

New records of *Vertigo moulinsiana* (Gastropoda: Vertiginidae) and notes on its distribution and habitats in the Czech Republic

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Vertigo moulinsiana (Dupuy, 1849) was found in 2003–2005 in Northern Bohemia (Czech Republic) at 11 sites. All these sites are situated on floodplains of smaller streams in a sandstone area. The known occurrence of this endangered relict in the Czech Republic is concentrated in three areas – a large area of Bohemian Cretaceous Basin, a floodplain near villages Břežany and Božice (Dyje River Basin) in Southern Moravia and small, isolated, treeless fens in the White Carpathians (Bílé Karpaty Mts.). The principal habitats where *V. moulinsiana* lives in the Czech Republic are sedge marshes, *Typha* swamps, reed swamps (with *Carex* spp.), alder carrs (also with *Carex* spp.) and tufa-forming spring fens.

Introduction

Vertigo moulinsiana (Dupuy, 1849) is considered to be an Atlantic-Mediterranean species, with continuous range in Southern Europe (mainly France) and isolated sites in Central Europe, Iberian Peninsula and – outside Europe – in Northern Africa (POKRYSZKO 2003). This species mainly inhabits calcareous, lowland wetlands (CAMERON et al. 2003). In contrast to most other species of the genus *Vertigo*, it prefers especially permanent wet sites. *V. moulinsiana* is regarded as globally threatened (POKRYSZKO 2003) and is considered to be a relict from the Late Holocene, when it inhabited the extensive wetlands, which occurred during this period (LOŽEK 1955). The decline of its occurrence was probably caused by the loss of suitable wetlands, primarily due to climatic changes and later mainly resulting from human activities.

Distribution in the Czech Republic

Despite the common occurrence in the Late Holocene (e. g. LOŽEK 1955) *V. moulinsiana* was considered to be extinct in the Czech Republic due to climatic changes and loss of suitable habitats. The first living population was discovered by B. Zvarič in Southern Moravia near Břežany village in 1965 (FLASAR & ZVARIČ 1966) and later (1968) near Božice village (ZVARIČ, unpubl.). Thirty years later (1994) large populations were found in extensive wetlands along brooks Liběchovka and Pšovka in the Kokořínsko Protected Landscape Area (Central and Northern Bohemia) by BERAN (1995). Recently more than 60 sites with its occurrence have been documented from this area (BERAN in press). *V. moulinsiana* was later found at 3 new sites in the White Carpathians, where this snail inhabits small isolated calcareous fens (HORSÁK 2005).

Nearly all these sites were included among pSCI (proposed Sites of the Community Importance) and many of them are also situated within protected

areas of different categories (Protected Landscape Area, National Nature Reserve, National Nature Monuments, Nature Reserve, Nature Monument).

New records

Vertigo moulinsiana was found in 2003–2005 in Northern Bohemia in new sites listed below. Presented data are as follows – geographical coordinates, code of the mapping field for faunistic grid mapping (cf. PRUNER & MÍKA 1996), altitude, name of the nearest settlement, description of the site, habitat, number of individuals, date of investigation:

1 – 50°30'00" N, 14°51'59" E, 5555, 230 m, Bělá pod Bezdězem, southern part of the Valcha pond near a railway, sedge marshes and tufts of *C. paniculata*, a) 10 specimens, 1 Oct 2003; b) 6 specimens, 12 Oct 2004;

2 – 50°30'03" N, 14°51'55" E, 5455, 230 m, Bělá pod Bezdězem, northern part of the Valcha pond near a railway, sedge marshes and tufts of *C. paniculata*, 5 specimens, 12 Oct 2004;

3 – 50°29'48" N, 14°54'26" E, 5555, 213 m, Velký Rečkov, Rečkov National Nature Monument, sedge marshes and alder carrs, 6 specimens, 4 Oct 2004;

4 – 50°29'42" N, 14°54'35" E, 5555, 213 m, Velký Rečkov, wetland on the south-eastern boundary of Rečkov NNM outside the NNM, sedge marshes, 17 specimens, 4 Oct 2004;

