

Agencija za zaštitu životne sredine Crne Gore

Environmental Protection Agency of Montenegro

CRNA GORA

između planina i mora pejzaž i biodiverzitet

MONTENEGRO

between the Mountains and the Sea
Landscape and Biodiversity



Podgorica, novembar 2021.

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DEKLARACIJA o ekološkoj državi Crnoj Gori

Mi, poslanici Skupštine Republike Crne Gore, svjesni smo da je, zbog ugrožavanja prirode zaštita identiteta prostora na kome živimo i djelujemo postala naš neodložan i pravovremen posao.

Svjesni duga prema prirodi, izvoru našeg zdravlja i inspiraciji naše slobode i kulture, posvećujemo se njenoj zaštiti u ime sopstvenog opstanka i budućnosti potomstva.

Prihvatamo da nijedna razlika među nama nije toliko velika koliko su velike promjene kojima je izloženo naše prirodno okruženje. Bez obzira na nacionalna, vjerska, politička i druga ubjedenja i osjećanja, znamo i prihvatamo da su dostojanstvo i svetinja ljudskog bića organski povezani sa svetinjom i čistotom prirode.

Čovjek i priroda u njemu i oko njega cijelovito su jedno u svojim dubinama i po svom smislu i naznačenju. S toga je oduvijek zloupotrebu čovjeka pratila zloupotreba prirode. Zato opredjeljujući se i boreći se za dostojanstvo čovjeka pozvani smo da se borimo i za dostojanstvo prirode.

Donošenjem ove deklaracije Crna Gora prema prirodi uspostavlja državni odnos i poziva na mudrost sve ljudi da spriječe ekološku katastrofu koja nam prijeti.

20. septembar 1991. godine
Skupština Republike Crne Gore

DECLARATION On the Ecological State of Montenegro

We, the members of the Parliament of the Republic of Montenegro, are aware that due to the threats to the nature, the protection of the identity of the area in which we live and work became our immediate and timely obligation.

Being aware of our debt to the nature, which is the source of our health and inspiration of our freedom and culture, we are drawn to its protection in the name of our own survival and generations to come.

We agree that no difference between us is as great as the changes inflicted upon our natural environment. Regardless of our ethnic, religious, political and other beliefs and feelings, we know and accept that the dignity and sanctity of the human being are organically linked to the sanctity and purity of nature.

Man and nature within and around him are complete only in their depth, both in their essence and designation. Therefore, the abuse of man has always been followed by the abuse of nature. In this sense, opting and fighting for human dignity, we are called to fight for the dignity of nature.

Adopting this Declaration, Montenegro is establishing the state policy towards nature and calls upon the wisdom of the people to prevent an environmental disaster that threatens us.

September 20th 1991.
Assembly of the Republic of Montenegro



svaki LIST svaka KAP

PREDGOVOR

Priroda neke zemlje predstavlja njenu najveću vrijednost i najveći resurs za razvoj. Mi smo ponosni, a to pokazuje i ova knjiga, da je Crna Gora jedna od najbogatijih zemalja što se tiče i pejzaža i biodiverziteta. Tome treba da zahvalimo, ponajprije, položaju države, raznolikosti staništa, od otvorenog mora do najviših planina, miješanju klima i geomorfologiji. Na žalost, ne toliko i aktivnoj zaštiti koja se provodi u Crnoj Gori posljednjih desetljeća.

Brojne biljne vrste, svijet gljiva, brojne vrste riba, vodozemaca, gmizavaca, ptica i sisara, brojne pejzažne jedinice na veoma malom parčetu Starog kontinenta, a koji su prikazani u ovoj knjizi, jasno ukazuju na to da je priroda najveći crnogorski resurs. To dokazuju tekstovi gotovo 38 eksperata iz raznih oblasti koje pokrivaju prirodu mora i kopna države. Dodatno, to potvrđuju i fotografije koje su brojni zaljubljenici u prirodu Crne Gore, besplatno ustupili za ovu knjigu.

Održivi razvoj, koji pored zaštite prirode, uključuje ekonomsku, socijalnu i kulturnu dimenziju, u vrhu je agende brojnih zemalja okrenutih progresu, te će ova knjiga predstavljati izvor podataka za sva naredna istraživanja i planove razvoja.

Cilj ove knjige jeste da informiše i da skrene pažnju na ogromno bogatstvo prirode koje treba da se čuva, aktivnije i ozbiljnije nego do sada. Posebno u svjetlu klimatskih promjena, stihajske urbanizacije, sve češćih požara i mnogih drugih, po prirodu Crne Gore, prijetećih pojava i aktivnosti.

Gotovo svi tekstovi eksperata koji su radili na ovoj knjizi završavali su se pasusima upozorenja na ugroženost svijeta prirode o kojem su pisali. Zato, ova knjiga opominje da sve to o čemu je u njoj pisano treba hitno i ozbiljno uvesti u okvire održivog razvoja i mudrog korišćenja prirodnih resursa.

Na kraju, najtoplje zahvaljujem kolegama i koleginicama koji su se potrudili da svako iz svoje oblasti kvantifikuje bogatstvo vrstama i napiše iz svoje oblasti o specifičnostima Crne Gore.

Knjiga izlazi na tridesetu godišnjicu proglašenja Crne Gore ekološkom državom. Ona je potvrda da to možemo i postati, samo ako svi damo svoj doprinos.

Ugodno vam čitanje.

PREFACE

Nature holds the greatest value and resource for development of a country. We are proud, and this book shows it, that Montenegro is one of the richest countries in terms of landscape and biodiversity. For this, we should primarily thank the location of our state, diversity of our habitats as we move from the open sea to the highest mountains and the mix of climate and geomorphologic processes. Unfortunately, we should not thank active protection implemented in Montenegro in the last decades for this, though.

Numerous species of flora, the world of fungi, numerous species of fish, amphibians, reptiles, birds and mammals, numerous landscape units on a very small piece of the Old Continent, which are presented in this book, clearly indicate that nature is the greatest Montenegrin resource.

This is proved by the texts of almost 38 experts from various fields covering the nature of the sea and the land of the country. Additionally, this is also confirmed by the photos provided by numerous nature lovers in Montenegro, free of charge for this book.

In addition to nature protection, sustainable development includes economic, social and cultural dimensions. It is at the top of the agenda of many countries committed to progress and this book will be a source of data for all future research and development plans.

This book aims to inform and draw attention to the enormous wealth of nature which needs to be preserved. We should do this in a more active and serious manner than before. Especially, in the light of climate change, disastrous urbanization, more frequent fires and many other phenomena and activities which threaten the nature of Montenegro.

Almost all the experts who worked on this book ended their texts with passages of warning about the endangerment of the world of nature they wrote about. Therefore, this book warns that everything written in it should be urgently and seriously introduced into the framework of sustainable development and smart use of natural resources.

In the end, I would like to most sincerely thank all of my colleagues who, each in their respective field, made an effort to quantify the richness of species and write about the specifics of Montenegro.

The book is published on the thirtieth anniversary of the proclamation of Montenegro as an ecological state. It is a confirmation that we can become that state, only if all of us give our contribution.

Enjoy your reading.

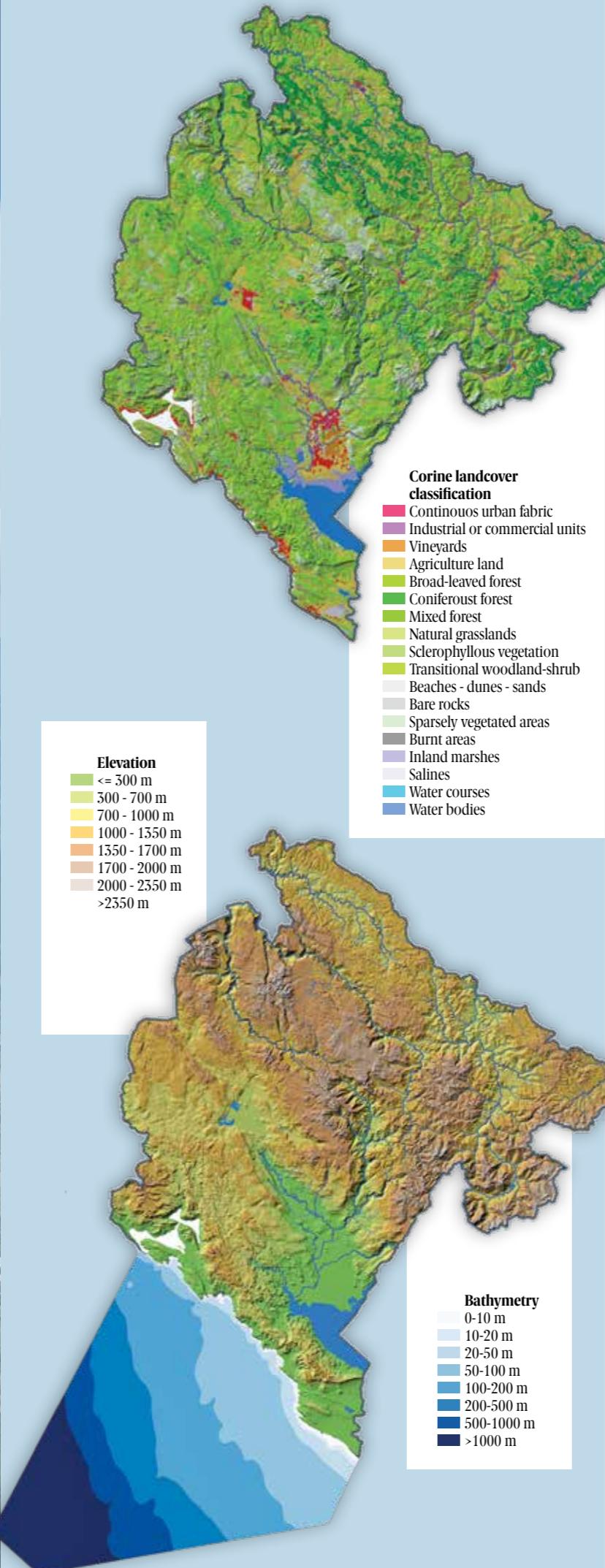


Dr Milan Gazdić,
direktor Agencije za
zaštitu životne sredine

Milan Gazdic,
PhD, Director of
Environmental Protection
Agency of Montenegro

Osnovne geografske karakteristike Crne Gore

BASIC GEOGRAPHICAL CHARACTERISTICS OF MONTENEGRO



Površina / Area:	13.812 km ²
Površina teritorijalnog mora / Area of territorial sea:	4800 km ²
Broj stanovnika / Population:	622 028
Gustina naseljenosti / Population density:	45 st./km ² / 45 P/km ²
Broj naselja / Number of settlements:	1307
Glavni grad / Capital:	Podgorica
Prijestonica / Old Royal Capital:	Cetinje
Nadmorska visina (% teritorije) / Elevation: (% of territory)	
do / up to 200 m –	10,30%
od / from 200 - 500 m –	5,7%
od / from 500 - 1000 m –	27%
od / from 1000 - 1500 m –	39,85%
od / from 1500 - 2000 m –	16%
preko / above 2000 m –	1,15%

Najviši vrh / Highest mountain peak:	Zla kolata 2534 mnv (Prokletije)
Najdublja jama / Deepest pit:	1162 m (Maganik)
Najduža pećina / Longest cave:	Pećina nad vražnjim firovima 17,5 km (Bijelo Polje)

Najduže rijeke / Longest rivers:	Lim 220 km (123 km u CG) / Lim 220 km (123 km in MNE)
Tara 157 km (150 km u CG) / Tara 157 km (150 km in MNE)	
Čehotina 125 km (100 km u CG) / Čehotina 125 km (100 km in MNE)	
Morača 99 km (cijelim tokom u CG) / Morača 99 km (all the flow in Montenegro)	

Prirodnih jezera ima 31, od toga je 29 planinskih (na Durmitoru 13, na Bjelasici 6 itd.) There are 31 natural lakes, out of which 29 are mountain lakes (13 in Durmitor, 6 in Bjelasica, etc.)

Najveće jezero Skadarsko jezero: 370 km² (222 km² u CG) / The biggest lake Skadar lake: 370 km² (222 km² in MNE)

Dužina obale / Total length of Montenegrin coast: 297 km

Najduža plaža / Longest beach: 12,5 km – Velika plaža Ulcinj

Hidrološke karakteristike

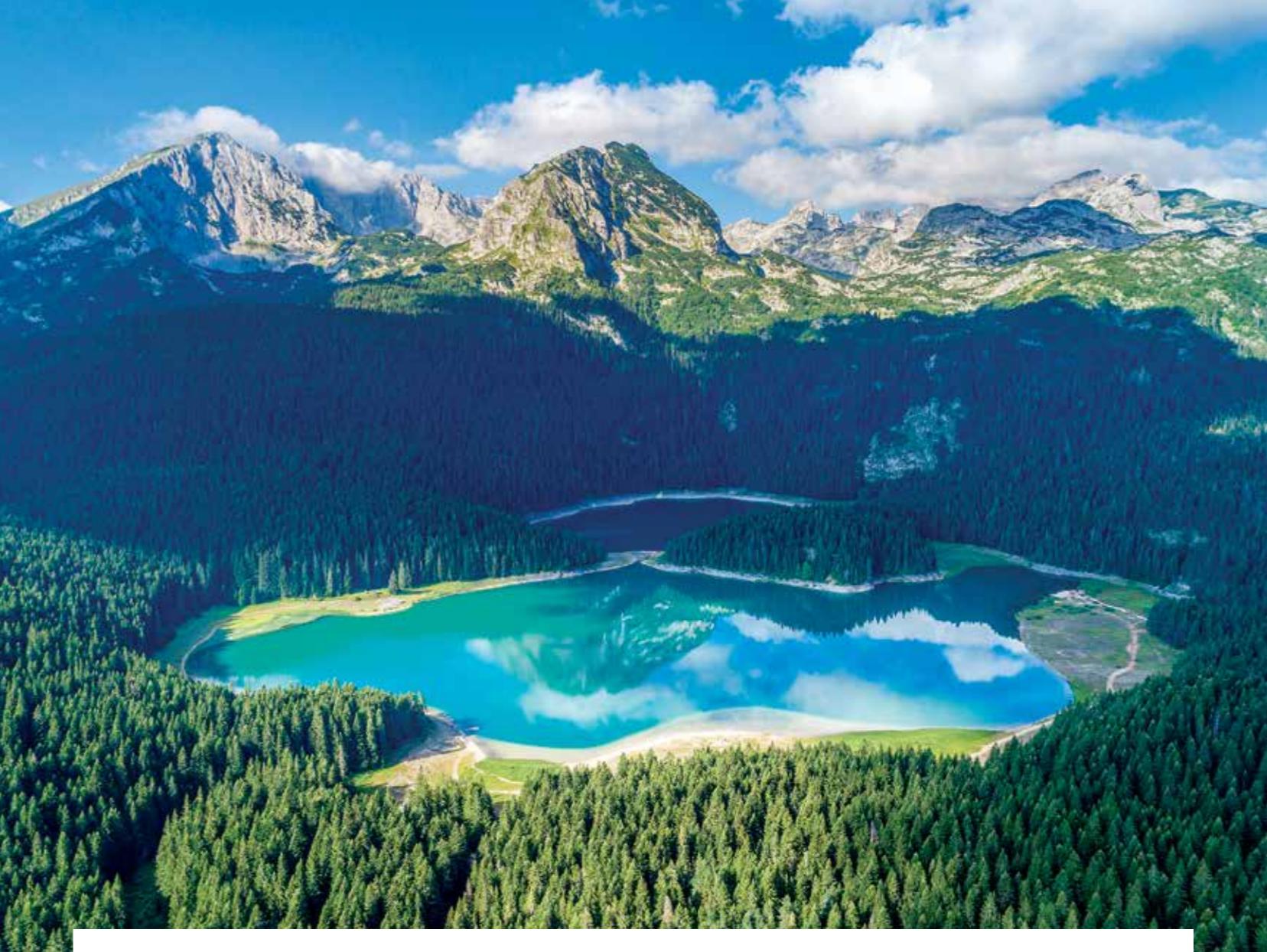
Prostorni raspored površinskih (rijeke, jezera, more) i podzemnih voda Crne Gore, primarno je određen njenim geomorfološkim i hidrogeološkim svojstvima. Osnovna hidrografska odlika jeste postojanje dva, približno jednaka slivna područja, sa kojih voda površinskim i podzemnim putem otiče prema slivu rijeke Dunav (Crnog mora) i slivu Jadranskog mora.

Ukupna površina dijela teritorije sa kojeg vode otiču prema Dunavskom slivu iznosi oko 6727 km^2 (48,7% ukupne površine) i glavni vodotoci su Lim, Tara, Piva, Čehotina i Ibar. Slivno područje sa kojeg vode gravitiraju Jadranskom moru iznosi oko 7085 km^2 (51,3%). Prema Skadarskom jezeru otiču Morača, Zeta, Cijevna, Rijeka Crnojevića i Orahovstica, kao i niz manjih vodotoka, a odatle rijekom Bojanom voda teče prema Jadranskom moru. Ovom slivnom području osim navedenih vodotoka pripadaju i tereni Crnogorskog primorja (bez stalnog oticanja, uglavnom bujičnog karaktera), zapadni i jugozapadni djelovi planine Orjen (daju vode i Hrvatskom primorju), zapadni i sjeverozapadni karstni tereni opštine Nikšić (daju vode slivu Trebišnjice, BiH), istočne padine planine Čakora i Bogičevica (daju vode Pećkoj Bistrici i dalje rijeci Drim).

Hydrological characteristics

The spatial distribution of surface (rivers, lakes, sea) and groundwater bodies of Montenegro is primarily determined by its geomorphological and hydrogeological properties. The basic hydrographic feature is the existence of two, approximately equal catchment areas, from which surface and ground water bodies flow towards the Danube River Basin (Black Sea catchment area) and the Adriatic Sea Basin.

The total area of the Danube River Basin is about 6727 km^2 (48.7% of the total area), and the main water bodies are rivers Lim, Tara, Piva, Čehotina, and Ibar. Rivers Moraca, Zeta, Cijevna, Rijeka Crnojevića and Orahovstica, and some smaller watercourses flow towards the Skadar Lake and from there to the Adriatic Sea via river Bojana. The catchment area from which the waters gravitate to the Adriatic Sea is about 7085 km^2 (51.3%). Apart from the mentioned water bodies, this catchment area also includes the terrains of the Montenegrin coast (without a constant runoff, mostly torrential character), western and southwestern parts of the mountain Orjen (that feed also the Croatian coast), western and northwestern karst terrains of the municipality of Nikšić (waters of Trebisnjica basin, B&H), the eastern slopes of the mountains Čakora and Bogičevica (they feed Pećkoj Bistrica and further river Drim).



Crno jezero na Durmitoru spada u veoma specifične i po mnogo čemu jedinstvene hidrografske objekte u Crnoj Gori. Zahvaljujući dugim i složenim geološkim procesima i pojавama, stvoreno je jezero, koje se već svoim oblikom i strukturom dva basena, spojena uzinom Struga, koja često tokom ljetnjih mjeseci presušuje i razdavaja jezero na Veliko i Malo – predstavlja rijetku prirodnu pojavu.

Pored padavina Crno jezero hrane površinski tokovi i sublakustički izvori. Površinskim putem najveću količinu dobija od Mlinskog potoka. Od periodičnih vrela najveći značaj imaju Čeline, koje se nalaze na padinama Mededa. Karakteriše ih tzv. „pučanje“, kad voda pod velikim pritiskom sistemom kanala izbija na površinu. Ta pojava karakteristična je za hidrografske objekte – estavele. Tokom godine, kad iz Čelina izbija veća količina vode, vode iz Malog jezera otiču prema Velikom jezeru, dok se tokom ostalih mjeseci taj proces odvija u suprotnom pravcu.

Interesantnost Crnog jezera ogleda se u tome što ono funkcioniše i kao prirodna bifurkacija (kad neki vodotok daje vodu u dva ili više slivova). Bojanjem vode Velikog crnog i Malog crnog jezera utvrđeno je da Veliko jezero ponire u Taru, a Malo jezero u Komarnicu.

Black Lake on Durmitor is one of the very specific and in many ways unique hydrographic structures in Montenegro. Thanks to long and complex geological processes and phenomena, a lake was created, which is a rare natural phenomenon with its shape and structure of two basins, connected by a narrow belt Struga, which often dries in the summer and divides the lake into Veliko and Malo.

In addition to precipitation, Black Lake is fed by surface streams and sublacustric springs. Via surface, it receives the largest amount from Mlinski potok. Out of the periodic springs, the most important are the Čeline, which is located on the slopes of Meded. They are characterized by the so-called "bursting", when water under high pressure bursts to the surface through a system of channels. This phenomenon is characteristic of hydrographic structures - estavelles. During the year, when a larger amount of water erupts from Čeline, the water from Malo Jezero flows towards the Veliko Jezero, while during the other months the process takes place in the opposite direction.

The interest of Black Lake is reflected in the fact that it also functions as a natural bifurcation (when a watercourse provides water for two or more basins). By coloring the water of the Veliko Crno lake and Malo Crno lake, it was determined that the Veliko Jezero plunges into Tara, and the Malo jezero into Komarnica.



Oba slivna područja bogata su vodom (prosječne vode), čak i prema svjetskim mjerilima. Međutim, znatan dio površine Crne Gore (oko 60%) pripada području izrazitog dinarskog karsta (krša), koji je bez stalnih tokova, s brojnim ponorima i škripovima, u koje se padavine (tečne i čvrste) sливaju i dalje podzemno otiču prema vodotocima ili moru. Upravo iz ovih razloga, zapadni dio prostora Jadranskog sliva ima vrlo oskudnu i nerazvijenu hidrografiju, što veoma relativizuje bogate padavinske potencijale na tom području, jer nema hidrografskih i hidrogeoloških uslova za akumulisanje vode i za njeno vodoprivredno i hidroenergetsko iskorišćavanje.

S prosječnim oticajem od oko 40 l/s/km^2 , ili zapreminske izraženo oko $19,5 \text{ km}^3$ godišnje, Crna Gora spada među 4% svjetske teritorije, s najvećim prosječnim oticajem.

Both catchment areas are rich in water (average waters), even by world standards. However, a significant part of the surface of Montenegro (about 60%) belongs to the area of distinct Dinaric karst, which is without constant flows, with numerous abysses and limestone pavement, into which precipitation (liquid and solid) flows and continues to flow underground towards watercourses or the sea. For these reasons, the western part of the Adriatic basin has very scarce and underdeveloped hydrography, which greatly relativizes the rich precipitation potentials in the area because there are no hydrographic and hydrogeological conditions for water accumulation and its water management and hydropower utilization.

With an average runoff of about 40 l/s/km^2 , or about 19.5 km^3 per year in volume, Montenegro is among the 4% of the world's territory, with the most considerable average runoff.

Imajući pri tome u vidu činjenicu da se čak 95,3% vodotoka u Crnoj Gori formira na njenoj teritoriji, tj. s izvorištem i slivnim područjem, s pravom se može reći da je voda naš najveći prirodni resurs iako je prostorno i vremenski veoma heterogena.

Crnoj Gori pripada veći dio Skadarskog jezera (najveće jezero po vodnoj površini na Balkanskom poluostrvu), Šasko i Zogansko jezero (depresije). Takođe, u planinskom dijelu Crne Gore postoje 31 lednička jezera. U drugoj polovini prošlog vijeka izgrađeno je sedam vještačkih jezera, koja se koriste za proizvodnju električne energije (osim Liverovićkog – za potrebe Željezare i Grahovskog jezera – melioracije).

Morski akvatorij naspram obale Crne Gore širok je oko 200 km, i čini dio južnojadranske kotline, u kojoj su izmjerene i najveće dubine Jadranskog mora – oko 1400 m. Salinitet vode južnog Jadrana (38,6‰) nešto je niži od prosjeka, za vode Sredozemnog mora (39‰).

Hemijski sastav vode sličan je ostalim morima, sadržaj hranljivih soli je nizak u poređenju s vodama okeana, što negativno utiče na organsku proizvodnju. Po temperaturi vode (do 27°C ljeti), Jadran se svrstava u topla mora. Morske struje, relativno slabe, teku paralelno s obalom – ka sjeverozapadu (stalna priobalna struja ima brzinu od 0,7 čvorova). Plima i osjeka su neizrazite (prosječna amplituda kolebanja je oko 35 cm). S koeficijentom razuđenosti oko tri, ukupna dužina morske obale Crne Gore iznosi 293,5 km. Uz preovladavajuću kamenitu obalu, more je po pravilu duboko, dok je na svega 20% dužine obalne linije, uz niska žala i pristupačne djelove kamenite obale, relativno plitko i, s pjeskovito-šljunkovitim dnom, pogodno za kupališne aktivnosti.

Bearing in mind that as much as 95.3% of watercourses in Montenegro are formed on its territory, i.e., with its springs and catchment area, it can rightly be said that water is our greatest natural resource even though it is spatially and temporally very heterogeneous.

Most of Lake Skadar belongs to Montenegro (the largest lake by water surface on the Balkan Peninsula), lakes Sasko and Zogansko (depressions). Also, in the mountainous part of Montenegro there are 31 glacial lakes. In the second half of the previous century, seven artificial lakes were built, which are used for the production of electricity (except for Liverovici - for the needs of the Steelworks and Lake Grahovo - land reclamation).

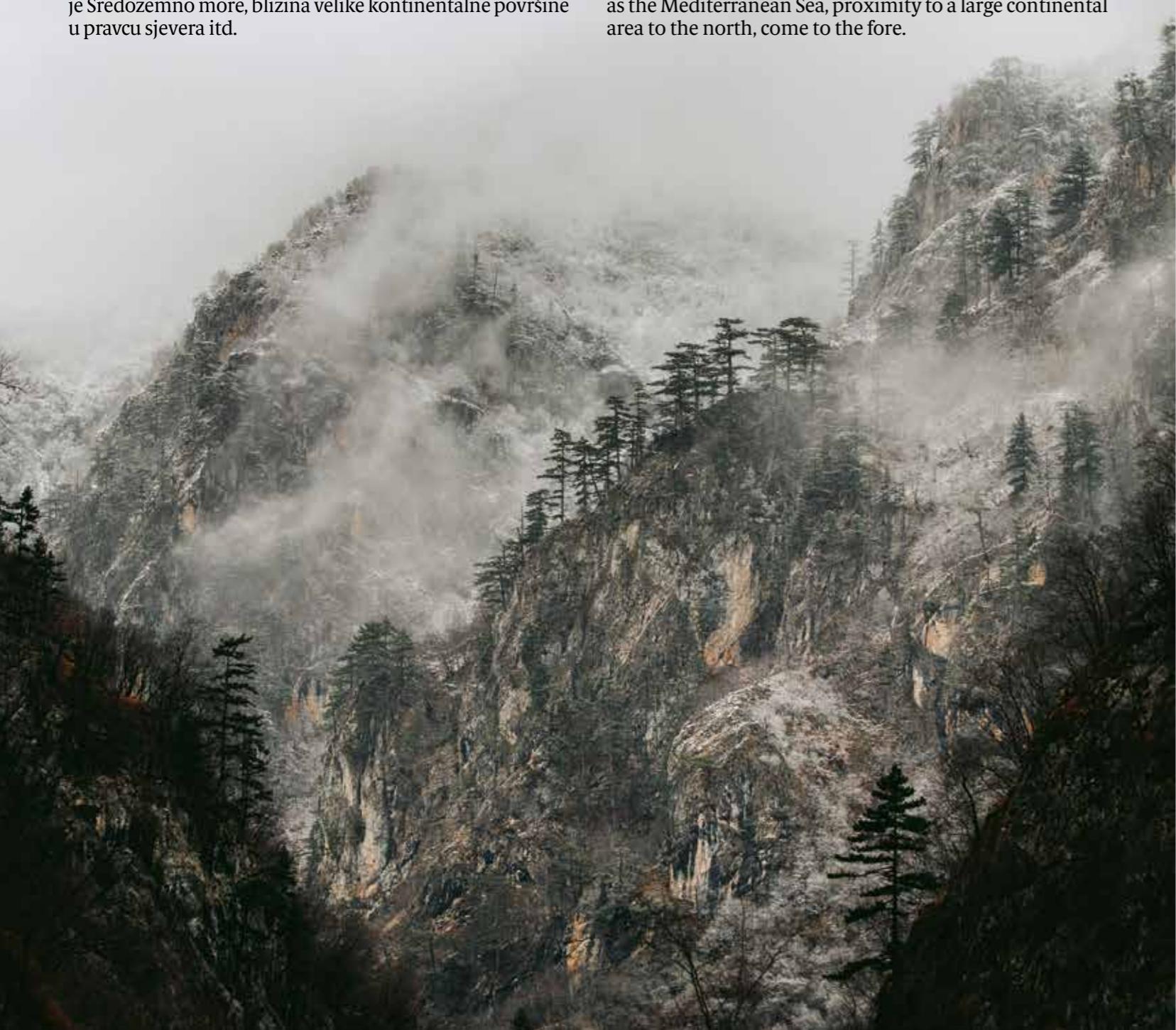
The sea area off the coast of Montenegro is about 200 km wide and is part of the southern Adriatic valley, in which the greatest depths of the Adriatic Sea were measured - about 1400 m. The salinity of the waters of the southern Adriatic (38.6‰) is slightly lower than the average for the waters of the Mediterranean Sea (39‰).

The chemical composition of water is similar to other seas. The content of nutrient salts is low compared to ocean waters, which negatively affects organic production. According to the water temperature (up to 27°C in summer), the Adriatic is a warm sea. Sea currents, relatively weak, flow parallel to the coast - to the northwest (constant coastal current has a speed of 0.7 knots). The tides are indistinct (the average amplitude of oscillations is about 35 cm). With a divergence coefficient of about three, the total length of the Montenegrin coast is 293.5 km. Along the predominant rocky shore, the sea is usually deep, while at only 20% of the length of the coastline, with low peaks and accessible parts of the rocky shore, it is relatively shallow and, with a sandy-pebble bottom, suitable for bathing activities.

Klimatske karakteristike

Položaj Crne Gore je specifičan, jer se ona nalazi u zoni veoma izražene termičke asimetrije između hladne sjeverne Evrope i veoma tople sjeverne Afrike. Upravo iznad Crne Gore vrši se intenzivna razmjena toplih vazdušnih masa koje idu ka sjeveru i hladnih vazdušnih masa koje sa sjevera idu ka jugu. Veoma često iznad Crne Gore dolazi do sudaranja i miješanja tih vazdušnih masa, koje karakterišu ekstremne i različite fizičko-meteorološke osobine.

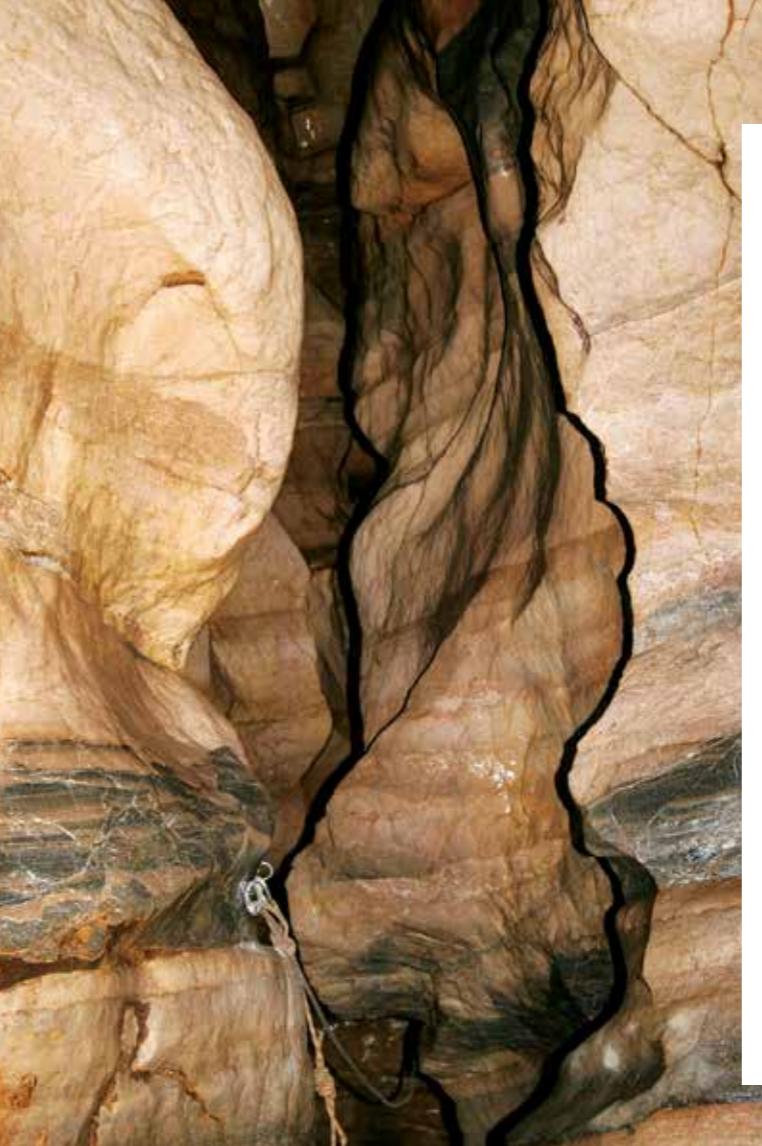
Prilikom transporta tih vazdušnih masa do izražaja dolazi orografija (planine i doline), njihova orientacija, blizina mora (Jadranskog), blizina velike vodene površine kao što je Sredozemno more, blizina velike kontinentalne površine u pravcu sjevera itd.



Climate characteristics

The position of Montenegro is specific because the country is located in a zone of very pronounced thermal asymmetry between cold northern Europe and very warm northern Africa. Above Montenegro, there is an intensive exchange of warm air masses going to the north and cold air masses going from the north to the south. Over Montenegro, there are collisions and mixing of these air masses, which are characterized by extreme and different physical and meteorological properties.

During the transport of these air masses, orography (mountains and valleys), their orientation, proximity to the sea (Adriatic), proximity to a large body of water such as the Mediterranean Sea, proximity to a large continental area to the north, come to the fore.



Crnogorsko primorje zajedno sa Zetsko-bjelopavličkom ravnicom predstavlja oblast u kojoj vlada mediteranska klima, koju karakterišu duga, topla i suva ljeta i relativno blage i kišovite zime. Taj prostor naročito se ističe po visokim ljetnjim temperaturama, i tu je registrovan apsolutni maksimum temperature vazduha u Crnoj Gori (Podgorica 44,8°C, 24. 8. 2007), kao i najveći prosječni broj tropskih dana (66) i noći (44).

Specifičnost predstavljaju i kraška polja, gdje se javlja nešto oštira klima, imajući u vidu da se ta polja obično nalaze na višim nadmorskim visinama, a i od Jadranskog mora su udaljena u prosjeku od 20 do 60 km. Zimi, prilikom antiklonskih vremenskih stanja, u tim poljima dolazi do taloženja hladnog vazduha, koji se spušta po stranama okolnih planina, dok se u ljetnjim mjesecima prizemni sloj vazduha prilično zagrije, uslijed čega je godišnje kolebanje temperature vazduha povećano i neujednačeno.

Centralni i sjeverni dio Crne Gore imaju karakteristike planinske klime, koja je donekle modifikovana uticajem Sredozemnog mora, što se prvenstveno ogleda kroz režim padavina i u višoj srednjoj temperaturi najhladnijih mjeseci. Krajnji sjever Crne Gore pripada kontinentalnom tipu klime, koja se osim velikim dnevnim i godišnjim amplitudama temperature odlikuje i malom godišnjom količinom padavina (uz prilično ravnomjernu raspodjelu po mjesecima).

Debljina karbonatnih stijena (pretežno krečnjaka) u Crnoj Gori, kreće se do dubine i do oko 4230 m. Ove stijene prekrivaju 2/3 ukupne teritorije Crne Gore. Na krečnjaku su razvijeni specifični oblici reljefa: kraška polja, uvale, vrtače jame, pećine i veoma složeni i jedinstveni hidrogeološki fenomeni. Jedan od najizrazitijih primjera složene fenomenologije karsta jeste i Nikšićko polje površine 65 km², koje je vodama najbogatije kraško polje u Dinaridima. U njemu se nalazi oko 300 vrela i izvora, te oko 30 manjih i većih vodotokova.

Thickness of carbonate rocks (mostly karst) in Montenegro ranges up to a depth of about 4230 m. These rocks cover 2/3 of the total territory of Montenegro. Specific landforms have been created in limestone: karst fields, inlets, sinkholes, caves and very complex and unique hydrogeological phenomena. One of the most striking examples of the complex phenomenology of karst is the Niksic karst field with an area of 65 km², which is the karst field richest in waters in the Dinarides. It contains about 300 springs-waters and springs, and about 30 smaller and larger water courses.

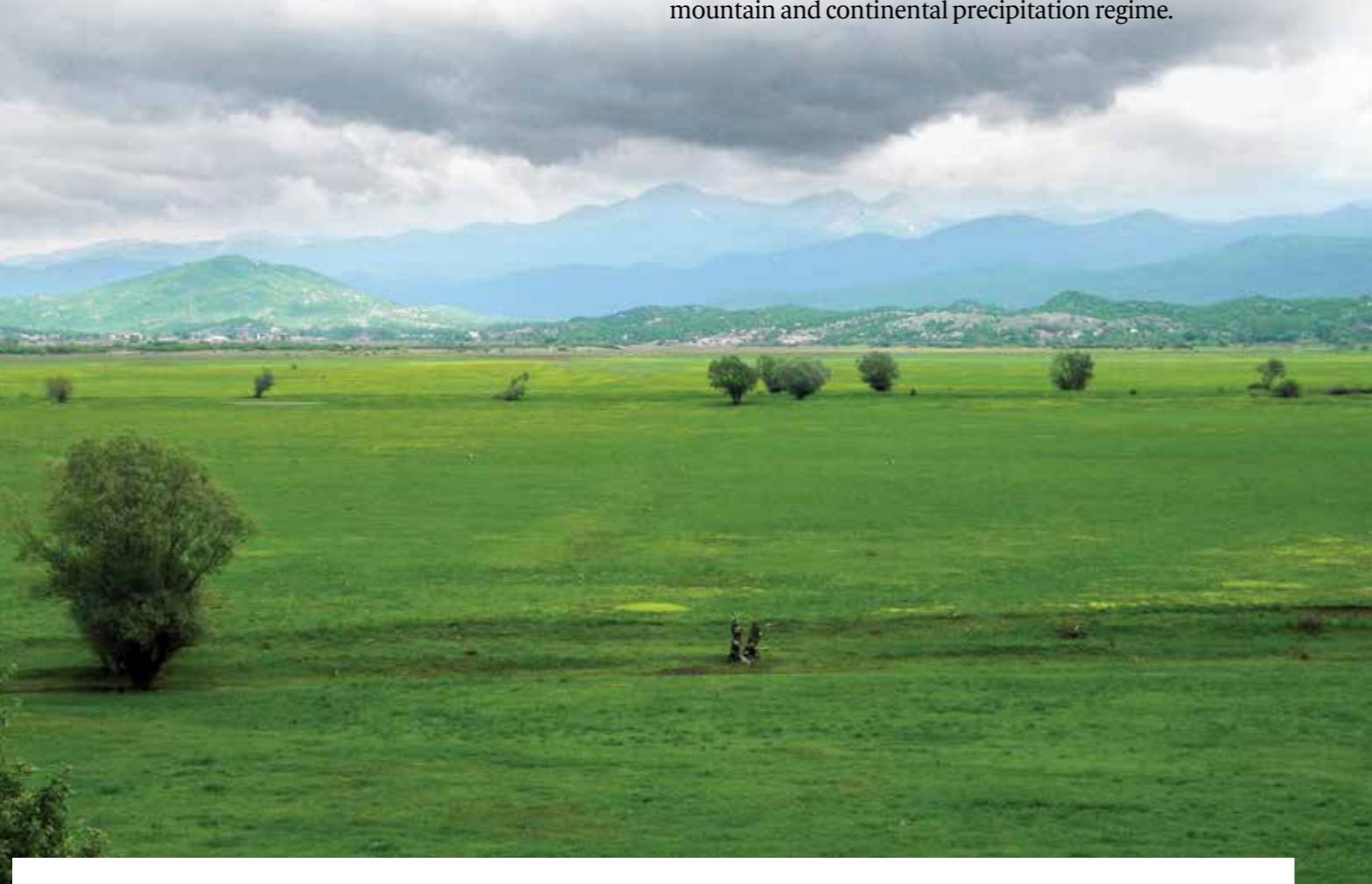
The Montenegrin coast and the Zeta-Bjelopavlicka plain are an area with a Mediterranean climate characterized by long, warm, and dry summers and relatively mild and rainy winters. High summer temperatures especially distinguish this area, and there is an absolute maximum air temperature in Montenegro (Podgorica 44.8°C, August 24, 2007), as well as the highest average number of tropical days (66) and nights (44).

Other specifics of the country are karst fields where the climate is somewhat harsher, bearing in mind that these fields are usually located at higher altitudes, and they are on average 20 to 60 km away from the Adriatic Sea. In winter, during anticyclonic weather conditions, cold air is deposited in these fields, which descends on the sides of the surrounding mountains, while in the summer months, the ground layer of the air is quite hot, as a result of which annual air temperature fluctuations are increased and uneven.

