PALEOECOLOGICAL RECONSTRUCTIONS OF HOLOCENE LOCALITIES OF BIRDS AND MAMMALS (AVES ET MAMMALIA – VERTEBRATA) IN NORTH-EASTERN BULGARIA

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Abstract: Paleoenvironmental reconstructions of 9 subfossil localities of mammalian and bird fauna of North-Eastern Bulgaria are presented here. The localities originate mainly from the feeding remains of Eagle owl (B. Bubo (L.)). All they present local paleofaunas with high species diversity, which testifies about some former habitats round them. The established species characterize four main habitats: open areas, wetlands, forests and rock habitats. The considerable high diversity of aquatic birds is significant about the former distribution of wetlands around the most of the localities, which does not exist there now. There is also established an impoverishment of the steppe and forest fauna, because of the destruction of the respective habitats.

Keywords: Paleoenecology, Paleozoology, Paleornithology, Holocene, Bubo bubo, habitats

1. INTRODUCTION

During the Holocene came some significant modifications of the natural habitats in the territories of Bulgaria and South-Eastern Europe. This modifications increased during the Late Holocene (since 500 BC), because of the human economical activity. It reduced the bird and mammal fauna to significant impoverishment.

2. MATERIAL AND METHODS

We present in this work the data from 9 Holocene (subfossil) localities of bird and mammal fauna in North-Eastern Bulgaria: Madara, Topchii, Shirokovo, Nisovo, Isperich, Popmartinova cave, Petrolna basa – Ruse, Strelkovo and Karapelit (Mitev, 2004). The region of our study covers a significant part of North-Eastern Bulgaria: from river Yantra in the West to Suha river in the East; from Danube river and the terrestrial border with Romania in the North to Provadian plateau and Samuilovski, Razgradski and Popovski hills in the South. The origin of the studied material is mainly from eagle owl (B. Bubo (L.)), from accumulations of its feeding remains (pellets). The majority of localities are Late Holocene at age. Only two (Madara and Shirokovo) are mixed at age – with not numerous Early Holocene and Late Pleistocene admixtures. That is why the present work refers really to the Late Holocene. All the localities present local paleofaunas with rich species composition, significant for existence of various habitats in their vicinities. Looking at the ecological characteristics of the found species, we made one paleoenvironmental reconstruction of the respective habitats round the localities. This reconstruction may be relative only, because of the following reasons:

- Selectivity of the accumulative agent – in our case the eagle owl.
- Relativity of the ecological classification, about some groups animals with high degree of mobility: birds, bats and mammalian predators.

3. RESULTS

We have established totally 112 bird species and 50 mammalian species of from all the studied localities. 105 bird species and 41 mammal species are presented in the recent bird and mammal fauna of the region, respectively 38.2 % and 59.4 % from its composition [1]. The birds are divided into 4 main ecological complexes [2]:


6. Taxa with undetermined ecological belonging: *Aquila chrysaetos/heliaca*, etc.

The average percentage shares of the birds from the main ecological complexes are presented in Fig. 1.

The mammals are classified into 7 ecological complexes, on the base of the ecological classification of [3] and [4]:

1. Mammals with various habitats:
   - Predators (5 sp.): *Vulpes vulpes* (L.), *Meles meles* (L.), *Mustela nivalis* L., *Martes foina* (Erxleben) and *Felis sylvestris* Schreber.
   - Bats (9 sp.): *Rhinolophus ferrumequinum* (Schreber), *Rhinolophus blasii/euryale*, *Nyctalus noctula* (Schreber), *Eptesicus serotinus* (Schreber), *Myotis cf. myotis* (Borkhausen), *Myotis blythi* (Thomas), *Myotis sp. - small species*, *Pipistrellus cf. pipistrellus* (Schreber) and *Miniopterus schreibersi* (Kuhl).


luteus (Eversmann), Mustela cf. eversmanni Lesson and Vormela peregusna (Gudenstaeedt).


7. Sinantrope mammals: Rattus norvegicus (Berckenhout), Rattus aff. rattus L. и Mus musculus L.


The average percentage shares the main mammal species are presented in Fig. 1.

