Slovak Rapt J 2008, 2: 27–36. DOI: 10.2478/v10262-012-0016-4.
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Lesser Spotted Eagle (*Aquila pomarina*) colour ringing programme and its first results in the period 2000–2008 in Slovakia

Program označovania orlov krikľavých (*Aquila pomarina*) farebnými krúžkami a jeho prvé výsledky v rokoch 2000–2008 na Slovensku

Miroslav DRAVECKÝ, Boris MADERIČ, Karol ŠOTNÁR, Štefan DANKO, Stanislav HARVANČÍK, Ján KICKO, Dušan KARASKA, Peter VRLÍK, Josef VRÁNA, Miloš BALLA, Dušan BOUCNÝ & Pavol KIŠAC

Dravecký M, Maderič B, Šotnár K, Danko Š, Harvančík S, Kicko J, Karaska D, Vrlík P, Vrána J, Balla M, Boucný D & Kišac P 2008: Lesser Spotted Eagle (*Aquila pomarina*) colour ringing programme and its first results in the period 2000–2008 in Slovakia. Slovak Rapt J 2: 27–36.

Abstract: In Slovakia during 2000–2008, 636 Lesser Spotted Eagles (*Aquila pomarina*) were marked with readable colour rings with double figure code. This is the highest number of Lesser Spotted Eagles marked in such a way in Europe. From this sample, 621 ind. (97.6 %) were chicks at the nest and 15 ind. (2.4 %) were adult birds which were trapped and consequently ringed. In this period, 2 colour series of rings have been used in Slovakia. In 2000 the ringing started with yellow rings, and up until the end of 2008, 631 ex. (616 young and 15 adults) were ringed. In 2008, the ringing started with light blue series of rings and 5 young at the nest were ringed. In addition to readable rings, aluminium ornithological rings of the Ringing Centres of Czech Republic (NM Praha) and Slovakia (NM Bratislava) have been used. The yellow series was used in fewer numbers also in Germany and Poland for marking the Lesser Spotted Eagle (*Aquila pomarina*), the Greater Spotted Eagle (*Aquila clanga*), and eventually their hybrids. In this article the authors reported first observations in Slovakia of such marked Lesser Spotted Eagles in the field. Observed eagles were 1, 2, 4, 5, 7 and 8 years old. Some of them were already breeding and were observed taking care of their chicks.

Abstrakt: V rokoch 2000–2008 sa na Slovensku označilo farebnými odčítateľnými krúžkami s dvojmiestným kódom spolu 636 jedincov orlov krikľavých (*Aquila pomarina*), čo je najviac takto označených orlov krikľavých v Európe. Z tohto počtu bolo 621 ex. (97,6 %) mláďat na hniezde a 15 ex. (2,4 %) adultných vtákov, ktoré sa odchytili a následne okrúžkovali. V uvedenom období sa použili na Slovensku dve série farebných krúžkov. Žltými krúžkami sa začalo krúžkovať v roku 2000, do konca roku 2008 sa nimi označilo 631 jedincov (616 mláďat a 15 adultných jedincov). Svetlomodrou sériou krúžkov sa začalo krúžkovať v roku 2008 a označilo sa nimi 5 mláďat na hniezde. Súbežne s odčítateľnými krúžkami sa používali aj klasické ornitologické krúžky krúžkovacích staníc v Čechách (NM Praha) a na Slovensku (NM Bratislava). Žltá séria sa v menšej miere použila aj v Nemecku a Poľsku na označenie orla krikľavého (*Aquila pomarina*), orla hrubozobého (*Aquila clanga*), prípadne ich hybridov. V predloženom článku autori uvádzajú prvé pozorovania takto označených orlov krikľavých vo voľnej prírode na Slovensku. Pozorované orly boli vo veku 1, 2, 4, 5, 7 a 8 rokov od ich vyliahnutia. V niektorých prípadoch to už boli hniezdiace jedince zastihnuté pri odchovávaní svojich mláďat.

