

The *Echium* Bugloss Imp along the Niagara River, USA

P. M. Eckel
Missouri Botanical Garden
4344 Shaw Blvd.
St. Louis, MO 63110
and, Research Associate
Buffalo Museum of Science

I have been monitoring a section of the Niagara River gorge in New York State for nearly a decade now, watching, sadly, the deterioration of some very important species populations along the relatively recently created public walkway between the DeVeaux (Whirlpool) Stairs just north of the Whirlpool, and upstream south to the trail-end, which occurs somewhat north of the Lower Arch Suspension Bridge. I have always thought this was a terrible idea and rather useless as the trail ends in a cul-de-sac and the hiker has to retreat back downstream at the end. Better would have been a circuit route from Devil's Hole to the DeVeaux Stairs and back in a loop along the base and rim of the gorge, hence preserving New York's rare plants from being exterminated in this upstream section of the gorge.

I monitored these populations every year. Recently I noticed a strange thing. There are noxious weeds, of course, all along this path, but the infestation usually ends between the DeVeaux Stairs and south at the Whirlpool. In this downstream sector, I usually enjoyed picking weeds such as the Eurasian species *Lapsana communis* (Nipplewort) and *Hesperis matronalis* (Dame's Rocket) that grow in a line following the edge of the hiking path. The weeds usually end at the northern end of the Whirlpool rock-fall and I set down my bag here and retrieve it on the way back.

Upon entering the rare plant sector between the rock-fall south to the trail end I was startled to see, for the first time, a line of a brightly colored weed. Vivid blue color is not common at all in weedy species, and this was conspicuously so the plant was immediately recognized as the Eurasian *Echium vulgare* (Viper's Bugloss). Continuing on south to the official trail end, the line of this bright blue weed continued along the path edge in a continuous line directly to the shale-spall area just north of the trail end. At the southern terminus, there was an explosion of this plant among the dolomite rocks there, as though someone, who was scattering this plant all along the trail, decided to empty their pockets all at once! The species occurred only in the rare plant section of the pathway and not between DeVeaux (Whirlpool) steps and the rockfall, where many weedy species can be found.

This is a rather tragic thing to have done in what was recently a pristine section of the gorge containing the last populations of several rare species in a special community before the creation of a rather redundant hiking trail. Weeds usually follow hikers along the trails that they follow, but the sudden occurrence of this colorful weed, and its

systematic dissemination was rather surprising. Why anyone should do such a thing is puzzling.

On the same day, I decided to explore the plants growing along the biking/hiking trail (the 'Birdview' area of the Riverwalk) constructed between the North Grand Island Bridge and the southern boundary of the Niagara Reservation (the Goat Island complex at the Niagara cataracts). Among the mix of introduced and opportunistic native riparian species established among the protective dolomite rocks reinforcing the shoreline, the weedy shrubs and trees, the native Dogwoods and a few Willows and Green Ash, I was startled to see that someone had also dribbled the bright-blue Bugloss in a line all along the dolomite rocks.

After entering this information, together with the lower gorge observations, in my field notes I began to prepare to return home for the year.

There is a grocery store located in Niagara Falls near the border with the Town of Niagara on Porter Road, past the Hyde Park Golf Course leading to Interstate 90. The grocery store parking lot borders on the entrance to the interstate. There, there are two overpasses, one for the northbound, one the southbound traffic leading to the North Grand Island Bridge. These are steep slopes of soil lifting the overpasses over Porter and Packard Roads. These elevations are mowed, although the grade is steep, and the soil is filled with weeds, such as Phragmites, Teasel, Queen-Anne's Lace, and all sorts of Composites. Some areas are mowed, such as along the base of the elevation, and sometimes the steep sides are mowed. One abutment on the southbound interstate facing the grocery store was mowed, in contrast to the rest of the elevation stretching from the abutment south to Packard Road. Seen from the distance of the parking lot, there was a blue color among the plants growing there, and I thought it was Alfalfa, in bloom at that time, with its lovely little blue flowers. Deciding to investigate, I was astonished to see the whole abutment had been seeded to Bugloss!

In all my years studying the Niagara flora, Viper's Bugloss has seldom occurred, and then in single populations or in groups of a few specimens, such as on Furman Blvd. in the Tiff Farm area in Buffalo. I began to see it as an apparent waif at the beginning of the upper gorge trail at Artpark. In 2009 I noted its occurrence just south of the Whirlpool rockpile at the gorge base. In 2014-15, it grew scattered on the Power Authority spoil area (Lewiston Plateau), together with an odd mix of alien species, apparently sown there. Above and below the heavily sown population at the Porter Avenue overpass abutment on the I90 and I290 in Buffalo, I found no *Echium* plants.

