



*Tivat
Salina*



GEOGRAPHICAL POSITION



The Tivat Salina is situated in the wetland part of the coastal strip of Boka Kotorska bay. 60 years ago, this area was designated as a saltpan, with basins, irrigation-drainage channel systems and communication dikes. Although it was constructed, it has never been used.

The saltpan is divided up into pools, each of which is approximately 3 hectares (150x200m) in size. The total area of the lagoon is 150 ha. Two rivers, the Široka and the Koložun, belong to the saltpan's catchment area.

HOW TO ARRIVE

BY PLANE: Tivat airport, <http://www.apativat.com>, only 1 km away from Tivat Salina. Info: +382 82 670 960, 670 975; dispatch@apativat.com

BY CAR: main road Budva-Herceg Novi, 20 km away from Budva, 5 km from Tivat, 8 km from Kotora (via tunnel)

TIVAT SALINA - TIVATSKA SOLILA

		<u>Površina / Surface</u>	150 ha
<u>E</u>	<u>18°42'54.56"</u>	<u>Obala / Coast</u>	0.6 km
<u>N</u>	<u>42°23'36.59"</u>	<u>Dubina / Max depth</u>	0.40 m

POLOŽAJ



Područje Solila sa nalazi u močvarnom dijelu priobalnog pojasa Tivatskog zaliva i zahvata neiskorišćeno poplavno područje u predjelu Grbaljskog polja. Prije 60 godina je na tom području predviđena aktivacija solane, sa izgrađenim kristalizacionim bazenima, sistemima dovodnih - odvodnih kanala i komunikacionim nasipima.

Međutim, nije pošela sa radom. Solila su isparcelisana i površina svakog bazena iznosi oko 3 hektara (150x200m). Ukupna površina lagune je oko 150 ha. Slivu Solila pripadaju dvije rijeke: Široka i Koložun.

KAKO DOĆI

AVIONOM: Aerodrom Tivat, <http://www.apativat.com>, na svega 1 km od Tivatskih solila. Info: +382 82 670 960, 670 975; dispatch@apativat.com

AUTOM: magistralni put Budva-Herceg Novi, 20 km od Budve, 5 km od Tivta, 8 km od Kotora (via tunel)

MORE INFORMATION - VIŠE INFORMACIJA

<http://www.birdwatchingmn.org>

<http://www.morskodobro.com>

<http://www.tivat-info.com>

<http://www.tivatonline.com>

Tivat Salina throughout history

The earliest data on the salt basins of Tivat Salina are found in medieval records, where its significance for the economy of Kotor is described. At that time, Kotor's prosperity was based on the production and trade of salt.

Articles regulating the production, import, export and trade of salt can be found in the town's statute. In 1683, when this area was under Ottoman occupation, the area of the present Salina was described as very important for salt production and it was stated that it created 81% of the local population's total income.

According to data from the historical archive, Tivat Salina always employed a number of salt workers for the preparation of bases, and construction of dikes, channels, outlets, etc. The salt harvest, which used to take place from April to October, involved the whole of the local working population and their beasts of burden. The area of Tivat Salina is recorded as a saltpan in all historical maps of the area.

WATER, AIR, SOIL AND NOISE

Tivat Salina receives water from two rivers draining the Tivat fields - the Široka and the Koložun. They both receive industrial waste waters. However, the sea water is of good quality in Tivat Bay and never leaves class I. Kalardovo beach, right next to the saltpan has been awarded the "blue flag" eco certificate because of the high quality of its waters. The pure sea water near the saltpan is marked as a zone of special interest in the plans of the Montenegro Coastal Zone Authority, among other reasons because of the good water quality.

The air along most of the Montenegrin coastline is clean. Legal limits for smoke, ground-level ozone and minor sedimentary substances have occasionally been breached in the Tivat area. One can say that the air around the saltpan is clean, with occasional peaks in the concentration of some pollutants at a minimal level.

Soil quality has not been explored in the location of the saltpan. However, values for some pollutants in the Tivat fields and Tivat Airport have been monitored. In the period 2002-2005 an increase in the concentration of heavy metals, including chromium, nickel, cadmium and lead, was recorded.