Key words: Lesser Spotted Eagle, *Aquila pomarina*, colour-ringing, colour rings, Slovakia

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Miroslav Dravecký, (corresponding author) Rovníková 8, SK–040 12 Košice, Slovakia. E-mail: dravecky.miroslav@mail.t-com.sk.
Boris Maderič, Ochrana dravcov na Slovensku, Svätoplukova 1, SK–841 02 Bratislava, Slovakia. E-mail: maderic@vtaky.sk.
Karol Šotnár, Gavloviča 1/5, SK–971 01 Prievidza, Slovakia. E-mail: karol_sotnar@post.sk.
Štefan Danko, J. Švermu 1, SK–071 01 Michalovce, Slovakia. E-mail: danko@gecom.sk.
Stanislav Harvančík, Pod Šípkom 1153 /1, SK–958 06 Partizánske, Slovakia. E-mail: havran@cabelmax.sk.
Ján Kicko, Podtureň 510, SK–033 01, Liptovský Hrádok, Slovakia. E-mail: kicko@sopsr.sk.
Dušan Karaska, Stodolisko 261, SK–027 41 Oravský Podzámok, Slovakia. E-mail: karaska@vtaky.sk.
Peter Vrlík, 9738 SE 42 nd AVE Milwaukie, Oregon, 97222, USA. E-mail: kondorkalifornsky@hotmail.com.
Josef Vrána, čp. 172, 549 21 Česká Čermná, Czech Republic. E-mail: pomarina@seznam.cz.
Miloš Balla, Správa CHKO Latorica, M. R. Štefánika 1755, SK–075 01 Trebišov, Slovakia. E-mail: balla@sopsr.sk.
Dušan Boucný, Prchaly 4458, 708 00 Ostrava, Czech rep. E-mail: boucny@centrum.cz.
Pavol Kišac, Klátova Nová Ves 432, SK–958 44, Klátova Nová Ves, Slovakia. E-mail: avosacster@gmail.com.

Acknowledgement: We thank our colleagues from the Czech Republic; Tomáš Bělka, Josef Vrána and Oldřich Šreibr who started the Lesser Spotted Eagle Colour Ringing Programme in Slovakia and provided us with first series of yellow rings. We also thank friends and colleagues from the Eagle Club Estonia; Urmas Sellis, Ülo Väli and Riho Männik who provided 300 pieces of rings of the light blue series from the Spotted Eagle Colour Ringing Programme (SECR). Our appreciation also goes to the following ringers and their assistants: L. Bohačík, M. Lehocký, M. Macek, H. Matušík, J. Mihók, R. Reťkovský and M. Riník for their hard field work and physically challenging effort during the ringing of chicks.

Introduction

In comparison with classical ornithological aluminium rings, the ringing of birds with readable plastic colour rings represents a more modern form of bird marking, or even its enhanced supplement. The differences between marking with plastic and metal rings are as follows:

1. ring size – plastic rings are larger and higher,
2. visibility – plastic rings have many colour variations (exactly defined for certain programs, researches, species or countries). The colour is long-lasting so the rings can be easily distinguished,
3. readability – the rings display a relatively small amount of large letters or numbers, or their combinations. Therefore, thanks to proper techniques and observation optics, it is easier to read them in comparison with the classical ornithological ones,
4. recoveries – there is no need to catch ringed birds again, being enough to observe them in the field,
5. records and access to colour ringing programs – the access is possible for every interested person on the European website of European Colour-Ring Birding,
6. internet communication through the discussion group cr-birding@yahoogroups.com – in some cases it is possible to obtain information about the origin of a ringed bird on the same day of its observation in any part of Europe (or in a relatively short time),
7. longevity of plastic rings – presently, the longevity of plastic rings in comparison with the classical metal or aluminium ones is questionable, due to the short life of the colour ringing program. Until now, the maximum time after which the ring was still well readable is 8 years,
8. plastic readable rings are usually restricted to larger birds.

According to the latest update of the European Colour--Ring Birding, on August 11, 2008, 321 species in 1605 running programs were included in the colour ringing (Raes 2008).

The methods and the start of the Lesser Spotted Eagle Colour Ringing Programme in Slovakia date back to 1999 (Maderič 2000). There is also a mention of using yellow rings starting from 2000 in the Report of the working group on the Lesser Spotted Eagle for 2004 (Maderič 2005). Dravecký et al. (2006) published a short note including photo documentation of a ringed young. The first observations and photo documentations but without an exact identification of a colour ringed Lesser Spotted Eagle have been mentioned in Dravecký (2007). In 2007, Š. Danko successfully took a photo and read a code I9 for a yellow plastic ring on a Lesser Spotted Eagle (Dravecký 2008). This bird bred successfully only 130 m from its place of hatching (Danko & Maderič 2008).

