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Andrzej WUCZYŃSKI¹ and Grzegorz HADA-JASIKOWSKI²

¹ Institute of Nature Conservation,
Polish Academy of Sciences
Lower-Silesian Field Station
Podwale 75
50-449 Wrocław, POLAND

² Os. Błękitne 6B/9
58-200 Dzierżoniów, POLAND

Ornithological observations in the Subarctic zone of the Polar Ural

ABSTRACT: The avifaunistic observations carried out in the tundra valley of the Sob River's upper course (west slopes of the Polar Ural) in July 1995 revealed the occurrence of 39 breeding and 8 non-breeding bird species. The most numerous were *Anthus pratensis*, *Calcarius lapponicus*, *Phylloscopus trochilus* and *Anthus cervinus*. The great variety of wetland and aquatic habitats had a decisive influence on species-richness and abundance of birds (jointly 30 breeding and 4 non-breeding species). Areas of low humidity were inhabited by 14 whereas anthropogenic habitats by 4 species. Most of them (except for eurytopic *A. pratensis* and *C. lapponicus*) occupied one-two habitats irrespective of their numbers. The density of *Buteo lagopus* was estimated at 1.67–2.00 p/10 km². Three species of distribution ranges laying to the south from the study area, namely *Bucephala clangula*, *Dendrocopos major*, *Circus macrourus*, were noted in the valley. The results obtained have been compared with available data on the avifauna of the region concerned.

Key words: Subarctic, Polar Ural – Russia, tundra, breeding avifauna, habitat selectivity.

Introduction

The Polar Ural constitutes the northernmost section of the Urals range and, stretching over *ca* 300 km, marks the north-eastern limits of the Western Palearctic. With respect to ornithofauna this area is one of the least known West-Palearctic regions, which results both from its inaccessibility – and, consequently, a relatively small number of studies (reviewed by Il'icev and Flint 1985) – and poor awareness of the research outcome beyond the Russian border. As a result, the knowledge of the Polar Ural avifauna is based on global facts con-

cerning the distribution and biology of species rather than on concrete field studies. Recently the penetration of this area has increased (Seppänen 1994, Green and Overfield 1995) and thus a faster influx of data can be expected in the nearest future.

The present paper discusses the results of the avifaunistic observations conducted in breeding season in a valley of the Polar Ural western margin. The study was aimed at determining the ornithofauna composition, establishing the quantitative relationships and providing a general review of the main habitats avifauna within the area concerned.

Description of the study area

The observations were carried out in a vast postglacial mountain valley (ca 67°N and 65°E) extending latitudinally ca 70 km SE of Vorkuta (Fig. 1) on the watershed between the Barents and Kara Seas, which marks the commonly agreed upon border between the continents of Europe and Asia. The region represents the transitional zone between: a) taiga and tundra – the vegetation predominating here is typical of tundra but arborescent forms, found only several dozen kilometers south-westwards, are completely lacking; b) mountains and lowlands – the valley opens with a wide gate to the west, gradually turning into an area of slightly undulating shrub tundra which is a part of the huge Bolshezemelskaya Tundra region.

The area under study lies within the Subarctic zone with the mean temperature of July and January equalling 8–10°C and -22°C respectively, the mean July precipitation of 50–75 mm, yearly precipitation totalling 400–600 mm, considerable weather fluctuations and very strong winds (Atlas..., 1985). The mean daily temperature during the spell of research (July) was 11.7°C (data obtained from the meteorological station in Polarny Ural settlement). The period was characterized by average or high numbers of small rodents (authors own obs., inf. from local people).

The observations covered a peculiar mosaic of habitats, the most important being:

1. Dry biotopes (ca 60% of the study area).

a) Mountain tundra, ranked among the formation of moss dwarf shrub tundras, covering vast areas of strongly undulated ground moraine. Lots of stones, loosely distributed or composing close extensive heaps, and low vegetation (chiefly the Arctic Willow *Salix arctica* Pall., Snake Weed *Polygonum bistorta* L., Spotted Saxifrage *Saxifraga bronchialis* L., Alpine Saxifrage *S. nivalis* L., a Moss Campion *Silene acaulis* (L.) Jacq., Mountain Avens *Dryas octopetala* L., Marsh Tea *Ledum palustre* L., large moss carpets, small lichens) are the main characteristics.

