

New findings of rare and under-recorded vascular plants, bryophytes, lichens, fungi and algae in Croatia and neighbouring countries – 3

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Abstract

This paper supplies new data on the occurrence of 17 vascular plants (*Allium telmatum*, *Crepis bursifolia*, *Euphorbia tauriensis*, *Heliotropium supinum*, *Lysimachia minima*, *Myosurus minimus*, *Narcissus serotinus*, *Neotinea maculata*, *Ophioglossum azoricum*, *Pistacia × saportae*, *Puccinellia distans*, *Ranunculus marginatus*, *Saccharum strictum*, *Setaria parviflora*, *Stachys maritima*, *Trifolium lucanicum* and *Viola hymettia*), four bryophytes (*Fissidens fontanus*, *Myurella sibirica*, *Pseudocampylium radicale* and *Targionia hypophylla*) and one fungus (*Gomphus clavatus*) in Croatia and neighbouring Montenegro.

Keywords: biodiversity, distribution, new records

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Sažetak

U članku se predstavljaju novi podaci za 17 vaskularnih biljaka (*Allium telmatum*, *Crepis bursifolia*, *Euphorbia tauriensis*, *Heliotropium supinum*, *Lysimachia minima*, *Myosurus minimus*, *Narcissus serotinus*, *Neotinea maculata*, *Ophioglossum azoricum*, *Pistacia × saportae*, *Puccinellia distans*, *Ranunculus marginatus*, *Saccharum strictum*, *Setaria parviflora*, *Stachys maritima*, *Trifolium lucanicum* i *Viola hymettia*), četiri mahovine (*Fissidens fontanus*, *Myurella sibirica*, *Pseudocampylium radicale* i *Targionia hypophylla*) i jednu gljivu (*Gomphus clavatus*) u Hrvatskoj i susjednoj Crnoj Gori.

Ključne riječi: bioraznolikost, rasprostranjenost, novi podaci

Vascular plants

Allium telmatum Bogdanović, Brullo, Giusso et Salmeri

Contributors: Sebastian Čato (SĆ), Sandro Bogdanović (SB)

Croatia, Northern Dalmatia, Šibenik, Zablaće, salt marsh between lakes Mala Solina and Velika Solina, Mediterranean temporary pond vegetation, 43.71761 °N, 15.87178 °E, 18 September 2022 (SĆ)

Croatia, Northern Dalmatia, Šibenik, surrounding of Zablaće, edge of salt marsh between Velika and Mala Solina, 43.71662 °N, 15.87210 °E, 21 October 2022 (SĆ, SB), herbarium ID: ZAGR 75913

Allium telmatum (Amaryllidaceae) belonging to the sect. *Codonoprasum* is a Croatian stenoendemic species occurring in Dalmatia, with localities known from Nin, Bočetina, Lake Vrana, and the islands Pag and Vir (Bogdanović et al. 2009, Nikolić et al. 2025). The ecology of this species is peculiar among the other Croatian *Allium* species as it is an autumn-flowering halophyte growing on damp coastal soils. Given its threatened habitat, limited distribution, and sparse records it has an endangered (EN) status (Nikolić et al. 2025). A new locality of this rare species, currently the southernmost known, was discovered in Zablaće, Northern Dalmatia (Fig. 1). There, over 100 individuals were



Figure 1. *Allium telmatum* from Zablaće (photo by S. Ćato).

Slika 1. *Allium telmatum* iz Zablaća (fotografija S. Ćato).

discovered inhabiting the edge of a local unnamed salt marsh, growing within dense halophytic vegetation. This discovery opens the question of the species' possible presence even farther south, as it is not restricted to the wider Zadar area as previously thought.

Crepis bursifolia L.

Contributors: Sebastian Ćato (SC), Magdalena Klarić (MK)

Croatia, Northern Dalmatia, Vodice, pathway cracks, 43.75646° N, 15.772193° E, 3 August 2025 (SC)

Croatia, Northern Dalmatia, Vodice, roadside vegetation, 43.76159° N, 15.77266° E, 28 November 2025 (SC)

Croatia, Northern Dalmatia, Srima, roadside vegetation, 43.74692° N, 15.80337° E, 8 August 2025 (SC)

Croatia, Northern Dalmatia, Skradin, lawn in a city park, 43.81732° N, 15.92410° E, 11 September 2025 (SC, MK), herbarium ID: ZAGR 82582

The presence of this secretive species was only recently reconfirmed for the Croatian flora (Ćato 2025), two centuries after the only previously known locality was published (Host 1802). The initial observation by Host originated from Skradin (Northern Dalmatia), while the most

recent records were reported from Vodice, a city situated less than 15 km away. Three populations were discovered in different parts of the city, occurring in different anthropogenic habitats such as roadsides and cracks in the sidewalk (Ćato 2025). Reported here are two additional records from Vodice (Fig. 2), new record from Srima, and a new record from Skradin - which confirms the species' ongoing presence in this historically known location. As before, the species was once again found in cracks in the sidewalk (Vodice) and on roadsides (Vodice, Srima), while in Skradin, it was observed in a children's playground area, growing among herbaceous, ruderal vegetation under various trees. The new observations from Vodice represent localities with only a couple of individuals, while in Srima the species was observed in tens of individuals, appearing sporadically along the main road, with over a hundred specimens present in the wider Srima area. The species' presence in the wider surrounding area is expected but additional research is needed to confirm (or deny) this supposition.



Figure 2. *Crepis bursifolia* from Vodice (photo by S. Ćato).

Slika 2. *Crepis bursifolia* iz Vodica (fotografija S. Ćato).

Euphorbia taurinensis All.

