

## OVERLOOKED HYBRIDS OF *PRUNELLA* L. IN CROATIAN FLORA

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Presence of poorly known hybrids *Prunella* × *dissecta* and *Prunella* × *intermedia* is confirmed for Croatian flora. Distribution data were collected from literature, herbaria revision and field observations. Diagnostic characters of all hybrids and determination key are presented.

**Key words:** *Prunella* × *dissecta*, *Prunella* × *intermedia*, distribution in Croatia, flora, hybrids

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Prisutnost slabo poznatih hibrida *Prunella* × *dissecta* i *Prunella* × *intermedia* potvrđena je za floru Hrvatske. Podaci o rasprostranjenosti sakupljeni su iz literature, revidiranog herbarskog materijala i terenskih opažanja. Navedena su dijagnostička svojstva svih hibrida kao i determinacijski ključ.

**Ključne riječi:** *Prunella* × *dissecta*, *Prunella* × *intermedia*, rasprostranjenost u Hrvatskoj, flora, hibridi

### INTRODUCTION

The genus *Prunella* L. (Lamiaceae) consists of six (HEß *et al.*, 1972) to eight (GREUTER *et al.*, 1986) species, with centre of its distribution in South Europe. In European flora the genus is represented by four (SMITH, 1972), and in Croatian flora by three species (*Prunella vulgaris* L., *P. laciniata* (L.) L. and *P. grandiflora* (L.) Scholler) (LOVAŠEN – EBERHART, 2000).

*P. laciniata*, originally Mediterranean plant, has spread its area of distribution to the secondary, termophilous habitats of Central Europe (HEGI, 1927; AICHELE & SCHWEGLER, 2000).

While *P. grandiflora* is termophilous, European–W–Asiatic plant, *P. vulgaris* is Euroasiatic plant (HEß *et al.*, 1972), secondary spread to entire temperate zone and therefore it is treated also as circumholarctic species (SIMON *et al.*, 1992). Phytosociologically, in Central Europe *P. vulgaris* is a common species for meadows of classes

*Molinio – Juncetea* and *Arrhenateretea*, while *P. laciniata* and *P. grandiflora* are characteristic species of class *Festuco – Brometea* (SIMON *et al.*, 1992).

All these three species are interfertile, and consequently hybrids are common where two or more of them grow together (SMITH, 1972; PIGNATTI, 1982). The hybrids are partly fertile, therefore they could be found at the places where the parental species are not present as well (HEß *et al.*, 1972; HAEUPLER & MUER, 2000). There is a complete range of intermediates between the extremes of the parental species in respect of nearly every character, and all of this variation may be due to hybridization (SMITH, 1972). Some of these intermediates were occasionally described as the varieties of the parental species. For example, the pubescent form of *Prunella vulgaris* (var. *hirtella* Beckhaus) and form with the pinnatifid cauline leaves (var. *pinnatifida* Koch) represent actually the hybrids with *P. laciniata* (HEGI, 1927).

According to FRITSCHÉ & KALTZ (2000) differences between morphological traits of *P. grandiflora* × *P. vulgaris* and their parental species are statistically significant. However, authors stress the possibility that without genetic analysis researched hybrids could be phenotypically plastic variants of the parental species.

The hybrids are named as:

*P. laciniata* × *P. vulgaris* = ***P. x intermedia*** Link 1791 (Syn.: *P. pinnatifida* Pers., *P. x hybrida* Knaf, *P. alba* var. *violacea* Opiz, *P. laciniata* var. *coerulea* Čelak., *P. vulgaris* subsp. *laciniata* var. *violacea* (Opiz) Čelak., *P. violacea* (Opiz) Podp.)

