

SEČOVLJE SALINA - AN ORNITHOLOGICAL ASSESSMENT OF A SLOVENE COASTAL WETLAND

Iztok ŠKORNIK

Ornithologist, MEDMARAVIS, 66000 Koper, Krožna 10, SLO
ornitolog, MEDMARAVIS, 66000 Koper, Krožna 10, SLO

Tihomir MAKOVEC

Ornithologist, Ornithological Association IXOBRYCHUS, 66000 Koper, Gasilska 8, SLO
ornitolog, Ornitološko društvo IXOBRYCHUS, 66000 Koper, Gasilska 8, SLO

Lovrenc LIPEJ

MSc, Biologist, Marine Biological Station, 66330 Piran, Fornače 41, SLO
mag. biol. znan., Morska Biološka Postaja, 66330 Piran, Fornače 41, SLO

ABSTRACT

To date, 248 bird species have been recorded in the Sečovlje salina and neighbouring wetland areas, of which 91 are breeding species. Several waterbird species, the Black-winged Stilt *Himantopus himantopus*, Little Tern *Sterna albifrons* and Kentish Plover *Charadrius alexandrinus* are important on a national level and breed only in the salina or in some Slovene coastal wetlands at the most. Each year the numbers of the breeding species are increasing, the exception is the European Kestrel *Falco tinnunculus*, which is declining as a result of mustelid predation. Despite conservation efforts in the salina and its protected status, human disturbance and threats are increasing.

Key words: Sečovlje Salina, wetland, birds, N Adriatic, trends, threats

Ključne besede: Sečovljske soline, mokrišče, ptice, Severni Jadran, trendi, ogroženost

INTRODUCTION

Slovenia has a relatively short coastline of only 46.6 km long. In the past the marshes and estuaries of rivers were transformed into salt-pans, the largest and most productive were the Piran Salt-pans. Since then some coastal areas have undergone urban development, only the small salt-pans in Strunjan and the more extensive 700 years old Sečovlje Salina (650 ha) now remain.

The Sečovlje Salina is situated at the mouth of the Dragonja river, the only in Istrian Slovenia we have managed to preserve in its natural form, which flows into the northern part of the Adriatic Sea. The Salina is among the most important locations of the Slovene natural wealth, particularly as far as the environmental protection is concerned. The Salina and the immediate

surroundings are an exceptional ornithological site, where numerous birds stop during the winter and on their migration. This area is generally an important coastal resting stop for a number of migratory birds. The Salina is interesting due to its striking breeders and especially as the habitat of some rare birds of scientific interest. It would be truly difficult to find a place in Slovenia that would be as intriguing and varied in all seasons of the year as is the Sečovlje Salina.

Because of its rich cultural and natural heritage, the Sečovlje Salina was declared a "Landscape park" in 1989. It is listed as an Important Bird Area site (Grimmet & Jones 1989), and is the only Ramsar site in Slovenia. The number of bird surveys carried out during the last 100 years (Schiavuzzi 1878, 1883, 1888, Gregori 1976, Geister & Šere 1977, Šmuc 1980, Škornik *et al.* 1990)

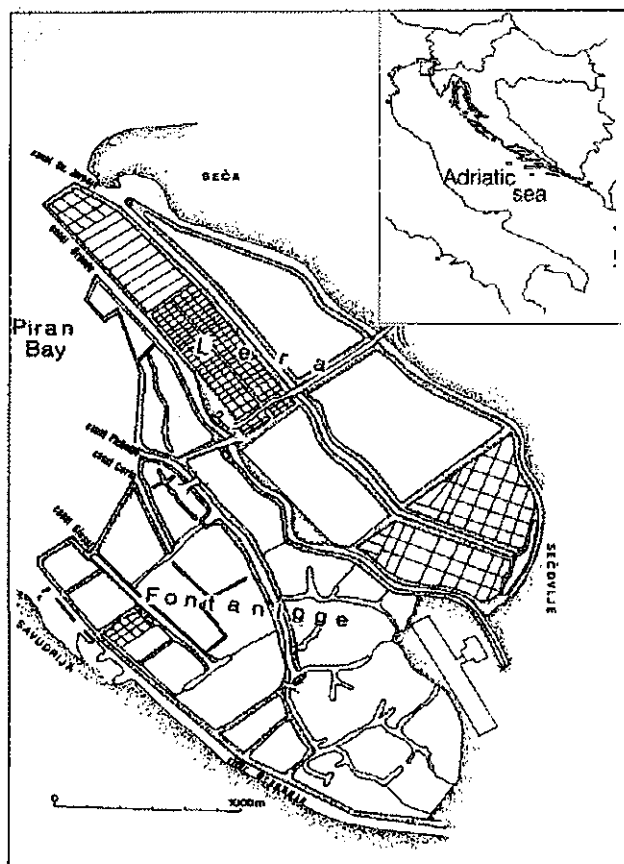


Fig. 1: Sečovlje Salina.
Slika 1: Sečovljске soline.

