Botanica SERBICA 34 (2): 81-86 (2010)

Original Scientific Paper

Contribution to the knowledge of serpentine flora in Kosovo's part of the Ibar river valley

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ABSTRACT: During field floristic investigations of serpentines in the middle part of the Ibar river valley (Kosovo's part of the river) 915 taxa were found in the period from 2002 – 2005. Investigated area, about 50 km long, is located in the territory north of Kosovska Mitrovica all the way to the administrative border with Serbia (close to the village Donje Jarinje). After this period, several new species for this area are found, during the years 2008 and 2009. Some of them are new and rare for the flora of Kosovo and Metohija and, at the same time, represent new localities of these species for the flora of Serbia. Some of the most interesting newly found species in the investigated area are: *Nuphar lutea*, *Thymelaea passerina*, *Waldsteinia geoides*, *Trigonella gladiata* and *Tremastelma palestinum*.

Key words: vascular flora, distribution, new chorological data, the Ibar river valley, Kosovo and Metohija, Serbia

Received 08 September 2009 Revision accepted 16 June 2010

UDK 581.95:582(497.115)

INTRODUCTION

The serpentine flora and vegetation, whose formation was primarily influenced by the geological base, which is characterized by a very fragile and mealy, poorly developed soil and unfavourable water and mineral regime and intensive insolation, represents an extraordinary area for botanical researches (both taxonomical and ecological).

Serpentine (ophiolithic) substrate covers large areas in Balkans, more so than in any other part of Europe (Stevanović *et al.* 2003a). The so-called Ibar serpentine area, that stretches along the valley of the middle course of the Ibar river, to the north of Kosovska Mitrovica, represents a part of the serpentine-peridotite area, that starts with the hill of Goleš (in the vicinity of Priština), covers the left bank of the Sitnica river, extends to the mountain of Čičavica, reaches the upper course of the Ibar river in Ibarski Kolašin and continues along the Ibar middle course, all the way to city of Raška. This serpentine area, along with Zlatibor massive, forms a link in the chain of the serpentine stretching along the direction of Bosnia-Zlatibor-Ibar river gorge-Albania.

During the floristic investigations of the serpentine terrain of the Kosovo part in the Ibar valley in the period of 2002–2005, the presence of 915 taxa was confirmed (Prodanović 2007). Since these investigations have not

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been interrupted and are still being performed, in the years of 2008 and 2009, more species, not cited in the original floral listing, were found. Out of a great number of taxa, in this paper we present only a few most interesting ones for the mentioned area: *Nuphar lutea* (L). Sm, *Thymelaea passerina* (L.) Fassano (syn. *Lygia passerina* (L.) Fassano), *Waldsteinia geoides* Willd., *Trigonella gladiata* Steven ex Bieb. and *Tremastelma palestinum* (L.) Janchen.

MATERIAL AND METHODS

On the basis of the material collected during the field work on the serpentines of the Kosovo part of the Ibar river valley (2008-2009), we selected a group of plants significant for this area for various reasons.

Identification of the collected plants is made according to Flora of Serbia (Josifović 1972, 1973; Sarić & Diklić 1986; Sarić 1992) and Flora Europaea (Tutin *et al.* 1964, 1967, 1976).

Updated literature and Internal database of Institute for Nature Conservation of Serbia were used to present and check an overall distribution of all studied taxa in Serbia. Revision of herbaria material was performed at Herbarium of the Institute of Botany and Botanical Garden "Jevremovac", University of Belgrade (BEOU). On the basis of relevant distribution data, all investigated species are mapped on 10x10 sq km at UTM grid system (UTM Zone 34T) (Lampinen 2001.)

Floristic elements were defined according to Meusel *et al.* (1965, 1978), and modified for the territory of Serbia according to Stevanović (1992a).

The Raunkiaer (1934) system has been used for classification of life forms amended for the territory of Serbia by Stevanović (1992b).

Collected material of plant species is deposited in the Herbarium Collections of Institute for Nature Conservation of Serbia, in Belgrade (HZZPB).

RESULTS

Fam. NYMPHAEACEAE

1. ***Nuphar lutea*** (L.) Sm.

Floristic element: euroas (bor-merid)

Life form: v-aut nat Hyd G rhiz

General distribution: Eurasia, the boreal part of Scandinavia to the north, western Siberia and isolated locality in middle Siberia along the Ob river, to Ireland and Portugal to the west, to Tunisia and Near East to the south, and to Baikal lake and the Lena river valley to the east (Janković 1992).

