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Broj: 2023/01-349
Datum: 23. 02. 2023

UNIVERZITET CRNE GORE

SENATU

CENTRU ZA DOKTORSKE STUDIJE

U prilogu akta dostavljamo Odluku sa XCV sjednice Vijeća Prirodno-matematičkog fakuteta održane 21.02.2023. godine.

v.f dekana,

Prof. dr Miljan Bigović

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Broj: 2023/02-224/2

Datum: 22.02.2023

Na osnovu člana 64 Statuta Univerziteta Crne Gore, a u vezi sa članom 34 stav 1 Pravila doktorskih studija, Vijeće Prirodno-matematičkog fakulteta je na XCV sjednici od 21.02.2023.godine uvrdilo

PREDLOG ODLUKE

o imenovanju komisije za ocjenu prijave doktorske disertacije

I

Imenuje se komisija za ocjenu prijave doktorske disertacije pod nazivom "Vegetacija suvih travnjaka u submediteranskom dijelu Crne Gore" kandidatkinje Milice Stanišić-Vujačić u sljedećem sastavu:

1. Prof. dr Svetlana Aćić, docent na Poljoprivrednom fakultetu Univerziteta u Beogradu (naučna oblast: Botanika),predsjednik;
2. Prof. dr Slađana Krivokapić, redovni profesor na Prirodno-matematičkom fakultetu Univerziteta Crne Gore (naučna oblast: Botanika), član;
3. Prof. dr Danka Caković, redovni profesor Prirodno-matematičkog fakulteta Univerziteta Crne Gore (naučna oblast: Botanika) član;
4. Dr Urban Šilc, naučni savjetnik na Biološkom Institutu "Jovan Hadži" ZRC SAZU, Ljubljana, Slovenija (komentor) (naučna oblast: Botanika) i
5. Prof. dr Danijela Stešević, redovni profesor Prirodno-matematičkog fakulteta Univerziteta Crne Gore (naučna oblast: Botanika), mentor.

II

Zadatak komisije je da podnese Izvještaj o ocjeni prijave doktorske disertacije Vijeću fakulteta u roku od 10 dana od dana javnog izlaganja studenta. Ukoliko komisija u navedenom roku ne podnese Izvještaj, imenovaće se nova komisija.

UNIVERZITET CRNE GORE Prirodno-matematički fakultet

v.f. D E K A N-a
Prof. dr Miljan Bigović

ISPUNJENOST USLOVA DOKTORANDA

OPŠTI PODACI O DOKTORANDU			
Titula, ime, ime roditelja, prezime	MSc Milica Zoran Stanišić-Vujačić		
Fakultet	Prirodno-matematički fakultet		
Studijski program	Biologija		
Broj indeksa	2/18		
NAZIV DOKTORSKE DISERTACIJE			
Na službenom jeziku	Vegetacija suvih travnjaka u submediteranskom dijelu Crne Gore		
Na engleskom jeziku	Vegetation of dry grasslands in Sub-Mediterranean part of Montenegro		
Naučna oblast	Fitocenologija		
MENTOR/MENTORI			
Prvi mentor	Prof. dr Danijela Stešević	Univerzitet Crne Gore, Crna Gora	Botanika
Drugi mentor	Prof. dr Urban Šilc	ZRC SAZU, Insitut za biologiju „Jovan Hadži", Slovenija	Botanika
KOMISIJA ZA PREGLED I OCJENU DOKTORSKE DISERTACIJE			
Doc. dr Svetlana Aćić, predsjednik komisije		Univerzitet u Beogradu, Poljoprivredni fakultet u Beogradu, Srbija	Botanika
Prof. dr Slađana Krivokapić, član komisije		Univerzitet Crne Gore, Crna Gora	Botanika
Prof. dr Danka Caković, član komisije		Univerzitet Crne Gore, Crna Gora	Botanika
Prof. dr Urban Šilc, naučni savjetnik, član komisije		ZRC SAZU, Insitut za biologiju „Jovan Hadži", Slovenija	Botanika
Prof. dr Danijela Stešević, član komisije		Univerzitet Crne Gore, Crna Gora	Botanika
Datum značajni za ocjenu doktorske disertacije			
Sjednica Senata na kojoj je data saglasnost na ocjenu teme i kandidata		21.01.2020. godine	
Dostavljanja doktorske disertacije organizacionoj jedinici i saglasanost mentora		14.02.2023.godine	
Sjednica Vijeća organizacione jedinice na kojoj je dat prijedlog za imenovanje komisija za pregled i ocjenu doktorske disertacije		21. 2. 2023. g.	

ISPUNJENOST USLOVA DOKTORANDA

U skladu sa članom 38 pravila doktorskih studija kandidat **je dio sopstvenih istraživanja vezanih za doktorsku disertaciju publikovao u časopisu sa (SCI/SCIE)/(SSCI/A&HCI) liste kao prvi autor.**

Spisak radova doktoranda iz oblasti doktorskih studija koje je publikovao u časopisima sa (upisati odgovarajuću listu)

(dati spisak radova koji sadrži: prezimena i imena autora, naziv naučnog rada, ime izdavača, mjesto i godinu izdavanja, DOI, link ka radu i dokaz za JRC)

Stanišić-Vujačić Milica, Stešević Danijela, Hadžiablahović Sead , Caković Danka & Šilc Urban **(2022).** An Asphodelus ramosus dominated plant community in Montenegro: fringe or grassland?. Acta Botanica Croatica 81 (1), 12–22. https://doi.org/10.37427/botcro-2022-027
Acta Botanica Crotica - JRC Impact factor (2021) = 1.02
(https://impactfactorforjournal.com/wp-content/uploads/2022/11/JCR-2021-Impact-Factor-PDF-list.pdf)

Stanišić-Vujačić Milica, Stešević Danijela, Hadžiablahović Sead & Šilc Urban **(2023).** Ecological and syntaxonomical characteristics of early spring therophytic ephemeral grasslands (alliance Romuleion) in the northeastern Mediterranean, Plant Biosystems 157, Published online: 23 Jan 2023, https://doi.org/10.1080/11263504.2023.2165570
Plant Biosystems - JRC Impact factor (2021) = 1.781
(https://impactfactorforjournal.com/wp-content/uploads/2022/11/JCR-2021-Impact-Factor-PDF-list.pdf)

Obrazloženje mentora o korišćenju doktorske disertacije u publikovanim radovima

Obe publikacije su iz kategorije originalnog istraživačkog rada i sadrže autorske podatke (fitocenološke snimke), koji su ciljano prikupljani tokom izrade ove doktorske teze.
U prvom radu, sa 17 originalnih fitocenoloških snimaka dokumentovana je asocijacija *Bromo erecti-Chrysopogonetum grylli*. U literaturi je navedena za područje Crne Gore, ali floristički sastav i struktura njenih sastojina nisu bili detaljno prikazani. Upravo u tome se ogleda naučni doprinos ovog rada. Jedan segment je posvećen i diskusiji o sintaksonomskoj klasifikaciji zajednica sa dominacijom vrste *Asphodelus ramosus* na Apeninskom i Balkanskom poluostrvu, koja je u načnoj javnosti izazvala mnogo debata.
U drugom radu su kao nove za nauku opisane dvije asocijacije: *Romuleo bulbocodii-Poetum bulbosae* Stanišić-Vujačić et al. 2023. i *Ornithogalo exscapii-Poetum bulbosae* Stanišić-Vujačić et al. 2023. U pitanju su zajednice suvih efemernih i terofitskih travnjaka sa dominacijom *Romulea bulbocodium* i *R. linaresii* subsp. *graeca*, koje se razvijaju u rano proljeće, na prostoru istočnog Mediterana. Obe asocijacije pripadaju svezi *Romuleion*, koja do sada nije bila uvrštena na listu sintaksona Crne Gore. S toga, sa ovim radom, postojeća verzija

„Prodromusa biljnih zajednica Crne Gore“, uvećana je za 3 sintaksona. U radu je napravljena i komparacija sa zajednicama iz istočnog Mediterana.
Datum i ovjera (pečat i potpis odgovorne osobe)
U Podgorici, 14. februar 2023. MP DEKAN

Prilog dokumenta sadrži:

1. Potvrdu o predaji doktorske disertacije organizacionoj jedinici
2. Odluku o imenovanju komisije za pregled i ocjenu doktorske disertacije
3. Kopiju rada publikovanog u časopisu sa odgovarajuće liste
4. Biografiju i bibliografiju kandidata
5. Biografiju i bibliografiju članova komisije za pregled i ocjenu doktorske disertacije sa potvrdom o izboru u odgovarajuće akademsko zvanje i potvrdom da barem jedan član komisije nije u radnom odnosu na Univerzitetu Crne Gore

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Broj: 1023/02-224/3
Datum: 15.02.2023.god

Na osnovu člana 33 Zakona o upravnom postupku, nakon uvida u službenu evidenciju, Prirodno-matematički fakultet izdaje

P O T V R D U

MSc Milica Stanišić-Vujačić student doktorskih studija na Prirodno-matematičkom fakultetu u Podgorici, dana 15.02.2023.godine dostavila je ovom fakultetu doktorsku disertaciju pod nazivom "Vegetacija suvih travnjaka u submediteranskom dijelu Crne Gore " na dalje postupanje.

V.f. D E K A N-a
Prof. dr Mirjan Bigović

Saglasnost

Nakon uvida u doktorsku disetraciju kandidata MSc Milice Stanišić, pod nazivom „Vegetacija suvih travnjaka u submediteranskom dijelu Crne Gore“ zaključujemo da rad zadovoljava sve predviđene kriterijume i dajemo saglasnost da se isti preda na ocjenu.

U Podgorici 14.02.2023.godine

Prof. dr Danijela Stešević, mentor

Prof. dr Urban Šilc, komentor

Curriculum Vitae

Lični podaci

Prezime/Ime	**Stanišić-Vujačić Milica**
Adresa	Ilije Milovića br. 1; Nikšić
Telefon	– Mobilni telefon(i) +382 68 853 612
E-mail	stanisic.milica90@gmail.com, milicas@ucg.ac.me
Nacionalnost	crnogorska
Datum rođenja	11.03.1990. god.
Pol	ženski
Trenutna pozicija/ zanimanje	Saradnik u nastavi na Prirodno-matematičkom fakultetu (Odsjek: Biologija)

Radno iskustvo

Period (od-do)	15.01.2013. – 01.10.2013.
Zanimanje ili pozicija	Savjetnik u Ministarstvu Poljoprivrede i ruralnog razvoja
Glavne aktivnosti i odgovornosti	Obavljanje poslova iz nadležnosti Sektora za vodoprivredu
Ime i adresa poslodavca	Ministarstvo poljoprivrede i ruralnog razvoja; Rimski trg 46, Podgorica
Period (od-do)	10.07.2014. – 20.07.2015.
Zanimanje ili pozicija	Savjetnik u Zavodu za statistiku Crne Gore
Glavne aktivnosti i odgovornosti	Obavljanje poslova iz nadležnosti Sektora životnu sredinu i šumarstvo
Ime i adresa poslodavca	Zavod za statistiku Crne Gore; IV Proleterske 2, Podgorica

Period (od-do)	01.10.2015. – 01.09.2016.
Zanimanje ili pozicija	Laborant u JP Vodovod i kanalizacija, Nikšić
Glavne aktivnosti i odgovornosti	Obavljanje poslova u okviru Tehničke službe
Ime i adresa poslodavca	JP Vodovod i kanalizacija, Hercegovački put 4, Nikšić
Period (od-do)	09.11.2016. –
Zanimanje ili pozicija	Saradnik u nastavi na Prirodno-matematičkom fakultetu (Odsjek: Biologija)
Glavne aktivnosti i odgovornosti	Izvođenje nastave na predmetima: Botanika, Sistematika viših biljaka II, Biogeografija, Biocenologija, Organska hemija i Ribarstvo
Ime i adresa poslodavca	Univerzitet Crne Gore, Prirodno-matematički fakultet; Džordža Vašingtona bb, Podgorica

Obrazovanje i obuka

Period (od-do)	07.09.2009. – 05.07.2012.
Naziv stečene kvalifikacije	Bachelor (BSc) – Biologija (sa prosječnom ocjenom 9,48)
Glavni predmeti/stečene vještine zanimanja	Anatomija i morfologija biljaka; Citologija i histoligija organa sa embriologijom; Alge, gljive i lišajevi; Invertebrata I i II; Više biljke I i II; Kičmnjaci I i II; Biohemija I i II; Hidrobiologija; Ekologija biljaka I i II; Zaštita životne sredine I i II; Moleklarna biologija I i II.
Ime i tip organizatora obrazovanja i obuke	Univerzitet Crne Gore, Prirodno - matematički fakultet, Podgorica
Period (od-do)	10.09.2012. – 11.07.2103.
Naziv stečene kvalifikacije	Spec. Sci Biologija – Ekologija (sa prosječnom ocjenom 9,90)
Glavni predmeti/stečene vještine zanimanja	Konzervaciona biologija; Bioindikatori i monitoring sistem; Principi održivog razvoja; Ekofiziologija; Biostatistika; Ekologija populacija; Biocenologija.
Ime i tip organizatora obrazovanja i obuke	Univerzitet Crne Gore, Prirodno - matematički fakultet, Podgorica
Period (od-do)	16.09.2013. – 14. 11. 2018.
Naziv stečene kvalifikacije	MSc Biologija – Ekologija (sa prosječnom ocjenom 10,00)
Glavni predmeti/stečene vještine zanimanja	Metodologija naučnog rada; Biljni svijet Balkanskog poluostrva.
Ime i tip organizatora obrazovanja i obuke	Univerzitet Crne Gore, Prirodno - matematički fakultet, Podgorica
Period (od-do)	22.10.2018. –
Naziv stečene kvalifikacije	Student doktorskih studija
Glavni predmeti/stečene vještine zanimanja	Flora i vegetacija Crne Gore i Balkanskog poluostrva Sinekologija zajednica travnatih ekosistema Biološki procesi u životnoj sredini Biodiverzitet i ekologija ekosistema
Ime i tip organizatora obrazovanja i obuke	Univerzitet Crne Gore, Prirodno - matematički fakultet, Podgorica

Lične vještine i kompetencije

Drugi jezik(ci)	engleski i ruski		
Diplome stranih jezika			
Samoprocjena	**Razumijevanje**	**Govor**	**Pisanje**
Engleski jezik	√	√	√
Ruski jezik	√	√	√
Kompjuterske vještine i kompetencije	Microsoft Office Word, Microsoft Office Excel, Microsoft Office PowerPoint, Internet, SPSS, Turboveg, Juice		
Druge vještine i kompetencije			
Vozačka dozvola	B kategorija		
Nagrade	Dobitnica sam nagrade Univerziteta Crne Gore za najbolju studentkinju Prirodno-matematičkog fakulteta u studijskoj 2010/2011 godini.		
Simpozijumi i konferencije	7th International Symposium of ecologist of Montenegro, Sutomore, 2017 7th Balkan Botanical Congress, Novi Sad, 2018 28th Workshop - Europaean Vegetation survey, Madrid (Spain), 2019		

Bibliografija

1. **Stanišić, M.**, Šilc, U., Küzmič, F., Caković. D., Stešević, D. (2017): Flora of Grahovo polje, October 2017, Conference: 7th International Symposium of ecologists - ISEM7.

2. Magnes, M., Kirschner, P., Janišová, M., Mayrhofer, H., Berg, C., Mora, A., Afif, E., Willner, W., Belonovskaya, E., Berastegi, A., Cancellieri, L., García-Mijangos, I., Guarino, R., Kuzemko, A., Mašić, E., Rötzer, H., **Stanišić, M.**, Vynokurov, D., Dembicz, I., Biurrun, I., Dengler, J. (2020): On the trails of Josias Braun-Blanquet - changes in the grasslands of the inneralpine dry valleys during the last 70 years. First results from the 11th EDGG Field Workshop in Austria. Palaearctic Grasslands, 45, 34-58.

3. Stešević, D., Küzmič, F., Milanović, Đ., **Stanišić-Vujačić, M.**, Šilc, U. (2020): Coastal sand dune vegetation of Velika plaža (Montenegro). Acta Botanica Croatica, 79(1).

4. Jasprica N., Škvorc Ž., Pandža, M., Milović, M., Purger, D., Krstonošić, D., Kovačić, S., Sandev, D., Lasić, A., Caković, D., Stešević, D., Anđić, B., **Stanišić-Vujačić, M.** (2020): Phytogeographic and syntaxonomic diversity of wall vegetation (Cymbalario-Parietarietea diffusae) in southeastern Europe. Plant Biosystems, 1-10.

5. Stešević, D., Anđić, B., **Stanišić-Vujačić, M.** (2020): Physcomitrium eurystomum Sendtn., a new moss species in the bryophyte flora of Montenegro. Acta Botanica Croatica, 79(1).

6. Stešević, D., Milanović, Đ., **Stanišić-Vujačić, M.**, Šilc, U., 2021. Aristida oligantha – a new alien species on the eastern Adriatic coast. Acta botanica Croatica 80, 217–220.. doi:10.37427/botcro-2021-019.

7. Milanović, Đ., Caković, D., Hadžiablahović, S., Vuksanović, S., Mačić, V., Stešević, D., **Stanišić-Vujačić, M.**, Biberdžić, V., Lakušić, D. (2021): Priručnik za identifikaciju tipova staništa Crne Gore od značaja za Evropsku uniju sa obrađenim glavnim indikatorskim vrstama. [Podgorica, Banja Luka: Agencija za zaštitu životne sredine Crne Gore, Univerzitet u Banjoj Luci - Šumarski fakultet.

8. **Stanišić-Vujačić, M.**, Stešević, D., Hadžiablahović, S., Caković, D., Šilc, U., 2022. An Asphodelus ramosus dominated plant community in Montenegro. Acta botanica Croatica 81.. doi:10.37427/botcro-2021-027.

9. Stešević, D., Milanović, Đ., **Stanišić-Vujačić, M.**, Šilc, U., 2022. New records of Salicornia s.l. in Montenegro and Bosnia and Herzegovina. Acta botanica Croatica 81.. doi:10.37427/botcro-2022-004

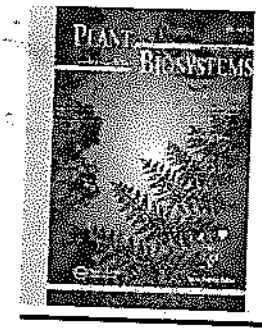
10. **Stanišić-Vujačić, M.**, Stešević, D., Hadžiablahović, S., Šilc, U. 2023: Ecological and syntaxonomical characteristics of early spring therophytic ephemeral grasslands (alliance Romuleion) in the northeastern Mediterranean, Plant Biosystems - An International Journal Dealing with all Aspects of Plant Biology, DOI: 10.1080/11263504.2023.2165570

Projekti

1. Rufford projekat (2018/2019): Seminatural Dry Grasslands in Montenegro as Potential NATURA 2000 Sites – Vegetation Diversity, Habitat Typology, Conservation

2. Projekat „Biljna raznolikost u močvarnim i vodenim staništima nikšićkog sliva (Budoška bara - akumulacija Vrtac, rijeka Zeta, rijeka Gračanica), Crna Gora. - ENDEMNIK" (NVO Župa u srcu).

3. Projekat rekonstrukcije magistralnih puteva i modernizacija dionice Danilovgrad-Podgorica – Izvještaj o istraživanju biodiverziteta (flora, vegetacija, staništa) u fazi pred-izgradnje Magistralnog puta M-18 Danilovgrad – Podgorica.



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Ecological and syntaxonomical characteristics of early spring therophytic ephemeral grasslands (alliance *Romuleion*) in the northeastern Mediterranean

Milica Stanišić-Vujačić, Danijela Stešević, Sead Hadžiablahović & Urban Šilc

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Ecological and syntaxonomical characteristics of early spring therophytic ephemeral grasslands (alliance *Romuleion*) in the northeastern Mediterranean

Milica Stanišić-Vujačić[a], Danijela Stešević[a], Sead Hadžiablahović[b] and Urban Šilc[c]

[a]Department for Biology, Faculty of Natural Sciences and Mathematics, University of Montenegro, Podgorica, Montenegro; [b]Department for Nature Protection, Environmental Protection Agency, Podgorica, Montenegro; [c]ZRC SAZU, Institute of Biology, Ljubljana, Slovenia

ABSTRACT

Our study deals with dry grasslands dominated by *Romulea bulbocodium*, *Romulea linaresii* subsp. *graeca* and *Romulea columnae* that develop in early spring in the eastern Mediterranean region. Based on numerical classification, we describe two new associations: *Romuleo bulbocodii-Poetum bulbosae* ass. nova and *Ornithogalo exscapii-Poetum bulbosae* ass. nova. The studied communities are classified within the *Romuleion* alliance, order *Poetalia bulbosae*, and class *Poetea bulbosae*. We analyzed all available relevés of *Romuleion* communities from the eastern Mediterranean and ordination analysis (NMDS) revealed that temperature and altitude are the most important ecological factors influencing the vegetation composition and distribution of dry grasslands of the *Romuleion* alliance. Newly described associations from Montenegro are floristically and ecologically similar to the *Alyssum alyssoides-Poa bulbosa* community from Epirus (Greece).

ARTICLE HISTORY
Received 3 July 2022
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KEYWORDS
Romulea bulbocodium; *Romulea linaresii* subsp. *graeca*; *Romuleion*; *Poetea bulbosae*; grasslands; Montenegro; vegetation

Introduction

The Mediterranean basin, characterized by a high degree of endemism, is one of 25 biodiversity hotspots identified worldwide (Myers et al. 2000; Sloan et al. 2014). For millennia it has been influenced by human activities and management, especially the grassland ecosystems (Apostolova et al. 2014). Mediterranean semi-natural dry grasslands are species-rich ecosystems composed predominantly of annual or perennial grasses adapted to the xerothermic climatic conditions, the poor soil conditions, and zoo-anthropogenic disturbances such as grazing, fertilizing, and trampling (San Miguel 2008; Janišová et al. 2011; Apostolova et al. 2014; Buisson et al. 2021). A combination of human management and the Mediterranean climate are considered the most important ecological and evolutionary drivers (Buisson et al. 2021). Because of habitat loss due to abandonment or change to arable lands and tree plantations, semi-natural dry grasslands have high conservation value (San Miguel 2008; Ribeiro et al. 2012; Buisson et al. 2021), and many of these habitats are protected under the European Union Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild flora and fauna 1992) and listed on the European Red List of Habitats (Janssen et al. 2016).

The territories of the Mediterranean region are biodiversity hotspots characterized by different grasslands types (Apostolova et al. 2014). One type of dry grasslands studied in the eastern Mediterranean, as part of the cultural landscapes, belongs, according to EU Habitat Directive *6220, to the priority habitat type pseudo-steppe with grasses and annuals of the *Thero-Brachypodietea* (San Miguel 2008; Ribeiro et al. 2012; Farris et al. 2013). This habitat is not homogeneous (San Miguel 2008); it includes plant communities from several vegetation classes: *Poetea bulbosae*, *Lygeo sparti-Stipetea tenacissimae*, *Helianthemetea guttati* and *Stipo-Trachynietea* (Farris et al. 2007; San Miguel 2008; Milanović et al. 2021). According to Mucina et al. (2016) the class *Thero-Brachypodietea*, order *Thero-Brachypodietalia* and alliance *Thero-Brachypodion*, are considered as *nomina ambigua*. Since they are often subject to different nomenclatural interpretations, these syntaxa are referred to as perennial Mediterranean grasslands (pseudo-steppes) rich in therophytes, but are also used for annual plant communities (Mucina et al. 2016).

The class *Poetea bulbosae* includes xeric, thermophilous, and mostly open Mediterranean seasonal perennial and ephemeral pastures growing on eutrophic or oligotrophic soils. They were created by intensive and continuous livestock activity (Farris et al. 2007; San Miguel 2008; Ribeiro et al. 2012; Farris et al. 2013; Sciandrello et al. 2013). They are widely distributed in the thermo- to oromediterranean belt (Biondi et al. 2014; Mucina et al. 2016) and characterized by very dense and short, low perennial herbs, therophytes and various geophytes (Galán de Mera et al. 2000; Cano et al. 2007; San Miguel 2008; Ribeiro et al. 2012; Sciandrello et al. 2013; Ribeiro and Espírito-Santo 2015).

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Grasslands of *Poetea bulbosae* have been well studied in the western and central Mediterranean, where they represent a very diverse vegetation type classified into six alliances (Galán de Mera et al. 2000; Cano et al. 2007; Ribeiro et al. 2012; Farris et al. 2013; Sciandrello et al. 2013). Similar vegetation types have also been studied in the eastern Mediterranean, particularly in Greece and Northern Macedonia (Oberdorfer 1954; Bolòs et al. 1996; Amanatidou 2005; Čarni et al. 2014). The studied dry grasslands are classified in the single alliance *Romuleion*, which encompasses early spring ephemeral therophytic grasslands on deeper soils dominated by *Romulea* sp. pl. communities from the Eastern Mediterranean (Čarni et al. 2014). In the Adriatic region, the *Romuleion* alliance is mentioned as present only for Croatia (Škvorc et al. 2017) and these communities are probably different from those described for the eastern Mediterranean. Studies on the *Romuleion* alliance are rare also because these grassland communities develop in two clear phenological optima (one in late winter and one in spring).

So far, the syntaxonomical classification of early spring ephemeral therophytic non-nitrophilous grasslands is sometimes doubtful due to their intermediate position between the classes *Helianthemetea* and *Poetea bulbosae*, which may be caused by intensive grazing (Galán de Mera et al. 2000; Cano et al. 2007; Farris et al. 2013; Biondi et al. 2014; Čarni et al. 2014). According to the most recent survey by Mucina et al. (2016), the early spring ephemeral therophytic grasslands of the Eastern Mediterranean (*Romuleion*) are classified in the class *Poetea bulbosae*.

Mediterranean seasonal perennial grasslands of the *Romuleion* alliance occur in areas under the influence of the Mediterranean climate and represent a typical element of Mediterranean landscapes maintained by traditional land use. They are mainly found in areas that are permanently and intensively grazed and trampled by livestock. Consequently, they are dominated by rosette plants and small grasses tolerant to intensive herbivory and trampling. *Romuleion* dry grasslands are characterized by high floristic and phenological diversity (Čarni et al. 2014).

In the early spring aspect, the grasslands of the *Romuleion* alliance are dominated by *Romulea bulbocodium* (L.) Sebast. & Mauri, *Romulea linaresii* subsp. *graeca* Bég. and *Romulea columnae* Sebast. & Mauri. The genus *Romulea* Maratti (family *Iridaceae* Juss.) includes about 95 species, distributed mainly in the Sub-Saharian Africa, Socotra, and the Arabian Peninsula (Frignani and Iriti 2011), while about 15 species occur in the Mediterranean basin (Manning and Goldblatt 2001). *Romulea linaresii* subsp. *graeca* is endemic to the Balkan peninsula (Frignani and Iriti 2011), *Romulea bulbocodium* is steno-Mediterranean species (Angiolini et al. 2015), while native range of species *Romulea columnae* is Macaronesia, Western Europe and Mediterranean (Euro+Med 2006).

The aim of this study was to (i) contribute to the knowledge of the composition and ecological characteristics of early spring ephemeral therophytic grasslands in Montenegro, (ii) compare all known early spring ephemeral therophytic non-nitrophilous grasslands in the Eastern Mediterranean and (iii) discuss their syntaxonomic classification.

Material and methods

Study area

A phytosociological survey of dry grasslands dominated by *Romulea* sp. pl. was made on several localities in the wider surroundings of Podgorica (Čemovsko polje, Malo Brdo, Dajbabska gora, Omerbožovići, Ljubović, and Vrela Ribnička), the capital of Montenegro. The study area geographically belongs to the north-eastern Mediterranean and it is influenced by Mediterranean climate with hot summers – Csa (Burić and Micev 2008). The predominant soils types are eutric cambisol, developed on fluvio-glacial deposits, and red soil "terra rossa" developed on limestone bedrock (Burić et al. 2017). The potential natural vegetation of the wider area of Podgorica are Apulian-southeast Adriatic meso-supra-Mediterranean *Quercus trojana* forests with *Pistacia* species (Bohn et al. 2000-2003) or precisely Macedonian oak forest '*Quercetum trojanae montenegrinum* Blečić et Lakušić 1975' (recte: *Quercetum trojanae* Em 1958). Recent studies indicate that Illyrian sub-Mediterranean rocky grasslands on shallow calcareous soils of the *Chrysopogono gryllí-Koelerion splendentis* Horvatić 1973 alliance predominate in the study area (Hadžiablahović 2018; Stanišić-Vujačić et al. 2022).