The central and northern parts of Montenegro have the characteristics of a mountain climate, which is somewhat modified by the influence of the Mediterranean Sea, which is primarily reflected in the precipitation regime and the higher average temperature of the coldest months. The extreme north of Montenegro belongs to the continental type of climate, which, in addition to large daily and annual temperature amplitudes, is also characterized by a small annual amount of precipitation (with a fairly even distribution over the months).

Na prostoru u planinskim oblastima na sjeveru, ljeta karakteriše relativno hladna i vlažna klima, dok su zime duge i oštре, sa čestom pojmom mrazeva i niskih temperatura (apsolutni minimum registrovan je u Rožajama, 13. 1. 1985. godine i iznosio je -32°C).

Prema režimu padavina, na teritoriji Crne Gore razlikujemo mediteranski i umjerenokontinentalni režim. Mediteranski režim se odlikuje maksimalnim količinama padavina u novembru i decembru, a minimumom u julu i avgustu. Umjerenokontinentalni režim se odlikuje češćim padavinama u drugoj polovini ljeta, sporednim maksimumom u oktobru i minimumom u februaru. U najvećem dijelu geografskog prostora Crne Gore, maritimni pluviometrijski režim je do nekak modifikovan planinskim i kontinentalnim režimom padavina.



Glavni vodotok Nikšićkog polja predstavlja ponornica rijeke Gornja Zeta, koja nastaje od nekoliko manjih i većih tokova na području Gornjega polja. Poslije toka od svega 15-ak kilometara, drenirajući praktično sve vode Nikšićkoga polja, do izgradnje vještačkih akumulacija rijeke Zeta je ponirala u svoj prirodnji ponor Slivlje, čija se obodna ivica nalazi na koti od 594 mm, tako da to predstavlja najnižu kotu u Nikšićkom polju, da bi se zatim javila kao vrelo „Glava Zete“ na koti 71 mm. Prirodni pad rijeke od ponora Slivlje do izvora pukotine je oko 523 m.

The main water course of Nikšićko polje is the sinking river Gornja Zeta, which arises from several smaller and larger streams in the area of Gornje polje. After only 15 kilometers of water course, draining virtually all the waters of the Nikšić field, until artificial reservoirs have been constructed, the river Zeta sank into its natural abyss Slivlje, having its peripheral edge at an elevation of 594 m.a.s.l which is the minimum elevation found in Nikšić field; the river only appears again as a spring "Glava Zete" at the elevation of 71 m.a.s.l.. From the Slivlje abyss to the source of the crack, the free fall of the river is around 523 m.

In the mountainous areas in the north, summers are characterized by a relatively cold and humid climate, while winters are long and harsh, with frequent frosts and low temperatures (the absolute minimum was registered in Rozaje on January 13, 1985, and was -32°C).

According to the precipitation regime, on the territory of Montenegro, we make a distinction between the Mediterranean and the temperate-continental regime. The Mediterranean regime is characterized by maximum rainfall in November and December and minimum in July and August. The temperate-continental regime is characterized by more frequent precipitation in the second half of summer, with a secondary maximum in October and a minimum in February. In most of the geographical areas of Montenegro, the maritime pluviometric regime has been somewhat modified by the mountain and continental precipitation regime.



Još jedan fenomen Nikšićkog polja predstavlja potajnica (mukavica) Vidov potok. To je jak kraški izvor, koji ima karakter potajnice samo u ljetnjem periodu godine. U vrijeme minimalne izdašnosti, krajem avgusta i početkom septembra, funkcioniše tako da se smjenjuju periodi isticanja, koji traju 15–20 minuta, s periodima prekida oticanja, koji prosječno traju 35–45 minuta. Razlike koje se javljaju u vremenu funkcionisanja potajnice kao vrelo i vremena prestanka oticanja vode, posljedice su složenog podzemnog sifonskog sistema i podzemnih rezervoara.



Gornjepolski vir je estavela i jedna je od najvećih pojava te vrste u karstu Dinaridašire. Ima oblik vrtcače, prečnika 100 m, a pri dnu se sužava u jamu. Najveća, do sada, izmjerena dubina iznosi 95 m (mjerena HMZ-a), a dalje je nemoguće bilo mjeriti zbog karaktera jamskog kanala i promjene njegovog azimuta prema masivu. Najniže zabilježeni nivo u Viru je 34 m od vrha depresije. Gornjepolski vir ima mehanizam estavele, što znači da u jednom dobu godine radi kao izvor (novembar – maj), a u drugom kao ponor (jul – novembar). U periodu kad radi kao izvor (> m³/s) javlja se pojava „pučanja Vira“, jer pri naglom nadolasku podzemnih voda u grotlu, dolazi do tutnje, nakon čega nastaje oslobadanje sabijenog vazduha u podzemnim kanalima, uz snažan pučanj. Tada voda izbacuje veliku količinu sitnog pijeska krem boje.

Gornjepolski vir is an estravelle, one of the greatest occurrence of its kind in the karst of Dinarides. It has the shape of a sinkhole, 100 m in diameter, and narrows into a pit at the bottom. The greatest depth measured so far is 95 m (measurements of IHMS), while it was still impossible to measure deeper than that due to the character of the cave channel and the change of its azimuth towards the massif. The lowest recorded level in Vir is 34 m from the top of the depression. Gornjepolski vir has a estavelle mechanism, which means that in a certain period of a year, it works as a spring (November - May), and in another as an abyss (July - November). In the period when it works as a spring (> m³/s), "Vir bursting" occurs, because when the groundwater suddenly rises, there is a rumble, after which compressed air is released in the underground channels, with a strong bang. Then, the water spews out a large amount of fine cream-colored sand.



PEJZAŽ
LANDSCAPE

Mapiranje i tipologija predjela Crne Gore

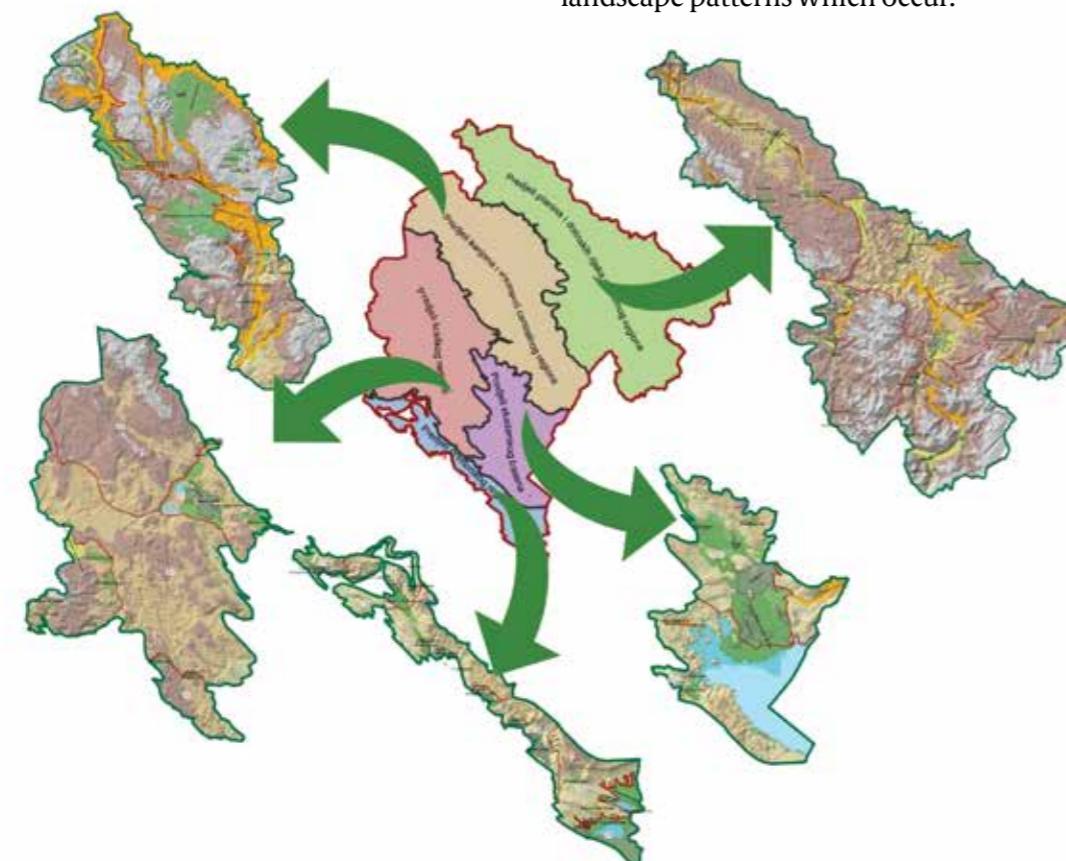
Raznovrsnost predjela u Crnoj Gori nastala je kombinacijom izuzetnih prirodnih vrijednosti s različitim lokalnim tradicijama korišćenja prostora, koje su se razvile kao odraz kulturno-istorijskih, socijalnih i ekonomskih prilika.

Uzimajući u obzir reljef, klimu, geološke i pedološke karakteristike, pokrivač tla, homogenost i prepoznatljivost, predjeli Crne Gore svrstani su u pet regiona:

- Predjeli primorskog regiona
- Predjeli skadarskog basena
- Predjeli kraškog regiona
- Predjeli kanjona i visoravnih centralnog regiona
- Predjeli planina i dolinskih rijeka sjevernog regiona.

Na prostoru Crne Gore na nacionalnom nivou prepoznato je deset tipova predjela: 1. urbana naselja; 2. ravnice (polja); 3. zaravni i visoravni; 4. kanjoni i klisure; 5. doline i kotline rijeka; 6. jezera; 7. visokoplaninski tip; 8. planinski tip; 9. niži planinski tip i 10. brdski tip.

Unutar navedenih tipova karaktera predjela u detaljnim studijama predjela na mikro nivou moguće je prepoznati mnoštvo različitih podtipova u zavisnosti od predionih obrazaca koji se javljaju.



Mapping and typology of Montenegrin landscapes

Landscape diversity in Montenegro was created thanks to a combination of exceptional natural values coupled with different local traditions of land use established as a reflection of cultural, historical, social and economic circumstances.

Considering the relief, climate, geological and pedologic characteristics, soil cover, homogeneity and recognizability, the landscapes of Montenegro are classified into five regions:

- Coastal Region landscapes of the coastal region
- Skadar Region landscapes of the Skadar basin
- Landscapes of the karst region
- Landscapes of canyons and plateaus of the central region
- Landscapes of mountains and valley rivers of the northern region.

Ten types of landscapes have been recognized in Montenegro at the national level: 1. urban settlements; 2. plains (fields); 3. various plateaus; 4. canyons and gorges; 5. river valleys and ravines; 6. lakes; 7. high mountain type; 8. mountain type; 9. lower mountain type and 10. hilly area type.

Detailed studies of landscapes at the micro level recognize many different subtypes within the above mentioned types of landscapes, depending on the landscape patterns which occur.



Predjeli primorskog regiona

Coastal Region landscapes

Prostiru se od morske obale do planinskog lanca Orjen – Lovčen – Sutorman – Rumija. Strme krečnjačke padine i vertikalni odsjeci izbrazdani su procjepima, dubokim točilima i između njih nazubljenim grebenima.

Padine su pri dnu ublažene zahvaljujući svom flišnom sastavu u podlozi, te su zasute siparima i plavinama. U sjeverozapadnom dijelu primorja pojas zaravni je uzan, za razliku od jugoistočnog primorja, gdje se prostire niska ravan Ulcinjskog polja.

U morfolojiji reljefa prisutne su i priobalne i plavne aluvijalne ravnice, močvare, plaže i ostrva.

U ovom regionu na horizontalnom i na vertikalnom profilu diferenciraju se brojne šumske zajednice uslovljene klimom, nadmorskom visinom i eksponcijom terena. Najniži pojas čine hidrofilne šume u priobalnom dijelu Bojane i na ušću Bojane u Jadransko more.

Na području primorskog regiona izdiferencirano je nekoliko tipova karaktera predjela, koji izgrađuju pomenuta područja karaktera predjela.

Stretch from the coastline to the mountain range Orjen - Lovcen - Sutorman - Rumija. Steep limestone slopes and vertical sections are furrowed with crevices, deep slides and reefs jagged in between.

At the foot, the slopes are softened thanks to their flysch composition in the base, thus being covered with taluses and fans. In the northwestern part of the coast, the plateau belt is narrow, in contrast to the southeastern coast, where the low plain of the Ulcinj field extends.

Coastal and alluvial plains, wetlands, beaches and islands are also present in the morphology of the relief.

In this region, numerous forest communities are differentiated on horizontal and vertical profile due to climate, altitude and terrain exposure. The lowest belt consists of hydrophilic forests in the coastal part of Bojana and at the confluence of the river Bojana and the Adriatic Sea.

In the area of the coastal region, several types of landscape characters have been differentiated, which form the mentioned regions of landscape character.

Tipovi karaktera predjela zasnovani na karakterističnoj prirodnoj i kulturnoj osnovi koja se ponavljaju u manje više sličnoj formi i obliku duž čitavog primorja jesu: primorski grebeni i stjenovite obale, brdsko-planinsko zaleđe na masivnim krečnjacima, ogoljeni brdoviti tereni na krečnjacima, šumovito brdsko zaleđe na krečnjacima, šumovite padine na flišu i deluvijumu, naselja na tradicionalnim poljoprivrednim poljima, naselja s tradicionalnim terasama, tradicionalne terase s maslinjacima, priobalne i plavne aluvijalne ravnice, močvarno zemljište (močvare, solila, solana), plaže – pješčane, šljunkovite, betonske, ostrva, Šasko jezero, izgrađeno zemljište (gradska naselja, industrijske zone, skladišna i servisna područja), djelimično izgrađeno zemljište – semiurbana naselja razbijenog tipa i devastirana područja (kamenolomi, deponije).

Landscape character types based on a characteristic natural and cultural basis that are repeated in a more or less similar shape and form along the entire coast are: coastal ridges and rocky shores, hilly-mountainous hinterland on massive limestone, bare hilly terrain on limestone, wooded hilly hinterland, wooded slopes on flysch and deluvium, settlements on traditional agricultural fields, settlements with traditional terraces, traditional terraces with olive groves, coastal and floodplains/alluvial plains, wetlands (swamps, salt pans, salina), beaches - sandy, pebble, concrete, islands, Sasko Lake, built-up land (urban settlements, industrial zones, storage and service areas), partially built-up land - semi-urban settlements of scattered type and devastated areas (quarries, landfills).

Kulturni obrazac:

- ruralna naselja na tradicionalnim poljoprivrednim poljima
- ruralna naselja s tradicionalnim terasama
- tradicionalne terase s maslinjacima
- primorska gradska i prigradska naselja, semi-urbana naselja
- industrijske zone, skladišna i servisna područja
- devastirana područja (kamenolomi, deponije)

Cultural pattern:

- rural settlements on traditional agricultural fields
- rural settlements with traditional terraces
- traditional terraces with olive groves
- coastal urban and suburban settlements, semi-urban settlements
- industrial zones, storage and service areas
- devastated areas (quarries, landfills)



Predio skadarskog basena

Obuhvata Podgoričko-skadarsku kotlinu i dolinu Zete s Bjelopavličkom ravnicom. Na ovoj površi uzdižu se brdoviti predjeli Komana, Pipera i Martinića, Veljeg brda i Zagarača, na istoku Drume i Hoti, Kakaricka gora, Doljani i Fundina, i u okolini skadarske kotline brdoviti predjeli krajine i Riječke nahiye. Podgoričko-skadarska kotlina zaravljena je fluvioglacijalnim materijalom. U basenu Skadarskog jezera prostiru se hidrofilne šume vrbe, topole i skadarskog hrasta lužnjaka.

Skadar basin landscapes

Includes Podgorica-Skadar valley and Zeta valley with Bjelopavlici plain. On this surface rise the hilly areas of Koman, Piper and Martinic, Velje Brdo and Zagarač, on the east Druma and Hoti, Kakaricka gora, Doljani and Fundina, and in the vicinity of Skadar valley - the hilly areas of Krajina and Riječka nahiye. Podgorica-Skadar valley is flattened with fluvioglacial material. Hydrophilic forests of willow, poplar and Skadar pedunculate oak stretch along the basin of Skadar Lake.

Na području skadarskog basena izdiferencirano je nekoliko tipova karaktera predjela. Tipovi karaktera predjela zasnovani na karakterističnoj prirodnoj i kulturnoj osnovi, koja se ponavljaju u manje više sličnoj formi i obliku, u okviru ovog regiona su pored samog jezera i plavnih ravnica oko jezera, naselja s tradicionalnim poljoprivrednim poljima (Crnicičko, Orahovsko, Zetska ravnica i Bjelopavlička ravnica, Kopiljsko polje), naselja s tradicionalnim poljoprivrednim terasama, izgrađeno zemljište (urbana i semiurbana naselja), klisure i kanjoni (Rijeka Crnojevića i Cijevna), doline rijeka, brdski predjeli i niži planinski predjeli.

Several types of landscape character have been differentiated in the area of the Skadar basin. Within this region, in addition to the lake itself and floodplains around the lake, landscape character types based on a characteristic natural and cultural ground, repeated in a more or less similar form and shape, also include the settlements with traditional agricultural fields (Crnicičko, Orahovsko, Zetska ravnica and Bjelopavlicka plain, Kopiljsko polje), settlements with traditional agricultural terraces, built-up land (urban and semi-urban settlements), gorges and canyons (Rijeka Crnojevića and Cijevna), river valleys, hilly areas and lower mountain areas.

Kulturni obrazac:

- gradsko naselje
- prigradska naselja s poljoprivrednim poljima, voćnjacima i vinogradima
- priobalna i ruralna naselja s tradicionalnim terasama u području Skadarskog jezera
- ruralna naselja u brdskom području
- industrijske zone, skladišna i servisna područja

Cultural pattern:

- urban settlements
- suburban settlements with agricultural fields, orchards and vineyards
- coastal and rural settlements with traditional terraces in the area of Skadar Lake
- rural settlements in the hilly area
- industrial zones, storage and service areas



ULCINJSKA MASLINADA – Valdanos predstavlja jedinstven i najveći kompleks pod maslinom u Crnoj Gori. Prema procjeni Biotehničkog fakulteta, broji oko 85.000 stabala. Od tog broja, oko 18.000 maslina prosječne je starosti oko 800 godina.

U novembru 2014. godine na Ulcinjskoj maslinadi i maslinjaku u Kručama mjerena je starost 25 stabala maslina. Istraživanje je pokazalo da su:

- šest stabala starosti od 300 do 455 godina
- osam stabala starosti od 555 do 695 godina
- šest stabala starosti od 724 do 949 godina
- pet stabala starosti preko 1000 godina i to: 1131, 1298, 1321, 1784, 1899 godina.

Zakonom o maslinarstvu Crne Gore, maslinjaci čine „dobro od opštег interesa i uživaju posebnu zaštitu“.

Maslinada u Ulcinju prošarana je mrežom kalarmisanih puteva i suvomeđama i ima nekoliko izvora, što je čini tipičnim predstavnikom primorskog tipa pejzaža.

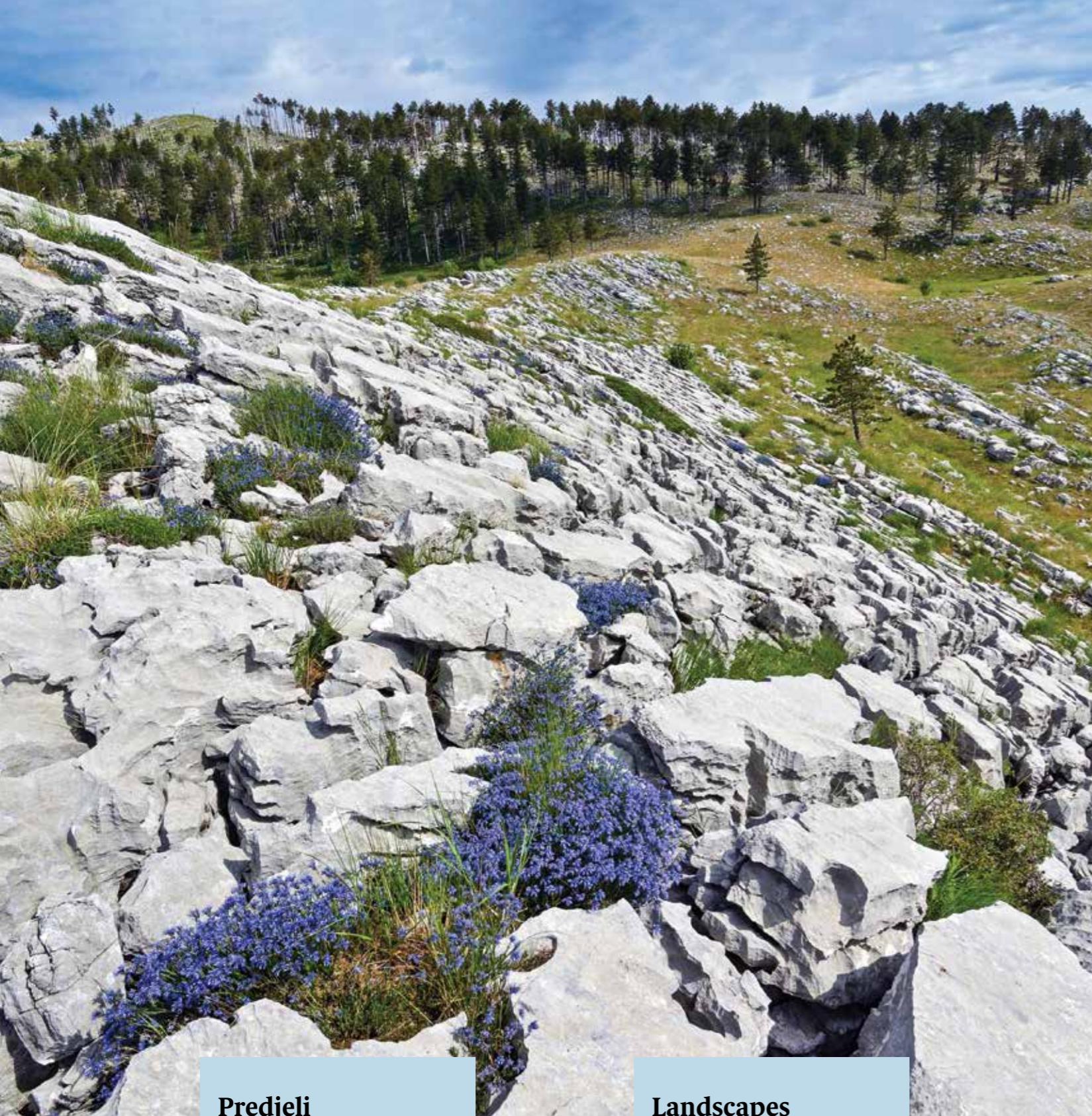
OLIVE GROVE (MASLINADA) IN ULCINJ – Valdanos is unique and the largest complex under olive trees in Montenegro. According to the estimates of the Biotechnical Faculty, it has about 85,000 trees. Out of that number, about 18,000 olives are on average about 800 years old.

In November 2014, the age of 25 olive trees was measured at the olive grove in Ulcinj and olive grove in Kruče. The research showed that:

- six trees 300 to 455 years old
- eight trees 555 to 695 years old
- six trees 724 to 949 years old
- five trees over 1000 years old, as follows: 1131, 1298, 1321, 1784, 1899.

According to the Law on Olive Growing of Montenegro, olive groves do "good of general interest and enjoy special protection".

The olive grove in Ulcinj is interspersed with a network of cobbled roads and dry borders and has several springs, which makes it a typical representative of the coastal type of landscape.



Predjeli kraškog regiona

Prostiru se sjeverno od planinskog lanca Orjen – Lovčen – Sutorman – Rumija, na sjeveru do pravca klanac Duga – Nikšić. Na ovoj površi uzdižu se krečnjačke planine: Somina, Njegoš, Golija i Budosa. Veće zaravni na ovom prostoru su kraška polja: Cetinjsko, Njeguško, Dragaljsko, Grahovsko, Nudo i Nikšičko. Region krša je predio s najdebljim slojevima karbonatnih stijena, pretežno krečnjaka s jakom izraženom karstnom erozijom uslovljrenom velikom količinom padavina.

Landscapes of the karst region

Stretch from the mountain range Orjen - Lovcen - Sutorman - Rumija in the north to the direction of Duga - Niksic pass. The following karst mountains rise on this surface: Somina, Njegos, Golija and Budosa. Larger plateaus in this area are karst fields: Cetinje, Njegusko, Dragaljsko, Grahovsko, Nudo and Niksic. The karst region is an area with the thickest layers of carbonate rocks, mostly limestone with a strong karst erosion caused by a large amount of precipitation.

Površ dubokog krša ima u cijelini oskudan pedološki pokrivač i veoma malo plodnog zemljišta, uglavnom pri dnu polja, vrtača i dolova ili na dolomitskim zaravnima. Ovaj je prostor ekološki veoma osjetljiv zbog dominantne krečnjačke i krečnjačko-dolomične geološke podloge, osiromašenih, degradiranih i labilnih šumskih i travnih ekosistema. Zbog velike količine padavina izraženi su erozioni procesi.

U reljefu su prisutne doline rijeka: Zete, Gračanice, Mrkošnica i Bistrice, vještačke akumulacije: Krupac, Slano i Liverovići, a na krajnjem zapadu od vodenih akumulacija značajno je Bilečko jezero.

Različiti ekonomski i politički uslovi kroz koje je stoljećima prolazio crnogorski krš uslovili su različite motive zbog kojih su u ovom regionu uništene šume. S nestankom šuma velike količine kišnih padavina, karakteristične za ovo područje, sprale su zemljišni sloj u kraška polja i vrtače. Po prestanku negativnog dejstva čovjeka u razmjerno kratkom periodu uočeni su zakoni singereze na kršu i pokazalo se da su šikare i niske šume bjelograbića i crnog jasena samo progredaciono-degradacioni stadijum šuma makedonskog hrasta, cera, sladuna ili medunca.

U kraškom regionu izdiferencirano je nekoliko tipova karaktera predjela: prema učestalosti pojavljivanja su niži planinski i planinski predjeli, kraška polja (Nikšičko polje, Grahovsko, Dragaljsko, Vrbanj, Kruševice, Ubli, Njeguško, Cetinjsko), izgrađeni predjeli (urbana, semiurban i ruralna naselja), vodene akumulacije (jezera Slano, Krupac, Liverovići, Grahovsko), doline rijeka (Zete, Gračanice, Mrkošnica, Bistrice), a mjestimično se u sjevernom dijelu javlja i visokoplaninski tip predjela s istaknutim planinskim vrhovima. U okviru ovih tipova karaktera predjela kao predioni elementi uočavaju se šume, livade i pašnjaci, ogoljeni krševiti tereni, poljoprivredna polja, devastirani predjeli kao što su kamenolomi, na primjer.

The surface of the deep karst has a sparse pedologic cover in general and very small amount of fertile land, mainly at the bottom of fields, sinkholes and valleys or on dolomite plateaus. This area is ecologically very sensitive due to the dominant limestone and limestone-dolomite geological base, depleted, degraded and labile forest and grass ecosystems. Due to the large amount of precipitation, erosion processes are pronounced.

The relief includes the valleys of the rivers: Zeta, Gracanica, Mrkosnica and Bistrica, artificial reservoirs: Krupac, Slano and Liverovici, and out of the water reservoirs in the far west, Bilecko Lake is significant.

Different economic and political conditions that the Montenegrin karst has been going through for centuries have led to different motives for the destruction of forests in this region. With the disappearance of forests, large amounts of rainfall, characteristic of this area, washed away the soil layer into karst fields and sinkholes. With the end of adverse human effects, in a relatively short period, the laws of synergy were observed on the karst and it was shown that the thickets and scrub-woods of oriental hornbeam and manna ash are only a progressive-degradation stage of forests of Macedonian oak, Turkey oak, Hungarian oak or downy oak.

In the karst region, several types of landscape character have been differentiated: according to their frequency of occurrence as follows: lower mountain and mountain landscapes, karst fields (Niksicko polje, Grahovsko, Dragaljsko, Vrbanj, Krusevice, Ubli, Njegusko, Cetinjsko), built-up landscapes (urban, semi-urban) and rural settlements, water reservoirs (lakes Slano, Krupac, Liverovici, Grahovsko), river valleys (Zeta, Gracanica, Mrkosnica, Bistrica), and in some places in the northern part there is a high mountain type of area with prominent mountain peaks. These types of landscape character have the following landscape elements included: forests, meadows and pastures, bare rock surfaces, agricultural fields, devastated areas (quarries, landfills), etc.

Kulturni obrazac:

- urbano naselje grada Nikšića
- prigradska naselja s poljoprivrednim poljima
- ruralna naselja s poljoprivrednim poljima u poljima
- ruralna naselja u brdskom području s malim poljoprivrednim gazdinstvima
- industrijske zone, skladišna i servisna područja
- kamenolomi

Cultural pattern:

- urban settlement of the town of Niksic
- suburban settlements with agricultural fields
- rural settlements with agricultural fields in the fields
- rural settlements in a hilly area with small farms
- industrial zones, storage and service areas
- quarries



Predjeli kanjona i visoravni centralnog regiona

U sjevernom dijelu obuhvataju visoke planine Durmitor, padine Sinjajevine a između njih su planinske površi i duboke doline kanjonskog oblika. Region se sjeveroistočnom granicom proteže duž kanjona Tare do Mojkovca. Spoljni granični niz planina prema kraškom regionu čine: Vojnik, Maganik, Prekornica, Kamenik i Žijovo. Na ovom prostoru nalaze se velike površi: Krnovo i Lukavica. Dio područja oskudan je vodom, a djelovi s krečnjačkom podlogom sasvim su bezvodni. Na jugozapadu se graniči s planinama: Maglić, Volujak i Bioč na koje se nadovezuju Pivska planina, južne i istočne padine Sinjajevine, Moračke planine, Vojnik, Vučje, visokoplaninski predjeli Maganika, Prekornice i Kamenika i planinski predjeli Kuča. Ovaj region presijecaju velike rijeke: Piva s Komarnicom, Morača i Tara s pritokama u gornjem toku.

U ovom regionu dominantne su: šume bukve, mješovite šume jele i bukve, šume smrće na Pivskoj planini i Volujaku i šume munike koji na području Štitova, Prekornice i Maganika imaju najveći kompleks u svom današnjem arealu.

Areas of the canyon and plateaus of the central region

In the northern part include the high mountains of Durmitor, the slopes of Sinjajevina, and mountainous areas and deep valleys of canyon shape in between. The region stretches along the northeastern border along the Tara canyon up to Mojkovac. The outer border consists of the series of mountains towards the karst region, and these are: Vojnik, Maganik, Prekornica, Kamenik and Žijovo. This area is comprised of large surfaces: Krnovo and Lukavica. Part of the area is scarce with water, and parts with a limestone base are completely waterless. In the southwest, it borders the mountains: Maglić, Volujak and Bioc, which are connected with the Pivska mountain, the southern and eastern slopes of Sinjajevina, Moracke mountains, Vojnik, Vučje, the high mountain areas of Maganika, Prekornica and Kamenik and the mountain areas of Kuće. This region is intersected by large rivers: Piva with Komarnica, Morača and Tara with tributaries in the upper course.

Beech forests, mixed forests of fir and beech, spruce forests on Piva Mountain and Volujak, and forests of Bosnian pine are dominant in this region, having the largest complex in their current areal distribution in the area of Štitovo, Prekornica and Maganika.

Ovom regionu pripada najveći dio visokoplanskih pašnjaka i rudina. Šume munike u regionu nalaze se na planinama: Štitovo, Prekornica, Maganik i Sinjajevina, od 1200 do 1800 m nadmorske visine, na svim ekspozicijama i plitkim karbonatnim zemljistima s izraženim uticajem mediteranske klime. Predstavljaju endemnu i reliktnu vegetaciju. Šume bukve i jele bez smrće i šume bukve razvijaju se na karbonatnoj podlozi u zapadnom dijelu, i na sedimentima durmitorskog fliša u istočnom dijelu regiona. Na planinama su pretežno monodominantne smrčeve šume.

U centralnom regionu izdiferencirano je nekoliko tipova karaktera predjela koji su diferencirali čitav region: pojavljuju se kanjoni, klisure i visoravni. Ovaj region obuhvata najprepoznatljivije predjеле kanjona Tare, Pive, Morače. Kao najistaknutiji predjeli visoravni izdvajaju se Jezerska, Pivska, Krnovska visoravan, Lukavica i Konjsko.

Pored navedenih kao dominantan tip predjela ističe se predio visokih planina Durmitora, Sinjajevine, Maglića, Bioča, Volujka, Vojnika, Maganika, Prekornice, Kamenika i Moračkih planina. U vezi s planinskim i nižim planinskim predjelima u okviru ovog tipa karaktera predjela izdvajaju se planinski predjeli Drobnjaka i Uskoka (Šavnik, Tušina, Boan, Semolj), dok se u južnom dijelu ovaj region završava Kućkim planinama. U ovom regionu prisutna su brojna jezera: Malo crno jezero i Veliko crno jezero, Vražje, Zminje, Zabojsko, Riblje, Sušicko, Škrčko, Trnovačko, Pivsko, Valovito, Kapetanovo, Manito i druga.

Kao dominantno antropogeni tip u okviru regiona izdvajaju se urbana naselja Žabljak, Plužine i Šavnik.

U okviru ovih tipova karaktera predjela kao predioni elementi uočavaju se šume, livade i pašnjaci, ogoljeni krševiti tereni, poljoprivredna polja i brojna ruralna naselja.

Most of the high mountain pastures and grasslands belong to this region. In the region, forests of Bosnian pine are located in the mountains: Štitovo, Prekornica, Maganik and Sinjajevina, from 1200 to 1800 m above sea level, on all exposures and shallow carbonate soils with a dominant influence of the Mediterranean climate. They represent endemic and relict vegetation. Beech and fir forests without spruce, and beech forests as well, develop on a carbonate sediment in the western part, and on Durmitor flysch sediments in the eastern part of the region. Spruce forests are mostly monodominant in the mountains.

In the central region, several types of landscape character have been differentiated, which further differentiated the entire region where canyons, gorges and plateaus appear. This region includes the most recognizable areas of the canyons of Tara, Piva, Moraca. Jezerska plateau, Pivska, Krnovska, Lukavica and Konjsko, stand out as the most prominent parts of the plateau.

In addition to the above, landscape of high mountains of Durmitor, Sinjajevina, Maglic, Bioc, Volujak, Vojnik, Maganik, Prekornica, Kamenik and Moracke mountains stands out as the dominant type of landscapes. In connection with mountain and lower mountain areas, within this type of landscape character, the mountain areas of Drobnjak and Uskok stand out (Šavnik, Tušina, Boan, Semolj), while in the southern part this region ends in the mountains of Kuci. There are numerous lakes in this region: Small Black Lake and Large Black Lake, Vražje, Zminje, Zabojsko, Riblje, Susicko, Skrčko, Trnovačko, Pivsko, Valovito, Kapetanovo, Manito and others.

The urban settlements of Žabljak, Pluzine and Savnik stand out as the predominantly anthropogenic type within the region.

The types of landscape character have the following landscape elements included: forests, meadows and pastures, bare rock surfaces, agricultural fields and numerous rural settlements.

Kulturni obrazac:

- manja urbana naselja Žabljak, Plužine i Šavnik
- brojna ruralna planinska naselja s malim poljoprivrednim gazdinstvima (poljoprivredna polja, košene livade)
- katuni s autentičnim objektima i oborima za stoku

Cultural pattern:

- minor urban settlements of Žabljak, Pluzine and Savnik
- numerous rural mountain settlements with small farms (agricultural fields, mowed meadows)
- farmer settlements (“katuni” in local language) with authentic facilities and stables for livestock



Predjeli planina i dolinskih rijeka sjevernog regiona

Čine planinski masivi Ljubišnje, Lisca, Lise, Bjelasice, Komova, Hajle, Prokletija, Visitora i Zeletina, i planinske površi: Barice – Krupice – Kosanica, Bobovo, s desne strane Čehotine: Mataruge, Crljenice, a prema sjeveru se prostiru površi Bihor i Korita. Region presijecaju od istoka prema zapadu riječne doline Lima, Ibra, Tare i Čehotine. U dolini Lima i njениh pritoka razvilo se nekoliko kotlina među kojima su najveće Beranska, Vraneška, Bjelopoljska, Rožajska i Plavsko-gusinjska. U dolini Tare najprostranije kotline su Mojkovačka i Kolašinska. U dolini rijeke Čehotine najznačajnije su veće kotline, Maočka i Pljevaljska.

Geološka podloga regiona je raznovrsna. Površ od Burena do Bobova i zaravni s desne strane Čehotine izgrađeni su od krečnjaka. Središnji pojasi s lijeve strane Čehotine kao i sjeverne padine Ljubišnje izgrađeni su od pješčara i škriljaca. Srednji i jugozapadni djelovi Bjelasice izgrađeni su, najvećim dijelom, od klastičnih stijena s manjim formacijama eruptivnih stijena. Područje Komova i Bjelasice izvorište je mnogih rijeka. Reljef tih planina je diseciran dolinama brojnih pritoka Tare.

Landscapes of mountains and valley rivers of the northern region

Consist of mountain massifs Ljubišnja, Lisca, Lisa, Bjelasica, Komovi, Hajle, Prokletije, Visitor and Zeletina, and mountain areas: Barice-Krupice-Kosanica, Bobovo, on the right bank of Cehotina: Mataruge, Crljenice, and to the north the surfaces of Bihor and Korita extend. The region is intersected from east to west by the river valleys of Lim, Ibar, Tara and Cehotina. In the valley of the Lim and its tributaries, several ravines have developed, the largest of which are Beranska, Vraneška, Bjelopoljska, Rožajska and Plavsko-gusinjska. In the Tara valley, the most extensive ravines are Mojkovacka and Kolasinska. In the valley of the river Cehotina, the most important are the larger ravines, Maočka and Pljevaljska.

The geological substrate of the region is diverse. The area from Buren to Bobova and the plateau on the right bank of Cehotina are built of limestone. The central belt on the left bank of Cehotina as well as the northern slopes of Ljubišnja are built of sands and shales. The central and southwestern parts of Bjelasica are built, for the most part, of clastic rocks with smaller eruptive rock formations. The area of Komovi and Bjelasica is the source of many rivers. The relief of these mountains is dissected by the valleys of numerous tributaries of Tara river.

Predjelima sjevernog regiona prepoznatljivost daju doline i klisure planinskih rijeka uokvirene brojnim planinama. U ovom regionu dominiraju četinarske šume jele i smrče i mješovite šume četinara s bukvom.

Diferencirani su sljedeći tipovi karaktera predjela: doline i kotline planinskih rijeka (Čehotine, Tara, Lima, Ibra i njihovih pritoka, Vraneška dolina, Ropojanska dolina i dr.); klisure i kanjoni planinskih rijeka (kanjon Drage, klisura Čehotine, Đalovića klisura, Tivranska klisura, Radmanska klisura, klisura Ibra i dr.); ravnice, polja, visoravni (Maočko i Potkrajicko polje, Suvo polje, Giljevo polje, Visoravan korita); urbana naselja (Pljevlja, Bijelo Polje, Berane, Plav, Rožaje, Andrijevica); vodene akumulacije – jezera (Plavsko, Hridsko, Biogradsko, Šiško); niži planinski tip (duž slijeva rijeke Čehotine, duž bjelopoljskog područja uz dolinu Lima, obodom Beranske kotline); planinski tip predjela (Ljubišnja, Lisac, Podgor, Vrba, Kosanica, Kovač, Grab, Barice, Stožer, Lisa, Lekovina) i visokoplaninski tip predjela (Bjelasica, Komovi, Hajla, Zeletin, Visitor i Prokletije).

Na razvoj održivog predjela ne utiču samo pitanja zaštite i načina upravljanja, već najviše učeće lokalnog stanovništva u oblikovanju predjela. Preduслов za dobro upravljanje predjelom je analiza karaktera predjela, ranjivosti i osjetljivosti predjela kroz izradu plana predjela ali jednak uzmajući u obzir i odnos lokalnog stanovništva prema predjelu u kojem živi kao i njihov subjektivan doživljaj – emocija koju gaje prema njemu.

Predio odslikava karakteristike društva, a posebno lokalne zajednice, mjesto je direktne socijalne interakcije koja omogućava društvene i kulturne integracije. Predjeli se razvijaju zajedno s društvenim promjenama. Integrativna funkcija predjela može se održati samo ako sve relevantne grupe stanovnika mogu direktno učestvovati u njegovom oblikovanju, doprinoseći razvoju i saradnji u realizaciji zajedničke ideje.

The valleys and gorges of mountain rivers framed by numerous mountains give recognizability to the landscapes of the northern region. This region is dominated by coniferous forests of fir and spruce and mixed forests of conifers with beech.

