Wandering Pond Snail (*Lymnaea peregra*)

Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, web version – 03/22/2018

Photo: Marion Barlow/Flickr, Creative Commons BY-NC. Available: https://www.flickr.com/photos/bugsarewild/3137754863/in/photolist-5MgLrZ-5MgPcM-5MgNdc-5MgMAk/.

1 Native Range and Status in the United States

Native Range

From Seddon et al. (2014):

"This species is widespread though Europe and north and west Asia. Although more work is required on the presence of cryptic species within the range, the likely range is extensive."

"This is a widespread species across Europe. According to Fauna Europaea (Bank et al. 2006), the species is present in Albania, Andorra, Austria, Azores (Portugal), Balearic Islands (Spain),

Belgium, Great Britain (UK), Bulgaria, Channel Islands (UK), Corsica (France), Czech Republic, Denmark (mainland), Faroe Islands (Denmark), Finland, France (mainland), Germany, Greece (mainland), Hungary, Iceland, Republic of Ireland (Eire), Russia, Latvia, Liechtenstein, Lithuania, Luxembourg, the former Yugoslav Republic of Macedonia, Madeira (Portugal), Malta, Northern Ireland (UK), Norway, Poland, Portugal (mainland), Romania, Serbia, Slovakia, Spain (mainland), Sweden, Switzerland, Netherlands, and Ukraine."

"Kantor et al. (2009) noted that the range extended to Lake Baikal and southern Siberia."

"Within Turkey it is known from the Lakes Region (Kebapci and Yilidrim 2010), although they comment it is not the most widespread of the three species of *Radix*. Around the eastern Mediterranean the range extends to Israel, although Germain's records from Syria are under the name *R. lagotis* (see comments below[in source material])."

"The records of *L. lagotis* from Georgia are probably not this species, based on Glöer and Pesic's research, and hence these have been transferred to *R. balthica*, pending further research."

"Germain (1931) lists this species under the name *Radix lagotis* for Afghanistan, Armenia, 'Transcaucasie', Turkenstan, and Iran, however Glöer and Pesic (2012) considered the range for *R. lagotis* to be more restricted, hence the records from SW and W Asia have been transferred to *Radix balthica* pending further research."

Status in the United States

From White-McLean (2011):

"U.S.: Massachusetts, New Jersey, New York, Pennsylvania, Vermont"

No indication was given to the native or invasive status of the populations in the areas listed.

Means of Introductions in the United States

No information on the means of introduction of *Lymnaea peregra* to the United States was found. It is not clear from the single reference to a distribution of this species in the United States if it is native or introduced.

Remarks

Various sources list different senior synonyms for this species. ITIS (2016) lists *Lymnaea peregra* and no other synonyms. Seddon et al. (2014) list *Radix balthica* as the senior synonym with *Lymnaea peregra* and *Radix peregra* as junior synonyms. GBIF (2013) lists *Radix peregra* as the accepted name and *Limnaea peregra* (Müller, 1774) and *Lymnaea peregra* (O. F. Müller, 1774) as synonyms.

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From ITIS (2016):

"Taxonomic Status:
Current Standing: valid"

"Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Protostomia
Superphylum Lophozoa
Phylum Mollusca
Class Gastropoda
Order Basommatophora
Family Lymnaeidae
Genus *Lymnaea*
Species *Lymnaea peregra*"

Size, Weight, and Age Range

From Seddon et al. (2014):

"This species has a generation length of 1 year."

From White-McLean (2011):

"The wandering snail is between 18-20 mm high and 12-13 mm wide."

From Islam (2001):

"A member of the Gastropoda class, *L. peregra* may exceptionally reach a shell length of almost 30mm but more ususally [sic] reaches a maximum shell length between 15-20mm (Fitter and Manuel, 1986; Barnes, 1992). In nature, mature *peregra* may vary from 5mm to as much as 31.5mm but it would be a difficult and hazardous business to make out how much of this enormous differences heritable (Boycott, 1938)."

Environment

From Seddon et al. (2014):

"This species inhabits rivers, creeks, streams, streamlets and stagnant waters. This species has demonstrated degrees of tolerance to pH levels, salinity concentrations and temperature conditions and it prefers calcareous waters (Welter-Schulte 2009)."