Sampling and data analysis

In late winter and early spring 2020, we sampled early spring ephemeral therophytic grassland communities dominated by *Romulea* sp. pl. using the Braun-Blanquet method (Braun-Blanquet 1964). We made 34 relevés with different plot sizes (from 1 to 25 m^2). The plot size is related to the ecological conditions and management in the study area. Plots from 18 to 25 m^2 were sampled on rocky, open sites, usually as gaps within shrub vegetation and planted *Pinus halepensis* forests or in the plain of Čemovsko polje in areas with intensive livestock grazing. Eleven smaller plots (1–3 m^2) were sampled in the plain of Čemovsko polje, where grasslands are overgrazed, intensively trampled and fertilized, and the vegetation is degraded and we were not able to sample larger plots.

Due to the phenological diversity of the sampled communities, each plot was visited at least twice. In late winter (early March), we identified plots with a dominance of *Romulea* sp. pl. and noted early spring species, mainly geophytes and estimated their cover. We repeated vegetation sampling in late April and early May, when grassland communities were optimally developed. Except geophytes, species cover values and total vegetation cover were based on the second aspect.

The vegetation dataset used for numerical and ordination analysis contains original relevés and relevés of the *Romuleion* alliance from the literature (Oberdorfer 1954; Bolòs et al. 1996; Amanatidou 2005; Čarni et al. 2014). All relevés were entered into the Turboveg database (Hennekens and Schaminée 2001). The original relevés are stored in the Vegetation database of Montenegro (GIVD EU-ME-001).

A numerical classification (flexible beta ($\beta = -0.25$) and Relative Sørensen index) was performed on the 34 relevés from our fieldwork. Diagnostic species for plant communities were

determined in the JUICE program (Tichý 2002) based on their fidelity values (Chytrý et al. 2002). The *phi* coefficient was used as a fidelity measure and calculated in the JUICE program. The phi threshold (multiplied by 100 in the JUICE program) for species considered diagnostic was set at 20. Threshold values for constant and dominant species are set to 25.

Non-metric multidimensional scaling (NMDS) was used to examine overall variation in species composition across the relevé dataset. Both classification and NMDS were performed using the R package 'vegan' (Oksanen et al. 2017).

Ecological indicator values (EIV) according to Pignatti (2005) and few missing values from Böhling et al. (2002) were used for ecological interpretation of vegetation patterns. Mean indicator values, weighted by species cover transformed from Br.-Bl. scale, were calculated for each relevé using the JUICE software (Tichý 2002). Climatic data available in the CHELSA database (Karger et al. 2017) were extracted for each relevé. Mean indicator values and climatic data were passively projected onto the NMDS graph.

Climatic data for the studied area are available in the CHELSA database (Karger et al. 2017). We selected all available bioclimatic variables (BIO1-19), but to avoid multicollinearity we calculated the VIF (variation inflation factor) and excluded all variables with a VIF greater than 20. In the ordination analysis, we then used the following variables: BIO 3 (isothermality), BIO 4 (temperature seasonality), BIO 8 (daily mean air temperatures of the wettest quarter), BIO 14 (precipitation amount of the driest month) and BIO 15 (precipitation seasonality). The VIF was calculated in CANOCO 5 (Ter Braak and Šmilauer 2012).

The synoptic table was created by compiling Oberdorfer (1954) synoptic table and available relevés. Species fidelity was calculated only for the original relevés (excluding frequency table of Oberdorfer (1954), the size of all groups was standardized to equal size, and Fisher's exact test was used with $p > 0.05$.

Nomenclature of taxa is in accordance with Euro+Med (2006) and nomenclature of higher syntaxa is according to Mucina et al. (2016). The character species for the classes are in accordance with EuroVegList (Mucina et al. 2016).

Results

The early spring ephemeral therophytic grasslands with *Romulea* species from the wider surroundings of Podgorica (Montenegro) are represented by 34 relevés in the phytosociological table (Table 1).

The dendrogram of cluster analysis of relevés of early spring ephemeral therophytic grasslands shows two well-defined groups (Figure 1). Both communities are developed in two clear phenological aspects. The late winter aspect is dominated by geophytes (*Romulea bulbocodium, Romulea linaresii* subsp. *graeca, Ornithogalum exscapum* Ten. and *Anemone hortensis* L.), while the spring aspect is dominated by grasses (*Poa bulbosa* L., *Bothriochloa ischaemum* (L.) Keng, *Vulpia ligustica* Link, *Stipa eriocaulis* Borbás and *Festuca stricta* subsp. *sulcata* (Hack.) Pils) and therophytes (*Bupleurum veronense* Turra, *Arenaria leptoclados* (Rchb.) Guss., *Daucus guttatus* L. and *Plantago bellardi* All.) are most common (Table 1). Due to distinct ecological and floristic differences, we have described two associations belonging to the *Romuleion* alliance: *Romuleo bulbocodii-Poetum bulbosae* and *Ornithogalo exscapii-Poetum bulbosae*. The first group comprises stands on rocky, open sites within shrubs on slopes. The second group includes grasslands in the plain of Ćemovsko polje with fine eutric cambisol with some stones. The first group is characterized by a group of species from the class *Festuco-Brometea*, indicating stony and dry sites (Table 1). The other group is found in the lowlands of Ćemovsko polje and is characterized by the presence of species from the classes *Helianthemetea guttati* and *Stipo-Trachynietea distachyae* indicating the influence of the Mediterranean climate with its pronounced summer droughts and human activities in the studied area (Table 1).

Cluster 1: *Romuleo bulbocodii-Poetum bulbosae* ass. nova (Table 1, rel. 1–13), Holotypus: Rel. 3, Table 1.

Diagnostic species: *Romulea bulbocodium, Festuca stricta* subsp. *sulcata, Salvia officinalis* L., *Ficaria verna* Huds.

Constant species: *Bothriochloa ischaemum, Romulea bulbocodium*

Dominant species: *Bothriochloa ischaemum, Vulpia ligustica, Stipa eriocaulis, Salvia officinalis, Romulea bulbocodium, Plantago lanceolata* L., *Bromopsis pannonica* (Kumm. & Sendtn.) Holub

Romuleo bulbocodii-Poetum bulbosae is developed at several localities in the surroundings of Podgorica (Malo Brdo, Dajbabska gora, Omerbožovići and Ljubović). It includes stands on predominantly rocky and stony soils between shrubs on slopes with predominantly south and west exposition. The total vegetation cover of the studied community is 65–100% in the spring aspect, while cover of rocks is up to 50%. This community thrives on shallow, skeletal red soil 'terra rossa', developed on limestone bedrock. Due to the ecological conditions at the sites (stoniness and dryness), *Romuleo bulbocodii-Poetum bulbosae* is characterized by the presence of numerous *Festuco-Brometea* species (*Festuca stricta* subsp. *sulcata, Salvia officinalis, Stipa eriocaulis, Bromopsis pannonica, Ranunculus millefoliatus* Vahl., and *Bothriochloa ischaemum*) (Table 1).

Cluster 2: *Ornithogalo exscapii-Poetum bulbosae* ass. nova (Table 1, rel. 14–34), Holotypus: Rel. 27, Table 1.

Diagnostic species: *Plantago bellardii* All., *Aira elegantissima* Schur, *Psilurus incurvus* (Gouan) Schinz & Thell. and *Anthoxanthum odoratum* L.

Constant species: *Poa bulbosa, Bothriochloa ischaemum, Romulea linaresii* subsp. *graeca* and *Plantago bellardii*

Dominant species: *Poa bulbosa, Bothriochloa ischaemum* and *Plantago bellardii*

The *Ornithogalo exscapii-Poetum bulbosae* is reported for the area of Ćemovsko polje. This plant community is exposed to intensive livestock activity: grazing, trampling, and fertilization. In the studied area, this association comprises stands on areas of different sizes and floristic composition depending on livestock activity. Larger stands are heavily grazed; in late spring they are dominated by the grass *Bothriochloa ischaemum*. Smaller stands are evenly distributed and restricted to the areas of intensive livestock trampling and fertilization. Stands are characterized by higher cover of perennial grass *Poa bulbosa*, while the cover of *Bothriochloa*

Table 1. Phytosociological table of early spring ephemeral therophytic grasslands with *Romulea* species from Montenegro.

Relevé number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
Relevé area (m2)	25	20	25	18	25	25	25	25	25	25	25	25	25	25	3	1,5	2.3	1.5	1	1.5	1	1,5	1	1.5	25	16	25	3	25	25	25	25	12	25
Altitude (m)	42	75	155	158	57	55	83	62	101	51	147	133	88	56	64	61	61	60	79	79	78	79	73	74	66	73	75	74	56	62	58	59	46	50
Aspect (°)		90	270	180	270	270	180	225	180	315	180	135	270																					
Slope (°)		19	4	10	5	4	2	20	7	2	8	7	21																					
Cover herb layer (%)	95	65	65	75	85	100	100	85	80	95	70	75	70	85	100	97	95	95	95	60	98	95	85	90	80	90	85	80	75	60	98	95	96	90
Character and differential species of the association *Romuleo bulbocodii-Poetum bulbosae* (rel. 1–13)																																		
Romulea bulbocodium (L.) Sebast. & Mauri	3	1	2	2	.	.	2	.	2	1	2	2	2	.	1	.	+	.	.	.	.	.	.	.	+	.	.	.	2	+	2	2	.	+
Ranunculus millefoliatus Vahl	2	2	.	.	+	2	+	+	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+	.
Ficaria verna Huds.	2	.	.	.	1	1	1	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Festuca stricta subsp. *sulcata* (Hack.) Pils	.	2	1	.	.	.	.	.	.	.	2	2	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Salvia officinalis L.	.	+	1	.	.	.	.	.	2	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Stipa eriocaulis Borbás	.	.	.	.	.	.	.	.	.	.	+	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Character and differential species of the association *Ornithogalo excapii-Poetum bulbosae* (rels 14–24)																																		
Anthoxanthum odoratum L.	.	.	.	.	+	.	1	.	.	.	.	.	.	+	1	+	.	+	1	1	+	+	1	+	+	1	2	+	1	1	1	1	+	1
Daucus guttatus Sm.	.	2	.	.	.	.	.	.	.	+	.	.	.	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Eryngium amethystinum L.	.	+	+	+	.	.	.	.	.	+	+	1	.	+	+	+	+	+	+	.	+	.	.	+	+	1	1	1	+	+	+	1	+	+
Ornithogalum exscapum Ten.	.	.	.	.	.	.	.	+	.	.	.	+	+	+	1	1	1	.	.	1	1	1	1	+	1	1	1	1	1	1	.	.	1	
Plantago bellardii All.	.	.	+	.	.	.	+	+	+	+	.	+	.	1	1	1	1	2	2	2	1	1	1	2	4	3	3	2	1	3	1	1	1	1
Psilurus incurvus (Gouan) Schinz & Thell.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	+	+	1	+	+	.	+	+	.	+	+	+	.	+	+	+	+	+	1
Romuleion																																		
Romulea linaresii ssp. *graeca* Bég.	.	.	.	1	2	1	2	2	2	1	.	.	.	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	.	2	1	1	2	2
Hedypnois rhagadioloides subsp. *rhagadioloides* (L.) F.W.Schmidt	.	.	.	.	.	.	.	.	+	.	.	+	.	+	+	.	.	.	.	.	.	.	.	+	+	1	+	.	.	.	.	.	.	.
Hypochaeris cretensis (L.) Bory & Chaub.	1	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Poetea bulbosae																																		
Poa bulbosa L.	1	1	2	2	2	1	1	1	1	2	+	1	.	3	3	3	3	3	3	2	3	3	3	3	.	1	2	1	2	2	2	2	1	2
Erodium cicutarium (L.) L'Hér.	.	.	+	+	.	.	+	2	1	1	.	+	.	1	+	+	1	2	+	+	1	1	+	1	1	1	+	+	1	+	+	+	+	1
Trifolium subterraneum L.	2	+	+	1	+	2	1	.	.	1	.	.	.	1	1	1	+	+	.	1	+	1	1	1	.	.	.	+	+	1	1	+	+	1	
Plantago lanceolata L.	3	.	.	1	1	2	+	1	2	2	.	.	.	1	1	1	+	+	.	1	+	1	1	1	.	.	.	+	+	1	1	+	+	1	
Trifolium scabrum L.	.	.	.	.	.	.	.	.	+	1	.	.	.	+	1	+	+	.	.	1	.	.	1	1	+	+	1	.	.	1	+	1	.	.	
Prospero autumnale (L.) Speta	+	.	.	.	.	.	+	1	.	.	.	+	1	.	.	.	.	.	+	+	1	+	+	1	+	+	.	+	.	+	.	.	+	+	
Trifolium nigrescens Viv.	.	.	.	.	.	.	+	+	+	+	.	.	.	.	.	.	.	.	+	+	+	.	.	+	+	.	.	+	.	+	.	.	+	+	
Bellis perennis L.	+	.	+	1	1	1	1	.	.	.	.	.	.	1	+	.	.	.	+	.	.	.	+	.	.	.	+	.	.	.	+	+	.	+	
Leontodon tuberosus L.	+	.	.	.	+	+	+	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
Herniaria glabra L.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	
Prunella laciniata L.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	.	.	+	.	.	+	.	.	1	.	.	.	.	
Medicago lupulina L.	.	.	.	.	+	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	1	.	.	.	.	.	.	
Lolium perenne L.	+	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
Helianthemetea guttati																																		
Crepis neglecta L.	.	+	.	.	+	1	.	.	1	2	.	+	.	1	+	+	.	+	+	1	1	1	+	1	+	.	.	.	+	+	+	+	.	1

(Continued)

Table 1. Continued.

Relevé number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
Galium divaricatum Pourr. ex Lam.	.	.	.	.	.	.	.	+	.	.	+	+	.	1	+	+	.	.	+	+	+	+	1	.	1	1	1	1	1	+	1	1	+	1
Filago gallica L.	.	.	+	.	.	.	.	.	.	.	.	+	.	1	+	+	+	+	+	.	+	+	+	.	+	1	.	1	.	+	.	.	1	+
Linaria pelisseriana (L.) Mill.	.	.	.	.	.	.	+	1	.	.	.	+	.	.	.	+	+	.	+	+	.	.	+	.	.	1	+	.	+	+	+	+	+	1
Helianthemum salicifolium (L.) Mill.	.	.	.	.	.	.	.	.	+	+	+	.	.	.	.	+	+	+	.	+	.	1	.	+	+	1	1	+	.	.	.	.	.	.
Lysimachia linum-stellatum L.	.	.	.	.	.	.	.	.	+	.	+	+	.	.	.	+	.	+	+	+	+	+	+	.	.	.	+	+	.	1	1	.	1	.
Tuberaria guttata (L.) Fourr.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	+	+	.	.	+	.	+	+	.	.	.	.	1	1	.	1	.	.	.	.
Cynosurus echinatus L.	.	.	.	+	.	3	.	+	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.
Vulpia ligustica Link	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Minuartia mediterranea Vierh.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	+	.
Stipo-Trachynietea distachyae																																		
Polygala monspeliaca L.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	+	+	.	+	+	.	+	.	+	.	.	+	+	+	+	1	+	+	.
Hippocrepis ciliata Willd.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	+	+	+	+	+	+	+	.	.	+	.	.	+	.	.	.	.	.	.
Neatostema apulum (L.) I.M.Johnst.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	+	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.
Ononis reclinata L.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.	.	.	+	.	.	.	.	.	.	+	.	+	.	+	.	.
Sedo-Scleranthetea																																		
Aira elegantissima Schur	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	+	.	+	+	.	+	.	.	.	.	.	.	+	.	.	.	.	.	.
Clinopodium acinos Kuntze	.	+	+	.	.	.	.	+	+	.	+	1	.	+	+	.	.	+	+	+	+	+	+	+	1	1	1	+	+	1	2	+	2	1
Trifolium campestre Schreb.	+	.	.	.	+	+	.	1	+	1	+	+	.	.	.	+	+	.	1	.	+	+	+	1	.	.	+	+	1	+	+	.	1	1
Viola kitaibeliana Schult.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	+	.	.	2	+	.	.	1	1	.	.	2	.	+	.	+	+	+	1
Cerastium pumilum subsp. *glutinosum* (Fr.) Jalas	.	.	.	.	+	.	+	.	.	+	.	.	.	+	1	+	1	.	+	.	+	+	+	1	.	+	+	+	1	+	+	+	+	1
Medicago minima (L.) L.	.	.	.	+	.	+	.	+	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	+	.	.	.	.
Bromus hordeaceus L.	.	.	.	+	+	+	1	.	+	.	.	.	.	.	+	.	.	.	.	+	.	+	.	1	+	1	.	+	+	.	.	.	+	+
Trifolium dalmaticum Vis.	.	.	.	.	.	.	.	2	+	+	.	.	.	+	+	+	.	.	.	.	.	.	.	.	+	+	.	.	1	.	.	.	.	.
Hypochaeris glabra L.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.	1	+	1	.	.	.	.	+	+
Petrorhagia saxifraga Link	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	+	+	+	.	.	.	+	+	+	.	.	+	+	.	.	.	.
Aethionema saxatile (L.) W.T.Aiton	.	+	+	.	.	.	.	.	.	+	.	.	.	.	+	+	+	.	.	.	.	.	.	+	.	.	+	.	.	.	.	.	+	.
Papaveretea rhoeadis																																		
Sherardia arvensis L.	+	.	.	+	+	1	+	.	+	1	+	.	.	+	+	+	.	.	+	.	+	+	+	.	.	+	.	+	+	+	.	.	.	+
Euphorbia falcata L.	.	+	+	.	.	+	.	.	+	+	+	.	.	+	.	+	+	+	+	.	+	+	.	.	+	.	+	.	+	.	.	1	1	.
Lysimachia arvensis (L.) U.Manns & Anderb.	.	+	.	.	.	+	.	1	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	+	1	1	.
Veronica arvensis L.	1	.	.	.	.	.	.	.	+	1	.	.	.	.	.	+	+	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.
Ajuga chamaepitys (L.) Schreb.	.	.	.	.	.	.	+	+	.	.	.	.	+	.	+	1	+	+	+	+	.	.	.	.	.	.	.	1	.	.	+	.	+	.
Euphorbia helioscopia L.	.	.	.	1	+	+	+	+	+	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	+	+	.	+	.	.	.	.
Sonchus oleraceus L.	.	.	.	+	+	.	+	+	.	.	+	+	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	+	.	+	.	.	.	.
Anthemis arvensis L.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sonchus asper (L.) Hill	.	.	.	+	1	.	.	.	.	.	.	+	+	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	+	.	1	1	.
Euphorbia exigua L.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Stellaria media (L.) Vill.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+

(Continued)

Table 1. Continued.

Relevé number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
Scleranthus annuus L.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	1	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.
Molinio-Arrhenatheretea																																		
Linum bienne Mill.	.	.	.	.	.	.	+	.	+	+	.	+	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	+	+	.	.	+	.
Trifolium resupinatum L.	+	.	.	+	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Dactylis glomerata L.	.	.	.	.	+	1	1	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	.
Lotus corniculatus L.	.	.	.	.	.	.	+	.	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Festuco-Brometea																																		
Convolvulus cantabrica L.	.	1	1	.	.	.	.	2	+	+	+	1	.	+	1	1	1	1	+	1	+	+	.	1	1	1	1	1	+	1	1	.	.	.	.
Arenaria leptoclados (Rchb.) Guss.	.	+	+	+	.	+	.	+	+	1	.	+	.	+	+	+	+	1	.	.	1	+	.	.	+	1	+	+	1	.	.	.	+	+	.
Hypericum perforatum L.	.	+	.	.	.	.	+	+	+	.	+	+	.	+	+	+	.	+	.	.	.	.	.	.	.	+	1	+	+	+	+	+	.	.	.
*Bupleurum veronense*Turra	.	1	.	.	.	.	.	+	+	.	+	+	.	+	+	+	.	+	.	.	.	.	.	.	.	+	+	+	+	+	+	+	.	.	.
Muscari comosum(L.) Mill.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	1	+	+	+	+	.	+	+	+	.	.	.	.	+	+	.
Sanguisorba minor Scop.	.	.	.	.	.	1	.	+	.	.	.	.	+	.	.	+	+	+	+	.	.	.	.	.	.	.	.	.	1	.	+	+	+	1	+
*Thymus longicaulis*C. Presl	1	.	.	.	.	.	1	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	1	+	.	.	+	1	+	.
Linum tenuifolium L.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	1	+	.
Thymus striatus Vahl	.	.	.	.	.	.	.	.	.	+	.	.	.	+	.	.	+	.	.	+	.	.	.	.	.	.	.	+	.	.	.	+	.	.
*Koeleria splendens*C. Presl	.	.	+	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.
Melica ciliata L.	.	.	.	.	.	.	.	+	.	1	+	.	.	.	.	.	.	.	.	.	.	.	.	.	1	+	+	.	.	.	.	.	.	.
Orchis coriophora (L.) R. M. Bateman	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.
Orchis morio (L.) R. M. Bateman	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	.	.
Carex caryophyllea Latourr.	1	.	.	.	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+	.	.	.	.
Chrysopogon gryllus(L.) Trin.	.	.	1	.	.	.	.	.	.	1	+	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Centaurium erythraea Rafn	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Other species																										+					+			
Bothriochloa ischaemum(L.) Keng	.	3	2	2	3	2	2	2	1	3	1	.	2	1	2	+	+	+	.	1	+	1	1	+	1	2	2	1	3	3	3	4	3	3
Crepis sancta (L.) Bornm.	+	1	1	1	2	1	+	1	2	2	+	.	.	1	+	+	.	.	+	+	2	1	1	1	+	1	1	+	+	.	1	.	1	1
Teucrium capitatum L.	.	+	1	.	.	.	.	1	.	1	1	+	+	1	1	.	.	+	1	.	1	+	+	+	1	1	2	2	1	1	1	1	2	2
Avena barbata Link	.	.	.	.	2	2	+	2	+	+	.	1	+	.	+	+	+	.	.	+	+	.	+	1	1	1	1	1	1	1	1	2	2	.
Sideritis romana subsp. *purpurea* (Talbot ex Benth.) Heywood	.	1	1	.	.	.	.	1	+	.	+	1	.	+	.	+	+	+	.	.	+	+	.	+	1	1	1	+	1	+	+	1	+	+	+
Vulpia ciliata Dumort.	+	.	.	.	.	.	1	+	+	+	.	+	.	+	1	.	.	+	1	1	1	+	+	+	+	1	+	+	1	.	.	.	1	1	.
Parentucellia latifolia (L.) Caruel	.	.	+	.	.	.	.	+	+	.	.	.	.	+	+	+	+	+	+	.	.	+	+	+	+	+	+	+	+	+	+	+	+	.
Aegilops geniculata Roth	.	.	.	.	.	.	+	1	+	+	.	.	.	.	.	+	1	.	+	+	.	+	1	+	+	2	+	+	1	+	+	.	1	.	.
Crepis foetida L.	.	.	.	.	.	.	.	+	.	+	+	.	.	+	+	.	1	+	+	.	+	1	+	+	.	1	1	+	+	+	.	.	+	.	.
Carthamus lanatus L.	.	+	.	.	.	.	.	+	.	+	.	.	.	+	.	+	.	+	.	+	1	+	+	+	.	+	+	.	.	.	.	.	.	.	.
Tordylium apulum L.	+	+	.	+	2	2	+	1	1	+	.	.	.	+	.	+	+	+	.	+	1	+	+	.	.	+	.	.	.	.	.	.	.	.	.
Centaurea deusta Ten	.	.	.	.	.	.	.	.	+	+	.	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Petrorhagia dubia (Raf.) G. López & Romo	.	.	.	.	.	.	.	.	+	+	.	+	.	+	+	+	1	.	+	+	.	.	.	+	.	+	+	+	.	.	1	1	+	+	.
Filago germanica (L.) Huds.	.	+	+	+	.	.	.	+	.	.	+	+	.	2	.	.	.	.	.	.	+	.	.	+	+	+	+	.	.	+	+	+	+	.	.

(Continued)

Table 1. Continued.

Relevé number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
Petrorhagia saxifraga(L.) Link	.	1	.	+	.	.	+	.	+	+	+	+	.	.	.	.	.	.	1	+	+	1	+	+	.	1	+	.	.	.	.	.	+	.
Draba verna L.	.	.	.	+	.	.	+	.	+	.	.	+	.	+	+	+	+	+	+	.	+	+	.	.	+	1	.	.	.	.	1	+	+	.
Potentilla recta L.	.	.	.	+	.	.	.	.	.	+	+	+	+	.	.	.	.	+	.	.	.	+	.	+	.	.	+	.	.	1	+	+	.	.
Orchis papilionacea L.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	+	.	+	.	.	+	.	1	+	.	1	+	+	.
Trifolium arvense L.	.	.	1	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	+	+	+	+	+	+	.	.	1	+	.	1	+	+	.	.
Carlina corymbosa L.	.	.	.	.	.	.	.	1	1	.	.	1	.	.	.	.	.	.	.	+	+	+	+	.	.	.	+	1	.	.	.	.	+	.	.
Poa annua L.	1	+	+	+	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Linum gallicum L.	.	.	.	.	.	.	.	+	+	.	.	+	.	1	.	.	.	.	.	.	.	.	+	+	.	1	.	.	.	.	.	.	.	.	+
Trifolium angustifolium L.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	+	+	+	+	+	.	.	+	.	.	.	.	.	.	.	.
Geranium molle L.	.	.	+	+	2	+	+	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	+	+	+	+	.	.	.	.	+	+	.
Geranium columbinum L.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cuscuta campestris Yunck.	.	.	.	.	.	.	+	+	+	.	+	.	+	.	.	.	.	.	.	.	.	.	.	+	.	.	+	+	.	.	.	.	+	+
Plantago holosteum Scop.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	+	+	.	.	.	.	.	+	.	.	+	+	.	.	.
Trifolium cherleri L.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	+	.	.	.	+	+	+	.	.	.	+	1	.
Cerastium glomeratum Thuill.	1	.	.	+	.	.	.	1	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	2	2	.	+	+	.	.	.	.	+
Dasypyrum villosum(L.) P. Candargy	.	.	.	.	2	.	.	+	.	+	.	1	1	.	.	.	+	+	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	1
Capsella rubella Reut.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+
Diplachne serotina(L.) Link	.	1	.	.	.	.	.	+	+	.	+	.	.	+	.	+	.	.	.	.	+	.	+	.	.	.	.	+	.	.	.	.	.	.
Leontodon crispus Vill.	.	.	+	.	.	.	.	.	.	+	1	+	.	.	.	.	.	.	+	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.
Centaurium maritimum(L.) Fritsch	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	1	.	.	.
Centaurium pulchellum(Sw.) Druce	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	+	1	.	+	.	.	+	.	.	+	.	.	.	.	+	.	.
Cynodon dactylon(L.) Pers.	1	.	+	1	.	.	.	.	.	+	.	.	.	.	.	.	.	.	+	.	.	.	.	+	+	.	.	.	.	.	.	+	+	.
Hypochaeris radicata L.	+	+	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	+	.
Nigella damascena L.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Medicago arabica (L.) Huds.	.	.	.	1	.	1	.	+	+	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.
Eragrostis minor Host	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	+	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.
Brachypodium distachyon(L.) P. Beauv.	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.	.	.	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Anchusella cretica (Mill.) Bigazzi & al.	.	.	.	.	1	.	.	1	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.
Valerianella muricata(M. Bieb.) W. H. Baxter & Wooster	.	.	.	.	.	.	1	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.
Satureja subspicata Bartl. ex Vis.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	+	.	1	.	2	.	.	.	.	.	.	.	1	.
Allium guttatum subsp. *dalmaticum* (A. Kern. ex Jánch.)	.	+	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	+	.	+	.	.	+	.	.	.	.	+	.	.	.
Vicia sativa L. subsp. *nigra* (L.) Ehrh.	.	+	.	.	+	1	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Medicago orbicularis(L.) Bartal.	.	.	.	.	.	+	.	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

(Continued)

Table 1. Continued.