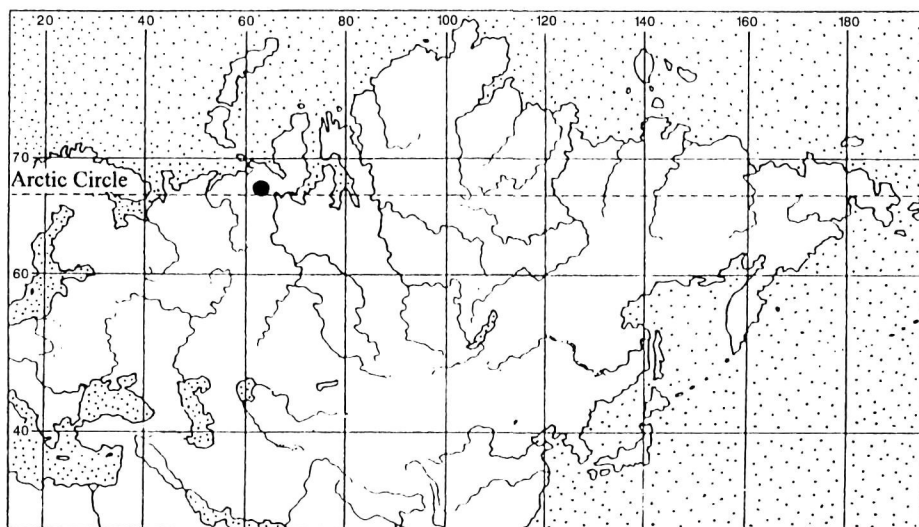
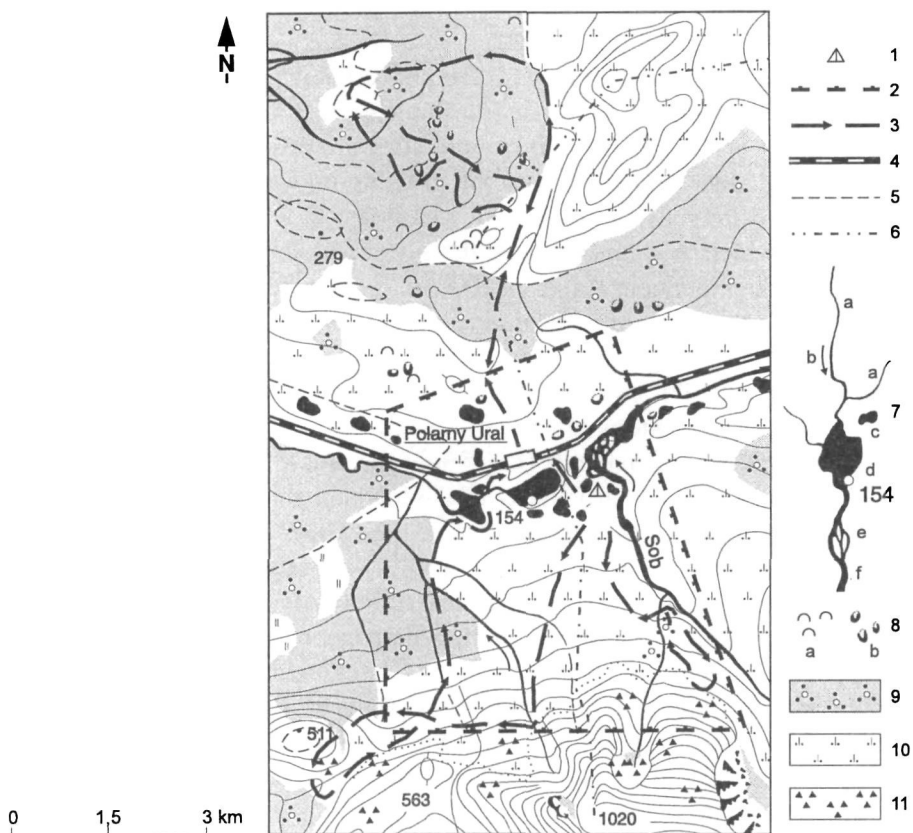


Fig. 1. Rough sketch of the study area: 1 – base; 2 – border of the study plot assessed with respect to the numbers of *B. lagopus*; 3 – transects; 4 – railway line; 5 – roads; 6 – watershed – border between Europe and Asia; 7 – water reservoirs: a, f – rivers, b – current direction, c – lakes, d – altitude, e – floodings; 8: a – hillocks, b – ground lowering; 9 – shrub tundra; 10 – mossy-stony moraine; 11 – rock rubble and screes.