The aim of this article is to advise a systematic monitoring of the Lesser Spotted Eagle in Slovakia. The purpose of this is in ascertaining if they are marked, and, if yes, to make it possible to read the colour ring with powerful optics (during monitoring by classical binoculars with magnification 10x50 such ringed individuals can be overlooked) and, even better, take photographic documentation. Such observations could allow us to collect new information about the biology of the Lesser Spotted Eagle.

Materials and methods

Readable plastic colour rings

Yellow series. In 2000, Czech colleagues (T. Bělka, J. Vrána and O. Šreibr) who carried out research on Lesser Spotted Eagles in Slovakia in the area of Stará Ľubovňa provided us with rings (Pro-Touch Engraving, Bay 3, 2605 – Faithfull Ave. Saskatoon, Sask. S7K 5W2 CANADA). In the period



M. Dravecký

Fig. 1. Anodized gold ornithological ring with the lock for *A. pomarina*. The Ringing Center of Slovakia and the text on the ring.
Obr. 1. Eloxovaný ornitologický krúžok zlatej farby so zámkom pre *A. pomarina*. Krúžkovacia centrála na Slovensku a text krúžku.

Slovak Rapt J 2008, 2: 27–36. DOI: 10.2478/v10262-012-0016-4.
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2000–2004, B. Maderič was responsible for the distribution and the database of these rings, in the period 2005–2008 was responsible the first author of this report. The ring series consisted of 841 letter and number combinations. To avoid possible mistakes during reading of rings in field, the letters D, F, G, O and number 6 and 8 were excluded.

To standardize different methodologies, in 1999 in Štefanová (Maderič 2000) the following principles for the Lesser Spotted Eagle colour ringing were agreed: the usage of a yellow ring with black letters which create a double figure code (combination of numbers, letters, or both) in vertical direction; placement of the ring to the right leg on young birds and to the left leg to adult; parallel usage of ornithological aluminium ring in the opposite position of leg of the marked individuals, and assessment of the beginning of the colour ringing to 2000.

Light blue series. In 2007, the Eagle Club Estonia in the framework of the Spotted Eagle Colour Ringing Programme (SECR) provided us a ring series (300 pieces) from the mentioned producer. Due to the effort of completing the ringing with the yellow series in 2007, the light blue series was not used in this period, so the first eagles marked with the light blue ring were not until 2008. The usage of light blue rings is consistent with the methodologies of the SECR Programme and unified in countries like Estonia, Latvia, Lithuania, Poland, Belarus, and Russia.

Classical aluminum rings of the Ringing Center of Slovakia with the text: BL [number] N.MUSEUM BRATISLAVA SLOVAKIA (Fig. 1) with lock and treated by anodizing to gold colour were used for ringing the Lesser Spotted Eagle Slovakia. They were used in combination with yellow (Fig. 2) and light blue rings (Fig. 3).

In addition to the ringing of chicks in the nests, also net-trapped adults were ringed (Figs 4 and 5). The adult eagles were trapped in the net using the stuffed Eagle Owl mostly in Eastern Slovakia. Trapped adults from known breeding pairs were important for monitoring of the breeding biology of this species from several points



M. Dravecký

Fig. 2. Combination of rings used during 2002–2008.
Obr. 2. Kombinácia krúžkov používaná v rokoch 2002–2008.



M. Dravecký

Fig. 3. Combination of rings used since 2008.
Obr. 3. Kombinácia krúžkov používaná od roku 2008.



Š. Danko

Fig. 4. Rings on the legs of trapped female. Lieskovec, 7 August 2007.
Obr. 4. Krúžky na nohách odchytenej samice. Lieskovec, 7. august 2007.


Š. Danko

Fig. 5. Adult male *A. pomarina*, code R9 with "window" on its left wing. Závadka, 2 May 2007.
Obr. 5. Adultný samec *A. pomarina*, kód R9 s "oknom" v ľavom krídle. Závadka, 2. máj 2007.

of view: monitoring of the duration of the breeding site occupancy by the same individual (pair), fidelity to the breeding site, age, creation or change of pairs on breeding site, monitoring of colour changing in regard to known age of ringed eagles, possibility of monitoring breeding individuals in the nest during breeding and care of chicks.

