

## THE IMPORTANCE OF THE TIVAT SALINA (MONTENEGRO) FOR MIGRATING AND WINTERING WATERBIRDS, INCLUDING SOME NOTES ON PASSERINES

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### ABSTRACT

*During the 16 counts carried out between June 2003 and March 2006 along the main dam, 47 species of waterbirds and waders or a total of 111 bird species were recorded in the Tivat salina (Montenegro). Almost all waterbirds were found in the seaward section of the salina and along the coastline (33 ha). In view of the frequencies of their occurrence and maximum numbers/count, the Yellow-legged Gull (*Larus michahellis*), Black-headed Gull (*L. ridibundus*), Eurasian Wigeon (*Anas penelope*) and Common Coot (*Fulica atra*) were the most abundant migrant and winter visitors. Among all waterbirds, evidence of nesting was found for the Little Ringed (*Charadrius dubius*) and Kentish Plovers (*Ch. alexandrinus*) only. During the spell of very low temperatures in January 2006, maximum numbers of > 1200 birds, mostly Yellow-legged Gulls and Common Snipes (*Gallinago gallinago*), or twice as many waterbirds in comparison to the former January counts, were present in the area. Low numbers of waterbirds in the salina are discussed in regard to the management plan, which is currently under consideration by the local authorities.*

**Key words:** waterbirds, waders, passerines, conservation, management plan, Tivat salina, Montenegro

### IMPORTANZA DELLE SALINE DI TIVAT (MONTENEGRO) PER UCCELLI ACQUATICI MIGRANTI E SVERNANTI, INCLUSE NOTE SU PASSERACEI

#### SINTESI

*Durante 16 censimenti effettuati fra giugno 2003 e marzo 2006 lungo l'argine principale delle saline di Tivat (Montenegro), sono state contate 47 specie di uccelli acquatici e trampolieri, ovvero 111 specie di uccelli in tutto. Quasi tutti gli uccelli acquatici sono stati avvistati nella sezione volta al mare delle saline e lungo la linea di costa (33 ha). In base alla frequenza d'avvistamento ed al numero di individui contati, le specie migranti e i visitatori invernali più abbondanti sono risultati: il gabbiano reale (*Larus michahellis*), il gabbiano comune (*L. ridibundus*), il fischione (*Anas penelope*) e la folaga (*Fulica atra*). Fra tutte le specie di uccelli acquatici, con certezza nell'area nidificano il corriere piccolo (*Charadrius dubius*) ed il fratino (*Ch. alexandrinus*). Durante il periodo di temperature molto basse nel gennaio 2006, è stato contato il numero più alto di uccelli, più di 1200 esemplari, in prevalenza di gabbiano reale e beccaccino (*Gallinago gallinago*), ossia il doppio rispetto al mese di gennaio degli anni precedenti. Gli autori discutono del basso numero di uccelli acquatici nelle saline e del piano di gestione, attualmente in fase di preparazione presso le autorità locali.*

**Parole chiave:** uccelli acquatici, trampolieri, passeracei, tutela, piano di gestione, saline di Tivat, Montenegro

## INTRODUCTION

Along the rocky shores of Dalmatian karst and its islands, most wetlands are restricted to a handful of river mouths and their alluvial lowlands. Some large wetland areas, which are of importance for wintering or migrating waterbirds using the Adriatic flyway, such as Vransko Jezero Nature Park and the Neretva river delta, are designated as Ramsar sites (Heath & Evans, 2000; Radović *et al.*, 2004). Even so, almost all estuaries, coastal lagoons, and inland marshes along the eastern coast of the Adriatic Sea have been heavily degraded by drainage, agricultural expansion and urbanization. In addition, the suitability of many wetlands for nesting or resting waterbirds and other wildlife is heavily impaired by unregulated or uncontrolled hunting and fishing (Hagemeyer *et al.*, 1994; Štumberger *et al.*, 2005).

Considering that many small wetland areas of the eastern Adriatic region are not covered by International Waterfowl Counts (IWC), information concerning their significance for waterbirds is mostly arbitrary or simply missing. Together with the delta of the Bojana/Buna River along the Albanian border and the marshlands of Buljarica Bay, the Tivat salina constitutes, in terms of its surface area, the most important wetlands along the coastline of Montenegro. Saveljić & Rubinić (2004) have published a list of 32 species of waterbirds and some raptors, which they recorded in the salina between 1999 and 2005. To evaluate the current importance of the area for migrating waterfowl, in addition to their list, waterbird counts are analysed herewith that have been performed by us in the Tivat salina since 2003. We hope that our data will be of certain help in the preparation of the management plan and in the evaluation regarding the implementation of various protection measures, as well as stimulate further monitoring in the area.

## MATERIAL AND METHODS

## Description of the study area

The salt-pans of Tivat are situated south of the city of Tivat (42°26' N, 18°42' E), approximately 16 km inland from the entrance to the Bay of Kotor (Boka Kotorska) on the east Adriatic coast. Above alluvial soils with > 3% salt in surface layers, the salt-pans of approximately 150 ha extend in the lowest part of Tivat Polje on the south-eastern fringes of the Bay of Tivat (Tivatski Zaljev), which forms the southernmost inlet of the Bay of Kotor (Magaš, 2002). The Tivat salt-pans (Solila) have been used for salt production since the 14<sup>th</sup>/15<sup>th</sup> century. During the early 1960s, the former salt-pans were renewed and adapted for industrial salt production (Cubrović, 2005). Although the modern salt-works have never been put into operation, the original marshlands were divided into artificial basins and cut from the

south-west to the north-east by a 714 metres long dam in a smaller seaside and a much larger inland part. The seaward section along the shore-line is dominated by shallow waters and temporarily flooded mudflats. These are covered by almost closed stands of halophytic vegetation of Glasswort (*Salicornia europaea*), Perennial Glasswort (*Arthrocnemum* sp.) and Sea Rush (*Juncus maritimus*). As the inland section still receives some water by tidal waters through the main dam, the basins along the landward side of the main dam were during most of our visits partly covered by shallow waters, but dried out irregularly during late summer and autumn. They are covered by low sedges (*Carex*), softrush (*Juncus*) and scattered stands of other brackish and freshwater vegetation. Along the canals, narrow but dense stands of Common Reed (*Phragmites communis*) are thriving, while most of the smaller levees are heavily overgrown by high grasses, scrub and low bushes.

