

New records of aquatic plants in Montenegro

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Ključne besede: floristične novosti, Balkanski polotok, *Callitriche brutia* ssp. *brutia*, *Elodea nuttallii*, *Helosciadium inundatum*, *Hydrocotyle verticillata*, *Potamogeton schweinfurthii*, *Sparganium erectum* ssp. *neglectum*

Abstract

We report the first records of six aquatic plant taxa in Montenegro, including four native species (*Callitriche brutia* Petagna ssp. *brutia*, *Helosciadium inundatum* (L.) W.D.J.Koch, *Potamogeton schweinfurthii* A.Benn., and *Sparganium erectum* ssp. *neglectum* (Beeby) K.Richt.), and two non-native species (*Elodea nuttallii* H.St.John and *Hydrocotyle verticillata* Thunb.). Of these, *Hydrocotyle verticillata* and *Potamogeton schweinfurthii* are new records for the Balkan Peninsula and *Helosciadium inundatum* is a new record for the western Balkans. In addition, we report new Montenegrin site records of five regionally rare species, including two native (*Hydrocharis morsus-ranae* L. and *Potamogeton coloratus* Hornem.) and three non-native species (*Eleocharis caduca* (Delile) Schultes in Roemer & Schultes, *Elodea canadensis* Michx., and *Elodea densa* Casp.). Mediterranean temporary ponds adjacent to Velika plaža (Long Beach) are important sites for aquatic plants. Assessment of the threat status of native taxa and important area for aquatic plants are suggested.

Izvešček

V članku poročamo o prvih najdbah šestih vodnih vrst, štirih domorodnih (*Callitriche brutia* Petagna ssp. *brutia*, *Helosciadium inundatum* (L.) W.D.J.Koch, *Potamogeton schweinfurthii* A.Benn. in *Sparganium erectum* ssp. *neglectum* (Beeby) K.Richt.) ter dveh tujerodnih (*Elodea nuttallii* H.St.John in *Hydrocotyle verticillata* Thunb.). Vrsti *Hydrocotyle verticillata* in *Potamogeton schweinfurthii* sta tudi novi vrsti za zahodni del Balkanskega polotoka. Poročamo tudi o petih vrstah iz Črne gore, ki predstavljajo regionalno redke vrste, dveh domorodnih (*Hydrocharis morsus-ranae* L. in *Potamogeton coloratus* Hornem.) in treh tujerodnih (*Eleocharis caduca* (Delile) Schultes in Roemer & Schultes, *Elodea canadensis* Michx. in *Elodea densa* Casp.). Sredozemski občasni ribniki v bližini Velike plaže so pomembna rastišča vodnih rastlin, zato predlagamo oceno ogroženosti domorodnih vrst in pomembnih območij za vodne rastline.

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Introduction

Aquatic ecosystems are among the most vulnerable in the world: approximately 87% of natural wetlands have been lost since the early 18th century, and the rate of loss accelerated significantly in the 20th and early 21st centuries (Davidson, 2014). Overall, aquatic plant collecting increased rapidly in the second half of the 20th century, but collectors focused more on thermophilous terrestrial vegetation than on aquatic plants in the Mediterranean (Kaplan, 2005). Many researchers have documented the aquatic flora of Montenegro (e.g., Janković et al., 1980; Biberdžić, 2007; Blaženčić, 2007; Bubanja & Stevanović, 2013; Bubanja, 2016; Bubanja et al., 2016; Pešić et al., 2018; Pulević, 2022; Romanov et al., 2024, 2025a, b; Mesterházy et al., 2025; and numerous references within). However, most previous studies were on inland lakes, largely neglecting the Adriatic coastal area. Here, we present new and interesting records of aquatic plants in Montenegro, primarily from coastal areas.

Materials and methods

From 2022 to 2026 we surveyed numerous freshwater bodies in Montenegro, especially temporary ponds, mostly along the Adriatic coast and around Lake Skadar and Podgorica. Almost all visited sites are traceable in the observations of the project 'Aquatic plants, algae and cyanobacteria of Montenegro' on iNaturalist (<https://www.inaturalist.org/projects/aquatic-plants-algae-and-cyanobacteria-of-montenegro>). All voucher specimens were deposited in the herbarium of the Natural History Museum of Montenegro (NHMM). We posted photographs of most species taken by the first author to the iNaturalist website. Observations posted to iNaturalist (2026) are indicated below by number (e.g., photos of observation 303392989 are found at [inaturalist.org/observations/303392989](https://www.inaturalist.org/observations/303392989)). Nomenclature follows POWO (2026). For each potentially native taxon, an assessment of the national threat status was made following the criteria of the International Union for Conservation of Nature (IUCN, 2012; IUCN Standards and Petitions Committee, 2022). This assessment is preliminary for all new national records of native species.

Results and discussion

Species accounts

New native taxa for Montenegro

Callitriche brutia Petagna ssp. *brutia* (Plantaginaceae) (Figures 1A, B, 2A), studied specimens: Podgorica Municipality: 1. small shallow temporary ponds S of Lužnica: 42.4633 N 19.1737 E, 6.04.2024; 2. 42.4660 N 19.1677 E, 6.04.2024; 3. inundated sand pit near



Figure 1: Morphological traits of new species of aquatic plants for Montenegro: **A, B**, fruits of *Callitriche brutia* ssp. *brutia*; **C**, shoot of *Elodea nuttallii*; **D-F**, general appearance of *Helosciadium inundatum*: **D, F**, nearly completely submersed plants; **E**, terrestrial plant. Scale bars: **A, B**, 1 mm; **D, F**, 5 cm (photo Roman Romanov).

