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Note

Roman Snail, *Helix pomatia* (Mollusca: Helicidae), in Canada

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Abstract

Populations of Roman Snail, *Helix pomatia*, a large European land snail, are reported for the first time in Canada from disturbed habitats in two distant locations: Sarnia, Ontario and Montrose, British Columbia. As Roman Snail is an edible species subject to international commercial trade, its deliberate, but illegal, introduction into Canada and intentional or unintentional releases are possible sources of these populations.

Key words: Mollusca; terrestrial snail; gastropod; new provincial records; Ontario; British Columbia; biogeography

The genus *Helix* L., 1758, in its modern, restricted sense, is a group of large-bodied land snails of Europe, some parts of western Asia, and North Africa (Schileyko 2006; Mumladze *et al.* 2008; Fiorentino *et al.* 2016). Larger land snails, including species of the genus *Helix* and its type species, *Helix pomatia* L., 1758 (Figure 1), are among those that have been consumed by humans for millennia (Bar 1977; Lubell 2004).

The range of *H. pomatia*, Roman or Burgundy Snail, includes central and southern Europe, but also extends into western and northwestern Europe to coastal areas of countries on the Baltic Sea and west to France and England (Kerney 1999; Neubert 2013, 2014), with the ancestral range in the Balkan region (Fiorentino *et al.* 2016). The presence of this species in Britain is generally believed to represent a Roman introduction (Taylor 1910; Kerney 1966, 1999); the Romans went so far as importing, breeding, and rearing snails in "cochlearia" (Taylor 1900). The original geographic range of *H. pomatia* may have been central European, with its spread into western Europe a result of ancient introductions by humans (Taylor 1910).

Recently, introductions have been reported as far east as European Russia (Sysoev and Schileyko 2009; Egorov 2015). In the United States, perhaps the first established population was noted in Jackson, Michigan, in 1937 (Archer 1937; Pilsbry 1939), but *H. pomatia* is now also known from Wisconsin, New York, Massachusetts, Indiana, Pennsylvania, Florida, and California (GBIF 2017; NatureServe 2019). The presence of this species in Canada has gone unreported in the literature, and we document here the occurrence of *H. pomatia* in British Columbia and Ontario.

Specimens were collected opportunistically by us or our contacts and are vouchered in the Mollusc Collection of the New Brunswick Museum, Saint John (NBM). Shell height (H) and diameter (or width; D) of unbroken, apparently mature specimens were measured using a digital caliper, to the nearest 0.1 mm.

Helix pomatia was first observed at Canatara Park in Sarnia, Ontario, on 10 May 2013 by J.K. (Figure 1a). Three live specimens and one empty shell were collected on 31 May 2013. Canatara is a multi-use municipal park of ~80 ha that is surrounded by urban lands. The south portion (~25 ha), where Roman Snails were found, was once a landfill site, which has regenerated over many decades. It consists of old field, thickets, and woodland with a high proportion of non-native invasive plant species. Roman Snails were found in dry meadow co-dominated by goldenrods (*Solidago* sp.) and Canada Thistle (*Cirsium arvense* (L.) Scopoli) with some Garlic Mustard (*Alliaria petiolata* (M. Bieberstein) Cavara & Grande). The snails were often seen under debris, such as boards, or climbing on vegetation up to 30 cm above the ground. The non-native, European Grove Snail, *Cepaea nemoralis* (L., 1758), was abundant in Canatara Park.

At Montrose, British Columbia (BC), S. Munch (pers. comm. 2015) had observed *H. pomatia* on his property since moving there in 2002. The habi-

FIGURE 1. Roman Snail, *Helix pomatia*. a. Canatara Park, Sarnia, Ontario. b. Shells from Sarnia, Ontario (left; NBM 010198) and Montrose, British Columbia (right; NBM 010200). Photo: a. J. Kamstra. Photo: b. R. Forsyth.

tat is an open area that includes lawn and tall uncut grass with small Trembling Aspen (*Populus tremuloides* Michaux), spruce (*Picea* A. Dietrich sp.), and Western Red Cedar (*Thuja plicata* Donn ex D. Don). The maximum number of snails encountered at one time was 15–20 individuals in a 9 × 9 m area.

We are also aware that *H. pomatia* has persisted for several years at Revelstoke, BC (H. Douglas pers. comm. 2014), but have little information about its presence there.

No native or introduced land snail in Canada approaches the size of *H. pomatia*, which is one of the largest of the European *Helix* species (up to 50 mm; Kerney and Cameron 1979). The only other established, large helicid species in Canada is Brown Gardensnail, *Cornu aspersum* (Müller, 1774), more commonly known as *Helix aspersa,* but that species is easily recognized by its smaller shell, different pattern of shell pigmentation, and different sculpture, among other characters (Kerney and Cameron 1979). *Helix lucorum* L., 1758, which can grow to be larger than *H. pomatia*, might be confused with *H. pomatia*, although it has markedly more prominent banding. Indeed, Burke (2013) figured a specimen of *H. lucorum* that he misidentified as *H. pomatia.*

Based on our own observations and correspondence with the discoverer of the Montrose population of *H. pomatia*, we believe that both this and the Sarnia population have persisted for several years (at least 13 years at Montrose) and that this species can be added to the growing list of introduced terrestrial molluscs in Canada. Variation in shell sizes suggests that different generations exist.

