



On the distribution of *Goniolimon tataricum* (Plumbaginaceae) in Serbia

Uroš BUZUROVIĆ^{1*}, Vladimir STEVANOVIĆ¹, Marjan NIKETIĆ², Ksenija JAKOVLJEVIĆ¹ and Gordana TOMOVIĆ¹

1 Institute of Botany and Botanical Garden, Faculty of Biology, University of Belgrade, Takovska 43, 11000 Belgrade, Serbia

2 Natural History Museum, Njegoševa 51, 11000 Belgrade, Serbia

ABSTRACT: A chorological investigation on the distribution of the genus *Goniolimon* Boiss. in Serbia was carried out. Based on collected material, it was determined that only *G. tataricum* (L.) Boiss. can be found in Serbia, which resolves the taxonomical and chorological confusion arose from literature sources. Therefore, the name *G. serbicum* Vis. is treated as a synonyme of *G. tataricum* for the first time. Distribution of the species *G. tataricum* in Serbia was mapped at 10 × 10 km UTM squares. The results of ecological analyses were also provided.

KEY WORDS: *Goniolimon*, distribution, ecology, Serbia

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Genus *Goniolimon* Boiss. includes about 20 species, widespread from North Africa (Algeria, Tunisia), across Europe and Russia to Mongolia (LINČEVSKI 1952). The largest number of species was recorded in the Mediterranean area, Macaronesia and Europe (DOMINA 2011). In the European flora 11 species are present (PIGNATTI & MOORE 1972). Most of these species are widespread in the Ukraine and the European part of Russia, while 8 species extend even to the region of Southeastern Europe and Italy.

In the Balkan peninsula, the following species are present: *G. besserianum* (Rchb.) Kusn., *G. collinum* (Griseb.) Boiss., *G. dalmaticum* (C. Presl) Reichenb. fil., *G. heldreichii* Halácsy, *G. sartorii* Boiss. and *G. tataricum* (L.) Boiss. Of these six species, five are recorded in Greece (HALÁCSY 1904; PIGNATTI & MOORE 1972). Four species are recorded in the flora of Bulgaria (ANČEV 1982), three in the flora of Romania (RĂVĂRUȚ 1960), two in the flora of both Macedonia (MICEVSKI & MATEVSKI 1995) and Serbia (GAJIĆ 1972; RANĐELOVIĆ & STAMENKOVIĆ 1986), while in the flora of Croatia (NIKOLIĆ 1994), Bosnia and Herzegovina (BJELČIĆ 1967), Albania (PAPARISTO *et al.*

1996) and the flora of Turkey (BOKHARI & EDMONDSON 1982; HEPPEP 1988) one species is recorded. In the flora of Montenegro no species of genus *Goniolimon* has been recorded (ROHLENA 1942; PULEVIĆ 2005).

The first data on the presence of the genus *Goniolimon* in Serbia originated from Josif PANČIĆ (1856: 121), who recorded the species *Statice tatarica* L. in Brđani and Klikovi below Brusnica (Šumadija). A few years later, based on the detailed analysis of Pančić's material collected in the serpentine areas in Raška (C Serbia), Kremna (W Serbia), Brđani and Klikovi, Visiani described a new species, called *Goniolimon serbicum* Vis. (VISIANI & PANČIĆ 1862: 440). The presence of this species is also mentioned, in Pančić's later literature sources (1867: 172; 1870: 178). However, in his capital work "Flora of the Principality of Serbia", PANČIĆ (1874: 583) 'gave up' on the formerly newly-described species and listed *Statice collina* Griseb. for Serbia ("on serpentine in Brđani Gorge in distr. Rudnik, around Raška in district Čačak"). In a footnote he stated that this plant is described and illustrated under the name *Goniolimon serbicum* Vis. in "Plantae Serbicae rariores aut novae" (VISIANI & PANČIĆ 1862).

