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EASTERN IMPERIAL EAGLE (*AQUILA HELIACA*) POPULATIONS IN EUROPE

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Abstract

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Based on the most recent information available from countries with existing populations, the European Imperial Eagle (*Aquila heliaca*) population is estimated to be between 1000 and 1600 breeding pairs, a much higher number than previous estimates. These data suggest that about half of the Imperial Eagle's world population is found in Europe and underline the importance of the conservation of European populations of this globally threatened species. Approximately 10% of the European breeding pairs had been located between 1996 and 2000. The recent European populations of the Imperial Eagle can be divided into three groups: (1) The compact and well-known Hungarian and Slovakian population in the northern part of the Carpathian basin is currently increasing. (2) The formerly abundant population on the Balkans declined dramatically during the 20th century and by now it is very small and fragmented. Luckily, this heavy decline seems to have stopped before the complete extinction of this species from the Balkans. (3) The East-European areas (in Russia, Ukraine and in the Caucasus) support the largest segment of the European Imperial Eagle population. Despite the exciting results of recent researches, only a fraction of these populations have been properly investigated, similarly to the most important factors threatening them.

Key words: *Aquila heliaca*, conservation, population in Europe.

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Introduction

The Imperial Eagle (*Aquila heliaca*) is a globally threatened species (*Collar et al., 1994*) that is also recognised by international legislation and conventions (e.g. IUCN "Vulnerable", CITES Appendix I, EU Birds Directive Annex 1). Its close relative, the Spanish Imperial Eagle (*Aquila adalberti*), is one of the most threatened raptor species in the world (*Meyburg, 1986*). While conservation of the latter species is dependent predominantly on Spanish efforts because of its highly restricted distribution (*Ferrer, 2001*), the eastern species is more widely distributed and it needs international collaboration for the conservation. Therefore an International Imperial Eagle Working Group was established on March 8, 1990.

The first two meetings of the Working Group took place in Budapest (March 8, 1990 and October 13, 1992) with the participation of Hungarian and Slovak colleagues. During these meetings the main aim was co-ordination of the conservation of the Carpathian basin's population through exchange of information and experience.

The 3rd International Conference on the species, organized by BirdLife Hungary (MME) and BirdLife International, took place in Királyrét (Hungary) on December, 10–12, 1993. A total of 32 participants gathered from 11 European countries, and presentations covered geographically almost the entire European population. As a result of the conference, the first International Action Plan for the Imperial Eagle was prepared (*Heredia, 1995*) and the European status of the species was updated (*Danko & Haraszthy, 1997*). Presentations given by the different countries were published in the book "Eagle Studies" (*Meyburg & Chancellor, 1996*).

The 4th International Conference on the species was held in Budapest on November 23–24, 1998 with 43 participants from 7 European countries (some of the presentations were also submitted in form of written communications and are published in the current issue of this journal). The participants agreed that the next Conference will be held in Bulgaria in 2003.

This paper summarises the European status of the Imperial Eagle based on 15 presentations of the 4th Conference, updated – or where need completed – with other information based on literature and personal communication. For zoogeographical considerations, the total Turkish population was discussed together with the European population.

Distribution of the Imperial Eagle in Europe

Based on the little data available from the 19th century it is clear that the species inhabited a much greater part of Europe than it does nowadays. The exact limits of the former breeding range are not known, but *Gonzalez et al. (1989)* suggested that the Imperial Eagle had bred at least occasionally in France, North-Spain and North-Algeria. From this period no quantitative data on the size of the European populations were found. Based on early references (e.g. *Leverkühn, 1907*) it is also obvious that the breeding density in the inhabited areas was much higher once. During the 20th century all of the Central and Southern European populations decreased dramatically. By the 1990's only a few small breeding populations remained outside the former Soviet Union, namely in the Carpathian basin and some parts of the Balkan peninsula. During the 1990's the population of the Carpathian basin began to increase in numbers and the distribution also expanded significantly. Other populations are considered stable or slightly decreasing.

Migration and wintering distribution

The adults in the Carpathian basin and on the Balkan peninsula are mainly resident. Juvenile birds of the Carpathian basin migrate south for the winter, mainly to the Balkan

peninsula (*Danko, 1996*). The East-European populations are migrating and spend the winter in the eastern part of the Mediterranean Basin (Israel, Jordan, Lebanon, Syria and Turkey) and in the Middle East (Iran, Iraq, Kuwait, Oman, Saudi Arabia and Yemen) (*Evans, 1994*). African records of the species exist in Egypt, Ethiopia and Sudan, and a few also from Kenya and Tanzania (*Roeck, 1993*).

Only a few dozen European records of vagrant Imperial Eagles are known outside the described distribution range: birds have been reported from Denmark, Finland, France, Germany, Italy, Sweden (*Roeck, 1993*), Belarus (*Vintchevski, pers. comm.*) and Slovenia (*Meyburg et al., 1995*) in the 20th century.

Recent breeding populations in Europe

The latest available data on the European breeding populations of the Imperial Eagle are summarised in Table 1 and Figure 1. A "known breeding pair" was defined where at least one active nest of the pair was known by the members of the Working Group between 1996 and 2000. In the following the current status of Imperial Eagle is discussed by each different country.

Albania

No relevant information was found on the status of Imperial Eagle in Albania. During the 1996–97 Greek Imperial Eagle survey, a pair of adults was observed three times in the breeding season at the Greek-Albanian border. In one case a bird showed display flights, but no nest was not found in Greece (*Sakoulis et al., 1997*). Even if an unknown breeding population may exist in Albania it is unlikely to receive information on confirmed breeding records or exact population data in the near future due to the unstable political situation of the country.

