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Ochrana dravcov na Slovensku

Svätoplukova 1,

SK-821 08 Bratislava, SLOVAKIA

Phone/Fax: +421.2.55573440

E-mail: dravce@dravce.sk

Internet: <http://www.dravce.sk>

Editor-in-Chief: +421.908.325218

E-mail: dravecky@spisnet.sk



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The Food of the Imperial Eagle (*Aquila heliaca*) in Slovakia

Potrava orla kráľovského (*Aquila heliaca*) na Slovensku

Jozef CHAVKO, Štefan DANKO, Ján OBUCH & Jozef MIHÓK

Chavko J, Danko Š, Obuch J & Mihók J 2007: The Food of the Imperial Eagle (*Aquila heliaca*) in Slovakia. Slovak Rapt J, 1: 1-18.

Abstract: In this work we assess the data on the food of the Imperial Eagle (*Aquila heliaca*) in two separate nesting populations: one in Western Slovakia (21 pairs), the other in Eastern Slovakia (30 pairs). In Western Slovakia between 1978 and 2005 we recorded a total of 562 food items, consisting of 33 species of animal. The species predominantly featuring in the food were the brown hare *Lepus europaeus* (40.2%), common pheasant *Phasianus colchicus* (17.3%), feral pigeon *Columba livia domestica* (11.7%) and the common hamster *Cricetus cricetus* (11.6%). In Eastern Slovakia between 1971 and 2005 we identified a total of 524 food items, made up of 30 animal species with slightly varying predominance of the same principal kinds of prey: *L. europaeus* (29.0%), *C. cricetus* (27.7%), *P. colchicus* (8.4%) and *Columba* sp. (8.2%). Imperial Eagles nesting in Slovakia are affected by the consequences of a marked reduction in population density of steppe-type rodents, especially ground squirrels (*Spermophilus citellus*) and hamsters (*C. cricetus*) and have become dependent for their food mainly on the prevalence of other small animals (*L. europaeus*, *P. colchicus*) and pigeons (*C. livia domestica*). Pairs nesting in neighbouring Hungary had similar prey, but a different order of predominance of the species (Haraszthy et al. 1996): *C. cricetus* (51.0%), *L. europaeus* (12.0%), *P. colchicus* (11.6%) and *S. citellus* (7.4%).

Abstrakt: V práci sme vyhodnotili údaje o potrave orla kráľovského (*Aquila heliaca*) dvoch oddelených hniezdných populácií: na západnom Slovensku (21 párov) a východnom Slovensku (30 párov). Na západnom Slovensku sme od roku 1978 do roku 2005 zistili spolu 562 kusov potravy, ktorú tvorilo 33 druhov živočíchov. Dominantne sú v potrave zastúpené druhy *Lepus europaeus* (40,2 %), *Phasianus colchicus* (17,3 %), *Columba livia domestica* (11,7 %) a *Cricetus cricetus* (11,6 %). Na východnom Slovensku sme od roku 1971 do roku 2005 zistili spolu 524 kusov potravy, ktorú tvorilo 30 druhov živočíchov s odlišnou dominanciou hlavných druhov koristi: *L. europaeus* (29,0 %), *C. cricetus* (27,7 %), *P. colchicus* (8,4 %) a *Columba* sp. (8,2 %). *A. heliaca* hniezdiace na Slovensku v dôsledku výrazného poklesu denzity stepných druhov hlodavcov, najmä *Spermophilus citellus* a *C. cricetus* sú potravne závislé predovšetkým na početnosti drobnej zveri (*L. europaeus*, *P. colchicus*) a holubov (*C. livia domestica*). Páry hniezdiace v susednom Maďarsku mali odlišné poradie dominantných druhov (Haraszthy et al. 1996): *C. cricetus* (51,0 %), *L. europaeus* (12,0 %), *P. colchicus* (11,6 %) a *S. citellus* (7,4 %).

Key words: Imperial Eagle, *Aquila heliaca*, food, Slovakia

Address for correspondence: Jozef Chavko, Ochrana dravcov na Slovensku, Svätoplukova 1, SK-841 02 Bratislava, Slovakia. E-mail: chavko@dravce.sk, www.dravce.sk

Štefan Danko, Zemplínske múzeum, Kostolné námestie 1, SK-071 01 Michalovce, Slovakia. E-mail: danko.stefan@slovanet.sk, Ján Obuch, Botanická záhrada Univerzity Komenského, SK-038 15 Blatnica, Slovakia. E-mail: obuch@rec.uniba.sk, Jozef Mihók, Buzulucká 23, SK-040 01 Košice, Slovakia. E-mail: mihok@centrum.sk.

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Introduction

The Carpathian Basin is an area featuring a partially-isolated population of Imperial Eagles nesting in the territories of Slovakia, Hungary and northern Serbia, while the boundary of their occurrence has extended in recent years into the Czech Republic and Austria. This area forms the north-western part of their total nesting area in Europe. This species most probably started nesting in Slovakia around the 1940's, and details of their progressive occupying of suitable nesting biotopes in both western and eastern Slovakia have been published. So far nobody has systematically studied the food of Imperial Eagles in Slovakia, and until recently there was a lack of similar data from Hungary as well. The causes of the expansion of the eagles' area of occurrence in Central Europe were studied by Sládek (1959), who also published some initial data regarding their food.

Methods

We gathered basic data on the prey of Imperial Eagles in two ways:

1. visual identification of species of captured animals during direct observation of nests,
2. identification of remains of prey collected from nests or their environs.

Remains of food were collected from nests during inspection for the purpose of ringing young birds, or after the young had left the nest. Part of the analyzed food remains consisted of items found below the nests or under the pairs' resting perches in the vicinity of the nests. These data were then summarized based on nesting pairs and individual seasons. Since some of the data were insufficiently representative, we proceeded to combine data from pairs nesting in the same orographic zone (Tables 1 and 3), and we linked seasons into five-year intervals (pentades, Tables 2 and 4). We assessed the food spectrum of *Aquila heliaca* using the method of seeking marked differences from the mean (MDFM, Obuch 2001). Distinct positive (+) and negative (-) deviations are shown in the contingency Tables 1 to 4, in which the prey types are ordered according to the customary zoological system. In Table 5 the diagnostic species are arranged into blocks with positive (+) MDFM, and other species are arranged according to decreasing prevalence.

Influences on the favourable state of hunting (feeding) territories

Imperial Eagles in Slovakia are specifically associated with the agricultural landscape, and for hunting they make use of the biotopes of lowland areas and the surrounding hills – typical cultivated environments. An exception still found in recent years consisted of pairs nesting in the Slovak Karst, hunting ground squirrels on the karst plateaux themselves. The diversity and availability of sources of food are influenced primarily by the human agricultural and game hunting usages of the countryside in which the eagles' hunting-grounds are located.

1. Agricultural usage

The range of foodstuffs and availability of food sources depend on the standard of agricultural environments achieved, their structure and character. During the spring, at the beginning of the vegetational period, hunting is more simple, but at this time of year food is only required for old pairs of eagles. While the young are being reared the countryside changes, and thus also the availability of prey which the parents need to catch in greater measure because of their hungry offspring. Environments which are practically unsuitable for hunting include for example tall maize or tobacco fields. In contrast the type of growth that is amenable includes alfalfa, lentils, and kinds of cereals with stem height not exceeding 60 cm. The structure and diversity of crops in the hunting territory have an important influence on the development of diversity and numbers of particular animal species. The conditions of Imperial Eagles' hunting-grounds in Slovakia are characterized by large-scale agricultural management, with individual monoculture plot areas ranging on average from 60 to 300 hectares. As a result of the intention to achieve the highest possible cereals production, during the period 1950 to 1970 water-logged fields were drained, boundaries were ploughed up, and woody thickets as well as solitary old trees were removed. The merging of smaller plots in the interests of creating extensive fields for more economical land management led to a marked change in the countryside, especially in terms of reduced variety in vegetation structure and a generally unfavourable impact on biodiversity. There was a particularly negative effect from the application of chemical substances in fertilizers, and there is currently still a significant threat mainly from the use of pesticides to eliminate small, ground mammals, especially rodents. On the other hand, there are clearly favourable consequences from the harvesting of food crops, which leads to significant numbers of animals

being killed, and these are often picked up by the eagles, especially from May onwards during the second half of their nesting period.

In contrast, summer and autumn ploughing has a definitely negative impact on the numbers of two important species of prey, the field hamster (*C. cricetus*) and the common vole (*Microtus arvalis*), precisely at the time when fully-reared young eagles fly into the hunting-grounds and begin hunting for themselves.

In spite of these circumstances it is nevertheless evident that Imperial Eagles have adapted to the current conditions. This is demonstrated by the good productivity of individual pairs and the constant increase in population numbers, which at the present time stand at 41 pairs within the whole territory of Slovakia (the counting included pairs in older nesting sites which have become disused in the meantime, so the number of monitored pairs quoted in the abstract and subsequently in this paper is actually higher).

The decisive factors for the availability of food sources in agriculturally-managed countryside are:

- the structure and proportions of appropriate kinds of crops planted, which create the biotope for key species of prey
- the cutting of perennial food crops, especially alfalfa, which creates opportunities for successful hunting or picking up of killed or wounded animals

- cereals harvesting, because the period following the young birds' flying from the nest and their introduction to the hunting-grounds provides important opportunities for hunting animals over extensive areas stripped of vegetation.

2. Game hunting usage

In Slovakia until around 1990 Imperial Eagles nested almost exclusively in upland areas. We assume that one of the principal factors for this upland nesting was the forcing of the raptors out of the lowlands, partly as a result of the exercising of hunting interests.

Game hunting in the eagles' hunting-grounds, including in many instances the illegal shooting of raptors, represents a significant negative factor. In our view, however, there appear to have been some positive changes in this respect, because since 1990 individual pairs have started nesting in the lowlands with increasing frequency, that is within their own hunting grounds. In Slovakia in 2005 up to 58% of pairs made their nests in lowland farming areas, while 42% nested in the hills.

In the interests of improving the favourable situation with regard to hunting grounds, it will be necessary to find a compromise between game-hunting usage and respecting the feeding requirements of Imperial Eagles as one of the most threatened species of eagle in Europe. The results of our study of the range of prey caught by these eagles

show in fact that their scant population in this country can in no relevant way threaten the interests or the role of game-hunting in the countryside, while the eagles' presence in the ecosystem on the other hand is of indispensable significance. In the period up to 1989 there was another unfavourable influence on the availability of food resulting from the mass killing of field hamsters (*C. cricetus*) by people intending to sell their skins.

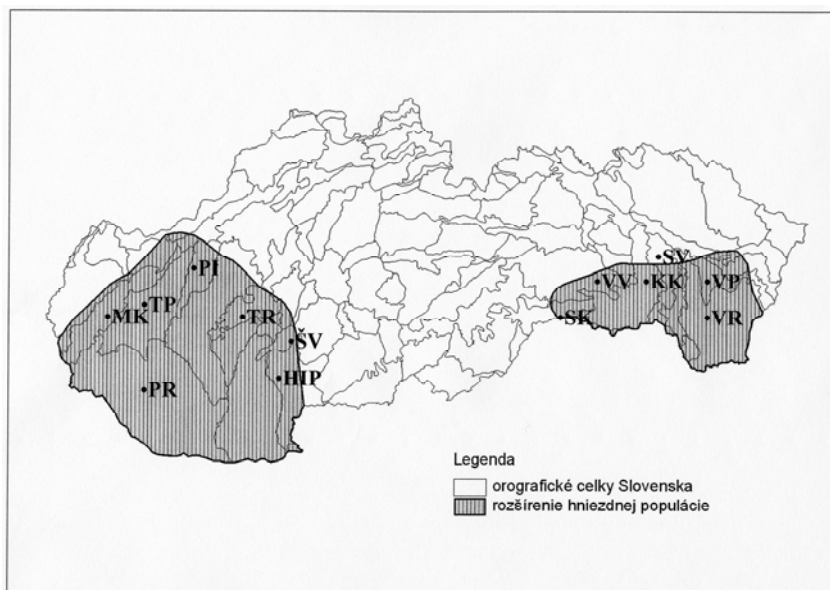


Fig. 1. Map showing the extent of nesting by Imperial Eagles in Slovakia. □ - orographic zones of Slovakia

Obr. 1. Mapa hniezdneho rozšírenia orla kráľovského na Slovensku. □ - orografické celky Slovenska

Results

A. Western Slovakia, Tables 1 and 2

In Western Slovakia we have been systematically monitoring the prey of *A. heliaca* since 1978 using a combined method of observing prey brought to nests and collecting remains for osteological identification.

Up to 2005 we acquired data on 562 items of prey. The predominant component consisted of mammals (Mammalia, 60.3%, 11 species). Birds were represented in lower numbers but greater diversity (Aves, 39.7%, 22 species). We evaluated material from 21 nesting pairs, whereby the most intensively monitored was the food of six pairs of *A. heliaca* nesting in the Little Carpathians. Comparing the food of individual nesting pairs, but also after cumulating the data based on orographic zones (see Table 1), we find marked similarity in the proportions of the food spectra represented, with only small deviations from the summary mean values. Most probably this is a result of the tendency of pairs nesting in the hills to hunt in adjacent farmland areas, just like the pairs nesting directly within these areas.

The predominant prey of *A. heliaca* in Western Slovakia is the brown hare (*Lepus europaeus*) 40.2%, mainly young animals with low body weight), followed by common pheasant (*Phasianus colchicus*) 17.3%, mainly younger birds or hens; no remains of cock birds were found, pigeons (*Columba livia domestica*) 11.7% and field hamsters (*Crictus cricetus*) 11.6%. Species found in lesser numbers in the food of *A. heliaca* were: magpie (*Pica pica*) 2.3%, roe deer (*Capreolus capreolus*) 2.1%, common vole (*Microtus arvalis*) 2.0%, ground squirrel (*Spermophilus citellus*) 1.6%, grey partridge (*Perdix perdix*) 1.6%, long-eared owl (*Asio otus*) 1.1%, wild mallard (*Anas platyrhynchos*) 1.1% and East European hedgehog (*Erinaceus concolor*) 1.1%. Other species (Mammalia, 5 species, Aves, 16 species) are chance prey for *A. heliaca* with occurrences below 1%. A markedly greater affinity for hunting magpies (*P. pica*) was found in one pair of *A. heliaca* on the Danube Plain. Ground squirrels (*S. citellus*) were hunted by only two pairs from the Little Carpathians, while hamsters (*C. cricetus*) were hunted in greater numbers by pairs from the Považský Inovec hills. There is also a relative balance in the kinds of prey when the data are evaluated season by season (Table 2). Only pheasants (*P. colchicus*) were hunted more frequently during the first phase of

monitoring (till the late 1980's), ground squirrels (*S. citellus*) in the late 1990's, and hamsters (*C. cricetus*) and magpies (*P. pica*) in the most recent years.

B. Eastern Slovakia, Tables 3 and 4

We have been monitoring the feeding of *A. heliaca* in the East Slovakian nesting grounds since 1970. Data are based mainly on observation of food items brought to nests, and of successful attacks on prey.

In the data on 524 food items collected up to the year 2005, mammals are more numerous (Mammalia, 71.4%, 13 species) than birds (Aves, 28.2%, 15 species). There were also rare findings of reptiles (Serpentes, 1 ex.) and fish (Pisces, 1 ex.).

The predominant species making up the food of *A. heliaca* are the brown hare (*L. europaeus*) 29.0% and field hamster (*C. cricetus*) 27.7%. The next most numerous prey are the common pheasant (*P. colchicus*) 8.4%, pigeons (*Columba* sp.) 8.2% and ground squirrel (*S. citellus*) 6.3%. Less common items of the eagles' food are the domestic hen (*Gallus gallus domestica*) 4.0%, rook (*Corvus frugilegus*) 2.7%, common vole (*M. arvalis*) 2.1%, raven (*Corvus corax*) 1.3% and domestic cat (*Felis catus domestica*) 1.2%. Other prey (Mammalia, 8 species, Aves, 12 species, Serpentes and Pisces) are represented in the food of *A. heliaca* with less than 1% incidence.

Ground squirrels (*S. citellus*) were hunted mainly by pairs nesting in the Slovakian Karst and the Košice Basin, although pairs nesting in the Volovské Hills also hunted them in these two orographic zones. Ground squirrels featured more frequently in the eagles' food in the early 1980's, but they have also been found occasionally in more recent years. Higher incidence of hamsters (*C. cricetus*) in the early 1970's and in the last five years is assumed to be linked with their long-term population cycles.

We found three nesting pairs specializing in hunting hamsters: one pair from the Volovské Hills and another from the Slanské Hills hunted them in the Košice Basin, and the third pair hunted them on the East Slovakian Plain. Field voles (*M. arvalis*) were found to be more numerous in the food of one nesting pair in the Košice Basin, and there was an interesting finding of at least two ravens (*C. corax*) in the nest of one pair in the Slanské Hills in 2005. This pair evidently specializes in ravens, since we also found them in the eagles' food in preceding years, namely 1996, 1997 and 2001.

A. Western Slovakia, Tables 1 and 2

Tab. 1. Western Slovakia, evaluation of data on the food of *A. heliaca* based on location of nests in orographic zones.

Tab. 1. Západné Slovensko, vyhodnotenie dát o potrave *A. heliaca* podľa umiestnenia hniezdisk v orografických celkoch.

Species/Orographic zones	MK	PR	TP	PI	TR	ŠV	HIP	Suma	%
<i>Erinaceus concolor</i>	5					1		6	1.07
<i>Lepus europaeus</i>	147	8	10	31	9	-10	11	226	40.21
<i>Spermophilus citellus</i>	9							9	1.60
<i>Rattus norvegicus</i>	2							2	0.36
<i>Cricetus cricetus</i>	41	1	3	+16	3	-0	1	65	11.57
<i>Ondatra zibethicus</i>	1							1	0.18
<i>Microtus arvalis</i>	4			5	1	1		11	1.96
<i>Felis catus dom.</i>	4							4	0.71
<i>Sus scrofa</i>				1				1	0.18
<i>Capreolus capreolus</i>	8			1		2	1	12	2.14
<i>Ovis musimon</i>	2							2	0.36
Mammalia	223	9	13	54	13	-14	13	339	60.32
<i>Anas platyrhynchos</i>	5			1				6	1.07
<i>Buteo buteo</i>	1						1	2	0.36
<i>Falco tinnunculus</i>						1		1	0.18
<i>Perdix perdix</i>	6			2		1		9	1.60
<i>Coturnix coturnix</i>					1	1	1	3	0.53
<i>Phasianus colchicus</i>	72	2	1	1-7	4	8	3	97	17.26
<i>Gallus gallus dom.</i>						1		1	0.18
<i>Meleagris gallopavo dom.</i>						1		1	0.18
<i>Vanellus vanellus</i>	1							1	0.18
<i>Larus ridibundus</i>				1				1	0.18
<i>Columba livia dom.</i>	42	3	2	12		6	1	66	11.74
<i>Columba palumbus</i>						1		1	0.18
<i>Streptopelia decaocto</i>	1							1	0.18
<i>Asio otus</i>	4			2				6	1.07
<i>Strix aluco</i>	2							2	0.36
<i>Lullula arborea</i>						1		1	0.18
<i>Coccothraustes coccothr.</i>	1							1	0.18
<i>Sturnus vulgaris</i>	1							1	0.18
<i>Pica pica</i>	-1	+8		2		2		13	2.31
<i>Corvus corax</i>							1	1	0.18
<i>Corvus frugilegus</i>	2			1		3		6	1.07
<i>Corvus corone</i>	1		1					2	0.36
Aves	140	13	4	28	5	+26	7	223	39.68
Total	363	22	17	82	18	40	20	562	100.00
H' diversity index	1.94	1.37	1.20	1.89	1.30	2.28	1.51	2.05	

Key:

Orographic zones: MK – Little Carpathians, PR – Danube Plain, TP – Trnava Hills, PI – Považský Inovec, TR – Tribeč, ŠV – Štiavnica Hills, HIP – Hron and Ipeľ Hills
 +, - : positive and negative deviations from mean values (Obuch 2001)

Vysvetlivky:

Orografický celok: MK – Malé Karpaty, PR – Podunajská rovina, TP – Trnavská pahorkatina, PI – Považský Inovec, TR – Tribeč, ŠV – Štiavnické vrchy, HIP – Hronská a Ipeľská pahorkatina
 +, - : kladné a záporné odchýlky od priemeru (Obuch 2001)

Tab. 2. Western Slovakia, summarization of data on the food of *A. heliaca* into five-year periods (pentads).

Tab. 2. Západné Slovensko, zlučenie dát o potrave *A. heliaca* do päťročných období (pentád).

Species \ Pentads	78-79	80-84	85-89	90-94	95-99	00-04	2005	Suma	%
<i>Erinaceus concolor</i>		2	2	1		1		6	1.07
<i>Lepus europaeus</i>	16	35	44	28	16	73	14	226	40.21
<i>Spermophilus citellus</i>			1		+ 8			9	1.60
<i>Rattus norvegicus</i>		2						2	0.36
<i>Cricetus cricetus</i>	2	7	11	3	5	+ 30	7	65	11.57
<i>Ondatra zibethicus</i>							1	1	0.18
<i>Microtus arvalis</i>		4		2	3		2	11	1.96
<i>Felis catus dom.</i>		1				1	2	4	0.71
<i>Sus scrofa</i>						1		1	0.18
<i>Capreolus capreolus</i>		1	6	1		3	1	12	2.14
<i>Ovis musimon</i>				2				2	0.36
Mammalia	18	52	64	37	32	109	27	339	60.32
<i>Anas platyrhynchos</i>			3	2			1	6	1.07
<i>Buteo buteo</i>						1	1	2	0.36
<i>Falco tinnunculus</i>						1		1	0.18
<i>Perdix perdix</i>	2	4				3		9	1.60
<i>Coturnix coturnix</i>						3		3	0.53
<i>Phasianus colchicus</i>	+ 14	+ 25	18	8	8	- 19	5	97	17.26
<i>Gallus gallus dom.</i>						1		1	0.18
<i>Meleagris gallopavo dom.</i>						1		1	0.18
<i>Vanellus vanellus</i>			1					1	0.18
<i>Larus ridibundus</i>							1	1	0.18
<i>Columba livia dom.</i>	3	13	8	7	8	22	5	66	11.74
<i>Columba palumbus</i>						1		1	0.18
<i>Streptopelia decaocto</i>			1					1	0.18
<i>Asio otus</i>	1	1	2			2		6	1.07
<i>Strix aluco</i>				2				2	0.36
<i>Lullula arborea</i>						1		1	0.18
<i>Coccothraustes coccothr.</i>						1		1	0.18
<i>Sturnus vulgaris</i>				1				1	0.18
<i>Pica pica</i>			1			+ 11	1	13	2.31
<i>Corvus corax</i>							1	1	0.18
<i>Corvus frugilegus</i>			1	1		3	1	6	1.07
<i>Corvus corone</i>					1	1		2	0.36
Aves	20	43	35	21	17	71	16	223	39.68
Total	38	95	99	58	49	180	43	562	100.00
H' diversity index	1.34	1.76	1.78	1.78	1.74	1.97	2.15	2.05	

Key:

+, - : positive and negative deviations from the mean value (Obuch 2001)

Vysvetlivky:

+, - : kladné a záporné odchýlky od priemeru (Obuch 2001)

B. Eastern Slovakia, Tables 3 and 4

Tab. 3. Eastern Slovakia, evaluation of data on the food of *A. heliaca* based on location of nests in orographic zones.
Tab. 3. Východné Slovensko, vyhodnotenie dát o potrave *A. heliaca* podľa umiestnenia hniezdisk v orografických celkoch.

Species/Orographic zones	SK	VV	KK	SV	ZV	VP	VR	Suma	%
<i>Erinaceus concolor</i>				2			1	3	0.57
<i>Talpa europaea</i>						1		1	0.19
<i>Lepus europaeus</i>		- 10	- 8	63	10	15	46	152	29.01
<i>Spermophilus citellus</i>	+ 5	+ 10	+ 15	- 2	1		- 0	33	6.30
<i>Rattus norvegicus</i>			1	4				5	0.95
<i>Cricetus cricetus</i>		24	16	51	7	- 2	45	145	27.67
<i>Ondatra zibethicus</i>				1				1	0.19
<i>Microtus arvalis</i>			+ 7	4				11	2.10
<i>Canis lupus fam.</i>	2							2	0.38
<i>Mustela nivalis</i>				2				2	0.38
<i>Felis catus dom.</i>			4	1		1		6	1.15
<i>Sus scrofa</i>				1			2	3	0.57
<i>Capreolus capreolus</i>		4		3			3	10	1.91
Mammalia	7	48	51	134	18	19	97	374	71.37
<i>Anas platyrhynchos</i>							3	3	0.57
<i>Anas platyrhynchos dom.</i>				1				1	0.19
<i>Phasianus colchicus</i>		- 0	3	15	5	6	15	44	8.40
<i>Gallus gallus dom.</i>	1	3	1	11	1	2	2	21	4.01
<i>Meleagris gallopavo dom.</i>				1				1	0.19
<i>Vanellus vanellus</i>			1					1	0.19
<i>Columba livia dom.</i>		+ 8	3	6	3		3	23	4.39
<i>Columba sp.</i>		1		13		2	4	20	3.82
<i>Cuculus canorus</i>				1				1	0.19
<i>Asio otus</i>				1				1	0.19
<i>Strix uralensis</i>				1				1	0.19
<i>Turdus sp.</i>				1				1	0.19
<i>Pica pica</i>				1		2		3	0.57
<i>Corvus corax</i>				7				7	1.34
<i>Corvus frugilegus</i>			1	6	4	1	2	14	2.67
<i>Corvus corone</i>				2				2	0.38
Passeriformes sp.				1				1	0.19
Aves sp.		2		1				3	0.57
Aves	1	14	- 9	69	13	13	29	148	28.24
Serpentes sp.	1							1	0.19
Pisces sp.	1							1	0.19
Total	10	62	60	203	31	32	126	524	100.00
H' diversity index	1.36	1.72	1.97	2.27	1.71	1.69	1.60	2.25	

Key:

Orographic zones: SK – Slovakian Karst, VV – Volovské Hills, KK – Košice Basin, SV – Slanské Hills, ZV – Zemplínske Hills, VP – East Slovakian Hills, VR – East Slovakian Plain
 +, - : positive and negative deviations from the mean value (Obuch 2001)

Vysvetlivky:

Orografický celok: SK – Slovenský kras, VV – Volovské vrchy, KK – Košická kotlina, SV – Slanské vrchy, ZV – Zemplínske vrchy, VP – Východoslovenská pahorkatina, VR – Východoslovenská rovina
 +, - : kladné a záporné odchýlky od priemeru (Obuch 2001)

Tab. 4. Eastern Slovakia, summarization of data on the food of *A. heliaca* into five-year periods (pentads).

Tab. 4. Východné Slovensko, zlučenie dát o potrave *A. heliaca* do päťročných cyklov (pentád).

