New findings of rare and under recorded vascular plants, bryophytes, lichens, fungi and algae in Croatia – 1

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Abstract

This paper supplies new data on the occurrence of eight vascular plants (*Carpesium abrotanoides, Guizotia abyssinica, Gypsophila fastigiata, Heliotropium supinum, Hermodactylus tuberosus, Polycarpon tetraphyllum, Pseudognaphalium luteoalbum, Reynoutria sachalinensis*), three bryophytes (*Corsinia coriandrina, Cryphaea heteromalla, Leptodon smithii*), one lichen (*Roccella phycopsis*), one fungus (*Mitrula paludosa*) and one alga species (*Trentepohlia aurea*) in Croatia.

Key words: biodiversity, distribution, new records

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Sažetak

U članku se predstavljaju novi podaci za osam vaskularnih biljaka (*Carpesium abrotanoides, Guizotia abyssinica, Gypsophila fastigiata, Heliotropium supinum, Hermodactylus tuberosus, Polycarpon tetraphyllum, Pseudognaphalium luteoalbum, Reynoutria sachalinensis*), tri mahovine (*Corsinia coriandrina, Cryphaea heteromalla, Leptodon smithii*), te po jednu vrstu lišaja (*Roccella phycopsis*), gljiva (*Mitrula paludosa*) i algi (*Trentepohlia aurea*) u Hrvatskoj.

Ključne riječi: bioraznolikost, rasprostranjenost, novi podaci

Introduction

Detailed knowledge of the flora of any area is crucial for the recognition of the patterns and for the understanding of the processes affecting biodiversity for recommendation of the ways in which it can be preserved. This paper is dedicated to new findings on the distribution of vascular plants, bryophytes, lichens, fungi and algae in Croatia. Here, we present the noteworthy data on 14 species in Croatia.

Vascular plants

Carpesium abrotanoides L.

Contributor: Marija Bučar

Central Croatia, Hrastovička gora Mt, Cepeliš, 45.4025°N, 16.2668°E, 15 May 2020

Central Croatia, Hrastovička gora Mt, Pecki, 45.4032°N, 16.2467°E, 22 October 2023

Central Croatia, Hrastovička gora Mt, Hrastovica, 45.3942°N, 16.2786°E, 4 March 2024

Central Croatia, Medvednica Mt, hiking trail 4, near waterfall Sopot, 45.8662°N, 15.8967°E, 12 November 2023

Central Croatia, Medvednica Mt, hiking trail 4, below peak Babin Zub, 45.8551°N, 15.894°E, 12 November 2023

Carpesium abrotanoides (Asteraceae) is native to the temperate region of Eurasia. In Europe this species seems to be limited to central and south-eastern countries (Euro+Med 2006-onwards, POWO 2024). After its first record in Jakuševec (Zagreb) in 1957 (Bevilaqua 1957), records of *C. abrotanoides* were only sporadically published in Croatia, from Baranja (Panjković 1989, 1990; Kevey & Csete 2008), Kopački Rit (Rožac et al. 2018) and Lonjsko Polje (Watterdorf 1997). Furthermore, it was observed in five more localities in Central Croatia (Nikolić 2005-onwards). New records of *C. abrotanoides*

Figure 1. *Carpesium abrotanoides* on Hrastovička gora (photo by M. Bučar).
Slika 1. *Carpesium abrotanoides* na Hrastovičkoj gori (fotografija M. Bučar).

include two additional localities on Mt Medvednica and three localities on Hrastovička gora (Fig. 1). Habitat description is very uniform throughout the new localities presented – forest edges along roadsides. In all habitats only one or two plants were observed. Further investigation focusing on *C. abrotanoides* will most probably reveal many more localities in the continental part of Croatia.

Guizotia abyssinica (L. f.) Cass.

