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DISTRIBUTION AND BIOLOGY OF GOSHAWK (*Accipiter gentilis* L.) IN THE CHŘIBY UPLAND, THE CZECH REPUBLIC

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Abstract

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In 2002–2006, mapping the goshawk (*Accipiter gentilis* L.) population was carried out at the SE edge of the Chřiby Upland, the Czech Republic. At the same time, the food spectrum of the predator was determined in detail in 2004. The studied area amounted to about 30 km^2. In the area, 5 nest localities occurred. Each year five occupied nests were observed. The food spectrum was analysed according to leftovers of food in nests and in the vicinity of the nests. In total, 387 leftovers of food were found. Birds represented 52%, mammals 42% and other animals (insect, reptiles etc.) 6% of prey. The population of goshawk was monitored from the period of a wedding flight to a period when young birds left their nest during the period of five years. The number of eggs was on average 2.9 per one nest. The total number of laid eggs was 73 during five years. The number of brood was on average 2.7 per one nest. Sex ratio was 47/53 per cent in favour of males. The total number of hatched birds was 68 during five years, out of the number 32 females and 36 males. Moreover, dimensions of nests at particular localities were also determined. The diameter of nests was on average 72.2 cm and the mean height of the actual nest was 48 cm. Nests occurred at an average height of 21.3 m.

food spectrum, population, nesting period

1: *Northen goshawk (Accipiter gentilis) – adult (photo Mark Hicken)*

Species occurring on the top of trophic chains in ecosystems, ie predators, particularly beasts and birds of prey are mostly affected by the environment loading. One of species, which suffers from changes in the landscape and forest environment, is goshawk (*Accipiter gentilis* L.). Living conditions for goshawk are affected by the species composition of trees, food supply, but also tourism and other activities of man.

Goshawk ranks among species, which are very sensitive to changes and degradation of the environment adapting very badly to marked changes.

Goshawk is one of the most hardly observable predators, because it is characterized by the very hidden life pattern. Also thanks to this fact, present ideas of the distribution of goshawk in the Chřiby Upland (typical wooded region of highlands with the high rate of close-to-nature forests) are rather contradictory. Part of professional as well as non-professional public considers that the goshawk population in the Chřiby Upland is excessive. According to them, thanks to the high population density goshawk does not have sufficient area for natural nesting. Moreover, strong food competition results in necessity to hunt in the field landscape adjacent to the Chřiby with subsequent impacts on the abundance of birds and mammals belonging to game.

On the other hand, the second party considers the Chřiby population to be very low and requires uncompromising protection (Tomešek, 2005). Thus, the exact determination of parameters of the actual population of goshawk in the Chřiby is also important for management of the whole area, which is, moreover, a protected landscape area.

Thanks to the strategic position of the upland in the region of southern Moravia and thanks to the extensive complex of forests the Chřiby Upland is exceptional (and to a great extent even throughout the ČR) in relation to the occurrence and abundance of goshawk. In the surroundings of the Chřiby Upland, except the "Ždánický les" forest, no major forest complex occurs. Thanks to this fact, it is possible to suppose that the character and distribution of goshawk in the area will be characteristic of the whole CR. There is only limited information on the biology and distribution of goshawk in the CR. At present, particularly Šťastný, Bejček and Hudec deal with the distribution of birds and thus also of goshawk. In 1985–1989, the total number of the species in the CR was estimated to 2000–2800 pairs (Šťastný, Bejček, 1993), which corresponds to results obtained by Danko et al. (1994) for 1990, ie 2000–2500 pairs. At present, the abundance of goshawk even decreased a little approaching 1800–2500 pairs. According to the methodology of Šťastný and Bejček, quadrates are occupied at 84–92% in all mappings carried out in the CR. Only few authors dealt with the food ecology of the predator and present literature sources are rather obsolete. Farský (1928), Sládek (1963) and Sulkava (1964) dealt with the food of goshawk intensively.