Slika 1: Morfološki znaci novih vodnih rastlin za Crno goru: **A, B**, plodovi *Callitriche brutia* ssp. *brutia*; **C**, poganjki *Elodea nuttallii*; **D-F**, splošen izgled *Helosciadium inundatum*: **D, F**, skoraj popolnoma potopljene rastline; **E**, kopenska rastlina. Merilo: **A, B**, 1 mm; **D, F**, 5 cm (foto Roman Romanov).

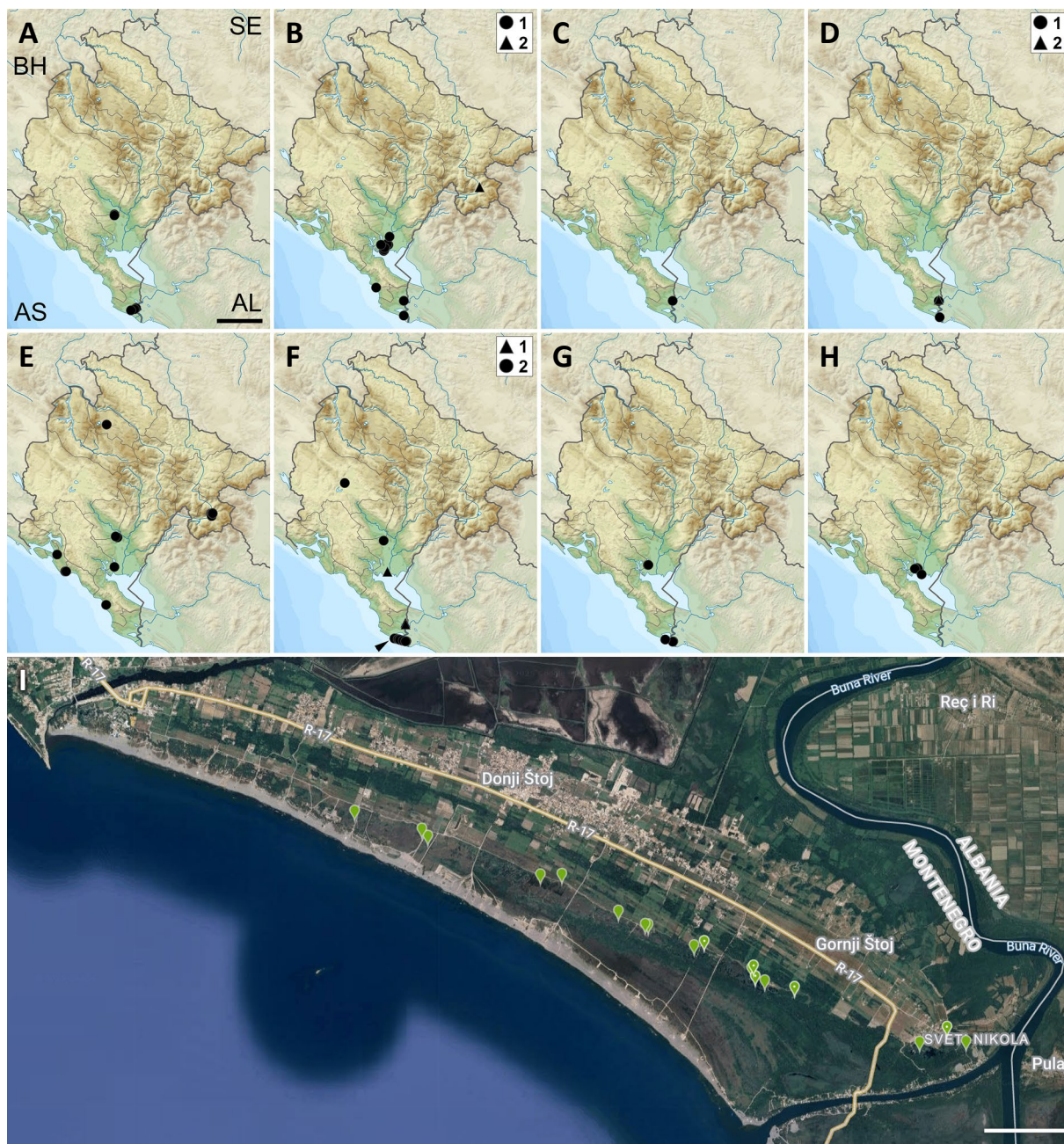


Figure 2: Distribution of studied species of aquatic plants in Montenegro: **A**, *Callitriche brutia* ssp. *brutia*; **B**, *Elodea canadensis* (1) and *Elodea nuttallii* (2); **C**, *Helosciadium inundatum*; **D**, *Hydrocotyle verticillata* (1) and *Potamogeton schweinfurthii* (2); **E**, *Sparganium erectum* ssp. *neglectum*; **F**, *Hydrocharis morsus-ranae* (1) and *Potamogeton coloratus* (2), arrowhead indicates the position of Velika plaža and its vicinities shown in **I**; **G**, *Eleocharis caduca*; **H**, *Elodea densa*; **I**, *Potamogeton coloratus*. Source of map in **I** – iNaturalist.org (2026). Scale bars: **A**, 30 km, **I**, 1 km. Abbreviations in **A**: **AL** – Albania, **AS** – Adriatic Sea, **BH** – Bosnia and Herzegovina, **SE** – Serbia.