Distribution in Serbia: Vojvodina: large moors and canals in deluging areas near large rivers, Pomoravlje: moors along the Velika Morava river (the surroundings of Smederevo and Mala Krsna); Eastern Serbia: moors near Sukovo and Krupac (Janković 1992), Vojvodina: Bačka: Apatinsko-Monoštirski Rit (Panjković 2005), Banat: Labudovo Okno (Polić *et al.* 2008); Srem: Zasavica, Obedska Bara (lake near Obrež); Bačka: Koviljski Rit, Petrovaradinski Rit (Slezen Bara), Beljanska Bara near Turije; Banat: Carska Bara (Internal database of Institute for Nature Conservation of Serbia); Osredak below Bele Vode – Kruševac (Petrović Bojana *pers. comm.*).

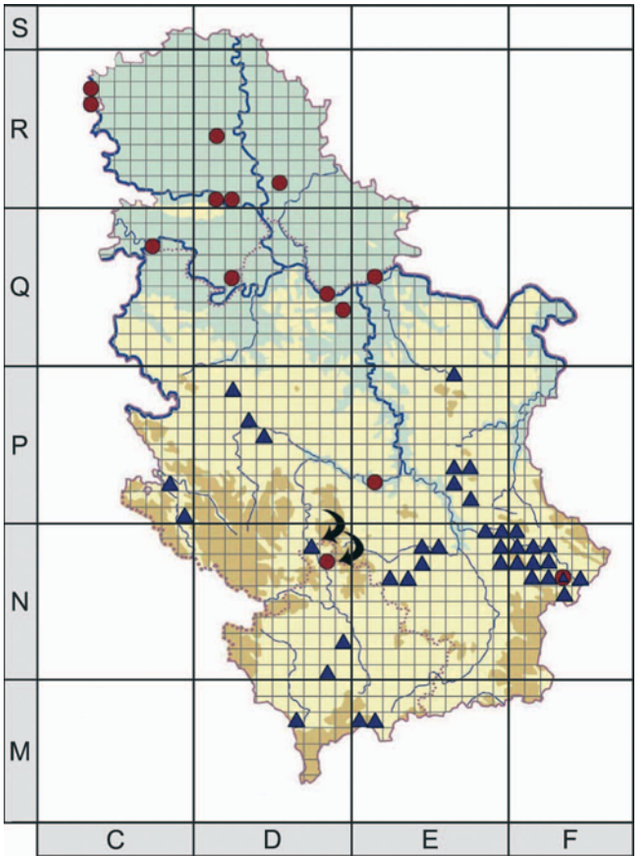

Fig. 1 Distribution of the species: *Nuphar lutea* (L.) Sm. (red dot) and *Waldsteinia geoides* Willd. in Serbia (blue triangle). New records marked with an arrow.

New chorological data in Serbia: Kosovska Mitrovica: Lešak - 43^0 10$'$ 08.0$''$ N, 20^0 44$'$ 09.7$''$ E (427 m a.s.l.) 34TDN87 (leg./det. *Prodanović D. & Krivošej, Z.* 22-Jun-2008) (Fig. 1).

At first sight, the presence of the yellow water lily (*N. lutea)* near the Ibar river valley may seem strange, because the Ibar is well-known as cold and at some parts extremely fast river. In the vicinity of Lešak village (40 kilometres north of Kosovska Mitrovica), on the left bank of the Ibar river, in a small pond, we found about twenty specimens of yellow water lily. The existing ponds are the water-filled pits, formed by the long-lasting sand exploitation and clad

with *Salix caprea* L., *S. fragilis* L., *S. purpurea* L. and other characteristic water plants. The floristic composition of all these ponds is poor and quite uniform: *Ceratophyllum demersum* L., *Potamogeton natans* L., *P. crispus* L., *Lemna minor* L., around the ponds *Typha latifolia* L., rarely *Butomus umbellatus* L. and *Alisma plantago-aquatica* L.

N. lutea is strictly protected species of Serbian flora (Decree on Protection of Natural Rarities, Official Gazette of RS, No. 50/93,93/93).

Even though we have continuously observed development of the yellow water lily in this locality, during the last two years considerable changes have been visible in the number of certain species. The invasive influence of the species *T. latifolia* L. is highly conspicuous as it slowly suppresses the population of yellow water lily.

Fam. THYMELAEACEAE

2. ***Thymelaea passerina*** (L.) Cosson & Germ. (syn. *Lygia passerina* (L.) Fasson)

Floristic element: evr (atl-me-med-submed-pont-ssib-or-tur)

Life form: a Mes-Meg T scap

General distribution: In major part of Europe, in Asia up to Altai and eastern India (Blečić 1972).

