

MATERIALS FOR A FLORA OF SERBIA FROM THE HERBARIUM COLLECTION PZZP (4)

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This article presents the fourth part of data on selected new and noteworthy taxa originating from the revision of Herbarium collection of the Institute for Nature Conservation of the Vojvodina province (PZZP). Selected taxa include 13 species, two subspecies, 1 variety and two nothospecies placed within 11 genera (*Malus* Mill., *Marrubium* L., *Marsilea* L., *Medicago* L., *Melampyrum* L., *Melica* L., *Melilotus* Mill., *Menyanthes* L., *Pholiurus* Trin., *Plantago* L. and *Ranunculus* L.). One species (*Malus dasyphylla*) is new for a flora of Vojvodina province. Also, one subspecies (*Melica ciliata* subsp. *magnolii*) and one variety (*Melampyrum nemorosum* var. *heterotrichum*) are confirmed for Serbia while one species (*Menyanthes trifoliata*) is confirmed for Vojvodina province.

Key words: botanical collections, flora, chorology, Serbia

INTRODUCTION

In this article are presented new results from our work on the identification, revision and publishing of selected new and noteworthy taxa from the Herbarium collection of the Institute for Nature Conservation of

the Vojvodina province (PZZP) (Perić *et al.* 2018, Perić & Knežević 2019, 2020) comprising data for genera *Malus* Mill., *Marrubium* L., *Marsilea* L., *Medicago* L., *Melampyrum* L., *Melica* L., *Melilotus* Mill., *Menyanthes* L., *Pholiurus* Trin., *Plantago* L. and *Ranunculus* L.

MATERIAL AND METHODS

Material and methods follow the same line as in our previous contributions (Perić *et al.* 2018, Perić & Knežević 2019, 2020): selection of vascular plant taxa (including nothotaxa) is based on the following criteria: 1) new (unpublished) taxa for a flora of Serbia, 2) otherwise known taxa documented so far with only a few published records for Serbia, 3) taxa with unclear or questionable distribution in Serbia due to recent substantial changes in their taxonomical concept, 4) revised or supplemented published data and 5) taxa protected by law in Serbia.

Unless otherwise stated, nomenclature follows the Euro+Med Plant Base (2006+) and “An annotated checklist of vascular flora of Serbia” (Niketić *et al.* 2018). Author citations are given according to Rec. 46A, note 1 of the Code (Turland *et al.* 2018). The term “scan” means a HD picture available online through official herbarium websites or digital platforms (e.g. Herbarium WU). Distribution data are mapped on the 10 × 10 km MGRS UTM maps (Lampinen 2001) within UTM Grid Zone 34T. Geographical regionalization of Serbia is cited according to Stevanović (1999). Abbreviations for herbarium collections used in the text are given according to Thiers (2016+).

RESULTS AND DISCUSSION

Malus dasyphylla Borkh., *Theor. Prakt. Handb. Forstbot.* **2**: 1269 (1803) [*domestica* × *sylvestris*].

NEW DATA: **Srem: Obedska bara**: [subnom. *Malus domestica* Borkh.] DQ25 Debela gora (Šajinović, B. 06-Jun-1977).

PUBLISHED DATA: **C Serbia: Goč Mt.**: DP72 **Brezna**: Ravnine, ass. *Helleboro serbicae*-*Danthonietum calycinae*, 830 m, SE exposure, slope 8°, serpentinite, eutric cambisol (April-1993, Obratov *et al.* 1994: 45); Gvozdac (Vukićević 1984: 110).

SW Serbia: CN 98 **Brodarevo** (Jovanović 1972: 148); DN46-DN45 **Tutin**, vicinity (Jovanović 1972: 148).

E Serbia: Svrlijske planine Mts.: EP90 **Pleš**, vicinity (Niketić 1985: 46); **Vidlič Mt.:** [subnom. *Malus pumila* Miller, interpreted by M. Niketić, pers. comm.] FN47 **Krupac-Visočki Odorovci**, along the road, 500-750 m (Jotić *et al.* 2013: 28).

Metohija: DN33 **Žljeb Mt.** (Jovanović 1972: 148); DM66-DM65 **Koritnik Mt.** (Jovanović 1972: 148).

Kosovo: Priština: EN12 **Grmija Mt.** (Jovanović 1972: 148), xero-thermic forests in the oak forest belt (Krivošej 2013: 95).

IMPRECISE PUBLISHED DATA: **Serbia** (Gajić 1980b: 128, 1983: 19); **Goč Mt.** (Jovanović 1972: 148); „**Kanjon Lazareve reke i Malinik**“ Reserve (Lakušić *et al.* 1996: 52); **Valley of the river Ibar** (Jovanović 1972: 148); **Valley of the river Lim** (Jovanović 1972: 148); **Prokletije Mts.** (Amidžić & Panjković 2003: 154).

NOTES: New for Vojvodina. There are wide disagreements over the identity, origin and taxonomical status of this (notho-)species. Various authors and recent basic sources of taxonomic and nomenclatural informations on the flora of Europe and the World treat it wildly different: as a good species within the *Malus sylvestris* complex, as a discrete infraspecific entity within *M. domestica* or its mere synonym, as a taxon of hybridogenic origin created by crossing between *M. domestica* and *M. sylvestris*, or finally as a taxon with an unresolved status (*cf.* Stöhr *et al.* 2006, Kurtto 2009 +, Quian *et al.* 2010, Kurtto *et al.* 2013, Dimopoulos *et al.* 2013, WFO, Hassler 1994–2024, Plants of the World Online). This taxonomic controversy caused uncertainty regarding the distribution of this species, since it has often been recorded under the names of one or both parent species or as other species or combination within *M. sylvestris* complex (for example according to the Flora of Greece Web all records of *M. pumila* auct. fl. graec., non Mill. should be treated as *M. ×dasyphylla*). According to Spengler (2019) „large fruits in Rosaceae evolved as a seed-dispersal adaptation recruiting megafaunal mammals of the late Miocen“ and there is genetic evidence „that the increase in fruits size and changes in morphology during evolution in the wild resulted from hybridization events and were selected for by large seed dispersers“. Distribution of wild apples in Europe, similar to other rosaceous genera with large fruits (e.g. *Cydonia*, *Mespilus*), shows conspicuously scattered or disjunct pattern with reduced „diversity and range coverage“, compared to avian-dispersed species-rich and widely distributed genera (like *Rubus*, *Crataegus*, *Cotoneaster*) where „the key to understanding population distribution of wild apples in the Holocene is a reduction in the densities of dispersers, rather than a complete loss of dispersers“ (Spengler 2019). To a certain extent, this can be applied to the distribution pattern of *M. dasyphylla* in Serbia, although the uneven degree and various quality of floristic investigations of different

regions in Serbia and above mentioned taxonomical confusion also had an impact on it (Fig. 1).

Marrubium* × *paniculatum Desr. in Lam., *Encycl. Méth. Bot.* **3**: 716 (1792) [*peregrinum* × *vulgare*].

NEW DATA: **Srem: Fruška Gora Mt.**: [subnom. *Marrubium peregrinum* L.; *Marrubium peregrinum* × *vulgare* Hayek"] DR20 **Čortanovci** (Čolović, S. 24-Jun-1955).

Banat: Banatska Palanka-Kajtasovo: EQ26 Devojački breg-Pesak (Perić, R. 08-Sep-2010).

PUBLISHED DATA: **Bačka**: DR28 [subnom. *Marrubium remotum* Kit.] **Senta** [„Zenta“] (Guelmino 1968: 131); DR22 **Žabalj** [„Zsablya“] [subnom. *Marrubium remotum* Kit.] (Feichtinger 1870: 24); DR40 **Titel** [subnom. *Marrubium remotum* Kit.] (Feichtinger 1870: 24).

Banat: DR57 [subnom. *Marrubium remotum* Kit.] **Kikinda** [„Nagykikinda“], on the railway embankment (Feichtinger 1870: 33); **Deliblato Sands**: EQ08 [subnom. *Marrubium peregrino-vulgare* Reichart] **Vakarec**, (31-Jul/01-Aug-1873, Borbás 1876: 226); DQ98 [subnom. *Marrubium peregrino-vulgare* Reichart] **Velika tilva** [„Tilva mare“] (31-Jul/01-Aug-1873, Borbás 1876: 226); EQ07 [subnom. *Marrubium peregrino-vulgare* Reichart] **Šušara** [„Schuschara“] + **Korn**, (31-Jul/01-Aug-1873, Borbás 1876: 226); EQ17 [subnom. *Marrubium peregrino-vulgare* Reich.] **Grebenac** [„Grebenác“] (31-Jul/01-Aug-1873, Borbás 1876: 269); EQ29 [subnom. *Marrubium remotum* Kit.] **Vršac**: city park (Sučević 1954: 324).

Srem: DR00 [subnom. *Marrubium peregrinum* L. var. *M. peregrino-vulgare* Reichardt.] **Sremska Kamenica** [„Kamenitz“] (Zorkóczy 1896: 70); DR10 [subnom. *Marrubium remotum*] **Sremski Karlovci** [„Karlowitz“], vicinity (Rumy 1846: 53).

E Serbia: Niš: EP60 **Berčinac** (Niketić 2005: 48).

IMPRECISE PUBLISHED DATA: **Serbia** [subnom. *Marrubium pannonicum* Kit.; Rchb., *M. peregrinum* × *vulgare*] (Pančić 1863: 226, „ganze Gebiet“ Adamović 1904a: 574, 583, 587, 614, Hayek 1929b: 255); **N Serbia** [subnom. *Marrubium pannonicum* Rchb.] (Adamović 1904a: 574); **SE Serbia** [subnom. *Marrubium peregrinum* × *vulgare* = *M. pannonicum* Rchb., *Marrubium peregrinum* × *vulgare* Hayek] (Adamović 1911: 199, Diklić 1974: 371); **Fruška Gora Mt.** [subnom. *Marrubium remotum* Kit., *Marrubium peregrinum* × *vulgare* Hayek] (Diklić 1974: 371), ruderal habitats, sporadic (Obradović 1966: 79); **Šajkaška** [„csajkás kerület“] [subnom. *Marrubium remotum* Kit.] (Feichtinger 1870: 28); **Rimski šanac** [„nagy római sánczok“] [subnom. *Marrubium remotum* Kit.] (Feichtinger

1870: 22); **Kopaonik Mt.** [subnom. *Marrubium peregrinum* × *vulgare* Hayek 1929] (Lakušić 1996: 25).

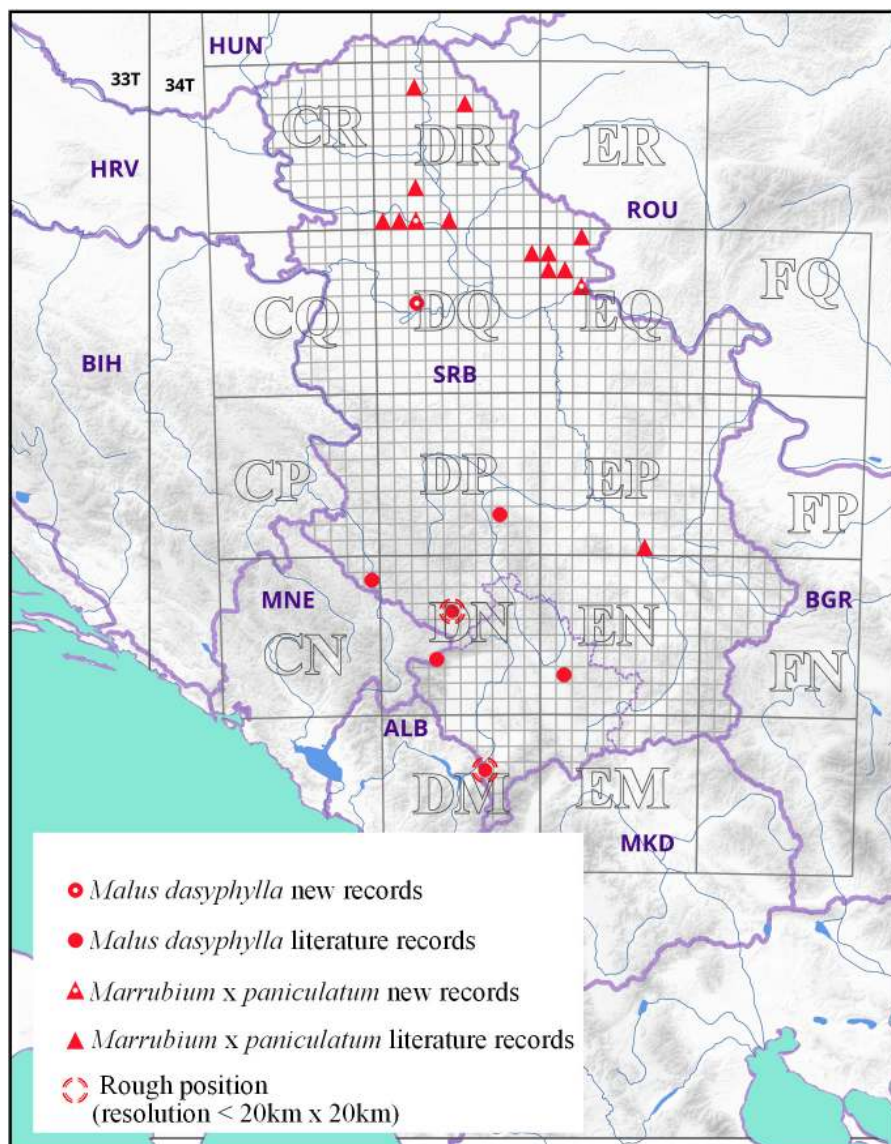


Fig. 1. - New herbarium and published data on the distribution of *Malus dasiphylla* Borkh. and *Marrubium* × *paniculatum* Desr. in Serbia.

NOTES: Considering that its parent species are quite common in Serbia (Diklić 1974), it seems surprising that the number of published records for this nothospecies in the flora of Serbia is limited. These records suggest that *M. x paniculatum* is mostly confined to dry sandy, loess or stony gras-

sland habitats in Vojvodina and eastern Serbia (Fig. 1). Some of otherwise typical specimens of *M. peregrinum* collected in Deliblato Sands (Dolina, Čolović, S. 14-Jul-1956, Obzovik bara, Stojšić, V. 04-Aug-2004) have calyx tube ending with 6 teeth (as in *M. ×paniculatum* vs. 5 teeth typical for *M. peregrinum*).

***Marsilea quadrifolia* L., Sp. Pl. 1099 (1753) [„*Marsilia quadrifolia*“].**

NEW DATA: **Banat:** DR34 **Kumane**, 45.529742° N, 20.212816° E, 74 m (Molnár, A. Oct-2016, pers. comm.); **Belo Blato:** DR41 **Šovajka** (Stojšić, V. 15-Jul-2009); **Neuzina:** DR72 **Budžak**, ≈ 45.35535833° N, 20.72111944° E, 70 m (Perić, R. 13-Jun-2013); DR61 **Tomaševac**, channel, ≈ 45.24899167° N, 20.60754722° E, 72 m (Perić, R., Stojšić, V. 01-Jul-2012); **Orlovat:** DR60 **Kutine**, 45.21506111° N, 20.56341389° E, 67 m (Perić, R. 28-Jun-2012); **Idvor:** vicinity, ≈ 45.19919722° N, 20.52205833° E, 67 m (Perić, R., Stojšić, V. 25-May-2012); DR50 **Farkaždin:** **Slatina**, 45.18263611° N, 20.46365556° E, 68 m (Perić, R. 10-May-2013); DQ59 **Sakule:** **Malo Graorište**, in front of reed belt, ≈ 45.13393333° N, 20.47695833° E, 71 m (Perić, R. 30-Jun-2011); **Čenta-Opovo:** along the road Zrenjanin-Belgrade, channel (Stojšić, V. 21-Oct-1996); **Baranda**, flooded valley of the river **Tamiš** (Babić, N. 04-Sep-1951); ER10 **Margita:** along the river **Moravica**, 45.211944° N, 21.1932° E, 75 m (Perić, R. 22-May-2020) + 45.214216° N, 21.199768° E, 75 m and 45.213887° N, 21.198993° E, 75 m (Perić, R. 24-Sep-2020, pers. comm.).

PUBLISHED DATA: **Bačka:** CR37 **Bački Monoštor** [„Monostorszeg“] (Prodán 1915: 126); CR57-CR56 **Sombor** [„Zombor“]: Veliki bački kanal [„Ferencz-csatorna“] (Prodán 1913: 124); CR45 **Apatin-Prigrevica** [„Bács-szentiván“]: **Apatinska slatina:** near bridge on the channel [now extinct swamp known under the name „Grosser Pfauden Morast“] (Boros 1944: 34); CR54 **Bogojevo** [„Gombos“] (Prodán 1910a: 149, 1915: 126); CR63 **Deronje** [„Dernye“], marshes opposite the railroad station (Prodán 1910b: 375, 1915: 126); DR11 **Kač** [„Káty“] („Jozsimfok“, Zorkóczy 1896: 117); DR10 **Kovilj:** **Kurjačka greda:** **Mala agla**, ass. *Marsilieto-Heleocharetum palustris* Babić 1971 subass. *cyperetosum fuscae* + ass. *Agrostideto-Polygonetum hydropiperi* (Babić 1971: 46, 59); DR20 **Kovilj** [„Kevevára“], vicinity (Tuzson 1915: 146), **Golić:** **Ribnjak**, ass. *Heleocharetum acicularis* Babić (Babić 1971: 53), **Kozjak** (Oct-1957, „en masse“, Obradović 1961: 145), **Dugaja**, ass. *Marsilieto-Heleocharetum palustris* Babić 1971 subass. *butomatosum* + subass. *cyperetosum fuscae* + ass. *Heleocharetum acicularis* Babić + ass. *Bidenteto-Potentilletum anserinae* (Babić 1971: 46, 53, 66), **Kozarnica**, ass. *Marsilieto-Heleocharetum palustris* Babić 1971 subass. *cyperetosum fuscae* (Babić 1971: 46), **Hagla**, ass. *Marsilieto-Heleocharetum palustris* Babić 1971 subass. *butomatosum* + subass. cy-

peretosum fuscae (Babić 1971: 46), Crni Kotao, ass. *Marsilieto-Heleocharetum palustris* Babić 1971 subass. *butomatosum* (Babić 1971: 46), Tonja, ass. *Marsilieto-Heleocharetum palustris* Babić 1971 subass. *butomatosum* + subass. *cyperetosum fuscae* (Babić 1971: 46); DR 30 **Gardi-novci**: Krčedinska ada (Panjković *et al.* 2010a: 64); DR40 **Titel**: along the river Tisa [„Tisza“] south of the city (Feichtinger 1870: 27).