Relevé number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
Urospermum picroides(L.) F. W. Schmidt	.	.	.	.	.	.	.	+	+	.	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Geranium purpureum Vill.	.	.	.	.	.	.	+	+	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
*Orobanche mutelii*F. W. Schultz	.	.	.	.	.	1	.	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Crepis zacintha (L.) Loisel.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1
Catapodium rigidum(L.) C. E. Hubb.	.	.	.	.	.	.	+	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.
Medicago polymorpha L. 2	.	.	.	.	1	+	.	+	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.
Arum italicum Mill.	.	.	.	1	+	.	+	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.
Ranunculus neapolitanus Ten.	.	.	.	.	+	+	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Blackstonia perfoliata(L.) Huds.	.	.	+	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Salvia verbenaca L.	.	.	.	.	.	+	.	.	.	1	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.
Vulpia myuros (L.) C. C. Gmel.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.
Scandix pecten-veneris L.	.	.	.	2	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Daucus carota L.	.	.	.	+	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Bromus sterilis L.	.	.	.	1	.	.	+	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Anemone hortensis L.	.	.	.	.	+	.	.	.	.	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sagina apetala Ard.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	1	+	.	.	.	.	.	.	.	.	.	.	.
Bromus squarrosus L.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sedum hispanicum L.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Echium italicum L.	.	.	.	+	.	+	.	+	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	+	.	+
Tyrimnus leucographus(L.) Cass.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Trisetaria aurea (Ten.) Pignatti	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	1	.	.	.	.	.	.	.	+
Bunium alpinum subsp. *montanum* (W. D. J. Koch) P. W. Ball	.	.	.	.	.	+	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Seseli montanum subsp. *tommasinii* (Rchb. f.) Arcang.	.	.	.	.	1	1	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hordeum murinum subsp. *leporinum* (Link) Arcang.	+	.	.	.	.	.	.	.	+	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

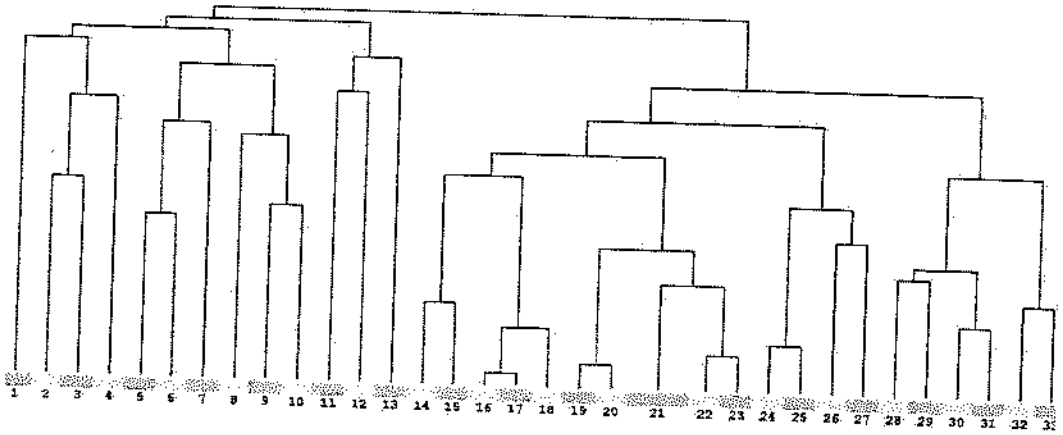

Figure 1. Cluster analysis of relevés of early spring ephemeral therophytic grasslands from Montenegro. Cluster 1 (relevés 1–13): *Romulea bulbocodii-Poetum bulbosae* ass. nova. Cluster 2 (14–33): *Ornithogalo exscapii-Poetum bulbosae* ass. nova.

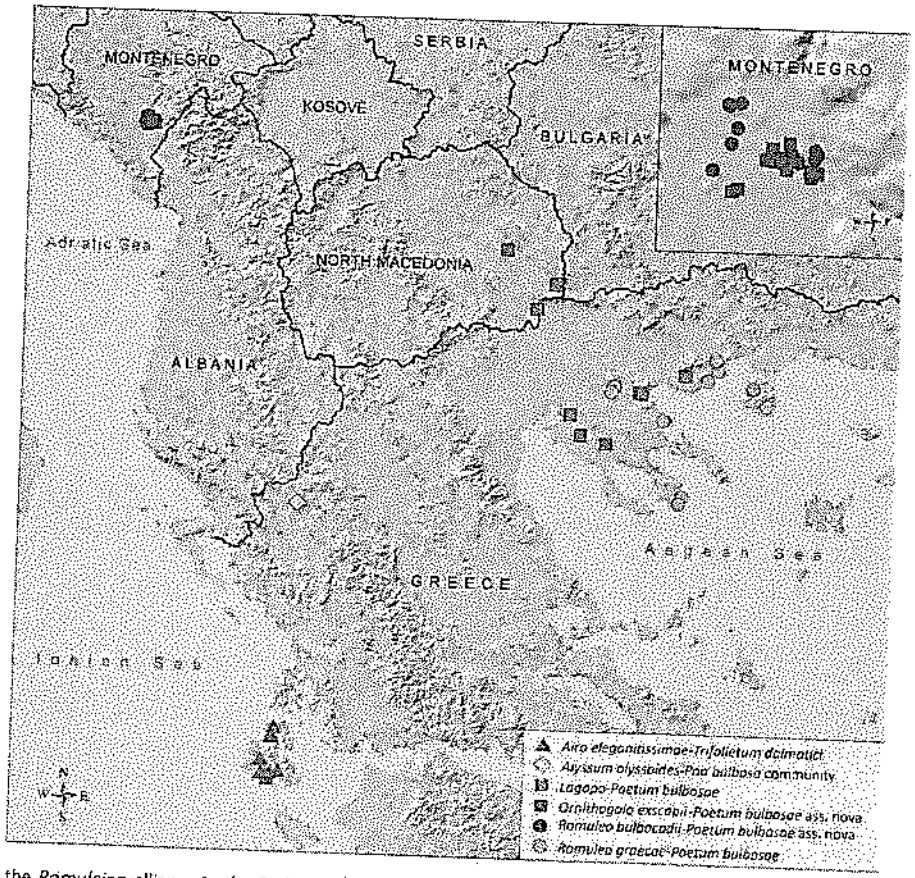

Figure 2. Distribution of the *Romuleion* alliance in the Eastern Mediterranean.

ischaemum is considerable. The association thrives on eutric cambisol soils in flat terrains, developed on fluvio-glacial deposits. The total vegetation cover is from 60% to 100% in the spring aspect. The percentage of stones is very low, often less than 5%. In addition to the species characteristic of the class *Poetea bulbosae*, there are groups of species of annual and ephemeral grasslands of the classes *Stipo-Trachynietea distachyae* and *Helianthemetea guttatae* (Table 1). The higher proportion of therophytes is due to the climatic conditions of the site. The studied community is distributed at lower altitudes, where summer drought is more pronounced. Permanent and intensive grazing and trampling is evident from the presence of ruderal species (*Avena barbata* Link, *Aegilops* sp. pl., *Ajuga chamaepitys* (L.) Schreb., *Lysimachia arvensis* (L.) U. Manns & Anderb. and *Bunias erucago* L., etc.) (Table 1).

Ordination analysis of Romuleion alliance in Eastern Mediterranean

For the analysis of the *Romuleion* alliance, we collected all available relevés of this vegetation type from the eastern

Table 2. Shortened synoptic table of plant communities of *Romuleion* alliance in Eastern Mediterranean.

Community	1		2		3		4		5		6		7		8	
Nr. of releves	17		12		14		11		7		22		13		21	
Lagopo-Poetum bulbosae Oberdorfer (1954) corr. Čarni et al. (2014)																
Achillea coarctata		42	22.3													
Alyssum desertorum	3	50	24.4	4												
Carex caryophyllea		42	13.3													
Myosotis ramosissima		58	20.4			9						31	11.4			
Teucrium polium (incl. *capitatum*)		58	–			9	–	14	–	41	–	15 46	–	86	18.7	
Stipo torilis-Poetum timolentis Oberdorfer (1954)																
Stipa capensis	1		–	5	18	–	29	20.5			–		–		–	
Tolpis umbellata	1	17	–	3	55	21					–		–		–	
Myosotis incrassata	1	17	14	3		–		–			–		–		–	
Bellevalia hyacinthoides				2							–		–		–	
Romuleo graecae-Poetum bulbosae Čarni et al. (2014)																
Crepis zacintha	1		–	1	45	12.8	29	–			–	8	–	14	–	
Galium murale		17	–		73	25.5		–			–		–		–	
Hordeum leporinum		8	–		73	23.2		–			–	15	–	5	–	
Lagurus ovatus			–		45	9.8	43	23.6			–		–		–	
Urospermum picroides			–		45	13.7	14	–			–	23	–	5	–	
Airo elegantissimae-Trifolietum dalmatici Bolòs et al. (1996)																
Aira elegantissima		33	–		82	6.7	43	–		5	–	8	–	90	12.4	
Medicago minima	4	58	–	5	36	–	57	–		95	58.1	31	–	48	–	
Onobrychis caput-galli	3	42	5.7	5	36	–	43	–		14	–		–		–	
Stipa capensis	1		–	5	18	–	29	20.5			–		–		–	
Trifolium dalmaticum			–			–	100	35.1		68	35	23	–	33	–	
Alyssum alyssoides-Poa bulbosa community Amanatidou (2005)																
Alyssum alyssoides			–			–		–		55	20.5	8	–		–	
Romuleo bulbocodii-Poetum bulbosae ass. nova																
Bothriochloa ischaemum	3	50	–	2	36	–		–			–	85	27.4	95	25.4	
Festuca sulcata ssp. *stricta*			–			–		–			–	38	30.2		–	
Ranunculus ficaria	4	33	7.2	3	9	–		–			–	38	16.5		–	
Ranunculus millefoliatus		25	–			–		–			–	46	23.4	14	–	
Salvia officinalis			–			–		–			–	31	29		–	
Stipa eriocaulis			–			–		–			–	15	25		–	
Ornithogalo exscapii-Poetum bulbosae ass. nova																
Anthoxanthum odoratum		8	–		36	–		–			–	15	–	95	23.5	
Daucus guttatus		17	–		45	–	43	–			–	15	–	95	16.9	
Eryngium amethystinum			–			–		–			–	46	–	86	23.9	
Ornithogalum exscapii			–			–		–			–	23	–	81	29.1	
Plantago bellardii	3	50	–	4	91	8.6	14	–			–	46	–	100	26.4	
Psilurus incurvus	3	83	9.3	2	100	13	14	–		27	–		–	81	6.1	
Romuleion																
Romulea bulbocodium	3	100	46.5	2	27	–	14	–			–	77	12.4	38	–	
Romulea columnae	1			2												
Romulea linaresii ssp. *graeca*	1	17	–	2	91	9						54	–	95	28.5	
Allium guttatum (incl. *sardoum*)	1	33	–	1	55	15.3		–		18	–		–		–	
Hedypnois cretica	3	42	–	3	100	17.7	29	–		14	–	15	–	29	–	
Hypochaeris cretensis	1	58	–	1	64	–		–		77	14.2	15	–		–	
Linaria simplex	1	17	–	2	36	14.9		–		5	–		–		–	
Lotus angustissimus		25	13.7	1	9	–		–			–		–		–	
Ornithogalum collinum		8	–		45	28		–			–		–		–	
Alyssum repens	1		–	2		–		–			–		–		–	
Ornithogalum exscapum	1			2						59	26.9		–		–	
Picris pauciflora	1		–	2		–		–								
Ziziphora capitata	1			1						14	10.7		–		–	
Campanula ramosissima	1		–	1		–	14	–		18	3.4		–		–	
Gagea reticulata				1												
Sedum aetnense				1												
Silene graeca	2		–	1		–		–		23	16.1		–		–	
Lagoecia cuminoides		8	–	1	9	–	29	13.9					–		–	
Alyssum minutum	1			1												
Gagea chrysantha				1												
Poetea bulbosae																
Poa bulbosa	5	100	–	5	100	–		–		95	–	92	–	95	–	
Erodium cicutarium	4	75	–	5	73	–	14	–		41	–	54	–	100	10.3	
Trifolium subterraneum	3	50	–	3	73	–		–		18	–	62	–	81	4.1	
Plantago lanceolata		50	–		27	–	14	–		59	–	62	–	62	–	
Trifolium scabrum	4	100	14.7	4	91	13		–			–	15	–	57	–	
Trifolium nigrescens		42	–		45	–	29	–		55	–	31	–	38	–	
Scilla autumnalis	1	25	–	3		–		–			–	38	10.5	33	6.9	
Bellis perennis		8	–		9	–	–	–		18	–	54	17.2	10	–	

Table 2. Continued

Community	1	2		3	4		5		6		7		8	
Lolium perenne		25	–		27	–		–	14	–	8	–		–
Biserrula pelecinus		25	–		36	11.6		–		–		–		–
Herniaria glabra			–		9	–		–		–	8	–	24	11.1
Leontodon tuberosus			–			–		–		–	31	14.1	14	
Medicago lupulina		17	–		9	–		–		–	8	–	5	
Prunella laciniata			–		9	–		–	9	–	15	–		
Trifolium pallidum		17	14.8			–		–		–		–		
Astragalus sesameus	1													
Tolpis virgata		8	–			–		–		–		–		
Plantago serriaria			–			–	14	–		–		–		
Trigonella gladiata			–			–		–	5	–		–		
Other species														
Aphanes microcarpa	2	33	13	4	27	8.9		–		–		–		–
Asteriscus aquaticus	2			2				–		–		–		–
Crupina crupinastrum		50	14.4		18	–	29	–		–		–		–
Filago gallica		33	–	3	55	–	29	–		–		–		–
Galium divaricatum	3	50	–	2	45	–		–	18	–	15	–	71	12.1
Helianthemum aegyptiacum		17	–		18	–		–		–	23	–	86	15.5
Helianthemum salicifolium	2	50	–	3	9	–	14	–		–		–		
Hippocrepis multisiliquosa			–			–	14	–		–	23	–	62	10.5
Linaria pelisseriana	1	42	–	3	91	15.8		–		–		–		
Linum trigynum	1		–	1		–	29	–		–	23	–	62	7.6
Minuartia mediterranea			–			–	14	–	27	19.1	8	–	38	12.4
Ornithopus compressus	1	58	11	1	91	25.5		–		–	8	–	10	
Scabiosa sicula			–		18	14.7		–		–		–		
Sedum caespitosum	2	25	9.3	4	27	10.6		–		–		–		
Trifolium globosum		8	–			–		–		–		–		
Trifolium tenuifolium		50	15.6		36	10.5		–		–		–		
Valerianella dentata		25	17.2			–		–		–		–		
Valerianella eriocarpa			–			–		–		–		–		
Vulpia ligustica			–			–		–		–	15	–	14	
Asterolinon linum-stellatum	1	50	–	2	64	7.7	29	–		–	15	–	5	
Briza maxima		17	–		64	16.3	43	–		–	23	–	57	6.2
Crepis neglecta		17	–		55	–	71	–	100	30.1	8	–		
Crepis neglecta ssp. corymbosa			–			–	71	29.3			46	–	76	
Cynosurus echinatus		25	–		45	–	43	–	50	7.2	15	–	10	
Hypochaeris achyrophorus			–			–	29	18.4				–		
Leontodon saxatilis		8	–			–		–				–		
Medicago coronata	1		–	1	9	–		–				–		
Silene colorata			–			–	29	19.4				–		
Trifolium stellatum	1	25	–	2	55	11.2	71	12.4	23		8	–		
Aegilops caudata			–			–	14					–		
Anthemis chia			–			–	14					–		
Crepis rubra			–			–	14		32	15.1		–		
Hippocrepis ciliata	1	8	–		9	–		–			8	–	43	15.5
Legousia falcata		8	–		18	11		–				–		
Lens nigricans			–		9	–		–				–		
Linum nodiflorum			–		9	–		–				–		
Linum strictum	1	42	5.6		27	–	71	15.7	9			–		
Lotus longesiliquosus			–			–	29	18.4				–	5	
Medicago disciformis	3	42	17.7	5	36	9		–				–		
Neatostema apulum	2	33	–	2	9	–		–				–		
Ononis reclinata			–		9	–	14	–				–	33	9.6
Phleum echinatum			–			–		–	14	14.4	8	–	24	7.7
Polygala monspeliaca			–			–		–				–		
Tordylium officinale	2		–	2		–		–	55	32.6	8	–	62	25.3
Velezia rigida	1	33	10	1	27	–		–	14			–		
Xeranthemum cylindraceum			–			–		–	5			–		
Bunium alpinum ssp. montanum			–			–		–			23	16.5		
Cerastium comatum		8	–		9	–		–				–		
Crucianella latifolia		25	–		18	–	29	–				–		
Euphorbia rigida			–			–	14	–				–		
Bromus sterilis		8	–		9	–		–	41	13.4	23	–		
Crepis foetida			–			–	14	–			23	–	76	20
Geranium columbinum			–			–		–	9		46	19.3	10	
Geranium dissectum			–			–		–				–	5	
Geranium molle	1	17	–	3	18	–	14	–	77	13.9	38	–	14	
Geranium pusillum		8	–			–		–				–		
Hordeum murinum			–			–	14	–	14	5.6		–		
Malva neglecta			–			–		–	9			–		
Sisymbrium officinale		25	–			–		–	27	9.3		–		
Sisymbrium orientale			–			–		–	9			–		
Tordylium maximum		8	–			–		–				–		

Table 2. Continued

Community	1	2		3	4		5		6		7		8	
Vicia villosa		8	–		18	–	43	27.3		–		–		–
Sedum atratum			–			–		–	9	–		–		–
Helianthemum glabrum			–			–	29	18.4		–		–		–
Scleranthus polycarpos	3		–	2		–		–		–		–		–
Scleranthus verticillatus		67	23.7		18	–		–		–		–	5	–
Tuberaria guttata	1	58	12.6	3	100	27.3	14	–		–		–		–
Hypochaeris glabra	2	67	11.7	4	73	13		–		–		–	43	–
Arenaria serpyllifolia	3	25	–	4	18	–		–	95	32.2		–	43	–
Cerastium pumilum		25	17.9			–		–		–		–		–
Clypeola jonthlaspi	1	25	11.9	2	9	–		–	9	–		–		–
Erophila praecox		8	–			–		–		–		–		–
Hornungia petraea	1		–			–		–		–	8	–		–
Saxifraga tridactylites			–	1		–		–	27	13.4	8	–		–
Sideritis montana			–		9	–		–		–		–		–
Trifolium campestre	3	58	–	3	91	8.4	71	–	14	–	62	–	52	–
Veronica praecox			–	1		–		–		–		–		–
Veronica verna		50	–	1	18	–		–	91	27.2		–		–
Vicia angustifolia		17	–		27	–		–		–	38	11.9		–
Aethionema saxatile			–			–		–		–	23	16.5		–
Bromus hordeaceus		42	–		36	–	14	–	9	–	46	–	29	–
Draba muralis			–		27	–		–	27	9.2		–		–
Potentilla argentea		17	10.1		9	–		–		–	46	10.6	67	19.9
Acinos arvensis			–			–		–		–	23	–	57	21.4
Cerastium glutinosum	3		–	4		–		–		–		–		–
Erophila verna	2	17	10.1	4	9	–		–	41	–	31	–	48	11.1
Erophila verna			–			–		–		–		–		–
Herniaria hirsuta	1	33	16.7	1	9	–	43	–	45	8		–		–
Petrorhagia prolifera	3	33	–	5		–		–		–	54	10.8	71	17.4
Petrorhagia saxifraga		17	–			–		–		–		–		–
Sedum amplexicaule			–		9	–		–		–	15	–	76	20.1
Viola kitaibeliana	1	25	–	2	18	–	29	24.6		–		–		–
Rumex bucephalophorus			–			–	14	–		–		–		–
Serapias lingua			–			–		–		–		–		–
Cistus salvifolius			–		9	–		–		–		–		–
Asphodeline lutea		17	14.8			–		–		–		–		–
Alyssum umbellatum		17	14			–		–		–		–		–
Carlina corymbosa	3		–	4		–	29	–	27	–	31	–	24	–
Cephalaria leucantha			–			–		–		–	8	–		–
Cistus incanus		17	14			–		–		–		–		–
Dorycnium hirsutum			–			–	14	–		–		–		–
Euphorbia flavicoma			–			–		–	18	13		–		–
Fumana thymifolia			–		18	14.7		–		–		–		–
Globularia alypum			–		18	14.7		–		–		–		–
Micromeria juliana			–		9	–		–	9	–	15	–		–
Ophrys scolopax ssp. *cornuta*			–			–		–	5	–		–		–
Phlomis fruticosa			–			–	14	–	27	18.5		–		–
Ranunculus isthmicus		8	–			–		–		–		–		–
Silene cretica			–		9	–		–		–		–		–
Thymus capitatus			–			–	29	19.4		–		–		–
Prunus cocomilia			–			–		–	5	–		–		–
Prunus spinosa			–			–		–	5	–		–		–
Asparagus aphyllus			–			–	14	–		–		–		–
Trifolium physodes			–			–		–	14	12.1		–		–
Alyssum foliosum		8	–			–		–		–		–		–
Asparagus acutifolius		33	8.5		45	13.9		–		–	8	–		–
Clematis flammula			–			–		–	14	10.7		–		–
Quercus coccifera			–			–	14	–	18	6.5		–		–
Quercus coccifera			–			–		–	5	–		–		–
Paliurus spina-christi			–		18	11.3		–		–	8	–		–
Arum italicum			–			–		–		–	31	19.6		–
Carex distachya			–			–		–	9	–		–		–
Jasminum fruticans			–			–		–	5	–		–		–
Allium subhirsutum			–			–	14	–		–		–		–
Anemone pavonina		8	–			–		–	5	–		–		–
Carpinus orientalis			–			–		–	5	–		–		–
Limodorum abortivum			–		9	–		–		–		–		–
Quercus pubescens			–			–		–	32	16.3		–		–
Ranunculus neapolitanus			–			–		–	18	–	31	14.7		–
Vicia barbazitae		8	–			–		–		–		–		–
Vicia grandiflora			–			–		–		–	15	14.2		–
Eleusine tristachya			–			–		–		–		–	5	–
Poa annua			–			–		–		–	46	19.2	14	–
Polycarpon tetraphyllum	1	33	9.5	3	45	16		–		–		–		–

Table 2. Continued

Community	1	2	3	4	5	6	7	8
Selaginella denticulata					29	18.4		
Persicaria decipiens								
Plumbago europaea						5		
Trigonella corniculata						9		
Aphanes arvensis		8			29	23	7.1	
Capsella bursa-pastoris		17		9		41	20.2	5
Euphorbia exigua		8		45	8 14	32	5.8	
Euphorbia falcata				9	43	14.1		8 10
Sherardia arvensis	3	75	3	9 73	43	86	9.2	46 67 17.8
Convolvulus arvensis				9		14	6.2	62 57
Matricaria chamomilla		8						
Senecio vulgaris	1	33	3	64	17.4 14			5
Sonchus asper						9		23 13 5
Sonchus oleraceus								46 20.5 10
Stellaria media						9		15 5
Arabidopsis thaliana		42 17		18				
Rumex acetosella s.lat.		50 21.7		9				
Scleranthus annuus						5		14 14.9
Veronica arvensis	2	42	2	64	10.2 14			23 43
Anagallis arvensis		67 9.8		18	29	9		38 38
Torilis arvensis				18		14		
Ajuga chamaepitys						18		15 48 16.4
Anthemis arvensis	4		5			77	31.9	24
Apera spica-venti				9				
Cuscuta compestris						41		38 21.3
Euphorbia helioscopia	1	25	3 18					46 14
Euphorbia taurinensis		17 14						8
Fumaria officinalis				9		9		
Kickxia elatine						5		
Lamium amplexicaule								
Lamium purpureum		17 14				5		
Mercurialis annua						23	11.3	
Neslia paniculata ssp. *thracica*		17 14						
Nigella arvensis	1	33 18.2	3					
Papaver rhoeas		8						
Raphanus raphanistrum		8						
Spergula arvensis		17 14						
Stellaria pallida					9			
Holosteum umbellatum	1	42 19.3	2 9					
Valeriana tuberosa								8
Leontodon crispus						9		31 13.7 10
Trinia glauca ssp. *pindica*						5		
Gaudinia fragilis					43 23.4			
Linum bienne								31 12.2 24 8.3
Carex flacca ssp. *serrulata*				9				
Poa trivialis ssp. *sylvicola*						5		15
Agrostis stolonifera				18 14.7				
Colchicum autumnale		17		18				
Dactylis glomerata		42		45		36		31
Gymnadenia conopsea				9				
Lotus corniculatus						27	8.9	23
Lysimachia punctata						5		
Oenanthe silaifolia				9				
Orobanche minor					14			
Poa pratensis		8				9		8
Poa trivialis								8
Potentilla reptans						5		
Prunella vulgaris								8
Serapias vomeracea								8 5
Silene ungeri						23	16.6	
Sporobolus indicus								8
Tragopogon orientalis								8
Trifolium lappaceum	2		2			5		
Trifolium pratense		8				5		8
Trifolium repens								15 14
Trifolium resupinatum								8
Verbena officinalis		25 8.2			14			8
Asphodelus ramosus	2	17	3 18		14			
Convolvulus althaeoides ssp. *tenuissim*					14			
Micromeria graeca								23 16.5
Urginea maritima								
Anemone hortensis								

Table 2. Continued

Community	1	2	3	4	5	6	7	8
Dactylis glomerata ssp. *hispanica*					29 22.2		8	
Hyparrhenia hirta				9	29 15			
Orchis papilionacea								
Pallenis spinosa				18	29	9		48 24.4
Piptatherum coerulescens				9				
Cistus creticus	42	9.4		64 18.2		5		
Genista carinalis				9				
Hypericum olympicum				9				
Hainardia cylindrica	8			9				
Sagina apetala			1					
Blackstonia perfoliata					57 20.8		15	14 13.5
Centaurium maritimum				9				10
Centaurium pulchellum					57 18.7		8	29 15.4
Crassula tillaea	1 25	17.2	3					24
Juncus capitatus	8							
Ophioglossum lusitanicum			1					
Clinopodium vulgare				9		5		
Lychnis coronaria				9				
Silene italica							8	5
Galium mollugo							8	
Calamintha nepeta						5	8	
Vicia tenuifolia						18 12.3		
Cleistogenes serotina							31 15	14
Buglossoides arvensis	8							
Melica ciliata	17			27			15	10
Arenaria leptoclados	67	7.2		18	29		62	67 7.9
Alyssum murale	8			9				
Phleum phleoides	8						23 12.5	14
Thymus longicaulis						14	15	
Carex halleriana				18	14	27	46	52 6.5
Hypericum perforatum	33						8	5
Fumana procumbens						5	8	24 12.7
Linum tenuifolium								5
Satureja montana						5		
Leontodon hispidus ssp. *hispidus*							8	14 9.4
Orchis coriophora							15 13.5	
Salvia pratensis							8	
Tragopogon porrifolius						36	54	81 15.7
Convolvulus cantabrica	1 33		2		14			
Ornithogalum norbonense						73 31.9	15	
Scorzonera laciniata						9		
Ruta graveolens						14		5
Teucrium chamaedrys	33 14.9							
Achillea setacea	33 16.7			9		9		
Achnatherum bromoides	50 11.8			64 16.2				
Allium sphaerocephalon	25 13.7			9				
Alyssum corymbosoides				9				
Alyssum strigosum	8			9				
Anacamptis pyramidalis						14 10.7		
Bromus pannonicus							15 22.6	
Bupleurum veronense							38	57 17.6
Centaurea jacea ssp. *angustifolia*							8	
Chrysopogon gryllus	58 13.9			36				
Cuscuta epithymum				9	57 23.5		31	
Eryngium campestre	4 58 13.1		5	36		41 5.3		
Euphorbia barrelieri ssp. *thessala*	8			18 11				
Festuca callieri								
Festuca valesiaca				9				
Gagea pusilla				18 14.7				
Genista dalmatica	8							
Helianthemum nummularium ssp. *nummularium*							8	
Helianthemum ovatum						55 27.1	8	
Herniaria incana	1 25		1	27				
Hieracium bauhini						14	15 13.5	
Hypericum rumeliacum	8					9		
Koeleria splendens	42 11.8			18 11			8	
Medicago falcata				9				
Medicago prostrata				18			31	5
Minuartia glomerata ssp. *macedonica*	17 14					14		
							15 14.2	

Table 2. Continued

Community	1	2	3	4	5	6	7	8
Muscari comosum		8		27		23	23	48 10.7
Muscari neglectum	1		2			5		
Onobrychis arenaria	2		1		18.4			
Ophrys sphegodes				14			15	10
Orchis morio						5		
Orobanche alba		8		9				
Petrorhagia illyrica ssp. *illyrica*						5		
Phleum montanum					29			
Pimpinella peregrina		17 14						
Poa angustifolia							8	
Polygala comosa		25 17.2		9				
Ranunculus psilostachys					14			
Ranunculus rumelicus				9				
Ranunculus sprunerianus		33			29	73 14.4	23	29
Rorippa lippizensis								
Sanguisorba minor (incl. *polygama*)				9				5
Scabiosa triniifolia								
Spiranthes spiralis				9				
Stipa capillata		8		9				
Thymus odoratissimus		17		18			8	19
Tragopogon balcanicus		58 18.2		9				
Valerianella turgida		33		36 8.8				
Trifolium retusum		25 11.4		73 23.2				
Scorzonera cana	4		4		14			
Carex divisa					18 14.7			
Luzula forsteri				27 18		5		
Brachypodium sylvaticum ssp. *sylvatica*								
Galium aparine						5		
Opopanax chironium						5		
Rubia tinctorium				9				
Epilobium hirsutum				9				
Centaurium erythraea				9			8	10
Galium lucidum							8	
Geranium robertianum				18		9		
Lunaria annua						5		
Viola odorata	1	17	2			5		
Euphorbia myrsinites						32 11.1		
Psoralea bituminosa		17			14	18 8		
Crupina vulgaris		17		18		5		10
Astragalus onobrychis				9				
Stachys angustifolia	1		3					
Plantago arenaria				9				
Chamaesyce canescens	5	75 7.8	4	91 10.9	14	9	31	10
Cynodon dactylon		8						
Polygonum aviculare				27 18				
Amaranthus albus	1	25	3	45 12.4			8	19
Eragrostis minor		17		55 21				
Portulaca oleracea	1	8	2					
Senecio vernalis		17 10.1		9				
Tragus racemosus						5		
Tribulus terrestris						5		
Inula oculus-christi						14 20.9		
Campanula spatulata						5		
Carduus tmoleus						45 21.5		
Pterocephalus perennis								
Stachys germanica ssp. *heldreichii*		17		64 22.1				5
Plantago coronopus	1				14			
Silene conica	3		3					
Bombycilaena erecta		17 14	1					
Filago minima		17 14						
Micropyrum tenellum	2	17	2	9		45 20.2		
Minuartia hybrida		33 9.5		45 15.1				
Moenchia erecta		17	4	18	14			
Sedum rubens	2	8	1	36		27 34.4		5
Trifolium striatum	1	50 13.3	2	18		32 16.3	8	10
Vulpia myuros		33 19.9				18	8	10
Bromus squarrosus								
Filago arvensis								

Table 2. Continued.

