

Data Regarding Antagonistic Relationships of the Common Tern (*Sterna hirundo* L.) at the Mouths of the Danube

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Introduction

From the various relationships within biocenosis, the antagonist ones have the maximum importance. The competition between the species and extra specifically is one of the most important driving force in both classical, Darwinist and actual conception. Co-evolution species, prey – predator, interrelations adaptations are deeply reflected in both groups from physiological and ecological or behavioural point of view. The same major indispensable adaptations are formed in time in the prey – parasite relationship as well. In the present paper we have proposed to study the antagonist relationships of common tern with animals from other systematically groups that can play a negative limitative role for the mentioned specie, but without approach to trophy – biotical aspects of common tern which are the issue of another studies (KISS, 1997B). Taking into account that parasitism is an antagonist form of inter-specific cohabitation; we will refer to this one as well as to the prey – predator relationships. If data's about species from other areas concerning this two relationship types are available we've made additional comparative references on this ones too.

Materials and Methods

Observations were carried in Danube Delta between 1967 and 1999, using a 15x60, Zeiss binoculars. The harvest of bromathological and parasitical material was made using the known classical methods. The own investigations have been supplemented using approachable references.

Results

As result of researches and bibliographical data, we identified a series of antagonistic relationships of Common Tern on west-paleartic level and Romania, both predator-prey relationships and host-parasite relationship, as follows:

1. Common Tern's Enemies

1.1. Invertebrates

In bird cases, invertebrates are usually parasites only and not properly predators from higher taxa. However, on 28th of June, 1971, it was found on

Sacalin Island a one-two days old chick of *Sterna hirundo*, killed and partly consumed by a mole cricket (*Gryllotalpa gryllotalpa*), which strained under nest and devoured the throat of chick (KISS, 1975 A).

1.2. Vertebrates

1.2.1. Reptiles

We have found data about two American snake species that consume Tern's eggs and chicks. The large individuals of *Thamnophis elegans* snake are mentioned as predators of Tern colonies, but they consume fish brought by adult birds too. In this case we speak about a partially or a facultative klepto-parasitism (LAZELL, NISBET, 1972). In Great Lakes area, also it has mentioned that *Elaphe vulpina* consumes Tern's eggs (LYON, 1927). Illiciev has written about Steppe Viper (*Vipera ursinii renardi*) which, in some areas of Black Sea consumes tern chicks (ILICIEV *et alii*, 1990). We have not observed this phenomenon in *Natrix natrix* case, even if is very common in the Danube Delta and the same for *Natrix tessellata*, that lives on strong populations, here and there, on adjacent areas to Dobrudja tableland, on rocky zones.

1.2.2. Birds

More detailed, we can discuss about antagonistic relationships between Common Tern and gulls, described in other countries; the question has a rich bibliography. Regarding other species modest data are available, see the references material. Part of those species does not live in the studied area and other are included in Romanian ornithofauna, but they have not been included as Common Tern's predators. In this case we enumerate bellow listed species:

Nycticorax nycticorax. The observations from USA, Maine state, show Night Heron as a potentially predator of a small chicks of Common Tern (COLLINS, 1970). The presence of this heron could induce even temporary leaving of nests and herons consume eggs and chicks without protection (HUNTER, MORRIS, 1976). Although this species is common in Danube Delta, we have not such data, even on 23rd of June 2003 we observed near Tulcea a Night Heron that swallowed a Moorhen chick (*Gallinula chloropus*) so big as an adult of Common Tern.

Branta canadensis. In North American tern colonies the Canada Goose has been observed consuming terns' eggs. Usually, terns aren't reacting against geese that get into colony (COURTNEY, 1980). We've observed the presence of Greylag Goose (*Anser anser*) on Sacalin colonies too, but without any antagonistic act against Common Tern.

Falco peregrinus, the Peregrine chases terns often, especially during migrations (GLUTZ, BAUER, 1982). Rarely, we've observed this act especially on Sacalin Islands.

The Eagle Owl (*Bubo bubo*) often attacks tern colonies, action mentioned on majority of studied bibliography. Same as *Bubo bubo*, *Bubo virginianus* plays the same roll on its distribution. On Cape Cod colonies, this species decapitates 15 – 20 individuals/night and on each breeding season provokes death for several hundred of Terns (AUSTIN, 1940). Beside direct attack, nocturnal raids induce and indirect damages because terns leave the nests till morning and this may compromise the success of the breeding.

