Kudzu Vine, *Pueraria montana*, Adventive in Southern Ontario

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Kudzu is reported for the first time in Canada. A population was found covering about 3500 m^2 on a bank above Lake Erie near the town of Leamington, Ontario. We detected high seed viability and germination rates but no evidence that the population has been expanding beyond this site. Nonetheless, we recommend that measures be taken to prevent its continued expansion.

Key Words: invasive species, Kudzu, *Pueraria montana,* seed set, Soybean Rust, *Phakopsora pachyrizi*, Canada.

On 11 May 2009, while conducting a floral inventory in a ravine near the Town of Leamington, Ontario, the senior author and field assistant P. J. Hurst observed an area along the Lake Erie shore that supported a rank growth of woody vine (Figure 1). Based on the senior author's experience with the flora of the southern United States, the vine was tentatively identified as Kudzu, *Pueraria montana* (Lour.) Merr. (*Pueraria lobata* (Willd.) Ohwi, *Glycine javanica* L.), a perennial vine in the family Fabaceae.

Kudzu is considered one of the 100 worst bioinvaders in the world (Global Invasive Species Database 2007*). It was introduced to North America from eastern Asia in 1876 as a feature in the Japanese exhibit at the Centennial International Exposition held in Philadelphia, Pennsylvania. Initially introduced as an orna-

FIGURE 1. Kudzu growing on a slope above Lake Erie near Leamington, Ontario.

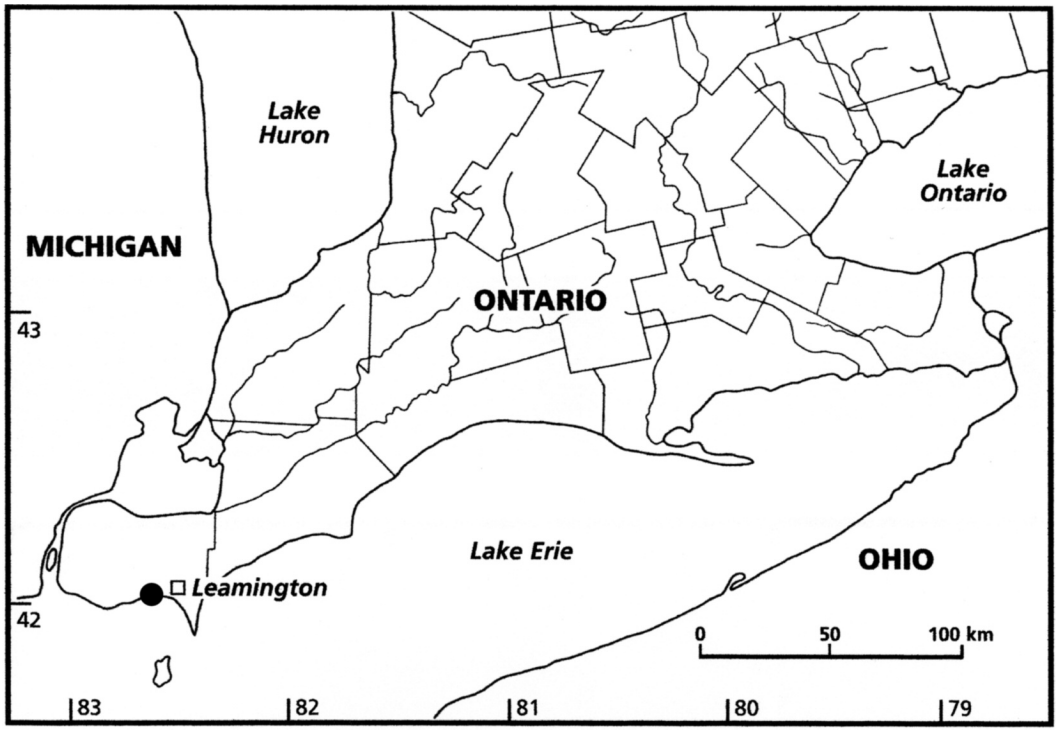

FIGURE 2. Location of Kudzu in southern Ontario, 2009.

mental, the species was later promoted as a forage crop and for stabilizing eroding banks (Winberry & Jones 1973; Alderman 2004). It is now estimated to occupy approximately 3000 km^2 in the southeastern United States and is increasing its coverage by over 500 km^2 a year (Sage et al. 2008). Kudzu is classified in most states where it occurs as a noxious weed. It is prohibited and banned as potentially invasive in Connecticut and Massachusetts (United States Department of Agriculture Natural Resources Conservation Service*). In Canada it is the subject of a fact sheet in the series 'Ontario's Least Wanted' produced by the Ontario Invasive Plant Council but it has no official status and is not designated a noxious weed under the Weed Control Act (M. Irvine, personal communication to G.E.W.).

The discovery near Leamington is the first reliable observation of Kudzu in Canada. Winberry and Jones (1973) state that Kudzu had been reported in Nova Scotia, but it is neither included in the Flora of Nova Scotia (Zinck 1998*) nor are there specimens in the E. C. Smith Herbarium at Acadia University in Wolfville, Nova Scotia (R. Newell, personal communication to G.E.W.). The Atlantic Canada Conservation Data Centre considers it reported but unconfirmed and it has not been officially listed in the flora of Nova Scotia (S. Blaney, personal communication to G.E.W.)

The Lake Erie shore at this location (Figure 2) consists of a steep south-facing bank approximately 12 m in height. The tableland soils are classified as Fox Sandy Loam (Richards 1989*). Outwash sands compose most of the bank face; the underlying compact, gritty glacial till is exposed at the base of the bank just above a narrow sand-gravel beach.

