Britton	**Large-pod Pinweed**
Lysimachia quadrifolia L.	**Whorled Yellow Loosestrife**
Monarda fistulosa L.	Wild Bergamot
Polygala polygama Walter	**Racemed Milkwort**
Prunus pumila L. *s.l.* ‡	**Sand Cherry**
Rhus aromatica Aiton	**Fragrant Sumac**
Schizachyrium scoparium (Michaux) Nash	**Little Bluestem**
Sorghastrum nutans (L.) Nash	**Indian Grass**
Spartina pectinata Link§	Prairie Cord Grass
Viola sagittata Aiton‖	**Arrow-leaved Violet**

*Species listed by Rodger (1998) in "Appendix 1: NHIC list of *rare and characteristic* [emphasis added] vascular plants associated with tallgrass prairie and savanna in Ontario"; as none of these species is provincially rare, all are presumed to be listed as *characteristic*.
†Brunton (2005).
‡*Prunus pumila* L. is listed by Rodger (1998) as *sensu lato*, which would include *Prunus susquehanae* Wildenow, listed by Brunton (2005) as "regionally significant".
§*Spartina pectinata* Link is strongly associated with Ottawa River shorelines in the Ottawa district, and tends to prefer a moister habitat than the other species listed here. It is unknown whether it would have occurred inland at Constance Bay where moisture allowed, but it certainly would have intermingled with the other characteristic species where the savannah habitat interfaced with the beach.
‖*Viola sagittata* Aiton is only listed by Brunton (2005) as var. *ovata* (Nuttall) Torrey & A. Gray, (formerly *Viola fimbriatula* Smith), whereas Rodger (1998) lists only the species and neither refers to a variety nor to *sensu lato* or *stricto*.

by Indigenous peoples, Hairy Puccoon was traditionally used to make a dye and body paint (Densmore 1928). However, it is conversely worth noting that American Hazelnut has not been documented at any other site along the Ottawa River corridor (Soper and Heimburger 1982; Sabourin 2009; iNaturalist 2021). Also, it is very difficult to separate the possibility that Indigenous use of the habitat is responsible for the presence of certain species from the possibility that the presence of those species is what prompted Indigenous use of the habitat (Bakowski and Riley 1994; MacDougall 2003).

Alternatively, certain bird species may have facilitated the dispersal of American Hazelnut. Blue Jays (*Cyanotta cristata*) are known to be prolific dispersers of nuts, and have cheek pouches to allow multiple nuts to be carried (Darley-Hill and Johnson 1981; Johnson and Adkisson 1985). Similarly, the Extinct Passenger Pigeon (*Ectopistes migratorius*), once considered to be the most abundant bird in North America, frequented (and was perhaps an important ecological component of) savannah habitats (Ellsworth and McComb 2003). Like Blue Jays, Passenger Pigeons are believed to have played a significant

role in the dispersal of nut-bearing plant species (Webb 1986).

The pattern of occurrence of American Hazelnut at Constance Bay suggests that it is not a recent arrival. Most of the documented individual plants are suppressed by a combination of grazing and shading by planted pines (Figure 1d). The only individuals large enough to fruit are those that have been "released" into canopy gaps by a combination of tree mortality and informal trail construction. That numerous suppressed individuals are established suggests that the population was present before the conversion of the habitat to pine plantation. Like American Hazelnut, most of the other rare and unusual species of Constance Bay (Tables 1 and 2) do not occur throughout the site and are restricted to small pockets. This is readily explained by the documented extensive loss of habitat (Catling and Brunton 2010), and it is possible that additional subpopulations of American Hazelnut have been lost. Furthermore, this species is not widely available in garden centres at major retailers. Although a determined plant enthusiast could acquire one, cross-pollination is required to set seed, making it unlikely to spread from a single ornamental planting (Kock *et al.* 2008).

Although some may find it surprising that a large and relatively conspicuous plant has until now gone unrecorded in a well-botanized area, it is not surprising to include it among the flora of Constance Bay, given the ecological history of the Constance Bay Sandhills and the distribution patterns of other locally rare species at the site. This discovery shows that there remains much to be found in well-studied protected areas, especially those known to harbour significant biodiversity. Additional surveys of both Constance Bay and other sandy sites along the Ottawa River are warranted.

Voucher specimens

CANADA, Ontario: Ottawa, Constance Bay Sandhills (Torbolton Forest), northeast area north of the recreation centre, 45.5060°N, 76.0940°W, 22 September 2021, *A. Bélair, O. Clarkin, E. Clarkin* (CAN 11014722).

CANADA, Ontario: Ottawa, Constance Bay Sandhills (Torbolton Forest), northeast area north of the recreation centre, 45.5060°N, 76.0940°W, 22 September 2021, *A. Bélair, O. Clarkin, E. Clarkin* (CAN 11014723).

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