Asio flammeus, Short-eared Owl was described in Holland as a predator of terns' colonies (BECKER, 1989). Although we recorded this species on Sacalin Island but we have no data regarding attacks against terns.

Haematopus ostralegus. Oystercatcher attacks and eats different bird chicks, even those of Common Tern (GLUTZ, BAUER, 1982; BEZZEL, 1985). We haven't observed this act, maybe because the Oystercatcher is a passage visitor in our country and appears very rare in breeding time.

Sterna (syn. *Gelochelidon*) *nilotica*. According to Fasola and Canova data, on Pad Delta the Gull-billed Tern is a potentially predator for Common Tern too, showing an attack frequency of 0.01 chicks/hours (FASOLA, CANOVA, 1996). Although the cohabitation of the two species has been often observed, in the Danube Mouths conditions we couldn't record this phenomenon.

It is mentioned also, a thrush species from North America (*Agelaius phoeniceus*) which consumed tern's eggs. This is an isolated case because the thrush consumed eggs forced by a very droughty summer (HATCH, 1970). We have no recordings in this direction in the studied area because there Blackbird and thrushes are not cohabitants with terns.

Within the searched zone we have established antagonistic relationships against tern for the following species:

Falco subbuteo – Hobby – attacks weak-flying young Common Tern. There were found in Sacalin Islands feeding places of Hobby (small hillocks, stubs, pieces of grounded floating reed islets) with terns' remains or plumage on every breeding season. In the same place, besides Common Terns we could identify as well the corpses of followings species: *Anthus* sp., *Coturnix coturnix*, *Chlydonias* sp., *Panurus biarmicus*, *Phylloscopus* sp., *Emberiza schoeniclus*, *Passeriformes* ssp., *Sterna sandvicensis* (KISS, 1973).

Circus aeruginosus – Marsh Harrier – captures its prey especially from ground and water, attacking flightless chicks that remove from the protected ray of colonies, attacks, damages or ill terns. The same, Marsh Harrier attacks disabled chicks, unable to fly or those trampled by sheep passing through the colonies. Such chicks, after leaving of colonies, remain hereabouts being feed further by parents. On each breeding season there were found several chicks in such condition. After leaving the colony by the nesting families, this chicks disappeared gradually by repeated attacks of Marsh Harriers (KISS, 1973, 1975 A).

Larus cachinnans – Yellow-legged Gull – is another potentially predator for terns' eggs and chicks (TINBERGEN, 1938; HATCH, 1970; RYDEN, 1970; TUCKER, EVANS, 1997; SPRETKE, 1998), a fact that can be supposed from response of these birds against large gulls which come into the colony. The terns tolerate approaching of large birds till about 50-80 m from colonies. After passing of this tolerance distance, terns emit alarm and warning calls. First terns that are flying on gulls attack are those not nesting at that moment and staying near their nests, then, if the strained situation it is still continuing, the nesting birds (at that moment) are flying too. The birds which are on advanced nesting period fly for stopping an attack harder than those that are just start nesting.

Larus ridibundus. There are a lot of data in the bibliography regarding aggressiveness of large size gulls such *Larus argentatus*, *L. marinus*, *L. fuscus*, *L. atricilla*, *L. delawarensis*, *Stercorarius parasiticus* (TINBERGEN, 1938; HATCH, 1970; RYDEN, 1970; HARRIS, MATHESON, 1975; MORRIS, HUNTER, 1977; CUTHBERT *et alii*, 1984). But, there are some few references, without details (BECKER, 1989; FASOLA, CANOVA, 1996) about Black-headed Gull as a predator of Common Tern, especially which this species often cohabit with Common Tern, forming mixed colonies (GLUTZ, BAUER, 1982). As a result of repeated observations we could accumulate material and give full details of this phenomenon too (KISS, 1978, 1980, 1980 C), without insisting on it in the present study.