Throughout its range in Europe, *H. pomatia* inhabits milder coastal areas as well as mountainous regions with more continental climates. Thus, the suc-

cessful establishment of this species in Canada is not a surprise. However, as climate change brings milder winters, in the future, we might expect increasingly more successful introductions of terrestrial molluscs in different parts of the country. Novel records of introduced terrestrial molluscs in Canada continue to be discovered, even in areas that are rather well explored (e.g., Forsyth 1999, 2008; Reise *et al.* 2000; Forsyth *et al*. 2001, 2016; Maunder *et al.* 2017). The discovery of *H. pomatia* at Montrose and Revelstoke adds a second introduced snail species known from the BC interior but not from the milder south coast region of BC. More surveys for terrestrial molluscs around populated centres, such as those of Forsyth (1999) who focussed on the Vancouver and Victoria regions, would be useful in the BC interior. Similar to BC, southern Ontario has been rather well explored for terrestrial snails. The great extent of modified habitats there allows for the foothold of many synanthropic, introduced species. The possible invasiveness of *H. pomatia* is not known. Apparently the species persists but had not spread far from Jackson, Michigan, even 80 years after it was first discovered (Atkinson 2019). At the Sarnia site, the species has not become appreciably more abundant in the five years since it was first discovered, in contrast to the highly invasive *Cepaea nemoralis*.

Most non-native terrestrial snails and slugs are likely accidentally introduced with plants, soil, and debris, or movements of other materials. However, for *H. pomatia*, the source of the introductions is uncertain. It seems likely that someone raising Roman Snail deliberately or unintentionally released several individuals. Roman Snail is an edible species that has international commercial value and is sold for both food and the pet trade. It is listed for sale on various websites, such as My Happy Snails (https://www.myhappysnails.com/), based in Ukraine, which will ship abroad to willing buyers. It is possible that Roman Snail was deliberately imported into Canada, although the importing of any species of *Helix* into Canada is prohibited (D. Mooij pers. comm. 2019). The Sarnia location is only about 150 km from where *H. pomatia* occurs in Michigan, but it seems unlikely that the Sarnia snails originated from that location, given the presence of an international border, a water barrier, and the distance.

Voucher specimens

Canada: Ontario: Lambton County: Sarnia: Canatara Park: ca. 43.0°N, 82.4°W, *leg.* James Kamstra, 31 May 2013 (NBM 010198, 1 specimen). British Columbia: Kootenay-Boundary Regional District: Montrose, ca. 49.1°N, 117.6°W, *leg.* Steven Munch, summer and fall 2015 (NBM 010200, 33 specimens; Figure 1b). British Columbia: Columbia-Shuswap Regional District: Revelstoke, 12 June 2014 (NBM 010199, 1 specimen).

Canadian shells (Figure 1a) can be described as follows. The shell is large (H = 33.6–42.0 mm, D = 30.46–39.37 mm; mean H/D = 1.05, SD = 0.05, n = 27) and rather globular with a conical spire. It is pale grey-brown, with lighter and darker colabral streaks and, in general, two to five spiral bands, which are sometimes rather weakly marked or absent. There are ~4 convex whorls, with the last whorl descending in full-grown specimens. The periphery is rounded, medial on the last whorl. The protoconch is smooth. The teleoconch has irregular, low, somewhat riblet-like colabral ridges and spiral rows of weak granules. The aperture is large, subovate-rounded, and showing the external shell colour through the shell wall. The outer lip is scarcely thickened and narrowly outwardly flared. The columellar lip is pinkish-brown, expanded, and almost sealing the umbilicus, which is a narrow slit.

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Literature Cited

Archer, A.F. 1937. *Helix pomatia* Linné in Jackson, Michigan. Nautilus 51: 61–63.

Atkinson, J.W. 2019. Exotic, invasive and pest snails and land slugs of Michigan. Michigan State University Snail Laboratory, Lansing, Michigan, USA. Accessed 13 March 2019. https://msu.edu/~atkinso9/pestsnailpage.htm.

Bar, Z. 1977. Human consumption of land snails in Israel. Basteria 31: 53–58.

Burke, T.E. 2013. Land Snails and Slugs of the Pacific Northwest. Oregon State University Press, Corvallis, Oregon, USA.

Egorov, R. 2015. *Helix pomatia* Linnaeus, 1758: the history of its introduction and recent distribution in European Russia. Malacologica Bohemoslavia 14: 91–101.

