

Short communication

The new association *Pimpinello lithophilae-Centaureetum lovricii* (*Crithmo-Staticetea*) from the island of Vis (southern Croatia)

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Abstract – This paper presents the new association *Pimpinello lithophilae-Centaureetum lovricii*, described for the halotolerant vegetation of the order *Helichrysetalia italici* (*Crithmo-Staticetea*) on the island of Vis (southern Croatia). The new association replaces the *Pimpinello lithophilae-Centaureetum issaeae*, originally published invalidly because its name was formed from the invalid taxon name ‘*Centaurea issaea* Lovrić’.

Keywords: Adriatic, *Capparo-Aurinion*, halotolerant vegetation, ICPN, phytosociological nomenclature, plant association, syntaxonomy

Introduction

The Vis Archipelago is located off the Eastern Adriatic (central Dalmatian) coast, in Croatia. The archipelago shows an exceptional concentration of endemic and rare plant species (e.g., *Centaurea* spp. and *Limonium* spp.) (Nikolić et al. 2015). Many of them inhabit halophytic and chasmophytic coastal and subcoastal habitats within rare plant communities (Terzi et al. 2020).

In Croatia, according to the European syntaxonomic framework of the EuroVegChecklist (EVC: Mucina et al. 2016), the halophilous coastal vegetation is included in the order *Crithmo-Staticetalia* whereas the halotolerant belt is classified in the order *Helichrysetalia italici* (Škvorc et al. 2017). Both orders belong to the *Crithmo-Staticetea* class. Although Škvorc et al. (2017) were the first to recognize the occurrence of the *Helichrysetalia italici* in Croatia, this order was widely described and documented for the first time for the eastern Adriatic by Terzi et al. (2020).

The order *Helichrysetalia italici* occurs between coastal vegetation under the direct influence of sea-borne salt spray and a vegetation belt notably less influenced by salt spray. In the island of Vis, within the order *Helichrysetalia italici* Terzi et al. (2020) reported two alliances (1) *Anthyllidion barbae-jovis*, with a Central Mediterranean distribution, and (2) *Capparo orientalis-Aurinion leucadeae* – an endemic alliance of the central Adriatic islands (Croatia) and the Tremiti (Italy).

The alliance *Capparo-Aurinion*, alongside four associations described from neighbouring islets in the Vis Archipelago and the Tremiti as well, includes the stenoendemic association *Pimpinello lithophilae-Centaureetum issaeae* Terzi, Bogdanović, D’Amico et Jasprica 2020 from the island of Vis. This association was, however, invalidly described because one of the name-giving taxon, *Centaurea issaea* Lovrić, had not been validly published at that time (Art. 31 of the ICPN, International Code of Phytosociological Nomenclature, Theurillat et al. 2021). In fact, according to Bogdanović et al. (2022), *Centaurea issaea* is a *nomen nudum*. Therefore, these authors described the new species *C. lovricii*. Consequently, the new association *Pimpinello lithophilae-Centaureetum lovricii* that is described here.

Materials and methods

This study was carried out according to the Braun-Blanquet approach (Westhoff and van der Maarel 1980). In the type relevé of the new association, the extended 9-point Braun-Blanquet cover-abundance scale was used, with a subdivision of symbol 2 into 2m, 2a and 2b (see Westhoff and van der Maarel 1980 and references therein). Nomenclatural decisions follow the fourth edition of the ICPN (Theurillat et al. 2021). Taxonomic nomenclature follows

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Flora Croatica Database (Nikolić 2023) except for *Limonium issaeum* and *Centaurea lovricii*, the nomenclature of which follows the revisions carried out by Bogdanović and Brullo (2015), and Bogdanović et al. (2022), respectively. Syntaxonomic nomenclature follows the Euro VegChecklist (EVC: Mucina et al. 2016). For complete description of the alliance *Capparo-Aurinion* and belonging tables, see Terzi et al. (2020).

