

Birds of prey in the collections of the Šariš Museum in Bardejov (Slovakia)

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Abstract: In this study, data presented of birds of prey (Accipitriformes, Falconiformes) specimens deposited in the collection of the Šariš Museum in Bardejov (SMB), Slovakia. The work builds on previous studies highlighting the importance of the SMB museum collections, but also the importance of the museum on a global scale. In total, data of 437 individuals belonging to 22 species from 86 sites in eastern Slovakia were evaluated. Individuals were acquired in 1954–1985 (and two specimens of *Buteo buteo* in 1998), but mainly in 1962 (n = 63, 14.4%) and 1963 (n = 32, 7.3%). Moreover, one specimen of the Common Buzzard (*B. buteo*) had signs of „a dilution (isabel)“ and one bird of the Western Marsh Harrier (*Circus aeruginosus*) had signs of „melanism“. The importance of the work also includes cataloguing, which provides important data on regional museums and their collections that can be significant not only regionally but also globally. Moreover, in the SMB collections there are also 20 specimens of 15 species of exotic Accipitriformes and Falconiformes [1 ex. – *Accipiter striatus*; 1 ex. – *Buteo buteo*; 1 ex. – *B. ventralis*; 1 ex. – *Buteogallus gundlachii*; 1 ex. – *B. meridionalis*; 1 ex. – *Caracara plancus*; 1 ex. – *Elanoides forficatus*; 5 ex. – *Falco sparverius*; 1 ex. – *Geranoaetus polyosoma*; 1 ex. – *Gyps africanus*; 1 ex. – *Haliaeetus albicilla*; 2 ex. – *Ictinia plumbea*; 1 ex. – *Pandion haliaetus*; 1 ex. – *Rupornis magnirostris*; 1 ex. – *Vultur gryphus*] originating mainly from Argentina and Cuba as well from Africa and Hungary.

Key words: raptors, Accipitridae, Falconidae, museum collections.

Introduction

In the Natural History Department of the Šariš Museum in Bardejov (hereafter SMB) there are 692 348 specimens and objects of living and non-living nature which were collected by Tibor Weisz (Hromada 2015a, Hromada *et al.* 2015). The best example of the importance of SMB collections is the more than 60 publications (up to 2015) created based on collections acquired by the former curator Tibor Weisz (Hromada 2015b). The bird collections of the museum contain about 5 047 specimens of 251 bird species that occur in Slovakia. In addition, the exotic bird collections, which contain about 600 specimens, also form an important part of the collection (Hromada *et al.* 2015, Mikula *et al.* 2018). The specimens consist of skins (about 6 000), breast bones (more than 3 500), egg sets (about 800) or ectoparasites in ethanol and others. Each sample contains supplementary data that includes information such as weight, body length, bill length, wingspan, general condition of the individual. In addition to these, materials such as stomach contents, parasites, claws and nests are often preserved (Hromada *et al.* 2003, Hromada & Klimovičová 2015).

Birds of prey include a total of 313 bird species (Ferguson-Lees & Christie 2001) of varying sizes (includes the world's largest flying birds with a wingspan of more than 3 metres), which are found in all parts of the world except Antarctica.

Material and Methods

In total, the museum houses 437 specimens of the following 22 raptor species (Accipitridae, Falconidae): the Northern Goshawk, *Accipiter gentilis* (Linnaeus, 1785) (149 ex.); the Eurasian Sparrowhawk, *A. nisus* Linnaeus, 1785 (43 ex.); the White-tailed Eagle, *Haliaeetus albicilla* Linnaeus, 1785 (2 ex.); the Eastern Imperial Eagle, *Aquila heliaca* Savigny, 1809 (1 ex.); Golden Eagle, *A. chrysaetos* Linnaeus, 1785 (8 ex.); the Lesser Spotted Eagle, *Clanga pomarina* Brehm, 1831 (18 ex.); the Common Buzzard, *Buteo buteo* Linnaeus, 1785 (79 ex.); the Rough-legged Buzzard, *B. lagopus* Pontopiddan, 1763 (11 ex.); the *Circus* sp. (2 ex.); the Western Marsh Harrier, *Circus aeruginosus*

Linnaeus, 1785 (7 ex.); the Hen Harrier, *C. cyaneus* Linnaeus, 1766 (25 ex.); the Montagu's Harrier, *C. pygargus* (Linnaeus, 1785) (3 ex.); the Pallid Harrier *C. macrourus* Gmelin, 1770 (1 ex.); the Red Kite, *Milvus milvus* Linnaeus, 1785 (2 ex.); the Black Kite, *M. migrans* Boddaert, 1783 (3 ex.); the European Honey Buzzard, *Pernis apivorus* Linnaeus, 1785 (12 ex.); the Osprey, *Pandion haliaetus* Linnaeus, 1785; the Merlin, *Falco columbarius* Linnaeus, 1785 (5 ex.), the Eurasian Hobby, *F. subbuteo* (11 ex.); the Common Kestrel, *F. tinnunculus* (35 ex.); the Red-footed Falcon, *F. vespertinus* Linnaeus, 1785 (15 ex.); the Saker Falcon, *F. cherrug* Gray, 1834 (1 ex.); and the Peregrine Falcon, *F. peregrinus* Tunstall, 1771 (3 ex.). These birds were deposited in the form of skins, taxidermy mounts, sternal bones or other types of voucher material. The specimens were collected mainly by Tibor Weisz between 1954 and 1983 from 86 localities and three specimens after his death in 1985 (1 ex. *B. buteo*) and in 1998 (2 ex. *B. buteo*). All specimens with detailed locality given were georeferenced (see Tab. 1). Moreover, for 59 individuals, the locality was not given and was listed as unknown.

Tab 1: Overview of birds of prey localities deposited in the SMB collection.

Locality, GPS coordinates	N	%	Locality, GPS coordinates	N	%
Andrejová, 49°20'03"N, 21°19'59"E	4	0.9	Hervartov, 49°14'47"N, 21°12'14"E	3	0.7
Apaj, ^b 47°06'59"N, 19°05'12"E	2	0.5	Hlinné, 48°57'10"N, 21°34'48"E	1	0.2
Bardejov, 49°17'40"N, 21°16'40"E	164	37.5	Hrabovec, 49°16'26"N, 21°22'39"E	2	0.5
Bardejovská Nová Ves, 49°18'04"N, 21°19'01"E	2	0.5	Humenné, 48°56'01"N, 21°54'32"E	1	0.2
Becherov, 48°25'11"N, 21°18'37"E	1	0.2	Hradec nad Moravicí, ^a 48°52'16"N, 17°52'33"E	1	0.2
Bogliarka, 49°16'37"N, 21°09'15"E	1	0.2	Hungary, ^c 47°08'N, 19°30'E	1	0.2
Buclovany, 49°09'18"N, 21°21'59"E	7	1.6	Iňačovce, 48°41'53"N, 22°01'46"E	2	0.5
Bžany, 49°05'28"N, 21°38'16"E	1	0.2	Jedlinka, 49°23'56"N, 21°22'13"E	1	0.2
Červený kláštor, 49°23'28"N, 21°05'17"E	1	0.2	Kľušov, 49°14'40"N, 21°15'35"E	2	0.5
Dlhá lúka, ^c 49°20'04"N, 21°17'39"E	1	0.2	Kobyly, 49°12'47"N, 21°17'48"E	4	0.9
Dubie, 49°10'48"N, 21°22'49"E	1	0.2	Komárov, 49°16'52"N, 21°21'04"E	4	0.9
Dubinné, 49°14'49"N, 21°26'23"E	1	0.2	Kraváre, ^a 49°55'50"N, 18°00'18"E	16	3.7
Dúbrava, 49°14'04"N, 21°37'38"E	1	0.2	Kríže, 49°14'34"N, 21°08'58"E	1	0.2
Frička, 49°24'09"N, 21°05'13"E	1	0.2	Kružlovská Huta, 49°18'56"N, 21°07'47"E	1	0.2
Fričkovce, 49°11'07"N, 21°14'22"E	7	1.6	Kurov, 49°20'35"N, 21°08'06"E	9	2.1
Gaboltov, 49°21'55"N, 21°08'33"E	5	1.1	Kyjovice, ^a 49°49'52"N, 18°02'28"E	1	0.2
Gerlachov, 49°05'55"N, 20°12'24"E	2	0.5	Lomné, 49°06'23"N, 21°38'16"E	3	0.7

Locality, GPS coordinates	N	%	Locality, GPS coordinates	N	%
Giraltovce, 49°06'47"N, 21°31'05"E	5	1.1	Lukavica, 49°15'48"N, 21°19'09"E	1	0.2
Hertník, 49°12'22"N, 21°13'34"E	10	2.3	Lukov, 49°17'30"N, 21°04'53"E	1	0.2
Maglec, ^d ?	1	0.2	Rokytno, 49°18'59"N, 21°11'23"E	7	1.6
Malcov, 49°18'21"N, 21°03'50"E	1	0.2	Senné, 48°39'55"N, 21°01'55"E	6	1.4
Mičakovce, 49°05'30"N, 21°31'13"E	1	0.2	Slovenská Kajňa, 48°57'54"N, 21°41'57"E	2	0.5
Mokroluh, 49°18'28"N, 21°12'52"E	1	0.2	Smilno, 49°23'03"N, 21°20'57"E	1	0.2
Moldava nad Bodvou, 49°36'48"N, 20°59'55"E	1	0.2	Smolkov ^a , 49°54'07"N, 18°04'24"E	7	1.6
Nižná Voľa, 49°13'20"N, 21°22'21"E	1	0.2	Spišská Nová Ves, 48°56'38"N, 20°33'47"E	1	0.2
Nižný Orlík, 49°20'05"N, 21°31'32"E	1	0.2	Stěbořice ^a , 49°56'12"N, 17°48'17"E	1	0.2
Nižný Tvarožec, 49°21'49"N, 21°11'14"E	1	0.2	Sveržov, 49°20'07"N, 21°09'28"E	4	0.9
Opava, ^a 49°56'38"N, 17°53'38"E	1	0.2	Svidník, 49°18'19"N, 21°34'08"E	1	0.2
Orkucany, 49°05'18"N, 21°06'45"E	1	0.2	Šarišské Čierne, 49°20'41"N, 21°23'09"E	3	0.7
Osikov, 49°10'27"N, 21°15'49"E	3	0.7	Vyšná / Nižná Šebastová, ^f 49°01'07"N, 21°17'56"E	2	0.5
Pavlovce nad Uhom, 48°36'50"N, 22°04'01"E	2	0.5	Šiba, 49°13'27"N, 21°14'23"E	7	1.6
Plavnica, 49°16'28"N, 20°46'49"E	1	0.3	Tarnov, 49°19'12"N, 21°10'11"E	6	1.4
Poliakovce, 49°15'14"N, 21°24'16"E	1	0.3	Tovačov, ^a 49°25'17"N, 17°17'48"E	1	0.2
Porúbka, 49°11'55"N, 21°25'36"E	1	0.3	Trebišov, 48°37'32"N, 21°42'57"E	2	0.5
Prešov, 48°59'46"N, 21°14'41"E	8	1.8	Tročany, 49°10'48"N, 21°19'18"E	2	0.5
Raslavice, 49°08'57"N, 21°18'56"E	8	1.8	Tulčík, 49°05'17"N, 21°18'44"E	1	0.2
Rešov, 49°14'19"N, 21°19'51"E	1	0.2	Valkov, 49°03'46"N, 21°39'09"E	2	0.5
Richvald, 49°16'33"N, 21°11'08"E	1	0.2	Vyšná Polianka, 49°24'47"N, 21°21'24"E	1	0.2
Vyšný Komárník, 49°24'09"N, 21°42'13"E	1	0.2	Zborov, 49°22'38"N, 21°19'50"E	2	0.5

Locality, GPS coordinates	N	%	Locality, GPS coordinates	N	%
Vyšná Voľa, 49°14'58"N, 21°21'40"E	1	0.2	Zlatá Baňa, 48°56'50"N, 21°25'19"E	1	0.2
Vyšný Mirošov, 49°23'11"N, 21°26'47"E	1	0.2	Zlaté, 49°20'26"N, 21°11'54"E	3	0.7
Vyšný Tvarožec, 49°23'07"N, 21°11'40"E	3	0.7	Židlochovice, ^a 49°02'21"N, 16°37'07"E	1	0.2
Zatín 48°28'27"N, 21°54'13"E	1	0.2	Unknown	59	13.5

^aVillages are not located on the territory of Slovakia, but are in the Czech Republic, district Opava, and were obtained through taxidermist Vilém Borůvka.

^bVillage on the territory of Hungary.

^cFormerly an independent village, it has been part of the town of Bardejov city since 1971.

^dIt is probably a local area in the cadastral territory of Tulčík village, on the ridge of Kapušianský hradný vrch (Kapusian Castle Hill) above the reservation Fintické svahy slopes.

^eUndetermined territory of Hungary.

^fProbably on the border of the two cadastral territories of municipalities (it was not possible to unambiguously determine based on the attached documentation).

The protocol cards assigned to individuals contain the information on the collection site that we provide above, and various information on age, sex, morphometric data, and other additional data. In addition, after individuals were obtained, sternal bones and, in some cases, stomach contents and parasites were collected in addition to taxidermy mounts and skins (Tab. 2).

It should be noted that in many cases the age and sex of the individuals were not specified. Where possible, each specimen was checked separately, and age (and sometimes sex) was determined using determination key (Svensson *et al.* 2004). In some unclear cases, we consulted with Štefan Danko.

Shortly after the individuals were collected, the individuals were also weighed and the weight recorded in grams, and measurements in millimetres were taken using a calliper: body length (body 1 – length without beak, from forehead to tail tip, body 2 – length from beak tip to tail tip), wing length (right and left wing – length measured from wing bend to end of longest flight feather), tail length (length from base of middle pair of tail feathers to end of longest tail feather), tarsometatarsus length (length between the sole of the open leg and the proximal point of the tarsometatarsus), beak length (beak 1 – length from the edge of the beak to the skull, beak 2 – length to the first feather, beak 3 – length to the outer edge of the nostril) and wingspan (wingspan – distance between the longest flights) (cf. Svensson 1992, Hromádka *et al.* 1992, Eck *et al.* 2011).

Results and Discussion

The specimens of birds of prey from the museum belong to both sexes, with the abundance of the sexes being different. The individuals are divided into two age categories namely juveniles (subadults), and adults. For various reasons, information on sex, location, age or various metric data is often missing (see Tab. 3 – 12). Also, several sternal bones were damaged during preparation or storage in the museum.

Tab 2: Overview of birds of prey voucher materials deposited in the SMB collection.