The following types of landscape character have been differentiated: valleys and ravines of mountain rivers (Čehotina, Tara, Lim, Ibar and their tributaries, Vraneška valley, Ropojanska valley, etc.); gorges and canyons of mountain rivers (Draga canyon, Čehotina gorge, Đalovića gorge, Tivranska gorge, Radmanska gorge, Ibar gorge, etc.); plains, fields, plateaus (Maočko and Potkrajicko fields, Suvo fields, Giljevo fields, plateau Korita); urban settlements (Pljevlja, Bijelo Polje, Berane, Plav, Rožaje, Andrijevica); water reservoirs - lakes (Plav, Hridsko, Biogradsko, Šiško); lower mountain type (along the Čehotina catchment area, along the Bijelo Polje area next to the Lim valley, along the edge of the Berane valley); mountain type of landscape (Ljubišnja, Lisac, Podgor, Vrba, Kosanica, Kovac, Grab, Barice, Stožer, Lisa, Lekovina) and high mountain type of landscape (Bjelasica, Komovi, Hajla, Zeletin, Visitor and Prokletije).

The development of a sustainable landscape is affected not only by issues of protection and management, but also by the highest participation of the local population in shaping the landscape. A prerequisite for sound landscape management is the analysis of the character of the landscape, vulnerability and sensitivity of the landscape through the development of a landscape plan, but equally taking into account both the attitude of the local population to the area in which they live and their subjective experience.

The area reflects the characteristics of society, and especially local communities; it is a place of direct social interaction that enables social and cultural integration. Landscapes are evolving along with social change. The integrative function of the landscape can be maintained only if all relevant groups of residents can directly participate in its management, thus contributing to the development and cooperation in the implementation of joint idea.

Kulturni obrazac:

- urbana i semiurbana naselja u dolinama rijeka
- ruralna planinska naselja s malim poljoprivrednim gazdinstvima (ograda polja, obori i torovi za držanje stoke, niski objekti za stanovanje, pomoći objekti – štale, stogovi sa sijenom i sl.)
- katuni

Cultural pattern:

- urban and semi-urban settlements in river valleys
- rural mountain settlements with small farms (fenced fields, barns and pens for keeping cattle, low housing facilities, auxiliary structures - barns, haystacks, etc.)
- farmer settlements ("katuni" in local language)

A photograph of a small, rugged island in the middle of a vast blue sea. The island is covered in dark, craggy rocks and a dense cluster of tall, green pine trees. On the left side of the island, there is a small, stone church with a red tiled roof perched on a rocky outcrop. The sky above is filled with soft, layered clouds, with warm orange and yellow hues from a setting or rising sun visible on the horizon.

MORE

SEA



Cotylorhiza
tuberculata,
Meduza

Planktonske zajednice

Fitoplankton alge su primarni organski producenti na račun kojih se, direktno ili indirektno, održava čitav živi svijet u vodi. Ti mikroorganizmi čine početnu kariku u lancima ishrane. Njihov pretjeran razvoj može imati i negativne posljedice, može dovesti do obogaćivanja ekosistema hranljivim supstancama, odnosno do eutrofikacije, što prati promjene u zajednici fitoplanktona, rast algi i povećanje biomase i dolazi do mogućeg toksičnog „cvjetanja“ algi. Ukoliko količina akumuliranih organskih supstanci prevazilazi nosivost sistema, hipoksija može dovesti do pada ribarstva i prinosa ostriga, lošeg kvaliteta vode i poremećaja cijelog ekosistema.

Na području Crnogorskog primorja više su zastupljene ove grupe fitoplanktonskih organizama i to: *Bacillariophyceae* (silikatne alge), *Dinophyceae* (dinoflagelate), *Prymnesiophyceae* (kokolitoforidi), *Chrysophyceae* (silikoflagelati), *Chlorophyceae* (hlorofite).

U Boki Kotorskoj zabilježene su 192 vrste fitoplanktona. Od dijatomeja je nađeno 90 vrsta, od dinofagelata nadene su 83 vrste, od kokolitoforda 14 vrsta, od silikoflagelata četiri vrste i od euglenofita jedna vrsta. Tokom analiza zajednica fitoplanktona u priobalnom dijelu identifikovane su 94 vrste. Od toga 46 pripadaju dijatomejama (48.94%), 39 dinofagelatama (41.49%), šest kokolit oforidama (6.38%), jedna silikoflagelatima (1.06%) i dvije hlorofitama (2.13%).

Česta grupa fitoplanktona koja ujedno čini najveći dio mikroplanktona jesu dijatomeje. Iako su prilagodljive na različite uslove, karakteristične su za hladniji period (kasna zima, rano proljeće) i to ukazuje na njihovu sposobnost da se prilagode veoma turbulentnim uslovima sredine. Poslije proljećnog cvjetanja dijatomeja, kad su vode siromašne hranljivim materijama, uglavnom se favorizuje razvoj dinofagelata koji imaju niže zahtjeve za nutrijentima. Dinofagelate su najvažnija grupa morskog fitoplanktona koja produkuje i biotoksine i štetna cvjetanja algi.

Tokom višegodišnjeg istraživanja lokaliteta u zalivu i obalnih lokaliteta otvorenog teritorijalnog mora Crne Gore utvrđeno je prisustvo trinaest grupa mrežnog zooplanktona: *Ctenophora*, *Hydromedusae*, *Siphonophorae*, *Ostracoda*, *Cladocera*, *Copepoda*, *Hyperidea*, *Pteropoda*, *Appendicularia*, *Chaetognatha*, *Mysidacea*, *Thaliacea* i *Meroplankton*.

Planktonic communities

Phytoplankton algae are the primary organic producers who, directly or indirectly, maintain all living organisms in water. These microorganisms form the initial link in food chains. Their excessive development can also have negative consequences and lead to enrichment of ecosystems with nutrients, i.e., eutrophication, which is accompanied by changes in the phytoplankton community, algal growth, and increases in biomass and leads to possible toxic „blooming“ of algae. Suppose the amount of accumulated organic substances exceeds the carrying capacity of the system. In that case, hypoxia can lead to a decline in fishing and oyster yields, poor water quality, and disruption of the entire ecosystem.

In the area of the Montenegrin coast, the following groups of phytoplankton organisms are more represented: *Bacillariophyceae* (diatoms), *Dinophyceae* (dinoflagellate), *Prymnesiophyceae* (cocco lithophorids), *Chrysophyceae* (silicoflagellates), *Chlorophyceae* (chlorophytes).

A total of 192 species of plankton have been recorded in the Bay of Kotor. A total of 90 species of diatoms were found, 83 species of dinoflagellates, 14 species of coccolithophorids, four species of silicoflagellates, and one species of euglenophytes. During the analysis of phytoplankton communities in the coastal area, a total of 94 species were identified. Of these, 46 belong to diatoms (48.94%), 39 to dinoflagellates (41.49%), six to coccolithophorids (6.38%), one to silicoflagellates (1.06%), and two to chlorophytes (2.13%).

Diatoms are a common group of phytoplankton that also make up the most significant part of microplankton. Although they are adaptable to different conditions, they are characteristic of the colder period (late winter, early spring), indicating their ability to adapt to very turbulent environmental conditions. After the spring diatoms bloom, when the waters are poor in nutrients, the development of dinoflagellates, which have lower requirements for nutrients, is generally favored. Dinoflagellates are the most important group of marine phytoplankton that produce both biotoxins and harmful algae blooms.

During many years of research of localities in the bay and coastal sites of the open territorial sea of Montenegro, the presence of thirteen groups of network zooplankton was determined: *Ctenophora*, *Hydromedusae*, *Siphonophorae*, *Ostracoda*, *Cladocera*, *Copepoda*, *Hyperidea*, *Pteropoda*, *Appendicularia*, *Chaetognatha*, *Mysidacea*, *Thaliacea* i *Meroplankton*.



Zahvaljujući geografskom položaju, crnogorsko priobalno područje pokazuje veliko bogatstvo vrsta, slično bogatim područjima zapadnog i istočnog Mediterana. U okviru prethodno navedenih grupa ukupno je utvrđeno prisustvo 155 taksona mezozooplanktona: 135 je zabilježeno u Bokokotorskem zalivu a 127 u obalnom dijelu otvorenog mora.

U ukupnoj brojnosti mrežnog zooplanktona, kopepoda su najzastupljenija grupa zooplanktona. U sastavu grupe kopepoda (*Copepoda*), ciklopoidni kopepodi iz porodice *Oncaeidae* te vrsta *Oithona nana* dominiraju na svim lokalitetima. Drugu važnu grupu planktonskih račića predstavljaju kladocere (*Cladocera*). Dinamika njihovog rasta prati promjene sredinskih parametara, zbog čega se mogu smatrati dobrim indikatorima stanja ekosistema, a njihovi su biološki ciklusi dobro poznati. Zbog partenogenetskog razmnožavanja u vrlo kratkom vremenu mogu dostići veliku gustinu populacije. Izrazito neritički karakter kladocera vjerojatno je u vezi s njihovim specifičnim razmnožavanjem koje se manifestuje odlaganjem trajnih jaja na morskom dnu, pri nepovoljnim uslovima sredine.

Thanks to its geographical position, the Montenegrin coastal area shows a great wealth of species, similar to the rich areas of the western and eastern Mediterranean. Within the groups mentioned above, a total of 155 mesozooplankton taxa were identified: 135 were recorded in the Bay of Kotor and 127 in the coastal part of the open sea.

In the total number of network zooplankton, copepods are the most represented group of zooplankton. As part of the *Copepoda* group (*Copepoda*), cyclopoid copepods from the *Oncaeidae* family and *Oithona nana* dominate in all localities. Another important group of planktonic shrimp is *Cladocera*. The dynamics of their growth is accompanied by changes in environmental parameters, which is why they can be considered good indicators of the state of ecosystems, and their biological cycles are well known. Due to parthenogenetic reproduction, they can reach a high population density in a very short time. The extremely neritic character of cladoceras is probably related to their specific reproduction, which is manifested by laying permanent eggs on the seabed under unfavorable environmental conditions.



Chrysaora
hysoscella,
Kompas meduza



Jellyfish (Scyphozoa)

In the research conducted so far, seven species of Scyphozoa - real jellyfish have been recorded. Among them are *Aurelia spp.* (common jellyfish), *Discomedusa lobata*, *Chrysaora hysoscella* (compass jellyfish), and *Cotylorhiza tuberculata* (Mediterranean jellyfish) that occur periodically in large numbers. The compass jellyfish belongs to the group of dangerous jellyfish and can cause irritation when in contact with the skin. The assumption is that global warming phenomena could trigger the observed changes, which is proven by analyzing long-term trends in sea surface temperature fluctuations.

Meduze (Skifomeduze)

U dosadašnjem istraživanju zabilježeno je sedam vrsta skifo meduza-pravih meduza. Među njima se *Aurelia spp.* (uhati klobuk), *Discomedusa lobata*, *Chrysaora hysoscella* (kompas meduza) i *Cotylorhiza tuberculata* (mediteranska meduza) periodičnojavljaju u većem broju. Kompas meduza pripada grupi opasnih meduza te može izazvati iritaciju prilikom kontakta s kožom. Pretpostavka je da bi fenomeni globalnog zagrijavanja mogli pokrenuti uočene promjene što je i dokazano analizom dugoročnih trendova kolebanja temperature površine mora.

Ihtioplankton

Ihtioplankton (rani razvojni stadijumi riba) predstavlja osnovu izučavanja ribarstvene biologije, odnosno brojnost polno zrelog dijela populacije zavisi od uspjeha u rastu, razvoju i preživljavanju ranih razvojnih stadijuma riba i uslova u kojima žive dok ne dostignu prvu polnu zrelost.

Dugogodišnje taksonomske analize ihtioplanktona pokazale su da se na području Bokokotorskog zaliva mrijeti 40 različitih vrsta riba, među kojima dominiraju vrste iz porodica inčuna *Engraulidae*, šparova *Sparidae*, usnača *Labridae* i skuša - *Scombridae*. Na području otvorenog mora analize pokazuju mriješćeњe 44 različite vrste među kojima dominiraju vrste iz porodica inčuna *Engraulidae*, lica *Carangidae*, skuša *Scombridae*, šparova *Sparidae* i vučića *Serranidae*. Najdominantnija vrsta u crnogorskim vodama je inčun *Engraulis encrasicolus* čije se zone mriješćenja i ishrane nalaze na području Kotorsko-Risan skog i Tivatskog zaliva, na potezu oko uvale Bigova i na potezu od Crnog rta do granice sa Albanijom.

Najveći diverzitet ihtioplanktona utvrđen je u Kotorsko-Risan skom zalivu, a na otvorenom moru na potezu od Bara do Petrovca, odnosno u blizini morskog parka „Katić“. Kotorski i Risan skali suštinski predstavljaju područja od posebnog značaja za reprodukciju i ishranu riba i riblje mlađi, pa je neophodna hitna zaštita ovog područja.

Ihtioplankton

Ichthyoplankton (early life development stages of fish) is the basis for fishery biology research, ie the number of sexually mature fish population depends on the success in growth, development and survival of early development stages and the conditions in which they live until they reach first sexual maturity.

Long-term taxonomic analyses of ichthyoplankton have shown that 40 different fish species spawn in the Boka Kotorska Bay area, among which species from the families *Engraulidae*, *Sparidae*, *Labridae* and *Scombridae* dominate. In the open sea area, analyses showed spawning of 44 different species, dominated by species from the families *Engraulidae*, *Carangidae*, *Scombridae*, *Sparidae* and *Serranidae*. The most dominant species in Montenegrin waters is anchovy *Engraulis encrasicolus*, whose spawning and nursery zones are located in the area of the Kotor-Risan Bay and Tivat Bay, on the stretch around Bigova Bay and on the stretch from Crni rt to the border with Albania.

The greatest diversity of species was determined in the Kotor-Risan Bay, and on the stretch from Bar to Petrovac, ie near the MPA „Katić“. The Bays of Kotor and Risan are areas of special importance as spawning and nursery zones of juvenile and adult fishes, so urgent protection of this area is necessary.



Engraulis encrasicolus



Sardina pilchardus



Fitobentos

Fitobentos tj. biljke koje žive na morskom dnu većinom su bile skrivene od očiju istraživača u prošlosti, a u odnosu na ribarstvo i jestive resurse iz mora od daleko su manje ekonomskog interesa. Najstarija poznata zbirka algi za crnogorski dio južnog Jadrana potiče iz 1835. g., ali nažalost, trend istraživanja u jugoistočnom Jadranu nije nastavljen, te do danas bentske alge nijesu dobro izučene. Do sada je identifikovano 367 morskih makroalgi uključujući 73 zelene alge (*Chlorophyta*), 77 smeđih algi (*Heterothrophyta*) i 217 crvenih algi (*Rhodophyta*).



Jadranski bračić,
Adriatic wrack

Prisutno je više mediteranskih endema, ali samo jedan je endem Jadranskog mora, tzv. jadranski bračić *Fucus virsoides*, kome je Bokokotorski zaliv najjužnija granica rasprostranjenosti. Ta smeđa alga raste na mjestima gdje ima više izvora slatke vode uz obalu ili ispod mora („vrulje“), što značajno smanjuje slanost i temperaturu morske vode. Uporedujući granice rasprostranjenosti ove alge na istočnoj obali Jadranskog mora (Bokokotorski zaliv) i na zapadnoj obali (Ancona), istaknut je značaj ne samo klime, već mnogo više geomorfoloških i hidrografskih faktora.

Phytobenthos

Phytobenthos or plants living on the seabed have mostly been hidden from the eyes of researchers in the past, while having far less economic interest in relation to fishery and edible resources from the sea. The oldest known collection of algae for the Montenegrin part of the southern Adriatic dates from 1835. Unfortunately, the trend of research in the southeastern Adriatic was not continued, and to date benthic algae have not been well studied. So far, 367 marine macroalgae have been identified including 73 green algae (*Chlorophyta*), 77 brown algae (*Heterothrophyta*) and 217 red algae (*Rhodophyta*).

Osim algi, fitobentos čine i morske trave, tj. više biljke koje su sekundarno prilagođene životu u moru što znači da: 1. rastu u morskoj vodi (obligatni halofiti), 2. potpuno su uronjene u vodu (submerzne), 3. moraju se ukorijeniti dovoljno snažno da bi mogle odoljeti uticaju talasanja i 4. moraju završiti životni ciklus u potopljenim uslovima (hidrofilno opršavanje). Osim primarne produkcije organske materije morske trave imaju važnu ulogu u obogaćivanju donjih slojeva vode kiseonikom, u stvaranju biocenosa pogodnih za stanovanje, ishranu i reprodukciju mnogih biljnih i životinjskih vrsta, te u učvršćivanju sedimenta i čuvanju obale od erozije.

Najtipičnija biocenosa morske trave u Crnoj Gori i na Mediteranu je livada morske trave *Posidonia oceanica*, poznatija kao murava. Resa tj. *Cymodocea nodosa* je mnogo manja i otpornija na zagađenje, dok je njoj slične strukture, ali osjetljivija i relativno rijetka u Crnoj Gori patuljasta svilina, *Zostera noltei*.

In addition to algae, phytobenthos are also seagrasses, i.e. plants that are rather secondarily adapted to marine life which means that: 1. they grow in seawater (obligate halophytes), 2. they are fully immersed in water (submerged), 3. they must be rooted strong enough to resist the impact of the waves and 4. must complete life cycle in submersed conditions (hydrophilic pollination). In addition to the primary production of organic matter, seagrasses play an important role in enriching the bottom layers of water with oxygen, and creation of biocenoses suitable for living, feeding and reproduction of many plant and animal species, as well as in strengthening of the sediment and protecting the coast from erosion.

The most typical seagrass biocenosis in the Montenegro as well as in the Mediterranean is the meadow of seagrass *Posidonia oceanica*, commonly known as Neptune grass. The little Neptun grass, *Cymodocea nodosa* is much smaller and more resistant to pollution, while similar in structure, but more vulnerable and relatively rare in Montenegro is *Zostera noltei*.



Posidonia oceanica,
Morska trava



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Morske lopte od
listova posidonije,
Neptun Sea Balls
(egagropili)



Ako šetajući plažom nađete morske lopte, to znači da je u neposrednoj blizini prisutna livada morske trave *Posidonia oceanica*. O značaju ove morske trave i poštovanju koje joj je dato govori činjenica da je biljni rod dobio ime po Posejdalu, bogu mora kod starih Grka. U našem moru ta vrsta može nastaniti morsko dno na dubinama do 30 m, a njen pratilac u plitkim vodama, resa, tj. *Cymodocea nodosa*, nastanjuje se na dubinama od 1 do 10 m. Ime roda *Cymodocea* potiče od imena nereide *Cymodocea*, koja je prema grčkoj mitologiji bila pratilac boga Posejdona. Sve morske trave osim primarne produkcije organske materije imaju važnu ulogu u obogaćivanju donjih slojeva vode kiseonikom, u stvaranju biocenoza pogodnih za boravak, ishranu i reprodukciju mnogih biljnih i životinjskih vrsta, te u učvršćivanju sedimenta i čuvanju obale od erozije.

If you find sea balls while walking along the beach, it means that the seagrass *Posidonia oceanica* meadow is present in the immediate vicinity. The importance of this seaweed and the respect given to it is shown by the fact that the plant genus was named after Poseidon, the god of the sea among the ancient Greeks. In our sea, this species can inhabit the seabed at depths of up to 30 m, and its companion in shallow waters little Neptun grass, i.e. *Cymodocea nodosa*, inhabits depths of 1 to 10 m. The name of the genus *Cymodocea nodosa* come from the name of the nereide *Cymodocea*, which according to Greek mythology was a companion of the god Poseidon. All seaweed, apart from the primary production of organic matter, play an important role in enriching the lower layers of water with oxygen, in creating biocenoses suitable for inhabiting, feeding and reproduction of many flora and fauna species, and in stabilizing sediment and protecting the coast from erosion.

Morski beskičmenjaci

Morsko dno duž Crnogorskog primorja prekriveno je različitim tipovima životnih zajednica. Na vrstu životne zajednice, odnosno biljke i/ili životinje koje će je graditi, utiču prvenstveno vrsta podlage tj. supstrata, ali i fizičko-hemijski parametri morske vode. U zavisnosti od toga je li morsko dno sastavljeno od mekih, pomicnih supstrata, koji su najčešće predstavljeni sitnim frakcijama pijeska i mulja, ili pak od čvrste, nepomicne podlage kao što su stijene i veliki kameni blokovi – zavisi kakav će biti biodiverzitet. Svako od tih podloga različiti organizmi prilagođeni su svojim adaptivnim sposobnostima.

U bentosnim biocenozama na otvorenom moru Crnogorskog primorja živi 729 vrsta beskičmenjaka. Od ukupnog broja zabilježenih vrsta, grupa sundera broji 64 vrste, žarnjacima pripada 49 vrsta, melušcima 354 vrste, anelidama 27 vrsta, zglavkarima 95 vrsta, briozoama 49 vrsta, bodljokošcima 63 vrste i plašašima 29 vrsta. Među vrstama koje nastanjuju bentosne zajednice morskog dna Crnogorskog primorja, 30 je zaštićeno nacionalnim i međunarodnim zakonodavstvom, dok se za 19 vrsta smatra da su unesene.

Marine invertebrates

Seabed along the Montenegrin coast is covered with different types of benthic communities. The type of benthic community, i.e. plants and/or animals to build it, is primarily influenced by the type of substrate, but also by physico-chemical parameters of seawater. What the biodiversity will be like depends on whether the seabed is composed of soft bottom and mobile substrates, which are most often represented by fine sand and mud fractions, or whether it is composed of solid, immovable substrates such as rocks and large stone blocks. Different organisms are adapted to each of these substrates with their own adaptive abilities.

Benthic biocenoses on the open sea of the Montenegrin coast is a home for 729 species of invertebrates. Out of the total number of recorded species, the group of sponges accounts to 64 species, 49 species belong to cnidarians, 354 species to molluscs, 27 species to annelids, 95 species to arthropods, 49 species to bryozoans, 63 species to echinoderms and 29 species to tunicates. Among the species that inhabit the benthic communities of the seabed of the Montenegrin coast, 30 are protected by national and international legislation, while 19 are considered introduced species.



Ophidiaster ophidianus,
Morska zvijezda,
Sea star



MORE
SEA

Savalia savaglia,
Zlatni koral,
Gold coral



Posebnu specifičnost Bokokotorskog zaliva predstavljaju lokaliteti na kojima su razvijene koraligene zajednice. Kao takve izdvajaju se Dražin vrt i Sopot gdje se na dubini od 12 m počinju razvijati guste kolonije zlatnog korala *Savalia savaglia*. Osim toga što su tu populacije ovog korala najbrojnije na Mediteranu, one su i među najplićima, jer se uglavnom razvijaju na mnogo većim dubinama. Specifičnost tih lokaliteta je prisustvo podzemnih izvora tzv. vrulja, koje stvaraju ambijent sličan ambijentu koji vlada na dubinama od nekoliko desetina pa i stotina metara. Ta staništa su, osim zlatnog korala, prave riznice morskih sunđera, korala, briozoa i drugih morskih beskičmenjaka.

Localities where coralligenous communities have been developed are a special features of the Bay of Boka Kotorska. Dražin vrt and Sopot stand out as such, where dense colonies of gold coral *Savalia savaglia* begin to grow at a depth of 12 m. Apart from the fact that the populations of this coral are the most numerous in the Mediterranean, they are also the shallowest, because such habitats are exiting at much greater depths. The specificity of these localities is the presence of groundwater sources, the so-called vrulja, which create an ambience similar to the one that prevails at depths of several tens or even hundreds of meters. In addition to golden corals, these habitats are true treasury of sea sponges, coral, bryozoans and other marine invertebrates.

Među prisutnim vrstama mnogo je onih koje se nalaze na međunarodnim i domaćim listama ugroženih i zaštićenih. Posebno se ističu sunđeri iz roda *Axinella cannabina*, *A. polypoides* i *Aplysina aerophoba/cavernicola*, kao i koral *Leptogorgia sarmentosa*. Na području otvorenog mora ističe se područje oko rta Rep blizu ostrva Stari Ulcinj po brojnoj populaciji zaštićenog sunđera *Axinella cannabina*.

Među staništima od posebnog interesa spadaju i morske pećine kojih duž Crnogorskog primorja ima znatan broj. Istraživanje morskih pećina duž crnogorske obale pokazuje prisustvo 70 polupotpunjivih pećina, od kojih je 20 pećina dugo 25 m ili više. Unutar pećina vladaju specifični uslovi smanjene svjetlosti i niže temperature, pa su i organizmi koji ih naseljavaju prilagođeni sciaphilnim uslovima života. Najbrojnije su vrste iz grupe sunđera, žarnjaka i briozoa. Među prisutnim vrstama mnogo je

Many of the species present found their place in numerous international and national lists of endangered and protected species. Sponges from the genera *Axinella cannabina*, *A. polypoides* and *Aplysina aerophoba/cavernicola*, as well as the Gorgonia *Leptogorgia sarmentosa* particularly stand out. In the open sea near the island of Stari Ulcinj, the area around Cape Rep stands out for the large population of the protected sponge *Axinella cannabina*.

Habitats of special interest include significant number of sea caves found along the Montenegrin coast. Research of sea caves along the Montenegrin coast shows the presence of 70 caves, out of which 20 caves are 25 m long or more. Specific conditions of reduced light and lower temperatures prevail inside the caves, so the invertebrate organisms that inhabit them are adapted to sciaphilic conditions. The most numerous species are from the group of sponges, cnidarians and bryozoans.



Glavonoći

Glavonoći (*Cephalopoda*) su klasa isključivo morskih organizama i pripadaju razdjelu mekušaca (*Mollusca*). Pretpostavlja se da u svjetskim morima obita više od 1000 vrsta glavonožaca, dok je u Jadranu zabilježeno oko 30 vrsta.

Najpoznatiji predstavnici ove grupe su hobotnica *Octopus vulgaris*, koja je rasprostranjena po cijelom svijetu. Na Crnogorskom primorju mogu se naći i dvije vrste muzgavaca (muškuna) – crni *Eledone moschata* i bijeli *Eledone cirrhosa*. Druge dobro poznate vrste glavonožaca su sipa *Sepia officinalis*, lignja *Loligo vulgaris* i mali totanj *Illex coindetii*.

Cephalopods

Cephalopods (*Cephalopoda*) are a class of exclusively marine organisms which belong to the phylum *Mollusca*. It is estimated that more than 1000 species of cephalopods inhabit the world seas, while about 30 species have been recorded in the Adriatic.

The most famous representatives of this group are common octopus *Octopus vulgaris*, which is widespread globally. Two other species of octopus are also found in Montenegrin waters – musky *Eledone moschata* and horned/curled octopus *Eledone cirrhosa*. Other well-known cephalopod species are common cuttlefish *Sepia officinalis*, European squid *Loligo vulgaris* and broadtail shortfin squid *Illex coindetii*.



Common octopus
Octopus vulgaris,
Hobotnica



Common cuttlefish
Sepia officinalis,
Sipa



MORE
SEA

Morski rakovi

Kad se uopšte govorи o rakoвima misli se na rakoве desetonoшce *Decapoda*, tj. rakoве koji imaju deset nogu, koji predstavljaju najbrojniji red u okviru podтипа *Crustacea* i u koјe spadaju свима наза добро poznate vrste poput jastoga, karla, škampa, kozica, kraba. U Jadranskom moru je zabilježena 241 vrsta *Decapoda*. S obzirom na то да су у Медiteranu zabilježene 383 vrste dekapodnih rakova, možemo zaključiti да је Jadransko more kvalitativno dobro istraženo. Na osnovу raspoložive literature, u Bokokotorskom zalivu žive 62 vrste dekapoda, dok ih u teritorijalnim vodama Crnogorskog primorja ima 95.

Sea crustaceans

When we talk about crustaceans in general, we mean the ten-legged crabs *Decapoda*, i.e., crustaceans with ten legs, which represent the most numerous order within the *Crustacea subphylum* and which include all well-known species such as lobster, crayfish, shrimp, prawns, crabs. Total of 241 species of *Decapods* have been recorded in the Adriatic Sea. Given that 383 species of decapod crustaceans have been recorded in the Mediterranean, we can conclude that the Adriatic Sea has been qualitatively well researched. Based on the available literature, 62 species of decapods live in the Bay of Boka Kotorska, and total of 95 species in the territorial waters of the Montenegrin coast.



Palinurus elephas,
Jastog



MORE
SEA



MORE
SEA

Callinectes sapidus,
Plavi rak

U Bokokotorskom zalivu do sada su zabilježene i dvije alohtone (unešene, strane) vrste porijeklom iz zapadnog Atlantika. To su smeđa kozica i plavi rak. Obje vrste imaju veliku komercijalnu vrijednost tamo odakle potiču, međutim, kod nas se još nisu počele eksploratisati u dovoljnoj mjeri. S druge strane, plavi rak se veoma namnožio ne samo u zalivu već i duž cijelog Crnogorskog primorja i za sad predstavlja noćnu moru ribarima, jer im kida mreže i uništava ulov. Naročito ga mnogo ima na Ada Bojani gdje je najvjeroatnije uspostavio populaciju.

Od komercijalnih vrsta dekapodnih rakova izdvajaju se jastog, škamp, tigrasti gambor i kozica. Jastog je u tolikoj mjeri izlovljen da ga u Bokokotorskom zalivu ima veoma malo. Spada u ugroženu vrstu. Škamp se izlovljava kočama na dubini preko 200 m. Kozica je ekonomski značajna vrsta u kočarskom ribolovu Crnogorskog primorja. Veću ekonomsku vrijednost ima tigrasti gambor koji je najprisutnija ušću rijeke Bojane mada ga ima i u Bokokotorskem zalivu, jer preferira brakične vode.

So far, two allochthonous (introduced, alien) species originating from the western Atlantic have been recorded in the Bay of Kotor. These are brown shrimp and blue crab. Both species have a significant commercial value where they come from; however, they have not yet begun to be exploited to a sufficient extent in our country. On the other hand, blue crab has vastly reproduced in the bay and along the entire Montenegrin coast and is a nightmare for fishermen because it tears their nets and destroys their catch. This species is represented greatly, especially on Ada Bojana, where it most likely established a population.

Commercial species of decapod crustaceans include lobster, shrimps, tiger prawns, and rose shrimps. The lobster has been fished to such an extent that very few of them can be found in the Bay of Kotor. It belongs to the endangered species. Shrimp are fished with traps at a depth of over 200 m. Rose shrimp is an economically important species in the trawl fishery of the Montenegrin coast. The tiger prawn, which is most present at the mouth of the Bojana River, has a greater economic value, although it is also present in the Bay of Boka Kotorska because it prefers brackish waters.

Morske ribe

Jadran se po broju vrsta ubraja u bogata mora, dok se po gustini populacije i mogućnostima eksploatacije tih vrsta svrstava u najsiromašnija. U Jadranskom moru zabilježeno je 407 vrsta i podvrsta ribe (bez *Cyclostomata*): 353 vrsta i podvrsta iz grupe *Osteichthyes* i 54 vrste iz grupe *Chondrichtyes*, što predstavlja 70% poznatih vrsta i podvrsta ribe u Mediteranu (oko 580 vrsta i podvrsta).



Hippocampus
guttulatus,
Morski konjic

Morski konjic *Hippocampus* spp. jedina je vrsta ribe gdje mlade na svijet donosi mužjak. Tokom parenja ženka jaja polaže u trbušnu vrećicu mužjaka. On ih unutra oplodi, nosi i čuva do sazrijevanja, a potom žive mladunce otpušta u more. Morski konjic je jedina riba koja pliva vertikalno, koristeći rep da se pričvrsti za podvodne biljke i korale. Dva isturena oka funkcionišu nezavisno što mu omogućava da gleda i naprijed i nazad.

Sea fish

The Adriatic is one of the richest seas in terms of species, while it is one of the poorest in terms of population density and possibilities of exploitation of these species. A total of 407 species and subspecies of fish (excluding *Cyclostomata*) were recorded in the Adriatic Sea: 353 species and subspecies from the *Osteichthyes* group and 54 species from the *Chondrichthyes* group, representing 70% of known fish species and subspecies in the Mediterranean (about 580 species and subspecies).

Od hrskavičavih riba najbrojnija je porodica *Rajidae* sa 11 vrsta. U Jadranskom moru mogu se sresti hrskavičave ribe koje pripadaju različitim ekološkim grupama.

Tako se mogu naći manje demerzalne vrste ajkula i raža od kojih su najčešće morska mačka bljedica *Scyliorhinus canicula*, pešikani *Mustelus* spp., te vrste raža kakve su modropjega raža *Raja miraletus* ili raža kamenica *Raja clavata*. S druge strane, Jadran naseljavaju i velike pelagične predatori, ali i planktivorne vrste hrskavičavih riba. Od predatorijskih vrsta najčešći je pas modrulj *Prionace glauca*, a bilježi se i mako ajkula *Isurus oxyrinchus*.

Cartilaginous fish belonging to different ecological groups can be found in the Adriatic Sea. Of the cartilaginous fish, the most numerous is the *Rajidae* family, with 11 species.

Thus, smaller demersal species of sharks and rays can be found, the most common of which are the small-spotted catshark *Scyliorhinus canicula*, the smooth-hounds *Mustelus* spp., and rays species such as the blue rye *Raja miraletus* or the thornback ray *Raja clavata*. On the other hand, the Adriatic is inhabited by large pelagic predatory and planktivorous species of cartilaginous fish. Of the predatory species, the most common is the blue shark *Prionace glauca*, and the shortfin mako *Isurus oxyrinchus* is also observed.



Chauliodus
sloani,
Iglozub strašni

U okviru FAO AdriaMed ekspedicije dubokog južnog Jadrana, u avgustu 2008. godine, prvi put su spuštene kočarske mreže i dubinski parangali na 1200 metara. Ulovljena je riba velikih dubina iglozub strašni *Chauliodus sloani*. Čeljusti ove ribe oivičene su igličastim providnim zubima, tako velikim da ne mogu stati u usta. One u odnosu na veličinu glave među ribama drže rekord za najveće zube. Prilagodene su životu u velikim dubinama i u vječitom mraku, pa imaju svjetlosne organe.

As part of FAO AdriaMed Deep Sea Expedition of southern Adriatic, in August 2008, trawl nets and deep longlines were lowered to 1,200 meters for the first time. A fish of great depths, Sloane's viperfish *Chauliodus sloani*, was caught. The jaws of this fish are bordered by needle-like teeth, so large that they cannot fit in the mouth. They hold the record for the largest teeth in relation to the size of the head among the fish. They are adapted to life in great depths and in eternal darkness, so they have bioluminescent organs.



Predstavnik planktivornih vrsta je gorostasna psina *Cetorhinus maximus*. Znatan procenat hrskavičavih riba Jadrana danas se smatra ugroženim vrstama i u njihovo očuvanje ulazu se znatni napor i širom Mediterana. Što se tiče košljoriba, najbrojnija porodica je *Gobidae* kojoj pripadaju 44 vrste i jedna podvrsta, zatim porodica *Labridae* s 18 vrsta, *Sparidae* takođe s 18 vrsta i *Blennidae* sa 17 vrsta.

A representative of planktivorous species is the Basking shark *Cetorhinus maximus*. A significant percentage of the cartilaginous fish of the Adriatic are today considered endangered species, and considerable efforts are being made to preserve them throughout the Mediterranean. As for bony fish, the most numerous family is *Gobidae*, which includes 44 species and one subspecies, followed by the family *Labridae* with 18 species, *Sparidae* with 18 species, and *Blennidae* with 17 species.



Exocoetus volitans,
Riba poletuša

Među stanovnike Jadranskog mora ubrajaju se i vrste iz porodice *Exocoetidae*, odnosno ribe poletuše. Prsna peraja ovih vrsta su neobično velikih razmjera u poređenju s drugim morskim ribama, a koriste ih da bi mogle lebdjeti iznad površine mora. Po tome su i dobile naziv, a mogućnost da lebde razvile su da bi mogle izbjegći predatore u otvorenom moru u kojem je teško naći zaklon. Naseljavaju uglavnom tropске i subtropske predjele, a malobrojne su u Jadrani iako su njegovi prirodni stanovnici. Nemaju ekonomsku vrijednost u ribarstvu Jadranskog mora i ulove se slučajno.

The inhabitants of the Adriatic Sea also include species from the family *Exocoetidae*, i.e. flying fish. The pectoral fins of these species are unusually large in comparison to other marine fish, and they use them so that they could float above the surface of the sea. They got their name after it, and they developed the ability to float so that they could avoid predators in the open sea, where it is difficult to find shelter. They inhabit mainly tropical and subtropical regions, and there are few in the Adriatic, although they are its natural inhabitants. They have no economic value in the fisheries of the Adriatic Sea and are caught by accident.

S druge strane, najveći broj porodica jadranskih riba je siromašan vrstama, čak 74 porodice uključuju samo jednu ili dvije vrste. Vrste iz porodice Sparidae komercijalno su važne s aspekta ribarstva, a toj porodici pripadaju orada *Sparus aurata*, zubatac *Dentex dentex*, arbun *Pagellus erythrinus* i druge značajne vrste.

U južnom Jadranu, prema nekim autorima, živi 205 vrsta riba, a od njih 140 naseljava Bokokotorski zaliv.

Posljednje decenije registrovane su 49 nove vrste jadranskih riba. Klimatske promjene i oceanografski faktori, koji se očigledno dešavaju i u basenu Jadranskog mora, glavni su razlog zbog kojeg se povećava broj vrsta, a jedan od razloga je i invazija vrsta iz Crvenog mora preko Sueckog kanala. Tim vrstama trebalo je preko 100 godina da savladaju temperaturnu barijeru i druge prepreke da bi se pojavile u Jadranu.

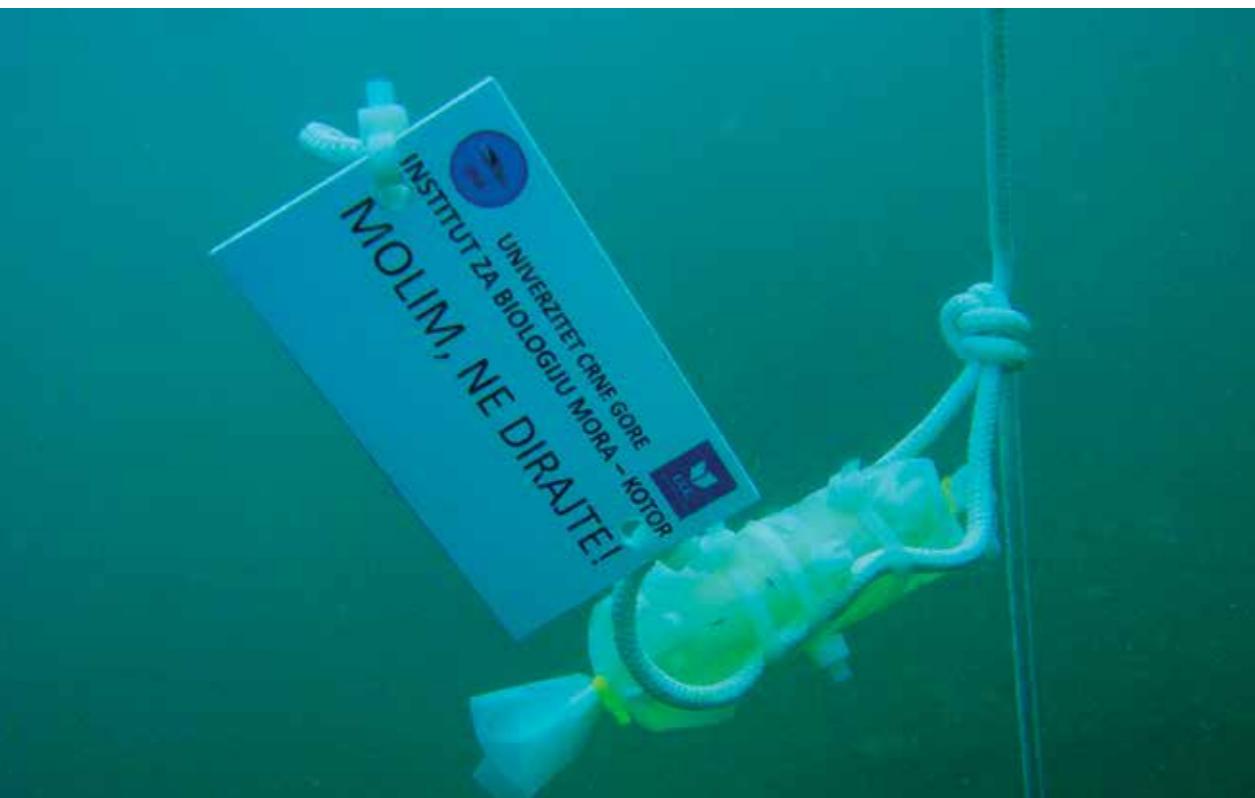
Većina vrsta i podvrsta, osim nekih endemičnih, pripada u biogeografskom smislu mediteranskoj i mediteransko-atlantskoj oblasti, odnosno istočnoatlantskoj borealnoj provinciji. Mediteranskoj biogeografskoj grupi pripada 22% jadranske ihtiofaune, mediteransko-atlantskoj oko 65%, kosmopolitske i druge šire geografski rasprostranjene vrste zastupljene su sa 11%, dok jadranskih endema ima malo (neke vrste iz porodica *Gobidae*, *Syngnathidae*, *Acipenseridae*).

On the other hand, the most significant number of Adriatic fish families is poor in species; as many as 74 families include only one or two species. Species from the family Sparidae are commercially crucial from the aspect of fisheries, and this family consists of the gilt-head bream *Sparus aurata*, the common dentex *Dentex dentex*, the common pandora *Pagellus erythrinus*, and other vital species.

According to some authors, 205 species of fish live in the southern Adriatic, and 140 of them inhabit the Bay of Kotor.