Banat: **Zrenjanin**: DR52 Mužlja [„Muzslya“]: the river Begej [„Be-ga“] backwaters (Bodrogekőzy & Györffy 1970: 37); DR51 **Ečka** (Vukićević 1992: 94, Stojanović *et al.* 2015: 94); **Ečka-Lukino Selo**: Kopovo Lake I [„Severno jezero I“] + Kopovo Lake II [„Severno jezero II“] (Milovanović & Živković 1953: 199); **Lukino Selo**: Budžak: fishpond lakes [„Južno jezero I i II“] (Milovanović & Živković 1953: 199); **Belo Blato**: Novo Lake (Milovanović, D. 11-May-1949, BEO 35676, Jovanović *et al.* 2019: 40); DQ75 **Ivanovo**: Mukulj rit (Sigunov, A. 02-Aug-1975, BEO 35677, Jovanović *et al.* 2019: 40).

Srem: CR80 **Susek** (Vukićević 1992: 94, Stojanović *et al.* 2015: 94), Ribnjak (Oct-1958, Obradović 1961: 145); DR10 **Sremski Karlovci** [„Karlovicz“, „Carlovicium“] (Heuffel, J., Borbás 1877: 457), vicinity, swamps (Heuffel, J., Borbás 1878-1879: 215); DR 20 **Čortanovci** (Vukićević 1992: 94, Stojanović *et al.* 2015: 94); **Bosut forests**: **Morović**: CQ58 Slezen bara (Rauš *et al.* 1980: 30) + Deševača bara [„Deševačka bara“], ass. *Polygono-Bidentetum* (Koch 1926) Lohm 1950 subass. *lycopetosum* (Rauš *et al.* 1980: 30, 41) + Sitaka bara, ass. *Polygono-Bidentetum* (Koch 1926) Lohm 1950 subass. *lycopetosum* (Rauš *et al.* 1980: 30, 41) + Mala bara, ass. *Polygono-Bidentetum* (Koch 1926) Lohm 1950 subass. *lycopetosum* (Rauš *et al.* 1980: 41) + Široka bara, ass. *Polygono-Bidentetum* (Koch 1926) Lohm 1950 subass. *lycopetosum* (Rauš *et al.* 1980: 41); CQ57 Bosut forests: bara Kuklotinja, ass. *Glycerietum maximae* Graebn. et Hueck 1931 (Rauš *et al.* 1980: 35); DQ25 **Kupinovo**: Tikvar-Jasenska [„Jasenska-erdő“] (Moesz 1916a: 5); DQ 35 **Progar** (Moesz 1916a: 4); DQ45 **Jakovo** (Moesz 1916a: 2); **Jakovo-Surčin**: Dudovo [„Dudovske Mlake“] (03-May-1950, Marinović 1955: 106).

NW Serbia: CQ95 **Šabac**, vicinity (Pančić 1875: 777, Vukićević 1992: 94).

Šumadija: **Beograd**: DQ56 Krnjača (Vukićević 1992: 94); Borča-Ovča: DQ56-DQ66 Veliko blato (Vukićević 1992: 94); DQ56 Novi Beograd (Vukićević 1992: 94); DQ45 Makiš (Gajić 1964: 35, Vukićević 1992: 94); DQ66 Karaburma, swamps below Karaburma (Vukićević 1992: 94).

NE Serbia: **Veliko Gradište**: EQ35 Srebrno Lake (Vukićević 1992: 94, Stojanović *et al.* 2015: 94).

IMPRECISE PUBLISHED DATA: **Serbia** (Hayek 1924: 31, Domac 1950: 24, Mayer & Hortvatić 1967: 153, Vukićević 1970: 119, Gajić 1980b: 128, Janković 1985: 155); **Serbia proper** (Niketić *et al.* 2018: 65); **Vojvodina** (Slavnić 1956: 62, Šajinović 1976: 35, Stojanović *et al.* 1987: 46, Niketić *et al.* 2018: 65); **Banat**: along the Danube [„Duna“], close to Banat sand wastelands [„bánsági homokpusztá“] (Tuszon 1914: 333); **Srem** (Obradović *et al.* 1982: C 17, Gajić & Karadžić 1991: 75); **Fruška Gora Mt.** („on northern slopes, along the Danube“, „sparsely“, Obradović 1966: 24, Stojanović *et al.* 2015: 94); **Šumadija** (Gajić 1967: 189); **E Serbia** (Adamović 1898: 151, Beck 1901: 273); **Belgrade** (Spasić, Kanitz 1863a: 44, Jovanović *et al.* 2014: 204, Stojanović *et al.* 2015: 94), vicinity (Pančić 1874: 777, Černjavski 1950: 117, Blečić 1957: 5, Čolić *et al.* 1963: 127, Janković 1972: 163); **Šajkaška** [„csajkás kerület“] (Feichtinger 1870: 27); **Koviljsko-petrovaradinski rit** (Stojanović *et al.* 2015: 94); **Čerević-Čortanovci**: along the Danube (Tmušić *et al.* 2019: 136); **Potamišje** (Stojanović *et al.* 2015: 94); **Along the river Sava** (Blečić 1957: 5, Čolić *et al.* 1963: 127); **Moravica** river in Banat (Ljevnaić-Mašić *et al.* 2016: 126); **Veliki bački kanal** [„Ferencz-csatorna“], „along the channel“ „in reeds“ (Prodán 1915: 126, 192); **Kajtasovo-Vlajkovac**: **Danube-Tisa-Danube channel** (Vukoje 1986: 541); **Zasavica** (Vukićević 1992: 94, Stojanović *et al.* 2015: 94); **Obedska bara** (Vukićević 1992: 94, Stojanović *et al.* 2015: 94).

Bosut forests [„Morovičko-bosutske šume“] (Stojanović *et al.* 2015: 94, Demeter *et al.* 2018: 118, Kiš *et al.* 2019: 82, Biró *et al.* 2020: 2, Molnár *et al.* 2021: 3).

NOTES: The recent distribution of this strictly protected species in Serbia (Anonymous 2010-2016) has been profoundly shaped by decades-long antropogenic impacts on wetland areas, including river regulation, melioration, forest plantation and land reclamation resulting with local dissapearrance and/or decrease of *Marsilea* habitats and populations. Based on our field investigations of recent and possible habitats of *Marsilea* conducted during the last 15 years it is possible to outline its 4 extant distribution centres in Serbia: Bosut forest-wetland area, Krčedinska ada, wetland pasture area along the river Tamiš (between Tomaševac and Baranda) and the river Moravica near Margita (Fig. 2). In these areas the populations of *Marsilea* are both rich and vital, largely due to preserved traditional wetland grazing practices (horses, pigs, cattle) supporting maintenance of optimal habitats for *Marsilea* and other Nanocyperion species. According to Biró *et al.* (2020) long-term abandonment of grazing may result in such specialist species becoming extinct across entire landscapes.

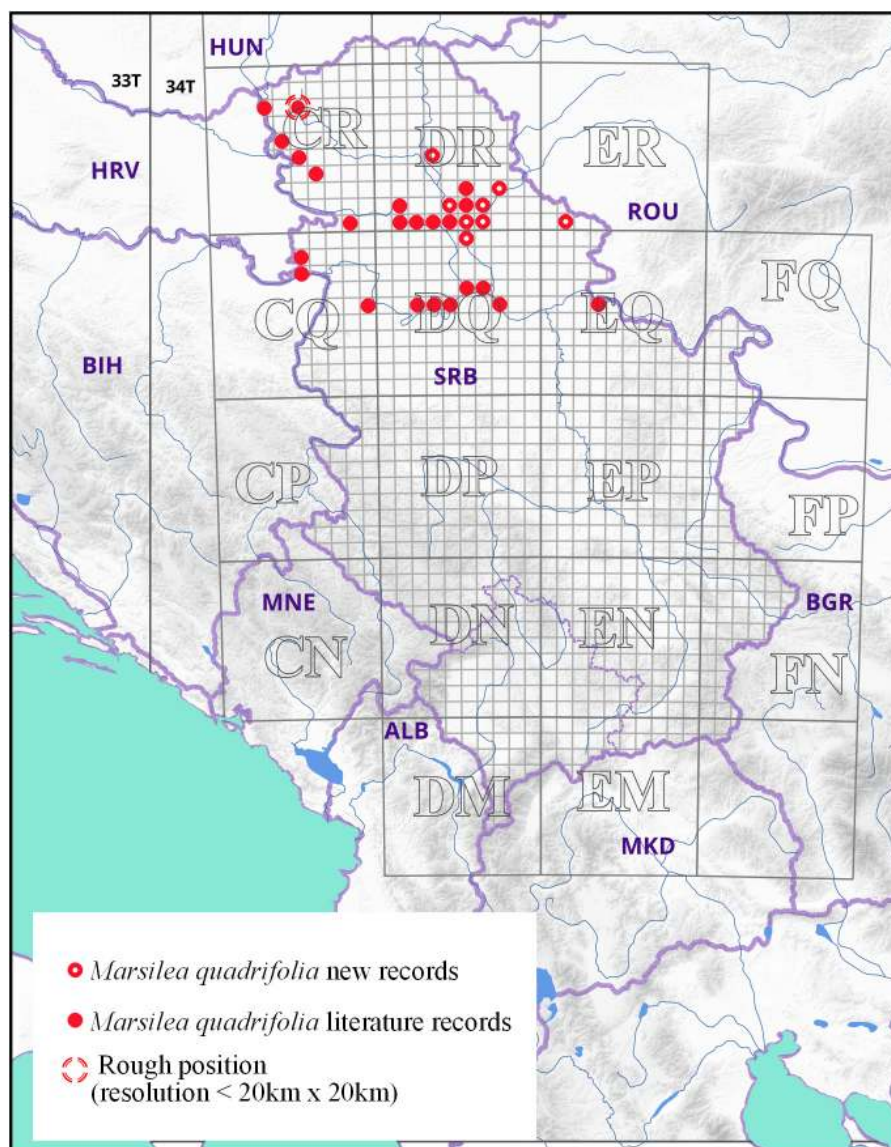


Fig. 2. - New herbarium and published data on the distribution of *Marsilea quadrifolia* L. in Serbia.

Medicago carstiensis Jacq., Collect. Bot. 1: 86 (1787).

NEW DATA: **Metohija: Peć: Radavac: DN43 Savine vode** (Panjković, B. 10-Jul-1996)

PUBLISHED DATA: **Šumadija: DQ70-DP79 Topola** (Pančić 1856: 479); DP97 **Kragujevac** (Dimitrijević, Fritsch 1910: 193); EP06 **Ratković**

[„Ratkovići“] (Kojić 1972a: 413), Hungarian oak-Turkey oak forest (Gajić 1965: 31).

E Serbia: EP73 **Sokobanja** [„Banja“] (Pančić 1856: 479, Vandas 1909: 154); **Aleksinac:** EP62 **Prugovac** (Ilić J., Formánek 1895: 362, Vandas 1909: 154, Nikolić *et al.* 1986: 290); **Niš:** EP60 **Miljkovac** (Kojić 1972a: 413), woods (Petrović 1882: 215); EN79 **Gabrovac** [„Grabovac“] + near Svete Trojice monastery (Petrović 1882: 215, Kojić 1972a: 413); **Sićevačka klisura:** EN89 **Sićevo:** near Presvete Bogorodice monastery [„Svete Bogorodice“] (Petrović 1882: 215, Kojić 1972a: 413); EN99 **Sićevačka klisura:** **Ostrovica:** Prosečki vis (Petrović 1882: xx); EN77 **Razgojna** [„Razgojno“] (Ilić, Fritsch 1910: 193, Kojić 1972a: 413).

S Serbia: EN65 **Lebane** (Kojić 1972a: 413); EN71 **Vranje** [„Vranja“]: **Krstilovica:** Devotinska reka [„Devotin“] (Adamović Fritsch 1910: 193); above Čoška (Ničić 1893: 30, Formánek 1889, Vandas 1909: 154); EN81 **Vranjska Banja** (Kojić 1972a: 413); **Vranje:** EN70 **Preobraženje:** at the church (Ničić 1893: 30).

SE Serbia: EN95 **Vlasotince** (Kojić 1972a: 413), groves, thickets and pastures on sun-facing slopes (Adamović 1909: 175).

Metohija: Prokletije Mts.: DN32 Lumbardska planina (Diklić 1977a: 208), northern slope (Rechinger 1935: 323); Paklena [„Peklen“] (Diklić 1977a: 208), beech forest belt, c. 1200 m (Rechinger 1935: 323).

Kosovo: EN24 **Batlavsko Lake** (Randjelović *et al.* 1982: 42, Nikolić *et al.* 1986: 290).

IMPRECISE PUBLISHED DATA: **Serbia** (Pančić 1874: 232, Adamović 1899: 367, Hayek 1926: 837, Domac 1950: 233, Gajić 1979: 9, 1980b: 128); **Šumadija** (Gajić 1967: 181); **Kopaonik Mt.** (Lakušić 1996: 18); **E Serbia** (Adamović 1898: 154); **Ozren Mt.** (Kojić 1972a: 413, „forest edges“ Pančić, Perić *et al.* 2012: 52); **Seličevica Mt.** (Petrović 1882: xxi); Hisar (Kojić 1972a: 413); **Suva planina Mt.** (Randjelović *et al.* 2000a: 64, 2000b: 309); **Grdelička klisura** (Randjelović & Stamenković 1979: 35); **Rogozna Mt.** (Papović *et al.* 2014a: 22); **Prokletije Mts.** (Amidžić & Panjković 2003: 156).

NOTES: Possibly more widespread in Serbia (Fig. 3).

Medicago × *varia* T. Martyn, *Fl. rust.* 3: 87 (1793) [*falcata* × *sativa*]

NEW DATA: **Bačka: Kula:** CR86 **Lipar:** Liparska dolina, ≈ 45.719456° N, 19.573144° E, 97 m (Perić, R. 16-Jun-2007); CR96 **Mali Idjoš** (*Sabadoš, K.* 14-Jun-2007).

Banat: Belo Blato-Perlez: DR51 Mala greda-Tiganjica (*Stojšić V.* 09-Jun-1994).

Srem: Fruška Gora Mt.: DQ09 Vrdnik, old limepit (*Stojšić, V.* 29-May-2007).

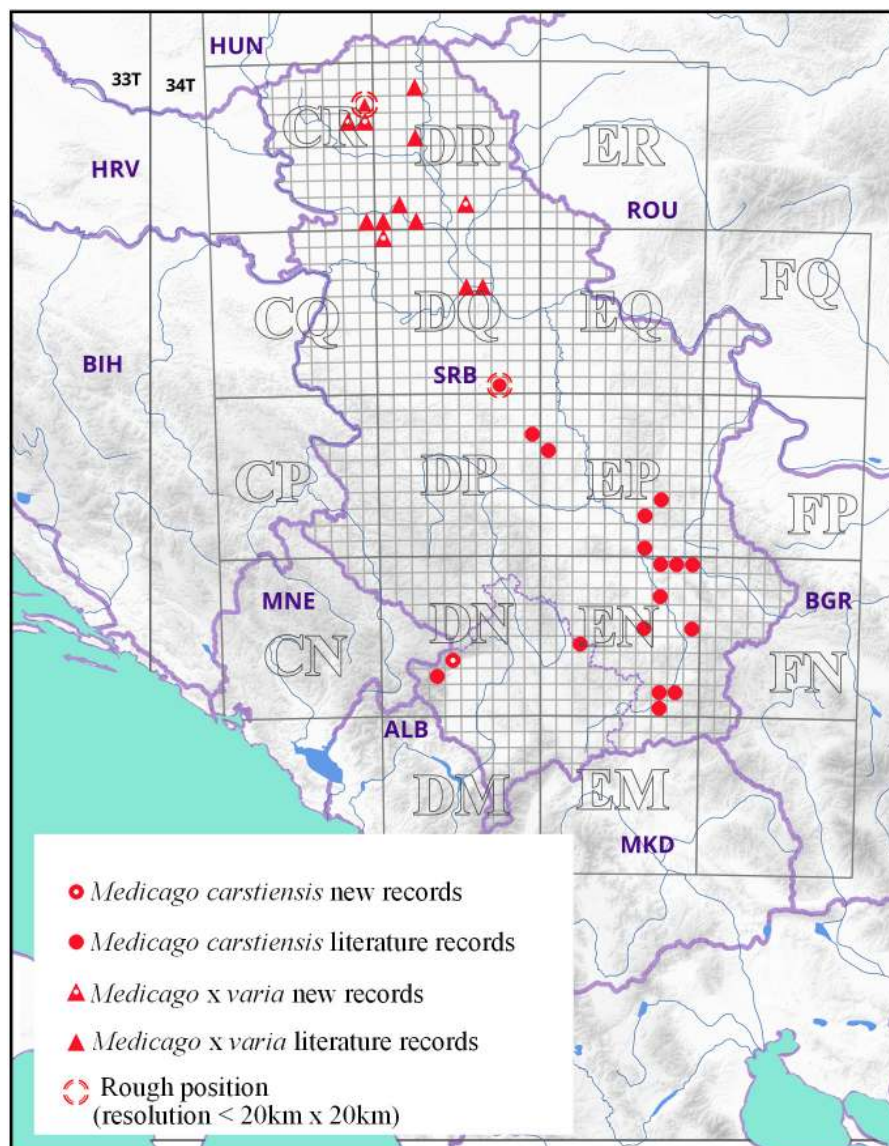


Fig. 3. - New herbarium and published data on the distribution of *Medicago carstiensis* Jacq. and *M. x varia* T. Martyn in Serbia.

PUBLISHED DATA: **Bačka:** DR28 **Senta** [„Zenta“] (Guelmino 1968: 125); CR97-CR87 **Bajša** (1973, Boža 1979: 53, Diklić & Nikolić 1986: 115), [subnom. *Medicago varia* Martyn *l. pseudohybrida* Ktze 1867] near a road (Jun-1973, Boža & Obradović 1980: 364); DR25 **Stari Bečej**

[„Óbecse“] [subnom. *Medicago varia* Mart. + *M. falcato-sativa* Rchb.] (Kovács 1929: 107, Diklić & Nikolić 1986: 115).

Srem: Fruška Gora Mt.: DR11 **Petrovaradin: Petrovaradin fortress** (1978, Boža 1979: 53); [subnom. *Medicago varia* Martyn l. *pseudohybrida* Ktze 1867] CR90 **Beočin**, above the city (Jun-1978, Boža & Obradović 1980: 364); **Beočin-Crveni čot** (1978, Boža 1979: 53); DR00 **Paragovo** (1977, Boža 1979: 53, Diklić & Nikolić 1986: 115); DR20 **Čortanovci** (1978, Boža 1979: 53, Diklić & Nikolić 1986: 115); [subnom. *M. falcata* L. γ *versicolor* Koch, *M. media* Pers.] DQ56 **Zemun** [„Semlin“], in vineyards (Pančić, Schulzer *et al.* 1866: 161, Hirc 1912: 208).

Šumadija: Beograd: [subnom. *Medicago falcata* L. var. *versicolor* Koch] DQ66 **Karaburma** [„Kajaburun“] (Pančić 1856: 479).