Species	N	Skin	Sternum	Taxidermy monuts	Stomach contents	Parasites
<i>A. gentilis</i>	149	137	120	4	3	1
<i>A. nisus</i>	43	39	17	4	6	
<i>H. albicilla</i>	2			2		
<i>A. heliaca</i>	1	1				
<i>A. chrysaetos</i>	8	4	3	4		
<i>C. pomarina</i>	18	14	8	4		
<i>B. buteo</i>	79	59	42	10	4	
<i>B. lagopus</i>	11	9	5	2		
<i>C. aeruginosus</i>	7	2	1	5		
<i>C. cyaneus</i>	25	21	6	4		
<i>C. macrourus</i>	1	1	1			
<i>C. pygargus</i>	3	1	1	2		
<i>Circus</i> spp.*	2					
<i>M. migrans</i>	3	1	1	2		
<i>M. milvus</i>	2			2		
<i>P. haliaetus</i>	1			1		
<i>P. apivorus</i>	12	10	4	2	1	
<i>F. columbarius</i>	5	4	1	1		
<i>F. cherug</i>	1			1		
<i>F. peregrinus</i>	3			3		
<i>F. subbuteo</i>	11	8	2	3		
<i>F. tinnunculus</i>	35	27	18	10	3	1
<i>F. vespertinus</i>	15	10	8	4	2	
Total	437	348	238	70	19	2

*At the time of writing this work, no preparations had been found. For this reason, the exact classification is still open.

Accipitriformes:

Collection of the Northern Goshawk (*Accipiter gentilis*)

The largest collection consists of the Northern Goshawk, *A. gentilis* (Fig. 1). The amount of information recorded on specimens on the accession cards relative to other species is relatively high, especially for age, which is often absent in other species (Tab. 3). The first specimens for this collection were acquired in 1954, and subsequently the collection has been supplemented with a few more specimens each year. The largest increases were observed in 1962, 1969 and 1973 with a gradual decline until 1983 (Graph 1).

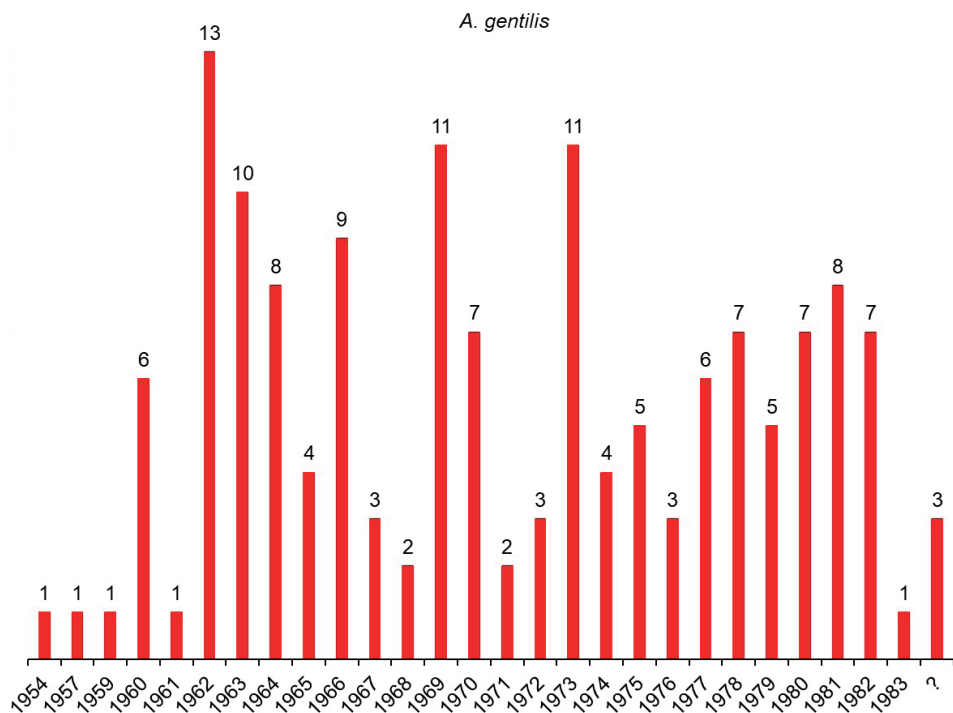
Based on data on the months in which specimens were collected, we can observe seasonal variation in collection (Graph 2). Most specimens were collected in winter months and early spring. The specimens came from 19 known localities (five specimens had no precise locality on record, cf. Graph 3).



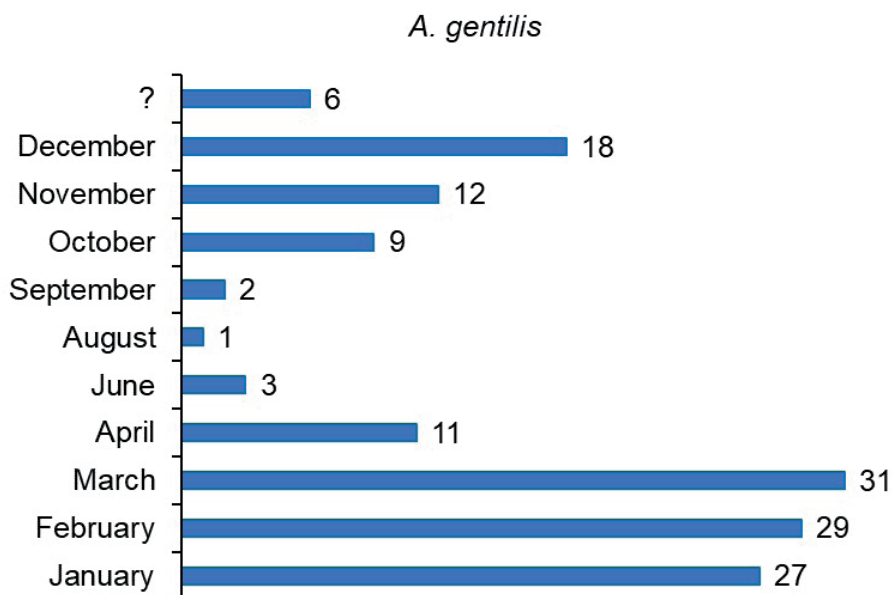
Fig. 1: Skins of the Northern Goshawk (*A. gentilis*) deposited in the SMB collection.

Tab 3: Basic information on the collection of the Northern Goshawk (*A. gentilis*) deposited in the SMB collection.

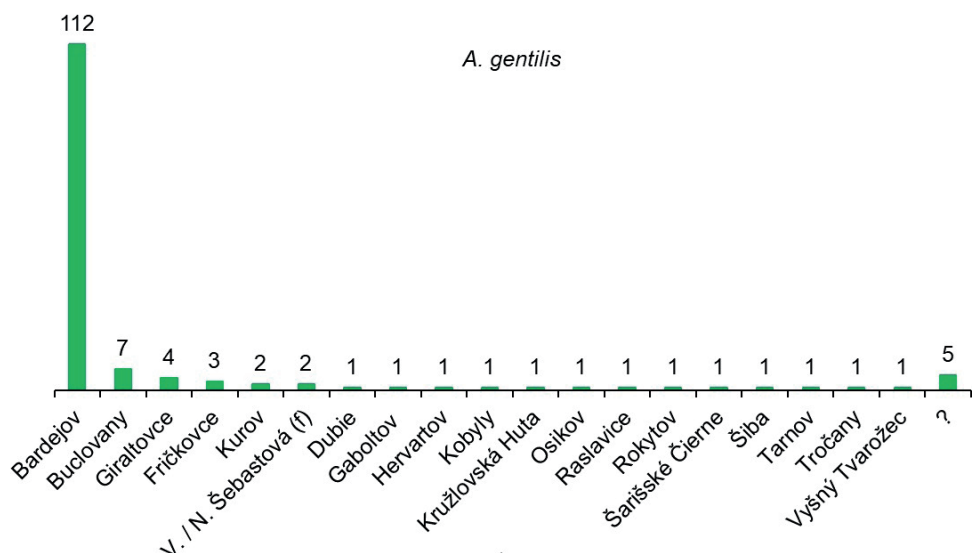
<i>Accipiter gentilis</i>	N	%
Sample size	149	100
Sample of males	82	55.0
Sample of females	57	38.3
The number of localities information	144	96.6
The number of date information	144	96.6
The number of age information	145	97.3
The number of sex information	139	93.3
The number of missing localities information	5	3.4
The number of missing date information	5	3.4
The number of missing age information	4	2.7
The number of missing sex information	10	6.7



Graph 1: Collection of the Northern Goshawk (*A. gentilis*) deposited in the SMB collection divided by years.



Graph 2: Collection of the Northern Goshawk (*A. gentilis*) deposited in the SMB collection divided by months.



Graph 3: Collection of the Northern Goshawk (*A. gentilis*) deposited in SMB collection divided by localities.

Distribution, ecology and conservation status:

The Northern Goshawk (*A. gentilis*) is widely distributed across Europe and Northern Asia, including the British Isles, Scandinavia, north Russia and Siberia, south to the Mediterranean, the Caucasus, the Himalayas and Japan. Also widespread in North America, including western and central Alaska, Canada, the U.S. and south to Mexico. Resident throughout much of its range (as well in Slovakia), but partially migratory in the northernmost populations of North America, Scandinavia and Russia migrate south between September and November, returning in March and April (del Hoyo *et al.* 1994, Snow & Perrins 1998, Squires *et al.* 2020). It is always seen singly or in pairs (Ferguson-Lees & Christie 2001). It inhabits mature woodland, preferring areas near clearings and the forest edge.

A. gentilis was last assessed on the IUCN Red List of Threatened Species in 2021. It is currently classified as Least Concern. This species is listed in CITES Appendix II, CMS Appendix II, Category 3 of the Memorandum of Understanding on Raptors, and Appendix II of the Bern Convention (BirdLife International 2021a). Derlink *et al.* (2018) showed that fourteen European countries currently have breeding population monitoring systems in place for this species (representing 33% of its European breeding range). Further research on habitat preferences, wintering biology, dispersal ability and the impact of changes in landscape structure on foraging behaviour and population viability will be essential to understand population trends. These are understudied because migration and roadside counts are limited due to low detectability and disruptive movements (Squires *et al.* 2020). Additional monitoring procedures need to be developed and implemented to determine population trends.

Collection of the Eurasian Sparrowhawk (*Accipiter nisus*)

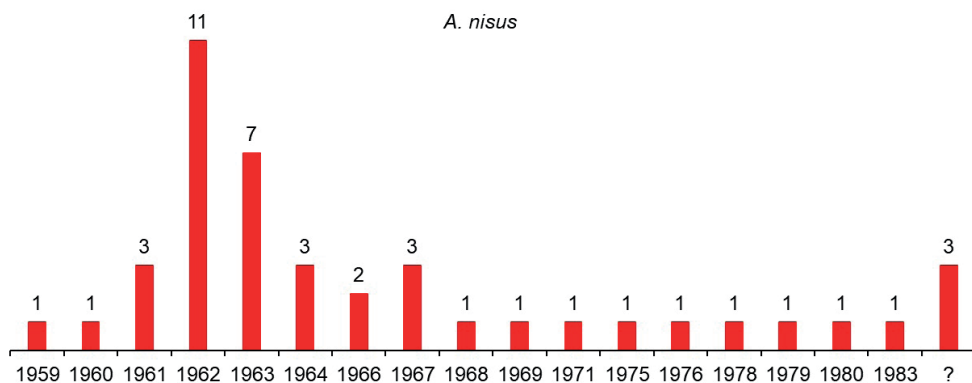
The abundance of specimens of the Eurasian Sparrowhawk, *A. nisus* (Fig. 2) is not very extensive. Nevertheless, it contains a relatively large number of sternal bones in a well-preserved condition. Much data, especially sex, locality, and metric data, are recorded on the relevant cards, but the age of most individuals was not known and was additionally determined by feather colouration. (Tab. 4).

Tab 4: Basic information on the collection of the Eurasian Sparrowhawk (*A. nisus*) deposited in SMB collection.

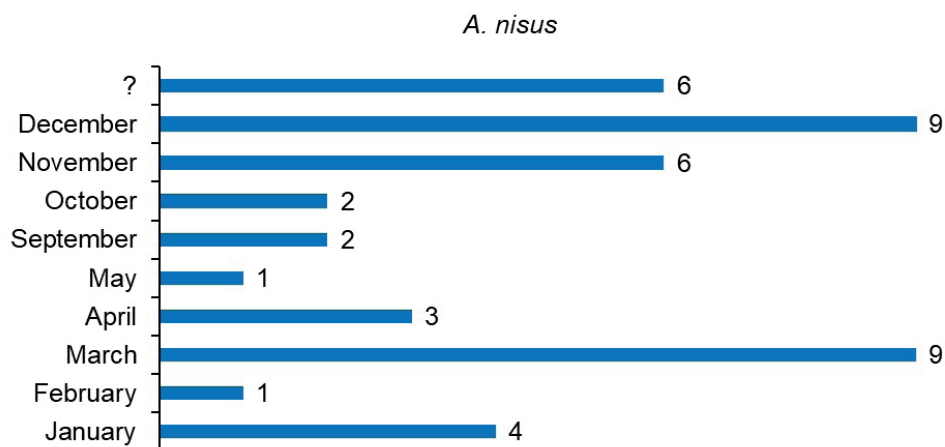
<i>Accipiter nisus</i>	N	%
Sample size	43	100
Sample of males	25	58.1
Sample of females	11	25.6
The number of localities information	39	90.7
The number of date information	37	86.0
The number of age information	40	93.0
The number of sex information	36	83.7
The number of missing localities information	4	9.3
The number of missing date information	6	14.0
The number of missing age information	3	7.0
The number of missing sex information	7	17.3



Fig. 2: Skins of the Eurasian Sparrowhawk (*A. nisus*) deposited in the SMB collection.

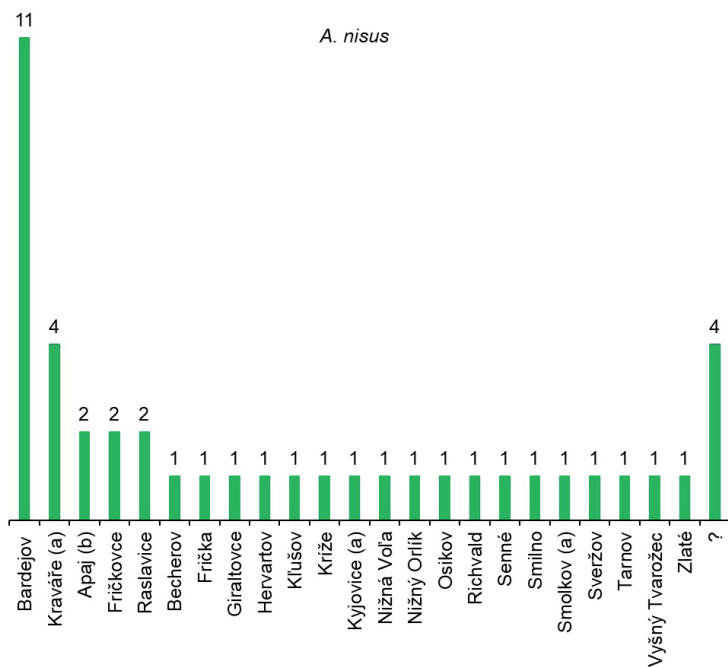


Graph 4: Collection of the Eurasian Sparrowhawk (*A. nisus*) deposited in SMB collection divided by years.



