SPECIES DIVERSITY, POPULATION AND ECOLOGY OF RAPTORS ON THE NORTHEASTERN SHORE OF THE RYBINSK RESERVOIR

MIROSLAV V. BABUSHKIN

Department of Zoology and Ecology, Moscow State Pedagogical University, Kibalchich St. 6, b.5, Moscow, RU–129278 Russia; babushkin02@mail.ru

Studies were done (1999–2005) in a 125 km^2 research area. The study area is situated on the NE shore of the Rybinsk reservoir, near the city of Cherepovets (Vologda region). During the 7 years of observations, 14 species of *Falconiformes* were recorded in the area, and breeding was confirmed for 12 of them. The combined mean annual abundance of breeding species was 32 pairs (27 to 37 pairs in different years) with an average population density of 29 pairs/100 km^2. The bulk of the population is constituted by the Black Kite (study period mean 23.7%), Hobby (21%), Black Kite (16%), Sparrowhawk (15.6%), Buzzard (11.6%) and White-tailed Sea Eagle (9.8%). The rest of the species contributed 1–10% to the total raptor population in the research area (Marsh Harrier (7.6%), Osprey (3.6%), Honey Buzzard (3.1%), Hen Harrier (2.2%)). The Kestrel (0.9%), Goshawk (0.4%) and Peregrine Falcon (0.4%) contributed less than 1% each. Occasional registrations of the Golden Eagle and transient Rough-legged Buzzard were also reported. Data on the abundance dynamics and ecology of *Falconiformes* in the investigated part of the Rybinsk reservoir shore area are presented.

Key words: Falconiformes, species diversity, population, ecology, Rybinsk Reservoir.

ВИДОВОЕ РАЗНООБРАЗИЕ, НАСЕЛЕНИЕ И ЭКОЛОГИЯ ХИЩНЫХ ПТИЦ СЕВЕРО-ВОСТОЧНОГО ПОБЕРЕЖЬЯ РЫБИНСКОГО ВОДОХРАНИЛИЩА. Бабушкин М.В. Московский государственный педагогический университет, Россия.

Исследования проводились (1999–2005 гг.) на стационаре площадью 125 км^2 исследуемая территория находится на северо-восточном побережье Рыбинского водохранилища, в окрестностях г. Череповца (Вологодская область). За 7 лет наблюдений на стационаре зарегистрировали пребывание 14 видов соколообразных, для 12 из них доказано гнездование. Среднегодовая суммарная численность гнездящихся видов составила 32 пары (от 27 до 37 пар в разные годы) со средней плотностью населения 29 пар/100 км^2. Основу населения составляют черный коршун (в среднем за все годы 23,7%), чеглок (21%), черный коршун (16%), ястреб-перепелятник (15,6%), канюк (11,6%) и орлан-белохвост (9,8%). Доля остальных видов в общем населении хищников стационара составляет 1–10% (болотный лунь (7,6%), скопа (3,6%), осоед (3,1%), полевой лунь (2,2%)), менее чем 1% приходится на пустельгу (0,9%), ястреба-тетеревятника (0,4%) и сапсана (0,4%). Отмечены единичные встречи беркута, а также на пролете зимняка. В работе приводятся данные по динамике численности и экологии соколообразных на исследуемом участке побережья Рыбинского водохранилища.

Ключевые слова: соколообразные птицы, видовое разнообразие, население, экология, Рыбинское водохранилище.

INTRODUCTION

Events of the past two decades, namely the sharp economic decline in the industry and agriculture of Russia and its north-western regions in particular, could not but tell on the population of raptors (Pchelintsev 2001). On the other hand, latest studies have shown that it is in the north of the forest zone that viable populations of rare raptors have survived. Data on the abundance and distribution of common raptor species are insufficient, however. Our main task therefore was to analyse the species composition, distribution and abundance dynamics of *Falconiformes* in north-western parts of the Upper Volga area.

MATERIAL AND METHODS

The paper is based on the results of studies carried out in 1999–2005 in the permanent sample plot situated in the Cherepovets district of the Vologda region. In the first year (1999) observations were made in an area of 70 km^2, between 2000 and 2003 the area increased to 125 km^2, in 2004 the sample area was 115 km^2, and in 2005 it decreased to 110 km^2.

The study area is situated on the left hand (SE) shore of the Sheksna branch of the Rybinsk reservoir, in the immediate vicinity of Cherepovets (fig. 1). The station is NE of the Darwin reserve, ca. 15 km away from its boundary (Babushkin 2003).

A considerable part of the polygon is under pine forests (45%). Raised bogs overgrown with dwarf pine trees cover 35% of the study area. Spruce forests account for 8%, birch forests for 6%. Aspen and black alder stands cover 5% and 1% of the polygon, respectively.

There are 10 settlements in the study area: 6 villages (ca. 500 inhabitants in total), 3 summer cottage villages (2000 people) and a tourist centre operating all year round. The human population density, including recreational load, is 20 people per 1 km^2. Over the 7 years of studies in the station, the road network has doubled, 2 new summer cottage communities with a total of 1300 inhabitants in the summer period appeared, the area of timber felling increased to 8–10 ha per year.

The main methods in the field were detection of nest areas and search for nests following standard procedures suggested by Galushin (1971). Also widely used was the transect counts method with registration of all raptors encountered along a transect, as well as observations from elevated watch sites and trees (Osmolovskaya & Formozov 1952, Galushin 1971, Drobyalis 1991). When searching for rare species and those rarely occurring in the region, checks of potential nesting areas were complemented with interviews with local people, who were very helpful in finding nests of the Osprey and White-tailed Sea Eagle.

The size of breeding territories, nest areas and hunting ranges were determined by constant registration and mapping of all raptor contacts with the type of activity (hunting, prey carrying, etc.) recorded.

During the study period (1999–2005), we registered 14 species of *Falconiformes*, of which 12 regularly nested in the area (Babushkin 2006). The initial material for assessing the distribution and abundance of raptors was 1872 registrations from various types of counts, maps of 51 nest areas of 12 species, as well as descriptions of 48 occupied nests of 8 species of *Falconiformes*.

Material on the diet of the Osprey, White-tailed Sea Eagle and Black Kite was gathered from the Darwin reserve in 2003–2005. Sampling of initial material was done mainly by gathering food remains (bones, feathers, scales, cast pellets) directly from the nest, from its immediate vicinity and from perches. The remains were then analysed to determine the species and weight of the prey, as well as the size class of the fish taken by the birds (Babushkin 2005).

The age of the prey was calculated from annual rings on scales and flat bones (cleithra). Then, knowing the fish age, its weight and length were determined. This was done using summary tables by Svetovidova (1975) reflecting linear growth rates of fishes from the Rybinsk reservoir.

Mean weight of prey birds in the Osprey, White-tailed Sea Eagle and Black Kite diet was calculated using data on the mean weight of birds (Ilyichev & Mikheev 1986). Mean weight of mammals detected in the diet of the species in question was determined after Sokolov (1989).

