

## Quagga Mussel, *Dreissena bugensis*

### Overview

#### Short description of *Dreissena bugensis*, Quagga Mussel

The Quagga mussel is a sessile bivalve of triangular shape and usually less than 5 cm length. It commonly has alternating light and dark brown stripes, but can also be solid light brown or dark brown.

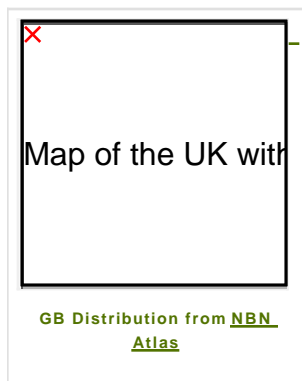
#### Description of *Dreissena bugensis*, Quagga Mussel status in GB

First GB record in October 2014 in Wraysbury Reservoir and the Wraysbury River, a tributary of the River Colne, near Egham, Surrey.

#### Habitat summary: *Dreissena bugensis*, Quagga Mussel

It occupies lakes, rivers and estuarine habitats. Adults attach to hard substrata such as rocks, wood, man-made piping and native mussel shells via byssal threads. Typically occurring in fresh water but thriving in salinities up to 1‰.

### Distribution map



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We try to keep these factsheets up to date, however if you notice any issues please contact us

### Overview table

Environment:	Freshwater
Species status:	Non-Native
Native range:	Caucasus, Russia South, Krym, Ukraine
Functional type:	Filter-feeder
Status in England:	Non-Native
Status in Scotland:	Non-Native
Status in Wales:	Non-Native
Location of first record:	Wraysbury
Date of first record:	10

### Invasion history: *Dreissena bugensis*, Quagga Mussel

#### Origin

The Quagga mussel originally had a very restricted distribution in just the Dnieper and Southern Bug estuary and the lower Inguletz River in the Ukraine where it was discovered in 1890.

#### First Record

First record in Wraysbury Reservoir and the Wraysbury River, a tributary of the River Colne, near Egham, Surrey, October 2014.

#### Pathway and Method

#### Species Status

Range expansion in the Ponto-Caspian area started in the 1980s into the Don River from where it, possibly via the Don-Volga canal, reached the Volga River in the early 1990s. Since 2005, it has extended its distribution area westward into the Romanian Danube. In April 2006, it was discovered in Western Europe, near Willemstad, the Netherlands, and a year later in the Main River in Germany. Colonisation of North America started in the late 1980s, when it appeared in the Great Lakes. It has since been reported from the Mississippi and Ohio Rivers. and several states such as

Nevada, Arizona and Utah. It has already become a major invasive species in both the Volga River and the North American Great Lakes.

## Ecology & Habitat: *Dreissena bugensis*, Quagga Mussel

### Dispersal Mechanisms

Dreissenid larvae are able to drift downstream for 3–4 weeks and up to 300 km before they attach and found new populations, but humans are responsible for most introductions into new areas. Adults can attach to boats and are thus quickly transported to new sites. In addition, larvae can be transported in fish and bait wells as well as in cooling ports of motors. While colonisation of new rivers in Europe has been enabled by opening of canals, its release into Great Lakes waters is linked to discharge of ship ballast water.

### Reproduction

It is a prolific breeder, with a fully mature mussel being capable of producing up to one million eggs per season, thus enabling a single mussel to establish a new population. It is dioecious, exhibits external fertilisation and can reproduce in salinities below 3‰.

### Known Predators/Herbivores

These small molluscs are preyed upon by different fish species, diving ducks, crayfish and muskrats.

### Resistant Stages

Under temperate summer conditions, adult Quagga mussels may survive on overland transport (e.g. small trailer-boats) for up to 5 days.

### Habitat Occupied in GB

First found in Wraysbury Reservoir and the Wraysbury River, a tributary of the River Colne, near Egham, Surrey.

## Distribution: *Dreissena bugensis*, Quagga Mussel

The first UK record of Quagga Mussel was found in Wraysbury Reservoir and the Wraysbury River, a tributary of the River Colne, near Egham, Surrey in October 2014. It is widely distributed across Eastern Europe, and some parts of Western Europe (Main, Rhine and Danube Rivers). Also present in North America.