*P. grandiflora* × *P. laciniata* = ***P. x dissecta*** Wenderoth 1831 (Syn.: *P. x bicolor* Beck, *P. x variabilis* Beck, *P. giraudassi* Coste & Soulié, *Brunella beguinoti* Sennen, *P. x paui* Merino)

*P. grandiflora* × *P. vulgaris* = ***P. x spuria*** Stapf in Kerner 1881 (Syn.: *P. x coutinhoi* Rouy, *P. x surrecta* Dumort)

The fact that hybrids are dominant type of *Prunella* on some localities, but mostly overlooked or misidentified as parental species, motivated authors to stress their presence in Croatian flora and to clarify their delimitation from parental species.

While the literature data about these hybrids are very scarce for Croatia (BOŠNJAK, 1925; DEGEN, 1937; PERICIN, 2001; FORENBACHER, 2001; FRAJMAN & JOGAN, 2006) and they are not mentioned in *Index Florae Croaticae* (LOVAŠEN – EBERHART, 2000) at all, a number of European floras quote at least some of them (e.g. HAYEK, 1927; HEß *et al.*, 1972; PIGNATTI, 1982; POPOVA, 1989; ROTHMALER *et al.*, 1990; SEBALD, 1996; STACE, 1997; HROUDA, 2000; SIMON, 2000; FISCHER *et al.*, 2005; JEANMONOD & GAMISANS, 2007; JOGAN, 2007; MORALES, 2007).

## RESULTS AND DISCUSSION

The recent finding of two hybrids of *Prunella* species in the Plitvice Lakes National Park led authors to investigate these, among Croatian botanist relatively poorly known hybrids. There are only few literature data about the distribution of these hybrids in Croatia. *P. x intermedia* was recorded by BOŠNJAK (1925), DEGEN (1937), PERICIN (2001) and FRAJMAN & JOGAN (2006) and *P. x dissecta* by DEGEN (1937). FORENBACHER (2001) states that the hybrids of the *Prunella* species are not rare on the Mt. Velebit, but without exact quotations neither of hybrid names nor of localities.

During the summer of 2008, on the grasslands in the Plitvice Lakes National Park hybrids *P. x intermedia* and *P. x dissecta* were found by authors (App. 1). All of the hybrid specimens were found on transitive habitat types between dry and moist grassland communities.

A few specimens of *P. x intermedia* were found in Prijeboj (Plitvice, Lika; Gauss-Krueger coordinates 5552900, 4965470). They grow on the small transitional grassland between dry grassland of alliance *Bromion erecti* developed on inclined slopes above thin layer of soil above limestone and dolomite bedrock (habitat of *P. laciniata*), and periodically moist grassland developed in valley along the brook, initially belonging to the community *Molinio-Lathyretum pannonicum*, but overgrown by *Deschampsia caespitosa* (habitat of *P. vulgaris*).

The large population of *P. x dissecta* was found in Brezovačko polje (Plitvice, Lika; Gauss-Krueger coordinates 5546315, 4960766). It grows in the heath community *Genisto – Callunetum vulgaris* in succession by grass *Molinia arundinacea*. Population embraces a range of intermediates between the extremes of the parental species in respect of two characters – leaf shape (crenate to pinnatifid) and corolla colour (violet, pink, or combination of pink upper lip and yellowish lower lip). The range of mentioned transitive characters could be a result of multiple hybridizations between fertile hybrids and parental species *P. grandiflora*. The parental species *P. grandiflora* is abundant in the heath, while the small population of *P. laciniata* grows on dry gravely substrate along the nearby roads. According to HAEUPLER & MUER (2000) the hybrid *P. x dissecta* can survive even when *P. laciniata* is not present on habitat any more.