For better visibility and possibility of monitoring ringed individuals for specific purposes, a combination of adult ringing system and the creation of a "window" in the wing (Fig. 5) by clipping out part of bars on both sides of the rachis has been used. Such marked birds were easily identified from long distance while flying (Fig. 6). All of this allowed the bird to be monitored during soaring above the breeding site, hunting and carrying the prey to the nest. Eventually it was also possible to distinguish the eagle from other individuals at controlled localities. The "window" was also visible in the following year until the bird changed the marked primaries feathers in the process of moulting. Subsequently the clipped out "window" disappeared.



Š. Danko

Fig. 6. The eagle marked with code R9 and "window" on the wing. Závadka, 2 May 2007.
Obr. 6. Označený orol s kódom R9 a s "oknom" v krídle. Závadka, 2. máj 2007.

Results

In Slovakia, from 2000–2008, 636 Lesser Spotted Eagles were marked in total with readable colour rings. This is

Tab. 1. Summary of Lesser Spotted Eagles (*Aquila pomarina*) ringed with colour rings in Slovakia in 2000–2008
Tab. 1. Prehľad označených orlov krikľavých (*Aquila pomarina*) farebnými krúžkami na Slovensku v rokoch 2000–2008

Ringer **Krúžkovateľ**	**2000**		**2001**		**2002**		**2003**		**2004**		**2005**		**2006**		**2007**		**2008**		**2000–2008**		
	pull.	**ad.**	**pull.**	**ad.**	**pull.**	**ad.**	**pull.**	**ad.**	**pull.**	**ad.**	**pull.**	**ad.**	**pull.**	**ad.**	**pull.**	**ad.**	**pull.**	**ad.**	**pull.**	**ad.**	∑
yellow series / žltá séria																					
Dravecký M	23	0	18	0	18	0	13	0	27	0	15	0	13	0	15	0	7	0	149	0	149
Karaska D	23	0	18	0	12	0	9	0	15	0	8	0	10	0	3	0	3	0	101	0	101
Maderič B	13	0	8	0	12	0	7	0	14	0	7	0	12	0	9	0	12	0	94	0	94
Kicko J	0	0	0	0	0	0	0	0	2	0	9	0	10	0	16	0	24	0	61	0	61
Šotnár K	0	0	5	0	3	0	4	0	4	0	9	0	12	0	11	0	8	0	56	0	56
Danko Š	17	0	6	0	2	1	0	0	8	0	0	0	2	2	2	2	2	0	39	5	44
Bělka T	12	2	0	0	11	0	5	0	7	2	0	0	0	0	0	0	0	0	35	4	39
Mihók J	0	0	0	0	0	0	0	0	11	0	4	0	0	0	11	0	11	0	37	0	37
Vrlík P	6	0	1	0	0	1	0	0	4	0	4	0	0	0	0	0	0	0	15	1	16
Vrána J	11	2	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	14	2	16
Macek M	0	0	0	0	0	0	0	0	4	0	0	0	0	0	4	0	0	0	8	0	8
Bohačík L	2	0	0	0	3	0	2	0	0	0	0	0	0	0	0	0	0	0	7	0	7
Šreibr O	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
∑	107	7	58	0	61	2	41	0	96	2	56	0	59	2	71	2	67	0	**616**	**15**	**631**
	114		**58**		**63**		**41**		**98**		**56**		**61**		**73**		**67**				
light blue series / svetlomodrá séria																					
Dravecký M																	5	0	**5**	**0**	**5**
∑																	**5**				
colour rings farebné krúžky	107	7	58	0	61	2	41	0	96	2	56	0	59	2	71	2	72	0	**621**	**15**	**636**

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the highest number of Lesser Spotted Eagles marked in such way in Europe (Dravecký et al. 2008). Of this number, 621 ind. (97.6 %) were chicks in the nest, 15 ind. (2.4 %) were adult birds which have been trapped and ringed. From 2000 to the end of 2008, 631 ind. (616 chicks and 15 adults) were ringed with yellow rings. In 2008 the use of a light blue series of plastic rings begun, so only 5 chicks in the nest were marked with these rings in that year (Tab. 1).