Community	1	2	3	4	5	6	7	8
Myosotis stricta	8	–	–	–	–	32	14	–
Trifolium arvense	2	67	12.1	3	73	12.9	–	–	–	–	–	–	–
Aira caryophyllea	1	–	–	2	–	–	–	–	–	–	8	–	38	–
Cerastium semidecandrum	–	42	13.7	–	36	11.4	–	–	–	–	–	–	–	–
Cetraria aculeata	2	–	–	1	–	–	–	–	–	–	–	–	–	–
Cladonia foliacea	–	–	–	–	–	–	14	–	–	–	–	–	–	–
Sedum sexangulare	–	50	13.4	1	36	7.8	14	–	–	–	8	–	–	–
Vicia lathyroides	–	8	–	3	–	–	–	–	–	–	–	–	–	–
Mibora minima	1	25	13.7	–	9	–	–	–	–	–	–	–	–	–
Anthemis ruthenica	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Hypochaeris radicata	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Plantago holosteum	–	–	–	–	–	–	–	5	–	23	11.8	10	–
Sedum acre	–	–	–	–	–	–	–	–	–	–	–	33	20.2
Erysimum diffusum s.str.	3	8	–	1	9	–	–	18	11.5	8	–	–	–
Bromus tectorum	2	8	–	–	45	17.6	–	–	–	–	–	–	–
Alkanna tinctoria	2	17	–	3	27	10.4	–	14	–	–	–	–	–
Erodium hoefftianum	–	–	–	–	9	–	–	–	–	–	–	10	–
Minuartia viscosa	1	8	–	–	9	–	–	–	–	–	–	–	–
Moenchia mantica	–	–	–	–	27	21	–	–	–	–	–	–	–
Scabiosa argentea	–	17	10.1	–	9	–	–	5	–	–	–	–	–
Sedum annuum	–	–	–	–	9	–	–	–	–	–	–	–	–
Lathyrus setifolius	–	–	–	–	–	–	–	–	–	–	–	–	–
Lathyrus sphaericus	–	–	–	–	–	–	–	–	–	8	–	–	–
Scorpiurus muricatus	1	–	–	–	9	–	–	5	–	8	–	–	–
Teesdalia coronopifolia	1	25	11.2	1	18	–	29	13.3	–	15	–	–	–
Trifolium cherleri	–	42	–	1	82	31.7	14	–	5	–	8	–	29	–
Trifolium hirtum	–	–	–	–	9	–	–	–	9	–	–	–	–	–
Plantago afra	–	–	–	–	9	–	–	–	–	–	–	–	–	–
Vulpia ciliata	3	75	–	3	91	–	57	–	77	–	46	–	76	–
Bromus intermedius	–	–	–	–	–	–	14	–	–	–	–	–	–	–
Bromus rigidus	–	–	–	–	–	–	14	–	–	–	–	–	–	–
Cerastium glomeratum	–	25	–	–	45	–	–	–	32	–	23	–	19	–
Coronilla scorpioides	–	–	–	–	–	–	–	–	5	–	–	–	–	–
Crepis sancta	3	25	–	4	27	–	–	–	50	–	85	17.8	81	10.4
Echinaria capitata	1	8	–	–	–	–	–	–	–	–	–	–	–	–
Gastridium ventricosum	–	–	–	–	18	11.3	–	–	–	–	8	–	–	–
Lotus edulis	–	–	–	–	–	–	29	18.4	–	–	–	–	–	–
Lotus ornithopodioides	–	–	–	–	–	–	14	–	–	–	–	–	–	–
Medicago orbicularis	1	–	–	–	27	–	29	–	36	4.4	31	–	–	–
Medicago rigidula	3	67	2.5	5	27	–	–	–	82	42.1	8	–	5	–
Medicago truncatula	–	–	–	–	–	–	57	26.1	–	–	–	–	–	–
Melilotus neapolitanus	–	8	–	–	–	–	–	–	9	–	–	–	–	–
Plantago lagopus	5	67	21.2	5	82	28	–	–	–	–	–	–	–	–
Silene gallica	–	25	–	–	45	16.7	–	–	–	–	–	–	–	–
Tordylium apulum	–	8	–	–	–	–	43	–	59	3.7	85	18.5	29	–
Torilis leptophylla	–	–	–	–	–	–	–	–	5	–	–	–	–	–
Trifolium angustifolium	2	67	8.8	1	82	9.9	43	–	9	–	–	–	38	–
Valantia muralis	–	8	–	1	9	–	14	–	–	–	–	–	–	–
Spergula pentandra	1	25	17.2	2	–	–	–	–	–	–	–	–	–	–
Valerianella carinata	–	–	–	–	–	–	14	–	–	–	–	–	–	–
Galium parisiense	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Thymelaea passerina	–	–	–	–	–	–	–	18	16.1	–	–	–	–	–
Anagallis foemina	2	–	–	3	–	–	–	–	–	8	–	5	–
Euphorbia peplus	–	17	10.1	–	9	–	–	–	–	–	–	–	–	–
Geranium lucidum	–	–	–	–	18	–	–	–	18	5.7	–	–	–	–
Salvia viridis	1	–	–	2	–	–	–	–	–	–	–	–	–	–
Echium plantagineum	2	8	–	2	55	23.1	–	–	–	–	–	–	–	–
Aegilops geniculata	–	33	–	–	45	–	29	–	–	–	31	–	71	11.2
Aegilops neglecta	2	–	–	3	–	–	–	–	50	30.5	–	–	5	–
Aegilops triuncialis	–	50	13.1	–	45	11.4	–	–	–	–	8	–	5	–
Aegilops ventricosa	–	–	–	–	–	–	14	–	–	–	–	–	–	–
Avena barbata	1	58	–	2	64	–	29	–	50	–	54	–	81	5.2
Avena sterilis	–	–	–	–	–	–	14	–	–	–	–	–	–	–
Bartsia trixago	–	–	–	–	–	–	29	18.4	–	–	–	–	–	–
Bromus madritensis	–	8	–	–	45	11.1	43	11.3	–	–	8	–	–	–
Bromus scoparius	–	–	–	–	–	–	–	–	5	–	–	–	–	–
Bunias erucago	1	17	–	–	–	–	–	–	36	12.2	8	–	–	–
Calendula arvensis	–	17	10.1	–	9	–	–	–	–	–	–	–	–	–
Capsella rubella	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Cardamine hirsuta	1	–	–	2	27	11.6	–	–	9	–	15	–	24	11.4
Carduus pycnocephalus	–	–	–	–	–	–	–	–	–	–	8	–	5	–
Catapodium rigidum	–	42	–	–	27	–	57	–	27	16.1	–	–	–	–
Chrysanthemum segetum	–	–	–	–	9	–	–	–	55	7.8	23	–	5	–

Table 2. Continued

Community	1	2	3	4	5	6	7	8
Cnicus benedictus		8		55	23.1			
Consolida regalis ssp. *paniculata*						55	25.6	
Cynoglossum columnae								
Dasypyrum villosum	2	25	2	9		5		
Galactites tomentosus						9		38
Galium tricornutum		8			29	18.4		
Geranium purpureum				9				
Geropogon hybridus								37
Knautia integrifolia					14			
Lathyrus aphaca					14			
Lathyrus cicera					14	41	14.2	8
Legousia hybrida		8						
Legousia speculum-veneris					14			
Lolium rigidum						14	11.4	
Lotus tetragonolobus								
Medicago arabica					14			
Medicago monspeliaca		17						
Medicago polymorpha	3	8	1	18	11	14		15
Nigella damascena			1					
Orlaya daucoides					14	5		15
Orlaya grandiflora					29	32	5	31
Orobanche mutelii				9	14	9		
Papaver apulum								15
Parvotrisetum myrianthum								31
Ranunculus muricatus		8			14			
Rhagadiolus stellatus				9				
Rostraria cristata		8		9				8
Rumex pulcher	3	25	3	18	14	27	9.1	
Scandix pecten-veneris					14	14		
Taeniatherum caput-medusae						23	14.9	
Torilis nodosa		17			14	9		23
Trifolium vesiculosum				45	18.5			13.6
Valerianella coronata						23	9.8	
Valerianella discoidea		17		9				
Valerianella locusta		8		45	15.9	14		
Vicia articulata					14			
Vicia peregrina				9				15
Origanum vulgare								14.2
Campanula erinus						14	11.4	
Sedum hispanicum						9		
Asplenium ceterach		8		27	14			8
Parietaria lusitanica						73	19.5	15
Veronica cymbalaria						5		
Campanula drabifolia						5		
Campanula lingulata						5		
Jasione heldreichii					43	22.6		
Pseudofumaria alba ssp. *acaulis*	3			9				8
Xeranthemum annuum								
Crepis setosa		8		18				
Daucus carota		17		27		5		
Dittrichia viscosa ssp. *viscosa*						18		8
Foeniculum vulgare				18	14.7	36	13.1	23
Marrubium peregrinum								
Salvia sclarea								8
Tragopogon dubius						36	19.6	
Verbascum speciosum						18	13	
Centaurea salonitana						9		
Verbascum sinuatum		25				18	12.3	
Chondrilla juncea		42	15.1	27		45	27.9	
Echium italicum		33		36				
Malva sylvestris						41	5.8	8
Calepina irregularis						23	6.9	23
Carduus nutans						18	14.4	
Carthamus lanatus								15
Centaurea calcitrapa		58	8.6	27				15
Centaurea solstitialis								31
Cichorium intybus						5		
Crepis rhoeadifolia		17		9				8
Echinops sphaerocephalus		33	12.4	27	9.2	64	30	8
Pastinaca sativa ssp. *urens*		17	14					
Picris hieracioides						5		
Potentilla recta								8
						23		38

Community	1	2	3	4	5	6	7	8
Cnicus benedictus								
Consolida regalis ssp. *paniculata*								
Cynoglossum columnae								
Dasypyrum villosum								
Galactites tomentosus							14.8	10
Galium tricornutum								
Geranium purpureum								
Geropogon hybridus							19.1	
Knautia integrifolia								
Lathyrus aphaca								
Lathyrus cicera								
Legousia hybrida								
Legousia speculum-veneris								
Lolium rigidum								
Lotus tetragonolobus								5
Medicago arabica								
Medicago monspeliaca								14
Medicago polymorpha								
Nigella damascena								10
Orlaya daucoides								5
Orlaya grandiflora								
Orobanche mutelii							14.2	
Papaver apulum							19.6	
Parvotrisetum myrianthum								
Ranunculus muricatus								
Rhagadiolus stellatus								
Rostraria cristata								
Rumex pulcher								10
Scandix pecten-veneris								
Taeniatherum caput-medusae							13.6	
Torilis nodosa								
Trifolium vesiculosum								
Valerianella coronata								
Valerianella discoidea								
Valerianella locusta								
Vicia articulata								
Vicia peregrina							14.2	
Origanum vulgare								
Campanula erinus								
Sedum hispanicum								
Asplenium ceterach								
Parietaria lusitanica								5
Veronica cymbalaria								
Campanula drabifolia								
Campanula lingulata								
Jasione heldreichii								
Pseudofumaria alba ssp. *acaulis*								
Xeranthemum annuum								
Crepis setosa								
Daucus carota								
Dittrichia viscosa ssp. *viscosa*								
Foeniculum vulgare								
Marrubium peregrinum								
Salvia sclarea								
Tragopogon dubius								
Verbascum speciosum								
Centaurea salonitana								
Verbascum sinuatum								
Chondrilla juncea								
Echium italicum								
Malva sylvestris							5	
Calepina irregularis								
Carduus nutans								
Carthamus lanatus								
Centaurea calcitrapa								
Centaurea solstitialis							67	11.5
Cichorium intybus								
Crepis rhoeadifolia								
Echinops sphaerocephalus								
Pastinaca sativa ssp. *urens*								
Picris hieracioides								
Potentilla recta							38	9.7

Table 2. Continued

Community	1	2	3	4	5	6	7	8
Salvia verbenaca	1	8	–	–	–	–	15	10
Scolymus hispanicus		8	–	–	–	–	–	–
Silene vulgaris		–	–	–	–	–	8	–
Sonchus arvensis		–	–	9	–	–	–	–
Tyrimnus leucographus		–	–	–	–	–	8	10
Verbascum blattaria		–	–	18	14.7	–	–	–
Verbascum densiflorum		–	–	18	–	9	–	–
Verbascum pulverulentum		–	–	–	–	32	17.3	–
Dianthus viscidus		8	–	9	–	–	–	–
Asperula aristata ssp. *scabra*		8	–	–	–	–	8	–
Stachys cassia		–	–	9	–	–	–	–
Aegilops uniaristata		–	–	–	14	–	–	–
Ajuga orientalis		–	–	–	–	14	10.7	–
Allium amethystinum		–	–	–	–	5	–	–
Allium ampeloprasum		–	–	–	–	–	8	–
Allium dalmaticum		–	–	–	–	–	15	14
Allium flavum		25	11.2	18	–	–	–	–
Allium sp.		–	–	–	14	–	–	–
Alyssum minus		–	–	–	–	–	15	13.5
Anchusa hybrida		–	–	–	–	27	15.1	–
Anchusa variegata		–	–	–	14	–	–	–
Anchusella cretica		–	–	–	–	41	13.3	38
Anthemis auriculata		67	13.7	91	23.5	–	–	12.4
Anthyllis vulneraria		–	–	–	43	22.3	9	–
Arabis sagittata		–	–	–	–	–	5	15
Arabis verna		–	–	–	–	–	5	–
Astragalus sinaicus	2	–	1	–	–	–	–	–
Astragalus spruneri		–	–	9	–	–	–	–
Aurinia corymbosa		–	–	9	–	–	–	–
Aurinia saxatilis ssp. *orientalis*		–	–	–	–	–	–	–
Barbula sp.	2	–	4	–	–	14	21.2	–
Berteroa obliqua		–	–	–	–	–	–	–
Berteroa orbiculata		8	–	–	–	32	16.8	–
Bidrum tenuifolium		–	–	–	–	–	–	–
Bifora testiculata		–	–	–	–	9	–	–
Biscutella didyma		–	–	–	–	5	–	–
Brachypodium distachyon	2	42	11.8	9	29	18.4	–	–
Buffonia sp.	1	–	1	–	57	14.2	–	–
Bupleurum commutatum		8	–	9	–	–	23	10
Bupleurum glumaceum		–	–	–	–	–	–	–
Calicotome villosa		–	–	–	14	9	–	–
Campanula phrygia		–	–	36	11.8	14	–	–
Cerastium brachypetalum (incl. *roeseri*)		8	–	27	18	–	–	–
Cerastium sp.		–	–	9	–	64	25.4	8
Clinopodium arvense		17	14	–	14	–	–	–
Delphinium sp.		–	–	–	–	–	–	–
Filago sp.		–	–	–	14	–	–	–
Gagea foliosa	1	–	–	–	14	–	–	–
Knautia sp.		8	3	–	–	–	–	–
Malabaila aurea		–	–	–	–	–	–	–
Mannia fragrans	1	–	2	–	–	5	8	–
Medicago praecox		17	–	36	15.7	–	–	–
Medicago turbinata	1	–	2	–	–	–	–	–
Minuartia hirsuta ssp. *falcata*		25	11.2	18	–	–	–	–
Myosotis sylvatica ssp. *cyanea*	1	–	–	–	–	–	–	–
Onobrychis aequidentata		8	–	–	–	5	–	–
Orchis sp.		–	–	9	–	–	–	–
Orlaya daucorlaya	1	–	1	–	–	–	–	–
Ornithogalum armeniacum		8	–	–	–	32	25.7	–
Ornithogalum montanum	1	–	2	–	–	–	–	–
Parentucellia latifolia		83	–	73	–	45	24.5	–
Petrorhagia velutina		58	–	100	17.6	29	59	23
Pimpinella tragium ssp. *polyclada*		–	–	–	–	–	–	15
Pleurochaete squarrosa		8	–	–	–	–	5	–
Poa cephalonica		–	–	–	–	14	–	–
Potentilla laciniosa		50	17.6	27	–	14	–	–
Potentilla pedata		25	17.2	–	–	–	–	–
Pyrus amygdaliformis	1	–	–	–	–	–	–	–
Riccia sp.		–	2	–	–	–	–	–
Rorippa thracica		17	–	18	–	14	12.3	–

Table 2. Continued

Community	1	2	3	4	5	6	7	8
Satureja montana ssp. *subspicata*							8	
Scabiosa palaestina		8		18	11			
Scabiosa tenuis						59	24.2	
Scandix australis ssp. *grandiflora*						5		
Securigera parviflora		8						
Securigera securidaca								
Sedum stellatum					14			
Seseli montanum ssp. *tommasinii*	1		3		14		23	17.7
Sideritis romana (incl. *purpurea*)		8			14		46	
Taraxacum sp.								86
Thymus sibthorpii		8				5		
Thymus substriatus	2	67	23.7	1 18				
Tortula ruralis								
Verbascum sp.	1		3				8	5
Verbascum undulatum								
Vicia glabrescens							15	13.5
Vicia hirsuta				9				
Centaurea affinis ssp. *pallidior*						9		
Centaurea alba ssp. *deusta*								
Centaurea grisebachii		42	19.3	9			23	67
Centaurea orphanidea				36	20.8			23.5
Centaurea zuccariniana								
Cerastium tenoreanum				27	18.7	14	11.4	
Chaerophyllum coloratum								
Daucus broteri		25	17.2				8	
Daucus involucratus								
Delphinium peregrinum					14			
Dianthus monadelphus ssp. *pallens*		8				5		
Ephedra major								
Erysimum crassistylum		33	14.3	9				
Euphorbia seguieriana ssp. *niciciana*		8		18 9				
Evax pygmaea	3		1					
Filago vulgaris		83	9.8	73	7.1	14		
Fritillaria messanensis ssp. *gracilis*						9	46 8	48
Galium intricatum								
Galium setaceum		17		18		71	29.3	
Galium tenuissimum	1	17	14					
Hippocrepis unisiliquosa								
Holcus setiglumis				9		14	9	
Huetia cynapioides	2							
Hymenocarpos circinnatus		17		2 9				
Lens ervoides				36	10.9	14		
Onopordum bracteatum							5	
Senecio rupestris							9	
Silene conica ssp. *subconica*		8					14	11.4
Taraxacum gracilens								
Taraxacum sect. *Ruderalia*		17	10.6				18	13
Thlaspi perfoliatum		8						
Thymus heterotrichus		33	16.7	9			5	15
Trifolium speciosum								
Trigonella grandiflora				18	14.7		5	
Tripodion tetraphyllum								
Trisetaria aurea					14			

Note: The original classification indicated by authors is used. Communities: 1. *Lagopo-Poetum bulbosae* (Oberdorfer 1954), 2. *Lagopo-Poetum bulbosae* (Carni et al. 2014), 3. *Stipo tortilis-Poetum timoleontis* (Oberdorfer 1954), 4. *Romuleo graecae-Poetum bulbosae* (Carni et al. 2014), 5. *Airo eleganitissimae-Trifolietum dalmatici* (Bolòs et al. 1996) 6. *Alyssum alyssoides-Poa bulbosa* community (Amanatidou 2005), 7. *Romuleo bulbocodii-Poetum bulbosae* ass. nova and 8. *Ornithogalo exscapii-Poetum bulbosae* ass. nova.

Mediterranean where it occurs (Figure 2, Table 2). For further analysis, we had to exclude the original table of Oberdorfer (1954), which had been published only as a synoptic table.

NMDS revealed a division of *Romuleion* communities into two groups along gradient of EIV temperature, BIO 14, and altitude (Figure 3). The communities from coastal Greece and in Northern Macedonia belong to one group (in lower part of NMDS graph) and the communities from Montenegro and continental part of Greece (Epirus) in second. Altitude is one of the most important factors affecting the floristic composition and distribution of *Romuleion* communities. Communities that developed at higher altitudes (Cephalonia and Epirus) are grouped in the right part of the NMDS diagram, while communities in the lowlands (Montenegro,

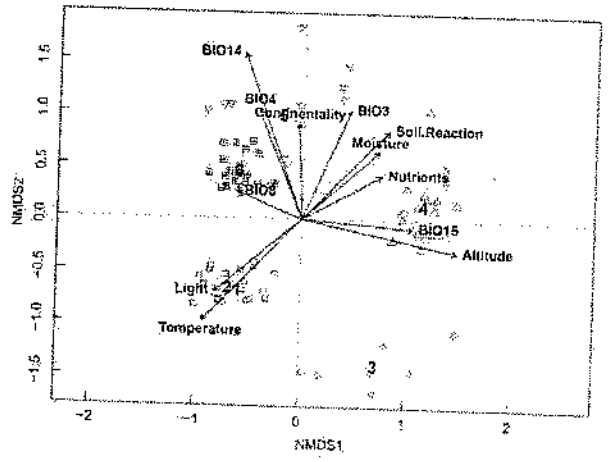

Figure 3. NMDS ordination of *Romuleion* communities from the Eastern Mediterranean. The numbers are centroids of particular syntaxon, the arrows represent the passively projected environmental variables. 1. *Lagopo-Poetum bulbosae*, Čarni et al. (2014), 2. *Romuleo graecae-Poetum bulbosae*, Čarni et al. (2014), 3. *Airo eleganitissimae-Trifolietum dalmatici*, Bolòs et al. (1996), 4. *Alyssum alyssoides-Poa bulbosa* community, Amanatidou 2005, 5. *Romuleo bulbocodii-Poetum bulbosae* Stanišić-Vujačić et al. (2022), and 6. *Ornithogalo exscapii-Poetum bulbosae* Stanišić-Vujačić et al. (2022).

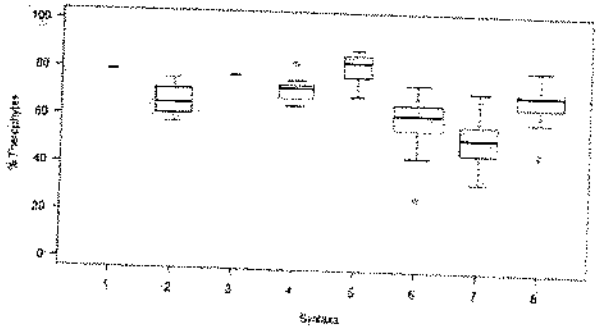

Figure 4. Percentage of therophytes in biological spectrum of *Romuleion* communities from the Eastern Mediterranean. 1. *Lagopo-Poetum bulbosae*, Oberdorfer (1954); 2. *Lagopo-Poetum bulbosae*, Čarni et al. (2014); 3. *Stipo tortilis-Poetum timolentis*, Oberdorfer (1954); 4. *Romuleo graecae-Poetum bulbosae*, Čarni et al. (2014); 5. *Airo eleganitissimae-Trifolietum dalmatici*, Bolòs et al. (1996); 6. *Alyssum alyssoides-Poa bulbosa* community, Amanatidou (2005); 7. *Romuleo bulbocodii-Poetum bulbosae* ass. nova, and 8. *Ornithogalo exscapii-Poetum bulbosae* ass. nova.

coastal Greece and Northern Macedonia) are found in the left part of the NMDS diagram. In the two-dimensional solution of the NMDS ordination attained a minimum stress of 0.22.

Analysis showed that the communities in the coastal areas (coastal Greece) are dominated by therophytes (Figure 4, boxes 1–5). On the other hand, hemicryptophytes are more abundant (Figure 5, boxes 6–8) in the continental parts (Epirus, Montenegro).

The comparison of *Romuleion* dry grasslands revealed many differences in the floristic composition of the described associations in the eastern Mediterranean (Table 2). *Romuleion* dry grassland communities from Montenegro show some floristic and ecological similarities to the *Alyssum alyssoides-Poa bulbosa* community from Epirus (Table 2, Figure 3). These communities are predominantly composed of *Poetea bulbosae* species. On the other hand,

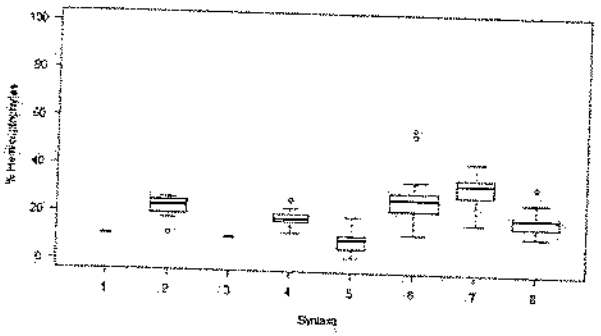

Figure 5. Percentage of hemicriptophytes in biological spectrum of *Romuleion* communities from the Eastern Mediterranean. 1. *Lagopo-Poetum bulbosae*, Oberdorfer (1954); 2. *Lagopo-Poetum bulbosae*, Čarni et al. (2014); 3. *Stipo tortilis-Poetum timolentis*, Oberdorfer (1954); 4. *Romuleo graecae-Poetum bulbosae*, Čarni et al. (2014); 5. *Airo eleganitissimae-Trifolietum dalmatici*, Bolòs et al. (1996); 6. *Alyssum alyssoides-Poa bulbosa* community, Amanatidou 2005; 7. *Romuleo bulbocodii-Poetum bulbosae* ass. nova, and 8. *Ornithogalo exscapii-Poetum bulbosae* ass. nova.

associations from coastal Greece, Cephalonia and Northern Macedonia are characterized by presence of many *Stipo-Trachynietea distachyae* and *Helianthemetea guttati* species (Table 2).