have allowed us to make certain comparisons and assess the population changes in this region. The most dramatic changes were recorded after salt production ceased in the 1960s. Gregori's (1976) checklist of 132 species, was complemented by records made by Geister & Šere (1977) and Šmuc (1980). A complete survey was then made by Škornik *et al.* (1990) who recorded 207 species. This list was subsequently increased to 222 species (Beltram & Lipej, 1994).

The aim of this paper is to analyse the trends of the avifauna of the Sečovlje Salina during the last 12 years, the emphasis will be on a selected number of breeding species which reflects the general trends for all breeding species, that have been monitored regularly from 1983 to 1995 by a team of ornithologists from the Ixobrychus Ornithological Association.

STUDY AREA

The area of Fontanigge is increasingly becoming an important location for waterbirds, notably the species protected nationally and internationally. The high abundance and high species diversity are a direct consequence of the habitat diversity in the area. Various

habitat types, including reed-beds, halophyte meadows, bushy vegetation, salt basins and dikes, are found in the area. The bird distribution within the Salina in winter is related mainly to the available food resources (Britton & Johnson, 1987). The study site of the Sečovlje Salina enclosed the still active salt-pans (Lera), the abandoned area of salt-pans with saltmarsh, reedbeds (Fontanigge), a small area of intertidal mudflats at the mouth of the river Dragonja and the shrubland area near the Sečovlje Airport (Fig. 1). The abandoned salt-pans are partially covered with halophyte vegetation.

METHODS AND MATERIAL

Complete counts were made of all breeding pairs of the Yellow-legged Gull *Larus cachinnans*, Common Tern *Sterna hirundo*, Little Tern *Sterna albifrons*, Kentish Plover *Charadrius alexandrinus* and the European Kestrel *Falco tinnunculus* during the period 1983-1995 (for Kentish Plover there are no data for 1991, because of the War in Slovenia). The Black-winged Stilt *Himantopus himantopus* was added to the list of breeding birds in 1990, (Makovec & Škornik, 1990) and successively monitored. This data together with distribution maps for all species provides a sound basis when analysing population trends. Some breeding data has already been published for certain species (Škornik 1992, Lipej 1993, Makovec 1994) but is incomplete. To assess the ornithological importance of the Sečovlje Salina, all historic and published material have been checked and compared with recent data.

RESULTS

In this study a total of 248 bird species have been observed, 91 are breeding in the Sečovlje Salina and surrounding area (Fig. 2). Among the recent additions to the list of breeding species, a pair of the Avocet *Recurvirostra avosetta* attempted to breed in the abandoned part of the Salina in 1994 (Škornik 1994). The selected list of important breeding species are described separately, the histograms show the trends for each species.

1. Yellow-legged Gull *Larus cachinnans*

In 1986, a small colony of 11 pairs of the Yellow-legged Gulls was discovered breeding in the Sečovlje Salina. Since then the species has bred annually and numbers have steadily increased to a maximum of 61 pairs in 1994 (Fig. 3). This increase is not surprising as most breeding populations along the northern Mediterranean coastline has shown dramatic increases (Škornik 1992) and research has shown that the Yellow-legged Gull is remarkably adaptable (Beaubrun 1994).

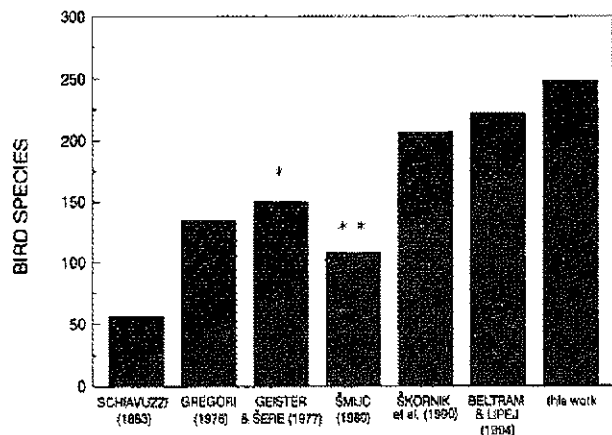


Fig. 2: Number of bird species at Sečovlje Salina according to different ornithofaunistic surveys in centennial period.