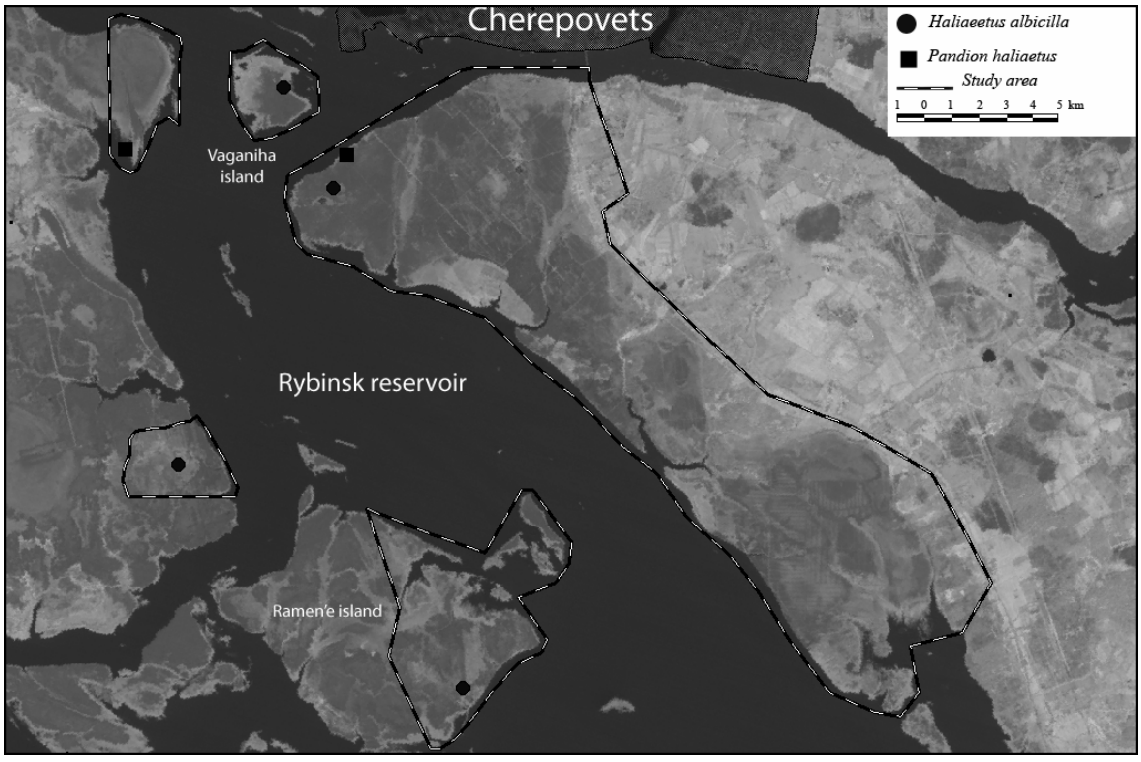

Figure 1. Distribution of Osprey and White-tailed Sea Eagle nests in the Cherepovets study area.

An important addition to the above-described methods of studying raptors was direct observations in hunting grounds and at nests. Total duration of observations over the breeding and hunting behaviour of the species was 130 hours, of which 36 h was hunt watching and 94 h observations at nests. Raptor hunting behaviour was watched from tall trees on the reservoir shore and from a tower 60 m high.

Within the present study (2003–2005) we gathered 47 samples of food remains from 13 White-tailed Sea Eagle nests, 11 Osprey nests and 5 Black Kite nests. From 2683 prey fragments (scales, bones, feathers) and cast pellets we identified 254 food items of 25 species. A total of 220 fish specimens (11 species), 29 bird specimens (11 sp.) and 5 mammal specimens (3 sp.) were identified.

RESULTS AND DISCUSSION

Osprey *Pandion haliaetus*. The species best studied among rare raptors in the Vologda region today are the Osprey and the White-tailed Sea Eagle. The reasons are good visibility of their nests from the air and during winter surveys, as well as the fact that the species are widely known and quite easily recognizable even by a little experienced birder.

Osprey and White-tailed Sea Eagle populations in the Vologda region are now mostly concentrated in four areas:

1) *Darwin reserve* and adjacent parts of the Mologa–Sheksna drainage divide. This is the core area for the populations of both species. There now live 50–55 breeding pairs of the Osprey and 25–30 pairs of the White-tailed Sea Eagle.

2) *Siz'ma widening of the Sheksna impoundment reservoir*. In 1988, there nested 3 Osprey pairs and 3 White-tailed Sea Eagle pairs (Belko 1990). In 1993, we detected 5 Osprey nests and 3 White-tailed Sea Eagle nests. Surveys and interviews with local people in 1999 yielded data about breeding of 11–12 Osprey pairs and 11 White-tailed Sea Eagle pairs at the widening. Now there nest ca. 15 White-tailed Sea Eagle pairs and 20–22 Osprey pairs.

3) *Lake Beloye shore*. In 1988, the shore was surveyed around the lake with 1 White-tailed Sea Eagle nest and 5 Osprey nests detected (Belko 1990). In 1993, the western shore of the lake was inspected with 6 breeding pairs of the White-tailed Sea Eagle and 1 Osprey pair registered.

4) *Lake Vozhe*. In 1988, 3 White-tailed Sea Eagle nests and 1 Osprey nest were found. The 2000 expedition detected 9 breeding Osprey and 11 White-tailed Sea Eagle pairs around the lake (Babushkin et al. 2000).

The Osprey population in the western part of the region is diffuse. There are quite a few lakes with 1–2 Osprey pairs nesting around (lakes Shol'skoye, Pereshnoye, Katromskoye, Siverskoye, Borodaevskoye, etc.) (Kuznetsov 2000).

The White-tailed Sea Eagle in the Vologda region tends to settle around large bodies of water, wherefore their surveys show higher densities of the species (Kuznetsov & Babushkin 2003).

Annually, 1–3 pairs of the Osprey breed in the Cherepovets area (fig. 1). One occupied and one abandoned nest were found during the study period. The nests were 5 and 3.5 km away from industrial districts of the city. Also, an old Osprey nest was found 2.5 km away from the city in August 1999.

In spring, Ospreys arrive in the Upper Volga area in the second ten days of April, with the onset of flood on rivers (Kerdanov 1991). The earliest arrival in the Cherepovets station was on 29 March 2000, the latest on 21 April 2003, the 7-year average being 12 April. Pairs were registered at nests in the second half of April – 7 April 1999 and 16 April 2000. At this time, snow starts melting actively in open sites, but its depth in the forest is still 20–30 cm. The Rybinsk reservoir is then covered in solid ice, although first openings already appear in the ice cover.