Slika 2: Razširjenost preučevanih vrst vodnih rastlin v Črni gori: **A**: *Callitriche brutia* ssp. *brutia*; **B**: *Elodea canadensis* (1) in *Elodea nuttallii* (2); **C**: *Helosciadium inundatum*; **D**: *Hydrocotyle verticillata* (1) in *Potamogeton schweinfurthii* (2); **E**: *Sparganium erectum* ssp. *neglectum*; **F**: *Hydrocharis morsus-ranae* (1) in *Potamogeton coloratus* (2), puščica kaže položaj Velike plaže in okolice na sliki **I**; **G**: *Eleocharis caduca*; **H**: *Elodea densa*; **I**: *Potamogeton coloratus*. Vir zemljaveda **I** – iNaturalist.org (2026). Merilo: **A**: 30 km, **I**: 1 km. Okrajšave **A**: **AL** – Albanija, **AS** – Jadransko morje, **BH** – Bosna in Hercegovina, **SE** – Srbija.

Mareza and Lužnica, 42.4690 N 19.1771 E, 6.04.2024; 4. temporary pond W of Lužnica: 42.4776 N 19.1545 E, 6.04.2024; Ulcinj Municipality: 5. temporary pond N of Ulcinjska solana, 41.9400 N 19.3143 E, 1.05.2024; 6. temporary pond at dirt road, NE of Ulcinjska solana, 41.9480 N 19.3306 E, 1.05.2024; 7. temporary narrow shallow overgrown pond N of Ulcinjska solana, 41.9321 N 19.2836 E, 13.05.2024.

The prevalence of short pedunculate nearly sessile fruit is normal for this taxon, but all collections of this subspecies in Montenegro also included long pedunculate fruits (Figures 1A, B), allowing their identification (Lansdown et al., 2017). The abundance of *Callitriche brutia* ssp. *brutia* was very low across all sites and did not exceed a few dozen plants at each site, with an area of a few square meters. This is a spring species associated with the Mediterranean temporary ponds in the area studied. Low physical damage to its sites from livestock can be beneficial for this taxon, reducing competition with other flowering plants. Eutrophication appears to be a limiting factor, because *Callitriche brutia* ssp. *brutia* was found only in spring temporary ponds with low abundance or complete absence of filamentous algae. *Callitriche brutia* ssp. *hamulata* (Kütz. ex W.D.J.Koch) O.Bolòs & Vigo was previously reported from Montenegro in the vicinity of Bar (Rohlena, 1942). However, this area has significantly changed over time through urbanization and eutrophication, which probably destroyed all suitable habitats. This subspecies is also listed from areas bordering Velika plaža (Bubanja, 2016). In the aquatic forms of both subspecies, the fruit is subsessile, and they cannot be distinguished based on morphological characteristics (Prančl et al., 2020), so the former data for subsp. *hamulata* likely also apply to subsp. *brutia*. In the Balkans, *Callitriche brutia* is known in all countries (Uotila, 2017; R.V. Lansdown pers. comment), but published records for Montenegro are lacking.

Helosciadium inundatum (L.) W.D.J.Koch (Apiaceae) (Figures 1D-E, 2C), studied specimens: 1, 2. Ulcinj Municipality, Lake Zaka, 41.9762 N 19.3620 E, 31.03.2025 and 22.05.2025.

Helosciadium inundatum appears to be a spring species in the area studied, because no signs of its presence were recognizable at the same site in June. The abundance of this species was low, with dozens of flowering and fruiting plants in an area of approximately 15 m². Low physical damage of this site by livestock can be beneficial for *Helosciadium inundatum* due to reduced competition with *Nymphaea alba* L. and *Phragmites australis* (Cav.) Trin. ex Steud. in the lake overgrown with aquatic plants. The water level in Lake Zaka significantly decreases during spring and

summer. This is a new species record for the West Balkans. In the Balkans, this species was previously known only from Greece (Hand, 2011; Dimopoulos et al., 2013).

Potamogeton schweinfurthii A.Benn. (Figures 2D, 3A-D), studied specimens: Ulcinj Municipality, N of Lake Šaško, wetland with stand of *Typha angustifolia* L., 41.9779 N, 19.3354 E, 10.04.2026, iNat: 348932936, confirmed by Zdenek Kaplan.

The population in Montenegro appears to be very small. It occupies an area of less than one m². It is associated with a temporarily inundated site overgrown with *Phragmites australis* and *Typha angustifolia*, which is impacted by livestock and dries up before June. This physical damage appears to be beneficial for *Potamogeton schweinfurthii*, providing space for its growth during early spring. However, further targeted searches are required for the assessment of the conservation status of this species. This is a new species record for the Balkan Peninsula. In Europe, this species is only known from the Mediterranean region: France, Italy, Malta, Spain, Portugal, and from a few islands of Greece (Kaplan, 2005; iNaturalist, 2026).