Graph 5: Collection of the Eurasian Sparrowhawk (*A. nisus*) deposited in SMB collection divided by months.

The first specimen was collected in 1959. Most specimens date from the early 1960s, and thereafter the collection was expanded only slightly until its expansion ceased in 1983 (Graph 4). Like the collection of *A. gentilis*, a large proportion of individuals were collected in the winter months and early spring, particularly in December and March (Graph 5). The specimens came from 23 known localities four specimens had no precise locality on record, cf. Graph 6).



Graph 6: Collection of the Eurasian Sparrowhawk (*A. nisus*) deposited in SMB collection divided by localities.

Distribution, ecology and conservation status:

Meyburg & Marks (2014) report that the species is migratory in the north of its range, wintering in southern Europe, southern Asia and less frequently in Africa. Further south, the birds are more likely to be resident (also in Slovakia) or dispersers (Ferguson-Lees & Christie 2001, Meyburg & Marks 2014). Migrants move south between July and November and return between March and June (Snow & Perrins 1998). Individuals of *A. nisus* are generally solitary, except for breeding, and migrate mostly singly, although large concentrations form in narrow sea passages (Ferguson-Lees & Christie 2001). It mainly inhabits forest, although preferring this to be interspersed with open areas (Meyburg & Marks 2014).

In the past (20th century), very extensive persecution, especially by foresters, resulted in large numbers of birds being killed (Ferguson-Lees & Christie 2001, Meyburg & Marks 2014). Similarly, the impact of harmful organochlorine pesticides, which cause direct mortality of adults as well as reduced breeding success, was responsible for the sharp declines in Europe in the 1950s and 1960s. Thousands of individuals of this species are still captured annually in Turkey, where it is exploited by falconers, but habitat alteration is considered to be the main current threat (Meyburg & Marks 2014).

Nevertheless, at both the European and EU28 scales, this species has an extremely large range (its extent of occurrence (EOO) is much larger than 20 000 km² and its area of occupancy (AOO) is much larger than 2 000 km²), and hence it does not approach the thresholds for Vulnerable under the range size criteria (criteria B and D2). For these reasons, the species is evaluated as Least Concern within both Europe and the EU28 (BirdLife International 2021b).

Collection of the Common Buzzard (*Buteo buteo*)

The collection of this species in the SMB is also quite large (Fig. 3). However, in addition to the lack of information on age, there is a slightly increasing lack of information on sex. In contrast to previous species, the number of female specimens is higher than that of males (Tab. 5). In addition, one individual has anomalous colouration, a form of dilution (isabel). This specimen was from Bardejov and was collected 1 April 1962 (cf. Mikula *et al.* 2017, Fig. 4). Specimens were collected between 1957 and 1998, with the collection being most expanded in 1962 and in some years not expanded at all (Graph 7).



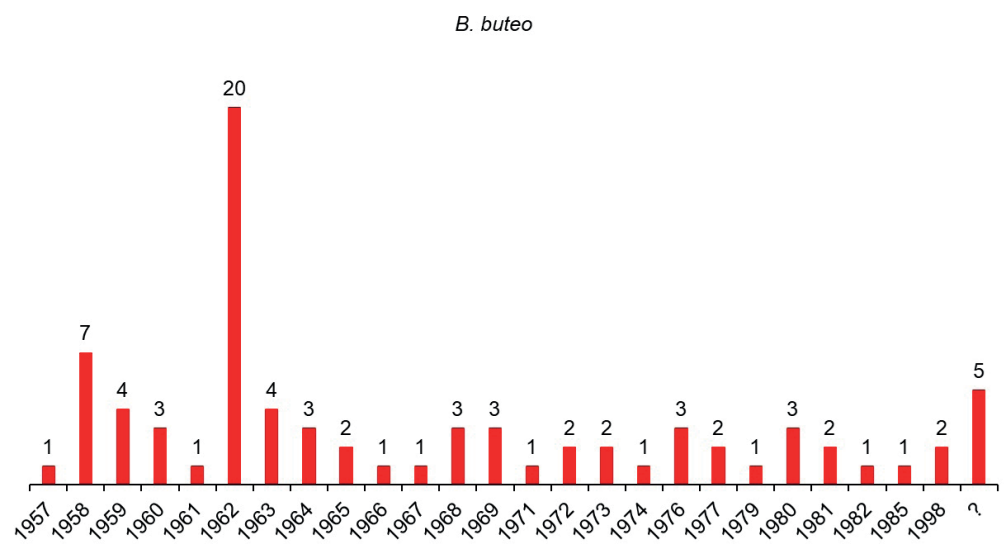
Fig. 3: Skins of the Common Buzzard (*B. buteo*) deposited in the SMB collection.



Fig. 4: Example of colour aberrations in the collection of SMB: a dilution (isabel) individual of the Common Buzzard (*B. buteo*) from Bardejov city (protocol. No. 93/62).

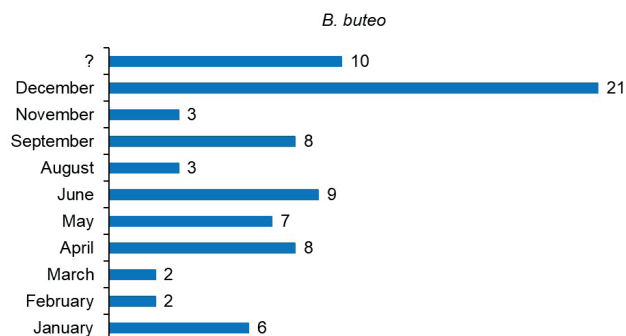
Tab 5: Basic information on the collection of the Common Buzzard (*B. buteo*) deposited in SMB collection.

<i>Buteo buteo</i>	N	%
Sample size	79	100
Sample of males	20	25.3
Sample of females	28	35.4
The number of localities information	72	91.1
The number of date information	73	92.4
The number of age information	64	81.0
The number of sex information	48	60.8
The number of missing localities information	7	8.9
The number of missing date information	6	7.6
The number of missing age information	15	19.0
The number of missing sex information	31	39.2

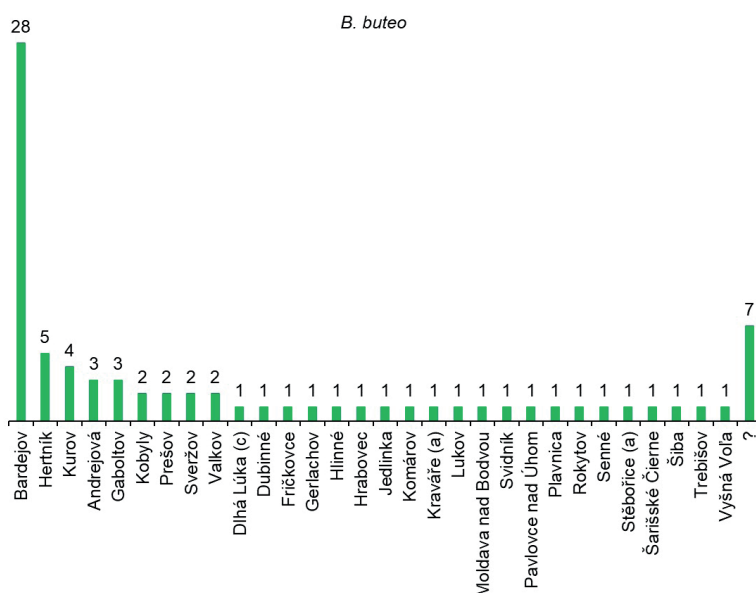


Graph 7: Collection of the Common Buzzard (*B. buteo*) deposited in SMB collection divided by years.

A large proportion of individuals were collected in the winter season, particularly in December and January (Graph 8). The specimens came from 30 known localities (seven specimens had no precise locality on record, cf. Graph 9).



Graph 8: Collection of the Common Buzzard (*B. buteo*) deposited in SMB collection divided by months.



Graph 9: Collection of the Common Buzzard (*B. buteo*) deposited in SMB collection divided by localities.

Distribution, ecology and conservation status:

According to Orta *et al.* (2015), populations in Scandinavia and most of the former Soviet Union are migratory, wintering in Africa and southern Asia. In other parts of the world they are resident. Migrants move south between August and November and make their return journey between February and May. Several authors (Brown *et al.* 1982, Snow & Perrins 1998, Ferguson-Lees & Christie 2001) report that individuals of *B. buteo* usually occur singly or in pairs. Sometimes they also roost in small family groups on roosts. However, they may also migrate in groups and, as birds, avoid as much as possible flying over larger bodies of water (e.g., seas, and even freshwater). Migration takes place only during the day and often follows mountain ranges and ridges (Brown *et al.* 1982). It inhabits a wide range of habitats,

but requires at least some tree cover for breeding. Ideal habitats are forest edges or a mosaic of forest and open areas.

Like *A. nisus*, the Common Buzzard has an extremely large range at both the European and EU28 scales and therefore does not approach the vulnerability threshold under the range size criteria. The population size is extremely large (much larger than 10 000 adults) and therefore does not approach the threshold for vulnerability under the population size criteria. At the same time, the population trend is generally increasing and therefore does not approach the thresholds for vulnerability under the population size reduction criterion. No extinction probability has been calculated for this species, therefore criterion E cannot be applied. For these reasons, the species is assessed as Least Concern within both Europe and the EU28 (BirdLife International 2021c).

Collection of the Rough-legged Buzzard (*Buteo lagopus*)

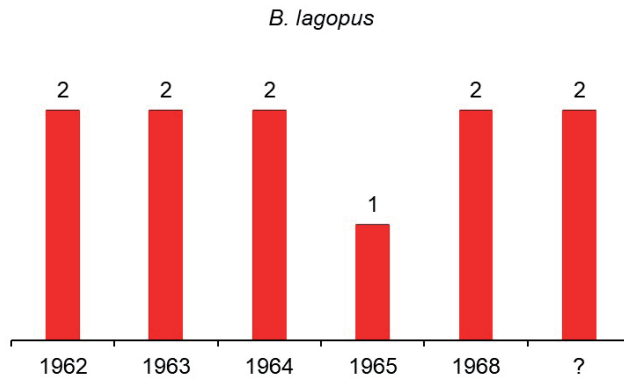
The collection of this species consists of 11 specimens (Fig. 5) with same number size of both sexes (Tab. 6). Specimens were collected between 1962 to 1968 (Graph 10). All birds were collected only in the winter season (Graph 11). The specimens came from nine known localities (two specimens had no precise locality on record, cf. Graph 12).



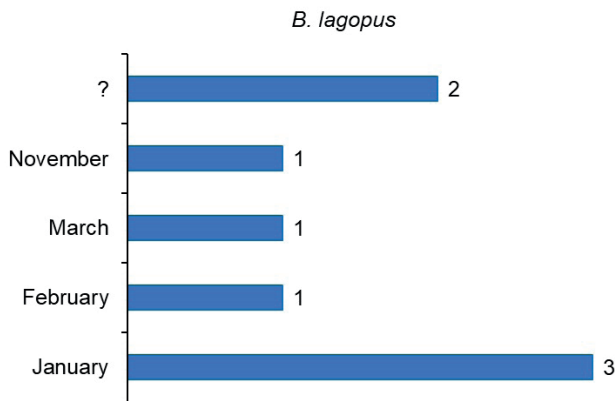
Fig. 5: Skins of the Rough-legged Buzzard (*B. lagopus*) deposited in the SMB collection.

Tab 6: Basic information on the collection of the Rough-legged Buzzard (*B. lagopus*) deposited in SMB collection.

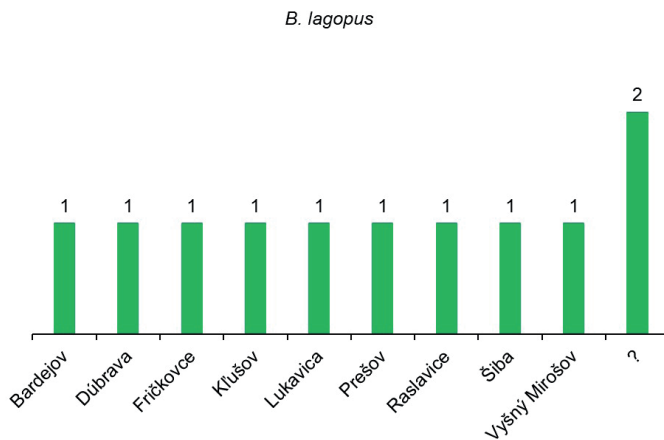
<i>Buteo lagopus</i>	N	%
Sample size	11	100
Sample of males	3	27.3
Sample of females	3	27.3
The number of localities information	9	81.8
The number of date information	9	81.8
The number of age information	9	81.8
The number of sex information	6	54.5
The number of missing localities information	2	18.2
The number of missing date information	2	18.2
The number of missing age information	2	18.2
The number of missing sex information	5	45.5



Graph 10: Collection of the Rough-legged Buzzard (*B. buteo*) deposited in SMB collection divided by years.



Graph 11: Collection of the Rough-legged Buzzard (*B. lagopus*) deposited in SMB collection divided by months.



Graph 12: Collection of the Rough-legged Buzzard (*B. lagopus*) deposited in SMB collection divided by localities.

Distribution, ecology and conservation status:

Bechard *et al.* (2020) report that the species is widespread in Fennoscandia and northern Russia. Wintering populations may occur in central and southern Europe as far south as Russia. According to the authors, this species is typically found in tundra, mainly treeless, although also wooded tundra and even extreme northern taiga, particularly in years of lemming and vole abundance. In the winter, it is often in areas more modified by humans, such as pastures, hayfields and croplands, but still mainly in open terrain such as prairies, marshes and shrublands. It does not breed in Slovakia and occurs only in the winter months.

The rough-legged Buzzard has most recently been assessed for The IUCN Red List of Threatened Species in 2020 and was listed as Least Concern (BirdLife International 2021d).

Collection of the White-tailed Eagle (*Haliaeetus albicilla*)

There are two specimens in the SMB collections in the form of taxidermy mounts (Fig. 6). Their origin is not clear. While one adult specimen came from an unidentified locality in Hungary, no further data could be found for the other immature specimen (Tab. 7).



Fig. 6: Taxidermy mount of the White-tailed Eagle (*H. albicilla*) deposited in the SMB collection (protocol. No. 412/67, Hungary). In the background is an anomalously coloured (dilution-isabel) specimen of *B. buteo* (cf. Fig. 4).

Distribution, ecology and conservation status:

The species has its main distribution in Norway and the European part of Russia (where together almost 50% of the European population lives). Other important populations are in Poland, Sweden, Germany and Finland (BirdLife International 2021e).