Contributor: Sebastian Ćato (SC)

Croatia, Northern Dalmatia, Vodice, Križina hill, 43.76862° N, 15.74782° E, 18 April 2025 (SC)

Euphorbia taurinensis (Euphorbiaceae) is a European annual species of *Euphorbia* subgenus *Esula*. Other local, similar species from the subgenus are *E. exigua* L. and *E. falcata* L. These species are differentiated by morphology and seed sculpting, with seed morphology being far more consistent (unlike habitus, which can be influenced by different factors) and ensuring more accurate identification. Both *E. exigua* and *E. falcata* are widely distributed along the Croatian coast, while records of *E. taurinensis* are restricted to the southern coast and islands such as Brač, Hvar, Vis, Korčula, and Mljet (Nikolić et al. 2025). A new record of this uncommon species, currently representing the northernmost known occurrence, comes from Vodice in northern Dalmatia. Two individuals (Fig. 3) were encountered on Križina hill, growing in small patches of soil on a rocky pathway leading over the hill. Both *E. exigua* and *E. falcata* are species quite common locally, occurring in numerous different locations, while *E. taurinensis* was discovered in Vodice only in 2025, even with consistent research going on in the area over the past few years. Investigation of the species' occurrence farther north should be undertaken in the future for potential discovery of new northern populations.



Figure 3. *Euphorbia taurinensis* from Vodice (photo by S. Čato).

Slika 3. *Euphorbia taurinensis* iz Vodica (fotografija S. Čato).

***Heliotropium supinum* L.**

Contributors: Sebastian Čato (SĆ), Magdalena Klarić (MK)

Croatia, Northern Dalmatia, Krka National Park, dry riverbed of Čikola river, 43.82649° N, 16.02198° E, 20 July 2025 (SĆ, MK)

Compared to the only other *Heliotropium* species in Croatia – *H. europaeum* L., *H. supinum* is quite rare and was even assessed as critically endangered (CR) for Croatia (Nikolić & Topić 2005). Distribution of this species in Croatia is predominantly Mediterranean, with two inland records in Slavonia. New records of the species were published in the past year; they filled existing distribution gaps and also expanded its known distribution range (Šegota et al. 2024, Čato 2025). The new record of *H. supinum* (Fig. 4) comes from Northern Dalmatia, locality situated in Krka National Park. A large population of more than 50 specimens was observed on the dry riverbed of the Čikola River, individuals growing from river deposits consisting of sand, gravel, and rocks of various sizes. The habitat is similar to those in past reports of the species, where the individuals appeared with water levels lowering in different water bodies (Čato 2025). As well as filling in a distribution gap, this record also represents a new species for the National Park's vascular flora as it was not previously recorded within the Park's borders (Hršak et al. 2022).



Figure 4. *Heliotropium supinum* from Krka National Park (photo by S. Čato).

Slika 4. *Heliotropium supinum* iz Nacionalnog parka Krka (fotografija S. Čato).

***Lysimachia minima* (L.) U.Manns et Anderb.**

Contributors: Sebastian Ćato (SĆ), Sandro Bogdanović (SB), Anja Rimac (AR)

Croatia, Banija, village Nebojan, post-harvest corn field, 45.47425° N, 16.211194° E, 28 April 2020 (AR)

Croatia, Northern Dalmatia, Šibenik, Zabláće, salt marsh between lakes Mala Solina and Velika Solina, Mediterranean temporary pond vegetation, 43.71807° N, 15.87053° E, 1 June 2023 (SĆ, SB), herbarium ID: ZAGR 82556

This cosmopolitan species is one of the rarest *Primulaceae* species of Croatia. Data about its presence in Croatia are very limited, hence the assigned Data Deficient (DD) status (Nikolić & Topić 2005). There is a single literature record of the species under the name *Centunculus minimus* L. from the locality Sv. Helena in the surroundings of Zagreb (Klinggräff 1861-1862). Three herbarium specimens are stored in ZA: one from Sv. Helena (ZA 15410), one from Osekovo in the Moslavina region (ZA 15411), and one more without any collection data (ZA 15411). Both localities are situated in Central Croatia and the population status of the species on these localities is very questionable given the outdated data which are over 150 years old. We found species in 2020 in the vicinity of the village of Nebojan in Banija (Central Croatia) on a post-harvest corn field. The species grew on open ground along with other ephemerophytes, e.g. *Lythrum portula* (L.) D. A. Webb, *Hypericum humifusum* L., *Filaginella uliginosa* (L.) Opiz, *Phaeoceros carolinianus* (Michx) Prosk. and *Anthoceros agrestis* Paton. in the plant community *Centunculo mini-mi-Anthoceretum punctati* Koch ex Libbert 1932. The most recent record, the first from Dalmatia, comes from Zabláće, Northern Dalmatia. The species was found growing in a floodplain situated next to a large salt marsh, with the plain holding freshwater, unlike the rest of the marsh area, which is saline and has the expected halophytic vegetation. This record confirms the species' presence for Croatia

but also poses the question: is this species, given its small size and ephemeral life cycle, really rare or just overlooked?



Figure 5. *Lysimachia minima* from Zabláće (photo by S. Ćato).

Slika 5. *Lysimachia minima* iz Zabláća (fotografija S. Ćato).

***Myosurus minimus* L.**

Contributors: Marija Kovačević (MK), Marko Doboš (MD), Sandro Bogdanović (SB)

Croatia, Slavonia, Pleternica, 45.25084° N, 17.75630° E, 9 April 2016 (MK)

Croatia, Slavonia, Orljavac, 45.41042° N, 17.51222° E, 20 April 2024 (MD)

Croatia, Podravina, Molve, 46.10601° N, 17.00749° E, 1 May 2025 (SB)

Myosurus minimus (*Ranunculaceae*) is an annual species (Fig. 6) associated with short-lived wet habitats such as seasonally flooded depressions, moist grasslands and temporarily inundated soils. It relies on a persistent seed bank to withstand extended dry periods. Although originally widespread across Europe, *M. minimus* is now rare and declining throughout much of its range. In Croatia, it is classified as strictly protected and listed as Critically Endangered (CR) (Nikolić & Topić 2005), with only a few recent localities, mostly in the Istria and Podravina regions (Nikolić et al. 2025). According to 19th-century records, the species was widespread

in Slavonia, particularly in fields flooded during winter (Schlosser & Farkaš-Vukotinović 1869). It was later recorded on grassland in Trpinja (Nikolić & Topić 2005), but is now considered extinct at that site (Boršić & Vukelić 2012). As the species is inconspicuous outside its short flowering and fruiting period, and because suitable microhabitats are easily overlooked, its actual distribution may be broader than currently documented. The newly identified localities in Slavonia comprise ephemeral wet microhabitats, including trampled livestock path, seasonally moist meadow patches and an arable field that had not been ploughed during the winter. The population from Pleternica was initially abundant in the trampled zones of a grazing land and subsequently spread along livestock paths, over several years. However, after the cattle ceased grazing, the formerly open, compacted and periodically wet swards regenerated, resulting in the disappearance of the species from most of the site. It now persists only along the livestock paths around stables and a small area of the original trampling-affected pasture. Occasional individuals also occur on nearby arable land, presumably introduced *via* mud containing seeds.