*Updated records of Gregori (1976).

**Passerines in paper not included.

Slika 2: Število vrst v Sečovljskih solinah na osnovi različnih ornitofavnističnih popisov v stoletnem obdobju.

*Dopolnjeni seznam Gregorija (1976).

**Pevke v delu niso vključene.

2. Common Tern *Sterna hirundo*

Common Terns were discovered breeding in the Sečovlje Salina in 1983. In the breeding colony, 9 nests were counted. Nesting by the Common Tern on the Slovene coast had not been observed before. The colony comprised of 9 nests with eggs. The nests were on a dike (Škornik 1983). Since then 3 colonies have become established, approximately 50 pairs on small mud artificial islands, and approximately 10 pairs on dikes.

Sudden increase in numbers in 1991 onwards is due to muddy artificial islands. The same was noticed in other Mediterranean Salinas (Walmsley 1993). The Salina population has increased and today comprises about 60 pairs (Fig. 4).

3. Little Tern *Sterna albifrons*

In 1985, a Little Tern start to breed in a mixed colony of the Kentish Plover and Common Tern (Škornik 1985). This was the third known breeding by this species in Slovenia. Due to the small number of 1-3 breeding pairs a decree has been passed to protect this small but unique breeding population in Slovenia and every effort should be made to improve the breeding habitat. In 1995 3 nest with eggs were found on dikes.

4. Kentish Plover *Charadrius alexandrinus*

The first known possible breeding record for this species dates back to the last century (Schiavuzzi

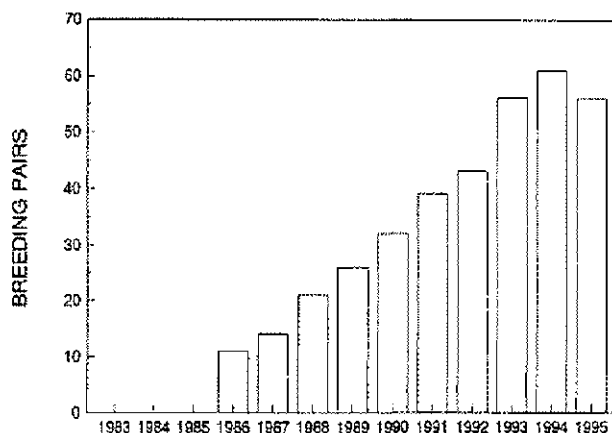


Fig. 3: Breeding population of the Yellow-legged Gull at Sečovlje Salina.

Slika 3: Gnezdeča populacija rumenonogega galeba na Sečovljskih solinah.

1883). Its breeding status was confirmed as late as in 1975 by Gregori (1976). The major part of the Kentish Plover's population nests in the abandoned salt-pans, on dikes and in dry basins. Some pairs nest within the colony of the Common Tern. Recently, some pairs began to breed also in dry basins with halophyte vegetation, chiefly *Limnietum venetum*. Some pairs of the Kentish Plover are today known to breed in other coastal wetlands (Makovec 1994). The biggest colony of Kentish Plover in Slovenia is in the basin near the Salt Museum. After 1991 (after the war in Slovenia) we noticed the first population peak, which could be a consequence of low human disturbance in period of the war. The fluctuations in numbers of breeding pairs over the years, are related also to weather conditions, and to the number of field observations. However, since the future of these wetlands is still uncertain, the Sečovlje Salina remains the bird's most important breeding site in Slovenia (Fig. 5).

5. Black-winged Stilt *Himantopus himantopus*

By transforming the abandoned Sečovlje salt-pans into larger salt lagoons from 1960's to date, their water surface rose to such a level that the banks became interesting for waders once more. In 1990, 2 pairs of the Black-winged Stilt were discovered breeding in this recently created habitat abandoned salt-pans (Makovec & Škornik, 1990). This long awaited event, was welcomed by Slovene ornithologists. After a slow start, further increases were recorded in 1992 (3 pairs), and again in 1994 (6 pairs), followed by an impressive increase to 32 pairs in 1995 (Fig. 6). These population increases are directly related to the habitat changes, water levels and protection in this habitat. Nest sites are on dikes with halophyte vegetation and on small mud