In the past decade, 49 new species of Adriatic fish have been registered. Climate change and oceanographic factors, which are happening in the Adriatic basin, are the main reason why the number of species is increasing, and one of the reasons is the invasion of species from the Red Sea through the Suez Canal. It took these species over 100 years to overcome the temperature barrier and other obstacles to appear in the Adriatic.

Most species and subspecies, except for some endemic ones, belong in the biogeographical sense to the Mediterranean and Mediterranean-Atlantic areas, i.e., the East Atlantic boreal province. A total of 22% of the Adriatic ichthyofauna belongs to the Mediterranean biogeographical group, about 65% to the Mediterranean-Atlantic, cosmopolitan, and other broader geographically distributed species are represented by 11%, while there are few Adriatic endemic species (some species from the families *Gobidae*, *Syngnathidae*, *Acipenseridae*).



MORE
SEA

Caretta caretta,
Glavata kornjača.
The loggerhead
turtle



Morske kornjače

Morske kornjače su dugoživjeće, sporo-rastuće, migratorne vrste životinja. U Jadranskom moru su registrirane tri vrste: glavata kornjača *Caretta caretta*, zelena kornjača *Chelonia mydas* i kožasta kornjača *Dermochelys coriacea*.

Glavata kornjača je najčešća vrsta u Jadranskom moru. Ujedno, to je vrsta čiji je životni ciklus najbolje proučen. Dužina oklopa glavate kornjače kreće se od 85 do 100 cm, a težina tijela između 100 i 150 kg. Hrani se morskim krabama, ježevima, mekušcima, salpama i meduzama. Na području Mediterana glavata kornjača se gnijezdi na plažama Grčke, Turske, Kipra i Libije. Postoje indicije da je gnijezdila na Ada Bojani 2002. godine. Jadransko more je jedno od najvažnijih područja za ishranu te vrste i vrlo važno područje za njeno prezimljavanje. U crnogorskim vodama trenutno postoji više od stotinu nalaza glavate kornjače.

Zelena kornjača povremeno je prisutna u Jadranskom moru. Dužina oklopa ove vrste može biti do 150 cm, a težina tijela do 400 kg. Na području Mediterana, ta vrsta je najbrojnija u oblasti Levantskog basena, u Grčkoj i Libiji. Jaja polaže na plažama Turske, Kipra i Sirije. U crnogorskim vodama zabilježena su samo dva nalaza zelene kornjače.

Kožasta kornjača je vrlo rijetka u Jadranskom moru. Njena glavna karakteristika je odsustvo koštanog oklopa. Oklop kožaste kornjače je zapravo modifikovana koža sa sedam (nekada i pet) uzdužnih nabora – grebena. Ona može biti teška i do jedne tone. Na području Mediterana, kožasta kornjača je najbrojnija u Tirenском i Egejskom moru. Za razliku od glavate kornjače i zelene kornjače, kožasta kornjača ne polaže jaja na području Mediterana. U crnogorskim vodama zabilježena su samo dva nalaza te vrste.

Glavne prijetnje morskim kornjačama u Jadranskom moru su slučajan ulov u ribarskim mrežama (*by-catch*), otpad, zagađenje i sudar s plovilima.

Sea turtles

Sea turtles are long-lived, slow-growing, migratory species of animals. In the Adriatic Sea, the presence of three species of sea turtles is identified: the loggerhead turtle *Caretta caretta*, the green turtle *Chelonia mydas*, and the leatherback turtle *Dermochelys coriacea*.

The loggerhead turtle is the most common species in the Adriatic Sea. At the same time, it is the species whose life cycle has been best studied. The length of the loggerhead turtle's shell ranges from 85 to 100 cm, and the bodyweight is between 100 and 150 kg. It feeds on sea crabs, sea urchins, molluscs, salps, and jellyfish. In the Mediterranean area, the loggerhead turtle nest on the beaches of Greece, Turkey, Cyprus, and Libya. There are indications that this species nested on Ada Bojana in 2002. The Adriatic Sea is one of the most important feeding areas of this species and a very important wintering area. There are currently more than a hundred loggerhead turtle sightings in Montenegrin waters.

The green turtle is only occasionally present in the Adriatic. The length of the shell of this species can be up to 150 cm, and the body weight up to 400 kg. In the Mediterranean area, this species is most present in the Levant Basin, in Greece and Libya. It lays eggs on the beaches of Turkey, Cyprus and Syria. Only two sightings of the green turtle have been recorded in Montenegrin waters.

The leatherback turtle is very rare in the Adriatic Sea. Its main characteristic is the absence of hard shell. The shell of a leatherback turtle is actually a modified skin with seven (sometimes five) longitudinal folds - ridges. It can weigh up to a ton. In the Mediterranean area, the leatherback turtle is most common in the Tyrrhenian and Aegean Seas. Unlike the loggerhead turtle and the green turtle, the leatherback turtle does not lay eggs in the Mediterranean area. Only two sightings of this species have been recorded in Montenegrin waters.

The main threats to sea turtles in the Adriatic Sea are *by-catches* in fishing nets, marine litter, pollution and collisions with vessels.

Morski sisari

Morski sisari su visoko migratorne vrste. Pojedine vrste kitova za vrijeme parenja prelaze ogromnu udaljenost od čak 10.000 km za mjesec dana. S obzirom na ovu karakteristiku, sve registrovane vrste morskih sisara Jadranskog mora istovremeno pripadaju i fauni Crnogorskog primorja. Do sada je u Jadranu registrovano sedam vrsta morskih sisara od čega smo u ovoj publikaciji opisali četiri.

Dobri delfin *Tursiops truncatus* je vrsta koja je trajno nastanjena u Jadranskom moru. Veoma su društvene životinje, u Crnogorskom primorju žive u skupinama od dvije do 14 jedinki. Dostižu dužinu do četiri metra i težinu do 650 kg. Nalazimo ih u Bokokotorskom zalivu i na otvorenom moru do izobate od 200 metara. Njihova populacija je ugrožena najviše zbog sve manje dostupne hrane, buke u moru, gustog pomorskog saobraćaja. Najčešće ih nalazimo iza ribarskih brodova – koča, što je indikator da u prirodi ima sve manje dostupne hrane. Prugasti delfin *Stenella coeruleoalba* je manji delfin koji povremeno naseljava otvorena mora Jadrana, pa i epikontinentalni pojas Crnogorskog primorja. Prugasti delfini su veoma brzi plivači, a nalazimo ih u mnogo većim grupama u odnosu na dobrog delfina. Na Jadranu mogu biti u grupama od preko 100 jedinki. Manji su rastom od dobrog delfina, dužine do dva metra a težine do 150 kg. Na ovom području najčešće se hrane glavonoćima (50%), a ostalo ide na druge morske organizme. Nalazimo ih na većim dubinama, najčešće u dijelu južnojadranske kotline.

Marine mammals

Marine mammals are highly migratory species. Certain species of whales pass a huge distance of as much as 10,000 km in a month during breeding season. In view of this characteristic, all registered species of marine mammals of the Adriatic Sea at the same time belong to the fauna of the Montenegrin coast. So far, seven species of marine mammals have been registered in the Adriatic.

The bottlenose dolphin *Tursiops truncatus* is a species that permanently inhabits the Adriatic Sea. They are very social animals and they live in the Montenegrin coast in groups of 2 to 14 individuals. They reach a length of up to four meters and a weight of up to 650 kg. They can be found in the Bay of Kotor and on the open sea up to the isobath of 200 meters. Their population is endangered mostly due to reduced food availability, underwater noise, and heavy maritime traffic. They are most often found behind fishing boats - trawler, which is an indicator that there is reduced food availability in nature. Striped dolphin *Stenella coeruleoalba* is a smaller dolphin that occasionally inhabits the open seas of the Adriatic, as well as the continental shelf of the Montenegrin coast. Striped dolphins are very fast swimmers which can be found in much larger groups in comparison to the bottlenose dolphin. On the Adriatic, they may be found in groups of over 50 individuals. They are smaller than the bottlenose dolphin, up to two meters long and weighing up to 150 kg. In this area, they usually feed on cephalopods (50%), and the rest accounts for other marine organisms. We find them at greater depths, most often in the part of the South Adriatic Valley.



Delphinus delphis,
Delfin



Balaenoptera physalus,
Veliki kit

Obični delfin *Delphinus delphis* nekad je bio najrasprostranjenija vrsta na Mediteranu i Jadranu, dok je danas među najugroženijim vrstama i na Jadranu se pojavljuje veoma rijetko. Razlog ugroženosti leži u činjenici da je nakon Drugog svjetskog rata pokrenuta masovna kampanja istrebljenja ove vrste duž cijele obale Jadrana pa i u Crnoj Gori, jer su ga ribari i ribolovne vlasti proglašili „štetočinom“ a za njihovo ubijanje ribari su dobijali nagradu.

Veliki kit ili kit perajar *Balaenoptera physalus* pripada kitovima usanima. Druga je po veličini vrsta morskih sisara nakon plavog kita. Povremeno naseljava Jadran u manjim zajednicama. Najbrži su plivači među kitovima ušanima. Maksimalna dužina do koje mogu narasti je 26 metara, a težina im se kreće od 38 do 55 tona. Hrane se tako što filtriraju vodu kroz usi i na taj način uzimaju plankton i sitnu plavu ribu. Polnu zrelost dostižu u periodu između 25. i 30. godine života dok im je ukupna dužina života približno 95 godina.

Sve vrste morskih sisara nalaze se na listi ugroženih vrsta zbog prekomjernog ribolova, buke u moru, gustog pomorskog saobraćaja. Veliki problem predstavlja i prilov, jer se slučajno kroz ribolovne operacije godišnje izlovi do 30.000 jedinki raznih vrsta sisara. Opstanak kitova je veoma upitan, jer se u mnogim zemljama još uvijek kitolov upražnjava kao legalan način ribolova. Procjenjuje se da je u prošlom vijeku na taj način izlovljeno 725.000 jedinki.

Short-beaked common dolphin *Delphinus delphis* used to be the most widespread species in the Mediterranean and the Adriatic and, nowadays, it is among the most endangered species and occurs very rarely in the Adriatic. The reason for the threat lies in the fact that after the World War II, a mass campaign of extinction of this species was launched along the entire Adriatic coast, even in Montenegro, because fishermen and fishing authorities declared it a „pest“ and fishermen received a reward for killing them.

Common rorqual or fin whale *Balaenoptera physalus* belongs to baleen whales. It is the second largest species of marine mammal after the blue whale. Occasionally, it inhabits the Adriatic in smaller communities. They are the fastest swimmers among baleen whales. The maximum length to which they can grow is 26 meters, and their weight ranges from 38 to 55 tons. They feed by filtering water through the ears and thus taking plankton and small pelagic fish. They reach sexual maturity between the age of 25 and 30, while their total life expectancy is approximately 95 years.

All species of marine mammals are on the list of endangered species due to overfishing, underwater noise, heavy maritime traffic. By-catch is also a big issue, because up to 30,000 specimens of various mammal species are caught annually through fishing operations. The survival of whales is highly questionable, as in many countries whaling is still practiced as a legal way of fishing. It is estimated that 725,000 individuals were caught in this way in the last century.



KOPNO

LAND

Gomphus calvatus,
Ljubičasta
lisičica



Gljive

Gljive pripadaju važnoj grupi organizama, kako zbog njihove uloge u funkcionisanju prirodnih ekosistema tako i zbog neprocjenjivog značaja za čovjeka. Iako je carstvo *Mycota* bogatije vrstama u odnosu na biljke i životinje, dugo je bilo slabije istraživan. Trenutno je u svijetu konstatovano oko 120.000 vrsta gljiva, a prema nekim procjenama moguće je očekivati i do 2,2 miliona vrsta.

Fungi

Fungi belongs to the group of important organisms, both for their role in ecosystem functioning and their paramount importance for humans. Although richer in species than flora and fauna, the kingdom of *Mycota* used to be researched poorly for a long time. Currently, there are 120.000 confirmed species of fungi in the world, and according to some estimates, up to 2.2 million species in total might be expected.



Strobiloscyphe cupressina

Ova sićušna askomiceta pripada familiji *Sarcosomataceae* koja obuhvata desetak rodova i oko 60 vrsta. Uglavnom rastu kao saprobi na suvom i natrulom drveću. *S. cupressina* se razvija na suvim grančicama čempresa (*Cupressus sempervirens*), starim dvije ili više godina, a opisana je prema nalazima iz Park šume Gorica iznad Podgorice. Više inostranih istraživača potvrđilo je njeno prisustvo i u zemaljama Mediterana (Francuska, Grčka, Italija, Španija i dr.).

Strobiloscyphe cupressina

This tiny ascomycete belongs to the *Sarcosomataceae* family which comprises of a dozen genera and about 60 species. They mostly grow as saprobes on dry and rotten trees. *S. cupressina* develops on dry cypress twigs (*Cupressus sempervirens*), two or more years old, as described in the findings from the Gorica Forest Park above Podgorica. Several foreign researchers have confirmed its presence in the Mediterranean countries (France, Greece, Italy, Spain, etc.).



Strobiloscyphe cupressina





Poronia erici



Poronia erici

Razvija se na ekskrementima sisara; u našem slučaju konja i krava, tokom vlažnog perioda od oktobra do maja. Registrovana je na Kakarickoj gori iznad Podgorice i u masivu Komova. Zbog sve veće primjene pesticida i industrijski prerađene hrane u stočarstvu opstanak vrste je ugrožen.

Hygrocybe punicea,
Velika vlažnica

Velika vlažnica

je karakteristična vrsta starih, neobrađenih, poluprirodnih pašnjaka u Evropi kojima se viševjekovno upravlja na tradicionalan način: ispašom i/ili redovnim ručnim košenjem. Glavni faktor ugrožavanja ove vrste su degradacija i nestajanje staništa. Površina pod ovim tipom staništa brzo se smanjuje uslijed napuštanja tradicionalnog stočarenja, sve veće primjene hemije u poljoprivrednoj praksi kao i zbog prenamjene u korišćenju zemljišta.

Poronia erici

It develops on mammalian excrement of horses and cows in our case, during the wet period from October to May. It is registered on Kakaricka gora above Podgorica and in the massif of Komovi. Due to the increasing use of pesticides and industrially processed food in livestock, the survival of the species is jeopardized.



Suillus americanus

Chicken fat mushroom grows in symbiosis with five needle pines (*Pinus strobus*, *P. monticola*, *P. lambertiana*, *P. longaeva*, *P. ayacahuite*, *P. cembra*, *P. peuce*, *P. wallichiana*) in natural and cultivated forests. It is widespread in the northern hemisphere. In Montenegro, *S. americanus* has been recorded in high mountain forests of endemic species of Macedonian pine (*Pinus peuce*) in a small number of localities.

Suillus americanus,
Molikin vučji hljebac

Molikin vučji hljebac

raste u simbiozi s petoigličastim borovima (*Pinus strobus*, *P. monticola*, *P. lambertiana*, *P. longaeva*, *P. ayacahuite*, *P. cembra*, *P. peuce*, *P. wallichiana*) u prirodnim i kultivisanim šumama. Rasprostranjena je na sjevernoj hemisferi. U Crnoj Gori *S. americanus* zabilježen je u visokoplanskim šumama endemičnog bora molike (*Pinus peuce*) i to na malom broju lokaliteta.

U Crnoj Gori gljive su još uvek nedovoljno istražena komponenta biodiverziteta. Do sada je utvrđeno prisustvo približno 2200 vrsta. U okviru tog broja opisani su i dva za nauku nova roda: *Perzia* i *Pseudoboubovia*, i 18 novih vrsta. Tri vrste gljiva pripadaju isključivo Crnoj Gori.

Prema grubim procjenama, u Crnoj Gori moguće je očekivati između 15.000 i 25.000 vrsta.

Najčešći faktori ugrožavanja gljiva su: degradacija, fragmentacija ili nestajanje staništa; zagadenje životne sredine (vazduha, vode, zemljišta); klimatske promjene; nepovoljna šumarska praksa i učestali požari; intenzivna poljoprivreda; unošenje stranih invazivnih vrsta biljaka i gljiva; neodgovarajuće i prekomjerno sakupljanje.

Određene vrste jestivih gljiva intenzivno se sakupljaju u komercijalne svrhe i za ličnu upotrebu u Crnoj Gori. Nekoliko hiljada tona jestivih gljiva bude godišnje izvezeno u zemlje zapadne Evrope.

U Crnoj Gori ne postoji narodna tradicija upotrebe gljiva u medicinske svrhe, niti savremena farmakološka istraživanja njihovih ljekovitih svojstava, kao što je to slučaj s nekim zemljama. U odnosu na broj vrsta makrogljiva do sada konstatovanih u Crnoj Gori, može se reći da 268 vrsta posjeduje određena ljekovita svojstva.

In Montenegro, fungi are still an insufficiently researched component of biodiversity. So far, the presence of approximately 2200 species has been determined. Within this number, two genera, new in science, have been described: *Perzia* and *Pseudoboubovia*, as well as 18 new species. Three species of fungi belong exclusively to Montenegro.

According to rough estimates, between 15,000 and 25,000 species can be expected in Montenegro.

The most common disturbance factor for fungi are: degradation, fragmentation or habitat loss; environmental pollution (air, water, soil); climate changes; adverse forestry practices and frequent fires; intensive agriculture; introduction of invasive alien species of plants and fungi; inappropriate and excessive collection.

Certain types of edible mushrooms are intensively collected for commercial purposes and for personal use in Montenegro. Several thousand tons of edible mushrooms are exported annually to Western European countries.

In Montenegro, there is no folk tradition of the use of mushrooms for medical purposes, nor modern pharmacological research of their medicinal properties as the case may be in certain countries. In relation to the number of macrofungal species confirmed so far in Montenegro, 268 species are said to have certain medicinal properties.



Alpova
komovianus



Alpova komovianus

je prva novoopisana gljiva sa prostora Crne Gore. Živi u simbiozi sa korenom jove (Aldus spp.), a kako njena plodonosna tijela rastu ispod zemlje teško ih je naći. Prvi put otkrivena je u podnožju masiva Komovi, obalom Vučjeg potoka (sliv Plavskog jezera), a potom i u slivu rijeke Tare. Otkriće ove vrste i podaci o njoj iz Crne Gore dragocjeni su i za objašnjenje planetarne distribucije roda kojem pripada. Njeno sistematsko istraživanje odvija se više od dvije decenije, a ovdje su do sada relizovana otkrića još jednog novog roda i tri nove vrste.

Alpova komovianus

is the first newly described species from the territory of Montenegro. It lives in an ectomycorrhizal community with alder, while being difficult to detect due to its hypogeous lifestyle. It was first discovered at the foot of the Komovi massif, along the shores of Vučji potok (Plavsko Lake basin) and then in the Tara river basin. The discovery of this species and the data on it coming from Montenegro are valuable for explaining the planetary distribution of the genus to which it belongs. Its systematic research has been going on for more than two decades, and there are only one more new genus and three new species discovered so far in this area.



Hygrocybe
spadicea,
Klipasta
vlažnica

Klipasta vlažnica

rijetka je i ugrožena vrsta koja se nalazi na evropskoj crvenoj listi ugroženih gljiva, i to među najugroženijima. Nađena je u Podgorici, na gradskoj ruderalnoj površini koja je već prekrivena gradilištem, a potom i u Park šumi Gorica, u travi. Kasnije je nađena na visokom planinskom pašnjaku (iznad 1800 mnm) u masivu Komova.

Hygrocybe spadicea

is a rare and endangered species from the European Red List of endangered fungi, among the most endangered ones. It was found in Podgorica, as a ruderal species on the city's surface already covered with a construction site, and then in the Park Forest Gorica, in the grass. It was later found on a high mountain pasture (more than 1800 m above sea level) in the Komovi massif.



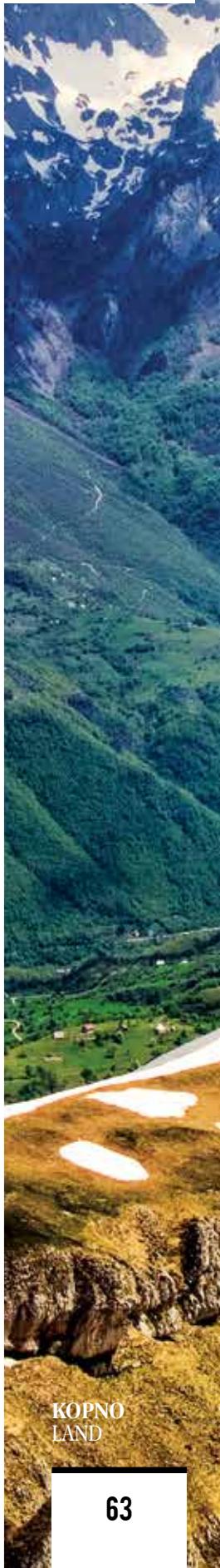
Lycoperdon mammiforme

rijetka je gljiva, specifičnog izgleda po karakterističnim bradavicama koje je odvajaju od ostalih vrsta iz svog roda. Spada u ugrožene vrste u Evropi, kojima je potreban niži nivo zaštite. Za sada je u Crnoj Gori nađena samo na dva lokaliteta u zoni Mediterana.

Gljive koje se mogu sakupljati u komercijalne svrhe

- mednjače
(vrste: *Armillaria mellea*, *A. ostoyae*)
- jestivi vrganj
(vrste: *Boletus aestivalis*, *B. edulis*, *B. pinophilus*)
- lisičarka
(*Cantharellus cibarius*)
- mrka truba
(*Craterellus cornucopioides*)
- ježevice
(vrste: *Hydnus repandum*, *H. rufescens*)
- mlječnice
(vrste: *Lactarius deliciosus*, *L. salmonicolor*, *L. deterrimus*, *L. sanguifluus*, *L. semisanguifluus*)
- smrčci
(vrste: *Morchella conica*, *M. esculenta*)
- supača
(*Marasmius oreades*)
- tartufi
(*Tuber spp.*)
- honey fungus
(species: *Armillaria mellea*, *A. ostoyae*)
- cep
(species: *Boletus aestivalis*, *B. edulis*, *B. pinophilus*)
- chanterelle
(*Cantharellus cibarius*)
- black trumpet
(*Craterellus cornucopioides*)
- hedgehog mushrooms
(species: *Hydnus repandum*, *H. rufescens*)
- milk-cap
(species: *Lactarius deliciosus*, *L. salmonicolor*, *L. deterrimus*, *L. sanguifluus*, *L. semisanguifluus*)
- morels
(species: *Morchella conica*, *M. esculenta*)
- fairy ring champignon
(*Marasmius oreades*)
- true truffle
(*Tuber spp.*)

*Lycoperdon
mammiforme*,
Bradavičava pušara





Hridsko jezero

Flora

Procjenjuje se da je na području Crne Gore prisutno nešto više od 3600 biljnih taksona nivoa vrste i podvrste. Radi poređenja, flora Velike Britanije ima oko 1400 samoniklih biljnih vrsta (i oko 1100 unesenih). Flora Poljske oko 1700 vrsta.

Ako se bogatstvo flore nekog područja izrazi brojem vrsta po jedinici površine, onda Crna Gora zauzima prvo mjesto među evropskim državama.

Flora

It is estimated that there are slightly more than 3600 plant taxa of the species and subspecies level in Montenegro. For comparison, the flora of Great Britain has about 1400 wild plant species (and about 1100 introduced). Flora of Poland has about 1700 species.

If the richness of the flora of an area is expressed by the number of species per unit area, then Montenegro ranks first among European countries.

Ovakvo bogatstvo diverziteta vaskularnih biljaka rezultat je prisustva različitih ekoloških faktora na teritoriji Crne Gore – visinska raščlanjenost, složen i raznovrstan geološki i pedološki sastav i tektonika, te visok stepen složenosti i raznolikosti klimatskih parametara.

U vaskularnoj flori Crne Gore prisutna su 372 balkanska endemična taksona (nivoa vrste i podvrste), od kojih je 39 rasprostranjeno samo u Crnoj Gori. Izuzetnim bogatstvom endemičnih taksona ističu se planinski masivi Orjena, Lovćena, Rumije, Komova, Durmitora, Prokletija i dr.

Kod endemičnih vrsta posebnu vrijednost predstavljaju lokalni endemi koji imaju usko rasprostranjenje npr. vrste rasprostranjene samo u Crnoj Gori: *Androsace komovensis*, *Asperula baldaccii*, *Draba bertiscea*, *Edraianthus wettsteinii subsp. lovchenicus*, *Iris orjenii*, *Pedicularis ernesti-mayeri*, *Protoedraianthus tarae* i dr.

This richness of vascular plant diversity is the result of the presence of various environmental factors on the territory of Montenegro - altitude breakdown, complex and diverse geological and pedological composition and tectonics, and a high degree of complexity and diversity of climatic parameters.

There are 372 Balkan endemic taxa (species and subspecies levels) in the vascular flora of Montenegro, out of which 39 are distributed only in Montenegro. The mountain masses of Orjen, Lovćen, Rumija, Komovi, Durmitor, Prokletije and others stand out with their exceptional wealth of endemic taxa.

In endemic species, local endemics that have a narrow distribution are of special value - e.g. species distributed only in Montenegro: *Androsace komovensis*, *Asperula baldaccii*, *Draba bertiscea*, *Edraianthus wettsteinii subsp. lovchenicus*, *Iris orjenii*, *Pedicularis ernesti-mayeri*, *Protoedraianthus tarae*, etc.



KOPNO
LAND



Edraianthus wettsteinii* subsp. *lovcenicus

a typical taxon of the Oromediterranean region (Southern European mountainous region); it is described from the findings at the area of Lovćen and it represents an endemic subspecies of this mountain. Type subspecies *E. wettsteinii* subsp. *wettsteinii* is described from the mountain Rumija and is endemic to Montenegro and Albania. Both taxa are protected in Montenegro.

Lovćenski zvončac

tipični je takson oromediteranskog regiona (južnoevropsko planinski); opisan je s područja Lovćena i predstavlja endemičnu podvrstu ove planine. Tipska podvrsta *E. wettsteinii* subsp. *wettsteinii* opisana je s planine Rumije i predstavlja endem Crne Gore i Albanije. Oba taksona zaštićena su u Crnoj Gori.



Cymbalaria ebelii

opisana je na materijalu koji je sakupio W. Ebel 1844. godine u okolini Skadarskog jezera. Vrstu je opisao Cufodontis 1936. godine i predstavlja endem basena Skadarskog jezera u Crnoj Gori i Albaniji.

Cymbalaria ebelii

Cymbalaria ebelii is described according to the material collected by W. Ebel in 1844 in the vicinity of Skadar Lake. The species was described by Cufodontis in 1936 and is endemic to the Skadar Lake basin in Montenegro and Albania.

Cymbalaria ebelii



Vegetacija

Biodiverzitet neke zemlje ne podrazumijeva samo sveukupan inventar biljnih i životinjskih vrsta, već i raznovrsnost njenog zelenog pokrivača – vegetacije. Upravo taj segment bioraznovrsnosti jedan je od najznačajnijih za područje Crne Gore, gdje se kao posljedica burne geološke istorije, specifičnosti geografskog položaja, širokog dijapazona klimatskih parametara, ali i uticaja čovjeka, razvio veoma heterogen vegetacijski pokrivač, koji se na tako malom prostoru na Starom kontinentu srijeće još samo u zemljama južne Evrope. Savremena istraživanja pokazuju da je u Crnoj Gori registrovano čak 207 vegetacijskih sveza, što Crnu Goru svrstava u vegetacijski najraznovrsnije evropske zemlje, odmah iza Španije, Italije, Bugarske, Grčke i Albanije.

Vegetation

The biodiversity of a country does not only mean the overall inventory of flora and fauna, but also the diversity of its green cover - vegetation. This segment of biodiversity is one of the most important for Montenegro, where as a consequence of turbulent geological history, specific geographical location, wide range of climatic parameters, but also human influence, a very heterogeneous vegetation cover has been developed, which in such a small area on the Old Continent can be met only in the countries of southern Europe. Modern research shows that as many as 207 vegetation associations have been registered in Montenegro, which places Montenegro among the most vegetatively diverse European countries, right behind Spain, Italy, Bulgaria, Greece and Albania.

*Eryngium
alpinum*

Na području Crne Gore moguće je razlikovati više biogeografskih regiona koji su determinisani različitom vegetacijskom komponentom: Mediteranski, Srednjoevropski, Cirkumborealni i Srednjejužno-evropsko planinski.

Mediteranskom regionu pripada primorski dio Crne Gore koji zauzima uzanu obalnu zonu i njeno zalede, do približno 800 m nad morem. Pripadaju mu i djelovi dolina rijeka Morače, Cijevne i Zete. U okviru toga regiona razlikuju se dva podregiona: mediteranski u užem smislu i submediteranski. Mediteranski podregion predstavljen je vegetacijom tvrdolisnih vječnozelenih šuma hrasta crnike (*Fraxino orni-Quercion ilicis*), dok je submediteranski predstavljen listopadnim šumama bjelograbića kao i listopadnim šumama crnog jasena i crnog graba.

In the area of Montenegro, it is possible to distinguish several biogeographical regions that are determined by different vegetation components: Mediterranean, Central European, Circumboreal and Central South European mountain.

The Mediterranean region includes the coastal part of Montenegro, which occupies a narrow coastal zone and its hinterland, up to approximately 800 m above sea level. It also includes parts of the valleys of the rivers Morača, Cijevna and Zeta. Within that region, two subregions are distinguished: Mediterranean in the narrow sense and sub-Mediterranean. The Mediterranean subregion is represented by the vegetation of hardwood evergreen holm oak forests (*Fraxino orni-Quercion ilicis*), while the sub-Mediterranean is represented by deciduous forests of Oriental hornbeam as well as deciduous forests of *Fraxinus ornus* and *Ostrya carpinifolia*.



Gentiana
lutea,
Lincura

Lincura

samoniklo raste na planinskim pašnjacima i livadama između 750 i 2200 mnv. Naziv *Gentana* poznat je još od prvog vijeka nove ere, od ilirskog kralja Gentija koji je vladao na području oko Skadarskog jezera i koji je otkrio ljekovitost ove biljke i upotrebljavao je za liječenje kuge. Lincura – carica planinskih pašnjaka, izdvaja se visokom i snažnom stabljikom, s načičkanim zlatnožutim evastima, izgledom baš poput krunica. Korijen ove strogo zaštićene i ugrožene biljke može doživjeti starost ido 60 godina i težiti oko 6 kg. Lincura je vjekovima bila svrstavana u biljke srca, jer se smatralo da pomaže slabom srcu, otuda i naziv srčanik. Osim što je carica planinskih pašnjaka i kamenjara, ova biljka je i carica gorkih ukusa, zbog sadržaja amarogentina – jedne od najgorčijih prirodnih tvari.

Gentiana lutea

Great yellow gentian grows wild on mountain pastures and meadows between 750 and 2200 meters above sea level. The name *Gentiana* has been known since the first century AD, from the Illyrian king Gentius who ruled the area around Skadar Lake and who discovered the healing properties of this plant and used it to treat plague. The great yellow gentian - the empress of mountain pastures, stands out with a tall and strong stem, with dotted golden-yellow inflorescences, looking just like crowns. The root of this strictly protected and endangered plant can live to the age of 60 and weigh about 6 kg. The great yellow gentian has been classified as a heart plant for centuries because it was thought to help the weak heart, hence the name heart plant. In addition to being the empress of mountain pastures and rocks, this plant is also the empress of bitter tastes, due to the content of amarogenin - one of the most bitter natural substances.



Moltkia petraea

Moltkia petraea is a perennial plant from the sharp-leaved family. This shrubby and bushy plant, with stems covered with tiny, white hairs and a lush blue of flowers, has found its home among the rocks. *Moltkia petraea* is a plant spread from the south to the highest mountains, we find it in sunny and well-drained habitats. The name of the species *petraea* indicates that it grows in rocky places (Greek word *petros* - stone). *Moltkia petraea* is a highly prized honey plant, and its roots bind the soil in limestone rocks. It is endemic to Balkan peninsula and grows on the slopes of Lovćen, Orjen, Rumija, Durmitor, Lisinj, Piva Mountain and near Podgorica, Medun and Bioč.

Modro lasinje

je višegodišnja biljka iz porodice oštrolista. Ova grmolika i busenasta biljka, sa stabljikama prekrivenim sitnim, bijelim dlačicama i raskošnim plavetnilom cvjetova, svoj je dom našla među stijenama. Modro lasinje je biljka rasprostranjena od juga do najviših planina, nalazimo je na sunčanim i dobro dreniranim staništima. Ime vrste *petraea* ukazuje na to da raste na stjenovitim mjestima (grčka riječ *petros* – kamen). Modro lasinje je veomacijenjena medonosna biljka, a svojim korijenjem veže tlo u krečnjačkim stijenama. Endem je primorskih planina Balkana i raste na padinama Lovćena, Orjena, Rumije, Durmitora, na Lisinju, Pivskoj planini i u blizini Podgorice, na Medunu i Bioču.

Srednjoevropski region takođe je predstavljen s dva podregiona koji su zastupljeni vegetacijom mezofilnih hrastovih i mezofilnih bukovih šuma kao i vegetacijom termofilnih i mezo-termofilnih hrastovih šuma.

U Crnoj Gori borealni region se javlja u subalpskoj zoni – u ovom regionu prisutna je vegetacija četinarskih šuma smrče, šuma jele, šuma bijelog bora, šuma crnog bora kao i vegetacija planinske klekovine. Ovaj region karakteriše i vegetacija endemičnog bora molike (*Pinus peuce*).

Srednjejužnoevropsko planinski region obuhvata dijelom subalpsku oblast i čitavu alpsku oblast. Ima dva podregiona: srednjoevropsko planinski i južnjevropsko planinski (oromediteranski). Prvi podregion predstavljen je zajednicama visokoplavninskih rudina i snježanika i prostorno je vezan za unutrašnje i srednje Dinaride. Drugi podregion čine subalpske munikine šume (*Pinion heldreichii*), crnoborove šume na krečnjaku i ofiolitima u kanjonima i klisurama te ekosistemi pukotina stijena, sipara i rudina.

The Central European region is also represented by two subregions represented by vegetation of mesophilic oak and mesophilic beech forests as well as vegetation of thermophilic and mesothermophilic oak forests.

In Montenegro, the boreal region occurs in the subalpine zone - in this region there is vegetation of coniferous forests, fir forests, white pine forests, black pine forests and mountain pine vegetation. This region is also characterized by vegetation of endemic pine Macedonian pine (*Pinus peuce*).

The Central and Southern European mountain region includes part of the subalpine area and the entire alpine area. There are two subregions: Central European Mountain and Southern European Mountain (Oro-mediterranean). The first subregion is represented by communities of high mountain ores and snowfields and is spatially connected to the inner and middle Dinarides. The second subregion consists of subalpine Bosnian pine forests (*Pinion heldreichii*), black pine forests on limestone and ophiolites in canyons and gorges, and ecosystems of rock crevices, cliffs and ores.

Moltkia petraea,
Modro lasinje



Iris orjenii,
Orjenska
perunika



Iris orjenii

If a mountain needs to be singled out for a large number of endemic and endangered species, then it is certainly Orjen. One of these rare and critically endangered species is *Iris orjenii*, a stenoendemic that lives in only one small area and nowhere else on the Planet. According to legend, the name Iris comes from Irida, the messenger of the Greek gods, who sent messages to Earth with lightning and thunder. Where lightning strikes the ground, a beautiful flower would sprout. The same legend is associated with the Slovenian god Perun, who illuminated the mountains with lightning, and where the rainbow touched the ground, irises of various colors sprang up. *Iris orjenii* grows on grassy slopes, at altitudes between 1500 and 1700 m above sea level, in sunny or slightly shaded habitats within communities with Bosnian pine.

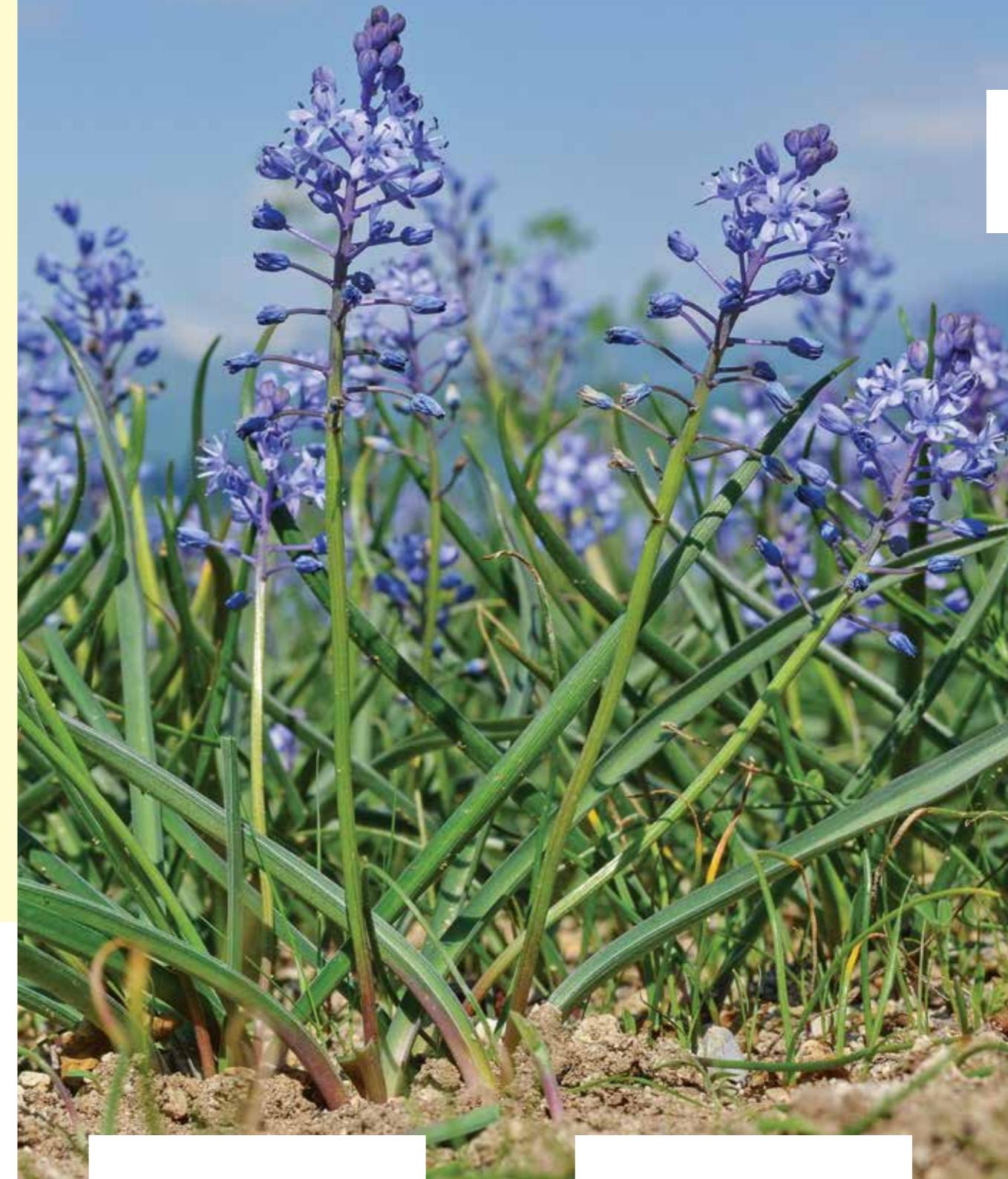
Orjenska perunika

Ako neku planinu treba izdvojiti po velikom broju endemičnih i ugroženih vrsta, onda je to zasigurno Orjen. Jedna od tih rijetkih i kritično ugroženih vrsta je i *Iris orjenii*, stenoendem koji živi na samo jednom malom području i nigdje više na Planeti. Prema legendi, naziv Iris potiče od Iride, glasnice grčkih bogova, koja je munjama i gromovima slala poruke na Zemlju. Tamo gdje munje dotaknu tlo, iznikao bi predivan cvijet. Ista legenda vezuje se za slovenskog boga Peruna, koji je munjama obasjao planine i tamo gdje je duga dotakla tlo, iznikle su perunike raznih boja. *Iris orjenii* raste na travnatim padinama, na visinama između 1500 i 1700 mnv, na osunčanim ili blago zasjenjenim staništima unutar zajednica s munikom.



Budući daje Balkansko poluostrvo prepoznato kao jedan od centara biodiverziteta planete Zemlje (tzv. hot-spot centri), skoro da nema fiziognomske formacije koja se ne odlikuje nekom endemičnom svezom: šume (*Pinion peucis*, *Erico-Fraxinon orni*), vrištine (*Aquilegio nigricantis-Rhododendron hirsuti*, *Daphne blagayanae-Genistion radiatae*), šikare i šibljaci (*Tamaricion dalmatica*), travnjaci (*Potentillo montenegrinae-Festucion paniculatae*, *Pancion serbicae*, *Molinio-Hordeion secalini*, *Seslerion comosae*, *Campanulion albanicae*, *Festucion pungentis*, *Seslerion nitidae*, *Festucion xanthinae*, *Cymbopogono-Brachypodium ramosi*, *Romuleion*, *Vulpio-Lotion*, *Astragalo angustifoli-Seslerion coerulantis*), visoke zeleni (*Rumicion balcanici*, *Cirsion appanediculati*), stijene (*Amphoricarpion neumayeri*, *Edraianthion*, *Centaureo cuspidatae-Portenschlagellion ramosissimae*), sipari (*Bunion alpini*, *Saxifragion prenjae*, *Petasition doerfleri*, *Polygono alpini-Poion laxae*, *Peltarion alliaceae*), tresave (*Narthecion scardici*) itd., unutar kojih su opisane brojne endemične asocijacije koje su prostorno ograničene samo za teritoriju Crne Gore i susjednih zemalja.

