Ökol. Vögel (Ecol. Birds) 8, 1986: 189-197

The ecology of the first breeding of the Mediterranean gull (*Larus melanocephalus* Temminck 1820) in the Evros delta (Greece)

Zur Ökologie der erstmaligen Brut der Schwarzkopfmöwe (*Larus melanocephalus* Temminck 1820) im Evros-Delta (Griechenland)

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Key words: *Larus melanocephalus*, Evros delta, Greece

Abstract

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On May 1981, a population of about 2000 Mediterranean gulls *(Larus melanocephalus* Temminck) with approximately 850 breeding mature pairs, invaded a small island in the coastal region of Evros delta. The biotop structure in combination with density and nature of the vegetation and the lack of human disturbance were the most important factors contributing to the selection of the region for reproduction. The largest number of eggs laid (35,99%) was destroyed by the Mediterranean gulls themselves whereas out of the eggs hatched (41,82%) many chicks died (11,12%). The fledging success reached a level of 0,89 young ones per egg hatched (or 0,37 young ones per egg laid).

Noticeable attraction was observed between the Mediterranean gulls and the Gullbilled Terns *(Gelochelidon nilotica* Gmelin) in our area.

Zusammenfassung

GOUTNER, V. (1986): Zur Ökologie der erstmaligen Brut der Schwarzkopfmöwe *(Larus melanocephalus* Temminck 1820) im Evros-Delta (Griechenland). — Ökol. Vögel 8: 189-197.

Im Mai 1981 besiedelte eine Population von etwa 2000 Schwarzkopfmöwen *(Larus melanocephalus)* eine kleine Insel in der Küstenregion des Evros-Deltas. Die Population umfaßte etwa 850 Brutpaare.

Der Auswahlgrund des Gebietes als Brutplatz lag in der Verbindung mit der Art und Dichte der Vegetation und vor allem im Fehlen von menschlichen Störungen.

Die größte Zahl der gelegten Eier (35,99%) wurde durch die Möwen selbst zerstört. Von den geschlüpften Jungen (41,82%) starben 11,12%.

Die Ausfliegrate betrug 0,89 Junge/geschlüpfter Jungvlgel (bzw. 0,37 Junge/gelegtes Ei).

Zwischen den Schwarzkopfmöwen und Lachseeschwalbe *(Gelochelidon nilotica* Gmelin) konnte eine bemerkenswerte gegenseitige »Anziehung« beobachtet werden.

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1. Introduction

The Mediterranean gull is an endangered bird and it appears to be threatened with disappearance, at least in Europe (KANELLIS 1977). Except Greece, its only known breeding sites in the Mediterranean is the Camargue (France) and the river Po delta (Italy) where however the breeding population recorded has been very low (BRICHETTI & ISENMANN 1981).

Greece, besides the fact that it offers hospitality to a part of the European wintering population (BAUER et al. 1969), seems to harbour the largest part of the European breeding population – except the Soviet Union – (HOFFMANN et al. 1970). The most important breeding sites of this bird in Greece have been the estuarine areas of Axios, Nestos and Ludias rivers, Porto Lago, the lakes Karla and Alyki and the region of Lamia (BAUER et al. 1969, HOFFMANN et al. 1970, ANTIPAS 1978, MAKATSCH 1978, DORIKOS 1981).

Most of the areas mentioned above were consistent breeding sites until 1970, but nowadays only the Lake Alyki (5000 pairs) is known to concentrate the whole breeding population of Greece. The remaining areas have become unsuitable because of intensive human interference with the purpose of using the land for agriculture. The only available information on the breeding biology of these gulls in Greece comes from MAKATSCH (1968) and ISENMANN (1976).

In the Evros delta, the Mediterranean gull is known only as a wintering and/or passage migrant in spring (BAUER & MÜLLER 1969).

During our general ecological study of the delta, which started in 1979, we discovered the first colony of the *Larus melanocephalus* Temminck in our study area, in the breeding season of 1981.

The purpose of this paper, is to make known such an important fact in the ornithological history of the delta, also the conditions under which it took place and even to provide some of the results which were obtained from the field research.

2. Study area

The area where we worked, consists of a little island in the coastal region of the Evros delta (Fig. 1). Its length is about 1500 m and its width fluctuates from 50 m to 200 m. Because of its low altitude above sea level (1,50 m maximum) the width changes periodically in relation to the tides, whose action is also affected by wind direction and speed.