## Methods

Between June 2003 and March 2006, we managed to visit the Tivat salina on 16 occasions. Depending on time schedules we performed, on our way to and from the Bojana/Buna delta, waterbird counts for EURO-NATUR (Radolfzell) at all times of the day (Tab. 1). Irrespective of day time, we standardized counts by counting all birds we could find in the seaward section of the salina by walking along a constant route of 714 m along the main dam from the road to Radovići to the dam's north-eastern end. Besides two Black-throated Divers (*Gavia arctica*) and a few scattered Great Cormorants (*Phalacrocorax carbo*), flocks of Yellow-legged Gulls (*Larus michahellis*) were noted in the coastal waters up to 1.5–2 km out to the Bay of Tivat during most counts. Due to human disturbances, many gulls constantly moved between the seaward section of the salina and the nearby refuse dumps of the city of Tivat. To overcome the problem of heavily fluctuating numbers of gulls during individual counts, we added all Yellow-legged Gulls, which were present in the bay or were seen moving between the salina, the bay or the nearby refuse dumps, to a single number/count (*cf.* footnotes in Table 2). Like in the seaward section, all birds that we could hear or find with the help of binoculars (10 x 40) and telescopes (30x, 20–60x) from the dam in the landward part of the salina were noted. Owing to the open terrain, our counts thus covered most birds present in the seaward section, whereas we most probably underestimated the numbers of smaller waterbirds, such as rails or some ducks, and of many passerines in the landward part of the salina. With a mean duration of  $45.0 \pm 17.2$  min/count (95% confidence limits;  $n = 14$ ), we spent > 570 min in the area (Tab. 1). For the comparison of the occurrence and numbers of different waterbird species, we calculated their frequencies of occur-

**Tab. 1: Date, time and weather conditions during the 16 waterbird counts in the Tivat salina, June 2003 – March 2006.****Tab. 1: Datum, čas in vremenske razmere med 16 štetji vodnih ptic v Tivatskih solinah med junijem 2003 in marcem 2006.**

No.	Date	Time of day (CET)	Weather conditions	Observer
1	10.6.2003	16:00–16:30	clouds 0/8, wind 0	P. Sackl, B. Štumberger
2	31.10.2003	13:30–14:10	clouds 1/8, wind 2	P. Sackl, B. Štumberger, J. Smole
3	15.11.2003	10:30–10:50	clouds 8/8, wind 1	P. Sackl, J. Smole
4	31.1.2004	–	–	P. Sackl, B. Štumberger
5	10.4.2004	12:55–13:15	clouds 8/8, windless, slight rain	P. Sackl, B. Štumberger
6	17.4.2004	–	–	P. Sackl, B. Štumberger
7	12.10.2004	17:40–18:20	clouds 8/8, wind 1–2, after rain	T. Lončar, P. Sackl, J. Smole
8	26.10.2004	11:05–11:30	clouds 0/8 – 2/8, wind 0–1	T. Lončar, P. Sackl, J. Smole
9	15.1.2005	15:50–16:20	clouds 2/8, wind 2–3, 3 °C	P. Sackl, B. Štumberger
10	22.1.2005	17:45–18:00	clouds 6/8, wind 1–2	P. Sackl, B. Štumberger
11	23.4.2005	9:15–10:03	clouds 1/8, wind 1, 10 °C	I. Geister, B. Štumberger
12	5.5.2005	11:10–11:45	clouds 8/8, wind 0–1, slight rain	T. Lončar, P. Sackl
13	29.10.2005	14:40–16:40	clouds 0/8, wind 0, very warm	T. Lončar, P. Sackl
14	5.11.2005	12:35–13:30	clouds 1/8, wind 0–1, warm	T. Lončar, P. Sackl
15	21.1.2006	15:00–15:57	clouds 8/8, wind 0	P. Sackl, B. Štumberger
16	21.3.2006	11:20–12:55	clouds 8/8, wind 0, ca. 15 °C	D. Denac, B. Štumberger

rence (= % of counts when a species was present) and their respective maximum numbers during all counts (= visits). Statistical analyses were performed with non-parametric tests by using the statistical package SPSS, version 13.0 (2004).