Species \ Pentads	70-74	75-79	80-84	85-89	90-94	95-99	00-04	2005	Suma	%
<i>Erinaceus concolor</i>	1				1		1		3	0.57
<i>Talpa europaea</i>			1						1	0.19
<i>Lepus europaeus</i>	13	9	6	11	13	39	44	17	152	29.01
<i>Spermophilus citellus</i>	3		+ 10		4	14	- 2		33	6.30
<i>Rattus norvegicus</i>	1	1				2	1		5	0.95
<i>Cricetus cricetus</i>	+ 23	6	- 0	10	18	31	+ 46	11	145	27.67
<i>Ondatra zibethicus</i>	1								1	0.19
<i>Microtus arvalis</i>	1		3			7			11	2.10
<i>Canis lupus fam.</i>					1	1			2	0.38
<i>Mustela nivalis</i>	2								2	0.38
<i>Felis catus dom.</i>						4	2		6	1.15
<i>Sus scrofa</i>						1	2		3	0.57
<i>Capreolus capreolus</i>					3	3	1	3	10	1.91
Mammalia	45	16	20	21	40	102	99	31	374	71.37
<i>Anas platyrhynchos</i>							2	1	3	0.57
<i>Anas platyrhynchos dom.</i>						1			1	0.19
<i>Phasianus colchicus</i>	3	5			6	10	11	9	44	8.40
<i>Gallus gallus dom.</i>			2	5	3	6	5		21	4.01
<i>Meleagris gallopavo dom.</i>					1				1	0.19
<i>Vanellus vanellus</i>						1			1	0.19
<i>Columba livia dom.</i>			1	+ 6	6	7	3		23	4.39
<i>Columba sp.</i>		5		1		8	1	5	20	3.82
<i>Cuculus canorus</i>								1	1	0.19
<i>Asio otus</i>								1	1	0.19
<i>Strix uralensis</i>							1		1	0.19
<i>Turdus sp.</i>		1							1	0.19
<i>Pica pica</i>		1			1			1	3	0.57
<i>Corvus corax</i>					1	3	1	2	7	1.34
<i>Corvus frugilegus</i>				2	6	2	2	2	14	2.67
<i>Corvus corone</i>		1		1					2	0.38
Passeriformes sp.	1								1	0.19
Aves sp.		1			1	1			3	0.57
Aves	- 4	14	3	15	25	39	- 26	+ 22	148	28.24
Serpentes sp.	1								1	0.19
Pisces sp.					1				1	0.19
Total	50	30	23	36	66	141	125	53	524	100.00
H' diversity index	1.64	1.85	1.46	1.65	2.22	2.26	1.73	1.92	2.25	

Key:

+, - : positive and negative deviations from the mean value (Obuch 2001)

Vysvetlivky:

+, - : kladné a záporné odchýlky od priemeru (Obuch 2001)

Discussion

The first raw data on the food of Imperial Eagles in Slovakia were from the 1950's, published by Sládek (1959). A nesting site up at Tribeč revealed remains of hamsters, ground squirrels, young hares, feral pigeons and unspecified reptiles. Remains of hares, stock doves and collared doves were found at a nesting site up at Inovec, and a nest in the Little Carpathians contained parts of two young hares, a partridge and a hen pheasant. In the Košice Basin an eagle was observed hunting ground squirrels. Mošanský (1956) found the beak and bones of a partridge in the stomach of an adult eagle. Information on the feeding of young buzzards in the nest was provided by Harvančík and Šnirer (1987). Part of the data published by Danko (1973) is used in this article. However, we have not found any other data on the food of Imperial Eagles in Slovakia in the literature. In Southern Moravia Horák (1998, 2000) found 5 hamsters, 3 young hares, one ermine and one other young rodent in eagles' nests.

The principal ways of hunting prey and acquiring food among Imperial Eagles are:

- attacking spotted prey from passing or circling flight,
- attacking spotted prey from perches in elevated locations,
- hunting wounded animals or collecting carrion
- kleptoparasitism
- snatching other birds' young from their nests

A surprisingly high proportion of pigeons (*C. livia dom.*) 11.7 % was found in the food of Imperial Eagles in Western Slovakia.

We observed two ways of acquiring this kind of prey:

1. Kleptoparasitism, in which the eagles steal prey from other raptors (falcons, hawks) by attacking an individual bird of another species either carrying prey in passing flight, or tearing at the prey on the ground. After some pursuit the attacked bird usually releases the prey in the interests of its own safety, and the eagle then takes it. For more details about kleptoparasitism by *A. heliaca*, see the article by Danko and Mihók on pages 29-33 of this edition of the journal.

2. Active hunting of pigeons, which has been observed on at least four occasions at M. R. Štefánik Airport in Bratislava. An eagle dropped from a height to attack a large flock of pigeons (*C. livia*

dom.) feeding in low vegetation or stubble. It then took advantage of the confusion among the flying-up birds and usually caught a pigeon in the air between 10 to 20 metres above the ground (Šarvari in verb.). We have observed an eagle catching a lapwing (*Vanellus vanellus*) in a similar way, dropping to the ground from a great height about 70 metres away from where a group of lapwings were sitting, but then continuing the attack at high speed just above the ground, making use of the surprise factor to successfully catch the substantially more agile prey.

The common vole (*M. arvalis*) is of special significance in the food of *A. heliaca*. It apparently makes up only a small part of the collected samples (around 2%), but demonstrating its true proportion is complicated by two factors. The first is the fact that the eagles hunt voles mainly outside of the nesting season, so remains are rarely found in nests, and the second is that they are almost completely digested in the eagle's stomach, so that insufficient remains of bones are left to be found in regurgitations. Eagles most commonly hunt voles from observation perches (trees, high bushes, haystacks), or by taking off from the ground and then flying in from a reduced height (between 20 to 50 metres). In late summer 2005, around 60 days after flying from the nest, a young *A. heliaca* was observed hunting voles in alfalfa stubble in the presence of an adult female (mother). It took off from the ground, flew up several metres (2 – 10 m) and then dropped obliquely onto the vole it had spotted. In this way the young eagle was able to catch new prey several times in succession, because at that time there was an unusually large population of voles in that place (Izakovič in verb.).

In the Čunovo area near Bratislava a juvenile Imperial Eagle was observed trying to hunt down an isolated and evidently not flying (probably shot down) bean goose (*Anser fabalis*). When the eagle attacked, the goose stretched out its neck and launched itself hissing at the raptor. After five or six repeatedly unsuccessful attacks, the eagle finally gave up and flew away.

Evidently a frequent way of gaining food for the eagles is to collect up any injured animals or carcasses which they find. In Eastern Slovakia some pairs have been artificially fed by people laying out carcasses for them (*F. catus dom.*, *C. cricetus*, *Eri-naceus concolor*, *C. livia dom.*).

Another way of acquiring prey is to snatch the young of other bird species from their nests, or to hunt them in the vicinity of their nests. This fact is most frequently documented by finds of young mag-

pies (*P. pica*). In the nest of a pair of eagles in Western Slovakia, on a single inspection we found the remains of as many as 5 young magpies. In other pairs' nests we have found the young of species such as *C. frugilegus*, *C. corax*, *V. vanellus*, *Strix aluco*, *Asio otus*, *Buteo buteo* and *Falco tinnunculus*. Another very interesting find was remains of a young woodlark (*Lullula arborea*) in an eagles' nest in the Štiavnické Hills (see Fig. 11).

In the cases of finds of ungulates such as roe deer (*Capreolus capreolus*), mouflon (*Ovis musimon*) and wild pig (*Sus scrofa*), these were exclusively less than week-old young, or parts of their bodies which the eagles had most probably found as carcasses after mowing, although the possibility of their having been hunted should not be ruled out either. In the case of the pigs, in fact, we have no confirmation of whether they were domestic or wild. Some of the species of animals and birds may have been instances of carcasses thrown away by people. Collisions of eagles with road vehicles or trains indicate that their prey could also consist of road-kill or rail-kill victims picked up from the ground.

Pairs nesting in the hills evidently also make use of opportunities for hunting other birds in the vicinity of their nests, as demonstrated by finds of captured species such as tawny and ural owls (*Strix aluco* and *S. uralensis*).

Based on finds of prey in eagles' nests, the maximum weight of an individual catch was estimated at up to 1.4 kg. Remains of larger and heavier animals probably come from carcasses found by eagles and carried to their nests in pieces, but in any case these were isolated cases. Adult eagles sometimes bring prey to the nest without the head, or already partly consumed. One instance was observed of an eagle in flight eating the head and upper body of a ground squirrel (*S. citellus*) it had caught.

Food of *A. heliaca* in the Pannonian Basin, Table. 5

Despite the tradition of systematic observation of eagles in Hungary, almost no data regarding their food have been published there. Tapfer (1973) mentions that according to his observations in the 1960's eagles hunted 60-70% ground squirrels and 20-25% hamsters. On rare occasions he found young hares or carcasses, in one case of a young domestic duck. Bécsy (1974) observed one eagles' nest in 1971-72 and found 8 hamsters, 3 hares and 2 pheasants in their food. The first complete data on Imperial Eagles' food were published much later by Haraszthy

et al. (1996). In comparing almost identical sizes of *A. heliaca* food samples from three areas of the Pannonian Basin (Table 5) with our Slovakian ones, we can see some marked differences. In the population from Western Slovakia the numbers of hunted birds (Aves) are higher, but especially certain species of small animals: hare (*L. europaeus*), pheasant (*P. colchicus*), partridge (*P. perdix*) and magpie (*P. pica*). Pigeons (*C. livia dom.*) were an important component of the food. In the East Slovakian population the incidence of prevalent species (*L. europaeus* and *C. cricetus*) is similar to the average in Pannonia. Compared with that average, however, there is more numerous incidence of some subdominant species in the food: hen (*G. gallus dom.*), rook (*C. frugilegus*) and raven (*C. corax*). The data from Hungary (Haraszthy et al. 1996) feature more numerous incidence of original steppe rodent species: hamster (*C. cricetus*) and ground squirrel (*S. citellus*). Certain more numerous species of *A. heliaca* prey show the same relative incidence in the samples from the observed areas of Pannonia, in particular *C. capreolus*, *M. arvalis*, *E. concolor* and *F. catus dom.* Some data on the food of Imperial Eagles in Vojnatina in Northern Serbia were published by Pelle (1986). The principal component consisted of ground squirrels (*S. citellus*), but young rooks (*C. frugilegus*) appear there more frequently, and there was probably a local nesting colony from which the eagles snatched the young of long-eared owls (*A. otus*). In the Pannonian Basin *A. heliaca* is dependent for its food on hunting in intensively-farmed agricultural country. Steppe species of prey which are optimal in size (*C. cricetus* and *S. citellus*) are replaced with others whose density is influenced by farming and hunting activities (*L. europaeus*, *P. colchicus*, *P. perdix*, *C. capreolus*, and muskrat *Ondatra zibethicus*) as well as domestic animals (mainly *C. livia dom.*, *G. gallus dom.* a *F. catus dom.*).

In data on the food of *A. heliaca* from an area of natural steppes almost free of human influence in Georgia (Abuladze 1996), smaller rodent species are still prevalent (Rodentia, 54%). Birds are less frequent prey, but there is greater incidence of reptiles (Sauria, 30%). In the steppes of North Kazakhstan (Naurzumskij zapovednik, Zabarnyj 1968), in addition to the predominant water vole (*Arvicola terrestris*) 24%, the eagles hunt greater numbers of marmots (*Marmota bobac*) 16%. In the desert area near Lake Aral (Lobačov 1967), after tawny ground squirrels (*Citellus fulvus*) 60% the next most frequent prey were great gerbils (*Rhombomys opimus*) 29%.

Tab. 5. Comparison of food of *A. heliaca* in three areas of Pannonia, adapted table.
Tab. 5. Porovnanie potravy *A. heliaca* v troch oblastiach Panónie, usporiadaná tabuľka.

Species \ Region	ZS	VS	Maď	Suma	%
<i>Lepus europaeus</i>	+226	152	- 73	451	26.59
<i>Phasianus colchicus</i>	+ 97	- 44	71	212	12.50
<i>Columba sp.</i>	+ 67	43	- 21	131	7.72
<i>Pica pica</i>	+ 13	3	- 1	17	1.00
<i>Perdix perdix</i>	+ 9		1	10	0.59
<i>Gallus gallus dom.</i>	-- 1	+ 21	20	42	2.48
<i>Corvus corone+frugilegus</i>	8	+ 16	7	31	1.83
<i>Corvus corax</i>	1	+ 7		8	0.47
<i>Cricetus cricetus</i>	-- 65	145	+311	521	30.72
<i>Spermophilus citellus</i>	- 9	33	+ 45	87	5.13
<i>Ondatra zibethicus</i>	1	1	+ 9	11	0.65
<i>Capreolus capreolus</i>	12	10	11	33	1.95
<i>Microtus arvalis</i>	11	11	5	27	1.59
<i>Erinaceus concolor</i>	6	3	11	20	1.18
<i>Felis catus dom.</i>	4	6	3	13	0.77
<i>Anas platyrhynchos</i>	6	3		9	0.53
<i>Rattus norvegicus</i>	2	5	1	8	0.47
<i>Asio otus</i>	6	1	1	8	0.47
<i>Buteo buteo</i>	2		3	5	0.29
<i>Sus scrofa</i>	1	3	1	5	0.29
<i>Coturnix coturnix</i>	3		1	4	0.24
<i>Meleagris gallopavo dom.</i>	1	1	1	3	0.18
<i>Canis lupus fam.</i>		2	1	3	0.18
<i>Turdus sp.</i>		1	2	3	0.18
<i>Vanellus vanellus</i>	1	1		2	0.12
<i>Streptopelia decaocto</i>	1		1	2	0.12
<i>Falco tinnunculus</i>	1		1	2	0.12
Mammalia	339	374	474	1187	69.99
Aves	+223	148	- 136	507	29.89
Total	562	524	610	1696	100.00
H' diversity index	2.04	2.18	1.82	2.16	

Key:

+, - : positive and negative deviations from the mean value (Obuch 2001)

Species recorded in the food in only one area:

ZS (Western Slovakia): *Ovis musimon* 2, *Strix aluco* 2, *Larus ridibundus* 1, *Lullula arborea* 1, *Sturnus vulgaris* 1, *Coccothraustes coccothraustes* 1

VS (Eastern Slovakia): *Talpa europaea* 1, *Mustela nivalis* 2, *Anas platyrhynchos dom.* 1, *Cuculus canorus* 1, *Strix uralensis* 1, *Serpentes sp.* 1, *Pisces sp.* 1

Maď (Hungary): *Glis glis* 1, *Vulpes vulpes* 1, *Anser anser dom.* 1, *Pernis apivorus* 1, *Turdus merula* 1

Vysvetlivky:

+, - : kladné a záporné odchýlky od priemeru (Obuch 2001)

Druhy zaznamenané v potrave len v jednej oblasti:

ZS (západné Slovensko): *Ovis musimon* 2, *Strix aluco* 2, *Larus ridibundus* 1, *Lullula arborea* 1, *Sturnus vulgaris* 1, *Coccothraustes coccothraustes* 1

VS (východné Slovensko): *Talpa europaea* 1, *Mustela nivalis* 2, *Anas platyrhynchos dom.* 1, *Cuculus canorus* 1, *Strix uralensis* 1, *Serpentes sp.* 1, *Pisces sp.* 1

Maď (Maďarsko): *Glis glis* 1, *Vulpes vulpes* 1, *Anser anser dom.* 1, *Pernis apivorus* 1, *Turdus merula* 1

Organized protection measures

One of the direct consequences of the trend of gradually-increasing numbers of *A. heliaca* in Slovakia can be identified above all in the active and targeted management of protection carried out over a long period by the Group for Protection of Raptors and Owls in Slovakia (SVODAS) in cooperation with several branches of the State Nature Conservancy of the Slovak Republic.

It is not insignificant that both eagle populations in Slovakia are able in our agricultural conditions to find such amounts of appropriate food as are indispensable for their positive development. This is demonstrated by the fact that the population is growing year on year by several new nesting pairs. Several projects have been implemented using funds from domestic and foreign sources, most recently however mainly from the EU.

Since 2003 a wider partnership of cooperation between the organizations Raptor Protection of Slovakia (RPS, successor to SVODAS), SNC SR and Hungarian specialists from MME-Bird Life has produced the project named "Protection of the Imperial Eagle in the Slovakian part of the Carpathian Mountains".

Among the aims of the protection programme, the principal one is to bring influence to bear on the key processes of usage of the countryside, with regard to improving the feeding and reproducing conditions of Imperial Eagles. As a result of the demise of the pasturing method of countryside management, from 1980 onwards there was a critical decline in numbers of ground squirrels (*S. citellus*) in Slovakia. The great majority of their colonies in the foothills disappeared, and with them also the bonds established with the historical nesting sites of the pairs of *A. heliaca* in the mountains. The disappearance of the ground squirrels led to a significant loss of part of the eagles' food sources, intensified by the demise of important pasture and meadow biotopes. In several selected locations, therefore, their restoration has been undertaken in the interests of improving the numbers and diversity of animal species making up the Imperial Eagles' food sources.

Súhrn

Karpatská panva je oblasťou, kde sa vyskytuje čiastočne izolovaná populácia orla kráľovského, hniezdiaca na území Maďarska, Slovenska, severnej

časti Srbska a okraj rozšírenia v posledných rokoch zasahuje aj na územie Českej republiky a Rakúska. V Európe tvorí severozápadnú časť jej celkového hniezdneho areálu. Druh s najväčšou pravdepodobnosťou začal na území Slovenska hniezdiť približne v 40-tych rokoch minulého storočia. Boli publikované údaje o postupnom obsadzovaní vhodných hniezdných biotopov na západnom i východnom Slovensku. Zatiaľ sa potravou tohto druhu na Slovensku nikto systematicky nezaoberal a donedávna chýbali o tom údaje aj z územia Maďarska. O príčinách rozširovania areálu orla kráľovského v Strednej Európe písal Sládek (1959), ktorý uverejnil aj niekoľko prvých údajov o jeho potrave. Na hniezdisku v Tribčici boli nájdené zvyšky chrčkov, sysľov, mladých zajacov, domácich holubov a bližšie neuvedené plazy. Na hniezdisku v Inovci boli zistené zvyšky zajaca, holuba plúžika a hrdličky poľnej. Na hniezdišti v Malých Karpatoch zistili dvakrát mladého zajaca a po jednom jarabicu a sliepku bažanta. V Košickej kotline bol pozorovaný orol pri love sysľov. Mošanský (1956) našiel v žalúdku dospelého orla zobák a kosti jarabice. O požívaní mláďat myšiakov lesných na ich hniezde informovali Harvančík a Šnír (1987). Časť údajov publikovaná Dankom (1973) je spracovaná v tomto článku. Viac údajov o potrave orlov kráľovských na Slovensku sme v literatúre nenašli. Na južnej Morave našiel Horák (1998, 2000) v hniezdach orlov 5x chrčka, 3x mladého zajaca, 1x hranostaja a 1x malého hlodavca.

Metodika

Základné údaje o koristi *A. heliaca* sme získavali dvoma spôsobmi:

1. vizuálnym určením druhov ulovených živočíchov pri priamej kontrole hniezd
2. determináciou zvyškov koristi pozbieraných na hniezdach, alebo v ich blízkosti

V práci sme vyhodnotili údaje o potrave orla kráľovského (*Aquila heliaca*) dvoch oddelených hniezdných populácií na západnom a východnom Slovensku. Dáta sme skumulovali podľa hniezdných párov a podľa sezón. Nakoľko niektoré údaje boli málo reprezentatívne, pristúpili sme k zlučovaniu dát od párov, hniezdiacich v rovnakom orografickom celku (Tab. 1 a 3) a sezóny sme spájali do päťročných intervalov (pentád, Tab. 2 a 4). Potravné spektrá *A. heliaca* sme vyhodnotili metódou zisťovania výrazných odchýlok od priemeru (marked differences

from the mean - MDFM, Obuch 2001). Výrazné kladné (+) a záporné (-) odchýlky sú vyznačené v kontingenčných tabuľkách č. 1– 4, kde je poradie druhov koristi usporiadané podľa zaužívaného zoológického systému. V Tab. 5 sú diagnostické druhy usporiadané do blokov s kladnými (+) MDFM, ostatné druhy sú usporiadané podľa klesajúcej dominancie. Pod tabuľkou sú vypísané druhy s výskytom zaznamenaným len v jednej oblasti.

Výsledky:

Diverzitu a dostupnosť potravných zdrojov orlov kráľovských ovplyvňuje predovšetkým poľnohospodárske a poľovnícke využívanie krajiny, v ktorej sú situované ich lovné teritória.

Na západnom Slovensku systematicky sledujeme koristiť *A. heliaca* od r. 1978 kombinovanou metódou zaznamenávania koristi na hniezde a zberu osteologických zvyškov s ich následnou determináciou. Vyhodnotili sme materiál od 21 hniezdných párov (uvedený počet oproti súčasnosti je vyšší, lebo boli hodnotené aj páry na hniezdiskách, ktoré medzičasom zanikli), pričom najintenzívnejšie bola sledovaná potrava 6 párov *A. heliaca*, hniezdiacich v Malých Karpatoch. Do roku 2005 sme získali údaje o 562 kusoch koristi. Dominantnú zložku tvorili cicavce (Mammalia, 60,3 %, 11 druhov). Vtáky sú zastúpené menej početne, ale s väčšou druhovou diverzitou (Aves, 39,7 %, 22 druhov). Pri porovnaní potravy jednotlivých hniezdných párov, ale tiež po kumulácii údajov podľa orografických celkov (Tab. 1) zisťujeme značnú podobnosť v pomernom zastúpení potravných spektier len s malými odchýlkami od sumárneho priemeru. S najväčšou pravdepodobnosťou je to dôsledkom toho, že páry hniezdiace v pohorí zaletovali na lov do agrocenóz, rovnako ako páry hniezdiace priamo v agrocenózach. Dominantnou koristiťou *A. heliaca* na západnom Slovensku je zajac poľný (*Lepus europaeus*, 40,2 %, predovšetkým mladé jedince s nižšou hmotnosťou), po ňom nasleduje bažant (*Phasianus colchicus*, 17,3 %, predovšetkým mladšie jedince alebo sliepky, zvyšky kohútov sme nezistili), holub (*Columba livia domestica*, 11,7 %) a chrček roľný (*Cricetus cricetus*, 11,6 %). Menej početnými druhmi zistenými v potrave boli: straka (*Pica pica*, 2,3 %), srnec (*Capreolus capreolus*, 2,1 %), hraboš poľný (*Microtus arvalis*, 2,0 %), syseľ (*Spermophilus citellus*, 1,6 %) jarabica (*Perdix perdix*, 1,6 %), myšiarka ušatá (*Asio otus*, 1,1 %), kačica divá (*Anas platyrhynchos*, 1,1 %) a jež bledý (*Erinaceus concolor*, 1,1 %). Ostatné druhy (Mammalia, 5 druhov,

Aves, 16 druhov) sú náhodnou koristiťou *A. heliaca* s dominanciou pod 1 %. Výraznejšie vyššia afinita k loveniu strák (*P. pica*) bola zistená u jedného páru *A. heliaca* na Podunajskej rovine. Sysle (*S. citellus*) lovili len 2 páry z Malých Karpát, chrčky (*C. cricetus*) lovili vo vyššom počte páry z Považského Inovca. Pomerne vyrovnané je tiež zastúpenie druhov koristi pri vyhodnotení materiálu podľa pentád (tab. 2). Len bažant (*P. colchicus*) bol častejšie lovený v prvej fáze sledovania (do konca 80. rokov), syseľ (*S. citellus*) koncom 90. rokov, chrček (*C. cricetus*) a straka (*P. pica*) v posledných rokoch.

Potravu *A. heliaca* na východoslovenských hniezdiskách sledujeme od r. 1970. Vyhodnotili sme materiál od 30 hniezdných párov (uvedený počet oproti súčasnosti je vyšší, lebo boli hodnotené aj páry na hniezdiskách, ktoré medzičasom zanikli). Prevažujú údaje o prinesenej potrave na hniezdo a údaje o pozorovaniach úspešných útokov na koristiť. Potrava podľa orografických celkov je v tab. 3, podľa pentád v tab. 4. V údajoch o 524 kusoch potravy získaných do roku 2005 sú početnejšie cicavce (Mammalia, 71,4 %, 13 druhov) ako vtáky (Aves, 28,2 %, 15 druhov). Ojedinele boli zistené tiež plazy (Serpentes, 1 ex.) a ryby (Pisces, 1 ex.). Dominantnými druhmi v potrave *A. heliaca* boli zajac (*L. europaeus*, 29,0 %) a chrček (*C. cricetus*, 27,7 %). Ďalšiu početnejšou koristiťou bol bažant (*P. colchicus*, 8,4 %), holuby (*Columba* sp., 8,2 %) a syseľ (*S. citellus*, 6,3 %). Menej početne boli v potrave *A. heliaca* zistené domáce kury (*Gallus gallus domestica*, 4,0 %), havran (*Corvus frugilegus*, 2,7 %), hraboš (*M. arvalis*, 2,1 %), krkavec (*Corvus corax*, 1,3 %) a mačka domáca (*Felis catus domestica*, 1,2 %). Ostatné druhy (Mammalia, 8 druhov, Aves, 12 druhov, Serpentes a Pisces) sú zastúpené v potrave *A. heliaca* s dominanciou pod 1 %. Sysle (*S. citellus*) lovili hlavne páry hniezdiace v Slovenskom krase a v Košickej kotline, ale aj páry hniezdiace vo Volovských vrchoch ich lovili v týchto dvoch orografických celkoch. Sysle boli početnejšie zastúpené v potrave začiatkom 80. rokov, ale ojedinelé zistenia sú aj z posledných rokov. Vyššie zastúpenie chrčka (*C. cricetus*) na začiatku 70. rokov a v posledných 5 rokoch zrejme súvisí s ich dlhodobými gradačnými cyklami. Zistili sme špecializáciu 3 hniezdných párov na lov chrčkov: jeden pár z Volovských vrchov a druhý pár zo Slanských vrchov ich lovili v Košickej kotline, tretí pár ich lovil na Východoslovenskej rovine. Hraboš poľný (*M. arvalis*) bol početnejšie zastúpený u jedného hniezdného páru v Košickej kotline a zaujímavý bol nález min. 2 jedincov krkavca (*C. corax*) na hniezde páru

v Slanských vrchoch v roku 2005. Tento pár sa na krkavce špecializuje, pretože v jeho potrave sme krkavce zistili už aj v predchádzajúcich rokoch 1996, 1997 a 2001.

Porovnanie potravy *A. heliaca* v Panónskej kotline, Tab. 5.

Napriek tradícii a systematickému sledovaniu orlov v Maďarsku o ich potrave na tomto území niet takmer žiadnych publikovaných údajov. Tapfer (1973) uvádza, že v 60-tych rokoch podľa jeho pozorovaní lovili v 60-70 % sysle a 20-25 % chrčky. Zriedkavo nachádzal mladé zajace alebo kadávery, v jednom prípade z mladej domácej kačice. Bécsy (1974) pozoroval v rokoch 1971-1972 jedno hniezdo orlov, pričom v potrave zistil 8 chrčkov, 3 zajace a 2 bažanty. Prvé ucelené údaje o potrave orla kráľovského publikovali až neskôr Haraszthy et al. (1996).

Pri porovnaní takmer rovnako veľkých vzoriek potravy *A. heliaca* z 3 oblastí Panónskej kotliny (Tab. 5) vidíme niektoré výrazné rozdiely. U populácie zo západného Slovenska sú početnejšie lovené vtáky (Aves) a hlavne niektoré druhy malej zveri: zajac (*L. europaeus*), bažant (*P. colchicus*), jarabica (*P. perdix*) a straka (*P. pica*). Dôležitou súčasťou potravy sú holuby (*C. livia dom.*). U východoslovenskej populácie je zastúpenie dominantných druhov (*L. europaeus* a *C. cricetus*) blízke priemeru v Panónii. Oproti tomuto priemeru sú v potrave početnejšie zastúpené niektoré subdominantné druhy: kura (*G. gallus dom.*), havran (*C. frugilegus*) a krkavec (*C. corax*). Páry hniezdiace v susednom Maďarsku mali odlišné poradie dominantných druhov (Haraszthy et al. 1996): *C. cricetus* (51,0 %), *L. europaeus* (12,0 %), *P. colchicus* (11,6 %) a *S. citellus* (7,4 %). Početnejšie sú teda zastúpené pôvodné stepné druhy hlodavcov: chrček (*C. cricetus*) a syseľ (*S. citellus*). Niektoré početnejšie druhy koristi *A. heliaca* sú vo vzorkách z porovnávaných 3 oblastí Panónie v rovnakom pomernom zastúpení, najmä druhy *C. capreolus*, *M. arvalis*, *E. concolor* a *F. catus dom.*

Niekoľko údajov o potrave orlov kráľovských vo Vojnatine v severnom Srbsku publikoval Pelle (1986). Hlavnú zložku tvoril syseľ (*S. citellus*), častejšie nachádzali mladé havrany (*C. frugilegus*) a pravdepodobne v ich kolónii vybrali z hniezd aj mláďatá myšiarok (*A. otus*).