5 – 50°29'40" N, 14°54'37" E, 5555, 213 m, Velký Rečkov, wetlands among the south-eastern bound-

ary of Rečkov NNM and a railway, alder carrs with *Carex* sp, reed swamps, sedge marshes, 5 specimens, 4 Oct 2004;

6 – 50°29'37" N, 14°54'30" E, 5555, 213 m, Velký Rečkov, wetland among the Bělá stream, a railway and a road on the eastern boundary of Velký Rečkov, alder carrs with *Carex* spp., 4 specimens, 4 Oct 2004;

7 – 50°29'49" N, 14°53'28" E, 5555, 215 m, Velký Rečkov, Klokočka National Nature Monument, sedge marshes, alder carrs with *Carex* spp., 5 specimens, 12 Oct 2004;

8 – 50°36'48" N, 14°42'51" E, 5354, 265 m, Hradčany, wetland in the eastern edge of the Hradčanský Rybník pond in the Hradčanské Rybníky Nature Reserve, alder carrs with *Carex* spp., 10 specimens, 5 May 2005;

9 – 50°34'21" N, 14°39'14" E, 5453, 266 m, Doksy, wetland on the border of the Dokeská Zátoka cove, tufts of *C. paniculata* bordering Máchovo Jezero pond (water level overstepped 1 m above the ground surface level), 35 specimens, 4 Aug 2005;

10 – 50°36'47" N, 14°35'31" E, 5353, 252 m, Jestřebí, wetland on the left side of the road Jestřebí – Provodín in the Novozámecký Rybník National Nature Reserve, alder carrs with *Carex* spp., 25 specimens, 16 Aug 2005;

11 – 50°36'41" N, 14°35'21" E, 5353, 252 m, Jestřebí, wetland on the left side of the road Jestřebí – Provodín in the Novozámecký Rybník National Nature Reserve, sedge marshes, 4 specimens, 16 Aug 2005.

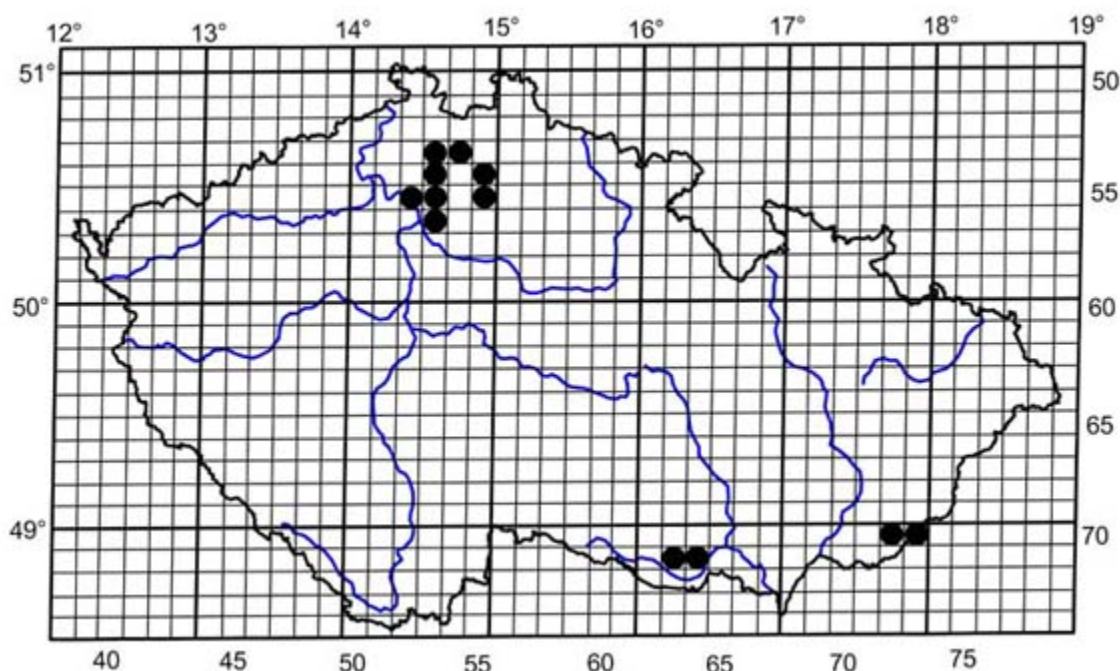


Fig. 1. Faunistic grid map showing the distribution of *Vertigo moulinsiana* in the Czech Republic. Orig. V. Nedbal.

