

DATA REGARDING THE BIRDS' BREEDING IN SOME NORWAY SPRUCE FORESTS FROM THE DOAMNEI RIVER HYDROGRAPHICAL BASIN (FĂGĂRAȘ AND IEZER-PĂPUȘA MOUNTAINS)

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Abstract. In this paper it is presented the situation regarding the breeding of the bird species in some Norway spruce (*Picea abies*) (L.) H. KARST., 1881 forests from the upper hydrographical basin of the Doamnei River. The study was done between 2002 and 2007. For the qualitative and quantitative data, 19 field research-studies were performed using the itinerary method. 29 bird species were registered during the breeding season. They belong to 4 orders, Passeriformes being the most numerous in species. 37.93% of them were certainly breeding species and 62.06% were probably breeding species. *Fringilla coelebs* had the highest density (67 pairs/100 ha). *Troglodytes troglodytes* (LINNAEUS, 1758), *Phylloscopus collybita* (VIEILLOT, 1887), *Regulus regulus* (LINNAEUS, 1758), *Regulus ignicapillus* (TEMMINCK, 1820), *Erithacus rubecula* (LINNAEUS, 1758), *Turdus philomelos* C. L. BREHM, 1831, *Parus ater* LINNAEUS, 1758 and *Certhia familiaris* LINNAEUS, 1758 had densities each over 10 pairs/100 ha. The density of all recorded species was 301 pairs/100 ha.

Keywords: breeding, birds, density, spruce forest.

Rezumat. Date privind cuibăritul păsărilor din unele păduri de molid din bazinul hidrografic Râul Doamnei (Munții Făgăraș și Iezer-Păpușa). În această lucrare este prezentată situația privind cuibărirea speciilor de păsări din unele păduri de molid (*Picea abies*) (L.) H. KARST., 1881 din bazinul hidrografic superior al Râului Doamnei. Studiul a fost efectuat în perioada 2002 – 2007. Prin intermediul a 19 ieșiri de teren, folosind metoda itinerariului, au fost urmărite datele de natură calitativă și cantitativă. De-a lungul sezonului de cuibărire au fost înregistrate 29 de specii de păsări cuibăritoare. Ele aparțin la 4 ordine, dintre acestea, Passeriformes fiind cel mai bogat în specii. 37,93% au fost specii sigur cuibăritoare iar 62,06% au fost probabil cuibăritoare. *Fringilla coelebs* a avut cea mai mare densitate (67 perechi/100 ha). *Troglodytes troglodytes* (LINNAEUS, 1758), *Phylloscopus collybita* (VIEILLOT, 1887), *Regulus regulus* (LINNAEUS, 1758), *Regulus ignicapillus* (TEMMINCK, 1820), *Erithacus rubecula* (LINNAEUS, 1758), *Turdus philomelos* C. L. BREHM, 1831, *Parus ater* LINNAEUS, 1758 și *Certhia familiaris* LINNAEUS, 1758 au avut fiecare peste 10 perechi/100 ha. Densitatea tuturor speciilor cuibăritoare a fost de 301 perechi/100 ha.

Cuvinte cheie: cuibărire, păsări, densitate, pădure, molid.

INTRODUCTION

In our country, the avifauna of the Norway spruce woodlands was studied by more ornithologists (MUNTEANU, 1986; MUNTEANU, 2000; RANG, 2002; PETRESCU, 2005; MESTECĂNEANU & CONETE, 2006; MESTECĂNEANU, 2006; MARIȘ, 2007) but in the Doamnei River hydrographical basin there have not been performed any research-studies until now.

MATERIAL AND METHODS

The Făgăraș and Iezer-Păpușa Mountains belong to Făgăraș Massif, which is a part of the Southern Carpathians. They are the place of origin for the springs of the Argeș, the Vâlșan, the Doamnei, the Bratia, the Târgului, and the Argeșel Rivers. The Doamnei River basin comprises the Doamnei River itself, the Bratia River, the Târgului River, and the Argeșel River (Fig. 1). It covers a surface of 1822 km² (BARCO & NEDELUCU, 1974).