Since the Balkan peninsula is recognized as one of the centers of biodiversity on the planet Earth (so-called hot-spot centers), there is almost no physiognomic formation that is not characterized by any endemic connection: forests (*Pinion peucis*, *Erico-Fraxinon orni*), heath (*Aquilegio nigricantis-Rhododendron hirsuti*, *Daphne blagayanae-Genistion radiatae*), thicket and shrub (*Tamaricion dalmatica*), lawns (*Potentillo montenegrinae-Festucion paniculatae*, *Pancion serbicae*, *Molinio-Hordeion secalini*, *Seslerion comosae*, *Campanulion albanicae*, *Festucion pungentis*, *Seslerion nitidae*, *Festucion xanthinae*, *Cymbopogono-Brachypodium ramosi*, *Romuleion*, *Vulpio-Lotion*, *Astragalo angustifoli-Seslerion coerulantis*), high greens (*Rumicion balcanici*, *Cirsion appanediculati*), rocks (*Amphoricarpion neumayeri*, *Edraianthion*, *Centaureo cuspidatae-Portenschlagellion ramosissimae*), scree (*Bunion alpini*, *Saxifragion prenjae*, *Petasition doerfleri*, *Polygono alpini-Poion laxae*, *Peltarion alliaceae*), bogs (*Narthecion scardici*), etc, where numerous endemic associations are described that are spatially limited only to the territory of Montenegro and neighboring countries.



Livadski procjepak

raste na vlažnim poplavnim livadama, pretežno na kraškim poljima, od Slovenije do Crne Gore. Sve vrste roda *Scilla* sadrže kardiotonične glikozide, supstance koje su ujedno i lijek i jak otrov. Zato se ovim biljkama nenadmašne ljepote i boja treba diviti s distance. Samo ime *Scilla* nije dobila tek tako. Naime, *Scilla* je u grčkoj mitologiji opisana kao lijepa nimfa koju je trovačica i čarobnica Kirke pretvorila u čudovište, koje je zatim proganjalo mnoge junake, uključujući i Odiseja. U Crnoj Gori raste na Orjenu.

Scilla litardierei

Meadow Squill It grows on wet floodplain meadows, mostly in karst fields, from Slovenia to Montenegro. All species of the genus *Scilla* contain cardiotonic glycosides, substances that are both a medicine and a strong poison. That is why these plants of unsurpassed beauty and color should be admired from a distance. She just didn't get the name *Scilla* just like that. Namely, in Greek mythology *Scilla* is described as a beautiful nymph who was turned into a monster by the poisoner and sorceress Kirke, who then haunted many heroes, including Odysseus. It grows on Orjen mt. in Montenegro.

Scilla litardierei,
Livadski procjepak



Androsace komovensis,
Mužika sa
Komova



Androsace komovensis

Androsace komovensis is an endemic, extremely rare plant in Montenegro. Rock jasmine from Komovi belongs to the Primrose family. The name and etymology of the genus come from the Greek words *andros* - man (that is why it is called mužika), and *sakos* - shield, due to the shape of the leaves. It was found in a narrow locality, on the southern slopes of the Kom where it grows in rock crevices and on slopes facing south. The population which was found contains a very small number of individuals (only ten), but it is believed that the actual size of the population may be much larger because parts of the Kom mt. are inaccessible and insufficiently researched.

Mužika sa Komova

je endemična, izuzetno rijetka biljka u Crnoj Gori. Komovska mužika pripada porodici jagorčevina. Naziv i etimologija roda potiču od grčkih riječi *andros* – čovjek (zato je kod nas nazvana mužika), i *sakos* – štit, zbog oblika listova. Nadena je na uskom lokalitetu, na južnim padinama kučkog Koma gdje raste u pukotinama stijena i na siparima okrenutim ka jugu. Nadena populacija sadrži veoma mali broj jedinki (svega desetak), ali smatra se da stvarna veličina populacije može biti mnogo veća zato što su djelovi kučkog Koma nepristupačni i nedovoljno istraženi.



Pinguicula balcanica,
Debeljača



Pinguicula balcanica

is a perennial insectivorous plant, a Balkan endemic, rare and protected. It has long sticky leaves and the flower is blue-purple, we will find it as flower from May to August. The plant, with its sticky leaves, stuns and traps insects, which it later decomposes and compensates for the poor mineral intake. They are unique because they conquer niches and habitats where other plants cannot grow. Its habitats are shaky.

Debeljača

je višegodišnja insektivorna biljka, balkanski endemit, rijetka i zaštićena. Imo duguljaste ljepljive listove a cvjet je plavolubičaste boje, u cvjetu ćemo je naći od maja do avgusta. Biljka pomoću svojih žljezdasto ljepljivih listova omamavljuje i zarobljava insekte koje kasnije razgrađuje i nadoknađuje siromašan unos minerala. Jedinstvene su jer osvajaju niše i staništa gdje druge biljke ne mogu rasti. Njena staništa su tresave.





Šume

Crna Gora sa 59,5% šumovitosti (0,9 ha šuma po glavi stanovnika) jedna je od najšumovitijih evropskih država, poslije Finske, Švedske i Slovenije. Broj šumskebilnih zajednica je velik, s još većim brojem asocijacija i vrsta.

Crnu Goru karakteriše dominacija liščarskog drveća čije šume pokrivaju 76,2% površine, dok je udio četinara u zapremini 40,2%. Dominantne vrste su bukva, hrastovi, smrča, jela i vrste bora.

Idući od obale mora ka visokim planinama smjenjuje se šumska vegetacija. Idući po zonama, smjenjuju se vrste koje su se adaptirale na te zone. Tako se u mediterranskoj zoni može registrovati hrast crnika (*Quercus ilex*) koji je suši prilagođen kožastim listovima, uvućenim porama i velikom korjenovom mrežom. U primorskom pojusu i oko Skadarskog jezera mjestimično su dobro očuvane šume pitomog koštanja i hrasta (*Querco-Castanetum*). Važnu komponentu vegetacije južnog dijela zemlje čine makije zajednice tvrdolisnih stalno zelenih vrsta šiblja ižbunja prošarane drvećem. Makije su se dobro prilagodile sušnim staništima i visokim temperaturama.

U ovoj zoni i u cijelom dijelu južne Crne Gore, nekad je bilo više šuma koje su Rimljani uništavali za gradnju galija, a kasnije i Mlečani za brodove jedrenjake. Tako je, na primjer, cijela Bjelopavlička ravnica bila prekrivena šumama hrasta lužnjaka, a danas je na tom području zastupljeno svega par stotina jedinki te vrste.

Penjući se na veću nadmorskiju visinu južnog dijela zemlje, srijeće se tipična vegetacija krša koja zahvata velike predjele crnogorsko-hercegovačkog krša. Po-ređ bijelog graba, česte vrste u ovim zajednicama su: crni jasen, hrast medunac, crni grab, drijen i druge. Oko uvala i vrtača u području krša česta je zajednica mećije ljeske i crnog graba, koja predstavlja ostatke reliktnih šuma.

Forests

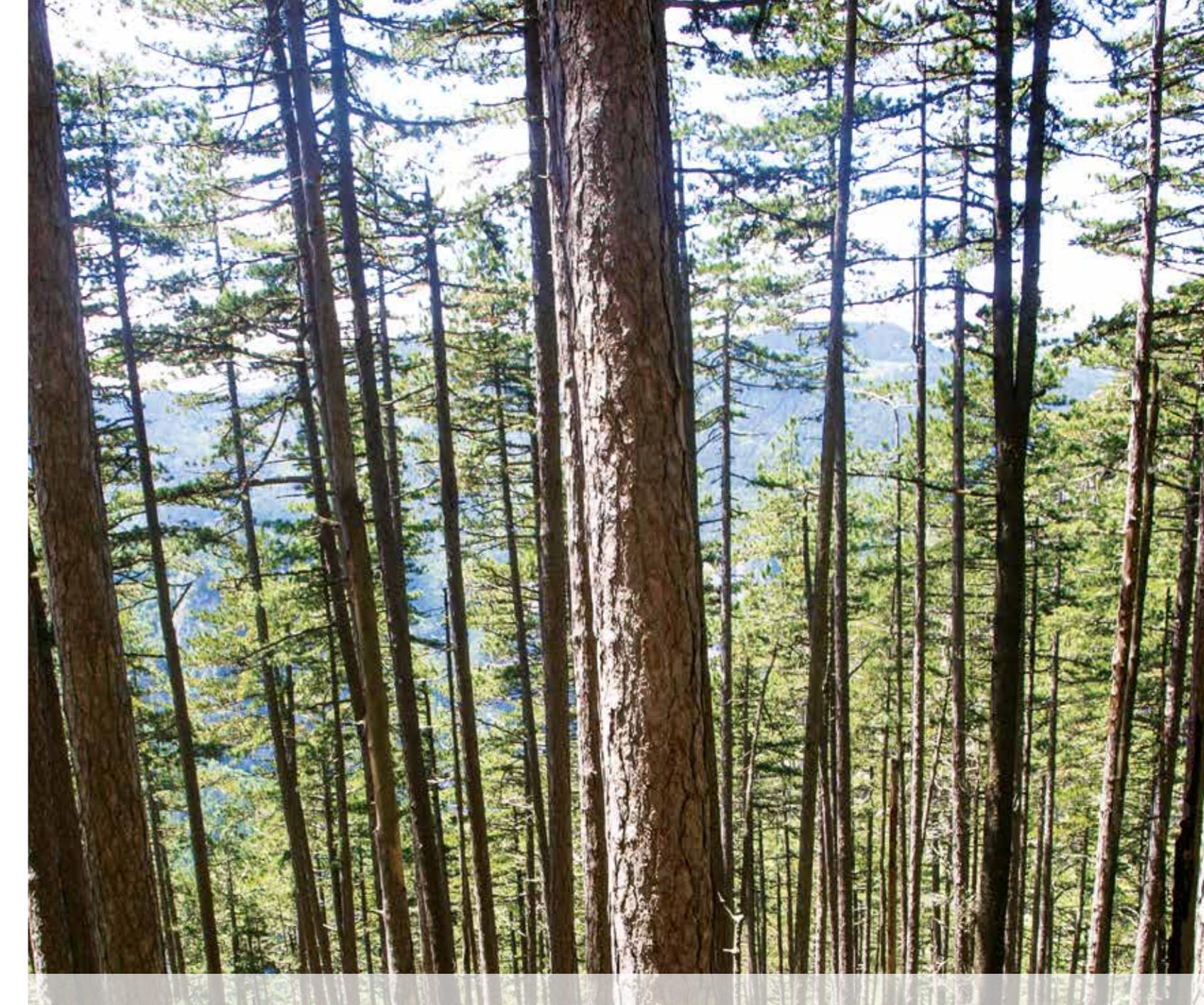
Having the forest cover percentage of 59.5% (0.9 ha of forest per capita), Montenegro is one of the most densely afforested countries in Europe, following Finland, Sweden and Slovenia. It has a large number of forest plant communities, with an even larger number of associations and species.

Montenegro is characterized by a domination of broadleaf trees with 76.2% of area covered by its forests, while the percentage of coniferous volume is 40.2%. Dominant species are beech, oaks, spruce, fir and species of pine.

Moving from the coast line to the high mountains, forest vegetation alternates. Moving through the zones, the types adapted to these zones alternate as well. Thus, black oak (*Quercus ilex*) can be found in the Mediterranean zone and it is adapted to drought with its leathery leaves, indentation formed in stomata and large root system. There are well preserved forests of sweet chestnut and oak (*Querco-Castanetum*) in coastal zone and partly around Skadar Lake. Maquis is an important component of the vegetation of the southern part of the country – communities of sclerophyllous evergreen types of shrublands dotted with trees. Maquis are well adapted to dry habitats and high temperatures.

This zone and the whole southern part of Montenegro used to have more forests which were destroyed by Romans for the purpose of building galliae and later by Venetians for sailing ships. Thus, for example, the whole Bjelopavlici plain used to be covered in pedunculate oak forests and today only a couple of hundreds of individuals of this species.

Higher altitude of the southern part of the country brings typical karst vegetation which occupies large area of Montenegro and Hercegovina's karst. Beside white hornbeam, common species found in these communities are as follows: manna ash, downy oak, black hornbeam, cornelian cherry, etc. Community of Turkish hazelnut and black hornbeam, which represent remains of relict forests, is common around inlets and sinkholes in karst area.



PARAMETRI ŠUMA

Drvna zapremina u šumama Crne Gore iznosi 122 mil. m³

Tekući prirast je 2,9 mil. m³

Visoke šume pokrivaju 51,1% a izdanačke 48,9%

Prosječna zapremina šumske površine procjenjuje se na 159,6 m³/ha

Udio državnih šuma je 52,3%, a privatnih 47,7%.

FOREST PARAMETERS

Timber volume in forests of Montenegro is 122 million m³.

Current increment is 2.9 million m³.

Percentage of high forests is 51.1%, while there are 48.9% of coppice.

Average volume of forest area is estimated at 159,6 m³/ha.

Share of state forests is 52.3%, while there are 47.7% of private forests.

Maslina u
Starom Baru

Old Olive Tree
in the City of Bar



Maslina u Starom Baru, zaštićena 1968.godine kao spomenik prirode, stara je više od 2100 godina i spada među tri najstarija stabla masline u svijetu.

Old Olive Tree in the City of Bar (Maslina u Starom Baru), since 1968 protected as a monument of nature; it is more than 2100 years old and one of the three oldest olive trees in the world.



Prašuma
Biogradske gore

The virgin forest
of Biogradska Gora



Nedaleko od Crnih poda, u slivu Biogradske rijeke i Jezerštice, nalazi se najveća prašuma u Crnoj Gori, i jedno od najstarijih zaštićenih područja na svijetu, poznato kao „Knjažev zabran“ ili „Branik“. U prašumi je zastupljeno 90 vrsta dendroflore. Starost pojedinih stabala prašume, procijenjena je na preko 400 godina, a neka stabla su i preko 40 m visine, pa čak i 60 m.

Near Crna Poda, in the catchment area of Biogradska River and Jezerstica, one of the largest rainforests in Montenegro and one of the oldest protected areas in the world is settled. This forest is known as 'Knjazev zabran' or 'Branik'. There are 90 species of dendroflora in the rainforest. Age of certain trees of the rainforest is estimated to more than 400 years, while certain trees are more than 40 and even 60 meters tall.

Šume crnog bora čine najljepši ukras duboko uklesanih riječnih kanjona i čine jedan od simbola prepoznatljivosti Crne Gore. U kanjonskoj dolini rijeke Tare, između Bistrice i Dobrilovine, na visini od 950 metara nalazi se prašuma crnog bora Crna poda. Taj kompleks borove šume zahvata površinu od 20 ha, a prosječna starost borova koji dostižu visinu i do 45 m, iznosi 400 godina. Ukupna količina drvene mase u Crnim podima iznosi 1.465,57 m³/ha i predstavlja najveću drvenu zapreminu po hektaru u Evropi.

Dvije najslavnije vrste drveća Crne Gore su molika i munika. Endemit i subendemit Balkanskog poloustrva, svojim korjenjem se kao kandžama drže za stijene i odolijevaju surovim uslovima.

Forests of black pine tree are the most beautiful ornament of deep river canyons and one of the symbols of recognizability of Montenegro. In the River Tara Canyon, between Bistrica and Dobrilovina, at an altitude of 950 meters, Crna Poda, a rainforest of black pine tree, is settled. This complex of pine forest covers the area of 20 ha, while the average age of trees reaching the height of up to 45 m is 400 years. Total wood volume in Crna Poda is 1,465.57 m³/ha and it represents the largest wood volume per hectare in Europe.

The two most famous species of trees in Montenegro are Balkan pine (molika) and Heldreich's pine (munika). Endemic and subendemic species of the Balkan Peninsula keep a claw grip on the rocks and survive harsh conditions.



Ljubišnja:
Crnogorske
smrčeve šume

Ljubišnja:
Montenegrin
Picea abies forests

Na području planine Ljubišnja kod Pljevlja smrčeve šume su do te mjere impozantne i posebne da ih je međunarodna klasifikacija staništa EUNIS prihvatiла као poseban tip staništa pod nazivom Crnogorske smrčeve šume sa šifrom G3.1E3. Evropska Agencija za životnu sredinu ima svoj informacioni sistem EUNIS i sve države su u obavezi da preko njega izvještavaju o stanju staništa, vrsta i drugih segmenata životne sredine, pa je Crna Gora svojom specifičnošću ovih šuma kontribuirala međunarodnoj nauci.

In the area of the mountain Ljubišnja near Pljevlja, spruce forests are so imposing and special that the international habitat classification EUNIS has accepted them as a special habitat type named Montenegrine Picea abies forests with the code G3.1E3. The European Environment Agency has its own information system EUNIS and all states are obliged to report on the state of habitats, species and other segments of the environment through it. Therefore, Montenegro has contributed to international science with its specificity of these forests.



KOPNO
LAND



U NP Durmitor, u strogom rezervatu Crna poda, prisutno je stablo crnog bora (*Pinus nigra*) s nevjerojatnom visinom od 47,4 m, a u pršumi Biogradske gore stablo jele (*Abies alba*) dostiže visinu od skoro 60m.

Black pine tree (*Pinus nigra*) is present in NP Durmitor, in the strict reserve Crna Poda, with an incredible height of 47.4 m, while silver fir (*Abies alba*) reaches a height of almost 60 m in the rainforest of Biogradska Gora.

Mahovine

Mahovine su široko rasprostranjene biljke. Procjenjuje se da je na Zemlji prisutno od 20.000 do 27.000 vrsta. U Crnoj Gori je do sada registrovano više od 700 vrsta što ukazuje na visok stepen diverziteta ove grupe organizama.

Krajem XIX vijeka iz materijala sakupljenog u Crnoj Gori, opisani su prvi taksoni: *Barbula montenegrina* i *Grimmia hartmannii var. montenegrina*.



Buxbaumia viridis,
Mahovina

Mahovina *Buxbaumia viridis* je borealno-planinska vrsta koja je prvi put u Crnoj Gori zabilježena sredinom XX vijeka na Durmitoru, a kasnije i na većini planinskih masiva. Raste na trulim panjevima i deblima, u vlažnim listopadno-četinarskim šumama, na zaklonjenim mjestima ili mjestima u sjenci.

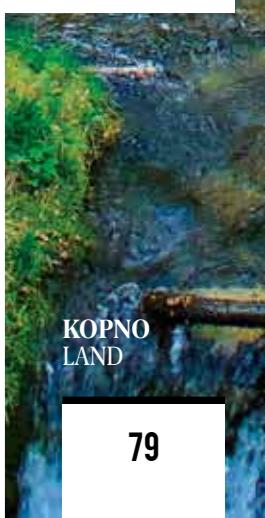
Bryophytes

Bryophytes are widespread plant. Estimated number of species on Earth is between 20,000 and 27,000. So far, more than 700 species have been registered in Montenegro, which indicates a high degree of diversity of this group of organisms.

The first taxa described, at the end of the XIX century, from the material collected in Montenegro were *Barbula montenegrina* and *Grimmia hartmannii var. montenegrina*.



Buxbaumia viridis,
Mahovina



KOPNO
LAND

MOSS Bryophyta *Buxbaumia viridis* is a boreal-mountain species that was first recorded in Montenegro in the middle of the XX century, on Durmitor Mountain, and later, also in the most of mountain massifs. It grows on rotten stumps and trunks, in moist deciduous-coniferous forests, in sheltered or shaded places.



Jovičića sige u
kanjonu Tare,
sfagnumsko
tresetište



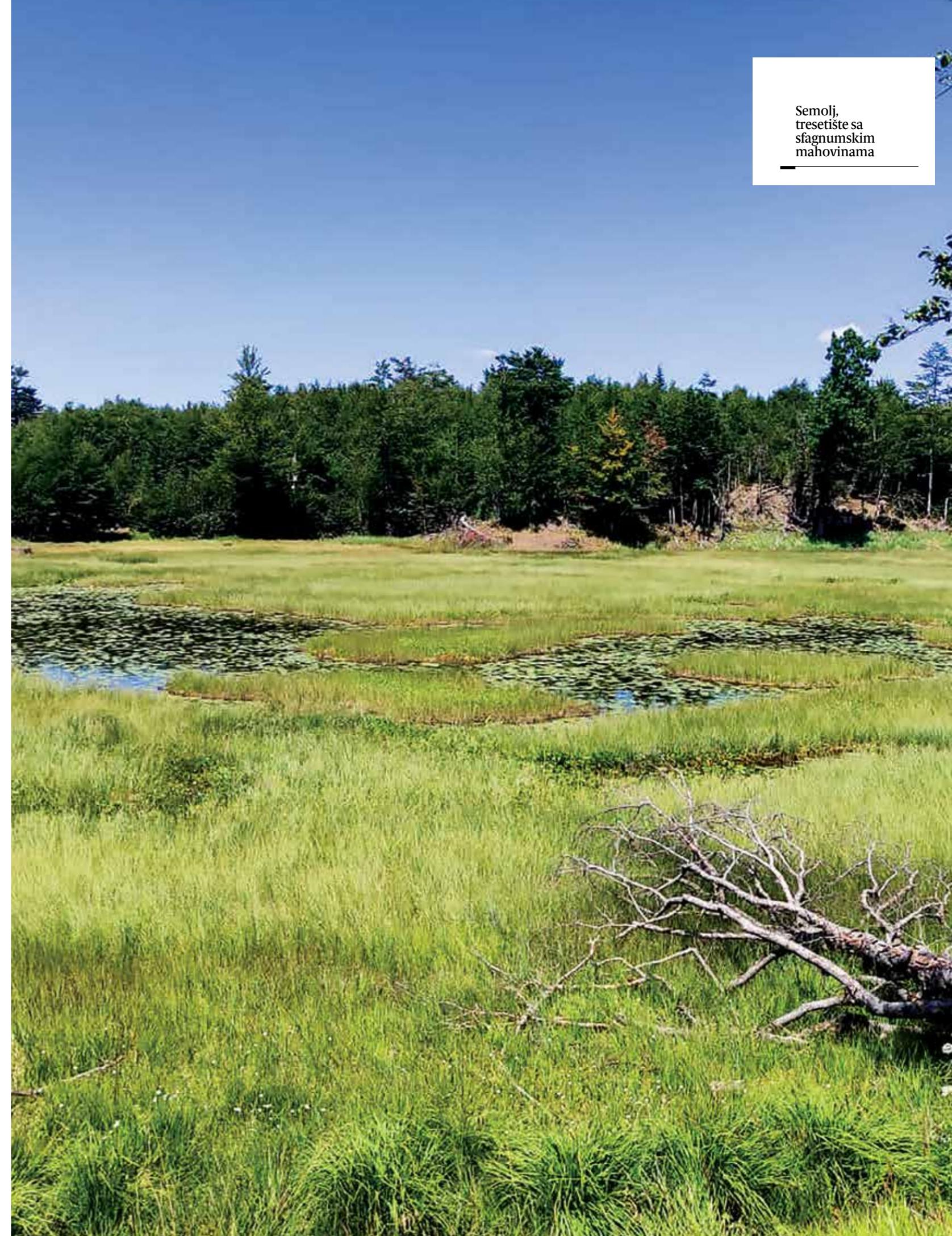
Sfagnum peat bogs are rare and unique habitats with a specific hydrophilic and amphibious bryophyte flora dominated by bryophytes of the genus *Sphagnum*. They are located mainly in the north of our country, on the mountains at the altitudes over 1000 m and represent the extreme southern branches of these habitats of Central and Northern Europe. They are considered as critically endangered habitats, because they have become rare, isolated and the area they cover decreases over the time. So far, it is known that sphagnum peatlands in our country are located on the following mountains: Durmitor, Semolj, Hajla, Bjelasica, Prokletije, Visitor, Zeletin, Rusolija.

In Europe is present 61 species of sphagnum mosses, of which 19 have been recorded in Montenegro so far.

Sedra nastaje u hladnim brdskim i planinskim izvorima i vodotocima koji su zasićeni kalcijum karbonatom. U Crnoj Gori, sedrene naslage najčešće formiraju mahovine: *Cratoneuron filicinum*, *Cratoneuron commutatum*, *Eucladium vericillatum*, *Rhynchostegium ripariooides* i druge. Do sada poznati lokaliteti na kojima su formirane sedrene naslage nalaze se u kanjonima: Mrvice (Bijeli Nerini), Morače (izvorište, rijeka Tušina), Tare (Bailovića i Jovičića sige), Lještanice.

Travertine (sometimes also called tufa) is formed in cold hilly and mountain springs and watercourses that are saturated with calcium carbonate. In Montenegro, travertine deposits are the most often formed by bryophytes: *Cratoneuron filicinum*, *Cratoneuron commutatum*, *Eucladium vericillatum*, *Rhynchostegium ripariooides* and others. So far, known sites where travertine deposits have been formed are in the canyons of the following rivers: Mrvica (Bijeli Nerini), Morača (spring, Tušina River), Tara (Bailovića and Jovičića sige), Lještanica.

Semolj,
tresetište sa
sfagnumskim
mahovinama



Lišajevi

Lišajevi su kompleksni organizmi, građeni od najmanje jedne vrste alge ili/i cijanobakterije i jedne vrste gljive. Podloga na kojoj lišajevi žive veoma je raznovrsna – stijene, zemljište, stabla i grane drveća, a u tropskim predjelima žive i na lišču biljaka. Evidentirano je njihovo prisustvo i na podlogama poput tijela insekata i vještačkih materijala kao što su gvožđe, smola, drveni ugalj, kosti, linoleum, vunene tkanine, porcelan.

Procjenjuje se da je, do sada, na svijetu poznato približno 20.000 vrsta lišajeva.



Cetraria islandica,
Izlandski lišaj



Islandski lišaj

Predstavlja jednu od malobrojnih vrsta koja je poznata po narodnom nazivu islandski lišaj, a pripada grupi žbunastih lišajeva. U Crnoj Gori je zabilježena uglavnom u sjevernim i sjeverozapadnim oblastima i u okolini Podgorice, u visinskom rasponu 1350–2460 mnv, na krečnjačkom i silikatnom zemljištu i na vrsti *Pinus peuce*. Ima primjenu u medicini, zahvaljujući snažnom anbiotskom djelovanju i uglavnom se koristi za ublažavanje problema s disajnim organima.

Lichens

Lichens are complex organisms, made up of at least one species of alga and/or cyanobacterium and one species of fungus. The substrate on which lichens live is very diverse - rocks, soil, tree trunks and branches, and in tropical areas they also live on the leaves of plants. Their presence was also recorded on substrates such as insect bodies and artificial materials such as iron, resin, charcoal, bones, linoleum, wool fabrics, porcelain.

To date, it is estimated that approximately 20,000 species of lichens are known in the world.



Lobaria pulmonaria

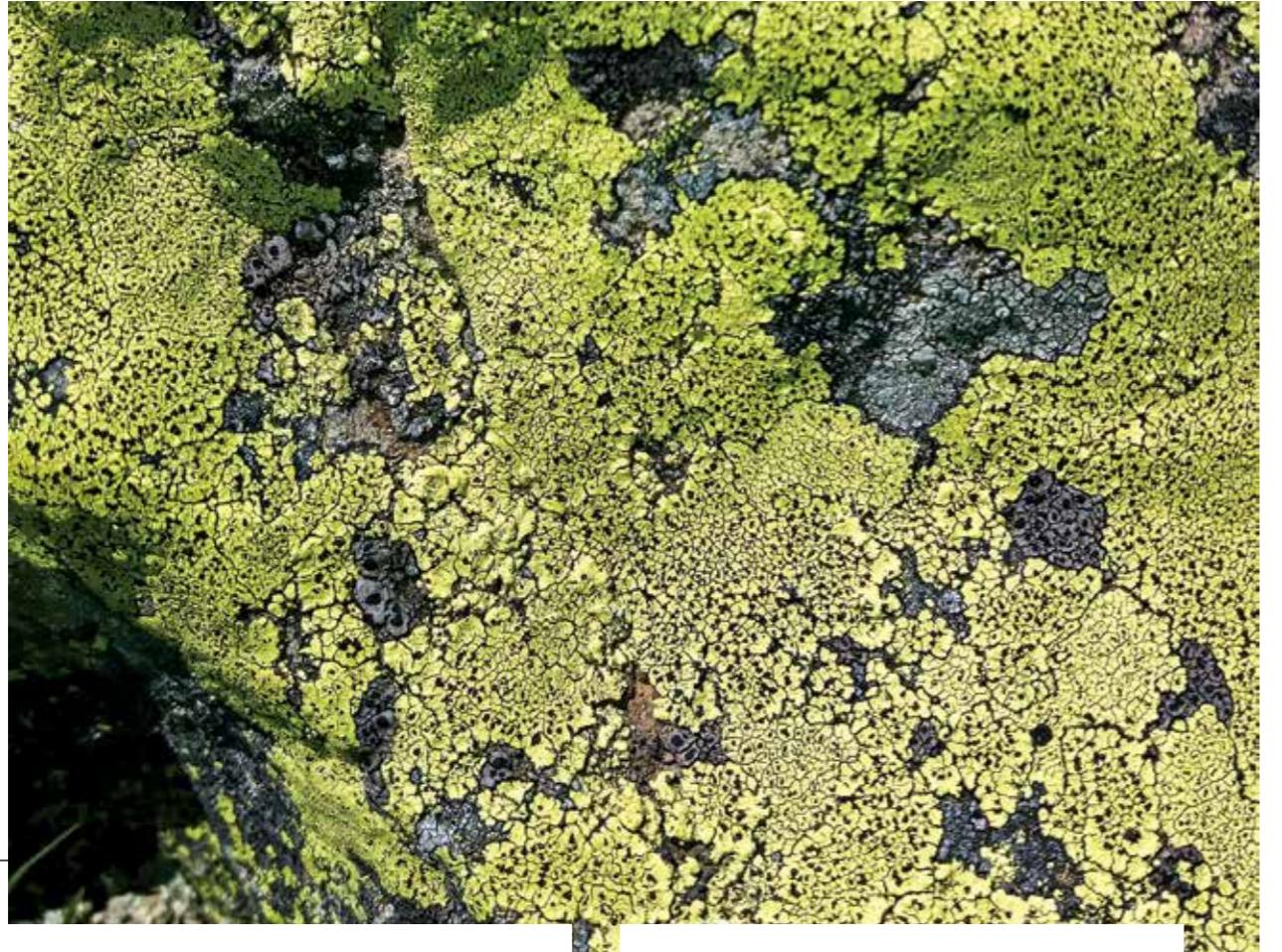
Jedna je od dvije vrste lišaja koje su prve evidentirane za Crnu Goru. Pripada grupi listastih lišajeva, krupnog talusa dimenzija do 30 cm. Naseljava uglavnom zasjenjena staništa, osjetljiva je na antropogeno zagadenje, pa predstavlja indikator zdravih, očuvanih ekosistema. U Crnoj Gori je evidentirana na brojnim lokalitetima, od primorskog preko centralnog dijela do visokih planina na sjeveru, u visinskom rasponu 475–1810 mnv, na različitim vrstama listopadnog drveća.

Lobaria pulmonaria

One of the first two species recorded in Montenegro. It belongs to the group of foliose lichens, characterized by a large thallus up to 30 cm in size. It inhabits mostly shaded habitats, sensitive to anthropogenic pollution, and is an indicator of healthy, preserved ecosystems. In Montenegro, it has been recorded in numerous sites, from the coastal area through the central part to the high mountains in the north, in the altitude range of 475–1810 meters, on various species of deciduous trees.



Rhizocarpon
geographicum



Rhizocarpon geographicum

subsp. *geographicum* – pripada grupi korastih lišajeva, raste na stijenama, djelimično urastajući u njih. Naseljava područja koja karakteriše nizak nivo zagadenja. Jedinke koje imaju približno okrugao talus koriste se u lichenometriji, proceduri kojom se određuje starost stijena. Jedinica ove vrste, nadena na Arktiku, ocijenjena je najstarijim živim organizmom na Planeti, s procijenjenom starošću od 8600 godina. U Crnoj Gori taj lišaj je evidentiran na više, uglavnom planinskih lokaliteta, u visinskom rasponu od 600 do 2403 mnv.

Rhizocarpon geographicum

subsp. *geographicum* - belongs to the group of crustose lichens, grows on rocks, partially growing into them. It inhabits areas characterized by low levels of pollution. Individuals that have an almost rounded thallus are used in lichenometry, a procedure that determines the age of rocks. An individual of this species, found in the Arctic, has been rated the oldest living organism on the planet, with an estimated age of 8600 years. In Montenegro, this lichen is recorded in several, mostly mountainous localities, in the altitude range from 600 to 2403 meters.

Prvi poznati lihenološki podaci o Crnoj Gori datiraju iz prve polovine XIX vijeka i do sada je u našoj zemlji registrovano približno 900 vrsta, što, imajući u vidu površinu naše države, te broj vrsta evidentiran u zemljama regionala, ukazuje na bogat diverzitet ove grupe organizama.

Na osnovu spoljašnjeg izgleda uobičajena je podjela lišajeva na tri glavne morfološke grupe – korasti (kojima pripada oko 80% poznatih vrsta), žbunasti (koji su najosjetljiviji na zagađenje vazduha) i listasti lišajevi.

The first known lichenological data on Montenegro was collected back in the first half of the 19th century. By now, approximately 900 species have been registered in our country, which, considering the area of our country and the number of species recorded in the region, indicates the rich diversity of this group of organisms.

Based on the outer appearance, lichens are commonly divided into three main morphological groups - crustose (80% of the known species), fruticose (the most sensitive to air pollution) and foliose lichens.





Beskičmenjaci

Beskičmenjaci predstavljaju najbrojniju grupu živih bića na Planeti koja je od krucijalnog značaja za opstanak i funkcijonisanje biosfere. Opisano je oko 1,7 miliona, a smatra se da postoji čak do 30 miliona vrsta. Zbog brojnosti beskičmenjaci su do sada najslabije istraženi.

Na teritoriji Crne Gore evidentirano je više od 6000 vrsta kopnenih, slatkovodnih i morskih beskičmenjaka. Na osnovu uporednih podataka sa zemljama regiona i brojem neistraženih grupa, smatra se da je broj vrsta koje naseljavaju teritoriju Crne Gore između 30.000 i 40.000.

Fauna beskičmenjaka je u Crnoj Gori izuzetno bogata. Tokom posljednjih decenija sprovode se intenzivna istraživanja tako da je opisan i značajan broj vrsta koje su nove za nauku. Takođe su registrovane brojne vrste koje su nove za faunu Crne Gore. U Crnoj Gori je evidentirano preko 4000 kopnenih i slatkovodnih beskičmenjaka.

Broj vrsta kopnenih i slatkovodnih beskičmenjaka u Crnoj Gori

Grupa	Broj vrsta
Slatkovodni sunđeri (<i>Porifera</i>)	1
Slatkovodni dupljarci (<i>Cnidaria</i>)	2
Pljosnati crvi (<i>Platyhelminthes</i>)	33
Valjkasti crvi (<i>Nematoda</i>)	16
Gordiusi, Konjske dlake (<i>Nematomorpha</i>)	4
Člankoviti crvi Anelida (<i>Oligochaeta i Hirudinea</i>)	151
Rotatoria, <i>Gastrotricha</i> , <i>Acanthocephala</i>	58
Mekušci (<i>Mollusca</i>) - kopneni i slatkovodni puževi i slatkovodne školjke	517
Slatkovodni rakovi (<i>Crustacea</i>)	130
Paukoliči zglavkari (<i>Arachnida</i>): paukovi (<i>Araneae</i>), škorpije (<i>Scorpiones</i>), pseudoškorpije (<i>Pseudoscorpiones</i>), grinje i krpelji (<i>Acari</i>)	720
Stonoge (<i>Myriapoda</i>)	73
Insekti (<i>Insecta</i>): tvrdokrilci <i>Coleoptera</i> , stjenice (<i>Heteroptera</i>), pravokrilci (<i>Orthoptera</i>), vilini konjici (<i>Odonata</i>), vodeni cvjetovi (<i>Ephemeroptera</i>), vodeni moljci (<i>Trichoptera</i>), proljetnjaci (<i>Plecoptera</i>), dvokrilci (<i>Diptera</i>), mrežokrilci (<i>Neuroptera</i>), mravi (<i>Formicoidea</i>), <i>Collembola</i> , bogomoljke (<i>Mantodea</i>), termiti (<i>Isoptera</i>), dnevni i noćni leptiri (<i>Lepidoptera</i>)	2380

Invertebrates

Invertebrates are the most numerous group of living beings on the planet, which is crucial for the survival and functioning of the biosphere. About 1.7 million species have been described, and it is estimated that there are up to 30 million species. Due to their number, invertebrates have been the least studied so far.

More than 6000 species of terrestrial, freshwater and marine invertebrates have been recorded on the territory of Montenegro. Based on comparative data with the countries of the region and the number of unexplored groups, it is estimated that the number of species inhabiting the territory of Montenegro is between 30,000 and 40,000.

The invertebrate fauna in Montenegro is extremely rich. During the last decades, intensive research has been conducted, so that a significant number of species that are new to science have been described. Numerous species that are new to the fauna of Montenegro have also been registered. Over 4000 terrestrial and freshwater invertebrates have been recorded in Montenegro.

Number of terrestrial and freshwater invertebrate species in Montenegro

Group	Number of species
Freshwater sponges (<i>Porifera</i>)	1
Freshwater cnidarian (<i>Cnidaria</i>)	2
Flatworms (<i>Platyhelminthes</i>)	33
Roundworms (<i>Nematoda</i>)	16
Gordian worms, Horsehair worms (<i>Nematomorpha</i>)	4
Segmented worms Anelida (<i>Oligochaeta i Hirudinea</i>)	151
Rotatoria, <i>Gastrotricha</i> , <i>Acanthocephala</i>	58
Molluscs (<i>Mollusca</i>) - terrestrial and freshwater snails and freshwater mussels	517
Freshwater crustaceans (<i>Crustacea</i>)	130
Arachnid (<i>Arachnida</i>): spiders (<i>Araneae</i>), scorpions (<i>Scorpiones</i>), pseudoscorpions (<i>Pseudoscorpiones</i>), mites and ticks (<i>Acari</i>)	720
Centipedes (<i>Myriapoda</i>)	73
Insects (<i>Insecta</i>): Beetles <i>Coleoptera</i> , Bedbugs (<i>Heteroptera</i>), Orthoptera (<i>Orthoptera</i>), Dragonflies (<i>Odonata</i>), Mayfly (<i>Ephemeroptera</i>), Caddisflies (<i>Trichoptera</i>), Stoneflies (<i>Plecoptera</i>), Dipteran (<i>Diptera</i>), Net-winged insects (<i>Neuroptera</i>), Ants (<i>Formicoidea</i>), <i>Collembola</i> , Mantises (<i>Mantodea</i>), Termites (<i>Isoptera</i>), Butterflies and Moths (<i>Lepidoptera</i>)	2380



Na teritoriji Crne Gore registrovano je preko 350 kopnenih i slatkovodnih vrsta koje se nalaze na globalnoj ili evropskoj IUCN Crvenoj listi. Zakonom zaštićeno je 69 vrsta beskičmenjaka.

Najčešći faktori ugrožavanja beskičmenjaka: fragmentacija staništa, degradacija i nestajanje staništa, urbanizacija, zagađenje, klimatske promjene, unos stranih ili invazivnih vrsta.



On the territory of Montenegro, over 350 terrestrial and freshwater species are registered, which are on the global or European IUCN Red List. Sixty-nine species of invertebrates are protected by law.

The most common invertebrate endangerment factors: habitat fragmentation, habitat degradation and habitat disappearance, urbanization, pollution, climate change, introduction of alien or invasive species.

Puževi

Na teritoriji Crne Gore do sada su zabilježene 502 vrste i podvrste kopnenih i slatkovodnih puževa. Od toga broja 380 pripada kopnenim, a 119 slatkovodnim puževima. Tri vrste su jestive: *Helix pomatia*, *Helix lucorum* i *Helix aspersa*.

Teritorija bivše Jugoslavije ima najveći broj vrsta puževa golača u Evropi. Na relativno malom području utvrđeno je prisustvo 46 vrsta puževa golača. Jedino je Grčka ispred sa 56 vrsta. U Crnoj Gori je zastupljeno 25 vrsta puževa golača, od kojih su devet vrsta endemi.

So far, 502 species and subspecies of terrestrial and freshwater snails have been recorded on the territory of Montenegro. Of that number, 380 belong to terrestrial and 119 to freshwater snails. Three species are edible: *Helix pomatia*, *Helix lucorum* and *Helix aspersa*.

The territory of the former Yugoslavia has the largest number of naked snail species in Europe. The presence of 46 species of naked snails was determined in a relatively small area. Only Greece is ahead with 56 species. There are 25 species of naked snails in Montenegro, of which nine species are endemic.