Corvus cornix (Hooded Crow) and *Pica pica* (Magpie). Both crow species walk near Common Tern's colonies, waiting for catching unawares chicks or eggs from a not-watched nest proper moment. Usually, the approach of such predators is repulsed by members of colony; even on Sacalin Island and other colonies there was observed that some attacks are successful. It is easier for crows to approach small colonies, the aggressiveness of terns being even bigger. Regarding the attack success, it had been found more successful the attacks of Hooded Crow than those of Magpie, although we haven't enough data for statistic processing. Much more clear is that the Hooded Crows attack more frequently the colonies on littoral beaches while Magpies are present on reed bed area or near forests (e.g. Letea Island colonies). The Hooded Crow ravages in Finland about 15-25% of tern's nests, especially those near bushes and trees used as cover against terns attack (GLUTZ, BAUER, 1982). We can mention that our numerous bromatological analyses carried out in delta haven't shown this food component (KISS, RÉKÁSI, 1977, 1983, 1987, 1991).

There is a particular antagonistic relationship between Common Terns and Skuas (*Stercorarius* genus) – klepto-parasitism, (the phenomenon is known within the frame of studied species too (LUDWIGS, 1998), but we deal here only with its inter-specific relationships). This is effected through harassing of terns by skuas till the yielding up of capture and prey is taken on falling by skuas (KISS, 1985).

1.2.3. Mammals

I found in specialty literature the enumeration of some mammals as Common Tern's predators. The same, some mammals, through their activity, induce disturbances of Common Tern. In this way, were observed repeated attacks of hedgehog *Erinaceus europaeus* (respectively *Erinaceus concolor*) against famous tern colonies from Amrum, Germany. The hedgehogs are nocturnal, destroying especially eggs (RUTHKE, 1962). Although tern colonies from studied area are generally situated on swamp zones, reed bed or small floating islands even we have no data in this way, the hedgehogs cannot be omitted from virtually predators list of Common Tern.

In literature are mentioned other mammals like Wolverine (*Gulo gulo*) as predators too making terns damages (AUSTIN, 1940). This mustelid species is not present in Romanian fauna. Also from literature are known some attacks against tern's colonies performed by two mustelid species: Steppe Polecat (*Mustela eversmanni*) and Weasel – *Mustela nivalis* – (ILICIEV *et alii*, 1990). Although, even both species are included on mammal fauna list of Northern Dobrudja, we don't have any data in this direction. Rabbits (*Oryctolagus cuniculus*), burrows digging of and their other nocturnal activities may induce some perturbations of nesting in the islands colonies (COURTNEY, 1977). These species are not present in Danube Delta.

During all the period of the present research, among autochthonous wild mammals, the Brown Rat (*Rattus norvegicus*) was identified as the most frequent injurious to Common Tern in both – Sacalin Island and other colonies (Sărățuri-Murighiol, Periteașca, Roșu, Somova etc). In Sacalin Island was identified the largest population of Brown Rat, especially on 1971 – 1973 period, due to decreasing effective of *Mustelidae* – rodent consumers. After 1973, on Sacalin Island, another natural enemy of rodents – the Raccoon Dog (*Nyctereutes procyonoides*) started to increase. That for, rodent effective decreased again, showing a permanent danger for ground-nesting birds. Sheltering especially under tree trunks brought by water, the Brown Rat makes nocturnal raids through colony. Due to the attacks, both eggs and different age chicks of Common Tern are destroyed. During night, the rats kill adult terns too, especially females on nest. On 16th and 23rd of June 1974, in Sacalin terns' colony have been found 15 carcasses of Common Tern, all of them were females, killed and partly consumed by rats. On the same place, in rat burrows have been found a large number of collected eggs – some of them with over 50 eggs / burrow – as well as entire carcasses or tern chicks' remains. In addition to *Sterna hirundo*, after food rests consumed by rats examining, we identified the followings bird species: *Anas platyrhynchos*, *Arenaria interpres*, *Coracias garrulus*, *Crex crex*, *Erithacus rubecula*, *Phylloscopus* sp., *Podiceps cristatus*, *Rallus aquaticus*, *Upupa epops*, *Turdus*

merula. Rats don't predate large bird species, those are eaten after their death by other reasons but small bird species and tern's chicks are predated by this voracious mammal (KISS, 1974, 1974 A).

Numerous observations show the existence of antagonistic relationships very acute between Brown Rat and Common Tern; in the case of a large invasion of rats, the terns are forced to leave their colonies. The rat as a factor of disturbance could be considered as dangerous as human factor. It is mentioned in literature that only one individual has destroyed in two days over a dozen of clutches and provoked the moving of 250 pair colonies in other area (AUSTIN, 1940).