Syntaxonomical scheme

Based on gathered relevés and the numerical classification and ordination we propose the following syntaxonomical scheme of the *Romuleion* alliance in the eastern Mediterranean.

Class: *Poetea bulbosae* Rivas Goday et Rivas-Mart. in Rivas-Mart. 1978

Order: *Poetalia bulbosae* Rivas Goday et Rivas-Mart. in Rivas Goday et Ladero 1970

Alliance: *Romuleion* Oberd. 1954

- *Lagopo-Poetum bulbosae* Oberdorfer 1954 corr. Čarni et al. 2014
- *Stipo tortilis-Poetum timoleontis* Oberdorfer 1954
- *Romuleo graecae-Poetum bulbosae* Čarni et al. 2014
- *Airo eleganitissimae-Trifolietum dalmatici* Bolòs et al. 1996
- *Alyssum alyssoides-Poa bulbosa* community Amanatidou 2005
- *Romuleo bulbocodii-Poetum bulbosae* ass. nova
- *Ornithogalo exscapii-Poetum bulbosae* ass. nova
- *Biareto-Poetum timolentis* Oberdorfer 1954 prov.

Discussion

The *Romuleion* alliance includes grassland communities of anthropogenic origin with distribution restricted to the Mediterranean basin. They are dominated by *Poa bulbosa* and consist of low perennial herbs, therophytes, and in late winter, geophytes (Oberdorfer 1954; Bolòs et al. 1996; Čarni et al. 2014).

The syntaxonomical and ecological characteristics of the *Romuleion* alliance are well documented for Greece (Oberdorfer 1954; Bolòs et al. 1996; Amanatidou 2005; Čarni et al. 2014) and the southern part of Northern Macedonia (Čarni et al. 2014), while this vegetation type is poorly studied in the western Balkans. So far, *Romuleion* dry grasslands

have been assigned to the different higher syntaxa, main difference was in classification into classes. According to Oberdorfer (1954), Bolòs et al. (1996), and Amanatidou (2005), this vegetation type is classified into the *Thero-Brachypodietea* class, while Čarni et al. (2014), classified it into the *Helianthemetea*. They also stated that it would be possible to classify them into the *Poetea bulbosae* as similar pastures are known from the western Mediterranean. Amanatidou (2005) mentioned the possibility to classify *Alyssum alyssoides-Poa bulbosa* community into the *Thero-Brachypodion* alliance. Earlier, Rodwell et al. (2002) mention classification of *Romuleion* into the *Saginetea maritimae*, but lack of halophytes does not support this solution. In the central Mediterranean, especially in Italy, there are many studies dealing with the vegetation of therophytic grasslands (Viciani et al. 2013, Scoppola 1999). Compared to *Romuleion* alliance grasslands, these grasslands are characterized by the absence of geophytes (e.g. *Romulea* sp. pl.) (Viciani et al. 2013, Scoppola 1999) and the perennial grass *Poa bulbosa* (Scoppola 1999). In contrast, several species from the genus *Sedum* are present in communities from Italy. Because of that, there is a possibility to classify these communities into the *Alysso alyssoidis-Sedion* alliance. Therophytic communities from Italy also develop on the flat surfaces of travertine debris, with a thin layer of organic soil and abundant mosses, which are not under the influence of intensive and permanent agropastoral activities (Viciani et al. 2013). After our analysis, we decided to classify *Romuleion* alliance within the *Poetea bulbosae*, which is in accordance with most recent classification (Mucina et al. 2016). So far, the class *Poetea bulbosae* was reported for the western and central Mediterranean. Although there are many climatic and floristic differences between the eastern and western/central Mediterranean (Čarni et al. 2014), these plant communities have in common intensive and permanent livestock activity. Communities of the *Poetea bulbosae* represent perennial pastures linked with zoo-anthropogenic activity, while the *Helianthemetea* includes annual pastures, less developed, often on lithosols, and with less nitrophilous species (Galán de Mera et al. 2000). Dry grasslands of *Poetea bulbosae* are characterized by the presence of species adapted to continuous trampling and fertilization by livestock (Galán de Mera et al. 2000; San Miguel 2008). The studied communities in the eastern Mediterranean are rich in many species of the *Poetea bulbosae* class such as *Poa bulbosa*, *Romulea bulbocodium*, *Anthoxanthum odoratum*, *Erodium cicutarium* (L.) L'Hér., *Trifolium subterraneum* L., *Leontodon tuberosus* L., *Prunella laciniata* L., *Trifolium nigrescens* Viv., *Hypochaeris cretensis* (L.) Bory & Chaub., and so on (Table 2). Agropastoral activities in Mediterranean grasslands condition the substitution of the oligotrophic communities of *Helianthemetea guttati* or the ruderal *Papaveretea rhoeadis* by the eutrophic ones of *Poetea bulbosae* (Ladero et al. 1992; Galán de Mera et al. 2000). As a result of grazing, trampling, fertilization, and nutrient cycle acceleration by faeces, the nitrophytic character of eastern Mediterranean communities is charaterized by the presence of species such as: *Avena barbata*, *Chondrilla juncea* L., *Hordeum murinum* subsp. *leporinum* (Link) Arcang., *Dasypyrum villosum* (L.) P. Candargy, and so on (Table 2). *Romuleion* communities from the eastern Mediterranean, especially from the coastal part of Greece and Northern Macedonia, are characterized by the presence of species of the *Stipo-Trachynietea distachyae* and *Helianthemetea guttati* classes, indicating strong influence of the Mediterranean climate (Table 2). High proportion of therophytes in these communities complicates classification into higher syntaxa.

The conducted analysis of *Romuleion* alliance has shown that the most important ecological factors affecting floristic composition and distribution are precipitation seasonality (BIO 15), EIV temperature and altitude (Table 2, Figure 3). According to Čarni et al. (2014), seasonality of precipitation and temperature were also the most important ecological variables. They also emphasized that the grasslands of *Romuleion* alliance do not occur on higher altitudes, although Oberdorfer (1954) mentions the *Biareto-Poetum timolentis* community from Epirus (Greece) that occurs at higher elevations. The occurrence of *Romuleion* dry grasslands at higher altitudes has been also confirmed for Cephalonia (Bolòs et al. 1996) and Epirus (Amanatidou 2005). The *Alyssum alyssoides-Poa bulbosa* community from Vikos-Aoos National Park is similar to the *Biareto-Poetum timolentis*. *Romuleion* dry grassland from Aegean and Ionian coast of Greece are dominated by therophytes which indicates persistent summer drought and grazing. These communities often develop on shallow rocky soils, in open spots between shrubs which are quickly colonized by annuals (Bolòs et al. 1996; Sciandrello et al. 2013). Communities from the continental part of Greece at higher altitudes and from sub-Mediterranean part of Montenegro have more hemicryptophytic character, indicating the influence of modified Mediterranean climate, with more evenly distributed precipitation. Although Čarni et al. (2014) clearly differentiated their communities based on climate and life forms character they are not that different when all communities of *Romuleion* are considered (Figures 3 and 4). In the sub-Mediterranean climate of Montenegro and Epirus more hemicryptophytes thrive due to less arid climate and two distinct groups of communities are evident in the *Romuleion*, one along coasts and one more continental or at higher altitudes.

The newly described association from Montenegro, *Romuleo bulbocodii-Poetum bulbosae*, is also characterized by many species of the class *Festuco-Brometea*; some of them (*Bothriochloa ischaemum*, *Festuca stricta* subsp. *sulcata*, *Ranunculus millefoliatus* and *Salvia officinalis*) are also considered as diagnostic species of the association. Due to the transitional character of the studied association between *Poetea bulbosae* and *Festuco-Brometea* class, we compared our stands with *Festuco-Brometea* dry grasslands reported for the sub-Mediterranean part of Montenegro (not shown). Mix of character species of different classes, human impact, and frequent droughts in recent years make clear syntaxonomic classification difficult. Based on floristical and ecological differences and dominance of species of the *Poetea bulbosae* species, accompanied with some elements of *Helianthmetea guttati* and *Stipo-Trachinietea distahyae* class, we decided to classify it within the *Poetea bulbosae* class. The other

association described from Montenegro, *Ornithogalo exscapii-Poetum bulbosae*, is clearly separated from the *Festuco-Brometea* grasslands in the sub-Mediterranean part of Montenegro.

Due to the high floristic and phenological diversity and the difficulty of sampling *Romuleion* communities, there is a lack of data on this vegetation type in the Mediterranean region. Communities studied are reported for Croatia (Škvorc et al. 2017), but detailed phytosociological studies are lacking. Considering the distribution of character species and ecology of sites, we assume that *Romuleion* alliance has a wider distribution than reported (Albania and other parts of Greece). Further, we estimate that *Romuleion* dry grasslands are distributed also in coastal part of Montenegro. We found similar stands dominated by *Romulea bulbocodium* in the wider surroundings of Ulcinj (unpublished). These stands are restricted to shallow, skeletoid sandy areas along roadsides, that are not grazed, but heavily trampled. Therefore, they are dominated by many ruderal species (*Avena barbata*, *Dasypyrum villosum*, *Tordylium apulum* L. and *Vicia villosa* subsp. *varia* (Host) Corb.). The potential occurrence of *Romuleion* communities on such sites should be studied in the future.

The *Satureja subspicata-Poa bulbosa* community is reported for sub-Mediterranean part of Montenegro (Černjavski et al. 1949), which is relatively close to our sampling sites. There are floristic differences between our stands of Čemovsko polje and the *Satureja subspicata-Poa bulbosa* community; it is obvious that the vegetation sampling was made only in the phenological optimum. Therefore, many late winter and early spring species are missing.

The *Festuco illyricae-Poetum bulbosae* community, dominated with grass *Poa bulbosa*, is reported for wider area of Podgorica (Blečić and Lakušić 1976), and for the Kvarner area in Croatia (Trinajstić 2008). A comparison of the *Romuleion* dry grasslands and the synoptic table for the *Festuco illyricae-Poetum bulbosae* community from Croatia (Horvat et al. 1974) shows many floristic differences, although both associations are dominated by *Poa bulbosa*. The *Festuco illyricae-Poetum bulbosae* community is classified within the *Festuco-Brometea* class (Horvat et al. 1974; Trinajstić 2008; Terzi 2015).

Dry grasslands of *Romuleion* alliance are distributed in areas where the potential vegetation are thermophilous oak forests dominated by *Quercus trojana* Webb and *Quercus pubescens* Willd. and evergreen forest dominated by *Quercus ilex* L. and *Quercus coccifera* L. These communities have become established as a result of permanent agropastoral activities and represent typical elements of the Mediterranean cultural landscape (Čarni et al. 2014).

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Appendix 1. Species in Table 1 occurring in less than 3 relevés

Hypochaeris cretensis (L.) Bory & Chaub. 13: 1, 5: +; *Prunella laciniata* L. 2: +, 7: 1; *Medicago lupulina* L. 14: +, 34: +; *Lolium perenne* L. 13: +; *Scleranthus annuus* subsp. *polycarpos* (L.) Bonnier & Layens 23: +; *Briza maxima* L. 14: +; *Trifolium stellatum* L. 11: +; *Linum strictum* L. 25: +; *Saxifraga tridactylites* L. 12: 1; *Hornungia petraea* (L.) Rchb. 10: +; *Alyssum alyssoides* (L.) L. 8: +; *Aphanes arvensis* L. 34: +; *Matricaria chamomilla* L. 9: +; *Fumaria officinalis* L. 3: +; *Serapias vomeracea* (Burm. f.) Briq. 7: +, 31: +; *Prunella vulgaris* L. 13: +; *Poa trivialis* L. 2: +; *Verbena officinalis* L. 8: +; *Sporobolus indicus* (L.) R. Br. 13: 2; *Tragopogon pratensis* subsp. *orientalis* (L.) Čelak. 1: +; *Poa pratensis* L. 2: 1; *Trifolium repens* L. 13: 1; *Galium mollugo* L. 2: 1; *Carex halleriana* Asso 10: 1, 12: 2; *Fumana procumbens* (Dunal) Gren. & Godr. 10: 1, 27: +; *Satureja montana* L. 24: 2; *Tragopogon porrifolius* L. 12: +; *Teucrium chamaedrys* L. 31: +; *Spiranthes spiralis* (L.) Chevall. 32: +; *Medicago prostrata* Jacq. 10: 1, 12: +; *Polygala comosa* Schkuhr 10: +; *Gagea pusilla* (F. W. Schmidt) Sweet 1: +; *Bromopsis pannonica* (Kumm. & Sendtn.) Holub 14: 1, 12: 3; *Pilosella bauhini* (Schult.) Arv.-Touv. 10: +; *Galium lucidum* All. 12: 1; *Crupina vulgaris* Cass. 24: +, 25: +; *Trifolium striatum* L. 9: +; *Sedum sexangulare* L. 8: +; *Sedum acre* L. 7: +; *Lathyrus sphaericus* Retz. 12: +; *Lathyrus setifolius* L. 12: +; *Medicago rigidula* (L.) All. 11: +, 31: +; *Gastridium ventricosum* (Gouan) Schinz & Thell. 14: +; *Thymelaea passerina* (L.) Coss. & Germ. 10: +, 34: +; *Bunias erucago* L. 11: +; *Anisantha madritensis* (L.) Nevski 13: +; *Orlaya grandiflora* (L.) Hoffm. 14: +, 12: 1; *Ranunculus muricatus* L. 13: +; *Cardamine hirsuta* L. 1: 1, 34: +; *Knautia integrifolia* (L.) Bertol. 11: +; *Lolium rigidum* Gaudin 25: +; *Aegilops neglecta* Bertol. 33: 1; *Aegilops triuncialis* L. 7: +, 34: +; *Valerianella locusta* (L.) Laterr. 1: +, 2: 1; *Campanula erinus* L. 3: +; *Geranium dissectum* L. 16: +; *Micromeria juliana* (L.) Benth. ex Rchb. 6: 1, 10: +; *Cephalaria leucantha* (L.) Roem. & Schult. 14: 1; *Asparagus acutifolius* L. 12: +; *Paliurus spina-christi* Mill. 3: +; *Vicia grandiflora* Scop. 7: +, 12: 1; *Eleusine tristachya* (Lam.) Lam. 9: +; *Valeriana tuberosa* L. 10: +; *Asphodelus ramosus* L. 14: 2; *Silene italica* (L.) Pers. 10: +, 16: +; *Calamintha nepeta* (L.) Kuntze 3: +; *Plantago coronopus* L. 9: 1; *Alkanna tinctoria* Tausch 18: +, 33: +; *Myosotis ramosissima* Rochel 1: +, 2: +; *Campanula lingulata* Waldst. & Kit. 10: +; *Crepis setosa* Haller f. 14: +; *Foeniculum vulgare* Mill. 11: +; *Chondrilla juncea* L. 4: +, 15: +; *Cichorium intybus* L. 14: +; *Centaurea solstitialis* L. 8: 1; *Picris hieracioides* L. 12: +; *Carduus nutans* L. 8: +, 10: +; *Silene vulgaris* (Moench) Garcke 1: +; *Calepina irregularis* (Asso) Thell. 5: +, 2: +; *Asperula aristata* subsp. *scabra* (J. Presl & C. Presl) Nyman 6: +; *Chaerophyllum coloratum* L. 12: +; *Noccaea perfoliata* (L.) Al-Shehbaz 1: 1, 2: +; *Taraxacum* F. H. Wigg. sect. *Taraxacum* 13: +; *Dactylis glomerata* subsp. *hispanica* (Roth) Nyman 13: +; *Scorzonera laciniata* L. 1: +, 2: +; *Fritillaria messanensis* subsp. *gracilis* (Ebel) Rix 3: +; *Malabaila aurea* (Sm.) Boiss. 12: +; *Salvia pratensis* subsp. *bertolonii* (Vis.) Soó 1: +, 2: +; *Poa trivialis* subsp. *sylvicola* (Guss.) H. Lindb. 13: +, 7: +; *Cerastium brachypetalum* Pers. 2: +; *Rostraria cristata* (L.) Tzvelev 33: +, 34: +; *Centaurea jacea* subsp. *angustifolia* (DC.) 2: +; *Anthyllis vulneraria* subsp. *rubriflora* (DC.) Arcang. 10: +, 14: +; *Helianthemum nummularium* subsp. *obscurum* (Čelak.) Holub 6: +, 10: +; *Scorpiurus muricatus* L. 8: +, 14: +; *Alyssum minus* (L.) L. 5: +, 8: +; *Verbascum species* 5: +, 9: +; *Vicia villosa* subsp. *varia* (Host) Corb. 7: +, 12: +; *Allium ampeloprasum* L. 2: +; *Genista sylvestris* subsp. *dalmatica* (Bartl.) H. Lindb. 10: 1.

Appendix 2. Relevé localities, coordinates (WGS84 reference system, in decimal degrees) and dates (year/month/day) of relevés in Table 1

1. Podgorica – Old Government building, 42.44127, 19.25676, 2020/05/11; 2. Podgorica – Malo Brdo, 42.45633, 19.25877, 2020/04/22; 3. Podgorica – Malo Brdo, 42.45542, 19.24872, 2020/04/22; 4. Podgorica – Malo Brdo, 42.4546, 19.24971, 2020/04/22; 5. Podgorica – Vrela Ribničke, 42.42617, 19.30133, 2020/05/12; 6. Podgorica – Vrela Ribničke, 42.42814, 19.3001, 2020/05/12; 7. Podgorica – Omerbožovići, 42.42525, 19.31892, 2020/05/12; 8. Podgorica – Omerbožovići, 42.42319, 19.30602, 2020/05/12; 9. Podgorica – Omerbožovići, 42.42817, 19.32114, 2020/05/12; 10. Kakaricka gora – kod Malog mosta, 42.43399, 19.29838, 2020/05/18; 11. Podgorica – Omerbožovići, 42.4304, 19.3195, 2020/05/12; 12. Dajbabska gora, 42.41612, 19.23846, 2020/05/11; 13. Ljubović, 42.43207, 19.25231, 2020/05/11; 14. Čemovsko polje – Stari Aerodrom, 42.43039, 19.28513, 2020/04/28; 15. Čemovsko polje, 42.42224, 19.29523, 2020/04/28; 16. Čemovsko polje, 42.42321, 19.29193, 2020/04/28; 17. Čemovsko polje, 42.42315, 19.29159, 2020/04/28; 18. Čemovsko polje, 42.42316, 19.28862, 2020/04/28; 19. Čemovsko polje to Dinoša, 42.41701, 19.32223, 2020/05/18;20. Čemovsko polje, 42.41697, 19.32029, 2020/05/18; 21. Čemovsko polje, 42.41707, 19.3205, 2020/05/18; 22. Čemovsko polje, 42.41701, 19.32032, 2020/05/18; 23. Čemovsko polje, 42.41827, 19.31656, 2020/05/18; 24. Čemovsko polje, 42.41784, 19.31825, 2020/05/18;25. Čemovsko polje to Omerbožovići, 42.42358, 19.30481, 2020/05/12; 26. Čemovsko polje to Omerbožovići, 42.41815, 19.31569, 2020/05/18; 27. Čemovsko polje, 42.41784, 19.3185, 2020/05/18; 28. Čemovsko polje, 42.41463, 19.3167, 2020/05/18; 29. Čemovsko polje, 42.42396, 19.28074, 2020/04/28; 30. Čemovsko polje, 42.4200, 19.2946, 2020/04/28; 31. Čemovsko polje, 42.42376, 19.29254, 2020/04/28; 32. Čemovsko polje, 42.42531, 19.29183, 2020/04/28; 33. Čemovsko polje, 42.40456, 19.2547, 2020/05/11; 34. Čemovsko polje, 42.40614, 19.25923, 2020/05/11.

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An *Asphodelus ramosus* dominated plant community in Montenegro: fringe or grassland?

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Abstract – Our phytosociological study in Montenegro (Čemovsko polje) deals with the syntaxonomy of arid grasslands in the Adriatic region and, in particular, different interpretations of plant communities dominated by *Asphodelus ramosus*. The main aims of this study were to contribute to knowledge of the composition of dry grasslands dominated by *Asphodelus ramosus* in Montenegro and to compare instances of *Asphodelus ramosus* dominated vegetation along the Adriatic. Our vegetation dataset included 82 phytosociological relevés: 17 from our recent field work and 72 relevés of South European *Asphodelus ramosus* communities. Ordination analysis (NMDS) was used for comparison of *Asphodelus ramosus* dominated communities in the Adriatic region. The *Asphodelus ramosus* community from Montenegro was classified into *Bromo erecti-Chrysopogonetum grylli*. The analysis revealed two distinct vegetation groups: grassland communities of the vegetation class *Festuco-Brometea* from Montenegro, Croatia and Albania, and edge vegetation of the new class *Charybdido pancratii-Asphodeletea ramosi* from Italy. Comparison with similar vegetation types shows high similarity with associations on the eastern Adriatic coast, where they are treated as grassland communities belonging to the alliance *Chrysopogono grylli-Koelerion splendentis*, order *Scorzoneretalia villosae*, class *Festuco-Brometea*.

Keywords: *Asphodelus ramosus*, *Bromo erecti-Chrysopogonetum grylli*, dry grasslands, *Festuco-Brometea*, Montenegro

Introduction

Secondary dry grassland communities in the Mediterranean have a zoo-anthropogenic origin; they have developed over centuries or even millennia of traditional land use, featuring practices such as mowing, grazing, temporary abandonment of arable fields, and/or other disturbance regimes (Apostolova et al. 2014, Valkó et al. 2018). Mediterranean and sub-Mediterranean dry grasslands are considered to be among the floristically richest vegetation types (Apostolova et al. 2014) and, at the same time, a very important habitat for endangered, rare and endemic species, so they are included in the list of Habitats of European Interest (Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora, 1992), as well as the European Red List of Habitats (Janssen et al. 2016). Compared to other parts of Europe, dry grasslands of the Balkan peninsula are still well preserved (Apostolova et al. 2014).

The Balkan peninsula is well known for its rich flora and well-preserved vegetation, because it was a glacial refuge for animal and plant species (Griffiths et al. 2004). Its biodiversity is considered to be among the highest in Europe (Apostolova et al. 2014). The peninsula is characterized by the presence of a broad spectrum of dry grasslands (e.g., Horvat et al. 1974, Jovanović et al. 1986, Apostolova et al. 2014, Terzi 2015, Ačić et al. 2015, Matevski et al. 2018). In some Balkan countries (Slovenia, Serbia, Bulgaria, Croatia, North Macedonia), dry grassland vegetation has been intensively researched (Apostolova et al. 2014, Matevski et al. 2018). In contrast to these countries, research into this type of vegetation in Montenegro has considerable discontinuity, and comprenhensive studies, especially in the sub-Mediterranean and Mediterranean region, are rare (Pulević and Bulić 2012).

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In our study, we focused on research into *Asphodelus ramosus*-dominated vegetation. *Asphodelus ramosus* is a species native to the Mediterranean and Macaronesian regions: southern Europe, northern Africa, the Middle East, Mediterranean islands and Canary Islands. It can be found in forest edges and grasslands, generally on basic soils of a certain depth, forming very dense populations in grazed areas, from the coast up to 1000 m, occasionally reaching 2150 m in the mountain systems of North Africa (Diaz-Lifante and Valdés 1996). It is unpalatable for grazing animals.

Research into plant communities dominated by *Asphodelus* spp. (and *Asphodelus ramosus* in particular) has become very intensive in recent years, especially in the western and central Mediterranean (Allegrezza et al. 2015, Biondi et al. 2016, 2017). In the Balkan peninsula, similar vegetation has been described from Albania (Fanelli et al. 2015) and Croatia (Horvatić 1934, 1939, 1963, Šegulja 1969, 1970, Hećimović 1984, Jasprica and Ruščić 2013, Jasprica et al. 2016).

Today, there are different opinions about the syntaxonomical classification of *Asphodelus ramosus* dominated vegetation in Europe and its position in the landscape (as grasslands or fringe (saum) communities). In the eastern Adriatic, these communities have been classified within the grassland class *Festuco-Brometea*, while in the central and western Adriatic, they have been classified as heliophilous edge vegetation of *Trifolio-Geranietea sanguinei* (Biondi et al. 2014, Allegrezza et al. 2015) or recently into a new class *Charybdido pancratii-Asphodeletea ramosi* Biondi et al. 2016 (Biondi et al. 2016, 2017).

The aim of this study was to (i) contribute to knowledge of the composition of dry grasslands dominated by *Asphodelus ramosus* in Montenegro and (ii) compare examples of *Asphodelus ramosus* dominated vegetation along the Adriatic and its syntaxonomical classification and classification into Natura 2000 habitat types.

Materials and methods

Study area

Čemovsko polje is a part of Zetska ravnica plain in Montenegro, between the rivers Morača, Cijevna and Ribnica. It covers 165 km² and extends from Podgorica, the capital of Montenegro, to Skadar Lake. The altitude of the investigated area ranges from 12 to 30 m a.s.l. During the Pleistocene period, moraine material eroded from the mountains was carried along the rivers Morača and Cijevna into the area of Čemovsko polje (Radojičić 2015). The dominant types of soil are eutric cambisol and rendzina, which are formed on fluvio-glacial deposits, and consequently are often shallow and skeletoid (Burić et al. 2017). The area of Čemovsko polje has a Mediterranean climate with hot summers – Csa (Burić and Micev 2008). A grassland ecosystem is dominant in this area. The studied *Asphodelus ramosus* – dominated vegetation occurs in pastures used for grazing by cattle and sheep. A significant area of Čemovsko polje is occupied by vineyards and plantations of peach and other kinds of fruit (Radojičić 2015). The area investigated has also recently been heavily impacted by urbanization (Burić et al. 2017).

Although many floristic studies have been performed in the area of Čemovsko polje (Černjavski et al. 1949, Hadžiablahović 2010, 2018, Stešević et al. 2014), the vegetation has remained poorly studied (Černjavski et al. 1949, Hadžiablahović 2018). Potential natural vegetation of the wider area of Podgorica and Lake Skadar is Apulian-southeast Adriatic meso-supra-Mediterranean *Quercus trojana* forests with *Pistacia* species (Bohn et al. 2000-2003) or precisely Macedonian oak forest '*Quercetum trojanae montenegrinum* Blečić et Lakušić 1975' (recte: *Quercetum trojanae* Em 1958). Illyrian sub-Mediterranean rocky grasslands on shallow calcareous soils of the alliance *Chrysopogono grylli-Koelerion splendentis* Horvatić 1973 prevail in the area of Čemovsko polje (Hadžiablahović 2010).

Sampling and data analysis

From April to June 2019, we sampled *Asphodelus ramosus*-dominated plant communities on Čemovsko polje according to the Braun-Blanquet method (Braun-Blanquet 1964). We made 17 relevés and the size of plots was 25 m². The minimum distance between plots was 100 m. The minimum coverage value of *Asphodelus ramosus* for it to be considered dominant was 25%. Each plot was visited in April and again in June. Cover values of species and total vegetation cover are based on the summer aspect (Tab. 1, Appendix 1). GPS coordinates were recorded for each plot (Appendix 2). All relevés made during fieldwork and relevés from the literature were entered into the Turboveg (Hennekens and Schaminée 2001) database. Relevés from the literature were used for comparison with vegetation data from our fieldwork (Appendix 3).

We obtained characteristic species of the association *Bromo erecti-Chrysopogonetum grylli* according to Horvatić (1963). Diagnostic taxa of alliance and order were assigned according to Terzi (2015), while the diagnostic taxa of classes were determined according to Terzi (2015) for the class *Festuco-Brometea*, Mucina et al. (2014) for other classes and Biondi et al. (2016) for the class *Charybdido pancratii-Asphodeletea ramosi*.