Figure 6. *Myosurus minimus* from Pleternica (photo by M. Kovačević).

Slika 6. *Myosurus minimus* iz Pleternice (fotografija M. Kovačević).

***Narcissus serotinus* L.**

Contributors: Ivana Džaković (IDŽ), Snežana Dragičević (SD)

Montenegro, Budva municipality, Krimovica, macchia, ca. 40 m a.s.l., 42.27715° N, 18.78287° E, 20 September 2025 (IDŽ, SD)

Montenegro, Budva municipality, Krimovica, macchia, ca. 40 m a.s.l., 42.27732° N, 18.78363° E, 20 September 2025 (IDŽ, SD)

In the native and adventive flora of Montenegro, six taxa of the genus *Narcissus* L. (*Amaryllidaceae*) have been recorded (Rohlena 1942, Karaman 1997, Pulević 2005, Stešević 2022). Records of the Mediterranean species *N. serotinus* along the eastern Adriatic coast are scarce and historically refer to Bosnia and Herzegovina and Croatia (Reichardt 1861): Promina near Drniš, the surroundings of Orlovac near Knin, Dinara, and the island of Ugljan. More recently, the species was discovered in 1998 on Pelješac Peninsula in Croatia (Devetak 2000). A review of relevant botanical literature reveals that the only previously known locality for this daffodil in Montenegro is Luštica Peninsula, specifically Pržno (Karaman 1997, Pulević 2005). The absence of data does not imply that the species is not present at other sites in the coastal zone of Montenegro (suitable habitats do exist), but rather reflects the insufficient research into this area during the autumn. Here we present a new record of *N. serotinus* for Montenegro, found in macchia at Krimovica (Fig. 7). The population occupies about 2,500 m² (partially fragmented due to road construction) and includes approximately 5,000 individuals, but is under pressure due to the planned construction of a hotel complex. The species was found in shrubland dominated by *Phillyrea latifolia* L. along with *Juniperus oxycedrus* L., *J. phoenicea* L., *Arbutus unedo* L., *Myrtus communis* L., *Pistacia lentiscus* L., *P. terebinthus* L., *Quercus ilex* L., *Viburnum tinus* L., *Hippocrepis emerus* subsp. *emeroides* (Boiss. & Spruner) Lassen and *Erica arborea* L. In the low shrub layer, *Cistus salviifolius* L., *Odontites luteus* (L.)

Clairv., and *Salvia officinalis* L. dominate, while the herb layer is characterized by the grass *Brachypodium retusum* (Pers.) P. Beauv. Ruderal species were also registered at the locality, including *Solanum nigrum* L., *Sonchus oleraceus* L., *Parietaria judaica* L., *Echium vulgare* L. and *Carthamus lanatus* L.



Figure 7. *Narcissus serotinus* from Krimovica, Montenegro (photo by I. Džaković & S. Dragičević).

Slika 7. *Narcissus serotinus* iz Krimovice, Crna Gora (fotografija I. Džaković i S. Dragičević).

***Neotinea maculata* (Desf.) Stearn**

Contributors: Sebastian Ćato (SĆ)

Croatia, Northern Dalmatia, Vodice, Križina hill, garrigue and Aleppo pine forest, 43.77405° N, 15.74344° E (SĆ), 18 April 2025

Croatia, Northern Dalmatia, Tribunj, Križina hill, garrigue and Aleppo pine forest, 43.77334° N, 15.74209° E (SĆ), 18 April 2025

Neotinea maculata (Orchidaceae) is a Near Threatened (NT) orchid widely distributed in southern Croatia,

with numerous records from most islands, as well as from the coast (Nikolić & Topić 2005, Nikolić et al. 2025). North of Trogir the records are sparse, with species recorded on the islands of Krk (Delforge 2006), Cres, and Lošinj (Wallnöfer 2008), as well as on the mainland in the wider Zadar area (Verhart 2022). A new locality of this species was found in Northern Dalmatia, Vodice (Fig. 8) and Tribunj, where this species has a population spanning over the Križina hill. The plants were found growing on open areas on the edge of an Aleppo pine forest among other orchids, such as *Ophrys* sp., *Anacamptis* sp., *Orchis* sp.) or inside the forest, where the individuals were more numerous. The population consists of around 100 individuals sparsely distributed over the hillside. For Vodice, 26 orchid taxa have been documented and for Tribunj, 11 (Ćato 2023, Ćato 2025, unpublished data). This is a taxon new for both Vodice and Tribunj.



Figure 8. *Neotinea maculata* from the surroundings of Vodice (photo by S. Ćato).

Slika 8. *Neotinea maculata* iz okolice Vodice (fotografija S. Ćato).