Tivat Airport is located in the saltpan's contact zone. It has a large frequency of landings and take-offs, especially during the summer season when there are more than 60 planes a day (landings and take-offs). Air traffic at the airport has been increasing and it may possibly become open for night traffic as well.

Tivatska Solila kroz istoriju

Prve podatke o slanim bazenima Tivatskih solila nalazimo u srednjovjekovnim spisima, kada se opisuje njen značaj za privredu susjednog Kotora, koji je svoj prosperitet dobrim dijelom temeljio na proizvodnji i prodaji soli. Čak se i Statutom ovog grada regulisala proizvodnja, uvoz, izvoz i prodaja soli.

Daleke 1683. godine, kada je ovo područje bilo pod turskom okupacijom, opisuje se da je područje na kome se danas nalaze Solila značajno za proizvodnju soli i da ona predstavlja 81% ukupnog prihoda lokalnog stanovništva.

Prema podacima iz istorijskih arhiva, rad na Solilima se uvijek odvijao pod budnim okom solara (pripremanje podloga, izgradnja nasipa, kanala, propusta) a berba soli, koja se odvijala od aprila do oktobra, uključivala je svo lokalno radno sposobno stanovništvo i tegleću stoku. Prostor Solila se kao solana nalazi na svim istorijskim kartama ovog područja.

VODA, VAZDUH, ZEMLJIŠTE I BUKA

Tivatska solila primaju vodu od dvije rijeke koje dreniraju Tivatsko polje - Široka i Koložun. Obje su opterećene industrijskim balastnim vodama. Za razliku od njih, voda mora u Tivatskom zalivu je dobrog kvaliteta i ne izlazi iz I klase. Plaža Kalardovo, koja se nalazi nadomak Solila, ima „plavu zastavicu“, eko sertifikat koji se dobija između ostalog i zbog kvaliteta morske vode. Čisto more ispred Solila je u planovima Morskog dobra označeno kao zona od posebnog interesa za razvoj marikulture.

Vazduh je na najvećem dijelu crnogorske obale u klasi čistog. Na području Tivta se registruju kratkotrajna prekoračenja graničnih vrijednosti dima, koncentracije prizemnog ozona i neznatno taložnih materija. Može se reći da je vazduh na Solilima čist sa minimalnim i povremenim prekoračenjima koncentracija pojedinih polutanata.

Kvalitet zemljišta na lokaciji Solila nije istraživano. Međutim, praćene su vrijednosti pojedinih polutanata u Tivatskom polju i na aerodromu Tivat, gdje je u periodu 2002-2005. godine zabilježeno povećanje koncentracija teških metala: hroma, nikla, kadmijuma i olova.

U kontaktnoj zoni Solila nalazi se Aerodrom Tivat sa velikom frekvencijom slijetanja i uzlijetanja, naročito tokom ljetnje sezone kada dnevno ova zračna luka opsluži više od 60 aviona (slijetanje i polijetanje), sa tendencijom porasta saobraćaja, eventualno otvaranja i za noćni saobraćaj.

Natural characteristics



FLORA AND VEGETATION

The area of Tivat Salina is characterised by vegetation populating halophyte wetlands. These are primarily meadows of *Salicornia* and *Limonietela*, *Juncetalia maritimi* and brackish water vegetation such as *Phragmitetalia*.

Since these complex types of natural vegetation on sludgy-clay grounds have already vanished in most of the habitats along the Eastern Adriatic coast, this site in particular is cited as having special ecological value.

The distribution of certain halophyte species participating in the construction of this vegetation in Montenegro is limited to this area and the Ulcinj Salina only. Therefore, the species registered for these two saltpans are protected by national legislation.

Prirodne karakteristike



FLORA I VEGETACIJA

U flori i vegetaciji Crnogorskog primorja, područje Solila se prepoznaje po vegetaciji koja nastanjuje zaslanjena vlažna staništa. Radi se prvenstveno o livadama biljaka *Salicornia* i *Limnietela*, te vegetaciji *Juncetalia maritime* i vegetaciji slatko - slanih močvara *Phragmitetalia*. Kako su ovakvi kompleksni tipovi prirodne vegetacije na muljevito-glinovitoj podlozi već iščezli na većini staništa na istočnoj obali Jadrana, to se očuvanje kompaktnosti područja Tivatskih solila kao sigurnog staništa halofitne vegetacije ističe kao posebni ekološki izazov.

