THE MAMMALS (MAMMALIA) FROM LETEA FOREST
(DANUBE DELTA), WITH THE FIRST SIGNAL OF TWO
SPECIES OF CARNIVORS

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Abstract. Studies about the mammals from Letea bank (Grindul Letea) are very scarce. Most of the researches were made sporadically, on small periods. In the scientific literature there were quoted 44 species of mammals as being present on Letea bank as follows: 5 species from the order of Insectivora, 8 species from the Rodentia order, one species from Lagomorpha order, 3 species from Artiodactyla order, 8 species from the order of Carnivora, 19 species from Chiroptera order. Martes martes has been observed in 2007 and 2008; being the first observations from Letea forest, respectively Danube Delta. Canis aureus has successfully adapted to delta conditions, in Letea forest being observed since 2003-2004.

Keywords: Letea forest, golden jackal, pine marten.

Introduction

Through the impressive diversity of habitats and living forms that it contains in a relatively small area, Danube Delta constitutes a real museum of biodiversity, a natural bank of genes of invaluable value for the universal natural patrimony. Many species of plants and animals have also constituted important exploitable natural resources, which attracted people in these areas from the oldest times. The human settlements were based, mainly, on the capitalization of natural resources, such that traditional economical activities and characteristic social relations were developed (Oțel, 2000).

Letea bank (Grindul Letea) lays on north-south direction located towards the sea, between Chilia and Sulina channels. It is composed from a multitude of tight and long under-banks, very close from one another in the north near Chilia channel, but loose in the south at Sulina channel, directing from north-west to south-east. Between the under-banks, which have the aspect of some dams that avert from one another in the south, there are sometimes long and tight lakes of zatoanes type. These are oriented from north-west to south-east (Petrescu, 1975). Letea bank relief is irregular, with alternation of dunes, depressions and backwaters. Most of the backwaters are now clogged or covered in sand. The dunes take the biggest surface of this bank, as well as between hasmacs as outside of them. Their general direction is from north-west to south-east. The form and length of the dunes is determined by the position and state of the coppices, this way being distinguished plane dunes, waving dunes, horseshoe dunes etc. (Costin, 1964). The natural vegetation is formed by very different associations, starting with semi-desert ones, with dry veldt...
elements on the top of the dunes, to mixed foliage forests and swamp associations. These associations vary a lot on very small areas, depending on the relief, the level of phreatic waters, ground conditions and microclimate (Costin, 1964). The forest has the aspect of some bands wide of 10-250 m, approximately oriented in north-south direction. They develop on the flat sides of the dunes that correspond with the direction. Such a forest strip in the delta is called hasmac. Hasmacul Mare, located in the east of the forest has a length of 10 Km, covering a surface of 130 ha and is the biggest hasmac. Other smaller hasmacs are Târla Popii, Schiopul, Crușina, Ivancencu, Grădina lui Omer and others. In the flowery specter of these hasmacs we mention the species of trees as: oak (*Quercus robur*, *Quercus pedunculiflora*), ash (*Fraxinus angustifolia*, *Fraxinus palissae*), elm (*Ulmus foliacea*), white poplar (*Populus alba*), gray poplar (*Populus canescens*), common aspen (*Populus tremula*); shrubs such as: blackthorn (*Prunus spinosa*), common hawthorn (*Crataegus monogina*), dog rose (*Rosa canina*), european barberry (*Berberis vulgaris*), wild privet (*Ligustrum vulgare*), sea buckthorn (*Hyppophae rhamnoides*), french tamarisk (*Tamarix gallica*); hanging plants such as: wild grapes (*Vitis sylvestris*), common ivy (*Hedera helix*), common hop (*Humulus lupulus*), old man’s beard (*Clematis vitalba*), and the most interesting is a liana of 25 m (*Periploca graeca*). An extension of the liana *Periploca graeca* is noticed in the high dunes areas, by seed (Ciocârlan, 1996).

