

## Exploitation of birds in the early Mesolithic of Central Russia

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Abstract. About 20 Mesolithic peat-bog sites have been discovered during last ten years by the Upper Volga expedition in Central Russia, 14 of them were excavated in which many bird bones were found. The present paper deals with avian remains from early Mesolithic layers. The most ancient one is the lower layer of Stanovoye 4 dated to the Younger Dryas by pollen analysis and to between 10300 and 10000 BP (uncalibrated) by C14. The lower layer of Ivanovskoye 7 is dated to the second quarter of the Preboreal by pollen analysis and to 9650 BP by C14 and layer III of Stanovoye 4 is dated to the late Preboreal by pollen analysis and to 9200 BP by C14. Thirty four bird species have been identified from these layers. Remains of waterfowl are the most abundant in all layers while *Capercaillie* also played an important role. Other avian species are represented by small numbers or by single bones. The palaeoecological data and the role of birds in economy of the early Mesolithic population is discussed.

Key words: birds, early Mesolithic, peat bog sites.

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### I. INTRODUCTION

Dozens of Mesolithic sites have been excavated and hundreds discovered during last few decades in Central Russia. Most of these sites are situated on mineral soils where organic materials are not preserved. About 20 Mesolithic peat bog sites with good preservation of various organic remains were discovered during last ten years by the Upper Volga expedition in Central Russia, 14 of which were excavated. Numerous mammalian, fish and avian bones were found associated with artefacts made from stone, bone, antler, wood and other plant materials in reliable stratigraphic contexts. Wide use of C14 and pollen analyses made accurate dating possible as well as the reconstruction of vegetation and climate during the habitation of these sites. Most Mesolithic peat bog sites with good preservation of organic remains in the East European forest zone belong to the middle and late Mesolithic and are dated to the Boreal and Atlantic periods. Early Mesolithic peat bog sites dated to the Preboreal period are still very scarce. Two of them – Pulli and Zveiniki 2 (lower layer) are in Estonia and Latvia, three others – Ivanovskoye 7 (lower layer), Stanovoye 4 (cut 3, layers IV, IIIa and III) and Sahtysh 14 (lower layer) are situated in the Volga-Oka interfluvium (Fig. 1).

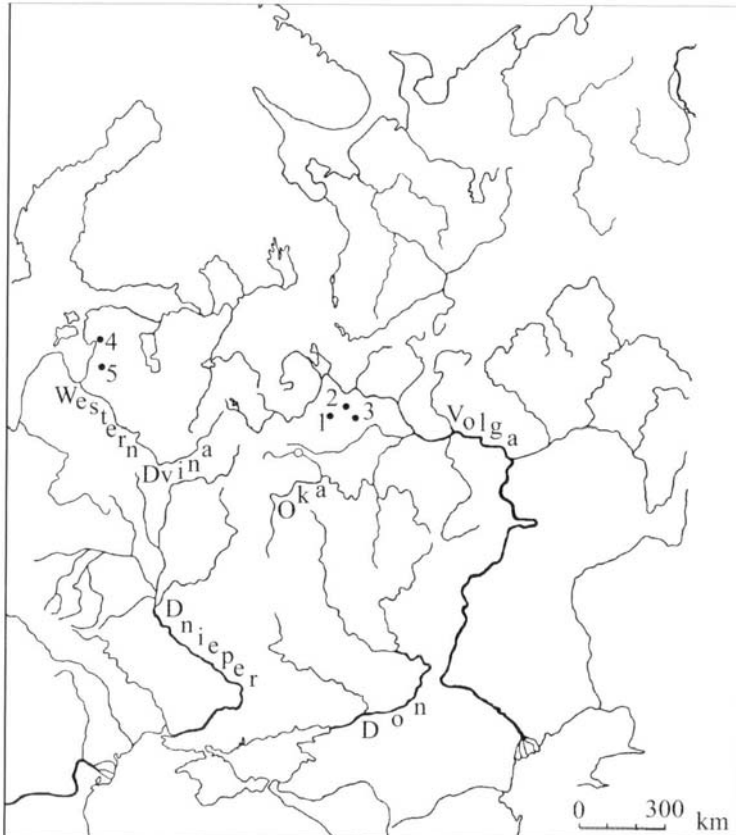


Fig. 1. Early Mesolithic sites with good preservation of organic remains in Eastern Europe. 1 – Ivanovskoye 7; 2 – Stanovoye 4; 3 – Sakhtysh 14; 4 – Pulli; 5 – Zveiniyeki 2.