MATERIAL AND METHODS

Food spectrum

The composition of food of every predator is affected by three basic factors: food supply, possibilities to catch a prey and individual selection. Thus, the resulting structure of food differs both between particular species and within a species according to areas, sex, age and individually. These differences can be of considerable ecological importance. The composition of food of predators can be determined by various methods (Mlíkovský, 1998). Since nesting localities were already very well known from previous monitoring the method of direct observation could be used.

Particular nesting localities were monitored in regular intervals once per 7 days, always twice 2 hours per day. The observation was carried from a sufficient distance and from a safe hiding place in order the birds not to be anyway disturbed. Binocular field-glasses 7 × 50 were used. Although it is possible to determine very well and exactly the rather wide spectrum of prey using this method as well as the subsequent fate of the prey, it refers to a very time-consuming method affecting only part of the food spectrum. To increase the representative character of the survey the direct observation was completed by analyses of the prey remnant in the period of nesting. Not digested leftovers of prey were found during the nesting period right in nests and in places of the regular processing of food. Food leftovers were collected and subsequently determined in regular intervals twice a week. Easily determinable rests of prey were determined and recorded directly in the place of collection, worse identifiable leftovers were explored in detail in the laboratory. Climbing to nests was carried out only twice (due to difficulties and necessity not to disturb the birds) during the nesting period. Under conditions of more frequent disturbing the nesting birds the whole clutch could be destroyed. The first inspection of nests was carried out roughly in mid-hatching, ie about 15 days after clutch. At the inspection, the number of eggs was also determined. The second inspection occurred on a nest with young birds aged about 15 days (roughly half the time spent by the brood on the nest). At this climbing, the number of young birds in the nest was also determined. The age of chicks was determined using qualified estimate in relation to facts concerning the time of hatching particular chicks. Determination of the food spectrum of goshawk was carried out during the period of nesting from February to July 2004.

Distribution and breeding biology

Breeding biology was determined at five nesting localities known in the region. The character of a nesting locality, general condition and the quality of the environment and the condition of forest stands where the nest occurred were taken into account. The population abundance was determined using the method of nest inspection (see above). At the first climbing, in addition to the number of eggs, the condition of the clutch hatching was assessed if, of course, the date was not known when the goshawk female began to sit on the first eggs. At the second climbing, in addition to the number of hatched brood, also the sex of the young birds was determined. Sex of the brood was determined according to their size and dimensions of their legs. We are successful with using this method. At this time, there is

very high probability that young birds, which occur in the nest, also fly out the nest.

Providing that the unpredictable death of young birds does not occur due to the shortage of food, effects of a predator or otherwise. Of course, young birds, which fly out the nest may not live to see maturity.

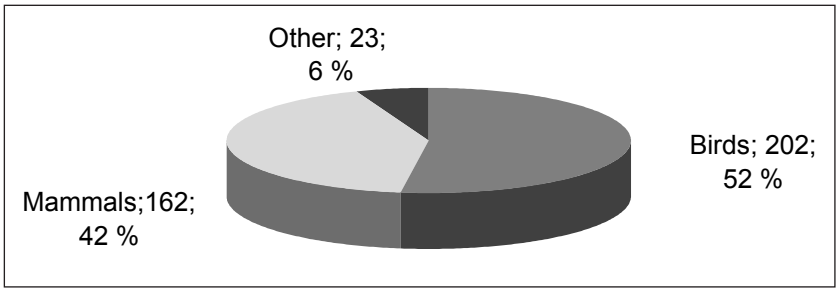
Monitoring young birds, which began to leave their nests and to live separately, is very difficult. Young birds belonging to particular nests can mingle and thus, it is not possible to differentiate unambiguously the young birds of particular nests.

Moreover, the height of nests at particular localities and the height of trees where the nests occurred was determined. At each of the localities, there were more nests, which were irregularly changed by particular pairs. An altimeter SILVA was used to measure tree heights. For each of the nests, photographic documentation was made. In nests occupied in 2004 and 2005, dimensions of nests (diameter and height) were also determined.