## RESULTS

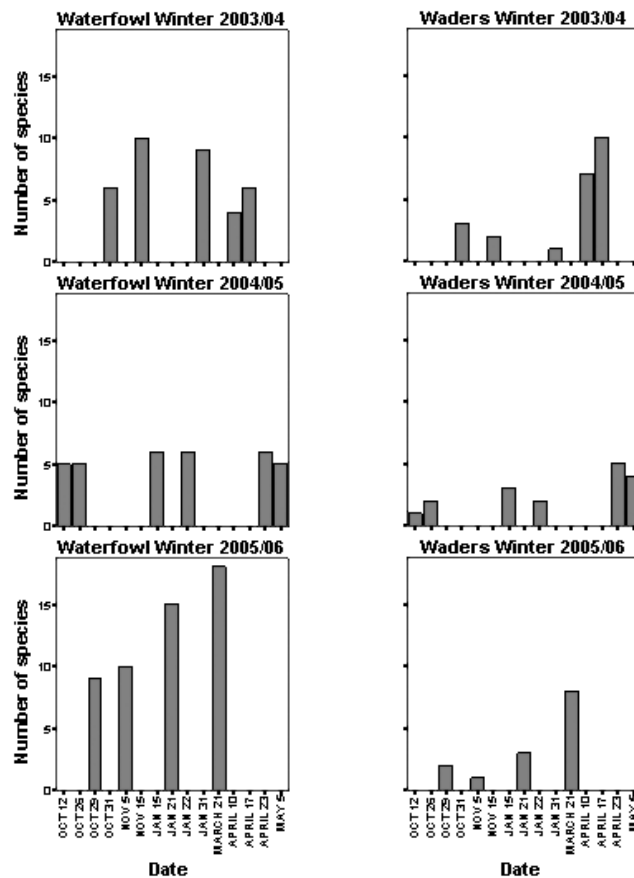
### Species diversity

Since June 2003, we noted 104 bird species in the salina. Their status and numbers per count are given in Table 2. Our list includes 46 Passeriformes (44.2%), while according to the subject and field methods of our study the larger portion of 58 species or 55.8% of all species recorded belong to the Non-Passeriformes. Including 7 species of waterbirds cited by Saveljić & Rubinić (2004), which we missed in Tivat, 65 Non-Passeriformes (= 58.6%) or a total of 111 species are currently documented for the area. Most of the species found in the salina are classified as passage migrants (58/55.8%) or winter visitors (13/12.5%). The rest is made up of confirmed or possible breeders (17/16.3%) and species (16/15.4%) that presumably nest in adjoining habitats and visit the salt-pans for feeding or outside the breeding season (Tab. 2). While 27 species or 58.7% of all passerines are confirmed or probable breeders, evidence of nesting, as far as Non-Passeriformes are concerned, was found for the Little Ringed (*Charadrius dubius*) and Kentish Plovers (*Ch. alexandrinus*) only.

### Waterbirds

In addition to waders, we noted 30 waterbird species (including Common Kingfisher *Alcedo atthis*), which are usually covered by the IWC scheme (Tab. 2). In all waterbird species, the frequencies of their occurrence and respective maximum numbers are positively correlated ( $r_p = 0.36$ ,  $P = 0.054$ ,  $n = 30$ ); *i.e.* the species, which we saw more regularly in the salina, tend to appear in larger numbers. Besides the small numbers of divers (Gaviidae), grebes (Podicipedidae), cormorants (Phalacrocoracidae) and some rare passage migrants, the resident Yellow-legged and wintering Black-headed Gulls (*Larus ridibundus*) were, together with Eurasian Wigeon (*Anas penelope*), Common Coot (*Fulica atra*), Grey Heron (*Ardea cinerea*) and Little Egret (*Egretta garzetta*), the most abundant migrant and winter visitors. Coinciding with spring migration of the species, large numbers of Garganey (*Anas querquedula*) were present in March 2006 (Tab. 2). Altogether, these species amounted to 94.4% of all waterbirds counted ( $n = 4767$ ). Little Grebe (*Tachybaptus ruficollis*), Great White Egret (*Egretta alba*) and Common Kingfisher, which overwinter in low numbers of 1–6 individuals (ind.), occurred in high frequency (Tab. 2).

Numbers of species in all winter periods since 2003 show no clear seasonal trend (Fig. 1), whereas the population numbers increased from autumn till January (Fig. 2), when large numbers of Eurasian Wigeon, Common Coots and Black-headed Gulls were concentrated in the shallowly flooded areas along the shore-line.



**Fig. 1: Numbers of waterbird and wader species recorded during waterbird counts in the Tivat salina, June 2003–March 2006.**

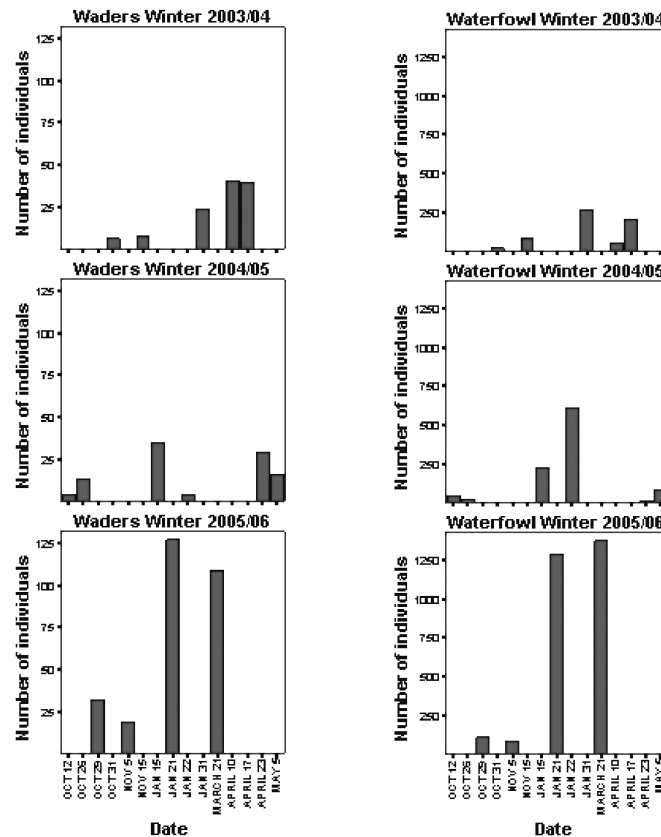
**Sl. 1: Število vodnih ptic in pobežnikov, zabeleženih med štetjem ptic Tivatskih solin v obdobju med junijem 2003 in marcem 2006.**

In contrast to the moderately warm winters 2003/04 - 2004/05, heavy winds ('bora') and temperatures below freezing prevailed during our visit in January 2006 along the eastern Adriatic's coast. While the Tivat salina was free of ice during our visit on January 21<sup>st</sup>, two days later the shallow inlet and the greater part of the Viluni Lagoon on the Albanian coast as well as most basins in the salt-works of Ulcinj (Montenegro) were covered with ice, with dozens of starving and freshly frozen Common Coots scattered across the ice sheet of the Viluni Lagoon. In Tivat, the numbers of species as well as population numbers of January counts were not significantly different between the three winter periods since 2003 (Kruskal-Wallis tests, numbers of species:  $\chi^2 = 3.00$ ,  $P = 0.22$ ; numbers of birds:  $\chi^2 = 1.80$ ,  $P = 0.41$ ; in both cases  $df = 2$ ), although peak numbers of > 1200 waterbirds, *i.e.* in comparison to former January counts, twice as many birds, and additional numbers of 6–9 waterbird species, were present in January 2006 (Figs. 1, 2). 83.5% of all waterbirds, which were present on January 21<sup>st</sup> 2006, were Yellow-legged Gulls that were resting along

shore-line or foraging at the nearby refuse dumps of the city of Tivat (Tab. 2).