*correspondence: uros_buzurovic@yahoo.com

In the Balkan Peninsula *G. collinum* was recorded in Romania (RĂVĂRUȚ 1960), sandy areas in E Bulgaria (ANČEV 1952), as well in Greece (PIGNATTI & MOORE 1972) and Turkey (HEPPER 1988). Given this type of distribution (far eastern parts of the Balkans), it is unlikely that this species could be found in Serbia. That was confirmed by PIGNATTI & MOORE (1972), who did not list this species for the territory of former Yugoslavia. However, in Analytical Flora of Yugoslavia (TRINAJSTIĆ 1981: 917) and Flora of Serbia (GAJIĆ 1972: 92) it was stated that *G. collinum* species grows in Serbia. GAJIĆ (1972: 92) accepted the change of status of *Goniolimon serbicum* as a variety within the species *Goniolimon collinum* given by HAYEK (1931: 2). In addition to *G.c.* var. *serbicum* (Vis.) Hayek, *G.c.* var. *collinum* was also listed in the Flora of Serbia.

Only recently, RANĐELOVIĆ & STAMENKOVIĆ (1986: 57) published the presence of the species *Goniolimon tataricum* (L.) Boiss. as a new taxon for the flora of Serbia, that was collected in the surroundings of Prokuplje city and in Mt Rujan. Considering the fact that the closest localities of this species are in W Bulgaria and N Macedonia, and its habitat type (xerophilous pastures and rocky grounds), confirmation of its presence on the territory of Serbia was completely expected.

Additional doubt about the presence of the species *G. collinum* in the former Yugoslavia was introduced by GREUTER *et al.* (1989) who accepted the opinion of HEPPER (1988). Namely, this author considered that *G. collinum* is a synonym for *Goniolimon incanum* (L.) Hepper and listed this species for Yugoslavia. However, they neglected the information on the presence of *G. tataricum* in Serbia previously published by RANĐELOVIĆ & STAMENKOVIĆ (1986).

On the basis of extensive field investigations conducted in several locations in Serbia, as well as on the basis of a detailed review and comparison of herbarium material deposited at BEO and BEOU (THIERS 2013), it could be concluded that there are no specimens of *Goniolimon* from Serbia that belong to the species *G. collinum* (glabrous bracts and calyx). All the analyzed specimens are characterized by more or less puberulent bracts and hirsute calyx, which corresponds to the description of *G. tataricum* (Figure 1) presented by RANĐELOVIĆ & STAMENKOVIĆ (1986).

The nomenclature status of the species *Goniolimon tataricum* in Serbia is:

Goniolimon tataricum (L.) Boiss. (RANĐELOVIĆ & STAMENKOVIĆ 1986)

≡ *Statice tatarica* (L.) Reichenb. (PANČIĆ 1856)

= *G. serbicum* Vis. (syn. nov.) (VISIANI & PANČIĆ 1862)

– *S. collina* Griseb. sensu PANČIĆ (1874)



Fig. 1. *Goniolimon tataricum* (L.) Boiss. (Mt Vujan in W Serbia).