All 11 new sites are situated in floodplains of smaller streams in a sandstone area with similar character as the sites where *V. moulinsiana* occurs in the Kokořínsko PLA. Especially in the case of last new four sites (loc. 8–11) presented above the findings of other sites with *V. moulinsiana* are possible due to the large area of wetlands in their surroundings.



Fig. 2. Sedge marshes (Kokořínsko PLA). Photo L. Beran.

All new sites, many of which are also situated in existing protected areas (National Nature Reserve, National Nature Monuments, Nature Reserve), have been included in pSCI and *V. moulinsiana* has been listed as a protected species.

Habitats

Vertigo moulinsiana belongs to unihabitat species occurring only in wetlands (POKRYSZKO 2003). In Britain, *V. moulinsiana* lives in permanently wet, usually calcareous, swamps, fens and marshes, bordering rivers, lakes or ponds, or in river floodplains, most often in open situations (KILLEEN 2003). Similar situations are documented from other countries (e. g. POKRYSZKO 1990, CAMERON et al. 2003).



Fig. 3. Alder carr with *Carex* spp. (Kokořínsko PLA). Photo L. Beran.

The principal habitats where *V. moulinsiana* lives in Bohemia are sedge marshes, reed swamps (with *Carex* spp.), alder carrs (also with *Carex* spp.) and calcareous fens. General distribution of habitats of particular sites with the occurrence of *V. Moulinsiana* in Bohemia is shown in Table 1. In all habitats the occurrence of *V. moulinsiana* depends on hydrological conditions, and higher densities were documented in wetter parts where water levels were at the ground surface or very close to it. In the case of tufts of *C. paniculata* or *C. appropinquata* this snail occurs in places where water level often overstepped 1 m above the ground surface level (e.g. loc. No. 9).

Table 1. General distribution of habitats with occurrence of *V. moulinsiana* at particular sites in Bohemia. SM – sedge marshes, RS – reed swamps (usually with *Carex* spp.), AC – alder carrs (with *Carex* spp.), CF – calcareous fens; SP – spring, BP – border of pond, BB – border of brook; ● – less than 10% of a total area with occurrence of *V. moulinsiana*, ●● – 10–25%, ●●● – more than 25%.

| Site | SM | RS | AC | CF | SP | BP | BB |
|---------------------------------|-----|-----|-----|----|-----|-----|-----|
| 1–2 – Valcha Pond | ●●● | | | | | ●●● | |
| 3–6 – Rečkov | ●●● | ●● | ●● | | ●●● | | ●● |
| 7 – Klokočka | ●●● | ●● | ●●● | | ●●● | | ●● |
| 8 – Hradčanský Rybník pond | | | ●●● | | | ●●● | |
| 9 – Máchovo Jezero pond | ●●● | | | | | ●●● | |
| 10–11 – Novozámecký Rybník pond | | | ●●● | | | ●●● | ●●● |
| Kokořínsko (BERAN in press) | ●●● | ●●● | ●●● | ● | ●●● | ●● | ●●● |

In Moravia the species lives in two areas. In the Dyje River Basin in lowland wetlands (floodplain, borders of ponds and brooks) it inhabits similar habitats as in Bohemia but often also *Typha* swamps (FLASAR & ZVARIČ 1966, ZVARIČ unpubl.). Small and isolated tufa-forming fens are the habitat of this snail in the White Carpathians. (HORSÁK 2005).

Hydrological conditions are considered as the most important for surviving populations of this species. Potential problems are the conflict between management for the maintenance of this snail and management for vegetation maintenance, or in the case of lack of management, vegetation succession.

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