On the surface of Letea bank, from the surface of forest background of 5395.7 hectares, it has been delimited an area with integral protection – Letea, with 2825 hectares. The area with integral protection regime Letea is placed on the bank with the same name, one of the oldest banks of the delta, being delimited in north by the southern limit of Nebunu Lake, at east by the communal road Periprava – C. A. Rosetti, up to about 1.5 km north of C. A. Rosetti locality, at south by the communal road Letea – C. A. Rosetti, on a straight line north-east-south-west, on about 2 km distance and at west of about 2 km distance until the southern limit of Hasmacul Ivancencu, at west, by the western limit of forestry formations of Letea beams. This area is adjacent with the tampon areas: Matița – Merhei – Letea with a surface of 22,260 hectares and with the ecological area Popina II, natural forests and plantation from U.P.I. Letea located at the south of C.A. Rosetti locality to Cardon and the area with agricultural use from the beams Sulina, Cherhanoiu, Schiopu, Pocora and Mahomed etc. (Petrescu, 1975). Therefore, the surface of forestry background Letea Forest represents 1.56% from the surface of the delta, which is located on Romania ground between Danube’s channels.

Material and Methods
The studies concerning the mammals from Letea bank are very scarce. Most researches were made sporadically, on small periods. The observations on the mammals were made taking in consideration the tracks left by those on sand and mud, left food and scraps, shelters and feces found.

Results and Discussion
Often, speaking of animals, people refer mainly at mammals. From these, the carnivorous and artiodactyls have attracted the human attention from the oldest times. With over 10 thousand years ago, before the beginning of domestication and taming of wild mammals, these were supplying the meat necessary for the feeding of human hordes and the furs for clothing. But, in order to hunt them, it was necessary to know they habits, way of living of the animals and how to avoid, especially from big carnivorous (Murariu & Munteanu, 2005).

In Romania the humans have gathered knowledge on the mammals, before the apparition of written documents. Many species were known from stories and popular beliefs; some were important for growing for food, transaction, guarding, and others were
harmful, decimating the harvests and the reservations from storehouses, through periodical invasions. Among the first writings from Romania there are the reports concerning a series of species of hunting interest (Murariu, 2000).

Inside the territory of Danube Delta Biosphere Reservation, as well as in the rest of Europe, more than half of the mammal species are jeopardized, as consequence of accentuate anthropic pressure from the last decades.


The rodent species that were identified on Letea Beam we remind of: *Arvicola terrestris* (Ștefănescu, 2000; Popescu & Murariu, 2001), *Mus musculus*, *Apodemus agrarius*, *Apodemus sylvaticus* and *Microtus arvalis* (Simionescu, 1977; Popescu & Murariu, 2001).

The muskrat (*Ondatra zibethica*), which originates from North America, was colonized for the first time in Europe in 1905. From only 5 individuals, by then set near Prague, millions of descendents have resulted which covered large surfaces from almost all the countries of Europe. In our country the muskrat has first showed up around 1940, in the western regions of the country, near the border with Hungary. The first verified apparition of this animal in the delta was in 1951, and the numerical rise in the conditions of Danube Delta, in only one decade, was sufficient that it’s spreading to cover the entire surface of the delta and the lakes and adjacent flooding areas (Marcheș, 1970, 1960, 1956; Pașcovschi, 1954).

The permanent habitants of Letea bank, as well as in the forest as in the near slopes, are the wild boars (*Sus scrofa*), which never leave the environment that they chose, because they always find in these areas a rich and variant food, formed by rhizomes full of sugary substances and starch from reed and especially reed mace. The wild boars migrate during autumn from swampy areas to the forest, to feed with acorn, period in which this species is submissive to poaching.

The roe deer (*Capreolus capreolus*), colonized in the years 1959-1960, does some damage by scratching on the white poplar with the horns. In the present the species is being met often inside the protected area Letea forest (Filip, 1974; Murariu, 2004). After the last monitoring made by the workers of Forestry Letea it was estimated that in Letea forest there are about 300 roe deers (in verbis the chief of Forestry Letea, 2007). The roe deer is exposed to the pressure of poaching, which, along with the wild boars, is hunted most often. The fallow deer (*Dama dama*) was colonized starting with 1968, and in 1974 there were 12 individuals (Filip, 1974), now this species is no longer present in the protected area Letea Forest.

