NESTING BIRD SPECIES IN LETEA FOREST (THE BIOSPHERE RESERVATION OF DANUBE DELTA)

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Abstract. Letea Forest, covering 2825ha, is located on Grindul Letea. During the studies that we made, starting with November 2003 until December 2007, there have been monitored 150 species, from which 76 nesting species, the rest of the species being winter guests, accidental species, passage species or species present only for feeding in Letea Forest. From the 76 nesting species, 7 are accidental (occasional) nesting species in Letea Forest, because the nesting of those depends on the water level from the forest.

Keywords: Forest Letea, ornithofauna, nesting species, echological aspects.

Introduction

Letea Forest is located on Letea beam. The surface of forest background of Letea Forest is of 5395.7 ha, from which there was delimited a surface under integral protection of 2825 ha. The strict protected area Letea Forest was put under protection in 2930, becoming “natural reservation” in 1938 (Petrescu, 1975).

The forest expands in the interdunes area under the aspect of stripes wide of 10-250m and mostly composed by: penducular oak (*Quercus robur*), grayish oak (*Quercus pedunculiflora*), white poplar (*Populus alba*), black poplar (*Populus nigra*), waterside ash tree (*Fraxinus angustifolia*), gray ash (*Fraxinus pallisae*), pear (*Pirus pyaster*), linden tree (*Tilia tomentosa*), plain elm (*Ulmus foliacea*) and very rare the common alder (*Alnus glutinosa*), completed by a rich subbrush: *Crataegus monogyga, Ligustrum vulgare, Cornus mas, Cornus sanguinea, Rhamnus frangula, Rhamnus cathartica, Viburnum opulus, Berberis vulgaris* s.a. A characteristic of the area is the abundance of hanging plants: *Periploca graeca, Vitis sylvestris, Humulus lupulus, Clematis vitalba*, which give the forest a subtropical aspect (Petrescu, 1975).

The forest expands naturally through the subbrushes as: *Prunus spinosa, Tamarix ramosissima, Hippocae rhamnoides* which in some portions are developing luxuriantly, forming true impenetrable barrages.

Letea Forest still remains an area very less studied in what it concerns the ornithology. The researches until now have as subject one of the next aspects: food, parasites, migration of certain species, and less, faunistic studies (Cătuneanu, 1973; Ciocchia, 1992; Kiss & Sterbetz, 1973; Kiss & Rekasi, 1975,1977; Kiss et al. 1976; Kiss, 1985, 1991; Pascovschi, 1973; Stănescu et al. 1985; Pocora & Ion, 2005, 2006).
Material and Methods

Ornithological observations in the protected area Letea Forest, Biosphere Reservation Danube Delta were made starting with October 2003 until December 2007. This study is a part of a vaster essay which has as main purpose the ecological study of Letea Forest ornithofauna. For the study there were monthly going outs on terrain, extended up to 15 days per month, containing all aspects that define the periodical changes of bicenosis.

The used methods of observing during the making of the study were the transect method, the method of observing from fixed position and the method of capturing with ornithological nets. For performing of qualitative and quantitative observing we used binoculars (8x40; 10x 50; 15x50) and a field glass (15-45x 60). For a more correct determination of the birds and the nests with the eggs found, we used the determination keys (Mullarney et al. 1999; Colin, 1998; Forsman, 2003).

Results and Discussion

There were inventoried 76 species of nesting birds in Letea Forest. We took in consideration as nesting species only the ones that we have sure indices that they are nesting (nests, eggs, nestlings, juveniles etc.). We also took note of the species that we have uncertainties concerning the nesting, but with the strict mentions. We used the scientific terms from the new classified list (Szabó & Baczó 2006).

*Ciconia ciconia* L., white stork – nowadays this species is nesting on Letea Grind, preferably in localities. However, there are 2 nests of white stork in the near vicinity of the forest, that’s why we included this species as being nesting in Letea Forest. In the period 2004-2007, on Letea Grind were present 11 nests of white stork, which are distributed as follows: 1 nest in Cardon locality, 1 in C.A.Rosetti locality, four in Șiștofca locality, 2 in Letea locality and 3 nests in the former piscicultural farm Popina II. The situation of the nests and birds during the study period is listed in table 1. The white stork arrives in the study area in the last decade of March (23.04) and begins the autumn migration at the beginning of September. During the autumn passage, large flocks of white storks that are crossing the forest can be observed. Therefore on 3.09.2006, we’ve observed a flock of about 2100 individuals which was flying from north to south.

Table 1. The situation of stork nestlings from Grindul Letea (2004-2007).

<table>
<thead>
<tr>
<th>Locality</th>
<th>Nest nr.</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardon</td>
<td>Nest 1</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Nest 2</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>C.A.Rosetti</td>
<td>Nest 1</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Nest 2</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Șiștofca</td>
<td>Nest 1</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Nest 2</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Nest 3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Popina 2</td>
<td>Nest 1</td>
<td>4</td>
<td>4</td>
<td>0</td>
<td>0</td>
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<tr>
<td></td>
<td>Nest 2</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Nest 3</td>
<td>0</td>
<td>4</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Letea</td>
<td>Nest 1</td>
<td>4</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Nest 2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
</tbody>
</table>
shelduck that feed in the humid areas near the forest, we believe that the number of nesting pairs from the forest is larger than the ones we found.