RESULTS

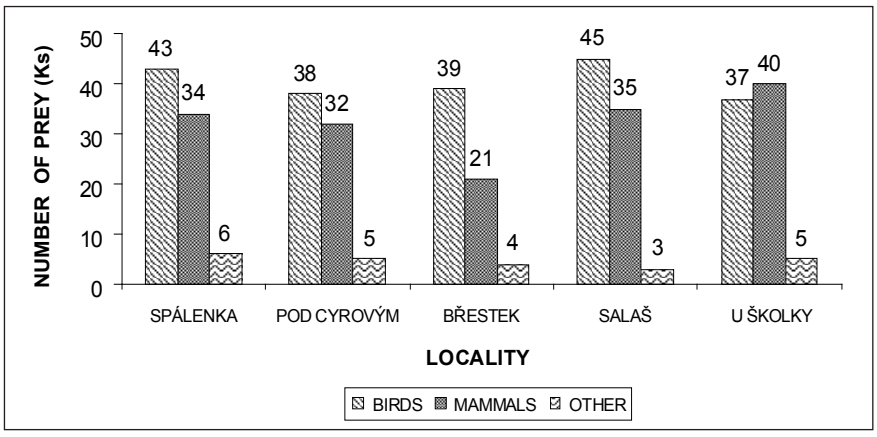
Food spectrum

The food spectrum of goshawk was determined at five localities (Spálenka, Pod Cyrovým, U školky, Břestek, Salaš) in 2004. Fig. 2 indicates the composition of food of goshawk on the basis of leftovers of food.



2: *Numerical and percentage expression of the composition of particular types of prey*

Thus, it is evident that the greatest proportion of prey consists of birds, viz. 52%, mammals 42% and other animals such as insect, reptiles, amphibians, *Annelida* and other create the smallest but nevertheless always important part of food, namely 6%. In total, 387 distinguishable leftovers of food were found (Fig. 3 and Tab. I).



3: *The food spectrum of goshawk (Accipiter gentilis L.) at particular localities*

Fig. 3 shows that the highest amount of food was found at the Salaš locality and then at Spálenka, U školky, Břestek and Pod Cyrovým localities. High and nearly the same amount of food leftovers at Salaš and Spálenka localities can be explained by the highest number of brood (14). In total, 15 genera of birds and 7 genera of mammals were determined. The number of hunted birds and mammals is rather balanced (Tab. I). Only at the Břestek locality, the number of hunted mammals is one order lower (21).

I: *The food spectrum of goshawk in the nesting period 2004 (in particular groups, genera or species are ordered according to the total number of items)*

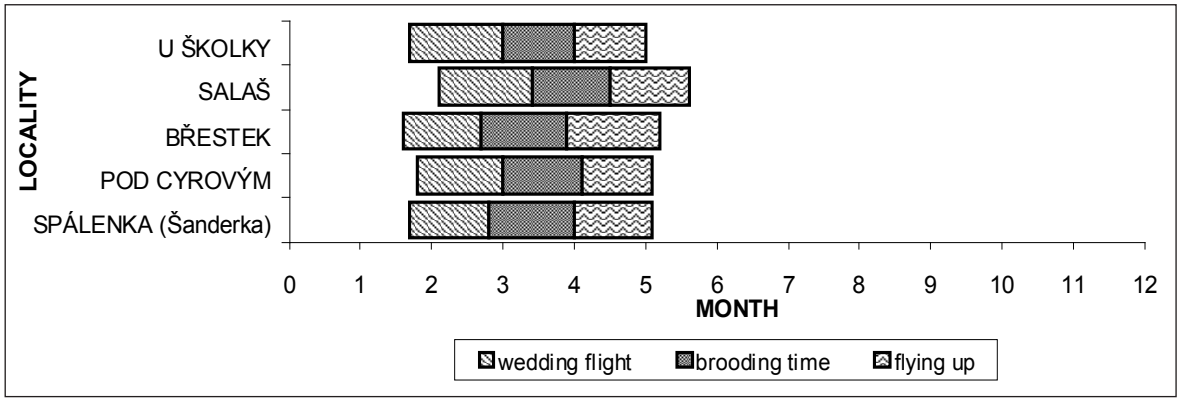
LOCALITY	Spálenka	Pod Cyrovým	Břestek	Salaš	U školky
GENUS – BIRDS					
Columba livia f. *domestica*	4	8	3	11	5
Garrulus glandarius	9	7	4	4	5
Streptopelia decaocto	4	5	2	7	5
Turdus merula	4	3	5	7	4
Turdus spp.	5	2	7	1	3
Columba spp. (wild)	3	1	2	6	2
Sturnus vulgaris	2	1	4	2	2
domestic fowl	1	0	5	1	3
Phasianus colchicus	2	3	1	1	0
domestic ducks	0	0	1	0	1
Pyrrhula pyrrhula	0	1	0	0	0
Anas platyrhynchos	1	0	0	0	0
Corvus monedula	0	0	1	0	0
Picus spp.	0	1	0	0	0
other birds	8	6	4	5	7
Total	43	38	39	45	37
GENUS – MAMMALS					
Arvicolidae, Muridae (small species)	16	14	10	13	18
Sciurus vulgaris	6	9	4	8	6
Rattus norvegicus	3	5	1	9	6
Talpa europaea	0	2	1	0	4
Lepus europaeus	3	0	1	0	0
Mustela nivalis	1	0	0	0	0
Total	34	32	21	35	40
OTHER					
beetles, insect, other animals	6	5	4	3	5
Total	6	5	4	3	5
TOTAL	83	75	64	83	82