IMPRECISE PUBLISHED DATA: **Subotica Sands** (Obradović & Boža 1986: 131); **W Bačka** (Grdinić *et al.* 2001: 147); **Telečka** [„Telecskai fensik“] (Prodán 1915: 172); **Titelski breg** [„Titeli fensik“] (Prodán 1915: 172); **Novi Sad** (Diklić & Nikolić 1986: 115, Ratiu *et al.* 2021: 36); **Fruška Gora Mt.** (Diklić & Nikolić 1986: 115).

NOTES: Possibly more common species in Serbia (Fig. 3), but tended to be confused with *M. sativa*.

Melampyrum barbatum* Willd., Sp. Pl. 3: 198 (1800) subsp. *barbatum

NEW DATA: **Bačka:** [subnom. *M. arvense* L.] DR11 **Kač-Budisava**, near railroad (Čolović, S. 06-Jun-1956); **Titelski breg:** DR41 **Dukatar**, loess gully (Šajinović, B. 22-May-1986).

Banat: Zrenjanin: DR52 **Mužlja**, saltmarshes (Stojšić, V. 20-Jun-2012).

PUBLISHED DATA: **Bačka:** CR57-CR56 **Sombor** [„Zombor“] (Prodán 1915: 256); CR64 **Odžaci** [„Hódság“] (Prodán 1915: 256); CR53 **Deronje** [„Dernye“]-**Vajska** [„Vajszka“] (Prodán 1911: 328, 1915: 256); **Vajska** [„Vajszka“] (Prodán, Soó 1927: 138); DR25 **Stari Bečej** [„Óbecse“] (Kovács 1915: 73, „rare“, 1929: 159); DR24 **Bačko Gradište** [„Bácsföldvár“] (Boros, Soó 1927: 138); DR22 **Žabalj** [„Zsablya“]-**Djurdjevo** [„Giurgevo“], among abandoned vineyards (Feichtinger 1870: 24); DR20 **Kovilj** [„Kovily“] (Zorkóczy 1896: 62).

Banat: DQ69-DQ79 **Kovačica** (Kojić 1975: 23); DQ76 **Pančevo** [„Pancsova“] (Simonkai, Soó 1927: 138, Kojić 1975: 23); DQ88 **Vladimirovac** (Kojić 1975: 23); EQ08 **Nikolinci** („en masse“, Šutić & Kljajić 1954: 105); **Deliblato Sands:** DQ98 **Devojački Bunar** (1967, Panjković *et al.* 1980: 317) + **Velika tilva** + **Mala tilva** (1967, Panjković *et al.* 1980: 317); DQ96 **Mramorak** [„Mramorák“] (Wierzbicki, Soó 1927: 138); **Deliblato Sands:** EQ07 **Flamunda**, in Austrian pine plantations (18-Apr-1974, Sigunov 1976: 69); EQ06 **Deliblato** (Jovanović-Dunjić 1974: 264,

1967, Panjković *et al.* 1980: 317); EQ29 **Vršac** [„Versec“] (Bernátsky, Soó 1927: 138, Kojić 1975: 23); **Vršac Mts.**: EQ39 **Malo Središte**, ass. *Inulo salicinae-Calamagrostietum epigeio* subass. *inuletosum salicinae*, 300 m, E exposure, Tertiary clays, brownized vertisols (Vučković 1991: Tab. 18, 19); **Karaula**, ass. *Inulo salicinae-Calamagrostietum epigeio* subass. *inuletosum salicinae*, 160 m, SW exposure, Tertiary clays, brownized vertisols (Vučković 1991: Tab. 13); **Mesić**, ass. *Inulo salicinae-Calamagrostietum epigeio* subass. *stipetosum tirsae*, 250 m, SE exposure, initial soils on shales (Vučković 1991: Tab. 5); EQ27 **Jasenovo** [„Jassenova“] (Bohatsch., Soó 1927: 138); EQ37 **Bela Crkva** (Kojić 1975: 23); DQ95 **Kovin** (Kojić 1975: 23).

Srem: Fruška Gora Mt.: CR90-DR00 [subnom. *Melampyrum barbatum* Waldstein et Kitaibel subsp. *Kitaibelii* Soó] **Čerević-Sremska Kamenica** [„Kamenić“] (Richter, L., Soó 1927: 139); CR90 **Beočin** (Jávorka, Soó 1927: 138); DR00 [subnom. *Melampyrum barbatum* W. et K. ssp. *Kitaibelii* Soó] **Brankovac** [„beočinske livade“] (Obradović 1966: 91, 1978: 47); [subnom. *Melampyrum barbatum* W. et K. ssp. *Kitaibelii* Soó] **Iriški Venac** [„Venac“] (Obradović 1966: 91, 1978: 47); **Fruška Gora Mt.**: **Paragovo**: [subnom. *Melampyrum barbatum* W. et K. ssp. *Kitaibelii* Soó] DR10 **Vučji do** (Obradović 1966: 91, 1978: 47); DR10 **Sremski Karlovci: Dobrilovac**, above vineyards („numerous“, Hirc 1919: 402); **Fruška Gora Mt.**: DR10 **Banstol** (Butorac 1980: 49); DR20 [subnom. *Melampyrum barbatum* Waldst. et Kit. var. *barbatum*] **Čortanovci** [subnom. *Melampyrum barbatum* W. et K. ssp. *Kitaibelii* Soó, *Melampyrum arvense* sensu Obradović 1966 p.p.] (Obradović 1966: 91, Jovanović-Dunjić 1974: 264, Obradović 1978: 47); DQ19 [subnom. *Melampyrum barbatum* Waldst. et Kit. var. *kitaibelii* (Soó) Pauca et Nyarady, *Melampyrum segetum* Kit. sensu Soó (1968: 214)] **Krušedol** [„Krušedol“, „Krušedol“, „Grusedol“] (Schulzer *et al.* 1866: 129, Schlosser & Vukotinović 1869: 680, Zorkóczy 1896: 62, *Kitaibel, P.*, 11-Jun-1800, Gombocz 1945: 513, Jovanović-Dunjić 1974: 264), bellow Krušedol, in fields (Kanitz 1863b: 113); DQ29 **Beška** [„Beska“] [subnom. *Melampyrum segetum* Kit. sensu Soó (1968: 214)] (*Kitaibel, P.*, 11-Jun-1800, Gombocz 1945: 514); DQ39 [subnom. *Melampyrum barbatum* Waldst. et Kit. var. *kitaibelii* (Soó) Pauca et Nyarady] **Krčedin** [„Kersedin“, „Kerčedin“, „Kercsedin“] (Kanitz 1863b: 113, Schulzer *et al.* 1866: 129, Schlosser & Vukotinović 1869: 680, Zorkóczy 1896: 62, Jovanović-Dunjić 1974: 264); DQ49 **Slankamen** [„Szlánkámen“] [subnom. *Melampyrum segetum* Kit. sensu Soó (1968: 214)] (*Kitaibel, P.*, 13-Jun-1800, Gombocz 1945: 516); **Surduk** [„Szurdok“] [subnom. *Melampyrum segetum* Kit. sensu Soó (1968: 214)] (*Kitaibel, P.*, 13-Jun-1800, Gombocz 1945: 516); CQ88 **Lačarak** [„Ladjarak“] (Godra 1872: 231); DQ45 **Jakovo** (Moesz, Soó 1927: 138); [subnom. *Alectorolophus barbatus*] **Jakovo-Surčin** (Moesz 1916b: 86);

DQ56 **Zemun** [„Semlin“] (*Pančić*, Schulzer *et al.* 1866: 129, Schlosser & Vukotinović 1869: 680).

Šumadija: DQ55 **Žarkovo**, near a road (Gajić 1964: 54); DQ74 **Grocka** (Jovanović & Bartula 1997: 137); DQ53 **Guncati** [„Gunjcate“] (*Pančić* 1856: 529); DP97 **Kragujevac** (Jovanović-Dunjić 1974: 264).

Pomoravlje: DQ91 **Smederevska Palanka** (Jovanović-Dunjić 1974: 264); EP26 **Jagodina**, mountain meadows (*Pančić* 1856: 529).

NE Serbia: EQ92-EQ91 [subnom. *Melampyrum barbatum* subsp. *eubarbatum* f. *typicum*] **Veliki Greben Mt.** [„Greben“] (Soó 1927: 138), thorny slopes (*Pančić*, Jul-1884, Beauverd 1916: 535).

W Serbia: **Zvijezda Mt.**: CP67 below Drlje [„Odrlije“], 1000 m, N-NE exposure, slope 60°, Upper and Middle Triassic limestone (Jul-1951, Čolić 1953: 478) + Crni Potok, 950 m, N-NW exposure, slope 45-55°, Upper and Middle Triassic limestone (Jul-1951, Čolić 1953: 478) + Soko stene, 900 m, N-NW exposure, slope 45-60°, Upper and Middle Triassic limestone (Jul-1951, Čolić 1953: 478); **Tara Mt.**: CP66 Aluška planina, 1050 m, NW exposure, slope ca. 55°, Triassic limestones, brownized rendzinas (Čolić 1965: 79) + Crvene stene, 1000 m, N exposure, slope 30°, Upper Cretaceous limestone formations (Jul-1951, Čolić 1953: 525) + Omar, 1100 m, S exposure, slope 45°, Triassic limestone (1950, Čolić 1953: 508) + Janjač, vicinity of the summit, 1300-1350 m, NE exposure, slope 65-70°, Triassic limestone (Jul-1952, Čolić 1953: 561); **Tara Mt.**: CP75 **Spajići**: Jabučice, 800 m, N-NW exposure, slope 50°, Upper Cretaceous limestone (Jun-1950, Čolić 1953: 570) + **Spajići-Lazići**: Vis, 780 m, N-NE exposure, slope 45°, Upper Cretaceous limestone formations (Jun-1950, Čolić 1953: 570); CP86 **Bajina Bašta**, above the city, Hungarian oak-Turkey oak forest edge (Gajić 1988: 342); **Golija Mt.**: DN69 Zimovnik: Breze, 1100 m, E-NE exposure, slope 5°, ass. *Koelero-Danthonietum calycinae* subass. *linetosum serbici* (Pavlović 1974: Phyt. Tab. I); **Belo Polje** [„Belopolje“], 1000 m, SE-E exposure, slope 10°, ass. *Koelero-Danthonietum calycinae* subass. *linetosum serbici* (Pavlović 1974: Phyt. Tab. I).

C Serbia: **Stolovi Mt.**: [subnom. *Melampyrum arvense* v. *barbatum*] DP72 Orlovac, 1000 m, SE exposure, slope 10°, ass. *Koelero-Danthonietum calycinae* subass. *linetosum serbici* (Pavlović 1974: Phyt. Tab. I); EN29 [subnom. *Melampyrum barbaticum*] **Blace**, vicinity (Perišić *et al.* 2004: 69).

E Serbia: FN19 **Osmakova** (Adamović 1910: 172); FN29 **Temaska** (Adamović 1910: 172, Jovanović-Dunjić 1974: 264); FN39 **Zavoj** (Adamović 1910: 172); FN38 **Koprivštica** (Adamović 1910: 172).

Kosovo: **Priština**: EN12 Gazimestan [„spomenik caru Lazaru“], 590-610 m, N exposure, slope 5° (Broz 1953: 146).

SE Serbia: FN47 Visočki Odorovci, 810 m, SE exposure, slope 30°, eroded brown calcareous soil on limestone (06-Jul-2008, Marković *et al.* 2015: 51).

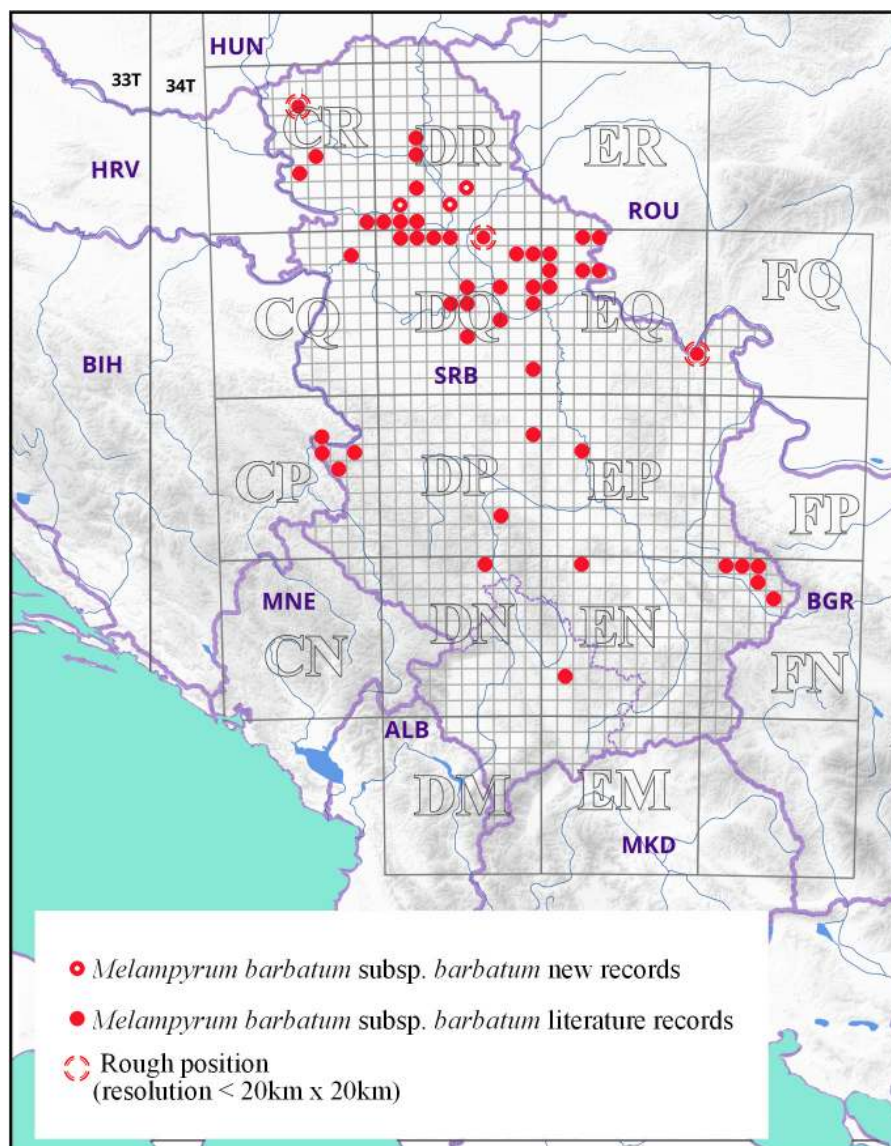


Fig. 4. - New herbarium and published data on the distribution of *Melampyrum barbatum* subsp. *barbatum*. in Serbia.

IMPRECISE PUBLISHED DATA: **Serbia** (Pančić 1874: 542, Hayek 1929a: 201, Tatár 1939: 4, 41, Gajić 1980a: 87, 1980b: 128); **Vojvodina** [subnom.

Melampyrum barbatum Waldst. et Kit. var. *kitaibelii* (Soó) Pauca et Nyarady] (Mayer 1968: 242, Obradović 1987: 107, Obradović *et al.* 1987: 74), ass. *Anthemis-Consolida orientalis*, ass. *Stachys annua-Ajuga chamaepitys* (Slavnić 1951: 89, 90); **Bačka**, on sands, ass. *Eragrostis major-Eragrostis minor* (Slavnić 1951: 98); **Banat**, on sands, ass. *Eragrostis major-Eragrostis minor* (Slavnić 1951: 98); **Srem** [subnom. *Melampyrum barbatum* Waldst. et Kit. subsp. *kitaibelii* Soó] (Obradović 1987: 107); **N Serbia** (Jovanović-Dunjić 1974: 264); **Šumadija** (Gajić 1967: 185); **Iron Gate** (Petrić *et al.* 2010: 49); **C Serbia** (Mayer 1968: 242, Jovanović-Dunjić 1974: 264); **SE Serbia** (Randelović *et al.* 2005: 54); **Subotica Sands** (Obradović & Boža 1986: 131); **W Bačka** (Grdinić *et al.* 2001: 147); **Rimski šanac** (Butorac 1998: 300), „ass. *Centaureo (sadlerianae)-Chrysopogonetum grylli* subass. *stipetosum capillatae*“ + „subass. *brachypodietosum pinnati*“ (Parabučki & Stojanović 1984: 125); **Šajkaška** [„csajkás kerület“] (Feichtinger 1870: 28); **Titelski breg** [„Titeli fensik“] (Zorkóczy 1896: 62, Igić 1988: 144); **Fruška Gora Mt.** [subnom. *Melampyrum barbatum* Waldst. et Kit. var. *kitaibelii* (Soó) Pauca et Nyarady] (Čolović 1956: 124, Jovanović-Dunjić 1974: 264, Obradović 1980: 7, 1967, Panjković *et al.* 1980: 317, Nikolić *et al.* 1986: 308); **Deliblato Sands** [„delibláti homokpuszta“] (Wagner 1914: 36, Španović 1936: 153, Obradović 1980: 7, Obradović & Panjković 1980: 329, Obradović 1983: 271); **Vršac Mts.** (Obradović 1980: 7, Obradović & Panjković 1986: 569, Panjković-Matanović 1989: 70); **Niš**, vicinity (Petrović 1882: 647, Jovanović-Dunjić 1974: 264); **Pirot** (Formánek 1897: 78, Adamović 1910: 172, Jovanović-Dunjić 1974: 264).

NOTES: Protected species and subspecies in Serbia (Anonymous 2010-2016) (Fig. 4). Our specimens and published data indicate that in Serbia is largely present typical subspecies, while subsp. *carstiense* Ronniger appears to be rare or rather absent (Soó 1927: 137).

CORRECTIONS: Herbarium specimens collected by Čolović (Čortanovci: field above the tunnel, 23-Jun-1955) and published under the name *Melampyrum arvense* L. (Obradović 1966: 91) in fact are referring to *M. barbatum* subsp. *barbatum*.

Melampyrum heracleoticum Boiss. & Orph. in Boiss., *Fl. Orient.* 4: 482 (1879).

NEW DATA: **Metohija: Peć**: DN43 **Radavac** (Savić, D. 15-Sep-1994).

PUBLISHED DATA: **Metohija: Prokletije Mts.**: DN31 **Ljubenički kamen** [„Ljubenića krš“], ass. *Quercus-Ostryetum carpinifoliae* (Tomić 1998: 58); DM59 **Djakovica** [„Djakovo“] (Soó 1927: 162); DM48 **Čafa Prušit**, ca. 700 m, oak bush formation (Dörfler, 30-Jul-1914, Hayek 1918: 182); DM88 **Mušutište**: Svete Trojice monastery [„Scroti Troitze“] (Dieck, Soó

1927: 162); **Prizren**: DQ87-DQ86 **Klisura Prizrenske Bistrice** (Diklić & Nikolić 1980: 23, Nikolić *et al.* 1986: 308); **Šar-planina Mts**: DM86-DM96 **Kobilica** (Duraki *et al.* 2010: 52, 2017: 19); DM66 **Žur** [„Džuri“] (Soó 1927: 162); DM65 **Globočica** [„Glbočica“] (Košanin, Soó 1927: 162).