V Panónskej kotline je *A. heliaca* potravne závislý od lovu v intenzívne obhospodarovanej poľnohospodárskej krajine. Veľkosťou optimálne stepné druhy koristi (*C. cricetus* a *S. citellus*) sú nahrádzané

druhmi, ktorých denzita je ovplyvnená poľnohospodárskym a poľovníckym obhospodarovaním (*L. europaeus*, *P. colchicus*, *P. perdix*, *C. capreolus*, *Ondatra zibethicus*) a domácimi zvieratami (najmä *C. livia dom.*, *G. gallus dom.* a *F. catus dom.*).

V údajoch o potrave *A. heliaca* z území málo ovplyvnených prirodzených stepí v Gruzínsku (Abuladze 1996) prevažujú menšie druhy hlodavcov (Rodentia, 54 %). Vtáky sú menej početnou korisťou, zato sú viac zastúpené plazy (Sauria, 30 %). V stepiach severného Kazachstanu (Naurzumskij zapovednik, Zabarnyj 1968) sú popri dominantnej kryse vodnej (*Arvicola terrestris*) 24 % početnejšou korisťou svište (*Marmota bobac*) 16 %. V púštnej oblasti pri Aralskom jazere (Lobačov 1967) boli popri sýsľoch (*Citellus fulvus*) 60 % početnou korisťou pieskomily (*Rhombomys opimus*) 29 %.

Záver

Na západnom Slovensku sme od roku 1978 do roku 2005 zistili spolu 562 kusov potravy, ktorú tvorilo 33 druhov živočíchov. Dominantne boli v potrave zastúpené druhy *Lepus europaeus* (40,2 %), *Phasianus colchicus* (17,3 %), *Columba livia domestica* (11,7 %) a *Cricetus cricetus* (11,6 %). Na východnom Slovensku sme od roku 1971 do roku 2005 zistili spolu 524 kusov potravy, ktorú tvorilo 30 druhov živočíchov s odlišnou dominanciou hlavných druhov koristi: *L. europaeus* (29,0 %), *C. cricetus* (27,7 %), *P. colchicus* (8,4 %) a *Columba sp.* (8,2 %). *A. heliaca* hniezdiace na Slovensku v dôsledku výrazného poklesu denzity stepných druhov hlodavcov, najmä *Spermophilus citellus* a *C. cricetus* sú potravne závislé predovšetkým na početnosti drobnej zveri (*L. europaeus*, *P. colchicus*) a holubov (*C. livia domestica*).

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Fig. 2. Nest of Imperial Eagle (*Aquila heliaca*) and its breeding territory in Eastern Slovakia. Photo: Š. Danko

Obf. 2. Hniezdo orlov kráľovských (*Aquila heliaca*) a ich hniezdne prostredie na východnom Slovensku. Foto: Š. Danko



3	4
5	6
7	8

Fig. 3 - 8. Breeding and hunting territories of Imperial Eagles (*Aquila heliaca*) in Western Slovakia.
Photo. J. Chavko

← - Location of eagle nests

Obr. 3 - 8. Hniezdne a lovné teritória orlov kráľovských na západnom Slovensku. Foto. J. Chavko

← - Umiestnenie orlieh hniezd



▲ ▼ Fig. 9, 10. Young of Imperial Eagle (*Aquila heliaca*) with different type of food (remains of 3 separate *C. cricetus*). Photo: J. Chavko

Obr. 9, 10. Mláďatá orlov kráľovských (*Aquila heliaca*) s rôznym druhom potravy (zbytky 3 jedincov *C. cricetus*). Foto: J. Chavko

▼ Fig. 11. Unusual prey in Imperial Eagle nest – young Wood Lark (*Lullula arborea*). Photo: J. Chavko

Obr. 11. Nezvyčajná korisť v hniezde orlov kráľovských – škovránok stromový (*Lullula arborea*). Foto: J. Chavko





▲ **Fig. 12.** Hamster (*Cricetus cricetus*) - frequent prey in Imperial Eagle nests. Photo: L. Šimák.

Obr. 12. Chrček (*Cricetus cricetus*) – častá potrava v hniezdach orlov kráľovských. Foto: L. Šimák.



◄ **Fig. 13.** Remains of food on the eagle nest - roe deer (*Capreolus capreolus*) and raven (*Corvus corax*). Photo: J. Chavko

Obr. 13. Pozostatky potravy na orlom hniezde – srnec (*C. capreolus*) a krkavec (*Corvus corax*). Foto: J. Chavko

Unusual cases of nesting by the Imperial Eagle (*Aquila heliaca*) in Eastern Slovakia

Nezvyklé prípady hniezdenia orla kráľovského (*Aquila heliaca*) na východnom Slovensku

Štefan DANKO & Miloš BALLA

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Abstract: Long-term monitoring of the Imperial Eagle in Eastern Slovakia has revealed that some pairs living permanently in an active agricultural environment (agrocœnosis) prove capable of adapting even to extreme conditions. In three cases eagles built their nests near railway lines (59, 22 and 15 m from the tracks), and in one case almost directly above a frequently-used road at a height of 21m.

Abstrakt: Počas dlhoročného monitoringu orlov kráľovských na východnom Slovensku sa zistilo, že niektoré páry trvalo žijúce v kultúrnej poľnohospodárskej krajine (agrocenózy) sa dokážu prispôbiť aj extrémnym podmienkam. V troch prípadoch si orly postavili hniezda pri železničnej trati (59, 22 a 15 m od koľajníc) a v jednom prípade tesne nad frekventovanou cestou vo výške 21 m.

Key words: Imperial Eagle, *Aquila heliaca*, nesting by railway lines and above a frequently-used road, Eastern Slovakia

Address for correspondence: Štefan Danko, Zemplínske múzeum, Kostolné námestie 1, SK-071 01 Michalovce, Slovakia. E-mail: danko.stefan@slovanet.sk

Miloš Balla, Správa CHKO Latorica, M. R. Štefánika 1755, SK-075 01 Trebišov, Slovakia. E-mail: balla@sopsr.sk

Imperial Eagles have been nesting in Slovakia at least since the 1940's. They originally chose older woodland for their nesting sites in various upland areas of Western and Eastern Slovakia. In the east this was mainly the Slanské Hills, the eastern part of the Volovské Hills and the Slovakian Karst, and later in the Zemplínske and Vihorlatské Hills (Danko & Chavko 1996). In 1986 for the first time one pair of Imperial Eagles nested in the active agricultural environment (agrocœnosis) of the Košice Basin, building their nest in a poplar windbreak in the middle of a field. The following year they built a new nest, but they were probably frightened away from this location by a pair of saker falcons, and returned to the Slanské Hills. In 1988 after a two-year interval some Imperial Eagles nested for the

first time in the agrocœnosis of the East Slovakian Uplands, the East Slovakian Plain in 1992 and again in the Košice Basin in 1993. Since that period the progressive settlement of new nesting sites in various places in these areas has proceeded to such an extent that at present (in 2004) the majority of the East Slovakian population (62.5%) nests in the active agricultural environment. This used to involve mainly new, young pairs, but then older pairs also started nesting in their own hunting grounds, occasionally exchanging their hillside nesting site for one on agricultural land. At the end of 2004 six of the ten pairs originally nesting in the hills persistently use stable nests in woodland complexes, and four of these occasionally nest in the lowlands as well. 13 pairs are using stable nests in the agrocœnoses.

We have been carefully monitoring the settlement of this new type of nesting biotope by Imperial Eagles from the outset. Since we did not know how the eagles would react to various types of disturbance in the open countryside, in 1991 we started organizing four-month stints of guarding with volunteer assistance. Large nests in windbreaks or in solitary trees were very noticeable, especially during the first nesting phase before the trees developed leaf-cover. The nest-guards made detailed notes of every possible kind of disturbance affecting the eagles (e.g. agricultural work, occasional passers-by, hunters), especially during incubation, and the eagles' reactions to them. At the same time we pointed out the existence of the nests to the relevant workers on the local collective farms (in particular their agricultural planners) and hunting associations (the gamekeepers), and asked them to refrain during the periods of incubation and raising young up to two weeks of age from carrying out any kind of activity in the vicinity of the nests which might disturb the eagles during their nesting. Urgent farming work was supposed to be carried out carefully under the supervision of the nest-guards.

Up to and including the year 1997 we guarded 16 nests, during which time we found that the eagles gradually became accustomed to the new type of nesting environment and capable of identifying very well which disturbances were dangerous for them and which were uninteresting. Farm work did not disturb them at all, even when tractors for example were operated directly below the nesting trees; nor were they disturbed by crop-spraying aeroplanes flying nearby. For this reason we ceased guarding them from 1998 onwards. We mean to demonstrate the eagles' gradual adaptation to the active agricultural countryside by presenting the following findings from the East Slovakian Plain.

Nesting of eagles alongside railway lines

In 2001 an older pair of eagles built a new nest in an oak tree at a height of about 17 metres, located only 15 m away from the railway tracks (see Fig. 1). For unknown reasons no clutch of eggs was ultimately laid in this nest, but the pair built another nest in the crown of a Scots pine cca. 750 m from the same tracks at the edge of a nearby field copse, which they nested in during 1995.



Fig. 1. Nest of an older pair of Imperial Eagles near the railway line in 2001. Photo: M. Balla

Obr. 1. Hniezdo staršieho páru orlov kráľovských blízko železnižnej trate v roku 2001. Foto: M. Balla

In 2002 one young pair built the first nest of their lives in an acacia tree near the same railway line at a straight-line distance of 5.5 km from the first pair. Although they abandoned this nest, they built another one 1 km further on, again near the railway line just 59 m from the tracks in a slim acacia at a height of approx. 11 m (see Fig. 2). A clutch was laid in this nest, but at the end of April it was probably destroyed by pine-martens, and the nesting ended unsuccessfully.

In 2004 the same pair chose to return to their 2002 nesting-place, located at a height of only 9 m, and at a distance of 22 m from the railway tracks (see Fig. 3). The sitting bird was not disturbed by passing trains (this was also noticed by the train-drivers themselves), nor did approaching trains even cause the male to fly from his perch in a tree directly overhanging the tracks. Ten chicks hatched out of this clutch, but at the beginning of June we found them dead in the nest for some unclear reason.

Whatever the cause, though, it was not due to the proximity of the railway line.



▲ **Fig. 2.** Nest of a young pair of Imperial Eagles near the railway line just 59 m from the tracks in 2002. Photo: M. Balla

Obr. 2. Hniezdo mladého páru orlov kráľovských blízko železničnej trate len 59 m od vedenia, v roku 2002. Foto: M. Balla



▲ **Fig. 3.** Nest of a young pair of Imperial Eagles near the railway line in 2002 and 2004. Photo: M. Balla

Obr. 3. Hniezdo mladého páru orla kráľovského blízko železničnej trate v rokoch 2002 a 2004. Foto: M. Balla

Nesting of eagles above a frequently-used road

In 2000 one older pair of eagles built a new nest in an ash-tree standing extremely close by a very frequently-used road, so close in fact that the nest was almost directly overhanging the road at a height of 21 m (see Fig. 4). Through repeated observation we found that the eagles became completely accustomed to the traffic on the road below, and there

were almost no circumstances which would cause the birds to fly from the tree.

Our experience up until that time had led us to consider the Imperial Eagle as a timid bird with a great escaping distance (several hundred metres), but in this case for example the tops of large trucks passed just 16 metres below the nest, and as long as people walking or cycling past the tree, i.e. 19 m below the nest, did not stare straight into the eyes of the bird standing or sitting there, then it never flew from the nest. The pair nested in this noisy place for four years in succession, each time successfully producing offspring, three times two chicks and once just one, but all finally flying from the nest.

To summarize these observations it can be concluded that permanent living in an active agricultural environment can lead to pairs of Imperial Eagles successfully adapting even to extreme conditions, which is a previously unknown experience for us as far as this kind of raptor is concerned throughout the whole area of its occurrence.

Súhrn

Prvé hniezdenie orlov kráľovských v otvorenej poľnohospodárskej krajine na Slovensku sa zistilo v r. 1986 v Košickej kotline, potom nasledovali prvé zahniezdenia vo Východoslovenskej pahorkatine v roku 1988 a na Východoslovenskej rovine v r. 1992. Od roku 1993 hniezdia už stabilne najmä na Vsl. rovine a v Košickej kotline, do roku 2004 vrátane hniezdilo v agrocénózach už 62,5 % východoslovenských párov. Vznik tejto nížinnej populácie sme pozorne sledovali a od r. 1991 sme organizovali aj fyzické stráženie ich hniezd, aby sme zistili reakcie orlov na rušivé vplyvy počas hniezdenia. Po viacročných skúsenostiach sme v r. 1998 od stráženia upustili, pretože sme zistili, že sa orly dokázali veľmi dobre adaptovať svojmu životnému prostrediu. Vedeli veľmi dobre analyzovať, ktoré vyrušenie je pre nich nebezpečné, resp. nezaujímavé.

K extrémnym prípadom adaptácie v prostredí kultúrnej krajiny došlo v štyroch prípadoch na Východoslovenskej rovine.

V troch prípadoch si postavili orly svoje hniezda pri železničnej trati. Jeden mladý pár mal dve hniezda vo vzdialenosti 59 a 22 m od koľajníc na agátoch vo výške cca 11 a 9 m, kde v prvom prípade v roku 2002 zničila znášku asi kuna a v druhom prípade v roku 2004 sme našli v hniezde začiatkom júna dve z neznámych príčin uhynuté mláďatá. Orol sediaci

na znáške v tesnej blízkosti železničnej trate nikdy neodletel, keď prechádzal po nej vlak.

V treťom prípade v r. 2001 u iného starého páru sa nachádzalo hniezdo len 15 m od koľajníc, ale orly v ňom nakoniec nezahniedzili. Znášku zniesli do iného hniezda mimo trate vo vzdialenosti 750 m.

Posledný prípad totálnej adaptácie na kultúrnu krajinu sme zaznamenali v rokoch 2000-2003, kedy jeden starý pár orlov hniezdil v hniezde postavenom na strome tesne vedľa veľmi frekventovanej cesty len vo výške 21 m nad ňou. Z dovtedajších poznatkov sme orla kráľovského poznali ako plachého vtáka s veľkou únikovou vzdialenosťou (niekoľko 100 m), v tomto prípade napr. vrch veľkého nákladného auta prechádzal len 18 pod hniezdom a pokiaľ človek prechádzajúci 21 m pod hniezdom na bicykli i pešo nepozoroval priamo očami na hniezde sediaceho alebo stojaceho vtáka, tak z hniezda nikdy nevyletel. Pár hniezdil na tomto rušnom mieste 4 roky za sebou vždy úspešne, z hniezda vyleteli 3x2 a raz jedno mláďa.

Zhrnutím týchto poznatkov sa dá usúdiť, že trvalým životom v kultúrnej poľnohospodárskej krajine sa niektoré páry orlov kráľovských dokážu prispôbiť aj extrémnym podmienkam, ktoré sme u tohto druhu dravca doteraz nepoznali v celom areáli jeho rozšírenia.

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Fig. 4. Nest of an older pair of Imperial Eagles above the road in 2000 – 2003. The pair nested in this noisy place for four years in succession, each time successfully producing offspring, three times two chicks and once just one
Photo: Š. Danko

Obr. 4. Hniezdo staršieho páru orla kráľovského nad cestou v rokoch 2000 - 2003. Pár hniezdil na tomto rušnom mieste 4 roky za sebou vždy úspešne, z hniezda vyleteli 3x2 a raz jedno mláďa. Foto: Š. Danko

Substitute nesting by Imperial Eagles (*Aquila heliaca*) in Slovakia

Náhradné hniezdenia u orlov kráľovských (*Aquila heliaca*) na Slovensku

Štefan DANKO, Jozef MIHÓK, Jozef CHAVKO & Leoš PREŠINSKÝ

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Abstract: During consistent monitoring of nesting pairs of Imperial Eagles primarily in Eastern Slovakia it was found that if for some reason the first clutch of eggs was destroyed at the very beginning of nesting, i.e. in late March or the first half of April, the eagles proceeded with substitute nesting. They built a replacement nest, so far always in a different place, in which a new clutch was laid. If the nesting was successful, then as a rule they raised one, and in two cases two offspring.

Abstrakt: Počas dôsledného monitoringu hniezdných párov orlov kráľovských predovšetkým na východnom Slovensku sa zistilo, že pokiaľ došlo z nejakých príčin ku zničeniu prvej znášky hneď na začiatku hniezdenia, t. j. koncom marca alebo do prvej polovice apríla, orly pristúpili k náhradnému hniezdeniu. Zatiaľ vždy na inom mieste postavili náhradné hniezdo, do ktorého zniesli náhradnú znášku. Pokiaľ bolo hniezdenie úspešné, spravidla vychovali jedno, v dvoch prípadoch aj dve mláďatá.

Key words: Imperial Eagle, *Aquila heliaca*, substitute nesting, Slovakia

Address for correspondence: Štefan Danko, Zemplínske múzeum, Kostolné námestie 1, SK-071 01 Michalovce, Slovakia. E-mail: danko.stefan@slovanet.sk

Jozef Mihók, Buzulucká 23, SK-040 01 Košice, Slovakia. E-mail: mihok@centrum.sk, **Jozef Chavko**, Ochrana dravcov na Slovensku, Svätoplukova 1, SK-841 02 Bratislava, Slovakia. E-mail: chavko@dravce.sk, www.dravce.sk, **Leoš Prešinský**, Ochrana dravcov na Slovensku, Svätoplukova 1, SK-844 40 Bratislava, Slovakia. E-mail: presinska@stonline.sk.

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Introduction

The nesting territory of Imperial Eagles in Slovakia is divided into two parts, the south-west and the south-east, and so far we lack data on the occurrence and possible nesting of these eagles in the southern part of Central Slovakia. Monitoring of the Imperial Eagle population has been maintained in Eastern Slovakia since 1969, and in the western region since 1975. Part of the project named "Monitoring and protection of the nesting population of Imperial Eagles in Slovakia", which was prepared in

1990 and has been implemented since 1991, involves detailed monitoring of nesting pairs of this raptor, which has led to the discovery of further interesting aspects of their nesting biology. It is a well-known fact about birds in general that if for various reasons the nest or clutch of eggs is destroyed during the nesting period, this results as a rule in substitute nesting. This phenomenon is especially familiar among songbirds, but also among other sorts of birds, and in certain circumstances it also occurs among raptors, although to a lesser extent. During our monitoring of all Imperial Eagle nesting sites

known to us, we have encountered this phenomenon in this species as well, moreover in several cases.

The issue of substitute nesting by Imperial Eagles has not been widely studied. In the literature available to us, the laying of a replacement clutch is mentioned for example by Glutz et al. (1971), who write: "Loss of eggs may lead to a replacement clutch being laid in the same or in another nest, and this second clutch most often consists of one, occasionally two eggs." (Leverkühn l. c.). Similarly only Leverkühn is cited by Hudec & Černý (1977) and by Cramp et al. (1994). Bezzel (1985) remarks only briefly that "replacement clutches occur". None of these works describes any specific cases in support. Makatsch (1974) notes that after the early loss of the first eggs Imperial Eagles may occasionally lay a replacement clutch, and quotes one case of a single replacement egg being laid in the Slovakian-Hungarian population, but without closer localization. Within Hungary just one instance is recorded from the Bükk Hills when in 1999 a first nest with a clutch of two eggs was blown down by a gale, and one young bird successfully flew from the new substitute nest (Horváth in litt.). The first specific cases of substitute nesting, moreover from Slovakia, were published by Švehlík & Meyburg (1979).

Summary of established cases of substitute nesting in Slovakia

1. The deceased Slovak egg-collector L. Erdős (in verb.) mentioned in discussions that Imperial Eagles can produce a replacement clutch if their first eggs are taken. During the assessment of his estate it was found that he had in his collection one clutch of two fresh, unformed eggs dated 18th April 1965 from the Slanské Hills, as well as the replacement, also still unformed eggs dated 19th May of the same year from a nearby location. Other details (e.g. tree types and their distance from each other) are not included in the clutch description. The eggshell masses in the first clutch were over 15 g, compared with just under 11 g in the replacement clutch. We are most grateful to Mr. B. Matoušek for kindly providing us with these details.

2. In 1972 one old pair of eagles in the Slanské Hills built a new nest in the fork of a beech-tree, and by 30th March they were sitting on a clutch. However, on 7th April we found the nest had slipped and the shells of two eggs were lying on the ground. Despite the fact that the nest was steeply slanting and empty, the eagles were still trying to complete its construc-

tion. We consequently reinforced its foundations, but the eagles ultimately abandoned this nest (Danko, Šimák unpubl.). According to Švehlík and Meyburg (1979), these eagles later built a substitute nest 4 km away from the first one, in which they successfully raised two young. Additional verification of this information revealed, however, that these authors had not recorded the substitute nesting themselves, but had obtained the details second-hand the following year from a forester otherwise unknown to us (Šimák in litt.). In 1973 this location featured an older Imperial Eagles' nest (probably from the previous year), but because this information was not verified by a specialist, we consider its accuracy questionable, especially as far as the number of young flying from the nest is concerned.

3. In 1973 the same pair as in 1972 built a new nest in an oak in the same nesting area where the substitute nesting had taken place the year before. On 31st March the eagles were already sitting on the clutch. The nest construction was very unstable, and the whole thing threatened to fall together with the clutch. This expectation was fulfilled on 17th April, because the nest was found tipped up, and the eggs had fallen to the ground. Later on in their work Švehlík & Meyburg (1979) mentioned that the eagles once again built a substitute nest 150 metres away from the upset one, and that allegedly one youngster flew from this new nest. However, despite our own monitoring of this pair (Danko and Šimák), we acquired no knowledge of the substitute nesting.

4. In 1995 one old pair in the Volovské Hills re-established their previous year's nest at the top of a fir, which had died in the meantime. In early April the Košice Municipal Forests Company felled the nesting tree, thus destroying the nest and the clutch of two eggs. The eagles abandoned the nest and moved away into the Košice Basin, the area of their hunting-grounds. They stayed for about two weeks near the village of Šebastovce in fields with poplar avenues. During this time they performed courting flights, after which they settled in the trees and mated. Then the eagles disappeared from this location, which was a signal to look for them again back at their nesting site. The pair set up 2.6 km to NW from the destroyed nest, using another, older and previously-used nest, where on 21st April they were sitting on their second clutch. But when the nesting site was checked on 13th June, the nest was abandoned, although it contained two eggs. Near to the nest there was a hunters' hide tower, which was used

by foresters for hunting deer, despite our requests, and so the eagles also abandoned this nest.

5. In 1995 one young pair on the East Slovakian Plain built their nest in the three-branched top of a slim pine at the edge of some field woodland. By 4th April the birds were already sitting on the clutch, but on 17th April as a result of violent rocking of the nest in high winds, two eggs fell to the ground. In the autumn we used wire to reinforce the top of the tree, which was located in a suitable place for nesting, so that it could also serve this purpose in future years (see case 11 below). By consistently monitoring nesting pairs in the wider area in the following years, we found that this pair occupied another nesting place in alternate seasons which was 6.5 km away from the first. In spring 1996 in this other place we found a nest from the previous year built in an oak tree, which was most likely the substitute nesting-place of this pair in 1995, although we do not know what issued from it.

6. In 1997 the same pair built a new nest in the crown of an oak, and whereas the eagles were sitting on a clutch on 8th April, on 10th April the nest was already abandoned. On checking the nest we found that it had broken in two, and the eggs had fallen into the fork of the tree below. As in the preceding case the eagles built a substitute nest in a neighbouring nesting-place in a small group of poplars 5 km away from the first, where they were found on 18th May. However, inspection of the nesting-place on 4th June revealed that for some unknown reason the nest had been abandoned, although there was one partially-brooded egg in it with a developed embryo. Substitute nesting in this case was unsuccessful.

7. In the same year one older pair in the Slanské Hills built a new nest at the top of a pine tree, from which the eggs fell to the ground on 10th April as a result of high winds. The eagles then built a substitute nest not far away (cca 100 m), once again in the crown of a pine, where one egg was laid. This nest was found deserted for unknown reasons during checking on 15th July, so substitute nesting was not successful in this case either.

8. In 1999 an older pair of eagles watched by J. Mihók in the Košice Basin built a new nest in a poplar windbreak. The construction was very bad and the nest started tilting seriously, so it was necessary to reinforce it, which was done on 1st April. Despite our having carried out this activity many

times before without encountering any problems at all, this particular intervention disturbed the eagles and they abandoned the nest with its contents of three eggs. The clutch was therefore removed and placed in an incubator at the raptor rearing centre in Rozhanovce. Two chicks hatched from it, and the third egg was infertile. We put the chicks out into the nests of other pairs which had only one offspring, and they later flew from these nests successfully. After their first nesting was disturbed, the original eagles built a substitute nest in another poplar at the edge of some field woodland 3 km away from the windbreak, in which they successfully raised one youngster, seen on 6th August standing fully-fledged on the edge of the nest. This was our first confirmed case of successful raising of young by Imperial Eagles from a replacement clutch in Eastern Slovakia.

9. In 2000 an old pair nesting as a rule in the Slanské Hills built a second nest in an active farming area of the East Slovakian Uplands, at the top of a pine in a strip of mixed bush and tree greenery close beside a frequently-used road surrounded by private farming plots. This brushland moreover was used by local people as a source of firewood. The same pair had nested at this location as early as 1993, but because of the frequent disturbances the eagles deserted the nest on 29th April and did not attempt substitute nesting. In 2000 the eagles were sitting on a clutch by 25th March, but once again they were disturbed by people gathering sticks below the nest. When we went to check the nest on 1st April the birds were very restless, and immediately flew off when our car stopped by the roadside. Due to our bad experience from 1993 we decided to remove the clutch, doing so on 5th April, and because of the unsuitability of the location we also destroyed the nest and made it impossible to build a new one there. We named this kind of intervention (removing a clutch from a threatened nest and forcing the eagles to find another nesting-place) “guided nesting”. There were three eggs in the nest, which we took to an incubator at the raptor rearing centre in Rozhanovce. Two chicks hatched from them, and the third egg was infertile. We placed the young together in another Imperial Eagles’ nest which had an infertile clutch, and both of them flew successfully from there. Following our intervention the original pair of eagles returned to the Slanské Hills, where they built a substitute nest 3 km away from the first in an oak at the edge of a clearing. We watched them building the nest on 14th and 27th April, and when we checked them again on

14th May they were sitting on a clutch. When we returned for the ringing on 20th July there was one youngster in the nest, which successfully flew off in August.