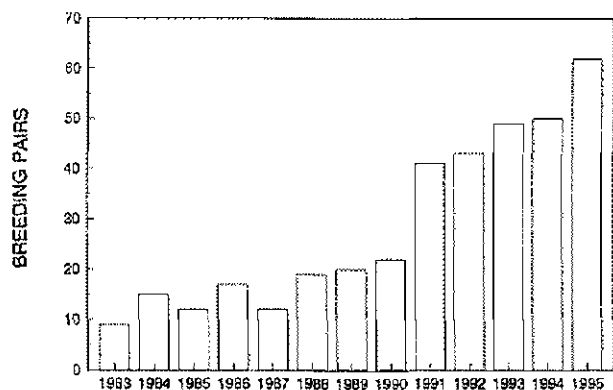


Fig. 4: Breeding population of the Common Tern at Sečovlje Salina.

Slika 4: Gnezdeča populacija navadne čigre na Sečovljskih solinah.

islands in the basins.

6. European Kestrel *Falco tinnunculus*

The European Kestrel *Falco tinnunculus* is the only bird of prey breeding in the Sečovlje Salina where it has occupied a niche in the abandoned buildings since 1976. A hundred years ago, Kestrels bred in variety of habitats, in coastal towns, and along the Dragonja river valley. Outside the salina the only known breeding sites are the rocky cliffs in the so-called Karst edge near Črni Kal (Lipej 1993, Lipej & Gjerkeš, 1994). At the Sečovlje Salina it has nested in the abandoned houses since 1976, when first couples were observed. More recent population estimates show fluctuating numbers of between 5 and 8 breeding pairs during the period 1983-1992, with a peak of 12 pairs in 1985 (Lipej 1993) (fig. 7). The sudden crash to zero pairs from 1993 to 1995 is probably due to mustelid predation.

DISCUSSION

To date, 248 bird species have been recorded at the Sečovlje Salina and its background, and among them at least 91 species breed there (Fig. 2). Because of the passive salt production in the area of Fontanigge, the management of water levels in basins, and the special nature of saline habitats make them ideal resting and refueling site for many birds species. Ecological studies in these artificial ecosystems have shown that Mediterranean salinas are wetlands of international importance for conservation and host rare and endangered flora and fauna. They also have rich invertebrate and vertebrate communities (Walmsley 1993, 1994). Certain breeding species are important on the national level, since they breed only at the Salina (Black-winged Stilt, Little Tern) or in another Slovene coastal wetland at

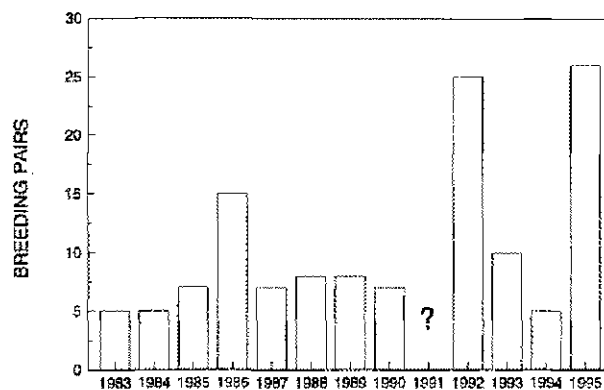


Fig. 5: Breeding population of the Kentish Plover at Sečovlje Salina.

Slika 5: Gnezdeča populacija beločelega deževnika na Sečovljskih solinah.

the most (Kentish Plover, Yellow-legged Gull). The breeding population of the Little Tern with three pairs remains quite stable. The Yellow-legged Gull is increasing rapidly and today presents a serious threat to other breeding birds (Škornik 1992). Only in the case of the Kestrel, a decrease in the numbers of its breeding pairs has been noted, which is principally the result of the mustelid predation and the increasing human activities during its breeding season. After the 1993, no Kestrel nests have been found.

Threats

Despite the protected status of the Sečovlje Salina and human pressures, threats, and disturbance are today present in the area and they are increasing.

Due to the growing popularity of the Sečovlje Salina, the too numerous visitors, have become a serious threat for the nesting species, because walk about in the area where Kentish Plovers breed. Some nests have been trampled. The salina is becoming increasingly popular for people from Italy and central part of Slovenia who visit the salina for weekend picnics, bath, walk, fishing etc, others visit the Salt Museum established in one of the abandoned buildings, close to where a colony of the Kentish Plover breed. Disturbance by visitors walking around in this important area will endanger the breeding population if allowed to continue. Other studies in the Mediterranean not only support this, but show that human disturbance can have a direct impact on laying dates and breeding success (Pineau 1992). In spite of the efforts of the Museum to extend their activities in a broader area, the nesting colony will be further jeopardized.