Rasprostranjenje pojedinih biljnih vrsta (halofite vrste) koje učestvuju u izgradnji ove vegetacije, u crnogorskim okvirima ograničeno je samo na Tivatska solila i područje Ulcinjske solane. Zbog ograničenog areala, one su zaštićene domaćim zakonodavstvom.







IMPORTANT FLORA - ZNAČAJNI PREDSTAVNICI FLORE

Salicornia fruticosa

Salicornia herbacea

Suaeda maritima








Juncus acutus






Limonium angustifolium

Plantago maritima

Scirpus litoralis

MAP OF VEGETATION - VEGETCIJSKA KARTA

-  Salicornietalia
-  Salicornietum herbaceae
-  Arctocnemum fruticosi
-  nova Aeluropetosum litoralis
-  Limonio Artemisetum caerulescens
-  Juncetum maritimo acuti Scirpetum maritimi
-  Moczvarna vegetacija

-  Sikara
-  Makija
-  Nasip
-  Kanali
-  Masline



HABITATS - STANIŠTA

PALEARCTIC HABITAT CLASSIFICATION
PALEARKTIČKA KLASIFIKACIJA STANIŠTA

Mediterranean and thermo Altanthic salt meadows

15.5

Mediterranean Neomoral saltmars scrub

15.6

Mediterranean salt steppes

15.8

FAUNA



Emberiza cia

AMPHIBIANS AND REPTILES

14 species of amphibians and reptiles are registered for the territory of Tivat lagoon. Ten vulnerable and 3 endangered species are on the IUCN Red list of endangered species. All of these species show the need to conserve this lagoon in order to ensure their long-term survival.

Species of special interest for protection in Tivat Salina are the Skadar frog *Rana shqipERICA* and the European legless lizard *Ophisaurus apodus*.

BIRDS

The immediate vicinity of the sea and the well-preserved geomorphology of Tivat Salina Lagoon make it of special interest for birds. Shallow salty water rich in fish, and sludgy ground rich in benthic organisms, attract water birds for feeding, wintering and resting during autumn and spring migrations. Up until now, 47 species of birds associated with water habitats have been registered in Tivat Salina.

Lagoon. 4 of them are permanently present, approximately 35 are wintering and 6 are probably nesting. With other bird species such as passerines, raptors, etc., a total of 111 species of birds have so far been registered in Tivat Salina. However, the list is not even nearly complete because every year, a few new species for the area are registered.

Since 526 bird species have been registered in Europe to date, the number of birds present in this lagoon corresponds to 21% of the total species of European avifauna, which cannot be neglected. Special importance is given to at least 11 species from Annex I of the Birds Directive EU, and to several globally endangered bird species, such as the Pygmy Cormorant, *Phalacrocorax pygmeus*.

VODOZEMCI I GMIZAVCI

Na području Tivatskih solila registrovano je 14 predstavnika vodozemaca i gmizavaca, od čega se na IUCN Crvenoj listi nalazi 10 ranjivih i 3 ugrožene vrste. Sve ove vrste dokazuju očuvanost ove lagune i njen potencijal da obezbijedi njihovo dugoročno preživljavanje.

Vrste od posebnog interesa za zaštitu na Tivatskim solilima su skadarska žaba *Rana shqiperica* i blavor, *Ophisaurus apodus*.

PTICE

Neposredna blizina mora i prilično sačuvana geomorfologija ove lagune čine da ona bude od posebnog interesa za boravak ptica. Plitka slana voda bogata morskim organizmima i muljevitim dnom bogatim bentosom privlači vodene ptice na ishrani, zimovanju, jesenjoj i proljećnoj seobi.

Na Solilima je dosad zabilježeno 47 vrsta ptica vodenih staništa, od čega su 4 vrste stalno prisutne, oko 35 njih zimuju dok 6 vrsta vjerovatno gnijezde. Sa ostalim grupama ptica, pjevačicama, grabljivicama i dr., na Solilima je do sada registrovano 111 vrsta. No, spisak nije ni približno konačan, jer se svake godine na njima registruje po nekoliko novih za to stanište.