*Haliaeetus albicilla* L., white-tailed eagle – data about the nesting of this species in Letea Forest are provided by: Cătuneanu (1973), Stănescu *et al.* (1985), Ciochia (1992). During the study we monitored 5 nests, from which 4 in good shape, livable, and 1 destroyed because a branch that sustained it broke. In all cases the nests are built in poplars high of about 20m, in the superior part of the tree at 3-4 m under the top. The distance between white-tailed eagles from Letea Forest varies from 1073 m to 10046 m. Nestling/Nest number was of 2 nestlings/nest, excepting year 2007 when in a nest there were 3 nestlings. This nest shows particularity, because it has more levels. The first nest is at 4m under the top of the tree and the 2nd at 2 m under the 1st. The situation of the nest is listed in table nr. 2.

<table>
<thead>
<tr>
<th>Nest nr./ year</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nest 1</td>
<td>occupied</td>
<td>vacant</td>
<td>occupied</td>
<td>occupied</td>
</tr>
<tr>
<td>Nest 2</td>
<td>vacant</td>
<td>occupied</td>
<td>occupied</td>
<td>vacant</td>
</tr>
<tr>
<td>Nest 3</td>
<td>occupied</td>
<td>occupied</td>
<td>occupied</td>
<td>occupied</td>
</tr>
<tr>
<td>Nest 4</td>
<td>occupied</td>
<td>vacant</td>
<td>occupied</td>
<td>vacant</td>
</tr>
</tbody>
</table>

*Circus aeruginosus* L., marsh harrier – is sedentary species, nesting during summer. In the forest perimeter, it prefers the peripheral areas, areas where there is reed, as it is the western part, near Merhei Lake. During the study, on the surface of Letea Grind there were found 14 nests, from which 2 in 2004, 4 in 2005, 3 in 2006 and 5 in 2007. From those 14 nests, 3 were located very near the forest, in the western part. Considering that the surface covered by reed on Letea Grind is much bigger, we believe that the number of nesting pairs of this species is much higher.

*Buteo buteo* L., common buzzard – is usually nesting in big hasmacs, as Hasmacul Ivancencu and Hasmacul Mare. During the first 3 years of study (2004-2007) the number of nesting pairs was constant; we found each year 3 occupied nests. In the last 2 years the number of common buzzard has decreased, which may be because the small areas of cultivated terrains owed to the high level of the water or maybe because the high temperatures during the wintry aspect, which determined a low migration of northern individuals. The number of common buzzard raises during the autumn migration period because of the northern individuals that station in the forest.

*Falco subbuteo* L., hobby – this species is well represented in the birds fauna of the forest. The hobby arrives in the nesting area at the end of April, beginning of May. The earliest that it was seen was on 27.04.2006, and the latest on 2.05.2007. It usually nests on poplars, at a height between 6 and 15 m. The nests can be found at the periphery of the forest, as well as in the center of it, in the big hasmacs, at their periphery, as well as in smaller hasmacs. During study there were found: 8 nests in 2004, 12 nests in 2005, 11 nests in 2006 and 14 nests in 2007. From the 14 nests found in 2007, 9 were placed in poplars at bigger heights, 2 nests on ash trees, 2 nests on willow trees and one on box thorn at the height of 6 m in a magpie nest.

*Falco tinnunculus* L., common kestrel – during study there were found 19 nests belonging to this species, distributed as it follows: 4 nests in 2004, 5 in 2005, 4 in 2006 and 6 in 2007. The common kestrel usually builds its nest on the superior part of the poplars, at 12-15m height, but we also met the species nesting in a magpie nest built on box thorn at 5m height. For Letea Forest, *Falco tinnunculus* is partially migrating species, because during winter only mails are met, also this in a smaller number. The first female
of common kestrel can be seen at the beginning of March when the nesting period starts at this species.

*Falco vespertinus* L., red-footed falcon – this is a nesting species in the area, being a summer guest. Arrives in Letea Forest at the beginning of April (1.04.2007) and leaves it in the first half of September (7.09.). In Letea Forest area, it prefers to nestle in the peripheral areas of the forest, usually near the agricultural terrains or lowlands. Most of the nests found during monitoring were built by magpie, on box thorn. In the 4 years of study there were observed 75 nests: 18 nests in 2004, 17 in 2005, 19 in 2006 and 21 in 2007. From the 21 nests that were found in 2007, 11 nests were built on magpie nests on box thorn, 5 were built over grey crow nests located on box thorn, 3 were built over grey crow nests on poplars, 1 built over a grey crow nest on acacia and 1 was built on a magpie nest on acacia.

*Phasianus colchicus* L., pheasant – was brought in Letea Forest in 1967 by the silvicultural organs, for hunting purpose, but sadly, because the introduction of this species that adapted very well, the population of *Perdix perdix* felt dramatically, because these 2 species can’t live together in the same ecological niche (Radu, 1979). In Letea Forest this species is very well represented, the number of individuals being rather big. Even though, in the past years a small decrease of pheasants can be felt, and this because the high level of poaching. It nestles in Letea Forest, usually at the periphery, the most of 200-300 m into the forest, liking better the near vicinities of gardens, from which they gather food, as grapes, during autumn.

*Coturnix coturnix* L., quail – is a decreasing species in the protected area of Letea Forest. Because of the high level of water from the past years, and especially because of the hay harvesting from inside the protected area and in the near vicinity of the forest, it became very rare. Nowadays it can be met in small number, nesting mostly in the eastern part of the forest, in the area of Hasmacul Mare. More individuals can be met in the area of the piscicultural farm Popina II, but here it’s also affected by the harvesting of hay.