***Ophiglossum azoricum* C. Presl**

Contributors: Sebastian Ćato (SĆ), Sandro Bogdanović (SB)

Croatia, Northern Dalmatia, Šibenik, Zablaće, salt marsh between lakes Mala Solina and Velika Solina, Mediterranean temporary pond vegetation, 43.71811° N, 15.87031° E (SĆ, SB), 15 April 2023, herbarium ID: ZAGR 82555

Three *Ophioglossum* (*Ophioglossaceae*) species occur in Croatia: *O. azoricum*, *O. lusitanicum* L., and *O. vulgatum* L. The rarest is *O. azoricum*, with only two localities known from Istria (Brana et al. 2014). The three species can be somewhat easily separated by size, leaf morphology and phenology. *Ophioglossum lusitanicum* is the smallest among them, the plants being minute, rarely reaching over 2 centimeters in height. The largest of the three is *O. vulgatum*, with individuals sometimes reaching over 20 cm in height. Morphologically intermediate between these two species is *O. azoricum*, which grows to around 10 cm tall. The intermediate morphology is easily explained given its allopolyploid origin from an ancestral hybridization between the two formerly mentioned species, *O. lusitanicum* and *O. vulgatum* (Löve & Kapoor 1966, 1967). Phenology-wise, the vegetation period of *O. lusitanicum* starts in winter with sporulation occurring during November-January, while *O. azoricum* and *O. vulgatum* show spring/summer reproductive seasons (Brana et al. 2014). Distribution-wise in Croatia, *O. azoricum* and *O. lusitanicum* are strictly Mediterranean species, where *O. vulgatum* shows a predominantly continental distribution, with observations from the Adriatic being far less common (Nikolić et al. 2025). A new locality of this rare species was discovered in Northern Dalmatia, Zablacé, near Šibenik (Fig. 9). A dense population of around 200 individuals on an area of only 2 m² was found. The habitat is a flood plain situated on the outskirts of a large salt marsh. Interestingly, this flood plain contains freshwater unlike the rest of the marsh area, where salt, and, consequently, numerous halophytes are present (*Salicornia perennans* Willd. subsp. *perennans*, *Triglochin barrelieri* Loisel., *Cressa cretica* L., *Limbarda crithmoides* (L.) Dumort, and *Limonium narbonense* Mill.). Inspection of the wider area of the salt marsh unfortunately did not uncover any additional findings of *O. azoricum*.



Figure 9. *Ophioglossum azoricum* from Zablacé (photo by S. Čato).

Slika 9. *Ophioglossum azoricum* iz Zablacé (fotografija S. Čato).

Pistacia × *saportae* Burnat

Contributors: Sebastian Čato (SĆ), Magdalena Klarić (MK)

Croatia, Northern Dalmatia, Lozovac, Skradinski Buk, Aleppo pine forest edge, 43.80561° N, 15.97177° E, 11 September 2025 (SĆ, MK), herbarium ID: ZAGR 82581

Pistacia L. (*Anacardiaceae*) is represented by three taxa in Croatia: *P. lentiscus* L., *P. terebinthus* L., and their hybrid *P. × saportae*. The genus is distributed along the whole of Croatia's coast, primarily in the eu-Mediterranean belt, with numerous records of both species while the hybrid is rarely recorded (Nikolić et al. 2025). In fact, the presence of *P. × saportae* was only recently confirmed for the eastern Adriatic (Temunović et al. 2024). Differentiation between *P. lentiscus* and *P. terebinthus* is rarely challenging for an experienced botanist, while identification of the hybrid can be, on the contrary, quite demanding. For instance, out of 21 collected individuals of assumed *P. × saportae* from Croatia, only four individuals were genetically confirmed (Temunović et al. 2024). The morphological heterogeneity of parental taxa is also reflected in their hybrid, with authors reporting variable data regarding the hybrid's morphology (AL-Saghir et al. 2012, Werner et al. 2001, Temunović et al. 2024). Overall, *P. × saportae* shows intermediate

characters of the parental taxa, with the hybrid usually differentiated from *P. lentiscus* by larger leaves, wider leaflets, and by the presence of a central leaflet, which is small compared to the neighbouring ones, commonly being even stunted. Compared to *P. terebinthus*, the hybrid has smaller leaves, more leaflets, a significantly smaller central leaflet, with the key difference being the evergreen nature of the hybrid, while *P. terebinthus* is deciduous. The new record of this rare hybrid is from Northern Dalmatia, the village of Lozovac (Fig. 10). The sole individual was found on the Aleppo pine forest edge, growing among the parental taxa. Its leaves were slightly curved, intermediate in size between the parents and possessing six to eleven leaflets with the central ones poorly developed, stunted or even absent causing the leaves to vary between odd and even leaflet numbers. This finding represents a new addition for the vascular flora of National Park Krka.



Figure 10. *Pistacia* × *saportae* from Lozovac (photo by S. Ćato).

Slika 10. *Pistacia* × *saportae* iz Lozovca (fotografija S. Ćato).

***Puccinellia distans* (Jacq.) Parl.**

Contributor: Sebastian Ćato (SĆ)

Croatia, Zagreb, Trnje, Most mladosti, roadside vegetation, 45.78683° N, 16.00410° E, 14 July 2025 (SĆ), herbarium ID: ZAGR 82583

Croatia, Baranja, Osijek, Retfala, Most Drava, ruderal vegetation, 45.57486° N, 18.63808° E, 7 September 2025 (SĆ)

Puccinellia distans (Poaceae) is a Euroasian native halophytic species distributed over different coastal littoral and continental saline habitats. In Croatia it is a critically endangered species commonly occurring along the shore (Nikolić & Topić 2005). The roadside spread of this species has been recently recorded in Croatia (Schmidt et al. 2023), where it occupies inland saline verges, a new habitat created by road salting. Continental records exist from Ogulin and surroundings (Kovačić 2012), Northern Croatia (the wider surroundings of Karlovac, Zagreb, and Varaždin), Southern Slavonia (the wider surroundings of Nova Gradiška, Slavonski Brod, and Županja), and Baranja (Darda municipality near Osijek) (Schmidt et al. 2023). Here we present two new inland records of *P. distans* from Croatia. The first record is from the city of Zagreb where the species was discovered growing from bare concrete roadside cracks of a bridge (Most mladosti) across the Sava River. Growing with it in great numbers was *Spergularia marina* (L.) Besser, which is another species spreading along verges. The second record is from the surroundings of Osijek city (Fig. 11) next to the Drava River, where larger clumps of the species were encountered growing from barren soil under the bridge. This artificial saline habitat was certainly created by salt-saturated water originating from the bridge above. Detection of numerous new inland localities is tentatively expected soon.



Figure 11. *Puccinellia distans* from Osijek (photo by S. Ćato).