10. In 2001 there was substitute nesting by two pairs. One pair in the Slanské Hills built a new nest at the top of an oak, but it became precariously tilted. For this reason on 6th April we reinforced it with wire. In addition it was located close by a frequently-used forest track. The eagles lost interest in the nest, however, and abandoned it, so we took the clutch of two eggs and put them in an incubator at the raptor rearing centre in Rozhanovce, but in this case nothing hatched from them. The eagles built a substitute nest in the crown of a pine at another place 1.5 km away from the first, in which they raised one offspring. At the end of June, however, local hunters shot the male bird, and the female alone could not cope with raising the nestling. The situation was complicated by heavy rain, so we did not check the nest again until 4th July. In it there was one exhausted, underfed and completely drenched youngster, which we took away, but which died shortly afterwards during the car journey. In this case it was only due to illegal human interference that the promising substitute nesting was unsuccessful, but the building of a substitute nest, laying of a replacement egg and initial raising of another chick nevertheless occurred.

11. In a second case in 2001 an older pair on the East Slovakian Plain had their nest, located in a poplar windbreak, destroyed by local hunters. They shot at the tree-trunk below the nest with a small-bore rifle to weaken it, then they also sawed into the trunk and threw the nest with three eggs to the ground, where we found it on 1st April. The pair consequently moved away and built a substitute nest in another poplar windbreak 1.7 km away from the first, and by 2nd May they were sitting on a new clutch. When we returned for the ringing on 23rd July there was one youngster in the nest, which successfully flew off in late August.

12. An interesting case occurred in 2002. The same pair on the East Slovakian Plain mentioned in examples 4 and 5 built a new nest in the top of an oak at the edge of some field woodland. At the very beginning of nesting, however, as March turned to April the nest was thrown down in high winds together with the clutch, and we were not able to ascertain the number of eggs. For substitute nesting the eagles

chose an older nest in the top of a pine-tree just 200 metres away from the first, which we had reinforced in 1995 and which they had successfully used for nesting in 2001. On 27th April 2002 the eagles were already sitting on a replacement clutch of eggs, by 21th June they were feeding and on 23rd July we discovered that there were in fact two youngsters in the nest! They were still holding out on the nest on 10th August, and later they successfully flew off. This was the first clearly recorded case of Imperial Eagles raising two young from substitute nesting.

13. Another case of Imperial Eagles raising two young from substitute nesting occurred in Western Slovakia in 2003, with an old pair of eagles nesting in the Považský Inovec hills. They built their nest at the top of a slim larch, and sat on the first clutch on 1st April. On 5th – 6th April there was a sudden gale in the area which threw the nest to the ground together with the clutch, as we discovered on 10th April. From the shells it was not possible to determine the number of eggs in the clutch. In May and June we observed the male bird carrying food further up into the hills, suggestive of substitute nesting. We found the new nest on 27th June, built in a spruce-tree about 3 km from the first nest. When we returned for the ringing on 5th July we found two youngsters in the nest, which later successfully flew off. While ringing on 23rd August we observed them flying above the Inovec ridge.

Summary and Conclusion

During monitoring of the Slovakian population of Imperial Eagles to date 13 cases of substitute nesting have been recorded. It follows from analysis of the recorded data that termination of the first, normal nesting occurred for these reasons:

1. In four cases due to removal of the clutch from threatened nests, either because unsuitable building made them liable to fall, or because the inappropriate choice of nesting tree made them liable to abandonment as a result of people's frequent disturbance of the surroundings. The removed clutches were subsequently placed in an incubator and the hatched-out young were placed in the nests of other pairs with few offspring, from where they later successfully flew.

2. In four cases due to the eggs falling out of the nest (twice as a result of strong bending of the nesting trees in high winds, and once each due to severe tilting or disintegration of the nests).

3. In four cases due to destruction of the nests (thrown down in two cases by high winds, once by cutting down of nesting tree and once by hunters).

4. In one case in 1965 the clutch was removed by an egg-collector.

In each of the above cases substitute nesting occurred, involving 11 instances of the eagles building new, replacement nests and two instance of their laying a replacement clutch in an old nest where they had nested the previous years. There was not one instance (bearing in mind that this was only possible in a small number of cases anyway) of the eagles laying a new clutch in the same nest (see Leverkühn's opinion on this point). In seven cases

the substitute nesting was successful, involving four instances of one youngster flying from the new nest, two instances of two youngsters and one more with a probability of two youngsters. In one case the number of youngsters flying was not established. In five cases the substitute nesting was unsuccessful, involving two instances of a replacement clutch containing a single egg being abandoned for unknown reasons, one substitute clutch containing two eggs being abandoned because of disturbing by hunters, one instance of the new clutch being removed by an egg-collector, and one other of the new chick dying following the shooting of the male of the nesting pair of eagles.

Tab. 1. Comparative table of details of substitute nesting by Imperial Eagles (*Aquila heliaca*) recorded primarily in Eastern Slovakia.

Tab. 1. Prehľadná tabuľka náhradných hniezdení orlov kráľovských (*Aquila heliaca*), zistených prevažne na východnom Slovensku.

case no./year	tree – 1st nesting	no. of eggs in first nesting	tree – substitute nesting	distance from 1st nest in km	no. of eggs in substitute nesting	no. of young hatched	no. of young successfully raised	remarks
1/1965	?	2	?	?	1	0	0	eggs in oolog. collection
2/1972	beech	2	oak	4	2 ?	2 ?	2 ?	unconfirmed, cited data
3/1973	oak	2	?	0.15	1 ?	1 ?	1 ?	unconfirmed, cited data
4/1995	abies	2	abies	2,6	2	0	0	abandoned
5/1995	pine	2	oak	6.5	?	?	?	success not established
6/1997	oak	?	poplar	6.5	1	0	0	abandoned
7/1997	pine	?	pine	0.1	1	0	0	abandoned
8/1999	poplar	3	poplar	3	?	1	1	successfully raised
9/2000	pine	3	oak	3	?	1	1	successfully raised
10/2001	oak	2	pine	1.5	?	1	0	male bird shot
11/2001	poplar	3	poplar	1.7	?	1	1	successfully raised
12/2002	oak	?	pine	0.2	2	2	2	successfully raised
13/2003	larch	?	spruce	3	2	2	2	successfully raised

We established that the eagles undertook substitute nesting only in those cases when the first clutch of eggs was destroyed in a sufficiently short time after the laying, that is during the period from the end of March until mid-April. At that point the eagles still have enough time to build a substitute nest and to lay a replacement clutch, involving a delay of about one month in nesting. If the first clutch was destroyed in the second half of April or later, then the eagles would not undertake substitute nesting. For this reason it is very important to monitor carefully all pairs of birds whose first nesting is terminated at an early stage, and not to consider the resulting state as final. In the replacement clutch as a rule the Imperial Eagles have one egg, only rarely two, and they most often raise a single youngster, only very rarely two.

A summary of the data is presented in the Tab. 1.

Súhrn a záver

Počas monitorovania slovenskej populácie orla kráľovského sa doteraz zistilo 13 prípadov náhradného hniezdenia. Z analýzy zaznamenaných údajov vyplýva, že k prerušeniu prvého normálneho hniezdenia došlo:

1. V štyroch prípadoch po odobratí znášky z ohrozených hniezd, kedy buď nevhodnou stavbou hrozil ich pád alebo nevhodným výberom hniezdneho stromu hrozilo ich zanechanie pre časté vyrušovanie okoliami ľuďmi. Odobraté znášky boli následne vložené do inkubátora a vyliahnuté mláďatá sa vložili do hniezd iných párov s malým počtom mláďat, odkiaľ úspešne vyleteli.

2. V štyroch prípadoch po vypadnutí vajec z hniezd (2x po silných výkyvoch hniezdnych stromov a po jednom prípade vplyvom silného vychýlenia alebo rozpadu hniezda).

3. V troch prípadoch boli zničené hniezda (2x spadnuté po silnej víchrici, raz vypílený hniezdny strom a raz zhodené poľovníkmi).

4. V jednom prípade v r. 1965 znášku vybral zberateľ vajec.

V každom z uvedených prípadov došlo k náhradnému hniezdeniu, pričom v 11 prípadoch si orly postavili nové náhradné hniezdo a v dvoch prípadoch zniesli náhradnú znášku do starých hniezd, v ktorých hniezdili v predošlých rokoch. Ani v jednom prípade (pokiaľ to v niekoľko málo prípadoch bolo ešte možné) nezniesli znášku do toho istého hniezda (viď názor Leverkusena).

V siedmych prípadoch boli náhradné hniezdenia úspešné, pričom v štyroch prípadoch vyletelo z hniezd po jednom mláďati, v dvoch prípadoch po dve mláďatá a v jednom prípade pravdepodobne dve mláďatá. V jednom prípade nebol počet vyletených mláďat zistený.

V piatich prípadoch boli náhradné hniezdenia neúspešné, pričom v dvoch prípadoch boli náhradné znášky obsahujúce jedno vajce z neznámych príčin zanechané, jedna náhradná znáška 2 vajec bola zanechaná pre vyrušovanie poľovníkmi, v jednom prípade bolo odobraté zberateľom vajec a v jednom prípade uhynulo mláďa po zastrelení samca z hniezdneho páru orlov.

Zistili sme, že k náhradnému hniezdeniu orlov došlo len v tých prípadoch, kedy bola zničená prvá znáška v dostatočne krátkom čase po jej znesení, teda v období od konca marca do prvej polovice apríla. Vtedy majú ešte orly dostatok času k stavbe náhradného hniezda a na znesenie náhradnej znášky, čím sa hniezdenie posúva asi o mesiac. Ak boli prvé znášky zničené v druhej polovici apríla a neskôr, k náhradným hniezdeniam už orly neprišli. Preto je veľmi dôležité pozorne monitorovať všetky páry, u ktorých v rannom štádiu hniezdenia dôjde k ich prerušeniu a nepovažovať daný stav za ukončený.

V náhradnej znáške majú orly kráľovské spravida jedno, zriedka dve vajcia a vychovávajú z nich najčastejšie jedno a len vzácne aj dve mláďatá. Súhrnné údaje sú znázornené v pripojenej Tab. 1.

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Kleptoparasitism by raptors, focusing on the Imperial Eagle (*Aquila heliaca*)

Kleptoparazitizmus u dravcov so zameraním na orla kráľovského (*Aquila heliaca*)

Štefan DANKO & Jozef MIHÓK

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Address for correspondence: Štefan Danko, Zemplínske múzeum, Kostolné námestie 1, SK-071 01 Michalovce,
Slovakia. E-mail: danko.stefan@slovanet.sk

Jozef Mihók, Buzulucká 23, SK-040 01 Košice, Slovakia. E-mail: mihok@centrum.sk

Kleptoparasitism (stealing or scrounging other animals' food or prey) is a specific method of acquiring food in which one animal steals the prey which another has already caught. If animals of the same species steal each other's food, we speak of intraspecific kleptoparasitism, while food stealing by different species is known as interspecific kleptoparasitism. For the individual concerned, the strategy of stealing food involves the saving of time and energy which would otherwise be spent in active hunting, which is much more demanding and tends to have a low success rate. In the animal world this phenomenon occurs among invertebrates (e.g. lepidoptera, arachnids) and vertebrates alike. Kleptoparasitism among the mammals is typical for the beasts of prey, e.g. hyenas, wolves and bears. It is also practised by fish, and among birds there are some species which have this characteristic included in their very names, such as the arctic skua or parasitic jaeger (*Stercorarius parasiticus*), although other seabirds such as seagulls, terns, frigates or cormorants also use this feeding method, as well as members of other bird families such as waders (herons) and estuarines (oystercatchers, curlews). The songbirds using this approach are mainly the corvine species, but there are also others, even the common finch (*Frangilla coelebs*) (Glutz von Blotzheim 2000). Kleptoparasitism is also characteristic for raptors, some species robbing other kinds of raptor, but also members of other bird families, which has been reported in the case of white-tailed sea eagles

(*Haliaeetus albicilla*) (Tömösvári 1982, Straka 1992) or Saker falcons (*Falco cherrug*) (Braun & Lederer 1996). It also happens that certain raptor species practising this method may themselves be victims of food-stealing, for example by corvine birds or seagulls (see the case of the peregrine falcon, *Falco peregrinus*, in Zuberogoitia et al. 2002). Among the raptors living in Slovakia, we have observed Saker falcons being robbed by common buzzards (*Buteo buteo*) while consuming their hunting spoils on the ground (J. Mihók, J. Lipták, J. Chavko unpubl.). During monitoring of Saker falcons' winter habitat in the Danube Plain and Borská Lowlands between 1995 and 2005, frequent instances were recorded of common buzzards stealing prey from these falcons. On the other hand, during the nesting season several cases were observed in which Saker falcons stole prey (voles – *Microtus arvalis*) from kestrels (*Falco tinnunculus*) and red-footed falcons (*Falco vespertinus*) (J. Chavko).

Kleptoparasitism is also frequent among red-footed falcons themselves. They have been observed many times stealing voles from kestrels nesting in the same tree. The prey sometimes ends up in the talons of a third attacker, however. We have seen a kestrel flying with captured vole being attacked by a redfooted falcon. After an exhausting chase, the falcon finally managed to snatch the prey, only to be robbed of it in turn by a passing Saker falcon. A Saker falcon was once seen robbing a northern goshawk (*Accipiter gentilis*) of a gopher (*Spermophilus*

citellus) in full flight, and another was seen similarly taking a captured vole from a grey heron (*Ardea cinerea*). Sometimes it happens that both robbers end up preyless. A sparrowhawk (*Accipiter nisus*) which had caught a starling (*Sturnus vulgaris*) was immediately attacked by a Saker falcon. Just as the falcon was about to strike, however, the sparrowhawk released the still-living starling, which went to ground and hid amid some alfalfa (all observations by J. Mihók).

Kleptoparasitism among Imperial eagles is not so familiar or much studied – see for example Probst (2002), who observed an eagle taking food from a red kite (*Milvus milvus*). We have not been able to find any other data in the literature. Our observations suggest that this way of acquiring food is relatively common for these eagles, but getting evidence of this requires long-term observation of the birds' behaviour. During monitoring of the Imperial eagle population in Eastern Slovakia we have had several opportunities to observe instances of kleptoparasitism by this species, and we would like to bring these to our readers' attention in this article. Three examples comes from Western Slovakia too.

The observations are presented in chronological order:

1st April 1992 – in the Slovakian Karst a male Saker falcon (*Falco cherrug*) was observed hunting gophers. At the seventh attempt it caught a gopher, which was then taken by an Imperial eagle circling over the plateau. At that time there were two pairs of Imperial eagles nesting in the Volovské Hills beyond the plateau, so there was always at least one eagle hunting around its margins. After a further two attempts the falcon caught another gopher and tried to fly off with it to its nesting area. Another eagle then started chasing it, but after a long stretch, maybe 1.5 kilometres of attacking in level flight, it was ultimately unsuccessful. Later on, when the young eagles were bigger, both pairs could hunt together, and then the Saker falcons had even less chance of carrying their prey from the hunting grounds back to the nest. For this reason the young falcons were most likely to starve in the nest during the period when they needed sufficient food. As a consequence of the eagles' kleptoparasitism all the young falcons died in the nest (J. Lipták).

19th April 1992 – an adult male eagle was seen sitting in bushes in a meadow on the East Slovakian Plain, watching a female grey kite (*Circus cyaneus*) hunting. When the kite caught a vole and was trying

to fly off with it, the eagle immediately attacked her. After the first strike the kite dropped her prey, which the eagle then picked up from the ground and swallowed. This happened twice in succession. The whole operation was observed by two hooded crows (*Corvus corone cornix*) sitting in the same bushes as the eagle, and on his successful return they – with apparent envy – pulled at his tail with their beaks so intensively that he almost lost his balance (Š. Danko).

22nd April 1993 – a young male eagle in the Košice Basin robbed a marsh harrier (*Circus aeruginosus*) of the gopher it had caught (J. Mihók).

30th March 1995 – an immature female eagle in the Košice Basin robbed a buzzard (*Buteo buteo*) of its captured gopher (J. Mihók).

18th May 1995 – an adult female in the Košice Basin attacked a fox (*Vulpes vulpes*) running across a field with some voles in its mouth. The eagle swooped several times to strike the fox, which then dropped its catch and ran away. The eagle landed and swallowed the voles one after another (J. Mihók).

31st May 1995 – an adult male eagle in the Košice Basin robbed a marsh harrier of the vole it had caught (J. Mihók).

1996 – an Imperial eagle in the Košice Basin chased a Saker falcon sitting on the ground away from the pigeon (*Columba palumbus*) it had captured (J. Lipták).

9th June 1996 – an adult eagle in the Košice Basin robbed a kestrel of the young gopher it had caught (J. Mihók).

10th June 1996 – an adult eagle in the Košice Basin stole a pigeon from a Saker falcon (J. Mihók).

28th July 1996 – an adult eagle in the Košice Basin robbed four different Saker falcons of their gophers. The eagle spent the whole day riding thermals high above the gopher fields where four young Saker falcons were hunting. Every time a young falcon managed to catch a gopher, the eagle folded its wings and dropped headlong in attack. The falcon tried to escape with its prey, but then dropped the gopher in front of the rapidly approaching eagle. It took the young falcons several days to develop a different strategy. They started waiting till evening, when the thermals stopped and the eagle flew down to the fields. They could then finally consume the gophers they took, even though the eagle could see that their hunting was successful (J. Mihók).

8th June 1997 – an adult eagle circling at height over the margins of the Slovakian Karst attacked a male marsh harrier flying along with its prey. The

harrier dodged skilfully, and both raptors circled up to a great height with the eagle still attacking the kite, until it finally gave up the chase without success (J. Mihók).

17th May 2000 – an adult eagle in the Košice Basin pursued a Saker falcon which had caught a pigeon, finally snatching the prey just before the falcon reached its nest (J. Mihók).

1st March 2003 – a pair of Saker falcons in the Košice Basin caught two pigeons, but a pair of Imperial eagles flew in and robbed the falcons of their catch (J. Lipták, J. Mihók).

15th March 2003 – a pair of Saker falcons in the Košice Basin caught a pigeon, and were then attacked by an Imperial eagle. The male falcon succeeded in scaring off the eagle, which wanted to rob the female of the prey (J. Lipták).

16th March 2003 – a pair of Saker falcons caught a pigeon on the East Slovakian Plain, but a pair of Imperial eagles flew up, intending to take the food from them. They did not accomplish their intention, because they were scared off by humans (J. Lipták).

17th August 2003 – a peregrine falcon (*Falco peregrinus*) successfully attacked a flock of carrier pigeons in the Trnava Hills. Hardly had the falcon landed by the pigeon, however, preparing to eat it, than a female Imperial Eagle swooped in from her look-out perch and chased the falcon off the prey. The falcon left the pigeon without the slightest resistance. The eagle prepared the pigeon and carried it off to her young. (L. Prešinský).

10th February 2004 – a fox (*Vulpes vulpes*) was carrying a wild duck across fields in the Trnava Hills. A female eagle dropped on the fox in the middle of a clover patch, landed in front of it and jumped at it twice with widespread wings. The fox dropped the prey from its jaws and left it to the eagle, who was joined after a while by the male of the pair. He waited for the female to eat her fill, and then he too set on the remains of the duck. This spotting is interesting not only for the kleptoparasitism itself, but also because it provides evidence as to who is the dominant predator in the lowlands of southern Slovakia. It is the Imperial Eagle. (L. Prešinský).

9th January 2005 – a young male eagle on the Danube Plain not far from Bratislava dropped from the top of an acacia tree into the stubble of a maize field to force a female sparrowhawk away from her prey, an urban pigeon, and then started eating it. The sparrowhawk subsequently returned four times and attacked the eagle, but unsuccessfully. Around that time there were hundreds of urban pigeons in this

area, forming an important source of food for several kinds of raptor. Among these were three lone Imperial eagles, which would sit around for hours in the tree-tops watching for the opportunity to snatch prey from other hunting raptors (J. Chavko).

26th March 2003 – an adult male eagle on the East Slovakian Plain attacked a common buzzard carrying a vole in its talons. On being attacked the buzzard dropped the prey, which the eagle immediately consumed (Š. Danko).

Apart from kleptoparasitism by Imperial eagles, this practice may also be frequently observed among corvine species, which constantly mob the eagles in their hunting grounds or their nesting areas in the lowlands. These are principally magpies and crows, but also ravens and jackdaws, and on one occasion they were joined by a goshawk. Several times we have observed mainly magpies mobbing an eagle feeding on the ground, trying to steal its food to the extent of snatching it from the eagle's beak.

Kleptoparazitizmus (kradnutie potravy alebo koristi, cudzopasnosť alebo lepšie príživníctvo) je jednou z metód zaobstarania si potravy, keď jeden živočích ukradne koristi druhému, ktorý si ju chytil. Ak sa vzájomne okráda o potravu ten istý druh, považujeme to za vnútrodrohový kleptoparazitizmus. Ak dochádza k okrádaniu medzi jednotlivými druhmi považujeme to za medzidrohový kleptoparazitizmus. Stratégia kradnutia potravy je pre daného jedinca časovo a energeticky výhodnejšia, nemusí sa sám zaoberať samotným lovom, ktorý je oveľa náročnejší a často pri útokoch aj neúspešný. V živočíšnej ríši sa vyskytuje ako u bezstavovcov (napr. blanokridlovce, pavúky), tak aj u stavovcov. Vyskytuje sa aj u rýb, u vtákov sú to napr. pomorníky, z ktorých tú vlastnosť už majú niektoré aj v samotnom názve (*Stercorarius parasiticus* – pomorník príživný), ale využívajú ho napr. aj iné morské vtáky ako čajky, rybáre, fregaty, kormorány atď. Z iných radov vtákov ho využívajú aj niektoré druhy brodivcov (volavky) a bahniakov (lastúrniciar, hvizdák). Zo spevavcov to robia hlavne krkavcovité vtáky, z iných dokonca aj pinka obyčajná (Glutz von Blotzheim 2000). Z cicavcov sú to šelmy, napr. hyeny, vlky, medvede atď. Charakteristický je aj pre dravce, keď niektoré druhy okrádajú iné druhy dravcov, ale aj druhy z iných radov vtákov, čo bolo publikované napr. u orliakov (Tömösvári 1982, Straka 1992), alebo u sokola rároha (Braun & Lederer 1996). Na druhej strane ale aj niektoré druhy drav-

cov, využívajúce kleptoparazitizmus môžu byť aj obeťami kradnutia potravy napr. krkavcovitými vtákmi alebo čajkami (napr. sokol sťahovavý, *Falco peregrinus*, vid' Zuberogoiia et al. 2002). Z u nás žijúcich dravcov sme pozorovali okrádanie sokolov rárohov myšiakmi lesnými (*Buteo buteo*), pokiaľ rárohy konzumovali ulovenú potravu na zemi (J. Mihók, J. Lipták, J. Chavko unpubl.) V priebehu monitoringu zimovísk sokola rároha (*Falco cherrug*) v Podunajskej rovine a Borskej nížine v rokoch 1995 až 2005 boli zaznamenané časté prípady, kedy myšiaky lesné (*Buteo buteo*) ukradli korisť sokolom rárohom. Naopak v hniezdnom období boli zas pozorované viaceré prípady, keď sokoly rárohy kradli korisť – hraboše sokolom myšiárom (*Falco tinnunculus*) a sokolom červenonohým (*Falco vespertinus*) (J. Chavko).

Kleptoparazitizmus je častý aj u sokola červenonohého (*Falco vespertinus*). Veľakrát bol pozorovaný ako obral sokola myšiara, hniezdiaceho na tom istom strome, o hraboša. Korisť ale niekedy skončí v pazúroch až tretieho útočníka. Sokol myšiara letel s uloveným hrabošom. Napadol ho sokol červenonohý a po úmornej naháňačke ho nakoniec obral o korisť. Ihneď nato však prilietel sokol rároh a obral zase sokola červenonohého. Raz bol pozorovaný sokol rároh (*Falco cherrug*) ako obral jastraba veľkého (*Accipiter gentilis*) letiaceho so sysľom počas letu, v druhom prípade obral rároh volavku popolavú (*Ardea cinerea*) o uloveného hraboša keď s ním vzlietla. Niekedy ale vyjdú obaja okrádači naprázdno. Jastrab krahulec (*Accipiter nisus*) chytil škorca a bol okamžite napadnutý sokolom rárohom. Rároh ho rýchlo dohonil, ale tesne pred tým krahulec ešte živého škorca pustil, ktorý sa skryl na zemi do porastu lucerny (všetky pozorovania J. Mihók).

Kleptoparazitizmus u orla kráľovského je málo známy a preskúmaný, vid' napr. Probst (2002), ktorý pozoroval odobratie potravy od haje červenej. Viac literárnych údajov sa nám nepodarilo nájsť. Podľa našich pozorovaní je tento druh zaobstarania si potravy u tohto orla pomerne bežný, vyžaduje však dlhodobé pozorovanie správania sa vtákov. Počas monitoringu východoslovenskej populácie orlov kráľovských sme v niekoľkých prípadoch mali možnosť pozorovať kleptoparazitizmus u tohto druhu, s čím by sme chceli oboznámiť čitateľov v tomto článku. Tri údaje pochádzajú aj zo západného Slovenska.

Pozorovania sú uvedené v chronologickom poradi:

1. 4. 1992 – v Slovenskom krase bol pozorovaný samec sokola rároha (*Falco cherrug*) pri love sysľov. Po 7 útokoch chytil sysľa, ktorého mu zobral orol kráľovský, krúžiaci nad planinou. V tom čase za planinou vo Volovských vrchoch hniezdili 2 páry orlov kráľovských, takže na okraji planiny bol vždy 1 alebo viac loviacich orlov. Po ďalších 2 útokoch chytil rároh zase sysľa a snažil sa s ním odletieť na hniezdisko. Vtedy ho začal naháňať ďalší orol počas dlhého, asi 1,5 km vodorovne vedeného útoku, ktorý bol napokon neúspešný. Neskoršie keď orly mali väčšie mláďatá, mohli oba páry loviť a tak vtedy rároh mal len malú šancu doniesť korisť z loviska až na hniezdo. Z tohoto dôvodu mláďatá rárohov na hniezde najviac hladovali práve v období, keď potrebovali dostatok potravy. V dôsledku kleptoparazitizmu orlov napokon všetky mláďatá na hniezde uhynuli. (J. Lipták).

19. 4. 1992 – dospelý samec orla sedel na kroví v lúke na Východoslovenskej rovine a pozoroval loviacu samicu kane sivej (*Circus cyaneus*). Keď kaňa ulovila hraboša a pokúšala sa s ním odletieť, orol ju okamžite napadol. Kaňa po útoku pustila svoju korisť, ktorú orol vzápätí zobral zo zeme a zhltoľ. To sa opakovalo dva razy za sebou. Celú akciu sledovali dve vrany (*Corvus corone cornix*), ktoré sedeli na tom istom kroví ako orol a po jeho úspešnom návrate ho zrejme zo závidosti tak intenzívne ťahali zobákmi za chvost, že strácal rovnováhu (Š. Danko).

22. 4. 1993 – mladý samec orla v Košickej kotline obral kaňu močiarnu (*Circus aeruginosus*) o uloveného sysľa (J. Mihók).

30. 3. 1995 – imaturná samica orla v Košickej kotline okradla myšiaka (*Buteo buteo*) o uloveného sysľa (J. Mihók).

18. 5. 1995 – dospelá samica útočila na líšku (*Vulpes vulpes*) v Košickej kotline, ktorá bežala po poli s hrabošmi v papuli. Orlica útočila na ňu náletmi. Po viacerých náletoch líška vypustila hraboše a utiekla. Orol zosadol a všetky hraboše po jednom prehltol (J. Mihók).

31. 5. 1995 – dospelý samec orla v Košickej kotline obral kaňu močiarnu (*Circus aeruginosus*) o uloveného hraboša (J. Mihók).