Sparganium erectum ssp. *neglectum* (Beeby) K.Richt. (Typhaceae) (Figures 2E, 4), studied specimens: Danilovgrad Municipality: 1. Livade, excavated pond, 42.4805 N 19.1598 E, 29.06.2023, iNat: 170261808; 2. drainage channel NW of Mareza, 42.4749 N 19.1801 E, 29.06.2023; 3. Kotor Municipality, wetland S of Tivatska solila, 42.3913 N 18.7293 E, 8.07.2023, iNat: 171965583; 4. Plav Municipality, Lake Plav, stands around the edge of the lake, incl. 42.5968 N 19.9207 E, 6.08.2025, iNat: 308507195; 5. Žabljak Municipality, small temporary stream W of the road from Šavnik to Žabljak, 43.1296 N 19.1251 E, 22.07.2025, iNat: 300896892; 6. Zeta Municipality, SE of Lake Gornje Malo Blato, S of Ponari, SE extremity of channel Šegrtica, dry part, 42.3136 N 19.1812 E, 29.08.2025; photographic vouchers: 1. Bar Municipality, Bar, drainage channel, 42.0905 N 19.1069 E, 27.08.2025, iNat: 309578945; 2, 3. Budva Municipality, Prijevor, Mrčevo polje, drainage channel, 42.2909 N 18.8058 E, 25.09.2024, iNat: 244043394; drainage channel, 42.2904 N 18.7978 E, 25.09.2024, iNat: 244043388; 4. Danilovgrad Municipality, near road drainage channel, 42.4748 N 19.1800 E, 29.06.2023, iNat: 170187654; Kotor Municipality: 5. wetland S of Tivatska solila, 42.3913 N 18.7293 E, 1.07.2023, iNat: 171965584; 6. wetland S of Tivatska solila, 42.3912 N 18.7293 E, 8.07.2023, iNat: 171965586. Some observations posted at iNaturalist.org (2026) were identified or confirmed by Evgeniy Belyakov.



Figure 3: Morphological traits of new and rare species of aquatic plants for Montenegro: **A-D**, *Potamogeton schweinfurthii*; **E**, *Hydrocharis morsus-ranae*: **A**, **E**, general appearance; **B**, **C**, apical parts of shoots; **D**, rhizome. Scale bars: **A**, **B**, 3 cm (photo Roman Romanov).

Slika 3: Morfološki znaki novih in redkih vrst vodnih rastlin v Črni gori: **A-D**: *Potamogeton schweinfurthii*; **E**: *Hydrocharis morsus-ranae*: **A**, **E**: splošen izgled; **B**, **C**: apikalni del poganjkov; **D**: rizom. Merilo: **A**, **B**: 3 cm (foto: Roman Romanov).

No threats are recognizable for this taxon on all sites in Montenegro, i.e., drainage channels, excavated ponds, wetlands, and margins of lakes, where it mostly occupies areas of at least several square meters. The sterile plants of *Sparganium emersum* Rehman growing in Lake Plav at a depth >of more than 0.7 m were notable in contrast to the abundant flowering and fruiting plants of *Sparganium erectum* ssp. *neglectum* surrounding this lake and forming extensive monodominant stands (Figure 4D); however, their abundance was low. The have keeled leaves in the basal parts (Figure 4B). This trait allows exclusion of *Sparganium*

natans L. that was earlier reported as *Sparganium minimum* Hill. *nom. inval.* from this lake, from the same habitat based on sterile plants (Blaženčić & Blaženčić, 1989; Blaženčić, 2007). *Sparganium erectum* subsp. *microcarpum* (Neuman) Domin (as *Sparganium erectum* L. ssp. *neglectum* (Beeby) Hay. var. *microcarpum* (Neuman) Hay.) was found in Montenegro at Plavnica, Lake Skadar (Rohlena, 1942).

This species was previously known from all Balkan countries except Montenegro and North Macedonia (Uotila, 2011).



Figure 4: Morphological traits of *Sparganium erectum* ssp. *neglectum* (A, C–F) and sterile *Sparganium emersum* (B, D): **A**, female heads with unripe fruits; **B**, upper and lower surfaces of floating leaves in Lake Plav; **C**, fruits; **D**, general appearance of plants with floating leaves in Lake Plav; **E**, infructescence with ripe and unripe fruits; **F**, infructescence with ripe fruits (photo Roman Romanov).

Slika 4: Morfološki znaci vrste *Sparganium erectum* ssp. *neglectum* (A, C–F) in sterilne vrste *Sparganium emersum* (B, D): **A**: ženske glavice z nezrelimi plodovima; **B**: zgornja in spodnja površina plavajočih listov na jezeru Plav; **C**: plodovi; **D**: splošen izgled rastlin s plavajočimi listi na jezeru Plav; **E**: soplodje z zreliimi in nezrelimi plodovi; **F**: soplodje z zreliimi in nezrelimi plodovi (foto: Roman Romanov).

New non-native species for Montenegro

Elodea nuttallii H.St.John (Hydrocharitaceae) (Figures 1C, 2B), studied specimens: Plav Municipality, Lake Plav, NE part, sparse community of *Phragmites australis*, single floating plant with other washed up angiosperms, 42.6015 N 19.9285 E, 30.07.2025, iNat: 303392989.

The survey of aquatic vegetation conducted across the lake in early August 2025 did not reveal any other sites of this species. Despite the wide variability in leaf traits known for this genus (Cook & Urmi-König, 1984), the found plant can be confidently assigned to *Elodea nuttallii*. However, further search for material is required to be sure that this species is well-established here. It might be mistaken for *Elodea callitrichoides* (Rich.) Casp. but the twisting of the leaves would be atypical for that species (R.V. Lansdown pers. comment). *Elodea nuttallii* differs from *Elodea canadensis* in leaves rarely >1.75 mm wide, usually folded along the midrib, recurved with undulate margins; male spathes ≤4.0 mm long; styles rarely >2.0 mm; sepals ≤2.0 mm (Cook & Urmi-König, 1984).