### Waders

Of 507 waders of the suborder Charadrii, which we have counted since 2003, Common Snipe *Gallinago gallinago* ( $n = 187$ ) and Common Redshank *Tringa totanus* ( $n = 174$ ) were most abundant in terms of their numbers. Regarding the frequencies of occurrence, on the other hand, Common Redshank (81.3%), Eurasian Curlew *Numenius arquata* (37.5%), Common Snipe (31.3%), Wood Sandpiper *Tringa glareola* (31.3%) and Greenshank *T. nebularia* (25.0% of all counts) were the most common species. All other waders occurred in frequencies < 20% (Tab. 2). Like in waterbirds, maximum numbers/count and frequencies of occurrence are positively correlated ( $r_p = 0.48$ ,  $P = 0.054$ ,  $n = 17$ ). In contrast to Common Snipes, which were seen in large numbers only in January and March 2006, wintering Common Redshanks (2–27 ind./count) and Eurasian Curlews



**Fig. 2: Population numbers of waterbirds and waders recorded during waterbird counts in the Tivat salina, June 2003–March 2006. (Note different scales of ordinates for waterbirds and waders.)**

**Sl. 2: Skupno število vodnih ptic in pobrežnikov, zabeleženih med štetjem ptic v Tivatskih solinah v obdobju med junijem 2003 in marcem 2006. (Pazi na različno velike skale na y-oseh.)**

(1–3 ind./count) were present in low numbers, although during most visits between October and January (Tab. 2). In waders, numbers of species peaked during spring migration (March–May), whereas numbers of birds showed no clear seasonal trend (Figs. 1, 2). Like in waterbirds, our data show no statistically significant effect of the unusually low temperatures in January 2006 (Kruskal-Wallis for January counts/winter; number of species:  $\chi^2 = 2.25$ ,  $P = 0.33$ ; numbers of birds:  $\chi^2 = 1.80$ ,  $P = 0.41$ ; in both cases  $df = 2$ ). With a total of three species, we noted similar numbers of species like during the former January counts (1–3 species), while the peak numbers of waders in January and March 2006 were made up by Common Snipes, which amounted to 85.8% of all waders we counted on January 21<sup>st</sup>, 2006 (Tab. 2).

### Passerines

In view of the species and numbers, we noted during the waterbird counts that the Tivat salina is an important site for some migrating and wintering passerines. Apart

from flocks of migrating Sand Martins (*Riparia riparia*) and Barn Swallows (*Hirundo rustica*), we counted a minimum of 141 Whinchats (*Saxicola rubetra*) on April 17<sup>th</sup>, 2004. With a strip of 100–200 metres, which we presumably covered by counting along both sides of the main dam, we roughly estimated the densities of 96.8–193.7 Whinchats/10 ha for that day. While we saw small numbers of Water (*Anthus spinoletta*) and Meadow Pipits (*A. pratensis*) between October and January, at least 53 Meadow Pipits were feeding on mudflats in the seaward section of the salina in January 2006. Passage and winter visitors, which were noted regularly during winter, were Hedge Accentor (*Prunella modularis*), Robin (*Erithacus rubecula*), and Great Grey Shrike (*Lanius excubitor*) (Tab. 2). In late April 2005, we noted a singing Reed Warbler (*Acrocephalus scirpaceus*), whereas in May of the same year we saw a displaying male Zitting Cisticola (*Cisticola juncidis*) in the landward basins beside the main dam. Minimum numbers of other species of conservation concern, which we noted, were 3 breeding pairs (bp.) of Tawny Pipit (*Anthus campestris*), 2–3 singing Great Reed

Warblers (*Acrocephalus arundinaceus*), 1-3 singing Corn Buntings (*Miliaria calandra*), 1–3 bp. of Red-backed Shrike (*Lanius collurio*) and at least 1 bp. of Whoodchat Shrike (*L. senator*).

## DISCUSSION

In comparison to other coastal wetlands of the central and eastern Mediterranean, the numbers of waterbirds and waders appear to be low in the Tivat salina, although throughout the Mediterranean region salinas are important for a variety of breeding, over-wintering and migrating waterbirds (Petanidou, 1977; Anonymus, 1996). With only two visits during the breeding season in June 2003 and early May 2005, our data are largely restricted to the winter months between October and April. In the same way, Saveljić & Rubinič (2004) visited the salina only during the migration and winter periods. Thus, current information concerning the potential of the area for breeding waterfowl, waders and other birds is arbitrary. Concerning the numbers of resting and wintering waterbirds, we noted in Tivat, besides migrating Garganeys, wintering Common Snipes, Black-tailed Godwits (*Limosa limosa*) and resident Yellow-legged Gulls, the species whose maximum numbers exceed 100 birds, *i.e.* Eurasian Wigeon, Common Coot and Black-headed Gull, belong to the most abundant species of waterbirds, which overwinter in maximum totals of over one million birds throughout the Western Palaearctic (Gilissen *et al.*, 2002; Saveljić & Rubinič, 2004). According to the extent of the area, population numbers of most waterbirds and waders are low in Tivat. Currently, no species reaches the 1% level of Ramsar criterion 3c (Wetlands International, 2002).

The low numbers of waterbirds in the Tivat salina may result from different reasons. In general, most of the eastern Adriatic coastline consists of rocky shores. Together with low tidal amplitudes < 30 cm, this appears to prevent many waterbird species, in particular waders and some ducks preferring shallow waters, to winter in large numbers along the Dalmatian coast (*e.g.* Smit, 1986; Stipčević, 1997). On the other hand, the area of permanently shallow waters and mudflats in Tivat, which is most suitable for feeding or resting waterbirds, is currently restricted to a narrow strip along the shoreline. With the erection of the main dam, the much bigger landward part of the salt-pans was cut off from the sea. The area of permanent water and low stands of halophytic vegetation on the seaward side of the main dam currently covers 33 ha, *i.e.* less than a third of the entire area of the salt-pans. With the exception of a few Little Egrets, which fed in the partly flooded basins of the landward section in spring 2004, we saw all waterbirds in the permanently flooded seaward part of the salina and along the coastline.