4. DISCUSSION

1. Open areas. In the majority of localities prevailing are the birds of the open areas, as plenty and species diversity. Their great number dues to most numerous two species: P. perdix and C. coturnix (at 10 - 14 % of the number of birds in some localities). They are characteristic about the opened fields and agrarian areas. Other bird species, spread in suburbs of woods or near groups of woods and bushes, are also often presented: St. turtur, P. pica, St. vulgaris и др. From the side of mammals the steppe species are prevailing too. The most numerous species is M. newtoni (15 - 43.8 %), nearly in all the localities. Third numberous species is Sp. citellus in three great localities (6 - 10 %). These species indicate the existence of wide field and steppe habitats, up till now existing in the studied region. However we mark a significant impoverishment of the typical steppe fauna in NE Bulgaria. The both hamster species M. newtoni и C. cricetus are rare or missing in recent materials from the studied region: in new pellets of eagle owl, collected in the period 1990-1993 (Mitev - unpublished data) and in trap catching (Markov - personal report). This testifies about the decreasing number of these rodents, obviously in XX c. because of the mechanization and chemical treating of agriculture. We have also established four former localities of the steppe species S. subtilis, not studied in Bulgaria. On the side of steppe birds we have fond the both species of bustards: O. tarda and T. tetrax, disappeared from the nesting avifauna of Bulgaria in the second half of XX c. [5].

2. Wetlands. The complex of aquatic bird has great species diversity, commensurable with the diversity of birds of opened areas. The most finds of aquatic birds are interesting as evidences for existence of wetlands inside North-Eastern Bulgaria in the past. Some frequently found birds, mainly rails and crakers (I. minutus, P. porzana, P. pusilla, R. aquaticus, G. chloropus и G. media) are characteristic for swamp-like habitats with plenty aquatic vegetation. Another species, prevailing ducks (A. platyrhynchos, A. crecca, A. querquedula, A. nyroca и F. atra) are indicators for greater water areas with opened surface. Such wetlands do not exist now round the localities, where this bird complex is found: Topchii, Madara, Shirokovo, Nisovo, Isperich and Karapelit. Too well presented are the inhibitors of wet meadows: C. crex, considerably numerous in some localities (5 - 8.7 %) and A. terestris, second numerous species in the majority of localities (7.2 - 27.6 %).
3. Woods. The wood birds are presented on a smaller scale – in the third place as number and species diversity. The share of wood mammals is insignificant too. Among the wood birds are four representatives of fam. Phasianidae, extinct in NE Bulgaria or in the country in general:
- Colchic Pheasant (the subspecies Phasianus c. colchicus). An autochthon inhabitant of the woody river valleys in Northern Bulgaria, found in three medieval settlings there: v. Garvan, Silistra district (6-11 c.)[2], v. Nikyup (2-6 c.)[8] and the city of Veliki Preslav (9-10 c.)[9].
- Hazel Grouse (B. bonasia). Wider spread all over the country to the end of XIX c., found inside or near to the studied region: the town of Zavet, Razgrad district [10] and the town of Byala, Ruse district [11].
- Black Grouse (T. tetrix). Extinct from the Bulgarian and Balkan fauna. During the past was probably nesting in Ruse district, in the land of Dobroudja, in some places of Rila mountain and elsewhere [12].

The Stock dove (C. oenas) is a rare wood species, found in five of our localities. It was very numerous and wide spread to recent past, but extinct in many places now, because of the clearing of old woods there [13].

Two extinct species of mammalian predators are found: brown bear (U. arctos) and probably mountain cat (F. lynx). Their extinction from the region is dated to the end of XIX c. - beginning of XX c. [14].

All these treated bird and mammalian species are indicative for existence of large old woods in NE Bulgaria, which have been subsequently destroyed.

4. Rock habitats. The most poor ecological complex, practically presented by few bird species. A numerous species among them is C. monedula (8.4 - 17.1 %). Three bird species of this complex are not now represented in the recent fauna of the studied region: F. cherrug, A. graeca и Pyrrh. graculus. The first species was nesting in the river valley of Rusenski Lom to the 70-th years of XX c., but subsequently extinct because of direct victimization [5]. The other two species are not known in the recent fauna of the region.

4. CONCLUSION

The paleoecological reconstruction of some regions of NE Bulgaria indicates a significant decrease of the steppe, wood and wetland habitats during the Late Holocene. A number of species decrease or extinct to the end of XIX c. and the beginning of XX c., but too violently during the second half of the XX c. The decrease of bustards, Galiform birds and two species of mammalian predators is caused by direct victimization and destruction of their habitats. The destruction of habitats is only reason for the catastrophic decrease of hams. The results of our study may be used in the management plans of protected areas in NE Bulgaria, purposely for reconstruction of the destroyed habitats and the populations of vulnerable species.

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