b) Shrubby areas — analogous with the above habitat, additionally covered by the Dwarf Birch *Betula nana* L. (reaching *ca* 0.5 m in height). Besides, continuous areas of the eastern part of the valley are covered in willow (up to *ca* 1 m high) and alder (to *ca* 2.5 m) scrub growing on wet but not waterlogged soil. Low scrub covers also specific high peat-bogs, called “palsa” (Brown and Kupsch 1995), which area raised above the surface of shrub tundra.

c) Slopes of the mountains (up to *ca* 1000 m a.s.l.) surrounding the Sob valley and the screes at the foot are built of dense rubble with a very poor vegetation (*cf.* Kosiński 1994). Postglacial cirques with a snow cover lying all year round make the surface diversified. The alpine belt neighbours immediately with an almost lowland valley-bottom covered by mountain tundra.

2. Aquatic and wetland habitats (*ca* 35% of the area).

a) Shrub tundra, typical particularly of the lowland areas adjoining the Polar Ural, is found mainly in the northern part of the valley. This is a formation of willow-birch tundras, composed — first of all — of a few willow species that differ in compactness and reach 2–2.5 m in height (*Salix phylicifolia* L., *S. lapponum* L., *S. lanata* L.), along with rich herbage in the undergrowth (*e.g.* a Cotton-grass *Eriophorum vaginatum* L., the Common Grass of Parnassus *Parnassia palustris* L., Globe Flower *Trollius europaeus* L., Rose-root *Rhodiola rosea* L., a few sedge species *Carex* sp.). Most of the surface of this habitat is permanently waterlogged, which results in marshy water bodies. Palsa areas several acres large are numerous here.

b) Open waters — postglacial lakes and the Sob River with its flood waters. The valley-bottom is covered by a great many of lakes several dozen hectares large. The water surface is usually surrounded by a narrow (up to a few meters) belt of scrub analogous to shrub tundra, moist sedge-grass communities or, directly, by dry moraines. The study area comprised a *ca* 6 km-long gorge section of the Sob upper course along with wide-spread shallow floodings and pass-through lakes on the valley bottom.

c) Anthropogenic habitats (*ca* 5% of the area) — the settlement of Polarny Ural situated in the vicinity of a railway line, the zone along the latter, and the accompanying technical infrastructure.

Methods of research

The study was conducted in a *ca* 40 km²-large area between 10th and 27th July, 1995. It was aimed at the determination of bird communities composition and the relative frequency of particular species. An assumption was made that the actual quantitative relationships between the species were correlated with the number of breeding sites discovered during penetration of the area. The observations were performed along many-kilometers-long routes drawn across all

habitat types in the valley. Considering the study period, most males were no longer singing, so the localities were established mainly on the basis of visual detection of the birds. Sometimes the observers were accompanied by a dog, which provided substantial help. On repeated penetrations, the authors tried not to take into account the already recorded breeding sites. It is probable that some of those occupied by the Red-necked Phalarope *Phalaropus lobatus* (L.), snipes *Gallinago* sp., the Willow Grouse *Lagopus lagopus* (L.), Little Bunting *Emberiza pusilla* Pall. and Arctic Warbler *Phylloscopus borealis* (Blasius) were overlooked because of secretive behaviour of the birds, whereas some of the Redpoll *Carduelis flammea* (L.) and Arctic Redpoll *Carduelis hornemanni* (Holboell) breeding sites were likely to be omitted due to the fact that a part of their populations (presence of flocks) had already completed their broods. In the case of the 4 most numerous species the methodology employed allowed only to estimate the minimum numbers of breeding localities. The habitats of dry moraines, river-bed and valley-bottom lakes were most exhaustively examined – jointly *ca* 75% of the investigation time. The observations in shrub tundra constituted *ca* 15% whereas those on the alpine belt mountain slopes and in anthropogenic habitats 5% each.

In a chosen study plot (*ca* 30 km²), including mainly dry moraines but also a zone of lakes (Fig. 1), the density of the Rough-legged Buzzard *Buteo lagopus* (Pont.) was estimated. The number of pairs was assured on the basis of the found nests as well as records of encounters and behaviour of individual birds.