A very frequent species from Letea bank is the brown hare (*Lepus europaeus*), met in Letea forest as well as in the nearing areas (Popovici et al., 1984; Ștefănescu, 2000; Murariu, 2004).

Other mammals present on Letea bank are: the otter (*Lutra lutra*) and the european mink (*Musteola lutreola*), animals that were the first to adapt to the life conditions given by the drift wood and reed plots, where they make their shelters. They are feeding with fish, especially with the predatory species, but they mostly hunt for water rats (*Arvicola amphibius*) (Murariu, 2000; Călinescu, 1931; Vasiu, 1961; Vasiu et al., 1968, Almășan et al., 1995, 1997; Ștefănescu, 2000; Cotta et al., 2001). On 8.06.2008, near Letea locality, we found a dead otter that entered a pound net and drowned. Besides the mentioned species, the weasel (*Mustela nivalis*) and the stoat (*Mustela erminea*) have also adapted to the drift wood living conditions. As the otter, these small predators, that make deep holes in the ground when on dry land, here they make their shelters on the surface of
the drift wood, they dip into water, swim perfectly and feed with fish and amphibians, so with cold blooded animals, leaving the animals with warm blood on the second position (Banu & Rudescu, 1965; Vasiliu et al., 1968; Oțel, 2000). On 8th of April 2010 we observed an individual of Mustela erminea, inside Letea locality, it was hidden in a heap of reed. The individual was presenting winter coloring.

The wildcat (Felis silvestris) has adapted to the drift wood habitat, feeding with rats, mice, slump birds and fish (Banu & Rudescu, 1965; Oțel, 2000; Murariu, 2004). In the actual moment, this species can be found in a rising number, sometimes also being present inside the localities, especially during the cold season, when it’s present to obtain food. There are inhabitants that capture them using loops, about 3-4 wildcats in a winter. In the area of the sand dunes, near Grădina lui Omer hasmac, we identified in 2006 a shelter of a wildcat.

Another inhabitant of Letea bank and Danube Delta is the raccoon dog (Nyctereutes procyonoides). The first official signal in our country, of the raccoon dog, dates from 1951, when an individual was captured at about 40 km south-west of Bucharest. Introduced in Ukraine, from where it got into the northern and eastern counties of our country (Maramureș, Suceava, Iași, Galați) and especially in Tulcea, in Danube Delta (Almășan, 1956; Barbu, 1967; Marcheș, 1970, 1956; Murariu & Munteanu, 2005).

In Letea forest there are currently present 5 pairs of eurasian badgers (Meles meles), pairs that are tracked from close by the workers of Forestry Letea (in verbis the chief of Forestry Letea, 2008) (Oțel, 2000). A permanent inhabitant of Letea bank is the fox (Vulpes vulpes) (Murariu & Munteanu, 2005).

Studies for longer periods were only made in the domain of chiropterology: Barbastella barbastellus, Eptesicus serotinus, Hypsugo savii, Myotis aurascens, Myotis dasycneme?, Myotis daubentoni, Myotis myotis/Myotis oxygnathus?, Myotis mystacinus/Myotis brandti, Myotis nattereri, Nyctalus lasiopterus?, Nyctalus leisleri, Nyctalus noctula, Pipistrellus nathusi, Pipistrellus pipistrellus, Pipistrellus pygmaeus, Plecotus austriacus, Vespertilio murinus, Tatarida teniotis (Ifrim & Pocora, 2007; Pocora & Pocora, 2008).

Martes martes (Linnaeus 1758), the pine marten. In the specialty literature there is data about the spreading of the species to Dobrogea. Călinescu (1931) has quoted the species at Măcin – Tulcea, Pazarlia – Constanța. Murariu (1981) specifies that he received information from the forestry engineer Ion Bitoneanu, about the presence of the pine marten in Tulcea County but does not present the location. Murariu (1996) has quoted the Martes martes species, as being present in Babadag forest, but it’s possible to be the same information with the one from 1981.