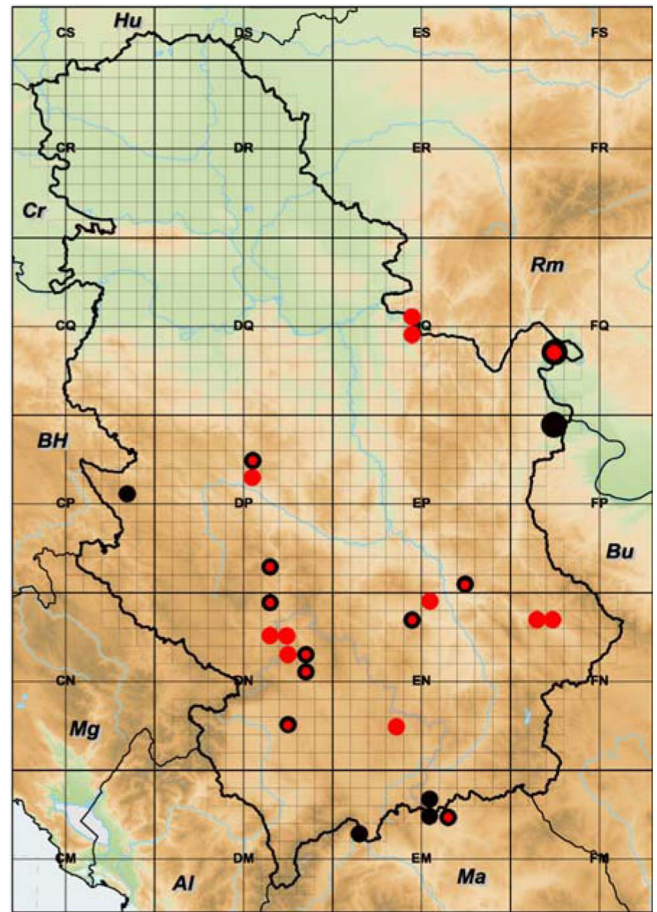


Fig. 2. Distribution of the species *Goniolimon tataricum* in Serbia; ^a black circle – literature data, red (gray) circle – herbarium and field data, black/red (gray) circle – literature data confirmed by field and herbarium specimens; ^b UTM squares FP29 and FQ23 are represented by a larger symbol indicating insufficiently precise locations.

Distribution of *G. tataricum* in Serbia based on literature, herbarium and field data:

Literature data: **NE Serbia:** KLADOVO - FQ23 (ADAMOVIĆ 1904); NEGOTIN: (surrounding) - FP29 (GAJIĆ 1972); **E Serbia:** NIŠ: Hum - EP70 (PETROVIĆ 1882); **Šumadija:** GORNJI MILANOVAC: Brđanska gorge - DP57, (PAVLOVIĆ 1962); rocky hills (PANČIĆ 1856); rocky grounds, serpentine (VISIANI & PANČIĆ 1862); rocky grounds (e.g. on serpentine) and dry grasslands (GAJIĆ 1972); Klik - DP57 (PANČIĆ 1856; VISIANI & PANČIĆ 1862); **W Serbia:** MT TARA: Kremna - CP85 (VISIANI & PANČIĆ 1862); **C Serbia:** RAŠKA - DN69 (PANČIĆ 1867); (surrounding) (PAVLOVIĆ 1962); (surrounding) rocky grounds (e.g. on serpentine) and dry grasslands (GAJIĆ 1972); (surrounding) gravel ground (VISIANI & PANČIĆ 1862); UŠĆE - DP61, (PANČIĆ 1870); (surrounding) (GAJIĆ 1972); MT VIDOJEVICA - EN48 (RUŽIĆ 1983); ass. *Diantho-Centaureetum diffusae* Ranđelović et Ružić, dolomite marbles (RANĐELOVIĆ et al. 1984); dolomite pastures, dolomite (RANĐELOVIĆ & STAMENKOVIĆ 1986); Grabak - EN48, ass. *Sedo-Potentilletum arenariae* Ružić (RUŽIĆ 1981); (surrounding) ass. *Dianto-Centaureetum diffusae* Rand. et Ružić; *Sedo-Potentilletum arenariae* Ružić, dolomite pastures (RANĐELOVIĆ & STAMENKOVIĆ 1986); Sokolica - EN48, ass. *Sedo-Potentilletum arenariae* Ružić, dolomite marbles, 280 m a.s.l., S, SE, 20° (RANĐELOVIĆ & RUŽIĆ 1986); ass. *Sedo-Potentilletum arenariae* Ružić (RUŽIĆ 1981); PROKUPLJE: Hisar - EN48 (FRITSCH 1916); ass. *Sedo-Potentilletum arenariae* Ružić (RUŽIĆ 1981); ass. *Sedo-Potentilletum arenariae* Ružić, dolomite marbles, 280 m a.s.l., S, SE, 20° (RANĐELOVIĆ & RUŽIĆ 1986); MT PASJAČA - EN48 (RUŽIĆ 1983); Markovo gumno - EN48, ass. *Sedo-Potentilletum arenariae* Ružić, dolomite marbles, 280 m a.s.l., SW, 20° (RANĐELOVIĆ & RUŽIĆ 1986); **S Serbia:** PREŠEVO: Miratovac (Karadag) - EM57, EM58, ass. *Sedo-Potentilletum arenarie* Ružić, dolomite marble (RANĐELOVIĆ et al. 1984); (surrounding) ass. *Dianto-Centaureetum diffusae* Rand. et Ružić; *Sedo-Potentilletum arenariae* Ružić, dolomite pastures (RANĐELOVIĆ & STAMENKOVIĆ 1986); MT RUJAN PLANINA - EM67 (RANĐELOVIĆ & STAMENKOVIĆ 1984); ass. *Sedo-Potentilletum arenarie* Ružić, dolomite marble (RANĐELOVIĆ et al. 1984); dolomite pastures, dolomite (RANĐELOVIĆ & STAMENKOVIĆ 1986); Orljak: - EM67, ass. *Dianto-Centaureetum diffusae* Rand. et Ružić; *Sedo-Potentilletum arenariae* Ružić, dolomite pastures (RANĐELOVIĆ & STAMENKOVIĆ 1986); **Kosovo:** IBAR VALLEY: Banjska - DN85, ass. *Potentillo-Fumarietum bonapartei* Rexhepi ass. nov., serpentine, 750 m a.s.l., NW, 35° (REXHEPI 1979); ass. *Sedo-Dianthetum serbici* Pavl., serpentine, 500 m a.s.l., SE (PAVLOVIĆ 1967); Banjska river - DN85, ass. *Sedo-Dianthetum serbici* Pavl., serpentine, 500 m a.s.l., SW (PAVLOVIĆ 1967); Ibar (left