1996 – orol kráľovský v Košickej kotline odohnal na zemi sediaceho rároha (*Falco cherrug*) z uloveného holuba (J. Lipták).

9. 6. 1996 – dospelý orol v Košickej kotline okradol sokola myšiara (*Falco tinnunculus*) o uloveného mladého sysľa (J. Mihók).

10. 6. 1996 – dospelý orol v Košickej kotline obral sokola rároha (*Falco cherrug*) o holuba (J. Mihók).

28. 7. 1996 – dospelý orol v Košickej kotline 4x obral mladé sokoly rárohy (*Falco cherrug*) o sysle. Orol celý deň lietal v termike vysoko nad sýľoviskom, na ktorom lovili 4 mladé rárohy sysle. Vždy keď sa mladému rárohovi podarilo sýľu uloviť orol stiahol krídla a strmhlav zaútočil. Rároh sa snažil s korisťou uniknúť, ale nakoniec sýľa vypustil pred rýchle sa približujúcim orlom. To trvalo niekoľko dní, kým mladé rárohy prišli na inú stratégiu. Počkali do večera, keď ustala termika a orol zletel na pole. Potom už konečne mohli ulovené sysle skonzumovať aj napriek tomu, že orol videl ich úspešný lov (J. Mihók).

8. 6. 1997 – dospelý orol krúžiaci vo výške na okraji Slovenského krasu napadol sameca kane močiarnej (*Circus aeruginosus*) letiaceho s potravou. Kaňa sa šikovne uhýbala a oba dravce počas napádania kane orlom vykrúžili do veľkej výšky, až kým orol od bezúspešného napádania upustil (Š. Danko).

17. 5. 2000 – dospelý orol v Košickej kotline prenasledoval rároha (*Falco cherrug*) s uloveným holubom, o ktorého ho nakoniec obral tesne pred priletom k hniezdu (J. Mihók).

1. 3. 2003 – pár sokolov rárohov (*Falco cherrug*) v Košickej kotline ulovil 2 holubov, ale priletel pár orlov kráľovských a sokolom ukradli ich úlovok (J. Lipták, J. Mihók).

15. 3. 2003 – pár rárohov (*Falco cherrug*) chytil holuba v Košickej kotline, na ktorý zaútočil orol kráľovský. Samcovi rároha sa orla podarilo odplašiť, ktorý chcel zobrať samici ulovenú korisť (J. Lipták).

16. 3. 2003 – pár rárohov (*Falco cherrug*) chytil holuba na Východoslovenskej rovine, ale priletel pár orlov kráľovských a chcel im zobrať potravu. Úmysel sa im nepodaril, lebo bol odplašený človekom (J. Lipták).

17. 8. 2003 – sokol sťahovavý (*Falco peregrinus*) úspešne zaútočil na kúdeľ poštových holubov v Trnavskej pahorkatine. No sotva k holubovi pristál, aby ho očistil a skonzumoval, priletel nízkym letom zo sediska orol kráľovský a sokola z koristi odohnal. Sokol opustil holuba bez najmenších známok odporu. Orlica holuba očistila a odniesla mláďatám (L. Prešinský).

10. 2. 2004 – liška (*Vulpes vulpes*) niesla cez polia v Trnavskej pahorkatine divú kačicu. Uprostred ďateliniska sa k nej spustila orlica, pristála pred liškou a s rozťahnutými krídlami do lišky dvakrát skočila. Liška vypustila z papule korisť a nechala ju orlici, ku ktorej po chvíli priletel aj samec z páru. Čakal, kým sa orlica nažrala, potom sa do zvyškov

kačice pustil aj on. Toto pozorovanie okrem samotného kleptoparazitizmu je zaujímavé aj tým, že je svedectvom toho, kto je dominantným predátorom na nížinách južného Slovenska. Je to orol kráľovský (L. Prešinský).

9.1. 2005 – mladý samec orla nedaleko Bratislavy (Podunajská rovina) sa spustil z vrcholca agáta do kukuričného strniska, kde z koristi – mestského holuba odohnal samicu krahulca (*Accipiter nisus*) a sám ju začal konzumovať. Samica krahulca sa potom ešte 4 x vrátila a zaútočila na orla, ale neúspešne. Na tejto lokalite sa v tom období vyskytovali stovky mestských holubov, ktoré boli dôležitým potravným zdrojom pre viaceré druhy dravcov. Medzi nimi sa tu vyskytovali 3 jedince orla kráľovského, ktoré dlhé hodiny vysedávali na vrcholoch stromov a sledovali potenciálnu možnosť získania koristi od iných loviacich dravcov (J. Chavko).

26. 3. 2005 – dospelý samec orla na Východoslovenskej rovine napadol myšiaka (*Buteo buteo*), nesúceho hraboša v pazúroch. Ten ho po útoku pustil a orol úlovok hneď skonzumoval (Š. Danko).

Popri kleptoparazitizme orlov kráľovských často možno pozorovať kleptoparazitizmus krkavcovitých vtákov, ktoré na orly v ich loviskách alebo na hniezdiskách v nížinách vždy dobiedzajú. Sú to predovšetkým straky a vrany, ale aj krkavce i kavky, v jednom prípade bol pozorovaný aj jastrab veľký. Viac krát sme pozorovali najmä straky, ako dobiedzali na orla, kŕmiaceho sa na zemi a kradli mu z potravy niekedy tak, že mu ju strhávali až zo zobáka.

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Unusually early nest building by Imperial Eagles (*Aquila heliaca*)

Neobyčajne skorá stavba hniezda u orla kráľovského (*Aquila heliaca*)

Štefan DANKO

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Address for correspondence: Štefan Danko, Zemplínske múzeum, Kostolné námestie 1, SK-071 01 Michalovce, Slovakia. E-mail: danko.stefan@slovanet.sk

Older pairs of Imperial Eagles in Slovakia remain throughout the whole year as a rule at their nesting site or in its vicinity, but pairs nesting in the hills spend more time at their hunting grounds. During harder winters with deep snow cover, however, they migrate further south, mainly to the territory of neighbouring Hungary. When spring comes some of the pairs build new nests, while other pairs set about repairing their previous year's nests. Nest construction activity is most often at its height during February, and in early March the birds have practically complete nests, apparently almost independently of the weather. A certain shift in their time schedule may occur in connection with the air temperature, but as far as I know nobody in this country has carried out any observation focusing on this phenomenon.

In 2005 though I have encountered one interesting exception. On 8th January while checking several nesting sites on the East Slovakian Plain I found that in the majority of them both eagles (or at least one of the pair) were remaining close to their previous year's nests. At one nesting site, however, I found a large new nest almost complete, to which the eagles were that day still assiduously adding branches. It is necessary to point out that the winter was mild during this period, with temperatures mostly above zero and the surroundings free of snow cover. Apparently such unusual weather at this point in the season had encouraged this pair to start building their nest early.

Staré páry orlov kráľovských sa na Slovensku zdržujú spravidla počas celého roka na hniezdisku alebo v jeho blízkosti, v prípade párov hniezdiacich v pohorí tieto trávia čas na svojich loviskách. Len počas silnejších zím s vysokou snehovou pokrývkou sa sťahujú južnejšie, najmä na územie susedného Maďarska. S príchodom jari časť párov stavia nové hniezda, iné páry začínajú opravovať svoje minulo-ročné hniezda. K stavebnej aktivite dochádza najčastejšie už v priebehu februára a začiatkom marca majú takmer hotové hniezda, zdá sa takmer bez spojitosti s počasím. K určitým časovým posunom možno dochádza aj v spojitosti s teplotou, ale pokiaľ mi je to známe takéto pozorovania zatiaľ u nás nikto cieľavedome nerobil.

V roku 2005 som sa stretol s jednou zaujímavou výnimkou. 8. januára počas kontroly niekoľkých hniezdísk na Východoslovenskej rovine som zistil, že na väčšine z nich sa oba orly (alebo aspoň jeden z nich) zdržiavali v blízkosti minulo-ročného hniezda. Na jednom hniezdisku som ale našiel už jedno nové, veľké hniezdo, na ktoré v ten deň orly naďalej usilovne nosili konáre. Je potrebné poznamenať, že zima v tomto období bola mierna, teploty boli väčšinou nad nulou a okolie bolo bez snehovej pokrývky. Zrejme takéto nezvyklé počasie pre toto ročné obdobie aktivovalo pár ku skoršiemu začiatku stavby hniezda.

Conidification among Imperial Eagles (*Aquila heliaca*)

Konidifikácia u orla kráľovského (*Aquila heliaca*)

Štefan DANKO

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Address for correspondence: Štefan Danko, Zemplínske múzeum, Kostolné námestie 1, SK-071 01 Michalovce, Slovakia. E-mail: danko.stefan@slovanet.sk

In 1960 Zmoray (1960) proposed a new term for a specific ecological relationship, so-called locational or nesting-site pacts, which he named conidification. This involves a specific type of symbiosis of two animal species (in our case birds), where the basic reason for the pact is equal claim to the nesting-site, leading to co-existence of at least two species in one locality. This is a consistent phenomenon, but not absolutely necessary for both partners involved. A secondary advantage of such a pact may be (but does not have to be) a feeding benefit for one of the participants, or an improvement in their combined safety. Mutual providing of benefits is not however the principal condition of the nesting pact, because the primary factor is the equal claim to the nesting-site.

Among Imperial Eagles this relationship is untypical, because they do not tolerate any larger species of bird in the vicinity of their nests in their nesting-sites, and usually chase them away. Within populations nesting in woodland it is predominantly other kinds of raptors that make nesting pacts. But with the transition of part of the Imperial Eagle population to a new type of nesting-site in open farming country, particularly in the early 1990's, this situation has changed. Agricultural areas offer very few suitable nesting opportunities (windbreaks, field woods or copses, solitary trees), so these are used also by other species of birds. Apart from Imperial Eagles the other kinds of raptors which sporadically nest in these places include the Common Buzzard (*Buteo buteo*) or more rarely the Northern Goshawk (*Accipiter gentilis*), but it is birds of the crow family which more frequently nest here, especially magpies (*Pica pica*), hooded crows (*Corvus corone cornix*)

and common ravens (*Corvus corax*). This group also includes field sparrows (*Passer montanus*), which are very keen on occupying the eagles' nests. Of the larger birds it is magpies and hooded crows which most often nest in mutual proximity. One of the advantages for these corvine birds is the possibility of scrounging from the remains of the eagles' food. In doing so they very often behave quite aggressively towards the eagles, and they use even short absences by the eagles to try to get into their nests themselves. For these reasons the eagles are often forced out, evidently worried about their clutch or their young offspring.

During monitoring of the lowland population of Imperial Eagles on the East Slovakian Plain, one case was recorded of conidification of these eagles with some ravens. Like Imperial Eagles, ravens also originally nested only in woodland, and in a secondary move they started occupying agricultural land in or around the 1970's. Here the ravens make use of similar biotopes for nesting as the Imperial Eagles, although later they began nesting on high-tension pylons, which is where they are most often found today. In one case a pair of ravens had their regular nesting-place on the East Slovakian Plain in a small group of Canadian poplars covering an area of 55 x 18 metres and surrounded by fields. In 1998 a pair of Imperial Eagles also built their nest in this small group of trees on a clump of mistletoe, leaving a distance of just 25 m between the nests of these two species. While checking the nests on 8th April we found the ravens already feeding their brood, while the eagles had been sitting on their clutch since 27th March. Unfortunately at that time I did not pay sufficient attention to this interesting phenomenon, and

so I do not have any record from observation about the way these two pairs of birds behaved towards each other. As it turned out, no young eagles ultimately flew from this nest. On 8th May the female was already standing on the edge of the nest, suggesting that the chicks had hatched out by then, but on 15th May the eagles' nest was found abandoned. I do not know the reason for these eagles' unsuccessful nesting.

The phenomenon of conidification is very interesting in any case, and it will be necessary to devote greater attention to it while monitoring the population of Imperial Eagles in Slovakia in the future.

V r. 1960 navrhol Zmoray (1960) jeden nový termín pre osobitný ekologický vzťah, tzv. priestorové alebo hniezdiskové spolčenie, ktoré nazval konidifikáciou. Jedná sa o osobitný druh súžitia dvoch živočíšnych druhov (v našom prípade u vtákov), kde základom spolčovania sa je rovnaký nárok na hniezdisko, teda spolčenie sa minimálne dvoch druhov na jednom priestore. Je to zákonitý zjav, ale nie nevyhnutný pre oboch zúčastnených partnerov. Sekundárnou výhodou tohto spolčenia môže (ale nemusí) byť potravná výhoda pre jedného z účastníkov alebo zvyšovanie vzájomnej bezpečnosti. Vzájomné poskytovanie výhod ale nie je hlavnou podmienkou spolčenia, lebo prvoradým činiteľom je rovnaký nárok na hniezdisko.

U orla kráľovského tento vzťah je netypický, pretože na svojom hniezdisku v blízkosti hniezda nestrpí väčší druh vtáka, preto ho z neho vyháňa. U populácie hniezdiacej v lesoch sa jedná predovšetkým o iné druhy dravcov. Prechodom časti populácie orla kráľovského na nový typ hniezdiska v otvorenej poľnohospodárskej krajine predovšetkým začiatkom 90-tych rokov minulého storočia sa však situácia zmenila. V agrocenózach je veľmi málo vhodných príležitostí na hniezdenie (vetrolamy, poľné lesíky alebo remízky, solitérne stromy) a preto sú využívané aj inými druhmi vtákov. Okrem orlov kráľovských v nich sporadicky hniezdia aj iné druhy dravcov (napr. myšiak hôrny *Buteo buteo* alebo zriedkavejšie jastrab *Accipiter gentilis*), ale pomerne často v nich hniezdia krkavcovité vtáky, najmä straky (*Pica pica*), vrany (*Corvus corone cornix*) a krkavce (*Corvus corax*). Do tejto skupiny ešte patria poľné vrabce (*Passer montanus*), ktoré

s obľubou hniezdia v hniezdach orlov. Z väčších druhov sú to straky a vrany (šedivky), ktoré najčastejšie hniezdia v zájomnej blízkosti. Jednou z východ pre tieto krkavcovité vtáky je možnosť príživenia sa na pozostatkoch potravy orlov. Veľmi často sa pritom správajú dosť agresívne voči orlom a v prípade ich čo len krátkej neprítomnosti sa snažia dostať aj priamo na ich hniezdo a preto sú orlami často odháňané, zrejme bojac sa o násadu alebo malé mláďatá.

Počas sledovania nižinnej populácie orla kráľovského na Východoslovenskej rovine v jednom prípade došlo ku konidifikácii orla kráľovského s krkavcom. Krkavec podobne ako orol kráľovský hniezdil pôvodne len v lesoch a sekundárne sa aj on stiahol do poľnohospodárskej krajiny zhruba v 70-tych rokoch minulého storočia. Tu aj krkavec využíva na hniezdenie podobné biotopy ako orol kráľovský, aj keď sa neskôr začal a v súčasnosti aj najčastejšie hniezdi na stožiaroch vysokého napätia. V jednom prípade pár krkavcov stabilne hniezdil na Východoslovenskej rovine v malej skupinke kanadských topoľov o veľkosti 55 x 18 m uprostred poli.

V roku 1998 si v tejto skupinke stromov postavila svoje hniezdo aj pár orla kráľovského na trs imela, pričom hniezda obidvoch druhov vtákov boli od seba vzdialené len 25 m. Počas kontroly 8. apríla krkavce už krmili mláďatá a orly sedeli na násade už 27. marca. Žiaľ vtedy som tomuto zaujímavému javu nevenoval pozornosť a tak nemám pozorovania o tom, ako sa tieto dva páry vtákov správali voči sebe. V konečnom dôsledku orol kráľovský nevhniezdil. 8. mája samica už stála na okraji hniezda, takže v hniezde boli už asi vyľiahnuté mláďatá, ale 15. mája bolo hniezdo orlov opustené. Príčinu neúspešného hniezdenia orlov nepoznám.

Každopádne tento jav je veľmi zaujímavý a popri monitoringu populácie orla kráľovského na Slovensku mu bude potrebné venovať v budúcnosti väčšiu pozornosť.

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First documented nesting by White-tailed Sea Eagles (*Haliaeetus albicilla*) in Eastern Slovakia

Prvé doložené hniezdenie orliaka morského (*Haliaeetus albicilla*) na východnom Slovensku

Štefan DANKO

Danko Š 2007: First documented nesting by White-tailed Sea Eagles (*Haliaeetus albicilla*) in Eastern Slovakia. Slovak Rapt J, 1: 37-42.

Abstract: The 1980's and 90's saw growth in the population and expansion of the areas occupied by White-tailed Sea Eagles over the whole territory of their occurrence in Europe. Under this influence the number of these eagles observed during the nesting period also increased in Eastern Slovakia. The most frequent occurrences have been recorded in the wetland woods along the River Latorica on the East Slovakian Plain, but so far without any documented nesting. In 2002 one pair built a nest in the Vihorlat Hills near Zemplínska širava reservoir, but they did not actually nest in it either that or the following year. Breeding by these eagles in these hills was noted over 70 years ago by Hrabar (1932) and Molnár (1933), but no nesting was documented. Nesting was documented for the first time in 2004, when one pair successfully raised two offspring. This pair successfully bred in the same nest in 2005 and 2006 too.

Abstrakt: V 80-tych a 90-tych rokoch minulého storočia nastalo narastanie populácie a rozširovanie areálu orliaka morského na celom území jeho rozšírenia v Európe. Vplyvom toho narastali počty pozorovaní orliakov v hniezdnom období aj na východnom Slovensku. Najčastejšie výskyty sa zaznamenali v lužných lesoch okolo rieky Latorica na Východoslovenskej rovine, ale zatiaľ bez doloženého hniezdenia. V r. 2002 si jeden pár postavil hniezdo vo Vihorlatských vrchoch pri Zemplínskej širave, ale v tom a nasledujúcom roku ešte v ňom nehniedil. O hniezdení orliakov v tomto pohorí písali Hrabar (1932) a Molnár (1933) v tridsiatych rokoch minulého storočia, ale hniezdenie nebolo doložené. Po prvý raz sa doložilo jeho hniezdenie v roku 2004, kedy pár úspešne vyviedol 2 mláďatá. Pár úspešne vyhniedil v tomto istom hniezde aj v roku 2005 a 2006

Key words: White-tailed Sea Eagle, *Haliaeetus albicilla*, first documented breeding, Vihorlat Hills, Eastern Slovakia

Address for correspondence: Štefan Danko, Zemplínske múzeum, Kostolné námestie 1, SK-071 01 Michalovce, Slovakia. E-mail: danko.stefan@slovanet.sk

The White-tailed Sea Eagle is one of the rarest nesting raptors in Slovakia. The first documented instance of nesting by these birds in our territory dates back to the 1920's in the Danube Valley (Matoušek 1931). Apart from one exception the nesting of this species here has always been connected with the wetland woods along the Danube. It may be assumed that this species also lived here in the more distant past, though we lack specific data in this regard. Nesting continued in an irregular way until 1964, but it was always a matter of a single pair (Štollmann 1966). More detailed information is

given by Áč (1989), who writes that from 1946 to 1964 only 9 cases of successful nesting by these raptors were recorded in this territory. Outside this area there was only one attempt at nesting by Sea Eagles by the Orava Reservoir in 1960 (Kocian 1960). From the remainder of Slovakian territory there are only general reports of nesting by this species in earlier times in Eastern Slovakia.

Hrabar (1932) wrote that "Formerly they nested in the woodland spreading along the Latorica," and there is just one report of their nesting in the Vihorlat Hills: "They do not usually seek out higher loca-

tions, but nonetheless they are now nesting at Morské Oko (a lake named 'Eye of the Sea') below Vihorlat, where they are in safety." Slightly more detail is provided by Portenko (1950), namely that one pair was nesting on the lower slopes of the hill Veža ('Tower') near Morské Oko, and Molnár (in Matoušek et al. 2002) mentions in his notes that one pair was nesting beside the Vihorlat lake on 2nd May 1931 (but without any other more detailed information, so we cannot consider this nesting as documented, see for example also Mošanský 1974), and on 2nd June 1932 the pair was no longer observed here. In his original work Molnár (1933) states that eagles nested at this location until 1930. The credibility of this statement might be partially confirmed by the following fact: In the collection of the Zemplín Museum in Michalovce there is a large oil painting of Morské Oko showing a pair of White-tailed Sea Eagles, one sitting on an islet in the lake and the other circling above it. The painting is unfortunately not signed, and we know only that it formed part of the family collection of Count Sztáray in Michalovce.

In our neighbouring countries the greatest numbers of nesting White-tailed Sea Eagles are in Poland and Hungary. Over the whole area of occurrence of this species in Europe there was a drop in numbers of these raptors in the late 1960's and early 1970's (in Poland 50-100 pairs), and in Hungary in the late 1970's and early 1980's the population was at a minimum, with probably just 10 pairs (Haraszthy 1998). Revival and strong growth in the population occurred in the 1980's and especially the 1990's. In Norway, where White-tailed Sea Eagles are most numerous in Europe, the population minimum of 700-800 pairs was reached in 1968, and by 1993 their number had doubled to cca 1500 pairs (Hagemeijer & Blair 1997). In Poland at present the figure of 450-500 nesting pairs is quoted (Tomiałojć & Stawarczyk 2003), with more than 40 in Hungary by 1996 (Haraszthy 1998) and up to 55-65 pairs in 1998 (Magyar et al. 1998). At the same time there was a shift in nesting patterns towards the east, with pairs starting to nest well up in the north-east of Hungary by the River Bodrog (Petrovics in verb.).

Increasing numbers of pairs were reported in the early 1990's by all European countries where these eagles nest. For example, in our neighbouring countries during the five years from 1991 to 1995 the numbers of nesting pairs rose from 245 to 270-280 in Poland, from 8-10 to 12 in the Czech Republic,

and from 36 to 42 in Hungary. Only in Ukraine was an unchanged figure of 50 pairs reported (Hauff 1996). In the Czech Republic in 1984 they started nesting again after 150 years in the Třeboň Basin (Ševčík 1989). The shift to the east was also confirmed by the first breeding by these eagles in Southern Moravia in 1984, and in 1988 there were already two pairs (Horák 1989). Sea Eagles settled once again in woodland by the Danube in 1991, when they also attempted breeding (Chavko in Danko 1994). From 1992 onwards further attempts at nesting were recorded, but this consisted only of carrying branches to other birds' nests, or nest-building without breeding (Bohuš 1996). It was not until 1998, the first time in 34 years, that two pairs raised broods in the Danube Valley (Chavko in Danko, Darolová & Krištín 2002, Stollmann 2004), and at present (2004) their number has risen to four pairs. Probable nesting was recorded in 1999 in the Borská lowlands, where also in 2004 one older pair attempted breeding for the first time, but unsuccessfully (Chavko in litt.). Repeated breeding by this raptor species occurred in 1999, this time in Austria (Zuna-Kratky et al. 2000). At Orava Reservoir one pair was observed courting and carrying branches in the spring of 1994 (Demko and Karaska in Danko et al. 1995).

In Eastern Slovakia outside of the nesting period the White-tailed Sea Eagles' most common habitat is in the East Slovakian Lowlands, mainly around Zemplínska šírava Reservoir, the Iňačovce-Senné fishponds or in the Medzibodrožie area, as evidenced by the results of observation since the Second World War. They can often be spotted all over the territory of Eastern Slovakia during the spring migration, especially during March. Their occurrence during the nesting period was exceptional, and involved only non-nesting young birds. One of the more interesting older spottings I can mention was that of a pair of eagles, a female with a white tail and a younger male, seen on 24th February 1974 carrying branches in their claws in the Veľký Milič nature reserve near Slanská Huta in the Slanské Hills, but this must have been some sort of birds' game, because they did not stay there for a longer time (Danko unpubl.).

The increase in numbers of nesting pairs in Europe and the eastward shift in nesting patterns during the 1990's led to the greatest expectation of their breeding again in the Medzibodrožie area in the wetland woods along the River Latorica, especially near the villages of Čičarovce and Beša, where un-

documented reports of nesting had already originated in the past.

I possess older records of sightings, one of a solitary juvenile dated 14th July 1963 above the woods near Čičarovce, and another of a single bird in the same place from 11th April 1965 (Danko unpubl.). We have managed to gain records of several further sightings from more recent times, which might be evidence of possible nesting by these eagles in this area. On 14th March 1988 I personally observed a single adult Sea Eagle in the wetland woods of the Beša polder, sitting beside the older nest of a white stork built in an oak-tree. Checking the nest later, however, we found that it was not occupied by eagles, and we only ever saw that one bird there. It remained in that area for some time though, because on 30th April 1988 it was spotted near Oborín by Balla. Since the creation of the Latorica Protected Nature Zone in 1990 the area has been under more regular observation, carried out since 1994 primarily by M. Balla. From the nesting period we have the following sightings: 25th May 1994 – Beša polder 1 ex.; 1 ad. in the Beša polder 17th March 1999, then 19th March 1999 near Hrušov (Balla); 1 immat. in the Beša polder 25th May 1999 (Danko, Balla); 1 ad. near the confluence of the Latorica and Laborec 11th May 2000; 1 ad. 12th May 2000 in the Beša polder (Balla); 2 birds with white tails in the Beša polder 24th May 2000 (Danko, Balla); 5th April 2001 – 1 ad. with food in the Beša polder, 24th May 2001 – 1 ad. near Čičarovce; 5th Feb. 2002 – 1 adult ex. flew into older woods in the Beša polder and started calling noisily (Danko, Balla), and on 14th Feb. the same happened again, but as the polder was flooded it was not possible to check the particular area (Balla). The woods were checked by Balla in April after the water receded, but he found no nest. In 2004 one pair of Sea Eagles remained near the village of Poľany during the whole of February, and 2 solitary birds were seen on 30th May 2004 near Boľ (all Balla in litt.). However, we have no specific details about nesting or even attempts at nesting (all Danko and Balla unpubl.).

There is just one claim by local hunters that in 1996 near Poľany a “large eagle” had three young in a nest in a big white poplar. A year later they showed us the place, but there was no nest there then, and after repeated observations we still had no sighting of any Sea Eagles, so we cannot accept the hunters’ claim.

Many sightings of Sea Eagles come from the fish-pool complex between Iňačovce and Senné, but

primarily from the periods of autumn or spring migration, or in winter. In the vicinity of the Senné fishponds there is one piece of woodland near Pavlovce nad Uhom, but we have not seen any Sea Eagles in this area. During the nesting period they rarely remain at the fishponds, for example 19th May 1997 – 1 ex., 1st April 1999 – 1 ex., 22nd May 2001 – 1 ex., mostly still not adult birds (Danko unpubl.). Monitoring them was important, however, because it is precisely such solitary birds which occupy new nesting territories.