During 2007 and 2008 using the colour ringing system, 10 observations of marked Lesser Spotted Eagles have been recorded. These were 1, 2, 4, 5, 7, and 8 years old and in two cases 4 and 5 years old eagles were breeding. In 7 cases, the distance between the place of hatching and the place of observation (eventually breeding site) ranged from 130 m to 251 km.

As a result of using the colour rings on eagles, the occurrence of 1 and 2 years old Lesser Spotted Eagles at localities only 85 and 45 km from their place of hatching was recorded for the first time in Slovakia. This was also confirmed by their return from wintering sites immediately in the first or second year of their life.

To achieve the above mentioned results, it has been necessary to ring a relatively large amount of chicks (Tab. 1). The first observations of marked eagles were acomplished in 2006, in the 7th year of the program, and then the first identified bird was known one year later.

Tab. 2. Summary of the types and series of the ornithological rings used together with colour ring during Lesser Spotted Eagle (*Aquila pomarina*) ringing in Slovakia in 2000–2008
Tab. 2. Prehľad typov a sérií ornitologických krúžkov použitých súbežne s farebnými krúžkami pri označovaní orlov krikľavých (*Aquila pomarina*) na Slovensku v období rokov 2000–2008

Ring type Typm krúžku	Ringing center Krúžkovacia centrála	Years / Roky									∑
BX	Praha	51	18	0	0	0	0	0	0	0	69
A	Praha	34	14	0	0	0	0	0	0	0	48
L	Praha	19	0	0	0	0	0	0	0	0	19
B	Praha	8	1	0	0	0	0	0	0	0	9
C	Bratislava	0	22	2	0	0	0	0	0	0	24
BL	Bratislava	0	0	60	41	97	51	61	72	72	454
ZM	Michalovce	0	2	0	0	0	0	0	0	0	2
∑		**112**	**57**	**62**	**41**	**97**	**51**	**61**	**72**	**72**	**625**

BX, A, L, B: N. MUSEUM PRAHA – aluminium ornithological ring, grey, without lock; **C**: N. MUSEUM BRATISLAVA SLOVAKIA – aluminium ornithological ring, grey, without lock; **BL**: N. MUSEUM BRATISLAVA SLOVAKIA – aluminium ornithological ring, anodized gold, with lock; **ZM**: Zemplín Museum.
BX, A, L, B: N. MUSEUM PRAHA – hliníkový ornitologický krúžok, sivý, bez uzáveru; **C**: N. MUSEUM BRATISLAVA SLOVAKIA – hliníkový ornitologický krúžok, sivý, bez uzáveru; **BL**: N. MUSEUM BRATISLAVA SLOVAKIA – hliníkový ornitologický krúžok, eloxovaný zlatý, s uzáverom; **ZM**: Zemplínske múzeum.

Tab. 3. Summary of observed Lesser Spotted Eagles marked with colour rings in Slovakia in 2007–2008
Tab. 3. Prehľad označení pozorovaných orlov krikľavých s farebnými krúžkami na Slovensku v rokoch 2007–2008

Colour ring code Kód farebného krúžku	Date of observation Dátum pozorovania	Colour Farba	Emplacement Umiestnenie	Ornithological ring Ornitologický krúžok	Emplacement Umiestnenie
I9	24. 4. 2007	yellow	right leg	BL 012 Bratislava	left leg
07	15. 7. 2007	yellow	right leg	BX 1547 Praha	left leg
4T	27. 4. 2008	yellow	right leg	BL 263 Bratislava	left leg
R9	30. 4. 2008	yellow	left leg	BL 067 Bratislava	right leg
YX	28. 5. 2008	yellow	right leg	BL 424 Bratislava	left leg
KM	17. 6. 2008	yellow	right leg	BL 390 Bratislava	left leg
PN	20. 6. 2008	yellow	right leg	BL 652 Bratislava	left leg
54	30. 6. 2008	yellow	right leg	BX 2559 Praha	left leg
HK	25. 7. 2008	yellow	left leg	BL 070 Bratislava	right leg
59	6. 9. 2008	yellow	right leg	BL 204 Bratislava	left leg

During 2000–2008, besides 636 colour rings also 625 classical ornithological rings of Ringing Centres Praha and Bratislava with ring types BX, A, L, and B (Praha) C, BL (Bratislava) and ZM (Michalovce) have been used concurrently (Tab. 2). In 11 cases, the eagles were marked only with yellow plastic rings without the ornithological ones (Kicko 5, Bohačík 3, Maderič 2 a Vrlík 1).

