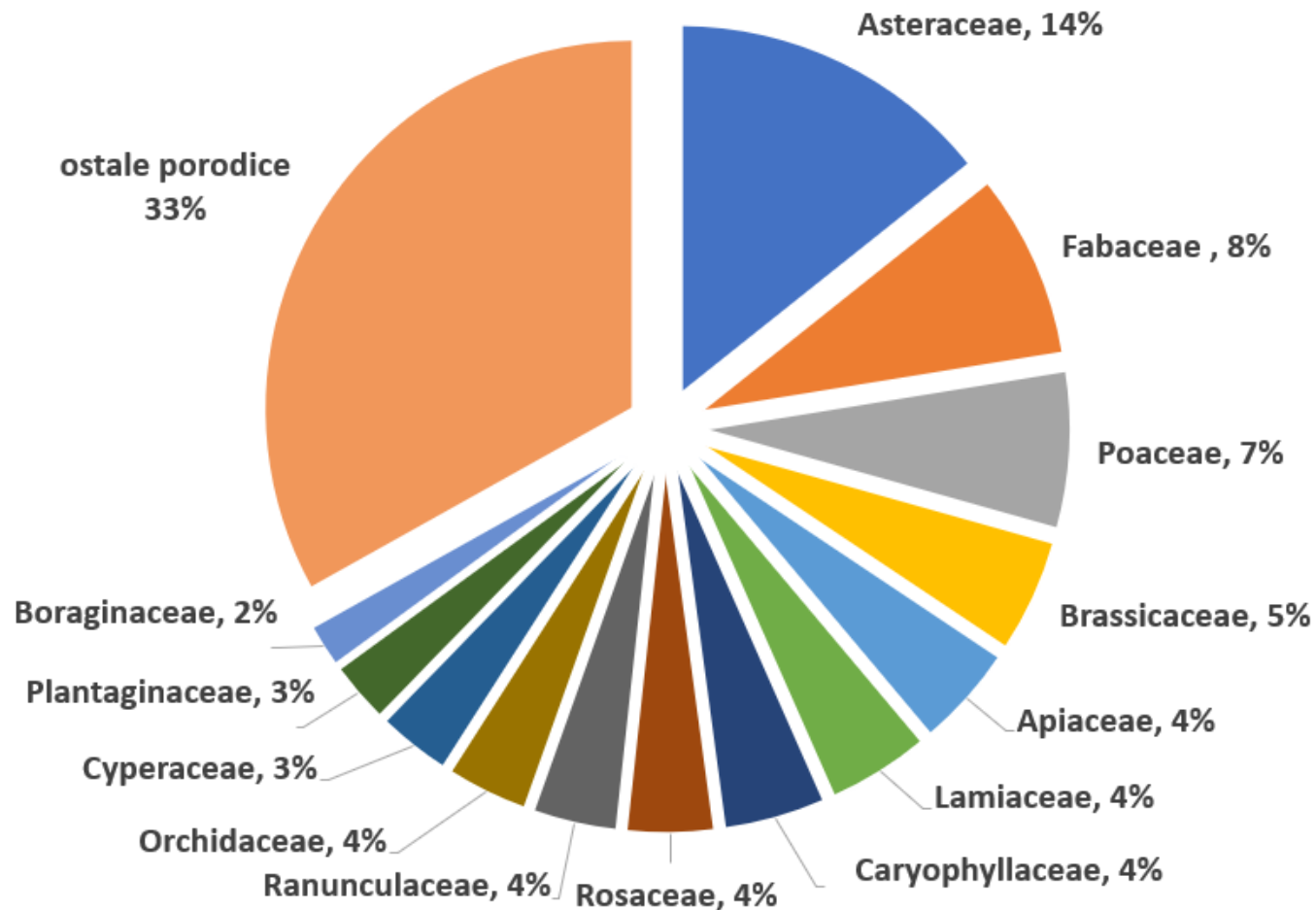


Poaceae
(trave)

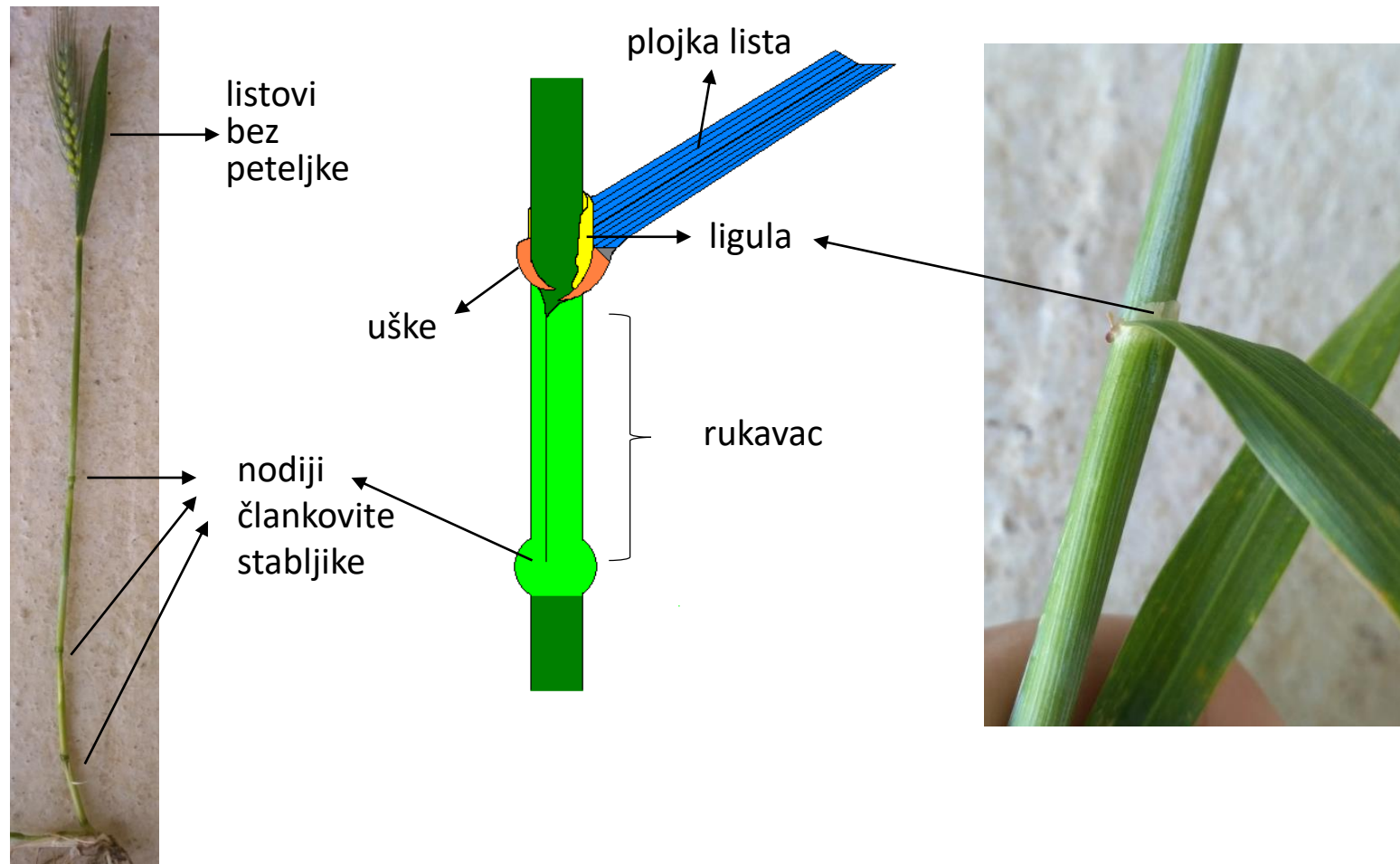
Najveće porodice hrvatske flore

~65% flore gradi
15 porodica

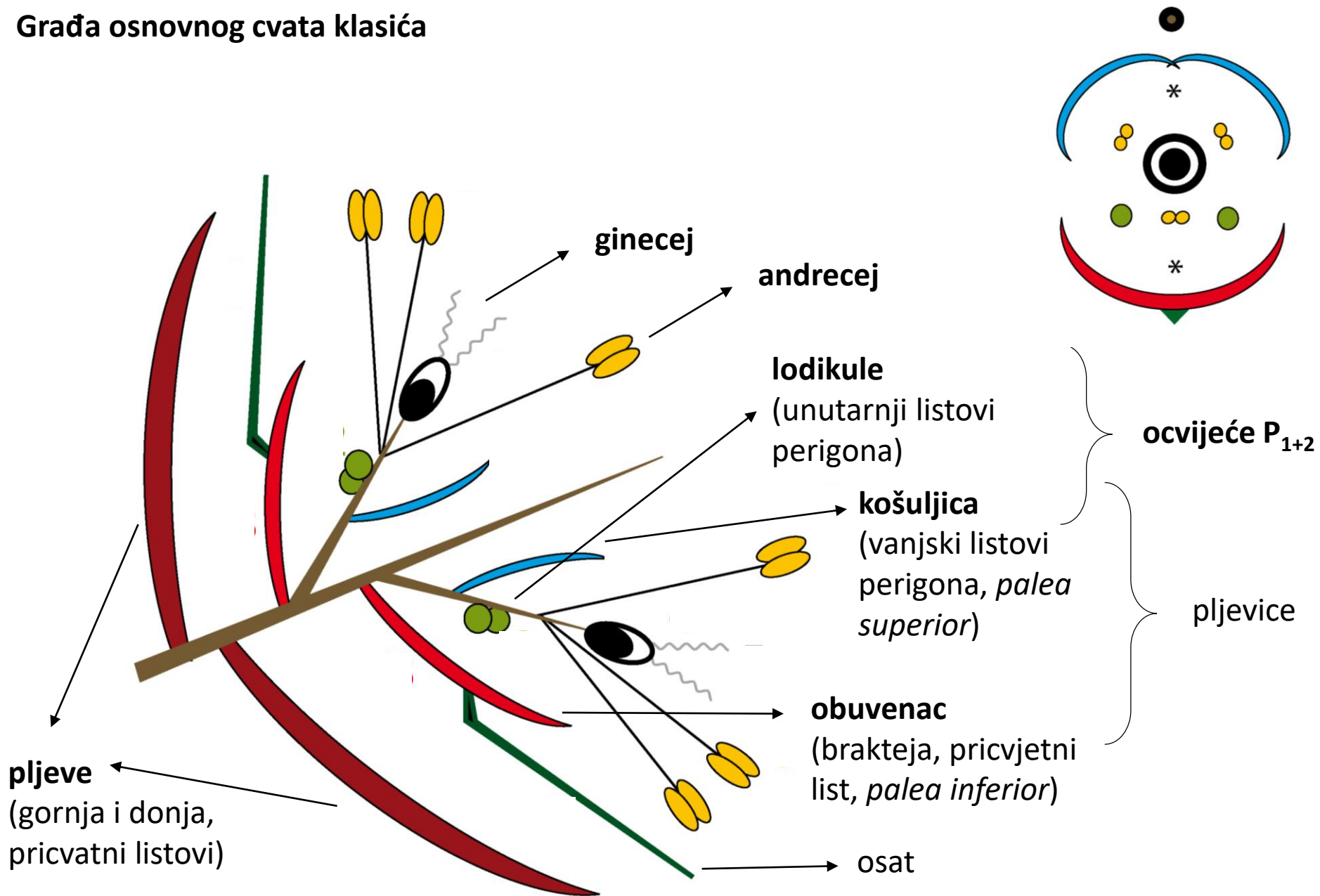


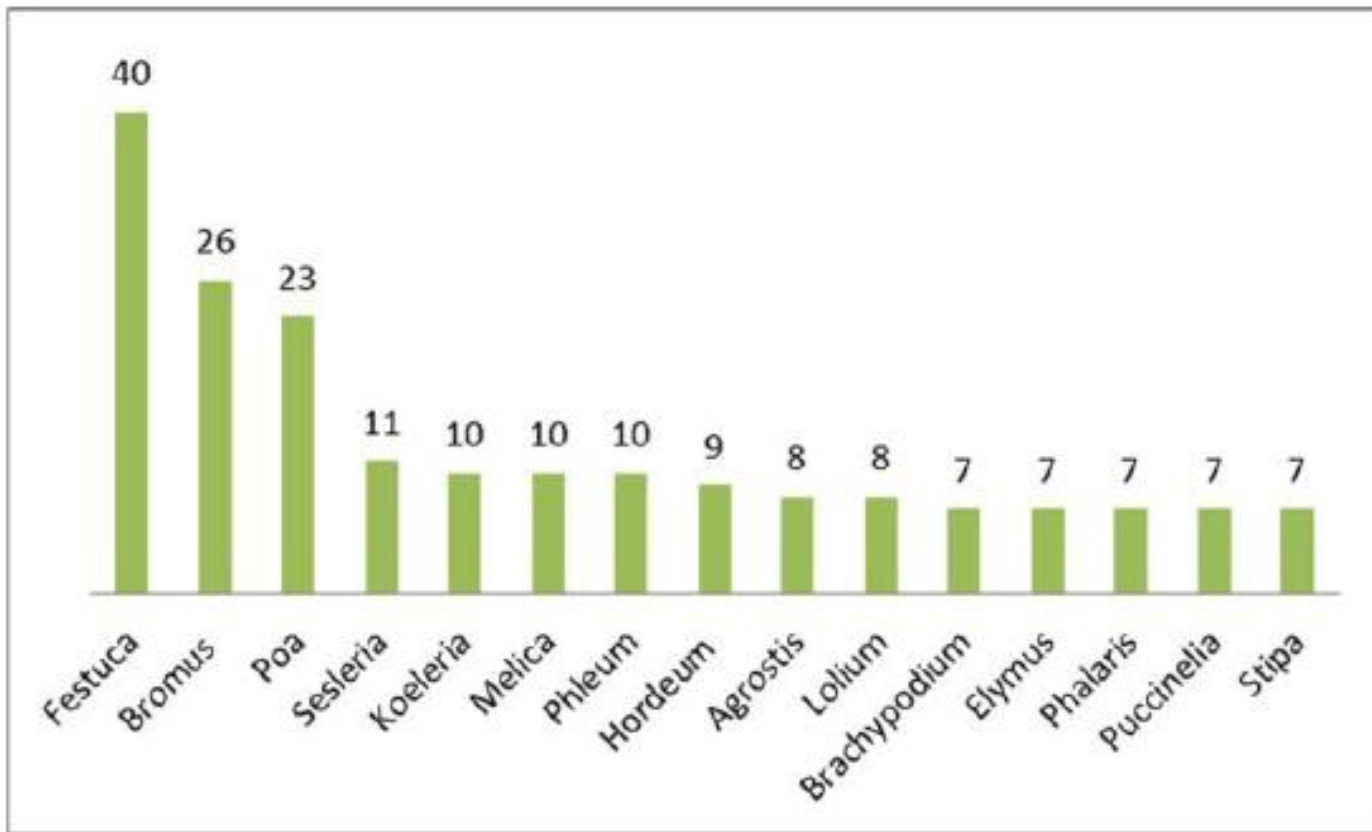
porodica	sp+subsp.
1 Asteraceae	793
2 Fabaceae	452
3 Poaceae	384
4 Brassicaceae	278
5 Apiaceae	250
6 Lamiaceae	250
7 Caryophyllaceae	249
8 Rosaceae	214
9 Ranunculaceae	207
10 Orchidaceae	200
11 Cyperaceae	179
12 Plantaginaceae	150
13 Boraginaceae	106
14 Orobanchaceae	99
15 Caprifoliaceae	87