Most Ospreys breeding around the reservoir start incubating eggs early in May. We registered a full clutch on 7 May 2000, the size of eggs in the nest closest to Cherepovets (2000) was 63.4 x 47.2; 63.7 x 47.7; 65.1 x 48.0. The young hatch in the first half of June (10 June 2000). In the Darwin reserve, the nestling stage lasts 40 to 56 days (our data) depending on feeding. Fledglings leave nests in the station in the second ten days of July (18 July 2000). In the reserve, we recorded the first fledglings out of the nest on 12 July 2003, 13 July 2004; the latest date known for the Osprey young to have left the nest in the reserve is 3 August 2005. After leaving the nest, fledglings stay around throughout August. The male keeps providing the brood with food, delivering it to the nest 4–6 times a day. Two peaks have been recorded in the feeding activity of male Ospreys (from 56 hours of observations at nests in the Darwin reserve) – from 11 a.m. to 2 p.m. and from 6 p.m. to 9 p.m. Starting about mid-August, juveniles appear over the reservoir water area, where adults continue feeding them at first. Departure takes place in late October – early November: the latest Osprey contacts in the area are dated to 27 October 2000 and 8 December 2004; in some years, Ospreys may stay in the Darwin reserve until mid-November.

The Osprey is strictly ichthyophagous, preying on fish only. Some authors, however, report that the Osprey may on some occasions eat gulls (Dmokhovskiy 1933) (on River Pechora), waterfowl and muskrats (Gusev & Chueva 1951) (River Il'), as well as other animals (Dementiev & Gladkov 1951).

The diet of Ospreys breeding around the Rybinsk reservoir comprises 8 fish species (tab. 1). One should note that our material contained nothing but fish. As regards the number of specimens, the main species in the Osprey diet are: bream (27%), blue bream (25%), roach (24%) and ide (13%). The lowest proportion is contributed by pike and ruff (1%), a medium position belongs to perch (6%) and white bream (3%). The dominants by weight were also bream (51% (21 kg)), blue bream (17.4% (7.18 kg)),

Table 1. Diet composition of the Osprey (data from pellets and prey remains).

Species		N	% N	Biomass consumed (g)	% biomass
Pike	*Esox lucius*	1	1	2300	5.6
Roach	*Rutilus rutilus*	19	24	4228	10.2
Ide	*Leuciscus idus*	10	13	4840	11.7
White bream	*Blicca bjoerkna*	2	3	800	1.9
Bream	*Abramis brama*	21	27	21,000	50.8
Blue bream	*Abramis ballerus*	20	25	7180	17.4
Perch	*Perca perca*	5	6	855	2.1
Ruff	*Acerina cernua*	1	1	110	0.3
Total		79	100%	41,313 kg	100%

(17.4% (7.18 km)), ide (11.7% (4.84 kg)) and roach (10.2% (4.23 kg)) (tab. 1). Linearly, prey-fish ranged from 12 cm (ide) to 61 cm (pike), an average being 29 cm. The weight of fish taken by the Osprey ranged from 78 g (ide) to 2800 g (pike), with an average of 630 g (N=79).

The size of fish in the diet of Ospreys from the Okskiy reserve size reported by Galushin (1958) was quite similar. Thus, Osprey diet there included specimens 10 to 40 cm long and weighing 35 to 1000 g (N=26). An average size of fish taken by the Osprey was 20 cm, average weight 340 g. For Germany, an average weight of Osprey prey fish reported by Moll (1956–1957) was 300–400 g, and by Mertens (1956) – 200–300 g. An adult bird living at the Rybinsk reservoir eats 500–700 g of fish a day. A male brings 1200–1500 g of fish to a nest with two nestlings four weeks old. Thus, an Osprey family consumes ca. 120 kg of fish over a breeding period – from late April – early May to mid-July. Researchers studying Osprey diet in southern Finland estimated that each bird family took about 120 kg of fish over ca. 130 days of stay in Finland (Häkkinen 1977).

Honey Buzzard *Pernis apivorus*. The Honey Buzzard has never been considered abundant in the Vologda region, and in the middle of the 20th century the species was rare in the region (Voropanova & Kochin 1954). It now occurs throughout, contacts being most frequent at the edge of tree stands and forest openings, along forest roads and forested shores (Butjev & Shitikov 2000, our observations).

In the Darwin reserve (112630 ha) the species would only breed in hot and dry years with abundant wasps, whose nests the species can find in forests and mires. The Honey Buzzard abundance in favourable years does not exceed 2–3 pairs (Kuznetsov & Nemtsev 2005, our observations).

The Honey Buzzard arrives later than other raptors. The 1999–2005 average date of arrival was 25 April, the earliest first contact was on 14 April 2000, the latest on 17 May 2002. Breeding begins in late May – early June. Summer young were seen on 21 July 2000, 17 July 2002, 19 July 2005. The spring migration is inconspicuous: only 5% of all contacts were recorded in April and May. After the young hatch, Honey Buzzard contacts become more frequent and 25% of all contacts occur in July. The species becomes most noticeable in autumn: 55% of all registrations are made in September. During the autumn migration, the birds often form groups of 7–8, not so often up to 10 individuals. The earliest date of the last contact was 13 August, the latest 25 September. In October, no contacts occurred.

The Honey Buzzard is insectivorous, its diet in the research area comprising chiefly bumblebees and digger wasps. On two occasions a Chaffinch (*Fringilla coelebs*) hunt was observed.

Over the study period (1999–2005), 1 breeding pair of the species was registered from the study area, but no nests were found (Babushkin 2003). The Honey Buzzard breeding density in the area is 1 pair per 100 km^2. Galushin (1978) reported of 2 to 5 pairs staying constantly in the area situated in the central part of the region (100 km^2) in the mid-1970s, the species breeding density thus reaching 4 pairs/100 km^2.

Black Kite *Milvus migrans*. The Black Kite is unevenly distributed across the Vologda region. In the middle of the past century the species was common in the Sukhona river floodplain, not so common on Lake Kubenskoye and River Vologda (Voropanova & Kochin 1954). In the first years after the Rybinsk reservoir impoundment (1946–1950) the species nested abundantly at the edges of large mixed conifer-dominated forest areas bordering vast flooded spaces (Spangenberg & Oliger 1949). Later on, however, the Kite grew adapted to the new conditions and started concentrating around fishermen's villages and fish cutting stations. Black Kites hunted also tundra voles (*Microtus oeconomus*) in temporarily flooded areas overgrowing with low herbaceous vegetation. Their numbers then increased somewhat and stayed at a relatively high level during the 1960s–1970s, when the Black Kite was the second most abundant (after the Osprey) raptor species in the Darwin reserve. The spe-

cies population in the reserve at the time was up to 16 breeding pairs (Kuznetsov & Nemtsev 2005). As the area of meadows shrank and the temporarily flooded area became overgrown with taller vegetation (canary grass, club-rush, willow carrs and especially reeds), availability of rodents to the species decreased. As the result, the Black Kite abundance around Rybinsk reservoir dropped significantly in the 1980s. Our estimate is that the Darwin reserve now has 6–7 breeding pairs of the species.

The Black Kite arrives mostly in the second half of April, when much of the reservoir water area has freed of ice. The earliest date of arrival is 28 March 2000, the latest 24 April 2002. Birds leave the reservoir in the first ten days of September, although in 2003 a registration was made in October (9 October 2003). The earliest time a clutch was found was 29 April 2000, the latest – 14/V 2003. An average clutch size (n=5) is 2 eggs, with a variation of 2 to 4. The first egg (n=4) hatched between 28 May and 12 June, the second (n=4) between 1 June and 16 June, the third (n=2) between 4 June and 16 June. An average brood is 1.8 nestlings (n=5), the parameter ranging from 1 to 4. The earliest registration of poorly flying fledglings about the nest was on 10 July 2000. The young stay close to the nest until 10 August.

