Competitive Interactions between the Herring Gull *L. a. cachinnans* and the Great Black-Headed Gull *L. ichthyaetus* at Sivash Lake (South Ukraine)

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Introduction

At Lake Sivash, as in many European countries and North America, the Herring Gull *Larus a. cachinnans* constantly increases in number, expands its breeding territory and occupies new habitats (SIOCHIN et al. 1988). In the Great Black-headed Gull *Larus ichthyaetus,* these processes occur less intensively. These two species form mixed colonies, their feeding rations are similar, but they differ in percentage composition of feeding objects (SIOCHIN et al. 1988). Competition for feeding sites in the colony, for feeding objects, as well as strong inclination for predation in *L. a. cachinnans* determine agressive relationships between the species in the colony.

Study area and methods

Investigations were carried out in Central Sivash (the island of Kitai) in April of 1984 and 1985, also in Eastern Sivash (near the island of Kujanly) in the first part of May in 1986. The Kitai is an island of solid ground (mainly clay) covered by dense grass vegetation reaching above 50 cm height, the area of the island being 3 ha and the height of banks 6m. In Eastern Sivash near the Kujanly there are some small alluvial sandy islands with the admixture of shells. *L. ichthyaetus* bred in one about 150 m length and to 20 m width. There were 4 microcolonies there (with 40–60 nests each) of 5 to 8 m apart. In total, 200 pairs bred in the island.

In the space between the colonies of *L. ichthyaetus, L. a. cachinnans* and *Phalacrocorax carbo* bred. The island of Kitai concentrated 2 microcolonies, located in a distance of 3–4 m each from another.

Observations were completed using a small tent located not far from the colonies. Behaviour of both species have been observed visually, filmed and photographed. Vocalizations were taped on a Sony TC-800B tape recorder. Some birds were marked by picric acid without catching them (e. g. dyeing the walls of the nest, etc.).

Results

Occupation of breeding areas occurred from mid-February to early March (KOSTIN 1983). *L. ichthyaetus* began making their nests in places without or with thin grass vegetation. Egg-laying of *L. a. cachinnans* started on March 5–18 and reached the peak in the first half of April. *L. ichthyaetus* laid eggs from mid-March to the end of the month, the egg-laying of the whole colony was over in the period of 10 to 12 days (KOSTIN 1983, SIOCHIN et al. 1988). Chicks of *L. ichthyaetus* hatched in mid-April in the interval of 7 to 10 days. After hatching, when chicks were already able to walk, they used to form a kind of flocks which were gradually joined by all the young. Thus all birds of the species laid eggs or hatched in a strictly determined period of time. Egg-laying and hatching were timed so that these processes never overlaid, i. e. hatching started only when egg-laying process in the colony was over. Such timing is also characteristic of *Larus melanocephalus* and *Larus atricilla* in North America (BURGER 1979; BUZUN & MIERAUSKAS 1987).

The processes of egg-laying and hatching in the Herring Gull were not strictly limited in time, i. e. when some birds were beginning to lay eggs, other clutches were already hatching. Thus the physiological state of Herring Gulls is more diverse than that of Great Black-headed Gulls, what, most probably, determines the aggressive behaviour of Herring Gulls.

L. a. cachinnans arrived at the breeding territory and began making nests earlier than *L. ichthyaetus* but these were only solitary individuals (KOSTIN 1983; SIOCHIN et al. 1988). *L. ichthyaetus* began making their nests after the territory had already been occupied by solitary *L. a. cachinnans. L. ichthyaetus* were characterized by mass colonization of the territory; it also applies to *L. melanocephalus* (BUZUN & MIERAUSKAS 1987). Such an entire occupation of the territory evoked aggressive reaction of *L. a. cachinnans* that had already settled. However, this was the sole means for *L. ichthyaetus* to deter aggressive attacks of *L. a. cachinnans* and to occupy the territory. Colonies of *L. ichthyaetus* were dense, pairs of this species usually nested in 17,5 ± 2,5 cm intervals from each other in the centre and in 1 m intervals at the periphery (SIOCHIN et al. 1988).