Građa osnovnog cvata klasića





Festuca



Bromus



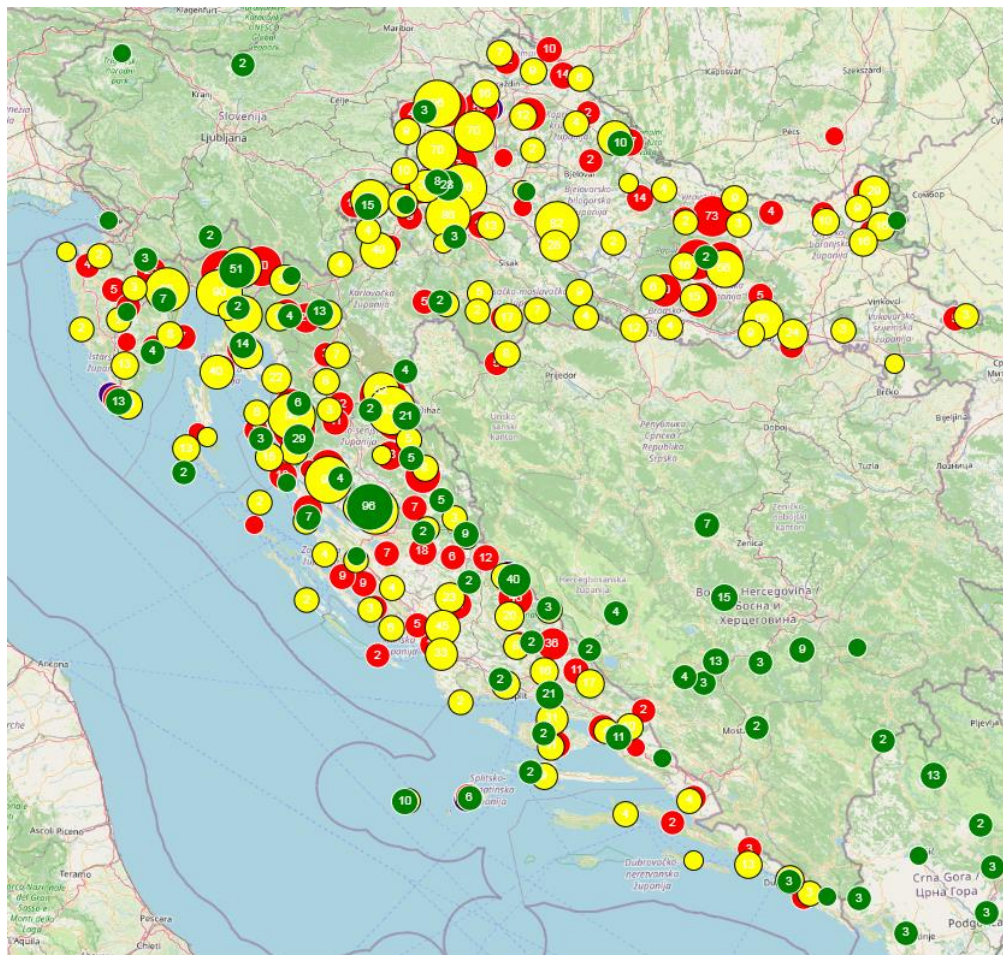
Poa



Sesleria

Festuca (vlasulje)

38 svojti



Festuca alfrediana Foggì et Signorini

Festuca alpina Suter DD

Festuca altissima ALL

Festuca amethystina L.

Festuca arundinacea Schreb.

Festuca arundinacea Schreb. ssp. *arundinacea*

Festuca arundinacea Schreb. ssp. *fenas* (Lag.) Arcang. DD

Festuca bosniaca Kumm. et Sendtn.

Festuca circummediterranea Patzke

Festuca dalmatica (Hack.) K. Richt.

Festuca drymeja Mert. Koch

Festuca filiformis Pourr.

Festuca gigantea (L.) Vill.

Festuca halleri All.

Festuca hercegovinica Markgr.-Dann.

Festuca heterophylla Lam.

Festuca lapidosa (Hack.) Markgr.-Dann.

Festuca nigrescens Lam.

Festuca nitida Kit.

Festuca ovina L.

Festuca panciana (Hack.) K. Richt.

Festuca paniculata (L.) Schinz et Thell. DD

Festuca pratensis Huds.

Festuca pseudovina Hack. ex Wiesb.

Festuca pulchella Schrad.

Festuca quadriflora Honck. DD

Festuca rubra L.

Festuca rupicola Heuff.

Festuca spectabilis Jan

Festuca spectabilis Jan ssp. *affinis* (Boiss. et Heldr. ex Hack.) Hack.

Festuca stenantha (Hack.) K. Richt. DD

Festuca stricta Host DD

Festuca trachyphylla (Hack.) Krajina NT

Festuca trichophylla (Gaudin) K. Richt. DD

Festuca vaginata Willd. CR

Festuca valesiaca Gaudin

Festuca violacea Gaudin

Širokolisne vlasulje (3-15 mm)

Festuca drymeja Mert. Koch
brdska vlasulja



Festuca pratensis Huds.
livadna vlasulja

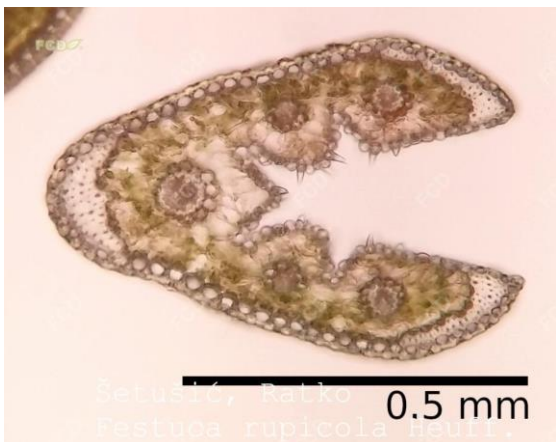


Festuca paniculata (L.)
Schinz et Thell. DD
metličasta vlasulja

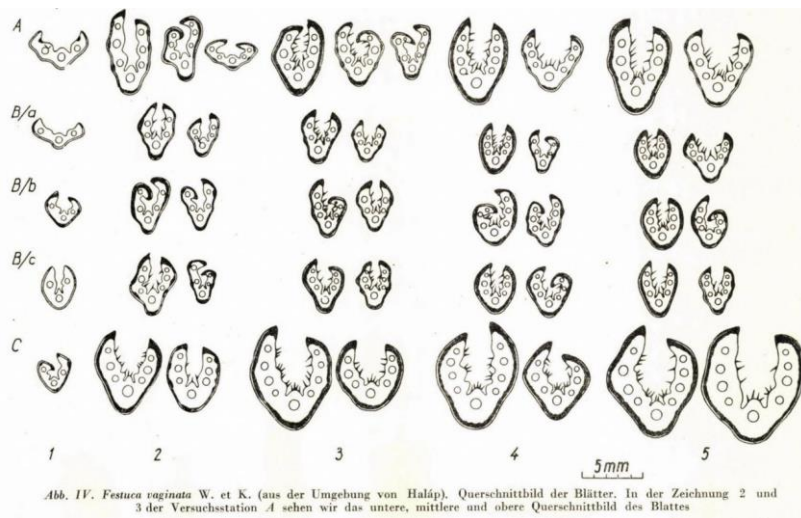


Uskolisne vlasulje (0,3-1,5 mm)

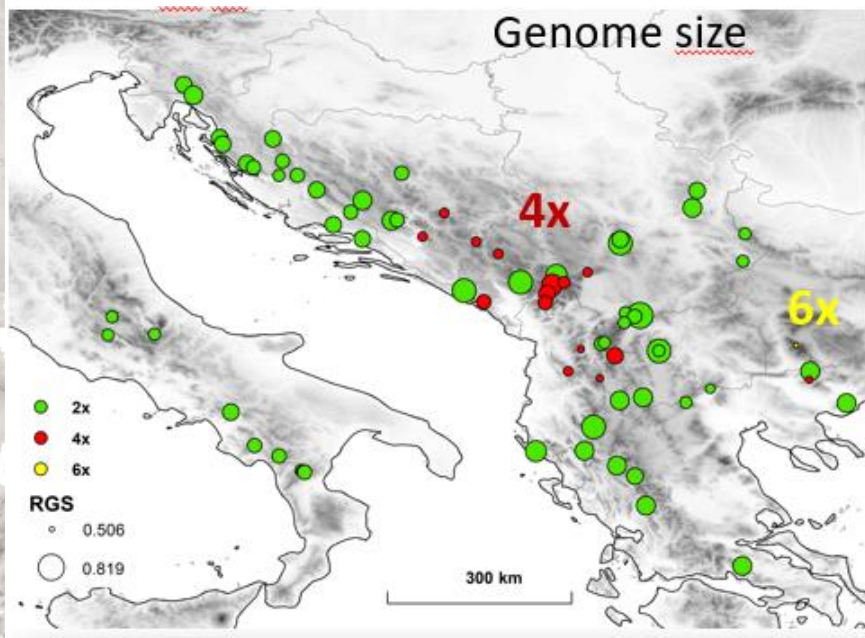
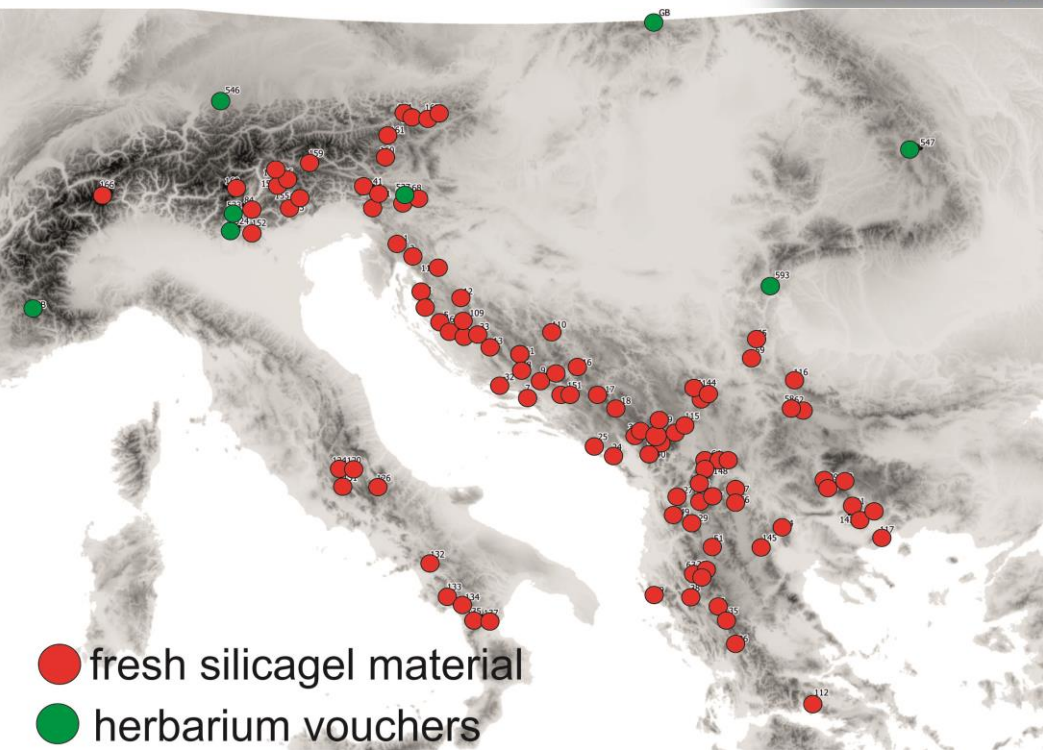
Festuca rupicola Heuff.
izbrazdana vlasulja

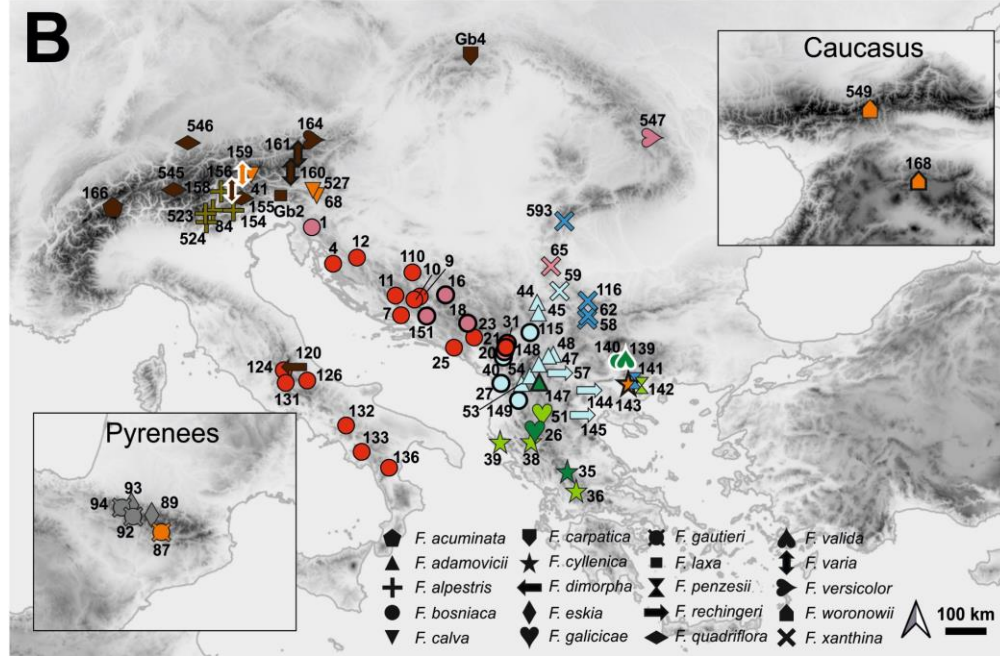
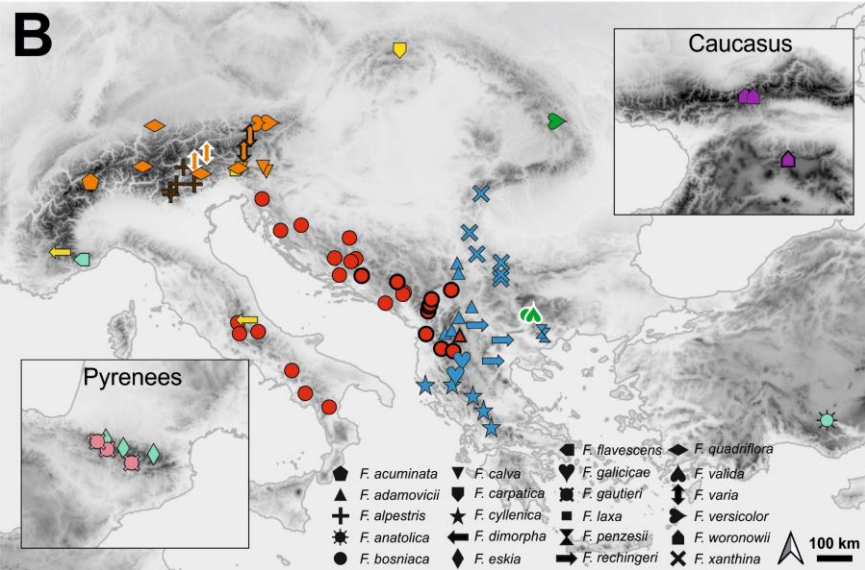
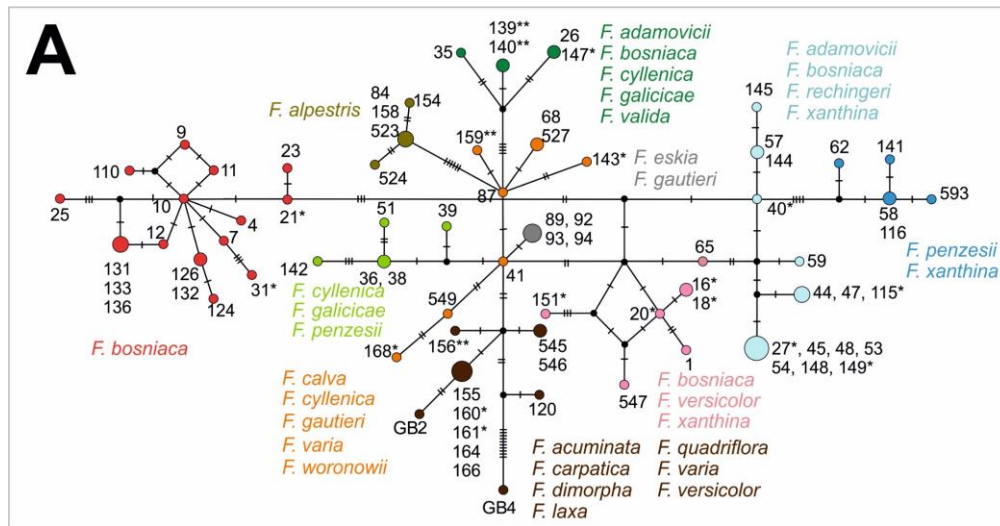
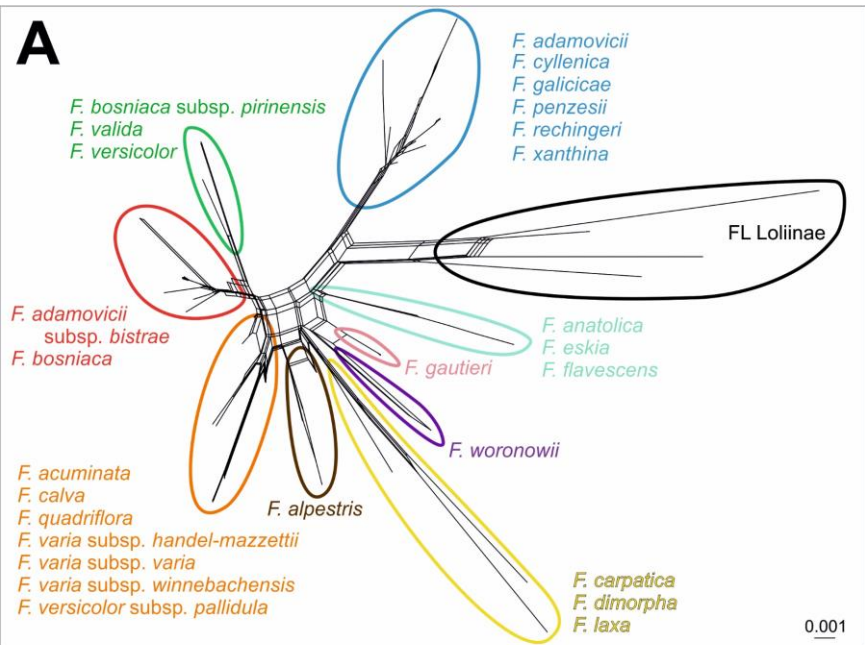