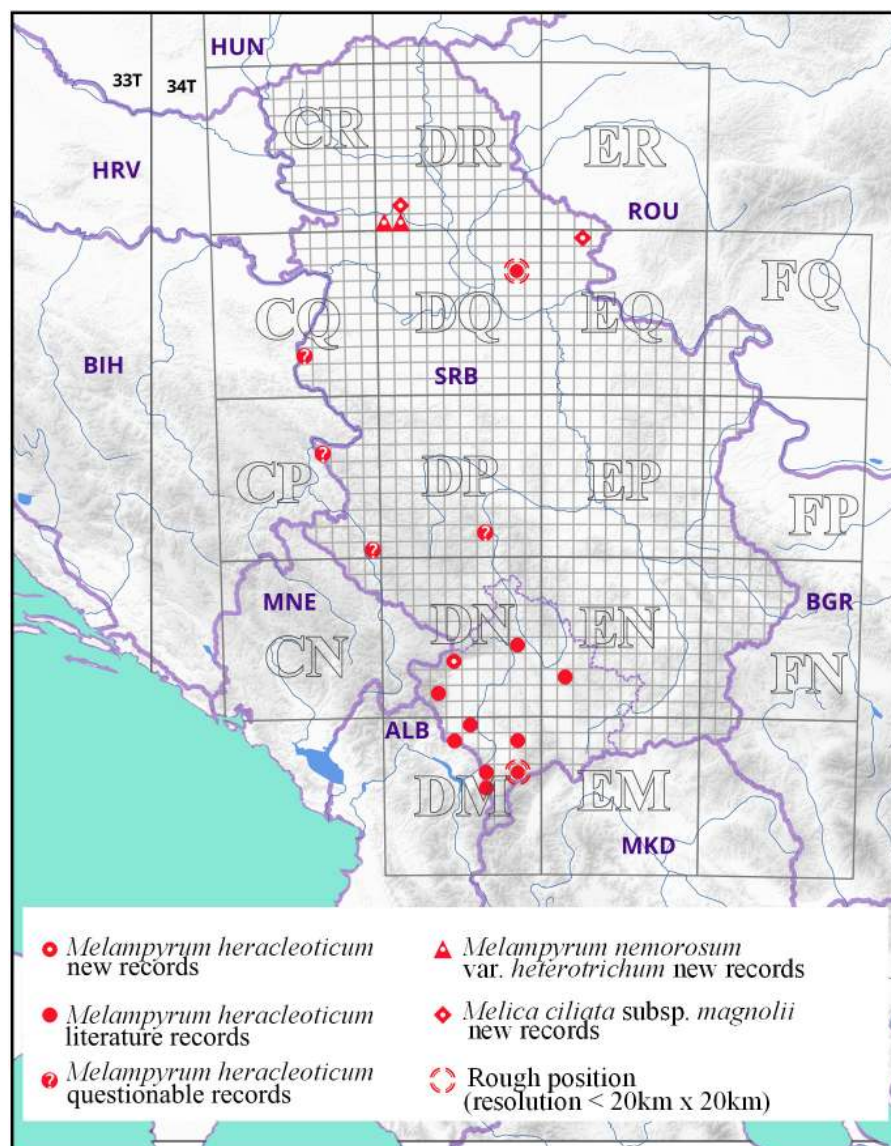


Fig. 5. New herbarium and published data on the distribution of *Melampyrum heracleoticum* Boiss. & Orph., *M. nemorosum* var. *heterotrichum* Ronniger and *Melica ciliata* subsp. *magnolii* (Gren. & Godr.) K. Richt. in Serbia.

Kosovo: Kosovska Mitrovica: DN84 **Košutovo**, left bank of the river Ibar („Simonida Motel“ Prodanović *et al.* 2008: 333), **Priština:** EN12 (Soó 1927: 162), **Grmija Mt.** [„Gërmia“] (Nikolić *et al.* 1986: 308, Mustafa *et al.* 2016: 179), beech-oak forests (1985, Krivošej 2013: 105).

DUBIOUS PUBLISHED DATA: **NW Serbia:** CQ52 **Gučevo Mt.** (Stojanović & Stevanović 2008: 102).

W Serbia: Tara Mt.: [subnom. *Melampyrum nemorosum* var. *ζ heracleoticum* (Boiss. & Orph.) Beauverd] CP66 **Derventa** canyon (Schneider, C. K., 17-Sep-1907, Beauverd 1916: 575).

SW Serbia: Radočelo Mt.: [subnom. *Melampyrum heracleoticum* Boiss. et Heldr. var. *albanicum* (Beauv.) Hay.] DP61 **Studenica monastery**, vicinity, ass. *Pinetum nigrae*, limestone (Sigunov 1975: 16); **Mileševka canyon:** CP90 **Duboki potok** [„Duboki do“, 780 m, W exposure, slope 45°, limestones, skeletal soil-rocks and rendzina, ass. *Ostryo-Pineto-Carpinetum mixtum* subass. *cotinetosum* (Matović 1990: Phyt. Tab. 1).

IMPRECISE PUBLISHED DATA: **Serbia** (Gajić 1980b: 128); **SW Serbia** (Tomović *et al.* 2014: 184); **S Serbia** (Adamović 1901: 24); **Kosovo & Metohija** [„Kosmet“] [subnom. *Melampyrum heracleoticum* var. *heracleoticum* f. *hyssofolium* Ronn., *Melampyrum heracleoticum* var. *albanicum* (Beauv.) Hayek] (Mayer 1968: 247, 248); **Kosovo** [subnom. *Melampyrum heracleoticum* Boiss. et Orphan. var. *albanicum* (Beauv.) Hayek] (Jovanović-Dunjić 1974: 265, Diklić 1977b: 222, Tomović *et al.* 2014: 184); **Metohija** (Tomović *et al.* 2014: 184); **Mileševka canyon** [„klisura Mileševke“] (Matović *et al.* 1996, Ostojić & Zlatković 2010: 25, Ostojić & Krsteski 2012: 51), 610 m, S exposure, slope 45°, limestones, skeletal soil-rocks and rendzina, ass. *Ostryo-Pineto-Carpinetum mixtum* subass. *typicum* (Matović 1990: Phyt. Tab. 1); **Rogozna Mt.** (Papović *et al.* 2014a: 24, 2014b: 108); **Šar-planina Mt.** (Janković 1982: 104); **Dečani** [„Decani“]-**Djakovica** [„Djakova“, „oak bush formation“ (Dörfler, 26-Jul-1914, Hayek 1918: 182).

NOTES: Protected species in Serbia (Anonymous 2010-2016). Various records have been published for the area of western and south western Serbia (e.g. Gučevo, Mileševka canyon), but their authenticity must be reconsidered (G. Tomović, *pers. comm.*) (Fig. 5).

***Melampyrum nemorosum* L., Sp. Pl. 605 (1753) var. *heterotrichum* Ronniger in Hayek, Fl. Steierm. 2: 197 (1912).**

NEW DATA: **Srem: Fruška Gora Mt.:** DR00 **Stari Rakovac** (Perić, R. 02-Aug-2008); [subnom. *Melampyrum pratense* L. var. *vulgatum* (Pers.) Beauv.] DR10 **Stražilovo**, forest edge (Čolović, S. 27-Jul-1955).

IMPRECISE AND UNCERTAIN PUBLISHED DATA: **Vojvodina** ? [subnom. *Melampyrum nemorosum* var. *nemorosum* f. *heterotrichum* (Ronn.) E. Mayer] (Mayer 1968: 244).

NOTES: First precise data for Serbia (Fig. 5). Calyx with mixed short and long hairs, calyx tube here and there becomes glabrous, with longer multicellular hairs along the veins (Soó 1968: 216). In our specimens

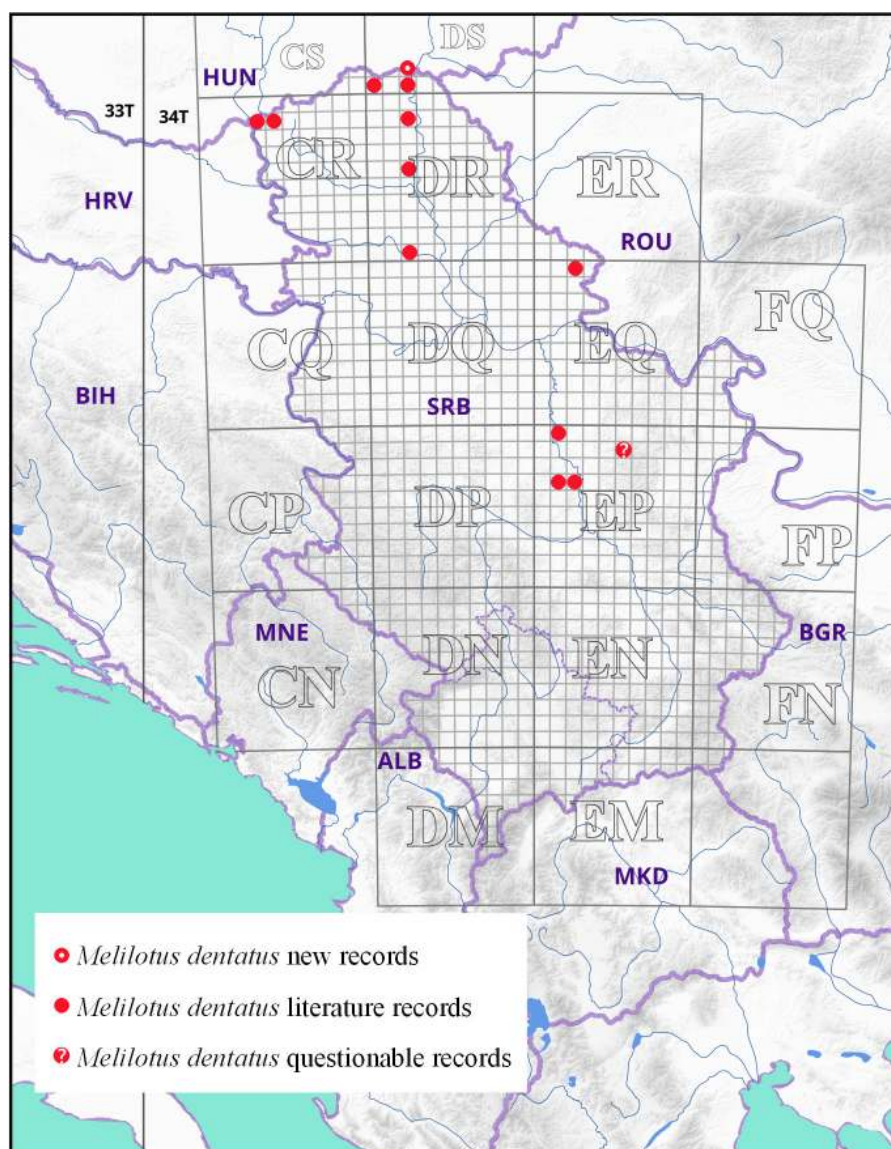


Fig. 6. - New herbarium and published data on the distribution of *Melilotus dentatus* (Waldst. & Kit.) Pers. in Serbia.

calyces with mixed and uniformly villous hairs can be found within the same individual. Perhaps more common in Serbia.

Melica ciliata L., *Sp. Pl.* 66 (1753) subsp. ***magnolii*** (Gren. & Godr.) K. Richt., *Pl. Eur.* 1: 78 (1890).

NEW DATA: **Banat: Vršac Mts:** EQ29 Djakov vrh, meadow (Stojšić, V. 26-Jun-1990).

Srem: [subnom. *Melica ciliata* L.] DR11 **Petrovaradin** (Babić, N. 31-May-1952).

IMPRECISE OR UNCERTAIN PUBLISHED DATA: **Serbia** [subnom. *Melica ciliata* L. var. *magnolii* (Gren. Godr.) Pant.] (Hayek 1933: 249, Cincović & Kojić 1976: 338); **Vojvodina** [subnom. *Melica ciliata* L. subsp. *magnolii* (Gren. & Godr.) Husn.] (Niketić *et al.* 2018: 129); **Serbia proper** [subnom. *Melica ciliata* L. subsp. *magnolii* (Gren. & Godr.) Husn.] („no data, but possible presence“, Niketić *et al.* 2018: 129); **Kosovo & Metohija** [subnom. *Melica ciliata* L. subsp. *magnolii* (Gren. & Godr.) Husn.] („no data, but possible presence“, Niketić *et al.* 2018: 129).

NOTES: First precise data for Serbia (Fig. 5). Probably more widespread in Serbia. Pančić's (1874: 748) remark about specimens of *M. ciliata* with longer and more lax inflorescences from localities in eastern Serbia perhaps can be related to subsp. *magnolii*.

CORRECTIONS: Data published for Petrovaradin under the name *Melica ciliata* L. (Obradović 1966: 91) in fact are referring to subsp. *magnolii*.

Melilotus dentatus (Waldst. & Kit.) Pers., *Syn. Pl.* 2: 348 (1807).

NEW DATA: **Bačka: Horgoš:** DS21 Bitovo, 46.163778° N, 20.012094° E, 74 m (Perić, R. 11-Oct-2018).

PUBLISHED DATA: **Bačka:** DS00 **Slano Lake** [„Sóstó“] (Šturc & Gajić 1986: 152, Šturc, B. 1956, Šturc 1997: 116); DS20 **Martonoš** (Slavnić, Atanacković 1958: 146); CR38 **Bački Breg**, ass. *Centaureo pannonicæ-Festucetum orientalis* subass. *lotetosum silicosæ* (Parabućski 1990: 112: Phyt. Tab. 2); CR48 **Gakovo**, ass. *Centaureo pannonicæ-Festucetum orientalis* subass. *lotetosum silicosæ* (Parabućski 1990: 112: Phyt. Tab. 2); DR28 **Senta-Gornji Breg** (Slavnić 1939: 79); **Gornji Breg:** at the junction of old Tornjoš road [„Tornyosi-út“] and Kalocsa valley [„Kalocsai völgy“], near Serbian school (Guelmino 1968: 100, 125); DR25 **Stari Bečej** [„Óbecse“]: Irizset + Szilvás („rare“, Kovács 1929: 106); DR20 **Kovilj** [„Kovily“], saline meadow (Zorkóczy 1896: 62).

Banat: [subnom. *Trifolium dentatum* Waldst. & Kit., *Trifolium Melilotus dentata*] EQ29 **Vršac** [„Versetz“] [*locus classicus*!] (Kitaibel, P. 23-

Jun-1800, Gombocz 1945: 533), humid meadows and marshy places (Waldstein & Kitaibel 1799-1802: 41, Tab. 42).

Pomoravlje: EP19 **Svilajnac:** along the river Velika Morava [„Morava“], sandy meadows (Pančić 1856: 481); EP16 **Jagodina:** along the river Velika Morava [„Morava“], sandy meadows (Pančić 1856: 481); EP26 **Čuprija:** along the river Velika Morava [„Morava“], sandy meadows (Pančić 1856: 481).

DUBIOUS PUBLISHED DATA: **NE Serbia:** EP58 **Resava gorge** (Mijatović *et al.* 2007: 76c).

IMPRECISE PUBLISHED DATA: **Serbia** (Hayek 1926: 844, Kojić 1972b: 421, Gajić 1980a: 80, 1980b: 128); **Vojvodina:** ass. *Alopecurus-Roripa Kernerii* Slavnić 1941 (Slavnić 1948: 113); **Bačka** (Slavnić 1953: 41, 52, Budak 1998: 96); **Banat** (Slavnić 1953: 41, 52): along the Tisa, ass. *Oenanthe-Beckmannia erucaeformis* (Topa 1939) (Slavnić 1948: 111); **W Bačka** (Grdinić *et al.* 2001: 147); **N Banat**, ass. *Oenanthe-Beckmannia erucaeformis* (Topa 1939) (Adamović 1959: 33); **E Serbia** (Randelović *et al.* 2008a: 87); **SE Serbia** (Randelović *et al.* 2008a: 87); **Subotica Sands** (Obradović & Boža 1986: 131).

NOTES: Although this species was firstly described from the present day Serbia *i.e.* from the vicinity of Vršac (Waldstein & Kitaibel 1799-1802: 41, Tab. 42), its ecology, coenology, distribution and threat status in Serbia are poorly known and based on limited number of mostly old data originating from lowland parts of Bačka, Banat and Pomoravlje (Fig. 6). Additional problem which further complicates these questions arises from the fact that majority of its known habitats in Serbia (humid, salinized meadows, depressions and ditches) has been disappearing rapidly due to melioration of saline habitats. Existing geological and pedological data suggest that its habitats are developing along the contact lines between loess and alluvial deposits, where atmospheric water leaking through the porous and higher loess terrain to less-permeable and fine grained alluvial low ground stops and forms wetland habitats, which under local climatic conditions tend to be salinized. Record of this species from ecologically unsuitable mountain limestone habitats in the river Resava gorge is probably erroneous.

***Menyanthes trifoliata* L., Sp. Pl. 145 (1753).**

NEW DATA: **Banat:** EQ17 **Kajtasovo:** along the Mrtvi Karaš, 44.883 15833° N, 21.24883889° E, 71 m (Perić, R. 02-Aug-2017) + 44.883257° N, 21.248603° E, 70 m (Perić, R. 10-Jun-2022).

PUBLISHED DATA: **Bačka:** DR25 **Stari Bečej** [„Óbecse“], „marshes on meadows“ (Kovács 1915: 72), Mrtva Tisa [„Tisza holt“] (Kovács, Prodán

1915: 247); DR24 Gornji rit [„Felsőrért“] + Donji rit [„Alsórért“] (Kovács 1929: 59); CR91 Futog [„Futak“], swamps (Prodán 1915: 126); DR11 Kač [„Káty“], humid meadows and swamps (Zorkóczy 1896: 71); DR20 Kovilj [„Kovily“], humid meadows and swamps (Zorkóczy 1896: 71).

NE Serbia: Despotovac: EP48 Dvorište: Vražja bara (Pančić 1874: 494, Stjepanović-Veseličić 1973: 462).

C Serbia: Kopaonik Mt.: DN89 Jankova bara [„Jankove bare“] (Stajić *et al.* 2009: 194), Gobelja (Stjepanović-Veseličić 1973: 462, *Lakušić* 1993, Lazarević *et al.* 2004: 46), Jaram (*Lakušić* 1993, Lazarević *et al.* 2004: 46).

W Serbia: Tara Mt.: CP66 Mala Batura („extinct“, Stojanović *et al.* 2015: 160); CP75 Zaovine (Čolić & Gigov 1958: 76, „?“; Gajić 1988: 594); CP85 Kremna, vicinity („extinct“, Stojanović *et al.* 2015: 160).

