

A European warm waters neophyte *Shinnersia rivularis* – new alien species to the Slovak flora

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Abstract: *Shinnersia rivularis* is reported as a new alien species of the Slovak flora. The species was found in the catchment water of a thermal spring at a site in Partizánske, part Velké Bielice (West Slovakia) in 2002. In the year of discovery, plants formed single population of about 30 square metres of water surface of the canal discharging warm water from the spa. Two populations covering the area ca 90 square meters were found in 2007. A brief description of the species is given and its distribution in Central Europe is reviewed. So far, the species has been reported from only three localities in Central Europe, which are distributed in three countries: Austria, Hungary and Germany.

Key words: *Shinnersia rivularis*; alien species; Central Europe; thermal water; Slovakia

Introduction

Plant invasions attract rapidly increasing interest among both, plant scientists and nature conservationists in the last years (Pyšek et al. 2006; Richardson 2006). In Slovakia, main focus was on terrestrial habitats (e.g. Eliáš 1998, 1999; Šípošová et al. 1999; Eliáš et al. 2001; Fehér & Končeková 2005) as a rather low number of invasive neophytes has been found in aquatic habitats (e.g. Ohrádková 1998; Oťaheľová & Valachovič 2006). However, experience from other regions (e.g. Šejna et al. 2007) has demonstrated a potential importance of monitoring of any change in species ranges of alien aquatic plants.

This short communication aims to report the occurrence of alien aquatic plant *Shinnersia rivularis* in Slovakia and to review the Central-European distribution of this neophyte species of the European flora.

Nomenclature, morphological description and native range of the species

Shinnersia rivularis (Gray) King & Robinson, Phytologia. 19: 297, 1970.

Syn: *Trichocoronis rivularis* A. Gray, Mem. Amer. Acad. Arts, n. s. 4: 66, 1849.

The species is the only species of the genus *Shinnersia* (King & Robinson 1970; Nesom 2006), whose separate position was recently doubted (e.g. Barkley in Diekobst & Wolff 1995; Turner 1997). The following morphological characters are important for the determination of

the species (after Nesom 2006): perennial plant rooted in muck; rhizomes relatively long, stems (10–30 cm in height) commonly submerged except for terminal 10 cm or less, leaves opposite; sessile; blades 1- or 3-nerved, broadly oblanceolate or 3-lobed, faces sometimes pilose and glabrescent or glabrous, gland-dotted, mostly 2–4 cm long, heads discoid, borne singly out of water, involucre hemispheric or broader, 6–9 mm in diameter, corollas white, ca. 2 mm long, throats broadly campanulate, cypselae prismatic, 4–5-ribbed, sparsely gland-dotted and sparsely hairy, ca. 2 mm long. The species is native to isolated aquatic systems in Mexico and USA – in south-western Texas, northern Coahuila and northern Nuevo Leónsouthern (King & Robinson 1970; Turner 1997). The species is cultivated as an aquarium plant all around the world (Cook 1990).

Species distribution in Central Europe

Three sites of *Shinnersia rivularis* were published from Central Europe till present (Fig. 1). The first report of the species occurrence in Central Europe was published by Diekobst & Wolff (1995) from Germany. Authors found the species in the river Erft in 1992. Hussner (2005) pointed out that processed wastewater from the nearby lignite opencast mining area causes a thermally abnormal situation in this river, with relative high temperatures in winter, which rarely drop below 10 °C. These conditions are favourable for some exotic plant species invading the rivers. Despite this fact *Shinnersia rivularis* was not confirmed here since 2000

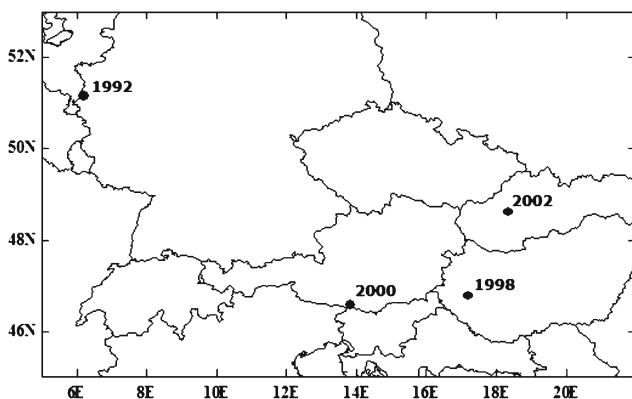


Fig. 1. Map of the distribution of *Shinnersia rivularis* in Central Europe based on references cited in text and field research of authors.

(Hussner l.c.). Szabó (1998, 2000) found the species in south-western Hungary in 1998; the plants populated a thermal crater-like lake on the eastern fringe of the Hévíz village. The last report of *Shinnersia rivularis* occurrence was published by Leute (2000) from thermal streams in Warmbad Villach in south-eastern Austria, but the author determined the species as *Cotula coronopifolia*. Melzer and Barta (2001) revised this finding and corrected Leute's determination.

New report from Slovakia

The Slovak population of *Shinnersia rivularis* (Fig. 2) is located in a waste canal discharging thermal water from the bath house named "Kalinka" on the southern part of the Veľké Bielice village, which is a part of the town of Partizánske (Western Slovakia, WGS-84 coordinates 48°37'17.22" N and 18°20'24.02" E). First plants have been collected there in 2002, but the species was determined correctly as late as two years later by J. Somogyi. Voucher herbarium specimens are deposited at BRNU and NI (abbreviations according to Holmgren et al. 1990). The temperature at the headspring of thermal water is 38.5°C (Takátsová 2001); the water temperature in the waste canal is approximately 10–15°C lower and this waste water flows into the river Nitra. Dense growth of the species was approximately 20 meters long and only 1–1.5 meters wide in the year of discovery (2002). Vegetation structure and habitat conditions resemble the *Sparganio-Glycerion fluitantis* alliance. The actual area of the growth (2007) is three times larger and the species forms two isolated populations. The first one is that found in 2002 and it nowadays covers an area of about 60 m². The second one was found in a parallel canal draining waste thermal water from greenhouses, in the distance of 50 metres from the first one. The second population covers approximately 30 square meters of the water surface. In 2007, plants formed inflorescences in June and July, but no germinable seeds were recorded. Consequently, the survival of *Shinnersia rivularis* has been ensured by long-lived rhizomes.

We suppose that *Shinnersia rivularis* apparently



Fig. 2. Herbarium specimen of *Shinnersia rivularis* from Partizánske, part Veľké Bielice.

colonised this site after 1994 because a floristic survey was conducted in this area at that time and no data about the presence of the species was published (Ambros 1996). The plant reached the site probably via aquarists. The occurrence of aquarium fish from the genus *Poecilia* and the North American turtle *Chrysemys scripta* in thermal water of the canal supports our theory.

We did not detect any massive invasion of the species at the locality. These accords well with the observation from the river of Erft in Germany, where alien aquatic species have increased α -diversity of the aquatic vegetation and they have not replaced any of native species (Hussner & Lösch 2005). On the other hand, Szabó (2002) has pointed out a long-term degradation of native vegetation by some invasive neophytes in the Hungarian thermal lake since 1799. By analogy, Šejna et al. (2007) published rapid invasive spreading of the tropical aquatic weed *Pistia stratiotes* in Slovenia. These events reported from Slovenia and Hungary pose serious concerns for the future of aquatic habitats in the region. A monitoring of the spread of *Shinnersia rivularis* in the Slovakian site is therefore needed.

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