Every year of observations 5 to 9 Black Kite pairs nested in the area (tab. 2). Over the seven years of activities in the area we detected 11 nest areas of the species. Five pairs demonstrated impressive fidelity to the same nest areas for seven years in a row. Two nests were occupied for 5 and 3 years, respectively. Nests and nest areas were situated at a significant distance, over 2 km apart, but occupied nests of other raptors, first of all the Hobby, were found just 150 to 400 m away.

The Black Kite is an obligate floodplain dweller – 6 of the 11 nest areas discovered were situated in the valleys of rivers forming the bays of the Rybinsk reservoir, 2 on islands, 3 in the reservoir shore area. All nests were in the immediate vicinity of open areas (reservoir water surface, temporarily flooded zone, meadows), 20–170 m away. Roads are nearby three of known nests. Four nests were built on pine trees, two on spruce trees. The nest trees were 18–27 m tall, an average being 22 m. Nests were placed in the central part of the crown at a height of 10–19 m, on branches close to the trunk (n=5), in the trunk forking (n=1).

During the study period (2003–2005) we gathered 47 samples of food remains from 13 White-tailed Sea Eagle nests, 11 Osprey nests and 5 Black Kite nests.

We detected 8 fish species (81.25%) in the Black Kite diet. Like for the Osprey, the dominants were roach (20%), blue bream (17.5%), and bream (15%). The second position was occupied by perch (10%) and pike (8.75%). A minor contribution was made by ide (6.25%), white bream (2.5%) and crucian carp (1.25%). The situation would be somewhat different if one calculates the weight of the fish captured by the Black Kite. The first one in the diet would then be bream (28.8% (16.4 kg)), the second position, instead of blue bream, would belong to pike (26.4% (15kg)), blue bream (8.7% (5.0 kg)) and roach (6.7% (3.8 kg)). The rest of fish species contribute ca. 10% (tab. 3).

Birds account for 17.5% (8 species) of the total number of prey in the Black Kite diet. The most frequent prey-bird species is the Chaffinch (6.25%). The Black Grouse and Anatidae account for 2.5% of the food range each, Capercaillie, *Larus spp*., Black Woodpecker and Hooded Crow for 1.25% each. Analysis of the diet by the weight of prey shows that the Chaffinch occupies only 0.2% (0.1 kg) of the food range, the first position in this case being held by the Capercaillie (7% (4 kg)), the second by the Black Grouse (4.2% (2.4 kg)), the third by *Anatidae spp*. (2.5% (1.4 kg)). The rest 4 species contribute to ca. 2% of the total weight of prey (tab. 3).

Mammals are represented by one species, the muskrat, which accounts for 1.25% of the food range, or 2.2% of the total prey biomass.

The Black Kite feeds on fish from 15 cm (roach) to 83 cm (pike) long and weighing from 10 g (perch) to 4300 g (pike) (N=65). An average fish taken by the Black Kite was 31 cm long and weighed 794 g.

Table 2. Abundance and breeding density of the Black Kite and Marsh Harrier in the Cherepovets research station.

Years	Explored area, km²	Number of breeding territories		Density, pairs/100km²		%	
		M.migrans	*C.aeruginosus*	*M.migrans*	*C.aeruginosus*	*M.migrans*	*C.aeruginosus*
1999	70	5	3	7.1	4.3	18,5	11.1
2000	125	7	4	5.6	3.2	18.9	10.8
2001	125	9	3	7.2	2.4	24.3	8.1
2002	125	8	2	6.4	1.6	25.0	6.3
2003	125	8	2	6.4	1.6	27.6	6.9
2004	115	8	1	7.0	0.9	27.6	3.5
2005	110	8	2	7.2	1.8	24.2	6.1
7-year mean	113.6	7.57	2.43	6.7	2.3	23.7	7.5

Table 3. Diet composition of the Black Kite (data from pellets and prey remains).

Species		n	% n	Biomass consumed (kg)	% biomass
Total Mammals		1	1.25	1.25	2.2
Muskrat	*Ondatra zibethicus*	1	1.25	1.25	2.2
Total Birds		14	17.50	9.02	15.9
Ducks	*Anas sp.*	2	2.50	1.40	2.5
Black Grouse	*Lyrurus tetrix*	2	2.50	2.40	4.2
Capercaillie	*Tetrao urogallus*	1	1.25	4.00	7.0
Gulls	*Larus sp.*	1	1.25	0.25	0.4
Black Woodpecker	*Dryocopus martius*	1	1.25	0.17	0.3
Hooded Crow	*Corvus cornix*	1	1.25	0.50	0.9
Magpie	*Pica pica*	1	1.25	0.20	0.4
Chaffinch	*Fringilla coelebs*	5	6.25	0.10	0.2
Total Fish		65	81.25	46.62	81.9
Pike	*Esox lucius*	7	8.75	15.00	26.4
Roach	*Rutilus rutilus*	16	20.00	3.79	6.7
Ide	*Leuciscus idus*	5	6.25	2.80	4.9
White bream	*Blicca bjoerkna*	2	2.50	0.72	1.3
Bream	*Abramis brama*	12	15.00	16.40	28.8
Blue bream	*Abramis ballerus*	14	17.50	4.96	8.7
Crucian carp	*Carassius carassius*	1	1.25	1.10	1.9
Perch	*Perca perca*	8	10.00	1.86	3.3
Total		80	100	56.89	100

A substantial part of the Black Kite food range is carrion, chiefly dead fish. Quite a few times we observed the raptor take half-dead fish from the reservoir water surface. We do not distinguish "carrion" into a separate category in the Black Kite diet since one cannot accurately determine the number of dead quarry, but the species shows clear preference for carrion.

Similar data on the Black Kite diet are reported by Shepel' for the Perm region. Thus, nearly a half of the Black Kite food range in the region is carrion – dead fish and birds. Birds in this group are dumped chickens and ducklings (Shepel' 1992).

Hen Harrier *Circus cyaneus*. Uncommon species with a sporadic distribution across the region. Noting the wide distribution of the Hen Harrier in the Vologda region, Butjev & Shitikov (2000) stress that alongside with areas where it stays (and perhaps breeds) continuously for many years there are significant areas of similar habitats where the birds have never been observed. Occasions are known from the mid-20th century when the raptor was bagged in the Vologda and Tot'ma districts of the region (Voropanova & Kochin 1954).

Breeding pairs of the species were registered from the Darwin reserve in the first years of its operation (late 1940s – early 1950s). Overgrowing of open land with scrub and forest caused the species to stop breeding there. Later on, the Hen Harrier visited the reservoir as passage migrant only (Kuznetsov & Nemtsev 2005).

First birds of the species appear around Cherepovets in late April – early May. The average date of arrival for the study years is 12 April. The earliest registration was on 27 April 2000. Autumn passage takes place in September–October, occasional birds are observed also in late October.