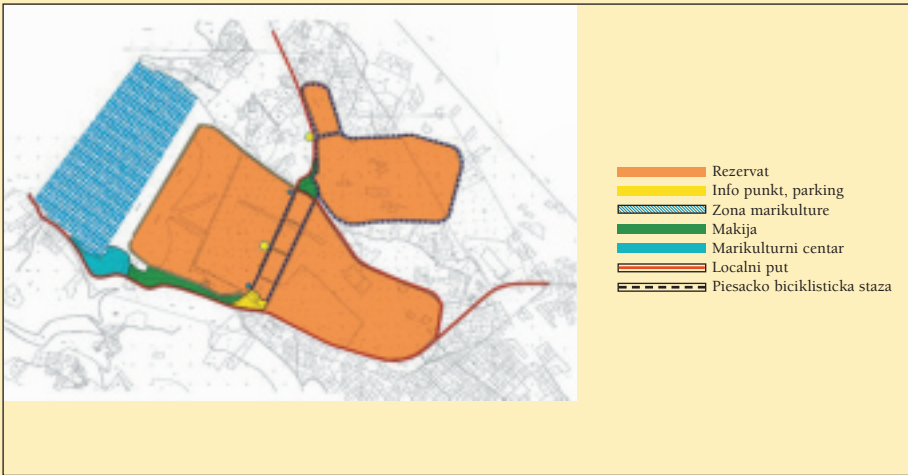
Obzirom da je u Evropi do sada registrovano 526 ptičjih vrsta, broj prisutnih ptica na ovoj laguni čini više od 20% ukupnog broja vrsta evropske ornitofane, što nije zanemarljivo. Posebno se ističe značaj najmanje 11 vrsta iz Aneksa I Ptičje direktive EU, te nekoliko globalno ugroženih ptičjih vrsta kakav je na primjer fendak, *Phalacrocorax pygmeus*.

MOST IMPORTANT FAUNA IN TERMS OF AMPHIBIANS, REPTILES AND BIRDS
 NAJZNAČAJNIJI PREDSTAVNICI FAUNE VODOZEMACA, GMIZAVACA I PTICA

Amphibians Vodozemci	<i>Hyla arborea</i> <i>Rana shqipERICA</i> <i>Triturus vulgaris</i>
Reptiles Gmizavci	<i>Caretta caretta</i> <i>Emys orbicularis</i> <i>Ophisaurus apodus</i> <i>Testudo hermanni</i> <i>Vipera amodytes</i>
Birds Ptice (nesting) (gnjezdarice)	<i>Alcedo attis</i> <i>Actitis hypoleucos</i> <i>Cettia cetti</i> <i>Charadrius alexandrinus</i> <i>Rallus aquaticus</i>
(wintering) (zimovalice)	<i>Anas penelope</i> <i>Ardea cinerea</i> <i>Charadrius dubius</i> <i>Egretta alba</i> <i>Egretta garzetta</i> <i>Fulica atra</i> <i>Galinago galinago</i> <i>Numenius arquata</i> <i>Phalacrocorax pygmeus</i> <i>Podiceps cristatus</i> <i>Podiceps nigricollis</i> <i>Tringa totanus</i>
(migrating) (migranti)	<i>Anas querquedula</i> <i>Limosa limosa</i> <i>Vanelus vanelus</i>

SPECIAL FLORA AND FAUNA RESERVE

Because of the importance of the survival of flora (increasingly scarce along the 800-km long eastern shore of the Adriatic), and due to the fact that Tivat Salina is a habitat for numerous endangered species of amphibians, reptiles and birds, it was declared a special flora and fauna reserve in 2007. This reserve was the first of its kind on the Montenegrin coast and the first area on the coast to be protected after 1968, when many beaches were protected. Tivat Salina is an Emerald site under the Bern Convention and an important bird area in Montenegro.