In Letea Forest, we observed the pine marten for the first time on 20.III.2007, in the southern part of Hasmacul Mare, in a pine plantation. An individual was observed that was resting in the top of a pine tree of 6 m height. In the moment in which it noticed us it began to move from one tree to another, through the pine plantation, until it reached in the thickness of Hasmacul Mare, where we couldn’t see it anymore. Another individual was observed on 23.IV.2008, in a small hasmac near Hasmacul Mare, on a branch of oak tree, at about 8 m above ground.

Admirable climber, it spends most of the time in trees. On the ground it moves on short distances, in a series of small and successive jumps. It makes its shelter in the hollows of old trees, or in the squirrel shelters. Unlike the beech marten, which is exclusively nocturne, the pine marten often hunts during the day, even though it is extremely prudent and fearful (Georgescu, 1989).

The pine marten feeds mostly with animals that it can kill. The trophic specter is large, starting with the deer’s kids and rabbits, to small birds. It can catch plenty of wild pigeons that are caught unaware during the night sleeping in trees (Pop, 1973). When
needed it also feeds from the meat of the carrions accidentally found. It also eats forest fruits (service trees fruits, bilberries, apples and pears). It has a special preference for mice (Georgescu, 1989). Considering the preferences for the habitat for the pine marten, we consider that it’s possible for this species to find optimal conditions to settle in Letea forest.

*Canis aureus* (Linnaeus 1758), the golden jackal. During 1929-1975, the apparition of the golden jackals in Romania was accidental, after some authors, these were passing from Bulgaria only during hard winters, when Danube river was frozen, so we had to deal with erratic individuals. After 1975, the golden jackal has settled definitely in the fauna of the country (Murariu & Munteanu, 2005). Călinescu (1931) has signaled, for the first time, the presence of the golden jackal in Romania, on the islet of Danube, near Ghidici-Dolj village. Vasiliu (1961) has signaled the jackal, between 1953-1954, at Jijila and Nisipari, in Dobrogea. The existence of steady jackals’ populations in Dobrogea, is attested by Almășan (1983), in the forests of Forestry Niculițel, near Nifon village. From 1985, a rising number of hunted jackals has been signaled, from Caraburum forest (the hunting background Golovița - Sinoe) and Grindul Lupilor. In October 1996 the howling of more individuals was heard, and 4 of them were observed in Hagieni forest, and one at Canaraua Fetiții from Dobrogea (Murariu & Munteanu, 2005). Sultan (2005) specifies: “Because the fending of Caraorman forest and the strong development of sub-shrubs, the population (of jackals, n.n.) has concentrated in this area, having a favorable habitat. The areas with reed plots are also searched for and used by this species”. In October 2003, along with Ion Constantin we noticed a young individual on Grindul Lupilor. It stood 2 days near the ornithological nets and was stealing the birds caught in the nets. From Hagieni forest there were also signals from August 2005, 2006 and May 2007, 2008 (in verbis Ionuț Iorgu & Fusu Lucian).

According to the information received from the workers from the Forestry Letea, this species has appeared in Letea forest during 2003-2004, in a small number. In the present we consider that the number of individuals is big, we observed the species several times. The first individuals were identified on 19.VIII.2006, around 21:00 o’clock; we heard the howls of more jackals. In 2007, on 12.V, we observed an individual in the reed plots, in the western vicinity of the forest. In 2007, during June – September period, we observed/heard more individuals in Letea forest. On 17.II.2008 we heard 3 packs of jackals howling in the forest around 19:00 o’clock, and on 3.III.2008 we surprised an individual, when it was trying to hunt an individual of *Turdus merula* (blackbird). On 9.VI.2008 we heard more individuals that were howling in the western vicinity of the village, in the reed plot areas. In 2009 the number of jackals from Letea forest has risen significantly. The sheep breeders from the area say that during spring, when the lambs are small, their folds were attacked several times by jackals. If by 2009 the majority of individuals were heard or observed in the strictly protected area of Letea forest, starting with November 2009 individuals were also heard and seen in the area located between C. A. Rosetti and Cardon. During the winter of 2009-2010, when the snow persisted a longer period of time, jackal individuals were signaled inside the localities from Letea bank. Starting with December 2009, in Letea forest there were observed more dead horses, this was beneficial for the jackals because it represented a source of food. More than once they were observed feeding from the bodies of dead horses in the forest. Most of the horses died in the southern part of the protected area Letea forest that is in the nearing of Letea and C.A. Rosetti localities, which brought the jackals closer to the localities.

