



ADDITIONS TO THE VASCULAR FLORA OF MONTENEGRO (NEW TAXA AND NEW RECORDS)

Danijela STEŠEVIĆ¹ & Anton DRESCHER²

¹ Faculty of Sciences, University of Montenegro, Džordža Vašingtona bb, 81000 Podgorica, Montenegro. E-mail: denist@t-com.me

² Anton Drescher, Institute for Plant Sciences, University in Graz, Holteigasse 6, Graz, Austria. E-mail: anton.drescher@uni-graz.at

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var. *tatula*,
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SYNOPSIS

During a field trip in June 2009, four taxa new for the flora of Montenegro were found: *Impatiens parviflora* DC., *Populus ×canescens* (Aiton) Sm., *Datura stramonium* L. var. *tatula* (L.) Torr and *Carex punctata* Gaudin. In addition, a short overview on the *Senecio nemorensis* group in Montenegro is given.

SINOPSIS

DODATAK VASKULARNOJ FLORI CRNE GORE (NOVI TAKSONI I NOVI NALAZI)

Tokom terenskih istraživanja izvedenih u junu 2009, zabilježena su 4 nova taksona za floru Crne Gore: *Populus ×canescens* (Aiton) Sm., *Datura stramonium* L. var. *tatula* (L.) Torr and *Carex punctata* Gaudin. U radu je dat i osvrt na nomenklaturu *Senecio nemorensis* grupe u flori Crne Gore.

INTRODUCTION

According to ROHLENA (1942), PULEVIĆ (2005), STEŠEVIĆ et al. (2008) and PETROVIĆ (2009) the check list of vascular plants of Montenegro consists of more than 3650 species (including subspecies). The majority of the taxa reported as new for the flora of Montenegro belong to the category of alien plants, mainly because of

the reason that the adventive flora has never been taken as a separate subject of investigation. Three of the taxa discussed in this paper belong to this category.

MATERIALS AND METHODS

The material collected during the field trip was pressed, dried, labeled and is housed in herbarium collections in Graz (GZU) and Podgorica (TGU). For identification PIGNATTII (1982a, b, c) and TUTIN et al. (1968, 1980) were used; the nomenclature follows Flora Europea (Royal Botanic Garden Edinburgh, 1998) and GREUTER (2008).

RESULTS AND DISCUSSION

In June 2009 in course of field investigations on the vegetation of the localities Ada Bojana, both Morača mouths, the northwestern surroundings of Podgorica, Crmnička rijeka, and the Tara river downstream of Mojkovac the authors found four taxa new for the flora of Montenegro: *Impatiens parviflora*, *Populus ×canescens*, *Datura stramonium* var. *tatula*, and *Carex punctata*.

Impatiens parviflora DC.

Up to now, in the flora of Montenegro the genus *Impatiens* was represented by two species: *Impatiens noli-tangere* L. (ROHLENA, 1942) and *I. balsamina* L. (STEŠEVIĆ & JOGAN, 2007). The investigations in the riverine vegetation along the Tara River downstream of Mojkovac *Impatiens parviflora* has been observed. It is new for the flora of Montenegro.

This scapose therophyte, with a height of 30-60 cm (FISCHER & al., 2008; JÄGER & WERNER, 2002; very rarely taller) and usually not extensive and shallow root system (COOMBE, 1956), is reproducing by seeds. Beside the production of adventitious root after being smashed, no vegetative reproduction was observed. Leaves are alternate and similar shape to *I. noli-tangere*, which is occurring on similar stands, but these two species easily can be distinguished by two leaf features: size of the upper leaves and number of teeth on each side. Upper leaves of *I. parviflora* are usually largest, and teeth number per leaf side is (13)20-35 teeth, while in *I. noli-tangere* upper leaves are smaller than lower ones and teeth number per side is 7-16(20). Flowers are cleistogamic and chasmogamic, pale yellow and between 8 and 18 mm long with a straight spur (Fig. 1). The fleshy capsules include 2 to 5 seeds. The ballistic fruits disperse the seeds some few meters off the plant. Beside that, along rivers water is a transportation agent, too. Period between germination and seed set is at least 3 months. After dormancy during winter [frost is

not obligatory (COOMBE, 1956)] the seeds show a high germination rate. Late frosts in spring are a limiting factor for the spread of the species. The estimated seed production ranges between few and 1,000-2,000 per plant (TREPL, 1984) and up to 10,000 for large plants (COOMBE, 1956). The seed production depends mainly on light and nutrient conditions.



Figure 1: *Impatiens parviflora*. Photo: W. Obermayer.