*Burhinus oedicnemus* L., stone curlew – during 2003-2007 this species has been nesting frequently, being about 3 pairs in the area. In 2007 a pair has nested at the periphery of Hasmacul Hudacov, right in the vicinity of agricultural terrains, a pair nested near the sand dunes, and the third pair nested on the plain near Letea locality. During migration period this species can be observed in Letea Forest in the first part of October, on 3.10.2006 we saw 15 individuals which spend spent the night near the forest, and on 6.10.2006 we saw 4 other individuals.

*Columba palumbus* L., wood pigeon – this species was first seen in Letea Forest on 08.07.1980, being quoted as a rare or accidental species (Kiss, 1985). Nowadays the wood pigeon is a nesting species in Letea Forest, doesn’t go over 35 pairs in the entire study area. The nest is built on the crowning of the tree, where it can be well masked. We found nests built on wild pear, ash tree, poplar and also on shrubs at 2m above the ground. It’s a very precautious species. During winter, the wood pigeons gather in large flocks, formed by 100-300 individuals. Starting with April the number of wood pigeons starts to decrease, remaining 40-50 individuals that nestle in Letea Forest.

*Columba oenas* L., stock dove – the number of nesting pairs raises up to 20-25 pairs. It prefers the area of Hasmacul Mare for nesting. Arrives in Letea Forest in the second decade of March (15.03) and is present until the beginning of September (2.09). Usually flies in small flocks, feeding on the plain, far from the nest.

*Streptopelia turtur* L., turtle dove – is rarely met in the study area, can be mostly seen feeding at ground level, in the forest peripheral areas. It’s present in the area starting with the end of April (28.04) until the beginning of October (3.10). It’s fearful and prudent, because it’s hunted a lot. The number of nesting pairs varies between 10-15 pairs.
In the past 2 years of study we observed this species feeding in the gardens inside the localities.

*Cuculus canorus* L., cuckoo – is present in the study area starting with the second half of April (19.04) until the beginning of September (4.09). Can be met in the forest, but in the reed plot areas near Letea Forest, many times it can be observed inside localities, singing on the top of the trees and on the electric lines.

*Athene noctua* L., little owl – is a species that can be mostly met in the entropic areas, nesting in abandoned house attics. It’s also nesting in the abandoned buildings of the former piscicultural farm Popina II, which is located near the forest. We heard this species inside the forest but we don’t know for sure if it is nesting there.

*Strix aluco* L., tawny owl – this is a new nesting species for Letea Forest, not being quoted as present in the forest. After the study made in 1979-1980 (Stănescu *et al.*, 1985), from the night birds of prey is quoted as nesting only the *Asio otus* species. Nowadays the tawny owl has adapted very well at the forest conditions, growing continuously. It was met during day as well as during night, mostly nesting in the bigger hasmacs. It can also be met, more rarely, in smaller hasmacs. A nest with 7 small chicks of tawny owl was found in the sand dunes near the forest boundary (I 63) on 18.04.2004. From the 7 chicks, the smallest was fallen on the ground and it seemed that the others pushed him. The nest was built in an oak tree at 5m above the ground, having the diameter of 30-40cm, formed by small twigs, very carefully placed. On the edge of the nest mice were hanged, about 16 of them.

*Asio otus* L., long-eared owl – it’s nesting at the periphery of the forest or in oak trees that bound the channels. During 2003-2006 we haven’t met any nesting pair in the study area. In 2007 we found the first pair at the periphery of the forest, the nest being located on the superior part of an oak tree at 17 m. For nesting it uses the old nests of grey crow or magpie. There were 4 eggs but only 3 of them were good. The first egg was laid on 26.03.2007, and on 5.05.2007 all nestlings hatched. On 20.26.2007 all chicks left the nest.

*Caprimulgus europaeus* L., nightjar – can be met nesting inside the forest, but especially can be located after their continuous singing heard during summer in the twilight or early at night, having a dry and resonant characteristic song. We observed nightjars during autumn migration (6.09.2006), at 23:30 hunting inside the forest.
**Viorel Pocora & Elena Irina Pocora**

_{Jynx torquilla_ L., wryneck} – it’s very hard to be observed because the dense and high forest. Because of this we drew it with the help of the song made by a caller. In the study period we observed about 4 nesting pairs in Letea Forest. It prefers the areas inside the forest for nesting, as far away from human presence.

_{Picus canus_ L., grey headed woodpecker} – in present this species is sedentary in Letea Forest and it usually prefers for nesting the big hasmacs located in the eastern and north-eastern part of the forest, more precisely in the forest plantation area located between C.A.Rosetti, Cardon, Sfisfofa. It can also be met nesting inside localities, where we found 3 nests, 2 in Letea and 1 in C.A.Rosetti. We believe that there are about 20 pairs of nesting pairs in the study area.

_{Dryocopus martius_ L, black woodpecker} – the first data about this species presence in Letea Forest is given bi Kiss J.B., which specifies that it’s a rare species in Letea Forest and north Dobrogea and that it was seen in the forest on 09.10.1980 (Kiss, 1985). Nowadays it’s a nesting species in the study area, nestles in big hasmacs of the forest, with priority in Hasmacul Ivancescu, but it can also be met in small hasmacs.