A. albicilla requires large and open areas of lakes, shorelines, or river valleys in the boreal, temperate, and tundra zones, near undisturbed cliffs or open stands of large old-growth trees, for nesting. Its main prey are vertebrates (fish, mammals and especially birds) from marine, freshwater and terrestrial environments. It migrates to the north and east of its breeding range, wintering in continental Europe and southern Asia. In the rest of its range, it is sedentary. Birds are usually found singly or in pairs or triplets (Ferguson-Lees & Christie 2001).

The white-tailed Sea-eagle has most recently been assessed for The IUCN Red List of Threatened Species in 2020. In Europe, this species has an extremely large range, and hence it does not approach the thresholds for Vulnerable under the range size criteria. Similarly, the population size is large, and the population trend appears to be increasing. Therefore, the species does not approach the thresholds for Vulnerable under the population size reduction criterion. For these reasons, the species is evaluated as Least Concern in Europe (BirdLife International 2021e). Moreover, reintroduction programmes have been successful in re-establishing populations in areas including Scotland and southern Bohemia (Orta *et al.* 2013).

Collection of the Eastern Imperial Eagle (*Aquila heliaca*)

There is one juvenile (subadult) of unknown sex (the age was determined later, based on the colour of the feathers) in the SMB collection, deposited as skin voucher material (Tab. 7). The specimen was collected on 01 December 1962 from the locality of Veľký Komárnik.

Distribution, ecology and conservation status:

Breeding of the species has been confirmed in Austria, Azerbaijan, Bulgaria, Czech Republic, North Macedonia, Georgia, Greece, Hungary, Russia, Serbia, Slovakia, Turkey, Ukraine (Heredia 1996) as well as in Russia, where it reaches 55°N (Meyburg & Kirwan 2013). In contrast, breeding has not been documented, but the species probably occurs in Albania, Armenia, Bosnia and Herzegovina, Croatia, Moldova and Romania, and is thought to be extinct in Cyprus (Demerdzhiev *et al.* 2011). Meyburg & Kirwan (2013) report that wintering birds also occur in southern Turkey.

Several authors (Ferguson-Lees & Christie 2001, Meyburg & Kirwan 2013) state that it is a lowland species that has been pushed to higher altitudes by persecution and habitat loss in Europe. In central and eastern Europe, it breeds in forests up to 1 000 m, but also in steppes and agricultural areas with large trees, and nowadays also on electricity pylons. In Turkey, rare nesting on the ground or on rocks has also been confirmed. In the Caucasus, it is found in steppes, lowland and floodplain forests and semi-deserts. On wintering grounds, it probably prefers wetlands. Adults return to breeding areas from late February to early May. Adults in central Europe, the Balkan Peninsula, Turkey and the Caucasus are usually residents, whilst most immatures move south. (Meyburg & Kirwan 2013).

The Eastern Spotted Eagle was last assessed on the IUCN Red List of Threatened Species in 2020 and was classified as Least Concern. This is due to the fact that the species has an extremely large range in Europe (its Extent of Occurrence (EOO) is much larger than 20 000 km² and its Area of Occurrence (AOO) is much larger than 2 000 km²). On the other hand, although the population size is small, it is not expected to approach the thresholds for

vulnerability under the population size criteria. The population trend appears to be upward and therefore the species does not appear to be approaching the thresholds for vulnerability under the population size criterion. At the same time, the probability of extinction has not been calculated for this species (BirdLife International 2021f).

Collection of the Golden Eagle (*Aquila chrysaetos*)

The SMB collection contains eight specimens of *A. chrysaetos* (Fig. 7, Tab. 7), collected over five years (Graph 13).

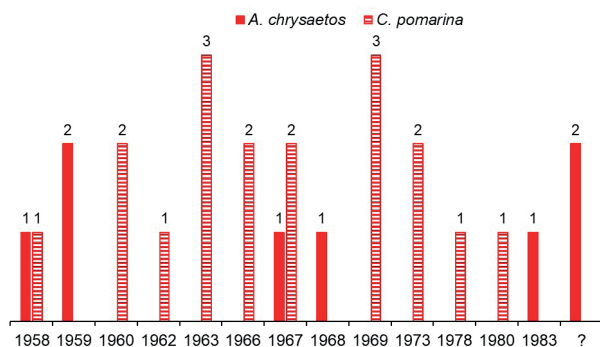
Of the eight individuals, the sex was known for three individuals; the sex of the other five individuals was undetermined. At the same time, six individuals were juveniles (subadults) and one was an adult (Tab. 7). All individuals were collected during three autumn-winter months (Graph 14) from six known localities (Tab. 7, Graph 15).



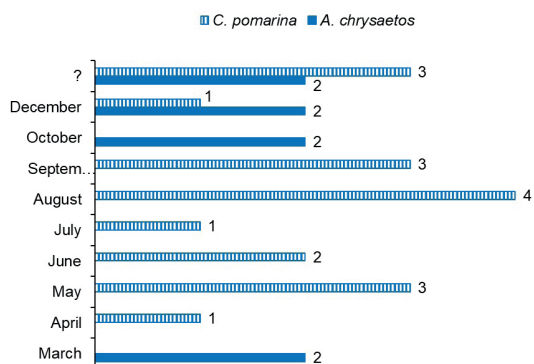
Fig. 7: Skins of the Golden Eagle (*A. chrysaetos*) deposited in the SMB collection.

Tab. 7: Basic information on the collection of the White-tailed Eagle (*H. albicilla*), the Eastern Imperial Eagle (*A. heliaca*), the Golden Eagle (*A. chrysaetos*) and the Lesser Spotted Eagle (*C. pomarina*) deposited in SMB collection.

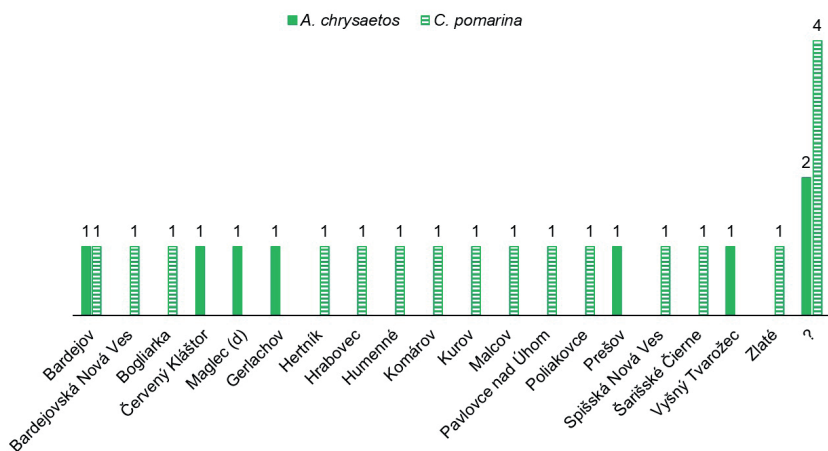
Species	<i>H. albicilla</i>	<i>A. heliaca</i>	<i>A. chrysaetos</i>	<i>C. pomarina</i>
Sample size	2	1	8	18
Sample of males	-	-	1	5
Sample of females	-	-	2	8
The number of localities information	-	1	6	14
The number of date information	-	1	6	17
The number of age information	-	-	7	17
The number of sex information	-	-	3	13
The number of missing localities information	2	-	2	4
The number of missing date information	2	-	2	1
The number of missing age information	2	1	1	1
The number of missing sex information	2	1	5	5



Graph 13: Collection of the Golden Eagle (*A. chrysaetos*) and the Lesser Spotted Eagle (*C. pomarina*) deposited in SMB collection divided by years.



Graph 14: Collection of the Golden Eagle (*A. chrysaetos*) and the Lesser Spotted Eagle (*C. pomarina*) deposited in SMB collection divided by months.



Graph 15: Collection of the Golden Eagle (*A. chrysaetos*) and the Lesser Spotted Eagle (*C. pomarina*) deposited in SMB collection divided by localities.

Distribution, Ecology and Conservation status:

In Europe, this species breeds notably in Turkey, Spain, Norway, Russia, Sweden, Italy and France. In Slovakia it is resident (BirdLife International 2021g).

It is one of the most widespread species of *Aquila* eagle, found throughout the non-Arctic and Palearctic regions (70°N to 20°E). However, it is rare and scarce throughout its range. It is generally a sedentary species, with juveniles dispersing up to 1 000 km in the first years of life. Birds inhabiting predominantly northern areas (> 65°N), such as Fennoscandia and northern Russia, migrate southwards. In the Palearctic, movements occur on a broad front to wintering areas in south-eastern Europe and the Russian steppes. Juveniles and subadults reach as far as North Africa (Ferguson-Lees & Christie 2001). It inhabits a wide range of flat or mountainous, mostly open habitats, often above tree line (Watson 2010), from sea level to 4 000 m (Hagemeijer & Blair 1997).

Like the previous species, it has been classified as a Least Concern species due to the enormous size of its range. Moreover, the population trend appears to be increasing (BirdLife International 2021g).

Collection of the Lesser Spotted Eagle (*Clanga pomarina*)

The SMB collection contains 18 specimens of *C. pomarina* (Fig. 8, Tab. 7), collected over ten years (see Graph 13). The sex was known for 13 individuals; the sex of the other five individuals was undetermined. At the same time, seven individuals were juveniles (subadults) and ten was an adult (see Tab. 7). In contrast to *A. chrysaetos*, individuals were collected not only in the autumn-winter season, but also in the spring and summer seasons (Graph 14) from 14 known localities (Tab. 7, Graph 15).



Fig. 8: Skins of the Lesser Spotted Eagle (*C. pomarina*) deposited in the SMB collection.

Distribution, Ecology and Conservation status:

In Europe, this species breeds notably in Latvia, Belarus, Romania, Poland, Russia, Lithuania and Ukraine. In Slovakia it is breeding (BirdLife International 2021h).

The Lesser Spotted Eagle is a migratory species leaving its breeding grounds from August to November. It returns to breeding grounds again in March and April (Snow & Perrins 1998, Ferguson-Lees & Christie 2001). During migration, it relies heavily on soaring flight using

thermals and therefore avoids large bodies of water. Birds are usually observed singly or in pairs, but congregate near abundant food sources and migrate in flocks (Snow & Perrins 1998, Ferguson-Lees & Christie 2001, Porter & Aspinall 2010). It breeds near forest edges, preferring moist woodland; most nest in lowlands but it is recorded breeding up to 2 200 m in montane areas.

At both European and EU28 scales, this species has an extremely large range, and hence it does not approach the thresholds for Vulnerable under the range size criteria. The population size is large, and hence it does not approach the thresholds for Vulnerable under the population size criteria. The population trend appears to be increasing, and hence the species does not approach the thresholds for Vulnerable under the population size reduction criterion. For these reasons the species is evaluated as Least Concern within both Europe and the EU28 (BirdLife International 2021h).

Collection of the Black Kite (*Milvus migrans*)

There are three specimens in the SMB collections in the form of two taxidermy mounts and one skin (Fig. 9, 25). Their origin is clear only by one specimen. One adult female is deposited as skin, and came from a locality, Lomné (20 June 1975). In contrast, no further data were found for the rest individuals (one subadult and one adult). The individuals were probably collected sometime in 1961.



Fig. 9: Skin of the Black Kite (*M. migrans*) deposited in the SMB collection.

Distribution, Ecology and Conservation status:

The occurrence of this species in Europe is mainly in Russia, but it also breeds in smaller but significant numbers in France, Spain and Germany. It also nests and breeds in Slovakia (BirdLife International 2021i).

According to Hagemeyer & Blair (1997), this species is found almost ubiquitously throughout habitats. It inhabits semi-deserts, cultivated areas and fragmented woodland, preferring areas below 1,000 m with adjacent aquatic environments. In Europe, unlike elsewhere in its range, it generally avoids breeding in urban areas. It arrives at its breeding grounds between February and May, and can be loosely colonial or a solitary breeder (Ferguson-Lees & Christie 2001).

Orta *et al.* (2020a) stated that the species is mainly migratory, with birds from Europe wintering in sub-Saharan Africa and the Middle East. It is generally a gregarious species, with

birds often roosting communally and migrating in scattered flocks (Ferguson-Lees & Christie 2001, Orta *et al.* 2020a).

The Black Kite has most recently been assessed for the IUCN Red List of Threatened Species in 2020 and was listed as Least Concern (BirdLife International 2021i).

Collection of the Red Kite (*Milvus milvus*)

There are two specimens in the SMB collections in the form of two taxidermy mounts (Fig. 10). Their origins are unclear. Both are juveniles and only one is known to have been acquired in 1957.

Distribution, Ecology and Conservation status:

This is a European species (Hagemeijer & Blair 1997) which breeds from Spain and Portugal east through central Europe to Ukraine, north to southern Sweden, Latvia and the U.K., and south to southern Italy. Populations winter within the western breeding range, and formerly in isolated patches south and east to eastern Turkey (Knott *et al.* 2009).

The species breeds in broadleaf woodlands and forests, mixed with farmland, pasture and heathland. In winter it also occupies farmland without trees, wasteland, scrub and wetlands. Formerly an urban scavenger, it still visits the edges of towns and cities. Most birds in north-east Europe are migratory, wintering mainly in southern France and Iberia, but with some travelling as far as Africa (Orta *et al.* 2020b).



Fig. 10: Taxidermy mounts deposited in exposition: No. 6 – the Red Kite (*M. milvus*); No. 7 – the Black Kite (*M. migrans*); No. 4 – the Golden Eagle (*A. chrysaetos*), No. 5 – the Lesser Spotted Eagle (*C. pomarina*); No. 8 – the European Honey Buzzard (*P. apivorus*).

Migrants travel south from their breeding grounds between August and November, returning between February and April (Snow & Perrins 1998). Birds are usually seen singly or in pairs, but sometimes form small flocks, possibly family groups, when soaring on migration (Ferguson-Lees & Christie 2001).

The Red Kite has most recently been assessed for the IUCN Red List of Threatened Species in 2020 and was listed as Least Concern. This was based on the fact that the species inhabits large territories and the population size for this species is also large (BirdLife International 2021j).

Collection of the Hen Harrier (*Circus cyaneus*)

The collection of this species in SMB is also quite large (Fig. 11), consisting of 25 specimens (Tab. 8). Sex and age were determined by 19 and 21 individuals (mostly additionally on the basis of feather colouring), respectively. The collection is dominated by females and juveniles (subadults), collected between 1957 and 1979. The collection was most widespread in 1968 and 1970, and in some years, it was not widespread at all (Graph 16).