At four localities out of five, birds predominate over mammals in food, only at the U školky locality, mammals predominated. Other species of animals occurred only marginally and the number of distinguishable pieces found ranged about 4–5 per one pair. However, the actual proportion will be probably higher and to find and determine small parts of insect is very difficult. The highest proportion consisted of wing-cases of beetles, which were also found during accidental climbings in previous years. They occurred mainly in nests and during a period when the brood was already hatched. As for small game, following species occur in the food spectrum of goshawk: pigeons (14), pheasants (7), hares (4) and mallard (1). The total amount is not high, namely 7% recognizable leftovers of food.

Nesting period

The view of particular stages of nesting gives the following diagram (Fig. 4).

Nesting activities begin by wedding flights already at the end of February and at the beginning of March. There were monitored five nests at the same five localities each year. The same pair was watched at the locality from 2002 to 2006. At the end March but as a rule in April, nesting begins is the area of interest. The start of brooding time was determined using an ocular estimate. Nesting took on average



4: *The mean period of nesting in 2002–2006*

40–45 days. The young began to hatch at the turn of April and May. Within next 25 to 30 days, the birds left their nests. A period when the young began to stay for a longer time out of their nests can be considered to be the time of leaving the nest. It means that the young birds move on surrounding branches (although they are not able to fly well) and return to their nest to rest, feed and spend the night. Thus, through the gradual growing up of plumage the birds are able to leave their nests.

The number of eggs in a nest

In 2002–2006, the mean number of eggs in the area of interest was 2.9 eggs per one nest. Tab. II gives a view of the number of eggs laid in particular years.

According to the table, the least number of eggs (13) was laid in 2002 and, on the other hand, most eggs (16) were laid in 2003. Pairs of the predator maintain in principle the same number of laid eggs through the years. Fluctuations are obviously caused by the marked shortage of food.

II: *Total number of eggs laid in particular years 2002–2006*

Year	Number of eggs	Number of pairs	Mean
2002	13	5	2.6
2003	16	5	3.2
2004	15	5	3
2005	14	5	2.8
2006	15	5	3
TOTAL	73	5	2.9

The number of brood and the hatching rate of eggs

Only five localities were always taken into account. A pair nesting at the Šanderka locality in 2002 nested at the Spálenka locality in 2003–2006. The mean number of brood was 2.72 per one nest, out of the number 1.28 females (47 %) and 1.44 males (53 %) per one nest. The effect of nesting beginning on sex ratio has not been found.