The vegetation in the Norway spruce forests from the Doamnei River hydrographical basin where the study was conducted is dominated by Norway spruce (*Picea abies*) (L.) H. KARST., 1881. There are also scarce individuals of *Pinus mugo* TURRA, 1764, *Larix decidua* MILL., 1768, *Pinus sylvestris* LINNAEUS, 1753, *Fagus sylvatica* LINNAEUS, 1753, *Acer pseudoplatanus* LINNAEUS, 1753, *Ulmus glabra* HUDSON, 1762 etc. Most of the trees are mature. The bush level is poorly represented. It is composed of: *Lonicera nigra* LINNAEUS, 1753, *Spiraea chamaedryfolia* LINNAEUS, 1753, *Rubus idaeus* LINNAEUS, 1753, *Ribes alpinum* LINNAEUS, 1753, *Vaccinium myrtillus* LINNAEUS, 1753 etc. The herbaceous level is not well represented but there is a group of species that are present almost in all the studied woodlands of spruce: *Oxalis acetosella* LINNAEUS, 1753, *Soldanella hungarica* SIMONK., 1887, *Homogyne alpina* (L.) CASS., 1821, *Campanula abietina* (GRISEB.) SIMONK., 1887, *Hieracium rotundatum* KIT. ex SCHULT., 1814, *Dryopteris carthusiana* (VILL.) H.P. FUCHS, 1958, *Saxifraga cuneifolia* LINNAEUS, 1762, *Doronicum carpaticum* (GRISEB. & SCHENK) NYMAN, 1865, *Adenostyles alliariae* (GOUAN) A. KERN., 1871, *Leucanthemum waldsteinii* (SCH. BIP.) POUZAR, 1975 etc. (ALEXIU, 2008).

The climate of the area is temperate-continental with mountain characteristics (BARCO & NEDELUCU, 1974).

We performed 19 field researches between 2002 and 2007. Ten of them have had quantitative feature and 9 of them have had qualitative feature. Our aim was to register the breeding bird species and to estimate their density. We used the itinerary method (MUNTEANU, 2000a). The categories of distance 0 – 9 m, 10 – 24 m, 25 – 49 m, 50 – 100 m and over 100 m were used. The transects for the quantitative data (May 31, 2003 – Iezer Stream and Iezerului Foot, June 25, 2005 – Iezer Stream and Piscani Valley, June 26, 2005 – Grădișteanu Peak and Găinațu Mare Peak, July 9, 2005 – Izvorul de lângă Plai Valley, July 28, 2006 – Cățunu Stream and Iezer Foot, July 15, 2007 – Iezer Stream) are 6.4 km long and the transects for the qualitative data (June 1, 2002 – Iezer Stream and Iezer Foot, June 25, 2005 –

Bătrâna Valley, July 9, 2005 – Izvorul de lângă Plai Valley, July 20, 2006 – Iezer Stream, June 30, 2007 – Valea Rea Stream, July 1, 2007 – Scărișoara Saddle – Nisipuri, July 28, 2007 – Iezer Stream and Grădișteanu Paek) are 5.6 km long. Two field researches were done in May, nine in June and eight in July. The altitude varied generally between 1550 m and 1750 m. The birds were identified visually and auditory (by BRUUN *et al.*, 1999) mostly in the morning for the quantitative data and all along the day for the qualitative data. A binocular 10*50 was used. The data were processed using the density. It represents the number of the breeding pairs (singing males) on the unit of area (BIBBY *et al.*, 2000).

The authors' names of the taxa used in this paper as well as the year when the description of every taxon was published are into accord with the scientific code of nomenclature (cf. Flora Europaea and Fauna Europaea).

