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NOTE

First records of the invasive beech leaf-mining weevil (*Orchestes fagi*) in New Brunswick and Prince Edward Island, Canada

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The beech leaf-mining weevil (*Orchestes fagi* L. (Coleoptera: Curculionidae)) is widespread in its native Europe and has recently been introduced to North America (Sweeney et al. 2012). Its leaf-mining larvae feed exclusively on beech (*Fagus* L. (Fagaceae)) species. They form a linear mine from the oviposition site on the midrib to the leaf margin and cause extensive wilting and browning of leaves (Figure 1A). No other leafminers occurring in North America cause similar damage to beech (Eiseman 2019). Adults also feed on expanding beech leaves in spring, causing scattered "shot" holes (Figure 1B). In Europe, the beech leaf-mining weevil does not cause mortality in the Palearctic species European beech (*Fagus sylvatica* L.), despite occasional outbreaks in European beech forests that cause defoliation, lower fruit production, and retard growth (Verkaik et al. 2009, Rullán-Silva et al. 2015).

In North America, the first adult specimens of beech leaf-mining weevil were collected in 2012 in Nova Scotia, Canada, in Halifax, Lunenburg, and Cape Breton counties, where they were associated with American beech (*Fagus grandifolia* Ehrh.) (Sweeney et al. 2012). It has since been recorded in Nova Scotia in Digby, Annapolis, Kings, Hants, Pictou, Victoria, and Inverness counties (Figure 3). Sweeney et al. (2020) report 48% to 88% tree mortality at three sites in Nova Scotia where the weevil had been present for at least six years. The spread of the beech leaf-mining weevil is ongoing. This paper documents records from Prince Edward Island and New Brunswick, the first reports of the species in North America outside of Nova Scotia.

The first known documented record of the beech leaf-mining weevil on Prince Edward Island is from 19 June 2020, when damaged foliage on American beech was photographed by Charlottetown city staff in Victoria Park. This foliage shows damage unique to beech leaf-mining weevil (Figure 1B). Adult specimens were collected at this site on 15 May 2021 and were deposited in the New Brunswick Museum (NBM) and the Canadian National Collection of Insects, Arachnids, and Nematodes (CNC). In addition to the occurrence at Victoria Park, leaf mines on American beech were photographed at several other sites in Charlottetown in 2021 and posted on iNaturalist (iNaturalist 2022). Additional leaf mines were photographed near Wood Islands in 2021 and posted to iNaturalist (Figure 3). The PEI Invasives Species Council received numerous reports of damage to American beech leaves consistent with the beech leaf-mining weevil from the Charlottetown and Wood Islands areas in 2020 and 2021 (Simon Wilmot, pers. comm., 2021), and the beetle has captured the attention of local media (e.g., Fernando 2021).

The first and only documented occurrence of beech leaf-mining weevil in New Brunswick was detected in Sackville, New Brunswick, in September 2020, when heavy leaf damage characteristic of the weevil was reported on ornamental European beeches at a private residence (Figure 3). The precise location of the residence is not included for privacy reasons. On 18 May 2021, hundreds of adult beech leaf-mining weevil were found on affected trees, and 10 adult specimens were collected by Woodpecker Tree Care staff (Figure 2). These specimens were deposited in the NBM and CNC.

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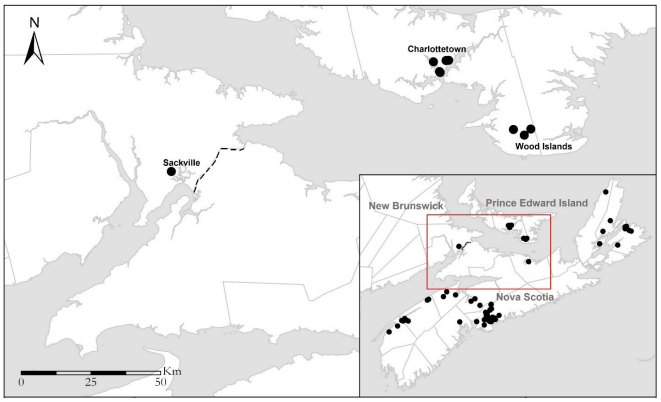
Figure 1. A. Closeup of mine, showing its mid-vein origin, and the associated browning and wilting. **Photographed** near Wood Islands, Prince Edward Island, on 9 June 2021 by John Klymko. **B.** Mines and "shot" holes of the beech leaf-mining weevil on American Beech. **Photographed** at Victoria Park, Charlottetown, Prince Edward Island, on 19 June 2020 by Jessika Corkum-Gorrill.

