

MOEHRINGIA PENTANDRA
J. GAY (*CARYOPHYLLACEAE*),
NEW TO THE FLORA OF CROATIA

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We describe and discuss the discovery of *Moehringia pentandra* from the Osorščica massif on the island of Lošinj. The species, new to the Croatian flora, grows on a calcareous substrate within an artificial *Pinus nigra* forest along with some small holm oaks (*Quercus ilex*). The herbaceous layer is characterized by vernal thermophilous therophytes, mainly with euri- or steno-Mediterranean distribution. We also underline the difficulty of distinguishing in the field *M. pentandra* from *Stellaria pallida*, whose main diacritical features are also analyzed. A key to the genus *Moehringia* in Croatia is proposed.

Keywords: *Moehringia pentandra*, Lošinj Island, ecology, phytocoenology, morphology

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U radu se opisuje i razmatra pronalazak vrste *Moehringia pentandra* na masivu Osorščice na otoku Lošinj. Ova nova vrsta za hrvatsku floru raste na vapnenačkoj podlozi u posađenoj šumi bora *Pinus nigra* i nešto manjih hrastova crnika (*Quercus ilex*). Sloj zeleni karakteriziraju proljetni termofilni terofiti, većinom euri- ili steno-Mediterranske rasprostranjenosti. Naglašavaju se poteškoće u terenskom razlikovanju *M. pentandra* od vrste *Stellaria pallida* i analiziraju glavne razlikovne osobine. Predlaže se ključ za rod *Moehringia* u Hrvatskoj.

Ključne riječi: *Moehringia pentandra*, otok Lošinj, ekologija, fitocenologija, morfologija

INTRODUCTION

Moehringia pentandra J. Gay (*Caryophyllaceae*) grows mainly around the central-western Mediterranean Basin (MONSERRAT MARTÍ, 1990). Its European distribution includes the Iberian Peninsula (Spain, Portugal and the Balearic Islands), Southern France, Corsica, Peninsular Italy, Sicily and Sardinia up to North-eastern Greece (JALAS & SUOMINEN, 1983). On the African side, the species can be found in Morocco, Algeria and Tunisia, while it does not occur in the Canary Islands (MARHOLD, 2011). The attribution of HALLIDAY (1964) for the former Yugoslavia was subsequently refuted by JALAS & SUOMINEN (1983) and HIND (1996). In Croatia, the species does not appear in the study by VOLARIĆ-MRŠIĆ (1978) and LOVAŠEN-EBERHARD (1994) or in the most recent checklist by NIKOLIĆ (2019) or in the Flora of Istria by ROTTENSTEINER (2014).

Following NIKOLIĆ (2019), the genus *Moehringia* in Croatia is represented by 6 species: *M. bavarica*, *M. ciliata*, *M. muscosa*, *M. pentandra*, *M. tommasinii* and *M. trinervia*.

MATERIALS AND METHODS

Morphological and morphometric analysis was performed both on fresh material and on herbarium specimens deposited in CNHM, MFU and TSB (acronyms follow INDEX HERBARIORUM, 2017) and in the private collection of F. Martini. A Leica EZ4 HD microscope was used for morphometrical observations and for taking photographs. The scientific nomenclature follows NIKOLIĆ (2019).

RESULTS AND DISCUSSION

Moehringia pentandra J.Gay, Ann. Sci. Nat. (Paris), sér. 1, 26 : 230 (1832).

Synonyms: *Arenaria pentandra* (J.Gay) Ardoino [1867, Fl. Anal. Alpes Marit., 67], non Dufour [1821]; *A. Trinervia* subsp. *Pentandra* (J.Gay) Bonnier [1913, Fl. Compl. Fr., 2 : 55]; *Moehringia thasia* Stoj. & Kitan. [1945, Ann. Univ. Sofia Fac. Phys. Math., ser. Sci. Nat., 41 : 293]

Moehringia trinervia subsp. *Pentandra* (J.Gay) Nyman [1878, Conspectus Fl. Eur., 112].

Specimina collecta.

Hrvatska: Otok Lošinj (Croatia: Lošinj Island), Osorščica southeastern side, locality Redikonka, m 284 (44° 38' 58,5"; 14° 22' 36,3"), 24/05/2017, leg. et det. F. Martini & C. Peruzovich, CNHM (Inv. nbr. 600:ZAG; 8312:BOB) and MFU.

The species (Fig. 1) was first observed in May 2017 by the Floristic Group of Friuli Venezia Giulia (Udine, Italy), during an excursion on the mount of Osor (Osorščica), southwest of the village of Nerezine, on Lošinj Island (Fig. 2). A further excursion was carried out in June 2018 to make some morphological floristic and environmental observations as follows.