Very often and in greater numbers outside the nesting period the Sea Eagles would remain in the vicinity of Zemplínska šírava Reservoir, with a maximum of 10 ex. on 3rd March 2000 at the Vinné Cove, where they usually spent the night in the poplars (Danko unpubl.). We found eagles present here during the nesting period for the first time on 11th April 2002. While watching raptors near Kusín, M. Balla and I noticed one immat. Sea Eagle flying over the reservoir at fairly low height. We considered it to be a migrating bird, but bearing in mind the lateness of the season we paid more attention to it. After a while the eagle turned and flew towards the forest of the Vihorlat Hills. It was quite far away, but with binoculars we could see it transferring food from its claws to its beak, and then it disappeared in the trees. Shortly afterwards it circled up again and flew back towards us, and then we recognized by its almost white tail that this was a different bird. The whole act looked like a pair taking turns sitting on their clutch. Even though we could not believe at that time that White-tailed Sea Eagles might nest in the Vihorlat Hills, nevertheless we checked the area of woods they were occupying. We soon found a large nest in the crown of a beech tree, which by its construction was typical for this species. On our approach, however, nothing flew from the nest. We immediately visited the local forestry office and informed the staff of our discovery, asking them to stop all kinds of forestry work in the vicinity of the nest to save it from disturbance. We checked it again later on 3rd May, but the birds were no longer there. The fact was that despite our information forestry work was still going on near the nest, which might well have disturbed the birds. Checking inside the nest itself on 10th May, we found that it did not contain a clutch of eggs or any shells from eggs which might have been damaged. It is probable that in that year no clutch was in fact laid. In 2003 I checked the nesting area and the nest itself on 10th and 27th April, but I did not see any birds there and

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Fig. 1. Young Sea Eagles in the nest on 26th May 2004.
Photo: L. Šimák

Obr. 1. Mláďatá orliakov morských na hniezde 26 mája
2004. Foto: L. Šimák

the nest was not occupied. On the other hand, I did sight a pair of Sea Eagles several times in April and May in the Senné Nature Reserve.

In 2004 I visited the nesting area the first time on 13th March. While I watched it from a great distance the nest was visited twice by the male of the pair. The bird's behaviour suggested that there was a clutch of eggs, so I checked the nest again on 17th March and found the female sitting on the clutch. I did all the checking from our vehicle on one of the forest tracks, so the sitting bird never flew from the nest. Once again I brought the occupied nest to the attention of two local foresters, thanks to whom the nesting was concluded successfully because they did not allow any forestry work to be done in the vicinity until there were older offspring in the nest.

I checked the nest at regular intervals from a distance, just observing the eagles carrying food back to the nest. On 20th April at least one chick was

visible in the nest being fed by the female parent, and on 21st May two chicks were clearly to be seen. On 26th May we carried out the ringing and photographic documentation (done by L. Šimák, with our thanks). On 15th June there were still two fledglings in the nest, and on 19th July they were in the trees above the nesting area.

The nest was built in thin beech woodland in the Vihorlat Hills military training area just 2.5 km away from Zemplínska šírava Reservoir. The eagles were hunting for food most probably from the reservoir, but they were also visiting the Senné fishponds. So far though we have no direct sightings from the hunting sites. Balla even spotted one eagle with food near Vojany on 2nd March 2004, flying towards the Vihorlat Hills. It may be assumed that it flew to that area from this nesting place at a time when the Latorica is flooded and there are good feeding opportunities there (flying distance cca 35 km).



Fig. 2. View of Sea Eagles' nesting site in the Vihorlat Hills, May 2004. Photo: Š. Danko

Obr. 2. Pohľad na hniezdne prostredie vo Vihorlatských vrchoch, máj 2004. Foto: Š. Danko

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Thus in 2004 we had the first documented nesting by White-tailed Sea Eagles in Eastern Slovakia. Thanks to this undisturbed and successful nesting it may be expected that this pair will return to nest permanently in this area. In the meantime the District Environment Office in Michalovce has declared the nesting site a protected area.

Based on this finding of a White-tailed Sea Eagles' nest in hills adjacent to a reservoir, it will be necessary in future to devote more attention to this species also in the vicinity of other large reservoirs (e.g. Domaša, Ružin, Starina) where they could nest and breed in a similar way.

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Proof of nesting by a second pair of White-tailed Sea Eagles (*Haliaeetus albicilla*) in Eastern Slovakia

Doložené hniezdenie druhého páru orliaka morského (*Haliaeetus albicilla*) na Východnom Slovensku

Ján LIPTÁK & Jozef MIHÓK

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Address for correspondence: Ján Lipták, Lomnická 44, SK-040 01 Košice, Slovakia.

Jozef Mihók, Buzulucká 23, SK-040 01 Košice, Slovakia. E-mail: mihok@centrum.sk

The increasing population of White-tailed Sea Eagles throughout Europe during the 1980's and 1990's has led to the birds' progressive revitalization. The first repeated successful nestings in our territory (after 34 years of stagnation) were recorded in Western Slovakia in 1998, when 2 pairs nested in the Danube lowlands (Chavko 2002, Stollmann 2004). The first proven successful nesting in Eastern Slovakia was recorded by Danko (2005) in the Vihorlat Hills in 2004. In that year and in 2005, two young birds were successfully raised at that nesting site, and similarly again in 2006 (Danko *in verb.*).

The greatest number of sightings of the presence of White-tailed Sea Eagles in Eastern Slovakia during the nesting period have been made in the Medzibodrožie area (Danko 2005). Up to that point, there had been no observational proof of nesting by this species in the East Slovakian Plain area; only Hrabár (1932) writes in general terms that in the past (i.e. prior to 1932) it used to nest in the woods around the river Latorica.

On 22nd March 2005 near the village of Oborín on the East Slovakian Plain we observed 6 circling Sea Eagles, one of which had immature plumage while the others were adult individuals. One adult bird flew into nearby plain-type woods and called. Another responded from a height above the woods. After this all the eagles disappeared from observable range, but about half an hour later the bird with immature plumage returned above this location and flew down to join the adult bird which had previous-

ly remained in the woods. In that year we observed two eagles on 3 other occasions in the same location, but we were unable to check the woods themselves because of flooding in that area.

In 2006 we visited the location on 20th April, and several times we spotted a circling eagle, though no signs of courtship. The first indications of courting were recorded on 29th April, when we heard an eagle calling from the woods. On 12th May an adult bird flew into the woods carrying something in its talons, but it was not possible to identify clearly whether it was nesting material or food being brought for the female or the young in the nest. When we checked the approach point on 17th June, we found an occupied eagles' nest. When the female flew from the nest, we could observe from the ground one young bird that was visible in it. It was completely white, which indicated in connection with the inspection date that this was a late nesting. At the next direct physical checking on 30th June, one young bird was found in the nest which was by then almost completely brown.

The nesting environment was of the character of wetland woods, with the rivers Laborec and Latorica flowing nearby, leading to the presence of ox-bow lakes. The land here is regularly flooded, and the wider surroundings are made up of a mosaic of wetland woods, arable land and meadows. Tree growth around the nest consisted mainly of poplar and ash.

The nest itself was built in a partially-overturned white poplar at a height of about 20 metres. The nest

construction was relatively shallow, and judging from the thickness of the branches used for building the body of the nest, it had certainly been built from scratch by these eagles.

It is probable that the eagles nested at this location for the first time in 2006, as evidenced by several facts. The nest body was relatively shallow, indicating that it was used for nesting that year probably for the first time. In addition the progress of nesting was delayed by about one month compared with other nests in Slovakia. One of the pair still had immature plumage in 2005, and in 2006 both birds were in full adult colours. It is not possible to state, however, whether the composition of the pair was the same in both years.

Súhrn

Prvé úspešné doložené hniezdenie na východnom Slovensku zaznamenal Danko (2005) v roku 2004 vo Vihorlatských vrchoch. V tom roku a v roku 2005 boli na tomto hniezdisku úspešné vyvedené po 2 mláďatá, podobne aj v roku 2006 (Danko in verb.). Najviac pozorovaní výskytu orliakov na východnom Slovensku v hniezdnom období bolo zaznamenaných v Medzibodroží (Danko 2005). Zatiaľ nebolo doteraz dokladované žiadne hniezdenie tohto druhu z územia Východoslovenskej roviny, iba Hrabár (1932) všeobecne píše, že v minulosti (teda ešte pred rokom 1932) hniezdil v lesoch okolo Latorice.

Dňa 22. 3. 2005 v okolí obce Oborín na Východoslovenskej rovine sme pozorovali 6 krúžiacich orliakov, z ktorých bol 1 v imaturnom operení a ostatné boli adultné jedince.

V r. 2006 sme navštívili lokalitu 20. 4. a pozorovali sme viackrát krúžiaceho orliaka bez známok prejavov toku. Prvé prejavy toku sme zaznamenali 29. 4., keď sme zaregistrovali hlas orliaka ozývať sa z porastu. Dňa 12. 5. zaletel dospelý jedinec do porastu a niečo niesol v pazúroch. Nebolo jednoznačne možné určiť, či to bol hniezdny materiál alebo potrava nesená pre samicu alebo mláďa na hniezde. Pri kontrole miesta záletu dňa 17. 6. sme našli obsadené hniezdo orliaka. Z hniezda vyletela samica a pozorovaním zo zeme bolo v hniezde viditeľné jedno mláďa. Bolo úplne biele, čo naznačovalo, že podľa dátumu kontroly ide o oneskorené hniezdenie. Pri ďalšej priamej fyzickej kontrole 30. 6. bolo v hniezde zistené jedno mláďa, ktoré bolo už takmer celé hnedé (Obr. 1).

Stavba hniezda bola pomerne nízka a podľa hru-

bých konárov použitých na stavbu hniezda išlo určite o hniezdo postavené od základu orliakmi.

Je pravdepodobné, že orliak na tejto lokalite zahniezdil prvýkrát v r. 2006, čomu nasvedčujú viaceré skutočnosti. Hniezdo bolo pomerne nízke, čo by naznačovalo, že bolo na hniezdenie použité tohto roku pravdepodobne prvýkrát. Zároveň priebeh hniezdenia bol oneskorený asi o jeden mesiac oproti iným hniezdam na Slovensku. Jeden z páru bol v r. 2005 v imaturnom vyfarbení a v roku 2006 obidva jedince boli plne vyfarbené ako dospelé. Nie je možné konštatovať, či zloženie páru bolo v obidvoch rokoch totožné.



Fig. 1. Young Sea Eagle (*Haliaeetus albicilla*) in the nest in the East Slovakian Plain on 30th June 2006.

Foto: J. Lipták

Obr. 1. Mláďa orliaka morského (*Haliaeetus albicilla*) z hniezda na Východoslovenskej rovine, 30. 6. 2006.

Foto: J. Lipták

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Nesting by Hobbies (*Falco subbuteo*) in the Košice Basin (Eastern Slovakia) from 1996 to 2005

Hniezdenie sokola lastovičiara (*Falco subbuteo*) v Košickej kotline (východné Slovensko) v rokoch 1996 až 2005

Ján LIPTÁK

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Abstract: In the course of ten nesting seasons from 1996 to 2005 I observed nesting by hobbies in Eastern Slovakia within a territory of 1000 km² in the Košice Basin. During this ten-year period 218 nestings were recorded. The average population density was two pairs per 100 km² in the monitored territory. In certain quadrants with better occupation it was from four to seven pairs per 100 km². The birds nested more frequently on very high tension (VHT) electricity pylons (126 instances) than in trees (92 instances). They prefer the nests of hooded crows (*Corvus corone cornix*) (110 cases) and ravens (*Corvus corax*) (90 cases), and in only 18 cases did they use another nesting solution. When nesting in VHT pylons in the 1980's they used to make more use of crows' nests, but at the present time they prefer ravens' nests to a significant degree.

Abstrakt: V priebehu hniezdných sezón 1996 až 2005 som sledoval hniezdenie sokola lastovičiara na východnom Slovensku v Košickej kotline na území približne 1000 km². Za obdobie desiatich rokov bolo zistené 218 hniezdení. Priemerná hustota bola 2 páry na 100 km² v sledovanom území. V niektorých štvorcoch s najlepšou obsadenosťou to bolo 4 až 7 párov na 100 km². Najčastejšie hniezdil na stožiaroch veľmi vysokého napätia (VVN), a to 126 krát a na stromoch 92 krát. Uprednostňuje hniezda vrán túlavých (*Corvus corone cornix*) v 110 prípadoch a krkavcov čiernych (*Corvus corax*) v 90 prípadoch, len 18 krát využil inú možnosť. Pri hniezdení na stožiaroch VVN v 80. rokoch využíval najmä hniezda vrán a v súčasnosti sú to v rozhodujúcej miere hniezda krkavcov.

Key words: Hobby, *Falco subbuteo*, Hooded Crow, Raven, density of population, Košice basin, Eastern Slovakia

Address for correspondence: Ján Lipták, Lomnická 44, SK-040 01 Košice, Slovakia.

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Introduction

The Hobby is studied by only a few ornithologists in Slovakia. This is probably due to the fact that observing this species requires a certain degree of specialization. Nor is there a great deal of literature from the past concerning their nesting in this country. They nest throughout Slovakia in suitable biotopes, but not very densely (Ferianc 1977). I assume that their numbers in this country are fairly

stable, but their manner of nesting during the last 25 years has been "modernized". In the same way that crows and ravens have adapted their nesting habits to the use of VHT pylons, this has also come to suit the hobbies, especially as they are associated with the former species with regard to their nesting. I recorded the first example of nesting in a VHT pylon in 1979 (Lipták in Danko 1980), and this manner of nesting has also been found in Germany (Kirmse 1991). The aim of this research was to compile some

basic data on the number of nesting pairs in the Košice Basin, the location and selection of their nests, and the level of their nesting success, and thus contribute to the knowledge of their nesting biology.

Description of the territory

The Košice Basin forms part of south-east Slovakia. The observed territory has an area of approx. 1000 km² and extends over 12 quadrants of the Databank of Fauna in Slovakia (DFS): 7094, 7194, 7293-94, 7390-94 and 7491-93 (see map in Fig.1). It is bordered by the Slanské and Volovské Hills, the Bodvianska ridges and the Slovakian Karst. Heights above sea-level range from 160 to 450 metres, and the catchment area is of the rivers Hornád, Torysa and Bodva. The south part is an intensively-farmed plain with belts of Canadian poplar (*Populus canadensis*) planted alongside rivers and drainage canals, and forming windbreaks. The northern part around the river Torysa rises in ridges with fields and smaller, mainly oak woods, but there are also poplar belts here along the Torysa and in windbreaks. The territory is crossed by two VHT transmission lines.

Methods and materials

Nesting data were collected in three basic ways:

1. Locating nesting pairs:

This was done in June when the birds were already sitting on their clutches. Findings were only confirmed as data when the pairs were seen to be sitting firmly and taking turns on the clutch.

2. Checking young in the nests:

This was done in July when the chicks were more than ten days old and could be observed from the ground. I climbed up to the nests only in exceptional cases.

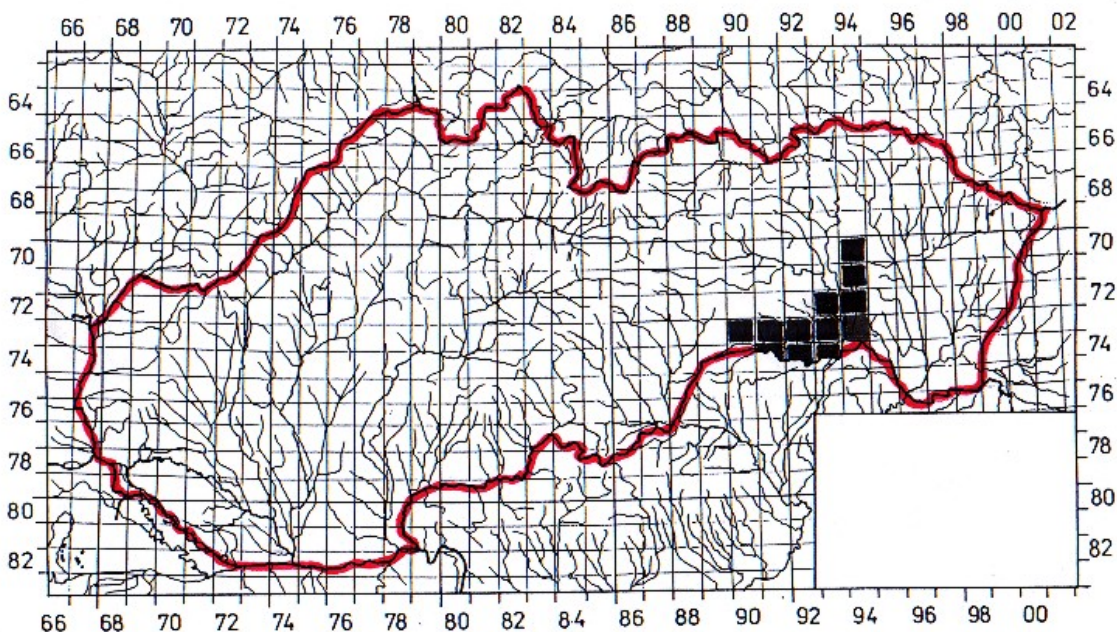
3. Checking fully-raised young:

This was done in August when young birds were observed in the close vicinity of the nest, or fully-fledged and capable of flight from the nest.

Due to the reason that some pairs do not nest regularly in the same locality, I carried out the locating of nesting pairs through systematic checking of suitable biotopes each year.

Fig.1. Observed territory shown as DFS quadrants covering the Košice Basin in Eastern Slovakia.

Obr 1. Sledované územie v sieti štvorcov DFS v Košickej kotline na východnom Slovensku.



Results

During the period in question, 1996 to 2005, 218 nestings by hobbies were confirmed in the Košice Basin (Tab. 1). The highest density of nesting pairs in one quadrant was from four to seven pairs per 100 km², and the lowest was from zero to two pairs per 100 km². The closest distance between two nesting pairs was found in 2005 at just 340 metres. Average nesting success was 69%, giving 31% of losses, when not even one young bird flew from the nests.

The average number of fully-raised birds per nest in cases of successful nesting was 2.25, and the average number of young birds flying from the nests of all nestingpairs was 1.56.

The most frequent number of young birds flying from one nest was three, occurring in 47.6% of the total number of successful nestings. In terms of percentage expression of numbers of young birds flying from nests in various European countries with varying numbers of nests, these results are comparable (Tab. 2).

Tab. 1. Nesting success rate of the Hobby (*Falco subbuteo*).

Tab. 1. Hniezdna úspešnosť sokola lastovičiara (*Falco subbuteo*).

Year	Number of occupied nests	Number of successful nestings	Number of young confirmed on nests	Number of fully-raised young	Average number of young on nests	Nesting success rate (number of fully-raised young per occupied nest)
1996	21	13	30	29	2,23	1.38
1997	24	16	34	33	2,06	1.38
1998	18	12	34	34	2,83	1.89
1999	25	17	41	39	2,29	1.56
2000	18	9	21	21	2,33	1.17
2001	24	19	37	35	1,84	1.46
2002	18	11	29	29	2,63	1.61
2003	18	14	38	37	2,64	2.06
2004	27	20	49	42	2,10	1.56
2005	25	20	45	41	2,05	1.64
TOTAL	218	151	358	340	2.25	1.56

Tab. 2. Numbers of young birds flying from nests in certain parts of Europe.

Tab. 2. Počet vyletených mláďat z hniezd v niektorých častiach Európy.

Observed territory	Period	Number of nests (n)	Numbers of young flying from nests								Source
			1		2		3		4		
			n	%	n	%	n	%	n	%	
Eastern Slovakia	1996-2005	151	19	12.5	58	38.4	72	47.6	2	1.3	This study
Danube Delta Romania	1981-1988	48	6	12.5	17	35.4	23	47.9	2	4.2	Müller & Rohde 1991
Berlin	1956-1982	328	51	15.5	108	32.9	156	47.6	13	4.0	Fiuczynski 1988
England	1930-1972	38	5	13.2	16	42.1	17	44.7	0	0	Fiuczynski & Nethersole-Thompson 1980

In 126 cases in this study, nests were located in VHT pylons (Tab. 3) and in 92 cases in trees, the majority of which were Canadian poplars (91 cases), with just one instance of acacia (*Robinia pseudoacacia*). The hobbies used old crows' nests in 110 cases, ravens' nests in 90 cases, and there were 18 uses of other species' nests: magpies (*Pica pica*) five times, imperial eagle (*Aquila heliaca*) one time, common

buzzard (*Buteo buteo*) one time, and there were 11 uses of artificial nest frames.

The earliest arrival here from the wintering area during the studied period was recorded on 12th April 2003, and the earliest sitting on a clutch similarly on 26th May 2003, whereas the last spotting of young birds not yet flown from the nest was on 2nd September 2004.

Tab. 3. Manner of nesting by hobbies (*Falco subbuteo*).

Tab. 3. Spôsob hniezdenia sokola lastovičiara (*Falco subbuteo*).

Year	Number of occupied nests	Location of nests		Nests originally built by			Nesting in VHT pylons	
		VHT pylon	Tree	Raven	Crow	Other	Raven	Crow
1996	21	11	10	7	11	3	7	2
1997	24	15	9	9	14	1	9	5
1998	18	14	4	11	6	1	11	3
1999	25	16	9	11	14	0	11	5
2000	18	12	6	9	8	1	9	3
2001	24	16	8	10	12	2	10	4
2002	18	13	5	10	7	1	10	2
2003	18	10	8	8	7	3	8	0
2004	27	10	17	9	15	3	9	0
2005	25	9	16	6	16	3	6	0
TOTAL	218	126	92	90	110	18	90	24

Discussion

There is no more detailed information available for the purpose of comparing numbers and nesting dynamics among the hobby population in this country. Likewise in the Košice Basin, where I have been observing hobbies for 25 years, I am unable to assess the dynamics of nesting numbers. There are several reasons for this. Deviations in particular years may be connected with natural influences on nesting such as weather, predators, availability of food and of suitable nests. Human impact on the environment is important as well – cutting down poplar belts, removal of nests from VHT pylons, and changes in agricultural use causing changes in numbers of swallows (*Hirundo rustica*) and house-martins (*Delichon urbica*), which are the hobbies' main prey.

Possibly the most important factor is the existence of a sufficient number of suitable crow and raven nests for the hobbies' nesting. One subjective reason is that I have not maintained equal intensity

of observation year by year. Hobbies are small, inconspicuous raptors which are difficult to track down to their nests. For their nesting they almost always choose the current year's nests of corvine birds, and only in exceptional cases do they occupy an older nest. It often happens that in successive years certain pairs occupy different nests, maybe 2-3 kilometres away from the previous year's nesting place, and whenever there were several such pairs close to one another, I would lose track of the identities of particular pairs. It has also happened, as for example in 2005, that I was unable to locate 7 pairs which had disappeared from their original nesting area, but then I found a further 7 new pairs nesting in different places from 5 to 20 km away.

Some pairs, though, remain faithful to their own nesting site for many years. One pair I have been observing for 26 years always return to the very same locality. The first time I found them using a



▲ **Fig. 2.** Nesting biotope with poplar avenue.
Photo: J. Lipták
Obr. 2. Hniezdny biotop s topoľovou alejou
Foto: J. Lipták



▲ **Fig. 3.** Nesting biotope with line of high-tension pylons. Photo: J. Lipták
Fig. 3. Hniezdny biotop s líniou stožiarov vysokého napätia. Foto: J. Lipták



▲ **Fig. 4.** Hobby falcon young in a crows' nest in a high-tension pylon. Photo: J. Lipták
Obr. 4. Mláďatá sokola lastovičiara vo vraňom hniezde na stožiaroch vysokého napätia. Foto: J. Lipták



▲ **Fig. 5.** Hobby falcon young in a ravens' nest in a high-tension pylon. Photo: J. Lipták
Obr. 5. Mláďatá sokola lastovičiara v hniezde krkavca na stožiaroch vysokého napätia. Foto: J. Lipták

crows' nest in a VHT pylon, but after three years the crows disappeared from this area. Immediately, however, the crows' place was taken by some ravens which started nesting in the pylon. Since then, thanks to the ravens, the hobbies have been nesting in the same pylon every year.

Sometimes it happens that the young ravens pull the nest to pieces on flying from it, which leaves nowhere for the hobbies to nest. For this reason I installed an artificial nest frame in the pylon, made from boards measuring 60x60x15 cm and filled with a mixture of earth and woodshavings.

Since 1984 ravens have used this every year as the base for their nests, and even if they take the nest apart the hobbies can still nest in the frame. The reason is probably that they have no other nesting opportunity in this area, but this place greatly suits them. It is also most probable that during the course of this period the adult birds in the pair have been replaced.

I am able to compare past and present patterns of nesting in VHT pylons. In the 1980's the hobbies nested in pylons mainly in crows' nests. For example in 1988 out of seven pairs in pylons, six were in

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Fig. 8. Hobby falcon (*Falco subbuteo*) with young in a crow's nest in a poplar. Photo: J. Lipták

Obr. 8. Sokol lastovičiar (*Falco subbuteo*) s mláďatmi vo vraňom hniezde na topoli. Foto: J. Lipták

crows' nests and just one in a ravens' nest (Lipták in Danko 1988), and in 1989 out of 15 pairs, 11 were in crows' nests and four in ravens' (Lipták in Danko 1989). Table 3 shows, however, that in the last few years the trend is the opposite, that hobbies nesting in VHT pylons now almost always use only ravens' nests. This is connected with a negative population trend among crows and increasing population dynamics among ravens during the 1990's (Danko et al. 2002), when there was also a marked increase in the numbers of ravens nesting in pylons. The number of hooded crows is falling partly due to changes in local agricultural usage (declining use of pastures and manure heaps). In the Košice Basin nowadays crowsonly rarely nest in VHT pylons.

Nesting in VHT pylons provides hobbies protection against their natural enemies, especially goshawks (*Accipiter gentilis*) and pine martens (*Martes sp.*). From here they get a very good all-round view of the surrounding country, as well as the measure of height which is so important for falcons. On the other hand, the nest and the young have no protection from rain and wind, and it can also happen that lightning strikes the pylon itself.

In wet years there are more losses from these nests than from those in trees. Another dangerous phenomenon is the inclusion by crows and ravens in their nest litter of lengths of string negligently left in the fields by farm workers. Not only young birds but also adults can become tangled in the string. I have always checked for this when visiting nests.

Hobbies have nested on artificial frames 11 times in this area. They only made use of a frame when they had no other nesting opportunity. Installation of frames is a possible means of enabling nesting to succeed in a particular year, but not of increasing the number of nesting opportunities.

In conclusion I would like to mention an interesting observation from 2003. A hobby which had been unsuccessful in nesting (I found egg-shells below the nest) still remained on the nest. A young kestrel (*Falco tinnunculus*) came flying from a nearby nest and perched below the hobby's nest, and on 26th July I twice observed the hobby giving the young kestrel food. On the following three days the young kestrel came again, but I did not observe any more presenting of food.

Súhrn

Na Slovensku je o sokolovi lastovičiarovi málo podrobnejších poznatkov. Vo vhodných biotopoch hniezdi na celom území štátu, aj keď nie vo veľkom počte. Pravdepodobne sa jeho početnosť u nás v posledných desaťročiach nemení (Karaska & Danko 2002). Posledných 25 rokov sa prispôbil hniezdeniu v hniezdach krkavcovitých vtákov na stožiaroch veľmi vysokého napätia (VVN). V období rokov 1996 až 2005 som sledoval tento druh v Košickej kotline. Územie o rozlohe 1000 km² zasahuje do 12 kvadrátov databanky fauny Slovenska (DFS) (Obr. 1). Nadmorská výška územia sa pohybuje od 160 do 450 m nad morom. Väčšinou je to poľnohospodársky využívaná krajina s pásmi topoľa kanadského (*Populus canadensis*), vysadenými popri vodných tokoch, odvodňovacích kanáloch a vo vetrolamoch. Južná časť kotliny je rovina a na severe prechádza do pahorkatiny. Sú tu aj menšie dubové lesíky. Cez územie vedú 2 trasy VVN.

Pri sledovaní boli vykonávané 3 základné kontroly:

1. **Vyhľadávanie hniezdných párov.** Prebiehalo v júni, keď vtáky sedia na znáškach.
2. **Kontrola mláďat na hniezdach.** V júli sa zistoval počet mláďat starších ako 10 dní.
3. **Kontrola vyvedených mláďat.** Prebiehala v auguste, keď mláďatá opúšťali hniezdo.