The Ivanovskoye peat bog (Fig. 1, 1) is situated about 150 km to the north-east of Moscow, between Moscow and Yaroslavl in the middle reaches of the River Nerl, which ran through a large lake during the Stone Age, connecting it with the River Klyazma, the left bank tributary of the River Oka. Ten sites were discovered there including Ivanovskoye 7, which is the most interesting. 106 square meters were excavated at Ivanovskoye 7 by D. A. KRAINOV between 1974 and 1975, and 332 square meters by M. G. ZHILIN between 1992 and 1997. The site has three Mesolithic and two Neolithic layers. Mesolithic settlements occupied a low promontory during lake regressions, which was submerged during transgressions. The lower, early Mesolithic (IV) layer belongs to the early Butovo culture and is dated by C14 (all dates in the present paper are uncalibrated before 1950) to  $9650 \pm 110$  BP (GIN-9520) and  $9640 \pm 60$  BP (GIN-9516). It is dated by pollen to the first half of the Preboreal period before its optimum. During the middle Preboreal transgression it was submerged; the bottom of the gyttja layer, overlapping the lower cultural layer is dated by C14 to  $9690 \pm 120$  BP (GIN-9367),  $9500 \pm 110$  BP (GIN-9517) and  $9500 \pm 100$  BP (GIN-9385).

The Podozerskoye peat bog (Fig. 1, 2) is situated between Ivanovo and Yaroslavl, 50 km to the south-east of the latter. The River Lahost, a tributary on the right bank of the River Kotorosl which in turn is a tributary on the right bank of the Upper Volga, begins at this bog. Five sites were discovered in the Podozerskoye peat bog including Stanovoye 4, which is the most interesting. Stanovoye 4 is situated on a promontory between a shallow gulf of a large ancient lake and a small pond from

which the River Lahost began. 427 square meters were excavated there between 1992 and 2001. The site has 4 Mesolithic layers. The lowermost Mesolithic layer (IV) is the earliest site of the Butovo culture. Pollen data indicate that the formation of the gyttja with cultural layer IV finds took place during the terminal part of the Younger Dryas. C14 dates from the bottom of gyttja layer, incorporating cultural remains in the central part of trench 3 include  $10060 \pm 120$  BP (GIN-10127 I),  $10040 \pm 90$  BP (GIN-10027 II),  $9970 \pm 50$  BP (GIN-10026 I) and  $9940 \pm 50$  BP (GIN-10026 II) and give an estimated the date for the transgression which flooded the site. The same layer in trench 2 is also referred to the terminal Younger Dryas by pollen evidence and yielded a C-14 date of  $10300 \pm 70$  (GIN- -10112 – II). The next occupation of the site by Ienevo culture took place during a very short period in the first half of the Preboreal period, just before its optimum (about 9600 BP). A wooden stake, sharpened with a stone axe or adze, from this layer in trench 3 is C14 dated to  $9620 \pm 60$  BP (GIN-8377). A sample of peat with gyttja, overlying this layer in the central part of trench 3 is C14 dated to  $9560 \pm 40$  BP (GIN-10125 II) and  $9480 \pm 120$  BP (GIN-10125 I), marking the submergence of the site during the middle Preboreal transgression. Cultural layer III, belonging to middle stage of the Butovo culture, is referred in trench 3 to the second half of the Preboreal period by pollen analysis (about 9300-9000 BP). C14 dates of peat samples from it include  $9280 \pm 240$  BP (GIN-10122 I) and  $9090 \pm 400$  BP (GIN-10124). A sharpened wooden stake dates to  $9220 \pm 60$  BP (GIN-8375) and determines the habitation period of the site more accurately.

