Current Status and Breeding Ecology of the Goshawk Accipiter gentilis in Northern Belarus

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INTRODUCTION

During recent years the problem of raptors and the environment became very acute due to man-made changes in the latter (e.g. Galushin 1977). Raptors in Belarus were traditionally hunted, among them the Goshawk *Accipiter gentilis* being always persecuted particularly vigorously. The impact of the Goshawk on small game populations in Belarus was studied only in the Belovezh Forest in the 1950s (Gavarin 1956; Golodushko 1963, 1965). In addition, the diet of this species was studied in the Vitebsk region in 1973-78 (Ivanovsky & Umanskaya 1981). No other studies on the Goshawk's trophic ecology were carried out in other areas of the country. The main goal of the research here presented was to understand the role of this predator in the ecosystems of northern Belarus.

MATERIALS AND METHODS

Study was carried out in the Vitebsk region, northern Belarus. The total area of the region is 40,100 km², about 35% of which is covered by forest (17-60% in different districts), mainly coniferous. Pine and spruce dominated forests comprise 42% and 19% of all forested areas. Bogs occupy about 9% of the region, lakes about 2.5% and the density of the river network is 45 km per 100 km².

Data were collected during all the seasons of the year in the course of special excursions in different districts of the Vitebsk region. Breeding ecology data were collected on 6 study plots with a total area of 800 km² during the breeding season (March-July). Each nest was visited from 1-3 times per breeding season; the total number of recorded breeding attempts was 90. Breeding density was calculated on the basis of total counts of occupied nests and territories in the study plot in March-May.. Observations of successful prey strikes and the analysis of pellet and food

Table 1. Reproductive indices of the Goshawk in northern Belarus, 1973-94.

for the control of the first sizes.

	1	2	3	4
Clutch (n=26)	-	3.8	30.8	65.4
Brood with newly hatched chicks (n=19)	-	26.3	52.6	21.1
Brood just before fledging (n=35)	8.6	54 3	37.1	

remains were used for the study of food choice. Identification of food remains was carried out by comparing the bones and feathers of prey with museum collections according to methods described by Marz (1972). In total, 677 prey items belonging to 60 animal species were identified in the Goshawk diet.

RESULTS AND DISCUSSION

Goshawks in the Vitebsk region build nests in different kinds of forests, 36.9% in mixed forests, 24.7% in pine and spruce forests, 9.6% in aspen forests, 2.7% in birch and 1.4% in black alder forests (n=73). The most preferred nest trees (n=90) were pine and spruce-31.1% each; other nest trees were aspen - 18.9%, birch-10%, black alder - 5.6%, ash - 2.2% and oak - 1.1%. There were from 1-4 alternative nests in each territory, 1.4 in average. Nest height above the ground varied between 4.5m and 22m (mean 12.5m); nest dimensions averaged 0.95m (diameter) and 0.7m (depth). Nests were situated either at a bifurcation of the trunk (55%) or at the base of a limb near the trunk. Sometimes Goshawks may use old nests of Common Buzzard *Buteo buteo*, Lesser Spotted Eagle *Aquila pomarina*, Honey Buzzard *Pernis apivorus* and even Black Stork *Ciconia nigra*.

Repeated captures of the adults revealed that they also occupy their breeding territories during autumn and winter. From early March adult Goshawks begin to visit their nests, make courtship flights and vocalize in duets in its vicinity. At the same time they begin to build a new nest or repair an existing one. Egg-laying begins between April 10 and 17. A full clutch contains 2-4 eggs, mean 3.6 (n=26, Table 1). One observed clutch consisted of eggs with Common Buzzard type of colouration, Mean egg dimensions are 59.7x46.1mm, the sizes of eggs with extreme dimensions were 64.8x47, 59.8x49.3, 50.4x45 and 63.7x41mm.

Hatching occurs in mid-May; broods with newly hatched chicks contain from 2-4 young, mean 2.9 (n=19, Table I). Brood reduction through fraticide often occurs in unfavourable years, sometimes just before fledging or even after it (e.g.