E Serbia: Stara planina Mt.: FN49 Kopren („shallows in subalpine region“, Adamović 1910: 144, Stjepanović-Veseličić 1973: 462, Marković *et al.* 2010: 16); **Pirot:** FN37 Krupac (Marković *et al.* 2010: 16).

SW Serbia: Pešter: Sjenica: DN29 Štavalj: along the river Knešnica, peat-bogs, 1050 m (*Lazarević, P.* 18-Jun-2004, Tomović *et al.* 2009: 40, Stojanović *et al.* 2015: 160), 43.26566667° N, 20.12811111° E, ca. 1050 m, *Magnocaricion* (*Lazarević, P.* 18-Jun-2004, Lazarević & Krivošej 2007: 442), peat-bog close to Štavalj minning waste area (*Lazarević, P., Panić, I.* 17-Apr-2000, Lazarević *et al.* 2004: 47); **Kneževac:** along the Štavaljska reka, peat-bog (Butorac *et al.* 1996: 137); DN27 Karajukića Bunari + Karamejdani Lake (Stojanović *et al.* 2015: 160); DN37 Manića livade (*Lazarević, P.* 20-May-2000, Lazarević *et al.* 2004: 47, Stojanović *et al.* 2015: 160); **Suvi Do:** DN36 Begov lug (Stojanović *et al.* 2015: 160); DN46-DN45 **Tutin:** vicinity (Stojanović *et al.* 2015: 160); DN45 Štavica, 950 m, alluvium, ass. *Equiseto-Eriophoretum latifolii* (Petković 1983: 80); **Tutin:** DN45 **Pope**, 980 m, SE and S exposure, alluvium, ass. *Equiseto-Eriophoretum latifolii* (Petković 1983: 80).

S Serbia: EN71-EN70 **Vranje** („extinct“, Stojanović *et al.* 2015: 160).

SE Serbia: Vlasina Lake: FN03 **Vlasina Rid**, ass. *Rhynchosporium albae* [!], *Caricetum goodenowii* (Randelović & Zlatković 2010: 77), close to the lake dam, on a peat island, ass. *Comaro-Caricetum droseretosum rotundifoliae* Tatić et Blaženčić (Tatić & Blaženčić 1982: 73); **Djošini:** Stevanovski potok [„Stevanski potok“], vicinity (*Jovanović, S., Niketić, M.* 29-Aug-1991, BEOU, Lazarević *et al.* 2004: 46); FN13 Biljena bara, ass. *Caricetum limosae* (Černjavski 1938: 12, 17, 20), Gadžina Bistrica (*Košanin, N.* 04-Jun-1907, BEOU, Lazarević *et al.* 2004: 46), ass. *Caricetum limosae* (Černjavski 1938: 12, 17, 20), Veliki most, ass. *Caricetum limosae* (Černjavski 1938: 12, 17, 20); FN02 Bratanov del („mixed sphagnetum“, Katić 1910: 23, 24), Promaja [„Duga Zanova“]

(„mixed sphagnetum“, Katić 1910: 23, 24), **Vlasina Okruglica** (Randje-
lović, V. 1994, Lazarević *et al.* 2004: 46), ass. *Rhynchosporium albae* [!]
(Randelović & Zlatković 2010: 77); FN12 **Stankovci**: road to Dugi del
(Jovanović, S., Niketić, M. 29-Aug-1991, BEOU, Lazarević *et al.* 2004:
46).

IMPRECISE PUBLISHED DATA: **Serbia** (*Friedrichsthal*, „in aquis“,
Grisebach 1844: 65, Adamović 1899: 378, Hayek 1930: 426, Domac 1950:

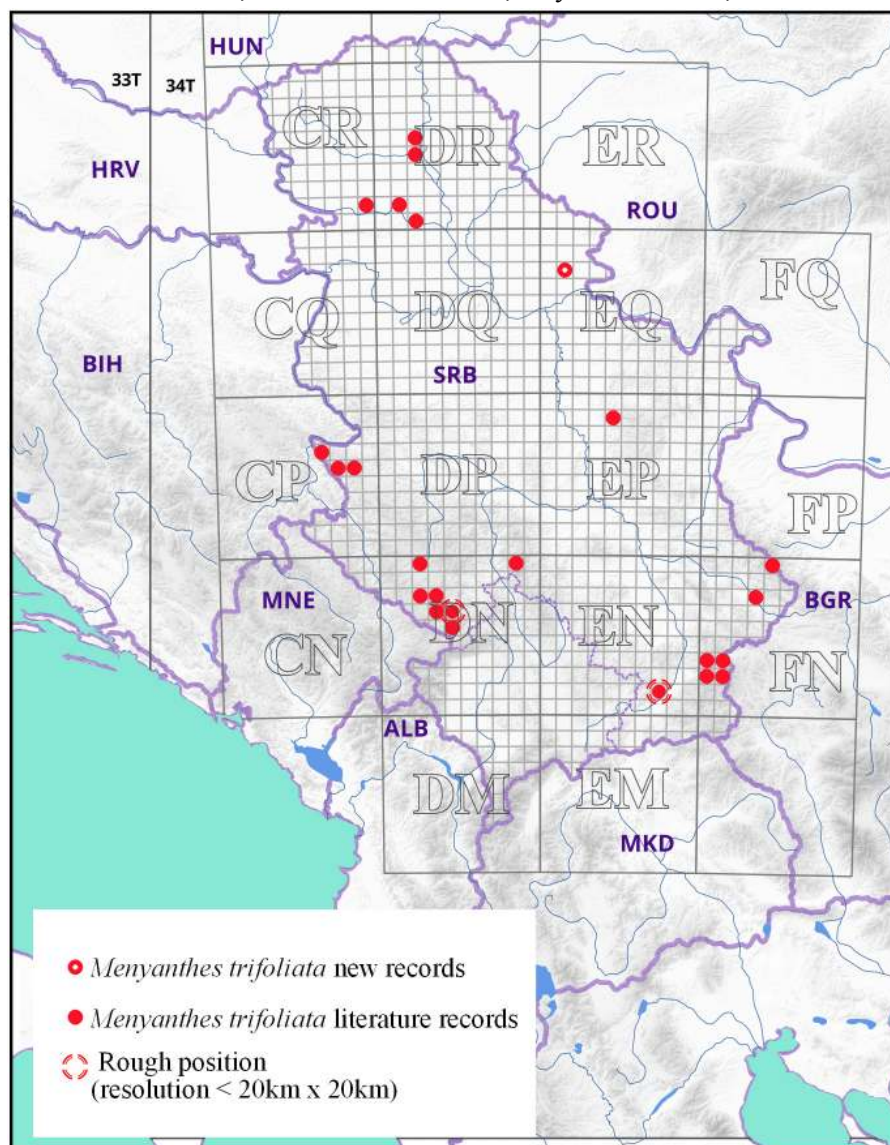


Fig. 7. - New herbarium and published data on the distribution of *Menyanthes trifoliata* L. in Serbia.

345, Gajić 1980b: 129, Zlatković 2004: 66); **Vojvodina** (Stojanović *et al.* 2015: 160); **E Serbia** (Stamenković *et al.* 1997: 52); **Kopaonik Mt.** (Gajić *et al.* 1991: 652, „extinct“, Stojanović *et al.* 2015: 160); **Grdelica gorge** (Randjelović & Stamenković 1979: 36, „?“ , Stojanović *et al.* 2015: 160); **Pešter plateau** (Lazarević 2014: 13); **Stara planina Mt.** [„Rečike“] (Stojanović *et al.* 2015: 160); **Pirot:** vicinity (Marković *et al.* 2010: 16, „extinct“, Stojanović *et al.* 2015: 160); **Vidlič Mt.** (Marković *et al.* 2019: 22); **Čemernik Mt.** (Stojanović *et al.* 2015: 160); **Ostrozub Mt.** („?“ , Stojanović *et al.* 2015: 160); **Vlasina Lake** [„Blato von Vlasina“] (Degen 1905: 128, Košanin 1910a: 36, „sphagnum bog and meadow bog“, Košanin 1910b: 176, 178, „pure sphagnetum“, Katić 1910: 18, 20, Stjepanović-Veseličić 1973: 462, Randelović 1985: 480, Stamenković & Randelović 1987: 79, Momčilović Petronijević *et al.* 2000: 100, Petrov, N. 23-May-1948, BEOU; Milovanović, D. Aug/Sep-1948, BEOU; Bratanov, D., Ljubisavljević, K. 19-Aug-1998, BEOU, Lazarević *et al.* 2004: 46–47, Pančić, J. 1880, Randelović & Zlatković 2010: 77), vicinity (Ilić, Fritsch 1915: 331); **Vlasina plateau** (Randelović *et al.* 2003: 113, Stojanović *et al.* 2015: 160); **Krajište**, ass. *Junco-Menthetum longifoliae* Lohm. 53 (Milo-savljević *et al.* 2008: 197).



Fig. 8. - Habitat of *Menyanthes trifoliata* L. near Kajtasovo (photo R. Perić).

NOTES: Confirmed species for the flora of Vojvodina province. The most typical recent habitats of this Boreal relic and strictly protected species (Anonymous 2010-2016) in Serbia are mires, peatlands and bogs in

large mountain ranges and on elevated plateaux in parts of southwestern and southeastern Serbia, with isolated and often unconfirmed records from the other mountain areas (Fig. 7). During the past centuries lowland peat marshes and mires along the large rivers in Vojvodina have been reduced or destroyed with largest surviving remnants confined to the area of Obedska bara in Srem (Lazarević 2013). Specific microclimatic conditions with pronounced temperature extremes and long or late frosts (cf. Stjepanović-Veseličić 1953) developing on the edge of Deliblato Sands, combined with colder waters and torrential nature of the Carpathian river Karaš are possibly contributing to the formation of relatively large (ca. 600 m²) and intact lowland mire in the oxbow of the river Karaš („Mrtvi Karaš“) near Kajtasovo (Fig. 8). The population of *M. trifoliata* here is relatively large (>100 individuals), but we did not noticed any flowering individuals, which implies vegetative reproduction (Fig. 9). Other characteristic mire species registered here are *Dactylorhiza incarnata* (L.) Soó subsp. *incarnata* (Perić, R. 18-Jun-2008) and *Epipactis palustris* (L.) Crantz (Perić, R. 18-Jun-2008).



Fig. 9. - *Menyanthes trifoliata* L., vicinity of Kajtasovo (photo R. Perić).

Pholiurus pannonicus (Host) Trin., *Fund. Agrost.* 132 (1820).

NEW DATA: **Bačka:** DS10 **Horgoš**, 46.135672° N, 19.963622° E, 81 m, ass. *Pholiurus pannonicus*-*Plantago tenuiflora* (Perić, R. 29-May-2014, pers. comm.); **Male Pijace** (Perić, R., 18-May-2009, pers. comm.);

Gakovo: CR58 **Rančevo**, $\approx 45.87446667^{\circ}$ N, 19.11717222° E, 83 m (Perić, R. 21-May-2009) + $\approx 45.859217^{\circ}$ N, 19.120089° E, 83 m (Perić, R. 12-Sep-2014, pers. comm.); CR57 **Svetozar Miletić**, $\approx 45.848536^{\circ}$ N, 19.157403° E, 82 m (Perić, R. 08-Jun-2016, pers. comm.); **Bački Monoštor-Bezdan:** CR47 **Štrbac** (Stojić, V. 25-May-1998, Perić, R. 21-May-2009, pers. comm.); **Kljajićevo:** CR66 **Gradina**, $\approx 45.718653^{\circ}$ N, 19.22445° E, 82 m (Perić, R. 29-Jul-2016, pers. comm.); **Žabalj:** DR32 **Livade**, 45.382351° N, 20.150550° E, 74 m (Perić, R. 07-Jun-2021); **Žabalj-Mošorin:** DR32 **Stari Žabalj**, 45.378350° N, 20.166813° E, 75 m (Perić, R. 18-Jun-2021, pers. comm.) + **Raskopanica-Greda**, 45.353130° N, 20.185692° E, 74 m (Perić, R. 18-Jun-2021, pers. comm.); **Djurdjevo-Mošorin:** DR32 **Senokos**, 45.344001° N, 20.125003° E, 76 m, ass. *Pholiurus pannonicus-Plantago tenuiflora* (Perić, R. 12-Jul-2021, pers. comm.); **Mošorin:** DR32 **Pustara**, 45.349204° N, 20.186395° E, 73 m (Perić, R. 18-Jun-2021) + **Rakitaš**, 45.369851° N, 20.109424° E, 72 m (Perić, R. 07-Jun-2021, pers. comm.); **Mošorin:** DR31 **Krivi Šarić**, 45.309716° N, 20.133885° E, 69 m (Perić, R. 12-Jul-2021, pers. comm.).

Banat: Novi Kneževac: DS20 north from the city, $\approx 46.061203^{\circ}$ N, 20.088889° E, 76 m (Perić, R. 26-Jun-2012, pers. comm.); **Jazovo:** DR38 **Slatina**, 05082553° N, 07438425° E (Perić, R. 20-Sep-2013, pers. comm.) + **Celeruša**, $\approx 45.913428^{\circ}$ N, 20.214592° E, 75 m (Perić, R. 25-Jun-2014, pers. comm.); DR48 **Banatski Monoštor:** $\approx 45.955575^{\circ}$ N, 20.271125° E, 74 m (Perić, R. 13-Aug-2013, pers. comm.) + **Markučeva bara**, $\approx 45.931075^{\circ}$ N, 20.280142° E, 76 m, ass. *Pholiurus pannonicus-Plantago tenuiflora* (Perić, R. 13-Aug-2013, pers. comm.); **Mokrin:** DR48 **Jaroš** (Butorac, B. 05-Jun-1992), **Tri ante**, near tree stand (Butorac, B. 18-Jun-1997); **Jazovo: Hodič**, 45.905594° N, 20.242053° E (Perić, R. 14-Sep-2011, pers. comm.); **Bočar:** DR36 **Prečka** (Perić, R., Rilak, S., Kartalović, V. 17-May-2016); **Novi Bečej-Novo Miloševo:** DR35 **Konice**, vicinity of 45.669158° N, 20.123478° E, 72 m, ass. *Pholiurus pannonicus-Plantago tenuiflora* (Perić, R. 05-Jul-2016, pers. comm.) + **Matej** (Perić, R. 05-Jul-2016, pers. comm.) + **Crvene štale**, $\approx 45.682347^{\circ}$ N, 20.211778° E, 74 m, ass. *Pholiurus pannonicus-Plantago tenuiflora* (Perić, R. 26-May-2016, pers. comm.); **Novo Miloševo:** DR45 **Paktovo**, $\approx 45.674408^{\circ}$ N, 20.257094° E, 74 m (Perić, R. 27-Jul-2016, pers. comm.); **Novo Miloševo-Bašaid:** **Devesilje**, $\approx 45.645211^{\circ}$ N, 20.309569° E, 76 m (Perić, R. 14-Sep-2016, pers. comm.); DR44 **Novi Bečej-Bašaid:** vicinity of 45.592094° N, 20.261839° E, 74 m (Perić, R. 21-Sep-2016, pers. comm.); DR44 **Kumane:** 45.53639722° N, 20.242475° E, 74 m (Perić, R. 03-Jun-2011); **Melenci-Bašaid:** **Ostrovo**, 45.566553° N, 20.340464° E, 75 m (Perić, R. 12-May-2017, pers. comm.) + 45.574006° N, 20.350614° E, 75 m, ass. *Pholiurus pannonicus-Plantago tenuiflora* (Perić, R. 12-May-2017, pers. comm.) + 45.5883° N, 20.333° E, 73 m (Perić, R. 12-May-2017, pers. comm.) +

45.592675° N, 20.316669° E, 74 m, ass. *Pholiurus pannonicus*-*Plantago tenuiflora* (Perić, R. 18-May-2017, pers. comm.); **Melenci**: DR44 Rusanda, 45.53052778° N, 20.30107778° E, 74 m, ass. *Pholiurus pannonicus* + *Plantago tenuiflora* (Stojšić, V., Perić, R. 13-Jul-2010); **Bašaid**: DR55 Veliki Bikač, 45.661367° N, 20.378194° E, 75 m (Perić, R. 25-Apr-2017, pers. comm.); **Banatski Dvor**: DR54 Lap, 45.534716° N, 20.459532° E, 73 m (Perić, R. 26-May-2022) + 45.518144° N, 20.452279° E, 73 m (Perić, R. 26-May-2022, pers. comm.); **Banatski Dvor**: DR53 Mali rit, 45.502519° N, 20.476113° E, 73 m (Perić, R. 19-May-2022); **Jankov Most**, 45.484083° N, 20.432292° E, 74 m, ass. *Pholiurus pannonicus*-*Plantago tenuiflora* (Perić, R. 06-Jul-2017, pers. comm.); **Banatski Dvor-Žitište**: DR63 Taladje, 45.495734° N, 20.490478° E, 74 m (Perić, R. 28-Jun-2022, pers. comm.); DQ59 Čenta: Veliki alas, 45.130728° N, 20.407908° E, 71 m, ass. *Pholiurus pannonicus*-*Plantago tenuiflora* (Perić, R. 24-Apr-2012, pers. comm.); **Farkaždin**: DR50 Napojište, ass. *Pholiurus pannonicus*-*Plantago tenuiflora* (Perić, R. 14-Jun-2011, pers. comm.); **Farkaždin**: DR60 Široka bara, ≈ 45.221597° N, 20.501022° E, 72 m (Perić, R. 21-Jun-2012) + 45.221597° N, 20.501022° E, 72 m (Perić, R. 21-Jun-2012, pers. comm.); DR60 **Idvor**, ≈ 45.2016° N, 20.520336° E, 68 m (Perić, R., Stojšić, V. 01-Jun-2012) + Ristina bara, 45.19534722° N, 20.50261944° E, 68 m (Perić, R. 27-May-2011, pers. comm.) + 45.2016° N, 20.520336° E, 68 m (Perić, R. 01-Jun-2012, pers. comm.); **Idvor**: DR50, between Tukoš and the river Tamiš, pasture, ass. *Pholiurus pannonicus* + *Plantago tenuiflora*, ≈ 45.18462222° N, 20.48603611° E, 71 m (Perić, R. 27-May-2011); **Idvor-Farkaždin**, 45.18451667° N, 20.485475° E, 71 m (Perić, R. 20-May-2009, pers. comm.); **Uzdin**: DR60 Velika slatina, 45.202042° N, 20.591106° E, 71 m, (Perić, R. 12-Jun-2012, pers. comm.) + Rakšin rit, ass. *Pholiurus pannonicus*-*Plantago tenuiflora* (Perić, R. 16-Jul-2013, pers. comm.); **Orlovat**: DR 60 Kutine, ass. *Pholiurus pannonicus*-*Plantago tenuiflora* (Perić, R. 28-Jun-2012, pers. comm.); **Tomaševac**: DR61 Slatina, ass. *Pholiurus pannonicus*-*Plantago tenuiflora*, ≈ 45.25116944° N, 20.60673611° E, 70 m (Perić, R. 01-Jul-2011, pers. comm.) + Brzava, 45.257494° N, 20.604711° E, 69 m (Perić, R. 01-Jul-2011, pers. comm.); **Dobrica**: DR80 Kukuta, 45.250806° N, 20.863575° E, 75 m (Perić, R. 01-Jun-2022); **Botoš**: DR71 Kaludjerica, ≈ 45.318653° N, 20.657736° E, 69 m (Perić, R. 07-Jun-2013) + Trnovača, 45.297458° N, 20.659997° E, 72 m, ass. *Pholiurus pannonicus*-*Plantago tenuiflora* (Perić, R. 07-Jun-2013, pers. comm.); DR72 **Sutjeska-Sečanj**: ≈ 45.389767° N, 20.74115° E, 70 m, ass. *Pholiurus pannonicus*-*Plantago tenuiflora* (Perić, R. 09-Jul-2013, pers. comm.); **Neuzina**: Budžak, 45.351011° N, 20.720447° E, 72 m (Perić, R. 13-Jun-2013, pers. comm.); **Dobrica**: DR90 Iberland, ass. *Pholiurus pannonicus* + *Plantago tenuiflora*, 45.224794° N, 20.890552° E, 74 m (Perić, R. 25-May-2022); **Šurjan**: DR92 Germ, 45.405092° N, 20.884014°

E, 74 m (Perić, R. 01-Jul-2011, pers. comm.) + ass. *Pholiurus pannonicus* + *Plantago tenuiflora*, 45.374039° N, 20.901181° E, 72 m (Perić, R. 26-Jul-2013, pers. comm.).