Non-metric multidimensional scaling (NMDS, Kruskal 1964) was used to examine the overall variation in the species composition in the whole relevé dataset. Hellinger transformation of percentage cover values (5=87.5 %, 4=62.5 %, 3=37.5 %, 2=12.5 %, 1=2.5 %, +=0.5 %, r=0.1 %) was used and Bray-Curtis as a measure of dissimilarity. NMDS was performed using the R package 'vegan' (Oksanen et al. 2017). For ecological interpretation of vegetation patterns, ecological indicator values (Pignatti et al. 2005) were passively projected onto the NMDS graph. Weighted by species cover, mean indicator values were calculated for each relevé using JUICE software (Tichý 2002).

The nomenclature of taxa is in accordance with Euro+Med (2006) and the nomenclature of higher syntaxa according to Mucina et al. (2014).

The taxonomy of *Asphodelus ramosus* species was sometimes ambiguous. Previously, the species *Asphodelus microcarpus* Viv. was accepted as valid by many authors but, after a taxonomic revision of the genus *Asphodelus* in the western Mediterranean (Díaz-Lifante and Valdés 1996), it has been considered a synonym of *Asphodelus ramosus* L. (Euro+Med 2006).

Results

The *Asphodelus ramosus* plant community from Čemovsko polje (Montenegro) is represented by 17 relevés in the phytosociological table (Tab. 1). The dominant species of the association are *Asphodelus ramosus* and *Chrysopogon gryllus*, while the most frequent species are *Asphodelus ramosus*, *Sanguisorba minor*, *Poa bulbosa*, *Teucrium capitatum*, *Sideritis romana* subsp. *purpurea*, and *Anacamptis papilionacea*. *Asphodelus ramosus* is also considered to be the only characteristic species of the association. The community develops in two clear phenological aspects. In the spring aspect (Fig. 2A), the dominant species is *Asphodelus ramosus*, while in summer (Fig. 2B), dominance is taken by the tall grass *Chrysopogon gryllus*. The spring aspect is also characterised by high frequency and coverage of *Anemone hortensis*, *Poa bulbosa* and *Sanguisorba minor*, and the summer one by *Bupleurum veronense* and *Teucrium capitatum*.

In addition to the species characteristic for the class *Festuco-Brometea*, there are several species of annual and ephemeral grasslands of the classes *Stipo-Trachynietea distachyae* and *Helianthemetea guttate*, and seasonal perennial and ephemeroid pastures of the class *Poetea bulbosae*, all indicating the Mediterranean and grassland character of the studied plant community. The impact of grazing is evident from the many ruderal species: *Avena barbata*, *Scandix pecten-veneris*, *Daucus guttatus*, *Scolymus hispanicus*, *Bromus squarrosus*, *Euphorbia exigua*, *Sonchus oleraceus* (Tab. 1). The studied stands constitute an open grassland community, which develops on stony soil and is used for grazing (cattle and sheep). Total vegetation coverage is 60 – 80% in the summer aspect. Stones and pebbles have dimensions of up to 20 cm and their cover is 5 – 40%. If the stones are removed and these areas are used for mowing, the vegetation changes into dry grasslands of the alliance *Vulpio-Lolion* (Hadžiablahović 2018).

Using various numerical classifications, we tried to classify the association *Bromo erecti-Chrysopogonetum grylli* into subassociations. This kind of vegetation is fairly uniform in the study area, and there were no ecologically evident/logical subunits.

A comparison of the studied *Asphodelus* community from Montenegro with *Asphodelus ramosus*-dominated communities from around the Adriatic (Fig. 1) revealed two distinct vegetation groups (Tab. 2, Fig. 3). Communities from Albania, Croatia and Montenegro form one group,

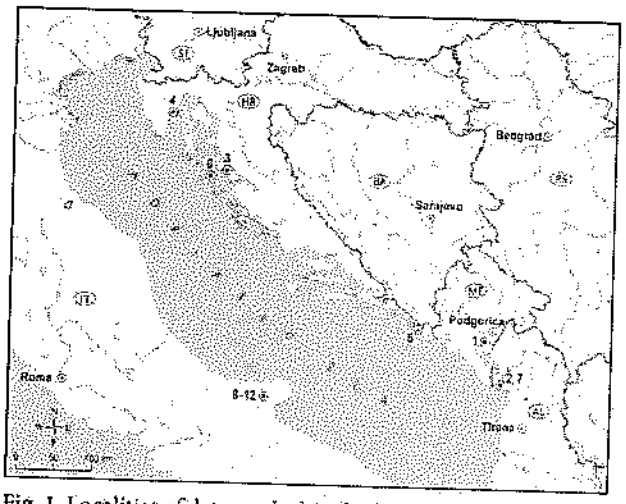

Fig. 1. Localities of data used of *Asphodelus ramosus*-dominated communities. See Tab. 2 for community abbreviations. AL – Albania, BA – Bosnia and Herzegovina, HR – Croatia, IT – Italy, ME – Montenegro, RS – Serbia, SI – Slovenia.

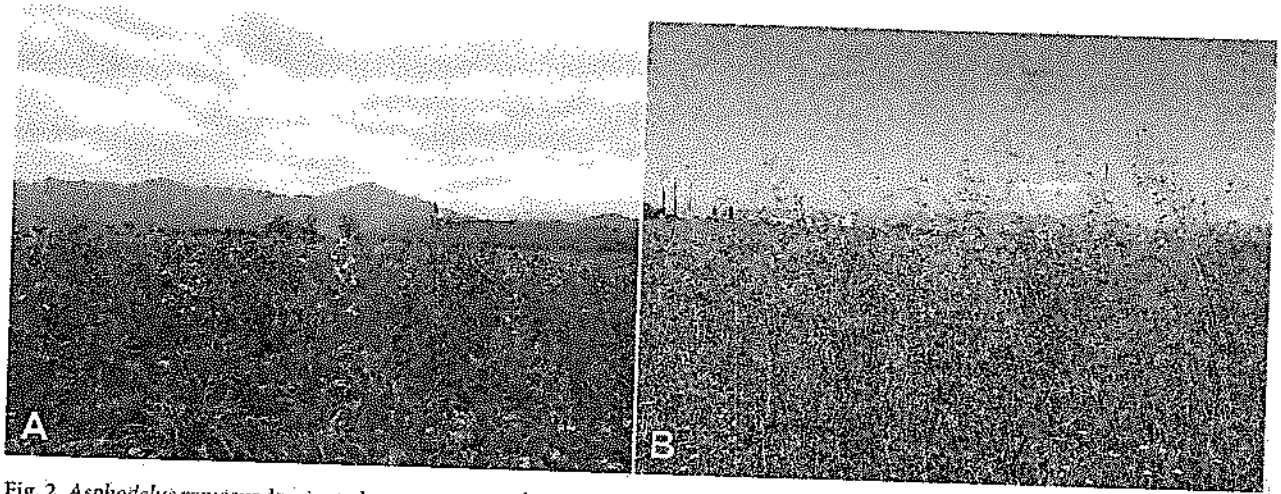

Fig. 2. *Asphodelus ramosus* dominated community on Čemovsko polje, vicinity of Podgorica, Montenegro. A – spring aspect, B – summer aspect.

Table 1. Phytosociological table of the association *Bromo erecti-Chrysopogonetum grylli* in Čemovsko polje (Montenegro).

Relevé number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Presence (%)
Plot size (m²)	25																	
Vegetation cover (%)	80	60	80	70	75	60	60	75	60	65	70	70	60	60	60	60	60	
Bromo erecti-Chrysopogonetum grylli																		
Asphodelus ramosus	4	3	4	3	4	3	3	3	3	4	3	3	3	3	4	3	4	17
Chrysopogono grylli-Koelerion splendentis																		
Bupleurum veronense	+	+	+	.	.	+	.	+	.	.	+	.	+	+	+	.	.	9
Carduus nutans subsp. *micropterus*	.	+	.	+	.	.	.	+	.	.	.	.	.	+	.	.	.	4
Scorzoneretalia villosae																		
Chrysopogon gryllus	1	2	2	3	2	2	1	2	.	1	3	2	2	2	2	1	.	15
Eryngium amethystinum	+	+	1	.	1	+	1	+	+	.	1	1	+	1	1	1	1	15
Koeleria lobata	+	+	+	.	+	1	.	.	+	.	1	.	+	1	1	+	1	12
Seseli montanum subsp. *tommasinii*	1	.	.	.	+	.	+	.	+	.	.	1	.	.	+	1	.	7
Satureja subspicata	.	.	.	+	.	.	.	.	+	2	.	.	.	2	2	.	+	6
Festuca stricta subsp. *sulcata*	.	.	.	+	.	+	.	1	2	.	.	+	.	.	.	.	.	5
Medicago prostrata	+	.	.	.	.	.	.	.	.	.	1	+	.	+	.	.	.	4
Plantago holosteum	.	+	+	+	.	.	.	.	.	.	.	+	.	.	.	.	.	4
Bunium alpinum subsp. *montanum*	.	.	+	.	.	.	.	.	+	+	.	.	.	.	+	.	.	4
Scorzonera villosa	.	.	1	+	.	.	.	.	+	+	.	.	.	.	.	.	.	4
Festuco-Brometea																		
Sanguisorba minor	3	2	3	2	2	+	1	2	+	1	2	2	2	1	1	2	1	17
Poa bulbosa	1	1	1	2	1	2	2	1	+	+	1	+	2	1	1	2	1	17
Teucrium capitatum	+	1	1	+	+	1	1	1	2	+	1	2	+	2	2	1	1	17
Hypericum perforatum	+	+	+	+	+	+	.	1	+	.	+	+	+	+	+	1	+	15
Hippocrepis ciliata	+	.	1	.	+	1	+	.	.	1	+	+	+	+	+	+	+	13
Centaurea deusta	+	+	.	.	+	+	+	3	1	+	1	1	1	1	.	3	.	13
Leontodon crispus	.	.	+	+	+	.	.	.	1	1	1	1	1	.	1	+	+	11
Ranunculus millefoliatus	.	+	+	+	.	.	.	+	+	.	.	+	1	+	+	.	+	10
Convolvulus cantabrica	+	.	.	.	2	1	2	.	.	.	1	1	1	+	.	1	.	9
Petrorhagia saxifraga	.	.	.	+	+	+	+	+	.	.	+	+	.	.	+	+	.	9
Linum tenuifolium	.	+	+	.	.	+	.	.	1	.	.	+	+	+	.	.	+	8
Anthyllis vulneraria subsp. *polyphylla*	.	.	+	.	+	+	.	.	+	+	+	+	+	.	.	.	.	8
Carex caryophyllea	.	.	.	1	.	.	.	.	.	.	1	+	+	1	1	1	.	7
Podospermum laciniatum	+	+	.	+	+	.	.	.	.	.	.	.	.	.	.	.	+	5
Bothriochloa ischaemum	.	.	.	.	.	.	.	+	1	+	1	.	.	.	1	.	.	5
Anacamptis morio	.	+	.	+	+	.	.	.	.	.	+	.	.	.	.	.	.	4
Trifolium campestre	.	+	.	.	.	.	+	.	.	+	.	.	.	.	.	+	.	4
Ophrys sphegodes	.	.	.	.	.	.	+	.	+	.	.	.	.	.	+	.	.	3
Cuscuta epithymum subsp. *epithymum*	.	.	.	.	+	.	.	.	.	+	+	.	.	.	.	.	.	3
Thymus striatus	.	.	.	.	.	.	.	.	+	.	.	.	+	+	.	.	.	3
Leopoldia comosa	.	+	.	.	.	.	.	.	+	.	.	.	.	.	.	+	.	3
Chenopodietea																		
Avena barbata	+	+	+	+	1	1	1	.	.	2	.	.	1	.	.	+	+	11
Valantia muralis	.	.	1	.	+	.	.	.	.	1	.	.	.	.	+	.	+	5
Scandix pecten-veneris	.	.	.	.	.	.	.	+	+	.	.	+	.	.	.	.	.	3
Stipo-Trachynietea distachyae																		
Sideritis romana subsp. *purpurea*	+	+	1	+	+	1	+	+	+	+	+	+	+	+	+	1	17
Crepis sancta	1	1	+	+	1	1	1	1	+	1	+	+	.	.	.	1	+	14
Arenaria leptoclados	1	.	+	1	+	+	+	.	.	.	.	.	+	+	+	+	.	10
Polygala monspeliaca	.	+	+	.	+	+	+	.	.	+	+	.	.	+	.	1	+	10
Ornithogalum collinum	+	.	.	.	+	+	+	1	+	.	1	1	2	.	.	.	.	9
Tordylium apulum	.	.	.	+	.	+	+	+	.	.	+	.	.	.	.	.	+	6

Relevé number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Presence (%)
Plot size (m²)									25									
Vegetation cover (%)	80	60	80	70	75	60	60	75	60	65	70	70	60	60	60	60	60	
Petrorhagia dubia	.	.	+	+	.	.	.	+	.	.	.	.	+	.	.	.	.	4
Filago germanica	+	.	.	.	.	+	.	.	.	.	.	+	.	.	.	.	+	4
Ononis reclinata	+	.	.	.	+	+	.	.	.	.	.	.	.	.	.	+	.	4
Trachynia distachya	.	.	+	.	+	.	.	.	.	.	.	1	.	.	.	.	.	3
Neatostema apulum	.	.	.	.	.	.	.	.	.	.	.	.	1	+	+	.	.	3
Helianthemetea guttati																		
Helianthemum salicifolium	1	+	1	+	1	1	2	2	+	1	1	1	1	.	1	1	.	15
Crupina vulgaris	+	+	+	.	+	+	1	.	1	+	+	+	+	+	.	.	.	12
Asterolinon linum-stellatum	+	1	+	+	+	1	1	.	.	.	.	.	+	+	1	+	.	11
Galium divaricatum	1	1	+	+	.	+	.	+	.	.	.	.	.	+	.	+	+	9
Plantago bellardii	+	.	.	.	.	.	+	+	.	+	.	.	1	+	+	.	.	7
Linaria pelisseriana	.	+	.	+	.	.	.	+	+	.	.	.	.	.	.	+	.	5
Filago gallica	.	+	.	.	.	+	.	.	.	.	.	.	+	.	+	.	.	4
Aira elegantissima	.	.	.	+	.	.	.	.	.	.	.	.	.	+	.	+	+	4
Trifolium stellatum	+	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	3
Poetea bulbosae																		
Anthoxanthum odoratum	+	2	.	1	+	+	+	.	+	+	.	.	+	+	.	1	+	12
Trifolium subterraneum	+	1	.	1	+	.	+	+	.	.	1	.	+	.	.	1	1	10
Plantago lanceolata	.	+	+	1	.	.	.	+	+	+	.	.	.	.	.	+	+	8
Leontodon tuberosus	.	.	+	+	+	.	+	1	+	.	.	.	.	.	.	.	.	6
Herniaria glabra	.	.	.	.	.	.	.	.	.	.	.	+	+	+	+	.	.	4
Prospero autumnale	.	.	+	.	.	.	.	.	.	.	.	+	.	.	+	.	.	3
Trifolium nigrescens	.	+	.	.	.	.	.	.	.	1	.	.	.	.	.	.	+	3
Sedo-Scleranthetea																		
Cerastium pumilum subsp. *glutinosum*	+	+	.	1	1	1	.	+	.	.	.	.	1	+	+	1	+	11
Viola kitaibeliana	1	1	+	+	+	+	.	+	.	+	.	.	+	+	.	.	.	10
Clinopodium acinos	.	.	+	.	+	.	1	.	.	.	+	+	+	+	+	.	.	8
Draba verna	+	.	.	+	.	.	.	.	.	.	.	+	+	+	+	.	.	6
Artemisietea vulgaris																		
Daucus guttatus	+	+	+	+	+	1	1	.	.	2	+	.	+	.	.	+	+	12
Scolymus hispanicus	.	+	+	1	.	+	1	1	+	+	+	.	.	.	+	1	.	11
Tyrimnus leucographus	1	.	.	+	.	+	+	1	.	+	.	.	.	.	.	+	+	8
Potentilla recta	.	.	.	+	1	.	+	1	.	.	.	.	.	+	.	.	.	5
Sisymbrietea																		
Geranium columbinum	+	+	.	+	+	+	+	+	+	+	+	.	+	+	.	+	+	14
Erodium cicutarium	+	.	.	1	.	.	.	1	.	.	+	+	1	+	+	.	1	9
Bromus squarrosus	1	.	.	.	.	.	1	+	.	.	1	.	+	.	+	.	.	6
Papaveretea rhoedis																		
Euphorbia exigua	+	.	.	.	+	1	1	.	.	+	+	+	+	1	1	+	+	+	13
Sherardia arvensis	+	+	.	.	+	+	1	.	+	.	.	.	+	.	.	+	+	9
Anagallis arvensis	.	.	+	+	+	+	1	.	+	1	.	.	.	.	.	+	.	8
Sonchus oleraceus	+	+	.	.	.	+	+	.	.	+	+	.	+	.	.	.	.	7
Euphorbia helioscopia	.	.	.	.	.	.	.	.	+	.	.	+	+	.	.	+	.	4
Euphorbia taurinensis	.	.	.	.	.	.	.	.	.	.	.	+	+	+	.	.	.	3
Molinio-Arrhenatheretea																		
Serapias vomeracea	.	.	+	.	.	.	.	.	.	+	+	.	+	.	+	.	5	
Hypochaeris radicata	.	+	.	+	.	.	.	.	.	.	.	.	.	+	+	1	5	
Ononido-Rosmarinetea																		
Carlina corymbosa	.	.	+	.	1	+	1	.	.	+	+	1	1	+	.	.	1	10

Relevé number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Presence (%)
Plot size (m²)									25									
Vegetation cover (%)	80	60	80	70	75	60	60	75	60	65	70	70	60	60	60	60	60	
Lygeo sparti-Stipetea tenacissimae																		
Anacamptis papilionacea	+	+	+	+	+	.	+	+	+	1	1	1	1	1	+	1	+	16
Anemone hortensis	2	2	2	2	2	1	2	1	+	1	1	.	.	.	.	2	.	12
Other species																		
Cynodon dactylon	.	+	+	+	+	+	+	.	+	1	+	+	+	+	+	+	+	15
Allium guttatum subsp. *sardoum*	+	1	.	1	+	.	+	+	.	.	+	.	+	.	+	+	+	11
Cerastium ligusticum subsp. *trichogynum*	2	1	+	1	1	.	.	.	+	.	.	1	.	1	1	.	.	9
Silene italica	.	+	+	+	+	+	.	.	.	.	+	1	.	1	.	.	.	8
Alkanna tinctoria	.	.	.	.	.	+	.	.	.	.	1	1	1	1	1	.	.	6
Hainardia cylindrica	.	.	.	.	.	.	1	.	.	.	.	.	+	+	.	.	.	3
Trifolium scabrum	.	.	.	.	.	.	.	.	.	+	.	+	+	.	.	.	.	3

Table 2. Shortened synoptic table of plant communities with *Asphodelus ramosus*. The original classification indicated by authors is used. Communities: 1. *Bromo erecti-Chrysopogonetum grylli* (Montenegro, new relevés from Čemovsko polje), 2. *Asphodelo-Chrysopogonetum grylli* (Albania, Fanelli et al. 2015), 3. *Bromo-Chrysopogonetum grylli* subass. *asphodeletosum microcarpi* (Croatia, Horvatić 1934), 4. *Narcisso tazzettae-Asphodeletum microcarpi* (Croatia, Šegulja 1970), 5. *Narcisso tazzettae-Asphodeletum microcarpi* (Croatia, Hećimović 1984), 6. *Narcisso tazzettae-Asphodeletum microcarpi* (Croatia, Jasprica et al. 2016), 7. *Asphodelus ramosus* community (Albania, Fanelli et al. 2015), 8. *Charybdido pancratii-Asphodeletum ramosi* (Italy, Biondi et al. 2016), 9. *Alkanno tinctoriae-Asphodeletum ramosi* (Italy, Biondi et al. 2016), 10. *Euphorbio characiae-Thapsietum garganicae* (Italy, Biondi et al. 2017), 11. *Asphodelo ramosi-Feruletum communis* (Italy, Biondi et al. 2016), 12. *Asphodelino luteae-Feruletum communis* (Italy, Biondi et al. 2016).

Plant community	1	2	3	4	5	6	7	8	9	10	11	12
Number of relevés	17	4	12	8	10	3	3	14	3	5	2	7
Bromo erecti-Chrysopogonetum grylli												
Asphodelus ramosus	100	25	100	100	100	100	100	100	100	60	100	100
Cytisus spinescens	.	.	50	.	.	.	.	.	.	.	.	.
Narcisso tazzettae-Asphodeletum microcarpi												
Narcissus tazetta	.	25	.	100	70	100	.	7	.	.	.	.
Anacamptis papilionacea	94	.	.	75	.	.	.	21	.	40	.	29
Chrysopogono grylli-Koelerion splendentis												
Carduus nutans subsp. *micropterus*	24	25	50	50	50	.	.	.	.	80	.	43
Bupleurum veronense	53	.	42	.	90	.	67	.	.	.	.	.
Centaurea cristata	.	.	.	13	.	.	.	.	.	.	.	.
Salvia officinalis	.	50	8	.	.	.	.	.	.	.	.	.
Scorzoneretalia villosae												
Chrysopogon gryllus	88	100	100	88	.	67	33	.	.	.	.	.
Koeleria lobata	71	25	67	88	40	67	.	.	.	.	.	.
Plantago holosteum	24	25	33	88	.	.	.	.	.	.	.	.
Eryngium amethystinum	88	50	58	88	.	.	33	7	.	60	.	57
Salvia pratensis	.	25	33	88	.	.	.	.	.	.	.	.
Medicago prostrata	24	.	25	.	.	.	.	.	.	.	.	.
Festuca valesiaca	.	.	83	13	.	.	.	.	.	.	.	.
Seseli montanum subsp. *tommasinii*	41	.	.	.	.	.	.	.	.	.	.	.
Satureja subspicata	35	.	.	.	.	.	.	.	.	.	.	.
Potentilla heptaphylla subsp. *australis*	.	.	8	.	.	.	.	.	.	.	.	.
Dorycnium pentaphyllum subsp. *germanicum*	.	.	17	.	.	.	.	.	.	.	.	.
Festuco-Brometea												
Sanguisorba minor	100	25	17	88	.	.	.	29	.	20	.	.
Bothriochloa ischaemum	29	25	.	50	100	.	33	.	.	.	.	.
Bromopsis erecta	.	25	100	75	.	33	.	.	.	.	.	.
Hippocrepis comosa	.	.	17	25	.	.	.	.	.	.	.	.

Plant community	1	2	3	4	5	6	7	8	9	10	11	12
Number of relevés	17	4	12	8	10	3	3	14	3	5	2	7
Linum tenuifolium	47	25	8	63	.	.	.	.	.	.	.	.
Ruta graveolens	.	25	17	75	.	.	.	36	.	.	.	.
Leopoldia comosa	18	.	.	.	70	.	.	.	.	.	.	43
Carex caryophyllea	41	25	.	50	.	.	.	.	.	.	.	.
Satureja montana	.	25	8	.	.	.	33	.	.	.	.	.
Ranunculus millefoliatus	59	.	.	.	.	.	.	.	.	20	.	14
Charybdido pancratii-Asphodeletum ramosi												
Carlina corymbosa	76	50	100	63	.	.	33	50	.	80	100	29
Asparagus acutifolius	6	25	50	100	50	.	.	79	100	60	100	86
Drimia pancration	.	.	.	.	.	.	.	100	67	20	100	57
Anemone hortensis	71	25	.	63	70	.	.	64	.	80	50	57
Asphodeline lutea	.	.	.	.	.	.	.	7	.	60	.	100
Thapsia garganica	.	.	.	.	.	.	.	57	.	100	.	100
Ferula communis	.	.	.	.	.	.	.	.	.	20	100	100
Hypochaeris radicata	29	.	.	.	.	.	.	29	33	.	.	.
Asphodeline liburnica	.	.	.	.	.	.	.	7	.	.	.	.
Other												
Dactylis glomerata subsp. *hispanica*	.	25	100	88	50	100	.	93	67	.	.	.
Plantago lanceolata	47	25	33	100	90	.	.	29	.	.	.	71
Reichardia picroides	.	25	50	75	100	67	.	43	.	40	.	43
Catapodium rigidum	6	50	75	88	100	.	100	.	.	.	.	.
Crepis sancta	82	.	.	.	.	.	.	43	67	.	100	43
Avena barbata	65	.	33	50	.	.	67	.	33	.	100	29
Trifolium scabrum	18	25	25	25	50	.	67	.	.	.	.	.
Helichrysum italicum	.	25	75	50	90	67	33	7	.	.	.	.
Paliurus spina-christi	25	63	.	.	.	.	.	43	.	.	100	.
Olea europaea	17	.	.	.	.	.	.	43	.	.	100	.
Pinus halepensis	.	.	.	.	.	.	.	.	33	20	.	.

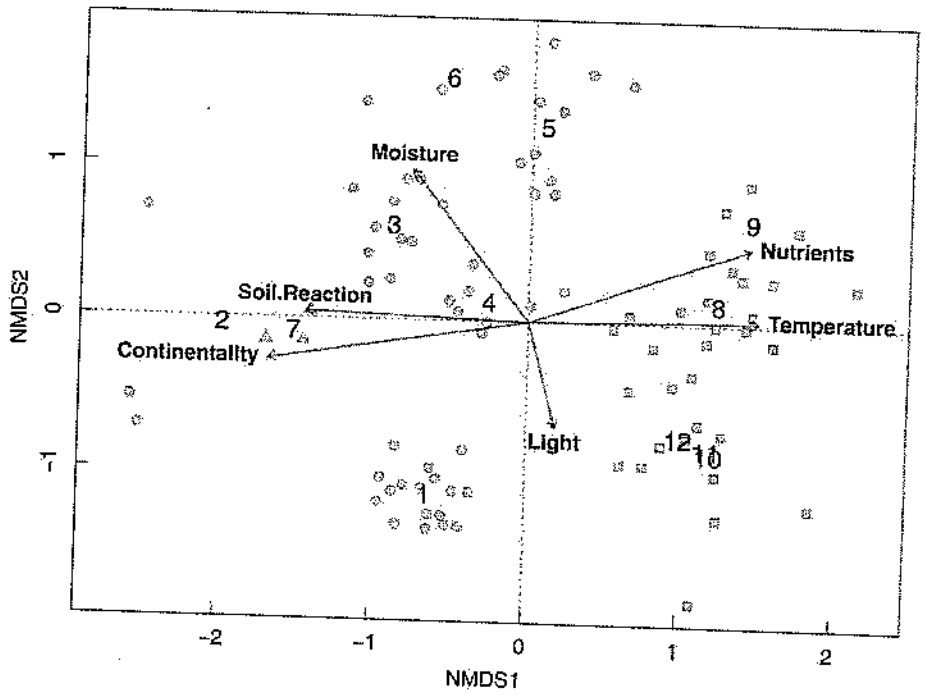

Fig. 3. NMDS ordination of *Asphodelus ramosus*-dominated communities from the Adriatic region with passively projected ecological indicator values. Symbols indicate classification into the classes: ○ – *Festuco-Brometea*, △ – *Artemisietea vularis*, □ – *Charybdido pancratii-Asphodeletea ramosi*. Numbers indicate centroids of relevés of particular communities (see Tab. 2).

with abundant grassland species of the class *Festuco-Brometea*, which are not present in the second group of edge communities from Italy. Two dimensional solution of the NMDS ordination attained a minimum stress of 0.21. The NMDS ordination clearly distinguishes the two groups along gradients of nutrients, light and soil reaction. Edge communities from Italy thrive on more nutrient-rich, shaded sites (Fig. 3).

Based on floristic composition and all the comparative analyses, we decided to classify the studied stands dominated by *Asphodelus ramosus* into the already described grassland association *Bromo erecti-Chrysopogonetum grylli*.

Discussion

In recent years, several studies on the distribution and dynamics of plant communities with *Asphodelus ramosus* have been performed, especially in the central and western Mediterranean (Biondi et al. 2016, Biondi et al. 2017). In contrast, this type of vegetation has been poorly studied in Montenegro.