The Muskrat (*Ondatra zibethica*) is another rodent what can destroy terns' nest from reed bed islet or floating vegetation. Our observations relate how the Muskrat, on Sărăturile-Murighiol, rolled water bird eggs out of nest into the water (KISS, 1980 A), being a virtually danger for nesting terns from reed bed islet.

Sus scrofa attila. In addition to vegetal food, the Wild Boar appeals in all possible circumstances for animal origin food, becoming in this way a facultative raptor. The most important evidences of Wild Boar as a predator are damages provoked in tern colonies. During our observation we could find the presence of Wild Boars evidences: removed nest, broken eggs, chicks' remains etc., everywhere in colony. Through 12th-16th of June 1976, a Wild Boar destroyed almost completely the mixed colony from Southern part (Roh) of Sacalin Island. We consider that some Wild Boar individuals – like Black-headed Gull case – is specializing in such kind of food. We have data regarding repeated attacks of Wild Boars against mixed colonies of herons (Murighiol – Kirilova area, in 1980) and pelicans (Hrecisca-Buhaiova area, in 1985 and 1992).

Nyctereutes procyonoides (Raccoon Dog), *Vulpes vulpes* (Red Fox), *Canis aureus* (Golden Jackal), *Lutra lutra* (Otter), *Mustela lutreola* (European Mink) – all being carnivorous species have been identified, directly or indirectly, by their tracks near or inside of tern colonies, especially on Sacalin Island also on Holbina I, Murighiol, Popina II etc. On Raccoon Dog case we have no direct data considering its damages against terns nesting. In fox's case, we have several data. They were observed within the Sacalin colonies too, on breeding seasons from 1993 and 1994, destroying systematically the colony (*in verbis*, Ignat Dumitru, ICPDD's laboratory assistant). We think this is one of reasons that any colony did not reinstall in 1996 on any part of the island, thus has disappeared the largest Common Tern colony of Romania. The two observations (on 19.06.1973 and 11.07.1989) from Sacalin respectively Popina II, near Sfiștofca village, confirm very vehement terns attacks so that they chased a fox (a fox for each case) coming near the colony. With this occasion too we could concretely find the advantaged provided by group nesting.

We have no data regarding jackal influence – species in a spectacular expansion in the last two decades in all South-Eastern Europe – against tern colonies. What is clear is that the jackal appears more and more frequent at the Danube Mouth (KISS, 2001, 2002) inclusively tern biotopes in Sacalin area; in the last decade especially, the island become a peninsula, attaching to the northern shore.

On the 13th of July 1973 it was found in a mixed terns colony from Sacalin a fresh carcass of a Stoat individual – *Mustela erminea* (KISS, 1974, 1974 A) but we can not prove that the Stoat was attacked the colony and killed by terns. We mention that there are some references in the consulted literature about the defence of terns against Stoat's attack, and they during attack emit rage and not alarm calls (Simmons, 1952 in CRAMP, 1985) and this could be explained through the small size of the predator.

In connection with Common Tern it is necessary to comment the role of domestic animals too, as potential aggressors. We did not categorized them among the anthropical factor's effects, though leaving of the domestic animals free in wild (caballine, bovine, pigs) as well the abandoning of the dogs and cats are a rooted practice with a profoundly traditional aspect on Danube Mouths area (KISS, 1997A, B). Some of them, especially like pigs (and sometimes dogs) live complete wild, sometimes for several generations, behaving as a wild animal. On the other hand, the pressure exercised against Common Tern and its biotope by such domestic animals is very important, sometimes decisive (e.g. Sacalin Island).

Herbivorous mammals can provoke damages for nesting birds either through destroying of grassy vegetation (used for covering) or directly trampling on nest or on hidden chicks. On natural conditions, ground – nesting birds defend successfully their nest or chicks against the herbivorous mammals that come near the colony, but in case of droves of cattle, this defence – even it is very vehement – does not save the nest. The bulls accustoming quickly to alarm call and attacks of terns and they even install in the middle of colony; at other times the bulls cross running the colony, chased by horsefly stings. We consider that, especially at the end of summer, the desperate flying of terns around cattle help them on moving tormenting off dipters (Culicidae, Tabanidae).

Sheep flocks have a very strong disturbance effect. The crossing of a sheep flock over a tern colony has a fully devastating effect, particularly when the sheep are driven by persons accompanied by dogs. On Sacalin Island, between 17 – 23 July 1976 on a 1000 m², as a test area had been identified 166 living and 65 death chicks, most of them being trampled by domestic animals (KISS, 1973). Same data we find from other workers whom consider the cattle grazing as one of the most important negative factors (ILICIEV *et alii*, 1990). It was not observed a similar behaviour on caballine's case.