Climate/Range

From Palomares and Pauly (2016):

"Temperate"

Distribution Outside the United States

Native

From Seddon et al. (2014):

"This species is widespread though Europe and north and west Asia. Although more work is required on the presence of cryptic species within the range, the likely range is extensive."

"This is a widespread species across Europe. According to Fauna Europaea (Bank et al. 2006), the species is present in Albania, Andorra, Austria, Azores (Portugal), Balearic Islands (Spain), Belgium, Great Britain (UK), Bulgaria, Channel Islands (UK), Corsica (France), Czech Republic, Denmark (mainland), Faroe Islands (Denmark), Finland, France (mainland), Germany, Greece (mainland), Hungary, Iceland, Republic of Ireland (Eire), Russia, Latvia, Liechtenstein, Lithuania, Luxembourg, the former Yugoslav Republic of Macedonia, Madeira (Portugal), Malta, Northern Ireland (UK), Norway, Poland, Portugal (mainland), Romania, Serbia, Slovakia, Spain (mainland), Sweden, Switzerland, Netherlands, and Ukraine."

"Kantor et al. (2009) noted that the range extended to Lake Baikal and southern Siberia."

"Within Turkey it is known from the Lakes Region (Kebapci and Yilidrim 2010), although they comment it is not the most widespread of the three species of *Radix*. Around the eastern Mediterranean the range extends to Israel, although Germain's records from Syria are under the name *R. lagotis* (see comments below [in source material])."

"The records of *L. lagotis* from Georgia are probably not this species, based on Glöer and Pesic's research, and hence these have been transferred to *R. balthica*, pending further research."

"Germain (1931) lists this species under the name *Radix lagotis* for Afghanistan, Armenia, 'Transcaucasie', Turkenstan, and Iran, however Glöer and Pesic (2012) considered the range for *R. lagotis* to be more restricted, hence the records from SW and W Asia have been transferred to *Radix balthica* pending further research."

Introduced

No records of introductions of *Lymnaea peregra* outside the United States were found.

Means of Introduction Outside the United States

No records of introductions of *Lymnaea peregra* outside the United States were found.

Short Description

From White-McLean (2011):

"The shells of this freshwater-dwelling group are not patterned and they do not posses an operculum. They will attain a maximum height of 70 mm. The tentacles of these species are characteristically triangular in shape with the small eyes located at the base […]."

"The shell of this species is tan to brown and may possess a blackish cover. The body of the animal is greenish with black and dirty-yellow spots covering it."

From Islam (2001):

"The soft body of *L. peregra* is protected by a thin shell, it is horney, fragile and with an elongated spire. The body whorl is large with a big aperture (Kotpal, 1995). The head has a single pair of non invaginable tentacles (flattened) with eyes at base. The foot is rounded behind, mostly aquatic primitively or by reversion and may acquire secondary gills (Wilbur and Yonge, 1964;1966). The aquatic pulmonates are monoecious, have no opercula, have lost their ctenidia and replaced them with highly vascularized mantle cavities, have relatively light weight shell and are comparatively active animals (Harman, 1974)."

Biology

From Palomares and Pauly (2016):

"In the Vainameri, north-eastern Baltic Sea, found mainly on silty substrate (Jereb and Roper 2005). Feeds on microalgae (Norling and Kautsky 2008). Members of the order Basommatophora are mostly simultaneous hermaphrodites (Ruppert et al. 2004)."

From Islam (2001):

"Eggs are laid in gelatinous capsules containing batches of up to several hundred eggs which hatch from late spring onwards (Jame and Delay, 1990). A wide variation in eggs capsule size has been noted by Bondesen (1950) and Russell-Hunter (1961a). If the capsule contains only few eggs (up to about 10) the form is oval, if the number increases to more than 15-16 the capsule begins to show a faint curvature. The capsule has a long thin, often filiform terminal tail. The capsule wall is solid with well developed forked capsular strings. Smaller capsules, for example from forms in running water, have a particularly well developed ramification of the capsular strings (Bondesen, 1950). Bondesen also reported that the eggs are oval and are regularly arranged in a corkscrew spiral up through the cylindrical capsule. Usually, the eggs lie in two rows and the corkscrew spiral shows oblique rows of eggs. If the eggs are arranged in one layer, it is called a zigzag arrangement. Transitional arrangements have been observed in the same capsule (Fig. 5 [in source material])."