_{Dendrocopos major_ L, great spotted woodpecker} – is the most often met species from Piciformes order from the study area. It doesn’t have preferences for certain areas of the forest, for nesting. One of the nests was found in Hasmacul Mare on 3.06.2006. The nest was built in a hollow, inside a poplar, at a height of 5-6 m. The nestlings were fed by both parents, which are very precautious when they approach the nest. If they observe any danger near the nest, as the presence of a human, the parents fly around the nest leaving an alarm song. When the danger goes away they get the food to the chicks.

_{Dendrocopos syriacus_ (Hemprich/Elenenberg), syrian woodpecker} – it’s observed as a new nesting species in Letea Forest, very rarely being met in the forest, mostly inside localities. It was observed, numerous times, in Letea, C.A.Rosetti and Periprava localities, on the reed roofs of the houses, where they usually search for food.

_{Dendrocopos minor_ L., lesser spotted woodpecker} – unlike the syrian woodpecker, this species is met more often in Letea Forest. It wasn’t quoted as being present in the study area before, we quote it as new nesting species for Letea Forest.

_{Galerida cristata_ L., crested lark} – it prefers for nesting the periphery of the forest, with priority the areas near agricultural terrains, from southern part, located near Letea and C.A.Rosetti and those from northern part, located near Periprava locality. Most often it’s observed in the areas where there are deposited the domestic remains.

_{Lullula arborea_ L., woodlark} – this species is nesting in the study area and can be observed nesting especially in the areas free of trees between hasmacs. Their nest is built on ground. It’s present in the study area the entire year. It can camouflage very well in the grass, but if it feels danger it flies in the nearest tree. During autumn and winter they gather in small flocks, formed by 5-30 individuals.

_{Alauda arvensis_ L., skylark} – it’s present in Letea Forest starting with April until the end of October. It can be met in smaller number in the clear of forest areas between hasmacs and in bigger number nesting on the plains near the forest. During the autumn migration they gather in small flocks and it’s mostly present on the stubble.

_{Anthus campestris_ L., tawny pipit} – is present in the study area starting with April until the end of September. It nestles mostly in open regions, that are arid and with low vegetation from the periphery of the forest or on the near plains.

_{Motacilla flava flava, Motacilla flava feldegg, yellow wagtail} – our observations showed that those species are nesting species, being mostly met in the open areas between hasmacs, where they nestle. They’re also nesting on the plains around the forest and in a very small number in the agricultural terrains area. They’re present in the area starting with April until the beginning of September.
Motacilla alba L., white wagtail – it’s very frequently met in Letea Grind area. We’ve seen it in Letea Forest near the water areas, searching for food – floating bugs. It nestles in a very big number as well as in localities from Letea Grind, in the humid areas near the forest as in the strict protected area Letea Forest. It has a predominant terrestrial life, catches bugs on the ground, rarely in air. It’s present in the study area from the beginning of March to the end of October – beginning of November. During winter they gather in small flocks.

Luscinia luscinia L., thrush Nightingale – can be heard singing, in thickets, from the beginning of May (3.05) until the end of August (30.08). It nestles in the big hasmacs, in the areas with very dense grassy vegetation. In the years when the water level is high, it retreats in the eastern part of the forest, to Hasmacul Mare area, and the number of nesting pairs lowers. In 2007 we captured 12 individuals, from which 9 adults and 3 juveniles. It’s possible that also the species Luscinia megarhynchos is present in the forest, but we haven’t observed it, this doesn’t mean that the species isn’t nesting in the study area. Even if in some researchers point of view (pers.com.), Luscinia megarhynchos is more abundant then Luscinia luscinia.

Phoenicurus phoenicurus L., common redstart – this species is nesting in Letea Forest, being present from the middle of April (18.04) until the second decade of October. It prefers for nesting the areas from the center of the forest, as far away of human presence. It’s present in the inferior part of the forest, in the shrubs area. It nestles in hollows at low heights (max 1.5m). It lies about 8 eggs, small and of greenish color. The nest is formed by dried grass placed in the hollow. Very agile and quick, it hides quickly in the leaves of the shrubs.

Phoenicurus ochrurus S.G. Gmelin, black redstart – this species wasn’t quoted as being present in the study area, but in the last 4 years was seen frequently as well as during the spring passage as in the autumn passage. During the spring passage it can be observed at the beginning of March, until the end of the month, and during the autumn passage it can be seen in October and November. A particular case was that on 16.06.2006 in C.A.Rosetti locality we’ve seen 1 black redstart male on the fence of a household. On 23.07.2006 we’ve seen 2 black redstart males and 1 female in Letea locality. In 2007 we found the species nesting in the study area. It builds its nest in abandoned houses or in the stables near the forest.

Oenanthe oenanthe L., northern wheatear – it’s a nesting species for the study area, being met starting with the end of March (30.03) until the beginning of September (9.09), it can be observed at the periphery of the forest or in bigger number inside the localities from Grindul Letea. It builds its nest under the sandy shores and under reed fences.

Turdus merula L., blackbird – this species is nesting in the study area depending on the hydrological conditions of Danube Delta and from Letea Grind. Thus in 2004, when the water level was low in the delta, the blackbird nested in the forest, but in 2005 and 2006 hasn’t nested because the water level was higher, and a big part of the forest was flooded, so the blackbird hasn’t found places for nesting. In 2007, when the water level gone lower, the blackbird nested in Letea Forest. In 2007, since March until 10 September we captured 7 individuals, from which 2 juveniles. It mostly lives in the inferior part of the forest, between shrubs, only in case of danger it retreats in top of the trees. At the end of the winter – beginning of spring it gathers in flocks that reach 80-90 individuals. The number of nesting pairs is very small (10-15) compared with the number of individuals that spend the winter in the study area.