In addition, as a result of excessive shooting and

hunting throughout the Balkans, all waterfowl, herons and waders are extremely frightened, as indicated by flight distances from people and boats of  $\geq 300$  metres (Sackl & Štumberger, *unpubl.*). During our visits, we regularly found used cartridges along the main dam in Tivat. In addition, the main dam is regularly used by the locals, while fishermen and oyster-farmers operate year-round < 100-200 m from the shore-line, forcing herons, ducks and other waterbirds along coastline regularly to take wing, although they are not shooting or carrying shot-guns. Therefore, we recommend re-evaluating whether the 500–520 m wide strip between the shoreline and the main dam, which according to the actual management plan is proposed to be prohibited for people, is wide enough for undisturbed feeding and resting of waterbirds.

Finally, to combat infestations of mosquitoes and other pests, spraying of pesticides is practiced during the spring and summer (Fig. 3). This may reduce the availability of insects and other invertebrate prey for birds. Although few studies have been made in the Mediterranean region, methoprene, an insect growth regulator used to combat mosquitoes, and other chemicals used for pest control, are known to reduce populations of dragonflies (Odonata), chironomid Diptera and other insect larvae (review in Grillas *et al.*, 2004). In addition to the high level of human disturbances, this may explain why we have found such low numbers of nesting waders and passerines in the salina (Tab. 2).

According to its extents and locality in the low-lying depression along the southern shore-line of Boka Kotorska, which is surrounded by high mountains and largely undisturbed scrub-lands, the Tivat salina may be suitable for much larger numbers of waterbirds (Saveljić & Rubinič, 2004). The potential of the area is illustrated by the



**Fig. 3: Infestations of mosquitoes are controlled with insecticides along the main dam of the Tivat salina, 23<sup>rd</sup> April, 2005. (Photo: B. Štumberger)**

**Sl. 3: Vzdolž glavnega nasipa v Tivatskih solinah se zatiranja komarje zalege lotevajo z insekticidi, 23. april 2005. (Foto: B. Štumberger)**

relatively large number of 47 species of waterbirds and waders, which we have noted since 2003. In addition, the salina appears to function as a refuge for waterbirds wintering along the Dalmatian coast and its Balkan hinterlands during the spells of low temperatures and heavy winds. Prolonged periods of severe weather, which force wintering waterfowl to search for open waters, are well known to trigger irregular and sometimes massive movements of waterbirds, like geese, Common Teal (*Anas crecca*) and other ducks, in northern Europe (Kear, 2005). Although our data are not statistically significant, this is illustrated by the large numbers of Yellow-legged Gulls, Common Snipes, Spotted Redshank (*Tringa erythropus*) and other waterbirds, which were present at Tivat in late January 2006. Besides many Yellow-legged Gulls, which over-winter mainly along the coastline, heavy winds and persistent frost may have forced some ducks and waders, which normally winter in inland wetlands of the western Balkans, to search for ice-free conditions along the coast of the eastern Adriatic.

The potential of the salina and its wider environment for birds and other wildlife is further documented by nine species of raptors and a variety of passerines, which we have noted during the migration and winter periods (Tab. 2). In addition, the salina of Tivat, where Stojnić (2004) found the first evidence of nesting in August 2004, is the only known nesting site of Zitting *Cisticola*

in Montenegro apart from the Bojana/Buna delta. In the same way, Reed Warblers nest rarely and very dispersedly along the Dalmatian coast (Schulze-Hagen, 1997; Rucner, 1998); although the singing male we noted in late April 2005 could have been a migrant visitor as well. Population numbers of some passerines, such as Tawny Pipit, Great Reed Warbler, Red-backed Shrike and Corn Bunting, which apparently nest more regularly in the salina, show long-term decline in most central and western European countries (Burfield & van Bommel, 2004; Bauer *et al.*, 2005). In addition, outside our waterbird counts we saw an adult Gull-billed Tern (*Gelochelidon nilotica*) on the adjoining airfield of Tivat airport on July 12<sup>th</sup>, 2002, and since 2003 we have found three Golden Jackals (*Canis aureus*) killed by traffic along the main road E-65 between Tivat airport and the crossroads to the village of Dub.

The Regional Tourist Master Plan proposes a buffer zone around the salina, which will function as a landscape park and where main recreational activities will take place (DEG, 2003), while the seaward section of the salina has been protected by the national law since autumn 2005 (Saveljić & Rubinič, 2004). This and a management plan currently under consideration by the local authorities is a good chance for restoring the Tivat salina as a stop-over and nesting site for many waterbirds along the Adriatic flyway.

**Tab. 2: Bird species, their status and respective numbers noted during the 16 waterbird counts in the Tivat salina (Montenegro), June 2003 – March 2006. Maximum numbers per species during all counts are indicated by bold numbers.**

**Legend: RB = resident breeder; BM = breeding migrant; BM? = possible or probably breeding migrant; (RB) and (BM) = resident breeder or breeding migrant possible or probably breeding in adjoining habitats; PM = (regular) passage migrant; WV = winter visitor; WV? = probably wintering; bp = breeding pair; m = male; s = singing male; Occ. (%) = numbers/percentage of counts when a species was present (frequency of occurrence).**

**Tab. 2: Vrste ptic, njihov status in število posameznih vrst, ugotovljenih med 16 štetji vodnih ptic v Tivatskih solinah (Črna gora) med junijem 2003 in marcem 2006. Maksimalno število vrste med vsemi štetji je označeno s krepko natisnjenimi številkami.**

**Legenda: RB = gnezdeča stalnica; BM = seleča se gnezdilka; BM? = možna ali verjetna seleča se gnezdilka; (RB) in (BM) = gnezdeča stalnica ali seleča se gnezdilka, ki morda ali verjetno gnezdi v sosednjih habitatih; PM = (redni) preletnik; WV = zimski gost; WV? = verjetni prezimovalec; bp = gnezdeči par; m = samec; s = pojoči samec; Occ. (%) = število/odstotek štetij, ko je bila vrsta opažena v solinah (frekvenca pojavljanja).**