Contributors: Anja Rimac, Vedran Šegota

Central Croatia, village Donji Vukašinac (north of Čazma), 45.85221°N, 16.62712°E, 22 September 2023

Guizotia abyssinica (Asteraceae) is a herbaceous annual plant originating in Ethiopia (Eastern Africa) where it was domesticated from about 2000 BCE. Today, it is cultivated mainly as an oilseed crop in Africa and southern Asia, but the seeds are also used as bird food worldwide (Hanson 2019, Shivarkar & Kashid 2020). It is also used as green manure for increasing soil organic matter, and rarely as the cover crop (Shivarkar & Kashid 2020). Today, the species is a casual ephemerophyte in most central European countries and in Great Britain, while in southern Europe (Spain and Italy) it spreads spontaneously and became naturalised. It spreads mostly by disposal of the remains of seeds from the many wild bird-feeds now commercially available. In Southeast Europe, only a few specimens were recorded in 1987, in Krapje Đol Ornithological Reserve in Lonjsko Polje Nature Park (Central Croatia) and these were assumed to have originated from bird food (Trinajstić & Pavletić 1989). In the summer 2023 it was discovered in two field crops near Donji Vukašinac village (Fig. 2), covering more than 50 % of the fields. The accompanying species *Phacelia tanacetifolia* Benth., *Raphanus sativus* L. var. *oleiformis* Pers., *Linum usitatissimum* L. and *Trifolium alexandrinum* L. clearly indicate that on this site the specimens originate from green manure seed mixture, and not from birdseed food.

Gypsophila fastigiata L.

Contributors: Nina Vuković, Marija Bučar

Croatia, Dalmatia, on the hiking path between the village Zrmanja Vrelo and Zrmanja spring, 44.203889°N, 16.082778°E, 3 August 2023 (ZA79057)

The genus *Gypsophila* (Caryophyllaceae) occurs in Croatia in three species: *G. fastigiata*, *G. muralis* L. and *G. repens* L. These are generally not very common in Croatia, with *G. fastigiata* being the rarest, having only several known records and being designated as DD (data deficient) according to the IUCN criteria. *Gypsophila fastigiata* is distributed mainly in Central and Eastern Europe (Tutin et al. 2010), with Croatia at the southernmost border of its distribution. So far it has been recorded by J. K. Schlosser in historical times on Mt Kalnik

Figure 2. *Guizotia abyssinica* near the village of Donji Vukašinac (photo by A. Rimac).
Slika 2. *Guizotia abyssinica* blizu sela Donji Vukašinac (fotografija A. Rimac).

(herbarium specimens ZA15687, ZA15689), with a long gap in records until 2006 when it was recorded on Mt. Velebit (Ruščić 2006), while further records include Mt Svilaja (Milović et al. 2021) and Mt Dinara (herbarium specimen ZAGR75307). We spotted the plant and collected the material while visiting the spring of the River Zrmanja, situated in the Dalmatian hinterland and reachable by a small hiking path of about 1 hour of walking and climbing. The plants were growing on top of a steep, open and stony calcareous ridge, on very thin and well-drained soil. The population was small and consisted of only a few individuals, which were however vigorous and ready to blossom (Fig. 3). On the northern border of its range, *G. fastigiata* shows the disjunct distribution of a typical glacial relict (Prentice 1992, Bengtsson 2000), and commonly inhabits open habitats, shallow and unstable soils and calcareous bedrock. Similarly, on its southern border in Croatia the species is distributed in several disjunct populations inhabiting mainly mountains in karst areas, where such habitats are very common. Although we believe that small populations may be also present in some other areas of the Dinaric karst in Croatia, many such areas are not easily reachable and therefore seldomly visited due to the harsh terrain, so the species could be under-recorded.

Heliotropium supinum L.

Contributor: Dijana Župan

Croatia, Northern Dalmatia, Island Morovnik near Olib, 44.428936°N, 14.735961°E, 13 July 2023

Croatia, Northern Dalmatia, Island Morovnik near Olib, 44.428936°N, 14.735961°E, 16 August 2023

Heliotropium supinum (Boraginaceae) is a herbaceous annual therophyte distinguished by its prostrate growth, smallish white-grayish leaves, and a calyx that drops from the plant together with the mericarp to aid the dispersal. It exhibits a Mediterranean-Irano-Turanian distribution (Euro+Med 2006-onwards) but is rare and considered critically endangered in Croatia, mainly due to lack of suitable habitats. Historical findings include occurrences in Dalmatia (Karin, Mljet, Makarska) and Slavonia (Stara Gradiška, Kobaš) with the most recent observation in Makarska in 2002 (Nikolić 2005-onwards). A single specimen was discovered on the island of Morovnik near Olib in July 2023 (Fig. 4). The species was growing near the shoreline, within a mosaic of *Euphorbio-Glaucietum flavi* H-ić. 1934 and *Juncetum maritimo-acuti* H-ić. 1934 habitat types. The habitat of the species is intermittently flushed by seawater and is influenced by the dense rabbit population and a nesting colony of seagulls on the island.