The dislocation of the chicks from their usual hiding places is another destructive effect, provoked indirectly by domestic animals. The two – three days old chicks usually move off radial from nest and them sheltering in proximity, hiding into vegetation, near to stumps or reed bed islets brought by water etc. Next terns accept these graduals and timorous approaching, accustoming to these chicks which they know them “personally” already, probable after disposing of spots on their dorsal part of body and on head. In case that an intruder disturbs the colony, when chicks heard alarm calls they leave their shelter and run far from their known area, where they are accepted. In these cases they are attacked and picked on head or back by terns. The confused and injured chicks can not return anymore for their own nest, making in this way very difficult for assessment damages.

In the Mouths of Danube conditions, especially on Sacalin Island, the consumption of vegetal cover is not an obstacle for breeding of ground – nesting species. On the contrary, the installation of rich vegetation does not permit the installation of tern colonies and other syntopic species.

The domestic pigs that are kept free in the wild and some of them are already completely wild can induce very big damages for ground – nesting species. Pigs are brought on spring in Sacalin Island by villagers and they are taking back on autumn or they spontaneously immigrate to the Northern part of the island where it is joined with Sf. Gheorghe branch micro-delta. The directly visual observations, tracks searching and food remains, prove that, the domestic pigs induce the largest damages for tern colonies. The pigs get into the colony either in daylight, tolerating without riposte the desperate terns attack or on night-time, and sometimes until morning the colony is 100% destroyed. Are devoured both clutch and hidden chicks in the vegetation, also the separated eggs, brought by waves and agglomerated.

In this way we consider that the main cause of gradually leaving of the island by nesting terns is the destruction of the colony, year by year, especially by domestic pigs so that, in last years no pair nests here (PLATTHEUW *et alii*, 2004).

Large damages induced by pigs on Superior Lake area, Wisconsin, are recording on references too (HARRIS, MATTESON, 1975).

Dogs, cats. Sometimes, the dogs without master or temporarily abandoned come to the colony. On all time of observations we could establish through search of tracks on sand that those dogs approached the colony, walking around it. We did not find that those dogs eat eggs or tern's chicks (after examination of food remains, scatological analyses etc). However, the attitude towards our own dogs trained for clutch finding and for chicks ringing (KISS, 1972, 1978 A) was of a maximal aggressiveness, they being attacked very vehement. Quite differently it is shown the antagonism between vagrant

dogs and terns from small colonies, where there are larger individual distances between nest. In contrast to *Larus ridibundus* that attacks all together the intruder, the Common Tern attacks only when the aggressor could endanger its own brood and the aggressor pass under minimal distance of tolerance (TAVERNIER, 1965). In this way, a separated colony is less defended and so that, it is more exposed for raptor attacks.

We observed on Torba Goală area, Ceamurlia Island, successively aggressions of a bitch dog for three consecutively days, repeated at the some hour. The bitch dog had a shelter with two 5-6 weeks old puppies. The concerned colony has been placed in a marsh on several elevations of the ground for about 20 x 50 cm. There were 50 nesting pairs during observations time and most of them had already chicks with about 10-14 days old.

On 20, 21 and 22 of June 1996, about 10 o'clock, we could systematically observe the display of aggression in all its phases. The terns, at the animal approaching, start to emit alarm calls for terrestrial danger and chicks covered on ground at the shelter of poor vegetation.

The bitch dog got down from the pond's dike and swam to elevations inhabited by terns. When the animal was reached at about 15 m to the edge of colony were started the first swooping attacks by terns what were nesting at that part of the colony. It could not observe the finality with beak hits, the attacker birds straightening very close to the head of the animal. When the bitch comes close to chicks, they ran toward to the water, moving away through swimming.

The raptor was hunting after them, catching up and bolting them. During that, she was much stronger attacked by bird pair whose chicks were hunted. On each time we could observe the consumption of 6-8 chicks in about 15 minutes, after that, the animal left the colony, being still pursued by some terns till about 150 meters. We have data about similar cases from literature (HARRIS, MATTESON, 1975). Also, on nesting time, M. Fasola and L. Canova proposed some particular measures for protection against vagrant dogs (FASOLA, CANOVA, 1996).