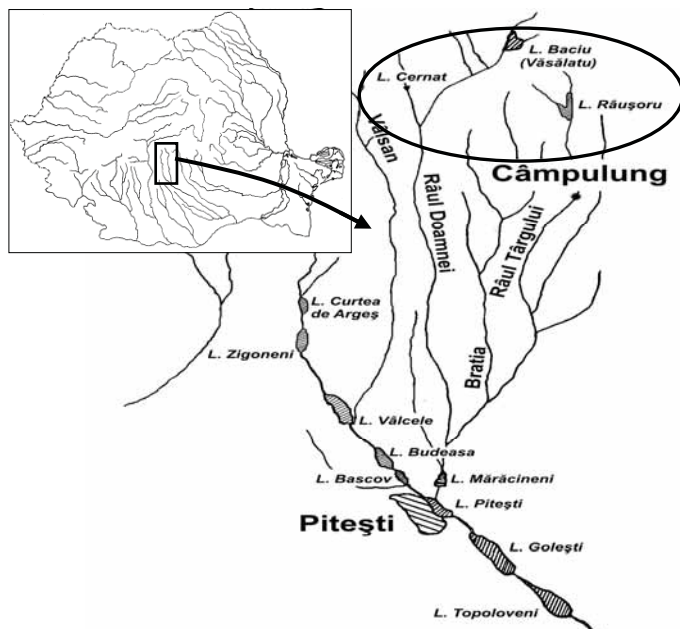


Figure 1. The map of the Doamnei River hydrographical basin (with area of study in the oval contour).

Figura 1. Harta bazinului Râului Doamnei (cu zona cercetată cuprinsă în conturul oval) (original).

RESULTS

Between 2002 and 2007, in the breeding period, on the mentioned tracks of the spruce forests from the Făgăraș and Iezer-Păpușa Mountains, we identified 29 bird species (Table 1). They belong to 4 orders (**Falconiformes**, with one family – Accipitridae: *Buteo buteo* LINNAEUS, 1758 and *Accipiter nisus* LINNAEUS, 1758), **Cuculiformes**, with one family – Cuculidae: *Cuculus canorus* LINNAEUS, 1758, **Piciformes**, with one family – Picidae: *Picoides tridactylus* (LINNAEUS, 1758) and *Dryocopus martius* (LINNAEUS, 1758), and **Passeriformes**, with ten families – Motacillidae: *Anthus trivialis* (LINNAEUS, 1758) and *Motacilla cinerea* TUNSTALL, 1771, Corvidae: *Garrulus glandarius* (LINNAEUS, 1758) and *Nucifraga caryocatactes* (LINNAEUS, 1758), Troglodytidae: *Troglodytes troglodytes* (LINNAEUS, 1758), Prunellidae: *Prunella modularis* (LINNAEUS, 1758), Sylviidae: *Sylvia atricapilla* (LINNAEUS, 1758), *Phylloscopus collybita* (VIEILLOT, 1887), *Regulus regulus* (LINNAEUS, 1758) and *Regulus ignicapillus* (TEMMINCK, 1820), Turdidae: *Phoenicurus ochruros* (S. G. GMELIN, 1774), *Erithacus rubecula* (LINNAEUS, 1758), *Turdus torquatus* LINNAEUS, 1758, *T. merula* LINNAEUS, 1758, *T. philomelos* C. L. BREHM, 1831 and *T. viscivorus* LINNAEUS, 1758, Paridae: *Parus montanus* CONRAD VON BALDENSTEIN, 1827, *P. cristatus* LINNAEUS, 1758 and *P. ater* LINNAEUS, 1758, Sittidae: *Sitta europaea* LINNAEUS, 1758, Certhiidae: *Certhia familiaris* LINNAEUS, 1758, and Fringillidae: *Fringilla coelebs* LINNAEUS, 1758, *Pyrrhula pyrrhula* (LINNAEUS, 1758) and *Loxia curvirostra* LINNAEUS, 1758). 11 of them (37.93%) were certainly breeding species (CB) and 18 (62.06%) were probably breeding species (PB), (Table 1). *Fringilla coelebs* had the highest density (67 pairs/100 ha) and *Troglodytes troglodytes*, *Phylloscopus collybita*, *Regulus regulus*, *R. ignicapillus*, *Erithacus rubecula*, *Turdus philomelos*, *Parus ater* and *Certhia familiaris* had densities each over 10 pairs/100 ha. The other species had lower densities. The density of all recorded species was 301 pairs/100 ha (Table 1).

DISCUSSIONS

The 4 orders (to whom the identified species belong to) represent 21.05% of all orders found in Romania and the families represent 20.31% of all families found in Romania (MUNTEANU, 1998). Besides the observed species, a series of species (*Accipiter gentilis* (LINNAEUS, 1758), *Bonasa bonasia* (LINNAEUS, 1758), *Tetrao urogallus* LINNAEUS, 1758, *Columba palumbus* LINNAEUS, 1758, *Strix aluco* LINNAEUS, 1758, *S. uralensis* PALLAS, 1771, *Dendrocopos major* (LINNAEUS, 1758), *Motacilla alba* LINNAEUS, 1758, *Corvus corax* LINNAEUS, 1758, *Sylvia curruca* (LINNAEUS, 1758), etc.) may breed here, too.