Figure 3. *Gypsophila fastigiata* near the spring of Zrmanja River (photo by M. Bučar).
Slika 3. *Gypsophila fastigiata* blizu izvora Zrmanje (fotografija M. Bučar).

Figure 4. *Heliotropium supinum* from the island of Morovnik (photo by D. Župan).
Slika 4. *Heliotropium supinum* s otoka Morovnik (fotografija D. Župan).

Hermodactylus tuberosus (L.) Mill.

Contributors: Bariša Ilić, Marko Doboš, Vedran Šegota, Marija Bučar

Southern Croatia, Neretva River Valley, Bijeli Vir, 43.005528°N, 17.664583°E, 15 February 2023

Southern Croatia, Neretva River Valley, Medići, 42.997167°N, 17.665639°E, 15 February 2023

Southern Croatia, Neretva River Valley, Bijeli vir, 43.004528°N, 17.666778°E, 15 February 2023

Southern Croatia, Neretva River Valley, Sankovići, 42.990222°N, 17.687333°E, 15 February 2023

Southern Croatia, Neretva River Valley, Sankovići, 42.990056°N, 17.687722°E, 15 February 2023

Southern Croatia, Neretva River Valley, Metković, 43.035994°N, 17.659417°E, 15 February 2023

Southern Croatia, Pelješac Peninsula, Ston, 42.827444°E, 17.690306°E, 16 February 2023

Southern Croatia, Neretva River Valley, Vratar, 43.08875°N, 17.552444°E, 17 February 2023

Southern Croatia, Neretva River Valley, Vidonje, 42.979056°N, 17.646528°E, 17 February 2023

Southern Croatia, Neretva River Valley, Dragovija, 43.096556°N, 17.592361°E, 17 February 2023

Southern Croatia, Neretva River Valley, Dubravica, 43.03175°N, 17.651917°E, 17 February 2023

Southern Croatia, Neretva River Valley, Mihalj, 42.986278°N, 17.502917°E, 17 February 2023

Southern Croatia, Neretva River Valley, Tuštevac, 42.985028°N, 17.513°E, 17 February 2023

Southern Croatia, Neretva River Valley, Lovorje, 42.981694°N, 17.527417°E, 17 February 2023

Southern Croatia, Neretva River Valley, Pižinovac, 42.981694°N, 17.536889°E, 18 February 2023

Southern Croatia, Neretva River Valley, Glavice, 42.999917°N, 17.551639°E, 18 February 2023

Southern Croatia, Neretva River Valley, Moračni do, 42.992083°N, 17.55975°E, 18 February 2023

Southern Croatia, Neretva River Valley, Rosni do, 42.985278°N, 17.557972°E, 18 February 2023

Southern Croatia, Neretva River Valley, Rosni do, 42.980556°N, 17.561167°E, 18 February 2023

Southern Croatia, Neretva River Valley, Slivno, 42.969583°N, 17.540944°E, 18 February 2023

Southern Croatia, Neretva River Valley, Magistrala Raba, 42.970528°N, 17.534611°E, 18 February 2023

Southern Croatia, Konavle, 42.587503°N, 18.254044°E, 16 January 2023

Southern Croatia, island of Korčula, near Lumbarda, 42.928161°N, 17.137433°E, 18 March 2023

Southern Croatia, island of Korčula, near Lumbarda, 42.93245°N, 17.145563°E, 13 March 2023

Southern Croatia, island of Lastovo, 42.750056°N, 16.897436°E, 16 March 2023

Southern Croatia, Pelješac Peninsula, west of Orebić, near Nakovanj, 42.997583°N, 17.079186°E, 13 March 2023

Southern Croatia, Pelješac Peninsula, west of Orebić, near Nakovanj, 42.996294°N, 17.091336°E, 13 March 2023

Southern Croatia, Pelješac Peninsula, west of Orebić, near Lovište, 43.019542°N, 17.058178°E, 12 March 2023

Southern Croatia, Neretva River Valley, near Vidonje, 42.968867°N, 17.647158°E, 14 January 2023

Southern Croatia, Neretva River Valley, near Prud, 43.091533°N, 17.593142°E, 13 January 2023

Hermodactylus tuberosus (Iridaceae) is a Mediterranean species morphologically very similar to irises, according to which some new taxonomic solutions place this species within the genus *Iris*, as *I. tuberosa* L. In Croatia it has been commonly recorded in Central and Southern Dalmatia (Nikolić 2005-onwards). However, in Dubrovnik-Neretva County the species was known only from few localities from Pelješac Peninsula, Konavle and the islands of Korčula, Mljet and Šipan. During the late winter and early spring

2023 comprehensive mapping of the species was performed in Dubrovnik-Neretva County, resulting in 28 new localities, out of which about 20 records are discovered in the broader area of the Neretva River Valley (Fig. 5), where the species was not known prior this survey.