Turdus philomelos C.L.Brehm, song thrush – as the precedent species, it nestles depending of the hydrological conditions, so it nested in 2004 and 2007 and in 2005 and 2006 it didn’t. The number of nesting pairs is smaller then the one of blackbirds. In 2007
we captured only 2 individuals which were juveniles. They usually be feed in the inferior part of the forest, together with the blackbirds, and when they’re disturbed they fly on top of the trees. During autumn migrations the number of individuals grows consistently, outnumbering the blackbirds (100 – 150 specimens/flock).

*Hippolais icterina* Vieillot, icterine warbler – arrives in the study area at the beginning of May, and migrates away at the beginning of September. It prefers for nesting the abundant grassy areas with box thorn. In 2007 we captured 12 individuals, from which 4 juveniles.

*Hippolais pallida* Hemprich & Ehrenberg, olivaceous warbler – as the precedent species it arrives in the forest at the beginning of May. It’s less abundant then *Hippolais icterina*, in 2007 there were only 7 individuals captured, from which 2 were juveniles.

*Sylvia curruca* Linnaeus, lesser whitethroat – arrives in the study area in the last decade of April (26.04) and leaves the area at the end of August. Is present in the areas rich with shrubs, especially from box thorn. It can also be met nesting inside localities or in the agricultural terrains area. In the period between 25th of April 2007 and 30 August we captured 5 individuals belonging to this species, from which 1 juvenile.

*Sylvia communis* Latham, common whitethroat – from the species of warblers this is the most frequently met in the study area. It can especially be met at the forest periphery, in the brambles and bushes near the agricultural terrains. It’s present in the forest from May (3.05) until the end of August.

*Sylvia borin* Boddaert, garden warbler – arrives in the study area at the beginning of May (3.05) and it leaves at the end of August. It’s hard to observe, like the other species of warblers. Between 25 April and 30 August we captured 5 individuals belonging to this species, from which 2 were juveniles.

*Sylvia atricapilla* L, blackcap – this species nestles in the area, being present in the rich sub-brushes areas. Arrives in the area the earliest from the warblers (25.04) and leaves in the second decade of October (11.10). It’s harder to observe, living a life hiding through leafage, but it can be easily determined by their song. It’s solitary, rarely flying in flocks. Starting with 25.04 until 15 October we captured 15 individuals belonging to this species, from which 4 juveniles.

*Phylloscopus collybita* Veillot, chiffchaff – arrives in the forest in the last decade of March (20.03) and leaves at the end of October. Because the species is hard to determine with the clear eye or with binoculars, we used for determination by drawing the individual with the help of their characteristic song. This species is rather frequent in the study area, being more abundant during the autumn passage because of the northern individuals add up.

*Phylloscopus sibilatrix* Bechstein, wood warbler – can be found in the study area in a smaller number that the previous species. As *Phylloscopus collybita*, has a life hidden in leafage and was determined with the help of the song and the ornithological nets. It prefers for nesting the Hasmacul Mare area, especially the areas with shrubs inside the forest. It’s present in Letea Forest starting with the last decade of April (28.04) until the end of October.

*Muscicapa striata* Brisson, spotted flycatcher – is a very common species for Letea Forest, being present from the end of April (23.04) until the beginning of September (9.09). It mostly nests in Hasmacul Mare area, in the others area having a smaller presence. During migration the number of individuals grows because the presence of individuals arrived from north.

*Ficedula albicollis* Temmink, collared flycatcher – this species wasn’t quoted before as being present in Letea Forest. In the spring it arrives in the area at the end of April (23.04) and leaves at the beginning of September (3.09), when the migration individuals can be observed. For the first time we’ve observed it nesting in the summer of
2004. The number of nesting pairs for Letea Forest is relatively small, about 10 pairs. It builds its nest in hollows, usually in the 1/3 superior part of the trees. From the 13 nests that were found in the 4 years of study, 9 were built in hollows in the superior part of the trees. It prefers for nesting the hollows from poplars. During hatching period the male feeds the female, the female leaving the nest for very short periods.

*Ficedula hypoleuca* Pallas, pied flycatcher – arrives in the study area in the last decade of April (24.04) and leaves the area in the first decade of September (3.09). We observed the species, at the beginning of nesting period, when it was preparing the nest. It builds its nest in hollows of ash trees, poplars, mostly in the superior part of the trees. I consider the nesting of this species more uncertain, because during hatching period and after, I haven’t observed it. However I observed it during the autumn passage.

*Aegithalos caudatus* L, long-tailed tit – is sedentary and nesting species in the study area and can be met, mostly, in the big has macs of the forest. In the study area both subspecies are present *Aegithalos caudatus caudatus* from N and E Europe, which has the head completely white and the secondary regimens wide, whitish and *Aegithalos caudatus europaeus* from Western Europe, which has a wide black strap above the eye, to the backhead, and the white color of the wing is vaguer. In Letea forest we only found *Aegithalos caudatus caudatus* nesting until now. The nest is built by both partners, and has the form of a horseshoe stuck on the tree and placed on a branch. It lies in multiple rounds; first round is laid in March.