Breeding of the species in the study area is irregular. We failed to find any nests of the species during the study period. Breeding pairs of the Hen Harrier were, however, observed in 2000, 2001 and 2005. In 2000 and 2001, breeding of two pairs was proved, and 1 pair nested in 2005. All breeding habitats of the Hen Harrier were situated in abandoned farmland along the Cherepovets–Yaroslavl highway.

Marsh Harrier *Circus aeruginosus*. Common breeder in the Vologda region. Often occurs around lakes of the Sukhona lowland, around Lake Kubenskoye and in other paludified areas (Voropanova & Kochin 1954).

The species was absent from the Darwin reserve in its first years. Occasional pairs started breeding in the reserve as late as the early 1950s. For thirty years afterwards (until the mid-1980s) territorial, most probably breeding pairs were observed in the reserve rarely and not annually. A rise in the abundance of the species clearly coincided with

massive spread of reeds in the temporarily flooded zone. The Marsh Harrier numbers peaked in the late 1980s – first half of the 1990s. It was then the third most numerous among raptors in the reserve (after the Osprey and White-tailed Sea Eagle), the population being 12–14 breeding pairs. The reed beds then kept expanding year after year, occupying more and more space and largely displacing sedge communities in the temporarily flooded zone. The continuing expansion of reed beds in the reservoir, which resulted in the dominance of reeds in most of the temporarily flooded zone, not just did not promote the abundance of the Marsh Harrier – it apparently led to its notable decline in the past few years. Marsh Harrier abundance has been declining since the mid-1990s. Thus, in 2003–2004 only one pair was detected at inland bays in the Darwin reserve, where up to 5 pairs used to breed in the late 1980s–early 1990s. At present, no more than 5 pairs breed in the reserve (Kuznetsov & Nemtsev 2005; our data).

The Marsh Harrier arrives in the breeding grounds near Cherepovets in mid-April, the 7-year average date being 13 April. The earliest arrival was registered on 28 March 2000, as well as on 1 May 2002. In autumn, the last birds depart in late September already; in 2004 a single bird was seen on 6 October.

In our study area the species is one of the most widespread. There annually breed 2–4 pairs, but no nests were found during seven years (Babushkin 2003). Judging by the number of contacts and breeding pairs in the station in 1999–2001, the Marsh Harrier abundance used to be high. Its sharp decline began in 2002 and still continues (tab. 2). The most probable reason is that extensive reed beds made it more difficult for Harriers to hunt any type of prey from the root vole (*Microtus oeconomus*) to waterfowl chicks. Reeds have spread so massively in the Rybinsk reservoir that waterfowl brood counts have become impossible – the broods hardly ever appear in open areas. The reed belt in many parts of the temporarily flooded zone reaches several kilometres in width.

Goshawk *Accipiter gentilis*. In the mid-20th century the Goshawk was a common species in the region, occurring there all year round (Voropanova & Kochin 1954). Galushin (1978) reported the Goshawk population density in the Vologda region to be 2 pairs/100 km^2. There now breed 3–5 pairs of the species (0.6 pairs/100 km^2) in the Darwin reserve (Kuznetsov & Nemtsev 2005).

In the Cherepovets station, the Goshawk is sedentary, often observed in the city of Cherepovets in winter (1999, 2000, 2002, 2004). We also observed it annually in the Vologda city parks.

Most registrations are made in autumn and winter – in this period up to 12 Goshawks were sometimes observed in the study area (e.g., January 2001). In all years of studies in the Cherepovets city area, only one pair of the species was reliably proven to breed there (2000). Thus, the species breeding density in the area is 0.8 pairs/100 km^2. The abundance is most probably underestimated due to the secretive life style of the species.

Sparrowhawk (*Accipiter nisus*). The main habitat in the Vologda region is marginal forests. Observed a few times around the city of Vologda and in the Vologda district (Voropanova & Kochin 1954). In the Darwin reserve, the species nests in mixed pine-spruce forests. In the 1980s and 1990s the species numbers in the reserve started growing. In the reserve, the birds settle in young mixed pine-spruce stands, at forest edges, and sometimes in low-productivity pine forests. The abundance of the hawk there is rather low – there now breed no more than 5–7 pairs in the reserve (2 pairs/100 km^2) (Kuznetsov & Nemtsev 2005; our data).

A totally different situation is observed in the study area. The Sparrowhawk is one of the most abundant species there and its numbers are quite stable – there annually breed 3 to 5 pairs, the breeding density being 4 to 5.5 pairs/100 km^2 (tab. 5). We have detected and described 8 nests of the raptor.

The Sparrowhawk is a migratory species, occasionally wintering near Cherepovets (1999, 2000, 2004). A minor part of residential birds wander during autumn and winter. Massive spring migration takes place in late April. First birds appear in the area in the first half of April, the 7-year average date being 13 April; the earliest registrations were on 4 April 2000 and 6 April 2002. The autumn migration begins in September and continues until mid-October. The latest Sparrowhawk registration during the autumn migration was on 23 October 2001.

We know of 9 nest areas in the area, of which 4 were occupied in seven successive years, 2 in two years and 1 in one year. The smallest distance between two occupied nests was 4.2 km on average. Nests of other raptor species were, however, much closer – 400 to 700 m. All nests found (n=8) were situated in low forest, on trees not higher than 16–18 m. Seven of the nests were on pine trees and one on a spruce tree. The nests (n=8) were 43 cm in diameter and 21 cm high on average. Most nests were rather loose, hardly ever lasting through the winter and not reused by the birds, although it did happen in 2000 that a Sparrowhawk used its last-year's nest again. Continuously used roads were found near three nests only; two nests were 70 m away and one 20 m away from a road.

Clutch initiation takes place in the first week of May: 3-8 May 2000, 1-2 May 2001, 3-6 May 2003. Hatching occurs in early to mid-June: 7-10 June 2000, 5-9 June 2001, 10-11 June 2003, 12-13 June 2004. Departure of fledged juveniles was observed for 6 nests. It usually happened in late June – early July: 24 July 2000, 17 July 2000, 3 July 2002, 7 July 2002, 25 June 2003, 5 July 2004.

Most clutches comprised 5 eggs (3 to 6), an average brood being 3.8 (2 to 5) young. The size of the eggs ranged from 37.8–42.9 x 31.3–38.0 mm, the average being 40.9 x 35.3 mm. The average brood size decreased by 20% over the breeding season (tab. 4.).

Table 4. Changes in Sparrowhawk brood size in the study area.

Number	Date		
	16-30 June	1-15 July	16-30 July
Nestlings	5	4,3	4
Nests	3	7	2

Rough-legged Buzzard *Buteo lagopus*. In the mid-20th century the Rough-legged Buzzard was rare in the Vologda region, even during migration (Voropanova & Kochin 1954). In 1927, a Rough-legged Buzzard was observed in the Cherepovets district during autumn migration (Bogachev 1927). Since the late 20th century, the species has been a common passage migrant with no registrations in some years.