Human Uses

From Seddon et al. (2014):

"There is no known trade in this species, that would impact the species nor lead to a threat, although some specimens maybe used in research on parasites."

Diseases

No records of OIE listed diseases were found.

According to Poelen et al. (2014) *Lymnaea peregra* can be parasitized by *Diplostomum spathaceum*, *Crepidostomum metoecus*, *Cotylurus cornutus*, *Echinoparyphium recurvatum*, and *Tylodelphys calvata* (Canning et al. 1973).

According to Poelen et al. (2014) *Lymnaea peregra* can be a host of *Echinostoma revolutum*, *Trichobilharzia regent*, *Hypoderaeum conoideum*, and *Austrobilharzia terrigalensis* (Miller 2016).

Threat to Humans

No information on any threats to humans from *Lymnaea peregra* was found.

3 Impacts of Introductions

No information on any impacts of introductions of *Lymnaea peregra* was found. The records available do not clearly indicate if there are any instances of introductions of *Lymnaea peregra*.

4 Global Distribution

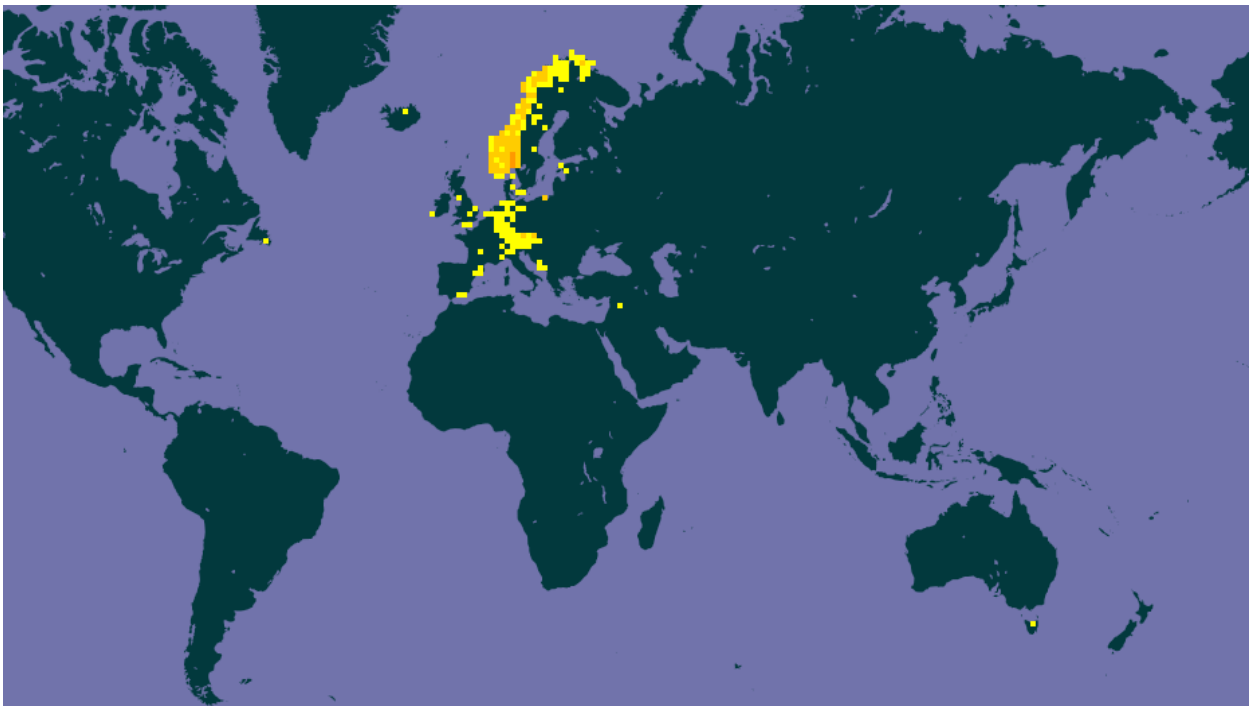

Figure 1. Known global distribution of *Lymnaea peregra*. Map from GBIF Secretariat (2016).