Species	Status	10.06.03	31.10.03	15.11.03	31.01.04	10.04.04	17.04.04	12.10.04	26.10.04	15.01.05	22.01.05	23.04.05	05.05.05	29.10.05	05.11.05	21.01.06	21.03.06	Occ. (%)
Black-throated Diver <i>Gavia arctica</i>	WV															<b>2</b>		1 / 6.3%
Little Grebe <i>Tachybaptus ruficollis</i>	PM/WV			2	2							1		3	3	<b>6</b>	<b>6</b>	7 / 43.8%
Great Crested Grebe <i>Podiceps cristatus</i>	WV				<b>6</b>					1						3	4	4 / 25.0%
Black-necked Grebe <i>Podiceps nigricollis</i>	WV															<b>2</b>		1 / 6.3%
Great Cormorant <i>Phalacrocorax carbo</i>	WV				3						4					2	<b>54</b>	4 / 25.0%
Pygmy Cormorant <i>Phalacrocorax pygmeus</i>	PM		7	1										3	<b>20</b>			4 / 25.0%
Squacco Heron <i>Ardeola ralloides</i>	PM												<b>1</b>					1 / 6.3%

Species	Status	10.06. 03	31.10. 03	15.11. 03	31.01. 04	10.04. 04	17.04. 04	12.10. 04	26.10. 04	15.01. 05	22.01. 05	23.04. 05	05.05. 05	29.10. 05	05.11. 05	21.01. 06	21.03. 06	Occ. (%)
Little Egret <i>Egretta garzetta</i>	PM		2	1		<u>99</u>	28	3	1			14	3	2	1		3	11 / 68.8%
Great White Egret <i>Egretta alba</i>	PM/WV	1						1	1	1				<u>2</u>	<u>2</u>	1	1	8 / 50.0%
Grey Heron <i>Ardea cinerea</i>	PM/WV	4	2	8	5	<u>83</u>	19	1	3	12	1	4		8	6	5	47	15 / 93.8%
Glossy Ibis <i>Plegadis falcinellus</i>	PM					<u>1</u>												1 / 6.3%
Eurasian Spoonbill <i>Platalea leucorodia</i>	PM					2	1										Z	3 / 18.8%
Mute Swan <i>Cygnus olor</i>	PM																<u>2</u>	1 / 6.3%
Common Shelduck <i>Tadorna tadorna</i>	PM			<u>1</u>														1 / 6.3%
Eurasian Wigeon <i>Anas penelope</i>	PM/WV			27	17					102	<u>276</u>			21	33	69	18	8 / 50.0%
Common Teal <i>Anas crecca</i>	WV															<u>16</u>	6	2 / 12.5%
Mallard <i>Anas platyrhynchos</i>	WV									2						<u>17</u>		2 / 12.5%
Garganey <i>Anas querquedula</i>	PM											2					<u>588</u>	2 / 12.5%
Northern Shoveler <i>Anas clypeata</i>	PM												1				<u>20</u>	2 / 12.5%
Northern Pintail <i>Anas acuta</i>	PM/WV?																<u>15</u>	1 / 6.3%
Common Pochard <i>Aythya ferina</i>	WV															Z		1 / 6.3%
Ferruginous Duck <i>Aythya nyroca</i>	PM																<u>14</u>	1 / 6.3%
Osprey <i>Pandion haliaetus</i>	PM																<u>1 ad</u>	1 / 6.3%
Marsh Harrier <i>Circus aeruginosus</i>	PM					2											<u>5</u>	2 / 12.5%
Hen Harrier <i>Circus cyaneus</i>	WV															<u>1</u>		1 / 6.3%
Montagu's Harrier <i>Circus pygargus</i>	PM/WV					<u>3</u>				1								2 / 12.5%
Northern Goshawk <i>Accipiter gentilis</i>	PM		<u>1</u>															1 / 6.3%
Eurasian Sparrowhawk <i>Accipiter nisus</i>	PM/WV		1													<u>2</u>		2 / 12.5%
Common Buzzard <i>Buteo buteo</i>	PM/WV		1		<u>3</u>				1						2		1	5 / 31.3%
Red-footed Falcon <i>Falco vespertinus</i>	PM						<u>2</u>											1 / 6.3%
Common Kestrel <i>Falco tinnunculus</i>	(RB)																<u>1m</u>	1 / 6.3%
Water Rail <i>Rallus aquaticus</i>	PM/WV?		<u>1</u>												<u>1</u>			2 / 12.5%
Common Coot <i>Fulica atra</i>	WV			22	68					100	<u>196</u>					69	59	6 / 37.5%
Black-winged Stilt <i>Himantopus himantopus</i>	PM					<u>12</u>	1						3					3 / 18.8%
Little Ringed Plover <i>Charadrius dubius</i>	BM/PM	1 bp				4	<u>9</u>											3 / 18.8%
Kentish Plover <i>Charadrius alexandrinus</i>	BM?/PM					<u>1 bp</u>												1 / 6.3%
Grey Plover <i>Pluvialis squatarola</i>	PM												<u>2</u>					1 / 6.3%
Northern Lapwing <i>Vanellus vanellus</i>	PM		1											5			<u>6</u>	3 / 18.8%
Ruff <i>Philomachus ugnax</i>	PM						<u>6</u>										1	2 / 12.5%
Common Snipe <i>Gallinago gallinago</i>	PM/WV					1				19		8				<u>109</u>	50	5 / 31.3%
Whimbrel <i>Numenius phaeopus</i>	PM					<u>3</u>												1 / 6.3%
Eurasian Curlew <i>Numenius arquata</i>	PM/WV		1	1		<u>3</u>			<u>3</u>	<u>3</u>	2							6 / 37.5%
Dunlin <i>Calidris alpina</i>	PM																<u>1</u>	1 / 6.3%