Figure 5. *Hermodactylus tuberosus* from the Neretva Valley (photo by M. Doboš).
Slika 5. *Hermodactylus tuberosus* iz doline rijeke Neretve (fotografija M. Doboš).

Polycarpon tetraphyllum (L.) L.

Contributors: Vedran Šegota, Anja Rimac, Antun Alegro

Central Croatia, Zagreb, Trnjanska cesta, along the street pavements, 45.797778°N, 15.980556°E, 15 July 2021

Central Croatia, Zagreb, Savica, along the Slavonska ulica boulevard, 45.795278°N, 15.990556°E, 30 July 2022

Central Croatia, Zagreb, Borovje district, on a pebble parking lot under the bridge Most mladosti, 45.786111°N, 16.003611°E, 30 July 2022

Central Croatia, Zagreb, Ulica Kneza Borne, 45.807778°N, 15.984722°E, 10 July 2023

Central Croatia, Zagreb, Vodnikova ulica, 45.805503°N, 15.968264°E, 10 May 2024

Central Croatia, Zagreb, Šubićeva ulica, 45.811580°N, 15.994702°E, 10 May 2024

Central Croatia, Zagreb, Šubićeva ulica, 45.811409°N, 15.994237°E, 15 May 2024

Central Croatia, Zagreb, Kvaternikov trg, 45.814231°N, 15.996645°E, 20 May 2024

Central Croatia, Zagreb, Vlaška ulica, 45.814010°N, 15.982882°E, 27 May 2024

Central Croatia, Zagreb, Vlaška ulica, 45.814448°N, 15.992035°E, 27 May 2024

Central Croatia, Zagreb, Paromlinska ulica, 45.803684°N, 15.978458°E, 28 May 2024

Central Croatia, Zagreb, Draškovićeva ulica, 45.808469°N, 15.983636°E, 14 June 2024

Central Croatia, Zagreb, Prilaz Gjure Deželića, 45.810961°N, 15.957992°E, 18 June 2024

Central Croatia, Zagreb, Klaićeva ulica, 45.809614°N, 15.959711°E, 18 June 2024

Central Croatia, Zagreb, Klaićeva ulica, 45.809410°N, 15.964366°E, 18 June 2024

Central Croatia, Zagreb, Perkovčeva ulica, 45.807437°N, 15.968498°E, 18 June 2024

Eastern Croatia, Osijek, Ulica Ivana Gundulića, 45.5562°N, 18.6806°E, 25 April 2024

Polycarpon tetraphyllum (Caryophyllaceae) grows as a typical annual ruderal species in the Mediterranean part of Croatia. However, it has been randomly recorded in several continental localities. As early as in 1924 it was found in Karlovac (Rossi 1924), followed by Plitvice Lakes National Park (Krga 1992) and two recent localities in Zagreb – Heinzelova ulica (Borovečki-Voska 2018) and Palmotićeva ulica (Schmidt & Szabolcs 2022). Here we report numerous new localities across Zagreb (central Croatia) recorded in the last few years (Fig. 6), where some populations are persistent and appear each year, however in different abundances, and one in Osijek (eastern Croatia) where several specimens were observed in spring 2024. We hypothesize that the seeds of the species are constantly arriving from Mediterranean to inland parts of Croatia by car transport. Moreover, milder winters in recent years and the effect of urban heat islands probably allow this Mediterranean species to establish its populations in a new environment easily.

Figure 6. *Polycarpon tetraphyllum* from Zagreb (photo by A. Rimac).
Slika 6. *Polycarpon tetraphyllum* iz Zagreba (fotografija A. Rimac).

Figure 7. *Pseudognaphalium luteoalbum* from Zagreb (photo by A. Rimac).
Slika 7. *Pseudognaphalium luteoalbum* iz Zagreba (fotografija A. Rimac).