bank) - DN85 (PAVLOVIĆ 1962); Belaška - DN85, ass. *Potentillo-Fumarietum bonapartei* Rexhepi ass. nov., serpentine, 600 m a.s.l., S, 45° (REXHEPI 1979); Srbovac - DN85, ass. *Potentillo-Fumarietum bonapartei* Rexhepi ass. nov., serpentine, 650 m a.s.l., W, 35° (REXHEPI 1979); PRIŠTINA: Koznica - EN32 (JURIŠIĆ 1923); (surrounding) (GAJIĆ 1972); MT ROGOZNA: Kamenica: Kamenička river - DN86, ass. *Sedo-Dianthetum serbici* Pavl., serpentine, 650 m a.s.l., SE (PAVLOVIĆ 1967); Kula - DN86, ass. *Sedo-Dianthetum serbici* Pavl., serpentine, 700 m a.s.l., S (PAVLOVIĆ 1967); Kula-Ibar - DN86, ass. *Sedo-Dianthetum serbici* Pavl., serpentine, 500 m a.s.l., S (PAVLOVIĆ 1967); Mala Sokolovina - DN86, ass. *Sedo-Dianthetum serbici* Pavl., serpentine, 700 m a.s.l., SW (PAVLOVIĆ 1967); Velika Sokolovina - DN86, ass. *Sedo-Dianthetum serbici* Pavl., serpentine, 850 m a.s.l., SE (PAVLOVIĆ 1967); MT ŠAR-PLANINA: Đeneral Janković: Gorance - EM16, ass. *Stipeto-Convolvuletum compacti*, serpentine, 650-750 m a.s.l., W, S, SW, 15-30° (MILLAKU et al. 2011); Metohija: PEĆ : (surrounding) - DN72, rocky grounds (e.g. on serpentine) and dry grasslands (GAJIĆ 1972).