Species	Status	10.06.03	31.10.03	15.11.03	31.01.04	10.04.04	17.04.04	12.10.04	26.10.04	15.01.05	22.01.05	23.04.05	05.05.05	29.10.05	05.11.05	21.01.06	21.03.06	Occ. (%)
Spotted Redshank <i>Tringa erythropus</i>	PM/WV															11		1 / 6.3%
Common Redshank <i>Tringa totanus</i>	PM/WV		4	6	23	5		4	10	13	2		10	27	19	7	44	13 / 81.3%
Marsh Sandpiper <i>Tringa stagnatilis</i>	PM					5	1										2	3 / 18.8%
Greenshank <i>Tringa nebularia</i>	PM					1	1					1	13					4 / 25.0%
Green Sandpiper <i>Tringa ochropus</i>	PM						1					3					2	3 / 18.8%
Wood Sandpiper <i>Tringa glareola</i>	PM					3	21					4	1				3	5 / 31.3%
Common Sandpiper <i>Actitis hypoleucos</i>	PM		1										1					2 / 12.5%
Black-headed Gull <i>Larus ridibundus</i>	PM/WV			2	152				11		128			7	4	8		7 / 43.8%
Yellow-legged Gull <i>Larus michahellis</i>	(RB)			19	3	12	1	30			2	54	ca. 63 <sup>1</sup>	min. 60	11	1075 <sup>2</sup>	525 <sup>5</sup>	12 / 75.0%
Gull-billed Tern <i>Gelochelidon nilotica</i>	PM												2					1 / 6.3%
Sandwich Tern <i>Sterna sandvicensis</i>	PM/WV?																1	1 / 6.3%
Caspian Tern <i>Sterna caspia</i>	PM					3												1 / 6.3%
Alpine Swift <i>Tachymartus melba</i>	(BM)	ca. 100																1 / 6.3%
Common Kingfisher <i>Alcedo atthis</i>	PM/WV		1	1	1			4	1					1	2	1	1	9 / 56.3%
Hoopoe <i>Upupa epops</i>	(BM)/PM											1						1 / 6.3%
Sky Lark <i>Alauda arvensis</i>	PM		1															1 / 6.3%
Sand Martin <i>Riparia riparia</i>	PM					> 20						120	ca. 20					3 / 18.8%
Barn Swallow <i>Hirundo rustica</i>	(BM)/PM					≥ 250							2	2			16	4 / 25.0%
Red-rumped Swallow <i>Hirundo daurica</i>	BM	2 (= 1 bp)											2 (= 1 bp)					2 / 12.5%
House Martin <i>Delichon urbicum</i>	(BM)												6					1 / 6.3%
Tawny Pipit <i>Anthus campestris</i>	BM	3 bp					3s											2 / 12.5%
Tree Pipit <i>Anthus trivialis</i>	PM		2															1 / 6.3%
Meadow Pipit <i>Anthus pratensis</i>	WV			1						15					min. 1	53	9	5 / 31.3%
Water Pipit <i>Anthus spinoletta</i>	PM/WV		2		2									min. 2				3 / 18.8%
Yellow Wagtail <i>Motacilla flava</i>	PM						13 <sup>3</sup>					25						2 / 12.5%
Pied Wagtail <i>Motacilla alba</i>	(BM)/PM							min. 3										1 / 6.3%
Hedge Accentor <i>Prunella modularis</i>	WV			1	4			5-10								1	1	5 / 31.3%
Robin <i>Erithacus rubecula</i>	PM/WV		ca. 50	2	1			≥ 50						> 10	> 10	2	3	8 / 50.0%
Rufous Nightingale <i>Luscinia megarhynchos</i>	BM						1s					3s	1s					3 / 18.8%
Black Redstart <i>Phoenicurus ochruros</i>	PM/(RB)																1	1 / 6.3%
Whinchat <i>Saxicola rubetra</i>	PM		1				141						5				5	4 / 25.0%
Common Stonechat <i>Saxicola torquata</i>	PM		6												2		27	3 / 18.8%
Northern Wheatear <i>Oenanthe oenanthe</i>	BM?/PM					≥ 10					1						2m	3 / 18.8%
Black-eared Wheatear <i>Oenanthe hispanica</i>	BM?/PM					1												1 / 6.3%
Blackbird <i>Turdus merula</i>	RB						1		1			2s						3 / 18.8%

Species	Status	10.06.03	31.10.03	15.11.03	31.01.04	10.04.04	17.04.04	12.10.04	26.10.04	15.01.05	22.01.05	23.04.05	05.05.05	29.10.05	05.11.05	21.01.06	21.03.06	Occ. (%)
Song Thrush <i>Turdus philomelos</i>	WV				<u>3</u>												1	2 / 12.5%
Fieldfare <i>Turdus pilaris</i>	PM/WV?																<u>1</u>	1 / 6.3%
Cetti's Warbler <i>Cettia cetti</i>	RB					1s	1s					<u>2s</u>	1s	1s				5 / 31.3%
Zitting Cisticola <i>Cisticola juncidis</i>	RB?												<u>1s</u>					1 / 6.3%
Reed Warbler <i>Acrocephalus scirpaceus</i>	BM?											<u>1s</u>						1 / 6.3%
Great Reed Warbler <i>A. arundinaceus</i>	BM	2s											<u>3s</u>					2 / 12.5%
Subalpine Warbler <i>Sylvia cantillans</i>	BM					<u>2 (1s)</u>						<u>2s</u>	1s				1m	4 / 25.0%
Barred Warbler <i>Sylvia nisoria</i>	PM		<u>1</u>															1 / 6.3%
Common Whitethroat <i>Sylvia communis</i>	PM						<u>4</u>											1 / 6.3%
Common Chiffchaff <i>Phylloscopus collybita</i>	PM		<u>4</u>												1			2 / 12.5%
Firecrest <i>Regulus ignicapillus</i>	PM			<u>1</u>														1 / 6.3%
Blue Tit <i>Parus caeruleus</i>	(RB)/WV				<u>6</u>												1	2 / 12.5%
Red-backed Shrike <i>Lanius collurio</i>	BM	<u>3 bp</u>											1m					2 / 12.5%
Great Grey Shrike <i>Lanius excubitor</i>	WV				<u>1</u>			<u>1</u>	<u>1</u>		<u>1</u>				<u>1</u>			5 / 31.3%
Woodchat Shrike <i>Lanius senator</i>	BM?					<u>2</u>	1						<u>2</u>					3 / 18.8%
Eurasian Jay <i>Garrulus glandarius</i>	(RB)							<u>1</u>										1 / 6.3%
Magpie <i>Pica pica</i>	(RB)											<u>3</u>						1 / 6.3%
Carrion Crow <i>Corvus corone</i>	(RB)				<u>3</u>			1						2		2		4 / 25.0%
Common Starling <i>Sturnus vulgaris</i>	PM/WV													<u>11</u>				1 / 6.3%
House Sparrow <i>Passer domesticus</i>	(RB)				<u>2</u>													1 / 6.3%
Spanish Sparrow <i>Passer hispaniolensis</i>	RB	<u>1m<sup>4</sup></u>																1 / 6.3%
Common Chaffinch <i>Fringilla coelebs</i>	(RB)																<u>3</u>	1 / 6.3%
Greenfinch <i>Carduelis chloris</i>	(RB)															<u>1m</u>		1 / 6.3%
Goldfinch <i>Carduelis carduelis</i>	(RB)			<u>1</u>											<u>1</u>			2 / 12.5%
Common Reed Bunting <i>Emberiza schoeniclus</i>	(RB)/WV?																<u>2</u>	1 / 6.3%
Corn Bunting <i>Miliaria calandra</i>	RB	<u>3s</u>				1s	1s						2s					4 / 25.0%