In the Balkans, this species is known from the Drava River in Slovenia (Király et al., 2008), Croatia (Király & Mesterházy, 2013), the Danube River in Serbia (Vukov et al., 2006), and Greece (Lansdown, 2023). It often replaces *Elodea canadensis* Michx. in many regions of Europe (Buldrini et al., 2023; Bučar et al., 2024), but it is unclear if it is suitable for Montenegro, because *Elodea canadensis* was only recently found in Montenegro on the Adriatic Coast (Bubanja & Stevanović, 2013), and the few sites are only known from the southern part of the country (see below).

Hydrocotyle verticillata Thunb. (Apiaceae) (Figures 2D, 5A), studied specimens: Ulcinj Municipality, north-eastern area adjacent of Velika plaža, sandy depression, 41.8766 N 19.3651 E, 24.09.2025; N of Lake Šaško, wetland with stand of *Phragmites australis* Trin., 41.9811 N, 19.3316 E, 10.04.2026.

Flowering and fruiting plants were found in September 2025 in a dense stand occupying a few square meters at the margin of a sparse reed stand in a depression near Velika plaža that is probably inundated during winter and spring. It can be recognized as evidence of naturalization of *Hydrocotyle verticillata* in Montenegro. The source of the plants is unclear. This site is situated in the vicinity of agricultural land. Another population appears to be established too, but it was represented by submersed sterile plants in April 2026.

In Europe, *Hydrocotyle verticillata* is known from Belgium, Italy, the Netherlands, and Spain (Hand, 2011;

Schou et al., 2023; Galasso et al., 2025). Another native species, *Hydrocotyle vulgaris* L., is known from areas near Lake Šaško (Petrović & Vuksanović, 2003), Lake Skadar (Hadžiablahović, 2005), and Velika plaža (Petrović & Stešević, 2010; Bubanja, 2016; Bubanja et al., 2016; Mesterházy et al., 2025).

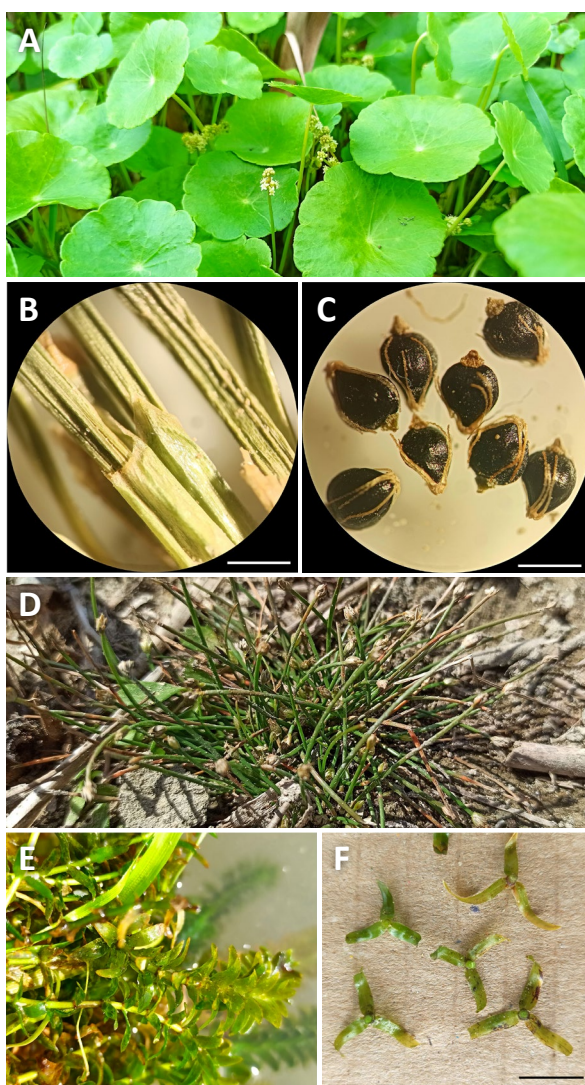


Figure 5: Morphological traits of new and rare species of aquatic plants for Montenegro: **A**, *Hydrocotyle verticillata*; **B-D**, *Eleocharis caduca*: **B**, sheaths of leaves; **C**, fruits; **D**, general appearance; **E, F**, *Elodea canadensis*: **E**, apical part of shoot; **F**, whorls of leaves. Scale bars: **B, C**, 1 mm; **F**, 1 cm (photo Roman Romanov).

Slika 5: Morfološki znaci novih in redkih vrst vodnih rastlin v Črni gori: **A**: *Hydrocotyle verticillata*; **B-D**: *Eleocharis caduca*: **B**: nožnice listov; **C**: plodovi; **D**: splošen izgled; **E, F**: *Elodea canadensis*: **E**: apikalni del poganjka; **F**: zviti listi. Merilo: **B, C**: 1 mm; **F**: 1 cm (foto: Roman Romanov).

Rare native species

***Hydrocharis morsus-ranae* L.** (Hydrocharitaceae) (Figures 2H, 3E), studied specimens: Ulcinj Municipality: 1. shallow pond N of Lake Šaško, single plant, 41.9783 N 19.3358 E, 10.04.2026; 2. SE of Lake Šaško, inundated animal trail in reed stand, occupied area 0.2 m², 41.9622 N 19.3427 E, 31.05.2026.

The abundance of *Hydrocharis morsus-ranae* was very low in both microsites damaged by livestock and wild animals. The physical damage to reed stands might result in an open space, beneficial for the growth of this species. This is the second site of *Hydrocharis morsus-ranae* in Montenegro, where it is known from Plavnica, Lake Skadar (Blaženčić, 2007; Pešić et al., 2018). This species is known from all Balkan countries (Uotila, 2009a). According to Petrović and Stešević (2010), species status in Montenegro was assessed as VU (criterion D).