Výsledky

Výsledky pozorovaní o hniezdnej úspešnosti sú v Tab. 1, počtu vyletených mláďat z úspešného hniezda v Tab. 2 a spôsobu hniezdenia v Tab. 3.

Bolo zistených 218 hniezdení, z toho na stožiaroch VVN 126 krát a 92 krát na strome. Na strohoch boli hniezda na topoli kanadskom (*Populus canadensis*) 91 krát a raz na agáte (*Robinia pseudo-acacia*). Na stožiaroch VVN hniezdili lastovičiari v hniezdach krkavcov 90 krát a v hniezdach vrán 24 krát. Celkom hniezdili v krkavčích hniezdach 90 krát, vo vraniach 110 krát a 18 krát využili možnosti v hniezdach iných druhov vtákov: straka čiernozobá (*Pica pica*) 5 krát, orol kráľovský (*Aquila helica*) 1 krát, myšiak lesný (*Buteo buteo*) 1 krát a 11 krát použili umelú hniezdnú podložku. Na umelých podložkách hniezdili len vtedy, keď nemali inú možnosť. Posledné roky vrany hniezdia na stožiaroch zriedkavejšie.

Hniezdna hustota sokola lastovičiara v lepších biotopoch Košickej kotliny je 4–7 párov na 100 km², inde sú to 0-2 páry na 100 km². Najbližšia vzdialenosť medzi dvomi hniezdiacimi párami bola zistená v roku 2005 – len 340 m.

Priemerná úspešnosť hniezdenia bola 69 % a 31 % tvorili straty, keď z hniezda nevyletelo ani 1 mláďa. Priemerný počet mláďat na hniezde bol 2,35 mláďaťa na hniezdo a priemerný počet vyletených mláďat na všetky hniezdné páry bol 1,56.

Najskorší prílet zo zimoviska k nám za spomínané obdobie som zaznamenal 12.4.2003, najskoršie sedenie na vajčkách 26.5.2003 a posledné pozorovanie ešte nevyletených mláďat na hniezde 2.9.2004.

Jeden pár lastovičiarov hniezdi na tej istej lokalite už 26 rokov a v tom istom hniezde 23 rokov.

Pozorované bolo predávanie potravy sokolom lastovičiarom, ktorý mal neúspešné hniezdenie mláďedu, už lietajúcemu sokolovi myšiarovi (*Falco tinnunculus*).



▲ **Fig. 6.** Wooden platform with hobby falcon young in a high-tension pylon. Photo: J. Lipták
Obr. 6. Drevená podložka s mláďaťom sokola lastovičiara na stožiaroch vysokého napätia. Foto: J. Lipták



▲ **Fig. 7.** Plastic container with hobby falcon young in a high-tension pylon. Photo: J. Lipták
Obr. 7. Umelohmotná nádoba s mláďaťmi sokola lastovičiara na stožiaroch vysokého napätia. Foto: J. Lipták

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Large numbers of young in nests of Tawny Owls (*Strix aluco*)

Vysoký počet mlád'at v hniezdach sovy obyčajnej (*Strix aluco*)

Dušan KARASKA

Karaska D 2007: Large numbers of young in nests of Tawny Owls (*Strix aluco*). Slovak Rapt J, 1: 53-56.

Address for correspondence: Dušan Karaska, Oravský Podzámok 261, SK-027 41, Slovakia.
E-mail: karaska@sovs.sk

The Tawny Owl (*Strix aluco*) is one of the relatively well-known bird species in Europe, including Slovakia. Installation of nesting-boxes and proper occupation of them by this owl creates suitable conditions for acquiring a good deal of information about its nesting biology.

In the Orava region since 1997 around 150 boxes suitable for Tawny Owl nesting have been put up. Most of them are regularly monitored. On 21st May 2004 the artificial nesting boxes were checked in Raciborská Valley near the village of Oravský Podzámok in the Orava Uplands. Of the 5 boxes installed in this area, 4 were occupied by Tawny Owls and the fifth remained empty. While checking and then ringing the young, I was struck by their large number. In box no.1 in a spruce tree (territory of Oravský Podzámok, Raciborská Valley – Sopúšky, approx. 660 metres above sea-level, quadrant DFS 6781) there were 6 fledglings. The food in the box consisted of a single adult yellow-necked mouse (*Apodemus flavicollis*). In the neighbouring box no.2, about 1.3 km away from the first and similarly located in a spruce tree (territory of Oravský Podzámok, Raciborská Valley – Blašková, approx. 670 metres above sea-level, quadrant DFS 6781) there were even 7 grown-up young. The 3rd box, 0.9 km away from the previous one and also located in a spruce tree (territory of Oravský Podzámok, Raciborská Valley – Prostredný Racibor, approx. 580 metres above sea-level, quadrant DFS 6781) was empty on that day, but the adult birds were observed in the vicinity. We conclude that the young had already flown from the nest, because on 1st May 2004 a single adult owl was occupying the box. The next box no.4 was about 1.7 km away from the pre-

vious one (territory of Oravský Podzámok, Skalka, approx. 660 metres above sea-level, quadrant DFS 6782) and installed in a fir tree. This box contained 5 young and one infertile egg. On 28th May 2004 we checked box no. 5, located in a fir tree in the Orava Magura hills (territory of Oravský Podzámok, Zábava, approx. 790 metres above sea-level, quadrant DFS 6681), at a distance of 5.6 km from box no.4, though it was the nearest to it in a northerly direction. In this box there were 5 fledglings. At the time of checking all the boxes contained similarly-aged (about one month old) young birds almost ready to fly from the nest. Around the box there were predominantly deciduous but also coniferous woods of various ages. The height above sea-level of the assumed hunting grounds was 550 – 900 metres. Another interesting thing was that the adult birds (apart from the pair in box no. 1) very intensively attacked and physically struck at anyone in the tree by the nest, including the assistant, who in the case of the last tower was ringing young birds on the ground. It was possible to compare their intensity with the attack of a Ural Owl near its nest. Later the boxes were not checked any more. Considering the young birds' maturity and their good physical condition, I assume that they had already flown away successfully. Apart from these boxes, others were checked in other places around the Orava area, but none of them held more than 4 young. In 2004 out of a total 15 cases the overall average of grown-up (probably flown away) young birds per nest was found to be 3.73.

With this kind of owl the number of eggs in the nest shows relatively great variability. The maximum number of eggs in a clutch known to me in

Slovakia was found by Benko (*in litt.*). In May 1998 one box in mixed woodland (prevalently beech) near the village of Opatová in the Strážovské Hills was found to contain a clutch of 8 eggs. Subsequent inspections revealed progressive disappearance of eggs and then chicks, until finally the nesting was unsuccessful. In the following years normal-sized clutches of 3-4 eggs were found in this box. In the former Czechoslovakia (Hudec et al., 1983) a range of 1 – 5 young with an average of 2.83 and numbers of eggs from 1 – 6 with an average of 3.79 were found. Mebs & Scherzinger (2000) mention only egg numbers ranging 1 – 7, most frequently 2 – 4, and the average number of successfully-raised young per pair between 0.3 – 3.5. Glutz & Bauer (1980) recorded a maximum of 9 eggs per clutch in Central Europe, and remark that in Northern Europe when the rodent population is at its height, 7 – 9-fold clutches are not uncommon. In Central Europe such large-numbered clutches are quite rare, and mostly come from two females (bigynia). Cramp (1985) mentions a maximum clutch of just 6 eggs, and comments that clutch size and number of fully-raised young depend on the sufficiency of food.

In fact the number of young flying from the nest and thus also the successfulness of nesting depend on several factors. Considering geographical variability, for example, numbers rise from the south and south-west towards the north and north-east (Glutz & Bauer, 1980). But ultimately the most substantial factor is availability of food. In years of rodent population increase (particularly of *Apodemus flavicollis* and *Clethrionomys glareolus*), nesting success rates as well as absolute numbers of young flying from nests are significantly higher than in years of population shrinkage. The former situation was true for the cases mentioned here, when in 2004 in the monitored territory there were large numbers of woodland rodents, and their population was at its maximum. Evidence of food sufficiency lies in the presence of a yellow-necked mouse in box no.5 with its 5 young, their overall good physical condition, even of the youngest (smallest) chicks, and the relatively small size difference between youngest and oldest siblings. There was also a positive influence on numbers of young in nests and nesting success rates from reduced predation by the owls' natural enemies (*Martes martes*, *Accipiter gentilis*, *Bubo bubo*), another result of the sufficiency of other food sources (greater numbers of woodland rodents). A positive effect on the numbers of successfully-raised young evidently also stemmed from the size of the nesting-boxes (a half-box also

intended for Ural Owls, with a base measuring 40 x 40 cm and a height of 50 cm). With a box base of such large area there was minimum probability of later-hatching chicks being trampled by the larger (earlier-hatching) ones. Losses of chicks caused by trampling are relatively more frequent in nesting spaces with smaller dimensions such as in hollow trees. One remarkable phenomenon was the great aggressivity of the parents during nesting-box inspections (especially nos. 2 and 5). I assume that the reason for this was the adults' good physical condition resulting from sufficiency of food. The parents' aggressivity may also have been strengthened by their greater investment in bringing up their young, because of the large number of eggs in the clutch and the number of young in the nest, and the resulting need to bring in greater amounts of food.

Summary

In Orava (northern Slovakia) in 2004 neighbouring nesting-boxes held 2 x 5, 1 x 6 and 1 x 7 fully-raised young Tawny Owls. These large numbers were linked with the greater numbers of woodland rodents in that year, relatively low predation by their natural enemies, and the large size of the nesting-boxes, originally intended for Ural Owls.

Sova obyčajná (*Strix aluco*) patri v Európe i u nás k relatívne dobre poznaným vtáčim druhom. Inštalácia hniezdnych búdok a ich dobré obsadzovanie touto sovou vytvára vhodné podmienky pre získanie množstva informácií z jej hniezdnej biológie.

Od roku 1997 sa v regióne Oravy vyvesilo približne 150 búdok vhodných pre hniezdenie sovy obyčajnej. Väčšina z nich je pravidelne monitorovaná. Dňa 21. mája 2004 boli kontrolované umelé hniezdne búdky v Raciborskej doline pri Oravskom Podzámku v Oravskej vrchovine. Z 5 búdok inštalovaných v tomto území boli 4 obsadené sovou obyčajnou a 5. bola prázdna. Pri kontrole a následnom krúžkovaní mláďat ma prekvapil vysoký počet mláďat. V búdke č. 1 na smreku (k. ú. Oravský Podzámok, Raciborská dolina – Sopúšky, približne 660 m n. m., kvadrát DFS 6781) bolo 6 vyperených mláďat. V búdke sa ako potrava nachádzal dospelý jedinec ryšavky žltohrdlej (*Apodemus flavicollis*). V susednej búdke č. 2 vzdialenej asi 1,3 km od predchádzajúcej a opäť umiestnenej na smreku (k. ú. Oravský Podzámok, Raciborská dolina – Blašková, asi 670 m n. m., kvadrát DFS 6781) bolo dokonca 7 vyspelých

mláďat. 3. búdka umiestnená na smreku (od predchádzajúcej vzdialená 0,9 km, k. ú. Oravský Podzámok, Raciborská dolina – Prostredný Racibor, cca 580 m n. m., kvadrát DFS 6781) bola v tento deň prázdna, ale adulty boli pozorované v okolí. Usudzujeme, že mláďatá už vyleteli z hniezda, pretože 1. 5. 2004 dospelý jedinec pevne sedel v búde. Susedná búdka č. 4 vzdialená od predchádzajúcej asi 1,7 km (k. ú. Oravský Podzámok, Skalka, približne 660 m n. m., kvadrát DFS 6782) bola inštalovaná na jedli. Nachádzalo sa v nej 5 mláďat a 1 hluché vajce. Dňa 28. 5. 2004 bola kontrolovaná búdka č. 5 umiestnená na jedli v Oravskej Magure (k. ú. Oravský Podzámok, Zábava, cca 790 m n. m., kvadrát DFS 6681). Od budy č. 4 bola vzdialená až 5,6 km, ale bola k nej najbližšie severným smerom. Nachádzalo sa v nej 5 vyperených mláďat. Vo všetkých búdkach boli v čase kontroly približne rovnako staré mláďatá tesne pred vyletením vo veku asi 1 mesiac. V okolí búdok pravažovali zmiešané až ihličnaté lesy rôzneho veku. Nadmorská výška predpokladaných lovisk bola 550 – 900 m n. m. Zaujímavá bola aj skutočnosť, že dospelé vtáky (až na pár z budy č. 1) veľmi intenzívne útočili a fyzicky napádali nielen osobu na strome pri búde, ale aj pomocníka, ktorý v prípade poslednej budy krúžkoval mláďatá na zemi. Intenzita sa dala prirovnať útokom sovy dlhochvostej (*Strix uralensis*) pri hniezde. Ďalej neboli búdky kontrolované. Vzhľadom na vyspelosť mláďat a ich dobrú fyzickú kondíciu predpokladám, že úspešne vyleteli. Okrem týchto búdok boli skontrolované búdky aj na iných miestach regiónu Oravy, ale v žiadnej z nich nebolo viac ako 4 mláďatá: V roku 2004 bol z 15 prípadov celkový priemer vyspelých (pravdepodobne vyletených) mláďat zistených na hniezde 3,73.

U tejto sovy počet vajec v hniezde vykazuje pomerne veľkú variabilitu. Maximálny mne známy počet vajec v znáške na Slovensku zistil Benko (in litt.). V máji 1998 v búde v zmiešanom poraste s prevahou buka pri obci Opatová v Strážovských vrchoch zaznamenal 8 kusovú znášku. Pri nasledujúcich kontrolách bolo zistené postupné miznutie vajec i mláďat a nakoniec bolo hniezdenie neúspešné. V nasledujúcich rokoch boli v tejto búde zistené normálne veľké znášky pozostávajúce z 3 - 4 vajec. V bývalom Československu (Hudec et. al., 1983) bolo zistených 1 – 5 mláďat, v priemere 2,83 a počet vajec sa pohyboval od 1 do 6 (priemer 3,79). Mebs & Scherzinger (2000) uvádzajú len počet vajec: 1 – 7, najčastejšie 2 – 4 vajcia a priemerný počet vyvedených mláďat na pár 0,3 – 3,5. Glutz & Bauer (1980) zo strednej Európy uvádzajú v znáške maxi-

málne 9 vajec a poznamenávajú, že v severnej Európe pri populačnom maxime hlodavcov nie sú vzácne 7 – 9 kusové znášky. V strednej Európe sú tieto viacpočetné znášky veľmi vzácne a väčšinou pochádzajú od 2 samíc (bigýnia). Cramp (1985) uvádza len maximálnu znášku 6 vajec a spomína, že veľkosť znášky a počet vyletených mláďat závisí od dostatku potravy. Počet vyletených mláďat a aj úspešnosť hniezdenia závisí od viacerých vplyvov. Vykazuje aj geografickú variabilitu. Počet vyletených mláďat sa zvyšuje od juhu, juhozápadu k severu, severovýchodu (Glutz & Bauer, 1980). V podstatnej miere ho však ovplyvňuje dostupnosť potravy. V rokoch populačnej gradácie hlodavcov (osobitne *Apodemus sylvaticus* a *Clethrionomys glareolus*) je úspešnosť hniezdenia i absolútny počet vyletených mláďat podstatne vyšší, ako v rokoch populačného minima. Tak to bolo aj v mojom prípade, kedy sa v roku 2004 na sledovanom území vyskytovalo množstvo lesných hlodavcov. Ich populácia bola v maxime. O dostatku potravy svedčí, prítomnosť 1 ryšavky žltohrdlej v búde č. 1 s 5 mláďatami, celkovo dobrý fyzický stav aj tých najmladších (najmenších) mláďat a relatívne malý veľkostný rozdiel medzi najmladším a najstarším súrodencom. Na počet mláďat v hniezdach a úspešnosť hniezdenia mala pozitívny vplyv i znížená predácia prirodzenými nepriateľmi (*Martes martes*, *Martes foina*, *Accipiter gentilis*, *Bubo bubo*), spôsobená dostatkom iných zdrojov potravy - gradáciou lesných hlodavcov. Pozitívnu úlohu na počte vyvedených mláďat zrejme zohrala aj veľkosť budy (polobúdka určená aj pre sovy dlhochvosté s rozmermi dna 40 x 40 cm, výška 50 cm). Na takejto veľkej ploche dna budy bola minimálna šanca, aby neskôr vyliahnuté mláďatá boli zašliapané väčšími (skôr vyliahnutými). Straty mláďat spôsobené zašliapaním sú relatívne častejšie v hniezdných dutinách menších rozmerov.

Osobitným javom je veľká agresivita rodičov pri kontrole búdok (najmä č. 2 a 5). Predpokladám, že jej príčinou bola v dobrej fyzickej kondícii adultov vyplývajúcej z dostatku potravy. Agresivitu rodičov mohol zosilňovať aj ich veľký vklad do výchovy mláďat (vysoký počet vajec v znáške a počet mláďat v hniezde a s tým spojená nutnosť donášania väčšieho množstva potravy).

Súhrn

Na Orave (severné Slovensko) boli v roku 2004 v susedných búdkach zistené 2 x 5, 1 x 6 a 1 x 7 vyspelých mláďat. Tento vysoký počet súvisí s

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gradáciou lesných hlodavcov v tomto roku, relatívne nízkou predáciou prirodzenými nepriateľmi a veľkými rozmermi búdok určenými pre sovy dlhochvosté.

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Unusual nesting by Tengmalm's Owls (*Aegolius funereus*) in Orava

Neobvyklé hniezdenie pôtika kapcavého (*Aegolius funereus*) na Orave

Dušan KARASKA

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Address for correspondence: Dušan Karaska, Oravský Podzámok 261, SK-027 41, Slovakia. E-mail: karaska@sovs.sk

The Tengmalm's Owl (*Aegolius funereus*) is a Siberian zoogeographical type, and usually nests inside hollowed-out trees. Most frequently these are hollows made by Black Woodpeckers (*Dryocopus martius*). In much more seldom cases they use naturally-occurring hollows, such as where a branch has rotted away. Only rarely do they occupy boarded nesting-boxes. This *tajga*-dwelling owl ranks together with the Pygmy Owl (*Glaucidium passerinum*) and Tawny Owl (*Strix aluco*) among the most common representatives of the *Strigiformes* order in the Orava region.

In April 2001 nesting-boxes were installed up at Kubínska Fell in the Oravská Magura hills, originally intended for Tawny and Ural Owls. These were not regularly monitored, though, and it was a great surprise to me when I was informed by J. Lehotský (*in verb.*) that a random inspection of one box on 8th June 2004 had found two Tengmalm's Owls sitting in the opening. That very day I went to check the box personally, and saw two fully-fledged youngsters sitting in the box, which flew into the nearby trees as I climbed up to the box. One adult bird was spotted in the vicinity. The floor of the box was covered in a thick layer of regurgitated pellets – undeniable proof that these owls had been raised in this nest.

The box was fixed to a spruce trunk 8 metres above ground, about 100 metres from the forest track leading from the town of Dolný Kubín up to the chalet at Kubínska Fell, at around 780 metres above sea-level (territory of Záskanie, Oravská Magura, quadrant DFS 6781). The box itself was 40 cm deep by 40 cm wide and 50 cm high, built as a half-box with an entrance opening taking up the upper

half of the front wall. This was altogether an abnormally large box for the Tengmalm's Owls, especially with the very large entrance hole.

The much more frequently-used natural woodpeckers' hollows have oval-shaped entrance openings between 6-11 x 8-11 cm in size (Hudec, 1983). The literature recommends boxes for Tengmalm's Owls with dimensions 18 x 18 cm up to 24 x 24 cm (floor), 30 – 50 cm in height and with a 7.5 – 11 cm diameter entrance hole (Hudec 1983, Mebs & Scherzinger 2000). The box occupied by these owls was therefore substantially larger.

This nesting in an abnormally large box may be explained through the lack of more suitable hollows in the vicinity, and superfluity of food supplies. In 2004 there was a great increase in woodland rodent numbers. Last but not least, a reason for the owls' using this box might have been the suitability of the immediate surroundings of the box. In future there will be more thorough monitoring of this particular box with the aim of finding out whether the Tengmalm's Owls occupy it on further occasions.

Summary

In the Oravská Magura hills near Dolný Kubín (northern Slovakia) on 8th June 2004, a nesting-box of dimensions 40 x 40 x 50 cm with the upper half of the front wall open as its entrance was found to contain two grown-up Tengmalm's Owl fledglings (*Aegolius funereus*). This is a case of unusual nesting by this species in an abnormally-large box with dimensions suitable for a Ural Owl (*Strix uralensis*). Nesting by Tengmalm's Owls in this large box may be explained through lack of more suitable hollows

in nearby trees, and superfluity of food supply, as in 2004 there was an increase in woodland rodent numbers. Last but not least, a reason for the owls' using this box was apparently the suitability of the immediate surroundings of the box.

Pôtik kapcavý (*Aegolius funereus*) ako sibírsky zoogeografický element hniezdi v dutinách stromov. Najčastejšie sú to dutiny po tesárovi čiernom (*Dryocopos martius*). Oveľa vzácnejšie sú to prirodzene vzniknuté dutiny po vyhnitom konári a pod. Zriedkavo obsadzujú aj umelé hniezdne búbky. Tento tajgový druh sovy patrí spolu s kuvičkom vrabčím (*Glaucidium passerinum*) a sovou obyčajnou (*Strix aluco*) k najbežnejším zástupcom radu *Strigiformes* na Orave.

V apríli 2001 boli v masíve Kubínskej hole v Oravskej Magure inštalované hniezdne búbky pôvodne určené pre sovy obyčajné a dlhochvosté. Tieto neboli pravidelne kontrolované. Bolo pre mňa veľkým prekvapením, keď mi J. Lehotský (in verb.) oznámil, že pri náhodnej kontrole jednej búbky 8.

Fig. 1. Tengmalm's Owls' (*Aegolius funereus*) nesting box. Photo: D. Karaska

Obr. 1. Hniezdna búbka pôtika kapcavého (*Aegolius funereus*). Foto: D. Karaska



júna 2004 v jej otvore sedeli 2 pôtiki kapcavé. Ešte v ten istý deň som urobil priamu kontrolu búbky. V búbke sedeli 2 mláďatá, ktoré boli plne operené. Pri lezení na strom k búbke preleteli na susedné stromy.

V blízkosti bol pozorovaný 1 dospelý jedinec. Na dne búbky sa nachádzala hrubá vrstva vývržkov – neklamný dôkaz toho, že v búbke tieto sovy vyhniezdili. Búbka bola 8 m vysoko na kmeni smreka asi 100 m od lesnej cesty vedúcej z Dolného Kubína na chatu na Kubínskej holi v nadmorskej výške približne 780 m n. m. (k. ú. Záskanie, Oravská Magura, kvadrát DFS 6781). Samotná búbka mala rozmery 40 (hĺbka) x 40 (šírka) x 50 (výška) cm. Vletový otvor zaberá hornú polovicu prednej steny. Jednalo sa o polobúbku. Ide teda o abnormálne veľkú búbku pre pôtika, navyše s veľmi veľkým otvorom.

Najčastejšie používané prirodzené tesárie dutiny majú vletový otvor veľký 6 - 11 x 8 - 11 cm oválneho prierezu (Hudec 1983). V literatúre sa pre búbky pre pôtika odporúčajú rozmery 18 x 18 cm - 24 x 24 cm (dno), 30 - 50 cm výška búbky a 7,5 - 11 cm priemer vletového otvoru (Hudec, 1983, Mebs & Scherzinger, 2000). Obsadená búbka mala teda podstatne väčšia.

Hniezdenie v tejto abnormálne veľkej búbke si možno vysvetliť nedostatkom vhodnejších dutín v okolí a nadbytkom potravy. V roku 2004 bola veľká gradácia lesných hlodavcov. V neposlednom rade mohla byť príčinou obsadenia búbky aj vhodnosť prostredia v jej okolí. V budúcnosti sa bude dôkladnejšie sledovať táto búbka za účelom zistenia, či ju pôtik neobsadí aj ďalšíkrát.

Súhrn

V Oravskej Magure pri Dolnom Kubíne (severné Slovensko) boli 8. júna 2004 v búbke o rozmeroch 40 x 40 x 50 cm s otvorenou hornou polovicou prednej steny zistené 2 vyspelé mláďatá pôtika kapcavého (*Aegolius funereus*). Ide o neobvyklé hniezdenie v abnormálne veľkej búbke rozmermi vhodnej pre sovu dlhochvostú (*Strix uralensis*). Hniezdenie v tejto veľkej búbke si možno vysvetliť nedostatkom vhodnejších dutín v okolí i nadbytkom potravy (v roku 2004 bola gradácia lesných hlodavcov). V neposlednom rade bolo zrejme príčinou obsadenia búbky aj vhodnosť prostredia v jej okolí.

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Tree nesting of Eagle owl (*Bubo bubo*) in Prievidza district

Stromové hniezdo výra skalného (*Bubo bubo*) v okrese Prievidza

Karol ŠOTNÁR

Šotnár K 2007: Tree nesting of Eagle owl (*Bubo bubo*) in Prievidza district. Slovak Rapt J, 1: 59-60.

Address for correspondence: Karol Šotnár, Gavloviča 1/5, SK-971 01 Prievidza, Slovakia. E-mail: Karol_Sotnar@post.sk

One of the rarer examples of nesting by the Eagle Owl is the occupying of nests in trees. In the majority of these cases the owls use nests left by the Common Buzzard (*Buteo buteo*), Northern Goshawk (*Accipiter gentilis*) or Black Stork (*Ciconia nigra*) (Diviš in Danko 1990), (Gahura, Bělka in Danko 1991), (Suchý 2001).

Another case of this kind was registered on 13th May 2004 when the nest of a Lesser Spotted Eagle (*Aquila pomarina*) was being checked, and a female Eagle Owl was found sitting on the nest with one chick. The location is near the village of Opatovce nad Nitrou, district of Prievidza, quadrant DFS 7277, at 350 metres above sea-level. The biotope consists of an oak and pine lowland complex, a sort of larger grove of trees among neighbouring fields and meadows. There are no rocks anywhere in the wider vicinity. The nesting tree stands about 300 metres inside the woods at the edge of a clearing. The nest was built in an approx. 60-year-old Scots pine at a height of 16 metres. On 25th May 2004 one juvenile owl flew successfully from the nest.

Beneath the nest, and in its environs, remains of the following prey were identified: Garganey Duck (*Anas querquedula*), Coot (*Fulica atra*), Moorhen (*Gallinula chloropus*), Buzzard (*Buteo buteo*), Kestrel (*Falco tinnunculus*), Tawny Owl (*Strix aluco*), Woodpigeon (*Columba palumbus*) and Raven (*Corvus corax*). Judging by these signs, which I also found here in preceding years, I would conclude that Eagle Owls have been living at this location since as early as 1997.

Medzi zriedkavé prípady zahniezdenia v populácii výra skalného patrí obsadenie stromových hniezd.

Vo väčšine prípadov používajú hniezda po *Buteo buteo*, *Accipiter gentilis* a *Ciconia nigra* (Diviš in Danko 1990), (Gahura, Bělka in Danko 1991), (Suchý 2001).