Distribution in Serbia: Vojvodina region: Srem: Rakovac (Fruška Gora), Krušedol, Čerević, Kamenica; Šumadija: Belgrade-Topčider, Makiš and Višnjica (near by Belgrade), Jagodina, Kragujevac, Obrenovac; Central Serbia: Supovac; Eastern Serbia: Sukovo, Rasnica, Kostur, Krnjina, Sinjac, Staničenje, Kopriš tice, Seličevica, Sićevo-Vis; surrounding of Niš, Gorica near by Niš; Western Serbia: Ribnica; Southwestern Serbia: Raška (Vukojičić 1997). Kosovo region: Mt Grmija, near Priš tina (Krivošej 1989).

Threatened category: Vukojičić (1997) states that species *T. passerina* has a general status of a threatened species in Serbia, as an extinct in Srem (EW), as a endangered species in south-eastern and southern Serbia (EN) and as critically endangered or vulnerable species in Kosovo area (CR-VU).

New chorological data in Serbia: Donje Jarinje-Kosovska Mitrovica: Đurin Krš - 43^0 12$'$ 63.1$''$ N, 20^0 41$'$ 66.9$''$ E (497 m a.s.l.) 34TDN78 (leg./det. *Krivošej Z. & Prodanović D.* 10-Jul-2008); Valač (surrounding)-Kosovska Mitrovica - 42^0 57$'$ 93.1$''$ N, 20^0 49$'$ 04.8$''$ E (479 m a.s.l.) 34TDN86 (leg./det. *Krivošej Z. & Prodanović D.* 10-Jul-2008) (Fig. 2).

During the field work in 2008 and 2009, this species was found in three localities along the left bank of the Ibar river. The remotest locality was in the vicinity of administrative border with central Serbia, near the village of Donje Jarinje (about 50 kilometres north from Kosovska Mitrovica), where near the neglected vineyard on the locality of Đurin Krš, we found about 50 specimens of the species. The further two localities are close to each other, on the Balaban crossroads, on the way to the villages of Banjska and Valač, on dry meadows where the number of these specimens was about 300.

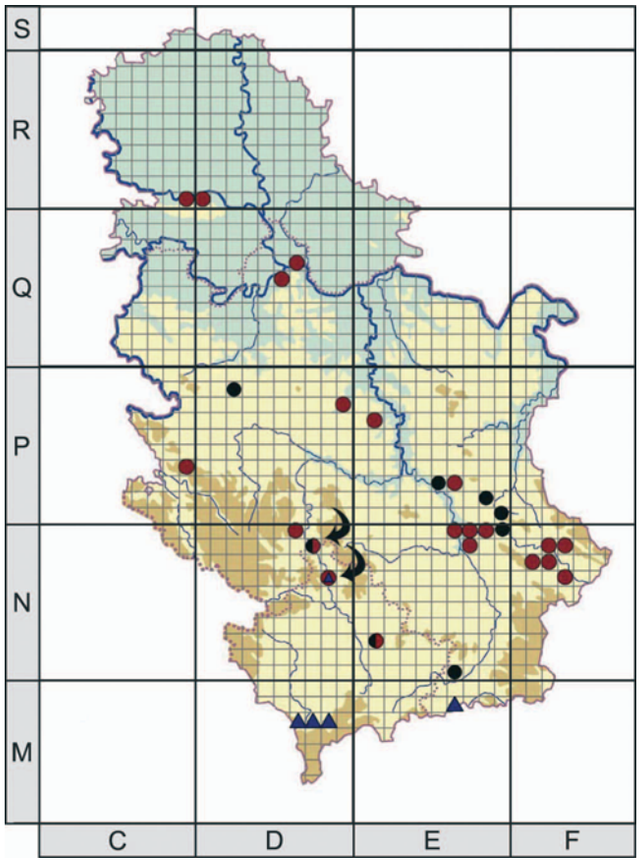

Fig. 2 Distribution of the species: *Thymelaea passerina* (L.) Cosson & Germ. (red dot), *Trigonella gladiata* Steven ex Bieb. (black dot) and *Tremastelma palestinum* (L.) Janchen. (blue triangle) in Serbia. New records for those three species marked with arrows.

Fam. ROSACEAE

3. ***Waldsteinia geoides*** Willd.

Floristic element: balk-karp

Life form: v Mi-Mes H ros

General distribution: Slovakia, Hungary, Romania, Western Ukraine, Crimea, Croatia, Serbia, Macedonia, Bulgaria (Niketić & Tomović 2003).