Festuca vaginata Willd. **CR**
rukavičasta vlasulja



Festuca bosniaca Kumm. et Sendtn.
oštra vlasulja



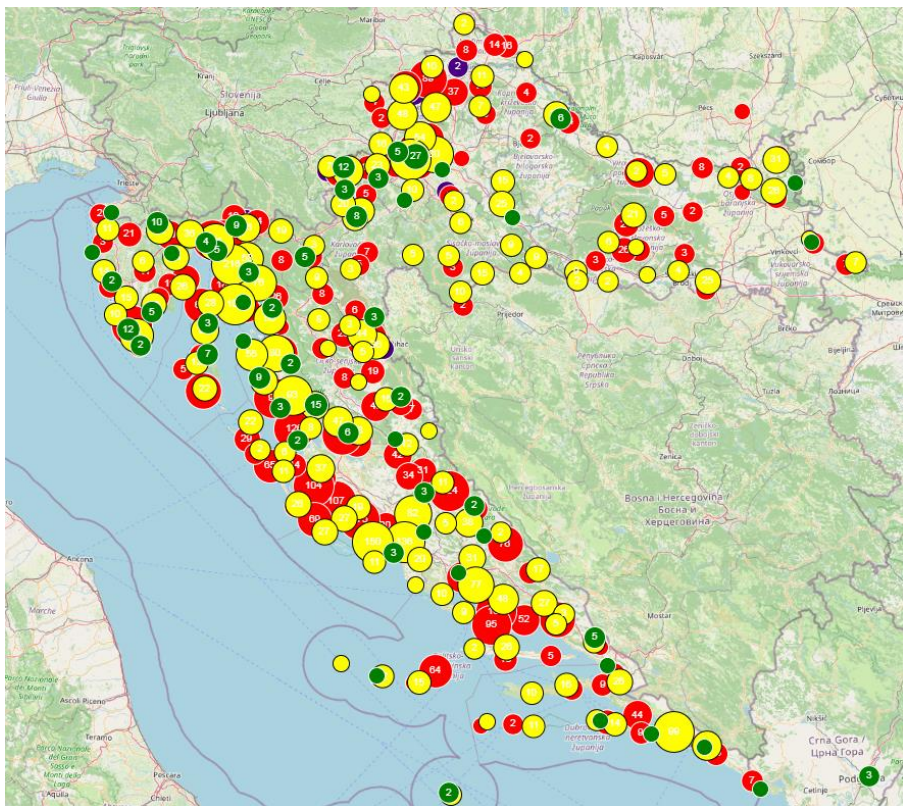


ITS

Cp DNA trnT-F

Bromus (ovsik)

29 svojti



Bromus arvensis L.

Bromus benekenii (Lange) Trimen

Bromus catharticus Vahl

Bromus commutatus Schrad. DD

Bromus diandrus Roth DD

Bromus erectus Huds.

Bromus erectus Huds. ssp. *condensatus* (Hack.) Asch. et Graebn.

Bromus erectus Huds. ssp. *erectus*

Bromus erectus Huds. ssp. *stenophyllus* (Link) Asch. et Graebn.

Bromus erectus Huds. ssp. *transilvanicus* (Steud.) Asch. et Graebn.

Bromus fasciculatus C. Presl

Bromus hordeaceus L.

Bromus hordeaceus L. ssp. *hordeaceus*

Bromus hordeaceus L. ssp. *molliformis* (Billot) Maire et Weiller

Bromus hordeaceus L. ssp. *pseudothominei* (P. M. Sm.) H. Scholz

Bromus inermis Leyss.

Bromus intermedius Guss.

Bromus japonicus Thunb.

Bromus lanceolatus Roth

Bromus madritensis L.

Bromus pannonicus Kumm. et Sendtn. DD

Bromus racemosus L.

Bromus ramosus Huds.

Bromus rigidus Roth

Bromus scoparius L. DD

Bromus secalinus L.

Bromus squarrosus L.

Bromus sterilis L.

Bromus tectorum L.

lancetaste pljevice



Bromus erectus Huds.
uspravni ovsik



Bromus sterilis L.
neplodni ovsik



Bromus madritensis L.
sredozemni ovsik

jajaste pljevice

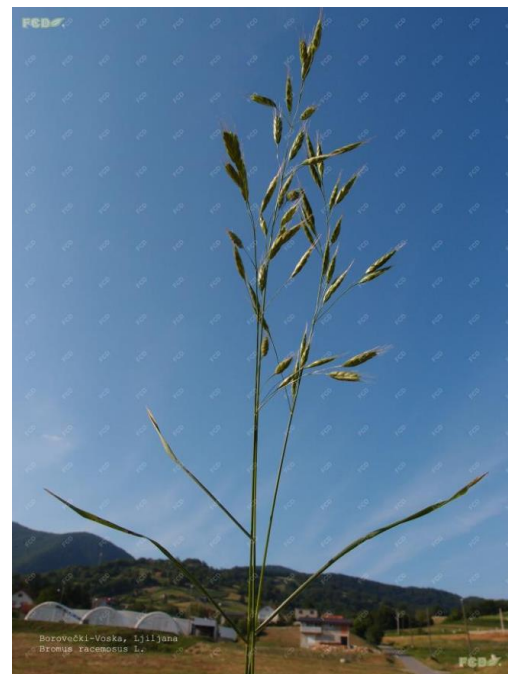


Bromus squarrosus L. - stršćí ovsík



Bromus hordeaceus L. - mekáni ovsík

Bromus racemosus L. grozdasti ovsík

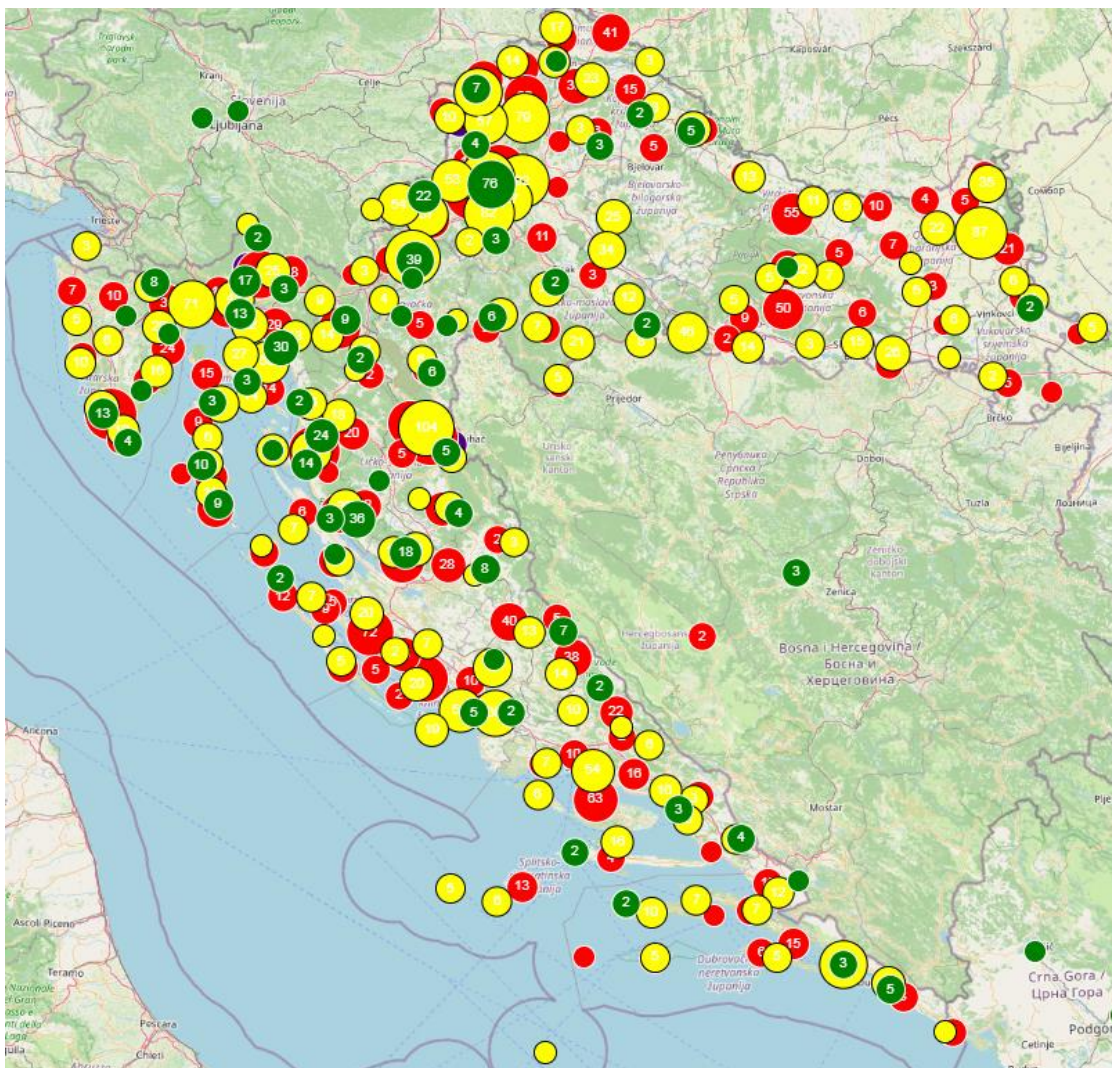


Bromus commutatus
Schrad. **DD**
zamíjenjeni ovsík



Poa (vlasnjača)

23 svojte



- Poa alpina* L.
- Poa angustifolia* L.
- Poa annua* L.
- Poa badensis* Willd. DD
- Poa bulbosa* L.
- Poa cenisia* All. DD
- Poa chaixii* Vill. DD
- Poa compressa* L.
- Poa glauca* Vahl
- Poa hybrida* Gaudin DD
- Poa infirma* Kunth
- Poa jubata* A. Kern.
- Poa media* Schur
- Poa minor* Gaudin DD
- Poa nemoralis* L.
- Poa palustris* L. NT
- Poa perconcinna* J. R. Edm. DD
- Poa pratensis* L.
- Poa pumila* Host DD
- Poa remota* Forselles DD
- Poa trivialis* L.
- Poa trivialis* L. ssp. *ylvicola* (Guss.) H. Lindb.
- Poa trivialis* L. ssp. *trivialis*



Poa annua L. - jednogodišnja vlasnjača



Poa pratensis L. - livadna vlasnjača



Poa trivialis L. - obična vlasnjača



Poa bulbosa L. - lukovičasta vlasnjača



Poa trivialis L. ssp. *silvicola* (Guss.) H. Lindb.



Endemi

Festuca alfrediana Foggi et Signorini ssp. *durmitorea* D. Lakušić et Foggi

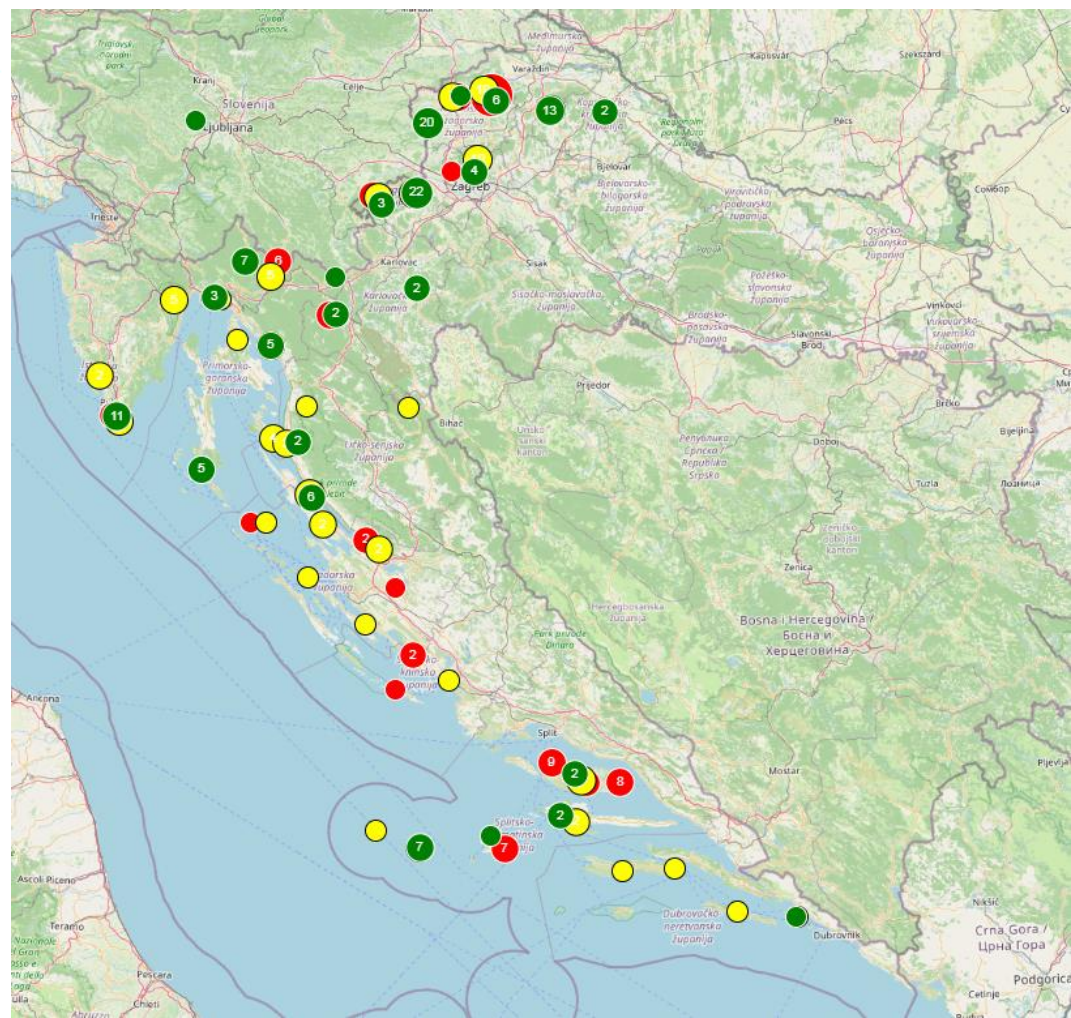
Festuca lapidosa (Hack.) Markgr.-Dann.