In order to analyze the habitat selectivity in birds, three types of habitat were distinguished: 1) aquatic and wetland, 2) dry, 3) anthropogenic. The first type was divided into: a) open waters, b) shrub tundra and shores of water reservoirs overgrown with shrubs, c) open shores covered by dry moraines, whereas the second comprised: a) dry scrub with *Betula nana* and *palsa*, b) rocky moraines. This division has been used in Tab. 1, which includes only breeding species, except for the Gyr Falcon *Falco rusticolus* L., Raven *Corvus corax* L. and Snow Bunting *Plectrophenax nivalis* (L.).

Results

Species composition and numbers

Altogether, the occurrence of 47 bird species was established in the Sob valley (Fig. 2). Of the 39 species acknowledged as breeding, the Meadow Pipit *Anthus pratensis* (L.) and Lapland Bunting *Calcarius lapponicus* L. were the most common and inhabited the highest number of habitats. The Red-throated Pipit *Anthus cervinus* (Pall.) and Willow Warbler *Phylloscopus trochilus* (L.) were equally numerous but, occurring mainly in shrubby areas, they seemed to

be rarer than the species mentioned before. On the whole, the kernel of the Sob valley avifauna consisted of 15–20 most abundant species (Fig. 2), which probably form also the basic bird community of the Polar Ural western margin in the broader sense. The species composition was complete with a large number of scarce birds: more scattered (water species, birds of prey) or more difficult to detect (Arctic Warbler, snipes).

Further 8, sporadically recorded, species were recognized as non-breeding in the valley, although most of them have been known to nest in this region. These were: the Black-throated Diver *Gavia arctica* (L.) – 3 inds. on 16th and 2 inds. on 25th July; Whooper Swan *Cygnus cygnus* (L.) – 1 flying ind. on 12th July; Tufted Duck *Aythya fuligula* (L.) – 1 male on 12th July; Goldeneye *Bucephala clangula* (L.) – 1 male on 25th July; Pallid Harrier *Circus macrourus* (S.G. Gmel.) – 1 adult male on 15th and 18th July; Snowy Owl *Nyctea scandiaca* (L.) – 1 adult ind. on 15th and 22nd July; Great Spotted Woodpecker *Dendrocopos major* (L.) – 1 male on 26th July; and Hooded Crow *Corvus corone* L. – 4 inds. on 15th July.

Ornithological characteristics of the Sob River valley habitats

Aquatic habitats

The species-richness and high numbers of birds in the Sob River valley resulted from the presence of a large group of species associated with aquatic and wetland habitats as well as birds of drier open habitats but situated in the close vicinity of lakes. On open waters the occurrence of 7 breeding species was ascertained (Tab. 1). Of them, the Red-necked Phalarope was the only one recorded on smaller reservoirs, often merely several dozen square meters in surface. The remaining species were as follows: the Common Gull *Larus canus* (L.), Lesser Black-backed Gull *L. fuscus* L., Arctic Tern *Sterna paradisaea* Pont., Pintail *Anas acuta* L., Long-tailed Duck *Clangula hyemalis* (L.), Red-breasted Merganser *Mergus serrator* L.; the non-breeding including the Black-throated Diver, Whooper Swan, Tufted Duck and Goldeneye. Many lakes, particularly smaller ones and devoid of shore vegetation, were completely ignored by birds. In general, the avifauna of aquatic habitats occurred only on valley-bottom in the broad sense, and exceeding 200 m a.s.l. (Wuczyński 1997). This zone was also a permanent hunting ground for birds of prey.

On drier shores of the lakes 11 species were recorded. This group comprised the three larids above mentioned, the Citrine Wagtail *Motacilla citreola* Pall., Wood Sandpiper *Tringa glareola* L. and Temminck's Stint *Calidris temminckii* (Leisl.), which nested here thanks to the immediate neighbourhood of water. The occurrence of the Pied Wagtail *M. alba* L., Golden Plover *Pluvialis apricaria* (L.), Meadow Pipit and Lapland Bunting was due to the structure of the moraines, the proximity of water having a minor influence. The only species linked chiefly with dry marginal moraines was the Long-tailed Skua *Stercorarius lon-*

Table 1

Habitat selectivity of the Sob valley birds (the species have been arranged according to the number of the inhabited habitats and their similarity).