Pseudognaphalium luteoalbum (L.) Hilliard et B. L. Burtt

Contributors: Vedran Šegota, Anja Rimac

Central Croatia, Zagreb, Trnjanska Street, along the street pavements, 45.797778°N, 15.980556°E, 15 July 2021

Central Croatia, Zagreb, Rebar Street, on the pavement, 45.829313°N, 16.002114°E, 25 May 2024

Pseudognaphalium luteoalbum (Asteraceae) is a data deficient species in Croatia, with several known localities from the Mediterranean part of the country (Nikolić 2005-onwards). In continental Croatia there is an old record from Varaždin (old herbarium specimen ZA3297 collected by Slavoljub Wormastini, but lacking date of collection) and a recent record from the railway station in Slatina (Prlić 2010). Here we report the first record from the town of Zagreb, in two localities (Fig. 7). In Trnje District several specimens have reappeared in the last four summers. The origin of these small populations is unknown, however intrusion by car transport from Mediterranean region is most plausible.

Reynoutria sachalinensis (F. Schmidt) Nakai

Contributors: Nina Vuković, Vedran Šegota

Eastern Croatia, Slavonia, village of Sirač, rivulet Dubnica, 45,527950°N; 17,242680°E, 3 July 2023

Reynoutria sachalinensis (Polygonaceae) is a large, perennial herb originating from southeast Asia, exhibiting significant vegetative growth through branched underground woody rhizomes, with a significant potential for spread via stem fragments and seeds. Surprisingly, it does not display strong invasive behaviour like its congeners *R. japonica* and *R.* × *bohemica*, however it provides pollen to the male-sterile *R. japonica* resulting in the creation of the notorious hybrid. Historical herbarium records of *R. sachalinensis* in Croatia were erroneous and resulted from its being confused with *R.* × *bohemica* (Vuković et al. 2019). Its occurrence in Croatia was confirmed only recently, when small naturalized populations in Gorski Kotar and Central Croatia were detected (Vuković et al. 2019, 2021), in Karlovac (2016), Stubica (2016), Čabar (2016) and Gerovo (2018). Our record from 2023 is the first record of this species in Slavonia (Eastern Croatia). The population was small but vigorous, probably established as a garden escapee, on the banks of the small rivulet (Fig. 8). According to the known data, the spread of this species in Croatia is so far slow. Most known populations in Croatia occur along riverbanks; therefore, regular maintenance of such riverbanks should be carried out with caution to prevent further spread.

Figure 8. Vigorous population of *R. sachalinensis* at the village Sirač, situated on the bank of the rivulet Dubnica (photo N. Vuković).
Slika 8. Bujne populacije vrste *R. sachalinensis* u selu Sirač uz obalu potoka Dubnica (fotografije N. Vukovic).

Bryophytes

Corsinia coriandrina (Spreng.) Lindb.

Contributor: Marko Doboš, Vedran Šegota

Southern Croatia, Island of Lastovo, south from village of Lastovo, along walking path near Kosovnji vrh, 42.750065°N, 16.897427°E, 16 March 2023

Southern Croatia, Pelješac Peninsula, Nakovanj, near main road, 43.001337°N, 17.083724°E, 11 March 2023

Southern Croatia, Pelješac Peninsula, near Zajut, on a path towards the bay Velika Bezdija, 43.020064°N, 17.062213°E, 12 March 2023

Corsinia coriandrina is a Mediterranean liverwort, rarely recorded in Croatia, with several old reports from the island of Korčula (Schiffner 1906, 1916, Szepesfalvy, 1931, Bischler & Jovet-Ast, 1973) and one from Dubrovnik (Müller, 1948). During 2023 the species was found again in Southern Croatia, at three new localities – two on Pelješac Peninsula, and one on the island of Lastovo (Fig. 9). The specimens were found on bare soil or among other bryophytes, in open microhabitats among Mediterranean macchia vegetation with many rocks.

Figure 9. *Corsinia coriandrina* from Lastovo (left) and Pelješac (Zajut) (right) (photo by M. Doboš).
Slika 9. *Corsinia coriandrina* s Lastova (lijevo) i Pelješca (Zajut) (desno) (fotografije M. Doboš).