The locations in Tasmania, Australia were not used as source locations for the climate match. The location given for where the specimens were collected is the same as the museum that holds the collection (GBIF Secretariat 2016).

5 Distribution Within the United States

White-McLean (2011) lists a general distribution by states within the United States but a specific distribution map was not available.

6 Climate Matching

Summary of Climate Matching Analysis

The climate match for *Lymnaea peregra* was high along the Appalachians, in parts of the Great Lakes Basin, pockets of the Great Plains, and southern California. The match was low in Florida and along the Gulf Coast, the southwest, and along the Pacific Coast; the match was medium everywhere else. The Climate 6 score (Sanders et al. 2014; 16 climate variables; Euclidean Distance) for the contiguous U. S. was 0.281, high and the following states had individually high Climate 6 scores Arizona, Arkansas, California, Colorado, Connecticut, Delaware, Georgia, Idaho, Illinois, Indiana, Kentucky, Maryland, Massachusetts, Michigan, Missouri, Montana, Nevada, New Jersey, New Mexico, New York, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, Tennessee, Utah, Vermont, Virginia, Washington, Washington D.C., West Virginia, and Wyoming.

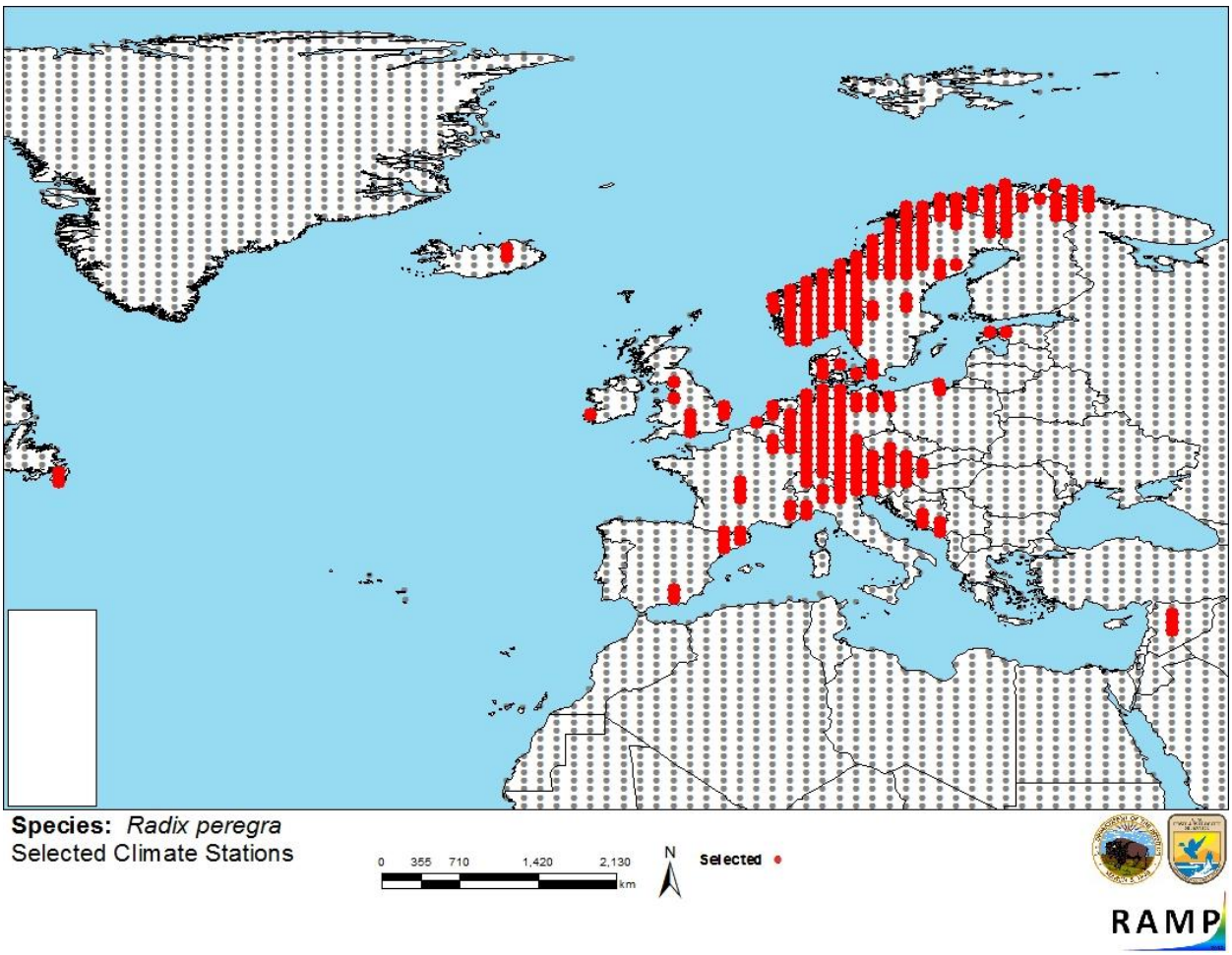

Figure 2. RAMP (Sanders et al. 2014) source map showing weather stations selected as source locations (red) and non-source locations (grey) for *Lymnaea peregra* climate matching. Source locations from GBIF Secretariat (2016). GBIF Secretariat (2016) uses *Radix peregra* as the senior synonym of *Lymnaea peregra*.