The earliest spring contacts were on 17 March 2004 and 20 March 2000, the latest one on 24 April 2003. In the period from 1999 to 2005, explicit spring passage was observed 3 times: 19 birds flew over on 12–14 April 2002; 15 and 12 birds flew over on 24–25 April 2003 and 12–13 April 2004, respectively. In the rest of study years, birds were observed on spring migration, flying in small groups of 2–3 birds. All in all, 53 birds were registered on spring passage in 7 years of observations. There were no Rough-legged Buzzard contacts in the area in 2000 and 2005.

Active autumn migration of the Rough-legged Buzzard is observed in September–October. The last registration was on 17 September 1999 at earliest, and on 12 November 2003 at latest. The only year with no autumn registrations of the Rough-legged Buzzard was 2002. Autumn passage was explicit in the following years: 12–13 April 2000 32 contacts; 16-17 October 2003 24 contacts and 9 October 2005 6 contacts. Over 4 years of observations we recorded a total of 73 Rough-legged Buzzards on autumn migration.

Common Buzzard *Buteo buteo*. The Common Buzzard is one of the most common raptors in the Vologda region. Galushin (1978) reported the breeding density of the species in the region to be up to 12 pairs/100 km^2. The Buzzard abundance in the reserve has always been low, the reason certainly being the insufficient area of open habitats. The species numbers were the highest in the 1960s–1970s, when up to 7–10 pairs nested in the reserve. As the area of open habitats decreased the Buzzard became rare in the reserve, and overgrowing of littoral areas with reeds made its settlement in the Rybinsk reservoir temporarily flooded zone impossible. At present, Buzzards live only around settlements, where hay is mown and they can prey on Microtus voles. Even in years with high Microtus vole abundance there are no more than 3–4 pairs of Buzzards breeding in the reserve (Kuznetsov & Nemtsev 2005, our data). In low vole years Buzzards do not nest in the reserve at all.

Annually, 3 to 5 pairs of the raptor nest in the research station, the breeding density averaged for seven years being 3.2 pairs/km^2. The Buzzard arrives in April – early May; the earliest date recorded was 5 April 2000, the latest 1 May 2003. The 7-year mean arrival date is 12 April. The latest encounters in autumn were recorded on 3 October 2000 and 10 October 2003.

In all years of studies in the Cherepovets research station we found 4 occupied nests and identified 7 nest areas of the species (tab. 5). The nest areas were 1.3 to 5 km apart, average spacing being 2.1 km. Closest to the Buzzard nests were nests of the Hobby , 880 m, and the Sparrowhawk ,1.5 km away.

Three nest sites of the Buzzard were situated in mixed pine-birch forests and one in a birch forest. All nests were 20–70 m away from open habitats (fields, forest glades). The height of nest trees was 12–22 m (18 m on average). Nests were sited at a height of 8–17 m (11 m on average).

Table 5. Abundance and breeding density of the Common Buzzard and Sparrowhawk in the Cherepovets study area.

Years	Explored area, km^2	Number of breeding Territories		Density, pairs/100km^2		%	
		B. buteo	*A. nisus*	*B. buteo*	*A. nisus*	*B. buteo*	*A. nisus*
1999	70	3	3	4.3	4.3	11.1	11.1
2000	125	5	5	4.0	4.0	13.5	13.5
2001	125	4	6	3.2	4.8	10.8	16.2
2002	125	3	5	9.4	4.0	2.4	15.6
2003	125	3	5	2.4	4.0	10.3	17.2
2004	115	4	5	3.5	4.4	13.8	17.2
2005	110	4	6	3.6	5.5	12.1	18.2
7-year mean	113.6	3.6	5	3.2	4.41	10.6	15.9

We observed two Buzzard pairs throughout the breeding period (2000, 2003) – from the beginning of nest construction to the departure of fledged juveniles. The Buzzards starts nesting in the station quite late – the first egg (n=2) was laid on 10 May 2000 and 13 May 2003. Hatching was recorded on 9 June 2000 and 15 June 2003. There were 3 (2000) and 2 (2003) chicks in the nests, and survival until fledging was 2 (2000) and 2 (2003) chicks, respectively. Fledglings departed (n=4) between 25 June and 17 July. Fledged juveniles stay with their parents within the nest area for quite a long time.

Golden Eagle *Aquila chrysaetos*. The species has always been rare in the Vologda region, although suitable breeding habitats are abundant (Voropanova & Kochin 1954). For the Darwin reserve, three nest areas of the Golden Eagle were known before 2000, and the areas were not used simultaneously. No more than 2 Golden Eagle pairs bred in the reserve at a time. No breeding pairs of the species have been detected in the reserve in the past few years (Kuznetsov & Nemtsev 2005, our data).

Over the 7 years of studies in the research station no occasions of Golden Eagle breeding have been recorded, but in some years the raptor was observed there in the post-breeding period. Thus, in 1999 there were two registrations (19 August 1999 and 28 August 1999) of the species. In both cases, these were single birds hunting in raised bogs. In 2000 (30 August 2000) we observed a young bird in the immediate vicinity of the city of Cherepovets (2 km away).

White-tailed Sea Eagle *Haliaeetus albicilla*. As mentioned above, the best studied populations in the region now are those of the Osprey and White-tailed Sea Eagle. During expeditions the author carried out together with the Darwin reserve staff, the main high-density breeding areas of the White-tailed Sea Eagle were identified. The species tends to settle around large lakes and reservoirs in the northwest of the region: Rybinsk reservoir (ca. 40 pairs), Sheksna reservoir (11–15 pairs), Lake Vozhe (11–13 pairs) and Lake Beloye (6–7 pairs) (Kuznetsov & Babushkin 2003, Kuznetsov 2000).

The Cherepovets research station is 15 km away from the Darwin reserve, which is the Sea Eagle high-density source area for the Vologda region. At present, 30–35 pairs of the raptor (3.5 pairs/100 km^2) nest within the Darwin reserve and its buffer zone (Kuznetsov & Babushkin 2003). Owing to the vicinity of the reserve, the Sea Eagle abundance in the station is quite high. Over the seven years of observations we found 4 occupied nests, and 2 to 4 breeding pairs of the species were registered annually (tab. 1). Thus, the breeding density of the raptor in the station is 3.2 pairs/100 km^2, i.e. comparable to that in the Darwin reserve (tab. 6).

In spring, White-tailed Sea Eagles arrive in late February – early March, when the reservoir is still under ice cover. The earliest registration in the research station was on 21 February 2003. In the winter of 2000–2001, a single bird overwintered near Cherepovets, feeding on fish left behind by fishermen, as well as on bivalves from branches and logs entangled in nets. In March, Sea Eagles quite often concentrate (10 birds or more) by melt ponds and rivers freed of ice, where they pick fallen fish.

Breeding begins in the first or second ten days of March; hatching takes place in late April – early May. A clutch (n=2) comprises 2 to 3 eggs.

The White-tailed Sea Eagle hunts actively, taking mostly fish, shorebirds and mammals. In the spring season, a significant part of the raptor's diet is animals that had died during the winter and fallen fish (carrion).

A characteristic feature of the White-tailed Sea Eagle diet is its wide range (Ben'kovskiy 1963, Vladimirskaya 1948, Kishchinskiy 1980, Labzyuk 1975, Ladygin 1991, Shibnev 1981, Shul'pin 1957). There are no clear food preferences. The species can utilize various food resources depending on their availability. It is an active predator mostly taking individuals deviating from the norm.