The association *Bromo erecti-Chrysopogonetum grylli* was described for the first time in Croatia (Island of Pag, Horvatić 1934), with two subassociations (*Bromo-Chrysopogonetum grylli dorycnietosum herbacei* and *Bromo-Chrysopogonetum grylli asphodeletosum microcarpi*), and classified in the alliance '*Chrysopogoneto-Satureion subspicatae* Horvat i Horvatić 1934' (recte: *Chrysopogono grylli-Koelerion splendentis*), order '*Brometalia erecti* Br. Bl.' Subsequently, *Bromo-Chrysopogonetum grylli asphodeletosum microcarpi* was raised by Horvatić (1963) to the rank of association, with the name *Asphodelo microcarpi-Chrysopogonetum grylli*, and included in the order '*Scorzonero-Chrysopogonetalia* H-ić et Ht (1956) 1958' (recte: *Scorzoneretalia villosae*). The association has so far been reported in Montenegro and Albania (Černjavski et al. 1949, Fanelli et al. 2015, Hadžiablahović 2018). In his nomenclatural revision of the order '*Scorzonero villosae-Chrysopogonetalia grylli* Horvatić et Horvat in Horvatić 1963', Terzi (2011) considered the associations *Asphodelo-Chrysopogonetum grylli* and *Bromo-Chrysopogonetum grylli* to be valid, while Terzi (2015) later united them and retained the earlier valid name, *Bromo-Chrysopogonetum grylli* (cf. Theurillat et al. 2021).

In Montenegro, *Bromo erecti-Chrysopogonetum grylli* was reported by Blečić and Lakušić (1976) in the coastal part of Montenegro, as well as in the vicinity of Podgorica, and by Černjavski et al. (1949) and Hadžiablahović (2018) in the area of Skadar Lake. These publications were not supported with phytosociological studies and it was not possible to make a comparison with our results from Čemovsko polje. According to Černjavski et al. (1949), *Bromo-Chrysopogonetum grylli* is developed on stony hills with thin soils, while our researched stands are found in the lowlands of Čemovsko polje on deeper alluvial soils. According to Černjavski et al. (1949) *Bromo-Chrysopogonetum grylli* is characterized by many species of shrub vegetation (*Paliurus spina-christi, Salvia officinalis, Rubus ulmifolius, Euphorbia veneta, Helichrysum italicum, Ruscus aculeatus, Cyclamen neapolitanum, Arum italicum, Phlomis fruticosa, Cistus villosus, Cistus salviaefolius, Nephrodium filix-mas, Pteridium aquilinum*, etc.) and chasmophytic vegetation (*Asplenium trichomanes, Edraianthus tenuifolius, Cardamine glauca, Silene quadridentata, Ceterach officinarum, Sedum album, Moltkea petraea*, etc.) that were absent from our stands from Čemovsko polje. Further investigation of the association *Bromo-Chrysopogonetum grylli* reported by Černjavski (1949) is needed to determine whether there are differences in relation to our community from Čemovsko polje.

Fanelli et al. (2015) reported *Asphodelo-Chrysopogonetum grylli* in Albania in the Buna River protected landscape and it shows high similarity with associations from Montenegro and Croatia. The species *Cytisus spinescens*, which is a characteristic species of the association (Horvatić 1963) is not present in stands from Montenegro and Albania. Stands from Montenegro are also characterized by an absence of species characteristic of dry grasslands of the classes *Festuco-Brometea – Salvia officinalis* and *Bromopsis erecta*.

According to Horvatić (1934, 1939), the development and distribution of *Bromo-Chrysopogonetum grylli asphodeletosum microcarpi* is conditioned by agro-pastoral activities, i.e., moderate grazing. In the case of Čemovsko polje, it is grazed particularly by sheep and rarely by cattle. Intensive and permanent grazing leads to degradation of this community, which is especially evident from the absence of *Asphodelus ramosus* from relevés on Rab island (Horvatić 1939). Intensive grazing leads to a higher abundance of shrubs (*Helichrysum italicum, Cytisus spinescens, Euphorbia spinosa, Salvia officinalis*) (Horvatić 1934), or ruderal and subruderal species (Fanelli et al. 2015). Overgrazed stands can be included in the order *Carthametalia lanatae* (*Artemisietea vulgaris*) because of abundant therophytes: *Carthamus lanatus, Dasypyrum villosum, Catapodium rigidum, Nigella arvensis*, etc. (Fanelli et al. 2015). On the other hand, stands are abandoned, after which succession leads to *Rhamno-Paliuretum* Trinajstić 1996, or are turned into mowed grasslands of the *Vulpio-Lotion* Horvatić 1963 alliance (Hadžiablahović 2018).

In several localities in Croatia along the Adriatic coast, similar vegetation types with *Asphodelus ramosus* have been reported. *Narcisso tazettae-Asphodeletum microcarpi* was described in Istria (Šegulja 1970). The same association was later reported on the islands of Bobara and Mrkan (Hećimović 1984), Supetar (Jasprica and Ruščić 2013) and Olib (Jasprica et al. 2016). Originally, it was classified into *Scorzonerion villosae*, but was later moved to *Chrysopogono grylli-Koelerion splendentis*. Ecological conditions are different to those of *Asphodelo ramosi-Chrysopogonetum grylli* and it occurs on deep skeletoid soils and under the influence of salt spray (Šegulja 1969). According to Jasprica et al. (2016), the association is considered to be the most thermophilous grassland along the eastern Adriatic coast. The characteristic species of the association are *Asphodelus ramosus, Narcissus tazzeta* and *Orchis papilionacea*. Thermophilous grassland communities with domination of

Asphodelus ramosus have a distribution along the eastern Adriatic, influenced by the Mediterranean climate.

There is a different situation along the western Adriatic coast, where *Asphodelus ramosus*-dominated communities are considered to be heliophilous fringe and tall-herb vegetation, which develops after the abandonment of agro-pastoral activities (Tesei et al. 2020). Comprehensive studies on heliophilous edge vegetation have been performed in Italy (Gargano peninsula, central part of the Apennines, northern part of Sardinia) and southern Spain (Biondi et al. 2016, 2017). As a result, a new class of edge vegetation *Charybdido pancratii-Asphodeletea ramosi* was described, focused on areas with a Mediterranean macrobioclimate (Biondi et al. 2016, 2017).

The proposal to update the EuroVegChecklist (Mucina et al. 2014) by adding this new class was provisionally rejected by the European Vegetation Classification Committee of the European Vegetation Survey working group of the International Association of Vegetation Science, due to the lack of evidence concerning a clear floristic delimitation of *Charybdido pancratii-Asphodeletea ramosi* from *Lygeo sparti-Stipetea tenacissimae* and *Trifolio-Geranietea sanguinei* (Biurrun and Willner 2020). Nonetheless, we can accept the existence of a new fringe class replacing *Trifolio-Geranietea* in the Mediterranean, but we are of the opinion that *Bromo erecti-Chrysopogonetum grylli* clearly represents grassland vegetation erroneously classified as fringe vegetation by Biondi et al. (2016). This is clearly indicated by the numerous species of *Festuco-Brometea* present in stands (Tab. 2) from eastern Adriatic *Asphodelus*-dominated communities. Fringe communities with *Asphodelus ramosus* from Italy, due to overgrazing, are dominated by monocotyledons, many of them toxic to animals, while in Montenegro these areas represent pastures. Another difference is the presence of shrub species with higher cover in stands of *Charybdido-Asphodeletea ramosi* (*Paliurus spina-christi, Olea europaea, Pinus halepensis*), missing in grasslands from the eastern Adriatic.

According to Biondi et al. (2016) the diagnostic species of the newly described class are *Asphodelus ramosus* subsp. *ramosus, A. fistlosus, A. tenuifolius, A. ayardii, Charybdis pancration, C. maritima, C. glaucophylla, C. aphylla, C. hesperia, Thapsia garganica, Asparagus acutifolius, Ornithogalum etruscum* subsp. *umbratille, Anemone hortensis, Carlina corymbosa, Hypochoeris radicata, Iris planifolia, I. bicapitata, Asphodeline liburnica, A. lutea, Ferula communis, F. communis* subsp. *cardonae, F. glauca, F. arrigonii* and *Hermodactylis tuberosus*. The diagnostic species group of *Charybdido-Asphodeletea* should also be revised, since many of them are attributed to other vegetation classes (*Festuco-Brometea, Lygeo sparti-Stipetea tenacissimae, Ononido-Rosmarinetea* etc.) according to Mucina et al. (2014). *Asphodelus ramosus, Anemone hortensis, Carlina corymbosa* and *Hypochoeris radicata*, which are considered to be character species by Biondi et al. (2016), are also very frequent in grassland vegetation of *Bromo erecti-Chrysopogonetum grylli*.

In terms of Natura 2000 habitat types (Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora, 1992) there are differences between grassland and fringe communities dominated by *Asphodelus ramosus*. Heliophilous *Asphodelus* spp. edge communities in the western and central Mediterranean do not represent any habitats of European Community interest and a progressive increase in *Asphodelus* spp. cover in grasslands can result in the disappearance of grassland habitat types (Tesei et al. 2020). According to a report of habitat types of Montenegro important for the European Union (Petrović et al. 2019), *Bromo erecti-Chrysopogonetum grylli* is classified within the Eastern sub-Mediterranean dry grasslands (*Scorzoneretalia villosae*) habitat type (code 62A0). The same situation applies to *Narcisso tazettae-Asphodeletum microcarpi* in Croatia (Jasprica et al. 2016).

Syntaxonomical scheme

Based on the analyses performed, the following syntaxonomical scheme is proposed for *Asphodelus ramosus*-dominated communities in the Adriatic region.

Festuco-Brometea Br.-Bl. et Tx. ex Soó 1947
Scorzoneretalia villosae Kovačević 1959
Chrysopogono grylli-Koelerion splendentis Horvatić 1973
Bromo erecti-Chrysopogonetum grylli Horvatić 1934
Narcisso tazettae-Asphodeletum microcarpi Šegulja 1969

Artemisietea vulgaris Lohmeyer et al. ex von Rochow
Asphodelus ramosus community

Charybdido pancratii-Asphodeletea ramosi Biondi in Biondi et al. 2016
Asphodeletalia ramosi Biondi in Biondi et al. 2016
Charybdido pancratii-Asphodelion ramosi Biondi et al. 2016
Charybdido pancratii-Asphodeletum ramosi Biondi et al. 2016
Alkanno tinctoriae-Asphodeletum ramosi Biondi et al. 2016
Euphorbio characiae-Thapsietum garganicae Biondi et al. 2017
Asphodelo ramosi-Ferulion communis Biondi et al. 2016
Asphodelo ramosi-Feruletum communis Biondi et al. 2016
Asphodelino luteae-Feruletum communis Biondi et al. 2016

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Appendix 1: Species present in only 1 or 2 relevés from Čemovsko polje in Table 1.

Asparagus acutifolius 17: +; *Catapodium rigidum* 6: +; *Geranium molle* 2: +; *Trifolium angustifolium* 3: +; *Romulea bulbocodium* 2: +; *Sonchus asper* 10: +; *Pyrus amygdaliformis* 3: 1; *Carthamus lanatus* 6: +; *Salvia verbenaca* 16: +; *Teucrium chamaedrys* 17: +; *Geranium purpureum* 7: +; *Alyssum minus* 10: 1; *Ajuga chamaepitys* 12: +, 16: +; *Vicia angustifolia* 9: +; *Crepis foetida* 2: +, 6: +; *Tragopogon porrifolius* 9: +, 11: 1; *Bellis perennis* 4: +; *Parentucellia latifolia* 14: +, 15: +; *Aphanes arvensis* 8: +, 17: +; *Valerianella rimosa* 6: +, 8: +; *Knautia integrifolia* 9: +, 10: +; *Stipa pulcherrima* 3: +, 4: 1; *Cardamine hirsuta* 4: +, 17: +; *Linum bienne* 5: +, 7: +; *Trifolium cherleri* 3: +, 5: +; *Bromus madritensis* 7: +, 16: +; *Trifolium resupinatum* 5: +; *Vulpia myuros* 10: +; *Trigonella gladiata* 1: +; *Veronica arvensis* 17: +; *Reseda phyteuma* 9: +; *Bromus sterilis* 11: +; *Calepina irregularis* 6: +; *Bromus hordeaceus* 3: +; *Orchis ustulata* 11: +; *Orlaya grandiflora* 9: +; *Medicago rigidula* 5: +; *Poa annua* 10: +; *Hyacinthella dalmatica* 5: +; *Matthiola incana* 15: 1; *Lactuca viminea* 3: +; *Aegilops neglecta* 11: +; *Alyssum alyssoides* 7: +; *Alyssum campestre* 11: 1; *Astragalus illyricus* 11: 2, 14: +; *Matricaria chamomilla* 13: +, 14: +; *Onosma echioides* 9: 1, 12: +.

Appendix 2: Relevé dates (year/month/day) and coordinates (WGS84 reference system, in decimal degrees).

1. 2019/04/07, 42.3968090, 19.3021110; 2. 2019/04/07, 42.3964610, 19.3030050; 3. 2019/04/07, 42.3960000, 19.3040000; 4. 2019/04/07, 42.3978055, 19.3048888; 5. 2019/04/07, 42.3985277, 19.3019638; 6. 2019/04/07, 42.4001488, 19.3031944; 7. 2019/04/07, 42.4006410, 19.3023280; 8. 2019/04/07, 42.4021890, 19.3049660; 9. 2019/04/07, 42.3880040, 19.2856690; 10. 2019/04/07, 42.3803160, 19.2743840; 11. 2019/04/09, 42.3708888, 19.2303056; 12. 2019/04/09, 42.3728888, 19.2316944; 13. 2019/04/09, 42.3697222, 19.2339166; 14. 2019/04/09, 42.3705580, 19.2360490; 15. 2019/04/09, 42.3709350, 19.2383990; 16. 2019/04/10, 42.4021370, 19.3210555; 17. 2019/04/10, 42.3885277, 19.3110277.

Appendix 3: Relevés from literature sources (name of the plant community, authors, table and number of relevés from original source paper).

1. *Bromo-Chrysopogonetum grylli* subass. *asphodeletosum microcarpi* (Horvatić 1934), Tab. 23, rels. 11-16, 18-23; 2. *Narcisso tazettae-Asphodeletum microcarpi* (Šegulja 1970), Tab. 2, rels. 1–8; 3. *Narcisso tazettae-Asphodeletum microcarpi* subass. *sisymbrietosum officinalis* (Hećimović 1984), Tab. 5, rels. 1–10; 4. *Narcisso tazettae-Asphodeletum microcarpi* (Jasprica and Ruščić 2013), rel. on the page 128; 5. *Asphodelus ramosus* community (Fanelli et al. 2015), Tab. 41, rels. 15, 70, 492; 6. *Asphodelo-Chrysopogonetum grylli* (Fanelli et al. 2015), Tab. 25, rels. 31–33; 7. *Narcisso tazettae-Asphodeletum microcarpi* (Jasprica et al. 2016), Tab. 11, rels. 1–3; 8. *Charybdido pancratii-Asphodeletum ramosi* (Biondi et al. 2016, Tab. 1, rels. 1–14; 9. *Alkanno tinctoriae-Asphodeletum ramosi* (Biondi et al. 2016), Tab. 2, rels. 1–3; 10. *Asphodelo ramosi-Feruletum communis* (Biondi et al. 2016), Tab. 3, rels. 1–2; 11. *Asphodelino luteae-Feruletum communis* (Biondi et al. 2016), Tab. 4, rels. 1–7; 12. *Euphorbio characiae-Thapsietum garganicae* (Biondi et al. 2017), Tab. 6, rels. 1–5.

УНИВЕРЗИТЕТ У БЕОГРАДУ

12.12.2018
11 5301/2

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ВЕЋЕ НАУЧНИХ ОБЛАСТИ
БИОТЕХНИЧКИХ НАУКА

Београд, 11.12.2018.
02-08 Број: 61202-5588/2-18
МЦ

На основу чл. 75. ст. 2. Закона о високом образовању ("Службени гласник РС", број: 88/17 и 73/18), чл. 48. ст. 5. тач. 1. Статута Универзитета у Београду ("Гласник Универзитета у Београду", број 201/18), чл. 13. ст. 1. Правилника о већима научних области на Универзитету у Београду ("Гласник Универзитета у Београду", број 134/07, 150/09, 158/11, 164/11, 165/11, 180/14, 195/16 и 197/17), чл. 24. ст. 1. тач. 1. Правилника о начину и поступку стицања звања и заснивања радног односа наставника Универзитета у Београду ("Гласник Универзитета у Београду", број 200/17) и Правилника о минималним условима за стицање звања наставника на Универзитету у Београду ("Гласник Универзитета у Београду", број 192/16, 195/16, 197/17 и 199/17), а на предлог Изборног већа Пољопривредног факултета, број: 400/2-2/6 од 29.11.2018. године, Веће научних области биотехничких наука, на седници одржаној 11.12.2018. године, донело је

О Д Л У К У

БИРА СЕ др Светлана Аћић у звање доцента на Универзитету у Београду-Пољопривредни факултет за ужу научну област Пољопривредна ботаника.

О б р а з л о ж е њ е

Пољопривредни факултет је дана 18.07.2018. године у листу "Послови" објавио конкурс за избор у звање доцента за ужу научну област Пољопривредна ботаника, због потреба Факултета.

Извештај Комисије за припрему извештаја о пријављеним кандидатима стављен је на увид јавности дана 17.10.2018. године преко огласне табле и сајта Факултета.

На основу предлога Комисије за припрему извештаја о пријављеним кандидатима, Изборно веће Пољопривредног факултета, на седници одржаној дана 29.11.2018. године, донело је одлуку о утврђивању предлога да се кандидат др Светлана Аћић изабере у звање доцента.

Пољопривредни факултет је дана 04.12.2018. године доставио Универзитету комплетан захтев за избор у звање на прописаним обрасцима.

Универзитет је комплетну документацију коју је доставио факултет ставио на web страницу Универзитета дана 04.12.2018. године.

Веће научних области биотехничких наука, на седници одржаној дана 11. децембра 2018. године разматрало је захтев Пољопривредног факултета и утврдило да кандидат испуњава услове прописане чл. 74. и 75. Закона о високом образовању, чл. 135. Статута Универзитета у Београду, као и услове прописане Правилником о минималним условима за стицање звања наставника на Универзитету у Београду, па је донета одлука као у изреци.

Поука о правном леку:
Против ове одлуке кандидат пријављен на конкурс може изјавити жалбу Сенату Универзитета, преко факултета. Жалба се доставља факултету у року од 8 дана од дана достављања одлуке.

ПРЕДСЕДНИК ВЕЋА
Проф. др Нада Драговић

Доставити:
- Факултету (2)
- архиви Универзитета

Biografija doc. dr Svetlane Aćić

Svetlana Aćić rođena je 21. marta 1973. godine u Beogradu. Osnovnu školu i gimnaziju završila je u Beogradu. Diplomirala je na Biološkom fakultet Univerziteta u Beogradu, studijska grupa - Opšta biologija. Doktorsku disertaciju pod nazivom „Sinekološka i fitocenološka studija livadske vegetacije Srbije" odbranila je na Katedri za Agrobotaniku Instituta za Ratarstvo i povrtarstvo Poljoprivrednog fakulteta u Beogradu 2018. godine, mentori dr Zora Dajić Stevanović i dr Urban Šilc.

Zaposlena je u zvanju docenta na Katedri za agrobotaniku Poljoprivrednog fakulteta Univerziteta u Beogradu od 2018 godine. Docent dr Svetlana Aćić objavila je preko 80 naučnih radova i saopštenja, od čega je 28 radova objavljeno u međunarodnim časopisima sa SCI liste. Koautor je dva praktikuma iz predmeta koji se slušaju na Katedri za agrobotaniku Poljoprivrednog fakulteta. Učestvovala je u realizaciji osam međunarodnih i sedam domaćih projekata, finansiranih od strane Fonda za nauku, Ministarstva za nauku i tehnološki razvoj, Ministarstva poljoprivrede, šumarstva i vodoprivrede i Ministarstva životne sredine i prostornog planiranja Republike Srbije.

Docent dr Svetlana Aćić je autor Vegetacijske baze fitocenoloških snimaka livadske vegetacije Srbije. Jedan je od inicijatora formiranja Nacionalne baze fitocenoloških snimaka vegetacije Srbije koja ima preko 10 000 fitocenoloških snimaka različitih tipova vegetacije (livadska vegetacija, hrastove šume, bukove šume, ruderalna i korovska vegetacija, močvarna vegetacija). Vegetacijska baza je prijavljena u Globalni Inventar Vegetacijskih Baza (GIVD), Arhivu Evropskih Baza Vegetacije (EVA) i sPlot grupu. Član je Evropske grupe za proučavanje travnjaka (EDGG), Evropskog društva za proučavanje vegetacije (EVS) i Internacionalnog društva za proučavanje vegetacije (IAVS), Društva za lekovito i aromatično bilje zemalja jugoistočne Evrope (AMAPSEEC), Društva fiziologa Srbije i Društva za zaštitu bilja Srbije.

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Univerzitet Crne Gore
University of Montenegro

Broj / Ref 03-1443

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Na osnovu člana 72 stav 2 Zakona o visokom obrazovanju („Službeni list Crne Gore", br. 44/14, 47/15, 40/16, 42/17, 71/17, 55/18, 3/19, 17/19, 47/19, 72/19 i 74/20 i 104/21) i člana 32 stav 1 tačka 9 Statuta Univerziteta Crne Gore, Senat Univerziteta Crne Gore, na sjednici održanoj 20.07.2022. godine, donio je

O D L U K U
O IZBORU U ZVANJE

Dr **SLAĐANA KRIVOKAPIĆ** bira se u akademsko zvanje **redovni profesor Univerziteta Crne Gore Botanika na Prirodno-matematičkom fakultetu Univerziteta Crne Gore,** na neodređeno vrijeme.

SENAT UNIVERZITETA CRNE GORE
PREDSJEDNIK

Prof. dr Vladimir Božović, rektor

BIOGRAFIJA

Ime i prezime: Slađana Krivokapić
Datum i mjesto rođenja: 11. 02. 1969., Kotor, Crna Gora
Nacionalnost: Crnogorska
Adresa: Studijski program Biologija, Prirodno-matematički fakultet, Univerzitet Crne Gore Cetinjski put bb, 81 000 Podgorica, Crna Gora
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NAUČNA OBLAST ISTRAŽIVANJA

Fiziološka ekologija -eutrofikacija obalnih voda; teški metali i antioksidativna zaštita biljaka; biološki aktivne materije vaskularnih biljaka i marinskih algi

OBRAZOVANJE

1992 - diplomirala na Odsjeku za biologiju (istraživačko-primjenjeni smjer), Prirodno-matematičkog fakulteta Univerziteta u Novom Sadu

1998 - magistarski rad pod nazivom »*Genetička varijabilnost rezervnih i funkcionalnih proteina tetraploidne pšenice*« odbranila na smjeru »Genetika i oplemenjivanje biljaka« Poljoprivrednog fakulteta u Novom Sadu

2006 - doktorsku disertaciju pod nazivom »*Dinamika biomase fitoplanktona kao indikatora stepena trofičnosti u unutrašnjem dijelu Bokokotorskog zaliva*« odbranila na Prirodno-matematičkom fakultetu Univerziteta u Novom Sadu

PROFESIONALNO ANGAŽOVANJE I USAVRŠAVANJA

1992-1993 - saradnik ne predmetu Genetika, Odsjek za biologiju, Prirodno-matematički Fakultet, Novi Sad

1994-1999 - Prirodno-matematički fakultetu u Podgorici (angažovana zaizvođenje vježbi na predmetima Anatomija biljaka, Fiziologija biljaka i Marinska biologija)

1999 - izabrana u zvanje asistenta na Katedri za Botaniku, predmet Fiziologija biljaka

2005 -3 sedmice u Laboratorio Nazionale di Riferimento per le Biotossine Marine,Cesenatico, Italy

2006 –izabrana u zvanje docenta za predmete Anatomija biljaka i Fiziologija biljaka.

2008 – 2 sedmice, Department of Chemistry, University of Oslo (hromatografske tehnike u biološkim istraživanjima)

2012 – izabrana u zvanje vanredni profesor za predmete Anatomija i morfologija biljaka i Fiziologija biljaka

2017- izabrana u zvanje vanredni profesor za predmete Anatomija i morfologija biljaka i Fiziologija biljaka (Držim nastavu i iz sledećih predmeta: - na specijalističkim studijama biologije – eksperimentala biologija i biotehnologija: Kurs laboratorijskih tehnika; specijalističkim studijama biologije – nastava biologije: Laboratorijski praktikum; na doktorskim studijama biologije: dio ispita Biodiverzitet vodenih ekosistema; izborni predmet na specijalističkim studijama biologije-eksperimntalna biologija i biotehnologija: Biološki aktivne materije biljaka; izborni predmet na magistarskim studijama biologije ekologija: Fotosinteze i primarna produkcija, Sekundarni metaboliti marinskih algi, Teški metali i antioksidativna zaštita biljaka, a na doktorskim studijama biologije: Biološki aktivne materije algi, Toksini marinskih algi)

U toku dosadanjeg rada bila sam koordinator jednog medjunarodnog i dva bilateralnog projekta, kao i učesnik u realizaciji više međunarodnih i nacionalnih naučn- istraživačkih projekata.
Bila sam mentor dva doktoranda, čije su doktorske disertacije odbranjenje na Studijskom programu Biologija, Prirodno-matematičkog fakulteta, UCG-a.

Autor sam skripte "Biološki akrivne materije biljaka" i koautor poglavlja "Phytoplankton Community and Trophic State in Boka Kotorska Bay" i "Phytobenthos in the Boka KotorskaBay: State of Knowledge and Threats" u "The Boka Kotorska Bay Environment", Hdb Env Chem.

Posjedujem aktivno znanje engleskog jezika.