In the period of egg-laying and hatching Herring Gulls often attacked the nests of Great Black-headed Gulls, especially, those at the periphery of the colony and those left by their owners. Neighbours of the attacked nest did not chase away the intruder trying only to frighten it by jabbing posture. Nimbleness of *L. a. cachinnans* allowed them to avoid the jab. *L. ichthyaetus* left the nest only then the distance between the approaching man and the nest was 4–5 m. The moment *L. ichthyaetus* left the nest, *L. a. cachinnans* started eating eggs even in the presence of the man. When *L. a. cachinnans* were approaching of flying above *L. ichthyaetus,* the latter used to turn their heads towards the predators with their bills open. To defend from the intruder *L. ichthyaetus* jabbed it with the bill or, if the predator seemed persistant, left the nest and chased the intruder away beeting it with wings or

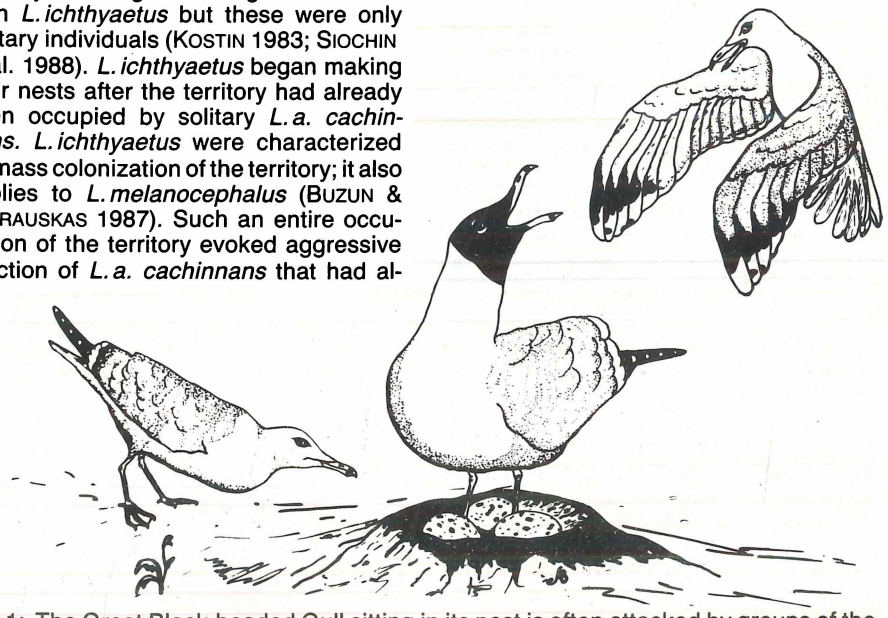

Fig. 1: The Great Black-headed Gull sitting in its nest is often attacked by groups of the Herring Gulls which increase their success in oophagia while cooperating among themselves.

Abb. 1: Eine auf ihrem Nest sitzende Fischmöwe (*L. ichthyaetus*) wird häufig von mehreren Silbermöwen *(L. a. cachinnans)* attackiert. Durch Kooperation mehrerer dieser Möwen erhöhen sie ihren Erfolg beim Eierraub.

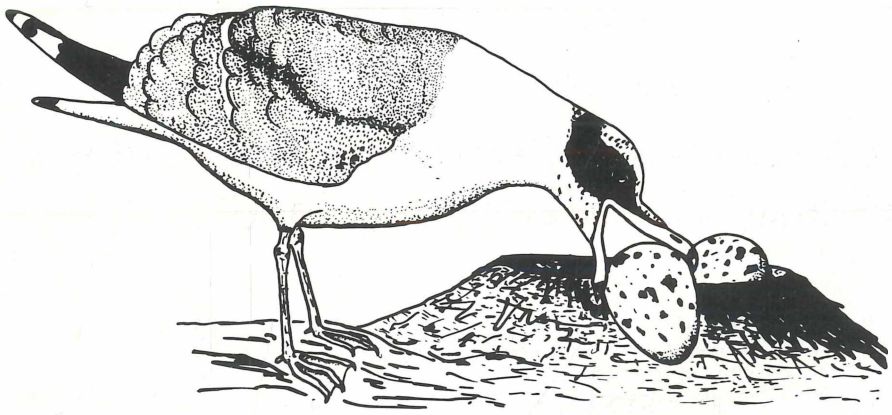

Fig. 2: The Great Black-headed Gull's clipping is less efficient than violent cut of the Herring Gull.

Abb. 2: Das »clipping« (Zerschneiden) der Fischmöwe ist weniger effektiv als der starke Hieb der Silbermöwe.

pushing with the breast. The greater body mass of Great Black-headed Gull gave it an advantage over the Herring Gull. *L. a. cachinnans* were more successful in oophagia, when 2 or 3 individuals cooperated (Fig. 1). In this case, one bird attacked a victim and enticed it from the nest; meanwhile the predator behind snatched an egg (or a chick) from the nest, pecked it through and ate.The owner of the nest didn't persuit the robber eating it's egg but returned to the nest. We haven't observed a case when a predator, eating the stolen egg, would attack the nest again.