Table 6. Abundance and breeding density of the White-tailed Sea Eagle and Hobby in the Cherepovets study area.

Years	Explored area, km^2	Number of breeding territories		Density, pairs/100km^2		%	
		H. albicilla	*F. subbuteo*	*H. albicilla*	*F. subbuteo*	*H. albicilla*	*F. subbuteo*
1999	70	4	6	5.7	8.6	14.8	22.2
2000	125	4	6	3.2	4.8	10.8	16.2
2001	125	4	7	3.2	5.6	10.8	18.9
2002	125	4	8	3.2	6.4	12.5	25.0
2003	125	2	7	1.6	5.6	6.9	24.1
2004	115	2	6	1.7	5.2	6.9	20.7
2005	110	2	7	1.8	6.3	6.1	21.2
7-year mean	113.6	3.1	6.7	2.9	6.1	9.8	21.2

In our case, fish contributed a substantial part to the Sea Eagle diet, ca. 80% (10 species) of all food items by number, and 67% by weight (tab. 7). The most frequent fish species in the diet were bream (22%), roach (18%), crucian carp and pike (8% each). Occasional specimens of perch and blue bream (6% each), sabrefish and pike-perch (1% each) were found. The situation appears different, however, if one calculates the weight of all fish captured by the White-tailed Sea Eagle. Bream remains the main pray, ca. 28 kg, i.e. over 26% of the weight of all prey. The second position belongs to pike rather than roach, ca. 15.2 kg (14.1%), the third one is crucian carp, 11.83 kg (11%). The rest of fish species account for ca. 16% of the Sea Eagle prey.

Table 7. Diet composition of the White-tailed Sea Eagle (data from pellets and prey remains).

	Species	n	%n	Biomass consumed (kg)	% biomass
Total Mammals		2	2	2.5	2.3
Muskrat	*Ondatra zibethicus*	2	2	2.5	2.3
Total Birds		15	16	25.83	24.0
Heron chick	*Ardea cinerea*	1	1	0.70	0.7
Ducks	*Anas sp.*	4	5	2.80	2.6
Black Grouse	*Lyrurus tetrix*	1	1	1.20	1.1
Capercaillie	*Tetrao urogallus*	5	5	20.00	18.6
Gulls	*Larus sp.*	1	1	0.25	0.2
Jay	*Garrulus glandarius*	1	1	0.18	0.2
Jackdaw	*Corvus monedula*	1	1	0.20	0.2
Hooded Crow	*Corvus cornix*	1	1	0.50	0.5
Total Fish		76	80	72.28	67.2
Pike	*Esox lucius*	8	8	15.20	14.1
Roach	*Rutilus rutilus*	16	18	6.50	6.0
Ide	*Leuciscus idus*	5	5	2.81	2.6
White bream	*Blicca bjoerkna*	5	5	1.62	1.5
Bream	*Abramis brama*	20	22	28.10	26.1
Blue bream	*Abramis ballerus*	6	6	2.09	1.9
Sabrefish	*Pelecus cultratus*	1	1	0.26	0.2
Crucian carp	*Carassius carassius*	8	8	11.83	11.0
Pike-perch	*Stizostedion lucioperca*	1	1	2.20	2.0
Perch	*Perca perca*	6	6	1.69	1.6
Total Carrion		2	2	7.00	6.5
Racoon dog	*Nyctereutes procyonoides*	1	1	4.00	3.7
Wild boar	*Sus scrofa*	1	1	3.00	2.8
Total		95	100	107.61	100%

Like for the Black Kite, birds are a significant component of the White-tailed Sea Eagle quarry, 16% (24% of biomass). Grouse and waterfowl prevail, 5% each. The food range includes a heron chick, a gull (species not identifiable), Eurasian Jay, Eurasian Jackdaw, Hooded Crow (1% each). The main prey by weight is the Capercaillie, 20 kg (18.6%), followed by *Anatidae spp.*, 2.8 kg (2.6%) and the Black Grouse, 1.2 kg (1.1%). Heron chicks, gull sp., the Jay, Jackdaw, Hooded Crow contributed ca. 2% (by weight).

The only mammal prey species (2% of all quarry) was the muskrat (2 specimens). The wild boar and raccoon dog (2%) were taken by the White-tailed Sea Eagle as carrion. In about 80% of cases carrion was eaten in the period from February to May. This fact is due to the unfavourable feeding conditions: the reservoir is then still under ice and the main prey, fish, is inaccessible. Our observations show also that the proportion of carrion is rather high in the diet of young birds in the first months after leaving the nest, since they are not skilled enough to capture live prey. Similar data on the White-tailed Sea Eagle diet are reported by some authors from Russia and other countries. Thus, the main component of the White-tailed Sea Eagle diet in the Middle Dnieper area (Gavrilyuk et al. 2001), like on Rybinsk reservoir, is fish, ca. 80% of all food items, birds account for ca. 15% and mammals for ca. 5%.

The size of the fish we found in the nests and calculated from the scale diameter by linear growth tables for the reservoir (Svetovidova 1975) ranged from 17 cm (roach) to 85 cm (pike), the average being 34.5 cm (N=76). Fish weight ranged from 90 g (perch) to 4500 g (pike), the average being 718 g (N=76) (tab. 4). The White-tailed Sea Eagle diet in Poland (Zawadzka 1999) differs somewhat from our data in the ratio of individual groups of organisms. There, fish contributed 30.1%, birds 65.9%, mammals 2.7%, carrion 1.3% of total quarry.

We observed 17 occasions of White-tailed Sea Eagles stealing prey from Ospreys. A Sea Eagle rather aggressively attacked an Osprey, which in 86% of cases was a male carrying food to the nest.

Peregrine Falcon *Falco peregrinus*. In the 1940s–1950s, the Darwin reserve harboured up to 3 breeding pairs of the Peregrine Falcon, whose nests were 50 km apart. Peregrine nests were situated in the temporary flooding zone, on floating peatlands and a flooded church. The last breeding event was recorded in 1961. Not a single individual of the species was registered in the reserve from 1964 to 1990 (Kuznetsov & Nemtsev 2005). Since the early 1990s, however, the Peregrine started appearing in the reserve again, and in 2003 it was regularly observed in its south-eastern part. In addition to the above, we registered the Peregrine during the expeditions of the Darwin reserve staff to north-western parts of the region. Thus, in July 2000, a pair of the falcons was observed over the western shore of Lake Vozhe (Babushkin et al. 2000). Butjev & Shitikov (2000) also report of a number of Peregrine contacts in the region. E.g., a singular bird was seen over the northern shore of the Siz'ma widening of the Sheksna reservoir on 5 June 1998; another singular bird (adult female) was encountered near the village of Pundoga, Harovsk district of the Vologda region on 10 June 1996 (Butjev et al. 1997).

In 2000, a pair of Peregrines stayed in the research station throughout the breeding period, and a few times the raptor was observed hunting ducks and terns. All registrations were made on Vaganikha Island (2 km away from the Cherepovets city industrial zone), or in its immediate vicinity.