We observed that the avifauna of the spruce woodland is more varied than the one of the upper level – the forest of Dwarf Pine (*Pinus mugo*) from the Iezer-Păpușa Mountains, where only 14 species of birds were registered breeding (MESTECĂNEANU, 2010). This fact is possible because the biocoenosis is richer and the trophic relations are more complex.

Here, the arboreal life is more obvious than the life from the lower levels. Almost all the birds identified in the spruce woodland are species of forests; only *Phoenicurus ochruros* lives in the rocky areas preponderantly from the mountain areas. *Picoides tridactylus*, *Nucifraga caryocatactes*, *Prunella modularis*, *Regulus regulus*, *R. ignicapillus*, *Turdus torquatus*, *Parus ater*, *P. montanus*, *P. cristatus* and *Loxia curvirostra* are species characteristic for the spruce forests, *Pyrrhula pyrrhula* is characteristic for the mixed woodlands and *Buteo buteo*, *Accipiter nisus*, *Dryocopus martius*, *Motacilla cinerea*, *Garrulus glandarius*, *Troglodytes troglodytes*, *Phylloscopus collybita* and *Turdus viscivorus* are typical for both types of forests. The other species are typical for the broadleaf forests or are ubiquitous species (*Cuculus canorus*, *Fringilla coelebs*). Because of the climate (short and chilly and wet summers; long and cold and abundant snow winters), more species are migratory or partial migratory; they arrive here only in summer or remain over the winter in small number: *Buteo buteo*, *Cuculus canorus*, *Anthus trivialis*, *Motacilla cinerea*, *Troglodytes troglodytes*, *Prunella modularis*, *Sylvia atricapilla*, *Phylloscopus collybita*, *Phoenicurus ochruros*, *Erithacus rubecula*, *Turdus torquatus*, *T. merula*, *T. philomelos*, *Fringilla coelebs*. The species that stay here all year round (more or less individuals in winter) have some adaptations. So, the species with mixed diet are predominant (*Garrulus glandarius*, *Nucifraga caryocatactes*, *Erithacus rubecula*, *Turdus merula*, *T. viscivorus*, *Parus montanus*, *P. cristatus*, *P. ater*, *Sitta europaea*, *Fringilla coelebs*, *Pyrrhula pyrrhula*), while less of them eat meat (*Buteo buteo*, *Accipiter nisus*), insects (*Picoides tridactylus*, *Dryocopus martius*, *Troglodytes troglodytes*, *Regulus regulus*, *R. ignicapillus*) or seeds (*Loxia curvirostra*). Other adaptations refer to the place of nest: among the branches of the trees (*Accipiter nisus*, *Garrulus glandarius*, *Nucifraga caryocatactes*, *Turdus viscivorus*, etc.) or into hollows (*Picoides tridactylus*, *Parus montanus*, *P. cristatus*, *Sitta europaea* etc.), (RADU, 1967).

Table 1. The density of breeding species identified in some Norway spruce forest from the upper hydrographical basin of the Doamnei River.
Tabel 1. Densitatea unor specii de păsări cuibăritoare observate în unele păduri de molid din bazinul superior al Râului Doamnei.

No	Species	Density (pairs/100 ha)	Breeding
1.	<i>Buteo buteo</i>	0.38	CB
2.	<i>Accipiter nisus</i>	0.13	CB
3.	<i>Cuculus canorus</i>	0.18	PB
4.	<i>Picoides tridactylus</i>	0.41	PB
5.	<i>Dryocopus martius</i>	0.37	PB
6.	<i>Anthus trivialis</i>	1.04	PB
7.	<i>Motacilla cinerea</i>	4.17	CB
8.	<i>Garrulus glandarius</i>	1.56	PB
9.	<i>Nucifraga caryocatactes</i>	5.47	PB
10.	<i>Troglodytes troglodytes</i>	11.46	PB
11.	<i>Prunella modularis</i>	4.69	PB
12.	<i>Sylvia atricapilla</i>	4.69	PB
13.	<i>Phylloscopus collybita</i>	16.41	PB
14.	<i>Regulus regulus</i>	21.48	PB
15.	<i>R. ignicapillus</i>	27.34	PB
16.	<i>Phoenicurus ochruros</i>	0.55	CB
17.	<i>Erithacus rubecula</i>	45.83	CB
18.	<i>Turdus torquatus</i>	1.04	PB
19.	<i>T. merula</i>	4.17	CB
20.	<i>T. philomelos</i>	10.42	PB
21.	<i>T. viscivorus</i>	2.08	PB
22.	<i>Parus montanus</i>	1.95	CB
23.	<i>P. cristatus</i>	7.81	CB
24.	<i>P. ater</i>	40.63	CB
25.	<i>Sitta europaea</i>	1.04	PB
26.	<i>Certhia familiaris</i>	12.5	PB
27.	<i>Fringilla coelebs</i>	67.19	PB
28.	<i>Pyrrhula pyrrhula</i>	2.08	CB
29.	<i>Loxia curvirostra</i>	3.91	CB