The vegetation consists mainly of halophytic and ammophile species, which stabilize the created sand-dunes. Dominant plant species are *Elymus giganteus sabulosus* Tzvelev and *Phragmites communis* Trin. Species like *Xanthium strumarium* L., *Cakile maritima* Scop, *Chenopodium album* L., exist in extensive associations among the sand dunes whereas others, like *Salicornia europaea* L., *Halimione portulacoides* Aellen, exist mainly in the northern coastal region of the island. Other species like *Limonium gmelinii* O. Kuntze , *Puccinellia festuciformis* Parl, *Aeluropus litoralis* Parl exist at more level areas in the interior of the island. Nevertheless, the associations frequently overlap one another. There are a few *Tamarix smyrnensis* Bunge shrubs scattered on the island.

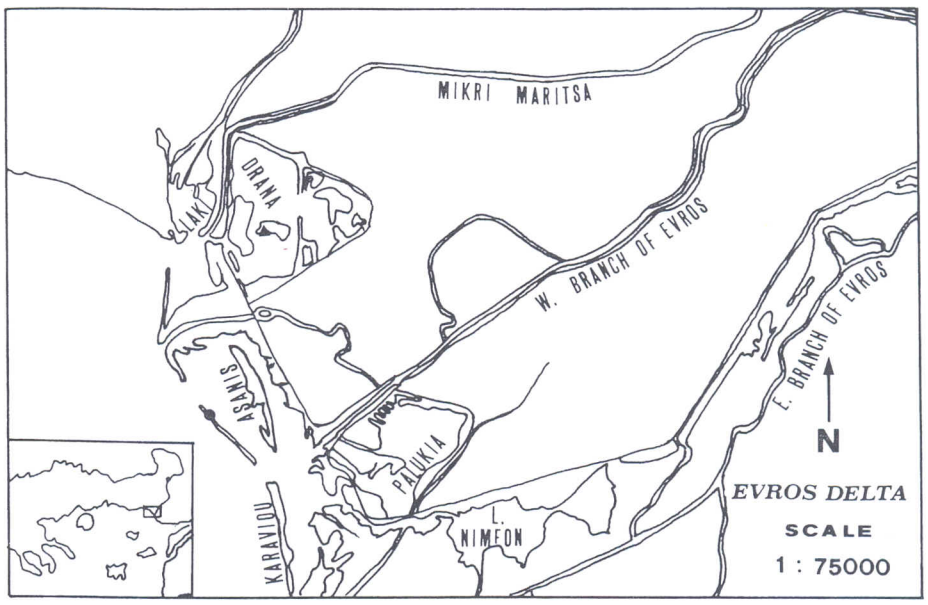

Figure 1. Map of the Evros delta. ● breeding place, ▲ Site of Mediterranean gulls' aggregation on 12.06.1982.
Abb. 1. Karte des Evros-Deltas. ● Brutplatz, ▲ Platz der Möwen-Ansammlung vom 12.06.1982.

3. Methods

We approached the island by boat, which enabled us to make some significant observations on activities of the birds, such as those feeding. Direct observation of the bird activities was almost impossible because of the dense vegetation and we could only use a telescope 20-60 X 80 from a few points about 100 m away. So we raised a hide successively at three sites in the colony. We put the hide in a Tamarix shrub and camouflaged it well, so that the birds accepted it immediately. At every field visit we kept data for the evolution of the egg laying and – later – the hatching at the colony, the egg and chick losses and the reasons, when possible.
Extensive photographing, sound recording and about 30 minutes super-8 filming were taken from inside and outside the hides for confirmation of this significant fact.

4. Results

4.1 Nest site selection

The part of the island where the colony was located exists on the first 300 m at its northern side (Fig. 1). No Mediterranean gulls bred either at any other site of this island or at the other two islands of the delta coastal region. This preference appears to be due to three basic factors:

4.1.1 Habitat structure

The northern part of this island includes the highest – from sea level – sites (on this island) so there is no danger of being covered from high tides, especially during

strong S-SW winds. This has been a strictly determining factor, considering the fact, that the largest part of the breeding population was already present on the island at the beginning of May when very strong S-SW winds became the reason of extensive egg losses to other Charadriiformes in other coastal areas of the delta.