Herbarium and field data: **NE Serbia:** GOLUBAC: Braničevo - EQ44, EQ45 (leg. Pančić, J., 14764, BEOU); (leg. Pančić, J., 14765, BEOU); KLADOVO - FQ23 (leg. Pančić, J., 6898, BEOU); **E Serbia:** BELA PALANKA: Crnoklište-Čiflik: near the bridge on the Nišava river - FN18, rocky grounds, limestone (leg. Niketić, M., Tomović, G., 21-July-2010., 30949, BEO); rocky grounds, limestone (leg. Vukojičić, S., Tomović, G., Zlatković, B., 17-August-2003., 17583, BEOU); rocky grounds - *Festuco-Brometea*, limestone, 380 m a.s.l. (leg. Lakušić, D., Vukojičić, S., Kuzmanović, N., 17-July-2012, BEOU, 43.22217° N, 22.42146° E); NIŠ: Hum - EP70 (leg. Petrović, 1879., 38907, BEOU); (leg. Petrović, 1879., 38925, BEOU); PIROT: Staničenje: roadside, near the railway station - FN28, roadside, limestone (leg. Niketić, M., 04-July-1989. BEO); (leg. Niketić, M., Tomović, G., 21-July-2010., 30953, BEOU, BEO, 43.21355° N, 22.51257° E); PIROT-BELA PALANKA: above the road - FN28, rocks, limestone (leg. Nikolić, V., Diklić, N., Bogdanović, M., 15-June-1974., BEO); above the road - FN28, limestone (leg. Diklić, N., 15-June-1974, BEO); **Šumadija:** GORNJI MILANOVAC: Brđanska gorge - DP57, serpentine (leg. Stevanović, V., Niketić, M., Vukojičić, S., Tomović, G., 13-April-2005., 19394, BEOU); cult (leg. Pančić, J., 6897, BEOU); (leg. Pančić, J., 1875., 6904, BEOU); (leg. Pančić, J., July-1877., 14763, BEOU); near the city dump - DP57, serpentine (leg. Stevanović, V., Niketić, M., Vukojičić, S., Tomović, G., 03-May-2004., 18878, BEOU); Drnovito hill - DP57, serpentine (leg. Niketić, M., 08-June-2013., BEO, 43.98660° N, 20.42491° E); MT Vujuan - DP56, rocky grounds - *Festuco-Brometea*, serpentine, 500 m a.s.l. (leg. Buzurović, U., 04-June-

2012, BEOU); rocky grounds - *Festuco-Brometea*, serpentine, 500 m a.s.l. (leg. Buzurović, U., 26-June-2012, BEOU); Mt Mali Vujan - DP56, serpentine, 610 m a.s.l. (leg. Lakušić, D., 07-October-2008., 28751, BEOU, 43.98255° N, 20.45203° E); rocky grounds, serpentine, 500 m a.s.l. (leg. Lakušić, D., Vukojičić, S., Jakovljević, K., Kuzmanović, N., 01-April-2009., 28826, BEOU, 43.98512° N, 20.44412° E); **C Serbia: RAŠKA** - DN69 (leg. Pančić, J., 1869, BEOU); (leg. Pančić, J., 1869., 6900, BEOU); (leg. Pančić, J., 1869., 6902, BEOU); serpentine (leg. Lindtner, V., 23-June-1948., 16583, BEO); serpentine (21-June-1910., 38900, BEOU); Gubavac - DN69, rocky grounds, serpentine, 380-400 m a.s.l. (leg. Tomović, G., Anačkov, G., 08-August-2010., 31338, BEOU); rocky grounds - *Festuco-Brometea*, serpentine, 483 m a.s.l. (leg. Tomović, G., Vukojičić, S., Jakovljević, K., Kabaš, E., Zlatković, B., 09-June-2012, BEOU); Matovići-Trnava - DN69, serpentine (leg. Niketić, M., Vukojičić, S., 21-August-1997, BEO); (leg. Vukojičić, S., Tomović, G., 21-August-1997., 7071, BEOU); road to Trnava - DN69, rocky grounds, roadside, serpentine (leg. Niketić, M., Tomović, G., 15-May-2011., 32172, BEOU, BEO); Rudine - DN69, rocky grounds - *Festuco-Brometea*, serpentine, 591 m a.s.l. (leg. Tomović, G., Vukojičić, S., Jakovljević, K., Kabaš, E., Zlatković, B., 09-June-2012, BEOU); Trnava - DN69 (leg. Pančić, J., 1869., 6901, BEOU); Ušće - DP61, rocks, serpentine (leg. Rajevski, L., 15-July-1950., 16599, BEO); PROKUPLJE - EN48 (leg. Pančić, J., 14760, BEOU); (leg. Petrović?, 1883., 38934, BEOU); Biljeg (Bilješka church) - EN59 (leg. Pančić, J., 1880., 6896, BEOU); hill above Prokuplje - EN48 (leg. Jurišić, Ž., 03-June-1911., 16611, BEO, rev. Buzurović, U., 04-April-2012); Hisar - EN48 (leg. Jurišić, Ž., 31-May-1911., 11613, BEO, rev. Buzurović, U., 04-April-2012); (leg. Lindtner, V., 05-July-1953., BEO, rev. Tomović, G., August-2010); rocky grounds, *Sedo-Potentilletum arenariae* (leg. Niketić, M., Tomović, G., 14-August-2010., 31354, BEOU, BEO); rocky grounds - *Festuco-Brometea*, dolomite, 340 m a.s.l. (leg. Tomović, G., Vukojičić, S., Jakovljević, K., Kabaš, E., Zlatković, B., 08-June-2012, BEOU); **S Serbia: MT RUJAN: Mali Orljak** - EM67, rocky grounds, limestone, 650-717 m a.s.l. (leg. Niketić, M., Tomović, G., 04-April-2010., 30594, BEOU, BEO); from the saddle to the peak - EM67, groves and steppe rocky grounds, limestone, 650-717 m a.s.l. (leg. Niketić, M., Tomović, G., 15-August-2010., 31360, BEOU, BEO); **Kosovo: IBAR VALLEY: road to Kosovska Mitrovica** - DN85 (leg. Nikolić, V., Diklić, N., Bogdanović, M., 12-July- 1973., BEO); **Kamenica: "Simonida" motel - Kamenica** - DN86, hilly pastures, serpentine, 847 m a.s.l. (leg. Krivošej, Z., Prodanović, N., 18-June-2008., 31436, BEOU, 43.24750° N, 20.93028° E); **LEŠAK: Borova** - DN77 (leg. Košanin, N., 22-August-1913., 38926, BEOU); **PRIŠTINA: Koznica:**