*Parus caeruleus* L, blue tit – along with the great tit is very frequently met species in the study area and in the near localities. We can observe it on the entire surface of the forest; it doesn’t have preferences for nesting places. It searches for food on branches and trunks climbing with agility, it’s rarely seen on ground, and outside the nesting period it often visits the near reed plots. It’s very fast, sometimes even aggressive. We’ve observed that for nesting it prefers the hollows located at a height of 6-9m, lays eggs in multiple rounds, one round having up to 8-9 eggs.

*Parus major* L., great tit – is very frequently met in Letea Forest, being present inside the forest and even inside the localities present on the beam. Nowadays it’s nesting species in the forest, being met in all types of habitats. It’s gregarious outside the nesting period; many times it can be seen in mixed flocks with other tits. It nestles in small hollows, mostly in ash tree or poplar, most of the found nests in the forest were at low heights (0.5-2m). Many times it can be observed feeding in the bushes and on ground. It’s a fast bird, in a continuous agitation.

*Certhia brachydactila* L., short-toed treecreeper – nowadays it’s present in Letea Forest as nesting species but also as a winter guest. For the determination of the species we used the singing of a caller and the capturing with ornithological nets. When using the singing of the caller, the birds answered to their specific song and also to the specific song of *Certhia familiaris*. From the beginning of March until 10 September, with the help of ornithological nets, we captured 6 individuals, from which 1 juvenile. At the captured individuals we measured their beak and the posterior nail, which were inside the specific measurements of the species (Ciochia, 1984), also taking in consideration the wing drawing (Svenson, 1992). In the study area it can be met very often, but the number of these individuals grows starting with October until the end of March with the winter guests. It prefers the areas with trees with more delicate crust as: the ash trees, the poplars, the pine trees and elm trees. It feeds in the superior part of the trunks, but sometimes, it can also be observed on the branches from the trees crowning.

*Oriolus oriolus* L., golden oriole – nowadays this species is nesting in Letea Forest, preferring the trees with rich crowning. It’s very fearful, difficult to observe, spending most time on top of trees. It seems more to observe during the autumn migration. It’s present in the study area study area from the beginning of May (5.05) until
Viorel Pocora & Elena Irina Pocora

the beginning of September (9.09). It nests as well as in forest as in the trees of gardens inside the localities near the forest.

*Lanius collurio* L., red-backed shrike – is nesting species in the study area, on the entire surface of the forest. It prefers for nestle the areas where the box-thorn shrubs are dominant, always being observed in the company of *Sylvia nisoria*. In the study area there are about 40 nesting pairs present. It’s present in the area from the first decade of May (7.05) until the middle of September (18.09).

*Lanius minor* Gmelin, lesser grey shrike – arrives in the forest at the beginning of May (4.05) and leaves it at the beginning of September (3.09). The number of nesting pairs is small, 15 pairs the most. It prefers the southern part of the forest, near Sfîșoțca locality where there are large areas of box thorn. We found 2 pairs nesting in the sand dunes area, the nests being built in the small hasmats with very rich grassy vegetation.

*Pica pica* L., magpie – is frequently met in the study area, being a nesting a sedentary species. It prefers for nesting the areas where *Hippophae rhamnoides* shrub species can be found, more precisely in the west-northern part of the forest, between C.A. Rosetti, Cardon and Sfîșoțca localities. In this area there were inventoried, each year, a medium of 40-45 occupied magpie nests. It also nests, but in a small number, in the other forest areas, preferring to build its nest on box thorn shrubs, usually on top of those. The laying round is formed by 5-7 eggs. Many abandoned magpie nests are occupied by the red-footed falcon. Because the preferred area for nesting is near C.A. Rosetti and Sfîșoțca localities, many times the nests are destroyed by natives, the magpie being considered, by them, injurious species.

*Corvus monedula* L., jackdaw – this species nests in hollows, being present in a small number in the forest, compared with other corvus species. It can be met in a larger number starting with September until the end of March. We can find it nesting at the periphery of big hasmats of the forest, mostly near the agricultural terrains, where it feeds. Their nests are built in hollows, preferably in the ones from poplars. The hollows in which they are built are situated at 7-10 m, and the entrance in the hollow is oval with the big diameter of 15 cm and the small one of 5-7 cm. It nests in small colonies of 6-12 pairs. It’s sociable, most of the time it can be seen in pairs or in flocks.

*Corvus frugilegus* L., rook – presently this species can be found in Letea Forest and is a nesting species. During nesting period the number of individuals present in Letea Forest is small, maximum of 14-15 nesting pairs. Their nests are preferably built in the poplars from the periphery of the forest, from the western part. After the nesting period this species can be observed in flocks large up to 80-100 individuals, in search for food.

*Corvus corone cornix* L., hooded crow – this species was quoted before as being present in the study area (Kiss, 1977, 2004; Cuzic, 2004). Nowadays it’s nesting species for Letea Forest, the nests inside the forest are usually built on top of poplars or acacia, and the nests from the periphery of the forest, in top of willows. The nest is being used more years in a row; it’s sheathed inside with manure, wool and horse hair. The laying round is formed by 3-5 eggs and it’s complete at the beginning of April. In case that the round is destroyed, the hooded crow can lay another. In the study area there are about 50-60 pairs nesting.