The Sakhtysh peat bog (Fig. 1, 3) is situated in 40 km to the south-west of Ivanovo, connected by the River Koika through Nerl to Klyazma, a tributary on the left bank of the Oka. The site occupies an area in a peat bog at the foot of a gentle promontory of a terrace of a late glacial lake. During the Mesolithic occupation was on a low lake shore near the river outlet. The site was discovered in 1999 and 108 square meters were excavated between 1999 and 2001. Five Mesolithic layers belonging to the Butovo culture were investigated at the site. The lower (IV) layer is dated to Preboreal by pollen and C14 dates are in progress.

## II. AVIAN REMAINS

The most representative collection of bird remains comes from the lower layer of Ivanovskoye 7 (KARHU 2002), it includes 921 identified bone remains, 788 of which belong to 34 bird species (Table I). The bone samples are well preserved although highly fragmented. Therefore besides the identified bones there were 940 undeterminable fragments, mainly shafts diaphyses. 270 (28.7%) of the latter belong to young individuals, while among the 788 identified bones there are only 46 (5.8%) young bird bones. Nine species (26%) are represented by only 1 or 2 bones. The condition of bone surfaces indicates their mechanical fragmentation took place before burial. Table II gives the anatomical composition of identified samples.

Various ducks and other waterfowl are the most abundant and include 20 species. Their remains make up 67.3% of the total identified samples. Ducks of the genus *Anas* are most numerous making up 36.5% of the identified bones. Mallard *Anas platyrhynchos* prevails, while Gadwall *Anas strepera*, Teal *Anas crecca*, Garganey *Anas querquedula*, Pintail *Anas acuta*, Pochard *Aythya ferina*, Tufted Duck *Aythya fuligula* and Smew *Mergellus albellus* are represented by fewer bones. Among the geese are the Greylag Goose *Anser anser*, the Bean Goose *Anser fabalis* and the White-fronted Goose *Anser albifrons*. Finally, Scaup *Aythya marila* and Goldeneye *Bucephala clangula* are also present, while Red-breasted Merganser *Mergus serrator* was identified from a single bone.

Black-throated Diver *Gavia arctica* is quite common and the remains of a Slavonian Grebe *Podiceps auritus* are most numerous, even 1.5 times more abundant than remains of the Mallard. Great Crested Grebe *Podiceps cristatus* and Red-necked Grebe *Podiceps grisegena* are much more scarce. 91% of Grey Heron *Ardea cinerea* bones came from young birds and several bones of Bittern were also found.

Table I

Avian species from Ivanovskoye 7, layer IV. NISP – number of identified specimens; MNI – minimum number of individuals