Legend: CB – certainly breeding species; PB – probably breeding species. / **Legendă:** CB – specii sigur cuibăritoare; PB – probably breeding species.

By comparison to the avifauna observed in other similar woodlands of Romania, we remark that 23 species (10 breeding species) were identified in the breeding period into a forest from the Retezat Mountains (MUNTEANU, 1986), 59 species were identified in the spruce forests from the mountain hydrographical basin of the Bistrița River – 21 breeding species in two woodlands (MUNTEANU, 2000) and 46 species were identified in the Piatra Craiului Mountains (MESTECĂNEANU, 2006). 30 species were observed during the year in the spruce forests from the middle hydrographical basin of the Siret River (RANG, 2002) and 15 species were counted in the Făgăraș Mountains from the upper hydrographical basin of the Argeș River at the beginning of August (PETRESCU, 2005).

Fringilla coelebs, the species with the highest density, is a eurybiont species. It is not characteristic for the spruce forest, fact observed by other authors. Its density was 73 pairs/100 ha in the Piatra Craiului Mountains, 126 pairs/100 ha in the Retezat Mountains and 68 pairs/100 ha in the upper basin of the Bistrița Moldovenească River. The

densities of the other species were similar with those calculated for the three mentioned areas. Also, the density of all registered breeding species was concordant with the density obtained in the other spruce woodlands: 444 pairs/100 ha - the Piatra Craiului Mountains, 274 pairs/100 ha-the Retezat Mountains, 346 pairs/100 ha -the upper basin of the Bistrița Moldovenească River (MESTECĂNEANU, 2006; MUNTEANU, 1986; MUNTEANU, 2000). Other values: 346 pairs/100 ha – the Dornele Depression, 296 pairs/100 ha - the Vlădeasa Mountain, 164 pairs/100 ha - the Bihor Mountains (MUNTEANU, 1986). As it has been stated above, the density of the breeding species resulted mainly from the counting of the singing males observed on transect. Other factors, for instance, the nests, the unfledged and low fledged juveniles, the adults with food in their beak were taken into account, too. The certainly breeding species and the probably breeding species were catalogued according to the methodology of the Atlas of the Romanian Breeding Birds: the certain breeding means the breeding of the species that was proved by the finding of nest with eggs or juveniles, the occurrence of adults with food in beak and moving to presumable place of the nest, the occurrence of unflying or barely flying juveniles in a typical biotope for the respective species; the uncertain breeding means the occurrence of the pairs into characteristic biotope and during the breeding, display, territorial behaviour of the pair, intense song of the male into the characteristic habitat (MUNTEANU *et al.*, 2002).

CONCLUSIONS

During 2002 – 2007, in the spruce forests from the upper basin of the Doamnei River, 29 breeding species were identified in the breeding season. They belong to 4 orders, Passeriformes being the richest in species. 37.93% of them were certainly breeding species and 62.06% were probably breeding species. *Fringilla coelebs* had the highest density (67 pairs/100 ha). *Troglodytes troglodytes*, *Phylloscopus collybita*, *Regulus regulus*, *R. ignicapillus*, *Erithacus rubecula*, *Turdus philomelos*, *Parus ater* and *Certhia familiaris* had densities each over 10 pairs/100 ha. The density of all recorded species was 301 pairs/100 ha. The situation regarding the breeding in the researched Norway spruce woodlands is within the general range of the similar forests from our country.

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