## Impacts: *Dreissena bugensis*, Quagga Mussel

### Environmental Impact

Being an active filter feeder with each adult mussel filtering one or more litres of water each day, it causes changes in the structural characteristics of zooplankton including total abundance, biomass and species composition. Invasions can negatively affect benthic invertebrate communities and alter whole ecosystems. Filter-feeding or deep-dwelling invertebrates that rely on detrital rain are particularly badly affected. Attachment on mussel shells can cause severe reductions and extirpation of native mussel populations.

### Health and Social Impact

The sharp shells may cause injuries in recreational areas. It is also a nuisance when it grows on recreational boats.

### Economic Impact

Thick encrustations of mussels form on man-made structures or within raw water systems, impacting on operation and efficiency. It is also an economic problem when it grows on commercial shipsboats, water treatment plants and electric power stations.

## References & Links: *Dreissena bugensis*, Quagga Mussel

### Identification

Pathy, D. & Mackie, G. (1993) Comparative shell morphology of *Dreissena polymorpha*, *Mytilopsis leucophaeata*, and the "quagga" mussel (*Bivalvia: Dreissenidae*) in North America. *Canadian Journal of Zoology*, **71**, 1012-1023.

### Biology, ecology, spread, vectors

Mills, E., Rosenberg, G., Spidle, A., Ludyanskiy, M., Pligin, Y. & May, B. (1996) A review of the biology and ecology of the quagga mussel (*Dreissena bugensis*), a second species of freshwater dreissenid introduced to North America. *American Zoologist*, **36**,

**271–286.**

Molloy, D.P., de Vaate, A.b., Wilke, T. & Giamberini, L. (2007) Discovery of *Dreissena rostriformis bugensis* (Andrusov 1897) in Western Europe. *Biological Invasions*, **9**, 871-874.

Orlova, M.I. (2009) Zebra and quagga mussels in the inland waters of European Russia and adjacent countries. *Monitoring and control of macrofouling mollusc in freshwater systems* (eds G. L. Mackie & R. Claudi), pp. 371-386. CRC Press, Boca Raton, Florida.

Ricciardi, A., Serrouya, R. & Whoriskey, F.G. (1995) Aerial exposure tolerance of zebra and quagga mussels (Bivalvia: Dreissenidae): implications for overland dispersal. *Canadian Journal of Fisheries and Aquatic Sciences*, **52**, 470-477.

Son, M. (2007) Native range of zebra mussel and quagga mussel and new data on their invasions within the pontocaspian region. *Aquatic Invasions*, **3**.

Therriault, T.W., Orlova, M.I., Docker, M.F., MacIsaac, H.J. & Heath, D.D. (2005) Invasion genetics of a freshwater mussel (*Dreissena rostriformis bugensis*) in eastern Europe: high gene flow and multiple introductions. *Heredity*, **95**, 16-23.

#### **Management and impact**

Aldridge, D.C., Elliott, P. & Moggridge, G.D. (2006) Microencapsulated BioBullets for the Control of Biofouling Zebra Mussels. *Environmental Science & Technology*, **40**, 975–979.

Brady, J., Benschoten, J.E.V. & Jensen, J.N. (1996) Technical note: Chlorination effectiveness for zebra and quagga mussels. *American Water Works Association Journal*, **88**, 107.

Mackie, G.L. & Claudi, R. (2009) *Monitoring and control of macrofouling mollusc in freshwater systems*. CRC Press, Boca Raton, Florida.

Molloy, D.P. & Mayer, D.A. (2007) Overview of a Novel Green Technology: Biological Control of Zebra and Quagga Mussels with *Pseudomonas fluorescens*.

Schloesser, D.W., Kovalak, W.P., Longton, G.D., Ohnesorg, K.L. & Smithee, R.D. (1998) Impact of zebra and quagga mussels (*Dreissena* spp.) on freshwater unionids (Bivalvia: Unionidae) in the Detroit River of the Great Lakes. *American Midland Naturalist*, **140**, 299-313.

#### **General**

Mills, E., Rosenberg, G., Spidle, A., Ludyanskiy, M., Pligin, Y. & May, B. (1996) A review of the biology and ecology of the quagga mussel (*Dreissena bugensis*), a second species of freshwater dreissenid introduced to North America. *American Zoologist*, **36**, 271–286.