Lolium subulatum Vis. DD

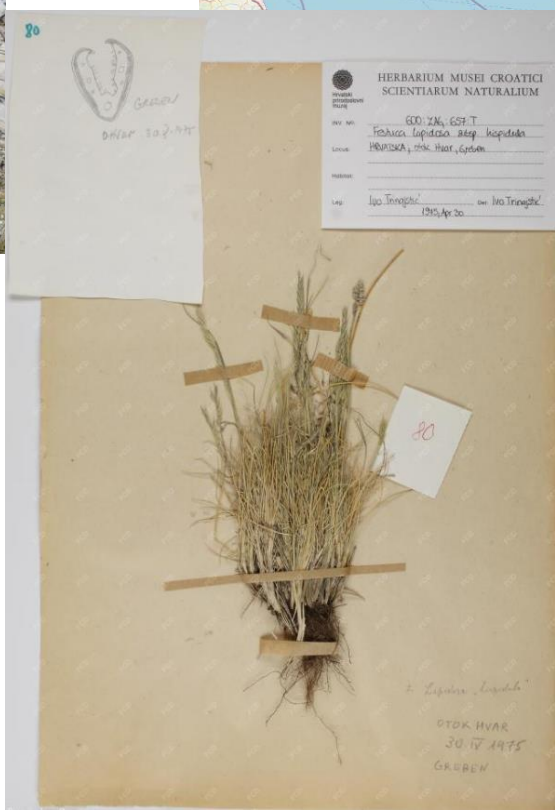
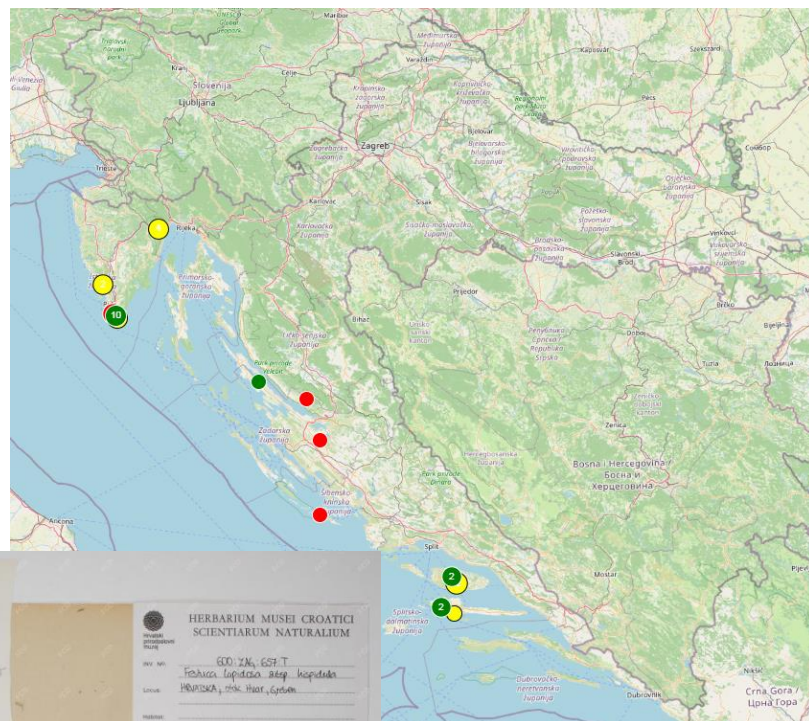
Puccinellia teyberi Hayek EN

Sesleria sadleriana Janka NT

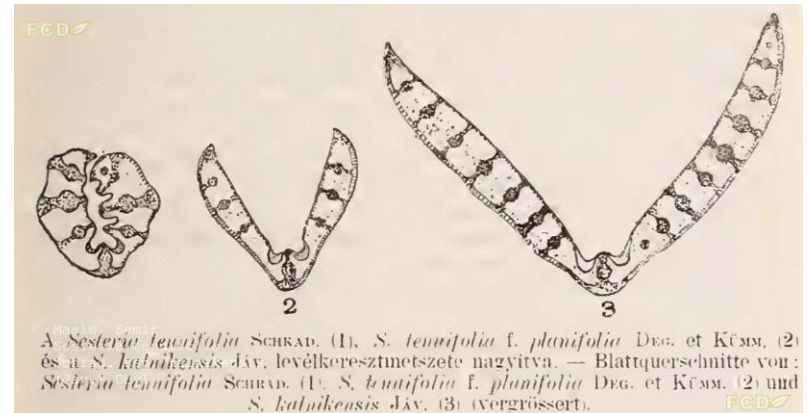
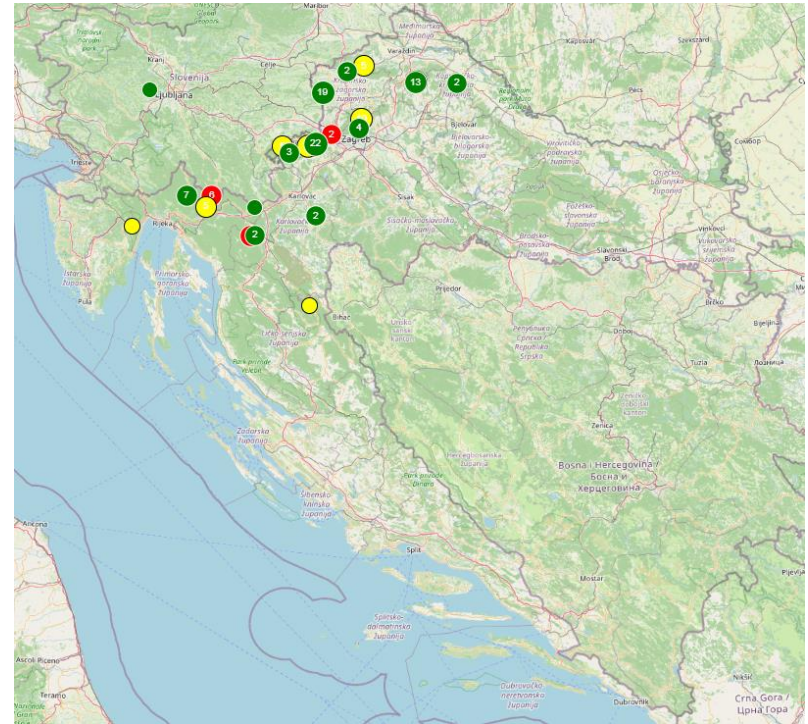
Sesleria tenuifolia Schrad. ssp. *kalnikensis* (Jav.) Deyl



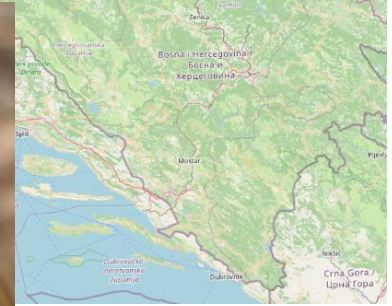
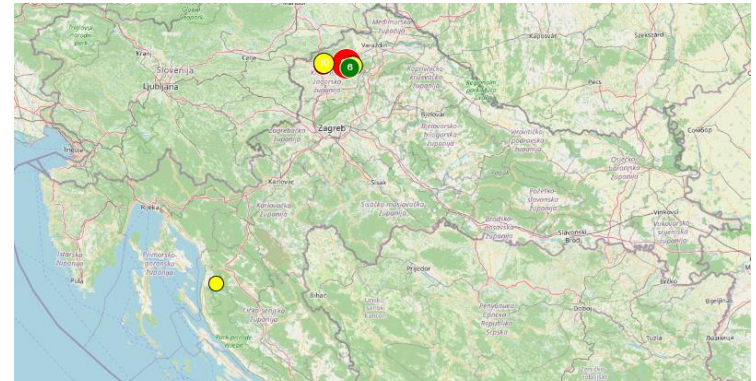
Festuca lapidosa (Hack.) Markgr.-Dann.
stjenska vlasulja



Sesleria tenuifolia Schrad. ssp. *kalnikensis* (Jav.) Deyl



Sesleria sadleriana Janka NT
Sadlerova oštrulja



?

Hodálová, I., Mártonfiová, L., Skokanová, K. et al. The utility of genome size in plant identification: a case study on *Sesleria* (Poaceae) from Croatia and Slovenia. *Plant Syst Evol* 306, 87 (2020).

<https://doi.org/10.1007/s00606-020-01715-2>

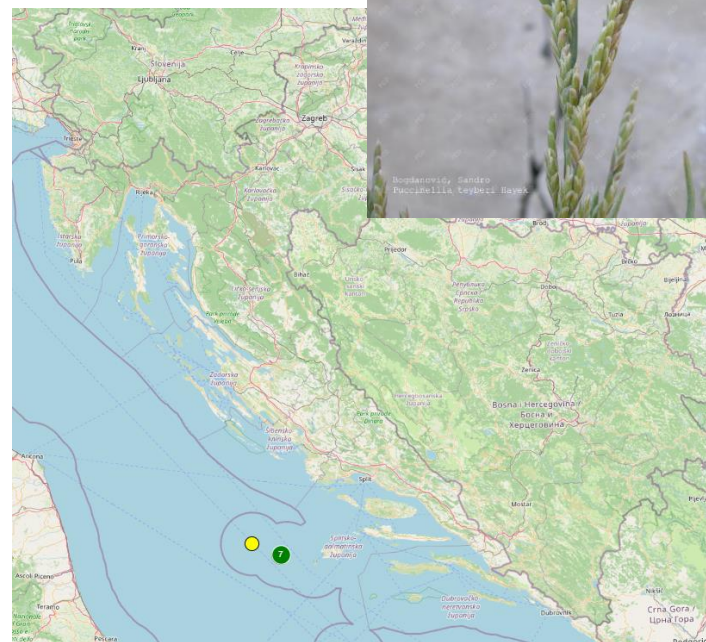
Puccinellia teyberi Hayek **EN**
Teyberova bezbridnjača



Biologia 67/1: 1—, 2012
Section Botany
DOI: 10.2478/s11756-011-0137-8

Taxonomic notes on *Puccinellia teyberi* (Poaceae), a critical species of Croatian flora

Sandro BOGDANOVIĆ^{1*}, Salvatore BRULLO², Antun L. ALEGRO¹, Ivana REŠETNIK¹
& Božena MITIĆ¹



Prilozi poznavanju flore Hrvatske

Procjena ugroženosti za endemičnu vrstu *Puccinellia teyberi* Hayek (*Poaceae*)

Sandro Bogdanović (Zavod za poljoprivrednu botaniku, Agronomski fakultet, Sveučilište u Zagrebu, Svetošimunska cesta 25, 10 000 Zagreb; sbogdanovic@agr.hr)



Prema recentnim taksonomskim istraživanjima (Bogdanović i sur. 2012) vrsta *Puccinellia teyberi* Hayek zabilježena je samo na otočiću Kamiku i otoku Jabuci, gdje jedinke ove vrste rastu na nepristupačnim okomitim strmcima i stijenama uz morsku obalu. Populacije su vrlo male, sveukupno je prebrojeno oko 250 jedinki koje su ograničene na obalne stijene. Prema kriterijima IUCN-a (2010), vrstu je potrebno uvrstiti u Crveni popis vaskularne flore Hrvatske kao osjetljivu (VU) na temelju kriterija: B2ab(i,iii,v); D2.

Slika 1. Habitus vrste *Puccinellia teyberi* s otoka Kamika (foto S. Bogdanović).

- **Bogdanović, S., Brullo, S., Alegro, A. L., Rešetnik, I., Mitić, B. (2012):** Taxonomic notes on *Puccinellia teyberi* (*Poaceae*), a critical species of Croatian flora. *Biologia* 67(1): 71-78.
- **IUCN (2010):** IUCN Standards and Petitions Subcommittee. 2010. Guidelines for using the IUCN Red list categories and criteria. Version 8.1. Prepared by the standards and petitions subcommittee in March 2010.

Ugroženost

CR – 15 svojti

EN – 7

VU – 8

NT – 23

LC – 3

DD - 66

Aeluropus littoralis (Gouan) Parl. CR
Ammophila arenaria (L.) Link ssp. *arundinacea* (Host) H. Lindb. CR
Beckmannia eruciformis (L.) Host CR
Catabrosa aquatica (L.) P. Beauv. CR
Corynephorus canescens (L.) P. Beauv. CR
Corynephorus divaricatus (Pourr.) Breistr. CR
Cutandia maritima (L.) Benth. CR
Elymus farctus (Viv.) Runemark ex Melderis CR
Festuca vaginata Willd. CR
Koeleria glauca (Schrad.) DC. CR
Pholurus pannonicus (Host) Trin. CR
Puccinellia distans (L.) Parl. ssp. *distans* CR
Puccinellia distans (L.) Parl. ssp. *limosa* (Schur) Soó et Jáv. CR
Tripidium ravennae (L.) H. Scholz CR
Ventenata dubia (Leers) Coss. CR

Aegilops uniaristata Vis. EN
Agropyron cristatum (L.) Gaertn. ssp. *pectinatum* (M. Bieb.) Tzvelev EN
Alopecurus bulbosus Gouan EN
Avellinia michelii (Savi) Parl. EN
Deschampsia media (Gouan) Roem. et Schult. EN
Hordeum secalinum Schreb. EN
Puccinellia teyberi Hayek EN

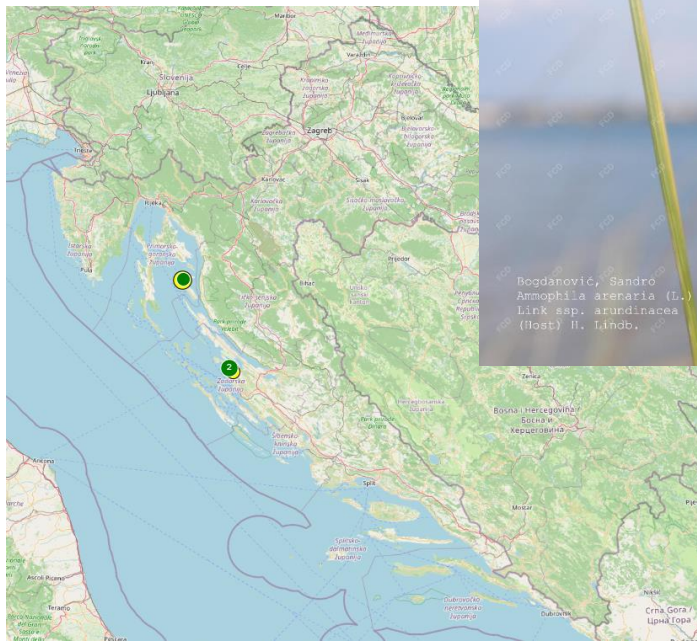
Alopecurus aequalis Sobol. VU
Alopecurus geniculatus L. VU
Alopecurus rendlei Eig VU
Desmazeria marina (L.) Druce VU
Glyceria fluitans (L.) R. Br. VU
Hordeum marinum Huds. VU
Parapholis incurva (L.) C. E. Hubb. VU
Sporobolus pungens (Schreb.) Kunth VU

Ammophila arenaria (L.) Link ssp. *arundinacea* (Host) H. Lindb. **CR**



Uzroci ugroženosti prema IUCN klasifikaciji:

1.3.3-Turizam, 1.4.1-Fragmentacija, 3.3.5-Gubitak staništa





Ammophila arenaria (L.) Link ssp. *arundinacea* H. Lindb.