The whole plant (swollen hypocotyl and lower nodes, and the morphology of the leaves) shows the affinity to usually moist stands and/or high air humidity. The plants are very susceptible to water stress and a shade tolerant, mostly found at 5-40 % relative daylight. They occur on a wide range of mineral soils moderately to highly rich in minerals, prefers nitrogen rich stands, with pH range between 4.5 and 7.6. (COOMBE, 1956). Due to its invasive character *I. parviflora* spread rapidly in central Europe beginning in the last quarter of the 19th century.

According to TREPL (1984), and USDA-ARS (2003) the species originates from the mountains of Central Asia (see map 278c in MEUSEL et al., 1978). There it is scattered usually in different forest types and on moist and shady places (TREPL, 1984). Outside the native range the species is reported from most of the European countries except the Mediterranean area, and for North America (EPPO, 2010). In the surrounding countries *I. parviflora* is reported from Serbia (PARABUCKI et al., 1977) and Croatia (FCD, 2004).

The date of the first introduction and the following escape from gardens is reported dissented [reports from the first half of the 19th century by DeCandolle about the cultivation in the Botanical Garden (1831), from other authors from several botanical gardens in Germany (1838), in the UK (1848) and in the Czech Republic

1871 (TREPL, 1984)]. By the second half of the 19th century it became naturalized in natural deciduous forests of Central Europe (TREPL, 1984). It colonizes diverse habitats from lowlands to mountain regions (BEGER & SCHMID, 1924; MOORE, 1968; MEUSEL, et al., 1978), but still does not fill its potential distribution area (for example see the grid map of Germany (FlorKart, 2006), that is similar like that of *Bromus ramosus* subsp. *benekenii* (MEUSEL et al., 1978). In central Europe *I. parviflora* is stated as an invasive species. Considering the fact that the species is spreading with seeds and that the vector of its long distance spreading is transport by man, we think that *I. parviflora* was introduced in Montenegro with vehicles from Serbia. We assume that after a lag-phase (DRESCHER & PROTS, 2000) it will spread very fast along the Tara stream and on other suitable stands in central and northern Montenegro.

In contrary to the polymorphism in the natural area *I. parviflora* is very uniform all over the european synanthropic area. COOMBE, 1956 concluded that the European population is originating from one single introduction.

The above mentioned biological properties: short life cycle, presence of cleistogamic flowers, production of a large number of easily germinating seeds, accompanied by rapid growth of seedlings and shade tolerance, allows *I. parviflora* to compete successfully with native components of the herbal layer, although the impact on the structure of the phytocoenosys is less than with *I. glandulifera* (GOEBEL, 1904; SCHEMSKE, 1978; SYMONIDES, 1987; OBIDZIŃSKI & SYMONIDES 2000).

The species is reported as potentially EPPO quarantine species (EPPO, 2010).

***Populus ×canescens* (Aiton) Sm.**

(syn. *Populus alba-tremula* auct., *Populus hybrida* Reih.)

Grey poplar is considered as a natural hybrid of white poplar (*Populus alba* L.) and aspen (*Populus tremula* L.). This opinion is supported by its morphological polymorphy (intermediate features between both parent species), as well as its ecological performance (see the different forms f. *obtusata*, f. *macrophylla*, f. *hungarica*, f. *gyonensis*, f. *rotundifolia* etc. distinguished in JOVANOVIĆ & TUCOVIĆ, 1972). The individuals sometimes are closer to *P. alba*, sometimes to *P. tremula* because of frequent backcrossing. The bark of the gray poplar is similar to that white poplar, but the color is more yellowish gray, the trees are often taller than *P. alba*. The leaves of long shots are deltate-ovate, to triangulate-ovate, cordate, not palmately lobed, but distinctly dentate, grey-tomentose beneath. The leaves of short shoots are similar to that of *P. tremula*, only during the development grey-tomentose beneath, but within short time glabrescent, petioles on both compressed (Fig. 2). Characteristic is the tendency of producing sarments that form genetically uniform patches in riverine forests in lowlands and lower mountain regions. Grey poplar prefers the drier stands in the floodplain, while white poplar is frequent in the regularly flooded softwood zone more close to the channel.



Figure 2: *Populus x canescens*. Photo: A. Drescher.

Usually grey poplar occurs together with both parents, but also on stands, where parent species are absent (JOVANOVIĆ & TUČOVIĆ, 1972). In Montenegro this species is recorded for the first time from the Bojana (Ada Bojana) and Morača river (mouth to Skadarsko Lake). At the Ada Bojana island it dominates the tree layer of the less long flooded parts of the floodplain.

Beside the two 'parent' species two more *Populus* taxa are recorded from Montenegro: *Populus nigra* and *Populus nigra* cv. 'Italica' (ROHLENA, 1942).

***Datura stramonium* L. var. *tatula* (L.) Torr.**

Syn. *Datura tatula* L., *Datura stramonium* L. var. *chalybaea* Koch, *D. praecox* Godr.