Hobby *Falco subbuteo*. This falcon has always been a widespread species in the Vologda region. Early in the 20th century it was considered a common breeder in the Cherepovets province (Bogachev 1927). Its breeding habitats in the Darwin reserve today are both forest edges and mires. The abundance is quite stable, although a slight rise has been observed in the past decade. At present, no more than 5–7 pairs of the raptor breed in the reserve (Kuznetsov & Nemtsev 2005). In 2003, we registered 4 breeding pairs of the Hobby in the reserve (2.3 pairs/100 km^2), in 2004 3 pairs (2.6 pairs/100 km^2), in 2005 5 pairs (4.5 pairs/100 km^2). The density of the Hobby population in the forested Darwin reserve (3-year average 3.2 pairs/100 km^2) is much lower than the values obtained by Galushin (1978) for the agricultural landscape in the Lake Katromskoye area, Vologda region (6 pairs/100 km^2).

In spring, the Hobby arrives in the research station in late April – early May, the average date being 29 April. The earliest arrival was recorded on 16 April 2000, the latest – on 6 May 2004.

Over the 7 years of studies in the research station we detected 22 occupied nests; in one of them a clutch of 2 eggs was initiated but abandoned for an unknown reason. Six to eight Hobby pairs bred in the study area every year (tab. 6). The breeding density ranged from 4.8 pairs/100 km^2 (2000) to 8.6 pairs/100 km^2 (1999), the 7-year mean being 6.1 pairs/100 km^2. We know of 8 Hobby nest areas in the area. Three pairs used them for 7 years, two pairs for 6 years, two for 4 years and one for 2 seasons. The distance between the nest areas is significant, 800 m to 6.5 km, average distance being 3–3.5 km.

All nests found in the research station were situated around the Rybinsk reservoir, close to the water edge (10–200 m). Most nests were sited in sparse mixed spruce-pine and pine-aspen forests 12–31 m high, the average height being 20 m. In the Darwin reserve, the species breeds not only on the reservoir shore but also in raised bogs, where nests are located on pine-overgrown ridges.

Nests within the station were placed at a height of 10–25 m (20 m on average) close to the tree top. In 91% of cases (20 nests) birds chose pine as the nest tree; one nest was found on a spruce tree and one on an aspen tree. All nests occupied by the Hobby had been constructed by the Hooded Crow. The nest diameter ranged within 30-55 cm, the average being 45 cm, the height within 15–30 cm, the average being 22 cm.

The Hobby tolerates the presence of people in its nest area fairly well. Roads and recreation sites were situated 30–200 m away from the nests occupied by the falcon. Neither does it avoid human settlements: thus, three pairs nested annually 100, 150 and 300 m away from human dwellings, and in 2000 we detected breeding of the raptor in the Cherepovets city park.

Egg laying usually takes place in May, a clutch normally comprising 2–4 eggs with an average (n=55) of 3.2 eggs (tab. 8). Egg size (n=32) is 41.1–45.4 x 31.7–33.9 mm, the average being 43.2 x 32.8 mm. Hatching takes place between 20 June and 10 July. Egg failure is ca. 6.3%. The number of young in a brood ranges from 2 to 4, the mean value being 3.0 (tab. 6). Mean breeding success over seven years (n=18) is 92.7%. Well flying fledglings were observed in mid-August. In August, adult birds continue feeding their young, and by September the latter are normally self-dependent.

Table 8. Reproductive indices of the Hobby in the Cherepovets research station.

Year	Mean clutch size	Egg mortality, %	Mean no of hatched young	Nestling mortality,%	Mean no of fledglings	Breeding success
2000 (n=6)	3.5	10.5	2.8	0.0	2.8	89.5
2001 (n=2)	2.5	0.0	2.5	0.0	2.5	100.0
2002 (n=4)	2.8	18.2	2.3	0.0	2.3	81.2
2003 (n=1)	4.0	0.0	4.0	0.0	4.0	100.0
2004 (n=3)	3.3	0.0	3.3	10.0	3.0	90.0
2005 (n=2)	3.0	0.0	3.0	0.0	3.0	100.0
Mean (n=18)	3.2	6.3	3.0	1.0	2.9	92.7

We determined the size of the Hobby breeding territory by colour ringing in 2000 and 2001. An average breeding territory was ca. 1 km^2 (0.8–1.9 km^2), and 1600–2400 m long. An interesting fact is that the birds used 1/3 (0.6–1.1 km^2) of the territory for hunting. Only the female hunted close to the nest, whereas the male preferred hunting in a radius of 200–1000 m away from the nest.

The quarry of the Hobby in our studies included small passerines and insects, *Coleoptera* and *Odonata* prevailing among the latter. We quite often observed young birds hunting Sand Martins, each seventh attack, as a rule, being successful.

Most birds depart in September, singular registrations were made in October, on 16 October 2000 and 9 October 2003.

Kestrel *Falco tinnunculus*. The Kestrel is a relatively common species in the region. Most of the species nest areas are strictly confined to the outskirts of settlements, meadows and hayfields. In areas adjoining the research station (Darwin reserve), the Kestrel is also an uncommon rarely breeding species. Up to 3–4 pairs of the Kestrel breed in the reserve not every year (Kuznetsov & Nemtsev 2005). The main reason for such low abundance of the species in the study area is the lack of open habitats (meadows, hayfields) suitable for hunting. Thus, in three years of surveys in the Darwin reserve (2003–2005) we observed only one breeding pair of the Kestrel (2005).

Over seven years of studies in the Cherepovets area we reliably proved breeding of a Kestrel pair, which occupied the same nest area for two seasons (2004 & 2005). Thus, the Kestrel breeding density in the area is 0.9 pairs/100 km^2, this value being much lower than the one reported by Galushin (1978) for the Vologda region, 1.0–3.0 pairs/100 km^2. In 2004, we found the only Kestrel nest – it was an old Hooded Crow nest on an 18 m high pine tree. The nest tree was 50 m away from a hay meadow.

The Kestrel arrives in the station between 5 April and 19 April, the two-year mean being 12 April. Clutch initiation takes place in late April – early May: 3 May 2004; hatching was registered on 8 June 2004; fledglings outside the nest were seen on 11 July 2004 and 17 July 2005. In late August – September most birds depart; the latest contact was on 9 October 2004.

Acknowledgements. I am grateful to colleagues and friends who have helped me at all stages of the study. First and foremost, special thanks for invaluable help, support and the possibility to do research in the nature reserve territory go to the Director of the Darwin Biosphere Reserve Andrei Kuznetsov.

I have also appreciated the help of my research supervisor, professor of the Zoology and Ecology Department of the Moscow State Pedagogical University Vladimir Galushin, and all professors and staff of the Department. I am sincerely grateful to my friend and co-thinker, Researcher from the Biological Research Institute of the St. Petersburg State University Vasily Pchelintsev for creative support and assistance in gathering field material.

In addition to people mentioned above, I would like to thank my friends and collaborators: N. Sidorchouk, I. Cherlagina, S. Mikhal'kov, D. Shiti-kov, A. Sharikov, as well as my family for great patience.

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