Slika 11. *Puccinellia distans* iz Osijeka (fotografija S. Ćato).

***Ranunculus marginatus* d'Urv.**

Contributors: Sebastian Ćato (SĆ), Sandro Bogdanović (SB)

Croatia, Northern Dalmatia, Šibenik, Zablaće, salt marsh between lakes Mala Solina and Velika Solina, Mediterranean temporary pond vegetation, 43.71808° N, 15.87056° E, 20 May 2023 (SĆ, SB), herbarium ID: ZAGR 82557

Croatia, Northern Dalmatia, Vodice hinterland, Kovča marsh, marsh vegetation, 43.82061° N, 15.776971° E, 1 July 2023 (SĆ)

Ranunculus (*Ranunculaceae*) is a rather large genus, represented by over 50 species in Croatia (Nikolić et al. 2025). Among them, some are rather rare and seldom reported, one of them being *R. marginatus*. Croatian records of this wetland species are scarce. In fact, all are situated in Dalmatia with the oldest records from two locations in the Ravni Kotari region, near Zadar (Horvatić et al. 1967-1968) while the only other record, the most recent, originates from Dugiš, Makarska (Šilić & Šolić 2022). Presented here are two new localities of this species from Northern Dalmatia. It was discovered in Zablaće on a flood plain next to a salt marsh and in the Vodice hinterland at Kovča marsh (Fig. 12). Both water bodies hold freshwater for prolonged periods of time during the year (mostly the winter-spring period) which is ideal for this moisture-loving species. In Vodice the species grows among taller coastal vegetation composed mostly of *Bolboschoenus maritimus* (L.) Palla which makes the species harder to notice than in the Zablaće locality, where the accompanying vegetation is low growing and the erect *R. marginatus* stems holding bright yellow flowers are easier to spot.



Figure 12. *Ranunculus marginatus* from the Vodice hinterland (photo by S. Ćato).

Slika 12. *Ranunculus marginatus* iz zaleđa Vodica (fotografija S. Ćato).

***Saccharum strictum* (Host) Spreng.**

Contributors: Sandro Bogdanović (SB), Antun Alegro (AA), Anja Rimac (AR), Vedran Šegota (VŠ), Maja Maslač Mikulec (MMM)

Croatia, Dalmatia, sand cliffs NE from Sabunike near the town of Nin, 44.25889° N, 15.15823° E, 7 May 2016, repeated observation 11 June 2016 (SB, AA, VŠ), herbarium ID: ZAGR 45795

Croatia, Dalmatia, Island of Pašman, near town of Pašman, along the dry wash on the way to the Kuna viewpoint, 43.95037° N, 15.37566° E, 10 July 2023 (AR, MMM)

The genus *Saccharum* L. (*Poaceae*) comprises only two species native to Europe and is primarily distributed throughout the Mediterranean region (Clayton 1980). *Saccharum strictum* is characterized as a rare and Data Deficient (DD) species within the Croatian flora. To date, the species has been recorded only once in Croatia, specifically within the urban flora of the town of Zadar (Milović 2012). Its distribution extends to Italy and various Balkan countries, including Croatia, Bosnia and Herzegovina, Montenegro, Serbia, Bulgaria, Romania, Albania, and Greece, as well as to the Middle East, comprising Turkey, Israel, Jordan, Lebanon, and Syria (Rohlena 1942, Euro+Med, 2006-onwards). The species typically grows as a

tall, robust perennial, reaching heights of up to 2 meters, and possesses rhizomes. In Dalmatia, two small populations were identified, consisting of several specimens; the first is located on a sandy cliff near the town of Nin (Fig. 13), and the second on open limestone rocky grasslands amid black pine trees near the town of Pašman.



Figure 13. *Saccharum strictum* from Sabunike: inflorescences (left), transition from the leaf sheath to the leaf blade (right) (photos by S. Bogdanović).

Slika 13. *Saccharum strictum* s područja Sabunika: cvat (lijevo), prijelaz rukavca u lisnu plojku (desno) (fotografije S. Bogdanović).

Setaria parviflora (Poir.) Kerguélen

Contributors: Sebastian Čato (SĆ), Antonio Eršegović (AE), David Grabovac (DG), Diana Kegelj (DK)

Croatia, Northern Dalmatia, Vodice, among cultivated plants, 43.76121°N, 15.78340°E, 27 September

Croatia, Island of Rab, Supetarska Draga, Fruga, grassland vegetation, 44.80275° N, 14.74636° E, 25 October 2025 (SĆ, AE, DG, DK), herbarium ID: ZA 82577

Setaria parviflora (Poaceae) is one of the alien *Setaria* species documented for Croatia, with the earliest record from 1997 in the Šibenik area in Northern Dalmatia (Milović et al. 2010). It was also reported from Zadar (Milović et al. 2010), Split (Ruščić 2003), Omiš (Tafra 2009), Brač Island (Ruščić 2009), and

Krka National Park (Hršak et al. 2022). It inhabits different ruderal habitats, commonly different cultivated grounds or lawns (Milović et al. 2010). The new records of this alien species are from Vodice (Northern Dalmatia) and Rab Island (Kvarner). In Vodice, the species was found in lawn vegetation by a gas station, with sporadic occurrences of individuals among cultivated plants. Around 20 individuals were documented on this locality. On Rab Island it was found in Fruga (Fig. 14), especially around Fruška Lokva (a pond). It is obvious that intensive grazing occurs in the area as the vegetation is quite low growing and herbaceous, especially around the pond. This probably benefits the species given its mentioned fondness for disturbed, grassy habitats. Near the pond, individuals of *S. parviflora* can be observed growing solitarily or in smaller clumps while only a hundred meters away it creates an almost homogeneous community which covers an area of over 2 ha. The only other noticeable species on this pasture among the numerous *S. parviflora* individuals is *Carlina corymbosa* L. It is quite an intriguing sight, as we have not seen any other *Setaria* occur in such great numbers, especially not over such a large area. It seems the species is well established and its presence can be expected in other parts of the island.