PUBLISHED DATA: **Bačka**: CS90 **Subotica** [„Zenta“] (Slavnić 1943: 401); CR76 **Sivac** (Slavnić, Atanacković 1958: 144); CR54 **Srpski Miletić** (Budak 1998: 106); DR28 **Senta** [„Zenta“] (Atanacković 1958: 144, Guelmino 1968: 150); DR24 **Stari Bečej** [„Obecse“] [subnom. *Lepturus pannonicus* (Host) Kunth] (Slavnić 1943: 401), **Donji rit** [„Alsörét“] + vicinity [„Irizsethát“] (Kovács 1915: 70, Prodán 1915: 201); DR22 **Žabalj** [„Zsablya“] [subnom. *Lepturus pannonicus* (Host) Kunth] (Slavnić 1943: 401, Atanacković 1958: 144, Sigunov 1979: 85, Budak 1998: 106), saline pastures (09-Jun-1912, Prodán 1914: 99, *Prodán*, Kümmerle 1916: 182), „along salt ditches“ (Prodán 1915: 201).

Banat: DS30 **Banatsko Arandjelovo-Srpski Krstur**: **Veliki Siget** (Knežević 1994: 75); DS40 **Banatsko Arandjelovo**: **Siget** [„Mali Siget“] (Knežević 1994: 75); DS30-DR39 **Novi Kneževac** (Knežević et al. 2011: 25); DR39 **Novi Kneževac-Filić** (Knežević 1994: 75); DR49 **Podlokanj** (Knežević 1994: 75); DR 37 **Padej** (Knežević 1994: 75); DR47 **Idjoš** (Knežević et al. 2014: 48); DR46 **Bočar** (Knežević 1994: 75), saline pasture east from the village, ass. *Pholiurus Plantago tenuiflora* Wendelberger subass. *camphorosmetetum* Slavnić“ + „subass. *ranunculetetum lateriflori* Slavnić“ (16-Aug-1937, Slavnić 1952: 423); DR34 **Kumane** (Knežević et al. 2009b: 32); DR43 **Elemir-Melenci**: **Okanj bara** (Knežević et al. 2009a: 191); **Zrenjanin**: DR52 **Mužlja** [„Muzslya“] (Knežević 1994: 75), the river Begej [„Bega“] backwaters, „*Pholiuro-Plantaginetum tenuiflorae* (Rapaics 27) Wendelbg. 43 *eleocharetosum (uniglumis)*“ (Bodrogközy & Györfy 1970: 35); DR51 **Lukino Selo** (Knežević 1994: 75); DR42 **Aradac** [„Arda“] (Knežević 1994: 75), the river Begej [„Bega“] backwaters, „*Pholiuro-Plantaginetum tenuiflorae*“ (Bodrogközy & Györfy 1970: 28); DR82 **Sečanj** (Vučković R. 1980, Knežević 1994: 75); **Boka** (Knežević 1994: 75); DR81 **Banatska Dubica** (Knežević 1994: 75); DR91 **Konak** (Knežević 1994: 75); DQ99 **Alibunar** [subnom. *Lepturus pannonicus* Kunth.]: above saline lake (Heuffel 1858: 236); ER00-EQ09 **Lokve** (Knežević 1994: 75); ER10 **Margita** [„Margitta“] [subnom. *Lepturus pannonicus* Kunth.] (Heuffel 1858: 236); **Vatin**, „ass. *Puccinellietum limosae* (Raps 1927) Soó 1930 subass. *asteretosum pannonicum*“ (Knežević 1984: 50); DQ76 **Pančevo** [„Pancsova“] [subnom. *Lepturus pannonicus* Kunth.], saline places (Heuffel 1858: 236).

Srem: DQ06 **Nikinci-Platičevo**: **Bokšina**, salt steppes complex (Slavnić 1950-1952: 147); DQ16 **Nikinci** – **Donji Tovarnik**: **Tiganj**, salt steppes complex (Slavnić 1950-1952: 147); **Donji Tovarnik**, saline pastures and meadows (Slavnić 1950-1952: 147); DQ15 **Obrež**, salt steppes (Slavnić

1950-1952: 147); DQ26 **Karlović**, saline leas + pastures „ass. *Staticeto-Artemisietum monogynae* Topa 1938“ + „ass. *Pholiurus Plantago tenuiflora* Wendelberger 1943“ (Slavnić 1950-1952: 147, 1953: 39-40); DQ36 **Dobanovci – Ugrinovci** [„Vijugava Bara“] (Slavnić 1950-1952: 147).

C Serbia: EN38 **Bresnić**: 43.24722222° N, 21.45277778° E, 293 m (29-Jun-2005, Zlatković *et al.* 2005b: 20, 2014: 97); EN59 **Oblačina** [subnom. *Lepturus Pannonicus* Trin.]: Oblačina Lake [„Oblačinska Bara“, „Bilješka Bara“] (Pančić 1884: 248, Adamović 1904b: 156), 43.30722222° N, 21.68166667° E, 285 m (28-Jun-2005, Zlatković *et al.* 2005b: 20, 2014: 97), **Lepaja**: 43.29305556° N, 21.66388889° E, 285 m (21-Jul-2005, Zlatković *et al.* 2005b: 20, 2014: 97); **Niš**: EN69 **Mali Lalinac** [„Lalinac“]: Lalinački Djeram [„Lalinačka slatina“], 43.3450000° N, 21.74583333° E, 200 m (14-Jun-2005, Zlatković *et al.* 2005b: 20, 2008b: 80, 2014: 97); **Mramor** [subnom. *Lepturus pannonicus* (Host) Kth.] (*Ilić*, Fritsch 1908: 153).

S Serbia: **Leskovac**: EN75 **Rudare** [„Rudari“] [subnom. *Lepturus pannonicus* (Host) Kth.] (*Ilić*, Fritsch 1908: 153); **Vranje**: EN70 **Aleksandrovac**: Aleksandrovačko Lake, 42.48888889° N, 21.90333333° E, 401 m (Zlatković, B., Randjelović, V., Amidžić, L., 2003, 02-May-2000, 05-Jun-2005, Zlatković *et al.* 2005b: 20, 2014: 97).

DUBIOUS PUBLISHED DATA: **Pomoravlje**: DQ91 **Smederevska Palanka** (Jakovljević & Jovanović 2005: 7).

DUBIOUS AND IMPRECISE PUBLISHED DATA: **Bačka**: **Titelski breg** (*Igić* 1988: 145).

IMPRECISE PUBLISHED DATA: **Serbia** [„*Pholiurus paniculatum*“] (Hayek 1933: 300, Gajić 1980a: 82, 1980b: 131); **Vojvodina** (Slavnić 1950: 141), „ass. *Puccinellietum limosae-Pholiuretosum*“ (Obradović & Budak 1974: 23); **Bačka** (Slavnić 1953: 52), „ass. *Pholiurus-Plantago tenuiflora* (Soó 1933) Wendelberger 1943“ + „ass. *Alopecurus-Roripa Kernerii* Slavnić 1941 subass. with *Statice Gmelini*“ (Slavnić 1948: 93, 113-114), along the river Tisa, „ass. *Ranunculetum pedati* Slavnić 1942“ (Slavnić 1948: 127, 128); **Banat** (Slavnić 1953: 52), „ass. *Pholiurus-Plantago tenuiflora* (Soó 1933) Wendelberger 1943“ + „ass. *Aster-Plantago maritima* Slavnić 1939“ + „ass. *Alopecurus-Roripa Kernerii* Slavnić 1941 subass. with *Statice Gmelini*“ (Slavnić 1948: 93, 96, 113-114), along the river Tisa, „ass. *Ranunculetum pedati* Slavnić 1942“ (Slavnić 1948: 127, 128); **Srem** (Slavnić 1953: 49, 50, 52, Cincović & Kojić 1976: 447), „ass. *Staticeto-Artemisietum monogynae* Topa 1938“ + „ass. *Pholiurus Plantago tenuiflora* Wendelberger 1943“ (Slavnić 1953: 42, 44, 51); **C Serbia**: salt steppes (Zlatković *et al.* 2005a: 36-37); **S Serbia**: salt steppes (Zlatković *et al.* 2005a: 36-37); **Subotica Sands** (Obradović & Boža 1986: 132); **W**

Bačka (Grdinić *et al.* 2001: 148); **N Banat**: „ass. *Puccinellia-Carex secalina* Slavnić 1940“ (Slavnić 1948: 96, 97), „ass. *Alopecurus-Rorippa Kernerii* Slavnić 1941“ + „ass. *Staticeto-Artemisetum monoginae* Topa 1939“ + „ass. *Pholiurus-Plantago tenuiflora* Wendelberger 1943“ (Adamo-
vić 1959: 34, 39, 42); **Middle Banat**: „ass. *Puccinellia-Carex secalina* Slavnić 1940“ (Slavnić 1948: 96, 97); **Potisje**: „ass. *Aster-Plantago maritima* Slavnić 1939“ (Slavnić 1948: 96); **Potamišje** (Budak *et al.* 1980); **E Potamišje**: „ass. *Pholiuro-Plantaginetum tenuiflorae* (Soo 33) Wendel-
berger 1943“ + „subass. *lythretosum hyssopifoliae*“ + „*Puccinellietum limosae* Wendelberger 1950“ + „*Camphorosmetum annuae* (Rapaics 16) Topa 1939“ (Vučković 1984: 306-307); **Žabalj** [„Zsablya“]-**Bačko Gra-
dište** [„Bácsföldvár“] [subnom. *Lepturus pannonicus*] (09-Jun-1912, Pro-
dán 1914: 107); **Novi Sad**: vicinity, „ass. *Puccinellietum limosae-
Pholiuretosum*“ (Obradović & Budak 1974: 23); **Lowland Srem** (Gajić &
Karadžić 1991: 352).



Fig. 10. - Typical habitat of community *Pholiuro pannonicum-Plantaginetum tenuiflorae* Wendelberger, vicinity of Dobrica (photo R. Perić).

NOTES: This highly specialized halophytic species is characteristic for wet or somewhat submerged microhabitats formed by erosion and trampling in shallow solonetz soils with more compact (not columnar) structure, mostly in earth cracks, micro-depressions, narrow ditches, animal or even car tracks, where it usually forms community *Pholiuro pannonicum-*

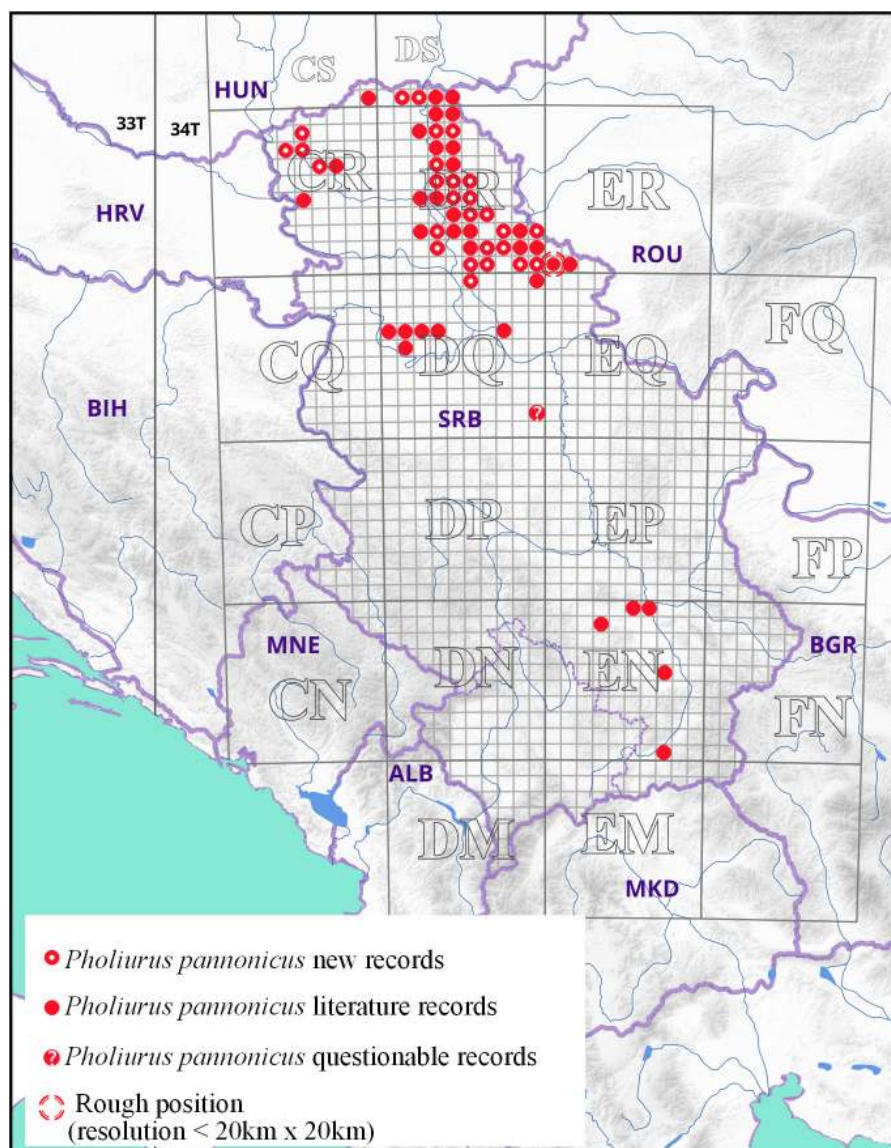


Fig. 11. - New herbarium and published data on the distribution of *Pholiurus pannonicus* (Host) Trin. in Serbia.

Plantaginetum tenuiflorae Wendelberger (Slavnić 1950-1952, Eliáš *et al.* 2010) (Fig. 10). This community is particularly widespread across saline-steppe pastures in Banat along the rivers Tisa, Tamiš, Brzava and Moravica (Fig. 11). In some cases (e.g. vicinity of Žabalj and Idvor) its areal is additionally expanded on natural or semi-natural saline grassland habitats due to erosion and degradation caused by excessive grazing and

trampling during most sensitive spring period when land is humid or partly submerged (*i.e.* soft), resulting in creation of numerous and unusually large secondary habitats. Habitat degradation tendencies producing secondary microhabitats along with poor floristic knowledge regarding remote saline parts of Banat are the possible explanation for our many new records of this species. Protected species in Serbia (Anonymous 2010-2016).

Plantago schwarzenbergiana Schur, *Verh. Mitth. Siebenbürg. Vereins Naturwiss. Hermannstadt* 6: 3 (1855).

NEW DATA: **Bačka: Ruski Krstur**: CR84 Bela pusta, 45.559122° N, 19.471381° E, 79 m (Perić, R. 22-May-2019).

Banat: Banatski Monoštor: DR48 Taladj, ≈ 45.932006° N, 20.280772° E, 76 m (Perić, R. 17-Aug-2013); **Mokrin**: Jaroš (*Butorac*, B. 04-Jun-1992, 05-Jun-1992), „Pojilište-Pištin salaš“ (*Butorac*, B. 24-Jun-1992); **Jazovo**: Celeruša, ≈ 45.913428° N, 20.214592° E, 75 m (Perić, R. 25-Jun-2014, *pers. comm.*); **Jarkovac**: DR71 Vizići, ≈ 45.307394° N, 20.726733° E, 73 m (Perić, R. 12-Jul-2011); **Farkaždin**: DR50 Napojište, 45.165711° N, 20.444628° E, 69 m (Perić, R. 10-May-2013); **Idvor**: DR60 Petričeva bara, 45.176994° N, 20.541889° E, 71 m (Perić, R., Stojšić, V. 16-Jul-2013); **Uzdin**: Topla bara: Mali lakat, 45.182386° N, 20.599611° E, 70 m (Perić, R., Stojšić, V. 16-Jul-2013); **Uzdin-Idvor**: ≈ 45.177797° N, 20.558786° E, 72 m (Perić, R. 16-Jul-2013, *pers. comm.*); **Dobrica**: DR80 Kukuta, 45.239638° N, 20.856917° E, 74 m (Perić, R. 01-Jun-2022); **Šurjan**: DR92 Kamen, 45.410797° N, 20.8967° E, 72 m (Perić, R. 05-Aug-2011, *pers. comm.*); DQ99 Seleuš, 45.134711° N, 20.936383° E, 74 m (Perić, R. 28-May-2019), Vladimirovački pašnjak, 45.112763° N, 20.925479° E, 76 m (Perić, R. 02-Jul-2020); **Lokve**, 45.136443° N, 20.998353° E, 75 m (Perić, R. 31-May-2022, *pers. comm.*).