***Potamogeton coloratus* Hornem.** (Potamogetonaceae) (Figures 2H, I, 6C-F), studied specimens: 1–3. Podgorica Municipality, S of Lužnica, temporary ponds in sand quarry, 42.4643 N 19.1734 E, 42.4648 N 19.1727 E, and 42.4650 N 19.1735 E, 6.04.2024; Ulcinj Municipal-

ity, area adjacent to Velika plaža: 4–8. interdunal ponds: 41.8936 N 19.3075 E, 17.04.2023; 41.8936 N 19.3075 E, 17 April 2023; 41.8825 N, 19.3374 E, 30 August 2023; 41.8893 N 19.3195 E, 27.04.2025; 41.8812 N 19.3431 E, 28.08.2025; 9. small interdunal ponds, dry and inundated, 41.8753 N 19.3614 E, 24.09.2025; 10. eutrophic pond, 41.8769 N 19.3652 E, 24.09.2025; 11. margin of dry section of pond, 41.8753 N 19.3680 E, 24.09.2025; 12. Island of Ada Bojana, temporary pond, partly shaded, 41.8664 N 19.3575 E, 1.03.2026; photographic vouchers: 1–6. Podgorica Municipality, south of Lužnica: 42.4643 N 19.1728 E, 6.04.2024, iNat: 207663207; 42.4649 N 19.1726 E, 6.04.2024, iNat: 207663208; 42.4651 N 19.1720 E, 6.04.2024, iNat: 207663209; 42.4648 N 19.1734 E, 6.04.2024, iNat: 207663211; 42.4651 N 19.1722 E, 6.04.2024, iNat: 209352813; 42.4647 N 19.1718 E, 7.04.2024, iNat: 209352814; Ulcinj Municipality, area adjacent to Velika plaža: 7–35. 41.8974 N 19.2904 E, 27.10.2022, iNat: 140185568; 41.8982 N 19.2895 E, 27.10.2022, iNat: 140307662; 41.9001 N 19.2798 E, 27.10.2022, iNat: 140308754; 41.8933 N 19.3097 E, 17.04.2023, iNat: 155357072; 41.8819 N 19.3390 E, 30.08.2023, iNat: 181098359; 41.8821 N 19.3385 E, 30.08.2023,

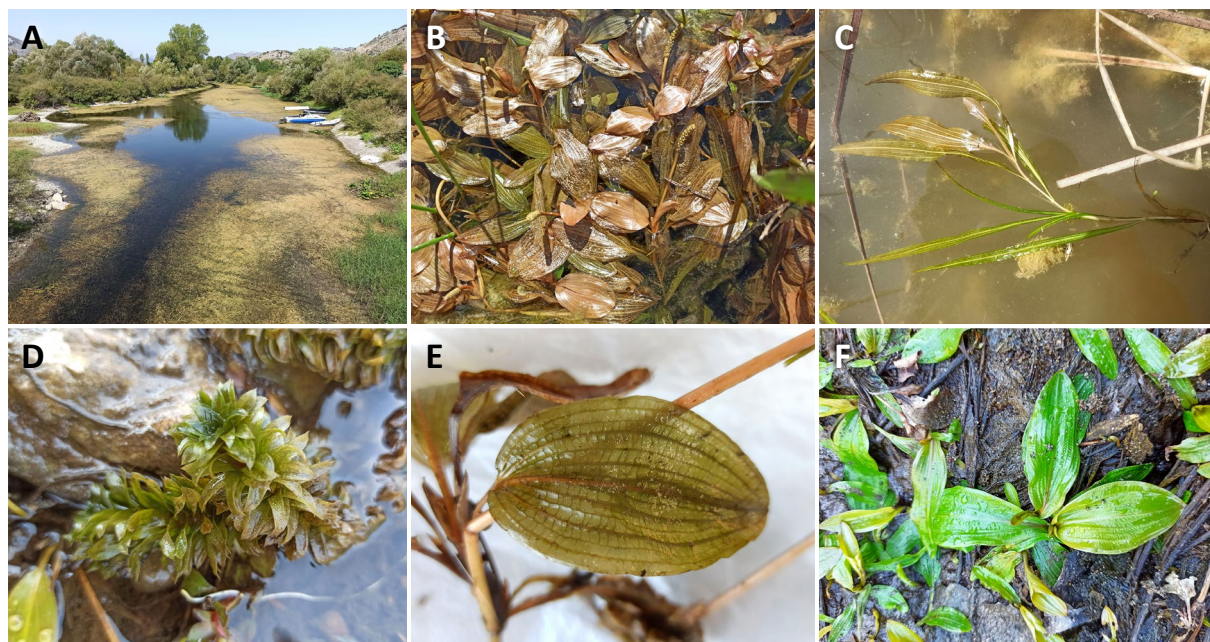


Figure 6: Community and general appearance of *Elodea densa* (A, D), morphological traits of *Potamogeton coloratus* (B, C, E, F): A, dense community in the channel Šegrtica; D, apical parts of shoot; B, general appearance of aquatic plants with submerged and floating leaves; E, submersed leaf; C, shoot with long narrow basal leaves; F, terrestrial plants (photo Roman Romanov).