The Yellow-legged Gull is considered an invading species in the western Mediterranean and a super predator on many waterbirds (Walmsley 1993), such as

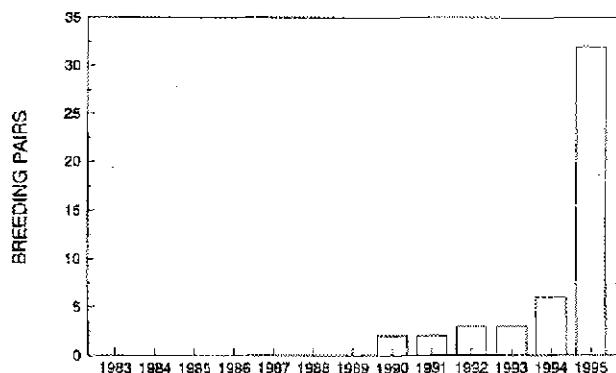


Fig. 6: Breeding population of Black-winged Stilt at Sečovlje Salina.

Slika 6: Gnezdeča populacija polojnika na Sečovljskih solinah.

those in Sečovlje Salina belonging to the Kentish Plover, Common Tern, Little Tern, and others (Škornik 1992, Makovec 1994).

Breeding success of the Common Tern in the Salina colonies was low almost every year; this was attributed to the unusually cold weather and heavy rains in the breeding period. In 1995, the breeding season was disastrous, in spite of a fairly high number of breeding pairs. Owing to the heavy rains, some colonies deserted completely, and after the Air Show held over the nearby airport, an exodus occurred, affecting a major part of the bird's population.

The decrease and disappearance of the Kestrel's breeding population were caused primarily by the mustelid predators and the economic revival of the salt-pans (Lipej 1993). Pine Marten *Martes foina* was also recorded to be preying on the Kentish Plover's clutches. We presume that other marine breeding species are also vulnerable to mustelid predators.

Terns, waders, plovers and gulls nest on dikes built between the salt-pans. These birds depend very much

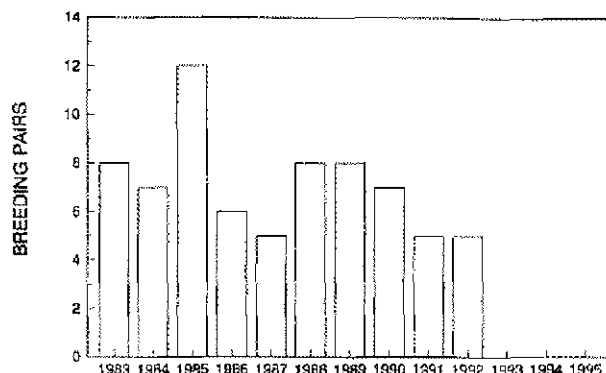


Fig. 7: Breeding population of the European Kestrel at Sečovlje Salina.

Slika 7: Gnezdeča populacija navadne postovke na Sečovljskih solinah.

on the "passive activities" necessary for salt production, and maintenance of the dikes affects the breeding success of these birds.

The salt company is planning to introduce fish farming into the Sečovlje Salina and aim to rear the Japanese Prawns (*Penaeus japonicus*) and other commercial species. This would considerably affect the avifauna of the Salina (Lipej 1994). It is a known fact that bird populations decline when salinas are transformed into fish farms (Rufino & Neves 1992). Fish farming activities and conservation are not compatible and may lead to conflicts. When this happens, fish eating birds are either frightened away or shot (Walmsley 1993)

ACKNOWLEDGEMENTS

Our sincere thanks are due to Dr. John Walmsley (MEDMARAVIS) and Dr. Davorin Tome for discussions and improvements on the manuscript.