Acta Soc. Sci. Fenn. ser. nov., B 1(2): 10 (1932)

Sinonimi: *Ammophila arenaria* (L.) Link var. *arundacea* (Mabille) Hayek, *A. arundinacea* Host, *Arundo arenaria* L. bas., *Psamma arundinis* Mabille

Red: *Cyperales*; Porodica: *Poaceae*

Hrvatsko ime: pješčarska mlava (engl. European Beach Grass, Marram Grass, franc. roseau des sables, élyme des sables, oyat, ammophile des sables, njem. Strandhafer, španj. barrón, grama de las dunas)

IUCN kategorija ugrođenosti: I: RE (CR?)

Regionalna prilagodba kategorijet: I; reintrodukcija je malo vjerojatna ili nemoguća zbog nedostatka staništa

IUCN II: E (LISANIĆ et TOPIĆ 2000)

Uzroci nestanka. Intenzivni razvitak turizma, fragmentacija i uništavanje primorskih obalnih pijesaka. Izvorni podaci o nalazištima su stari, a svi kasniji autori se pozivaju na njih. Kao novih potvrda prisutnosti svoje nema, vjerojatno da ova svoja više ne uspijeva na navedenim lokalitetima. Stoga se može smatrati regionalno izumrlom (RE) s vrlo malom vjerojatnošću njezina ponovnog nastanka.

Uzroci ugrođenosti prema IUCN klasifikaciji: 1.3.3. Turizam, 1.4.1. Fragmentacija staništa, 3.3.5. Gubitak staništa.

IUCN status u susjednim zemljama, Europi i svijetu

Područje	I	SV	H	SC	BH	EU	SVIJET
Ugroženost	-	-	-	-	-	-	-



Stanište. Primorski obalni pijesci (sipine) s psamo-halofilnom vegetacijskom savezom *Ammophila*.

Stanište prema CORINE klasifikaciji. 16.211212 Sjevernomediterranske primarne sipine (*Agropyretum mediterraneum*), GLCC/SSC, 3.

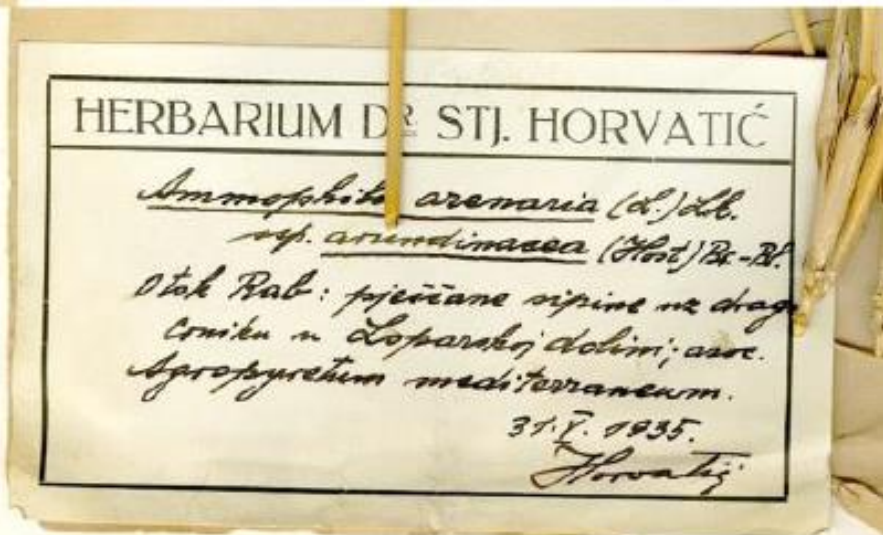


Mjere zaštite. Nisu poduzimane, NSAP-om je predviđena izrada i provedba akcijskoga plana zaštite vrste, kao i akcijskoga plana zaštite pješčovitih morskih obala (NN 81/99, 3. 8. 1999.).

Postojeće mjere zaštite	Potrebne mjere zaštite
1.1.1. Razvoj, 1.1.2. Primjena 4.4.3. Upravljanje (?)	5.1. Re-introdukcija?



Slika 41. Podvrsta *Ammophila arenaria* (L.) Link ssp. *arundinacea* H. Lindb., herbarski primjerak sabiran 1935. godine u uvali Crnika, Lopat. o Rab, leg./det. S. Horvatić (foto D. Miku, I. Soić)



HERBARIUM DE STJ. HORVATIC

Ammophila arenaria (L.) Link.
var. *arundinacea* (Host) B. & S.
Otok Rab: pješčane ravnice na dragi
Crnici u Loparskoj dolini; asoc.
Agropyretum mediterraneum.
31. 7. 1935.
Horvatij

HERBARIUM DE STJ. HORVATIC

Ammophila arenaria (L.) Link.
var. *arundinacea* (Host) B. & S.
Otok Rab: pješčane ravnice na dragi
Crnici u Loparskoj dolini; asoc.
Agropyretum mediterraneum.
31. 7. 1935.
Horvatij

Tablica IV.
Asocijacija *Agropyretum mediterraneum*
(Ass. *Agropyrum junceum-Cyperus micranthus*)

Subasocijacija (Subassociation)	Agropyretum mediterraneum typicum (Frags.)							Agropyretum mediterraneum glaciatum			
	1	2	3	4	5	6	7	8	9	10	11
Boji zemlja (So. & A. 1930)	0	0	0	0	NO	0	0	NW	NW	0	SW
Većina starih u m ² (Cron & A. 1930)	ca 300	100	100	100	200	150	300	300	150	60	50
Svojstvene vrste asocijacija: (Characteristic of Association)											
<i>Agropyrum junceum</i> (L.) P. B.	3.2	2.2	2.1	1.2.1	2.1	1.1	2.1				
<i>Stachys maritima</i> L.	+1			+3		+1					
<i>Euphorbia peplo</i> L.	+1									+1	
<i>Polygonum maritimum</i> L.											+1
Svojstvene vrste vrste Amorphilium: (Vascular-Characteristic)											
<i>Medicago sativa</i> L.	3.1	+1	3.1	+1	1.2	+1	1.2.1				
<i>Salvia hili</i> L.	+1			+1	2.1	+1	+1			2.2	
<i>Valeriana officinalis</i> (Sibth.) Don		2.3.1	+1	+1	3.2		+1				
<i>Amorpha canescens</i> (L.) Lk. sp. <i>arvensis</i> (Nutt.) B.-H.	+2			+2	+2	2.3	+3				
<i>Plantago lanceolata</i> L.											
<i>Cynodon dactylon</i> L.	2.2	1.2	2.1								
Svojstvene vrste vrste: (Characteristic of Association)											
<i>Euphorbia peplus</i> L.	3.3	1.2	2.3.2	2.2	1.2.2	3.3.2	2.2	1.2	2.3.2	1.2.2	+2
<i>Medicago falcata</i> Roth		+1									
Diferencijalne vrste subasocijacija: (Differentiating of Subass. vascular- glaciatum)											
* <i>Glaucium flamm. Crois.</i>								3.2	+2.3	+1	+1
<i>Chamaerhizis Acheroni</i> Sinek.								+1	+1		+1
<i>Scabimus hirsutus</i> L.								+3	+1	+1	
<i>Gambusia monophylla</i> L.								+1	1.1-2		
<i>Cataglyphis hispidus</i> (Hud.) Lk.									+1	+1	
* <i>Euphorbia piza</i> L.										+1	
<i>Rubus hirsutus</i> (L.) Roth.										+1	
<i>Panicum rufiflorum</i> Moench.											+1
<i>Antilechia rotunda</i> L.											+1
<i>Valeriana maritima</i> L.								+1			
[<i>Drypis pinnata</i> L. sp. <i>jacquiniana</i> Moench. et Wittm.]											
Pratilice: (Insects)											
<i>Echinochloa crusgalli</i> L.	+1	+1	+1		2.1	+1	2.1				
<i>Silene vulgaris</i> (Murr.) Garcke sp. <i>argyrifolia</i> Guss.	+1	+1	+1		2.1		+1				
<i>Cyanus decoloratus</i> (L.) Pers.			2.2	2.2							+1
<i>Inula viscosa</i> (L.) Ait.			+1					3.2	+1.2		
<i>Junca maritima</i> Lam.	+1	+2	1.2								
<i>Cyperus bulbosus</i> L.		3.1	2.1								
<i>Veronica sinuata</i> L.				2.1	+3						
<i>Trifolium compestre</i> Schreb.								+1	1.2.1		
<i>Fraxinus pedunculata</i> L.		+2	+2								
<i>Agropyrum littorale</i> Boiss.									+1		+2
<i>Hemerocallis glabra</i> L.				+1					+1		
<i>Echinochloa crusgalli</i> L. var. <i>pandurata</i> (Sibth. et Sav.) Fin.		+1	+1								
<i>Plantago lanceolata</i> L.		+1	+1								
<i>Aragallus arvensis</i> L.								+1		+1	
<i>Cicobium arvensis</i> L.									+1	+1	
<i>Lappula ectemata</i> Guss.								+1	+1		
<i>Allium sphaerocephalum</i> L.									1.1		

* Lokalno svojstvene vrste (Local Characteristics).

Pregled vegetacije otoka Raba sa gledišta biljne sociologije

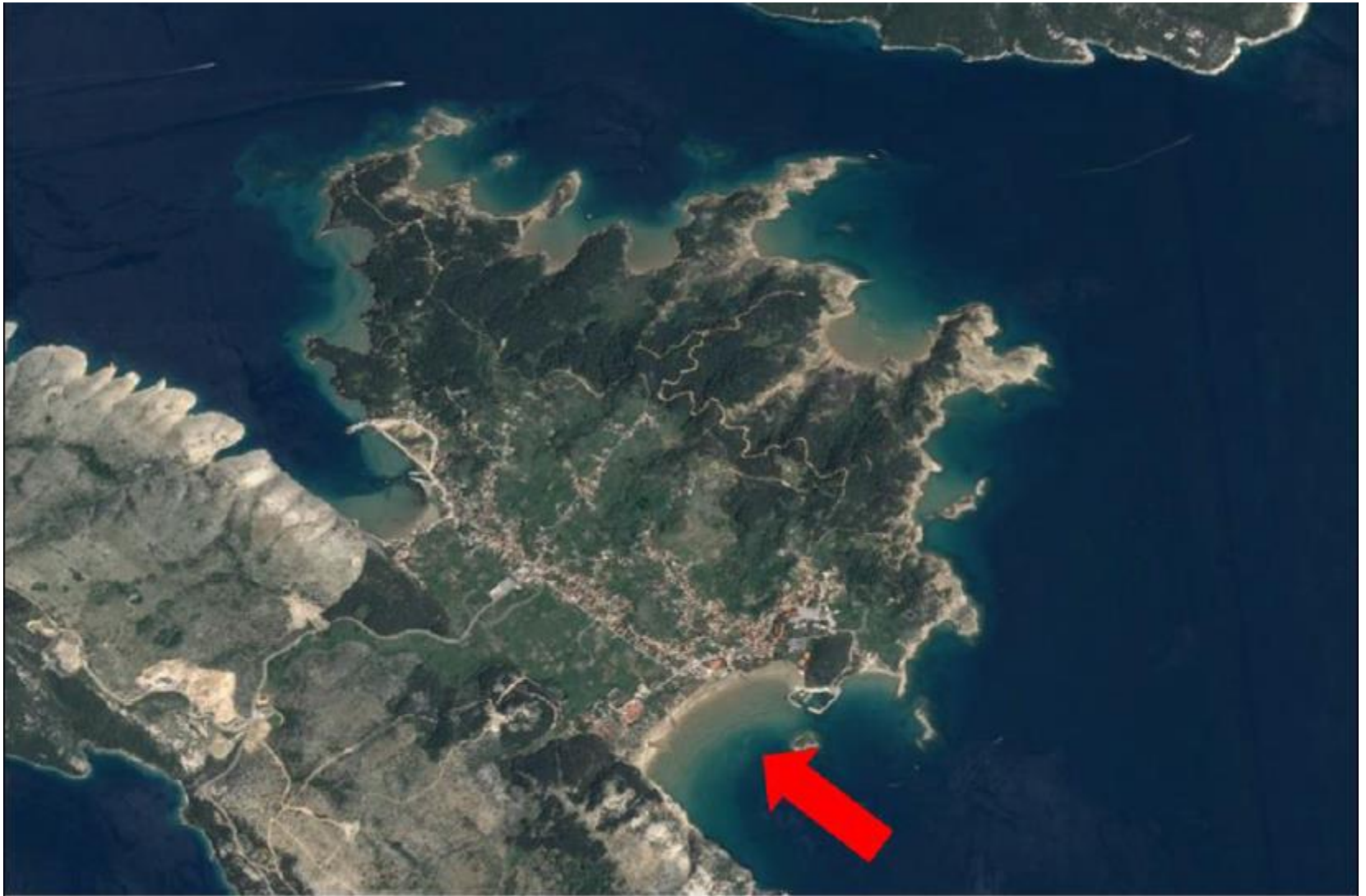
Napisa dr. Stjepan Horvatić

(Izdano u botaničkom institutu univerze
Kralja Aleksandra I. u Ljubljani).

Primljeno na sjednici matematičko-prirodoslovnoga razreda Jugoslavenske akademije
znanosti i umjetnosti 19. listopada 1937.

Predgovor i uvod

Poznato je, da u pogledu fitogeografskih istraživanja nije svim pojedinačnim dijelovima našeg mediteranskog i submediteranskog vegetacijskog područja povećana dosada jednaka pažnja. U nekim je predjelima, kao na pr. u najvećem dijelu unutaršnjeg dalmotinskog kopna, flora istražena samo posve nedostavno, a vegetacija upravo nikako; u nekim drugima opet, kao na pr. u samom Hrvatskom Primorju (Rossi, 1910) ili na skupini otoka Dugog (Pevalek, 1930) proučena je flora prilično potanko, ali vegetacija — bar sa suvremenog gledišta — nepotpuno ili nikako, a tek u razmjerno malom dijelu čitavog područja poznata nam je više ili manje potpuno i flora i vegetacija. Može se reći, da u tom pogledu stoji zasad razmjerno još najbolje skupina t. zv. Kvarnerskih Otoka, ako pod tim imenom, shvaćenim u širem smislu, ujedinaimo čitavo otočje od Paga na jugu do Krka i Cresa na sjeveru. Iz toga područja poznajemo danas razmjerno dosta dobro flora otočnih skupina Lošinja (Haračić, 1905; Lusina, 1932, 1933 b, 1934 b, 1936) i Raba (Morton, 1915), te otoka Croa (Hirc, 1913; Marchesotti, 1930; Morton, 1934), Paga (Horvatić, 1934), Plavnika (Horvatić, 1927) i Krka (Tommasini, 1875; Borbas, 1876/77; Lusina, 1927 a, b, 1932). No što se tiče njihove vegetacije, poznati su nam i ti otoci zasad još vrlo nejednolično: samo imo djelimično i nepotpuno obaviješteni na osnovi dosadnje literature o sastavu cjelokupne vegetacije otoka Krka (Lusina, 1933 a, 1934 a; Horvatić 1937, 1938, 1939) i Lošinja (Lusina 1933 b, 1934 b), dok su naprotiv vegetacijske prilike ostalih triju najvećih kvarnerskih otoka prikazane u tri opsežne monografije od kojih je jedna (Morton, l. c. 1915) posvećena otopnoj skupini Raba, druga (Horvatić, l. c. 1934) otoku Paga, a treća (Morton, l. c. 1934) otoku Croa.