Slika 6: Združba in splošen izgled *Elodea densa* (A, D), morfološki znaki *Potamogeton coloratus* (B, C, E, F): A: gosta združba v kanalu Šegrtica; D: apikalni del poganjka; B: splošen izgled vodnih rastlin s potopljenimi in plavajočimi listi; E: potopljeni list; C: poganjek z dolgimi ozkimi bazalnim listi; F: kopenske rastline (foto: Roman Romanov).

iNat: 181098369; 41.8824 N 19.3376 E, 30.08.2023, iNat: 181100324; 41.8832 N 19.3371 E, 30.08.2023, iNat: 181105426; 41.8833 N 19.3371 E, 30.08.2023, iNat: 181105428; died plants, 41.8833 N 19.3371 E, 30.08.2023, iNat: 181106030; 41.8835 N 19.3374 E, 30.08.2023, iNat: 181107808; dry plants, 41.8933 N 19.3063 E, 30.08.2023, iNat: 181175612; 41.8933 N 19.3066 E, 30.08.2023, iNat: 181178415; 41.8861 N 19.3302 E, 30.08.2023, iNat: 181195349; 41.8857 N 19.3287 E, 22.09.2023, iNat: 184427422; 41.8882 N 19.3219 E, 15.09.2023, iNat: 184595041; 41.8880 N 19.3222 E, 22.09.2023, iNat: 184596775; 41.8879 N 19.3222 E, 22.09.2023, iNat: 184596778; 41.8880 N 19.3217 E, 22.09.2023, iNat: 184599854; 41.8894 N 19.3179 E, 22.09.2023, iNat: 184601234; 41.8810 N 19.3433 E, 28.07.2025, iNat: 303399898; 41.8812 N 19.3432 E, 28.07.2025, iNat: 303399900; 41.8753 N 19.3680 E, 24.09.2025, iNat: 319006132; 41.8769 N 19.3652 E, 24.09.2025, iNat: 319249379; 41.8753 N 19.3613 E, 24.09.2025, iNat: 320917886; 41.8753 N 19.3613 E, 24.09.2025, iNat: 320917894; 41.8753 N 19.3612 E, 24.09.2025, iNat: 320917904; 41.8753 N 19.3614 E, 24.09.2025, iNat: 320917905; 41.8753 N 19.3613 E, 24.09.2025, iNat: 320917915. Some observations in iNaturalist.org were confirmed or identified by Zdenek Kaplan.

Interdunal ponds and inundated sand pits in the area adjacent to Velika plaža of the Adriatic Coast and S of Lužnica are important habitats of *Potamogeton coloratus* in Montenegro. They are also important for species protection in Southeast Europe. In these sites, *Potamogeton coloratus* is a seasonal plant emerging only during winter and spring, before the drying of temporary ponds. It can grow as a terrestrial plant appearing after autumn rains and recovering as an aquatic plant after filling of temporary ponds with rainwater. It also grows in ponds remaining inundated during summer with significantly dropping water level. All the documented populations are small. They mostly occupy a few square meters. The variability of leaf shape is remarkable for this species growing in shallow waters (Figure 6C-F). The reduction of area of suitable habitats in Montenegro is expected in the future due to changes in the area adjacent to Velika plaža found earlier (Petrović & Vuksanović, 2005; Šilc et al., 2020). The area adjacent to Velika plaža is important area for charophytes and some terrestrial plants in Montenegro and Southeast Europe (Romanov et al., 2025a; Stešević et al., 2025). The area S of Lužnica is protected, because this is important plant area. In Montenegro, *Potamogeton coloratus* was known from two sites only: Krupac water reservoir in Nikšić Municipality (Stešević et al., 2008) and a temporary pond in the area adjacent to Velika plaža

in Ulcinj Municipality (Mesterházy et al., 2025). This species has limited distribution in the Balkans, where it is known from Albania, Croatia, Serbia, Slovenia, and probably Greece (Uotila, 2009b).

Rare non-native species

Eleocharis caduca (Delile) Schultes in Roemer et Schultes (Cyperaceae) (Figures 2F, 5B-D), studied specimens: Ulcinj Municipality, north-eastern area adjacent to Velika plaža: 1, 2. sandy slope near inundated sand pit, few plants, 41.8769 N 19.3653 E, and sandy bottom of dry temporary pond, 41.8754 N 19.3613 E, 24 September 2025; 3, 4. Zeta Municipality, S extremity of Lake Gornje Malo Blato, Muljage, 42.3255 N 19.1695 E, 42.3255 N 19.1693 E, and 42.3264 N 19.1655 E, 29 August 2025.

The Lake Gornje Malo Blato site is a sandy area inundated during winter and spring, later exposed to significant heat and grazing by livestock after dropping of water level during summer. At the end of summer, the area is covered with sparse, dried *Schoenoplectus* sp. or sterile *Phragmites communis*. The new sites in Velika plaža appear to be inundated during spring. Complete removal of plants and intensive development have not been achieved in the new site S of Lake Gornje Malo Blato. *Eleocharis caduca* was much less abundant in our new sites compared with the recently found site in Velika plaža on the Adriatic Coast, where it formed its own community (Mesterházy et al., 2025). The new records provide evidence that the arrival of this species is not recent; all populations are well-established.