Fiorentino, V., G. Manganelli, F. Giusti, and V. Ketmaier. 2016. Recent expansion and relic survival: phylogeography of the land snail genus *Helix* (Mollusca, Gastropoda) from south to north Europe. Molecular Phylogenetics and Evolution 98: 358–372. https://doi.org/10.1016/j.ympev.2016.02.017

Forsyth, R.G. 1999. Distributions of nine new or little-known exotic land snails in British Columbia. Canadian Field-Naturalist 113: 559–568. Accessed 3 October 2019. https://biodiversitylibrary.org/page/34235429.

Forsyth, R.G. 2008. First record of the European land snail *Trochulus striolatus* in British Columbia, Canada (Pulmonata: Hygromiidae). Festivus 40: 76–78.

Forsyth, R.G., J.M.C. Hutchinson, and H. Reise. 2001. *Aegopinella nitidula* (Draparnaud, 1805) (Gastropoda: Zonitidae) in British Columbia—first confirmed North American record. American Malacological Bulletin 16: 65–69.

Forsyth, R.G., J.E. Maunder, D.F. McAlpine, and R.G. Noseworthy. 2016. Distributional status of an introduced land snail *Discus rotundatus* (Rotund Disc, Mollusca: Discidae) in Canada. Canadian Field-Naturalist 130: 235–246. https://doi.org/10.22621/cfn.v130i3.1887

GBIF (Global Biodiversity Information Facility). 2017. GBIF backbone taxonomy. Checklist dataset. *Helix pomatia* Linnaeus, 1758. Accessed 9 February 2019. https://doi.org/10.15468/39omei

Kerney, M.P. 1966. Snails and man in Britain. Journal of Conchology 26: 3–14.

Kerney, M.P. 1999. Atlas of the Land and Freshwater Molluscs of Britain and Ireland. Harley Books, Colchester, Essex, United Kingdom.

Kerney, M.P., and R.A.D. Cameron. 1979. A Field Guide to the Land Snails of Britain and North-west Europe. Collins, London, United Kingdom.

Lubell, D. 2004. Prehistoric edible land snails in the circum-Mediterranean: the archaeological evidence. Pages 77–98 *in* Petits animaux et sociétés humaines du complément alimentaire aux ressources utilitaires. XXIV^{e} rencontres internationales d'archéologie et d'histoire d'Antibes. *Edited by* J-J. Brugal and J. Desse. Éditions APDCA, Antibes, France.

Maunder, J.E., R.G. Noseworthy, J.M.C. Hutchinson, and H. Reise. 2017. Terrestrial molluscs of the Province of Newfoundland and Labrador, Canada. Part 1: Boettgerillidae. Check List 13: 277–284. https://doi.org/10.15560/13.4.277

Mumladze, L., D. Tarkhnishvili, and B.M. Pokryszko. 2008. A new species of the genus *Helix* from the Lesser Caucasus (SW Georgia). Journal of Conchology 39: 483–487.

NatureServe. 2019. *Helix pomatia* — Linnaeus, 1758. Nature Serve Explorer, v. 7.1. Accessed 14 March 2019. http://explorer.natureserve.org/servlet/NatureServe?searchName=Helix+pomatia.

Neubert, E. 2011. *Helix pomatia. In* The IUCN Red List of Threatened Species. International Union for Conservation of Nature and Natural Resources, Cambridge, United Kingdom. e.T156519A4957463. https://doi.org/10.2305/iucn.uk.2011-1.rlts.t156519a4957463.en

Neubert, E. 2014. Revision of *Helix* Linnaeus, 1758 in its eastern Mediterranean distribution area, and reassignment of *Helix godetiana* Kobelt, 1878 to *Maltzanella* Hesse, 1917 (Gastropoda, Pulmonata, Helicidae). Contributions to Natural History [Natural History Museum Bern] 26: 1–200.

Pilsbry, H.A. 1939. Land Mollusca of North America (North of Mexico), Volume I, Part 1. Monograph 3. Academy of Natural Sciences of Philadelphia, Philadelphia, Pennsylvania, USA.

Reise, H., J.M.C. Hutchinson, R.G. Forsyth, and T.J. Forsyth. 2000. The ecology and rapid spread of the terrestrial slug *Boettgerilla pallens* in Europe with reference to its recent discovery in North America. Veliger 43: 313–318.

Schileyko, A.A. 2006. Treatise on Recent terrestrial pulmonate molluscs, part 13. Helicidae, Pleurodontidae, Polygyridae, Ammonitellidae, Oreohelicidae, Thysanophoridae. Ruthenica Supplement 2: 1765–1906.

Sysoev, A., and A. Schileyko. 2009. Land Snails and Slugs of Russia and Adjacent Countries. Pensoft, Sofia, Bulgaria.

Taylor, J.W. 1900. A Monograph of the Land and Freshwater Mollusca of the British Isles. Structural and General Volume. Part VII. Taylor Brothers, Leeds, United Kingdom.

Taylor, J.W. 1910. A Monograph of the Land and Freshwater Mollusca of the British Isles. Zonitidæ. Endodontidæ. Helicidæ. Part XVII. Taylor Brothers, Leeds, United Kingdom.

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