Cryphaea heteromalla (Hedw.) D. Mohr

Contributor: Vedran Šegota, Marija Bučar, Marko Doboš

Southern Croatia, Neretva Valley, village Vratar, 43.087015°N, 17.555053°E, 13 January 2023

Cryphaea heteromalla is a Mediterranean-Atlantic epiphitic moss, rarely recorded in Croatia. All known localities are from Istra – Ćepić polje (four herbarium sheets from J. Baumagartner kept in ZA, cited in Pavletić (1955)), around the towns of Pazin and Motovun (Düll 1999) and the nearby settlement of Seline (Babić & Alegro 2019). The old record from Dalmatia lacks a precise locality („*within evergreen shrub vegetation in Dalmatia*“) (Pavletić 1955), and thus this finding close to the village of Vratar near the Neretva River Valley is the first exactly recorded locality of this species in Dalmatia. The specimens were found growing very abundantly on the the trunks and branches with many ripe capsules (Fig. 10).

Figure 10. *Cryphaea heteromalla* near the village of Vratar (photo by M. Bučar & M. Doboš).
Slika 10. *Cryphaea heteromalla* blizu mjesta Vratar (fotografije M. Bučar i M. Doboš).

Leptodon smithii (Hedw.) F. Weber et D. Mohr

Contributors: Marko Doboš, Vedran Šegota

Eastern Croatia, Slavonia, Sokolina Duzluk, 45.505255°N, 17.872398°E, 31 December 2023

Eastern Croatia, Slavonia, Topličko brdo, 45.505098°N, 17.878752°E, 6 January 2024

Eastern Croatia, Slavonia, Topličko brdo, 45.505255°N, 17.872398°E, 6 January 2024

Eastern Croatia, Slavonia, Podrumine (Riudina), 45.497611°N, 17.856368°E, 3 March 2024

Leptodon smithii is a typical epiphytic moss in the Mediterranean part of Croatia, found both on evergreen trees in the eu-Mediterranean and deciduous trees in the sub-Mediterranean zone. Here we report four localities on the northern side of Mt Papuk (Eastern Croatia), providing the first records of this species in continental part of Croatia. The species was found growing on steep dolomitic boulders and rocks (Fig. 11). Although found on northern exposures, the exposed rocky outcrops clearly mimic a thermophilic microhabitat.

Figure 11. *Leptodon smithii* from the northern side of Mt Papuk (photo by M. Doboš).
Slika 11. *Leptodon smithii* sa sjevernih padina Papuka (fotografije M. Doboš).

Lichens

Roccella phycopsis (Ach.) Ach.

Contributors: Maja Maslać Mikulec, Marko Doboš, Sven Kapelj, Andreas Engelen

Southern Croatia, Island of Biševo, on the chapel walls (north and east) and the olive tree on the east side of it, 42.975285°N, 16.011152°E, 10 June 2022

Southern Croatia, Island of Lastovo, south of Pasadur, in the entrance to Jurjeva harbour, on the small cliff (around 2-3m, facing north), 42.762860°N, 16.81411°E, 12 June 2022

Southern Croatia, Island of Sušac, northern cliffs of the island, 42.772867°N, 16.512160°E, 13 June 2022

Southern Croatia, Island of Jabuka, 43.091852°N, 15.460044°E, June 2022

Southern Croatia, Lastovo Islands, Island of Mali Maslovnjak, NW facing rocks, 42.776667°N, 16.823211°E, 20 June 2024

Southern Croatia, Lastovo Islands, Island of Bratin, NW facing rocks, 42.74745°N, 16.795300°E, 22 June 2024

Roccella phycopsis is primarily distributed along the marine, arid, subtropical coastal areas with a Mediterranean type of climate such as found in the Mediterranean area, southern California, the central Chilean coast and southern Africa (Tehler et al. 2004). In Croatia it is very rare, since it is a Mediterranean species which is also hygrophytic, and therefor listed as endangered according to the Red List of Lichen of Croatia (Partl 2009). It grows on dry sheltered rocks of the supralittoral, sometimes on old walls, and very rarely as an epiphyte. Most of the records of this species in Croatia are very old (1895-1914): Srednji Greben (near Silba), Kornat (on Tarac fortress), Greben (near Vis), Biševo (on a chapel), Brusnik, Kamik, Sušac, Palagruža, Jabuka, Pod Kopište (Lastovo islands), Donji Vlašnik (Lastovo islands) (Mehmedović 2019). Several recent records after 2000 from Palagruža, Brusnik, Kamik and Kornat confirmed old localities after more than a century, while a new locality was recorded on island of Lavernaka (Kornati islands) (Mehmedović 2019). In 2022 we created a first record for Lastovo island, on a small cliff next to the sea, with some thalli also on the branches of the surrounding shrubs. Moreover, we confirmed the old record on Biševo island, on the same church of St. Silvester, after 110 years. This church dates from the 11th century, and the population of lichen looks to be in good condition, although there was a comprehensive restoration in 1994/1995 (Mardešić 2019). We have even recorded a lot of thalli on an olive tree on the east side of the church, which is a rather rare substrate. Additionally, in 2022 we confirmed the historical records for Sušac and Jabuka during ornithological research of these islands, while climbing on steep cliffs.