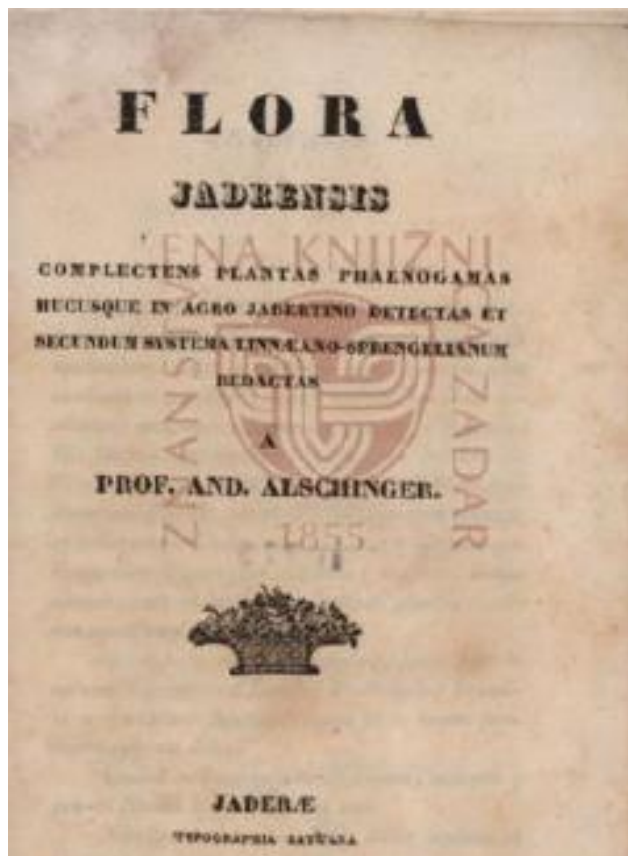
Ilijanić (1987) piše da je »stanište ove zajednice pod izuzetno snažnim utjecajem i pritiskom bezbrojnih turista u ljetnim mjesecima. Za potrebe kampa koji je tamo podignut asphaltirana je i cesta na samoj obali, a pokraj ceste uzgojen nasad topola, pa je nekadašnja zajednica pješčarki jako osiromašena. Ne treba mnogo dokazivati da će i ono malo biljaka pješčarki što se još opiru najezdi turista ubrzo nestati s otoka Raba ako se ne poduzmu odgovarajuće mjere zaštite.«



draga Crnika, Loparska dolina, otok Rab







povijesni nalaz iz okolice Nina iz 1832. godine
(Flora Jadrensis = Flora Zadra)

63. *Psamma*. Sandrohr. Canna delle sabbie,
Brula. *Társt.*

arenaria P. panicula spicata, calycibus acutis, lana corollae brevissima, foliis involutis. (Arundo L.). — In arena mobili ad mare Ænonae. — Aprili ad fin. vergente.

Short communication

Resurrection of a regionally extinct taxon in Croatia – the case of *Ammophila arenaria* (L.) Link (Poaceae)

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Abstract – A regionally extinct taxon, *Ammophila arenaria* (L.) Link subsp. *arundinacea* H. Lindb., has been rediscovered in the Croatian flora after 78 years. Previously it was known only from two coastal sand dune sites in Northern Dalmatia. The habitat at the locality of Crnika near Lopar on the northern Adriatic island of Rab is destroyed and *A. arenaria* subsp. *arundinacea* does not grow there anymore. At the second locality, on the sand dunes of Kraljičina plaža in the vicinity of the town of Nin, *A. arenaria* subsp. *arundinacea* was rediscovered and confirmed after 174 years. This is the only population of this taxon in Croatia, counting 48 mature individuals where the psammophyous habitat of Kraljičina plaža is under strong anthropogenic influence. This taxon is now classified as critically endangered (CR) and merits adequate active protection and conservation of its psammophyous habitat.

Key words: *Ammophila*, conservation, extinction, Nin, psammophytes, rare species

Introduction

The species European beachgrass, *Ammophila arenaria* (L.) Link, belongs to the family Poaceae and it is a typical psammophyous grass that inhabits coastal sand dunes from the eastern Atlantic coasts of Europe to the Mediterranean area (Tutin 1980, Valdés and Scholz 2009). The species is represented by two subspecies along the distribution area: the typical *A. arenaria* (L.) Link subsp. *arenaria* is distributed along the Atlantic sandy coasts of North and West Europe, southwards to the French Basque Country, while the second one, *A. arenaria* subsp. *arundinacea* H. Lindb is distributed on the coasts of South Europe, from Romania to Portugal, with the northern limit in the French Basque County (Tutin 1980, Biurrún et al. 2012, Marcenò and Jiménez-Alfaro 2017).

In the Croatian flora the taxon *A. arenaria* subsp. *arundinacea* was mentioned for the first time by Alschinger (1832: 27) as *Psamma arenaria* Beauv. for the area of Aenona (the town of Nin) in the vicinity of the town of Zadar in Northern Dalmatia. Subsequently, Visiani (1842: 79) cited the same locality "circa Nona" in his *Flora Dalmatica*, as did Schlosser and Vukotinović (1869: 1232) in *Flora Croatica*. Afterwards, it was recorded by Morton (1915: 249) as *Ammophila pallida*

(C. Presl) Fritsch var. *australis* Mabile and by Horvatić (1939: 25), both for the same locality (Crnika near the village of Lopar) on the island of Rab. To conclude, these were the only two known localities of *A. arenaria* subsp. *arundinacea* in the Croatian flora for more than eight last decades.

During the re-evaluation of the national Red list of vascular flora of Croatia, Ilijanić (2005) evaluated the taxon *A. arenaria* subsp. *arundinacea* as a regionally extinct (RE) with a note "Extinct in the wild, with a very small possibility of re-finding due to habitat loss". The author underlined various intensive touristic activities on sandy beaches as a main reason for the extinction of this taxon.

Materials and methods

Field investigation was carried out on Kraljičina plaža (44°15'0.89" N, 15°10'37.28" E) in the vicinity of the town of Nin in Northern Dalmatia, and in Crnika near the village of Lopar (44°49'25" N, 14°44'26"E) on the island of Rab during the vegetation season of May, June and July of 2016 (Fig. 1). Additionally, the flora of the entire South-Eastern coast



Fig. 3. Habitat of *Ammophila arenaria* (L.) Link subsp. *arundinacea* H. Lindb. in Kraljičina plaža near the town of Nin (photo by V. Šegota).

Diversity of AMF associated with *Ammophila arenaria* ssp. *arundinacea* in Portuguese sand dunes

Susana Rodríguez-Echeverría · Helena Freitas

Abstract Dune vegetation is essential for the formation and preservation of sand dunes and the protection of the coast line. Coastal sand dunes are harsh environments where arbuscular mycorrhizal fungi (AMF) play an important role in promoting plant establishment and growth. We present a study of the diversity of AMF associated with *A. arenaria* ssp. *arundinacea* in two locations of the Portuguese coast under a Mediterranean climate. These two locations were selected to compare a well-preserved dune system from a protected area with a degraded dune system from a public beach. AMF diversity was assessed mainly by cloning and sequencing of a fragment of the ribosomal SSU using the primer NS31 and AM1. Most of the 89 AMF clones obtained from the rhizosphere and roots of *A. arenaria* belonged to the genus *Glomus*, the largest clade within the *Glomeromycota*. Higher AMF diversity was found in the least disturbed site, in which spores of *Scutellospora persica*, *Glomus constrictum* and *Glomus globiferum* were found in the rhizosphere of *A. arenaria*.

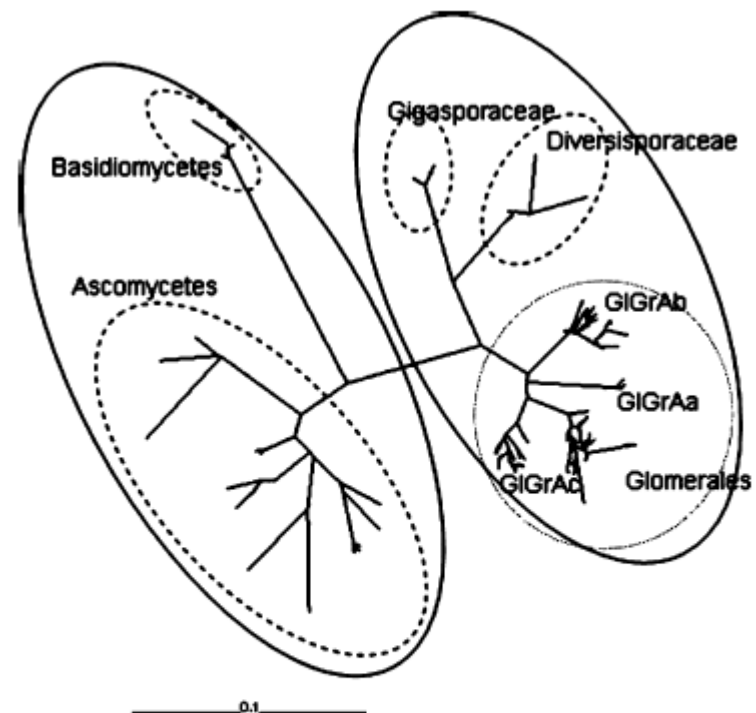


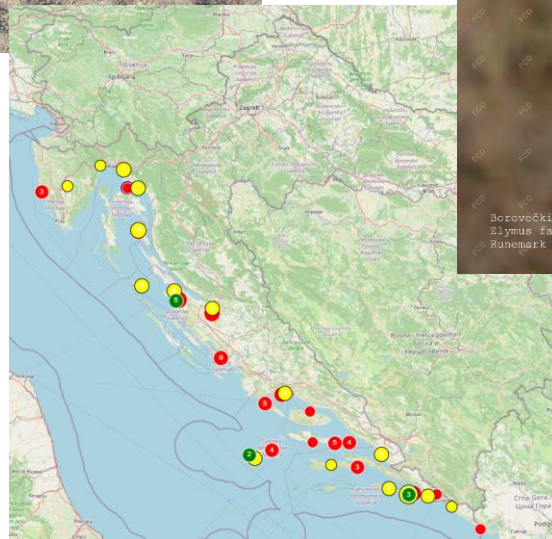
Fig. 1 Unrooted tree based on Kimura's two parameter distances inferred from partial SSU rDNA fungal sequences from the clones obtained from *A. arenaria* roots and AMF spores. Taxonomic classification follows Schwarzott et al. (2001). GIGrAa, Ab and Ac are the subclades defined within the clade GIGrA (*Glomus* Group A). All sequences obtained in this study belonging to the genus *Glomus* clustered into the clade GIGrA

Elymus farctus (Viv.) Runemark ex Melderis **CR**



Uzroci ugroženosti prema IUCN klasifikaciji:

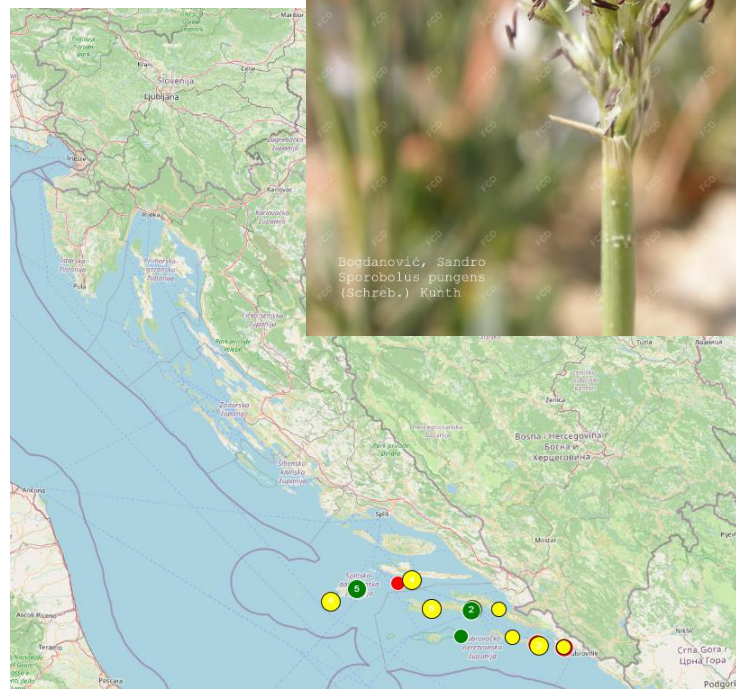
1.2-Iskorištavanje (Extraction), 1.2.8-Ostalo, 1.3.3-Turizam



Sporobolus pungens (Schreb.) Kunth VU

Uzroci ugroženosti prema IUCN klasifikaciji:

1.3.3-Turizam, 1.4.1-Fragmentacija, 3.2.5-Nestanak staništa

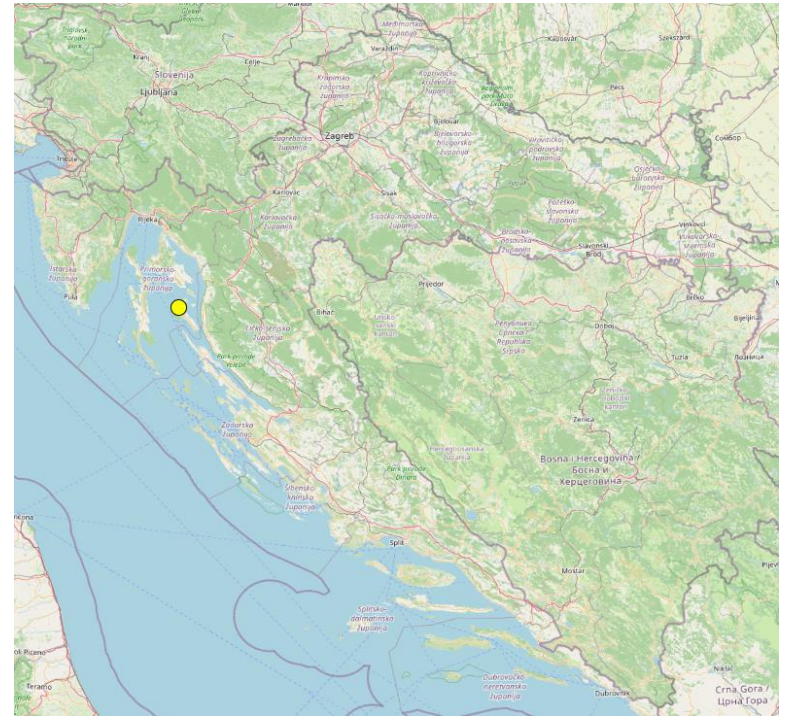


Cutandia maritima (L.) Benth. CR



Uzroci ugroženosti prema IUCN klasifikaciji:

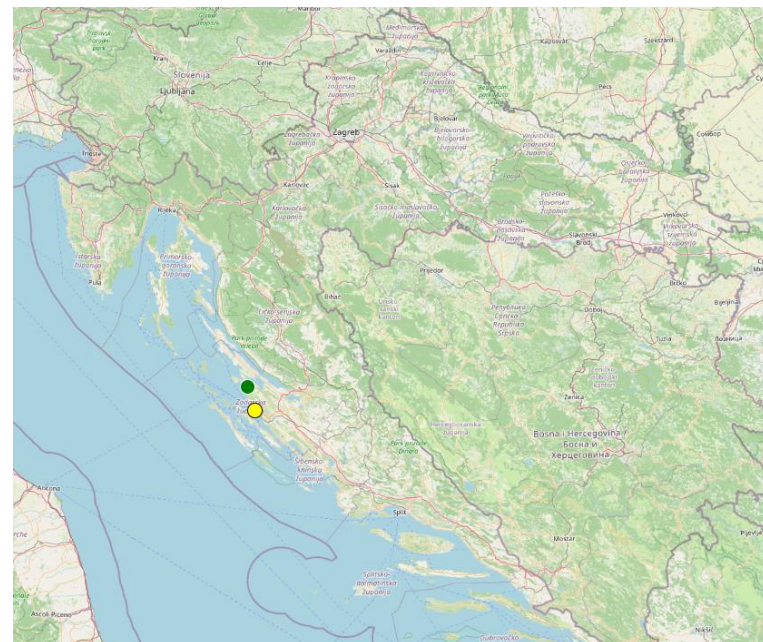
1.3.3-Turizam



uvala Crnika (Lopar, Rab)

Tripidium strictum (Host) H. Scholz DD

Hostov sladorovac





original scientific paper / izvorni znanstveni rad

THE URBAN FLORA OF THE CITY OF ZADAR (DALMATIA, CROATIA)

MILENKO MILOVIĆ¹ & BOŽENA MITIĆ²

No. of taxa	Taxa	Family	Life-form	Chorological group	Endemic & Threatened taxa	Protected taxa	Author of previous registered taxa
718.	<i>Rosa gallica</i> L.	Rosaceae	P	EUAS		pr	
719.	<i>Rosa sempervirens</i> L.	Rosaceae	P	CIME		pr	
720.	<i>Rosmarinus officinalis</i> L.	Lamiaceae	P	CUAD			Pe
721.	<i>Rubia peregrina</i> L.	Rubiaceae	P	CIME			
722.	<i>Rubus caesius</i> L.	Rosaceae	P	EUAS			
723.	<i>Rubus ulmifolius</i> Schott.	Rosaceae	P	MEAT			
724.	<i>Rumex conglomeratus</i> Murray	Polygonaceae	H	WISP			
725.	<i>Rumex crispus</i> L.	Polygonaceae	H	WISP			
726.	<i>Rumex obtusifolius</i> L.	Polygonaceae	H	WISP			
727.	<i>Rumex patientia</i> L.	Polygonaceae	H	EEUP			
728.	<i>Rumex pulcher</i> L. ssp. <i>woodsii</i> (De Not.) Arcangeli	Polygonaceae	H	SEPO			
729.	<i>Ruscus aculeatus</i> L.	Liliaceae	G	MEPO		pr	Pe
730.	<i>Ruscus hypoglossum</i> L.	Liliaceae	G	CUAD		pr	Pe
731.	<i>Ruta graveolens</i> L. (incl. <i>R. divaricata</i> Ten.)	Rutaceae	Ch	ILAP		pr	
732.	<i>Saccharum strictum</i> (Host) Spreng.	Poaceae	H	ILSE		sp	
733.	<i>Sagina maritima</i> G. Don	Caryophyllaceae	T	WISP			

Phleum arenarium L. DD
pješčarska mačica

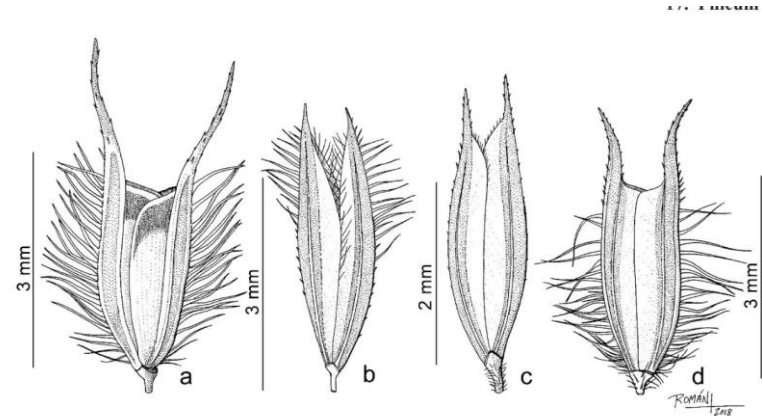


Fig. 7. – Glumas de: a) *Phleum alpinum*; b) *Ph. arenarium*; c) *Ph. phleoides*; d) *Ph. pratense*.

Corynephorus canescens (L.) P. Beauv.

CR

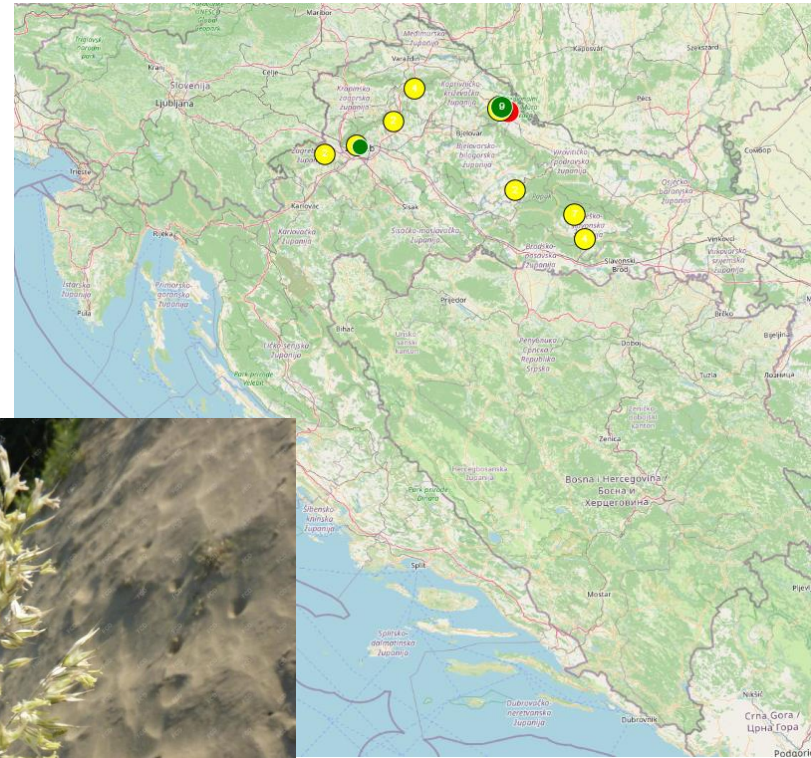
Uzroci ugroženosti prema IUCN klasifikaciji:

1.1.6-Plantažni uzgoj šuma, 3.2.5-Nestanak staništa, 3.3.5-Gubitak staništa



Podvećki Vojak, Ljiljana
Corynephorus canescens
(L.) P. Beauv.

FCBR



Podvećki Vojak, Ljiljana
Corynephorus canescens
(L.) P. Beauv.

FCBR

Festuca vaginata Willd. CR

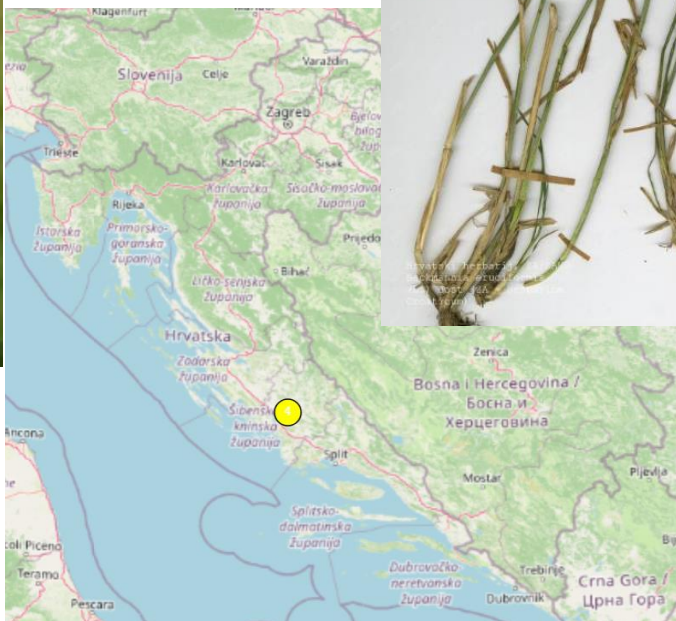
Uzroci ugroženosti prema IUCN klasifikaciji:

3.3.8-Ostalo

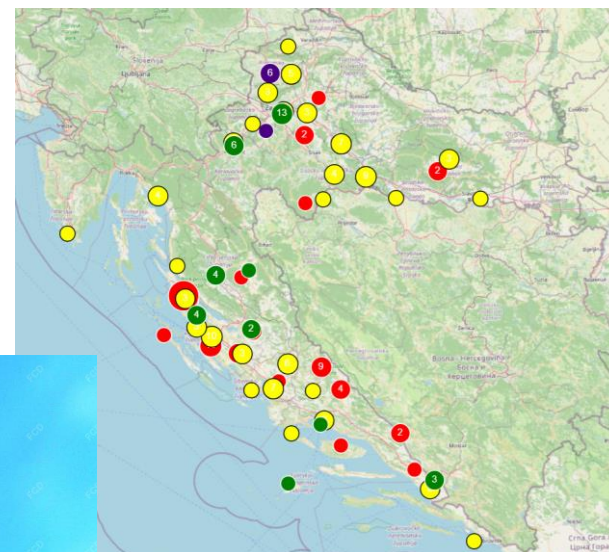




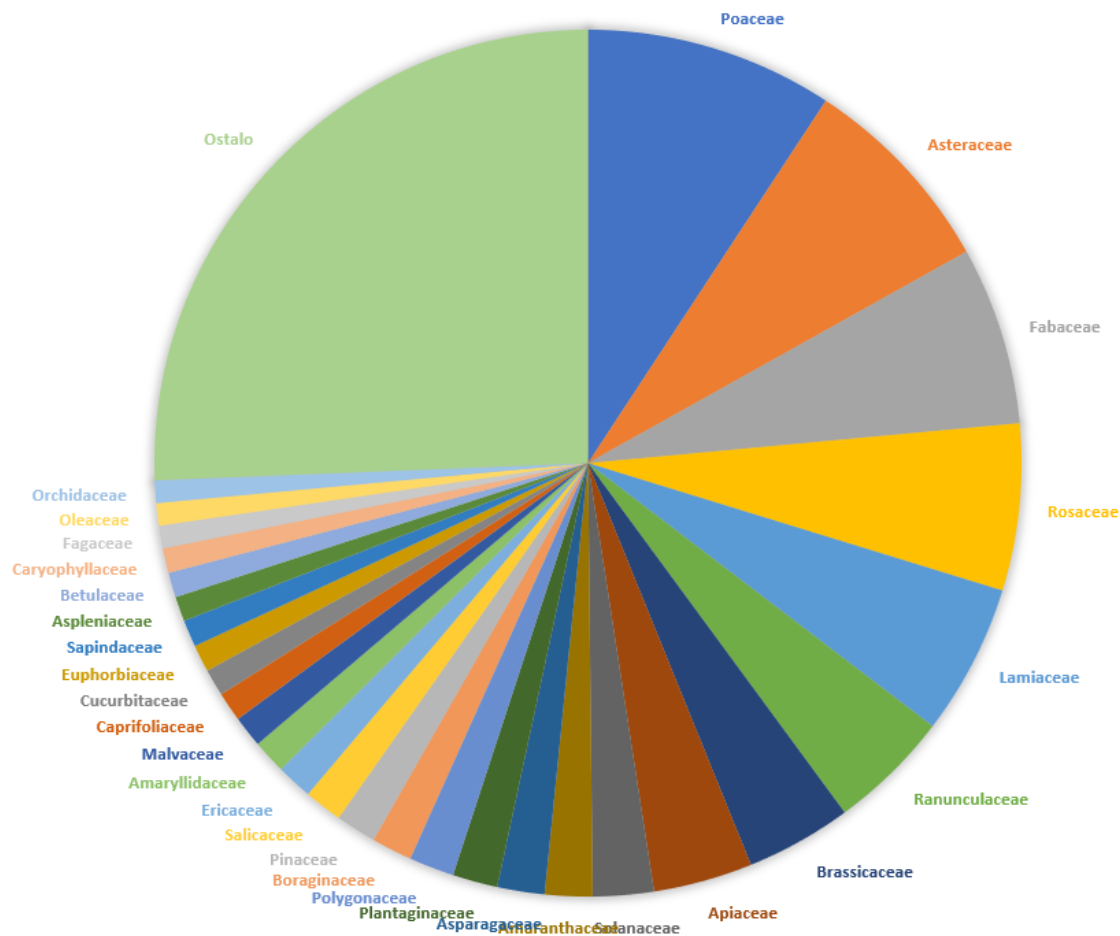
Beckmannia eruciformis (L.) Host **CR**



Alopecurus rendlei Eig VU
mješinasti repak



Korisno bilje



	Porodica	korisno bilje
1	Poaceae	110
2	Asteraceae	91
3	Fabaceae	79
4	Rosaceae	74
5	Lamiaceae	67
6	Ranunculaceae	54
7	Brassicaceae	47
8	Apiaceae	44
9	Solanaceae	27
10	Amaranthaceae	21
11	Asparagaceae	21
12	Plantaginaceae	20
13	Polygonaceae	20
14	Boraginaceae	18
15	Pinaceae	18

Zea mays L.



Photo by Semir Maslo



Maslo, Semir
Zea mays L.

Photo by Semir Maslo



Maslo, Semir
Zea mays L.

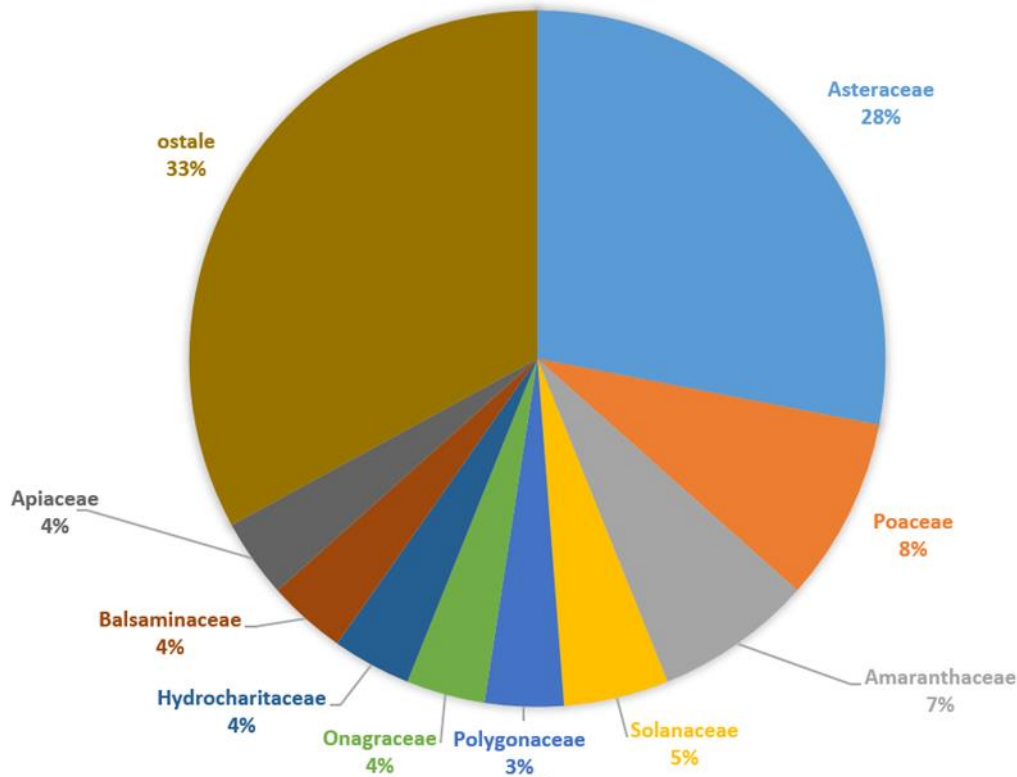
Triticum spp.