Taxon	NISP	NISP%	MNI	MNI%
<i>Gavia arctica</i> (LINNAEUS, 1758)	38	4.8	7	4.6
<i>Gavia</i> sp.	2			
<i>Podiceps auritus</i> (LINNAEUS, 1758)	139	17.6	13	8.6
<i>Podiceps cristatus</i> (LINNAEUS, 1758)	14	1.8	3	2
<i>Podiceps griseigena</i> (BODDAERT, 1783)	2	0.3	1	0.7
<i>Ardea cinerea</i> LINNAEUS, 1758	34	4.3	9	5.9
<i>Botaurus stellaris</i> (LINNAEUS, 1758)	4	0.5	2	1.3
<i>Pandion haliaetus</i> (LINNAEUS, 1758)	3	0.4	1	0.7
<i>Haliaeetus albicilla</i> (LINNAEUS, 1758)	2	0.3	1	0.7
<i>Anser fabalis</i> (LATHAM, 1787)	16	2	3	2
<i>Anser albifrons</i> (SCOPOLI, 1769)	3	0.4	1	0.7
<i>Anser anser</i> (LINNAEUS, 1758)	23	2.9	2	1.3
<i>Anser</i> sp.	1			
<i>Anas penelope</i> LINNAEUS, 1758	31	3.9	7	4.6
<i>Anas strepera</i> LINNAEUS, 1758	45	5.7	8	5.3
<i>Anas crecca</i> LINNAEUS, 1758	20	2.5	6	3.9
<i>Anas platyrhynchos</i> LINNAEUS, 1758	93	11.8	15	11.2
<i>Anas acuta</i> LINNAEUS, 1758	36	4.6	7	4.6
<i>Anas querquedula</i> LINNAEUS, 1758	31	3.9	6	3.9
<i>Anas clypeata</i> LINNAEUS, 1758	32	4	10	6.6
<i>Aythya ferina</i> (LINNAEUS, 1758)	53	6.7	8	5.3
<i>Aythya fuligula</i> (LINNAEUS, 1758)	63	8	13	8.6
<i>Aythya marila</i> (LINNAEUS, 1761)	24	3	4	2.6
<i>Clangula hyemalis</i> (LINNAEUS, 1758)	1	0.1	1	0.7
<i>Bucephala clangula</i> (LINNAEUS, 1758)	9	1.1	3	2
<i>Mergus serrator</i> LINNAEUS, 1758	1	0.1	1	0.7
<i>Mergellus albellus</i> (LINNAEUS, 1758)	8	1	2	1.3
Anatinae	130			
<i>Tetrao tetrix</i> LINNAEUS, 1758	6	0.8	2	1.3
<i>Tetrao urogallus</i> (LINNAEUS, 1758)	31	3.9	6	3.9
<i>Grus grus</i> (LINNAEUS, 1758)	3	0.4	1	0.7
<i>Porzana porzana</i> (LINNAEUS, 1766)	1	0.1	1	0.7
<i>Fulica atra</i> LINNAEUS, 1758	16	2	4	2.6
<i>Limosa limosa</i> (LINNAEUS, 1758)	2	0.3	1	0.7
<i>Larus ridibundus</i> LINNAEUS, 1766	2	0.3	1	0.7
<i>Corvus corone</i> LINNAEUS, 1758	1	0.3	1	0.7
<i>Corvus frugilegus</i> LINNAEUS, 1758	1	0.3	1	0.7
Number of specimens identified to species level	788	100,1	152	101.8
Total number of identified specimens	921			
Number of species			34	

Table II

Anatomical composition of the identified bone remains of birds from Ivanovskoje 7, layer IV. NISP – number of identified specimens; numbers of specimens identified only to generic or subfamily levels are shown in brackets

Skeletal element	NISP
Coracoideum	189 (15)
Humerus	156 (14)
Tibiotarsus	107 (16)
Scapula	103 (8)
Ulna	57 (10)
Carpometacarpus	56 (5)
Radius	40
Tarsometatarsus	41 (7)
Femur	17 (1)
Sternum	6 (27)
Clavicula	4 (30)
Mandibula	5
Phalanga proximalis digiti majoris	3
Quadratum	2
Phalanges pedis	2
Total	788 (133)

Birds of prey are represented by White-tailed Eagle *Haliaeetus albicilla* and Osprey *Pandion haliaetus*. Capercaillie *Tetrao urogallus* is represented mainly by bones of adult male birds – 24 of 31 (77.4%). The number of Black Grouse *Tetrao tetrix* bones is substantially smaller. Three bones of Crane *Grus grus* were identified. Coot *Fulica atra* composes a small series of bones, while Black-headed Gull *Larus ridibundus*, Hooded Crow *Corvus corone cornix* and Rook *Corvus frugilegus* are represented by 1-2 bones each.