The detection area is located along the path that goes from Nerezine up towards the southeastern ridge of the Osorščica massif, within an artificial *Pinus nigra* forest along with some small holm oaks (*Quercus ilex*) on a calcareous substrate partly covered with pine needles (Fig. 3). The shrubbery (cover 5%) is reduced to sporadic specimens of *Juniperus oxycedrus* and *Phillyrea latifolia*. Such a type of wood locally forms a strip of vegetation above the holm oak Mediterranean forest, which the aforementioned wood species of the relevé – excluding *Pinus nigra* – come from. The grass layer (cover



Fig. 1. Inflorescence of *Moehringia pentandra*.



Fig. 2. Geographic position of *Moehringia pentandra* population on the Osorščica massif (Lošinj Island).

20%) presents the following species: *Moehringia pentandra*, *Arenaria serpyllifolia*, *Brachypodium distachyon*, *Bromus madritensis*, *Capsella rubella*, *Cerastium pumilum* subsp. *glutinosum*, *Cynosurus echinatus*, *Desmazeria rigida*, *Galium murale*, *Gastridium ventricosum*, *Geranium purpureum*, *Helichrysum italicum* subsp. *italicum*, *Leontodon crispus* subsp. *crispus*, *Melica ciliata* subsp. *ciliata*, *Medicago lupulina*, *Myosotis arvensis*, *Reichardia picroides*, *Stellaria pallida*, *Torilis arvensis* subsp. *purpurea*, *Valantia muralis*, *Veronica arvensis*, *Vulpia ciliata*.

The population of *M. pentandra* consists of scattered specimens of reduced size, 3-8 cm tall, generally with procumbent or creeping stems. Outside this area the presence of the species continues on the side of the path for about fifty meters, although strongly thinned out. The herbaceous layer, sparse and very discontinuous, is characterized by vernal thermophilous therophytes, mainly with euri- or steno-mediterranean distribution, such as *Bromus madritensis*, *Brachypodium distachyon*, *Capsella rubella*, *Galium murale*, *Valantia muralis*, *Vulpia ciliata* and others.

It seems interesting that, at least within the detected phytocoenosis, *M. pentandra* shares a habitat with *Stellaria pallida*, whose distinction from the first one is far from easy in the field because of their strong similarity, especially in the vegetative habitus (see also TISON & DE FOUCAULT, 2014). The flowers, tiny and inconspicuous due to the reduction or complete absence of petals, have 5 (8) stamens in *M. pentandra*, 1-3 (5) in *S. pallida*. The same is true for the other main vegetative features, summarized in Tab.1 (from MONSERRAT MARTÍ, 1990; ROMO, 1990; HIND, 1996; MINUTO & CASAZZA, 2018).

The specimens of Osorščica, examined on site and subsequently dried, show stems and branches with two opposing lines of hairs on the underside and with a diffused hairiness on the upper part; most leaves have a hairless or a ciliate edge in the proximal part, but we also observed the presence of cilia along the entire length or solely in the distal part of the edge; petals are absent or sometimes rudimentary; 5 stamens (sometimes with another 1-2 rudimentary ones); seed length is about 0,6-0,8 mm (0,72 mm average), with very small and \pm lobed strophiole (Fig. 4).

Tab. 1. Main distinctive characters (reproductive and vegetative) between *Moehringia pentandra* and *Stellaria pallida*.

Characters	<i>Moehringia pentandra</i>	<i>Stellaria pallida</i>
Petals	rudimentary or absent	absent (rarely minute)
Number of stamens	5 (8)	1-3 (very rarely 5)
Seeds length	0,6-0,8 mm	1-1,2 mm
Seed strophiole	small, branched	absent
Stem indumentum	2 distinct lines of hairs at least at base, hairy all around above	1 (2) line of hairs below each internode
Leaf edge	ciliate almost at base	glabrous



Fig. 3. Habitat of *Moehringia pentandra* (photo by C. Peruzovich).

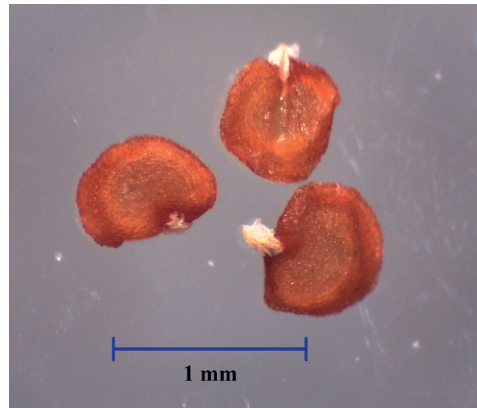


Fig. 4. Seeds with strophiole of *Moehringia pentandra* from the Osorščica massif (original photo by F. Martini).

CONCLUSIONS

Habitat and the plant association observed on Osorščica could suggest an accidental introduction of *Moehringia pentandra* linked to the planting of the black pine. On the other hand, similar environments are not uncommon, either on the Dalmatian islands or in the hinterland, so that it is possible that even elsewhere in Croatia *M. pentandra* has so far escaped observation or been mistaken for *Stellaria pallida*.

The potential finding of *M. pentandra* along the eastern Adriatic side would extend the eastern part of the Mediterranean distribution (Greece) to the north and, in such a case, the Osorščica station would represent a connection between the Italian peninsula and the Illyrian-Balkan region.