(Loznište) - EN32 (leg. Jurišić, Ž., 27-June-1914., 16600, BEO); **ROGOZNA: Banja-Grižani Han** - DN67, DN76 (leg. Košanin, N., 23-June-1914., 38902, BEOU); **Metohija: PEĆ: Pograđe** - DN72 (leg. Sobrijević, 1933., 16586, BEO, det. Černjavski, P).

In the territory of Serbia, *Goniolimon tataricum* is recorded in 25 UTM squares (Figure 2). Five of them correspond to literature data, 10 to herbarium, and 10 of them are literature data confirmed by herbarium specimens.

In Serbia, *Goniolimon tataricum* can be found on xerophilous pastures and rocky grounds in the ass. *Diantho-Centauretum diffusae* Randelović et Ružić 1982 and ass. *Sedo-Potentilletum arenariae* Ružić 1978, as well as within serpentine xerophilous pastures and rocky grounds included in the ass. *Sedo-Dianthetum serbici* Z. Pavlović 1967, *Potentillo-Fumanetum bonaparti* Rexhepi 1979 and ass. *Stipeto-Convolutetum compacti* Millaku et al. 2011. It grows on all geological substrates, including limestone, dolomite, marble, silicate and serpentinite in the altitude range of 280-850 m a.s.l.

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Botánica SERBICA



REZIME

Distribucija vrste *Goniolimon tataricum* (Plumbaginaceae) u Srbiji

Uroš BUZUROVIĆ, Vladimir STEVANOVIĆ, Marjan NIKETIĆ, Ksenija JAKOVLJEVIĆ,
Gordana TOMOVIĆ

Istraživana je distribucija roda *Goniolimon* Boiss. u Srbiji. Na osnovu prikupljenog materijala, utvrđeno je da je u Srbiji prisutna samo vrsta *G. tataricum* (L.) Boiss., što rešava taksonomsku i horološku konfuziju proisteklu iz literaturnih podataka. Na osnovu toga, ime *G. serbicum* Vis. po prvi put se tretira kao sinonim vrste *G. tataricum*. Distribucija vrste *G. tataricum* prikazana je na UTM kvadratima 10×10 km. Predstavljeni su i rezultati ekološke analize.

Ključne reči: *Goniolimon*, distribucija, ekologija, Srbija