Distribution in Serbia: Central Serbia: Pasjača and Vidojevica mts; Northeastern Serbia: surrounding of Žagubica; Eastern Serbia: Lepterija and Devica Mt. near Soko Banja (Diklić 1962), Eastern Serbia: Ozren (Soko Banja), Pljačkovica-surrounding of Vranje (Gajić 1972), Sićevo Gorge (Zlatković 1999); the surroundings of Aleksinac, Niš, Pirot, Dimitrovgrad and Suva and Ozren mts, Niš-Niška Banja, Mt Svrljiške: Mt Rinjska, Dimitrovgrad); South Serbia (the surrounding of Vranje,

Mt Sokolovica-peak Mali Krš, Radulovac, Veliki do-Presla); Kosovo region (the surroundings of Dobroševac); Metohija region (the Šar, Paštrik and Crnoljeva mts); Northewestern Serbia (Mt Maljen); Western Serbia (the surrounding of Čačak, Mt Jelica-peak Stjenik) , and Southwestern Serbia (Priboj and Prijepolje, the valley of river Lim) (Niketić & Tomović 2003).

New chorological data in Serbia: Donje Jarinje-Kosovska Mitrovica: Košutica-Čukara - 43^0 12$^{'}$ 62.1$^{"}$ N, 20^0 41$^{'}$ 76.9$^{"}$ E (558 m a.s.l.) 34TDN78 (leg./det. *Krivošej Z. & Prodanović D.* 16-May-2008); Donje Jarinje-Kosovska Mitrovica: Košutica-Čukara - 43^0 12$^{'}$ 22.5$^{"}$ N, 20^0 41$^{'}$ 21.2$^{"}$ E (739 m a.s.l.) 34TDN78 (leg./det. *Krivošej Z. & Prodanović D*. 16-May-2008); Donje Jarinje-Kosovska Mitrovica: Postenje - 43^0 12$^{'}$ 10.4$^{"}$ N, 20^0 41$^{'}$ 66.3$^{"}$ E (563 m a.s.l). 34TDN78 (leg./det. *Krivošej Z. & Prodanović D*. 17-Jun-2008) (Fig. 1).

W. geoides can be found in forests and thickets, mostly on the limestone, but at several localities in Mt Sokolovica, the geological substratum was made of andesite (Tomović 2001). We found this relatively rare species of Serbian flora on the serpentine on the left bank of the Ibar river at the administrative border near the village of Donje Jarinje. The altitudinal range of the species *W. geoides* was from 558 m a.s.l. in a thick shrub of *Carpinus orientalis* Mill. to the altitude of 739 m, where the shrub of *C. orientalis* was replaced by the *Quercus petraea* Liebl. forest.

The serpentine area on the left bank of the Ibar river, at the administrative border with Serbia, represents not only a new locality for the flora of Serbia, but also an extremely rich population of the species *W. geoides* with a few thousands specimens.

Fam. FABACEAE

4. ***Trigonella gladiata*** Steven ex Bieb.

Floristic element: med-submed

Life form: v-a Mi-Mes T scap

General distribution: South Europe, Caucasus**,** Asia Minor, North Africa (Diklić 1972)

Distribution in Serbia: Northewestern Serbia: Mt Maljen (*leg*. Pavlović, 1879 BEOU); Southeastern Serbia**:** Sićevačka Klisura gorge, Pirot (Careva Česma) (Diklić 1972), Niševac, Eastern Serbia: Aleksinac, Southern Serbia: Preševo (surroundings) (Nikolić *et al.* 1986); Kosovo region: Mt Grmija, near Priština (Krivošej 1989).

New chorological data in Serbia: Donje Jarinje-Kosovska Mitrovica: Košutica - 43^0 12$^{'}$ 61.1$^{"}$ N, 20^0 41$^{'}$ 63.3$^{"}$ E (522 m a.s.l.) 34TDN78 (leg./det. *Krivošej Z. & Prodanović D.* 22-Jun-2008) (Fig. 2).

This relatively rare species was firstly found at the left bank of the Ibar river, at the very administrative border with Serbia near the village of Donje Jarinje. The new chorological record for *T. gladiata* contribute to a better knowledge of its distribution pattern in Serbia.

Fam. DIPSACACEAE

5. ***Tremastelma palestinum*** (L.) Janchen

Floristic element: med-submed

Life form: a Mes-Mac T scap

General distribution: Mediterranean and submediterranean area (Diklić 1973). According to Flora Europaea (Ferguson 1976) the presence of this plant in Italy is uncertain.

Distribution in Serbia: Kosovo: Prizren (Žur) (Diklić 1973); Southern Serbia: Mt Rujan (Cer) (Nikolić *et al*: 1986); Metohija: gorge of Beli Drim, village Našec-34TDM77 (*leg*. Stevanović V. 07-Jul-1979, BEOU), Duvska klisura (Prizren) 34TDM87 (*leg*. Stevanović V. 25-Jul-1989, BEOU).