4.1.2 Vegetation density

The vegetation of this island is still at premature succession stages in contrast with the other two (especially Asanis) where it is more stable. The density of *Phragmites* and *Elymus* appeared to have special significance (analysing below).

4.1.3 Ecological isolation

Human activities are almost non-existent on the northern part of the island. Only sometimes fishermen go there to place their equipment.

4.2 Colony structure and nest building

The Mediterranean gulls formed a large colony in such a way, that six different subcolonies appeared to exist. However, it rather happened because of the distribution of the vegetation on the sand dunes, which did not permit continuation at the colony, consisting of about 850 pairs, whereas the total present population was about 2000 birds. The nest building started at the beginning of May. The nests were placed on the substrate in preference to sites with low halophytic vegetation *(Aeluropus litoralis, Cakile maritima, Salicornia fructicosa,* mainly) or covered by sparse vegetation of *Phragmites communis* and *Elymus giganteus* (Phot. 1,2). Many nests were made under *Tamarix* shrubs which existed there. Many nests on the peripheries of the colony were not made in or beside the vegetation cover but on dry plant material deposited there by exceptionally high tides in winter.
The nest material consisted mainly of dead *Phragmites* and *Elymus* but also of the plant material mentioned above and in most cases it was abundant.
The distance between the nests in the colony was very short. It usually fluctuated from 30-50 cm but many of them were only 20 cm one from the other, so that we counted up to 100 nests in regions not greater than 25 m^2 (5x5 m).

Table 1. Egg production of *Larus melanocephalus.*
Tabelle 1. Gelegezahlen von *Larus melanocephalus.*

	Number of eggs per nest Anzahl der Eier pro Nest			
	1	2	3	4
Number of clutches Gelegezahl	142	353	338	2

total eggs laid Gesamt-Eizahl	number of completed clutches Anzahl der kompletten Gelege	mean clutch size (± SD) mittlere Gelegegröße (± SD)
1870	835	2,24 ± 0,72

4.3 Egg laying

The first eggs were laid in the first week of May and the breeding peak was between the 15th and 20th of May. Isolated laying happened in June but we were not able to observe its course. The results of the egg laying (Tab. 1) include neither the laying in June nor the repeated clutches. (Table 1).

Photo 1. Nests of Mediterranean gulls among *Phragmites communis* vegetation.
Foto 1. Nester der Schwarzkopfmöwen in *Phragmites communis*-Vegetation.

Photo 2. Part of the 1981's breeding site of the Mediterranean gulls, as appeared in early June of 1982. The vegetation of *Phragmites communis* is high and dense.
Foto 2. Teilansicht des 1981er Brutplatzes (Anfang Juni 1982 fotographiert). Die Vegetation von *Phragmites communis* ist hoch und dicht.

4.4 Hatching, mortality and fledging

The mortality (Table 2) before hatching, was mainly due to egg predation by the *Larus melanocephalus* themselves, which frequently destroyed eggs of densely lying nests. Most of these losses were observed in the first two weeks of June, that is during the incubation period. The main reason for this happening was the manner of nest placement in connection with the various — and frequently violent — interactions among the pairs. No predation appeared to occur by Hooded Crows *(Corvus corone cornix* L.) or other gulls common over the area *(Larus cachinans* and *Larus ridibundus* L.) and we clearly saw that these birds avoided approaching or really crossing the colony areas. No eggs were found destroyed in the manner characteristic of rats (Maxson & Oring 1978) although these animals exist on the island (probably brought in from fishing boats). Egg collection, in this case, did not appear to happen, although it sometimes does to other birds.
We found the first chicks at the beginning of June. The chicks remained in the nests sometimes for long periods (possibly days) without moving or returned there whenever they wandered away from the nesting site. The chicks were fed by the parents

with sardines *(Sardina pilchardus* Willugh.) mainly, and brooded more intensively at noon (during observation periods). We did not observe chick feeding from about 14.00 to 17.00.