Sarić, Semir
Triticum aestivum L.

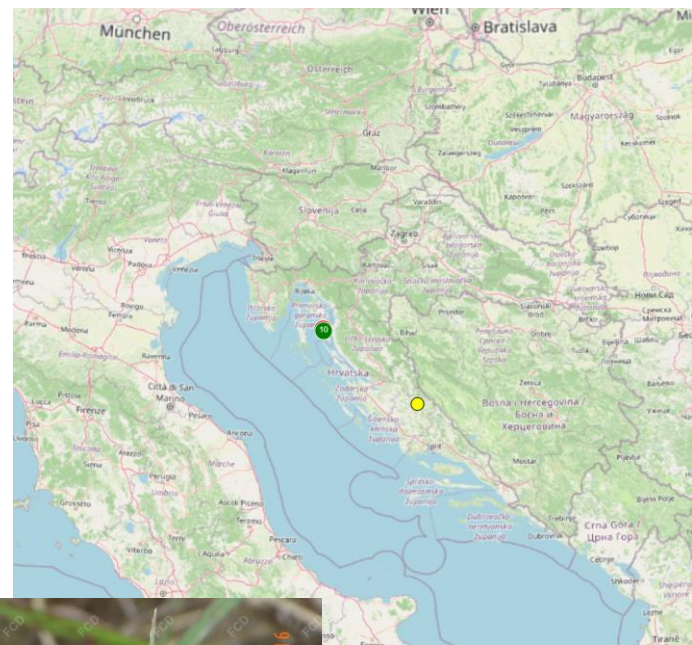
- Triticum aestivum* L.
- Triticum dicoccon* Schrank ex. Schübl.
- Triticum durum* Desf.
- Triticum monococcum* L.
- Triticum polonicum* L.
- Triticum spelta* L.
- Triticum turgidum* L.

Invazivne vrste



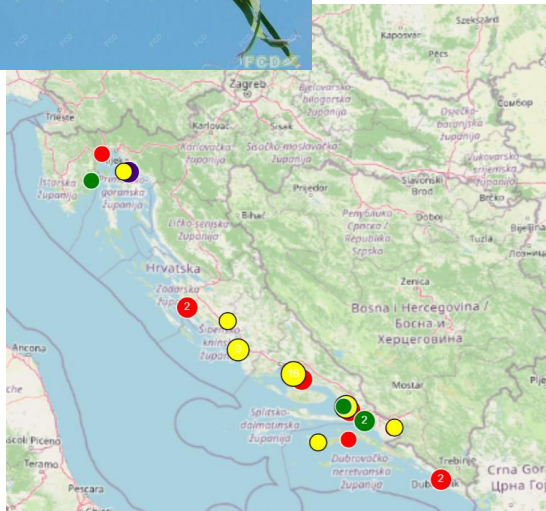
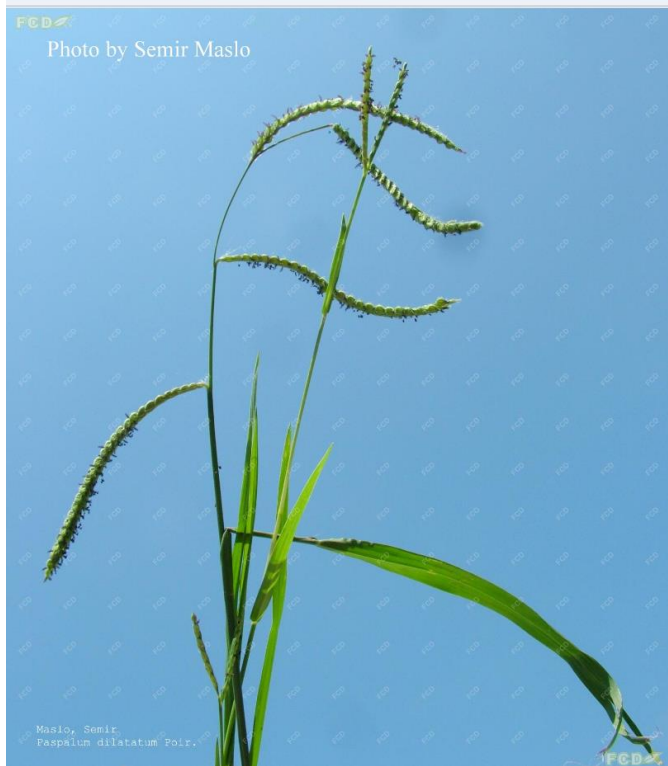
Cenchrus longispinus (Kneuck.) Fernald
Eleusine indica (L.) Gaertn.
Panicum capillare L.
Panicum dichotomiflorum Michx.
Paspalum dilatatum Poir.
Paspalum paspalodes (Michx.) Scribn.
Sorghum halepense (L.) Pers.

Cenchrus longispinus (Kneuck.) Fernald
dugotrni sitnoplodac



Šegota, Vedran
Cenchrus longispinus
(Kneuck.) Fernald

Paspalum dilatatum Poir.
prošireni paspalj



Paspalum paspalodes (Michx.) Scribn.
divlji paspalj



Sorghum halepense (L.) Pers.
piramidalni sirak



Panicum capillare L.
vlasasto proso



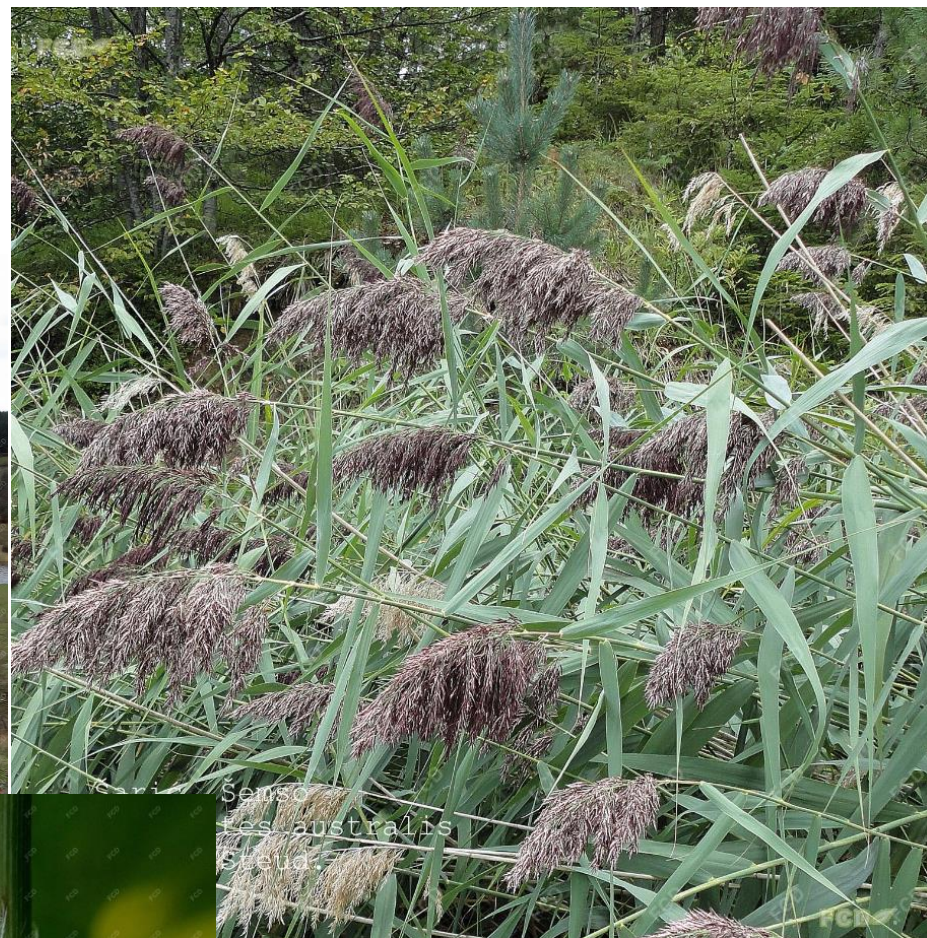
Eleusine indica (L.) Gaertn.
indijska proha



Šarić, Šemso
Eleusine indica (L.)
Gaertn.

Šarić, Šemso
Panicum capillare L.

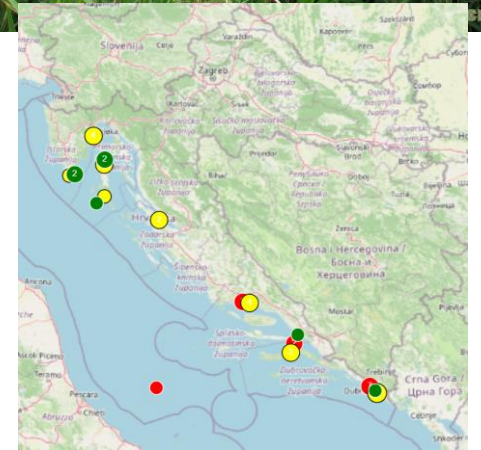
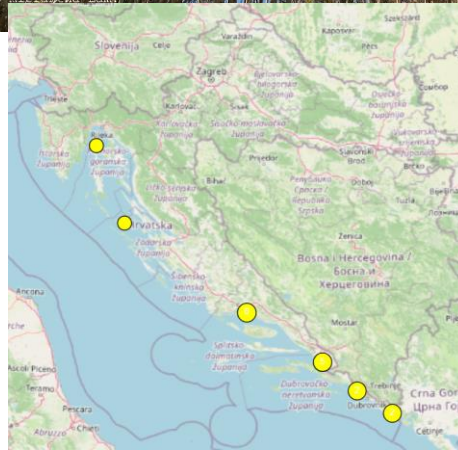
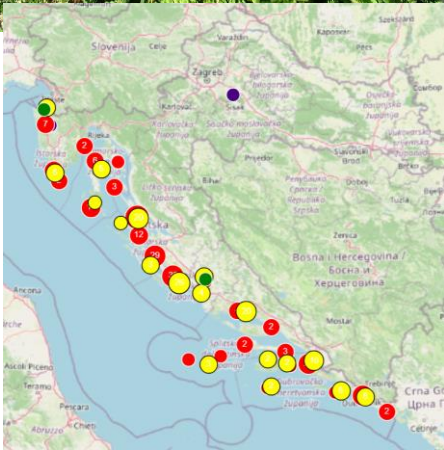
Phragmites australis (Cav.) Steud.
vodena trska



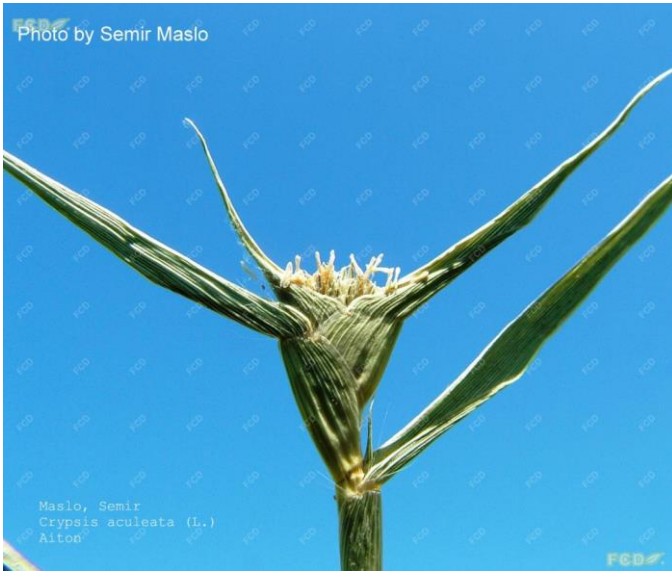
Arundo donax L.
obični trst

Arundo micrantha Lam.
sitnocvjetni trst

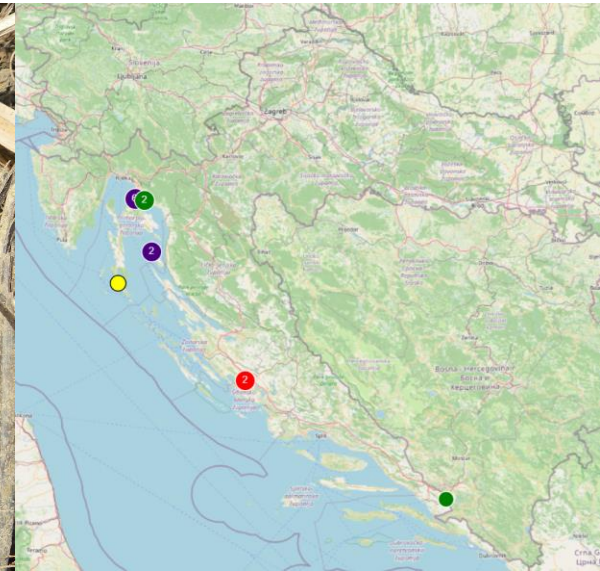
Arundo plinii Turra DD
Plinijev trst



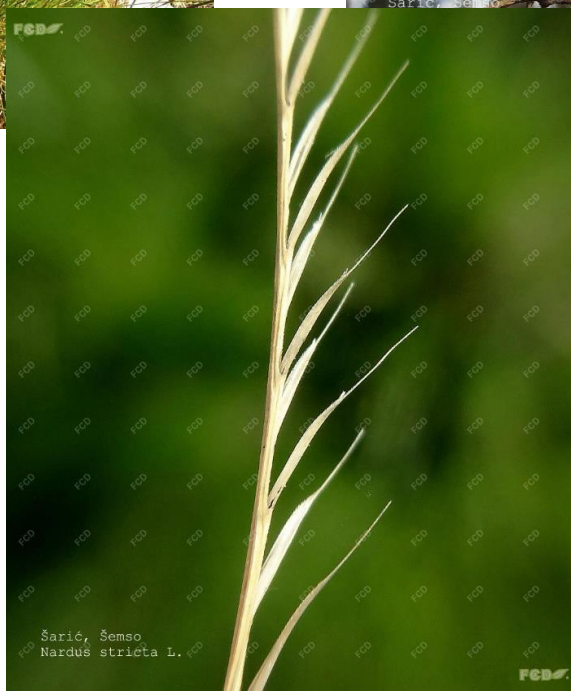
Sporobolus aculeatus (L.) P. M. Peterson - bodljasta trnica NT



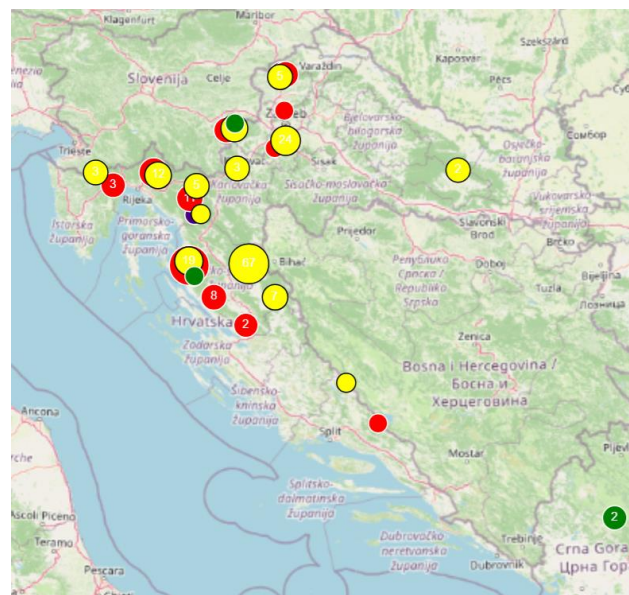
Sporobolus schoenoides (L.) P. M. Peterson - razgranjena trnica NT



Nardus stricta L.
stegnuta tvrdača



Šarić, Šemso
Nardus stricta L.



Oplismenus undulatifolius (Ard.) Roem. et Schult.
valoviti pravobradac