PUBLISHED DATA: **Bačka**: DS00 Palić: Vila Lujza (Babiak 1998-1999: 34); **Slano Lake** (Obradović, M. Budak 1998: 110); **Hajdukovo**, „*ass. Lepidio-Puccinellietum limosae*“ (Gajić 1986: 224), Sunjog čarda (Babiak 1998-1999: 34); DS00-DS10 „**Ludaš Lake**“ **Special Nature Reserve** (Szabados 2007: 61); DS10 **Bački Vinogradi** [„Bácsszőlös“-]**Horgoš** [„Horgos“] (Šturc 1986: 411, 1979, Sturc 1997: 84), Stočni pašnjak (Lakušić 1999: 46); **Horgoš**: DS11 Čengeš rampa (Lakušić 1999: 46); DS11-DS 1 **Horgoš** [„Horgos“] (Slavnić 1943: 402, Obradović 1971: 26, Godicl 1980); DS20 **Martonoš** [„Martonos“] (Slavnić 1943: 402, Obradović 1971: 26, Godicl 1980); **Kanjiža** (Godicl 1980); DR28 **Senta** [„Zenta“] (Slavnić 1943: 402, Guelmino 1968: 77, Obradović 1971: 26); **Gornji Breg** [„Felsőhegy“] (Guelmino 1968: 134); **Kruševlje**: CR59 northeast from the village (Vajgand *et al.* 2003: 86); CR85 **Kula**, „*ass. Plantagineto-Festucetum pseudovinae* subass. *puccinellietosum limosae* + *typicum*“

(Parabućski 1980: 86-87); CR75 **Kruščić** (Knežević 1979: 1276), solonchak-solonetz, „ass. *Camphorosmetum annuae* Topa 1939“ + „ass. *Agrosti-Caricetum distantis* (Rapaics 1927) Soó 30“ (Knežević 1979: 1278, 1280, 1980: 112: Tab. 3, 115), „ass. *Achilleo-Festucetum pseudovinae* (Magyar 1928) Soó (1933) 1945 subass. *juncetosum gerardi* + subass. *rhinanthetosum rumelici*“ (Knežević 1980: 120: Tab. 7), „ass. *Plantagineto-Festucetum pseudovinae* subass. *puccinellietosum limosae* + *typicum*“ (Parabućski 1980: 86-87); CR64 **Bački Gračac**, „ass. *Plantagineto-Festucetum pseudovinae* subass. *puccinellietosum limosae* + *typicum*“ (Parabućski 1980: 86-87); CR74 **Ruski Krstur** [subnom. „*Plantago schwarsenbergiana* Schur f. *macrophylla* Schur“] (Budak 1998: 110), lime-sodic-chloridic solonchak, „ass. *Camphorosmetum annuae* Topa 1939 subass. *plantaginetosum schwarzenbergiani*“ (Kujundžić 1979: 600, 1980: 109), „ass. *Plantagineto-Festucetum pseudovinae* subass. *puccinellietosum limosae* + *typicum*“ (Parabućski 1980: 86-87), lime-sodic-chloridic solonchak, „ass. *Agrosti-Caricetum distantis*“ + „ass. *Achilleo-Festucetum pseudovinae* subass. *rhinanthetosum rumelici* + *normale*“ (Kujundžić 1980: 104: Phyt. Tab. 1, 2); DR04 **Srbobran** [„Szenttamás“] (Jávorka 1925: 1032, Obradović 1971: 26); DR24 **Stari Bečej** [„Óbecse“] (Jávorka 1925: 1032, Obradović 1971: 26); DR22 **Žabalj** (Budak 1998: 110); CR71 **Bačka Palanka** (Budak 1998: 110); CR91 **Futog** [subnom. „*Plantago schwarsenbergiana* Schur f. *macrophylla* Schur“] (Budak 1998: 110); DR21 **Djurdjevo** (Parabućski, S. Budak 1998: 110).

Banat: DS30 **Banatsko Arandjelovo-Srpski Krstur:** Veliki Siget (Knežević 1994: 78); DS40 **Banatsko Arandjelovo:** Siget [„Mali Siget“] (Knežević 1994: 78); DR38 **Ostojićevo** (Slavnić 1950: 136, Obradović 1971: 26); DR37 **Padej** (Slavnić 1950: 136); DR47 **Sajan** (Slavnić 1950: 136, Obradović 1971: 26, Knežević 1994: 78); **Idjoš** (Knežević *et al.* 2014: 48); DR46 **Bočar** (Slavnić 1950: 136, Obradović 1971: 26); DR46 **Novo Miloševo** [„Beodra“] (Obradović 1971: 26); **Novo Miloševo:** DR36 Kerektov [„Pa. Kerektó“], humid & saline meadows (Thaisz 1907: 167); **Novo Miloševo – Novi Bečej:** DR45 Budžak-Paktovo [„large salt steppe SE (right) from the road Novi Bečej-Miloševo“] (Guelmino 1972: 106); DR35 **Novi Bečej:** Slano Kopovo [„Šoškop“] [subnom. *Plantago schwarzenbergiana* Schur f. *pilosula* Schur 1866] („saline meadow“ Boža *et al.* 1987: 62, Knežević 1994: 78, Lakušić 1999: 46); DR34 **Kumane** (Slavnić 1950: 136, Obradović 1971: 26); DR44 **Melenci** (Slavnić 1950: 136, Obradović 1971: 26), Rusanda (Knežević & Boža 1990, Knežević 1994: 78); DR43 **Elemir – Melenci:** Okanj bara (Knežević *et al.* 2009a: 191, Panjković *et al.* 2010b: 67, 2011: 769); **Elemir** (Slavnić 1950: 136, Obradović 1971: 26); DR51 **Lukino Selo** [subnom. *Plantago schwarzenbergiana* Schur f. *macrophylla* Schur] (Knežević 1994: 78); DR72 **Neuzina** [subnom. *Plantago schwarzenbergiana* Schur f. *macrophylla*

Schur] (Knežević 1994: 78); DR72 **Banatski Despotovac – Botoš** [subnom. *Plantago schwarzenbergiana* Schur f. *macrophylla* Schur]: Deračka bara (Knežević 1994: 78), „ass. *Suaedetum maritimae*“ + „ass. *Chenopodium-Atriplex salina*“ + „ass. *Puccinellietum limosae*“ + „ass. *Puccinellietum limosae* subass. *plantaginetosum schwarzenbergianae*“ + „ass. *Camphorosmetum annuae*“ (Vučković 1986: 475); DR82 **Sečanj** [subnom. *Plantago schwarzenbergiana* Schur f. *macrophylla* Schur] (Vučković R. 1980, Knežević 1994: 78), „ass. *Poeto-Alopecuretum pratensis halophyticum* subass. *agrostetum albae*“ (Vučković 1982: 18); DR81 **Jarkovac** (Knežević 1994: 78); DR90 **Ilandža** (Knežević 1994: 78); ER10 **Margita** (Knežević 1994: 78); **Vatin** (Obradović 1971: 26), „*Puccinellietum limosae* (Raps 1927) Soó 1930 subass. *asteretosum pannonicum*“ (Knežević 1984: 51); EQ19 **Vlajkovac** (Lakušić 1999: 46); **Pavliš** (Lakušić 1999: 46); **Vatin – Vršac**: ER20 Selište-Velike livade [„Veliki pašnjak“] (Lakušić 1999: 46); **Vršac** [„Versec“] – **Vatin** [subnom. *Plantago sibirica*]: saline meadows along railroad (Bernátsky 1905: 160); EQ29 **Vršac** [„Versec“] [subnom. *Plantago sibirica*] (Bernátsky 1905: 147, 159, 160).

IMPRECISE PUBLISHED DATA: **Serbia** (Gajić 1980a: 87, 1980b: 131); **Vojvodina** (Janković & Gajić 1974: 333); **N Vojvodina** (Godić 1980a); **Bačka** (Slavnić 1953: 41, 52), „ass. *Staticeto-Artemisietum monoginae* Topa 1939“ (Slavnić 1948: 108-109), along the river Tisa, „ass. *Ranunculetum pedati* Slavnić 1942“ + „ass. *Festucetum pseudovinae* Soó 1936“ (Slavnić 1948: 127, 128, 131, 132); salt-steppes (Obradović 1987: 108, Obradović *et al.* 1987: 74); **Banat** (Slavnić 1953: 41, 52), „ass. *Staticeto-Artemisietum monoginae* Topa 1939“ (Slavnić 1948: 108-109), along the river Tisa, „ass. *Ranunculetum pedati* Slavnić 1942“ + „ass. *Festucetum pseudovinae* Soó 1936“ (Slavnić 1948: 127, 128, 131, 132); salt-steppes (Obradović 1987: 108, Obradović *et al.* 1987: 74); „ass. *Halo-Agrostetum albae* Vučković 1985“ (Knežević *et al.* 1995: 162); **Subotica**, vicinity (Obradović & Boža 1985: 67); **Subotica Sands** (Obradović & Boža 1986: 132); **Selevenjske pustare** (Butorac 1999: 34, Butorac *et al.* 2002: 17); **W Bačka** (Grdinić *et al.* 2001: 148); **C Bačka** (Obradović 1987: 108); **N Banat**: „ass. *Staticeto-Artemisietum monoginae* Topa 1939“ (Adamović 1959: 39); **Potisje** (Obradović 1987: 108, Obradović *et al.* 1987: 74): „ass. *Trifolietum subterranei* Slavnić 1942 subass. with *Statice Gmelini*“ (Slavnić 1948: 124, 126); **Potamišje** (Budak *et al.* 1980); **E Potamišje**: „ass. *Pholiuro-Plantaginietum tenuiflorae* (Soo 33) Wendelberger 1943“ + „*Puccinellietum limosae* Wendelberger 1950“ + „*Camphorosmetum annuae* (Rapaics 16) Topa 1939“ (Vučković 1984: 307).

NOTES: Strictly protected species in Serbia (Anonymous 2010-2016) (Fig. 12). Usually it can be found in preserved alkali steppic mosaic

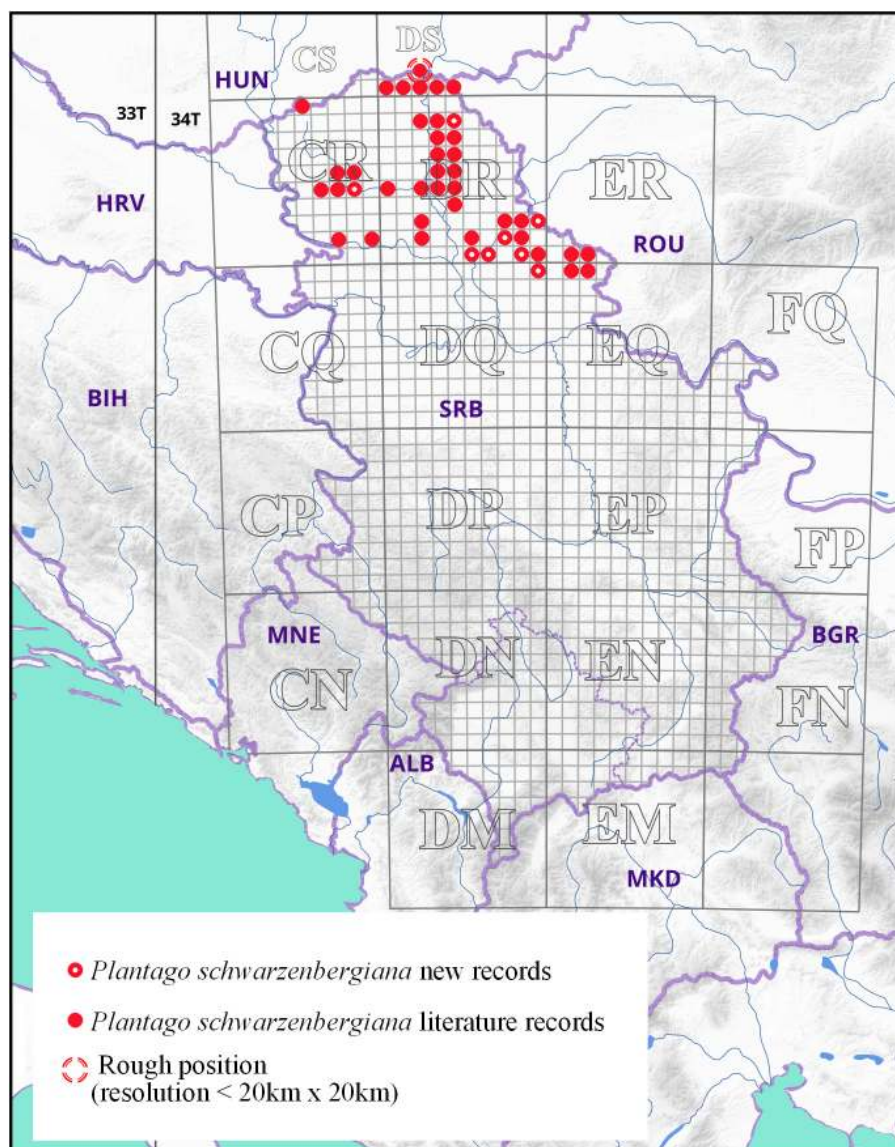


Fig. 12. – New herbarium and published data on the distribution of *Plantago schwarzenbergiana* Schur in Serbia.

habitats composed of communities *Camphorosmetum annuae* Rapaics ex Soó and *Artemisio-Festucetum pseudovinae* Soó in Máthé. In some instances, when plant communities become disturbed owing to overgrazing, this species could appear in copious amounts. Such was the case in the vicinity of Melenci (Mala Rusanda: Mutljača, $\approx 45.511628^\circ$ N, 20.292764° E, 72 m, Perić, R. 22-Sep-2011, PZZP).

Plantago tenuiflora Waldst. & Kit., *Descr. Icon. Pl. Hung.* 1: 37 (1802).

NEW DATA: **Bačka: Horgoš:** DS10, 46.135672° N, 19.963622° E, 81 m, ass. *Pholiurus pannonicus-Plantago tenuiflora* (Perić, R. 29-May-2014, pers. comm.); **Žabalj:** DR32 Livade, ≈45.375653° N, 20.133463° E, 76 m (Perić, R. 05-Apr-2021, pers. comm.); **Žabalj-Mošorin:** DR32 Stari Žabalj, 45.379154° N, 20.166304° E, 74 m (Perić, R. 18-Jun-2021, pers. comm.) + Raskopanica-Greda, 45.350655° N, 20.185093° E, 75 m (Perić, R. 18-Jun-2021, pers. comm.); **Djurdjevo-Mošorin:** DR32 Senokos, 45.344001° N, 20.125003° E, 76 m, ass. *Pholiurus pannonicus-Plantago tenuiflora* (Perić, R. 12-Jul-2021, pers. comm.); DR19 **Velebit**, vicinity (Perić, R. 27-May-2007).

Banat: Čoka: DR38 Arenda, southeastern part of the salt lake (Perić, R. 17-Jul-2013); DR48 **Banatski Monoštor:** Markučeva bara, ≈ 45.9310 75° N, 20.280142° E, 76 m, ass. *Pholiurus pannonicus-Plantago tenuiflora* (Perić, R. 13-Aug-2013, pers. comm.); **Mokrin:** DR48 Jaroš (*Butorac*, B. 05-Jun-1992), Tri ante, near tree stand (*Butorac*, B. 18-Jun-1997); **Bočar:** DR36 Prečka (Perić, R., Rilak, S., Kartalović, V. 17-May-2016); **Bašaid:** DR55 Veliki Bikač, 45.661367° N, 20.378194° E, 75 m (Perić, R. 25-Apr-2017); **Banatski Dvor:** DR54 Lap, 45.542743° N, 20.454640° E, 73 m (Perić, R. 26-May-2022); DR53 **Jankov Most**, ≈ 45.484083° N, 20.432 292° E, 74 m, ass. *Pholiurus pannonicus-Plantago tenuiflora* (Perić, R. 06-Jul-2017, pers. comm.); **Zrenjanin:** DR51 **Mužlja – Lukino Selo:** between Kopovo 3 and Belo jezero (Stojić, V. 16-Jul-2009); **Tomaševac:** DR61 Slatina, ass. *Pholiurus pannonicus-Plantago tenuiflora*, 45.25116944° N, 20.60673611° E, 70 m (Perić, R. 01-Jul-2011, pers. comm.) + Brzava, ass. *Pholiurus pannonicus-Plantago tenuiflora*, 45.257494° N, 20.604711° E, 69 m (Perić, R. 01-Jul-2011, pers. comm.); DR71 **Botoš:** Kaludjerica, ≈ 45.318653° N, 20.657736° E, 69 m (Perić, R. 07-Jun-2013, pers. comm.) + Trnovača, ass. *Pholiurus pannonicus-Plantago tenuiflora*, 45.297458° N, 20.659997° E, 72 m (Perić, R. 07-Jun-2013, pers. comm.); **Boka – Banatska Dubica:** DR81 Kalovitica-Svatovska humka, ass. *Pholiurus pannonicus-Plantago tenuiflora*, ≈ 45.33255° N, 20.834933° E, 73 m (Perić, R. 22-May-2013, pers. comm.); DR92 **Šurjan:** ass. *Pholiurus pannonicus* + *Plantago tenuiflora*, 45.374039° N, 20.901181° E, 72 m (Perić, R. 26-Jul-2013, pers. comm.); **Dobrica:** DR80 Kukuta, 45.238268° N, 20.856204° E, 74 m (Perić, R. 01-Jun-2022); **Dobrica:** DR90 Iberland, ass. *Pholiurus pannonicus* + *Plantago tenuiflora*, 45.224794° N, 20.89 0552° E, 74 m (Perić, R. 25-May-2022); **Vršac-Vatin:** ER20 Selište, 45.196446° N, 21.294059° E, 76 m (Perić, R. 24-May-2021); **Lokve:** EQ09 Velike livade, 45.141614° N, 21.007481° E, 74 m (Perić, R. 31-May-2022).