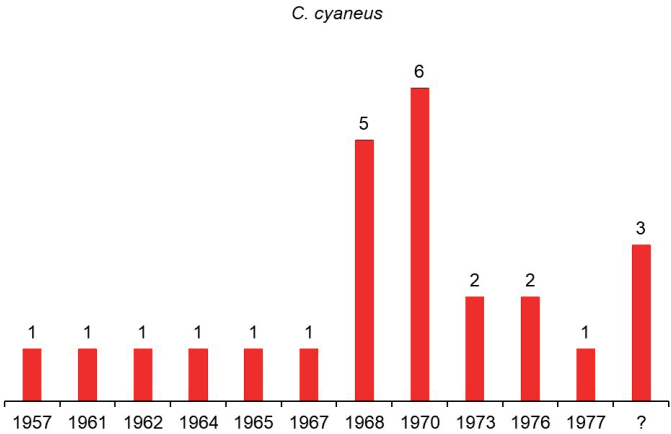


Fig. 11: Skins of the Hen Harrier (*C. cyaneus*) deposited in the SMB collection.

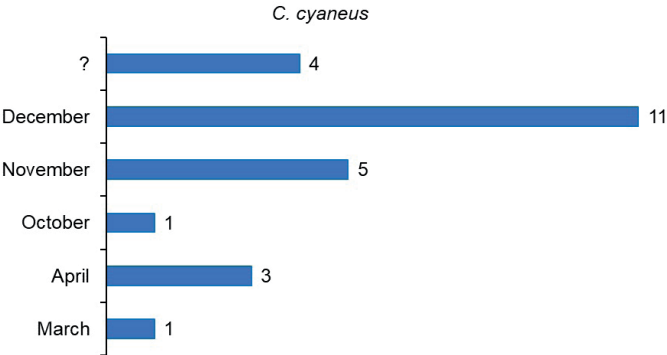
Most of the birds were collected in the autumn-winter period, with dominance in December (Graph 17). The specimens came from ten known localities (four specimens did not have the exact locality listed in the record, cf. Graph 18).

Tab 8: Basic information on the collection of the Hen Harrier (*C. cyaneus*) deposited in SMB collection.

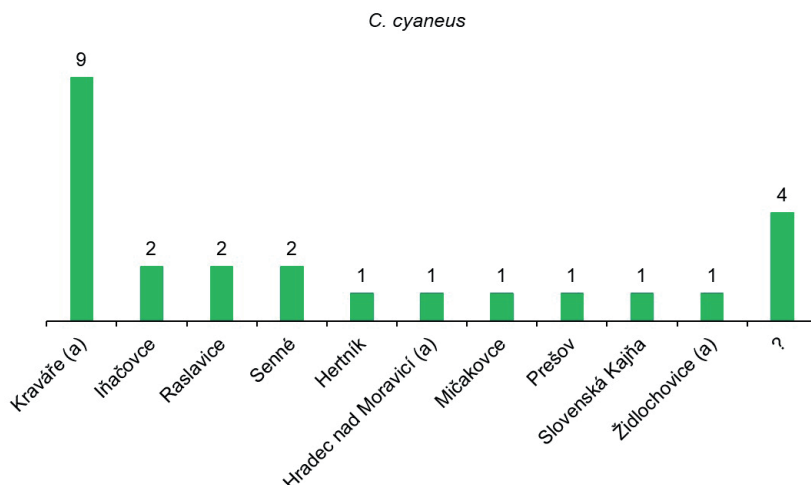
<i>Circus cyaneus</i>	N	%
Sample size	25	100
Sample of males	8	32
Sample of females	11	44
The number of localities information	21	84
The number of date information	21	84
The number of age information	21	84
The number of sex information	19	76
The number of missing localities information	4	16
The number of missing date information	4	16
The number of missing age information	4	16
The number of missing sex information	6	24



Graph 16: Collection of the Hen Harrier (*C. cyaneus*) deposited in SMB collection divided by years.



Graph 17: Collection of the Hen Harrier (*C. cyaneus*) deposited in SMB collection divided by months.



Graph 18: Collection of the Hen Harrier (*C. cyaneus*) deposited in SMB collection divided by localities.

Distribution, Ecology and Conservation status:

Orta *et al.* (2014) showed that in Europe, the Hen Harrier breeds from Ireland in the west to European Russia in the east. However, according to Hagemeijer & Blair (1997), it does not breed in the Balkans, Italy, Switzerland and Austria.

This species inhabits open country with some grass or shrub cover, especially grassland, steppe, meadows, moorland, scrub and cultivation, and it is also found in wetlands and young conifer plantations. In the winter, it becomes more widespread, for example, occurring over ploughed land. It nests on the ground, in dense grass or scrub, crops or marshy vegetation. The species is completely migratory in northern and north-east Europe and is partially migratory and dispersive elsewhere (Orta *et al.* 2014).

Like most of the above-mentioned raptors, the Hen Harrier also has a huge range in Europe as well as a large population size. Therefore, in 2020, it was listed as Least Concern (BirdLife International 2021k).

Collection of the Western Marsh Harrier (*Circus aeruginosus*)

The collection of this species in SMB is small (Fig. 12), consisting of seven specimens (Tab. 9). Sex was determined for five birds, while age for seven individuals. There are five taxidermy mounts in the collection, and two skins, one of which is from a melanistic individual (Fig. 13). The collection is dominated by males and adults, collected between 1959 to 1964 (Graph 19). There is insufficient information on the period of acquisition of individuals (Graph 20). The specimens came from two known localities (five specimens did not have the exact locality listed in the record, Graph 21).



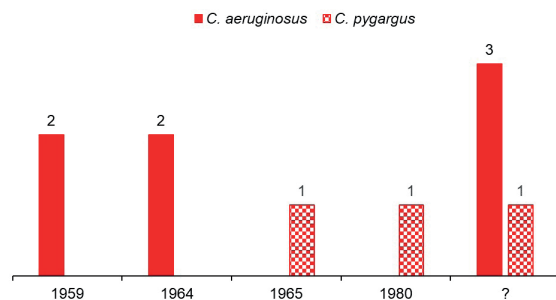
Fig. 12: Taxidermy mount of the Western Marsh Harrier (*C. aeruginosus*) in exposition of the SMB.



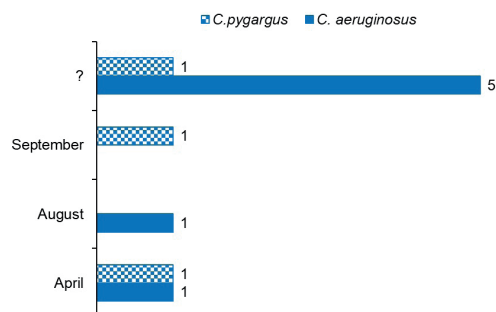
Fig. 13: Example of colour aberrations in the collection of SMB: a melanistic individual of the Western Marsh Harrier (*C. aeruginosus*) deposited in the SMB collection (protocol. No. 139/64, Tovačov, Tovačovský rybník pond).

Tab. 9: Basic information on the collection of the Western Marsh Harrier (*C. aeruginosus*), the Montagu's Harrier, *C. pygargus*, the Pallid Harrier *C. macrourus*, and *Circus* spp. deposited in SMB collection.

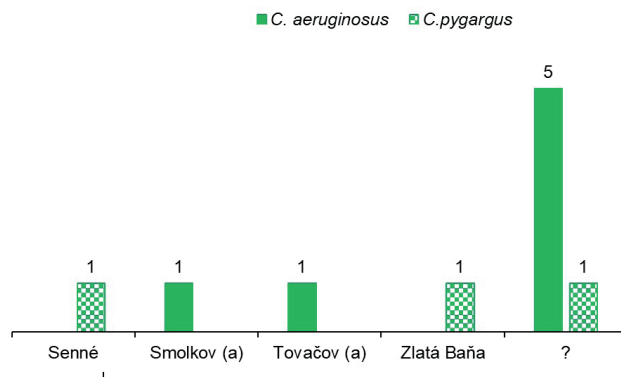
Species	<i>C. aeruginosus</i>	<i>C. pygargus</i>	<i>C. macrourus</i>	<i>Circus</i> spp.
Sample size	7	3	1	2
Sample of males	4	2	1	-
Sample of females	1	1	-	1
The number of localities information	2	2	1	1
The number of date information	2	2	1	1
The number of age information	7	3	1	-
The number of sex information	5	3	1	1
The number of missing localities information	5	1	-	1
The number of missing date information	5	1	-	1
The number of missing age information	-	-	-	2
The number of missing sex information	2	-	-	1



Graph 19: Collection of the Western Marsh Harrier (*C. aeruginosus*), and the Montagu's Harrier (*C. pygargus*) deposited in SMB collection divided by years.



Graph 20: Collection of the Western Marsh Harrier (*C. aeruginosus*), and the Montagu's Harrier (*C. pygargus*) deposited in SMB collection divided by months.



Graph 21: Collection of the Western Marsh Harrier (*C. aeruginosus*), and the Montagu's Harrier (*C. pygargus*) deposited in SMB collection divided by localities.

Distribution, Ecology and Conservation status:

In Europe, this species breeds largely in Russia, and also notably in Ukraine, Romania and Latvia (BirdLife International 2021).

According to several authors (Ferguson-Lees & Christie 2001, Orta *et al.* 2020c), it is mainly migratory, although populations in western Europe are generally resident. Orta *et al.* (2020c) stated that migrant birds leave their breeding grounds in September and October, wintering from France south as far as sub-Saharan Africa. Birds begin their return journey in February and March, arriving in March and April (Snow & Perrins 1998, Ferguson-Lees & Christie 2001, Orta *et al.* 2020c). Migration is generally on a broad front, although there is some concentration at a few sites (Brown *et al.* 1982). Hundreds of birds occasionally gather at roosting sites, sometimes with other harriers such as *C. pygargus*, but otherwise they are usually solitary, associating only temporarily at especially rich feeding sites (Snow & Perrins 1998, Ferguson-Lees & Christie 2001, Orta *et al.* 2020c). They have a slightly greater tendency to be gregarious while on migration, but the above still generally applies. Birds fly c. 10–30 m above the ground (Brown *et al.* 1982). The species inhabits extensive areas of dense marsh vegetation, in fresh or brackish water, generally in lowlands (Orta *et al.* 2020c), up to 400 m (Hagemeijer & Blair 1997).

Like most of the above-mentioned raptors, the Western Marsh Harrier also has a huge range in Europe as well as a large population size. Therefore, in 2020, it was listed as Least Concern (BirdLife International 2021).

Collection of the Montagu's Harrier (*Circus pygargus*)

There are three specimens in the SMB collections in the form of two taxidermy mounts and one skin (Fig. 13). Their origin is clear from two specimens (cf. Tab. 9, Graphs 19, 20 and 21). One adult female is deposited as skin, and came from a locality, Senné (11 April 1965). The second specimen (subadult male) comes from Zlatá Baňa (28 September 1980). In contrast, no further data was found for one adult male (Fig. 14).



Fig. 14: Taxidermy mount of the Montagu's Harrier (*C. pygargus*) in exposition of the SMB.

Distribution, Ecology and Conservation status:

In Europe, this species breeds mainly in Russia, but also notably in Spain and France (BirdLife International 2021m).

This is a migratory species, wintering in sub-Saharan Africa (Ferguson-Lees & Christie 2001, Orta *et al.* 2020d) which leaves its breeding grounds in August and September. Beginning its return in March and April (Snow & Perrins 1998, Orta *et al.* 2020d). Birds tend to migrate on broad fronts, but there are concentrations in Gibraltar and along the Rift Valley (Ferguson-Lees & Christie 2001, Orta *et al.* 2020d). Nevertheless, it will readily migrate over expanses of water (Brown *et al.* 1982). Birds tend to hunt alone, although they do gather at high prey concentrations and will roost in groups of often over 50, sometimes communally with *C. macrourus* and *C. aeruginosus* (Ferguson-Lees & Christie 2001). It is a bird of open country, usually in the lowlands.

The Montagu's Harrier also has a large range in Europe as well as a large population size. Therefore, in 2020, it was listed as Least Concern (BirdLife International 2021m).

Collection of the Pallid Harrier (*Circus macrourus*) and *Circus* spp.

There is one subadult male of the Pallid Harrier obtained from locality Prešov (12 April 1966) deposited in the SMB collection in the form of skin (Protocol No. 97/66). In addition, there are still undetermined specimens (*Circus* spp.) in the collection that have not yet been found (cf. Tabs. 2, 9).

Distribution, Ecology and Conservation status:

In Europe, small populations breed in Azerbaijan, Romania, Turkey and Ukraine, and it breeds irregularly further west in Sweden and Germany. A minority winter in south-east and central Europe but most migrate to the Afrotropic and the Indian subcontinent (Billerman *et al.* 2020).

This species breeds in uncultivated grasslands. It evidently avoids very dry open sites and selects wetter areas for nesting, preferably with sparse shrubs and weeds (Tucker and Heath 1994). It will nest above 1 000 m in the Caucasus (Hagemeijer & Blair 1997). The species returns to its breeding grounds in March and April and nests in loose colonies. The species is migratory, with most birds wintering in sub-Saharan Africa or south-east Asia. They leave their breeding grounds between August and November and return in March and April (Billerman *et al.* 2020). Birds migrate on a broad front, with only minor concentrations at bottleneck sites (Ferguson-Lees & Christie 2001, Billerman *et al.* 2020). Although birds are most often seen singly, females and juveniles can form parties of 10–15 on migration (Snow & Perrins 1998, Ferguson-Lees & Christie 2001).

The Pallid Harrier has most recently been assessed for The IUCN Red List of Threatened Species in 2020, and was listed as Least Concern (BirdLife International 2021n).

Collection of the European Honey Buzzard (*Pernis apivorus*)

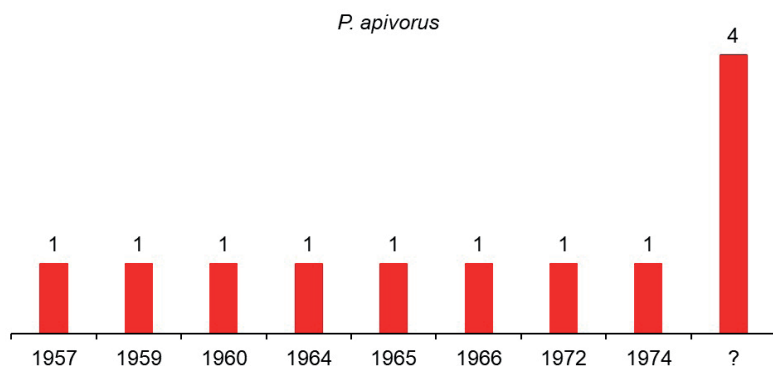
There are twelve specimens in the SMB collections in the form of two dermoplastic taxidermy mounts and ten skins (Fig. 15). Their origin was clear from six specimens (cf. Tab. 10, Graphs 22, 23, and 24) and came from five localities. Specimens were collected between 1957 and 1974 (Graph 22).