In two cases it occurred that the eagles marked with colour rings lost the ornithological ones from their legs. In both cases these rings were BX Praha (aluminium rings without a lock). In one case the eagle marked with aluminium ornithological ring BL Bratislava lost its colour one (Vrána).

Lesser Spotted Eagles with colour rings observations

Year 2007

Code: I9 (yellow ring). On April 24, 2007 Š. Danko took a photo of an eagle with yellow ring I9 in "Ondavská vrchovina" highlands near by the village of Lieskovec, in the Humenné district, Eastern Slovakia. On July 4, 2002 B. Maderič ringed this eagle as a chick in the nest at the same locality. Futher observations confirmed that the eagle was a male and fed its chicks at the nest which was only 130 m from this eagle's place of hatching. If there has been no change of female in this breeding site, which has been monitored regularly since 1985, it could be possible that the son and mother bred together (Danko & Maderič 2008).

Code: 07 (yellow ring). On July 15, 2007 J. Vrána and T. Bělka observed Lesser Spotted Eagle near village Chmeľnica (Stará Ľubovňa district, Eastern Slovakia, "Spišsko-šarišské medzihorie" intermountain). Thanks to the photo the code of yellow ring 07 was read. On July 6, 2007 J. Vrána ringed this eagle as a chick in the nest at the locality Nižné Ružbachy (Stará Ľubovňa district, Eastern Slovakia, "Spišská Magura" Mts). This eagle was also ringed with the ornithological ring BX 1547 Praha (aluminium ring without a lock) but during the observations no ring was seen on its leg. Probably the eagle itself removed the ring from its leg. Observations confirmed that after 7 years the ringed eagle stayed only 10 km from its place of hatching (Vrána).

Year 2008

Code: 4T (yellow ring). On April 27, 2008, S. Harvančík took a photo of two adult Lesser Spotted Eagles near Nováky city, part Laskár (Prievidza district, Central Slovakia, "Hornonitrianska kotlina" basin) which were often sitting on trees close to the main road. The code 4T on its yellow ring was possible to read (Fig. 7). On July 9, 2007, B. Maderič ringed this eagle near the village Ptičie (Humenné district, Eastern Slovakia, "Vihrolatské vrchy" Mts) as the older bird of two siblings (Fig. 8). In 2008, this male as a 4 years old bird bred successfully near the village Opatovce nad Nitrou (Prievidza district, Central Slovakia, "Hornonitrianska kotlina" basin) and it fledged one young (Fig. 9). The distance between the place of hatching and the breeding site was 251 km westwards (Šotnár).

Code: R9 (yellow ring). On May 2, 2007, Š. Danko trapped a Lesser Spotted Eagle adult male near the village Závadka (Humenné distict, Eastern Slovakia, "Beskydské predhorie" foothill) and he ringed it with a yellow readable ring R9. On April 30, 2008, he observed this eagle on the original ringing place (Fig. 10) whereby the return of the eagle to the breeding site in the following year was confirmed.

Code: YX (yellow ring). On May 28, 2008, M. Dravecký took a photo of a Lesser Spotted Eagle sitting on a rowan tree close to the main road near the village of Horná Štubňa (Turčianske Teplice district, Central Slovakia, "Veľká Fatra" Mts). The eagle was observed several times in this locality. This eagle had a yellow ring with the code YX on its right leg (Fig. 11). On July 8, 2004, M. Macek and R. Reťkovský ringed this individual as a chick in the nest near the village Háj (Turčianske Teplice district, Central Slovakia, "Veľká Fatra" Mts). In 2008, the distance between the place of hatching and of observation (without finding of an occupied nest) was 5 km. The ringing confirmed the presence of a 4 years old eagle close to its place of hatching (Dravecký).