SPECIJALNI FLORISTIČKO FAUNISTIČKI REZERVAT

Zbog značaja za opstanak flore koja se rijetko gdje danas može naći na 800 km dužoj istočnoj obali Jadrana, kao i zbog činjenice da je stanište brojnim ugroženim vrstama vodozemaca, gmizavaca i ptica, Solila su 2007. godine zaštićena kao specijalni florističko faunistički rezervat, prvi takve vrste na crnogorskoj obali i prvo zaštićeno područje na obali poslije 1968. godine, kada je zaštićen veliki broj plaža. Solila su Emerald stanište Bernske konvencije i Područje od međunarodnog značaja za boravak ptica u Crnoj Gori - IBA.



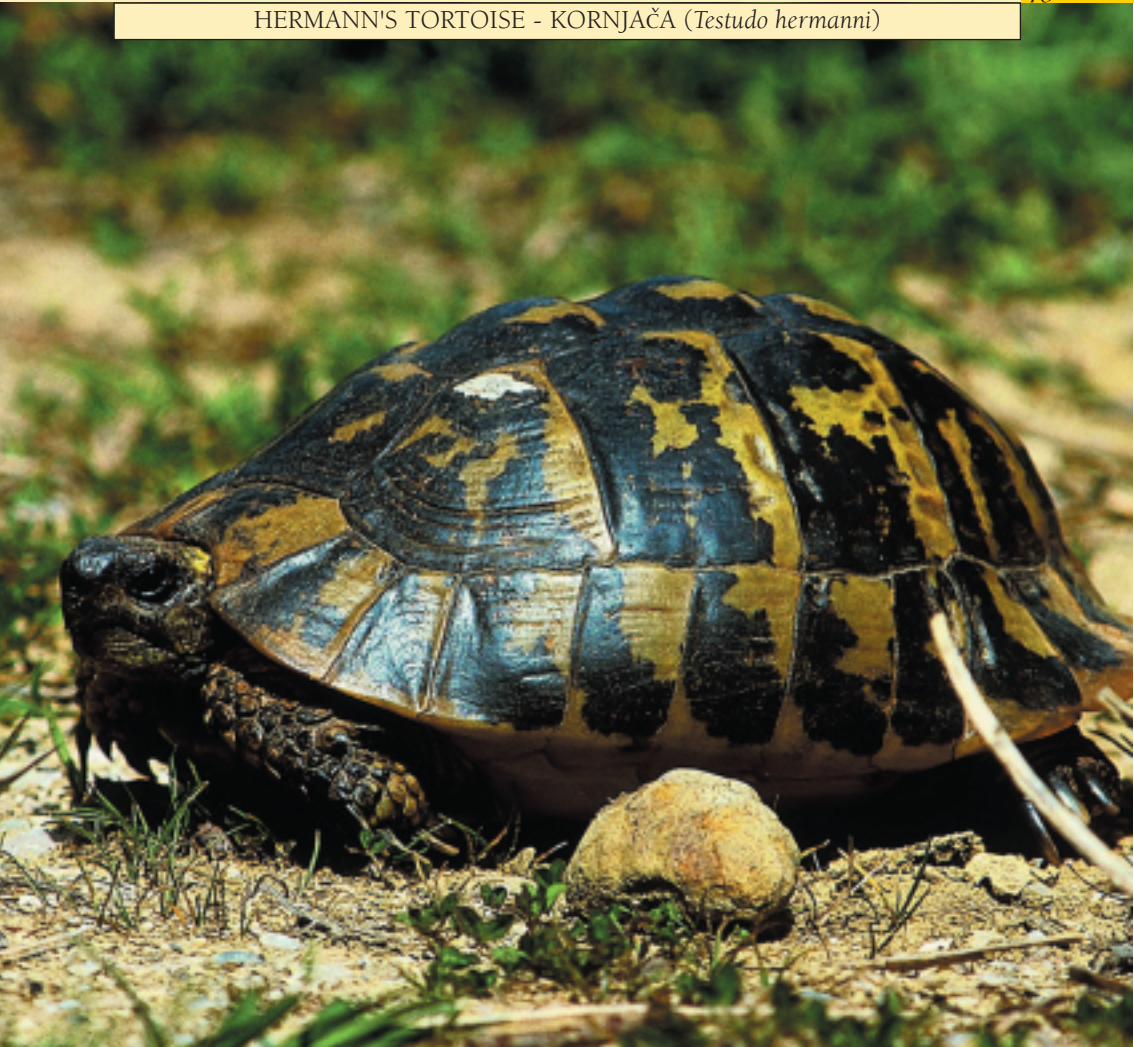
Glasswort, or *Salicornia*, is a succulent plant resistant to high salinity in the ground where it grows. In Montenegro, it has been registered only in Tivat Salina and Ulcinj Salina. When developing it is green, while in autumn it makes beautiful purple and red meadows, leaving nobody indifferent. It is of great importance for the ecology of Tivat Salina, because it is a nesting habitat for a large number of birds and a large number of other groups of animals.