5: *Eggs on the nest (photo author)*

6: *Brood on the nest (photo author)*

III: *The number of brood in 2002–2006*

Year	Number of brood	Hatching rate %	Number of females	Number of males
2002	12	92	5	7
2003	16	100	7	9
2004	14	93	8	6
2005	13	93	5	8
2006	13	87	7	6
TOTAL	68	Mean 93%	32	36

Nesting success of pairs 2002–2006

IV. *Nesting activity of all five pairs 2002–2006*

Locality	Number of eggs	Number of brood	Hatching rate%	Number of brood – 15 day after hatching	% living from hatching
Spálenka	20	18	90%	17	94%
Pod Cyrovým	13	12	92%	9	75%
Břestek	12	11	92%	10	91%
Salaš	16	15	94%	13	87%
U školky	12	12	95%	10	83%
TOTAL	73	68	MEAN 93%	59	MEAN 87%

The biggest hatching rate was at the U školky locality – 100%. The biggest percentage of brood stayed on nest (15 day after hatching) at the Spálenka locality – 94%.

Nest dimensions, height of placing the nest, stands and nesting trees

The survey of nest dimensions of goshawk is given in Tab. IV.

The largest diameter of a nest (83 cm) was found at the Salaš locality. The nest was used repeatedly for several ears. On the other hand, the smallest diameter (61 cm) of a nest was measured at the Břestek locality. A view of the mean height of placing the nest at particular localities is given in Tab. V.

V: *Dimensions of nests at particular localities [cm]*

Locality	Diameter	Height	Number of nests
Spálenka	64	30	5
Pod Cyrovým	78	57	1
Břestek	61	46	4
Salaš	83	54	2
U školky	75	53	2
MEAN	72.2	48	TOTAL 14

VI: *The mean height of nests at particular localities [m]*

Locality	Mean height of placing a nest	Mean height of a tree
Šanderka	19	31
Spálenka	21	33.5
Pod Cyrovým	26	39
Břestek	25.5	32
Salaš	18.5	28
U školky	18	30.5
MEAN TOTAL	21.3 m	32.3 m

7: *Nest of the goshawk (photo author)*

8: *Northern goshawk (Accipiter gentilis) – 1'st calendar year individual (photo V. Vašíček)*

A nest placed most highly (26 m) occurs at the locality Pod Cyrovým. The locality is situated on a relatively large slope and the nest height suits evidently to a goshawk pair. On the other hand, the smallest height of the goshawk nest was measured at the locality U školky (18 m). Although it refers to a rather old stand (96 years) trees reach only small heights there. In total, 16 nests were measured, namely not only those, which were occupied but also those where nesting occurred already earlier.

The fifteen nests were situated on larch trees *Larix decidua* in older stands with slightly open canopy; one nest was situated on beech *Fagus sylvatica* – the Spálenka locality.

DISCUSSION

Food spectrum

The food spectrum does not differ from the one mentioned below. As compared with literature it is necessary to take into account that in this study, food was determined only in the period of goshawk nesting. Thus, its structure need not be identical with year-long surveys. In Slovakia, Sládek (1963) processed the food of goshawk by the analysis of 150 stomachs. Results obtained by this author were completed by other 65 analyses of stomachs generally from the area of the ČR (Farský, 1928). Results are comparable with our survey. According to Sládek (1963), birds amount to 54% (here 52%), mammals 40.1% (here 42%), other components are exceptional (here 6%). Of course, Sládek (1963) emphasises that results are affected by a fact that residues of birds remain more at nests than residues of mammals.

The importance of the method used is documented by Lewis et al. (2004) from SE Alaska using three different methods of determining the food spectrum at the same nests. During monitoring the brought prey by video, the ratio of food was as follows: 77.8% birds and 22.2% mammals. During collecting residues of prey on a nest and in its surroundings, which is the same methodological procedure as in this paper, the ratio of food was 91.4% birds and 8.6% mammals. At collecting pellets the ratio was as follows: 59.3% birds and 40.7% mammals. Difficulties associated with finding the residues of mammalian prey on nests and in their vicinity are probably the main reason of differences (feather is usually much more distinct than hair) and, vice versa, their easier identification in pellets.