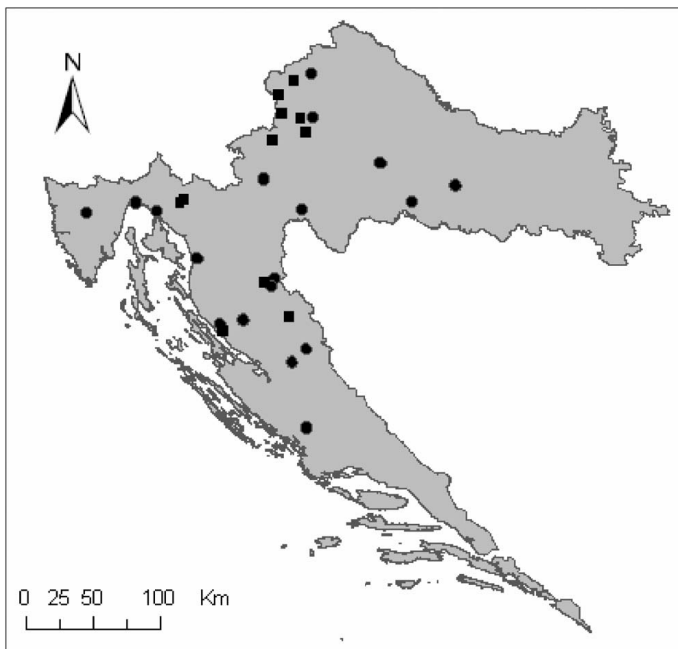


Fig. 1. Distribution of *Prunella x dissecta* (■) and *Prunella x intermedia* (●). Localities and data sources quoted in App. 1.

In addition, the revision of the herbarium specimens of genus *Prunella* from the herbaria ZA and ZAHO was made. Map of distribution based on field observations, literature and herbarium revision is presented in Fig. 1.

It has to be pointed out that, according to available sources, there are no data at all for *P. x spuria* in flora of Croatia.

The most evident characters of the *Prunella* hybrids are as follows (Hegi, 1927; Hrouda, 2000):

*P. x dissecta* (*P. grandiflora* x *P. laciniata*) differs from typical *P. grandiflora* by usually pinnatifid cauline leaves, stronger hairiness and often smaller flowers, and from typical *P. laciniata* by weaker hairiness, violet corolla and higher habitus (Fig. 2).

*P. x intermedia* (*P. laciniata* x *P. vulgaris*) differs from typical *P. laciniata* by weaker hairiness and more or less violet-blue corolla, and from typical *P. vulgaris* by stronger hairiness and usually pinnatifid upper leaves (Fig. 3).

*P. x spuria* (*P. grandiflora* x *P. vulgaris*) looks very similar to typical *P. grandiflora*, but has inflorescence either subtended by leaves or on very short stalk and smaller flowers. The recognition of this hybrid is the most complicated and probably therefore it is not recorded for the flora of Croatia. The misidentification either as *P. grandiflora* or *P. vulgaris* is quite possible.

Additional character for delimitation of species and their hybrids is the structure of outer stamens (Fig. 4). The species *P. laciniata* (c) and *P. vulgaris* (a) have conspicuous acute appendages near anthers. In *P. grandiflora* (e) the stamen appendages are reduced to small tubercle. Generally, the hybrids are characterised by transitional form of stamen appendages, what is clearly seen in *P. x intermedia* (b), while *P. x dissecta* (d) has appendages closer to those of parental *P. grandiflora*.

Following determination key is proposed:

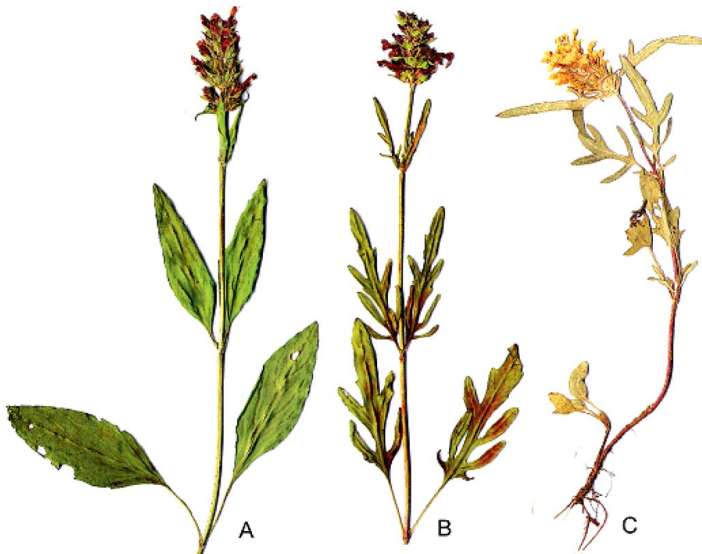


Fig. 2. Parental species *Prunella grandiflora* (A) and *P. laciniata* (C) and hybrid *P. x dissecta* (B).