<sup>1, 2, 5</sup> including ca. 60, ca. 700 and 450 ind. feeding at nearby refuse dump

<sup>3</sup> all males *M. f. cinereocapilla*

<sup>4</sup> displaying male

#### ACKNOWLEDGMENTS

On our assignments to Montenegro and Albania, we were accompanied by Jakob Smole, Tina Lončar, Iztok Geister and Damijan Denac. Their assistance in counting waterbirds was of great help to us. In the same way

we are grateful for information on the history of salt-production in Tivat and the hydrology of the area by an anonymous referee and Z. Cubrović of the Institute for the Protection of Historic Monuments (Regionalni zavod za zaštitu spomenika kulture) in Kotor (Montenegro).

POMEN TIVATSKIH SOLIN (ČRNA GORA) ZA PREZIMUJOČE IN SELEČE SE VODNE PTICE,  
IN NEKAJ OPAŽANJ O TAMKAJŠNJIH PEVKAH

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## POVZETEK

Tivatske soline so glede na površino (150 ha), ki jo pokrivajo, med najpomembnejšimi mokrišči na črnogorski obali. Z namenom, da se dokumentira njihov današnji pomen za prezimujoče in seleče se vodne ptice, je bilo med junijem 2003 in marcem 2006 opravljenih 16 štetij vzdolž solinskega glavnega nasipa (714 m). Štetja so pokrivala celotni priobalni del solin in obrežje samo (33 ha), kjer se je zadrževalo največ vodnih ptic. V neenakomerno posušenih solnih bazenih na drugi strani glavnega nasipa je bilo zabeleženih zelo malo vrst vodnih ptic.

Skupaj je bilo zabeleženih 104 vrst ptic. Vključno s 7 vrstami, ki jih za to območje v svojem seznamu, ki vsebuje tudi vodomca (*Alcedo atthis*), navajata Saveljič & Rubinič (2004), je bilo v obravnavanem območju doslej ugotovljenih 47 vrst vodnih ptic oziroma 111 vrst vseh ptic. Najštevilnejši med njimi, s 94,4% vseh prešteti vodnih ptic ( $n = 4767$ ), so bili tod prebivajoči rumenonogi galebi (*Larus michahellis*) in prezimujoči rečni galebi (*L. ridibundus*), njim pa so sledile reglje (*Anas querquedula*), žvižgavke (*A. penelope*), črne liske (*Fulica atra*), sive čaplje (*Ardea cinerea*) in male bele čaplje (*Egretta garzetta*). Poleg teh vrst tu redno, a v manjšem številu od 1 do 6 osebkov, prezimujejo mali ponirki (*Tachybaptus ruficollis*), velike bele čaplje (*Egretta alba*) in vodomci. Najštevilnejši med skupaj 17 vrstami pobjeznikov so bili glede na frekvenco pojavljanja in število osebkov, prešteti med vsemi popisi, rdečonogi martinci (*Tringa totanus*), veliki škurhi (*Numenius arquata*), kozice (*Gallinago gallinago*), močvirski martinci (*T. glareola*) in zelenonogi martinci (*T. nebularia*). Kar zadeva vodne ptice, sta v preučevanem območju zanesljivo gnezdila le mali (*Charadrius dubius*) in beločeli deževnik (*Ch. alexandrinus*). V obdobju neobičajno hladnega vremena in močnih vetrov proti koncu januarja 2006 je bilo v obravnavanem območju zabeleženo maksimalno število ( $> 1200$ ) ptic, predvsem rumenonogih galeb (83,5%), ali kar dvakrat več kot med januarskimi štetji v prejšnjih letih. Čeprav se število vseh ptic statistično ne razlikuje od prejšnjih januarskih štetij, pa veliko število vodnih ptic, prešteti januarja 2006, govori o dejstvu, da imajo soline funkcijo zatočišča za vodne ptice, ki v obdobjih hudih vremenskih razmer prezimujejo vzdolž vzhodne jadranske obale (rumenonogi galeb) in v njenem balkanskem zaledju (kreheljc, mlakarica, kozica). O ornitološkem potencialu območja nadalje govorijo visoke številke tam počivajočih repaljčic (*Saxicola rubetra*) v aprilu 2004 kot tudi dokazi o gnezdenju rjave cipe (*Anthus campestris*), srpične trstnice (*Acrocephalus scirpaceus*), rakarja (*A. arundinaceus*), brškinke (*Cisticola juncidis*), rjavega (*Lanius collurio*) in rjavoglavega srakoperja (*L. senator*).

Razmeroma nizko število vodnih ptic v Tivatskih solinah je lahko posledica nenadzorovanega lova, postavitve nasipa v šestdesetih letih prejšnjega stoletja, ki je otežil povezavo med kopenskim delom solin in morjem, in uporabe pesticidov za uničevanje komarjev v spomladanskih in poletnih mesecih. Upravljalni program, ki ga prav zdaj pripravljajo lokalne oblasti, je dobra priložnost, da se soline vnovič vzpostavijo kot postajališče in gnezdišče za vodne ptice. Toda glede na pridobljene rezultate bi bilo treba na novo oceniti, ali je predlagano osrednje območje vzdolž obale, ki je zdaj zaščiteno pred vznemirjanjem, ki ga povzroča človek, dovolj široko za nemoteno prehranjevanje in počitek vodnih ptic.

**Ključne besede:** vodne ptice, pobjezniki, pevke, varstvo, načrt upravljanja, Tivatske soline, Črna gora

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