At the site, Kudzu vines form a solid blanket from the beach to the top of bank, a distance of 31 m, along 113 m of shoreline. The following species were observed growing with the Kudzu: Manitoba Maple (*Acer negundo* L.), Hackberry (*Celtis occidentalis* L.), Lamb's Quarters (*Chenopodium album* L.), White Mulberry (*Morus alba* L.), Eastern Cottonwood (*Populus deltoides* Bartram ex Marshall), and Burr Cucumber (*Sicyos angulatus* L.). Kudzu vines had climbed the woody plants to a height of 8 m. Bank vegetation to either side of the Kudzu growth included Tree-of-heaven (*Ailanthus altissima* (Miller) Swingle), Sugar Maple (*Acer saccharum* Marshall), Large-tooth Aspen (*Populus grandidentata* Michaux), Red Oak (*Quercus rubra* L.), Black Cherry (*Prunus serotina* Ehrh.), Black Locust (*Robinia pseudo-acacia* L.), Staghorn Sumac (*Rhus typhina* L.) and Riverbank Grape (*Vitis riparia* Michaux).

Kudzu is reported to set seed only infrequently in North America (Ahlgren 1949; Winberry and Jones 1973), but the Leamington plants produced abundant seed in 2009. On 21 September 2009, the Kudzu was in full flower and heavily scented. Several bees were observed visiting the flowers, including the exotic

Megachile sculpturalis Smith, a giant resin bee. Seeds gathered in the first week of November, after a killing frost, had an 80% germination rate (16 of 20 seeds) using the method described by Susko et al. (1999, 2001). These seeds were viable even though 2009 was cooler than average at 3359 heat units (compared to average from 10 May to 30 September of 3459, based on data from the nearby Agriculture and Agrifood Research Station at Harrow, Ontario [G. Stasko, personal communication to G.E.W.]). This area averages 815 cm of precipitation and the mean annual frost-free period is about 185 days (Sanderson 1980*).

There is concern that Kudzu could function as an alternative overwintering host to Soybean Rust (*Phakopsora pachyrizi*) and thus provide an innoculum reservoir (T. Anderson, personal communication to G.E.W.). In 2009, the tableland above the lake bank was planted to Soybean, *Glycine max*. Although Kudzu vines had grown 14 m into the Soybean field there was no evidence that they were infected with rust (T. Anderson, personal communication to G.E.W.).

The provenance of this station is unknown as the present owner states that it was extant when he acquired the property over a decade ago. It may have been planted to stabilize the eroding bank. Kudzu is found in the adjacent state of Michigan at two locations along the Lake Michigan shore at a distance of over 300 km from the Ontario site. It also occurs in Ohio near the south shore of Lake Erie in East Cleveland about 100 km distant across the lake (A. A. Reznicek, personal communication to G.E.W.). In these locations it does not appear to be aggressively expanding from the original site. Given the high seed viability, it is likely that Kudzu will spread within the immediate area and perhaps further into southern Ontario, especially with climatic warming, unless measures are taken to prevent its dispersal.

Specimen vouchers: ONTARIO: Essex: shore of Lake Erie near Leamington, 42°02'07.01"N, 82°39' 19.11"W. G. E. Waldron and P. J. Hurst, 11 May 2009 (MICH); shore of Lake Erie, Leamington 42.03509, -82.65474, D. Mooij, 22 September 2009 (DAO 844785, DAO-CFIA 525, 543, 544).

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Documents Cited (marked * in text)

Global Invasive Species Database. 2007. 100 of the World's Worst Weeds. Invasive Species Specialist Group. I.U.C.N. – The World Conservation Union Species Survival Commission. University of Auckland, New Zealand. Available online at http://www.issg.org/database/welcome.

Richards, N. R., A. G. Caldwell, and **F. F. Morwick.** 1989. Soil Survey of Essex County. Report Number 11 of the Ontario Soil Survey. Ontario Ministry of Agriculture and Food. 85 pages.

Sanderson, Marie. 1980. The Climate of the Essex Region, Canada's Southland. Department of Geography, University of Windsor. 106 pages.

United States Department of Agriculture, Natural Resources Conservation Service Plants Database. Available online at http://plants.usda.gov/java/profile.

Zinck, M. 1998. Roland's Flora of Nova Scotia. Nimbus Publishing and The Nova Scotia Museum.

Literature Cited

Ahlgren, G. H. 1949. The kudzu vine. Forage Crops. McGraw-Hill, New York.

Alderman, D. H. 2004. Channing Cope and the making of a miracle vine. Geographical Review 94: 157-177.

Sage, R. F., H. A. Coiner, D. A. Way, G. B. Runion, S. A. Prior, H. A. Torbert, R. Sicher, and **L. Ziska.** 2009. Kudzu [*Pueraria montana* (Lour.) Merr. variety *lobata*]: A new source of carbohydrate for bioethanol production. Biomass and Bioenergy 33: 57-61.

Susko, D. J., J. P. Mueller, and **J. F. Spears.** 1999. Influence of environmental factors on germination and emergence of *Pueraria lobata*. Weed Science 47: 585-588.

Susko, D .J., J. P. Mueller, and **J. F. Spears.** 2001. An evaluation of methods for breaking seed dormancy in kudzu (*Pueraria lobata*). Canadian Journal of Botany 79: 197-2003.

Winberry, J. J., and **D. M. Jones.** 1973. Rise and decline of the "miracle vine": Kudzu in the southern landscape. Southeastern Geographer 13: 61-70.

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