Figure 14. *Setaria parviflora* from Fruga (island Rab) (photo by S. Čato).

Slika 14. *Setaria parviflora* iz Fruge (otok Rab) (fotografija S. Čato).

Stachys maritima Gouan

Contributors: Vedran Šegota (VŠ), Sandro Bogdanović (SB), Antun Alegro (AA), Sebastian Čato (SĆ), Antonio Eršegović (AE), David Grabovac (DG), Diana Kegelj (DK)

Croatia, Dalmatia, Sabunike near town of Nin, Kraljičina plaža (beach), psammophytic vegetation, 44.250248° N, 15.177024° E, 24 April 2016, repeated observation 7 May 2016, repeated observation 10 June 2016 (VŠ, SB, AA), herbarium ID: ZAGR 45981, ZAGR 41717, ZA 7590

Croatia, Island of Rab, Lopar, Saramić bay, Sahara beach, psammophytic vegetation 44.83935° N, 14.75106° E, 24 October 2025 (SĆ, AE, DG, DK), herbarium ID: ZA 82576

Stachys maritima (Lamiaceae) is a psammophytic-Circum-Mediterranean species. Given that psammophytic habitats are particularly uncommon in Croatia, the majority of species found in these environments are rare, endangered, and, in some cases, nationally extinct. Data regarding the distribution of *S. maritima* in Croatia are limited; existing records include observations from Makarska in Southern Dalmatia (Host 1802), the island of Rab (Horvatić 1939), and the island of Ilovik (Rottensteiner 2015). A record from Mt Matokit (Vitasović Kosić et al. 2020) appears to be inaccurate. This report presents two recent observations of *S. maritima* in Croatia. The first observation was made in 2016 at Kraljičina plaža (beach) near the town of Nin, where the species occurred within vegetation on a complex of sand beaches. The second recent observation was made in sand vegetation on Lopar Peninsula in the northeastern part of the island of Rab (Fig. 15). The species was not confirmed at the historical site of Crnika Bay (Horvatić 1939) due to the complete clearance of the historically documented psammohalophytic vegetation for the development of tourism, which has already caused the extinction of several rare taxa (Bogdanović et al. 2018).



Figure 15. *Stachys maritima* from the island of Rab (photo by S. Čato).

Slika 15. *Stachys maritima* s otoka Raba (fotografija S. Čato).

Trifolium lucanicum Guss.

Contributor: Sandro Bogdanović (SB)

Croatia, Lika, Donji Lapac, Bare, mesophilous grassland along the road, 44.52944° N, 15.96466° E, 14 July 2025 (SB), herbarium ID: ZAGR 82050.



Figure 16. Flowering stems of *Trifolium lucanicum* (photo by S. Bogdanović).

Slika 16. Cvatuće stabljike *Trifolium lucanicum* (fotografija S. Bogdanović).

Trifolium lucanicum (Fabaceae) (Fig. 16) is one of the rarest and poorly known *Trifolium* species in Croatia. Until now, this species was known only from two localities in Dalmatia, the island of Hvar and Vela Kluda (Trinajstić 1993, Vladović et al. 2001). Two new localities were recently recorded in the area of Vodice and Gornji Karin by Ćato (2025). All previous sites belong to the Mediterranean region, while the newly discovered site from Lika in Donji Lapac is the only one that belongs to the continental region of Croatia.

***Viola hymettia* Boiss. et Heldr.**

Contributor: Sebastian Ćato (SĆ)

Croatia, Northern Dalmatia, Vodice hinterland, Gorjak hill, karst vegetation, 43.83082° N, 15.77589° E, 19 April 2025 (SĆ), herbarium ID: ZAGR 82580

Viola hymettia (Violaceae) is an annual Euroasian violet species belonging to section *Melanium*. The section is represented by five species in Croatia: *V. arvensis* Murray, *V. hymettia*, *V. elegantula* Schott., *V. kitaibeliana* Schult., and *V. tricolor* L (Nikolić et al. 2025). *Viola hymettia* was only recently added to the Croatian flora although it was initially documented nearly 20 years ago, the reason being its misidentification (Čičmir 2025). Because of its small to medium sized creamy-whitish flowers, it is commonly confused with the similar and much more common *V. arvensis* and *V. kitaibeliana*. The key difference separating *V. hymettia* from the latter species is the roundish petals abruptly narrowing at the base, which are distinctly longer than sepals (Čičmir 2025). The only confirmed locality of the species is situated between the cities of Vodice and Šibenik, containing over 200 individuals while the approximated distribution covers the wider area between cities Vodice and Split (Fig. 7 in Čičmir 2025). A new locality of this rare and underreported violet was discovered inside the approximated distribution in the hinterland of Vodice (Fig. 17), nine kilometers northwest of the previously reported population. A small population of around 30 individuals was discovered at the foot of Gorjak

hill, growing among rocks in small pockets of soil. Flowers in the population are both creamy-whitish and lightly purple. The plants appeared in smaller patches along the hill, attracting attention with their bright flowers emerging from the dense herbs. Future research in the Vodice (and wider) area is needed to uncover new localities, which will ultimately help us better understand the complete distribution of this elusive species in Croatia.



Figure 17. *Viola hymettia* in the hinterland of Vodice (photo by S. Ćato).

Slika 17. *Viola hymettia* iz okoline Vodica (fotografija S. Ćato).