In general the avian assemblage of the lower layer of Ivanovskoje 7 shows a dominance of hydrophilic species with ducks, geese, divers, grebes, heron, gull, Bittern, Crane, Coot, White-tailed Eagle and Osprey making up 30 of the 34 identified species. Among the others the Hooded Crow and the Rook prefer meadows and shrubby meadow areas, while the Capercaillie lives in forests. Black Grouse inhabits both shrubby water-meadows and sparse forests with water-meadows or raised bogs. Only the Capercaillie and the Black Grouse are sedentary species, the Hooded Crow is sedentary or a partial migrant, while all other identified species are migrants.

Excavations at Stanovoye 4 are not yet finished, and the study of the bird remains is still in progress. About 500 identifiable bones come mainly from layer III. 24 species have been preliminarily identified. As in Ivanovskoye 7, the main part of the avian assemblage from the Mesolithic layers of Stanovoye 4 is composed of hydrophilic species such as ducks, geese, divers and grebes. Of all the remains of birds of prey White-tailed Eagle are the most numerous. On the other hand, remains of such important forest birds as Capercaillie are very scarce. In general, the species composition of the avian assemblages of the Mesolithic layers of Ivanovskoye 7 and Stanovoye 4 correspond to the modern avifauna of Central Russia. Excavations at Sahtysh 14 are in an initial phase and faunal remains have not yet been studied. However, bird remains are abundant in the lower layer of the site and bones of waterfowl are clearly very common.

### III. BIRD HUNTING

All identified samples belong to medium and large species, typical for collections coming from hunting activities.

The ecological groups represented by bird remains are more of a reflection of the selective nature of hunting than of the bird populations and biotopes surrounding the site. The Mesolithic populations of both Ivanovskoye 7 and Stanovoye 4 preferred to hunt birds surrounding their habitation sites including those found on water or near water. These localities attracted prehistoric hunters due to the abundance of bird species valued as prey.

The good preservation of bone does not allow one to suppose that the scarcity of young bird remains can be explained by taphonomic conditions. The dominance of the bones of adult birds indicates seasonal mass bird hunting before the beginning of the autumn migration i.e. before the moment when young individuals prevail over adult ones and would hence compose most of the birds taken. Late spring (after the end of the spring flood) and summer hunting of waterfowl seems most probable. The only clearly observed exception to this is the heron, represented at Ivanovskoye 7 mainly by the bones of juveniles (91%). This implies that grown up nestlings and young herons with poor flight capabilities could be a specialized form of prey. Hunting of forest birds such as the Capercaillie was practiced but its role was much less important than that of waterfowl.

Hunting weapons are well represented among finds from the early Mesolithic layers of Ivanovskoye 7, Stanovoye 4 and Sakhtysh 14. The bow and arrow was the main weapon used primarily for hunting mammals but also waterfowl and large fish, as indicated by numerous stray finds of bone arrowheads in ancient lake deposits at considerable distances from habitation sites. Arrowheads from sites mentioned above include various types made from mammalian bones (ZHILIN 1998, 2001). Some of them, especially the slotted ones with one or two rows of flint microblades along their sides, fixed in slots with a special pitch, were used for hunting large mammals. Small finely barbed points were used for shooting pike in shallow water. A specimen from Ivanovskoye 7 was found stuck deeply in the lake bottom at an angle about 70°. Arrowheads of this and some other types (Fig. 2) could be used for shooting large birds as well.

However, the majority of waterfowl, especially ducks and grebes, were caught with snares and nets. Snares installed above the water usually enable ducks to be caught, and the dominance of the latter in the bird remains from the studied sites confirms this. Grebes, divers and saw-bills are rarely caught with snares, instead they were caught by stationary nets, either as a by-product of fishing, or by nets installed especially for this purpose. Nets can only explain the remains of Slavonian Grebe being 1.5 times more numerous than remains of Mallard in the lower layer of Ivanovskoye 7. Catching the former in nets is most probable because this species usually feeds at shallow water, overgrown by water plants which are areas also preferred by the so called "grass" Pike. The latter composes most of the fish caught by the early Mesolithic inhabitants of the sites mentioned. The use of nets for fishing is documented by a series of net sinkers from the early Mesolithic layers of Ivanovskoye 3 and Stanovoye 4. Flocks of moulting drakes could be driven into nets installed above the water, probably supplemented by a fence like a fish trap. Remains of such fences were excavated at Stanovoye 4, and a fish trap made from split willow branches was found in the IIIa layer of Stanovoye 4 accompanied by a large sinker. Capercaillie were probably taken with bow or caught by snares and other traps.