Prey species/items	rey species/items Breeding season		Nonbreeding season		
	n=639	Males, $n=21$	Females, $n=17$		
Anas platyrhynchos	18	-	-		
A. crecca	0.3	-	-		
À. acuta	0.2	-	-		
A. querquedula	0.2	-			
A. domestica	0.2	-	-		
Anatidae sp.	12	-	-		
Pernis apivorus	0.2	-	-		
Accipiter gentilis	0.2	-	5.9		
A. nisus	0.2	-	-		
Buteo buteo	0.2	-	-		
Circus aeruginosus	0.2	-	-		
Falco columbarius	0.2	-	-		
Falconiformes sn	0.2	-	-		
Lavonus lavonus	0.2	-	-		
Tetrao urogallus	0.6	-	59		
T tetrix	6.4	-	5.9		
Ronasa honasia	82	48	-		
Tetraonidae sp	0.2	1.0	_		
Pardix pardix	-	14.2	59		
Callus domesticus	18	18	23.4		
Malagoris domesticus	1.6	4.0	5.9		
Vanallus vanallus	0.2		5.2		
Tringa ochronur	0.2	-			
Callingo callingo	0.3	-	-		
Scolonar rusticala	0.2	-	-		
Numanius asauata	0.0	-	-		
Numenius urgana	0.2	-	-		
finner liner	0.2	-	-		
Chanadaiidan an	0.3	-	-		
Calumbra livia	16.0	42.0	-		
Columba livia	10.9	42.9	5.9		
C. patumbus	0.1	-	-		
	0.2	-	-		
Cuculus canorus	0.3	-	-		
Strix aluco	0.2	-	5.9		
Asto ofus	0.9	-	-		
Dryocopus martius	0.2	-	-		
Picus canus	0.2	-	-		
Picidae sp.	1.4	4.8	-		
Turdus merula	0.2	-	-		
Turdus sp.	1.7	-	-		
Chloris chloris	0.2	-	-		
Garrulus glandanus	5.6	-	-		
	5.0	-	-		
Corvus monedula	0.3	-	-		
C.frugilegus	17.3	-	5.9		
C. cornix	2.0	9.5	5.9		
C. corax	0.6	-	-		
Corvus sp.	0.9	-	-		
Small Passertformes spp.	2.3	-	-		
Aves spp.	7.2	-	-		
Lepus timidus	-	-	5.9		
L. europaeus	-	-	59		
Lepus sp.	1.7	•	-		
Sciurus vulgaris	1.5	4.8	-		
Arvicola terrestris	0. ~	-	-		
Muridae sp.	-	14.2	11.7		
Rodentia sp.	0.4	-	-		
Mustela nivalis	0.2	-	-		
Perca fluviatilis	0.2	-	-		

Table 2. Diet of the Goshawk in northern Belarus, 1973-94, in% of recorded prey items.

21 June 1994 at Osvyato study plot). Fledging occurs in the last ten days of June. Just before and after fledging broods consist of 1-3 young, mean 2.3 per successful nest (n=35, Table I). About 27% of hatched young died before fledging, and 95% of 35 active nests where breeding success was measured during the study were successful. Parents continue to feed fledglings near the nest up to early August, after which the young birds start to disperse. In all 99 Goshawks were ringed during the study period and 9.1% of them were recovered. All first year bird recoveries were from areas to the south of their birthplaces. All Goshawks (n=8) recovered in northern Belarus during autumn and winter were born in Finland. The main causes of mortality were kills by poachers and electrocution. Only four falconers are now in the region and their impact on the population through catching birds on passage and taking fledglings from the nest is negligible.

Data on the diet of northern Belarussian Goshawks are presented in Table 2. The main prey items are corvid, dove and grouse species, Rook Corvus frugilegus and Feral Pigeon Columba livia were preyed on most often during the breeding season. The diet outside the breeding season is less diverse, and the role of domestic fowl and small rodents increases. Some pairs showed food specialization during the breeding season, preving heavily on e.g. Rooks (40-80% of total diet), doves (40-60%), grouse (20-30%) and medium-sized mammals (Red Squirrel Sciurus vulgaris and hares Lepus spp., 10-20%). At the Obol study plot I tried to estimate the total predation pressure of 5 Goshawk pairs on some prey species populations breeding in the 180 km² area, using the approach of V.M. Galushin (1960,1962). No serious effect was found: the proportion of bird prev was either negligible (Mallard Anas platyrhynchos - 0.6%, Capercaillie Tetrao urogallus 0.2%) or small (Hooded Crow Corvus cornix - 4.1 %, Black Grouse Tetrao tetrix - 2.5%). It must be pointed out that the density of breeding Goshawks in northern Belarus has decreased to some extent due to selective logging of old-growth forests, and wetland drainage has altered a large part of the species' hunting grounds. Current mean breeding density in the study area is about 6.5 pairs per 100km² of forested area.

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