*Corvus corax* L., common raven – this species was first quoted as being present in Letea Forest by Kiss. J.B. in 1971, when he collected an individual to make a study about the crows’ food (Kiss, 1977). Dan Stănescu and the collaborators quotes this specie as being present in Letea Forest in the period 1979-1980, but it isn’t quoted as being a nesting species (Stănescu et al., 1985). Presently, in Letea Forest, there are 5 nests, from which 4 are built on Sea and 1 in the southern part of the forest, near Cardon locality. The nests are located near the white-tailed eagle nests; the raven is better protecting the nestlings this way, but also follows the white-tailed activity.
Sturnus vulgaris L., common starling – presently this species nestles in the area, being very frequently met inside the forest and on the near agricultural terrains. During the nesting period we can observe this species nesting usually in hollows, preferably in those of poplar, at the periphery of the forest, to be closer to the agricultural terrains area, which is a very good source of food. The common starlings can be very rarely met nesting in the middle of the forest. In August and September we can observe this species flying in large flocks up to 200-300 individuals in search for food, making damage to the vineyards, and return in the forest in the evening, to rest. Usually this species leaves Letea Forest during November, but in the last 4 years, when winters were kinder, they spend the winters in the study area. The number of individuals which remain to spend the winter is small, maximum 50 individuals.

Passer montanus L., tree sparrow – is a nesting species, met in big hasmacs, isolated, in the central part of the forest. In the forest is met in a larger number then the hen sparrow, most of the time nesting in tree hollows. It’s gregarious species, always being observed in small flocks. It builds its nest in areas rich with sub-bushes, at a low height above the ground.

Fringilla coelebs L, chaffinch – this species is nesting in the study area, being met in all parts of the forest. The number of chaffinch individuals that can be met in the forest is small, being met in a larger number during the winter passage. During nesting period, usually solitary, however, starting with the end of August it can be observed flying in small flocks, formed by 6-15 individuals. It starts to nestle at the beginning of March, once with the arriving of the females.

Carduelis carduelis L, goldfinch – can be observed nesting in the peripheral areas of the forest, especially in the western part, in the areas with reed plots or rich in osier plots. It’s forming very small flocks of 5-8 individuals during summer and larger flocks of 20-50 individuals, during migration and winter. In the autumn and winter this species can be observed eating seeds of bull thistle and thorn.

Carduelis chloris L., greenfinch – according with the studies made 30 years ago, this species is quoted as being a nesting species for the study area (Stănescu et al., 1985). Nowadays we observed it, in the forest, during the wintry aspect or in the autumn or spring passage. I consider nestle of this species uncertain, because I haven’t observed or captured the species during nesting period. I observed during the spring passage (6.05) 2 individuals, in the western part of Hasmacul Ivancencu.

Species occasionally nesting. From the birds nesting species, in the study area, there is a group that we called it occasionally nesting, because nestle of this species in the forest depends on the water level in that year. So, if the water level is lower the birds from this category won’t nestle, and if the water level is high and a big part of the forest is flooded then they’ll find good conditions to nestle.

Anas platyrhynchos L., mallard – in 2004-2006 this species nestled in the forest. We considered that this species nestled in the forest because the high level of water. In 2007, the water level of Danube Delta was very low, because of which in Letea Forest there was no water. Yet, in 2007 we found 4 nests of mallard, but all were located in trees. The first nest we found on 24.04 in the western part of the forest, in the trees plantation area, near boundary II 3. The nest was situated in poplar, at a height of 12m, and had the exterior diameter of about 70cm. When I got close to the tree, the female fought away from the nest. The second nest was found on 4.05 near the sand dunes near boundary VI 62. The nest was located on top of an oak tree at 9m above ground. The extern diameter was of 27cm, the interior of 18em and the depth of 12cm. The interior was sheathed with feathers. The eggs had the medium of the big diameter of 59.3 mm and the medium of the small diameter of 39.3.74mm. On 8.05 we found a nest located on a poplar at 10m above ground, near boundary V9, from near 2 females and 1 male fought away. The fourth nest
was found on the same date, located on an oak tree at 7m above ground. Even if we only found 4 nests I believe that the number of nesting pairs, of great duck, in the forest is bigger, because we’ve observed more pairs flying through the forest, most formed by 2 females and 1 male. I consider that this species is constant nesting species in the study area.

*Botaurus stellaris* L., bittern – this species wasn’t quoted before as being present in Letea Forest. We’ve observe it nesting in 2005 and 2006, at the western periphery of the forest, in Hasmacul Ivancencu area, in a specific habitat with reed plots from place to place.

*Aythya nyroca* Göldenstädt, ferruginous duck – this species nestled in Letea Forest during the summer of 2006, when we observed a female with 5 nestlings in the forest, near Hasmacul Ivancencu, in the area with rich osier plot. It was the single pair of ferruginous duck observed nesting in the forest until now.

*Gallinula chloropus* L., common moorhen – is a species that nestles in big number in the humid areas with aquatic vegetation in the forest vicinity, but in the years when the water level is high and the water persists longer in the forest, the common moorhen nests inside the forest. In 2005 and 2006 this species has nested inside the forest, especially in Hasmacul Ivancencu, in a habitat with reeds and reed plots, from inside the forest and near the areas with compact sub-bushes vegetation. In the summer of 2005 we’ve observed 2 females with nestlings and in 2006 3 females with nestlings.

*Fulica atra* L., coot – same as the moorhen, this species nestles in Letea Forest in the years when there are favorable conditions, as high waters and abundant vegetation. In 2005 and 2006 2 pairs nested, at the periphery of Hasmacul Ivancencu, in the forest areas where reed is present.