Most of surveys (either from similar or markedly different natural conditions) mention the higher proportion of birds than our survey. In a long-term survey carried out in central Italy (Penteriani, 1997), the proportion of birds was 75% items (71% biomass). Lewis et al. (2006) mention the proportion of birds in the richer north of Alaska 72% and in the poorer south 77%. An extensive survey carried out in the Wigry National Park in Poland (Zawadska, Zawadski, 1998) mentions the proportion of birds 94% items (and 92% biomass) of the food spectrum. According to data of Uttendörfer (1939, 1952) from Germany, the proportion of birds is also up to 90%, mammals create only 10% food.

Goshawk is not an exclusive food specialist its food being affected by the species composition of available prey. A survey from Canada (Lewis et. al., 2006) mentioned above demonstrates preferring a prey bringing the highest profit, ie relatively large and easily huntable (thanks to the life pattern of a prey or its availability). Goshawks preferred large birds and mammals, which were hunted in tree crowns. If such a prey did not occur in the given area they focussed on hunting small birds and hardly huntable mammals moving on land.

Predominating species or genera of the goshawk prey are the same or similar in the majority of comparable areas (although different in many parameters). In the area of the Chřiby Upland, domestic and wild species of pigeon *Columba spp.* and jay bird *Garrulus glandarius.* These birds also predominated or at least ranked among the most important species in the goshawk food for example in Granada (Padial et al., 1998), National Park Wigry in Poland (Zawadska, Zawadski, 1998) or in central Italy (Penteriani, 1997). Similarly, the high proportion of squirrel *Sciurus vulgaris* mentioned by Penteriani (1997) and Padial et al. (1998) is characteristic of the goshawk food. Differences in the species composition of animals between particular areas are not marked on the small territory of the Chřiby Upland. It is possible to note the lower proportion of mammals at the Břestek locality where birds amounted to 61 % and, on the contrary, their higher proportion at the locality U školky where birds amounted to only 45 % food.

The higher proportion of rodents in food at the locality U školky was probably caused by the higher occurrence of rodents living on beds of forest tree species. Rodents have favourable conditions for reproduction and so their number is higher than at other localities.

As for the controversial theme of impacts on the small animal populations in adjacent hunting districts it is possible to note that they are low and, therefore, this prey is hunted only little and thus, effects of goshawk on these populations are not important at present.

Nesting period

The period of nesting was determined from the period of wedding flights. In the area under investigation, these flights occurred predominantly in the last third of February or at the beginning of March. According to observations at particular localities, the start of nesting occurs from the 1/3 to the 2/3 of April, sometimes goshawks nested already at the end of March. The nesting occurred always once a year. Hudec (1977) mentions that the first clutches occur as early as the end of March and the last as late as the beginning of May. The nesting is always once a year (if the clutch was not destroyed at the beginning of nesting). A period when young birds leave their nests, occurred in the Chřiby Upland from the 1/3 June, exceptionally already at the end of May. According to Hudec (1977), the young sleep outside their nest about in mid-June as early as the 50th day after hatching. Thus, data obtained do not differ from average data for the ČR.

The number of eggs

In 2002–2006, the mean number of eggs per one nest was 2.9. According to Wittenberg (1964), the mean number of eggs in standard clutches is 3.5 per one nest and in substitute clutches 3 per one nest. Dungel and Hudec (2001) mention 2–5 eggs (3–4 predominate) for Slovakia and Czechia. Zawadska and Zawadski (1998) mention the mean number of eggs 3.1 per one nest. Thus, in the Chřiby Upland, the number of laid eggs is near the lower limit of an expected interval. Comparable results on the number of eggs/nest occur also in numerous literatures from North America. Squires and Reynolds (1997) mention 2–4 eggs per one nest. Apfelbaum and Seelbach (1983) mention 2.7 eggs per one nest, Peck and James (1983) mention the same number of eggs for Ontario.