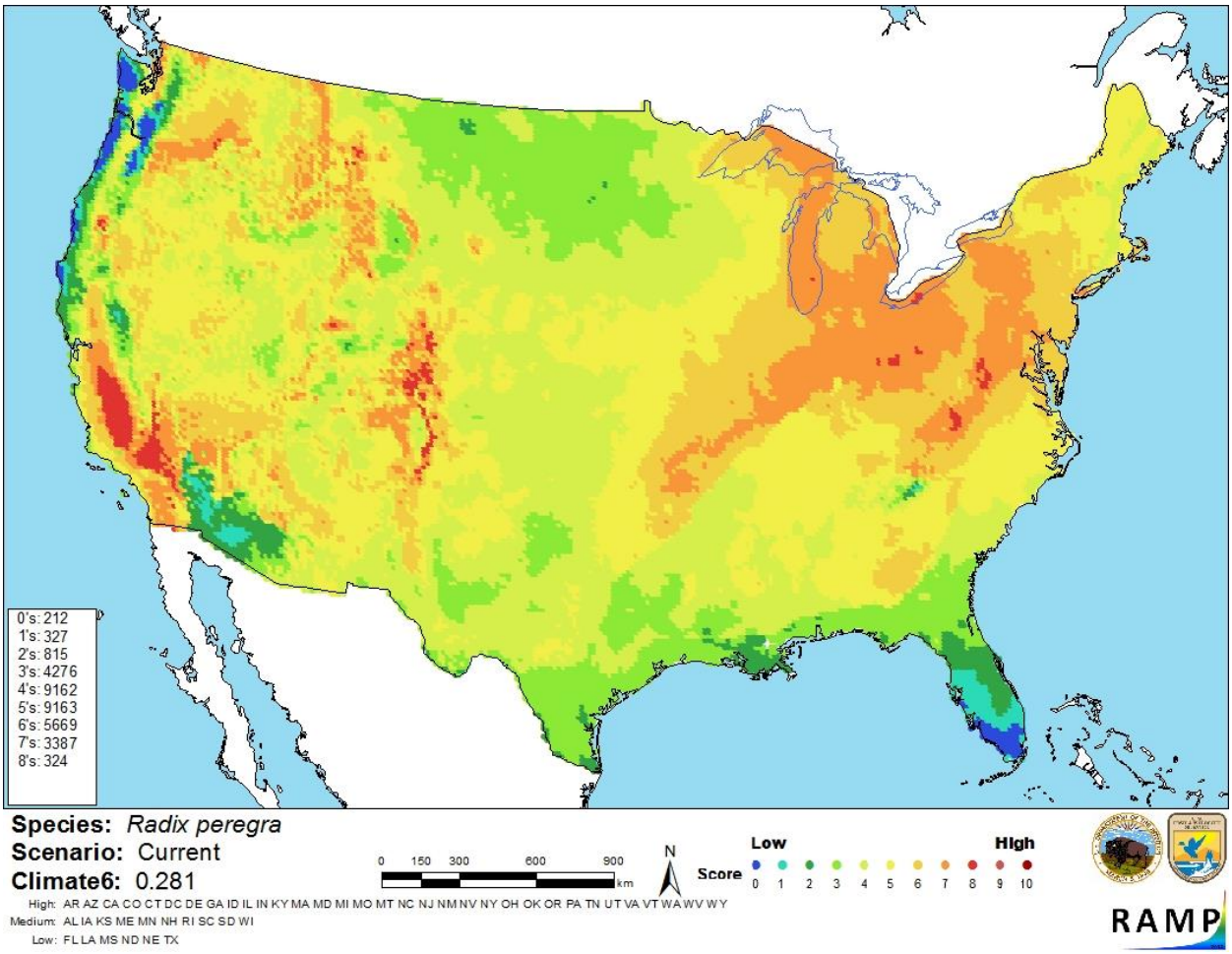

Figure 3. Map of RAMP (Sanders et al. 2014) climate matches for *Lymnaea peregra* in the contiguous United States based on source locations reported by GBIF Secretariat (2016). 0 = Lowest match, 10 = Highest match. GBIF Secretariat (2016) uses *Radix peregra* as the senior synonym of *Lymnaea peregra*.

The High, Medium, and Low Climate match Categories are based on the following table:

Climate 6: Proportion of (Sum of Climate Scores 6-10) / (Sum of total Climate Scores)	Climate Match Category
0.000≤X≤0.005	Low
0.005<X<0.103	Medium
≥0.103	High

7 Certainty of Assessment

The certainty of this assessment is low. There is no consensus on the accepted name of this species. Although the author searched for information using all given accepted names, it is distinctly possible not all available information was found or that the information found may pertain to another species. Seddon et al. (2014) indicates that there are issues with the known

distribution of this species due to misidentification of specimens or reclassification of species and subspecies. No clear records of introduction were found.

8 Risk Assessment

Summary of Risk to the Contiguous United States

The history of invasiveness is uncertain. Most sources list the range of this species as confined to Europe and Asia. One source did list populations in North America but did not explicitly state if they were native or introduced. No other records of introduction were found. The climate match was high, especially in the Appalachian range, parts of the Great Lakes Basin and Great Plains, and southern California. Most of the country had a medium climate match. The certainty of assessment is low. The overall risk assessment category is uncertain. The history of invasiveness of this species is unclear, as is the actual global distribution.