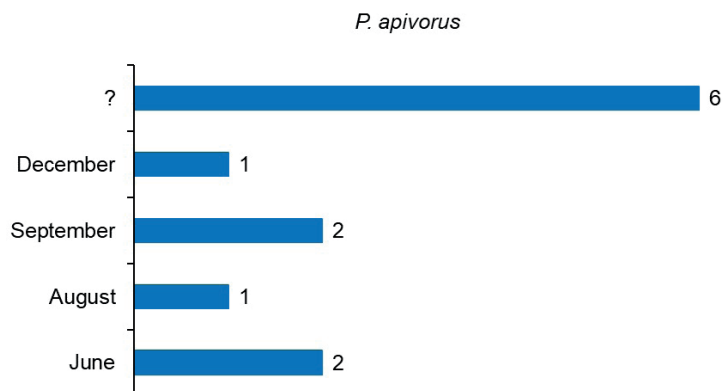
Fig. 15: Skins of the European Honey Buzzard (*P. apivorus*) deposited in the SMB collection.

Tab 10: Basic information on the collection of the European Honey Buzzard (*P. apivorus*) deposited in SMB collection.

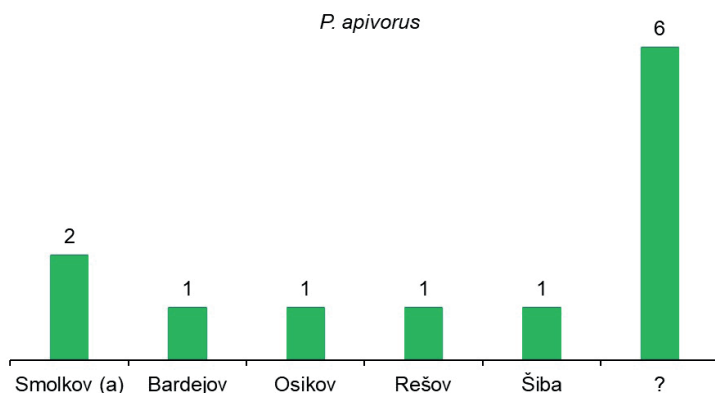
<i>Pernis apivorus</i>	N	%
Sample size	12	100
Sample of males	3	25.0
Sample of females	2	16.7
The number of localities information	6	50.0
The number of date information	6	50.0
The number of age information	10	83.3
The number of sex information	5	41.7
The number of missing localities information	6	50.0
The number of missing date information	6	50.0
The number of missing age information	2	16.7
The number of missing sex information	7	58.3



Graph 22: Collection of the European Honey Buzzard (*P. apivorus*) deposited in SMB collection divided by years.



Graph 23: Collection of the European Honey Buzzard (*P. apivorus*) deposited in SMB collection divided by months.



Graph 24: Collection of the European Honey Buzzard (*P. apivorus*) deposited in SMB collection divided by localities.

Distribution, Ecology and Conservation status:

In Europe, this species breeds largely in Russia, and notably in France, Romania and Belarus. In Slovakia and the Czech Republic, it is also breeding (BirdLife International 2021o).

This is a migratory species, wintering in tropical Africa, which leaves its breeding grounds in August and September. Birds return to their nesting sites between April and June (Orta *et al.* 2020e). Several authors (Ferguson-Lees & Christie 2001, Porter & Aspinall 2010, Orta *et al.* 2020e) showed that birds are mostly solitary except on migration, when they flock throughout, gathering in large numbers at preferred crossing points as well as roosting socially.

This species is diurnal (Snow & Perrins 1998) and Orta *et al.* (2020e) showed that the species is found in forests and woods, preferably deciduous, but also mixed forests in temperate and boreal zones. It also uses a variety of habitats with both wooded and open areas, including heathland and cultivated area (Orta *et al.* 2020e).

The European Honey Buzzard has most recently been assessed for The IUCN Red List of Threatened Species in 2020, and was listed as Least Concern (BirdLife International 2021o).

Collection of the Osprey (*Pandion haliaetus*)

There is one adult female of the Osprey obtained from locality Senné deposited in the SMB Museum in the form of taxidermy mount deposited in exhibition (Fig. 16). The individual does not have a protocol number listed, and we do not know more information about the individual.



Fig. 16: Taxidermy mount of the Osprey (*P. haliaetus*) in exposition of the SMB.

Distribution, Ecology and Conservation status:

The Osprey is a cosmopolitan species of the family Pandionidae except in South America and Antarctica. It only migrates through Slovakia, very rarely overwintering. Records are regularly from large rivers and water bodies; fewer sightings are flying over forested areas (Karaska & Chavko 2002).

Individuals in the tropics and subtropics are resident, but others migrate to the lower latitudes of the Amazon Basin, South America's northern coast, or West Africa in the non-breeding season (del Hoyo *et al.* 1994). Migrants begin moving to lower latitudes in August and arrive by October, returning in March and April (Ferguson-Lees & Christie 2001). Birds are generally solitary and usually migrate alone, but may congregate in small groups at roosts or plentiful food sources (del Hoyo *et al.* 1994, Ferguson-Lees & Christie 2001). The species migrates on broad fronts and is not dependent on land bridges during migration (Snow & Perrins 1998, Ferguson-Lees & Christie 2001); birds readily cross bodies of water using flapping flight, but can soar easily over land. It is entirely diurnal (Brown *et al.* 1982). It inhabits the areas around shallow waters, being sufficiently tolerant of human settlement to persist in suburban and sometimes urban environments (del Hoyo *et al.* 1994).

The Osprey has most recently been assessed for The IUCN Red List of Threatened Species in 2021 and was listed as Least Concern (BirdLife International 2021p).

Falconiformes

Collection of the Common Kestrel (*Falco tinnunculus*)

The collection of this species in the SMB is also quite large (Fig. 17), especially in terms of sternal bones. However, in addition to the lack of information on age, there is a slightly increasing lack of information on sex. In contrast to previous species, the number of female specimens is higher than that of males (Tab. 11). Specimens were collected between 1954 and 1979, with the collection being most expanded in 1962 and in some years not expanded at all (Graph 25).

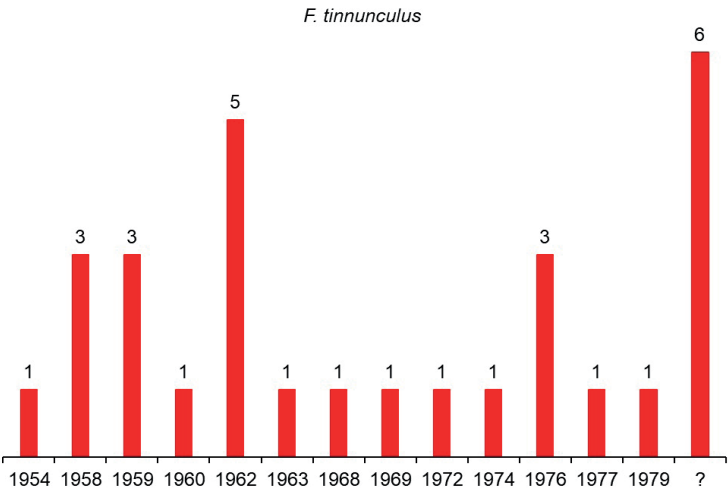


Fig. 17: Skins of the Common Kestrel (*F. tinunculus*) deposited in the SMB collection.

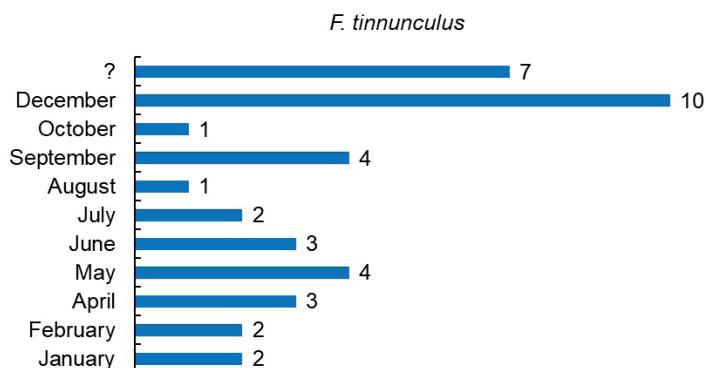
This collection also differs from the others in the months in which the specimens were collected. Although most were obtained in December, the collection grew by a few individuals in almost every month of the year (Graph 26). The specimens came from nineteen known localities (seven specimens had no precise locality on record, cf. Graph 27).

Tab 11: Basic information on the collection of the Common Kestrel (*F. tinnunculus*) deposited in SMB collection.

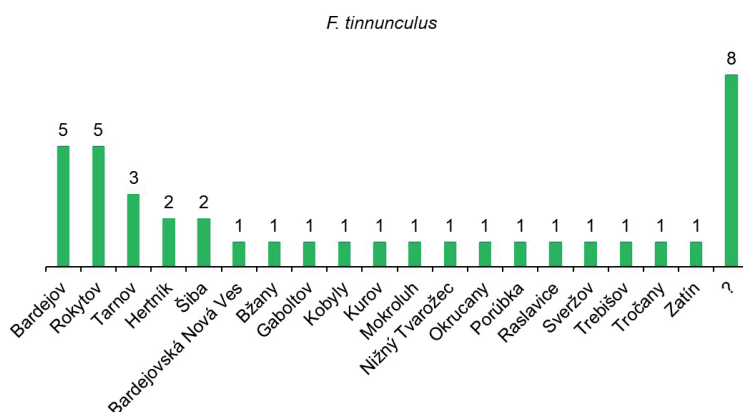
<i>Falco tinnunculus</i>	N	%
Sample size	39	100
Sample of males	15	38.5
Sample of females	20	51.3
Sample of pulls	4	10.3
The number of localities information	31	79. 5
The number of date information	32	82.1
The number of age information	34	87.2
The number of sex information	35	89.7
The number of missing localities information	8	20.5
The number of missing date information	7	17.9
The number of missing age information	5	12.8
The number of missing sex information	4	10.3



Graph 25: Collection of the Common Kestrel (*F. tinnunculus*) deposited in SMB collection divided by years.



Graph 26: Collection of the Common Kestrel (*F. tinnunculus*) deposited in SMB collection divided by months.



Graph 27: Collection of the Common Kestrel (*F. tinnunculus*) deposited in SMB collection divided by localities.

Distribution, Ecology and Conservation status:

In Europe, the species breeds primarily in France, the European part of Russia and Germany, with significant numbers in Romania, the United Kingdom, Ukraine and Spain (BirdLife International 2021).

Orta *et al.* (2020f) report that populations in the northern part of the species' range tend to be migratory, while others are resident. Migratory individuals of the species leave their breeding grounds from August to October. In contrast, those arriving in sub-Saharan Africa leave them from October onwards (Ferguson-Lees & Christie 2001). The return journey begins between February and April (the exact time probably depends on food availability) and often takes place in small mixed groups with *Falco naumanni* Fleischner, 1818 and occasionally with *F. vespertinus* Linnaeus, 1766 (Brown *et al.* 1982, Snow & Perrins 1998, Ferguson-Lees & Christie 2001).

The species may be solitary or gregarious, most commonly occurring singly, but sometimes moving in flocks of up to 10 individuals, especially during migration. Larger groups may congregate near sources of abundant food. It is predominantly diurnal (Ferguson-Lees & Christie 2001). This species tolerates a wide range of open and partially forested habitats.

The Common Kestrel has most recently been assessed for The IUCN Red List of Threatened Species in 2020 and was listed as Least Concern (BirdLife International 2021r).

Collection of the Eurasian Hobby (*Falco subbuteo*)

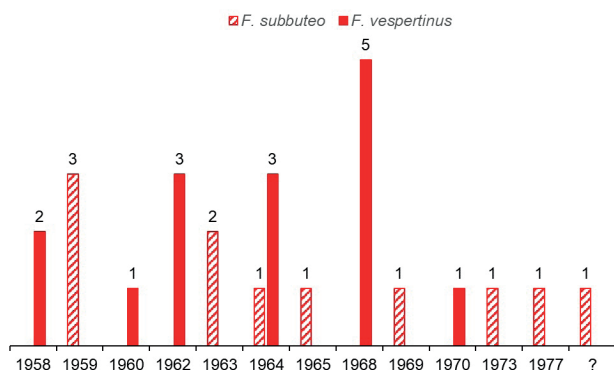
Eleven specimens in the form of three taxidermy mounts and eight skins are in the SMB collections (Tab. 2, Fig. 18). Their provenance is evident from ten specimens (Tab. 12, Graphs 28 – 30). All specimens were collected between 1959 and 1977 (Graph 28), and in some years were not acquired. These specimens were collected during the five months from April to September (Graph 29). The specimens came from eight known localities (one specimen does not have an exact locality in the record, Graph 30).



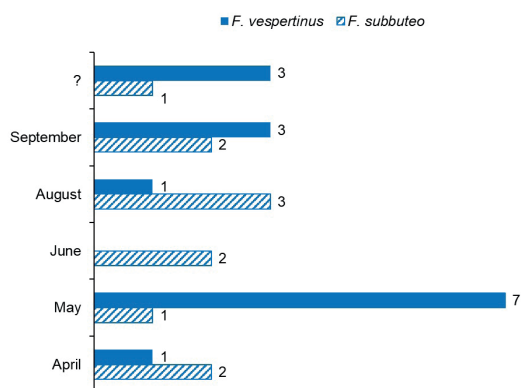
Fig. 18: Skins of the Eurasian Hobby (*F. subbuteo*) – left (seven specimens) and the Merlin (*F. columbarius*) – right (four specimens) deposited in the SMB collection.

Tab 12: Basic information on the Eurasian Hobby (*F. subbuteo*) and the Red-footed Falcon (*F. vesperinus*) deposited in SMB collection.

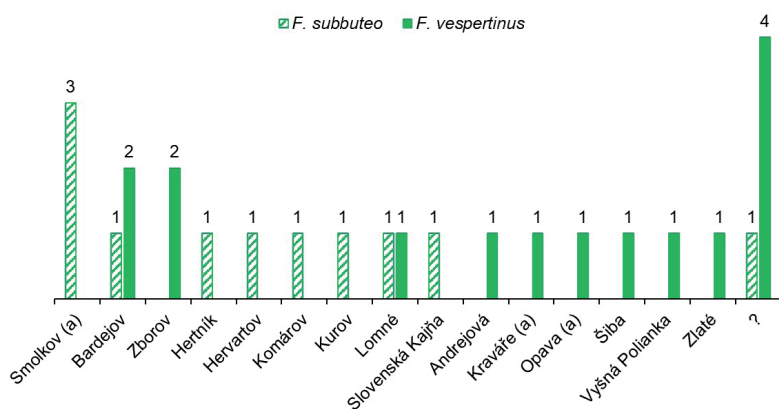
Species	<i>F. subbuteo</i>	<i>F. vesperinus</i>	<i>F. peregrinus</i>	<i>F. columbarius</i>	<i>F. cherug</i>
Sample size	11	15	3	5	1
Sample of males	5	8	2	-	-
Sample of females	4	5	1	1	-
The number of localities information	10	11	2	3	-
The number of date information	10	13	2	4	-
The number of age information	12	13	3	5	1
The number of sex information	9	13	3	1	-
The number of missing localities information	1	4	1	2	-
The number of missing date information	1	2	1	1	-
The number of missing age information	-	2	-	-	-
The number of missing sex information	2	2	-	4	-



Graph 28: Collection of the Eurasian Hobby (*F. subbuteo*) and the Red-footed Falcon (*F. vesperinus*) deposited in SMB collection divided by years.