We have not recorded observations regarding domestic cats that would have attack nesting species from mixed colonies of terns. We mention that, in some cases, the fisherman that lived there for a longer period of time brought with them cats, but they did not come in proximity of the colony. Also, there were neither direct observations nor tracks on sand for attestation of this act.

The natural enemies have a very important roll in the numerical control of the population not only through the attack of chicks and eggs but even through aggression of adult individuals.

2. Parasites

2.1. Ectoparasites

2.1.1. Mallophaga

The studying of Common Tern antagonistic relationships implies to follow the host–parasite inter-specific relationships. Through 1974-1996, after examination of 44 *Sterna hirundo* individuals coming from Danube Delta, were collected and determined 9 bird lice – *Mallophaga* – species (RÉKÁSI, KISS, 1977, 1980, 1994, 1997; RÉKÁSI *et alii*, 1997, 1997 A). Out of them, two are improper to host species. *Cumingsiella* sp. parasite some *Scolopacidae*, especially *Scolopax rusticola* and *Numenius arquata* as well *Lipeurus maculosus maculosus* Clay 1938 lives usually onto *Phasianus colchicus*. Although they have been found onto Common Tern too, their presence it is accidental. Certainly, the *deserter* individuals, even surviving on a non-specific host, they will not multiply and will be gradually removed.

The bird lice (*Mallophaga*) identified on terns: *Austromenopon pachypus* (Piaget, 1888), *Austromenopon sternophilum piageti* (Ferris, 1932), *Koenigirmus sellatus sellatus* (Burm., 1838), *Quadriceps* sp., *Saemundssonina sterna* (L. 1758), *Actornithophilus* sp., *Quadriceps stellatus* (Burm., 1838). The intensity of parasite degree (number of harvested parasites/number of infested birds) has been 9.6 and regarding to extensity (number of infested birds/total number of examined birds), this has been 52.27%. Also, we consider that the presence of 9 bird lice species shows an intense parasitism, seldom found in autochthonous ornithofauna.

Also the extensity and intensity of the parasitism shows large values, fact what we explain through gregarious style of life and the nesting in colonies (RÉKÁSI *et alii*, 1997A, 1997B). Thus, the passing of the parasite from a host to other is facilitated by reduced individual distances (KISS, 1972, 1973, 1975, 1977 A). Moreover, the big number of blood haematophagous dipters, especially *Culicidae* and *Hippoboscidae* can contribute to the spreading of strange bird lice for species. The phenomenon is known and described with *forezia* name (STUGREN, 1994; UDVARDY, 1983; WALTER, 1989).

Niethammer's work (NIETHAMMER, 1948) enumerates six bird lice (*Mallophaga*) species for Common Tern, among them: *Esthiopterium parviceps*, *Saemundssonina laricola*, *Saemundssonina melanocephala* and *Koenigirmus gyricornis*, the last one being a *deserter* from *Phalacrocorax carbo*, almost found here.

2.1.2. Acaridae

With regard to the acarines, we have no personal data, thus, we have relied on data from literature which for *Sterna hirundo* enumerates followings species: *Anoplnotus semaphorus*, *Alloptes bisectatus*, *Cheleothopsis nörneri*,

Freyarna anatina, *Giebelia puffini*, *Pterolichus martini*, *Thacarhra* sp. (NIETHAMMER, 1948). A strong attack of ectoparasites can not only to weaken very much the chicks and break their post-embryonic development but also can infest them with varied micro-organisms like arboviruses, fact what can produces high mortality (ILICIEV *et alii*, 1990).

2.1.3. Diptera

During the chicks searching and sometimes from recently dead adult terns were observed for several times some parasite-flies, about 1-3 individuals/host and they have been determined as *Ornithomia avicularia* (Ord. Diptera, Fam. Hippoboscidae).