Assessment Elements

- **History of Invasiveness (Sec. 3): Uncertain**
- **Climate Match (Sec. 6): High**
- **Certainty of Assessment (Sec. 7): Low**
- **Remarks/Important additional information** No additional remarks.
- **Overall Risk Assessment Category: Uncertain**

9 References

Note: The following references were accessed for this ERSS. References cited within quoted text but not accessed are included below in Section 10.

GBIF Secretariat. 2016. GBIF backbone taxonomy: *Radix peregra* (O.F.Müller, 1774). Global Biodiversity Information Facility, Copenhagen. Available: http://www.gbif.org/species/5189887. (June 2016).

Islam, M. N., G. R. Port, and A. J. McLachlan. 2001. The biology of *Lymnaea peregra* (Muller) (Gastropoda: Pulmonata: Basommatophora) with special reference to the effects of herbicides on its reproduction. Journal of Biological Sciences 1(6):532–540.

ITIS (Integrated Taxonomic Information System). 2016. *Lymnaea peregra*. Integrated Taxonomic Information System, Reston, Virginia. Available: http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=76495. (June 2016).

Palomares, M. L. D., and D. Pauly, editors. 2016. *Lymnaea peregra*. SeaLifeBase. Available: http://www.sealifebase.ca/summary/Lymnaea-peregra.html. (June 2016).

Poelen, J. H., J. D. Simons, and C. J. Mungall. 2014. Global Biotic Interactions: an open infrastructure to share and analyze species-interaction datasets. Ecological Informatics 24:148–159.

Sanders, S., C. Castiglione, and M. Hoff. 2014. Risk assessment mapping program: RAMP. U.S. Fish and Wildlife Service.

Seddon, M. B., U. Kebapçi, D. Van Damme, and V. Prie. 2014. *Radix balthica*. The IUCN Red List of Threatened Species 2014: e.T155647A42430553. Available: http://www.iucnredlist.org/details/full/155647/0. (June 2016).