Figure 12. *Roccella phycopsis* from the island of Lastovo (left), olive tree with *R. phycopsis* next to the church on Biševo (right) (photo by M. Doboš).
Slika 12. *Roccella phycopsis* s otoka Lastova (lijevo), drvo masline s *R. phycopsis* u blizine crkve na Biševu (desno) (fotografije M. Doboš).

Fungi

Mitrula paludosa Fr. : Fr.

Contributors: Antun Alegro, Neven Matočec, Ivana Kušan, Vedran Šegota

Central Croatia, Banija, village of Blatuša, peat bog Đon Močvar, 45.317500°N, 15.906111°E, 24 April 2009

Mitrula paludosa is an extremely rare ascomycetes, with boreal distribution, living on wet plant remnants in acidic bogs and moist coniferous forests. In Croatia it was known solely from the acidic peat bog Lepenica in Gorski Kotar (Matočec & Kušan 2008), but this habitat was destroyed by the construction of a reservoir for an electric power plant. A population of *M. paludosa* was subsequently found in 2009 in the largest Croatian peat bog Đon Močvar, growing along the margins of shallow ponds (Fig. 13) within the association *Rhynchosporetum albae* W. Koch 1926, with a steady water face. The population counted several dozen specimens and it appears to be stable, since it was regularly observed in several subsequent years. Đon Močvar is now the only known site of this highly endangered species in Croatia.

Figure 13. *Mitrula paludosa* from the peat bog Đon Močvar (photo A. Alegro).
Slika 13. *Mitrula paludosa* s creta Đon Močvar (fotografije A. Alegro).

Algae

Trentepohlia aurea (Linnaeus) C. Martius

Contributors: Nikola Koletić, Neven Matočec, Ivana Kušan

Southern Croatia, Krka River, Skradinski buk, 43.805845°N, 15.963892°E, 15 October 2023

Central Croatia, Plitvice Lakes National Park, Rudanovac, 44.773928°N, 15.681603°E, 16 November 2023

The sole representative of terrestrial algae documented in Croatia is the green alga *Trentepohlia aurea* (Chlorophyta) (Koletić et al. 2020; Guiry & Guiry 2024). This species exhibits distinctive macroscopic characteristics manifesting as golden, brightly orange or red-coloured woolly patches that proliferate across various aerial substrates. These substrates include rocks, tree barks, leaves, twigs, fruits, soil, woodwork and concrete, and the species is often found coexisting with mosses and cyanobacteria. The earliest recorded instance of *T. aurea* in Croatia dates back to 1890 (Hansgirg 1890), pinpointing its presence in the vicinity of the Krka River. Despite being the subject of research in the Krka River area by Golubić (1957), populations of this species were not documented at that time. However, after a span of 133 years, populations of *T. aurea* were observed and recorded on tufa blocks along the northern side of the former natural bathing area downstream from the Skradinski buk waterfall (Fig. 14). Additionally, during fieldwork aimed at defining fungal diversity in the bogs and fens of Plitvice Lakes National Park in 2023, the species was recorded on the locality Rudanovac. A small population was found on continuously wet thin tufa-like crusts in a broad spring area of the fen, devoid of any other macroscopically visible fouling (Fig. 15).

Figure 14. Orange patches of *Trentepohlia aurea* on a tufa block near the Krka River (photo by N. Koletić).
Slika 14. Narančaste nakupine vrste *Trentepohlia aurea* na sedrenom bloku (fotografija N. Koletić).

Figure 15. A portion of *Trentepohlia aurea fouling* (left), microphotograph of *T. aurea* (1000×) from Rudanovac (photo by N. Matočec).
Slika 15. Dio obraštaja vrste *Trentepohlia aurea* (lijevo) i mikrofotografija *T. aurea* (1000×) s Rudanovca (photo by N. Matočec).

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