Graph 29: Collection of the Eurasian Hobby (*F. subbuteo*) and the Red-footed Falcon (*F. vesperinus*) deposited in SMB collection divided by months.



Graph 30: Collection of the Eurasian Hobby (*F. subbuteo*) and the Red-footed Falcon (*F. vesperinus*) deposited in SMB collection divided by localities.

Distribution, Ecology and Conservation status:

In Europe, the species breeds primarily in the European part of Russia and Ukraine, with significant numbers in France, Romania, Germany, and Turkey (BirdLife International 2021s).

Orta & Kirwan (2014) report that in this species most individuals are migratory, with western birds wintering mainly in Africa. Birds leave their breeding grounds Between August and October, birds leave their breeding grounds and arrive on their wintering grounds from late October. Their return journey starts in March and April and the breeding territories are reoccupied in May and June. Individuals are usually found singly or in pairs or family groups, even during migration, with larger groups being rare except at roost sites and particularly rich feeding grounds (Ferguson-Lees & Christie 2001).

Kestrels migrate along broad fronts during migration and generally do not concentrate in narrow sea passages as many other migratory raptors do (Snow & Perrins 1998, Orta & Kirwan 2014). It is predominantly diurnal, although it may be partly crepuscular and even to some extent nocturnal during migration (Ferguson-Lees & Christie 2001). It occurs in open woodland, including woodland, grassland, scrub or scrub with clumps of trees, scattered trees or copses; in fields with hedgerows; and on woodland edges.

In both Europe and the EU28, this species has an extremely large range and the population size is also very large. Moreover, the population trend appears to be stable, and hence the species does not approach the thresholds for vulnerable. For these reasons, the species is evaluated as Least Concern in both Europe and the EU28 (BirdLife International 2021s).

Collection of the Red-footed Falcon (*Falco vespertinus*)

Fifteen specimens in the form of four taxidermy mounts and eight skins are in the SMB collections (Tab. 2, Fig. 19). Their provenance is evident from eleven specimens (Tab. 12, Graphs 28 – 30). All specimens were collected between 1958 and 1970 with the largest increases were observed in 1968 (Graph 28). These specimens were collected during the four months Graph 29). The specimens came from eight known localities (one specimen does not have an exact locality in the record, Graph 30).



Fig. 19: Skins of the Red-footed Falcon (*F. vespertinus*) deposited in the SMB collection.

Distribution, Ecology and Conservation status:

The Red-footed Falcon breeds in eastern Europe, with its main range stretching from Belarus south to Hungary, northern Serbia and Montenegro, Romania, Moldova and east Bulgaria, eastward through Ukraine and north-west and south Russia. On the second hand, it winters in southern Africa (Palatitz *et al.* 2009, Billerman *et al.* 2020).

It is a species breeding in open lowlands with trees and many insects, including steppes and woodlands, open forests, cultivated areas and pastures with tall hedges or fringing trees, agricultural areas with buffer strips, and in the northeast in swampy areas and on the edge of the taiga. It occurs from sea level to about 300 m. It is often crepuscular (Ferguson-Lees & Christie 2001). Billerman *et al.* (2020) report that the breeding season lasts from mid-April to August. Although usually colonial, it can also be solitary, nesting in unused nests of other birds (most commonly *Corvus frugilegus* Linnaeus, 1758). It prefers the upper parts of trees, but sometimes nests on rocks or in tree holes, in hedgerows or in isolated shrubs (Ferguson-Lees & Christie 2001, Billerman *et al.* 2020).

It is a migratory bird, with individuals travelling long distances to wintering grounds in southern Africa (Billerman *et al.* 2020). Most leave their breeding grounds in August and September, making the return journey between February and May (Ferguson-Lees & Christie 2001, Billerman *et al.* 2020). According to several authors (Brown *et al.* 1982, Snow & Perrins 1998, Billerman *et al.* 2020), the birds migrate on a broad front across the Mediterranean Sea and do not concentrate at bottleneck sites to the extent that many other raptors do. During migration, they form mixed flocks, often of more than 100 members, with other falcons such as *F. naumanni* Fleischer, 1818, and stay at very high altitudes for most of the journey (Ferguson-Lees & Christie 2001).

In Europe, this species has an extremely large range and the population size is very large (larger than 10,000 mature individuals), and hence it does not approach the thresholds for Vulnerable under the population size criteria. Nevertheless, the population trend is undergoing rapid population size declines (>30% over three generations), and it is therefore classified as Vulnerable under the population size reduction criterion. The probability of extinction has not been calculated for this species. For these reasons, the species is evaluated as Vulnerable (VU A2acbd+3bcde+4abcde) in Europe (BirdLife International 2021t).

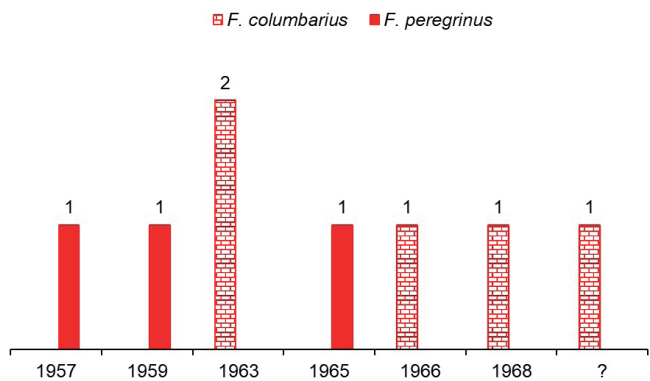
Similarly, in the EU28, this species has a very large range, therefore it does not approach the thresholds for Vulnerable under the range size criteria. Its small population size (<10 000 mature individuals) is declining rapidly (>10% within three generations), and hence it meets the thresholds for Vulnerable under the population size criterion. For these reasons, the species is evaluated as Vulnerable (VU) in the EU28 (BirdLife International 2021t).

Collection of the Peregrine Falcon (*Falco peregrinus*)

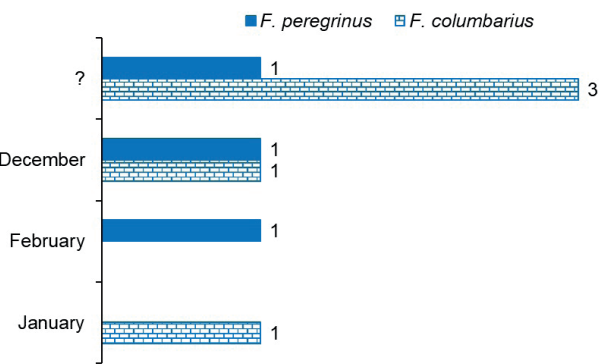
Three specimens in the form of taxidermy mounts are in the SMB collections (Tab. 2, Fig. 20) and came from two localities (Tab. 12, Graphs 31 – 33).



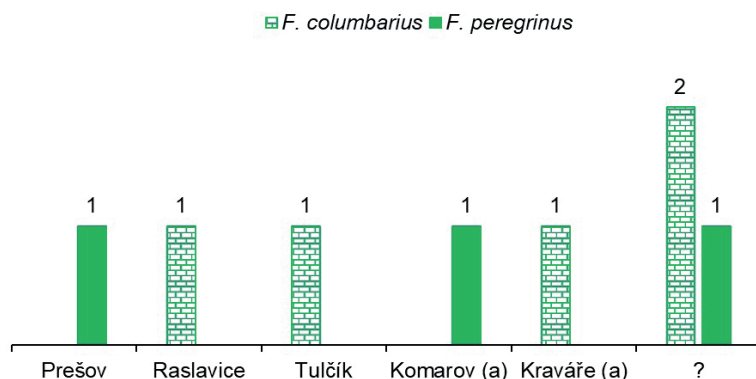
Fig. 20: Two taxidermy mounts (adult and subadult) of the Peregrine Falcon (*F. peregrinus*) in exposition of the SMB.



Graph 31: Collection of the Peregrine Falcon (*F. peregrinus*) and the Merlin (*F. columbarius*) deposited in SMB collection divided by years.



Graph 32: Collection of the Peregrine Falcon (*F. peregrinus*) and the Merlin (*F. columbarius*) deposited in SMB collection divided by months.



Graph 33: Collection of the Peregrine Falcon (*F. peregrinus*) and the Merlin (*F. columbarius*) deposited in SMB collection divided by localities.

Distribution, Ecology and Conservation status:

In Europe, the species breeds primarily in Greenland, Spain, Turkey, France, the United Kingdom, Germany, Italy, the European part of Russia and Norway. In Slovakia, its occurrence is resident (BirdLife International 2021u).

In the temperate and Arctic zones of its range, the Falcon Peregrine is highly migratory and ranges from Europe to Africa. Birds that breed at lower latitudes tend to be resident (White *et al.* 2013). Migratory birds leave their breeding grounds between August and November and return between March and May (Snow & Perrins 1998). Most birds travel singly or in pairs, even during migration, and readily fly over vast marine and oceanic areas (Ferguson-Lees & Christie 2001). The species inhabits a wide range of habitats, tolerating both wet and dry, hot and cold climates (White *et al.* 2013).

The Peregrine Falcon has most recently been assessed for The IUCN Red List of Threatened Species in 2020 and was listed as Least Concern (BirdLife International 2021u).

Collection of the Merlin (*Falco columbarius*)

Five specimens in the form of one taxidermy mount and four skins are in the SMB collections (Tab. 2, see Fig. 18) and came from three known localities (Tab. 12, Graphs 31 – 33).

Distribution, Ecology and Conservation status:

In Europe, the species breeds primarily in Russia, with significant numbers in Finland, Sweden, Norway, Iceland and the United Kingdom. In Slovakia, its occurrence is non-breeding (BirdLife International 2021v).

The Merlin is found in a wide variety of habitats, from sea level up to the tree line in some mountain ranges, from boreal forest and tundra to parkland with deciduous trees, shrub steppe, moorland, open prairies and steppes. The species generally prefers areas with some trees or scrubby vegetation. On migration, it inhabits an even broader range of habitats, often along sea coasts. It breeds from March to June and does not build a nest. Instead, it uses old stick nests of other species, especially corvids (*Corvus*, *Pica*) in trees but also uses tree cavities, cliff ledges or stick nests on ledges and the ground. The species is migratory except for those populations in Iceland and the British Isles (White *et al.* 2015).

In Europe, this species has an extremely large range (its extent of occurrence (EOO) is much larger than 20,000 km² and its area of occupancy (AOO) is much larger than 2 000 km²), and hence it does not approach the thresholds for Vulnerable under the range size criteria. The population size is large (larger than 10 000 mature individuals), and hence it does not approach the thresholds for Vulnerable under the population size criteria. The population trend is suspected to be decreasing by at least 30% over 13 years (three generations), and hence meets the thresholds for Vulnerable under the population size reduction criterion. The probability of extinction has not been calculated for this species. Therefore, for these reasons, the species is evaluated as Vulnerable (VU A2bc) in Europe. Similarly, the situation was also confirmed in the EU28 (BirdLife International 2021v).

Collection of the Saker Falcon (*Falco cherrug*)

One adult specimen in the form of a taxidermy mount is in the collections of the SMB without further details (cf. Tab. 21, 12).

Distribution, Ecology and Conservation status:

The species breeds mainly in central and south-east Europe, which holds only a tiny proportion of its global breeding population. In Europe, this species breeds mainly in Ukraine and Hungary, and notably in Austria, Slovakia and Russia (BirdLife International 2021z).

The Saker Falcon is physically adapted to hunting close to the ground in open terrain, combining rapid acceleration with high manoeuvrability, thus specialising on mid-sized diurnal terrestrial rodents of open grassy landscapes such as steppes and arid montane areas; in some areas, particularly near water, it switches to birds as key prey, and has recently substituted domestic pigeons (*Columba livia f. domestica* Gmelin, 1789) for rodents in parts of Europe. It uses copses or cliffs for nest sites (sometimes even the ground), occupying the old nests of other birds. Breeding success varies with year (especially in areas where rodents cycle) (Baumgart 1991, Snow & Perrins 1998). The species usually occurs singly or in pairs (Ferguson-Lees & Christie 2001). Birds are sedentary, part-migratory or fully migratory, largely depending on the extent to which the food supply in breeding areas disappears in winter (Baumgart 1991, Snow & Perrins 1998). Migrating central European adults travel as far as the Mediterranean. Juveniles are mainly migratory with central and eastern European birds wandering from the Balkans to Turkmenistan, Egypt and north-west India (Hagemeijer & Blair 1997). Migrating birds generally leave their breeding grounds in September and October, returning between February and May (del Hoyo *et al.* 1994).

The Saker Falcon has most recently been assessed for The IUCN Red List of Threatened Species in 2020 and was listed as Endangered. In Europe, as well as in the EU28, this species has an extremely large range (its extent of occurrence, and hence it does not approach the thresholds for Vulnerable under the range size criteria. The probability of extinction has not been calculated for this species. The population trend appears to be decreasing at a rapid rate which meets the thresholds for Vulnerable under the population size reduction criterion. In contrast, the population size is small, and, combined with the rapid decline, also meets the thresholds for Endangered (EN) under the population size criterion. It is therefore assessed as such in Europe and EU28. There is not considered to be significant potential for rescue from outside the region, and therefore the final category remains unchanged (BirdLife International 2021z).

Conclusions

In this study we focused on birds of prey (Accipitriformes, Falconiformes) deposited in SMB collection. Summarisation of samples deposited in SMB collection confirmed the occurrence of 437 individuals belonging to 22 species (Tab. 1 – 12). This collection includes specimens collected in various places and times (Graphs 1 – 33) mainly from north-eastern Slovakia. Individuals were acquired in 1954–1985 (and two specimens of *B. buteo* in 1998), but mainly in 1962 (n = 63, 14.4%) and 1963 (n = 32, 7.3%). The SMB's collection includes individuals of both sexes and age groups (adult and subadults/juveniles) with body size values recorded on the protocol cards. At the public exhibition, there were also exposed mounted specimens of the above-mentioned species which had feathers with typical colouring for these species. In conclusion, results presented in this study confirmed previous knowledge about the occurrence of studied species as well as highlighted the importance of SMB's collection. The significance of the presented paper also lies in making the data available to a wider professional and public, which can be used for further research.