Do sada je registrovano devet vrsta puževa golača – endema: *Limax wohlberedti*, *Limax graecus*, *Limax conemenosi*, *Tandonia albanica*, *Tandonia budapestensis*, *Tandonia reuleaxi*, *Malacolimax mrazekii*, *Deroceras turcicum* i *Deroceras maasseni*.

So far, nine species of endemic snails have been registered - endemic: *Limax wohlberedti*, *Limax graecus*, *Limax conemenosi*, *Tandonia albanica*, *Tandonia budapestensis*, *Tandonia reuleaxi*, *Malacolimax mrazekii*, *Deroceras turcicum* and *Deroceras maasseni*.

Helix dormitoris dormitorisi,
Endem Crne Gore



U Crnoj Gori je pod zaštitom pet vrsta puževa: *Tandonia reuleaxi*, *Limax wohlberedti*, *Deroce-ras maasseni*, *Helix vladika* i *Helix dormitoris dormitoris*. Vrsta *Limax wohlberedti* registrovana je uglavnom na stjenovitim krečnjačkim staništima ili u suvim stjenovitim grmovima koji nijesu značajno ugroženi ljudskim aktivnostima. Našim istraživanjima ta vrsta je konstatovana u cijeloj Crnoj Gori, kako u mediteranskom dijelu tako i u visokoplanskom i na visini preko 2000 mnv.

Five species of snails are protected in Montenegro. *Tandonia reuleaxi*, *Limax wohlberedti*, *Deroceras maasseni*, *Helix vladika* and *Helix dormitoris dormitoris*. Species *Limax wohlberedti* has been registered mainly on rocky calcareous habitats or in dry rocky shrubs that are not significantly endangered by human activities. Our research has found this species in the whole territory of Montenegro, both in the Mediterranean and in the highlands and at an altitude of over 2000 meters above sea level.



Limax wohlberedti,
Endem Crne Gore





Insekti

Insekti su najbrojnija grupa beskićemnjaka, a ujedno i najbrojnija grupa živih bića na Planeti. Oni čine više od 60% specijskog biodiverziteta i jedan su od najvažnijih segmenta u funkcionalisanju biosfere. Od izuzetnog značaja je njihovo učešće u lancima ishrane, kruženju materije u prirodi i opršivanju biljaka.

Insects

Insects are the most numerous group of invertebrates, and at the same time the most numerous group of living beings on the planet. They make up more than 60% of species biodiversity and are one of the most important segments in the functioning of the biosphere. Their participation in food chains, the circulation of matter in nature and the pollination of plants, are of great importance.

Leptiri

Od približno 17.280 opisanih vrsta dnevnih leptira u svijetu, u Evropi je poznato 576, a u Crnoj Gori 192 vrste, što čini 33% evropske faune dnevnih leptira. Dnevni leptiri su u Crnoj Gori dobro istraženi. Fauna noćnih leptira obuhvata oko 250 vrsta.

Leptiri su značajni kao opršivači biljaka. Ugroženi su zbog degradacije i nestajanja staništa.

Butterflies

Out of the approximately 17,280 described species of diurnal butterflies in the world, 576 are known in Europe and 192 in Montenegro, which makes up 33% of the European diurnal butterfly fauna. Butterflies are well researched in Montenegro. The fauna of moths includes about 250 species.

Butterflies and moths are important as plant pollinators. They are endangered due to habitat degradation and disappearance.



U Crnoj Gori zakonom su zaštićeni: Apolonov leptir *Parnassius apollo*, jedarce *Iphiclides podalirius*, lastin rep *Papilio machaon* i sredozemni lastin rep *Papilio alexanor*.

In Montenegro, the following species are protected by law: the Apollo butterfly *Parnassius apollo*, Scarce swallowtail *Iphiclides podalirius*, Old World swallowtail *Papilio machaon* and the Mediterranean swallowtail *Papilio alexanor*.



Papilio
machaon,
Lastin rep



KOPNO
LAND



Apolonov leptir je zaštićen nacionalnim zakonodavstvom. Apolonov leptir naseljava planinske pašnjake i livade, a za razmnožavanje su mu neophodne biljke iz porodice Crassulaceae. Ugrožen je zbog zarastanja pašnjaka.

The Apollo butterfly is protected by national legislation. Apollo's butterfly inhabits mountain pastures and meadows, and it needs plants from the Crassulaceae family to reproduce. It is endangered due to pasture healing.

Mravi

Mravi su široko rasprostranjena grupa na svim kontinentima, osim na Antarktiku. Po broju vrsta čine samo 1,5% ukupne faune insekata, ali čine više od 10% ukupne biomase svih životinja. Ukupno je registrovano oko 12.000 vrsta mrava, dok faunu mrava Crne Gore čini 140 vrsta.

Istraživanja koja su počela u XIX vijeku, uglavnom su obavljana u južnom dijelu Crne Gore. Rezultat toga je i mnogo veći broj vrsta (97) registrovanih u južnom u odnosu na sjeverni (48 vrsta) i centralni dio (51 vrsta).

The Myrmecofauna

Ants are a widespread group inhabiting all continents except Antarctica. By number of species, they amount to only 1.5% of the total insect fauna, but more than 10% of the total biomass of all animals. Approximately, a total of 12,000 species of ants have been registered, while the myrmecofauna of Montenegro consists of 140 species.

Research that began in the 19th century was mainly conducted in the southern part of Montenegro. This resulted in a much higher number of species (97) registered in the south in comparison to the north (48 species) and central part (51 species).

Na osnovu poznatog areala, tri vrste su endemi Crne Gore *Crematogaster auberti savinae*, *Crematogaster gordani*, *Crematogaster montenigrinus*, a tri pripadaju endemima Istočne obale Jadrana.

Domaće zakonodavstvo prepoznao je riđeg šumskog mrava u Crnoj Gori kao vrstu *Formica rufa*. Međutim, veći broj vrsta ima morfološki slične radnike i identične ili slične ekološke uloge u svojim staništima. Neformalno one čine *Formica rufa* grupu vrsta. Sve one grade gnezda od biljnih ostataka čije kupe mogu biti i više od metra izdignute iznad površine tla. Na teritoriji Crne Gore do sada su registrovane tri vrste iz *Formica rufa* grupe: *Formica polyctena*, *Formica pratensis* i *Formica rufa*. Na osnovu višedecenijskih terenskih istraživanja, najzastupljenija je *Formica pratensis*, koja naseljava otvorena staništa i može se naći i na primorskim planinama iznad 850 mnv. Ostale dvije vrste su nalažene samo na planinama sjeverne Crne Gore, iznad 1100 mnv u šumskim staništima.

Upoređujući brojnost faune mrava susjednih regiona i država i raznolikost ekosistema u njima, očekujemo da Crnu Goru naseljava oko 180 vrsta mrava.

Based on the known areal distribution, three species are endemic to Montenegro *Crematogaster auberti savinae*, *Crematogaster gordani*, *Crematogaster montenigrinus* and three belong to endemic species of the Eastern Adriatic Coast.

National legislation has recognized the red wood ant in Montenegro as a species of *Formica rufa*. However, a number of species have morphologically similar workers and identical or similar ecological roles in their habitats. Informally, they set up a group of species called *Formica rufa*. All of them build nests out of plant residues with domes of more than a meter raised above the ground surface. So far, three species from the *Formica rufa* group have been registered on the territory of Montenegro: *Formica polyctena*; *Formica pratensis* and *Formica rufa*. Based on decades of field research, the most common is *Formica pratensis* which inhabits open habitats and can be found in coastal mountains above 850 m. The other two species were found only in the mountains of northern Montenegro, above 1100 m in forest habitats.

Comparing the number of myrmecofauna of neighboring regions and countries and the diversity of ecosystems in them, we expect that Montenegro is inhabited by approximately 180 species of ants.



Formica pratensis,
Ridi šumski mrav



Osolike muve

Syrphidae (osolike muve, muve lebdilice ili cvjetne muve) predstavljaju jednu od najbrojnijih familija dvokrilaca sa oko 6000 do sada opisanih vrsta u svijetu. U Evropi je registrovano 815 vrsta osolikih muva, dok je u Crnoj Gori do sada zabilježeno 390 vrsta.

Osolike muve su jedna od najbolje istraženih insekatskih grupa kod nas, a istraživanja su naročito intenzivirana od osamdesetih godina prošlog vijeka. Rezultat tih istraživanja je 76 vrsta novih za Crnu Goru, registrovanih u posljednjih dvadesetak godina. Ova grupa organizama ima važnu ulogu u prirodi, naročito kad je u pitanju oprašivanje biljaka.

Eumerus montanum,
Mužjak lijevo
ženka desno



Vrsta opisana kao nova za nauku 2017. godine na osnovu primjeraka sakupljenih u kanjonu Komarnice

U Crnoj Gori registrovano je i opisano više vrsta koje su nove za nauku, među kojima su: *Anasimyia femorata*, *Cheilosia alba*, *Cheilosia balkana*, *Cheilosia barbabascia*, *Chrysogaster mediterraneus*, *Eumerus montanum*, *Merodon adriaticus*, *Merodon luteomaculatus*, *Merodon virgatus*, *Pipizella bispina*, *Pipiza laurusi*, *Psilotia nana*, *Riponnensis morini*.

Imajući u vidu veličinu teritorije u odnosu na druge evropske zemlje, Crna Gora ima veoma bogatu i raznovrsnu faunu osolikih muva, sa znatnim brojem endemičnih, rijetkih i ugroženih vrsta. Od ukupnog broja registrovanih vrsta, skoro četvrtina njih (oko 90 vrsta) smatra se rijetkim i ugroženim, bilo na nivou Evrope, Balkana ili Crne Gore.

Hoverflies

Syrphidae (Hoverflies) represent one of the most numerous families of dipteran with about 6000 species described so far in the world. 815 species of syrphid flies have been registered in Europe, while 390 species have been recorded in Montenegro so far.

Syrphid flies are one of the best researched insect groups in our country, and research has been especially intensified since the 1980s. The result of these surveys is 76 species new to Montenegro, registered in the last twenty years. This group of organisms plays an important role in nature, especially when it comes to plant pollination.

Čak polovina ovih vrsta, prema najnovijim procjenama, imaju IUCN kategorije ugrožene (EN) i ranjive (VU) na evropskom nivou.

Osnovni razlog ugroženosti pojedinih vrsta je gubitak prirodnih staništa neophodnih za opstanak vrste (uslijed fragmentacije, deforestacije, požara, isušivanja, prenamjene zemljišta, raznih tipova zagadenja itd.).

As many as half of these species, according to the latest estimates, have IUCN categories endangered (EN) and vulnerable (VU) at the European level.

The main reason for the endangerment of certain species is the loss of natural habitats necessary for the survival of the species (due to fragmentation, deforestation, fire, draining or drainage, land conversion, various types of pollution, etc.).



A species described as new to science in 2017 based on specimens collected in the Komarnica canyon

Several species new to science have been registered and described in Montenegro, including: *Anasimyia femorata*, *Cheilosia alba*, *Cheilosia balkana*, *Cheilosia barbabascia*, *Chrysogaster mediterraneus*, *Eumerus montanum*, *Merodon adriaticus*, *Merodon luteomaculatus*, *Merodon virgatus*, *Pipizella bispina*, *Pipiza laurusi*, *Psilotia nana*, *Riponnensis morini*.

Having in mind the size of the territory in relation to other European countries, Montenegro has a very rich and diverse fauna of hoverflies, with a significant number of endemic, rare and endangered species. Of the total number of registered species, almost a quarter of them (about 90 species) are considered rare and endangered, either at the level of Europe, the Balkans or Montenegro.

Ova vrsta osolikih muva izgledom i obojenjem tijela veoma podsjeća na ose. Uglavnom preferira stare termofilne hrastove ili humidne šume hrasta, kestena i lovora, naročito ona stabla na kojima nalazimo i saproksilnu vrstu mrava *Liometopum microcephalum*, što ukazuje na to da je drvo suplje. Predstavlja endem Balkana i Apenina i do sada je zabilježeno svega par primjeraka u Crnoj Gori, Italiji, Srbiji i Grčkoj. Vrsta se smatra ugroženom (EN) na evropskom nivou, i za sada je zabilježena samo u Morinju (Boka Kotorska) i to sa svega jednim primjerkom. Degradacija staništa je glavni uzrok ugroženosti ove vrste.

This species of syrphid flies is very similar to wasps in appearance and body color. It mainly prefers old thermophilic oaks or humid forests of oak, chestnut and laurel, especially those trees on which we find the saproxylic species of ants *Liometopum microcephalum*, which indicates that the tree is hollow. It is endemic to the Balkans and the Apennines and so far only a few specimens have been recorded in Montenegro, Italy, Serbia and Greece. The species is considered endangered (EN) at the European level, and so far it has been recorded only in Morinj (Boka Kotorska), with only one specimen. Habitat degradation is the main cause of endangerment of this species.



Sphiximorpha petronillae

Tvdokrilci

Tvdokrilci *Coleoptera* su najbrojnija grupa insekata i uopšte živih organizama na planeti. U Evropi je registrovano oko 30.000 vrsta.

U Crnoj Gori ova grupa insekata je nedovoljno istražena sa do sada evidentiranih oko 900 vrsta.



Cerambyx cerdo,
Velika hrastova
strižibuba



Velika hrastova strižibuba

zaštićena je nacionalnim zakonodavstvom. Hrastova strižibuba najčešće naseljava hrastove šume, ali se registruje i na drugom listopadnom drveću. Ugrožena je zbog fragmentacije i nestajanja staništa.

Beetles

Coleoptera is the most numerous group of insects, and living organisms on the planet in general. About 30,000 species have been registered in Europe.

In Montenegro, this group of insects has been partially investigated. Based on available data, about 900 species have been recorded so far.

Cerambyx cerdo

The great oak longhorn beetle is protected by national legislation. The oak longhorn beetle most often inhabits oak forests, but it is also registered on other deciduous trees. It is endangered due to fragmentation and habitat loss.



Lucanus cervus,
Jelenak



Oryctes nasicornis,
Nosorožac

Bubamare

Bubamare *Coccinellidae* zbog svog izgleda i boje spada u grupu najatraktivnijih i najpopularnijih insekata. U svijetu je opisano oko 6000 vrsta. U Crnoj Gori su do sada registrovane 64 vrste. Tokom prethodnih 10 godina sprovedena su detaljna istraživanja, tokom kojih je pronađeno 36 vrsta novih za Crnu Goru. Bubamare su izuzetno značajne zbog načina ishrane. Najveći broj vrsta hrani se biljnim vašima, što je u poljoprivredi veoma važno.



Coccinella septempunctata,
Sedmotačasta
bubamara

Ladybugs

Ladybugs *Coccinellidae* due to their appearance and color belong to the group of the most attractive and popular insects. About 6,000 species have been described worldwide. So far, 64 species have been registered in Montenegro. During the previous 10 years, detailed research was conducted, during which 36 new species were found for Montenegro. Ladybugs are extremely important because of their diet. Most species feed on plant lice, which is very important in agriculture.



Vilini konjici

Vilini konjici *Odonata* su stara grupa insekata, koja je životnim ciklusom vezana za vodene ekosisteme. Danas je u svijetu poznato oko 5700 vrsta. U Evropi su registrovane 143 vrste *Odonata*, dok je u Crnoj Gori konstatovano 67 vrsta ili 47% evropske faune. Tokom posljednjih petnaestak godina u Crnoj Gori je evidentirano 16 novih vrsta za faunu Crne Gore.

Mnoge vrste vilinih konjica koriste se kao indikatori kvaliteta životne sredine. Izuzetno su značajni kao predatori parazitskih dvokrilaca.

Na Skadarskom jezeru registrovane su 52 vrste vilinih konjica, zbog čega ono predstavlja „vruću“ tačku biodiverziteta za ovu grupu insekata.

Dragonflies

Dragonflies *Odonata* are an old group of insects, whose life cycle is related to aquatic ecosystems. Today, about 5,700 species are known worldwide. 143 species of *Odonata* have been registered in Europe, while 67 species or 47% of European fauna have been found in Montenegro. During the last fifteen years, 16 new species for the fauna of Montenegro have been recorded in Montenegro.

Many species of dragonflies are used as indicators of environmental quality. They are extremely important as predators of parasitic dipteran insects.

52 species of dragonflies have been registered on Skadar Lake, which is why it represents a „hot spot“ of biodiversity for this group of insects.



Veliki potočar

je balkanski endem. U Crnoj Gori su prisutne značajne populacije ove vrste.

Cordulegaster heros

Balkan goldenring is Balkan endem. Significant populations of this species are present in Montenegro.

U Crnoj Gori žive globalno ugrožene, značajne vrste vilinih konjica poput velikog potočara *Cordulegaster heros*, velikog perorepog konjica *Lindenia tetraphylla* i primorska plemkinja *Caliaeschna microstigma*.

Vilini konjici su ugroženi uslijed antropogenih uticaja i klimatskih promjena.

Montenegro is home to globally endangered, significant species of dragonflies such as Balkan goldenring *Cordulegaster heros*, bladetail *Lindenia tetraphylla* and Eastern Spectre *Caliaeschna microstigma*.

Dragonflies are endangered due to anthropogenic influences and climate change.



Veliki perorepi konjic

Na Skadarskom jezeru živi najveća populacija na globalnom nivou. Naseljava stajaće vode i sporotekuće rijeke. Ugrožena je zbog nestajanja staništa.

Lindenia tetraphylla

The largest population on the global level lives on Skadar Lake. It inhabits stagnant waters and slow – flowing rivers. It is endangered due to habitat loss.

Insekti s Aneksa II i IV Natura 2000 mreže

Crnoj Gori se sprovode istraživanja faune insekata za potrebe izrade mreže Natura 2000 zaštićenih staništa i vrsta. Značajne vrste pobrojane su na Aneksima II i IV. U Crnoj Gori je do sada registrovano 24 vrste insekata s Aneksa II i IV Natura 2000

Insects listed in the Annexes II and IV of the Natura 2000 network

In Montenegro, research on insect fauna is being conducted for the purpose of creating a network of Natura 2000 protected habitats and species. Significant species are listed in the Annexes II and IV. So far, 24 species of insects listed in the Annexes II and IV Natura 2000 have been registered in Montenegro.



Lindenia tetraphylla,
Veliki perorepi konjic





Slatkovodne alge

Alge su raznovrsna grupa fotosintetskih, uglavnom vodenih organizama. One nemaju prava tkiva i organe, po čemu se razlikuju od biljaka. Karakteriše ih velika heterogenost organizacije, počev od jednoćelijskih i kolonijalnih oblika (mikroalge), preko končastih i korastih oblika, do vrlo složenih i krupnih oblika (makroalge) koji izgledom podsjećaju na biljke.

Kad su u pitanju slatkvodne alge, u Crnoj Gori je registrovano preko 1250 taksona mikroalgi (uglavnom silikatnih i zelenih algi) i 38 taksona makroalgi (pršljenčica). Najveći broj taksona algi iz obje grupe zabilježen je u Skadarskom jezeru: 1093 taksona mikroalgi (od kojih više od 700 nijesu zabilježene na drugim mjestima u Crnoj Gori) i 30 taksona pršljenčica (24 u crnogorskom dijelu jezera), što je povezano s velikom površinom, prostornom heterogenošću i hidrološkim specifičnostima Skadarskog jezera. U ovom jezeru opisane su i dvije vrste silikatnih algi novih za nauku: *Cyclotella skadariensis* i *Cymbella scutariana*, koje se smatraju endemima Skadarskog jezera.

Broj taksona mikroalgi u ostalim jezerima kreće se od 87 (Visitorsko jezero) do 378 (Crno jezero). Planinska glacijalna jezera sjevernog dijela Crne Gore karakterišu uglavnom oligotrofni uslovi (mala količina mineralnih soli, niska produktivnost), pa stoga imaju malu biomasu algi (s dominacijom silikatnih algi), ali veliki diverzitet vrsta. U ovim jezerima vaskularne vodene makrofite slabo su razvijene ili ih uopšte nema, pa su alge jedini primarni producenti koji omogućavaju autohtonu obogaćivanju vode organskim materijama. Idući ka jugu Crne Gore, trofični status (produktivnost) jezera raste, što rezultira porastom ukupne biomase algi, ali i promjenom strukture njihovih zajednica, u smislu povećanja procentualnog učešća zelenih i modrozelenih algi (naročito u planktonskoj zajednici), što je posebno izraženo u Skadarskom jezeru.

Flora rječnih algi u Crnoj Gori proučena je znatno slabije, a taksonomske liste postoje samo za sisteme rijeka Tare, Morače, Čehotine, Pive i Komarnice.

Freshwater algae

Alge are a diverse group of photosynthetic, mostly aquatic organisms. They do not have the right tissues and organs, which makes them different from plants. They are characterized by a great heterogeneity of organization, starting from single-celled and colonial forms (microalgae), through filamentous and crusty forms, to very complex and large forms (macroalgae) that look like plants.

When it comes to freshwater algae, over 1250 taxa of microalgae (mainly diatoms and green algae) and 38 taxa of macroalgae (charophytes) have been registered in Montenegro. The largest number of algal taxa from both groups was recorded in Skadar Lake: 1093 microalgal taxa (of which more than 700 were not recorded elsewhere in Montenegro) and 30 charophytes taxa (24 in the Montenegrin part of the lake), which is associated with a large area, spatial heterogeneity and hydrological characteristics of Skadar Lake. Two species of diatoms new to science have also been described in this lake: *Cyclotella skadariensis* and *Cymbella scutariana*, which are considered endemic to Lake Skadar.

The number of microalgal taxa in other lakes ranges from 87 (Visitorsko Lake) to 378 (Black Lake). Mountain glacial lakes in the northern part of Montenegro are characterized mainly by oligotrophic conditions (small amount of nutrients, low productivity), so they have a small biomass of algae (dominated by diatoms), but a large diversity of species. In these lakes, vascular aquatic macrophytes are poorly developed or absent, so algae are the only primary producers that enable autochthonous enrichment of water with organic matter. Moving to the south of Montenegro, the trophic status (productivity) of lakes is growing, which results in an increase in the total biomass of algae, but also in a change in the structure of their communities, in terms of increasing the percentage of green and blue-green algae (especially in the planktonic community) which is particularly emphasized in Skadar Lake.

The flora of algae found in rivers of Montenegro has been studied far less, and taxonomic lists exist only for the systems of the rivers Tara, Morača, Čehotina, Piva and Komarnica.

KLIMA I ALGE

Iako se tropске šume smatraju plućima Planete, najveću količinu kiseonika na Zemlji proizvode zapravo planktonske alge. Prema različitim procjenama, ukupan postotak kiseonika koji ti mikroskopski organizmi proizvode kreće se od 50% do 85%! Jedan od najsitnijih oblika fitoplanktona *Prochlorococcus* (toliko je mali da milioni stanu u kap vode) sam proizvodi oko 20% svjetskog kiseonika.

S druge strane, planktonske alge istovremeno apsorbiraju ogromnu količinu ugljendioksida (neke vrste imaju i do 50 puta veću stopu usvajanja nego kopnene biljke), pa znatno smanjuju količinu tog gasa staklene bašte u atmosferi, čime značajno utiču na globalnu klimu. Smatra se da su prije otprilike 450 miliona godina veće i složenije alge postale brojnije i „gutale“ su ugljendioksid tako brzo da su poremetile prvobitni ciklus ugljenika na Planeti, što je moglo uzrokovati globalno zahlađenje i glacijaciju odgovornu za najranije poznato masovno izumiranje.

CVJETANJE VODE

Neke planktonske alge, pod povoljnim svjetlosnim i temperaturnim uslovima i pri povećanoj količini hranljivih materija u vodi, mogu se prenamnožiti i izazvati tzv. „cvjetanje vode“. U Crnoj Gori, takva pojava u prošlosti povremeno je registrovana za algu *Peridinium* (iz grupe dinoflagelata) na Rijeci Crnojevića tokom ljetnjih mjeseci, kad je voda dobijala karakterističnu crvenu boju (zbog pigmenta karotenoida prisutnih u ćelijama ovih algi). Cvjetanje algi je nepoželjna pojava, jer se nakon njihovog uginuća velika količina biomase razgradije, čime se ubrzano troši kiseonik u vodi, što se negativno odražava na živi svijet, naročito na ribe. Ova pojava češća je u morima a naročito je opasna ukoliko cvjetanje izazivaju toksin-produkujuće vrste dinoflagelata, kakve su u Jadranu npr. vrste roda *Dinophysis*.

CVJETANJE ŠASKOG JEZERA

Slatkovodna invazivna toksin-produkujuća vrsta iz grupe modrozelenih algi – *Cylindrospermopsis raciborskii*, registrirana je prvi put u Crnoj Gori u Šaskom jezeru 2016. godine i pod povoljnim uslovima mogla bi izazvati cvjetanje vode i trovanje vodenih organizama, u prvom redu riba, a naročito opasnost predstavlja ukoliko dospije u vodu za piće. Ovoj vrsti pogoduje širok spektar uslova sredine zbog čega je teško predvidjeti njenu pojavu ili prenamnožavanje. Temperatura vode i koncentracija amonijum-jona smatraju se najvažnijim faktorima potrebnim za rast i razvoj ove vrste.

CLIMATE AND ALGAE

Although tropical forests are considered the lungs of the planet, the largest amount of oxygen on Earth is actually produced by planktonic algae. According to various estimates, the total percentage of oxygen produced by these microscopic organisms ranges from 50% to 85%! One of the smallest forms of phytoplankton, *Prochlorococcus* (so small that millions fit in a drop of water), itself produces about 20% of the world's oxygen.

On the other hand, planktonic algae simultaneously absorb a huge amount of carbon dioxide (some species have up to 50 times higher absorption rate than terrestrial plants), so they significantly reduce the amount of that greenhouse gas in the atmosphere, which significantly affects the global climate. Approximately 450 million years ago, larger and more complex algae are thought to have become more numerous and „swallowed“ carbon dioxide so quickly that they disrupted the planet's original carbon cycle, which could have caused global cooling and glaciation responsible for the earliest known mass extinction.

ALGAL BLOOM

Some planktonic algae, under favorable light and temperature conditions and with an increased amount of nutrients in the water, can overgrow and cause the so-called „algal bloom“. In Montenegro, in the past, such a phenomenon was occasionally registered for the alga *Peridinium* (from the group of dinoflagellates) on the Rijeka Crnojevića during the summer months, when the water acquired a characteristic red color (due to carotenoid pigments present in the cells of these algae). Algal bloom is an undesirable phenomenon, because after their death, a large amount of biomass is decomposed, which rapidly consumes oxygen in the water, thus having a negative impact on the aquatic organisms, especially fish. This phenomenon is more common in the seas and is especially dangerous if the blooming is caused by toxin-producing species of dinoflagellates, such as in the Adriatic, for example, species of the genus *Dinophysis*.

ALGAL BLOOM IN THE LAKE ŠAS

Freshwater invasive toxin-producing species from the group of blue-green algae - *Cylindrospermopsis raciborskii*, was registered for the first time in Montenegro in the Lake Šas in 2016 and under favorable conditions could cause water blooms and poisoning of aquatic organisms, primarily fish. Therefore, it poses a special threat if it gets into drinking water. This species is affected by a wide range of environmental conditions, which makes it difficult to predict its occurrence or overpopulation. Water temperature and ammonium ion concentration are considered to be the most important factors required for the growth and development of this species.

Slatkovodni rakovi

Na području Evrope danas živi pet autohtonih vrsta slatkovodnih rakova iz porodice *Astacidae*. Dosadašnjim istraživanjima u Crnoj Gori utvrđene su tri autohtone evropske vrste i to: *Austropotamobius pallipes*, *Austropotamobius torrentium*, *Astacus astacus*. Ovi rakovi naseljavaju različita staništa: hladne vode bogate kiseonikom, brza strujanja i veće nadmorske visine ili staništa mirnijih voda u kojima temperatura ljeti mora biti iznad 10 celzijusa.

Sve vrste prefiriraju staništa koja pružaju mnoštvo povoljnih zaklona ili omogućavaju da ih rakovi sami mogu iskopati. Rakovi su noćne životinje. Danju se zadržavaju u skloništima pod kamenjem, korijenjem ili rupama koje izbuše u obalama potoka, rijeke i jezera. U skloništu se postavljaju glavom prema izlazu, a klješta drže ispružena naprijed. Noću izlaze iz skloništa i traže hrano. Noćna aktivnost je prilagođavanje životinja da izbjegnu predatora koji većinom zavise od vida, mada nije isključena mogućnost da rakovi love noću jer je i njihov plijen tada aktivan.

Ovi rakovi bitni su konzumenti u mnogim prehrabnenim lancima i mogu dominirati biomasom životnih zajednica dna u jezerima, potocima i rijekama. Oni su i predatori, herbivori i detritivori, ali i sami biti mogu plijen i terestičnih životinja, posebno nakon presvlačenja i izlijeganja mlađih. Upravo su zato ključni organizmi mnogih prehrabnenih lanaca i važan katalizator obrta organske materije.



Bjelonogi rak

Narastu do 14 cm, a mužjaci su uvijek veći od ženki iste starosti. Polnu zrelost dostižu u drugoj ili trećoj godini pri dužini do 6,5 cm. Broj jaja koje nose kreće se od 25 do 50, zavisno od veličine ženke. U Crnoj Gori rasprostranjen je u donjem toku rijeke Zete.

Austropotamobius pallipes

They grow up to 14 cm, while males are always larger than females of the same age. They reach full maturity in the second or third year at a length of up to 6.5 cm. The number of eggs they lay ranges from 25 to 50, depending on the size of the female. It is widespread in the lower course of Zeta River in Montenegro.

Freshwater ichthyofauna

Today, five autochthonous species of freshwater Crustaceans from the *Astacidae* family live in Europe. Previous research in Montenegro has identified three indigenous European species, namely: *Austropotamobius pallipes*, *Austropotamobius torrentium*, *Astacus astacus*. These crustaceans inhabit different habitats: cold waters rich in oxygen, fast currents and higher altitudes, or habitats of calmer waters in which the temperature in summer must be above 10 degrees Celsius.

All species prefer habitats that provide many favorable shelters or allow crustaceans to dig them themselves. Crustaceans are nocturnal animals. During the day, they stay in shelters under rocks, roots or holes they drill in the banks of streams, rivers and lakes. In the shelter, they are placed with their head towards the exit, and the claws are held out forward. At night, they come out of the shelter and look for food. Nocturnal activity is the adaptation of animals to avoid predators that are mostly dependent on species, although the possibility of crustaceans hunting at night is not excluded because their prey is also active.

These crustaceans are essential consumers in many food chains and can dominate the biomass of bottom living communities in lakes and streams. They are also predators, herbivores and detritivores, but they can also be prey for terrestrial animals, especially after changing and hatching. That is why they are the key organisms of many food chains and an important catalyst for the turnover of organic matter.



Slatkovodne ribe

Uvodama Crne Gore registrovano je 89 vrsta riba, od čega se 14 vrsta nije hvatalo godinama. To su mahom bile vrste unesene sedamdesetih godina iz Kine, koje se nijesu uspjele prilagoditi novim uslovima.

Trenutno stanje faune riba čine 62 autohtone vrste, dok je unesenih 13 vrsta. Autohtonih, rezidentnih (nemigratornih) ili tipično slatkovodnih ima 48 vrsta, migratornih i onih koje naseljavaju bočatne vode ima 14 vrsta (autohtone). U Crnoj Gori vode oticu u dva sliva Jadranski i Crnomorski. U Jadranskom slivu ima znatno više vrsta (43 autohtone) nego u Crnomorskem (19 autohtonih) zbog bočatnih staništa Bojane i primorskih malih pritoka.

Freshwater fish

There are 89 species of fish registered in the waters of Montenegro, out of which 14 species have not been caught for years. Most of these species were imported from China in the 1970s and failed to adapt to the new conditions.

The current state of the ichthyofauna consists of 62 indigenous species, while 13 species have been introduced. There are 48 species of autochthonous, resident (non-migratory) or typically freshwater species, as well as 14 migratory species (autochthonous) and species that inhabit brackish waters. The water of Montenegro belongs to two basins, Adriatic Sea and Black Sea. There are significantly more species (43 autochthonous) in the Adriatic basin than in Black Sea (19 autochthonous) due to brackish habitats of Bojana river and small coastal tributaries.



Bodonja

Mogu porasti do 10 cm. Riba je poznata kao brižni roditelj jer gradi gnijezdo slično pticama i čuva jaja do izlegnuća. Mužjaci grade gnijezdo od biljnog materijala i učvršćuju ga sekretom iz usta. U jednom gnijezdu po nekoliko ženki odloži ikru. Brigu o potomstvu vode mužjaci štiteći ikru i mlade. Za to vrijeme veoma su teritorijalni i agresivni. Zbog te osobine ova vrsta je veoma zanimljiva u akvaristici. Indikator je nezagadjenih voda.

Gasterosteus gymnurus

They can grow up to 10 cm. The fish is known as a caring parent because it builds a bird-like nest and keeps the eggs until they hatch. Males build a nest of plant material and secure it with secretions from their mouth. In one nest, several females lay their eggs. Males take care of the offspring, protecting the eggs and offsprings. During that time, they are very territorial and aggressive. Due to this feature, this species is very interesting in aquaristics. It is an indicator of unpolluted water.

Četiri vrste su endemične za Crnu Goru: *Salmo zetensis* – zetska mekousna, *Gobio skadrensis* – skadarska mrenica, *Barbatula zetensis* – zetska brkica, *Knipowitschia monteneginus* – morački vodenjak.

U slivu Skadarskog jezera (Crna Gora i Albanija) registrovano je osam vrsta prisutnih samo u ovom slivu (endemične). U širem području ovog sliva ili u jugoistočnojadranskom ekoregionu prisutno je 18 endemičnih vrsta koje su registrovane u Crnoj Gori.

U vodama Crne Gore prisutno je pet egzotičnih vrsta (s drugih kontinenata), dok su ostale autohtone u susjednim vodama izvan Crne Gore. Nekoliko vrsta je u Crnoj Gori translocirano iz jednog sliva u drugi i one se ne stavljaju u kategoriju introdukovanih vrsta za cijelo područje. To je slučaj s lipljenom (*T. thymallus*), ubačenim u Moraču, ili skadarskim klijenom (*Squalius platyceps*), ubačenim u sliv Pive. Takve vrste su alohtone za sliv u koji su translocirane i uvrštene su u spisak alohtonih vrsta za to područje.

S tim vrstama Crnomorski sliv ima sedam alohtonih vrsta, a Jadranski 13 vrsta. U njih nije uključen *C. carpio* – krap koji je u Skadarsko jezero vjerovatno dospio još u vrijeme Rimskog carstva.

Zaštita staništa, poštovanje zakona i međunarodnih ugovora, zaštita od ilegalne eksploracije riba ključne su aktivnosti u zaštiti ihtiofonda Crne Gore.

Four species are endemic to Montenegro: *Salmo zetensis* – Adriatic trout, *Gobio skadrensis* – Skadar gudgeon, *Barbatula zetensis* – Zeta stone loach, *Knipowitschia monteneginus* – freshwater goby endemic to Morača River.

In the Skadar Lake basin (Montenegro and Albania), eight species present only in this basin (endemic) have been registered. In the wider catchment area or in the southeastern Adriatic ecoregion, there are 18 endemic species registered in Montenegro.

Five exotic species (from other continents) are present in the waters of Montenegro, while the rest are autochthonous in the neighboring waters outside Montenegro. Several species have been translocated from one basin to another in Montenegro and they are not placed in the category of introduced species for the whole area. This is the case with European grayling (*T. thymallus*), introduced in Morača, or Skadar chub (*Squalius platyceps*), introduced in the Piva basin. Such species are allochthonous for the basin into which they are translocated and are included in the list of allochthonous species for that area.

With these species, Black Sea basin has seven non-native species, and there are 13 species in the Adriatic. They do not include *C. carpio* – a carp that probably reached Skadar Lake during the Roman Empire.

Habitat protection, compliance with laws and international agreements, protection against illegal exploitation of fish are key activities in the protection of the fish stock of Montenegro.



Peš

Naseljava rijeku Taru čitavom dužinom toka i pritoke Tare. Živi u vodama Crnomorskog sli-va. Nakon izgradnje akumulacije, nestala je iz rijeke Pive, ali je prisutna u njenim pritokama. Indikator je nezagadjenih voda.

Cottus gobio

It inhabits Tara river along the entire length of Tara's flow and tributary. It lives in the waters of the Black Sea basin. After the construction of the reservoir, it disappeared from the Piva River, but it is present in its tributaries. It is an indicator of unpolluted waters.





Gavčica

Riba nije duža od 6 cm. Boja tijela varira zavisno od pola, polne zrelosti i uzrasta. Za vrijeme mrijesta kod ženki postoje i vidljive su legalice različite veličine. U Crnoj Gori gavčica je rasprostranjena u Jadranskom sливу. Mužjaci brane malu teritoriju oko nekoliko školjki. Mogu se mrijestiti i do pet puta tokom jedne sezone. Ženka polaže jaja legalicom u školjke po čemu je jedinstvena u Crnoj Gori.

Rhodeus amarus

The fish is up to 6 cm long. Body color varies depending on gender, sexual maturity and age. Female ovipositors of different sizes exist and are visible during spawning. In Montenegro, the European bitterling is widespread in the Adriatic basin. Males defend a small area around several shells. They can spawn up to five times in one season. Female bitterling uses its ovipositor to place their eggs onto the gills of a mussel, which makes it unique in Montenegro.

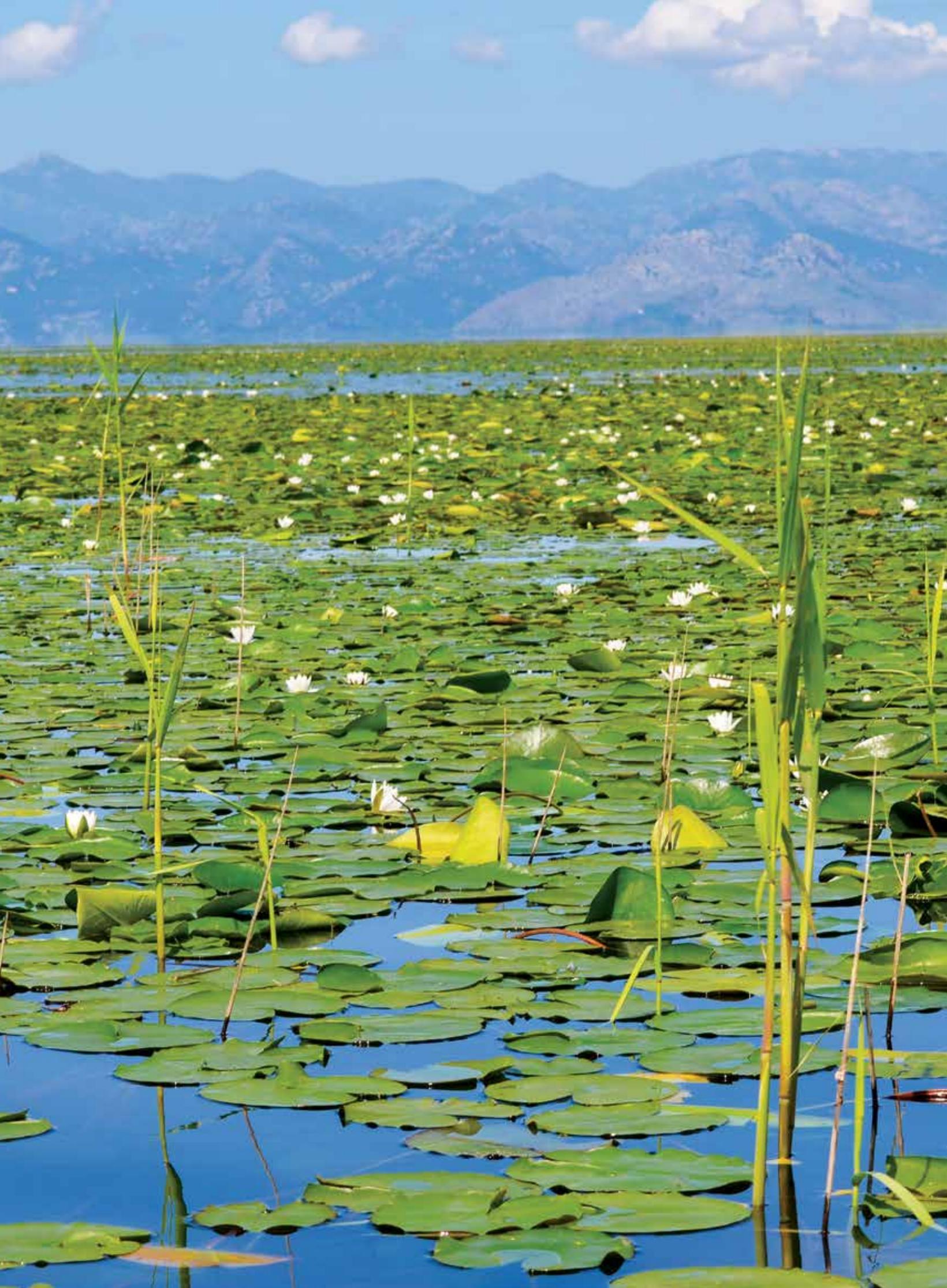


Kinez

U Skadarskom jezeru je vrlo brojna zbog povoljnih ekoloških uslova, i zauzima istu ekološku nišu kao šaran, pa predstavlja njegovog direktnog konkurenta. Podnosi zagadene vode i vode koje imaju nizak sadržaj kiseonika. Pri niskim temperaturama vode može izdržati i po nekoliko sati. Ikru mogu oploditi mužjaci drugih šaranskih riba (ginogeneza), pa je zbog toga izuzetno invazivna. Smatra se da je glavni faktor kontrole prenamnožavanja ove vrste u Skadarskom jezeru prisustvo kormorana i pelikana koji se njome hrane.