Ďalší takýto prípad bol zaregistrovaný dňa 13. 5. 2004 pri kontrole hniezda orla krikľavého (*Aquila pomarina*), kedy miesto neho sedela na hniezde samica výra s jedným mláďaťom. Lokalita sa nachádzala pri obci Opatovce nad Nitrou, okres Prievidza, 350 m. n. m., DFS 7277. Biotop tvoril dubovo-borovicový nížinný komplex, akýsi väčší háj susediaci s poliami a lúkami. V širšom okolí nie sú skaly. Hniezdny strom sa nachádzal asi 300 m v lese na okraji rúbane. Hniezdo bolo umiestnené na cca. 60 roč. borovici v 16 m výške. Dňa 25. 5. 2004 úspešne vyletelo jedno mláďa. Pod hniezdom, ale aj v širšom okolí boli zaznamenané nasledovné zvyšky koristi: *Anas querquedula*, *Fulica atra*, *Gallinula chloropus*, *Buteo buteo*, *Falco tinnunculus*, *Strix aluco*, *Columba palumbus*, *Corvus corax*. Podľa týchto pobytových znakov, ktoré som tu nachádzal po minulé roky, usudzujem, že výtry obývajú lokalitu pravdepodobne už od roku 1997.

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Šotnár K: Tree nesting of Eagle owl (*Bubo bubo*) in Prievidza district.



Fig. 1. Eagle owl female flying away from the occupied nest on the tree, originally used by Lesser-spotted eagle (*Aquila pomarina*). Photo: K. Šotnár.

Obr. 1 Vylietavajúca samica z obsadeného stromového hniezda pôvodne využívaného k hniezdeniu orlom krikľavým. Foto: K. Šotnár

Summary of Ringing Project for Raptors and Owls in Slovakia from 2002 to 2004

Sumarizácia krúžkovania dravcov a sov v rokoch 2002 až 2004 na Slovensku

Vladimír SLOBODNÍK

Slobodník V 2007: Summary of Ringing Project for Raptors and Owls in Slovakia from 2002 to 2004. Slovak Rapt J, 1: 61-66.

Address for correspondence: Vladimír Slobodník, Správa CHKO Ponitrie, Dlhá 3, SK-971 01 Prievidza, Slovakia. E-mail: vslobod@sopsr.sk

In 2002 a total of 23 835 birds were ringed in Slovakia, of which raptors and owls made up 3.1% (744 ind.). The range of species of all ringed birds covered 152 species, of which raptors and owls made up 15.8% (24 spec.). There was similar representation of raptors and owls among young birds ringed in the nest. In 2002 altogether 3 948 young were ringed, of which 554 young raptors and owls represented 14% of that year's total.

In 2003 a total of 30 761 birds were ringed in Slovakia, of which raptors and owls made up 613 individuals, representing almost 2%. The range of species of all ringed birds covered 164 species, of which raptors and owls made up 16.4% (27 spec.), similarly as in 2002. Reduced numbers of small land mammals in that year resulted in low numbers of young, especially among owls, and this was also reflected in the number of ringed young. Mainly for this reason the representation of young raptors and owls among all young birds ringed in 2003 (5 441 ind.) was only 8.9% (485 ind.).

In 2004 a total of 33 696 birds were ringed in Slovakia, of which 1007 individuals were raptors and owls, representing 2.9%. The range of species of all ringed birds covered 173 species, of which raptors and owls made up 15.6% (27 spec.). Increasing numbers of small land mammals after 2003 and greater activity by several ringers in 2004 resulted in the highest numbers of ringed raptors and owls, as well as their greatest share out of all ringed birds in the three-year period under assessment. This is further confirmed by the representation of young raptors and owls among all young birds ringed in 2004

(6 029), making up 14.4% (866 ind.) (Tab. 1.).

In 2002 24 species of raptors and owls were ringed (17 species of raptor and 7 kinds of owl) with a total number of 744 individuals. Of this number, 544 were young birds in the nest, representing 74.5%. On this occasion two owl species (*Tyto alba*, *Asio otus*) got into the top ten of all non-songbirds ringed in Slovakia, which is not a common phenomenon.

If we analyze that year's results in more detail, we gain further data. The separate numbers of raptors and owls were quite balanced that year. The total of raptors ringed was 377 ind., while the number of owls was only slightly less at 367 ind. (49.3% of the assessed groups of species). Young birds in the nest made up 54% of the raptors ringed (299 ind.) and 46% of the owls (255 ind.).

In 2003 27 species of raptors and owls were ringed (17 species of raptor and 10 kinds of owl) with a total number of 613 individuals. Of this number, 485 were young birds in the nest, representing 79.4%. The year 2003 confirmed the unfavourable situation in the raising of young birds, especially among owls.

If we analyze that year's results in more detail, we gain further interesting data. The representation of owls dropped rapidly compared with the previous year. The total of raptors ringed was 504 ind., but the number of owls was only 109 ind. (17.7% of the assessed groups of species). Young birds in the nest made up almost 86.5% of the raptors ringed (436 ind.), whereas young owls represented about half of that proportion at 44.9% (49 ind.).

In 2004 27 species of raptors and owls were ringed (17 species of raptor and 10 kinds of owl) with a total number of 1007 individuals. Of this number, 866 were young birds in the nest, representing 86%. The year 2004 confirmed an improvement in the situation regarding the raising of young birds among raptors and owls alike.

More detailed analysis of that year's results provides us with further interesting data. The total of raptors ringed was 713 ind., and the number of owls was up to 294 ind., representing 40.7% of the assessed groups of species. For the owls, that means an

increase of more than double the percentage representation compared with the previous year. Numbers of young birds in the nest also rose, making up almost 92% of the raptors ringed (652 ind.), while young owls represented almost 73% of the total (214 ind.).

As with other bird families, in the ringing of raptors and owls we meet with distinct specialization by individual ringers. This means specialization on particular species or groups of species. The following ringers can be presented as examples of specialization (Tab. 2, 3).

Tab. 1. List of ringed raptors and owls in Slovakia from 2002 to 2004.

Tab. 1. Prehľad krúžkovaných dravcov a sov na Slovensku v rokoch 2002 – 2004.

No.	Species	2002			2003			2004		
		pull.	others	Σ	pull.	others	Σ	pull.	others	Σ
1.	<i>Pernis apivorus</i>	2	2	4	14	0	14	2	1	3
2.	<i>Milvus migrans</i>	2	0	2	0	0	0	0	0	0
3.	<i>Milvus milvus</i>	2	0	2	4	0	4	1	0	1
4.	<i>Circaetus gallicus</i>	1	0	1	0	0	0	0	0	0
5.	<i>Circus aeruginosus</i>	3	0	3	9	1	10	18	1	19
6.	<i>Circus cyaneus</i>	0	5	5	1	0	1	0	6	6
7.	<i>Circus pygargus</i>	0	1	1	0	1	1	7	1	8
8.	<i>Accipiter gentilis</i>	10	7	17	31	6	37	34	4	38
9.	<i>Accipiter nisus</i>	22	9	31	0	13	13	3	10	13
10.	<i>Buteo buteo</i>	28	35	63	52	21	73	86	22	108
11.	<i>Buteo lagopus</i>	0	0	0	0	1	1	0	0	0
12.	<i>Aquila pomarina</i>	65	3	68	69	1	70	126	0	126
13.	<i>Aquila heliaca</i>	33	0	33	42	2	44	41	0	41
14.	<i>Aquila chrysaetos</i>	13	0	13	8	2	10	28	1	29
15.	<i>Haliaeetus albicilla</i>	0	0	0	0	0	0	9	0	9
16.	<i>Falco tinnunculus</i>	67	16	83	112	13	125	188	14	202
17.	<i>Falco vespertinus</i>	1	0	1	0	0	0	3	0	3
18.	<i>Falco columbarius</i>	0	0	0	0	1	1	0	0	0
19.	<i>Falco subbuteo</i>	0	0	0	28	2	30	24	1	25
20.	<i>Falco cherrug</i>	31	0	31	30	4	34	32	0	32
21.	<i>Falco peregrinus</i>	19	0	19	36	0	36	50	0	50
22.	<i>Tyto alba</i>	142	28	170	21	9	30	29	13	42
23.	<i>Otus scops</i>	6	2	8	0	1	1	0	1	1
24.	<i>Bubo bubo</i>	24	0	24	8	0	8	30	3	33
25.	<i>Glaucidium passerinu</i>	0	0	0	0	1	1	0	1	1
26.	<i>Athene noctua</i>	0	0	0	0	3	3	0	1	1
27.	<i>Strix aluco</i>	62	4	66	6	3	9	100	8	108
28.	<i>Strix uralensis</i>	8	0	8	3	5	8	40	2	42
29.	<i>Asio otus</i>	13	61	74	11	35	46	10	38	48
30.	<i>Asio flammeus</i>	0	17	17	0	1	1	0	10	10
31.	<i>Aegolius funereus</i>	0	0	0	0	2	2	5	3	8
Σ	2002: 24 species 2003: 27 species 2004: 27 species	554	190	744	485	128	613	866	141	1007

Tab. 2. Specialization by ringers on particular species of some raptors and owls in Slovakia.
Tab. 2. Špecializácia jednotlivých krúžkovateľov na vybrané druhy dravcov a sov na Slovensku.

Ringer	specialization
DANKO Štefan	<i>Aquila heliaca, Aquila pomarina</i>
DRAVECKÝ Miroslav	<i>Aquila pomarina</i>
CHAVKO Jozef	<i>Falco cherrug, Falco peregrinus, Aquila heliaca</i>
KAŇUCH Pavol	<i>Aquila pomarina</i>
KARASKA Dušan	<i>Aquila pomarina, Strix uralensis, Buteo buteo</i>
KORŇAN Ján	<i>Aquila chrysaetos</i>
KRIŠTÍN Anton	<i>Otus scops</i>
LENGYEL Jozef	<i>Circus cyaneus, Circus aeruginosus, Asio flammeus</i>
MACEK Metod	<i>Aquila chrysaetos, Falco peregrinus</i>
MADERIČ Boris	<i>Milvus milvus, Milvus migrans, Aquila pomarina</i>
MIHÓK Jozef	<i>Aquila pomarina, Accipiter gentilis, Falco subbuteo, Falco tinnunculus, Strix uralensis, Buteo buteo</i>
SÁROSSY Martin	<i>Tyto alba</i>
ŠIMÁK Ladislav	<i>Aquila chrysaetos</i>
ŠNÍRER Ladislav	<i>Aquila heliaca, Falco peregrinus, Haliaeetus albicilla</i>
ŠOTNÁR Karol	<i>Aquila pomarina, Accipiter gentilis, Buteo buteo</i>
TRNKA Alfréd	<i>Circus aeruginosus</i>

In Slovakia, thanks to the activity of Ladislav Šnirer, production of local rings (larger types) began in 2001 and still continues to date – from inside his tower-block flat in Partizánske. In 2001 he made rings with diameters of 25, 20, 16, 12, 9 and 7 mm (i.e. types A, B, C, D, E, H). Since 2002 (on Štefan Danko's recommendation) he has also made type BL with a diameter of 18 mm, specially for the lesser spotted eagle. The smallest ring types (L, M, N, P, S, T) are made abroad (so far we have ordered them from Poland). Medium-sized ring types (K and LL) are made by Ivan Olejár in Prešov. By no means could we state that the arrangement of financing for ring production is problem-free. The year 2004 was a case in point: that autumn Martin Sárossy and I prepared a project worth about 200 000 SKK, only to discover at the end of the year that all grants which were supposed to be paid out of state funds were blocked because of the gale disaster in the High Tatras. For this reason at present we need sponsors much more than ever before.

On the other hand, we do have some more pleasant information. Even after this short period of ringing with Slovak rings, every year dozens of return reports are now coming in from abroad. It is natural that most of these return reports come from Hungary or Poland. It is also true that the vast majority consists of reports on swans and seagulls (more than 80%), but we also have data about eagles.

The most interesting are three reports on Lesser spotted eagles (*Aquila pomarina*).

1. One was ringed by Dušan Karaska in Orava on 18th July 2001, and on 27th October 2001 it was found dead in Zambia (distance 6 900 km).

2. The second was ringed by Karol Šotnár in Prievidza district on 18th July 2002, and on 24th September 2002 it was found in a state of exhaustion in Israel. It is pleasing to know that after treatment and recovery it was successfully released again into the wild.

3. The third turned up on 19th July 2004 (having been poisoned) at the Rehabilitation Centre of the Štiavnické Hills Protected Nature Area in Banská Štiavnica, and it had a Polish ring. It was established that this bird was ringed as a lone juvenile at a nest in the Polish Carpathian foothills on 27th June 1999. Again it is pleasing to note that this eagle recovered so well in Banská Štiavnica that on 2nd September 2004 it was released back into the wild in the Žiar nad Hronom district.

To conclude these notes on the successful processing of return reports: All reports to Ringing Centres abroad should pass through the Ringing Centre in Slovakia – not via individual ringers' separate lines. The reason is that the more the Ringing Centres are kept busy by individuals, the longer it takes them to prepare answering reports for the official Ringing Centres – and that also includes ours here in Slovakia.

Tab. 3. Activities of ringers in ringing of raptors and owls during year 2004.

n – number of all ringed individuals, (pull) – no. of ringed young.

Tab. 3. Aktivita krúžkovateľov dravcov a sov v roku 2004.

n- počet všetkých okružkovaných jedincov, (pull) – z toho počet krúžkovaných mláďat.

Species	year 2004		Ringers (numbers of ringed species)
	n	pull	
<i>Pernis apivorus</i>	3	(2)	Šotnár (2 pull), Šnirer (1)
<i>Milvus milvus</i>	1	(1)	Maderič (1 pull)
<i>Haliaeetus albicilla</i>	9	(9)	Šnirer (6 pull), Danko (2 pull), Kubán (1 pull)
<i>Circus aeruginosus</i>	19	(18)	Trnka A (8 pull), Lengyel (6 pull), Kaňuščák (2 pull), Balla, Hošek, Zicha (1 each)
<i>Circus cyaneus</i>	6		Lengyel (5), Kerestúr (1)
<i>Circus pygargus</i>	8	(7)	Kaňuščák (7 pull), Lengyel (1)
<i>Accipiter gentilis</i>	38	(34)	Mihók (29 pull), Šotnár (5 pull), Lengyel, Macek, Matis, Olekšák (1 each)
<i>Accipiter nisus</i>	13	(3)	Karaska (3 pull), Olekšák (5), Sárossy (2), Fábry, Kaňuščák, Slobodník (1 each)
<i>Buteo buteo</i>	108	(86)	Mihók (62 pull), Šotnár (16 pull), Karaska (3 pull), Fábry, Korňan (by 2 pull), Vrlík (1 pull), Slobodník (8), Hapl, Lengyel, Matis, Murin, Olekšák (2 each), Kubán, Kubica, Sviečka a Šrank (1 each)
<i>Aquila pomarina</i>	126	(126)	Dravecký (27), Kaňuch Pa. (24), Karaska (15), Maderič (14), Mihók (12), Danko (8), Macek, Vrlík (5 each), Šotnár (3), Šnirer (2), Boháčik (1)
<i>Aquila heliaca</i>	41	(41)	Danko (14), Šnirer (10), Mihók (9), Chavko (8) – all pull
<i>Aquila chrysaetos</i>	29	(28)	Korňan (9), Šimák (7), Macek (5), Mihók, Šotnár (3 each), Boháčik, Murin (1 each) all pull
<i>Falco tinnunculus</i>	202	(188)	Mihók (149), Krišovský, Lengyel (10 each), Polanský, Vrábel (8 each), Kaňuch Pe., Sárossy (4 each), Kerestúr (3), Macek, Mikšik, Murin, Slobodník, Šipkovský, Šrank (1 each)
<i>Falco vespertinus</i>	3	(3)	Maderič (3 pull)
<i>Falco subbuteo</i>	25	(24)	Mihók (22 pull), Maderič (2 pull), Sviečka (1)
<i>Falco cherrug</i>	32	(32)	Chavko (32 pull)
<i>Falco peregrinus</i>	50	(50)	Chavko (16), Macek (10), Šnirer (8), Hapl (6), Olekšák, Šotnár (3 each), Matis, Mihók (2 each) all pull
<i>Tyto alba</i>	42	(29)	Sárossy (1)(+ 27 pull), Šrank (12), Kerestúr (2 pull)
<i>Otus scops</i>	1		Murin (1)
<i>Bubo bubo</i>	33	(30)	Mihók (8), Kaňuch Pa., Šnirer (4 each), Balla, Kubica (3 each), Fábry, Matis, Slobodník, Vrlík (2 each), Demko, Macek, Šotnár, Šrank (1 each)
<i>G. passerinum</i>	1		Murin (1)
<i>Athene noctua</i>	1		Mihók (1)
<i>Strix aluco</i>	108	(100)	Karaska (47), Šotnár (19), Mihók (14), Šnirer, Slobodník (8 each), Kaňuch Pa. (4), Olekšák (3), Hapl, Kubica (2 each), Demko (1)
<i>Strix uralensis</i>	42	(40)	Mihók (2)(+ 30 pull), Karaska (10 pull)
<i>Asio otus</i>	48	(10)	Lengyel (9), Olekšák, Pjenčák (6 each), Sviečka (5), Matis (4), Krišovský, Vrábel (4 each, no. of 3 pull), Karaska (3 pull), Sárossy (1)(+ 1 pull), Balla, Dravecký, Kaňuch Pe., Kubica, Szentandrásy (1 each)
<i>Asio flammeus</i>	10		Lengyel (7), Sviečka (3)
<i>Aegolius funereus</i>	8	(5)	Murin, Sviečka (2 pull each), Olekšák (2), Karaska (1 pull), Matis (1)
	1007	866	

V roku 2002 bolo na Slovensku okružkovaných spolu 23 835 vtákov, z nich dravce a sovy tvoria 3,1 % (744 ex.). Druhové spektrum všetkých okružkovaných vtákov reprezentuje 152 druhov, pričom dravce a sovy tvoria až 15,8 % zastúpenie (24 druhov). Podobné zastúpenie majú dravce a sovy medzi okružkovanými mláďatami na hniezdach. Celkove

bolo v roku 2002 okružkovaných 3 948 mláďat, z ktorých 554 mláďat dravcov a sov v tomto roku predstavuje 14 % zastúpenie.

V roku 2003 bolo na Slovensku okružkovaných spolu 30 761 vtákov, z čoho 613 jedincov tvorili dravce a sovy, čo predstavuje takmer 2 %. Druhové spektrum všetkých okružkovaných vtákov reprezentuje 164 druhov, pričom dravce a sovy tvoria (po-

dobne ako v roku 2002) až 16,4 % zastúpenie (27 druhov). Pokles kvantity drobných zemných cicavcov mal za následok nízky počet mláďat, najmä u sov a tento fakt sa prejavil aj v počte okružkovaných mláďat. Najmä z tohoto dôvodu bolo zastúpenie mláďat dravcov a sov medzi všetkými okružkovanými mláďatami (5 441) v roku 2003 len 8,9 % (485 mláďat).

V roku **2004** bolo na Slovensku okružkovaných spolu 33 696 vtákov, z čoho 1007 jedincov tvorili dravce a sovy, čo predstavuje 2,9 %. Druhové spektrum všetkých okružkovaných vtákov reprezentuje 173 druhov, pričom dravce a sovy tvoria až 15,6 % zastúpenie (27 druhov). Nárast kvantity drobných zemných cicavcov po roku 2003 a zvýšená aktivita niekoľkých krúžkovateľov v roku 2004 majú za následok najvyššie počty okružkovaných dravcov a sov, aj najvyšší podiel na všetkých okružkovaných vtákoch za hodnotené trojročné obdobie. Potvrďuje to aj zastúpenie mláďat dravcov a sov medzi všetkými okružkovanými mláďatami (6 029) v roku 2004, čo predstavuje 14,4 % (866 mláďat) (Tab 1).

V roku **2002** bolo okružkovaných 24 druhov dravcov a sov (17 druhov dravcov a 7 druhov sov) v celkovom počte 744 exemplárov. Z tohoto počtu mláďatá na hniezdach tvorili 544 jedincov, čo predstavuje 74,5%. Pritom 2 druhy sov (*Tyto alba*, *Asio otus*) sa dostali do prvej desiatky všetkých okružkovaných nespevavcov na Slovensku, čo nie je bežným javom. Ak výsledky z tohoto roku prehodnotíme podrobnejšie, získame ďalšie údaje. Početné zastúpenie dravcov a sov bolo v tomto roku veľmi vyrovnané. Dravce boli okružkované v počte 377 jedincov a sovy v takmer totožnom množstve 367 ex., čo predstavuje 49,3 % zastúpenie sov z hodnotenej skupiny druhov. Mláďatá na hniezdach u dravcov tvorili 54 % (299 ex.) a u sov 46 % (255 ex.)

V roku **2003** bolo okružkovaných 27 druhov dravcov a sov (17 druhov dravcov a 10 druhov sov) v celkovom počte 613 exemplárov. Z tohoto počtu mláďatá na hniezdach tvorili 485 jedincov, čo predstavuje 79,4 %. Rok 2003 potvrdil nepriaznivú situáciu v odchove mláďat najmä u sov. Ak výsledky z tohoto roku prehodnotíme podrobnejšie, získame ďalšie zaujímavé údaje. Zastúpenie sov oproti minulému roku rapidne pokleslo. Dravce boli okružkované v počte 504 jedincov a sovy len v množstve 109 ex., čo predstavuje len 17,7 % z hodnotenej skupiny druhov. Mláďatá na hniezdach u okružkovaných dravcov tvorili takmer 86,5 % (436 ex.) a u sov boli mláďatá zastúpené 44,9 % (49 ex.).

V roku **2004** bolo okružkovaných 27 druhov dravcov a sov (17 druhov dravcov a 10 druhov sov) v celkovom počte 1007 exemplárov. Z tohoto počtu mláďatá na hniezdach tvorili 866 jedincov, čo predstavuje 86 %. Rok 2004 potvrdil zlepšenie situácie v odchove mláďat u dravcov aj u sov. Podrobnejším prehodnotením výsledkov krúžkovania získame ďalšie zaujímavé údaje. Dravce boli okružkované v počte 713 jedincov a sovy v množstve 294 ex., čo predstavuje 40,7 % z hodnotenej skupiny druhov. U sov je to viac ako 2-násobný nárast percentuálneho zastúpenia oproti predchádzajúcemu roku 2003. Mláďatá taktiež zaznamenali nárast počtov. Na hniezdach u okružkovaných dravcov tvorili takmer 92 % (652 ex.) a u sov boli mláďatá zastúpené takmer 73 % (214 ex.).

Aj pri krúžkovaní dravcov a sov sa stretávame s výraznou špecializáciou jednotlivých krúžkovateľov. Jedná sa o špecializáciu na jednotlivé druhy alebo skupiny druhov. Ako príklady špecializácie možno uviesť nasledovných krúžkovateľov (Tab. 2,3).

Na Slovensku sa zásluhou aktivity Ladislava Šnírera začala v roku 2001 výroba slovenských krúžkov (väčších typov) a pokračuje dodnes – v interiéri jeho panelového bytu v Partizánskom. V roku 2001 boli vyrobené krúžky s priemerom 25, 20, 16, 12, 9 a 7 mm (teda typy A, B, C, D, E, H). Od roku 2002 (na základe doporučenia Štefana Danka) je vyrábaný aj typ BL s priemerom 18 mm, špeciálne pre orla krikľavého. Najmenšie typy krúžkov (L, M, N, P, S, T) sú vyrábané v zahraničí (doteraz sme objednávali z Poľska). Stredne veľké typy krúžkov (K a LL) vyrába pán Ivan Olejár v Prešove. V žiadnom prípade nemôžem konštatovať, že zabezpečovanie financií na výrobu krúžkov je bezproblémové, v roku 2004 skôr naopak. Počas jesene 2004 sme pripravili s Martinom Sárossym projekt na cca 200 000 Sk a v závere roka sme sa dozvedeli, že všetky granty, ktoré majú byť vyplácané zo štátnych financií sú zablokované – kvôli tragédii v Tatrách. Preto v súčasnosti potrebujeme sponzorov oveľa viac ako kedýkoľvek predtým.

Na strane druhej máme aj príjemnejšie informácie. Aj po krátkom období krúžkovania slovenskými krúžkami prichádzajú každoročne desiatky spätných hlásení zo zahraničia. Je prirodzené, že väčšina spätných hlásení pochádza z Maďarska, resp. Poľska. Je faktom, že drvivú väčšinu tvoria údaje o labutiach a čajkách (viac ako 80 %), ale máme aj údaje o orloch.

Najzaujímavejšie sú tri údaje o **orloch kriľavých** (*Aquila pomarina*):

1. Jedného krúžkoval Dušan Karaska 20. júla 2001 na Orave a 27. októbra 2001 bol nájdený uhytný v Zambii (vzdialenosť 6 900 km).

2. Druhého krúžkoval Karol Šotnár 18. júla 2002 v okrese Prievidza a 24. 9. 2002 bol nájdený v stave vyčerpania v Izraeli. Potešiteľné je, že po ošetrení a zosilnení bol úspešne vypustený do voľnej prírody.

3. Tretí sa objavil 19. 7. 2004 (ako priotrávený) v Rehabilitačnej stanici Správy CHKO Štiavnické vrchy v Banskej Štiavnici a mal poľský krúžok. Bolo zistené, že tento jedinec bol krúžkovaný ako

jediné mláďa na hniezde v Podkarpatskej oblasti Poľska dňa 27. 6. 1999. Je potešiteľné, že orol sa v Banskej Štiavnici tak zotavil, že už 2. 9. 2004 bol vypustený do voľnej prírody v okrese Žiar nad Hronom

Záverom poznámka k úspešnému vybavovaniu spätných hlásení. Všetky údaje do zahraničných Krúžkovacích centráľ by mali ísť cez Krúžkovaciu centráľu na Slovensku – nie po samostatných linkách jednotlivých krúžkovateľov. Totiž čím viac sú Krúžkovacie centrály zaťažované jednotlivcami, tým dlhšie trvá príprava odpovede pre oficiálne Krúžkovacie centrály – teda aj pre tú našu Slovenskú.



Fig. 1. Young Lesser-spotted eagle (*Aquila pomarina*) ringed with classical ornithological aluminium ring (right leg) in combination with yellow readable plastic ring (left leg). Photo: M. Dravecký

Obr. 1. Mláďa orla kriľavého (*Aquila pomarina*) krúžkované klasickým ornitologickým krúžkom (pravá noha) v kombinácii s odčítateľným žltým umelohmotným krúžkom (ľavá noha). Foto: M. Dravecký

Information for Authors

The journal Slovak Raptor Journal (Slovak Rapt J) publishes peer-reviewed articles on all aspects of biology of diurnal raptors and owls, including original studies, review articles and reports from projects and special raptor working groups.

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OCHRANA DRAVCOV NA SLOVENSKU RAPTOR PROTECTION OF SLOVAKIA – RPS



OCHRANA DRAVCOV NA SLOVENSKU (RPS) je nezávislá mimovládna organizácia - občianske združenie, ktoré sa venuje výskumu a ochrane voľne žijúcich dravých vtákov a sov na Slovensku. RPS v súčasnosti združuje takmer 150 členov a sympatizantov z celého Slovenska. Svojimi aktivitami sa snaží riešiť nájzvažnejšie problémy a negatívne antropické faktory ohrozujúce populácie dravcov a sov a ich biotopov na Slovensku.

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RAPTOR PROTECTION OF SLOVAKIA (RPS) is an independent, non-governmental organization, a civic association focusing on the research and protection of birds of prey and owls living in the wild around Slovakia. At present RPS comprises almost 150 members and supporters from all over Slovakia. RPS tackles the most serious problems and negative human factors threatening the populations of raptors and owls and their habitats in Slovakia.

To help the Imperial Eagle population, in 2003 - 2007 Raptor Protection of Slovakia and its partner the State Nature Conservancy of the Slovak Republic and Zapadoslovenska energetika, a.s. carried out activities of LIFE2003NAT/SK/000098 project supported by the EU LIFE-Nature. To read more about this project and its results go to www.dravce.sk