Table 2. Causes of mortality in *Larus melanocephalus.*
Tabelle 2. Verlust-Ursachen bei *Larus melanocephalus.*

Eggs Eier	total Total	predation Raub	addled* faul	disappeared verschwunden
	1088	673	65	350
% of total laid % der Gesamt-Eizahl	58,18	35,99	3,47	18,72
% of total lost % des Gesamt-Verlustes	100	61,86	5,97	32,17
Chicks Küken	total Total	killed by other L. melanocephalus durch andere Möwen getötet	found dead tot gefunden	disappeared verschwunden
	87	31	10	46
% of total hatched % der Gesamt-Schlupfzahl	11,12	3,96	1,28	5,88
% of total lost % des Gesamt-Verlustes	100	35,63	11,49	52,87

* Liquid feel when handled

Some of the wandering chicks were sometimes killed by adult gulls (Table 2). Some were found dead without conspicous outer injury, possibly dead because of some sickness or because of the incapability of the parents to brood them. Death by exposure appeared to happen only 5-8 days after hatching. The chicks tended to hide in the vegetation when approached during their first three weeks of life, whereas after this stage they went away swimming on the water so that a big flock of young ones was formed with adults around.
The chicks were able to fly about 5 weeks after hatching. All the breeding population of the Mediterranean gulls of the delta, together with the young ones, left by the end of July. The breeding success is given in Table 3.

Table 3. Fledging success of *Larus melanocephalus.*
Tabelle 3. Ausfliegerate von *Larus melanocephalus.*

eggs hatched ausgebrütete Eier	chicks fledged flügge Jungen	chicks fledged per egg hatched flügge Juv. pro ausgebrütetes Ei	chicks fledged per egg laid flügge Juv. pro gelegtes Ei
782 (41,82)*	695	0,89	0,37

* Per cent of total eggs laid
Prozent der Gesamt-Eizahl

4.5 Participation of other bird species

Charadriiformes breed on the island where the gulls bred because it is one of the best places for their reproduction in the Evros delta. Large numbers of Common Terns *(Sterna hirundo* L.), Little Terns *(Sterna albifrons* Pallas), Red-winged Pratincoles *(Glareola pratincola* L.) and (the seriously endangered) Gull-billed Terns *(Gelochelidon nilotica* Gmelin), breed there and a good number of Oystercatcher *(Haematopus ostralegus* L.), Kentish Plover *(Charadrius alexandrinus* L.) and Redshank *(Tringa totanus* L.) pairs breed as well.
The species which really appeared to participate in the colony of the Mediterranean gulls was the Gull-billed Tern. The common and Little Terns constructed separate colonies on the island. These birds also bred near the Mediterranean gull colony but only on the periphery and at sites where the gull nests were sparse. No Red-winged Pratincoles or other Charadrii of the island bred in the colony of the gulls.

5. Discussion

Although our search of new breeding sites in 1982 was continued in the breeding season, we found that the birds did not finally breed in the delta region again.
At the beginning of May 1982, about 3000 birds gathered on the island and some gatherings happened at the known breeding site having the colony pattern of 1981. We discovered only one egg on 8th of May there, but no nests. In early June of the same year, the vegetation cover of *Phragmites communis* was so dense and high at the colony sites that we crossed it with difficulty (Phot. 3). It appears that this habitat change prevented the selection of the same place for new breeding. The negative influence of the vegetation growth on the reproduction of other colonially breeding seabirds is known through various studies (Massey 1974, Tomkins in McNichol 1975, Blokpoel et al. 1978, Morris et al. 1980).
On the 12th June 1982 about 300 Mediterranean gulls gathered on an island of the fish-pond area Drana (Fig. 1). We found only two nests there without eggs and the birds left a few days later. This possibly happened because it was late in the season for breeding.
Earlier in the season, about 60 pairs of Gull-billed Terns had bred at the same locality whereas almost none of these birds bred on the coastal island.
The attraction of Gull-billed Tern and the Mediterranean gull seemed noticeable to us in both breeding seasons. However, we have not yet confirmed whether it is because of common habitat preference or whether there are other factors encouraging these birds to breed together.
The breeding of the Mediterranean gulls in the Evros delta shows that appropriate legislation must protect the few refuges of the endangered bird species in the delta. Furthermore, the development of some wildlife management is necessary in order to save parts of the biotop for the endangered birds to breed.

Acknowledgements

I am grateful to Christos and Sotiris Goutner for their help during the field visits. Also to Dimitris Goutsouras who participated as cameraman and elaborated the received film and the teacher of English Apostolos Emmanuel who corrected the English manuscript. Special thanks to Dr. Dimitris Babalonas for his help on the identification of plant species.

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