Fig. 3. Parental species *Prunella vulgaris* (A) and *P. laciniata* (C) and hybrid *P. x intermedia* (B).

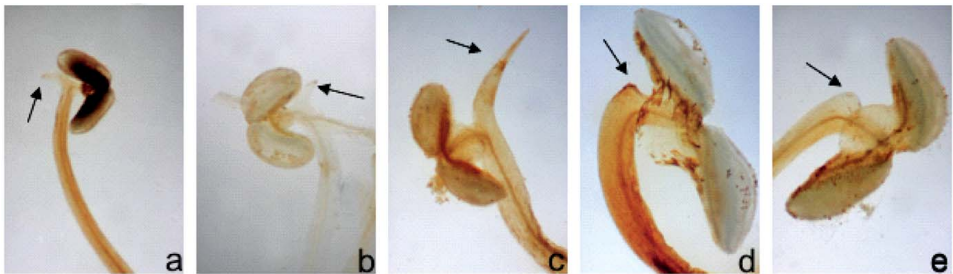


Fig. 4. Different types of outer stamen filament appendages (pointed by arrow) in *Prunella*: a) *P.vulgaris*, b) *P. x intermedia*, c) *P. laciniata*, d) *P. x dissecta* and e) *P. grandiflora*. Picture height equals 2,8 mm.

- 1 Inflorescence not subtended by the first pair of leaves . . . . . 2
- 1 Inflorescence subtended by the first pair of leaves. . . . . 4
- 2 At least the upper leaves pinnatifid or lobed, corolla violet, pink, or combination of pink upper lip and yellowish lower lip . . . . . *P x dissecta* (*P. grandiflora* x *P. laciniata*)
- 2 Leaves entire, corolla violet . . . . . 3
- 3 Corolla 2 – 2,5 cm long. . . . . *P. grandiflora*
- 3 Corolla 1,5 – 2 cm long . . . . . *P. x spuria* (*P. grandiflora* x *P. vulgaris*)
- 4 Stem and leaves ± densely white pubescent, flowers yellowish . . . . . *P. laciniata*

- 4 Stem and leaves glabrous or sparsely pubescent, flowers violet, pink or pink yellowish . . . . . 5
- 5 At least upper leaves pinnatifid, flowers pink or pink yellowish . . . . . *P. x intermedia* (*P. laciniata* x *P. vulgaris*)
- 5 All leaves entire, flowers violet . . . . . 6
- 6 Corolla not more than 1,5 cm long . . . . . *P. vulgaris*
- 6 Corolla 1,5–2 cm long . . . . . *P. x spuria* (*P. grandiflora* x *P. vulgaris*)

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## SAŽETAK

### Zanemareni hibridi roda *Prunella* (Lamiaceae) u hrvatskoj flori

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U hrvatskoj flori rod *Prunella* zastupljen je s tri vrste (*P. vulgaris*, *P. laciniata* i *P. grandiflora*), koje sve međusobno hibridiziraju. Hibridi su nedovoljno poznati za floru Hrvatske, tako da ih *Index Florae Croaticae* uopće ne navodi, a *Flora Croatica Database* navodi samo jednog od njih. Na temelju terenskih opažanja te dodatnog proučavanja literature i revizije herbarskog materijala, sakupljeni su podaci o rasprostranjenosti hibrida *P. x intermedia* i *P. x dissecta*. Opisana su i osnovna morfološka svojstva hibrida s naglaskom na razlike od roditeljskih vrsta. Za određivanje hibrida i roditeljskih vrsta predložen je sljedeći determinacijski ključ:

- 1 Cvat udaljen od prvog para listova . . . . . 2
- 1 Cvat sjedi na prvom paru listova . . . . . 4
- 2 Barem gornji listovi perasto razdijeljeni ili krpasti, vjenčić ljubičast, ružičast ili gornja usna ružičasta, a donja žučkasta  
. . . . . *P x dissecta* (*P. grandiflora* x *P. laciniata*)
- 2 Listovi cjeloviti, vjenčić ljubičast . . . . . 3
- 3 Vjenčić dug 2–2,5 cm. . . . . *P. grandiflora*
- 3 Vjenčić dug 1,5–2 cm . . . . . *P. x spuria* (*P. grandiflora* x *P. vulgaris*)
- 4 Stabljika i listovi ± gusto bijelo fino dlakavi, cvjetovi žučkasti . . . *P. laciniata*
- 4 Stabljika i listovi goli ili rijetko dlakavi, cvjetovi ljubičasti, ružičasti ili ružičasto-žučkasti . . . . . 5

- 5 Gornji listovi perasto razdijeljeni, cvjetovi ružičasti ili ružičasto-žučkasti  
 . . . . . *P. x intermedia* (*P. laciniata* x *P. vulgaris*)
- 5 Listovi cjeloviti, cvjetovi ljubičasti . . . . . 6
- 6 Vjenčić dug do 1,5 cm . . . . . *P. vulgaris*
- 6 Vjenčić dug 1,5 – 2 cm . . . . . *P. x spuria* (*P. grandiflora* x *P. vulgaris*)

## Appendix 1. Localities of *Prunella* hybrids in Croatia sorted by authors.

### SPECIMINA VISA

#### *Prunella x intermedia*

*Hirc, D.*: Lepoglava (Sv. Ivan), 1888 (ZA), Zagrebačka gora (Čučerje), 1897 (ZA), Topusko (Nikolino brdo), 1900, Skradin (Skradinski buk), 1905 (ZA), Topusko (Nikolino brdo), 1909 (ZA), Topusko, 1909 (ZA), Topusko, 1909 (ZA), Topusko, 1910 (ZA), Rijeka (Kantrida), 1910 (ZA), Moslavina (Sv. Benedikt), 1911 (ZA); *Rossi, Lj.*: Topusko, 1891 (ZA), Gospić (Jasikovac), 1896 (ZA), Karlovac (Luščić), 1911 (ZA), Karlovac (Turanj), 1920 (ZA); *Horvat, I.*: Novska, 1935 (ZAHO); *Šegota, V., Alegro, A., Hršak, V.*: Prijeboj, 2008 (ZA).

#### *Prunella x dissecta*

*Faller, N.*: Zagrebačka gora (Sljeme), 1878 (ZA); *Hirc, D.*: Delnice (Ježera), 1879 (ZA), Delnice (Vrh Ježera), 1898 (ZA), Zagreb (Rebro), 1898 (ZA), Orešćak in Rudarska draga, 1901 (ZA), Krapina (old Krapinski grad), 1915 (ZA); *Horvat, I.*: Cesargradska gora, 1918 (ZAHO), Dubrava, between Merenje north of Bobovec, 1918 (ZAHO), Dubrava, south of Merenje, north of Borošak, 1918 (ZAHO), Lička Plješevica, Brusnić, 1927 (ZAHO), Delnice (Petehovac), 1947 (ZAHO); *Šegota, V., Alegro, A., Hršak, V.*: Brezovačko polje, 2008 (ZA).

### LITERATURE DATA

#### *Prunella x intermedia*

*Bošnjak*: Psunj Mt. (Benkovačko pogorje, Rogolje), 1925; *Degen, A.*: Senjska draga (between Sv. Križ and Kestenje), 1937, Oštarije, 1937, Crnopac (north-east side), 1937, Bukovi vrh (Krbava), 1937; *Pericin, C.*: Trviž (Istria), 2001; *Frajman, B., Jogan, N.*: Plitvička jezera (Drakulić rijeka), 2006 (FCD)

#### *Prunella x dissecta*

*Degen, A.*: Oštarije, 1937