L. a. cachinnans often attacked nests of their conspecifics. Usually *L. a. cachinnans* that had lost their nests became predators. In the colony there were always a group of birds constantly engaged in predation. Others did that rather seldom.

Intraspecific predation was also characteristic of *L. ichthyaetus.* Defensive behaviour was similar to that directed to other species. We haven't observed any case of *L. ichthyaetus* attacking *L. a. cachinnans.* The later didn't even permit *L. ichthyaetus* to approach their nests as they were permitted.

L. a. cachinnans attacked a chick or an egg killing it with a violent cut of a bill whereas *L. ichthyaetus* clipped a victim with a bill as if with scissors (MIERAUSKAS 1987). Such a technique is not very efficient in fighting, killing a chick or cutting an egg (Fig. 2). Thus *L. a. cachinnans* usually cut an egg through quicker than *L. ichthyaetus*, though body mass and the bill itself of the latter are greater. We also noticed that *L. a. cachinnans* momentarily killed a chick, whereas *L. ichthyaetus* often shaked it for some time. Infanticide in *L. ichthyaetus* was rarely observed at Lake Sivash, whereas in the Caspian Sea this phenomenon was registered rather often, especially, in large colonies (PANOV et al. 1980).

Discussion

MOYNIHAN (1959) grouped the Great Black-headed Gull with »primitive« gulls. It has a primitive vocal repertoir, producing only eight different types of calls. Like *L. melanocephalus, L. relictus* and *L. genei, L. ichthyaetus* has no special vocalizations expressing warning, anxiety, alarm or aggressiveness. This acoustic evidence supports the theory that *L. ichthyaetus* is closely related to »primitive« gulls or to species that have formed even earlier (BUZUN & MIERAUSKAS 1987; MIERAUSKAS 1987; MIERAUSKAS & BUZUN 1988).

From the viewpoint of defence behaviour, *L. ichthyaetus* has a low defence capacity. It usually defends only the nest, but not the colony, beating the intruder with wings, by jabbing posture or passively sitting in dense colonies (ZUBAKIN 1976). Contrary to *L. ichthyaetus*, the Herring and Common Gulls as well as other »progressive« gull species actively defend their nests, chicks and even the colony chasing away and attacking the intruder.

L. a. cachinnans, as other »progressive« species, has a special group of birds warning the colony of approaching danger, while *L. ichthyaetus* has no such »informants« in the colony (MIERAUSKAS 1987).

Violent cut with a bill by *L. a. cachinnans* is more efficient than *L. ichthyaetus* clipping. It can be treated as a more developed phenomenon that appeared in the course of evolution. This feature is supposed to be one of many reasons for great competitive abilities in *L. a. cachinnans* to appear.

In spite of low defence capacity, reproductive success of *L. ichthyaetus* in a mixed-species colony is rather high what is due to the mass character of nest building, synchronic egg-laying and hatching between separate individuals of the species in the colony and due to breeding density.

Mass character of nest-building, egg-laying, etc. as well as breeding in dense groups makes the colony life settled and causes difficulties in expanding breeding territories or occupying new habitats. Occupation of new areas is possible only when the number of *L. ichthyaetus* increases considerably, thus a newly formed group colonizes a new area. Solitary new-comers would undoubtedly be pushed out by *L. a. cachinnans.*

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Zusammenfassung

Konkurrenzbeziehungen zwischen der Silbermöwe (*L. a. cachinnans*) und der Fischmöwe (*L. ichthyaetus*) am Sivash See (südliche Ukraine)

Im April 1984 und 1985 sowie im Mai 1986 führten die Autoren verhaltensbiologische Studien an der Fischmöwe und der Silbermöwe durch, die am Sivash See (südliche Ukraine) Mischkolonien bilden.

Es wird die Besetzung des Brutplatzes, der Nestbau, die Eiablage und das Brutgeschäft bei beiden Arten beschrieben und die gegenseitige Beeinflussung auf den zeitlichen Ablauf der einzelnen Phasen dargestellt und diskutiert. Auch wird das zwischenartliche Predationsverhalten (Eier- und Jungenraub) beschrieben.

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