Figure 2. An adult beech leaf-mining weevil collected in Sackville, New Brunswick, on 18 May 2021.

It is unclear how beech leaf-mining weevil arrived in New Brunswick and Prince Edward Island, but it is likely that human transport played a role. Morrison et al. (2017) found that in areas where beech leaf-mining weevil is common, adults can be found in high numbers sheltered in the bark of various tree species during their dormant period (August to May). They hypothesize that this may facilitate their accidental transport in firewood and timber.

The rapid spread of the beech leaf-mining weevil, and the associated high level of mortality of American beech, is a serious threat to beech-dominated forests and species that rely on American beech, in the Maritimes and potentially throughout the tree's range, which includes southern Ontario and Quebec and the eastern United States south to

Figure 3. Beech leaf-mining weevil occurrences in the Maritime provinces. Nova Scotia data from Sweeney et al. (2012), Sweeney et al. (2020), and iNaturalist (2022).



Florida and Texas (Nixon 1997). Work is ongoing in Europe to identify parasitoids that may be useful to control of beech leaf-mining weevil in North America (Sweeney et al. 2020).

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REFERENCES

Eiseman, C. 2019. Leafminers of North America. Self-published e-book. clii+1857 pp. Available from http://charleyeiseman.com/leafminers [accessed ?date].

Fernando, T. 2021. Leaf-mining weevil killing P.E.I. beech trees. Canadian Broadcasting Corporation. Available from https://www.cbc.ca/news/canada/prince-edward-island/pei-beech-leaf-mining-weevil-1.6069125 [Accessed 10 October 2021].

iNaturalist. 2022. Available from https://www.inaturalist.org [Accessed 26 February 2022].

Morrison, A., Sweeney, J., Hughes, C., and Johns, R.C. 2017. Hitching a ride: firewood as a potential pathway for range expansion of an exotic beech leaf-mining weevil, *Orchestes fagi* (Coleoptera: Curculionidae). The Canadian Entomologist **149**: 129–137.

Nixon, K.C. 1997. Fagaceae. *In* Flora of North America North of Mexico. Vol. 3. Magnoliophyta: Magnoliidae and Hamamelidae. *Edited by* Flora of North America Editorial Committee. Oxford University Press, New York, NY. pp. 436–506.

Rullán-Silva, C., Olthoff, A.E., Pando, V., Pajares, J.A., and Delgado, J.A. 2015. Remote monitoring of defoliation by the beech leaf-mining weevil *Rhychaenus fagi* in northern Spain. Forest Ecology and Management **347**: 200–208.

Sweeney, J., Anderson, R.S., Webster, R.P., and Neville, R. 2012. First records of *Orchestes fagi* (L.) (Coleoptera: Curculionidae: Curculioninae) in North America, with a checklist of the North American Rhamphini. The Coleopterists Bulletin **66**: 297–304.

Sweeney, J.D., Hughes, C., Honghao, Z., Hillier, N.K., Morrison, A., and Johns, R. 2020. Impact of the invasive beech leaf-mining weevil, *Orchestes fagi*, on American Beech in Nova Scotia, Canada. Frontiers in Forests and Global Change **3**: 1–11.

Verkaik, E., Moraal, L., and Nabuurs, G. 2009. Potential Impacts of Climate Change on Dutch Forests, Mapping the Risks. Wageningen: Wageningen Environmental Research. 84 pp.