Spisak izabranih referenci:

Krivokapić, S., Bosak, S., Viličić, D., Kušpilić, G., Drakulović, D., Pestorić, B. **(2018):** Algal pigments distribution and phytoplankton group assemblages in coastal transitional environment – Boka Kotorska Bay (South eastern Adriatic Sea). Acta Adriatica 59(1):35-50.	**SCI**
Krivokapić, S., Petrović, D., **(2018):** Trace metals in vegetables plants (*Allium cepa* L., *Capsicum annum* L., *Lycopersicon esculentum* Mill and *Beta vulgaris* L.). Fressenius Environmental Bulletin 27 (5): 2690-2696	**SCI**
Kastratović, V., Bigović, M., Jaćimović, Ž., Kosović, M., Đurović, D., **Krivokapić, S. (2018):** Levels and distribution of cobalt and nickel in the aquatic macrophytes found in Skadar Lake, Montenegro. Environmental Science and Pollution Research. 25(27):26823-26830	**SCI**
Kastratović, V., Jaćimović, Ž., Bigović, M., Kosović, M., Đurović, D., **Krivokapić, S. (2017):**Seasonal patterns of Cu in a system of sediment-water-macrophytes. Fressenius Environmental Bulletin 26 (2):1247-1253. ISSN1018-4619.	**SCI**
Pejatović, T., Samardžić, D., **Krivokapić, S.** (2017): Antioxidative properities of a traditional tincture and several leaf extracts of Alliumursinum L. (collected in Montenegro and Bosnia and Herzegovina). Journal of Materials and Environmental Sciences 8(6): 1929-1934. ISSN:2028-2508.	
Krivokapić, S., Pestorić, B., Krivokapić, M. **(2017):** Application of the TRIX for water quality assessment along Montenegrin coast. Studia marina. 29(1): 47-62.	
Kastratović, V., Jaćimović, Ž., Bigović, M., Đurović, D., **Krivokapić, S. (2016):** Environmental status and geochemical assessment sediments of Lake Skadar, Montenegro. Environ Monit Assess 188:449 DOI 10.1007/S10661-016-5459.	**SCI**
Petrović, D., Jančić D., Furdek, M., Mikac, N., **Krivokapić, S. (2016):** Aquatic plant *Trapa natans* L. as bioindicator of trace metal contamination in freshwater lake (Skadar lake, Montenegro). Acta Botanica Croatica. 75 (2): 236-243. DOI 10151/botcro- 2016-031	**SCI**
Anđić, B., Dragićević, S., Stešević, D., Jančić D., **Krivokapić, S. (2015):** Comparative analysis of trace elements in the mosses – *Bryumargenteum* Hedw. And *Hypnum cupressiforme* Hedw. In Podgorica (Montenegro). J. Mater. Environ. Sci. 6 (2) 333-342. ISSN: 2028-2508.	
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Kastratovic, V., **Krivokapić, S.,** Bigović, M., Đurović, D., Blagojević, N. **(2014):** Bioacumulation and translocation of heavy metals by *Ceratophyllum demersum* from Skadar Lake, Montenegro. Journal of Serbian Chemistry Society, doi: 10.2298/JSCI14040907AK.	**SCI**
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Dinoflagellate assemblages in the Boka Kotorska Bay. Studia Marina 27(1) 65-84.	
Petrović. D., **Krivokapić, S.,** Jančić, D. **(2013):**Contens of heavy metals (Zn, Mn, Cu) in different parts of Trapa natans L. From Skadar lake, Montenegro. Natura Montenegrina 12 (3-4) 925-935. ISSN 1451-5776(CD ROM) .ISSN 1800-7155 (on line).	
Kastratović, V., **Krivokapić, S.,** Đurović, D., Blagojević, N. **(2013):** Seasonal changes in metal accumulation and distribution in the organs of *Phragmites australias* (common reed) from Lake Skadar, Montenegro. Journal of Serbian Chemistry Society, 78 (8) 1241-1258. ISSN 0352-5139.	**SCI**
Drakulović, D., Pestorić, B, Cvijan, M., **Krivokapić, S**, Vuksanović, N. **(2012):** Distribution of phytoplankton community in Kotor Bay (south-eastern Adriatic Sea). Central European Journal of Biology. 7 (3) 470-486. ISSN 1895-104X	**SCI**
Bosak, S., Šilović, T., Ljubešić, Z., Kušpilić, G, Pestorić, B., **Krivokapić, S.,** Viličić, D. **(2012):** Phytoplankon size structure and species composition as an indicator of trophic status in transitional ecosystems: the case of a Mediterranean fjord-like karstic bay. Oceanologia, 54 (2) 255-286. ISSN 0078-3234.	**SCI**
Dautović, J., Strmečki, S., Pestorić, B., Vojvodić, V., Plavšić, M., **Krivokapić, S.,** Ćosović, B. **(2012):** Organic matter in the karstic enclosed bay (Boka Kotorska Bay, south Adriatic Sea). Fressenius environmental bulletin, 21 (4a) 995-1006. . ISSN 1018-4619.	**SCI**
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Krivokapić, S.,Pestorić, B. **(2011):** Chlorophyll *a* and trophic state in the BokaKotorska Bay (Eastern Adriatic Sea). Journal of Environmental Science and Engineering, 5 (4) 420-427. ISSN 1934-8932 (print) ISSN 1934-8940 (on line).	
Krivokapić, S., Pestorić, B., Drakulović, D., Vuksanović, N. **(2010):** Subsurface chlorophyll a maxima in the Boka Kotorska Bay. Biotechnology & Biotechnological Equipment 24(2): 181-185. ISSN 1310-2818.	**SCI**
Krivokapić, S., Stanković, Ž., Vuksanović, N. **(2009):** Seasonal variations of phytoplankton biomass and environmental conditions in the inner Boka Kotorska Bay (eastern Adriatic Sea). Acta Botanica Croatica, 68 (1) 45-55. ISSN 0365-0588	**SCI**

Univerzitet Crne Gore
University of Montenegro

Broj/ Rep. 03-1696
Datum/ Date 16.09.22

Na osnovu člana 72 stav 2 Zakona o visokom obrazovanju („Službeni list Crne Gore" br 44/14, 47/15, 40/16, 42/17, 71/17, 55/18, 3/19, 17/19, 47/19, 72/19 i 74/20 i 104/21) i člana 32 stav 1 tačka 9 Statuta Univerziteta Crne Gore, Senat Univerziteta Crne Gore, na sjednici održanoj 16.9.2022. godine, donio je

O D L U K U
O IZBORU U ZVANJE

Dr DANKA CAKOVIĆ bira se u akademsko zvanje **redovni profesor Univerziteta Crne Gore** iz oblasti **Ekologija na Prirodno-matematičkom fakultetu Univerziteta Crne Gore**, na neodređeno vrijeme.

SENAT UNIVERZITETA CRNE GORE
PREDSJEDNIK
Prof. dr Vladimir Božović, rektor

Kratka biografija Danke Caković

Rođena sam 28.08.1977. godine u Titogradu, gdje sam završila osnovnu školu i gimnaziju. Školske 1996/97 godine upisala sam studije Biologije na Prirodno-matematičkom fakultetu u Podgorici. Diplomirala sam oktobra 2000. godine sa prosječnom ocjenom 9,48 i stekla zvanje diplomirani biolog. Dobitnik sam plakete Univerziteta Crne Gore za najboljeg studenta u oblasti prirodnih nauka, za školsku 1999/2000. godinu. Poslijediplomske studije, smjer Ekologija i geografija biljaka upisala sam školske 2000/01. godine na Biološkom fakultetu Univerziteta u Beogradu. Magistarsku tezu pod nazivom: "Floristička studija planine Sutorman" odbranila sam 05. 02. 2004. godine i stekla zvanje magistra bioloških nauka. Zvanje doktora bioloških nauka stekla sam na Prirodno-matematičkom fakultetu (Studijski program Biologija) Univerziteta Crne Gore, odbranom doktorske teze "Floristička i vegetacijska studija planinskog masiva Rumije" 17.10.2011.

Usavršavanje kroz posjete i saradnje sa međunarodnim institucijama:

Institut za botaniku, Innsbruck – 4 mjeseca (2014/2015/2016/2018/2019) Institut za Botaniku, Graz – 1 mjesec (2010) Univerzitet u Ljubljani, odsjek za Biologiju – 1 mjesec (2009)

Radno iskustvo:

2001. do 2012. – saradnik u nastavi na studijskom programu Biologija. U navedenom periodu bila sam angažovana na izvođenju nastave iz botaničke grupe predmeta (Ekologija biljaka, Anatomija i morfologija biljaka, Sistematika biljaka).

2005. do 2012. – saradnik u nastavi na Poljoprivrednom fakultetu smjer Poljoprivredna proizvodnja, predmet Botanika.

2007. do 2012. – saradnik u nastavi na Farmaceutskom fakultetu, Botanika

2012. do 2017. – profesor (docent) na studijskom programu Biologija i na Farmaceutskom fakultetu 2017. do danas – vanredni profesor na studijskom programu Biologija i na Farmaceutskom fakultetu 2016. do dans – rukovodilac Studijskog programa Biologija

Stručni angažmani:

1. Flora i vegetacija šireg područja Podgorice
2. IPA (Important Plant Area) projekat
3. Biodiversity (habitats/vegetation) mapping for selected locations in the Coastal area of Montenegro
4. Studija biodiverziteta obalnog područija
5. Katalog Flore Crne Gore (I, II i III tom)

6. Monitoring biodiverziteta odabranih lokaliteta u Crnoj Gori
7. Unaprijeđenje ekološke baze za održivo šumarstvo u Crnoj Gori
8. Evolucija dvije grupe biljaka iz Crne Gore i susjednih regiona (Balkansko poluostrvo)
9. Studija "Prirodne vrijednosti poluostrva Vrmac"
10. Strateška procjena uticaja na Program razvoja lovstva
11. Studija zaštite planinskog masiva Sinjajevine
12. Procjene uticaja na životnu sredinu u različitim dijelovima Crne Gore
13. Prilog Studiji zaštite Šaskog jezera
14. Prostorni plan posebne namjene za Nacionalni park Skadarsko jezero, vođa biološkog tima 15. Prostorni plan posebne namjene za Nacionalni park Prokletije, vođa biološkog tima
16. Zaštita i održivo korištenje biodiverziteta Prespanskog, Ohridskog i Skadarskog jezera "Hydromorphological and Shorezone Functionality Index (SFI) of Skadar lake"
17. Predsjenik Komisija za izradu programa za predmet Biologija – Opšta Gimnazija i Matematička gimnazija (predsjednica komisije)
18. Akcioni plan za biodiverzitet Podgorice
19. Upoznavanje sa ciljevima održivog razvoja u srednjim školama u Jugo-istočnoj Evropi
20. Uspostavljanje NATURA 2000 mreže u Crnoj Gori – ekspert za staništa
21. Kartiranje međunarodno značajnih staništa na području NP Skadarsko jezero

Dodatne informacije:

2001. – dobitnik plakete "Najbolji student Univerziteta Crne Gore u oblasti prirodnih nauka"

Članstvo u profesionalnim grupama: IUCN Species Survival Commission, International Association for vegetation Science

BIBLIOGRAFIJA:

Petrović D. & Pulević V.:Botanical Exploration in Crnnica Area – Inheritance and Future, Compilation of Contributions to the Symposium held in Vir (12-13 July 2002), Virpazar, 2002.

Petrović D.: Analyses of Mountain Sutorman Flora (Master's Thesis), Faculty of Biology, Belgrade, 2003.

Petrović D.: Chenopodium multifidum & Medicago Carstiensis two new species for the flora of Montenegro, Third International Balkan Botanical Congress (Sarajevo), 2003.

Stesević D. & **Petrović D.**: Rare, Endangered and Protected Plants of Mountain Bjelasica. Depart. Biol. Univers. Monten. - Centre Biodivers. Montenenegro. (Podgorica). Monogr. 1, 2003.

Vuksanović S. & **Petrović D.**: In spite of Prevailing Opinion to the Contrary - Kickxia cirrhosa (L.) Fritisch Grows on the Balkan Peninsula, XI OPTIMA Meeting, (Belgrade) 2004.

Petrović D.: A Contribution to Knowledge of the Mountain Sutorman Flora, 1st Symposium of Montenegrin Ecologists, (Tivat) 2004.

Petrović D. & Vuksanović S.: A contribution to the Knowledge of District of Ulcinj Flora, 1st Symposium of Montenegrin Ecologists, (Tivat) 2004.

Petrović, D.: IPAs in Montenegro. In: Anderson, S., Kušik, T., Radford, E. (*Eds*) Important Plant Areas in Central and Eastern Europe – Priority Sites for Plant Conservation, 74 – 75. Plantlife International, UK. 2005.

Petrović D, Vuksanović S., Bozović M.: *Cypripedium calceolus* L. - New finding in Montenegro. II International Symposium of the Ecologists of the Republic of Montenegro, (Kotor) 2006.

Petrović D, Ojdanić M, Malidžan D: Bilogy for 8th grade of elementary school, 2007. Agency for books, Ministery of Education and Science.

Malidžan, D., **Petrović, D.,** Ojdanić, M.,: Workbook for Bilogy for 8th grade of elementary school, 2007. Agency for books, Ministery of Education and Science.

Petrović, D. IPAs in Montenegro a progress report. 5th European Conference on the Conservation of Wild Plants in Europe. (Cluj Napoca) 2007:, Romania.

Vuksanović S, **Petrović D:** The flora and vegetation of Salt works in Ulcinj. Natura Montenegrina 6, (Podgorica) 2007.

Petrović D, Malidžan D: Bilogy for 9th grade of elementary school, 2008. Agency for books, Ministery of Education and Science.

Malidžan, D., **Petrović, D.**: Workbook for Bilogy for 9th grade of elementary school, 2008. Agency for books, Ministery of Education and Science.

Petrović, D, Stešević, D, Vuksanović, S: Materials for the Red Book of Montenegro. Natura Montenegrina 7, (Podgorica) 2008.

Stešević, D., **Petrović, D.,** Vuksanović, S., Bubanja, N., Biberdžić, V.: Contribution to the vascular flora of Montenegro (Supplementum to the Material for vascular flora of Montenegro). Natura Montenegrina 7, (Podgorica) 2008.

Petrović, D: Important Plant Area country reports – Montenegro. In: Radford, E., Odé, B. (*Eds.*) Conserving Important plant Areas: Investing in the green gold of South East Europe, 55-62. Plantlife International, UK. 2009.

Petrović, D. (*ed*): Važna biljna staništa u Crnoj Gori (IPA projekat): 1-80. Nevladino udruženje "Zelena Gora", 2009.

Petrović, D., Stešević, D.: Materials for the red book of vaskular flora of Montenegro (second contribution). Biologica Nyssana, 1 (1-2). December 2010: 27 – 34, Niš.

Petrović, D., Stešević, D.: Reports 151 – 153, pp 431 – 433 in: Vladimirov, V., Dane, F., Stevanović, V., Tan, K. (ed): New chorological data for the Balkans, 14. Phytologia Balcanica 16 (3): 415 – 445, Sofia, 2010.

Stešević, D., **Petrović, D.:** Preliminary list of plant invaders in Montenegro. Biologyca Nyssana, 1 (1 – 2): 35 – 42, Niš, 2010.

Petrović, D.: *Rosaceae* (*Rubus*). – In: Kurtto, A., Weber, H. E., Lampinen, R. & Sennikov, A. N. (eds.) Atlas Florae Europaeae. Distribution of Vascular Plants in Europe. **15** (Distribution of the vascular plants in Montenegro). Helsinki University Printing House, 2010, 362 pp.

Petrović, D., Stešević, D.: New data on the distribution of *Micromeria cristata* (Hampe) Griseb. and *Steptorhamphus tuberosus* (Jacq.) Grossh., moving of the westernmost limit of distribution area. Acta Botanica Croatica (ISNN 0365-0588), 70 (2): 259 - 267, Zagreb, 2011. (SCI)

Petrović, D., Hadžiablahović, S., Vuksanović, S., Mačić, V., Lakušić, D. (2012): Catalogue of habitat typest of EU importance of Montenegro, Podgorica-Beograd, 2012.

Caković, D., Stešević, D., Iković, V., Knežević, M., Latinović, N.: Contribution to the knowledge of weed flora in Bjelopavlići plain. Agriculture & Forestry, Vol. 58, Issue 4: 25-41, Podgorica, 2012.

Stešević, D., **Caković, D. (2013):** Towards the Catalogue of Vascular Plants of Montenegro, Natura Montenegrina 12(1): 231-240, Podgorica 2013.

Stešević, D., **Caković, D. (2013):** Contribution to the alien flora of Montenegro and Supplementum to the Preliminary list of plant invaders, Biologica Nyssana 4 (1-2): 1-7, Niš 2013.

Caković, D., Stešević, D., Vuksanović, S.: Some floristic and chorological contribution to the vascular flora of Montenegro (Ulcinj area). Natura Montenegrina, 12 (2): 271 – 279, Podgorica, 2013.

Stešević, D., **Caković, D.:** Katalog vaskularne flore Crne Gore, Tom I: 1 – 363, CANU, Podgorica, 2013.

Stešević, D., Latinović, N., **Caković, D.:** Invasive alien plant species in Montenegro, with special focus on *Ambrosia artemisifolia*. Proceedings from the 4th ESENIAS Workshop: International Workshop on IAS in Agricultural and Non-Agricultural Areas in ESENIAS Region, 16-17 December 2013

Lansdown R., Anastasiu, P., Barina Z., Bazos I., Çakan H., Delipetrou P., Matevski V., Mitić B., **Caković, D.,** Ruprecht E., Tomović G., Tosheva A., Király G.: Review of alien freshwater vascular plants in south-east Europe. Proceedings from the 4th ESENIAS Workshop: International Workshop on IAS in Agricultural and Non-Agricultural Areas in ESENIAS Region, 16-17 December 2013.

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Caković, D., Stešević, D., Vuksanović, S., Kit, T.: *Colchicum cupanii* Guss. Subsp. *Glossophyllum* (Heldr.) Rouy, *Datura innoxia* Mill. And *Eclipta 5rostrate* (L.) L., new floristic records in Montenegro and western Balkan, Acta Botanica Croatica, 73, Zagreb, 2014. (SCI)

Caković, D.: Rosaceae taxa (Amelanchier, Aronia, Chaenomeles, Cotoneaster, Crataegus, Cydonia, Eriobotrya, Malus, Mespilus, Prunus, Pyracantha and Pyrus) – Distribution of the vascular plants in Montenegro). – In: Kurtto, A., Weber, H. E., Lampinen, R. & Sennikov, A. N. (eds.) Atlas Florae Europaeae. Distribution of Vascular Plants in Europe 15 (ISBN 978-951- 9108-16-2) Helsinki University Printing House

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Ljubljana, 19. 1. 2017

Na podlagi 11. alineje prvega odstavka 52. člena Statuta Znanstvenoraziskovalnega centra Slovenske akademije znanosti in umetnosti z dne 4. 2. 2015 in 18. člena Pravilnika o pogojih in postopku za napredovanje delavcev v raziskovalnih nazivih na ZRC SAZU z dne 7. 7. 2009 (s spremembami in dopolnitvami) je Znanstveni svet ZRC SAZU na 3. seji dne 19. 1. 2017 soglasno sprejel naslednji

SKLEP
O PREDČASNI IZVOLITVI V NAZIV ZNANSTVENI SVETNIK

Dr. Urban Šilc, zaposlen na Biološkem inštitutu Jovana Hadžija ZRC SAZU, se **predčasno** izvoli v naziv **znanstveni svetnik**.

Izvolitev je trajna in velja **od 19. januarja 2017 dalje**.

O b r a z l o ž i t e v:

V postopku izvolitve je Znanstveni svet Biološkega inštituta Jovana Hadžija ZRC SAZU predlagal predčasno izvolitev, za katero je prosil raziskovalec. Znanstveni svet ZRC SAZU je na 1. seji, dne 10. 11. 2016, na podlagi priložene vloge, dokumentacije, recenzij, sklepa Znanstvenega sveta inštituta in poročevalca ugotovil, da kandidat po kvantitativnih kriterijih za 200 % presega minimalno število točk bibliografskih kazalcev, zato lahko raziskovalec kandidira za ta naziv že po preteku prve izvolitve v naziv višji znanstveni sodelavec. Pozitivno mnenje k izvolitvi je dne 19. 12. 2016 podal tudi Znanstveni svet ARRS. Ker kandidat poleg kvantitativnih kazalcev v celoti izkazuje tudi kvalitativne kazalce, je Znanstveni svet ZRC SAZU odločil, kot izhaja iz prve točke izreka tega sklepa.

Pravni pouk:

Zoper ta sklep lahko kandidat, ki je zaprosil za izvolitev v naziv, v skladu z 20. členom Pravilnika o pogojih in postopku za napredovanje delavcev v raziskovalnih nazivih na ZRC SAZU vloži pritožbo. Pritožbo se vloži na ZS ZRC SAZU v roku 8 dni od vročitve tega sklepa. O pritožbi odloča ZS ZRC SAZU v razširjeni sestavi. Kandidat mora pritožbo obrazložiti in predložiti ustrezna dokazila.

Predsednik Znanstvenega sveta ZRC SAZU:
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Urban Šilc, born 13.7.1970

EDUCATION:

- B.S., University of Ljubljana (1996),
- MSc, University of Ljubljana (2000),
- Ph.D., University of Ljubljana (2003).

ACADEMIC TITLE:

- Scientific Advisor (2017, ZRC SAZU),
- Assistant professor (2015, University of Primorska)

EMPLOYMENT:

- Jovan Hadži Institute of Biology ZRC SAZU (since 1996)
- BC Naklo (since 2014, add. 20%).

ADMINISTRATIVE RESPONSIBILITIES:

- Head of Institute of Biology ZRC SAZU (2018-)
- secretary general of Easternalpine-Dinaric Society for Vegetation Science (2001-2005),
- founding co-editor (2002-2005) and Editor-in-Chief (2006-) of scientific journal Hacquetia (Ljubljana),
- editor of journal Phyton (Graz), member of editorial board of journals Tuexenia and Phytocoenologia
- vice president and president of Scientific Council of Jovan Hadži Institute of Biology ZRC SAZU,
- member of Council EVA (European Vegetation Survey) and EVCC (European Vegetation Classification Committee).

RESEARCH PROJECTS – LEADING:

- Biodiversity of weed flora and vegetation and changes of agroecosystem (bilateral project Slovenia and Serbia and Montenegro) - leading researcher
- - Biodiversity Multivariate analysis of biodiversity and quality of grasslands in west Balkans as basis for sustainable management (bilateral project Slovenia and Serbia and Montenegro) - leading researcher
- Psammophytic vegetation of Montenegro and its conservation (bilateral project Slovenia and Montenegro) - leading researcher
- Grassland vegetation along climatic gradient on NW Balkan Peninsula (bilateral project Slovenia and Croatia)-leading researcher.
- Mapping of non-forest habitat types for areas Šentjernej-Gorjanci and Bloščica - leading researcher
- Survey of animal and plant species, their habitats and mapping of habitat types with special attention on European important species, ecologically important areas, special conservation areas, protected areas and natural values on area from middle to lower Sava river (between HE Medvode and HE Vrhovo) – leader of project
- Rufford grant (2013-2014) Conservation of halophytic vegetation in coastal lagoons in Albania – leader of project
- The design of monitoring of the conservation status of minor Natura 2000 forest habitat types in Slovenia – Target-research-project (2015-2017) – leader of project
-

RESEARCH PROJECTS – COOPERATION:

- research program Flora, fauna and vegetation of Slovenia and neighbouring countries (1999-2008),

- research program Gradients and biodiversity– ARRS P1-0236 (2008-),
- LJUBA- people for Barje (EEA Grants – 2015-2016)
- Vegetation and hydrology of Ljubljansko barje in the past, present and future – a consequence of succession, human impact or climatic fluctuations?
- research projects: Natural stands of larch in Slovenia, Influence of former management of landscape on recent forest vegetation, Military firing ranges as risk for environment with special emphasis on ecological sanation of military range Poček, Research of population genetics and site characteristics of autochtonous black poplar (*P. nigra* L.) on large flooded areas and directions for its conservation, Development of system of monitoring of genetic diversity in natural and endangered habitats, Biodiversity of Posočje and nature conservation applications for Natura 2000 areas, Estimation of influence of military range Krivolak on environment with purpose of its sanation, Kras-biodiversity, reforestation and nature conservation, Succession of birch forests in SE Slovenia.
- FP 5 AQUADPT- Strategic tools to support adaptive, integrated water resource management under changing utilisation conditions at catchment level: A co-evolutionary approach, FP 7 BIOMOT- MOTivational strength of ecosystem services and alternative ways to express the value of BIOdiversity, LJUBA – ljudje za barje (EEA grants – 2015-2016)
- applicative projects: mapping projects (areas Kras, Šentjernej-Gorjanci, Bloščica, Mirna, lower and middle Sava river) and impact assessment on environment (Lipica)

MENTORSHIP:

- Svetlana Ačić, Agricultural faculty, University of Belgrade, Serbia – Ph.D. – finished 2018
- Milica Petrović, Agricultural faculty, University of Belgrade, Serbia – Ph.D. – finished 2019
- Filip Küzmič, Biotechical faculty, University of Ljubljana, Slovenia – Ph.D. student
- Milica Stanišić-Vujačić, Faculty of Science and Mathematics, University of Montenegro, Montenegro – Ph.D. student
- diploma thesis BC Naklo (6)- supervisor

TEACHING:

- lecturer of 2 courses: Biodiversity evaluation and Ecosystem equilibrium (Higher Vocational College for Nature Conservation, Biotechnical Centre Naklo)
- lecturer of course: Ecology of terrestrial ecosystems (master study Nature conservation, University of Primorska)

SELECTED RESEARCH PROJECTS AND RESULTS:

The design of monitoring of the conservation status of minor Natura 2000 forest habitat types in Slovenia

We researched distribution of minor Natura 2000 forest habitat types by existing data, field mapping and modelling. For all researched habitat types we extracted characteristic species and ecological conditions. Through comparison of similar projects abroad and our results we made a proposal of monitoring approach of minor forest habitat types that Slovenia must implement according to the Article 17 of the Habitats Directive

Psammophytic vegetation of Montenegro and its conservation

We researched vegetation of Velika plaža in Montenegro and anthropogeneous influence on vegetation changes. We detected land-use change s since 1950. Using transect method we sampled alien plant species in different habitat types and changes of zonation of plant communities due to human impact. We researched impact of alien species on changes of plant communities species composition, their species and phylogenetic diversity and changes in plant functional traits. Trampling impact on embryonal and stabilized dunes was studied. We sampled distribution and source of macro plastic litter in different habitat types along the beach.

Biodiversity: patterns, processes, predictions and conservation

Using large datasets of vegetation data we were involved in several macroecological studies of various vegetation types on continental level:

- Alien plant species in European forests (Wagner et al. 2017),
- Floodplain forest of Europe (Douda et al. 2016),
- Vegetation of fens and mires in Europe (Peterka et al. 2017),
- Vegetation of hay meadows in Balkans (Šilc et al. 2014),
- Classification of vegetation of European and Mediterranean sand dunes (Marceno et al. 2018).

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O D L U K U
O IZBORU U ZVANJE

Dr Danijela Stešević bira se u akademsko zvanje redovni profesor Univerziteta Crne Gore za **oblasti Opšta botanika i Opšta grupa bioloških predmeta,** na Prirodno-matematičkom fakultetu Univerziteta Crne Gore, na neodređeno vrijeme.

SENAT UNIVERZITETA CRNE GORE
PREDSJEDNIK
Prof. dr Danilo Nikolić, rektor

KRATKA BIOGRAFIJA PROF. DR DANIJELE STEŠEVIĆ

LIČNI PODACI

Rođena sam 16.07.1976. godine u Titogradu, gdje sam završila osnovnu školu »Savo Pejanović« i srednju školu gimnaziju »Slobodan Škerović«.

PODACI O VISOKOM OBRAZOVANJU

Školske 1994/95 godine upisala sam studije Biologije na Prirodno-matematičkom fakultetu u Podgorici, gdje sam diplomirala 6. 10. 1998. godine sa prosječnom ocjenom 9,45 i stekla zvanje diplomirani biolog.

Poslijediplomske studije upisala sam školske 1998/99. godine na Biološkom fakultetu Univerziteta u Beogradu (smjer: Ekologija i geografija biljaka) i završila ih sa prosječnom ocjenom 10. Magistarsku tezu pod nazivom: "Flora kraških polja u Piperskom kraju Crne Gore" odbranila sam 15. 05. 2001. godine i stekla zvanje magistra bioloških nauka.

Doktorsku disertaciju pod nazivom: "Ekološka-fitogeografska analiza flore šireg urbanog područja Podgorice", odbranila sam 24. 06. 2009. godine, na Biološkom fakultetu Univerziteta u Beogradu i stekla zvanje doktora bioloških nauka. Rješenje o priznavanju Uvjerenja o stečenom naučnom stepenu Doktora bioloških nauka izdato mi je od strane Ministarstvo Nauke i Prosvjete 26. 10. 2009. godine.

PODACI O RADNIM MJESTIMA I IZBORIMA U AKADEMSKA ZVANJA

Od 1999. godine zasnovala sam radni odnos na Prirodno-matematičkom fakultetu u Podgorici (Studijski program Biologija), gdje sam januara 1999. godine izabrana u zvanje asistenta. U toku svog desetogodišnjeg staža asistirala sam u laboratorijskim vježbama na predmetima: *Anatomija biljaka, Ekologija biljaka, Ekologija životinja, Sistematika i filogenija viših biljaka, Limnologija, Sistematika i filogenija nižih biljaka, Biologija mora, Botanika* na akademskim studijskim programima Biljna proizvodnja i Farmacija.

Zvanje docenta na Prirodno-matematičkom fakultetu u Podgorici (predmeti *Sistematika i filogenija viših biljaka I i II*, na studijskom programu Biologija i *Botanika*, na studijskom programu Biljna proizvodnja) stekla sam 27.05.2010. godine. Školskih 2010/2011 i 2011/2012. godine bila sam angažovana kao predavač Botanike na Farmaceutskom fakultetu. Od školske 2012/2013 držim dio predavanja iz "Bioloških zbirki" koje se slušaju na specijalističkim studijama, na studisjkom programu Biologija. Od izbora u zvanje docenta, nastavila sam da držim vježbe na predmetima *Sistematika i filogenija viših biljaka I* i *II*, na studijskom programu Biologija.

Zavanje vanrednog profesora na Prirodno-matematičkom fakultetu u Podgorici (predmeti *Sistematika i filogenija viših biljaka I i II*, na studijskom programu Biologija i *Botanika*, na studijskom programu Biljna proizvodnja) stekla sam 24.06.2015. godine.

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