Code: KM (yellow ring). On June 17, 2008, P. Kišac took a photo of a flying eagle near the village Klátova Nová Ves (Partizánske district, Western Slovakia, "Nitrianska pahorkatina" heights) which had rings on both legs (Fig. 12). After magnification, the code KM could be read on the yellow ring. On July 8, 2006, K. Šotnár ringed this eagle as a chick in the nest at locality Tužina (Prievidza district, Central Slovakia, "Strážske vrchy" Mts). The eagle was the older of 2 young fledged from the same nest. Recently, as a 2 years-old bird it occurred 45 km westwards from its place of hatching and probably created a breeding pair, since being observed with another un-ringed Lesser Spotted Eagle on several occasions (Harvančík).

Code PN (yellow ring). On June 20, 2008, M. Balla took a photo of a flying eagle near village Leles (Trebišov district, Eastern Slovakia, "Východoslovenská rovina" lowland) which had rings on both legs (Fig. 13). On July 8, 2007, B. Maderič ringed this eagle as a chick in the

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nest at locality Roškovce (Medzilaborce district, Eastern Slovakia, "Laborecká vrchovina" highlands, Fig.14). The distance between the place of hatching and the place of observation was 85 km southwards. Thanks to the colour ringing, this eagle as 1 year old bird occurs close to its place of hatching (Maderič).

Code: 54 (yellow ring). In 2008 during breeding season, J. Kicko observed several times, a colour ringed female Lesser Spotted Eagle sitting close to the nest as well as on the nest with a chick at locality Kráľova Lehota (Liptovský Mikuláš district, Central Slovakia, "Nízke Tatry" Mts). On June 30, 2008 he read the code 54. On July 21, 2000, P. Vrlík ringed this female as a chick in the nest at "Dúbrava" locality (Liptovský Mikuláš district, Central Slovakia, "Nízke Tatry" Mts). In 2008 this 8 years old female successfully bred and fledged one young. In 2008 the distance between the place of hatching and the breeding site was 21,5 km eastwards. The female (initially ringed also with aluminium ornithological ring without lock BX 2559 Praha) did not have the ornithological ring which it probably removed from its leg by itself (Kicko).



S. Harvančík

Fig. 7. Adult male *A. pomarina* with ring 4T. Nováky – Laskár, 27 April 2008.
Obr. 7. Dospelý samec *A. pomarina* s krúžkom 4T. Nováky – Laskár, 27. apríl 2008.

Code: HK (yellow ring). On August 7, 2007, Š. Danko trapped an adult femaleLesser Spotted Eagle and ringed it with a yellow readable ring HK. On July 25, 2008 (Fig. 15), he observed this eagle in the ringing place so its return to the breeding site in the following year could be confirmed.

Code: 59 (yellow ring). On September 6 and 7, 2008, D. Boucný observed a Lesser Spotted Eagle pair hunting in the meadow close to the main road from Liptovský Mikuláš to "Smrečany" village (Liptovský Mikuláš district, Central Slovakia, "Liptovská kotlina" basin). He took a photo and he found that the eagle was marked with yellow ring 59 on its right leg (Fig.16). On July 24,



B. Maderič

Fig. 8. The older chick from 2 siblings ringed with the code 4T. Ptičie, 9 July 2004.
Obr. 8. Staršie z dvoch mláďat Okrúžkované kódom 4T. Ptičie, 9. júl 2004.



S. Harvančík

Fig. 9. Four years old male 4T carrying food to the nest. Opatovce nad Nitrou, 16 July 2008.
Obr. 9. Štvorročný samec 4T pri prinesení potravy mláďaťu na hniezdo. Opatovce nad Nitrou, 16. júl 2008.



Š. Danko

Fig. 10. *A. pomarina* adult male with ring R9 in following year at the breeding site. Závadka, 30 April 2008.
Obr. 10. Dospelý samec *A. pomarina* s krúžkom R9 v nasledujúcom roku na hniezdisku. Závadka, 30. apríl 2008.



M. Dravecký

Fig. 11. Four years old *A. pomarina*, code YX, found 5 km from its place of hatching. Horná Štubňa, 28 May 2008.
Obr. 11. Štvorročný *A. pomarina*, kód YX, zistený 5 km od miesta vyliahnutia. Horná Štubňa, 28. máj 2008.