I found no *Echium* plants on Goat Island, at the base of the gorge between Devil's Hole and the Power Authority fishing docks to the north; field notes for the entire length of the gorge begun in late 1900's showed none on the crest of the Niagara River gorge, that could have seeded the lower bank. No *Echium* plants occurred in the dangerous basal path between the Lower Arch Bridge, and the end of the path constructed between DeVeaux (Whirlpool) stairs and the official southern path terminus. Whoever sowed these weeds stopped where the path was safest.

Echium vulgare is found scattered throughout western New York State and adjacent Ontario, according to specimen records at BUF. George Clinton collected specimens from Niagara Falls in 1863.

Homer House (1924) reported the species as rare in 1843 (Torrey, 1843; Paine, 1865). It was considered rare about Rochester in 1896, "however within the past two

decades [i.e. the first two decades of the 20th century] it has spread with great rapidity, especially on dry, sterile, stony or sandy soils” (House 1924). In 1894 the plant was not reported by Cameron (1894) for the Queen Victoria Niagara Falls (Ontario) Park. Panton (1890), however, did report a station in that area. Day (1888), in his Niagara Falls flora, reported it as “Below the Falls on the American side.” In all of the Niagara Frontier region, the species was reported as “Infrequent ... sparse except as otherwise noted,” including a station at Niagara Falls (Zenkert 1934) . In Chautauqua Co. the species, although ‘frequent,’ the populations were ‘sparse’ along roadsides and dry fields (Eaton & Schrot 1987).

Recently in the Regional Municipality of Niagara (Ontario, Canada) the species was reported as a common introduction (Oldham 2010). In the New York State Flora, the species occurs in most counties throughout New York State, and is reported as doing “very well over calcareous substrates and is tolerant of xeric, thin, and rocky soils. Mostly not in natural habitats” (Weldy et al. 2018). The Niagara River gorge is a calcareous substrate throughout its seven mile length.

It is important to note that the conformation of natural populations are naturally ‘sparse’ (a thinly dispersed or scattered conformation of a few plants), whereas in the populations observed on the Niagara trails, they were in a line along the hiking path at the gorge base and Riverwalk shoreline, and then in a dense burst at the end of the gorge trail. The population on the abutment, of course, was a crop.

The plant is spread by seed dispersal, and can produce up to 2800 seeds per plant, which would make it rather easy, I would think, to potentially harvest masses of these seeds for salting in open areas.

Viper’s Bugloss is a non native, Eurasian species. In the United States it is reported as invasive in Tennessee, Washington State, Idaho, and Montana according to the Early Detection and Distribution Mapping System (EDD MapS). It is also invasive in the Antietam National Battlefield National Park (Maryland), as reported in the Invasive Plant Atlas of the United States. It is a serious weed in southern Michigan (Voss 1996). It is invasive in South Africa and is considered to be a regionally noxious plant under the British Columbia “Weed Control Act” (Invasive Species Council of BC).

In certain respects, one cannot tell whether the plant is invasive in New York State because, although most states in the Union have identified or evaluated invasive species for their regions, New York has not yet produced a “State Noxious Weed List” to be added to the USDA Natural Resources Conservation Service website. The reasons New York State government is not represented on the USDA website are not known to me, and this absence may stem either from State Government, or from the USDA itself, which has its own problems. The final report of the New York Invasive Species Council, published on June 10, 2010, seems less a scientific document than, as it says in its introduction, a proposal “primarily intended for the regulation of commerce: buying, selling and introducing non-native species.” There does not seem to be a protocol for response to the presence or expansion of species already in the New York State flora, except as it has a measureable (negative) impact on the State’s economic resources. The escape of invasive species into landscapes native or disturbed and in the public (not private) domain, and their ongoing ecological impact does not seem to be a concern for the State’s “Regulatory System.”

Species such as *Echium vulgare*, *Eupatorium serotinum*, *Geum urbanum*, *Lapsana communis*, *Picris hieracoides*, *Solidago sempervirens* are generally known for their ability to

spread, or that there is evidence for their aggressive propagation in nature. These species do not seem able to be addressed by the DEC in the political apparatus of the New York Invasive Species Council. Interestingly, none of these species occur on the extensive list of species for regulatory review in the June 10, 2010 report of the Invasive Species Council, as though the species were selected so as to be under the regulatory radar of the DEC.

But other than pondering what to do about what appears to be a systematic and deliberate attempt to release significant diaspores of weedy species in the Buffalo-Niagara area, aggressive in other parts of the country, but not yet with a commercial impact on urban or agricultural landscapes, still leaves the question about who might be doing this and what do they stand to gain?