The number of brood

In 2002–2006, the mean number of brood was 2.72 per one nest. According to Hudec (1977), the number of young birds per one nest is on average 2.3 in the ČR. From central Poland, Goszczyński (2001) mentions 2.6 hatched young birds per one nest, Zawadska and Zawadski (1998) mention 2.7 from the Wigry National Park, Widen (1985) published the same number from the boreal forest in Sweden. In North America, a range 1.4–3.9 (Leslie, 1996) or 2–2.8 (Squires and Reynolds, 1997) is mentioned. In particular detailed surveys, the most frequent number is about 2 or slightly less (eg Hines, 1984; Boal et al., 2001).

The relatively high number of brood (with respect to the somewhat lower number of eggs) in the Chřiby is particularly given by the very high percentage of hatched young birds (93 % laid eggs). It indicates both the good health condition of birds and, thus, indirectly also enough food in the studied region as well as low predation (including effects of man). In surveys mentioned above, the percentage of hatched brood ranged mostly on lower levels. In the Wigry National Park, brood hatched from 87 % laid eggs (Zawadska and Zawadski, 1998). Goszczyński (2001) from Poland and Reynolds and Wight (1978) from Oregon in USA mention brood hatched from 81 % eggs, other data from North America mention even lower values (eg Squires and Reynolds, 1997 or Boal et al., 2005). The high percentage of hatching is surprising with respect to the rather lower number of eggs in a nest. Byholm and Nikula (2007) mention that the failure of nesting is generally highest in clutches with the small number of eggs.

In the Chřiby Upland, the ratio of sex was 47/53 per cent in favour of males. The difference is very small and the sex ratio does not differ from the nation-wide average (Hudec, 1977). The higher proportion of males in clutches has not been clarified yet. It can be caused by a fact that males, with respect to their smaller size, hatch in higher numbers to compensate for expected higher mortality. The effect of nesting beginning on sex ratio has not been found.

Nest dimensions, nest height, stands and nesting trees

Nest diameters ranging from 61 to 83 cm (on average 72.2 cm) occur within the limits mentioned by Hudec (1977) from 56 to 120 cm (on average 89 cm). The height of nests ranged from 30 to 57 cm (on ave-

rage 48 cm), which corresponded again with data given by Hudec (1977), who mentioned a range from 35 to 85 cm (on average 53 cm). The nest height depends on a time how long the nest is used and how much material is layered on it by birds.

The place of nests on a tree was mainly near a stem at a height of 18 to 26 m (on average 21.3 m). Hudec (1977) mentions the nest height from 7 to 25.1 m (on average 17.1 m) data being obtained from 79 nests. In eastern and central Estonia, under conditions partly comparable with the Chřiby region, nests were found at a height of 11.5–17 m (Lõhmus, 2006). Data from North America mention a height of 6–23 m above the ground (Brown et al., 1968).

Predominant tree species and its ecological height optimum in the given area is an important affecting factor for the height of placing the nest. It is possible to conclude that even at highly different localities goshawks chose for nesting mainly coniferous trees similarly as in the Chřiby Upland where larch *Larix decidua* mostly was selected. The pairs had occasions for nesting on other trees at the localities, for example on Scotch pine *Pinus sylvestris* or beech *Fagus sylvatica*, but they preferred larch. The pair from the Spálenka locality nested on beech on one occasion. However, the beech had proportions of larch trees (markedly dominant tree). We suppose that growth habit is more often predominant for nesting tree selection than tree species.

Preferring larch for the construction of nests is mentioned also in Great Britain (Anonymus, 1989). Lõhmus (2006) mentions the predominance of nests on conifers, viz. 74% nests, Squires and Reynolds (1997) or Mahon et al. (2003) mention it from North America. In this regard, findings from Finland on the higher nesting failure on broadleaves (particularly *Populus* spp. and *Betula* spp.) as compared with conifers are very interesting (Byholm, Nikula, 2007). A reason can consist in the easier approach of predators into crowns of these trees and in case of the Chřiby Upland, with respect to its tree species composition, also better view and easier construction of nests on larch trees as compared with dominant beech *Fagus sylvatica*.