2.2. Endoparasites

2.2.1. Plathelminthes

We have got modest personal data regarding endoparasites although the Common Terns as an ichthyophagist species plays a very well outlined roll in fish epizooties. Among dead birds found on Sacalin Island terns' colony, 16 individuals were dissected and on three samples it has been determined some *Lingula intestinalis* individuals. From an individual found in Sarinasuf on 21.07.1975 it has been determined some *Diplostomus* sp. individuals. Because in our own research we operated here only with digestive canal it has resulted a modest given material for analysis and this does not show the real situation of the diseases provoked by parasites. The relatively high degree of infestation can be explained through the colonial life of the studied species with multiple possibilities for contacts. In literature are quoted for the Common Tern the followings species of intestinal worms (with the succession used on quoted works): *Cotylurus oviformis*, *C. platycephalus*, *C. variegatus*, *Cyathocotyloides dubius*, *Hemistomum pileatum*, *Plagiorchis laricola*, *Pseudohemistomum minor*, *P. unicum*, *Ranicola tetia*, *Stephanophora denticulata*, *Tanaisia fedschenkoi*, *Tocotrema lingua*, *Agamospirura* sp., *Aploparaksis cirrosa*, *Capillaria contorta*, *Choanotaenia porosa*, *C. sternina*, *Diphyllobothrium dendriticum*, *Diphyllobothrium fissiceps*, *Lateriporus clerci*, *Ligula intestinalis*, *Schistocephalus solidus*, *Tetrabothrius erostris*, *T. cylindraceus*, *Schistorophus acanthocephalicus*, *Reighardia sterna*, *Mezorchis pseudoechinatus*, *M. denticulatus*, *M. reynoldi*, *Himasthia elongata*, *Heterostophyes sobolevi*, *Cryptocotyle lingua*, *Apophallus mühlingi*, *Pygidiosis genata*, *Galactosomum lacteum*, *G. puffi*, *Cercaroides aharoni*, *Microphallus papillorobustus*, *Maritrema echinocirrata*, *M. oocista*, *Tetracladium sterna*, *Renicola lari*, *R. paraquinta*, *Ornithobilharzia caniculata*, *Strigea falconi met.*, *Cotylurus pileatus*, *Diplostomum communatum*, *D. murrayense*, *Anomotaenia micrantha*, *Paricterotaenia porosa*, *Capillaria*

carbonis, *Eucoleus laricola*, *Paracuaria tridentata*, *Rusguniella elongata*, *Cosmocephalus obvelatus*, *Streptocara crassicauda*, *Contraecum spiculigerum* (NIETHAMMER, 1948; GREZE, 1975). Regarding big number of parasites, *Sterna hirundo* comes around only to *Larus argentatus* and from latter one it has been described minimum 54 species and 22 are shared with those from *Sterna hirundo* (GREZE, 1975).

Conclusions

After investigations we could verify the existence of antagonistic relationships of the Common Tern at the Mouths of the Danube, assigning importance to following factors:

- rats attack against nests and adult terns;
- massive damages provoked by foxes;
- sometimes, Wild Boars and pigs destroy colonies entirely, sheep and cows trample their nests;
- it has been recorded a very rare case of an attack of a mole cricket against one chick of Common Tern;
- the terns, in general as a colonial species, are massive infested by internal and external parasites;
- hydrological changes, what induce the joining of Sacalin Islands with shore, make possible the access of raptors to colony and in this way, the loss of the most important breeding place of *Sterna hirundo* on Romania;
- of course, the antagonistic relationships of the Common Tern with other living beings it is not reducing to the aspects found by us or found on quoted literature, the future researches could yield new contributions in this way.

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**Date privind relațiile antagoniste ale rândunicii-de-mare (Sterna hirundo L.)
la Gurile Dunării**

Rezumat

În perioada 1967 – 1999 în câteva zone costiere ale Deltei Dunării a fost efectuat un studiu privind relațiile prădător – pradă și gazdă – parazit la rândunica-de-mare, exceptând interacțiunile legate de hrănire. Observațiile au fost comparate cu datele bibliografice. Cel mai mare impact asupra rândunicii-de-mare este produs de mamiferele sălbatice (în special, șobolani, mistreți și vulpi) și domestice (câini și pisici). Atacurile repetate ale unuia sau mai multor indivizi din aceste specii pot provoca părăsirea coloniei de creștere. O formă aparte de atac este efectuată de un *Gryllotalpa gryllotalpa*, care a ucis și mâncat parțial un pui, recent eclozat.

Cele mai multe cercetări parazitologice efectuate la rândunica de mare se referă la paraziții externi, în mod special la Mallophaga. Au fost identificate nouă specii de paraziți, din care șapte sunt specifici aceste specii, iar două facultative.

Dintre cauzele diminuării numărului de rândunici-de-mare în zona studiată, un rol important l-au avut schimbările hidrologice care au permis accesul mai ușor al prădătorilor la colonii.

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