Elodea canadensis Michx. (Hydrocharitaceae) (Figures 2B, 5E, F), studied specimens: 1. Bar Municipality, Uvala Ujtin potok, washed up by the sea, 42.0470 N 19.1378 E, 23 July 2023, iNat: 174544041; 2. Ulcinj Municipality, Lake Šaško, short shallow channel for boats, 41.9811 N 19.3304 E, 22 May 2025, iNat: 283487688; Zeta Municipality: 3, 4. south of Kurioci, gravel quarry, 42.3088 N 19.1894 E, 42.3086 N 19.1893 E, 29 August 2025; 5. south-west of Ponari, sand quarry, 42.3149 N 19.1800 E, 29 August 2025; 6. W of Golubovci, inundated gravel quarry in the valley of Morača River, 42.3254 N 19.2073, 16.04.2026, iNat: 350991650; photographic vouchers: 1. Bar Municipality, Uvala Ujtin potok, washed up by the sea, 42.0470 N 19.1378 E, 6.06.2023, iNat: 165903693; Zeta Municipality: 2–4. Morača River, near mouth 42.2780 N 19.1481 E, 42.2807 N 19.1525 E, and 42.2775 N 19.1476 E, 19.06.2023, iNat: 168693631, 168590252, 168591378; 5, 6. valley of Morača River, ponds, 42.2874 N 19.1526 E, 42.2829 N 19.1527 E, 19.06.2023, iNat: 168693643, 168392323; 7. floodplain of Morača River, puddle, 42.2945 N 19.1577 E,

19.06.2023, iNat: 168389898; 8. Zeta Municipality, W of Golubovci, inundated gravel quarry in the valley of Morača River, 42.3249 N 19.2076 E, 16.04.2026, iNat: 350896350.

This species was known from one site adjacent to Velika plaža (Bubanja & Stevanović, 2013; Bubanja & al., 2019), where it was absent in September 2025 according to our observations. However, it seems to be well-established in the area SE of Lake Malo Gornje Blato (Vešović Dubak et al., 2026; our observations), in inundated gravel quarries in the valley of Morača a River, and in the left branch of Morača River near its mouth. *Elodea canadensis* formed nearly monodominant stands in gravel pits, where they occupy areas of several dozen square meters. The communities on the mouth of Morača River can benefit from nutrients entering the river from wastewater discharge in Podgorica. The expected improvement of water quality after future launch of sewage water treatment factory which is under construction may change the current situation. However, considering the wide environmental tolerance of this species, the probability of these changes may be low. The plants found washed up in a small bay of the Adriatic Sea probably originated from the Bojana River or more eastern sites considering patterns of sea water movement (Barović et al., 2020). The washed up plants were together with *Ceratophyllum demersum* L., *Myriophyllum spicatum* L., *Potamogeton crispus* L., *Potamogeton* cf. *gramineus* L., *Potamogeton lucens* L., *Potamogeton nodosus* Poir., *Potamogeton perfoliatus* L., *Potamogeton pusillus* L., *Stuckenia pectinata* (L.) Börner, *Vallisneria spiralis* L., and one fruit of *Trapa natans* L. s.l., indicating eutrophic environment of water body, probably Lake Skadar, where they were growing. Records of this species in the western part of the Balkan Peninsula are mainly limited to the area around the larger lakes as Skadar, Ohrid, and Prespa (Barina, 2017; Poulis & Zervas, 2017).

Elodea densa Casp. (Hydrocharitaceae) (Figures 2G, 6A, B), studied specimens: Zeta Municipality, SE of Lake Gornje Malo Blato: 1. NW, W, and S of Ponari, eastern part of the channel Šegrtnica, dense communities along the section from 42.3190 N 19.1517 E to 42.3199 N 19.1782 E, 4.05.2019, 2461 NHMM; from 42.3199 N 19.1782 E to 42.3142 N, 19.1819 E, 29.08.2025; 2. SW of Ponari, inundated sand quarry, 42.3153 N 19.1804 E, 29.08.2025.

This species was very abundant at both sites, forming extensive monodominant stands occupying hundreds of square meters in the channel Šegrtnica. It was spotted in this channel in 2019, according to our observations and observations No. 110562720 and 110562681 by Til Di-

eterich, and later in 2023, according to observation No. 173485816 by Michael Bierbaumer posted on iNaturalist.org (2026). The huge amount of plants in Montenegrin sites indicate that this species is well-established here (Đurišić, 2025; our observations) probably arriving at least ten years ago. It seems to be the same case for Plavnica, Lake Skadar (Đurišić, 2025). In the Balkans, this non-native species was known from Türkiye (Uotila, 2009a), and it was recently found at the south of both Croatia and Bosnia and Herzegovina (Rimac et al., 2018; Nikolić, 2020; Maslo et al., 2025). *Elodea densa* is the most thermophilic species of this genus known in the region.

We report the first records of six aquatic plant taxa in Montenegro, including four native taxa (*Callitriche brutia* ssp. *brutia*, *Helosciadium inundatum*, *Potamogeton schweinfurthii*, and *Sparganium erectum* subsp. *neglectum*), and two non-native species (*Elodea nuttallii* and *Hydrocotyle verticillata*). Of these, *Hydrocotyle verticillata* and *Potamogeton schweinfurthii* are new records for the Balkan Peninsula and *Helosciadium inundatum* is a new record for the western Balkans. In addition, we report new Montenegrin site records of five regionally rare species, two native (*Hydrocharis morsus-ranae* and *Potamogeton coloratus*) and three non-native species (*Eleocharis caduca*, *Elodea canadensis*, and *Elodea densa*). We classified the status of *Hydrocharis morsus-ranae* and *Potamogeton schweinfurthii* as Data Deficient (DD) and *Sparganium erectum* subsp. *neglectum* as Least Concern (LC). All other native species reported fit criteria for Near Threatened taxa (NT). All the non-native species reported appear to be established in Montenegro, except *Elodea nuttallii* whose status is unknown. High abundance of *Elodea densa* requires management of these sites for the control for this invasive species.

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Research Data Availability

All data supporting the findings of this study are available within the paper.

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