Bryophytes

***Fissidens fontanus* (Bach. Pyl.) Steud.**

Contributors: Anja Rimac (AR), Marija Bučar (MB)

Croatia, Istra, Mirna River, Kamenita Vrata, near Buzet, 45.39834° N, 13.9389° E, 14 July 2022 (AR, MB)

Croatia, Istra, River Mala Huba, near Buzet, 45.40558° N, 13.95471° E, 22 July 2025 (AR, MB)

Croatia, Sava River, downstream from Zagreb, near the settlement of Rugvica, 45.74637° N, 16.2297° E, 27 August 2025 (AR, MB)

Fissidens fontanus (Fissidentaceae) is an aquatic moss, commonly known as a pocket-moss owing to its distinctive, partly conduplicate lamina and its complanate leaves arranged in two rows (Fig. 18). Within the genus, *F. fontanus* is easily recognized

by its narrowly lanceolate leaves, up to ten times as long as wide, with the conduplicate portion comprising less than one-third of the total leaf length. *Fissidens fontanus* is considered to be scarce and scattered throughout its distribution range, but locally abundant (Frey et al. 2006, Atherton et al. 2010). It typically grows on submerged rocks in standing or slowly flowing water and is regarded as moderately pollution-tolerant (Erzberger 2016). In Croatia, it was first reported from the Trepča River near its confluence with the Kupa River (Alegro et al. 2019), then followed by a record from Lake Visovac in Krka National Park, where it occurred among rich macrophyte vegetation at depths up to 2.5 m (Šegota et al. 2019). During recent monitoring of macrophyte vegetation for the Water Framework Directive, three new Croatian localities were recorded: the Mirna and Mala Huba rivers near Buzet, Istria, and the



Figure 18. *Fissidens fontanus* from the Sava River near Rugvica (photos by A. Rimac).

Slika 18. *Fissidens fontanus* iz rijeke Save kod Rugvice (fotografije A. Rimac)

Sava River downstream of Zagreb, near Rugvica (Fig. 18). In the Mirna River it was accompanied by bryophytes *Fissidens crassipes* Wilson ex Bruch & Schimp., *Cinclidotus fontinaloides* (Hedw.) P. Beauv., *C. aquaticus* (Hedw.) Bruch et Schimp., and the quite rare *C. danubicus* Schiffn. et Baumgartner, as well as the eutrappent *Leptodictyum riparium* (Hedw.) Warnst. In the Mala Huba, the vegetation was dominated by *Chara vulgaris* L. and *Potamogeton nodosus* Poir., while bryophytes occupied larger substrata. Here, *F. fontanus* was accompanied by the bryophytes *Fontinalis antipyretica* Hedw., *Rhynchostegium riparioides* (Hedw.) Cardot, *Cratoneuron filicinum* (Hedw.) Spruce, and *L. riparium*. In the Sava River, the species grew only on large stones along the river margins with *F. antipyretica*, *R. riparioides*, *L. riparium*, *C. danubicus*, and *Cinclidotus riparius* (Host ex Brid.) Arn.

***Myurella sibirica* (Müll. Hal.) Reimers**

Contributors: Anja Rimac (AR), Antun Alegro (AA), Vedran Šegota (VŠ)

Croatia, Plitvice Lakes National Park, *Ostrya carpinifolia* forest stand above western margin of Lake Galovac, on the stones, 44.87474° N, 15.60451° E, 29 September 2023 (AR, AA, VŠ), herbarium ID: ZA 82432

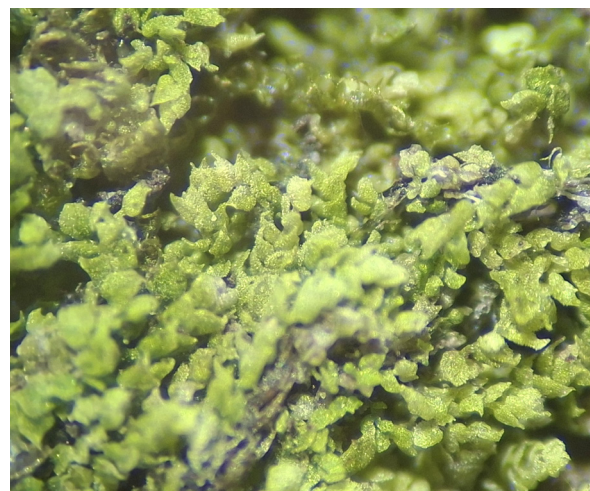


Figure 19. *Myurella sibirica* from the Plitvice Lakes National Park (photo by A. Rimac).

Slika 19. *Myurella sibirica* iz Nacionalnog parka Plitvička jezera (fotografija A. Rimac).

This eastern subarctic-alpine species is widely distributed in the mountains of southern Siberia, China, Japan and the Himalayas, but is rare in Europe. In Croatia, *Myurella sibirica* (*Plagiotheciaceae*) was first found in the crevices of permanently shaded and moist limestone rocks surrounding the source of the Kupa River (Alegro et al. 2018), where it survived as a glacial relic and is assessed as a vulnerable (VU) taxon in the flora of Croatia. The new site is in the immediate vicinity of Lake Galovac in the Plitvice Lakes National Park, within a low European hop-hornbeam forest (Fig. 19).

***Pseudocampylium radicale* (P. Beauv.)
Vanderp. et Hedenäs**

Contributors: Marija Bučar (MB), Anja Rimac (AR), Vedran Šegota (VŠ), Beáta Papp (BP)

Croatia, Hrvatsko Zagorje, Dubravica Bog, Lugarski Breg, Zagorje, 45.96492° N, 15.74627° E, 27 April 2023 (MB, VŠ, AR, BP), herbarium ID: ZA 80370, ZA 80371, ZA 80372

The genus *Pseudocampylium* (*Amblystegiaceae*), established by Vanderpoorten and Hedenäs (2009) accommodates only one species – *Pseudocampylium radicale*, previously known as *Amblystegium radicale* P. Beauv. *Pseudocampylium radicale* is a small and indistinct pleurocarpous moss which grows in semi-shade, on acidic and waterlogged soil (Hill et al. 2007), sometimes over rotting vegetation (Frey et al. 2006), such as in bogs. In Europe, it is considered to be of least concern regarding natural threats, however, the low number of records shows that it is often overlooked. In some countries of Southeastern Europe, where permanently waterlogged forest sites are rare, *P. radicale* is considered to be under threat – endangered in Hungary and Serbia, and critically endangered in Romania (Hodgets & Lockhart 2020). In Croatia, this species was previously only found once, by an Austrian botanist, Joseph A. Knapp, in Slavonia in 1866, on the path from Slatinski Drenovac to Jankovac (Schulzer v. Müggenburg et al. 1866). This new recent record confirms *P. radicale* for Croatia after

157 years. It was found in the Dubravica Bog in Hrvatsko Zagorje overlying dead leaves on the soil (Fig. 20). Despite being overlooked, the species is easily recognized by its 'spiky' look – the longly acuminate and decurrent leaves are evenly distributed on the stem and not crowded, spreading from the stem almost at 90 degrees, which gives the plant a complanate appearance.