The Linnaean species is already in DeCandolles Prodrômus (Prodr. 13(1): 540. 1852) treated as a variety. Due to the fact that the majority of floras don't treat infraspecific taxa lower than subspecies, the variety *tatula* is often included in *Datura stramonium*. According to the Flora Europaea (Royal Botanic Garden Edinburgh, 1998) *Datura tatula* is considered as a synonym for *Datura stramonium*. Based on the presence of anthocyanins and spines on the fruits DANERT, 1954 distinguished 4 varieties:

Datura stramonium var. *stramonium*

Datura stramonium var. *tatula*

Datura stramonium var. *inermis* (Jacq.) Timm.

Datura stramonium var. *godronii* Danert

Similar to var. *tatula* is var. *godronii*, that has violet flowers, but the fruits are without spines!

Compared with the typical variety var. *tatula* has smaller flowers, which are of light violet, while the shoots, leaf petioles and leaf veins are tinged violet (Fig. 3). Beside these morphological features Withastramonolide of the steroidal lactones is present in *Datura stramonium* var. *tatula* and F1-Hybrids of *Datura stramonium* var. *godronii* with *D. ferox* and *D. quercifolia*, but lacking in *D. stramonium* s.str.



Figure 3: *Datura stramonium* var. *tatula*. Photo: D. Stešević.

Up to now, in the flora of Montenegro only the typical variety was reported (ROHLENA, 1942). The variety *tatula* is noted at Podgorica city area, but we expect that this taxon is more frequent in Montenegro.

***Carex punctata* Gaudin**

With its habitat and morphological features, *Carex punctata* is very similar to *C. distans* L. The most obvious differentiating character between these two species is the length of the lowest bract, which in *C. punctata* exceeds the inflorescence (Figure 4), while in *C. distans* it is shorter than the spikelet (CHATER, 1980; JERMY & TUTIN, 1968; PIGNATTI, 1982c). *C. punctata* belongs to the mediterranean-subatlantic geoelement (PIGNATTI, 1982c) and its first known locality in Montenegro is riverine forests along Ada Bojana island. We suppose that, due to similarity with *C. distans*, that is extremely variable in southern Europe, these two species are often confused in the past. Therefore there is less known about their distribution in the Balkan Peninsula.



Figure 4: *Carex punctata*.
Photo: D. Stešević.

NOMENCLATURE REVISION OF THE *Senecio nemorensis* GROUP IN MONTENEGRO

For the flora of Montenegro ROHLENA (1942) listed two taxa of the *S. nemorensis* group: *S. nemorensis* L. and *S. fuchsii* Gmel. (= *S. nemorensis* L. var. *dalmaticus* Griseb.).

Up to the last treatment in the Med-checklist (GREUTER et al., 2008) the taxonomic concept of this group changed several times (CHATER & WALTERS, 1976; PIGNATTII, 1982c, Herborg, 1987). Due to the new classification (HERBORG, 1987; accepted in GREUTER, 2008 with some changes in nomenclature) in the Balkan peninsula the *Senecio nemorensis* group is represented by the 3 taxa of species level (see GREUTER, 2008): *Senecio hercynicus* Herborg, *Senecio nemorensis* L. and *Senecio ovatus* (P. Gaertn., Mey. & Scherb.) Willd.

In our flora *S. nemorensis* group is presented with only two subspecies of *S. hercynicus* Herborg:

i) ***S. hercynicus* subsp. *dalmaticus*** (Griseb.) Greuter

Basionym: *Senecio nemorensis* var. *dalmaticus* Griseb.; Syn.: *Senecio jacquinianus* var. *expansus* Boiss. & Heldr.; *S. hercynicus* var. *expansus* (Boiss. & Heldr.)Herborg,

ROHLENA (1942) noted this subspecies under the name *S. fuchsii* from Peručica dol infra Kom, Murino, Zakamen and Vojnik. During our field trip in June 2009, we found it also at Biogradska Gora National Park, near the delta of Biogradska River.

ii) ***S. hercynicus*** subsp. ***durmitorensis*** Herborg

Syn.: *Senecio nemorensis* var. *subdeccurens* Griseb.

This subspecies is endemic in the Durmitor Mt. and has been collected the first time by Pantocsek in July 1872. It is cited in ROHLENA (1942) under the name *S. nemorensis* var. *subdecurrens*.

CONCLUSION

Intensive floristic surveys of the territory of Montenegro are often resulting with new taxa or new records. During our summer field trip in June 2009, four taxa new for the flora of Montenegro were found, so genera *Impatiens*, *Populus*, *Datura* and *Carex* got additional representatives in our flora, while some *Senecio* taxa from *S. nemorensis* group got a new actual names.

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