In the light of the recent finding, we think it is useful to propose a key to the genus *Moehringia* in Croatia:

- 1 Petals rudimentary (0,5-1,2 mm long) or absent; stamens 5 (rarely 8).....*M. pentandra*
 Petals developed (3,5-7 mm long); stamens 8-10 2
- 2 Sepals and petals 4. Stamens 8 (very rarely 5-6); styles usually 2; capsule
 dehiscent with 4 teeth3
 Sepals and petals 5. Stamens 10; styles usually 3; capsule dehiscent with 6
 teeth4
- 3 Plant green; stems thin (0,5-0,7 mm in diam.); leaves needle-shaped sometimes
 shiny when fresh, rarely glaucescent*M. muscosa*
 Plant greyish-green; stems thicker (0,6-1,1 mm in diam.); leaves semi-terete,
 the upper linear or elongate-spathulate, glaucous,
 not shiny when fresh..... *M. tommasinii*
- 4 Leaves ovate, 3-5 veined; sepals with ciliate margin..... *M. trinervia*
 At least the upper leaves linear; sepals glabrous5
- 5 Leaves ciliate at base, green; pedicels 5-8 (10) mm..... *M. ciliata*
 Leaves glabrous, glaucous; pedicels 10-25 mm *M. bavarica*

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REFERENCES

- HALLIDAY, G., 1964: *Moehringia* L. In: TUTIN, T.G., HEYWOOD, V.H., BURGESS, N.A., VALENTINE, D.H., WALTERS, S.M. & D.A. WEBB (Eds.), *Flora Europaea*. 1. *Lycopodiaceae* to *Platanaceae*. Cambridge: University Press. p.123-125.
- HIND, D.J.N., 1996: *Moehringia* L. In: TUTIN, T.G., BURGESS, N.A., CHATER, A.O., EDMONDSON, J.R., HEYWOOD, V.H., MOORE, D.M., VALENTINE, D.H., WALTERS, S.M. & D.A. WEBB (Eds.), *Flora Europaea*. 1. *Psilotaceae* to *Platanaceae*. Cambridge: University Press. p. 148-152.
- INDEX HERBARIORUM, 2017: Index herbariorum, a global directory of public herbaria and associated staff. New York Botanical Garden's Virtual Herbarium. [<http://sweetgum.nybg.org/science/ih>].
- JALAS, J. & J. SUOMINEN (Eds.), 1983: *Atlas Florae Europaeae*. 6. *Caryophyllaceae* (*Alsinoideae* and *Paronychioideae*). Helsinki: Helsingin Liikekirjapaino Oy.
- LOVAŠEN-EBERHARD, Ž., 1994: *Moehringia* L. In: NIKOLIĆ T. (Ed.), *Flora Croatica*. Index Florae Croaticae, Pars 1. Nat. Croat. 3, suppl. 2, 73.
- MARHOLD, K., 2011: *Caryophyllaceae*. In: Euro+Med Plantbase - The information resource for Euro-Mediterranean plant diversity. *Moehringia pentandra* J. Gay. Accessed through: Euro+Med PlantBase at <http://ww2.bgbm.org/euroPlusMed/PTaxonDetail.asp?UID=BD38F89A-63D2-4050>

BFA2-7E36A0FB92F0

- MINUTO, L. & G. CASAZZA, 2018: *Moehringia* L. In: PIGNATTI, S., Flora d'Italia. 2, 92-98. Milano, Bologna: Edagricole.
- MONSERRAT MARTÍ, J.M., 1990: *Moehringia* L. In: CASTROVIEJO, S., LAINZ, M., LÓPEZ GONZALÉZ, G. et al., Flora Iberica. II. *Platanaceae-Plumbaginaceae (partim)*. 2. Madrid: Real Jardín Botánico, CSIC. p. 225-230.
- NIKOLIĆ, T. (Ed.), 2019: Flora Croatica Database. University of Zagreb, Faculty of Science, Department of Botany. <https://hirc.botanic.hr/fcd/>
- ROMO, A.M., 1990: *Stellaria* L. In: CASTROVIEJO, S., LAINZ, M., LÓPEZ GONZALÉZ, G. et al., Flora Iberica. II. *Platanaceae-Plumbaginaceae (partim)*. 2. Madrid: Real Jardín Botánico, CSIC. p. 253-260
- ROTTENSTEINER, W.K., 2014. Exkursionsflora für Istrien. Klagenfurt: Verlag des Naturwissenschaftlichen Vereins für Kärnten.
- TISON, J.-M. & B. DE FOUCAULT (coords.), 2014: Flora Gallica. Flore de France. Méze: Biotope.
- VOLARIĆ-MRŠIĆ, I., 1978: Rod *Moehringia* L. In: TRINAJSTIĆ I., Analitička Flora Jugoslavije 1 (4), 519-526. Institut za Botaniku Sveučilišta u Zagrebu, Zagreb: Grafički zavod Hrvatske.