A number of authors from various countries (Squires and Reynolds, 1997; Hakkarainen et al., 2004; Lõhmus, 2006) mentions preferring older and rather slightly open stands (however, not too open stands). Undisturbed places in the interior of stands are preferred for nesting (Krüger, 2002).

CONCLUSION

With respect to negative interactions with man, goshawk (*Accipiter gentilis* L.) is a predator discussed on a long-term basis. Monitoring the food spectrum of goshawk in 2004 and its population in 2002–2006 at the SE margin of the Chřiby Upland was to answer if goshawk was excessively multiplied or, on the contrary, if its population was undersized (and if yes, what factors were responsible for its low population density) and moreover, if goshawk affected significantly the abundance of animals among the so called small game or among poultry and pigeon breeding.

On the basis of findings mentioned above it is possible to evaluate the present goshawk population as normal. Population density, the successfulness of nesting and feeding behaviour do not differ significantly from populations in comparable areas or from the country averages. Small game occurred virtually as a minority prey in the goshawk food. It means that goshawk was not a predator, which could affect significantly populations of these species at present. Losses of domestic animals (poultry, pigeons etc.) are also negligible

SOUHRN

Rozšíření a biologie jestřába lesního (*Accipiter gentilis* L.) v Chřibech

Cílem zkoumání potravního spektra jestřába lesního v roce 2004 a sledování stavu jeho populace v letech 2002–2006 na jihovýchodním okraji Chřibů bylo zjistit složení potravy, stav populace a vliv jestřába na chovy drobné zvěře, drůbeže a holubů. Zjištění stavu populace vysvětluje otázku, zda je jestřáb v Chřibech přemnožen či nikoliv. Zkoumáním potravního spektra bylo zjištěno, jakým druhům živočichů dává jestřáb přednost. Zájmové území zaujímalo cca 30 km^2, na kterém se vyskytovalo pět hnízdních lokalit. V okolí hnízd a přímo v hnízdech v době hnízdění bylo nalezeno celkem 387 zbytků kořisti. Po podrobné analýze byl stanoven podíl ptáků v potravě na 52%, podíl savců na 42% a podíl ostatních živočichů (hmyz, plazi atd.) na 6%. V potravě převažovaly nejvíce lesní druhy ptáků i savců. Drobná lovná zvěř se vyskytovala minimálně a v relativně únosné míře. Populace jestřába byla sledována od svatebního letu až do doby, kdy mláďata opustila hnízdo v časovém období pěti let. Hnízdění začínalo na zájmovém území svatebním letem koncem února až začátkem března. Sezení na vejcích začalo koncem března, ale zpravidla začátkem dubna. Zhruba za čtyřicet dní se líhla mláďata, která opustila hnízdo koncem května až začátkem června. Počet vajec byl průměrně 2,9 ks na jedno hnízdo. Nejvíce vajec bylo sneseno v roce 2003 (16 ks) a nejméně v roce 2002 (13 ks). Celkový počet snesených vajec za pět let byl 73 ks. Počet mláďat byl průměrně 2,72 ks na jedno hnízdo. Poměr pohlaví je 47% ku 53% ve prospěch samců. Celkový počet vylíhlých mláďat za pět let byl 68 ks, z toho bylo 36 samic a 32 samců. Průměrná líhnivost byla vysoká 93%. V roce 2004 byly též zjišťovány rozměry jednotlivých hnízd a jejich výška. Rozměry byly zjišťovány pouze u hnízd obsazených v roce 2004 a výšky byly zjišťovány i u hnízd neobsazených v tomto roce, ale nacházejících se na dané loka-

litě. Průměrná velikost hnízda d = 72,2 cm, průměrná výška vlastního hnízda byla 48 cm. Celkem bylo tedy změřeno pět obsazených hnízd. Hnízdo bylo v průměru umístěno ve výšce 21,3 m. Průměrná výška stromů, na kterých se hnízda nacházela, byla 32,5 m. Informace přispívají k posouzení a objasnění funkce jestřába lesního v současnosti.

potravní spektrum, populace, hnízdní období

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