PUBLISHED DATA: **Bačka: Subotica Sands:** CS91 Jasenovačka šuma [„Körösi-erdő“] (Sturc 1990: 1); DS00 **Hajdukovo** (Budak 1998: 110); **Slano Lake** [„large pond, up to 1 km long laying along the road to Horgoš, between Palić Lake and Ludaš lake“] (Slavnić 1939: 79); DS20 **Martonoš** [„Martonos“] (Slavnić 1943: 401); DR28 **Senta** [„Zenta“] (Slavnić 1943: 401, Guelmino 1968: 134); CR59 **Ridjica** [„Regőcze“] (Prodán 1910b: 376, 1915: 257); CR48 **Gakovo** [„Gádor“] (Prodán 1910b: 376, 1915: 257); CR58 **Stanišić** [„Őrszállás“] (Prodán 1910b: 376, 1915: 257); CR37 **Bezdan** [„Bezdán“], pastures (Prodán 1910b: 377, 01-May-1911, Prodán 1914: 105, 119, 122, 132, Prodán 1915: 257); CR47 **Bezdan-Bački Monoštor: Štrbac-Kozara forest** [„bezdáni erdő“], saline meadows (01-May-1912, Prodán 1914: 98, 132); **Bački Monoštor** (Budak 1998: 110); CR57-CR56 **Sombor** [„Zombor“] (Prodán 1910b: 377, 1915: 257, Budak 1998: 110); CR67 **Čonoplja-Svetozar Miletić** [subnom. *Plantago tenuiflora* W. et K. f. *depauperata* Domin.], „ass. *Lepidio crassifolio-Festucetum pseudovinae* Knežević et al. 2000 subass. *camphorosmetum annuae*“, solonchak (Knežević et al. 2000: 47); CR45 **Apatin** (Prodán 1910b: 377, 29-May-1910, Prodán 1914: 127, Prodán 1915: 257, Godicl 1980), „ass. *Peucedano-Asteretum punctati* Soó 47 subass. *festucetosum pseudovinae*“ (Parabućski 1978: 23); **Apatin-Svilojevo: Kurjačica**: salt steppes on the forest edge, solonetz with solonchak spots on loess, 45.66139167° N, 19.02246667° E (Perić, R. 19-Apr-2009, BEO, PZZP, Niketić et al. 2009: 88); CR55 **Doroslovo** [subnom. *Plantago tenuiflora* f. *depauperata* Domin.] (Purger, J. 1993, Budak 1998: 110); CR54-CR53 **Karavukovo** [„Bácsordas“] (Prodán 1910b: 377, 1915: 257); CR63 **Deronje** [„Dernye“] (Prodán 1910b: 377, 08-May-1910, Prodán 1914: 110, 127, 132, Prodán 1915: 257, leg. Prodán, „saline places“, Kümmerle 1916: 195); CR53 **Vajska** [„Vajszka“] (Prodán 1915: 257); CR52 **Bodjani** [„Bogyán“], forest [„bogyani erdőben“] (Prodán 1910b: 377, 1914: 127, 132); CR62 **Bač** [„Bács“] (Prodán 1910b: 377, 1915: 257); CR71 **Bačka Palanka** [„Palanka“] (Prodán 1910b: 377); CR74 **Ruski Krstur** (Janjatović, V., Budak 1998: 110); DR25 **Stari Bečej** [„Óbecse“] (Slavnić 1943: 401); DR24 **Bačko Gradište** (Budak 1998: 110); CR91 **Futog** [„Ófutak“] [subnom. *Plantago tenuiflora* f. *depauperata* Domin 1933] (Prodán 1915: 257, Budak, V., Boža et al. 1987: 60, 1978, Janjatović, V., Budak 1998: 110); **Novi Sad:** DR01 **Veternik** [„Chottek-pusztá“] (Prodán 1910b: 377, 1914: 132); DR11 **Kač** [„Káty“] (Prodán 1910b: 377, 1915: 257); DR21 **Djurdjevo**, „ass. *Trifolietum subterranei* Slav. 42 subass. with *Statice gmelini*“ (Parabućski 1978: 34); **Budisava** (Janjatović, V., Budak 1998: 110); DR22 **Žabalj** [„Zsablya“], saline pastures (09-Jun-1912, Prodán 1914: 99, Slavnić 1943: 401, 1978, Djurčanski, R. 1980, Janjatović, V., Budak 1998: 110), along the Jegrička river (Djurčanski, R. 1980, Budak 1998: 110); DR20 **Kovilj** [„Kovily“ „Alsókabol“, „Felsőkabol“] („saline

meadows“, Zorkóczy 1896: 87, Prodán 1910b: 377, 1915: 257, 1978, Budak 1998: 110), Kovilj monastery, saline meadows (15-May-1910, Prodán 1914: 125, 132).

Banat: DS30-DR39 **Novi Kneževac** (Knežević *et al.* 2011: 25); DS30 **Banatsko Arandjelovo-Srpski Krstur:** [subnom. *Plantago tenuiflora* W. et K. f. *depauperata* Domin] Veliki Siget (Knežević 1994: 78); DS40 **Banatsko Arandjelovo:** [subnom. *Plantago tenuiflora* W. et K. f. *depauperata* Domin] Siget [„Mali Siget“] (Knežević 1994: 78); DR39 **Novi Kneževac – Filić** [subnom. *Plantago tenuiflora* W. et K. f. *depauperata* Domin] (Knežević 1994: 78); DR49 **Podlokanj** (Knežević 1994: 78); DR58 **Mokrin** (Knežević 1994: 78); DR57 **Kikinda**, vicinity, near a road (Gajić 1973: 21, Janković & Gajić 1974: 330); DR37 **Padej** [subnom. *Plantago tenuiflora* W. et K. f. *depauperata* Domin] („solonetz + chloridic-sodic-sulphatic solonetz“, Janjatović 1971: 20, 21, Gallé 1974: 37, Bogojević 1979: 9, Knežević 1994: 78); DR47 **Sajan**, sodic-chloridic solonetz (Janjatović 1971: 22, Bogojević 1979: 9); **Idjoš** (Knežević *et al.* 2014: 48); DR46 **Novo Miloševo** [subnom. *Plantago tenuiflora* Waldst. et Kit. f. *depauperata* Domin] (Knežević 1994: 78), saline pasture, „ass. *Camphorosmetum annuae matricharietetum* Slavnić“ (15-Aug-1937, Slavnić 1952: 423); **Bočar** [subnom. *Plantago tenuiflora* Waldst. et Kit. f. *depauperata* Domin] (Knežević 1994: 78), saline pasture east from the village, ass. *Pholiurus Plantago tenuiflora* Wendelberger subass. *camphorosmetum* Slavnić“ + „subass. *ranunculeetum lateriflori* Slavnić“ (16-Aug-1937, Slavnić 1952: 423); DR35 **Novi Bečej:** [subnom. *Plantago tenuiflora* Waldst. et Kit. f. *depauperata* Domin] Slano Kopovo [„Šoškop“] (Boža *et al.* 1987: 60, Knežević 1994: 78); DR34 **Kumane** (Knežević 1994: 78, Knežević *et al.* 2009b: 32); DR44 **Melenci: Ostrovo** [„Ostrov“] (Knežević 1994: 78); DR42 **Aradac** [„Arda“] [subnom. *Plantago tenuiflora* W. et K. f. *depauperata* Domin] (Knežević 1994: 78), „ass. *Pholiuro-Plantaginetum tenuiflorae*“ + „ass. *Pholiuro-Plantaginetum tenuiflorae* (Rapaics 27) Wendelbg. 43 *eleocharetosum (uniglumis)*“ (Bodrogekőzy & Györffy 1970: 28, 35); **Zrenjanin:** DR52 Mužlja („sodic solonchak + chloridic-sodic solonetz“, Janjatović 1971: 14, 15, Bogojević 1979: 7, Knežević 1994: 78); DR50 **Perlez** (Knežević 1994: 78); DR50-DR60 **Idvor – Farkaždin** [subnom. *Plantago tenuiflora* Waldst. et Kit. f. *depauperata* Domin] (Knežević 1994: 78); DR72 **Banatski Despotovac – Botoš Deračka bara** (Knežević 1994: 78); DR82 **Sečanj** [subnom. *Plantago tenuiflora* W. et K. f. *depauperata* Domin] (Vučković R. 1980, Knežević 1994: 78); **Boka** [subnom. *Plantago tenuiflora* Waldst. et Kit. f. *depauperata* Domin] (Knežević 1994: 78); DQ59 **Čenta** [subnom. *Plantago tenuiflora* W. et K. f. *depauperata* Domin] (Knežević 1994: 78); DQ99 **Alibunar**, above saline lake (Heuffel 1858: 186); ER10 **Margita** [„Mar-

gitta“] (Heuffel 1858: 186); EQ29 **Vršac** [„Versec“] (Bernátsky 1905: 159, 162, 165).

Srem: DQ06 **Nikinci-Platičevo:** Bokšina, salt steppes (Slavnić 1950-1952: 147); DQ17 **Budjanovci**, pasture, „ass. *Heleochloa-Spergularia salina* Slavnić 1948“ (Slavnić 1953: 37, 50); DQ16 **Nikinci-Donji Tovarnik:** Tiganj, salt steppes (Slavnić 1950-1952: 146); DQ26 **Karlovčić**, saline pastures (Slavnić 1950-1952: 146), „ass. *Staticeto-Artemisietum monogynae* Topa 1938“ + „ass. *Pholiurus Plantago tenuiflora* Wendelberger 1943“ (Slavnić 1953: 39, 40); DQ36 **Petrovčić**, saline pastures (Slavnić 1950-1952: 146); DQ35 **Bečmen**, saline pastures (Slavnić 1950-1952: 146).

DUBIOUS PUBLISHED DATA: **SW Serbia: Pešter: Sjenica:** [subnom. *Plantago minor*] DN28 **Medare** [„Medari“] + **Dubinje** (Krstić 1956: 415).

DUBIOUS AND IMPRECISE PUBLISHED DATA: **E Serbia: Suva planina Mt.** [subnom. *Plantago minor*] (Krstić 1956: 398).

IMPRECISE PUBLISHED DATA: **Serbia** (Gajić 1980a: 83, 1980b: 131); **Vojvodina** (Slavnić 1950: 141), „ass. *Puccinellietum limosae-Pholiuretosum*“ (Obradović & Budak 1974: 21); **Bačka** (Slavnić 1953: 52, Pihler *et al.* 2016: 11), „ass. *Pholiurus-Plantago tenuiflora* (Soó 1933) Wendelberger 1943“ + „ass. *Staticeto-Artemisietum monoginae* Topa 1939“ (Slavnić 1948: 92-93, 109); along the river Danube [„Duna“], salt steppes (Prodán 1914: 97); along the river Tisa, „ass. *Ranunculetum pedati* Slavnić 1942 subass. with *Statice Gmelini*“ (Slavnić 1948: 127, 128); **Banat** (Slavnić 1953: 52, Pihler *et al.* 2016: 11), „ass. *Pholiurus-Plantago tenuiflora* (Soó 1933) Wendelberger 1943“ + „ass. *Staticeto-Artemisietum monoginae* Topa 1939“ (Slavnić 1948: 92-93, 109); along the river Tisa, „ass. *Ranunculetum pedati* Slavnić 1942 subass. sa *Statice Gmelini*“ (Slavnić 1948: 127, 128); **Srem** (Slavnić 1953: 49, 52), „ass. *Heleochloa-Spergularia salina* Slavnić 1948“ + „ass. *Staticeto-Artemisietum monogynae* Topa 1938“ + „ass. *Pholiurus Plantago tenuiflora* Wendelberger 1943“ (Slavnić 1953: 42, 44); **W Bačka** (Grdinić *et al.* 2001: 148); **Žabalj** [„Zsablya“]-**Bačko Gradište** [„Bácsföldvár“] (09-Jun-1912, Prodán 1914: 107); **Novi Sad** [subnom. *Plantago tenuiflora* W. et K. f. *depauperata* Domin 1923] (Parabućski *et al.* 1971), vicinity (Janjatović 1971: 90, Gajić 1977: 164, Anđelić *et al.* 1979: 509), „ass. *Puccinellietum limosae-Pholiuretosum*“ (Obradović & Budak 1974: 21); **N Banat:** „ass. *Elatine hungarica-Ammania verticillata* Slavnić“ (Slavnić 1951: 155), „ass. *Staticeto-Artemisietum monoginae* Topa 1939“ + „ass. *Camphorosmetum annuae matricarietosum* Slavnić 1952“ + „ass. *Pholiurus-Plantago tenuiflora* Wendelberger 1943“ + „ass. *Ranunculetum pedati* Slavnić 1942“ (Adamović 1959: 39, 41, 42, 44); **Potamišje** (Budak *et al.* 1980); **E Potamišje:** „ass. *Pholiuro-Plantaginetum tenuiflorae* (Soo 33) Wendel-

berger 1943“ + „*Puccinellietum limosae* Wendelberger 1950“ + „*Camphorosmetum annuae* (Rapaics 16) Topa 1939“ (Vučković 1984: 307).

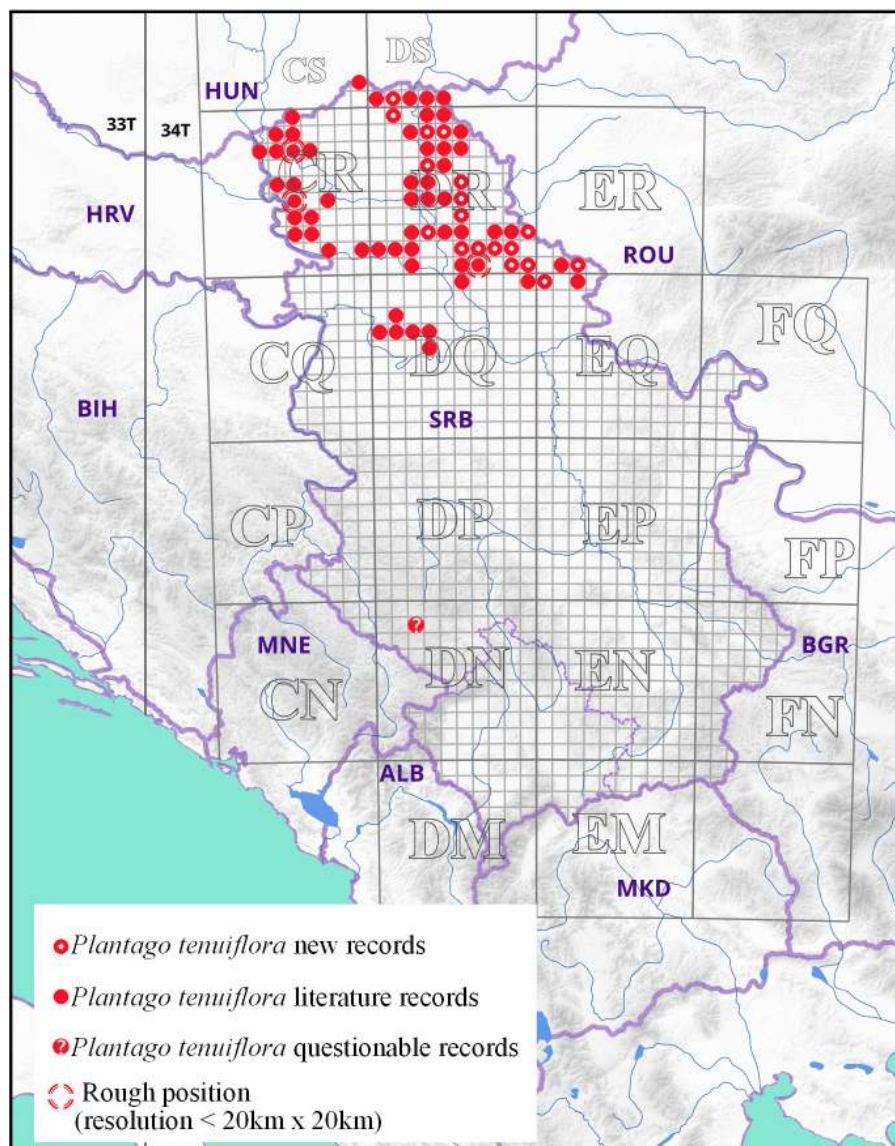


Fig. 13. - New herbarium and published data on the distribution of *Plantago tenuiflora* Waldst. & Kit. in Serbia.

NOTES: Protected species in Serbia (Anonymous 2010-2016) only known from saline habitats in Vojvodina (Fig. 13). In these habitats in ecological, coenological and chorological sense this species is largely overlapping with *Pholiurus pannicus* (see notes in section about *Pholi-*

urus) with which it creates highly specialized halophytic community *Pholiuro pannonici-Plantaginietum tenuiflorae* Wendelberger (Fig. 10). Therefore, its records from very different mountain habitats in southwestern and eastern Serbia should be regarded as erroneous.

***Ranunculus lingua* L., Sp. Pl. 549 (1753).**

NEW DATA: **Banat: Aradac:** DR32 along the river Tisa, 45.393172° N, 20.219608° E, 72 m (Perić, R. 20-Jun-2012).

NOTES: Strictly protected and endangered species in Serbia (Anonymous 2010–2016, Tomović *et al.* 2009). Review of herbarium and literature data about its distribution, ecology, coenology, threatened status and population trends has been published by Stojšić & Panjković (1999) and Tomović *et al.* (2009). We recorded it in humid meadows adjacent to the river Tisa near Aradac, confirming the presence of this species in Banat. The population seems to be very fragmented, comprising two flowering and one non-flowering plant.

CONCLUSIONS

In this article is presented fourth part of data selected from the most recent results of our revision of vascular plant material deposited at the Herbarium collection of the Institute for Nature Conservation of the Vojvodina province (PZZP). Selected plant taxa include 11 genera (*Malus* Mill., *Marrubium* L., *Marsilea* L., *Medicago* L., *Melampyrum* L., *Melica* L., *Melilotus* Mill., *Menyanthes* L., *Pholiurus* Trin., *Plantago* L. and *Ranunculus* L.), 13 species, two subspecies, one variety and two nothospecies within new 80 UTM squares.

New taxon for Vojvodina is one species (*Malus dasycphylla*). Confirmed taxa for Serbia are: 1 subspecies (*Melica ciliata* subsp. *magnolii*) and 1 variety (*Melampyrum nemorosum* var. *heterotrichum*) and for Vojvodina: 1 species (*Menyanthes trifoliata*).

New chorological data are given for eight species (*Marsilea quadrifolia*, *Medicago carstiensis*, *Melampyrum heracleoticum*, *Melilotus dentatus*, *Pholiurus pannonicus*, *Plantago schwarzenbergiana*, *P. tenuiflora*, *Ranunculus lingua*), one subspecies (*Melampyrum barbatum* subsp. *barbatum*) and two nothospecies (*Marrubium ×paniculatum*, *Medicago ×varia*).

Nationally protected taxa include 4 species (*Marsilea quadrifolia*, *Menyanthes trifoliata*, *Plantago schwarzenbergiana*, *Ranunculus lingua*) categorized as “strictly protected” and 4 species with one subspecies (*Melampyrum barbatum* subsp. *barbatum*, *M. heracleoticum*, *Pholiurus pannonicus*, *Plantago tenuiflora*) categorized as “protected”.

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**МАТЕРИЈАЛИ ЗА ФЛОРУ СРБИЈЕ ИЗ ХЕРБАРИЈУМСКЕ КОЛЕКЦИЈЕ
PZZP (4)**

РАНКО ПЕРИЋ, ЈЕЛЕНА КНЕЖЕВИЋ

Р Е З И М Е

Чланак садржи четврти део података о пробраним, новим и у флори Србије пажње вреднијим таксонима добијених током ревизије Хербаријумске колекције Покрајинског завода за заштиту природе (ПЗЗП). Одабрани подаци укључују 13 врста, 2 подврсте, један варијетет и две нотоврсте сврстане у 11 родова (*Malus* Mill., *Marrubium* L., *Marsilea* L., *Medicago* L., *Melampyrum* L., *Melica* L., *Melilotus* Mill., *Menyanthes* L., *Pholiurus* Trin., *Plantago* L. and *Ranunculus* L.). Једна врста (*Malus dasyphylla*) је нова за флору покрајине Војводине. Поред тога, једна подврста (*Melica ciliata* subsp. *magnolii*) и један варијетет (*Melampyrum nemorosum* var. *heterotrichum*) су потврђени за Србију, односно једна врста (*Menyanthes trifoliata*) за покрајину Војводину.