*Recurvirostra avosetta* L., avocet – Dan Stănescu et al. (1979-1980), found this species nesting in the eastern part of the forest and mentioned that it’s accidental nesting, because of the high level of water (Stănescu et al., 1985). In 2006, when the water level has reached record limits, for Danube Delta and almost 60% of the forest was flooded until the end if July, we found this species nesting inside the forest, in the eastern part of Hasmacul Ivancencu, in the area between hamsacs. In this area, with abundant grassy vegetation, we managed to find 1 nest with 2 nestlings and 2 eggs, which was placed on a little raised piece of ground. In the sand dunes area we managed to trace 2 pairs of avocet which, after their manifested behavior in that period, we believe that they had nests in the area.

*Himantopus himantopus* L., black-winged stilt – we managed to trace 5 nests of black-winged stilt on 4.06.2006, 3 nests were at the periphery of the forest in the eastern part of Hasmacul Ivancencu, near the nests of avocet and lapwing. Other 2 nests were found in the area of the sand dunes, located in the spaces between hamsacs. The area was flooded, or the first time in the last 20 years, the water level was of 10 up to 30 cm depth, rich in aquatic vegetation.

*Vanellus vanellus* L., lapwing, in the period 2004-2006 in nested in the study area, but only in 2006 I managed to find nests. I identified 5 nesting pairs and managed to find 7 nests from which 2 were abandoned and the other 5 had eggs. Three nests I identified in the eastern part of Hasmacul Ivancencu, and the other 2 in the sand dunes area. All the nests were located on raised ground, unflooded. In 2007, because the low level of the water from the precursory period of nesting, the lapwing hasn’t nested in the forest, but somewhere at 300 m away of the southern part of the forest.

**Conclusions**

After the study made between 2003 and 2007 we identified 76 nesting species in the study area, from which 6 are occasionally or accidentally nesting. From the total of 76
nesting species we can say that 26 of them are quoted as being nesting for the first time in Letea Forest. Those species are: *Columba palumbus*, *Athene noctua*, *Strix aluco*, *Merops apiaster*, *Dryocopus martius*, *Dendrocopos syriacus*, *Dendrocopos minor*, *Anthus campestris*, *Phoenicurus ochruros*, *Sylvia crassirostris*, *Phylloscopus collybita*, *Ficedula albicollis*, *Ficedula hypoleuca*, *Certhia brachydactyla*, *Lanius minor*, *Corvus frugilegus*, *Corvus corax*. Comparing our data with the birds fauna data from 30 years before, made in Letea Forest (Stănescu et al., 1985), there are 18 species that don’t nestle anymore in the forest, this species are: *Pernis apivorus*, *Milvus migrans*, *Circaetus gallicus*, *Circus cyaneus*, *Pandion haliaetus*, *Perdix perdix*, *Streptopelia decaocto*, *Hirundo rustica*, *Delichon urbica*, *Passer domesticus*, *Parus palustris*, *Eurystomus ruebcula*, *Luscinia megarhynchos*, *Anthus trivialis*, *Anthus cannabina*, *Emberiza citrinella*, *Emberiza schoenicthlus*, *Apus apus*.

*Streptopelia decaocto*, *Hirundo rustica*, *Delichon urbica* and *Passer domesticus* species are nesting in Letea Grind, but only inside localities, they only appear in the forest when feeding or during migration. *Emberiza schoenicthlus* nestles in Letea Grind, especially in the reed plot areas, appears in the forest during the autumn and winter passage, when it forms flocks of 7-10 individuals and it feeds in the spaces between hasmacs. In the past *Perdix perdix* was nesting in the entire delta (Radu, 1979) and on Letea Grind (Stănescu et al., 1985), but in the past 4 years of study we only observed 2 individuals during spring migration on 28.04.2007. *Erithacus rubecula* can be observed in the forest during autumn and spring migration, or it can spend the winter, in the study area, in the kinder winters. Nowadays *Pernis apivorus* and *Milvus migrans* can be observed in Letea Forest only during migration, especially in the autumn. However in some ornithologists point of view (pers.com.), is possible that the bee-eater still nestles in Letea Forest. *Circus cyaneus* is a winter guest for the study area. *Circaetus gallicus*, *Pandion haliaetus*, can only be observed in the forest accidentally or during the autumn and spring passage period.

The total number of species inventoried in Letea Forest is of 150, from which 69 are permanent nesting species and 7 species are nesting depending on the water level from Danube Delta, respectively Letea Grind. We consider that the species *Anas platyrhynchos* is permanent nesting species, because its nesting doesn’t depend anymore on the level of the water. The mallard can also nest safely in trees. We don’t have data about the percentage of living of the nestlings, for the individuals that nestle in trees, but if this is convenient for the species, we believe that we’re assisting at a new adaptation of the species at a new type of nesting. The nestling in the tree of the species *Anas platyrhynchos* has both advantages and many disadvantages. One of the disadvantages is that their eggs are laid in nests of *Corvus corone cornix*, which are mostly located in the superior part of the trees, which makes the nestlings to be more exposed for the dangers that come from the diurnal birds of pray and from species like Corvidae. Another disadvantage is the big distance of the nests from the water sources, and the moving of the younglings to the water is also difficult, the distance that the younglings must travel is big and full of danger that come from the terrestrial predators. We consider that the study of these specimens that prefer to nestle in trees is necessarily, to find out what is determining the species to change the way it nestles.

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References
Kiss, J. B., Rékási, J., 1975. Date referitoare asupra hranei unor specii de păsări în nordul Dobrogei. Nymphaea, III: 229 - 244.