I am including here *Solidago sempervirens*, which is considered to be a rare species of Goldenrod, especially in the Niagara Frontier Region, due to its pure stands (monocultures) along the steep Interstate highway elevations (e.g. overpasses) occurring on the Buffalo beltway (I 290) around that city (Eckel, et al. 2012a, 2012b). These monocultures no longer exist after the years in which they were examined because the authorities mowed these populations down, and effectively controlled them. But why was this species released on those embankments anyway? The species does not appear to occur anywhere else, being relegated back to the rare plant status it originally possessed.

The weedy *Picris hieracoides* was also reported from an Interstate embankment (Eckel 2017b) as was *Eupatorium serotinum* (Eckel 2017a), and now *Echium vulgare*, the subject of the present article. Since all these species involved mowing measures on steep embankments, the evident conclusion is that it is Federal and State highway administrations that are somehow involved in these occurrences.

For your information, the New York State Invasive Species Council includes nine state agencies, including the DEC, Department of Transportation (DOT), Parks, Recreation and Historic Preservation (OPRHP) and the New York State Thruway Authority.

I am unable to answer questions as to who and why, so will conclude by informing any readers who walk along the base of the Niagara River gorge, or along the Niagara River shoreline above the Falls (Riverwalk), thinking that you are walking in a natural or naturalized environment, that if they see a bright blue weed trailing along ahead of or behind them, you have been pranked by the *Echium* Imp.

LITERATURE CITED

- Cameron, R. 1895. Catalogue of Plants Which Have Been Found Growing Without Cultivation in the Park and its Outlying Territories. Collected, mounted and catalogued for the Park herbarium in the Superintendent's Office. Queen Victoria Park. Appendix to the 10th Annual Commissioners for the Queen Victoria Niagara Falls Park. Ontario Government Publication, Ottawa.
- Day, D. F. 1888. Catalogue of the Niagara Flora. A Catalogue of the Flowering and Fern-Like Plants Growing Without Cultivation in the Vicinity of the Falls of the Niagara. Annual Report of Commissioners of the State Reservation at Niagara for 1887, pp. 85-96. Also printed as a pamphlet, Troy, N.Y.
- Eaton, S. W. & E. F. Schrot. 1987. A Flora of the Vascular Plants of Cattaraugus County, New York. Bull. of the Buffalo Soc. Nat. Sci. Vol. 31. Buffalo, New York.
- Eckel, P. M. 2017a. The strange case of *Eupatorium serotinum* Michx. in the Buffalo-Niagara area. *Clintonia* 32(2): 7-9.
- Eckel, P. M. 2017b The odd case of *Picris hieracoides* L. at Niagara Falls. *Clintonia* 32(4): 8-10.

- Eckel, P. M., J. Schlegel & M. Siuta. 2012a. Seaside Goldenrod (*Solidago sempervirens* L.) in Buffalo and Niagara Falls, New York: Part 1. *Clintonia* 26(4): 6–7. 2011.
- Eckel, P. M., J. Schlegel & M. Siuta. 2012b. Seaside Goldenrod (*Solidago sempervirens* L.) in Buffalo and Niagara Falls, New York: Part 2. *Clintonia* 27(1): 8–11. 2012.
- House, H. H. 1924. Annotated list of the Ferns and Flowering Plants of New York State. *New York State Museum Bulletin* 254, Albany, New York.
- Paine, J. A., Jr. 1865. Catalogue of Plants Found in Oneida County and Vicinity. Eighteenth Annual Report of the Regents of the State of New York, pp. 53–192. Albany, New York. [cited in Zenkert 1934] 139 annotated pages.
- Panton, J. H. 1890, Flora of the Queen Victoria Niagara Falls Park. In: Annual Reports (1889) of the Commissioners for the Queen Victoria Niagara Falls Park. *Ontario Legislative Sessional Papers* 22: 17–31.
- Torrey, J. 1843. A Flora of the State of New York, comprising full descriptions of all the indigenous and naturalized plants hitherto discovered in the state; with remarks on their economical and medicinal properties. Vols. 1 & 2 of *Natural History of New York*. Albany.
- Voss, E. G. 1996. Michigan Flora. Part III. Dicots (Pyrolaceae-Compositae). *Cranbrook Institute of Science Bulletin* 61 and *University of Michigan Herbarium*, Ann Arbor.
- Weldy, T., D. Werier & A. Nelson. 2016. *New York Flora Atlas*. [S. M. Landry and K. N. Campbell (original application development), USF Water Institute. University of South Florida]. *New York Flora Association*, Albany, New York.
- Zenkert, C. A. 1934. The Flora of the Niagara Frontier Region. Ferns and Flowering Plants of Buffalo, N. Y. and Vicinity. *Bull. Buffalo Soc. Nat. Sci.* 16. Buffalo.