Carassius auratus

It is very numerous in Skadar Lake due to favorable ecological conditions, and occupies the same ecological niche as carp, so it represents its direct competitor. It tolerates polluted water and water with low dissolved oxygen concentrations. At low temperatures, it can last for several hours out of the water. Eggs can be fertilized by males of other carp fish (gynogenesis), so it is extremely invasive. It is believed that the main factor in controlling the overpopulation of this species in Skadar Lake is the presence of cormorants and pelicans that feed on it.



Vodozemci

Vodozemci su u Crnoj Gori prisutni u dvije grupe – repati (*Caudata*) i žabe (*Anura*). Repati vodozemci odlikuju se izduženim trupom i repom dugim približno koliko i trup. Prilikom kretanja tijelo savijaju bočno. Za razliku od njih, žabe (*Anura*) se kreću u skokovima na kopnu i plivanjem, odnosno ronjenjem, u vodenoj sredini. Karakteriše ih potpuno odsustvo repa.

U Crnoj Gori je do sada registrovano 15 vrsta i osam podvrsta vodozemaca, od toga šest vrsta su repati, a devet vrsta bezrepi vodozemci (žabe). Kao potencijalni predstavnik pećinske faune navodi se čovječja ribica čije prisustvo nije potvrđeno, iako za to postoje jasne indicije.

Jezero pod Jezerskim vrhom Lovćena, te ostala zamočvarena staništa ove planine bogato su stanište makedonskog mrmoljka (*Triturus macedonicus*) i cetinjskog žutotrbog mukača (*Bombina variegata scabra*) balkanskog endema, ali i važan reproduktivni centar mnogih drugih vodozemaca.

Prostor oko Virpazara i susjedna zamočvarena područja Crmnice i Orahovštice na Skadarskom jezeru, poznata su kao terra typica (locus typicus) skadarske zelene žabe (*Pelophylax shqipericus*) – balkanskog endema.

Prokletije s planinskim jezerima (Bukumirsko i Hridsko) u kojima se nalaze neotenične populacije planinskog mrmoljka, nesumnjivo predstavljaju posebnu vrijednost zbog ovog biološkog fenomena, kao i zbog relativno malog broja populacija u kojima se neotenija javlja. Ovo područje karakteriše prisustvo grčke žabe (*Rana graeca*) – balkanskog endema i crnog dazdevnjaka (*Salamandra atra*) – glacijalnog relikta.

Biogradsko jezero sekundarno je postalo moćan reproduktivni centar kako grčke žabe – balkanskog endema, tako i drugih žaba i mrmoljaka.

Na Durmitoru se područja bitna za vodozemce uglavnom poklapaju s postojećim strogim rezervatima, jer pojedine vrste u nekim od njih imaju optimalne uslove za opstanak planinski mrmoljak (*Ichthyosaura alpestris*), mali mrmoljak (*Lissotriton vulgaris*), livadsku žabu (*Rana temporaria*) u Barnom jezeru i oko njega.

Amphibians

Amphibians are present in Montenegro in two groups *Tailed amphibians* (*Caudata*) and frogs (*Anura*). *Tailed amphibians* are characterized by an elongated body and a tail approximately as long as the body. When moving, the body bends laterally. Unlike them, frogs (*Anura*) move by jumping, or by swimming and diving when in the water. They are characterized by the complete absence of tails.

So far, 15 species of amphibians have been registered in Montenegro: six species are Tailed amphibians and nine species are frogs, to which eight subspecies belong. The olm is mentioned as a potential representative of the cave fauna. However, its presence has not been confirmed although there are clear indications for that.

The lake below Jezerski vrh of Lovćen, and other marsh habitats of this mountain represent a rich habitat of the Macedonian crested newt (*Triturus macedonicus*) and yellow-bellied toad found in Cetinje (*Bombina variegata scabra*), but also an important reproductive center of many other amphibians.

The area around Virpazar and the neighboring wetlands of Crmnica and Orahovštica on Skadar Lake are known as terra typica (locus typicus) for the Albanian pool frog (*Pelophylax shqipericus*) – a Balkan endemic species.

Inhabited by neotenic populations of Alpine newt, Prokletije with mountain lakes (Bukumirsko and Hridsko) undoubtedly represent special value due to this biological and relatively small number of populations in which neoteny occurs. This area is characterised by presence of a Greek stream frog (*Rana graeca*) and Alpine salamander (*Salamandra atra*) glacial relict.

Biogradsko Lake has secondarily become a powerful reproductive center for both the Stream frog – a Balkan endemic, and other frogs and *Triturus* newts.

On Durmitor, the areas important for amphibians mostly coincide with the existing strict reserves, because some species in some of these have optimal conditions for survival, such as Alpine newt (*Ichthyosaura alpestris*), Smooth newt (*Lissotriton vulgaris*), Common frog (*Rana temporaria*) in Barno Lake and its surroundings.

Zminičko jezero je od ključnog značaja za opstanak endemskog zminičkog mrmoljka (*Ichthyosaura alpestris serdarus*). Nekontrolisano porobljavanje ovog jezera desetkovalo je populacije te podvrste pa je upitno ima li ih uopšte u jezeru.

Vodozemci su na globalnom nivou najugroženija klasa kičmenjaka. Degradacija, fragmentacija i uništavanje prirodnih staništa, zagađenje voda, porobljavanje planinskih jezera, samo su dio prijetnji po opstanak ove grupe kičmenjaka. Klimatske promjene i izuzetno velika osjetljivost na globalno zagrijavanje čine da su posljednjih decenija vodozemci širom svijeta na udaru izuzetno smrtonosnih glivičnih i virusnih oboljenja, koje za kratko vrijeme mogu desetkovati ili potpuno uništiti populacije ovih životinja.

Lake Zminica is of key importance for the survival of the endemic Montenegrin alpine newt (*Ichthyosaura alpestris serdarus*). Uncontrolled fish stocking of this lake has decimated the populations of this subspecies, so it is questionable whether there are any in the lake at all.

Amphibians are the most endangered vertebrate class globally. Degradation, fragmentation and destruction of natural habitats, water pollution, restocking of mountain lakes, are just some of the threats to the survival of this group of vertebrates. Climate change and an extremely high sensitivity to global warming have caused that amphibians around the world are hit by extremely deadly fungal and viral diseases in recent decades, which can decimate or completely destroy the populations of these animals in a short time.



Skadarska žaba

Albanian pool frog

je endemična vrsta Balkanskog poluostrva. Zvanično je opisana 1987. godine na osnovu primjeraka jedinki iz Virpazara. Naseljava nizijske predjele jugoistočne Crne Gore i sjeverne i centralne djelove priobalja Albanije. U Crnoj Gori naseljava povoljna priobalna staništa od albanske granice do Buljarice, kao i nizijski jugoistočni dio zemlje – oblasti delte Bojane i Skadarskog jezera. Noviji podaci ukazuju na to da se skadarska žaba prostire i u močvarnim djelovima Bjelopavličke ravnice. Tijelo joj je veličine do 7,5 cm, s gornje strane svjetlosmeđe ili u različitim nijansama zelene boje, često s krupnim tamnim mrljama i tankom svjetlom linijom po sredini leđa.

The Albanian pool frog is an endemic species of the Balkan Peninsula. It was officially described in 1987 on the basis of specimens of individuals from Virpazar. It inhabits the lowlands of southeastern Montenegro and the northern and central parts of the Albanian coast. In Montenegro, it inhabits favorable coastal habitats from the Albanian border to Buljarica, as well as the lowland southeastern part of the country – the area of the Bojana delta and Skadar Lake. Recent data indicate that the Albanian frog also spreads in marsh parts of Bjelopavlici Plain. Her body is up to 7.5 cm in size, light brown on the upper side or in various shades of green, often with large dark spots and a thin light line in the middle of the back.





Elaphe
quatuorlineata,
Cetvoroprugasti
smuk

Gmizavci

Gmizavci su jedanod najvažnijih činilaca lanca ishrane u nekom ekosistemu. Nezamjenjivi su i kao predatori i kao plijen. Uređuju brojnost insekata i glodara i tako smanjuju širenje zaraznih bolesti ili sprečavaju širenje parazita u našim baštama i voćnjacima. U isto vrijeme hrana su mnogim vrstama gmizavaca, ptica i sisara.

Reptiles

Reptiles are one of the most important factors in the food chain in an ecosystem. They are irreplaceable both as predators and as prey. They regulate the abundance of insects and rodents and thus reduce the spread of infectious diseases or prevent the spread of parasites in our gardens and orchards. At the same time, they are food for many species of reptiles, birds and mammals.



Šargan

Šargan je otrovna zmija čiji je otrov najmanje opasan za čovjeka, a po jačini je sličan ujedu pčele ili stršljenu. To je najmanja evropska otrovnica veličine od 30 do 50 centimetara. Naseljava visokoplaninske pašnjake iznad 1000 m nadmorske visine. Prepoznatljiv je po cik cak šarama, ali za razliku od poskoka nema rog. Šargan, kao i ostale otrovnice, hladni dio godine od oktobra do marta provodi u mirovanju tj. u zimskom snu. Kao i druge otrovnice, živorodan je tj. ne polaze jaja već rađa žive mladunce.

Meadow viper

Meadow viper is a venomous snake whose venom is the least dangerous to humans, and its strength is similar to the sting of a bee or hornet. It is the smallest European poisonous viper with a size of 30 to 50 centimeters. It inhabits high mountain pastures above 1000 m above sea level. It is recognizable by its zigzag patterns, but unlike the Long-nosed viper, it does not have a horn. Meadow viper, like other poisonous vipers, spends the cold part of the year from October to March at rest, that is in hibernation.

Like other poisonous vipers, it is viviparous, it does not lay eggs but gives live birth.



Vipera ursinii,
Sarkan

KOPNO
LAND



Vipera
ammodytes,
Poskok



Na području Evrope zastupljenesu 124 vrste gmizavaca dok je na Balkanskom poluostrvu prisutno 70 vrsta.U Crnoj Gori je registrovano 37 vrsta gmizavaca od čega: sedam vrsta kornjača, 15 vrsta guštera i 15 vrsta zmija. Među tim vrstama su i crvenouha kornjača, unesena vrsta slatkvodne kornjače, i jedna potencijalno introdukovana vrsta guštera – italijanski zidni gušter. O kakvom bogatstvu se radi govori podatak da Francuska, koja je teritorijalno skoro 50 puta veća od Crne Gore, ima 30 vrsta gmizavaca dok Velika Britanija ima svega devet vrsta.

Poskok

Poskok je jedna od tri otrovnice koje žive u Crnoj Gori i možemo ga registrovati na područjima od 0 do 2.400 metara nadmorske visine. Prosječna dužina poskoka je 70 centimetara. Ženke su veće od mužjaka. Prepoznatljivi su po cik cak šari na ledima i rogu na vrhu njuške čija funkcija još uvijek nije poznata. Poskok ne polaže jaja, već rada žive mladunce. Hrani se glodarima, pticama i gušterima. Može biti braon-smedji do narandžasto-crveni i ljubičasti. Creveno-narandžaste poskoke možemo sresti na Ada Bojani. Pojava izuzetno crvene kože je urođeno stanje i poznata je kao eritrozam.

Long-nosed viper

Long-nosed viper viper is one of the three venomous animals that live in Montenegro and we can register it in areas from 0 to 2.400 meters above sea level. The average length is 70 centimeters. Females are larger than males. They are recognizable by the zigzag patterns on the back and the horn on the tip of the muzzle whose function is still unknown. The Long-nosed viper does not lay eggs, but gives live birth. It feeds on rodents, birds and lizards. It can be brown-black to orange-red and purple. Red-orange Long-nosed viper can be found on Ada Bojana. The appearance of extremely red skin is a congenital condition and is known as erythema.

Veličina ovih vrsta varira od grupe do grupe. Kopnene i slatkvodne kornjače dugačke su do 30 centimetara, gušteri mogu dostići dužinu i preko jedan metar, kao na primjer blavor ili oko pola metra, na primjer veliki zelembać. Treća grupa gmizavaca – zmije, mogu biti dugačke svega 30 centimetara poput šargana ili crvolike zmije, dok smukovi (neotrovne zmije) mogu dostići i preko dva metra kao četvoroprugasti smuk i stepski smuk. Naravno, posebno su zanimljive vrste koje žive na jednom uskom području. Tako, na primjer, prokletijski gušter, vrsta otkrivena 2007. godine, živi samo na malom dijelu crnogorskih i albanskih Prokletija.

Gmizavci Crne Gore naseljavaju različita staništa, ali najčešće se srijeću u žbunastim, kamenitim, šumskim i travnatim staništima. Osim tih staništa gmizavci kod nas naseljavaju i močvarna, urbana i poljoprivredna staništa. Tako ćemo u kamenjaru bogatom izvorima najčešće sresti poskoka, na livadama stepskog smuka, a u močvarama barsku kornjaču.

The size of these species varies by group instance. Terrestrial and freshwater turtles are up to 30 centimeters long, lizards can reach a length of over one meter, such as the European legless lizard or, for example, about half a meter long large Balkan green lizard. The third group of reptiles - snakes, can be only 30 centimeters long like a Meadow viper or a European worm snake , while snakes (non-venomous snakes) can reach over two meters as a Four-lined snake and Caspian whipsnake. Of course, the species that live in one narrow area are especially interesting. Thus, for example, the Prokletije rock lizard, species discovered in 2007, lives only in a small part of the Montenegrin and Albanian Prokletije.

Montenegrin reptiles inhabit different habitats, but are most common in scrubby, rocky, forest and grassy habitats. In addition to these habitats, reptiles also inhabit wetlands, urban and agricultural habitats. Thus, in the rocky area rich in springs, we will most often meet Long-nosed viper, in the steppe and valley Caspian whipsnake, and in the swamps the European pond turtle.



Dinarolacerta
montenegrina,
Prokletijski guster

Projkeltijski gušter živi samo u Crnoj Gori i Albaniji . Obuhvata prostor od planine Đebeza tj. okoline Bukumirskog jezera pa zaključno sa dijelom Albanskih Prokletija. Živi na visini od oko 1600 mnv, u vlažnim i otvorenim staništima otvorenih šuma i žbunja. Dugačak je do 18 centimetra. Leđna strana je sive do maslinasto zelene boje, a trbušna je žute boje. Ugrožavaju ga ekstremno povećanje temperature, sjeća šuma i požari.

Prokletije rock lizard inhabits only Montenegro and Albania. It covers the area around Đebeza mountain, specifically around the Bukumirsko Lake, and all the way to a part of the Albanian Prokletije. It lives at an altitude of about 1600 m above sea level, in moist and open habitats of open forests and shrubs. It is up to 18 centimeters long. The dorsal side is gray to olive green, and the ventral side is yellow. It is threatened by extreme temperature rises, deforestation and fires.



KOPNO LAND

Južni dio Crne Gore kad su u pitanju gmizavci najraznovrsniji je ne samo u Crnoj Gori nego i u čitavom regionu. Po brojnosti se nalazi čak ispred delte rijeke Evrosi poluostrva Peloponez (Grčka). Ta područja su, inače, prepoznata kao centri biodiverziteta gmizavaca Evrope, jer uslijed geografskih i klimatskih odlika imaju optimalne uslove za veću raznovrsnost od ostalih evropskih regija. To je zbog toga što su gmizavci organizmi čija temperatura, pa time i vitalnost, zavisi od uslova spoljašnje sredine.

The southern part of Montenegro, when it comes to reptiles, is most diverse not only in Montenegro but in the entire region. In terms of numbers, it is located even in front of the delta of the river Evrosi of the Peloponnese peninsula (Greece). These areas are, by the way, recognized as hotspots of biodiversity of reptiles in Europe, because due to their geographical and climatic characteristics, they have optimal conditions for greater diversity than other European regions. The reason for this is that reptiles are organisms whose temperature, and thus vitality, depends on environmental conditions.

Blavor



Blavor je beznogi gušter. Posljednje noge skoro su mu nevidljive, ali pažljivim zagledanjem mogu se uočiti njihovi ostaci. Nestajanje nogu rezultat je prilagodavanja bržem načinu kretanja.

Blavor je naš najveći gušter, može narasti do 1 i po metar. Živi u srednjoj i južnoj Crnoj Gori. Tamno smeđe je boje i možemo ga sresti u šumama, kamenjarima, livadama i šikarama.

Hrani se miševima, gušterima, zmijama, puževima i insektima. Puževi su mu omiljeni plijen. Ljudi ga često izbjegavaju, jer ga smatraju zbijom, a u principu je vrlo korisna životinja.

European legless lizard has hind legs are almost invisible, but with careful looking you can see their remains. The disappearance of the legs is the result of adapting to a faster way of moving.

European legless lizard is our largest lizard, it can grow up to one and a half meters. He lives in central and southern Montenegro. It is dark brown in color and can be found in forests, rocky areas, meadows and bushes.

It feeds on mice, lizards, snakes, snails and insects. Snails are his favorite prey. People often avoid it because they consider it a snake, but, in principle, it is a very useful animal.



Riječna kornjača ima spljošteni maslinasto-sivi oklop dužine 25 centimetara. U Crnoj Gori naseljava slatke vode primorskog zaleđa. Najviše preferira rijeke i potoke, a nešto manje bare, močvare i jezera.

Tolerantna je na morsku vodu. Ako bare i močvare presuše, ulazi u period mirovanja tj. estivacije. Dolaskom hladnih dana, tj. od novembra mjeseca, ulazi u zimski san koji traje do februara.

Polaže 4–6 jaja koja su dugačka oko 3 centimetra. Mladunci izlaze nakon 70-ak dana. Prvih par godina najviše se hrane insektima, a odrasli biljkama.

A Balkan Terrapin has a flattened olive-gray shell of 25 centimeters long. It inhabits the freshwaters of the coastal hinterland in Montenegro. It prefers rivers and streams the most, and slightly less ponds, swamps and lakes.

It is tolerant to sea water. If the ponds and swamps dry up, it enters a period of dormancy, i.e. estivation. With the arrival of cold days, i.e. from November, it enters hibernation which lasts until February.

It lays 4-6 eggs that are about 3 centimeters long. The fries come out after about 70 days. For the first couple of years, they feed mostly on insects, and adults on plants.

Tri područja koja se izdvajaju po bogatstvu vrsta gmizavaca i njihovo brojnosti u Crnoj Gori su: Bjelopavlička ravnica, područje Skadarskog jezera i delta rijeke Bojane. Na tim područjima dominiraju mediteranske i submediteranske vrste među kojima su mnoge lokalno i regionalno ugrožene. Ključni problem ove grupe životinja je nestajanje staništa, koje je uzrokovanu najviše nepromišljenoj urbanizacijom, požarima i fragmentacijom tj. rascjepkanosti staništa. Rascjepkanost staništa onemogućava kretanje životinja iz mjesta zimovanja do hraništa ili mjesta za polaganje jaja.

Sve više zastičenih područja na nacionalnom nivou, kao i uspostavljanje NATURA 2000 ekološke mreže obećava prestanak gubitka staništa i oporavak populacije faune gmizavaca u Crnoj Gori.

Three areas that stand out for the richness of reptile species and their numbers in Montenegro are: Bjelopavlička plain, the area of Skadar Lake and the delta of the river Bojana. These areas are dominated by Mediterranean and Sub-mediterranean species, many of which are locally and regionally endangered. The key problem of this group of animals is the disappearance of habitats, which is caused mostly by reckless urbanization, fires and habitat fragmentation. Habitat fragmentation prevents animals from moving from wintering grounds to feeding grounds or egg-laying sites.

Increasing number of protected areas at the national level, as well as the establishment of the NATURA 2000 ecological network are promising in terms of ending the habitat loss and recovery of the reptile fauna population in Montenegro.





Ptice

Uzimajući u obzir položaj Crne Gore, dinamiku reljefa i klime, kao i činjenicu da se nalazi na Jadranskom migratornom koridoru ptica kojim ptice iz Sibira, Centralne, Sjeverne i Istočne Evrope lete ka Africi i obratno, moglo bi se i bez istraživanja naslutiti da Crna Gora krije veliko bogatstvo ornitofaune.

Dosad su u državi registrovane 352 vrste ptica, od čega je 215 gnjezdarica. U odnosu na Evropu (533 vrste), to je 66% ukupne faune ptica Starog kontinenta.

U poređenju s ostalim evropskim državama, broj gnjezdarica relativno je visok, uzimajući u obzir da je Crna Gora jedna od najmanjih evropskih država. Primjera radi, Crna Gora se po površini nalazi na 39. mjestu, dok se po broju gnjezdarica nalazi na 22. mjestu, iznad Mađarske, koja je skoro sedam puta veća od Crne Gore. Isto tako, u Crnoj Gori ima više gnjezdarica nego što ih imaju Velika Britanija, Česka, Portugal, Danska, Slovenija ili Švajcarska, na primjer. Indeks gustine gnjezdarica u Crnoj Gori znatno je iznad balkanskog prosjeka (0,435) i iznosi 0,563.

Birds

Taking into account the position of Montenegro, the dynamics of relief and climate, and the fact that it is located on the Adriatic migratory corridor of birds through which birds from Siberia, Central, Northern and Eastern Europe fly to Africa and vice versa, even without research, one could sense that Montenegro hides a great treasure of ornithofauna.

So far, 352 bird species have been registered in the country, out of which 215 are breeding birds. Compared to Europe (533 species), that is 66% of the total bird fauna of the Old Continent.

Compared to other European countries, the number of nesting birds is relatively high, taking into account that Montenegro is one of the smallest countries. For example, Montenegro is in 39th place in terms of area, while in terms of the number of breeding birds it is in 22nd place, above Hungary, which is almost seven times larger than Montenegro. Also, there are more breeding birds in Montenegro than in the United Kingdom, the Czech Republic, Portugal, Denmark, Slovenia or Switzerland, for example. Breeding density index in Montenegro is significantly above the Balkan average (0.435) and amounts to 0.563.

More sa svojim pješčanim plažama, preko dina u zaleđu najduže – Veliike plaže, pa preko zaslanjenih močvara, laguna i solana čini prvi pojas biodiverziteta. Tu se posebno ističe delta rijeke Bojane s Ulcinjskom solanom kao najznačajnijim staništem za ptice na istočnoj obali Jadrana koja, zajedno s deltom Bojane, na godišnjem nivou ugosti milione ptica na gniježđenju, zimovanju ili na preletu ka Africi i obratno. Više od 250 vrsta ptica nadljeće ovo područje tokom godine.

Nakon što prelete maslinjake, mediteransku maķiju, planinske pašnjake i litice Orjena, Lovćena i Rumije, čeka ih kameno more centralnog dijela države ili Skadarsko jezero ako lete dolinom Bojane. Evropski ptičji aerodrom, amazonija ovog dijela Evrope i ornitoloski raj, samo su neki od sinonima za Skadarsko jezero. Kapacitet jezera za zimovanje, stotine i hiljade gnijezdećih parova ptica, u prvom redu kormorana, baljoški, više vrsta čaplji i čigri, uključujući i svima poznatog pelikana, čine jezero pravim bioreaktorom. Podaci s međunarodnog programa zimskog cenzusa ptica ukazuju na to da broj zimujućih jedinki na Skadarskom jezeru premašuje ukupan broj zimovalica nekih država, kakva je, na primjer, Slovenija.

The sea with its sandy beaches, over the dunes in the hinterland of the longest - the Long Beach, then over the salty swamps, lagoons and saline makes the first zone of biodiversity. The Bojana river delta stands out with the Ulcinj saline as the most important bird habitat on the eastern Adriatic coast, which, together with the Bojana Delta, hosts millions of birds annually for breeding, wintering or flying to Africa and vice versa. More than 250 species of birds fly over this area during the year.

After flying over olive groves, Mediterranean maquis, mountain pastures and cliffs of Orjen, Lovćen and Rumija, the rocky sea of the central part of the country or Skadar Lake awaits them if they fly through the Bojana valley. The European bird airport, the Amazon of this part of Europe and the ornithological paradise, are just some of the synonyms for Skadar Lake. The capacity of the lake for wintering hundreds and thousands of breeding pairs of birds, primarily cormorants, coots, several species of herons and terns, including the well-known Dalmatian pelican, makes the lake a real bioreactor. Data from the international programme of the winter bird census indicate that the number of wintering individuals on Skadar Lake exceeds the total number of wintering birds in some countries, such as Slovenia.



Kaja zmijar

Kaja, orao zmijar, prva je ptica iz Crne Gore čija je migracija praćena putem satelita. Iz Crne Gore poletjela je do Sudana i nazad do Turske. Do svog zimovališta, koje se nalazi 2.300 km ravne linije od gnijezda u kom je ponikla, Kaja je krila širila iznad 12 zemalja i to Albanije, Makedonije, Grčke, Turske, Sirije, Jordana, Izraela, Libana, Egipta, Sudana, Čada i Libije.

Short-toed snake eagle

is the first bird from Montenegro whose migration was monitored via satellite. From Montenegro she flew to Sudan and back to Turkey. To its wintering ground, located 2,300 km in a straight line from the nest in which it originated, Kaja spread its wings over 12 countries, namely Albania, Macedonia, Greece, Turkey, Syria, Jordan, Israel, Lebanon, Egypt, Sudan, Chad and Libya.

Preko jezera let ptice vodi do Ćemovskog polja, polustepne koja okuplja pojedine vrste koje su od posebnog interesa za zaštitu jer ovakva staništa doživljavaju intenzivnu transformaciju, pa su pojedine vrste ptica kao što su noćni potrk, velika i kratkoprsta ševa, postale ugrožene u Evropi.

Skadarska kotlina se račva u tri pravca, dva su kanjonima Cijevne i Morače, dublje u Prokletije i centralni dio Crne Gore, a jedan dolinom rijeke Zete ka Nikšićkom polju. Dolina rijeke Zete predstavlja važno usko grlo za migraciju ptica, gdje hiljade grabežljivica, močvarica, pjevačica i posebno ždralova, u proljećnom periodu prolaze na putu ka sjeveru.

Across the lake, the bird's flight leads to Ćemovsko polje, a semi-steppe that gathers certain species that are of special conservation concern because such habitats are undergoing intense transformation, so certain bird species such as night owls, great and short-toed larks have become endangered in Europe.

The Skadar basin goes in three directions, two are through the canyons of Cijevna and Morača, deeper into Prokletije and the central part of Montenegro, and one along the valley of the river Zeta towards Nikšićko polje. The Zeta river valley is an important bottleneck for bird migration, where thousands of predators, shorebirds, passerines and, especially cranes, in the spring pass by on their way to north.



Pelikani

Pelikani

Kudravi pelikan, gnezdarica Skadarskog jezera, jedna je od najprepoznatljivijih vrsta ptica Crne Gore i zaštitni je znak Nacionalnog parka Skadarsko jezero. Pelikani još u decembru počinju da gnijezde u trsci ili na plovećim ostrvcima treseta. Porastom nivoa vode jezera nakon većih kiša jaja ili mladi bivaju potopljeni, pa je uspješnost gnijezđenja ove vrste na jezeru često bila nula. Postavljanje prvih vještačkih ostrva za njihovo gnijezđenje počelo je 2003. godine. Nadogradnjom ostrva i postavljanjem splavora na drugim lokacijama, taj je problem uspješno riješen pa je u 2021. godini ova vrsta imala rekordnih 150 ptića a pelikan je konačno spašen.

Pelicans

Dalmatian pelican, a nesting bird of Skadar Lake, is one of the most recognizable bird species in Montenegro and is a trademark of the Skadar Lake National Park. Pelicans start nesting in reeds or on floating islands of peat in December. As the water level of the lake rises after heavy rains, the eggs or young are submerged, so the success of nesting of this species on the lake was often zero. The setting up of the first artificial islands for their nesting began in 2003. By upgrading the island and setting up rafts in other locations, this problem was successfully solved, so in 2021, this species had a record-breaking 150 birds and pelican was finally rescued.

Kraška polja predstavljaju važna staništa za odmor, zimovanje i gnijezđenje ptica. Najveće kraško polje u Crnoj Gori, Nikšićko polje, s vještačkim vodenim akumulacijama jedno je od najvažnijih mesta za ptice u zemlji. Plavne livade, meandri rijeka, ekstenzivna poljoprivreda, uslovi su koji su obezbijedili da ovo polje bude utočište za vrste kao što su kosac, sivi svračak, pirogava grmuša, i odmoriste i zimovalište glavoča, ždralova, baljoške, kao i velikog broja šljukarica.

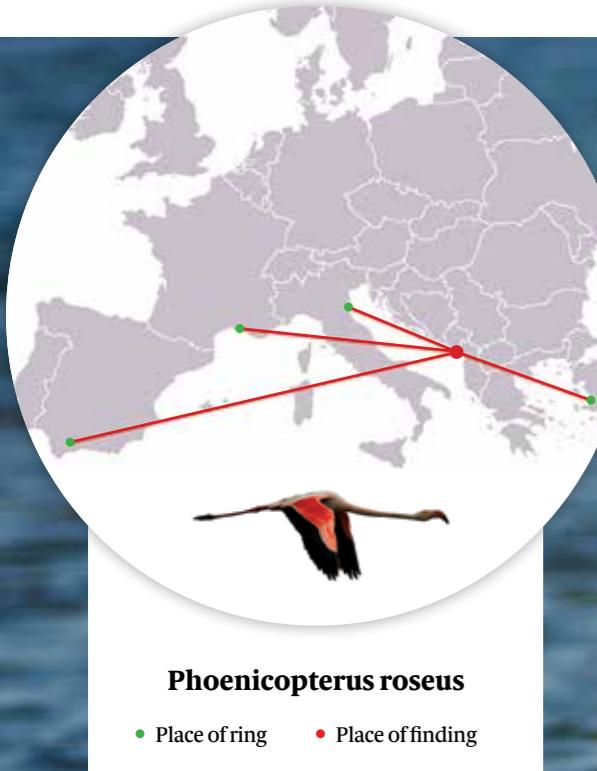
Ostatak Crne Gore isprepleten je kanjonima, zavrnama i planinama. Bogatstvo šumama čini Crnu Goru jednom od najbogatijih zemalja u Evropi, što doprinosi prisustvu i brojnosti vrsta kao što su tetrijeb i lještarka, više vrsta sova i svih deset vrsta djetliča prisutnih u Evropi. Durmitor, Biogradska gora, Prokletije, Ljubišnja, samo su neke od tzv. vrućih tačaka ornitološkog diverziteta Crne Gore u čemu prednjači Durmitor sa do sada 172 registrovane vrste ili skoro polovinom ukupno registrovanih u državi.

Karst fields are important habitats for resting, wintering and nesting of birds. The largest karst field in Montenegro, Nikšićko polje, with artificial water reservoirs is one of the most important places for birds in the country. Floodplain meadows, river meanders, extensive agriculture, are the conditions that have ensured that this field is a refuge for species such as corn crakes, grey shrike, barred warbler, resting and wintering grounds for grebes, cranes, coots, as well as large number of waders.

The rest of Montenegro is intertwined with canyons, plateaus and mountains. The richness of forests makes Montenegro one of the richest countries in Europe, which contributes to the presence and abundance of species such as capercaillie, hazel grouse, several species of owls and all ten species of woodpeckers present in Europe. Durmitor, Biogradska gora, Prokletije, Ljubišnja, are just some of the so-called hot spots of the ornithological diversity of Montenegro, in which Durmitor leads with 172 registered species or almost half of the total registered in the country.

Međunarodnim programom Natura 2000 u Crnoj Gori do sada su identifikovana 33 potencijalna SPA područja (Područja posebne zaštite po Ptčijoj direktivi), što je skoro 55% teritorije države. Zahvaljujući pticama, u Crnoj Gori imamo i tri Ramsarska područja (Močvara od međunarodnog značaja) – Skadarsko jezero, Tivatska solila i Ulcinjska solana.

The international program Natura 2000 in Montenegro has identified 33 potential SPAs so far (Special Protection Areas under the Birds Directive), which is almost 55% of the country's territory. Thanks to birds, we have three Ramsar sites in Montenegro (wetland of international importance) - Skadar Lake, Tivat saline (Tivat solila) and Ulcinj saline (Ulcinjska solana).



Flamingos

Flamingos je vrsta s najviše očitanih prstenova kod nas – čak 78. Od toga ih je najviše iz Italije 35, iz Francuske 20, Španije 16. Posebno je interesantna jedinka koja je u Turskoj prstenovana 16. 8. 2009. koja je tokom 2010. i 2011. boravila u Grčkoj, zatim Francuskoj a 2012. i 2013. u Italiji. Nakon kratke pauze bila je u Grčkoj, i to 2016. Na Ulcinjskoj solani registrovana je 5. 4. 2018.

Flamingos

Flamingos are the species with the most counted rings in our country - as many as 78. Most of them are from Italy 35, from France 20, Spain 16. Particularly interesting is the individual that was ringed in Turkey on August 16th, 2009, which resided in Greece during 2010 and 2011, then in France and in 2012 and 2013 in Italy. After a short break, she was in Greece, in 2016. She was registered at the Ulcinj Salina on April 5th, 2018.





Sisari

Sisari imaju veoma značajnu ulogu u regulisanju naših ekosistema i u njihovom stabilnom funkcionisanju. Do sada je u Evropi registrovano oko 270 vrsta sisara. Većina evropskih kopnenih vrsta sisara su sitni oblici letječih i neletječih mišolikih sisara. Od ukupnog broja evropskih vrsta, u Crnoj Gori je do sada evidentirano 85 kopnenih sisara, što predstavlja 1/3 faune sisara Evrope na samo 0,1% površine evropskog kontinenta.

Najveći evropski slijepi miš stanovnik je i Crne Gore. Na južnim obroncima planine Orjen, nedavno je pronađena i najveća vrsta slijepog miša u Evropi. Veliki noćnik je slijepi miš raspona krila i do 46cm. Iako se slijepi miševi Evrope hrane isključivo beskičmenjacima, na jelovniku ovog slijepog miša tokom proljeća i jeseni, mogu se naći i male ptice poput crvendača ili šumskog zviždaka.

Mammals

Mammals play a very important role in regulating our ecosystems and in their stable functioning. About 270 species of mammals have been registered in Europe so far. Most European terrestrial mammal species are tiny forms of flying and non-flying mouse-like mammals. Out of the total number of European species, 85 terrestrial mammals have been recorded in Montenegro so far, which represents 1/3 of the mammal fauna of Europe on only 0.1% of the surface of the European continent.





Kopita kao cepini, a srce atlete. Balkanska divokoza, alpska antilopa Balkanskog poluostrva, jedna je od najugroženijih podvrsta alpske divokoze. Na crnogorskim planinama živi oko 1500 divokoza, od čega je 1/3 populacije skoncentrisana u Nacionalnom parku Durmitor. Nekad je bila gusto rasprostranjena po Bjelasici, Komovima, Vojniku, Moračkim i Kućkim planinama, po crnogorskem dijelu Prokletija, a danas se tamo vrlo rijetko može registrovati. Iako za nju postoji mnogo pogodnih staništa u Crnoj Gori, vrsta je na mnogima iščezla uslijed krivolova.

Hooves like ice axes, and the heart of an athlete. The Balkan chamois, the alpine antelope of the Balkan Peninsula, is one of the most endangered subspecies of the alpine chamois. About 1,500 chamois live in the Montenegrin mountains, of which 1/3 of the population is concentrated in the Durmitor National Park. It used to be densely distributed in Bjelasica, Komovi, Vojnik, Moračke and Kućke mountains, in the Montenegrin part of Prokletije, and today it can be very rarely registered there. Although there are many suitable habitats for it in Montenegro, the species has disappeared in many due to poaching.

Fauna sisara Crne Gore odlikuje se veoma interesantnim, rijetkim i endemičnim vrstama, čiji se ekološki tipovi ogledaju kroz podzemne, nadzemne, vodene i letjeće vrste. Kombinacija niskog stepena istraženosti sisara i fizičko-geografskih karakteristika Crne Gore, otvara mogućnost pronalaska još mnogo vrsta iz ove životinjske grupe. U posljedne tri godine otkrivene su tri nove vrste sisara za Crnu Goru: šareni tvor, primorski ušati slijepi miš i veliki noćnik.

The mammal fauna of Montenegro is characterized by very interesting, rare and endemic species, whose ecological types are reflected through underground, aboveground, aquatic and flying species. The combination of a low level of mammal research and physical-geographical characteristics of Montenegro, opens the possibility of finding many more species from this animal group. In the last three years, three new species of mammals have been discovered for Montenegro: the marbled polecat, the mediterranean long-eared bat and the greater noctule bat.



Kroz Program za očuvanje krupnih zvijeri, u oktobru 2020. godine u Parku prirode Piva, a radi boljeg razumijevanja ekologije mrkih medvjeda, Centar za zaštitu i proučavanje ptica (CZIP) opremio je jednog medvjeda satelitskim odašiljačem sa službenim nazivom „Borko“. Pomoću satelita doći će se do odgovora na pitanja o sezonskoj dinamici vrste, ishrani, veličini teritorije, lokacijama koje preferiraju za brloženje itd. U Pivi je takođe, a na osnovu genetičke analize iz izmeta, determinisano prisustvo 19 mužjaka i sedam ženki.

U vrijeme kad mu je stavljena ogrlica Borko je imao 148 kg i bio je star oko pet godina. Za prva dva dana od obilježavanja prešao je skoro 15 km, a tokom prve jeseni preplivao je Pivsko jezero čak 10 puta.

Through CZIP Programme for Large Carnivore Conservation, in October 2020 in Nature Park Piva, for the purpose of better understanding of the ecology of brown bears, a bear with the official name "Borko" was equipped with the GPS-transmitter by the Center for Protection and research of Birds (CZIP). The transmitter will help answer the questions of seasonal dynamics of the species, feeding, size of the territory, preferred den sites, etc. Also, based on the genetic analysis of feces, the presence of 19 males and 7 females was determined in Piva.

At the time the collar with GPS-transmitter was placed, Borko's weight was 148 kg and he was five years old. For the first two days since marking, he crossed nearly 15 km and during the first autumn he swam across Piva lake as many as ten times.



Prisustvo mungosa u Crnoj Gori je i poziv za hitno kreiranje strategije upravljanja invazivnim vrstama. Mali indijski mungos porijeklom je iz Azije. Ubraja se u 100 najinvazivnijih vrsta na svijetu i pravi ogromnu štetu izvornim vrstama. U zaleđu plaže Jaz markirane su tri jedinke mungosa koje se prate pomoću GPS uređaja koji će pomoći u otkrivanju više detalja iz ekologije, ponašanja i biologije malog indijskog mungosa u Crnoj Gori.

The presence of mongoose species in Montenegro is also a call for the urgent creation of an invasive species management strategy. The small Indian mongoose comes from Asia. It is one of the 100 most invasive species in the world and does enormous damage to native species. In the hinterland of Jaz beach, three mongooses have been marked, which are tracked using GPS devices that will help reveal more details from the ecology, behavior and biology of the small Indian mongoose in Montenegro.



A wide-angle photograph of a mountainous landscape. In the foreground, there are rolling hills covered in green and yellow vegetation, suggesting a transition between seasons. The middle ground features more hills and some small bodies of water or streams. The background is dominated by large, rugged mountains with rocky peaks and patches of snow or ice. The sky is filled with scattered clouds, with some bright sunlight breaking through.

ZAŠTITA
PRIRODE

NATURE
PROTECTION

Istorijat zaštite prirode

Perve aktivnosti na zaštiti prirode u Crnoj Gori datiraju još od kraja XIX vijeka kad je 1878. godine dio šuma na području Biogradske gore poklonjen knjazu Nikoli Petroviću te je tako nastao „Knjažev zabran“, koji je kasnije bio poznat kao „Branik kralja Nikole“. Nakon šest godina (1884) donijete su Naredba o zaštiti korisne divljači i Naredba o lovljenju divljači. Ovim aktima regulisan je lovostaj za određene vrste divljači, s tim što se „štetna“ divljač mogla loviti tokom cijele godine. Zabranjeno je bilo i uništavanje gnijezda, jaja i mladunčadi svih vrsta korisne divljači. Poznati istraživač ptica Crne Gore Ljudevit Firer, autor značajnog djela „Jedna godina ornitološkog istraživanja u Crnoj Gori“ (1894), žalio se kako mu crnogorski pastiri i seljaci nijesu htjeli, ni za ponuđenu visoku novčanu nagradu, pokazati gnijezda rijetkih i drugih ptica u vrijeme lovostaja.

Године 1893. ступио је у живот закон о лову и о заштити птица, што га је саставио кнезевић-наследник, те се тим законом од фебруара до септембра најстрожије брани сваки лов и свако хватање, за тим вађење гнијезда и продавање птичијих јаја. Народ се томе закону свуда покорава и ни по што га неће преокршити. Тако и. пр. пастире, који су знали за птичија гнијезда, ни за награду, према овдашњим приликама велику, нијеси могао повратити, да ти покажу такво гнијездо. Осим тога забрањено је народу за сву годину пуштање близу арбанаске међе, јер би по овим непрестаним немирима на међи, по даномичним готово свађама, и по крвавој освети, која на жалост још увијек своје жртве тражи, сваки метак из пушкине значио позив на оружје.

