Senecio inaequidens (*Asteraceae*): a new alien species for the Bulgarian flora

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Received: October 28, 2009 ▹ Accepted: November 30, 2009

Abstract. *Senecio inaequidens*, a South-African species alien to Europe, is reported for the first time for the Bulgarian flora. It was found along the railway tracks close to a railway station in Sofia. The morphology of the species and its habitat are concisely described and illustrated. Tetraploid chromosome number, $2n = 4x = 40$, was established from the Bulgarian accession confirming earlier counts from elsewhere in Europe.

Key words: alien species, *Asteraceae*, Bulgarian flora, chromosome number, invasive species, *Senecio*

Introduction

In the past few years alien representatives in the Bulgarian flora have been receiving increased attention from Bulgarian botanists. This resulted in the discovery of several new, mainly recently naturalized plant species (e.g. Dimitrov & Tzonev 2002; Milanova & Nakova 2002; Šumberova & al. 2004; Tzonev 2005, 2007; Petrova 2006; Vladimirov 2006). Regrettably, especially fruitful in this respect were the summer and autumn of 2009, when at least six new, unintentionally introduced and naturalized aliens were recorded for the first time in the Bulgarian flora. Among others, *Senecio inaequidens* was found along the railway tracks in Sofia.

Senecio inaequidens is native to South Africa. Since 1889 it has been repeatedly and unintentionally introduced to Europe with sheep's wool. After several decades this wool alien began to expand and since the 1950s it spread across West, Central and South Europe (Ernst 1998).

Material and methods

Plant material was collected by the authors from a locality in Sofia. Morphological characters were recorded from this plant material and relevant literature sources (Chater & Walters 1976; EPPO 2006; Heger & Böhmer 2006). Herbarium specimens were deposited in the Herbarium of the Institute of Botany (SOM), BAS.

Seeds were collected from the field and brought to the Institute of Botany for germination in Petri dishes so as to obtain the chromosome number. Counting of the chromosomes was done on metaphase plates from actively growing root meristem. Root tips were collected and pretreated with 0.01 % colchicine for 90 min and fixed in ethanol:glacial acetic acid (3:1) for about 3 h at room temperature. Hydrolyzation was conducted in 1n HCl at 60 °C for 20 min. Then the root tips were treated with HCl:ethyl ether (1:1) for 8 min at 60 °C, rinsed in distilled water and stained with haematoxylin after Gomori (Melander & Wingstrand 1953) for 30 min at 60 °C. Finally, the root tips were squashed in a drop of 45 % acetic acid, mounted in Euparal and observed with light microscope Eclipse 50i of Nikon.

Results and discussion

Senecio inaequidens DC., Prodr. 6 (1837) 401 (Fig. 1)

Herbaceous perennial to dwarf shrub, woody at base, up to 60(100) cm tall. Stems erect, ± glabrous, often strongly branched from the base. Leaves alternate, 3–14 × 0.3–0.7(1.0) cm, simple, linear to linear-lanceolate, acute, very variable, with denticulate to coarsely and irregularly dentate margin, occasionally petiolate, bright-green, getting smaller upward the stem; upper leaves occasionally pinnately-lobed, shortly petiolate, subsessile or sessile. Inflorescences terminal or axillary, corymbose panicles. Capitula 18–25 mm in diameter, radiate, 80 to 100 per plant. Involucral bracts lanceolate, acute, ± glabrous, keeled, 4–7 mm long, resinous. Supplementary bracts 10–20, acute, ± glabrous, dark-tipped. Ray florets (7–13 mm), female, ligules bright-yellow, becoming revolute; disc florets numerous. Achenes 2–2.5 mm long, cylindrical, pubescent between ribs; pappus 2–3 times as long as achene, white.

Senecio inaequidens is easily recognized from the other species of *Senecio* s.l. in the Bulgarian flora by

Fig. 1. *Senecio inaequidens*: **a** – plant habit; **b** – shape of cauline leaves; **c** – flowering capitula; **d** – fruiting capitula with ripe achenes (photos V. Vladimirov).

a combination of the following characters: branched from the base stem and narrow (usually less than 0.5 cm), linear to linear-lanceolate, acute leaves.

Phenology. Still unstudied in the Bulgarian occurrence. The observed individuals apparently had started to flower in August and at the time of collecting had capitula with fallen and ripe seeds, flowering capitula and very young capitula, suggesting that they will continue to flower until the inset of winter.

Distribution in Bulgaria. Sofia region: along the railway tracks near the Poduene Railway Station in Sofia, 42.70107°N, 23.34398°E (three flowering and fruiting plants observed) and 42.69727°N, 23.35813°E (one flowering and fruiting plant), 18.09.2009, coll. *V. Vladimirov* & *A. Petrova* (SOM 165442 to 165446, five herbarium sheets).

The species has a wide range of habitats but it prefers well-drained and disturbed soils. It colonizes a great variety of Central European plant communities and habitats like urban and industrial ruderal sites, roadsides, walls, disturbed grasslands, and tree plantations (Bornkamm 2002). It prefers to grow in particular along railways and motorways where its spread is greatly facilitated by the different means of transport. The significance of trains as a vector for dispersal of this species, including at long distance, has been discussed in detail by Ernst (1998). The discovery of the taxon along railways in Bulgaria suggests that it has been brought here from abroad by the international trains.

General distribution. Native to South Africa, where it grows on the sandy and gritty riverbanks of periodically and at the rocky sites of permanently flowing rivers in Natal, as well as in stony grassland on the hill slopes in Transvaal and Natal (Hilliard 1977 cited by Ernst 1998; Heger & Böhmer 2006). Naturalized and often invasive in many regions of Australia, Europe, Central and South America (EPPO 2006).

Chromosome number. $2n = 4x = 40$. The same chromosome number was reported earlier by Chichiricco & al. (1979), Lafuma & al. (2003). The latter authors had found only tetraploid individuals occurring in Europe, whereas both diploids and tetraploids were found in South Africa.

Pest risk and impact on human health. *Senecio inaequidens* is included in the EPPO list of the invasive alien species (EPPO 2006). It develops dense populations in ruderal habitats, potentially interfering with their management and improvement. When invading open rock vegetation it may threaten rare or endangered species. It also grows in crops (particularly grapevine), fallows and pastures (EPPO 2006). The species is toxic to humans and livestock, as it contains pyrrolizidine alkaloids, and may have effect on human health, e.g. through milk and bread (EPPO 2006; Heger & Böhmer 2006).

Acknowledgements. Financial support of the National Science Fund (Projects DO-02-194 & IFS–605/07) is gratefully acknowledged. The authors are thankful to the reviewer for the useful notes.

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