POVZETEK

Do danes je bilo v Sečovljskih solinah in okolici ugotovljenih 248 vrst ptic, od katerih jih najmanj 91 tam tudi gnezdi. Med gnezdečimi vrstami so nekatere pomembne tudi na nacionalni ravni, saj gnezdijo samo tu (polojnik, mala čigra) ali kvečjemu še na drugih slovenskih obalnih mokriščih (beločeli deževnik, rumenonogi galeb). Število gnezdečih vrst iz leta v leto rahlo narašča, medtem ko je upad navadne postovke treba pripisati predvsem povečanim človekovim dejavnostim in plenjenju s strani živali. Kljub temu, da je območje zaščiteno in da so v njem v veljavi dodatni naravovarstveni ukrepi, pa ga danes ogroža cela vrsta antropogenih dejavnikov, ki se nenehno povečujejo.

REFERENCES

- Beaubrun, P., C. 1994.** Controllo numerico di una specie in espansione: Il gabbiano reale *Larus cachinnans* in MEDMARAVIS, La gestione degli ambienti costieri e insulari del Mediterraneo. Edizioni Sole.: 353-379.
- Beltram, G., L., Lipej (in print).** Conservation and Management of Wetlands on the Slovenian Coast (NE Adriatic). J. Coast. Conserv.
- Britton, R.H., & A. R., Johnson 1987.** An ecological account of a Mediterranean Salina: The Salin de Giraud, Camargue (S France). Biol. Conserv. 42: 185- 230.
- Grimmet, R., F., A., T., A., Jones, 1989.** Important Bird areas in Europe. ICBP Technical publication N.9.
- Gregori, J., 1976.** Okvirni ekološki in favniški pregled ptičev Sečoveljskih solin in bližnje okolice. Varstvo narave 9:81-102.
- Lipej, L., 1993.** Status in ogroženost gnezditvene populacije navadne postovke *Falco tinnunculus* na Sečoveljskih solinah. Annales 3: 29-36.
- Lipej, L., 1994.** Ocena vpliva gojenja morskih organizmov na ornitofavno Sečoveljskih solin. Acrocephalus 62:31-33.
- Lipej, L. & M. Gjerkeš 1994.** Ujede (Falconiformes) in sove (Strigiformes) Slovenske Istre. Annales 4: 53-62.
- Makovec, T. & I., Škornik, 1990.** Pričakovana gnezditve rdečenogega polojnika *Himantopus himantopus* v Sloveniji. Acrocephalus, 46: 87-95.
- Makovec, T. 1994.** Status in gnezditvene navade beločelega deževnika *Charadrius alexandrinus* na slovenski obali. Annales 4. Series historia naturalis, 63-70.
- Pineau, O. 1992.** The decline of a breeding population of Kentish Plover in a French Mediterranean resort. In: M. Finlayson, T. Hollis & T. Davis (eds.). Managing Mediterranean Wetlands and their Birds. Proceed. IWRB Int. Symp. Grado Italy: 122-125.
- Rufino, R. & R. Neves. 1992.** The effects on wader populations of the conversion of salinas into fish farms. In: M. Finlayson, T. Hollis & T. Davis (eds.). Managing Mediterranean Wetlands and their Birds. Proceed. IWRB Int. Symp. Grado Italy: 177-183.
- Schiavuzzi, B., 1883.** Materiali per un' avifauna del territorio di Trieste fino Monfalcone e dell' Istria.
- Škornik, I., 1983.** Navadna čigra *Sterna hirundo* gnezdi v Sečoveljskih solinah. Acrocephalus, 16: 32-34.
- Škornik, I., 1985.** Maša čigra *Sterna albifrons* gnezdi v Sečoveljskih solinah. Acrocephalus, 26: 55-56.
- Škornik, I., 1987.** Sečoveljske soline - pomembno ornitološko območje Evrope. Falco 2: 3-13.
- Škornik, I., 1992.** Prispevek k poznavanju ekologije rumenonogega galeba *Larus cachinnans* Pall. (AVES-LARIDAE). Annales 2: 53-66.
- Škornik, I., 1994.** Inventar in pomembnost zaščitenih lokalitet v Jadranu. Annales 4. Series historia naturalis: 87-100.
- Škornik, I., T. Makovec, M., Miklavc 1990.** Favniški pregled ptic slovenske obale. Varstvo narave. 16: 49-99.
- Walmsley, J., G. 1993.** Industrial Salinas in the Camargue and the Conservation of breeding Seabird populations. Proceedings of the 2nd. Symposium MED-MARAVIS, Calvia, Majorca, Mar. 1989.
- Walmsley, J., G. 1994.** Un approccio pratico alla gestione ambientale nelle Saline del Mediterraneo. In MED-MARAVIS, La gestione degli ambienti costieri e insulari del Mediterraneo. Edizioni Sole.:147-168.