New chorological data in Serbia: Kosovska Mitrovica: „Simonida" motel - 43^0 00$^{'}$ 29.0$^{"}$ N, 20^0 48$^{'}$ 22.1$^{"}$ E (481 m a.s.l.) 34TDN86 (leg./det. *Prodanović D. & Krivošej Z.* 30-May-2009) (Fig. 2).

This rare species in Serbian flora was found on the right bank of Ibar river, along the main road Kosovska Mitrovica-Raška-Kraljevo, right in front of the „Simonida" motel, 15 kilometers north from city of Kosovska Mitrovica. About 300 samples of this species were found at a very small, approximately 70x30m large area. It was impossible to find this species outside this zone, so there is still an open question, how this submediterranean species has not been noticed so far in such a "busy" and easily accessible area and if there is any other locality of this species in the territory of Kosovo. The answer may lie in the fact that *Tremastelma palestinum*, as an annual short-living plant, finishes quickly its vegetational cycle and disappears, so this might be the most probable reason why it has not been found so far at some similar locality in the Ibar river valley.

The species is included in Preliminary Red data list for the flora of Serbia (Stevanović *et al.* 2003b) in categories from endangered (EN) to vulnerable (VU).

CONCLUSIONS

During the floristic investigations of the serpentine terrains in the Kosovo part of the Ibar river valley, in the period of 2002-2005, 915 taxa were recorded. Since these investigations were not interrupted, and continue over the last two years (2008-2009), a certain number of new species has been found and they were not mentioned in the previous floral list. Among these new taxa for the investigated area, the following one were presented:

1. The discovery of *N. lutea* (L.) Sm. in northern Kosovo and Metohija significantly contributes to a better understanding of the species distribution in Serbia. The southernmost locality of the species distribution in Serbia is a new one in the vicinity of Lešak village.
2. Acording to Vukojičić (1997) the species *T. passerina*

has a general status of a threatened species in Serbia, as an extinct in Srem (EW), as a endangered species in south-eastern and southern Serbia (EN) and as critically endangered or vulnerable species in Kosovo area (CR-VU). The new localities on the territory of Kosovo and Metohija could explain the area of this type in the flora of Serbia, which will enable proper protection of this species.

3. The species *W. geoides* Willd. is represented by two new localities for the flora of Serbia not far away from each other, on the serpentine geological substratum, with the population of a few thousand specimens.
4. The Ibar river valley locality with *T. gladiata* Steven ex Bieb. species represents a new locality with this submediterranean species not only for the flora of Kosovo and Metohija, but also for the flora of Serbia.
5. Since there were only few records of *T. palestinum* (L.) Janchen in Serbia, new finding in the Ibar valley present first locality for Kosovo territory and an important contribution to the chorology of this very rare plant in Serbia.

Acknowledgements – The authors express their acknowledgement to the Academician Vladimir Stevanović, who provided the data on some types of localities with the *Tremastelma palestinum* species.

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REZIME

Prilog poznavanju serpentinske flore kosovskog dela Ibarske doline

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U radu su predstavljeni podaci o novootkrivenim lokalitetima za pet biljnih vrsta, sa serpentinskih terena kosovskog dela Ibarske doline. Za vrstu *Nuphar lutea* novootkriveni lokalitet u barama oko Ibra, u okolini naselja Lešak, predstavlja najjužniju tačku rasprostranjenja ove vrste u Srbiji. Novi lokaliteti vrste *Thymelaea passerina* na području severnog Kosova i Metohije doprinose boljem poznavanju rasprostranjenja ove vrste u Srbiji, što omogućava bolju procenu statusa ugroženosti ove vrste na teritoriji naše zemlje. Za vrstu *Waldsteinia geoides* predstavljena su dva nova lokaliteta za floru Srbije, sa populacijama od nekoliko hiljada jedinki. Lokalitet u dolini Ibra za vrstu *Trigonella gladiata*, predstavlja drugi nalaz ove submediteranske vrste na teritoriji Kosova i Metohije, kao i još jedan novi lokalitet na području uže Srbije. Pored lokaliteta u Metohiji koji se u literaturi navode za vrstu *Tremastelma palestinum*, u dolini Ibra konstatovan je prvi lokalitet za teritoriju Kosova, kao i još jedan novi lokalitet na području Srbije.

Ključne reči: vaskularna flora, distribucija, novi horološki podaci, Ibarska dolina, Kosovo i Metohija, Srbija