### IV. CONCLUSIONS

Pollen data (SPIRIDONOVA and ALESHINSKAYA 1999) indicate that since the transition from the Pleistocene to the Holocene early Mesolithic populations in Central Russia preferred large lake depressions and river valleys occupied by taiga forests. Surrounding landscapes were mosaic like in the first half of the Preboreal with some areas at watersheds still covered by tundra and steppe ele-

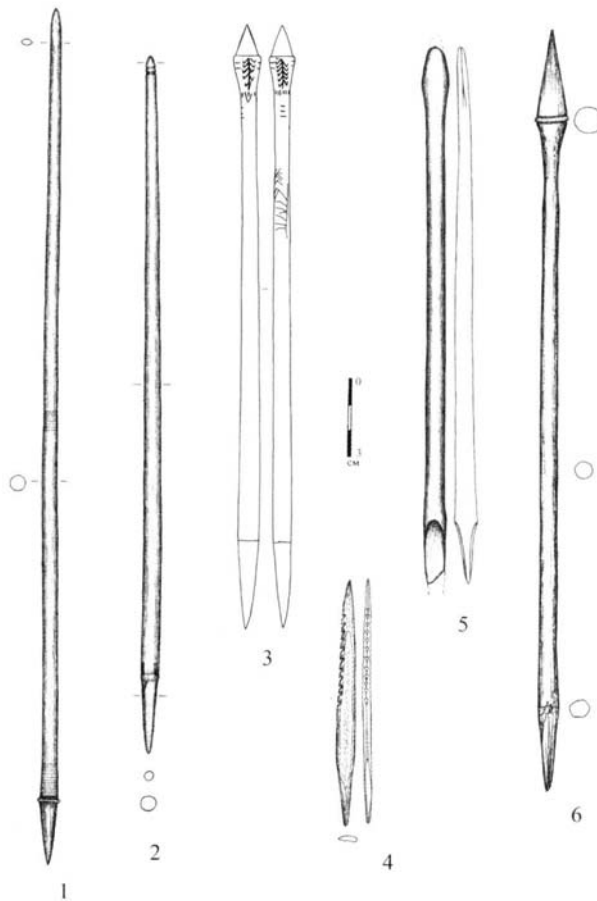


Fig. 2. Bone arrowheads which were probably used for hunting birds: 1-4 – Ivanovskoye 7, layer IV; 5-6 – Stanovoye 4, cut 3, layer III.

ments. Dry meadows were also widespread while bogs occupied depressions. Hunting of large mammals was the main basis of the early Mesolithic economy; elk and beaver being the most important hunted animals (KIRILLOVA 2002). Fishing was the second most important branch of the economy. Pike dominates among the fish bones from the early Mesolithic sites in Central Russia with good bone preservation (SYCHEVSKAYA 2002). Hunting of mammals and fishing were supplemented by the gathering of edible forest and water plants, as indicated by hazelnut shells, some with imprints of human teeth, and water lilies seeds, found in coprolites, from the lower cultural layer of Ivanovskoye 7.

Studies of bird exploitation in Central Russia during the early Mesolithic showed that this branch of hunting played an important role in the supply of food and was well developed, supplementing the hunting of mammals and fishing. Waterfowl were the most important birds hunted. Methods and hunting gear were varied and somewhat sophisticated. Analyses of settlement patterns indicate that summer camps were founded in localities, suitable for forest hunting as well as fishing and fowling. Since the very beginning of the Mesolithic the population of Central Russia was practicing a complex economy of forest hunting, fishing and gathering, in which birds played an important role.

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