The jackals look for the thickets of grass and bushes if shrubs, starting from the littoral area of the Black Sea and Danube Delta, then along Danube Meadow (Lunca Dunarii) where it prefers the thickets of ivy, brambles and reed plots, areas that are also preferred by wild boars, wildcats and pheasants (Murariu & Munteanu, 2005).
Usually they are active during evening and night, when they leave their shelters during daytime, in search for food and/or mating. In Letea forest, we heard their howls, similar to the whining of kids, after the sunset, at the end of May, in 2007. When an individual emits a call, another is answering immediately, such that it detects the directions to which it should lead to. In the morning, before the sunrise, they draw back to their shelters; we observed them running between the areas between the hasmacs.

The jackals don’t migrate with regularity. Their moving from one place to another is only for searching more plentiful food areas. Thus, even if they are not migratory, the jackals have very large individual territories (130-600 ha for a family) and can travel on distances of 50-150 km (MacDonald & Barrett, 1993), such that sometimes are reported from areas in which it wasn’t known that jackals exist. This is how the first apparitions of jackals from the south of Romania are explained (ex. at Dăbuleni, in 1929), being individuals that came from Bulgaria, which probably passed on the frozen Danube river (Murariu & Munteanu, 2005).

They dig their burrows in the reminded thickets. At their digging, both males and females take part. If a female is pregnant and is about to give birth, it searches for abandoned burrows of foxes or badgers, which it arranges with new digs (Murariu & Munteanu, 2005). In Letea forest we observed burrows occupied by jackals in 1/3 superiority of the dunes, in areas with no vegetation. The majority of burrows were identified in the central part of the strict protected area, being less accessible to humans.

The jackals live in pairs, solitary or in families, but they catch they pray solely, moving in trot with stops from time to time, to smell in the wind direction or to dig a gallery of mice. Thus, they were observed in packs of 4-5 individuals. On 17.X.2009, on the road between C. A. Rosetti and Cardon localities, 2 jackals followed me. They were following me from a distance of 300-400 m, while I was moving they were moving as well, and when I was stopping they stopped as well. They followed for about 30 minutes after which they went inside the forest.

The sounds emitted consist of repeated howls, followed by barks that can be heard after sunset. Their role is for communication between individuals, especially during mating. Other sounds are for warning (sharp bark), yelped, groaning.

The jackals are not usually hunted, but with the occasion of organized hunting sessions for the species. There are also poachers that install traps, usually near dead bodies, to which the jackals go to without many precautions. Instead of traps, in Danube Delta they are caught with special traps, the hook being installed at 80-100 cm above ground, such that in order to get to the bait (usually fish), the jackals jump and remain hanged by the jaws (Murariu & Munteanu, 2005). Until now, on Letea bank the jackals were not hunt, which lead to a fast rise in number of the individuals from Letea forest. A reason is that the majority of jackals live in the strict protected area of the forest where hunting is forbidden, another reason would be that the number of people that have guns, from the localities from Letea bank, has decreased in the last years and until the present they didn’t cause significant damages to the inhabitants.

Conclusions

In the case of *Martes martes* more ample researches are necessary in order to see if it has adapted to the conditions from Letea forest and Danube Delta, or only erratic individuals were observed. About *Canis aureus* we can affirm that it successfully adapted to the conditions of Letea bank and implicitly from Danube Delta. The breed, by the inhabitants, of animals in a semi-wild regime, is an advantage for the jackals. These are feeding during winter with dead animals (horses, cows) and during spring with the calves and colts just born.
References