P. Kišac

Fig. 12. Two years old *A. pomarina*, code KM, found 45 km from place of hatching. Klátova Nová Ves, 17 June 2008.
Obr. 12. Dvojročný *A. pomarina*, kód KM, zistený 45 km od miesta vyliahnutia. Klátova Nová Ves, 17. jún 2008.



M. Balla

Fig. 13. One year old eagle, code PN, 85 km from its place of hatching. Leles, 20 June 2008.
Obr. 13. Jednoročný orol, kód PN, 85 km od miesta vyliahnutia. Leles, 20. jún 2008.

Slovak Rapt J 2008, 2: 27–36. DOI: 10.2478/v10262-012-0016-4.
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2002, P. Vrlík ringed this eagle in Žiar (Liptovský Mikuláš district, Central Slovakia, "Liptovská kotlina" basin). The eagle was trapped in the net using the stuffed Eagle Owl. The bird was marked with ornithological ring BL 204 and estimated it to be a minimum 5 year old female. Since 1989, Vrlík regularly monitored the breeding site of these eagles. The pair regularly occupied the same forest in "Západné Tatry" Mts foothill. It can be assumed that the female is very old because it occupied the same nest on the spruce, futher more this pair successfully nested there in 2008 (Kicko in verb.) as well as at least 4 times in the past. Since 1989, this nest have been already occupied 8 times. This pair fledged 2 young successfully without human intervention. The fidelity of adult eagles (mainly females) to the breeding site is confirmed by observations of the female in 5 km southeastwards from the ringing place and also by observing occupied nests in the "Západné Tatry" Mts (Vrlík).

Conclusion

On the basis of the obtained results we can consider the marking of the Lesser Spotted Eagle population with colour rings as a reliable method which allows us to ob-



B. Maderič

Fig. 14. Chick ringed in the nest with the code PN. Roškovce, 8 July 2007.
Obr. 14. Mláďa okrúžkované na hniezde kódom PN. Roškovce, 8. júl 2007.



Š. Danko

Fig. 15. Adult female with the code HK in following year after returning to the breeding site. Lieskovec, 25 July 2008.
Obr. 15. Dospelá samica s kódom HK v nasledujúcom roku po návrate na hniezdisko. Lieskovec, 25. júl 2008.



D. Boucný

Fig. 16. Adult female marked with the code 59. Smrečany, 6 September 2008.
Obr. 16. Dospelá samica označená kódom 59. Smrečany, 6. september 2008.

tain important data on the biology of this protected bird species. Referring to the current high quality of optics and photographic equiptment as well as its availability, the colour ringing is a simultaneously effective method which enables to gather data without repeated trapping of marked individuals. All such obtained information has substantial importance in the provision of protection for existing and potential Lesser Spotted Eagle breeding biotopes.

In many cases the marking of individuals with colour rings was done without problems. In several cases during marking rupture and breakage of rings occurred. This could have been caused by a production defect or because the rings were kept in the cold so their elasticity and manageability was relatively lower. The fact that these rings, which are bigger and higher, do not restrain the eagles movement, hunting, manipulation of prey, etc. and at the same time the lock type (elastic covering of both sides) minimizes the removal of the ring, is a big improvement. It is also very important that it is still possible to identify the code on the oldest ringed eagle (8 years old). This is the longest duration of such a ring type on any marked individual of *A. pomarina* in Europe.

The ambition as well as wish for the future for the individual members of the working group for research and protection of the Lesser Spotted Eagle in Slovakia, apart from continuous intensive marking of chicks in the nest, is also to increase the number of ringed adult birds from which important data can be obtained. For an example it could be possible to collect data on fidelity of eagles to their breeding site, occasional changing of partners in pairs, and futher data.

The colour ringing is not only being actioned in Slovakia but also in other countries within the framework of the Lesser Spotted Eagle colour ringing programme in Europe. Therefore individuals with other ring colours can be spotted (Dravecký et al. 2008).

Up to present, there were only vague ideas and assumptions about the age and return of young eagles (1–3 years old) to the surroundings of their breeding sites. With the observations mentioned in this article, there have been a conclusive evidence that young birds (1–2 years old) occurred close to their places of hatching and older ones (4–5 years old) already bred. This was confirmed in the case of I9 ring when the male fed the chick in the nest only 130 m from its place of hatching (Danko & Maderič 2008).

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