Species	Aquatic and wetland habitats			Dry habitats		Anthro- pogenic habitats	Number of habitats
	open waters	shrub tundra	open shores	shrubby areas	stony moraines		
<i>Anthus pratensis</i>			+	+	+	+	4
<i>Calcarius lapponicus</i>		+	+	+	+		
<i>Turdus pilaris</i>				+		+	
<i>Tringa glareola</i>		+	+				
<i>Motacilla citreola</i>		+	+				2
<i>Calidris temminckii</i>		+	+				
<i>Anthus cervinus</i>		+			+		
<i>Circus cyaneus</i>		+		+			
<i>Phylloscopus trochilus</i>		+		+			
<i>Carduelis flammea</i>		+		+			
<i>Carduelis hornemanni</i>		+		+			
<i>Larus canus</i>	+		+				
<i>Larus fuscus</i>	+		+				
<i>Sterna paradisea</i>	+		+				
<i>Charadrius hiaticula</i>					+	+	
<i>Motacilla alba</i>			+			+	
<i>Lagopus lagopus</i>				+	+		
<i>Pluvialis apricaria</i>			+		+		
<i>Buteo lagopus</i>					+		
<i>Falco columbarius</i>					+		
<i>Oenanthe oenanthe</i>					+		
<i>Stercorarius longicaudus</i>			+				
<i>Gallinago gallinago</i>		+					
<i>Gallinago media</i>		+					
<i>Gallinago stenura</i>		+					
<i>Asio flammeus</i>		+					
<i>Luscinia svecica</i>		+					
<i>Turdus iliacus</i>		+					
<i>Emberiza pusilla</i>		+					
<i>Acrocephalus schoenobaenus</i>		+					
<i>Phylloscopus borealis</i>		+					
<i>Emberiza schoeniclus</i>		+					
<i>Anas acuta</i>	+						
<i>Clangula hyemalis</i>	+						
<i>Mergus serrator</i>	+						
<i>Phalaropus lobatus</i>	+						
Total	7	19	11	8	9	4	
	30			14			

gicaudus Vieill. A few species displayed more decided preference for running waters: the Red-breasted Merganser, Common Gull, Arctic Tern – their pairs remained mostly on the Sob River or in its vicinity, whereas the Citrine Wagtail and Temminck's Stint occurred by smaller watercourses.

Shrubby areas

These habitats were characteristic by the greatest species variety (jointly 22 species). Superficial observations revealed that also the relative density of the bird community, as compared with that found in the other habitats, was highest here. As an equivalent of forest, scrub was inhabited by a group of woodland species [Little Bunting, thrushes *Turdus* sp., Bluethroat *Luscinia svecica* (L.), Willow Warbler] that decided about the large total numbers.

On the whole, the most abundant birds of shrubby areas were the Willow Warbler and Red-throated Pipit (the latter mainly in shrub tundra). Apart from them, the Bluethroat, Redwing *T. iliacus* L., Little Bunting, Citrine Wagtail, less frequently the Lapland Bunting, Wood Sandpiper, Temminck's Stint, Redpoll, Reed Bunting *Emberiza schoeniclus* L., Arctic Warbler and Sedge Warbler *Acrocephalus schoenobaenus* (L.) occupied even small groups of shrub adjacent to lakes or to the river. The same species nested in shrub tundra, the Lapland and Reed Buntings being the only ones to avoid dense extensive scrub. The Common Snipe *Gallinago gallinago* (L.), Great Snipe *G. media* (Lath.), Pintail Snipe *G. stenura* (Bonap.), Short-eared Owl *Asio flammeus* (Pont.) and Hen Harrier *Circus cyaneus* (L.) were also recorded. The avifauna composition of drier scrub was markedly poorer (8 species). Besides the Willow Warbler, Meadow Pipit and Lapland Bunting that were abundant in the whole valley, the Fieldfare *T. pilaris* L., Redpoll, Arctic Redpoll, Hen Harrier and Willow Grouse (the last one particularly numerous on palsa) were found nesting here.

Dry habitats (mossy-stony mountain tundra)

As the structure of this type of habitat was similar to that of the above discussed dry shores of lakes, the ornithofauna composition of the two was analogous (here 9–11 species). The numbers of particular species were low, only the eurytopic Meadow Pipit and Lapland Bunting being comparatively abundant. Moreover, the number of encounters of all bird species decreased with the altitude gradient. Apart from the two before mentioned, the Rough-legged Buzzard, Willow Grouse, Ringed Plover *Charadrius hiaticula* L., Golden Plover, Red-throated Pipit, Wheatear *Oenanthe oenanthe* (L.) and, sporadically, the Raven, Snow Bunting and Merlin *Falco columbarius* (L.) were recorded. On dry moraines in the southern part of the valley the Snowy Owl was also observed. Of all the bird species occurring in the Sob valley, the Golden Plover and Wheatear showed the most strongly pronounced preference for dry habitats (remaining almost exclusively in this environment).