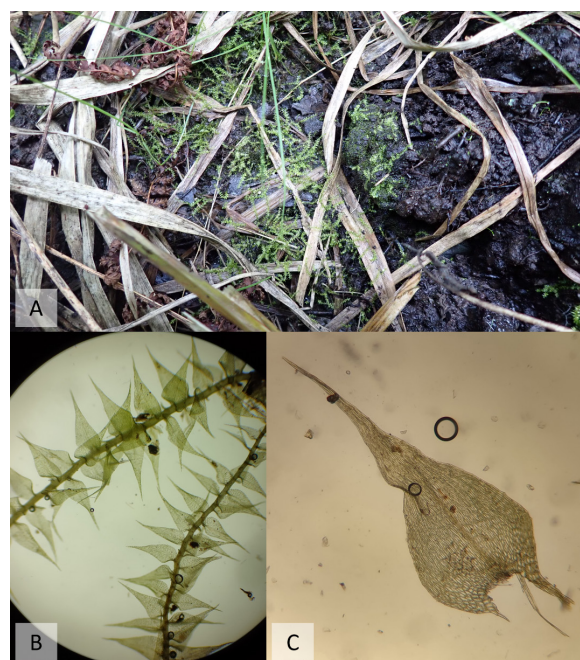


Figure 20. *Pseudocampylium radicale*: A – habitat, B – leaf arrangement, C – leaf detail (photos by M. Bučar)

Slika 20. *Pseudocampylium radicale*: A – stanište, B – raspored listića, C – listić (fotografije M. Bučar)

***Targionia hypophylla* L.**

Contributor: Simona Strgulc Krajšek (SSK)

Croatia, Rab Island, the entrance to Mladenova Buža Cave, on the rocky slope SW of San Marino beach, 44.819546° N, 14.730853° E, 13 April 2025 (SSK)

Targionia hypophylla L. (*Targioniaceae*) is a thallose liverwort with oceanic and sub-Mediterranean distribution (Chavoutier & Hugonnot 2021). It is easily recognisable by an opaque thallus with numerous surface pores. When dry, the thallus

edges roll up and expose a conspicuous black ventral surface. Female branches with sporangia are hidden in 2-valved black involucre, which have a mussel-like shape. The spores are larger than 50 μm and have an ornamented surface with a conspicuous rim (Schumacker & Váňa 2005, Long 2010, Chavoutier & Hugonnot 2021). We found a well-developed specimen growing on the bare carbonate rock at the entrance to Mladenova Buža Cave on the Island of Rab (Fig. 21). The habitat is exposed to full sun for part of the day. The thallus covered approximately 1 dm^2 , was partly dry, and had developed ripe sporangia. This represents the first documented occurrence of *T. hypophylla* in Kvarner Bay and the northern Adriatic, whereas the majority of other records from Croatia date back a century or more (Alegro & Šegota 2025).



Figure 21. *Targionia hypophylla* from the entrance to Mladenova Buža Cave on the Island of Rab (photo by S. Strgulc Krajšek).

Slika 21. *Targionia hypophylla* na ulazu u špilju Mladenova Buža na otoku Rabu (fotografija S. Strgulc Krajšek).

Fungi

Gomphus clavatus (Pers.) Gray

Contributor: Ilinka Četković

Montenegro, Žabljak Municipality, Durmitor National Park, near Crno Jezero, 43.14790° N, 19.09830° E, 1443 m a.s.l., 17 August 2014 (IČ), herbarium ID: NHMM 312/6908

Montenegro, Žabljak Municipality, Durmitor National Park, near Crno Jezero, 43.14903° N, 19.09514° E, 1438 m a.s.l., 19 August 2020 (IČ), herbarium ID: NHMM 898/13071

Gomphus clavatus is a fungal species (Agaricales, Basidiomycota), ectomycorrhizal with coniferous and deciduous trees (*Picea*, *Abies*, and *Fagus*), mostly in mature forests of the montane zone. The basidiomata appear during the summer and early autumn, solitary, gregarious or in clusters, often forming lines or fairy rings. The species is distributed in Europe, Asia, and North America. In Europe, it is widespread but rare in many areas, and is red-listed in 17 countries (Gminder et al. 2000, Dahlberg & Croneborg 2003). In Montenegro, this species is protected by law and has been recorded at only two locations: in Durmitor National Park (near Crno Jezero), in a forest dominated by *Picea excelsa* and *Abies alba* (Karadžić 1995, Perić & Perić 1997, 2004), and in the Rožaje area, in coniferous forest (Hadžić 2018), although the exact location is not specified. The findings presented here (Fig. 22) are the first published Montenegrin records of *G. clavatus* accompanied by a precise location. The collected materials (basidiomata) are deposited in the mycological collection of the Natural History Museum of Montenegro in Podgorica.



Figure 22. *Gomphus clavatus* from Durmitor National Park, near Crno Jezero (photo by I. Četković).

Slika 22. *Gomphus clavatus*, Nacionalni park Durmitor, u blizini Crnog jezera (fotografija I. Četković).

Acknowledgements

Heliotropium supinum and *Pistacia × saportae* were recorded in Krka National Park during a student volunteer internship within the National Park. *Setaria parviflora* and *Stachys maritima* from the island of Rab were documented during the flora mapping project, *Flora Arbiana*, led by the Biology student organization BIUS, and funded by the Public Institution Priroda for the management of protected areas in Primorje-Gorski Kotar County. The discovery of *Fissidens fontanus* was made during the annual monitoring of Croatian surface waters funded by the Croatian Institute for Water Management. The finding of *Pseudocampyllum radicale* occurred during the monitoring of bog vegetation in Dubravica Bog. The study that led to the discovery of *Targionia hypophylla* was financed by the Slovenian Research Agency (grant no P1-0212).

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