У осталом Црногорци већином лове гађају у лијету, те осим Веридлове пушкине ријетко кад уза се имају другу; па пошто се лов сматра „прозреном“ забавом, то људи нити се ишта разумiju у орнитологију, нити се за њу занимају.

History of nature protection

The first activities on nature protection in Montenegro date back to the end of the 19th century, when a part of the forests in the area of Biogradska gora was donated to Prince Nikola Petrović in 1878 and thus the "Knjažev zabran" was created, later known as "Branik Kralja Nikole". Six years later, in 1884, the Order on the Protection of Useful Game and the Order on Game and Hunting were issued. These acts regulate the hunting season and its closure for certain types of game, with the provision that "harmful" game could be hunted throughout the year. It was also forbidden to destroy nests, eggs and young of all kinds of useful game. Ludwig von Führer, well-known bird researcher of Montenegro, who wrote a significant paper "One year of ornithological research in Montenegro" (1894), complained that Montenegrin shepherds and peasants did not want to show him the nests of rare and other birds at the time of closed season, even for the high monetary reward offered.

Poslije Drugog svjetskog rata, 1945. godine, donijet je Zakon o zaštiti spomenika kulture i prirodnih rijetkosti, dok je prvi Zakon o zaštiti prirode donijet 1961. godine kad je osnovana prva institucija u oblasti zaštite prirode u Crnoj Gori – Republički zavod za zaštitu prirode. Prvi spisak zaštićenih životinjskih vrsta donijet je 1968. godine, koji je proširen 1985. Taj spisak je proširen 2006. godine i donijeto je Rješenje o stavljanju pod zaštitu pojedinih biljnih i životinjskih vrsta. Od tada pa do danas zakonski okvir iz oblasti zaštite prirode konstantno je unapredijan.

Prva zaštićena područja nakon Drugog svjetskog rata proglašena su 1952. godine i to su tri nacionalna parka: NP Biogradska gora, NP Lovćen i NP Durmitor. Posebno su značajne 1965. godina kad je proglašeno sedam novih zaštićenih područja, i 1968. godina kad je 48 lokaliteta dobilo status zaštićenog područja najviše u kategoriji spomenik prirode. U ta područja ušao je i veći broj plaža Crnogorskog primorja. Istim aktom iz 1968. godine kao objekti prirode pod zaštitu su stavljene i određene značajne biljne i životinjske vrste. Trend proglašenja zaštićenih područja nastavio se od tada do danas i rezultirao je uspostavljanjem 75 zaštićena područja – 73 kopnena i dva morskog područja.

After World War II in 1945, the Law on the Protection of Cultural Monuments and Natural Rarities was passed, while the first Law on Nature Protection was passed in 1961, when the first institution in the field of nature protection in Montenegro, the Republic Institute for Nature Protection, was established. The first list of protected animal species was compiled in 1968 which is expanded 1985. This list was expanded in 2006, when a Decision on the protection of certain plant and animal species was issued. From then until today, the legal framework in the field of nature protection has been increasingly improved.

The first protected areas after World War II were declared in 1952 and these are the three national parks: Biogradska Gora, Lovcen and Durmitor. The year 1965 is especially noteworthy, when 7 new protected areas were declared, and then 1968, when 48 new protected areas were declared, mostly in the category of natural monuments. A large number of beaches on the Montenegrin coast were included in these areas. Certain important plant and animal species were protected by same 1968 Act as nature structures. The trend of declaring protected areas has continued ever since and has resulted in the establishment of 75 protected areas - 73 terrestrial and two marine.



Šest godina nakon proglašenja prvog nacionalnog parka u svijetu (Jelouston u SAD-u, 1872. godine) zaštićena je i teritorija Biogradske gore (sliv Biogradske rijeke i Jezerštice), kad su crnogorska plemena (Moračko i Rovačko) svoj dio šuma na području Biogradske gore poklonili gospodaru Crne Gore – knjazu Nikoli. Ovaj dio šume danas pripada NP Biogradska gora i predstavlja jednu od malobrojnih prašuma u Evropi.

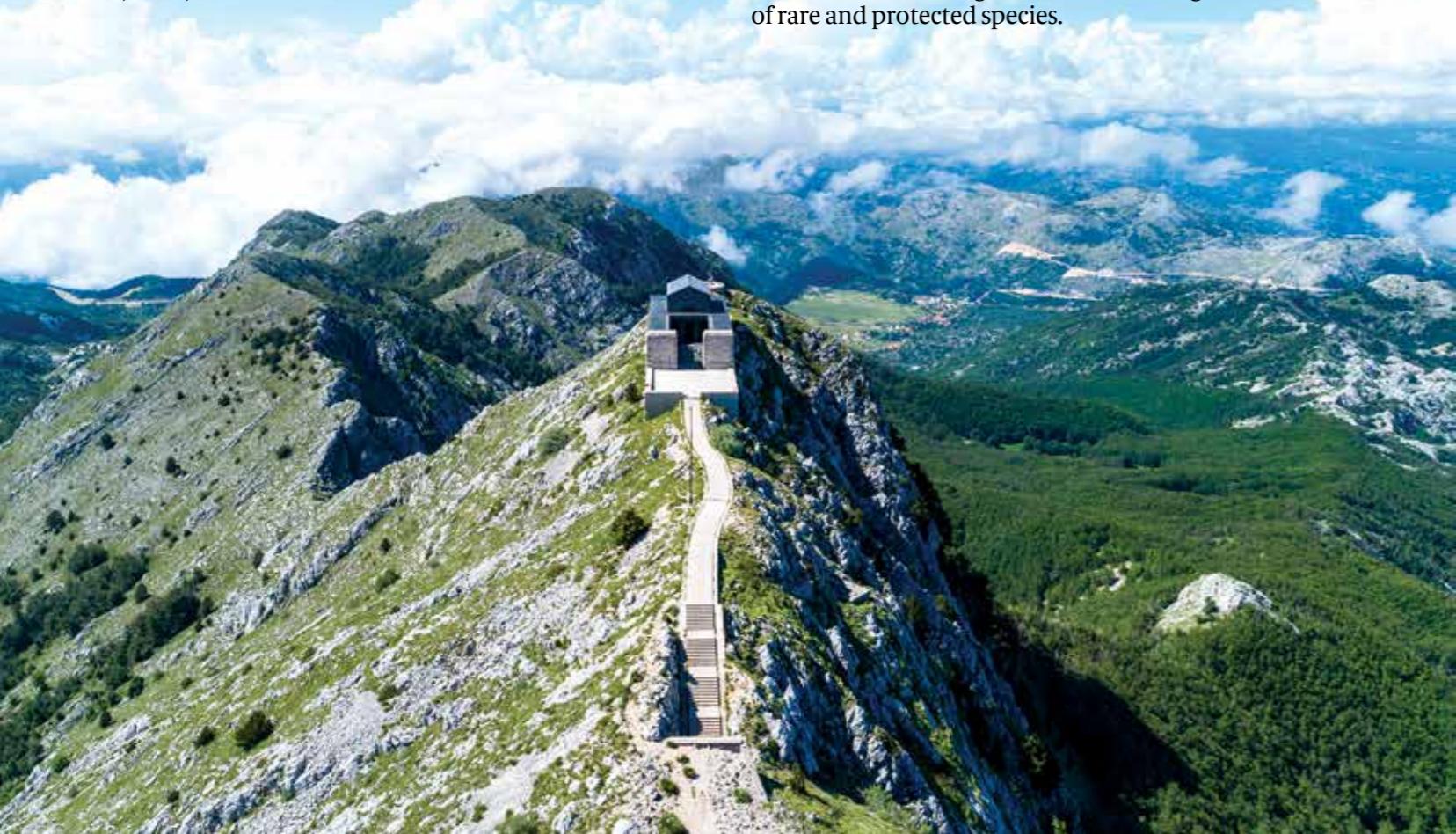
Six years after the proclamation of the first national park in the world (Yellowstone, 1872 in the USA), the territory of Biogradska gora (Biogradska river and Jezerštica river catchment area) was protected, when Montenegrin tribes (Moračko and Rovačko) had their share of forests on area of Biogradska gora donated to the lord of Montenegro - Prince Nikola. Today, this part of the forest is located within the Biogradska gora National Park and is one of the few rainforests in Europe.

Nacionalni park Lovćen

Nacionalni park Lovćen proglašen je zaštićenim područjem 1952. godine. Park obuhvata centralni i najviši dio lovćenskog masiva. Površina parka iznosi 6.220 ha. Izdiže se u neposrednoj blizini mora te predstavlja značajnu planinu oromediteranskog dijela Crne Gore. Najviši vrhovi parka: Štirovnik (1749 m) i Jezerski vrh (1657 m) okruženi su dubokim kraškim depresijama: Ivanova korita, Dolovi, Kuk, Veliki Bostur, Mali Bostur i dr. Posebnu vrijednost parka predstavlja 1.300 registrovanih biljnih vrsta, što čini 1/3 ukupne crnogorske flore, među kojima je veliki broj endema.

Nacionalni park Biogradska gora

Dio područja NP Biogradska gora uživa zaštitu još od 1878. godine kad je proglašen Knjaževim zabranom; dok Biogradska gora kao nacionalni park figurira od 1952. godine. Površina parka iznosi 5.650 ha. Najvažnije obilježje parka je prašuma koja se u sлив Biogradske rijeke, Biogradskog jezera i rijeke Jezerštice prostire na površini od 1.600 ha. U prašumi je prisutno preko 86 vrsta drveća i žbunja, a starost pojedinih stabala procijenjena je na 400 godina, dok su neka od njih visoka oko 60 metara. Pored Biogradskog jezera u parku se ističu još tri lednička jezera: Pešića jezero, Ursulovačko jezero i Šiško jezero. Park se odlikuje bogatom i očuvanom florom, svjetom gljivom i faunom sa značajnim brojem rijetkih i zaštićenih vrsta.



Lovcen National Park

Lovcen National Park was declared a protected area in 1952. The park includes the central and highest part of Lovcen massif. The area of the park is 6,220 ha. It rises in close proximity of the sea and it is a significant mountain in the oro-Mediterranean part of Montenegro. The highest peaks of the park: Stirovnik (1749 m) and Jezerski vrh (1657) are surrounded by deep karst depressions: Ivanova korita, Dolovi, Kuk, Veliki Bostur, Mali Bostur and others. The special value of the park is represented by 1,300 registered plant species, which makes 1/3 of the total Montenegrin flora, out of which a large number is endemic.

Biogradska gora National Park

Part of the area of the Biogradska gora National Park has enjoyed protection since 1878, when "Knjazev zabran" was declared; while Biogradska gora has been a national park since 1952. The area of the national park is 5,650 ha. The most important feature of the park is the rainforest in the basin of the Biogradska river, Biogradsko lake and the river Jezerstica, which covers an area of 1,600 ha. There are over 86 species of trees and shrubs in the rainforest, and the age of some trees is estimated at 400 years, while some of them are about 60 meters high. In addition to Biogradsko lake, three other glacial lakes stand out in the park: Pešića, Ursulovačko and Šiško lakes. The park is characterized by rich and preserved flora, the world of fungi and fauna with a significant number of rare and protected species.

Nacionalni park Skadarsko jezero

Skadar Lake was declared a national park in 1983. The area of this protected area is 40,000 ha dominated by aquatic and wetland ecosystems. One of the main characteristics is the wetland, which stretches along the northern coast on 20,000 ha, which is on the world list of wetlands of international importance - Ramsar list, since 1995. Also, Skadar Lake is an area of international importance for the residence of birds (IBA - Important Bird Areas). About 280 bird species are registered on the lake, which services millions of birds throughout the year. Due to its richness in birds, it is also known as the "European Bird Airport".

Nacionalni park Prokletije

Nacionalni park Prokletije proglašen je 2009. godine. Površina Nacionalnog parka Prokletije je 16.038 ha. Park u cjelini predstavlja jedan od najsloženijih planinskih masiva Balkanskog poluostrva. Karakteriše ga više planinskih grupa od kojih se posebno ističu: Bogičevica, Ujkov krš, Maja karanfili, Vezirova brada, Maja podgajš, Popadija, Trojan i drugi. Glavni greben Prokletije dug je preko 70 km.

Crnogorske Prokletije ograničene su rijekama: Cijevnom, Limom i Ibrom. Karakterišu ga brojni vrhovi s preko 2.000 mnv te glacijalna jezera: Hridsko, Visitorsko, Ropojansko, Tatarisko jezero, Bjelajsko, jezerce na Vezirovoj bradi, jezerce na Treskavcu, Koljindarsko i dr., zatim rijeke, vrela i izvorite pitke i mineralne vode. Na Prokletijama se nalazi najviši vrh Crne Gore – Zla Kolata (2.534 m).

Nacionalni park Prokletije posebno se odlikuje bogatstvom i raznovrsnošću flore, faune i gljiva tako da predstavlja ne samo centar visokoplaninskog diverziteta Balkana, već i centar biodiverziteta od evropskog i svjetskog značaja.



Skadar Lake National Park

Skadar Lake was declared a national park in 1983. The area of this protected area is 40,000 ha dominated by aquatic and wetland ecosystems. One of the main characteristics is the wetland, which stretches along the northern coast on 20,000 ha, which is on the world list of wetlands of international importance - Ramsar list, since 1995. Also, Skadar Lake is an area of international importance for the residence of birds (IBA - Important Bird Areas). About 280 bird species are registered on the lake, which services millions of birds throughout the year. Due to its richness in birds, it is also known as the "European Bird Airport".

Prokletije National Park

Prokletije National Park was declared in 2009. The area of the Prokletije National Park is 16,038 ha. The park as a whole is one of the most complex mountain massifs of the Balkan Peninsula. It is characterized by several mountain groups, out of which the most prominent are: Bogičevica, Ujkov krš, Maja karanfili, Vezirova brada, Maja podgajš, Popadija, Trojan and others. The main ridge of Prokletije is over 70 km long.

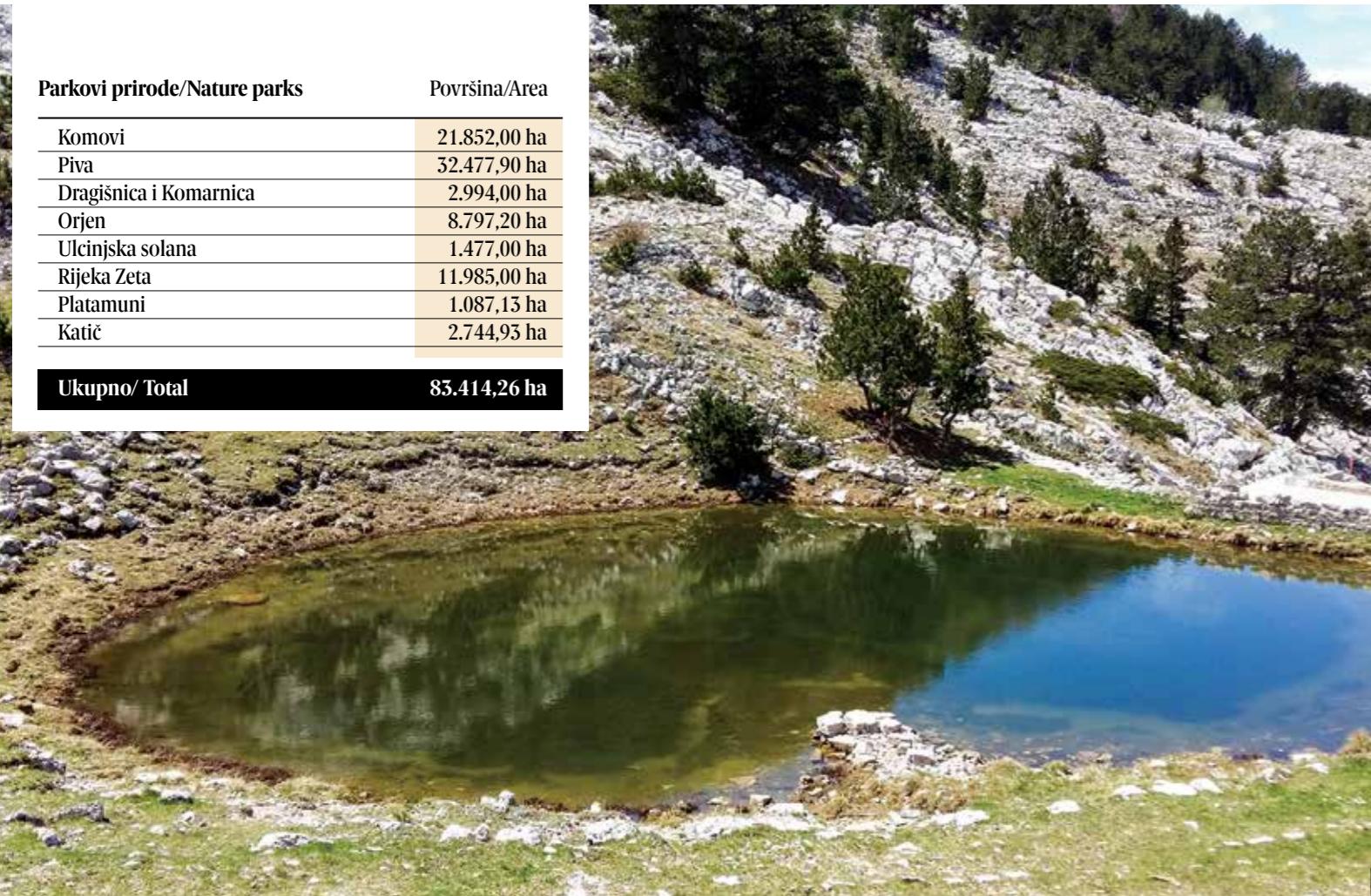
Montenegrin Prokletije is limited by the rivers: Cijevna, Lim and Ibar. It is characterized by numerous peaks 2,000 meters or more above sea level and glacial lakes: Hridsko, Visitorsko, Ropojansko, Tatarisko lake, Bjelajsko, a lake on Vezirova Brad, a lake on Treskavac, Koljindarsko, etc., as well as by rivers, springswaters and sources of drinking and mineral water. The highest peak in Montenegro is settled in Prokletije - Zla Kolata (2,534m).

Prokletije National Park is especially characterized by the richness and diversity of flora, fauna and fungi, so that it represents not only the center of high mountain diversity in the Balkans, but also the center of biodiversity of European and world importance.

Parkovi prirode

Nakon nacionalnih parkova, po površini najveća zaštićena područja u Crnoj Gori su parkovi prirode: Komovi, Piva, Dragišnica i Komarnica, Orijen, Ulcinjska solana, Rijeka Zeta, Platamuni i Katić.

Parkovi prirode/Nature parks	Povrsina/Area
Komovi	21.852,00 ha
Piva	32.477,90 ha
Dragišnica i Komarnica	2.994,00 ha
Orijen	8.797,20 ha
Ulcinjska solana	1.477,00 ha
Rijeka Zeta	11.985,00 ha
Platamuni	1.087,13 ha
Katić	2.744,93 ha
Ukupno/ Total	83.414,26 ha



Park prirode Dolina rijeke Zete

Dolina rijeke Zete proglašena je parkom prirode 2019. godine. Ona predstavlja prostranu cjelinu koju karakteriše veliko prirodno i kulturno-istorijsko bogatstvo s izraženim biodiverzitetskim, pejzažnim i kulturnim vrijednostima i obilježjima od nacionalnog i međunarodnog značaja. Vode Zete, posebno u gornjem toku, staništa su pastrmskih vrsta riba sa posebno značajnom endemskom vrstom – zetskom mekousnom pastrmkom *Salmo obtusirostris zetensis*. Područje Parka rijeke Zete karakteriše prisustvo velikog broja beskičmenjaka, 10 vrsta vodozemaca i 23 vrste gmizavaca, 265 vrsta ptica i 24 vrste sisara.

Nature parks

National parks are followed by the largest protected areas in Montenegro - nature parks: Komovi, Piva, Dragišnica and Komarnica, Orijen, Ulcinjska solana (Ulcinj Salila), Zeta River Nature Park, Platamuni and Katić.



Nature Park Zeta River Valley

Nature Park Zeta River Valley was declared in 2019. Zeta River Valley is a vast settlement characterized by great natural and cultural - historical wealth with pronounced biodiversity, landscape and cultural values and features of national and international importance. Zeta waters, especially in the upper course, are habitats of trout fish species with endemic - Zeta soft-mouth trout *Salmo obtusirostris zetensis*. The area of Zeta River Park is characterized by the presence of a large number of invertebrates, 10 species of amphibians and 23 species of reptiles, 265 species of birds and 24 species of mammals.

Park prirode Ulcinjska solana

Park prirode Ulcinjska Solana proglašen je 2019. godine, jednu od najvećih solana na Mediteranu i predstavlja vještacko stanište gdje čovjek diriguje vrijeme upumpavanja vode u bazine, nivo vode i salinitet. Solana je najznačajnije hranilište, gnjezdilište ptica i odmaralište tokom jesenje i proljeće seobe na cijeloj istočnoj obali Jadrana. Do sada su na Solani registrovane 252 vrste ptica. Prestankom rada Solane kao fabrike soli doveden je u pitanje opstanak miliona ptica koje koriste njene servise, naročito tokom seobe.

Park prirode Platamuni

Park prirode Platamuni proglašenje 2021. godine kao prvo morsko zaštićeno područje u Crnoj Gori. Karakteriše ga prisustvo stanišnih tipova prioritetnih za zaštitu na evropskom nivou: stanište morske trave (*Posidonia oceanica*), naročito visoke reprezentativnosti u uvali Žukovac, u okolini hradi Kalafat (Seka Albaneze), ali i kod rta Platamuni i u uvali Velika kreka; zatim staništa morskih pećina s nadvodnim i podvodnim ulazima.

Na kopnenom dijelu Parka prirode Platamuni posebno je značajna vegetacija mediteranskih morskih klifova obraslih endemičnim vrstama roda *Limonium*, te termomediteranski prepustinjski žbunjaci s drvenastom mlječikom (*Euphorbia dendroides*).

Park prirode Platamuni karakterišu i pejzažne vrijednosti i bogata kulturna baština a posebno je značajno bogatstvo vrsta flore i faune od kojih su brojne vrste ugrožene i rijetke na nacionalnom i na međunarodnom nivou.



Nature Park Ulcinj Salina

Nature Park Ulcinj Salina was declared in 2019. Nature Park Ulcinj Salina is one of the largest salt pans in the Mediterranean, an artificial habitat where man determines the time of pumping water into basins, its level and salinity. Salina is the most important feeding ground, bird nesting place and resting place during autumn and spring migration on the entire eastern Adriatic coast. So far, 252 species of birds have been registered at the Salina. Decommission of Salina as a salt factory raised doubts of the survival of millions of birds that use the Salina services, especially during the migration.

Nature Park Platamuni

Platamuni Nature Park was declared in 2021 as the first marine protected area in Montenegro. It is characterized by the presence of habitat types which have priority protection at the European level: seagrass habitats (*Posidonia oceanica*), especially high representativeness in the bay Zhukovac, around the cliffs Kalafat (Seka Albaneze), but also near Cape Platamuni and Velika Krekavica inlet; as well as the habitats of sea caves with surface and submarine entrances.

On the terrestrial part of the Platamuni Nature Park, the vegetation of the Mediterranean sea cliffs overgrown with endemic species of the genus *Limonium*, and the thermo-Mediterranean desert shrubs with tree spurge (*Euphorbia dendroides*) are particularly significant.

Nature Park Platamuni is characterized by both landscape values and rich cultural heritage, and the richness of flora and fauna is especially significant, many of which are endangered and rare species both on national and international level.

Ostala zaštićena područja

Osim nacionalnih parkova i parkova prirode zaštićena područja u Crnoj Gori su:

- strogi rezervati prirode
- posebni rezervat prirode
- spomenici prirode
- predjeli izuzetnih odlika.

Strogi rezervati prirode: Mrijestilište ukljeve na Skadarskom jezeru; Rezervat Pančeva oka i Manastirska tapija

Posebni rezervat prirode:

Tivatska solila
Posebni rezervat prirode Tivatska solila proglašen je 2008. godine. Njegova površina iznosi 150 ha. Karakteriše ga bogatstvo ornitofaune a ukupan broj ptičjih vrsta registrovanih na Tivatskim solilima iznosi 111 vrsta, od čega je 48 vodenih. Tako ovaj rezervat prirode spada među najznačajnija zimovališta i gnjezdališta za ptice u Crnoj Gori. Područje Tivatskih solila ima i posebne pejzažne vrijednosti, a značajna su i s kulturološkog apseka kao srednjovjekovna solana.

Posebni rezervati prirode pod preventivnom zaštitom

- Sopot i Dražin vrt. Lokaliteti Sopot i Dražin vrt u Bokokotorskom zalivu stavljeni su pod preventivnu zaštitu 2021. godine. Površina posebnih rezervata prirode pod preventivnom zaštitom – Sopot i Dražin vrt iznosi 23.290,66 m². Područje karakteriše izuzetna vrijednost biodiverziteta, a posebno koraligene zajednice vrste Savalia savaglia (Zlatni koral). Istraživanja vrste Savalia savaglia u Crnoj Gori pokazala su da je prisutna samo u Bokokotorskem zalivu, kad je utvrđeno nešto manje od 1.000 kolonija Zlatnog korala, što je dvostruko više od svih poznatih kolonija ove vrste u čitavom Mediteranu. Najveće populacije zabilježene su upravo na lokalitetima Sopot i Dražin vrt.

Spomenici prirode: Kanjon Cijevne; Arboretum u Grahou; Gornjopoljski vir; Poluostrvo Ratac sa Žutokrljicom; Sastojina lovora i oleandera iznad vrela Sopot kod Risna; Botanički vrt Dulovine u Kolašinu; Brdo Spas kod Budve; Park i zgrada zavičajnog muzeja u Herceg Novom; Park Hotela „Boka“; Veliki gradski park u Tivtu; Njegošev park, Park 13. jul i Park u dvorištu dječje bolnice na Cetinju; Park Muzeja na Topolici u Baru; Kompleks zelenih površina koje se nalaze između tvrdave Forte Mare i tvrdave Citadele u Herceg Novom; Čalovića Klisura; Jama Duboki Do na Njegušima; Lipska pećina; Novakovića pećina kod Tomaševa; Pećina Globičica; Pećina Babatuša; Pećina Magara; Pećina Špilja kod Trnova/Virpazar; Velika plaža kod Ulcinja; Plaža Veliki pijesak; Plaža Bečići; Plaža Drobni pijesak; Plaža Jaz; Plaža Lučice; Plaža Mogren; Plaža Petrovac; Plaža Pržno kod Tivta; plaže Svetog Stefana i Miločera; Slovenska plaža; Mala ulcinjska plaža; Stari Ulcinj (otok i plaža); Plaža Buljarica; Plaža Čan; Plaža Pećin; Plaža Su-

Other protected areas

In addition to national parks and nature parks, protected areas in Montenegro are:

- Strict nature reserves;
- Special nature reserve;
- Natural monuments;
- Areas of exceptional features

Strict nature reserves: Common bleaks hatchery on Skadar Lake; Panceva Oka Reserve and Manastirska tapija.

Special nature reserve:

Tivat Saline
Special nature reserve Tivat Saline was declared in 2008. The area of the special nature reserve Tivat Saline is 150 ha. Special nature reserve Tivat Saline is characterized by the richness of ornithofauna and the total number of bird species registered in Tivat Saline is 111 species, out of which 48 are aquatic. Thus, the special nature reserve Tivat Saline falls among the most important wintering and nesting places for birds in Montenegro. The area of the Special Reserve also has special landscape values, and it is significant from the cultural aspect as a medieval saline.

Special nature reserves under preventive protection

- Sopot and Dražin vrt. The sites Sopot and Dražin vrt in the Bay of Kotor were placed under preventive protection in 2021. The area of special nature reserves under preventive protection - Sopot and Dražin vrt is 23290.66 m². The area is characterized by an exceptional value of biodiversity, and especially coralligenous communities of the species Savalia savaglia (Golden Coral). Research on the species Savalia savaglia in Montenegro showed its presence only in the Bay of Kotor, when slightly less than 1,000 colonies of Golden Coral were found, which is twice as many as all known colonies of this species in the entire Mediterranean. The largest populations were recorded at the localities of Sopot and Dražin Vrt.

Natural monuments: Cijevna Canyon, Botanical garden Arboretum Grahovo, Gornjopolje spring, Ratac Peninsula with Žutokrljica, Botanical reserve of laurel and oleander above the Sopot spring near Risan, Botanical Garden of Dulovina in Kolašin; Spas hill near Budva; Park and museum building near in Herceg Novi; Park near the Boka hotel; City park in Tivat; Parks „13th July“ and „Njegoš Park“ in Cetinje; Castle Park on Topolica in Bar; The complex of green areas located between the fortresses of Forte Mare and the Citadel fortress in Herceg Novi; Čalovića Gorge; Duboki Do pit in Njeguši; Lipa Cave; Novaković Cave near Tomaševo; Globičica Cave; Babatuša Cave; Magara Cave; Špilja Cave near Trnovo/Virpazar; Long beach in Ulcinj; Veliki pijesak Beach (Great Sand); Bečići Beach, Drobni pijesak Beach; Jaz

tomore; Plaža Topolica; Plaža Valdanos; Hrast medunac (*Quercus pubescens*) u Donjem Orahovcu; Hrast česvina (*Quercus ilex*) u Baru (dva dendrološka objekta); Maslina (*Olea europaea*) u Budvi; Stara maslina u Baru; dva stabla hrasta česvine (*Quercus ilex*) u Herceg Novom; Skupina stabala hrasta medunca (*Quercus pubescens*) u Kotoru kod crkve Sv. Petke; Hrast medunac (*Quercus pubescens*) u Tuzima u Vranju; dva stabla hrasta česvine (*Quercus ilex*) u Ulcinju ispod sela Komina i u Limanu; dva stabla hrasta medunaca (*Quercus pubescens*) u Ulcinju u Krutima i u Zogjanu; stabla hrasta prnara (*Quercus coccifera*) u Ulcinju ispod hotela Jadran; skupina stabala Hrasta prnara (*Quercus coccifera*) u Ulcinju u Meterizima.

beach; Lučice beach; Mogren Beach; Petrovac Beach; Pržno Beach near Tivat; St Stefan and Miločer beach; Sloveian Beach; The Small Ulcinj Beach; Old Ulcinj (island and beach); Buljarica Beach, Čanj Beach, Pećin Beach; Sutomore Beach, Topolica Beach; Valdanos Beach; The downy oak (*Quercus pubescens*) in Donji Orahovac; the evergreen oak (*Quercus ilex*) In Bar (two dendrological objects); the Olive (*Olea europaea*) in Budva; Old Olive in Bar; two trees of evergreen oak (*Quercus ilex*) in Herceg Novi; group of trees of the downy oak (*Quercus pubescens*) in Kotor near the church St Petka; the downy oak (*Quercus pubescens*) in Tuzi and Vranje; two evergreen oaks (*Quercus ilex*) in Ulcinj, below villages Komina and Liman; the kermes oak trees (*Quercus coccifera*) in Ulcinj below Jadran hotel; the group of trees of kermes oak (*Quercus coccifera*) in Ulcinj in Meterizi.

Međunarodno zaštićena područja

Crna Gora je potpisnica brojnih međunarodnih dokumenta/konvencija u oblasti zaštite prirode na osnovu kojih su određena područja stavljeni pod međunarodnu zaštitu.

UNESCO zaštićena područja

Prirodno i kulturno-istorijsko područje
Kotora – 14.600 ha
Biosferin rezervat „Basen rijeke Tare“ – 182.889 ha
Svjetska prirodna baština NP Durmitor s kanjonom rijeke Tare – 32.100 ha

RAMSAR zaštićena područja

NP Skadarsko jezero – 20.000 ha
Tivatska solila – 150 ha
Ulcinjska solana – 1.477 ha

EMERALD područja

Na osnovu Bernske konvencije u Crnoj Gori identifikovana su 32 Emerald područja.

Ustpostavljanje mreže zaštićenih područja – Natura 2000 u Crnoj Gori

U Crnoj Gori je u toku realizacija brojnih aktivnosti u cilju identifikacije potencijalnih područja ekološke mreže od značaja za Evropsku uniju (Natura 2000) koja se zasniva na implementaciji Direktive o habitatima EU i Direktive o pticama EU.

Internationally protected areas

Montenegro is a signatory to numerous international documents / conventions in the field of nature protection on the basis of which certain areas are placed under international protection.

UNESCO protected areas

Natural and cultural-historical area of Kotor - 14,600 ha
Biosphere Reserve "Tara River Basin" - 182,889 ha
World Natural Heritage NP "Durmitor" with the canyon of the river Tara - 32,100 ha

RAMSAR protected areas

NP "Skadar Lake" - 20,000 ha
Tivat Saline - 150 ha
Ulcinj Salina - 1,477 ha

EMERALD areas

Based on the Bern Convention, 32 Emerald areas have been identified in Montenegro.

Establishment of a network of protected areas - Natura 2000 in Montenegro

There are many ongoing activities in Montenegro on the identification of potential sites suitable to be part of ecological network of the importance for European Union (Natura 2000) which is based on the implementation of the EU Habitats Directive and the EU Birds Directive.

Istraživanja biodiverziteta u susret članstvu u EU

Crna Gora, kao zemlja kandidatkinja za članstvo u Evropskoj uniji (EU) u obavezi je da uspostavi mrežu zaštićenih područja – Natura 2000. Kako je propisano Zakonom o zaštiti prirode ova područja biće dio ekološke mreže. Od momenta otvaranja pretpriступnih pregovora, država je u brojnim strateškim dokumentima identifikovala značaj zaštite prirode, a Poglavlje 27 – životna sredina i klimatske promjene, kao jedno od najzahtjevnijih i najkompleksnijih poglavlja. Jedan od uslova za zatvaranje pomenutog poglavlja jeste i uspostavljanje mreže Natura 2000. Mreža se sastoji od područja od značaja za zajednicu (SCI), koja se proglašavaju na osnovu odredbi Direktive o staništima i područja od posebne zaštite (SPAs) na osnovu Direktive o pticama.

Prva sistematizovana istraživanja radi uspostavljanja zaštićenih područja predviđenih direktivama EU napravljena su IPA projektom Uspostavljanje mreže Natura 2000, u periodu od 2016. do 2019. godine. U okviru projekta izvršena su sveobuhvatna istraživanja na osnovu u literaturi dostupnih podataka za sve vrste i staništa od interesa za Zajednicu (vrste i staništa koja su taksativno pobrojana na aneksima dviju direktiva), pripremljene takozvane referentne liste (na kojima su prikazane sve vrste s aneksima direktiva, koje su registrovane u CG) kao polazna osnova za istraživanja na terenu, određene granice biogeografskih regiona, pripremljeni kriterijumi za odabir budućih Natura 2000 područja. Sprovedene su i dvije sezone istraživanja na terenu.

Na osnovu usvojenih znanja i iskustava, a koristeći osnove postavljene prethodno pomenutim projektom, Agencija za zaštitu životne sredine prilagodila je i unaprijedila metodologiju i uspješno nastavila sakupljanje podataka na terenu, sljedeće tri sezone (2019 - 2021).

Do sada je uspješno kartirano 30% kopnene teritorije za staništa i vrste i istražen dio morske teritorije - Kotorsko-risanjski zaliv, Platamuni, Katič i Ostrvo Stari Ulcinj. Detljnim istraživanjima za ptice pokriveno je 6% teritorije.

Biodiversity research Towards EU Membership

As a candidate country for the membership in the European Union (EU), Montenegro is obliged to establish a network of protected areas - Natura 2000. As prescribed by the Law on Nature Protection these areas will be part of the ecological network. Since the opening of pre-accession negotiations, the country has identified the importance of nature protection in numerous strategic documents, and Chapter 27 – Environment and Climate Change as one of the most demanding and complex chapters. One of closing benchmarks for this chapter is the establishment of Natura 2000 network. The network consists of Sites of Community Importance (SCI), which are proclaimed based on the provisions of the Habitats Directive and Special Protection Areas (SPA) under the Birds Directive.

The first systematic research for the establishment of protected areas provided by EU directives was carried out by IPA project Establishment of Natura 2000 network, which was implemented from 2016 to 2019. The project carried out comprehensive research based on available data in the literature for all species and habitats of the Community interest (species and habitats listed in the annexes of the two directives). Also, so-called reference lists have been prepared as a baseline for field research (showing all species from the annexes to the directives registered in Montenegro). The boundaries of biogeographical regions have been determined, and criteria for selecting future Natura 2000 sites prepared. Three seasons of field research were also conducted (2019 - 2021).

Based on the acquired knowledge and experience, and using the foundations set by the aforementioned project, the Environmental Protection Agency has adapted and improved the methodology and successfully continued the collection of data in the field, in the next three seasons from 2019-2021.

Up to now 30% of inland territory was mapped for habitat types and species and part of sea territory – Kotor – risan bay, Platamuni, Katic and stari Ulcinj island. Detailed research for birds covered 6% of territory.

AGENCIJA ZA ZAŠTITU ŽIVOTNE SREDINE

osnovana je 2008. godine. Pripajanjem nekadašnjeg Zavoda za zaštitu prirode 2012. godine Agencija preuzima značajne nadležnosti po pitanju zaštite prirode definisane Zakonom o zaštiti prirode. Misija Agencije je da aktivno i profesionalno unaprijedi ekološki status Crne Gore, služeći tako prirodi, zdravlju i ekonomskim interesima sadašnjih i budućih generacija, s vizijom da će Crna Gora biti zemlja u kojoj će se živjeti u harmoniji s prirodom. Ključne nadležnosti Agencije odnose se na praćenje stanja svih segmenata životne sredine, na izdavanje dozvola i odobrenja uključujući postupke procjene uticaja projekata na životnu sredinu i strateške procjene uticaja; na uspostavljanje informacionog sistema iz oblasti životne sredine i upravljanje njime; na komunikaciju s javnošću; na izradu studija zaštite za buduća zaštićena područja; na izdavanje stručnih mišljenja po pitanju zaštite prirode i vođenje procesa uspostavljanja mreže Natura 2000 u Crnoj Gori.

Agencija sarađuje s međunarodnim organima i organizacijama drugih država koje se bave zaštitom životne sredine, a posebno s Evropskom agencijom za životnu sredinu, Međunarodnom agencijom za atomsku energiju, učestvuje u radu profesionalnih mreža u okviru Evropske unije, kao i sa sličnim agencijama u drugim državama. Od značajnih projekata koje je Agencija do sada realizovala ili u njima aktivno učestvovala izdvajaju se: Studije zaštite ili revizije za zaštićena područja – Gornjopoljski vir, Spomenik prirode „Kanjon Cijevne“, Park prirode „Dragišnica i Komarnica“, Park prirode „Orjen“, Park prirode „Ulcinjska solana“, Park prirode „Rijeka Zeta“, i Park prirode „Katič“, Savinska Dubrava, Veliki gradski park u Tivtu, Spomenik prirode „Plaža Pržno“, NP „Biogradska gora“, „Uspostavljanje Natura 2000 u Crnoj Gori – sakupljanje podataka o rasprostranjenju staništa i vrsta s Prilogom Direktive o staništima i Direktive o pticama, radi identifikacije budućeg prijedloga Natura 2000 područja u Crnoj Gori“, Web portal za nacionalno zaštićena područja kao i brojnih drugih kako iz oblasti zaštite prirode tako i projekata u vezi s kvalitetom vazduha, radioaktivnosti, bukom, klimatskim promjenama, morskim ekosistemom itd.

ENVIRONMENTAL PROTECTION AGENCY

was established in 2008. Acquisition of former Nature Protection Institute in 2012 caused that EPA gain significant competence pertaining to nature protection and defined by the Law on nature protection. EPA's mission is to actively improve the ecological status of Montenegro in a professional manner, thereby serving nature, health and economic interests of present and future generations, with a vision that Montenegro will be a country living in harmony with nature. Key competence of EPA relate to: monitoring the state of all segments of the environment; issuing permits and approvals including procedures related to environmental impact assessment and strategic environmental assessment; establishing and managing environmental information system; communicating with the public; developing protection studies for future protected areas; providing expert opinion related to nature protection and conducting the process of establishment of Natura 2000 network in Montenegro.

EPA cooperates with international bodies and organizations conducting environmental protection affairs, in particular with European Environment Agency and International Atomic Energy Agency. Furthermore, it participates in the work of professional networks within the European Union and cooperates with similar agencies in other states. Some of the important projects implemented by EPA so far: Protection or revision study for the following protected areas: Gornjopolje Spring, Natural Monument "Cijevna Canyon", Nature Park „Dragišnica and Komarnica“, Nature Park "Orjen", Nature Park "Ulcinjska solana", Nature Park "River Zeta", Nature Park "Katič", Savinska Dubrava, Tivat City Park, Natural Monument "Przno Beach", NP "Biogradska Gora", "Establishment of Natura 2000 network in Montenegro", web portal for nationally protected areas as well as many other environmental projects related to air quality, radioactivity, noise, climate change, marine ecosystem, etc.



svaki LIST svaka KAP

**Agencija za zaštitu
životne sredine Crne Gore**
Environmental Protection Agency
of Montenegro

CRNA GORA

**između planina i mora
pejzaž i biodiverzitet**

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between the Mountains and the Sea
Landscape and Biodiversity



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