Anthropogenic habitats

Within the settlement and railway line 4 bird species were recorded (Ringed Plover, Meadow Pipit, Pied Wagtail and Fieldfare). Their occurrence was due to presence of more suitable, higher situated, places for nest location and – probably – to a little better protection from unfavourable weather conditions and against predators. Ringed Plovers were found staying in the zone along the railway line, Fieldfares built their nests on wooden scaffolding of snow shields whilst Rough-legged Buzzards – in some years – on transmitting poles (verbal inf. from local people; similar cases were recorded from the region of Vorkuta by Galushin, Konyayev and Lobanov 1985).

A number of observations concerning anthropogenic areas beyond the Sob valley were made during the journey. One of the most frequently encountered species was the Hooded Crow, also outside settlements, *i.e.* along the river and the Vorkuta-Seijda and Seijda-Polarny Ural railway lines. This species, however, was absent from mountainous territory. The House Sparrow *Passer domesticus* (L.) and Magpie *Pica pica* (L.) were observed in all, including the smallest, localities and recorded as close to the valley as the village of Yeletsky, merely *ca* 30 km distant from the settlement of Polarny Ural (contrary to Morozov's (1987) statement about the Magpie occurrence being restricted to the Vorkuta River valley). Single pairs of the Wood Sandpiper were observed among the buildings of Vorkuta, in the neighbourhood of wetland willow shrubs adjacent to streets.

The Sob River

The avifauna associated with the Sob has already partly been discussed above (water birds and those occurring in shore shrubs). The only one to be added is the Dipper *Cinclus cinclus* (L.), recorded in a somewhat more easterly section of the Sob (J.Kozhevnikov, personal commun.). On precipitous escarpments of the Sob gorge sections the following birds of prey nested: the Rough-legged Buzzard, Merlin, probably Gyrfalcon and Raven, but also the Wheatear and Pied Wagtail. The Snow Bunting was recorded in shadowed places covered by snow (firn). In the case of the Gyrfalcon, the area under observation probably comprised a part of the nesting territory of one pair. On July 23rd a single individual of this species was observed, and another, analogous, record concerning a big falcon (Gyrfalcon or Peregrine Falcon *F. peregrinus* Tunst.) was made on July 23rd.

Of the nine Rough-legged Buzzard breeding sites discovered, four were fairly regularly distributed along the studied six-kilometer-long section of the river. The density of the species in the marked section of the valley (Fig. 1) equalled 1.67–2.0 p/10 km² (5–6 pairs were found nesting there). The dates and outcome of the controls of the four found nests and their locations were as follows:

- a ledge on a several-meter-high escarpment of the Sob – one fledged nestling (18th–27th July),

- a ledge on a several-meter-high escarpment of the ravine of a brook – one fledged grown nestling, one dead nestling also in plumage and one unhatched egg (14th July),
- a nest on the ground on a gentle slope of a moraine – two entirely downed nestlings a few days old, clearly departing with respect to age from the nestlings found in the remaining nests (14th and 17th July),
- the top of a single boulder 2.5 m high – lost brood, an egg shell found below the nest, the adult birds still occupying the territory (15th July).

Alpine belt

The stony mountain slopes were inhabited by mere two-four species of birds. The Snow Bunting was the most abundant one, particularly in snow-covered cirques. It was also sporadically observed down the valley. The Wheatear, nesting close to the foot of mountainsides and exclusively in places with patches of vegetation, was very rare. The Raven and Rough-legged Buzzard were recorded in higher fragments of slopes; their possible nesting was not confirmed.

The presented ornithological characteristics of the Sob River valley habitats indicates qualitative dominance of an ecologically heterogenous group of species linked with aquatic environment (30 species plus 4 non-breeding ones) over birds typical of low-humidity areas (14 species) and a specific group of four synanthropic species (Tab. 1). Except for the eurytopic Meadow Pipit and Lapland Bunting, the remaining species occurred in one-two habitats irrespective of their numbers. In principle, the most strongly expressed preferences concerned five species that were comparatively abundant but restricted either to the environment of shrubby wetland (Bluethroat, Redwing, Little Bunting) or to stony moraines (Wheatear, Golden Plover). Table 1 groups species of similar habitat preferences:

- the Wood Sandpiper, Citrine Wagtail and Temminck's Stint inhabited the surroundings of water reservoirs irrespective of their character, though the second species mentioned was more frequently observed on shrubby shores of reservoirs;
- the Willow Warbler, Redpoll and Arctic Redpoll as well as the Hen Harrier were closely connected with shrubs irrespective of their neighbourhood and moisture content in the soil;
- three larid species formed an ecologically compact group; open waters (foraging ground) neighbouring with a dry open area, where the birds nested, were the requirement for their occurrence;
- a comparatively large group (8 species) was composed of birds of drier habitats, most often observed in the environment of mossy-stony moraines; the Pied Wagtail, Golden Plover and Long-tailed Skua breeding sites adjacent to lakes were almost always situated on dry surfaces, particularly the crests of the moraines surrounding lakes.

Discussion

Taking into consideration the available comparative data, the Sob River valley bird community can be regarded as representative of the concerned part of the Polar Ural and the border region with the Bolshezemelskaya Tundra (Gladkov 1962, Uspenski 1969, Morozov 1987, Estafiev *et al.* 1995). The list of the commoner species is probably complete. Some of those that might be expected in this region were not actually found in the valley. These were: the Dotterel *Charadrius morinellus* L., Shore Lark *Eremophila alpestris* (L.), Brambling *Fringilla montifringilla* L., Jack Snipe *Limnocryptes minimus* (Bünn.), Pallas's Reed Bunting *Emberiza palliasi* (Cab.), Siberian Accentor *Prunella montanella* (Pall.), or the considerably scattered Peregrine Falcon, Lesser White-fronted Goose *Anser erythropus* (L.), Spotted Sandpiper *Tringa erythropus* (Pall.), Whimbrel *Numenius phaeopus* (L.) and Ptarmigan *Lagopus mutus* (Montin).

The avifauna composition of the studied area is also similar to that of the Sob valley section that runs along the eastern, partly wooded, declivities of the Urals (Ryzhanovsky 1985, Green and Overfield 1995).

The obtained results seem to be representative of the whole Subarctic zone of Eurasia (*cf.* Uspenski 1969, Estafiev *et al.* 1995, Ryabitsev and Alekseeva 1995). For instance, quantitative examination of 32 plots at the transition between taiga and tundra in Lapland showed the highest densities and numbers of species in palsa and wet shrubby areas with *Betula nana* and *Salix* sp. (Järvinen and Väisänen 1976). In these habitats the Meadow Pipit, Lapland Bunting, Willow Warbler, Yellow Wagtail *Motacilla flava thunbergi* Billb. (replacing the Citrine Wagtail absent from this region) were most abundant, whereas in the dry tundra with numerous patches of stones the highest numbers concerned the Snow Bunting, Wheatear, Golden Plover, and also the Temminck's Stint, Dotterel, Shore Lark and Meadow Pipit.

The influence of mountain environment on the avifauna manifested itself in the presence of two Arctic-alpine species (Snow Bunting, Wheatear) (Kishchinsky 1974), and probably the Snowy Owl, and in the lack of the House Sparrow and Magpie (severer climatic conditions). Besides, the species-richness in the valley was rapidly declining with the altitude getting higher (Wuczyński 1997). The records of two hole-nesters, *i.e.* the Goldeneye and Great Spotted Woodpecker, assumed as not reaching beyond the boreal zone (Rutschke 1990, Cramp 1985), were unexpected. The Goldeneye had sporadically occurred in this area but no broods of the species had been found (Estafiev *et al.* 1995). Although the Great Spotted Woodpecker distribution range in the European part of Russia stretches up to 67°N (Stepanian 1990), the species is observed in regions with at least minimum forest cover. Single records from the tundra environs of Vorkuta can be found in Lobanov (1982). Many ornithologists, however, stress the influence of river valleys in shaping the Subarctic avifauna. In tundra this is

mainly the arborescent vegetation in the valleys of rivers, big ones in particular, that provides nesting sites for corvids and birds of prey (Morozov 1987, Estafiev *et al.* 1995). Moreover, it constitutes a corridor of northward penetration by many conservative forest species (Mikhailov and Filchagov 1984, Kishchinsky 1988, Wuczyński 1996a). The records from the Sob valley of the Hooded Crow, Great Spotted Woodpecker or Goldeneye should probably be associated with tree-covered areas situated along nearby river valleys.