It is also important for salt production due to the fact that perspiration is always greater by transpiration from plants than by evaporation. In many countries it is served with fish dishes and is used for making salads, which of course do not need salt. Its habitats are increasingly endangered by drainage and the conversion of salt pans into fish-farms or other purposes.



Solnjača pripada sukulentama otpornim na visoku zaslanjenost podloge na kojoj rastu. U Crnoj Gori se registruje samo na Tivatskim solilima i Ulcinjskoj solani. Tokom razvića ima zelenu boju da bi u jesen napravila prekrasne purpurno crvene livade, čija boja nikoga ne ostavlja ravnodušnim.

Posebno je važna u ekologiji solana jer je stanište za gniježđenje velikog broja ptica, te velikom broju ostalih grupa životinja. Značajna je i za proizvodnju soli jer je isparavanje uvijek veće transpiracijom iz biljaka nego prostom evaporacijom. U mnogim državama se služi uz jela od ribe kao i za pravljenje salata koje, naravno, ne treba soliti. Njena staništa su sve ugroženija isušivanjem, pretvaranjem solana u ribnjake ili za neku drugu namjenu.



This turtle is one of five species of its order and inhabits Southern Europe. It is 20 cm long and weights up to 2 kg. Black, mosaic and ochre tiles cover its shell. It uses the morning sun to warm itself and eats plants selected by smell. Flowers are a favourite meal of Hermann's Turtle and it will also eat fruit. Wintertime is spent in hibernation, which usually takes place in bedding. It lays its eggs in a hole in the ground facing the sun and lives a long life, averaging 70-100 years.

Jedna je od pet vrsta iz ovog roda. Naseljava Južnu Evropu. Dugačka je do 20 cm a teška do 2 kg. Ima mozaično rasporedene crno-oker pločice po oklopu. Jutarnje sunce koristi za zagrijavanje. Hrani se biljnom hranom koju odabira mirisom. Rado jede cvijeće, ponekad i voće. Jaja polaže u rupi u zemlji, obavezno na prisojnoj strani. Dugovječna je, živi u prosjeku od 70-100 godina. Hibernira tokom zime u stelji.

The length of its body does not exceed 17 cm. It is partially a migratory species in Montenegro and one of the most important nesting birds of Tivat Salina. It also breeds in Ulcinj Salina. It eats insects, molluscs and crustaceans from the mud. It is always near water and very skilled when flying. Once a year it breeds and lays 4 eggs. The nest is made of snail and mussel shells.

However, it sometimes just makes a hole in the sand or in the ground. It is easily distinguished from its two closest relatives, *C. hiaticula* and *C. dubius*, by a broken black necklace on its neck and by its darker legs. It is listed in Annex I of the Birds Directive as a species of special interest for protection.



Dužina njegovog tijela ne prelazi 17 cm. Kod nas je djelimična selica. To je jedna od najznačajnijih gnjezdarica Tivatskih solila. U Crnoj Gori gnijezdi još u Ulcinjskoj solani. Spada u živahne šljugarice koje se hrane insektima, mekušcima i račićima iz mulja. Uvijek je blizu vode. U letu je jako spretna. Gnijezdi jednom godišnje, polaže 4 jaja.

Gnijezdo pravi od ljuštura puževa i školjki, nekad samo udubi mjesto u zemlji ili pijesku. Od svoja dva srodnika *C. hiaticula* i *C. dubius* najlakše se razlikuje po prekinutoj crnoj ogrlici na vratu i tamnijim nogama. Nalazi se na Aneksu I Ptičje direktive kao vrsta od posebnog interesa za zaštitu.