Notes: In the SMB collections there are also 20 specimens of 15 species of exotic Accipitriformes and Falconiformes [1 ex. – *Accipiter striatus* Vieillot, 1807; 1 ex. – *Buteo buteo* (Linnaeus, 1758); 1 ex. – *B. ventralis* Gould, 1837); 1 ex. – *Buteogallus gundlachii* (Cabanis, 1855); 1 ex. – *B. meridionalis* (Latham, 1790); 1 ex. – *Caracara plancus* (Miller, 1777); 1 ex. – *Elanoides forficatus* (Linnaeus, 1758); 5 ex. – *Falco sparverius* Linnaeus, 1758; 1 ex. – *Geranoaetus polyosoma* (Quoy & Gaimard, 1824); 1 ex. – *Gyps africanus* Salvadori, 1865; 1 ex. – *Haliaeetus albicilla* (Linnaeus, 1758); 2 ex. – *Ictinia plumbea* (Gmelin, 1788); 1 ex. – *Pandion haliaetus* (Linnaeus, 1758); 1 ex. – *Rupornis magnirostris* (Gmelin, 1788); 1 ex. – *Vultur gryphus* Linnaeus, 1758] originating mainly from Argentina and Cuba as well from Africa and Hungary (cf. Mikula et al. 2018).

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References

- Baumgart W. (1994): Saker *Falco cherrug*. In: Tucker G.M. & Heath M.F. (eds). Birds in Europe: their conservation status. BirdLife International (Conservation Series 3), Cambridge, UK., pp. 198-199.
- Bechard M.J., Swem T.R., Orta J., Boesman P.F.D., Garcia E.F.J. & Marks J.S. (2020): Rough-legged Hawk (*Buteo lagopus*), version 1.0. In: Billerman S.M. (ed). Birds of the World, Cornell Laboratory of Ornithology, Ithaca, NY.
- Billerman S.M., Keeney B.K., Rodewald P.G. & Schulenberg T.S. (eds) 2020. Birds of the World, Cornell Laboratory of Ornithology, Ithaca, NY.
- BirdLife International (2021a): *Accipiter gentilis* (Europe assessment). – The IUCN Red List of Threatened Species 2021: e.T22695683A166300716. Accessed on 17 May 2023.
- (2021b): *Accipiter nisus* (Europe assessment). – The IUCN Red List of Threatened Species 2021: e.T22695624A166300043. Accessed 17/5/2023.
- (2021c): *Buteo buteo* (Europe assessment). – The IUCN Red List of Threatened Species 2021: e.T61695117A166456567. Accessed 17/5/2023.
- (2021d): *Buteo lagopus* (Europe assessment). – The IUCN Red List of Threatened Species 2021: e.T22695973A166301294. Accessed 17/5/2023.
- (2021f): *Haliaeetus albicilla* (Europe assessment). – The IUCN Red List of Threatened Species 2021: e.T22695137A166294180. Accessed 18/5/2023.
- (2021g): *Aquila heliaca* (Europe assessment). – The IUCN Red List of Threatened Species 2021: e.T22696048A166304029. Accessed 18/5/2023.

- (2021h): *Aquila chrysaetos* (Europe assessment). – The IUCN Red List of Threatened Species 2021: e.T22696060A166304641. Accessed 18/5/2023.
 - (2021i): *Clanga pomarina* (Europe assessment). – The IUCN Red List of Threatened Species 2021: e.T22696022A166301877. Accessed 18/5/2023.
 - (2021j): *Milvus migrans* (Europe assessment). – The IUCN Red List of Threatened Species 2021: e.T181568721A166444585. Accessed 21/5/2023.
 - (2021k): *Milvus milvus* (Europe assessment). – The IUCN Red List of Threatened Species 2021: e.T22695072A166293437. Accessed 21/5/2023.
 - (2021l): *Circus cyaneus* (Europe assessment). – The IUCN Red List of Threatened Species 2021: e.T22727733A166434775. Accessed 21/5/2023.
 - (2021m): *Circus aeruginosus* (Europe assessment). – The IUCN Red List of Threatened Species 2021: e.T22695344A166297363. Accessed 21/5/2023.
 - (2021n): *Circus pygargus* (Europe assessment). – The IUCN Red List of Threatened Species 2021: e.T22695405A166298788. Accessed 21/5/2023.
 - (2021o): *Circus macrourus* (Europe assessment). – The IUCN Red List of Threatened Species 2021: e.T22695396A166298169. Accessed 21/5/2023.
 - (2021p): *Pernis apivorus* (Europe assessment). – The IUCN Red List of Threatened Species 2021: e.T22694989A166292381. Accessed 24/5/2023.
 - (2021q): *Pandion haliaetus*. – The IUCN Red List of Threatened Species 2021: e.T22694938A206628879. Accessed 24/5/2023.
 - (2021r): *Falco tinnunculus* (Europe assessment). – The IUCN Red List of Threatened Species 2021: e.T22696362A166306910. Accessed 17/5/2023.
 - (2021s): *Falco subbuteo* (Europe assessment). – The IUCN Red List of Threatened Species 2021: e.T22696460A166309232. Accessed 24/5/2023.
 - (2021t): *Falco vespertinus* (Europe assessment). – The IUCN Red List of Threatened Species 2021: e.T22696432A166307599. Accessed 25/5/2023.
 - (2021u): *Falco peregrinus* (Europe assessment). – The IUCN Red List of Threatened Species 2021: e.T45354964A166455186. Accessed 25/5/2023.
 - (2021v): *Falco columbarius* (Europe assessment). – The IUCN Red List of Threatened Species 2021: e.T22696453A166308600. Accessed 25/5/2023.
 - (2021z): *Falco cherrug* (Europe assessment). – The IUCN Red List of Threatened Species 2021: e.T22696495A166310374. Accessed 25/5/2023.
- Brown L.H., Urban E.K. & Newman K. (1982): The Birds of Africa, Volume I. Academic Press, London. 521 pp.
- Demerdzhiev D., Horváth M., Kovács A., Stoychev S. & Karyakin I. (2011): Status and population trend of the Eastern Imperial Eagle (*Aquila heliaca*) in Europe in the Period 2000-2010. – *Acta Zoologica Bulgarica*. Suppl. 3: 5-14.
- Derlink M., Wernham C., Bertoncelj I., Kovács A., Saurola P., Duke G., Movalli P. & Vrezec A. (2018): A review of raptor and owl monitoring activity across Europe: its implications for capacity building towards pan-European monitoring. – *Bird Study* 65 (Suppl. 1): S4-S20.
- del Hoyo J., Elliott, A. & Sargatal J. (1994): Handbook of the Birds of the World, vol. 2: New World Vultures to Guinea-fowl. Lynx Edicions, Barcelona, Spain. 638 pp.
- Eck S., Töpfer T., Fiebig J., Heynen I., Fiedler W., Nicolai B., Töpfer T., van den Elzen R., Winkler R. & Woog F. (2011): Measuring birds. (2011): Measuring birds/Vögel vermessen. Wilhelmshaven: Deutsche Ornithologen-Gesellschaft. 118 pp.
- Ferguson-Lees J. & Christie D.A. (2001): Raptors of the world. Christopher Helm, London. 320 pp.
- Hagemeijer E.J.M. & Blair M.J. (1997): The EBCC atlas of European breeding birds: their distribution and abundance. T. and A. D. Poyser, London. 903 pp.
- Heredia B. (1996): International action plan for the Imperial Eagle (*Aquila heliaca*). In: Heredia B. Rose L. & Painter M. (eds). Globally threatened birds in Europe: action plans, Council of Europe, and BirdLife International, Strasbourg. pp. 159-174.
- Hromada M. (2015a): Tibor Weisz – collector and ornithologist. – *Folia Oecologica, Acta Universitatis Presoviensis* 7(2): 55-67.
- Hromada M. (2015b): Natural history collection of T. Weisz in scientific publications 1983-2015. – *Folia Oecologica, Acta Universitatis Presoviensis* 7(2): 79-88.
- Hromada M. & Klimovičová M. (2015): From dusty collections to descriptions of new species – birds in Sarisske Museum Bardejov as valuable source for investigating mite biodiversity. – *Folia Oecologica, Acta Universitatis Presoviensis* 7(2): 109-114.
- Hromada M., Kuczyński L., Skoracki M., Antczak M. & Tryjanowski P. (2003): The value of the bird collections and associated data in regional museums: *Lanius excubitor* specimens in Šarišské Museum, Bardejov, Slovakia. – *Bulletin of the British Ornithologists' Club* 123A: 226-233.

- Hromada M., Čanády A., Mikula P., Peterson A.T. & Tryjanowski P. (2015): Old natural history collections for new millennium – birds and mammals in the collection of PhMr. Tibor Weisz in Sarisske Museum Bardejov, Slovakia. – *Folia Oecologica, Acta Universitatis Presoviensis* 7(2): 115-141.
- Hromádka M., Horáček J., Chytil J., Pithart K. & Škopek J. (1992): Příručka k určování našich pěvců část 1. Hradec Králové. 200 pp.
- IUCN (2021): The IUCN Red List of Threatened Species. Version 2021-3. Available at: www.iucnredlist.org. (Accessed: 09/12/2021).
- Karaska D. & Chavko J. (2002): Kršák rybár/Kršák rybožravý. In: Danko Š., Darolová A., & Krištín A. (eds). Rozšírenie vtákov na Slovensku. Bratislava, Veda. pp. 204-205.
- Knott J., Newbery P. & Barov B. (2009): Action plan for the red kite *Milvus milvus* in the European Union. – BirdLife International for the European Union.
- Meyburg B.U. & Kirwan G.M. (2013): Eastern Imperial Eagle (*Aquila heliaca*). In: del Hoyo J., Elliott A., Sargatal J., Christie D.A. & de Juana E. (eds). Handbook of the Birds of the World Alive, Lynx Edicions, Barcelona.
- Meyburg B.U. & Marks J.S. (2014): Eurasian Sparrowhawk (*Accipiter nisus*). In: del Hoyo J., Elliott A., Sargatal J., Christie D.A. & de Juana E. (eds). Handbook of the Birds of the World Alive, Lynx Edicions, Barcelona.
- Mikula P., Čanády A. & Hromada M. (2017): Aberrant plumage colouration in birds from the collection of the Sarisske Museum Bardejov, Slovakia. – *Zoology and Ecology* 27(3-4): 223-227.
- Mikula P., Čanády A. & Hromada M. (2018): A critical evaluation of the exotic bird collection of the Šariš Museum in Bardejov, Slovakia. – *ZooKeys* (776): 105.
- Orta J. & Kirwan G.M. (2014): Eurasian Hobby (*Falco subbuteo*). In: del Hoyo J., Elliott A., Sargatal J., Christie D.A. & de Juana E. (eds). Handbook of the Birds of the World Alive, Lynx Edicions, Barcelona.
- Orta J., Boesman P., Marks J.S. & Garcia E.F.J. (2015): Eurasian Buzzard (*Buteo buteo*). In: del Hoyo J., Elliott A., Sargatal J., Christie D.A. & de Juana E. (eds). Handbook of the Birds of the World Alive, Lynx Edicions, Barcelona.
- Orta J., Marks J.S., Garcia E.F.J. & Kirwan G.M. (2020a): Black Kite (*Milvus migrans*). In: del Hoyo J., Elliott A., Sargatal J., Christie D.A. & de Juana E. (eds). Handbook of the Birds of the World Alive, Lynx Edicions, Barcelona.
- . (2020b): Black Kite (*Milvus migrans*). In: del Hoyo J., Elliott A., Sargatal J., Christie D.A. & de Juana E. (eds). Handbook of the Birds of the World Alive, Lynx Edicions, Barcelona.
- Orta J., Boesman P.F.D., Marks J.S., Garcia E.F.J. & Kirwan G. M. (2020c): Western Marsh-harrier (*Circus aeruginosus*), version 1.0. In: del Hoyo J., Elliott A., Sargatal J., Christie D.A. & de Juana E. (eds). Birds of the World, Cornell Lab of Ornithology, Ithaca, NY, USA.
- Orta J., de Juana E., Boesman P.F.D., Marks J.S. & Garcia E.F.J. (2020d): Montagu's Harrier (*Circus pygargus*), version 1.0. In: del Hoyo J., Elliott A., Sargatal J., Christie D.A. & de Juana E. (eds). Handbook of the Birds of the World Alive, Cornell Lab of Ornithology, Ithaca, NY, USA.
- Orta J., Marks J.S. & Kirwan G.M. (2020e): Oriental Honey-buzzard (*Pernis ptilorhynchus*), version 1.0. In: del Hoyo J., Elliott A., Sargatal J., Christie D.A. & de Juana E. (eds). Cornell Lab of Ornithology, Ithaca, NY, USA.
- Orta J., Boesman P.F.D. & J. S. Marks J.S. (2020f): Eurasian Kestrel (*Falco tinnunculus*), version 1.0. In: Billerman S.M., Keeney B.K., Rodewald P.G. & Schulenberg T.S. (eds.). Birds of the World, Cornell Lab of Ornithology, Ithaca, NY, USA.
- Palatitz P., Fehérvári P., Solt S. & Barov B. (2009): European species action plan for the Red-footed Falcon *Falco vespertinus*. – BirdLife International for the European Commission. 50 pp.
- Porter R. & Aspinall S. (2010): Birds of the Middle East. Christopher Helm, London. 400 pp.
- Snow D.W. & Perrins C.M. (1998): The Birds of the Western Palearctic, Volume 1: Non-Passerines. Oxford University Press, Oxford. 1008 pp.
- Squires J.R., Reynolds R.T., Orta J. & Marks J.S. (2020): Northern Goshawk (*Accipiter gentilis*), version 1.0. In: Billerman S.M. (ed.), Birds of the World, Cornell Lab of Ornithology, Ithaca, NY.
- Svensson L. (1992): Identification guide to European passerines. Stockholm: British Trust for Ornithology. 368 pp.
- Svensson L., Mullarney K., Zetterström D. & Grant P.J. (2004): Ptáci Evropy, severní Afriky a Blízkého východu. [Birds of Europe, North Africa and Middle East]. Svojtka & Co., Praha, 400 pp.
- Tucker G.M. & Heath M.F. (1994): Birds in Europe: their conservation status. – BirdLife International, Cambridge, U.K. 600 pp.
- Watson J. (2010): The Golden Eagle. T. & A.D. Poyser, London. 464 pp.
- White C.M., Christie D.A., de Juana E. (2013): Peregrine Falcon (*Falco peregrinus*). In: del Hoyo J., Elliott A., Sargatal J., Christie D.A. & de Juana E. (eds). Handbook of the Birds of the World Alive, Lynx Edicions, Barcelona.
- White C.M., Boesman P. & Kirwan G.M. (2015): Merlin (*Falco columbarius*). In: del Hoyo J., Elliott A., Sargatal J., Christie D.A. & de Juana E. (eds). Handbook of the Birds of the World Alive, Lynx Edicions, Barcelona.

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