As far as anthropogenic habitats are concerned, the number of four breeding species recorded in the Sob valley can be regarded as average, taking into account the very small size of Polarny Ural settlement and the general poverty of the avifauna of this type of habitat in the Arctic and Subarctic. For the whole Russian polar zone Uspenski (1969) mentions *ca* 10 breeding species, including a few penetrating into the settlements only at the northern limits of their distribution ranges (Citrine Wagtail, Bluethroat, Redwing, Redpoll). Another species characteristic of the human settlements situated north of the shrub tundra zone is the Snow Bunting (Danilov, Ryzhanovsky and Ryabitsev 1984).

The number of birds of prey in the Sob valley should to be emphasized: five species that belong to the orders *Accipitriformes* and *Falconiformes*, and two owl species *Strigiformes*. It is scarcely possible to talk about the composition of this group being complete. However, the number seems to be high, and considering the type of habitat (tundra) – the Peregrine Falcon is probably the only missing species here. The occurrence of the species mentioned was, obviously, a consequence of the relatively large numbers of rodents in the study period. In the light of the available data, the rank of the records of birds of prey in the Sob valley is varied.

The observations of the Snowy Owl are particularly interesting. The species breeds only in years of average or high numbers of rodents (*cf.* Ryabitsev and Alekseeva 1995). The southern border of its distribution range lies in the zone of Arctic tundra, far away from the Sob River valley, and, additionally, the species has probably lately been retreating to the north (Uspenski 1969). Although the Gyrfalcon regularly nests in the region concerned, its numbers are very low and the estimates imprecise. Estafiev *et al.* (1995) assess the species numbers in a huge area between the mountains ranges of Tyman and Urals (a distance of 500 km) at “not fewer than 8–10 pairs”, whereas as many as 3–4 Gyrfalcon pairs nesting each year (in 1981–85) were recorded from 100 km² of tundras south-west of Vorkuta.

The comparative data on the numbers of the Rough-legged Buzzard in the discussed region are equally sparse. In 1958 near the settlement of Sob, situated in the Sob River valley 20 km east of the study plot, Danilov (after Estafiev *et al.* 1995) ascertained the occurrence of three pairs of the species nesting in the distance of 0.5–1 km one from another. In a 60 km²-large area of tundra in the environs of Vorkuta Galushin, Konyayev and Lobanov (1985) found densities

ranging from 0.83 p/10 km² in a year of rodents numbers depression (1981) to 1.47 p/10 km² in a year of their peak numbers (1979). The effect of breeding in these years was respectively 2.8 and 3.2 juvenile per successful nest. More available data concern the Jamal Peninsula, in the southern part of which mean densities calculated for different plots and years amounted from 0.3 to 3.1 (max. 9.4) p/10 km² (Ryabitsev and Alekseeva 1995). When these data are compared with the results obtained for the Sob valley, 1995 seems to be a season of average Rough-legged Buzzard numbers and a very low breeding success of the species.

Finally, the observations of the Pallid Harrier in the Sob valley are striking. They were made in a place situated *ca* 1200 km from the northern limits of species compact distribution range, so the record belongs to the northernmost ones and is the first for the European part of north-eastern Russia (Dementiev and Gladkov 1951, Cramp 1980, Estafiev *et al.* 1995). Considering the recent reports of the Pallid Harrier broods distant from the species permanent breeding sites and cases of hybridization with the Montagu's and Hen Harriers (Fairclough 1995, Forsman 1995), and also the time of observations, the possibility that the Pallid Harrier breeds in the Polar Ural cannot be entirely excluded (Wuczyński 1996b).

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Streszczenie

Polarny Ural wyznacza skrajną, północno-wschodnią granicę zachodniej Palearktyki i pod względem ornitologicznym jest jednym z najslabiej rozpoznanych jej rejonów. W okresie 10–27.07.1995 przeprowadzono obserwacje awifaunistyczne na ok. 40 km² doliny połodowcowej położonej przy zachodniej krawędzi Polarnego Uralu w strefie tundry (ok. 67°N i 65°E) (Rys. 1). Łącznie zanotowano tam 47 gatunków ptaków, w tym osiem nielegowych (Rys. 2). Określono względną częstość poszczególnych gatunków porównując liczby wykrytych stanowisk lęgowych. Najliczniej występowały *A. pratensis*, *C. lapponicus*, *Ph. trochilus* i *A. cervinus*.

Dokonano ornitologicznego przeglądu ważniejszych środowisk doliny Sobu (Tab. 1).