Results and discussion

Syntaxonomic scheme:

Class: *Crithmo-Staticetea* Br.-Bl. in Br.-Bl. et al. 1952

Order: *Helichrysetalia italici* Biondi et Géhu in Géhu et Biondi 1994

Alliance: *Capparo orientalis-Aurinion leucadeae* Lovrić ex Terzi, Bogdanović, D'Amico et Jasprica 2020

Association: *Pimpinello lithophilae-Centaureetum lovricii* Jasprica et Terzi *ass. nov.*

Holotypus: Relevé no. 50 of Supplement S3 in Terzi et al. (2020), from the island of Vis. Plot size: 20 m²; coordinates (WGS84): latitude 43°04'28", longitude 16°06'33"; altitude 30 m a.s.l., aspect: 360°; slope 60°; vegetation cover 40%; date: 30 May 2018. List of taxa: *Brachypodium retusum*, 2m; *Brassica incana*, 2m; *Centaurea lovricii*, 2a; *Coronilla valentina* subsp. *valentina*, +; *Crithmum maritimum*, +; *Desmazeria rigida*, +; *Dorycnium hirsutum*, r; *Erica manipuliflora*, +; *Helichrysum italicum* subsp. *italicum*, 2m; *Inula verbascifolia*, 2a; *Juniperus phoenicea*, +; *Limonium issaeum*, 1; *Pimpinella tragium* subsp. *lithophila*, 2m; *Reichardia picroides*, +; *Silene vulgaris* subsp. *angustifolia*, +; *Valantia muralis*, 1. Name-giving taxa: *Pimpinella tragium* Vill. subsp. *lithophila* (Schischk.) Tutin and *Centaurea lovricii* Bogdanović, Boršić, Ljubičić, Brullo et Giusso.

Distribution records: The stands occur along the northern coast between Dragodid Bay and Oključina Bay, the island of Vis (Fig. 1). The association is localized in a narrow coastal belt of ca. 0.5 km².



Fig. 1. *Pimpinello lithophilae-Centaureetum lovricii*, *ass. nova*. A – the habitat type, B – *Pimpinella tragium* subsp. *lithophila*, C – *Centaurea lovricii*, D – detail of the association with *C. lovricii* and *Brassica incana*. (Photo: N. Jasprica; the island of Vis, May 30, 2018).

Ecology: It grows on sea facing cliffs constituted of Triassic dolomites at 10–100 m a.s.l. The association *Pimpinello lithophilae-Centaureetum lovricii* is characterized by the steno-endemic *Centaurea lovricii* and differentiated by *Brassica incana* and *Pimpinella tragium* subsp. *lithophila*. The latter is found in almost all countries of the northern Mediterranean Basin, while the distribution area of *Brassica incana* includes the western Balkans and Italy (Euro+Med 2006–2023). However, those two taxa are rare along the Dalmatian coast (Bogdanović and Ruščić 2011, Nikolić et al. 2015, Nikolić 2023) and therefore are selected as differential taxa of the new association.

Aurinia leucadea and *Capparis orientalis* were also included among the character-taxa of the *Capparo-Aurinion*. The association includes narrow endemic taxa (e.g., *Centaurea lovricii*, *Campanula teutana*, *Limonium issaeum*) together with some diagnostic taxa of the *Centaureo-Campanuletalia* (*Inula verbascifolia*, *Pimpinella tragium* subsp. *lithophila*, *Sesleria tenuifolia*) and some others of *Crithmo-Staticetea* / *Helichrysetalia italici* (*Crithmum maritimum*, *Helichrysum italicum*, *Allium commutatum*).

Conservation status: According to Bogdanović et al. (2022), the population of *C. lovricii* is estimated as Vulnerable (VU D1) (*sensu* IUCN 2022). However, it grows on very steep and quite inaccessible habitats, which makes the population and plant association unthreatened by any human disturbance. The rarity of this taxon and its associated plant community necessitates the implementation of a comprehensive conservation strategy.

The association name *Pimpinello lithophilae-Centaureetum issaeae* Terzi, Bogdanović, D'Amico et Jasprica 2020 *nom. inval.* (Art. 3 l) was formed from the taxa names *Pimpinella tragium* subsp. *lithophila* and *Centaurea issaea*. Although at that time, the name *Centaurea issaea* Lovrić was in use in the Flora Croatica Database (accessed 1 October 2018, see Terzi et al. 2020), it is a *nomen nudum* for *Centaurea lovricii*. Therefore, the name *Pimpinello lithophilae-Centaureetum issaeae* cannot be validated and is replaced here by *Pimpinello lithophilae-Centaureetum lovricii*. The relevés originally ascribed to the *Pimpinello lithophilae-Centaureetum issaeae* by Terzi et al. (2020: relevés 48–54 of Supplement S3) belong to the original diagnosis of the new association.

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