White-McLean, J. A. 2011. Terrestrial mollusc tool. USDA/APHIS/PPQ Center for Plant Health Science and Technology and the University of Florida. Available: http://idtools.org/id/mollusc/factsheet.php?name=lymnaeidae. (June 2016).

10 References Quoted But Not Accessed

Note: The following references are cited within quoted text within this ERSS, but were not accessed for its preparation. They are included here to provide the reader with more information.

Bank, et al. 2006. [Source material did not give full citation for this reference.]

Barnes. 1992. [Source material did not give full citation for this reference.]

Bondesen, P. 1950. A comparative morphological-biological analysis of the egg capsules of freshwater pulmonate gastropods. Natura Jutlandica 3:1–208.

Boycott, A. E. 1938. Experiments on the artificial breeding of *Limnaea involuta*, *Limnaea burnetti* and other forms of *Limnaea peregra*. Proceeding of the Malacological Society of London 23:101–108.

Canning, E. U., F. E. G. Cox, N. A. Croll, and K. M. Lyons. 1973. The natural history of Slapton Ley Nature Reserve: VI Studies on Parasites. Field Studies 3:981–718.

Fitter, R., and R. Manuel. 1986. Field guide to freshwater life. Collins, London.

Germain. 1931. [Source material did not give full citation for this reference.]

Glöer, P., and V. Pešić. 2012. The freshwater snails (Gastropoda) of Iran, with descriptions of two new genera and eight new species. ZooKeys 219:11–61.

Harman, W. N. 1974. Snails (Mollusca: Gastropoda). Pages 275–312 *in* C. W. Hart, and S. L. H. Fuller, editors. Pollution ecology of freshwater invertebrates. Academic Press, New York and London.

Jame, P., and B. Delay. 1991. Population genetics of freshwater snails. Trends in Ecology and Evolution 6:383–386.

Jereb, P., and C. F. E. Roper, editors. 2005. Cephalopods of the world. An annotated and illustrated catalogue of Cephalopod species known to date, volume 1. Chambered nautiluses and sepioids (Nautilidae, Sepiidae, Sepiolidae, Sepiadariidae, Idiosepiidae and Spirulidae). FAO Special Category Fishery Purp 4(1):262.

Kantor, Y. I., A. A. Schileyko, M. V. Vinarski, and A. V. Sysoev. 2009. Catalogue of the continental mollusks of Russia and adjacent territories.

Kebapçı, Ü., and M. Z. Yıldırım. 2010. Freshwater snails fauna of Lakes region (Göller Bölgesi), Turkey. Muzeul Olteniei Craiova. Oltenia Studii şi comunicari Ştiintele Naturii 26:75–81.

Kotpal, R. L. 1995. A text book of Mollusca. Rastogi Publication, Meerut, India.

Miller, S. E. 2016. Species associations from Wardeh, M., et al. Database of host-pathogen and related species interactions, and their global distribution. Science Data 2:150049 doi: 10.1038/sdata.2015.49 (2015). Available: https://github.com/millerse/Wardeh-et-al.-2015/archive/c6e69d5a6f98f6d41161c1cfe6460f2abb777683.zip. (January 2017).

Norling, P., and N. Kautsky. 2008. Patches of the mussel *Mytilus* sp. are islands of high biodiversity in subtidal sediment habitats in the Baltic Sea. Aquatic Biology 4:75–87.

Ruppert, E. E., R. S. Fox, and R. D. Barnes. 2004. Invertebrate zoology. A functional evolutionary approach, 7th edition. Brooks/Cole, Thomson Learning.

Russell-Hunter, W. D. 1961a. Annual variations in growth and density in natural populations of freshwater snails in the west of Scotland. Proceedings of the Zoological Society of London 136:219–253.

Welter-Schulte, F. 2009. Species summary for *Omphiscola glabra*. Available: http://www.animalbase.uni-goettingen.de/zooweb/servlet/AnimalBase/home/species?id=2200.

Wilbur and Yonge. 1964. [Source material did not give full citation for this reference.]

Wilbur and Yonge. 1966. [Source material did not give full citation for this reference.]