Armenia

Abuladze (1996) estimated 2 or 3 breeding pairs in the Northern part of the country, while *Heredia (1995)* estimated the total population at around 8 to 10 pairs. According to *Ananian (pers. comm.)* the species is very rare in Armenia and nowadays it occurs there almost exclusively on migration.

Austria

By the end of the 1990's, the observations of Imperial Eagle in East-Austria became more frequent. In 1999 (189 years after the last confirmed Austrian breeding attempt) one pair started to nest again in the country, and raised two juveniles successfully both in 1999 and 2000 (*Ranner, pers. comm.*).

Azerbaijan

Abuladze & Shergalin (1996) estimated 25 pairs in the northern part of the country. *Abuladze (1996)* studied two pairs near the Georgian border and reported a viable population along the upper valley of the river Kura. No monitoring was performed for the whole population of the country, but cited authors estimated it to be around 40 pairs.

Bosnia and Herzegovina

No recent information was found on the status of the species in Bosnia. There are breeding pairs near the Bosnian border in Yugoslavia (*Vasic & Misirlic, 2002*) and possibly in Croatia (*Heredia, 1995*), so there is a chance that a few breeding pairs exist at the north-eastern part of the country.

Bulgaria

Petrov (1996) reported 15-20 pairs in Bulgaria between 1980 and 1993, after the population declined dramatically during the second half of the 20th century. During the 1998-1999 survey there were 6 confirmed and 16 probable breeding records in the country, but a few more, yet unknown, territories may exist (*Stoychev, pers. comm.*). These data suggest that the previous dramatic decline has slowed down or even halted.

Croatia

No specialist is working on Imperial Eagle in Croatia (*Vasilik, pers. comm.*). One or two breeding pairs may still exist in south-eastern Slavonia, near the Yugoslavian border (*Kralj, 1997*).

Cyprus

After a significant decline, only a few pairs managed to survive by the end of the 20th century in the Troodos mountains (*Flint & Stewart, 1992*). Recent data suggest that the species no longer breeds neither in North Cyprus (*Flint, pers. comm.*) nor in South Cyprus (*Gordon, pers. comm.*), and occasional observations refer to migrants only.

Czech Republic

The first recent breeding of the species in the Czech Republic was observed in 1998, and since than the pair has bred every year successfully (two fledglings in 1998, 1999 and 2000) (*Mrlik, pers. comm.*). The single Czech and Austrian breeding pairs are in close relation with the West-Slovakian population. In the near future further pairs may start to nest in these countries.

Georgia

The Imperial Eagle population of Georgia was probably the best known within the former Soviet Union. Between 1984 and 1991 53 breeding attempts were followed in East Georgia (and in West Azerbaijan), and almost the total population of the country was surveyed. Data were collected on the distribution and breeding biology of the species, and nest site selection and prey species were also studied. There were 10-12 breeding pairs in East Georgia, while the western parts of the country were not inhabited by Imperial Eagle (*Abuladze, 1996*). The current size of the Georgian population of Imperial Eagle is estimated around at 15 breeding pairs, most of them located in a relatively small area on the Iori River plain (*Gavashelishvili, pers. comm.*).

Greece

A dramatic decline of the Greek population was reported during the second half of the 20th century, and the last confirmed breeding of the species took place in 1990 in the Dadia Forest Reserve. Despite the fact that the species was monitored continuously and a National Survey was also carried out in 1996-1997 in hope to find breeding pairs (with special emphasis on the former breeding territories), there was no known breeding between 1990 and 1999. During the 1996-1997 survey several observations were made on the species and there was also a possible breeding record near the Albanian border (*Sakoulis et al., 1997*). Ten years after the last known breeding, one pair bred again with success in the Evros prefecture in 2000 and there were observations of 3 additional pairs during the breeding season in Northern Greece (*Bourdakis, pers. comm.*).

Hungary

During the 1990's the Hungarian population has doubled and reached 55-60 pairs by 2000. With the increasing population size the breeding range also expanded and lowland habitats which were abandoned for 50 years have been reoccupied (*Haraszthy et al., 1996; Bagyura et al., 2002*).

Kazakhstan

The Asian territories of the country hold very significant populations of Imperial Eagle. *Bragin (1999)* studied about 100 pairs in northern Kazakhstan and estimated the total population of the country at about 750-800 pairs. No comprehensive surveys were done in the European part of the country (west of the Ural river). According to *Belik et al. (2002)* the estimated population size is around 250 pairs in this region.

Republic of Macedonia

The several different estimates published on the population size of Imperial Eagle in FYR Macedonia (e.g. *Grimmett & Jones, 1989; Sakoulis et al., 1997*) are based

predominantly on the surveys of *Grubac (pers. comm.)* who reported the population size to be between 5 and 25 pairs. *Vasic & Misirlic (2002)* presume that the FYR Macedonian population is around 15 pairs.

Moldova

Approximately 10 pairs nested in the 1960's and 1970's along the Lower Prut river, but only a few remained by the 1980's. By the 1990's it became occasional visitor on passage or during winter (*Abuladze & Shergalin, 1996). Belik et al. (2002)* also suppose that the species became extinct or at most two or three pairs may still exist.

Poland

The status of the species in Poland was charcterised by *Roeck (1993)* in the following: "single pairs may breed on the Slovak border". The Polish Rarities Committee does not know any confirmed report on a breeding attempt and the species is still considered a rare vagrant in Poland with only 20 observations within the country (*Stawarczyk & Mizera, pers. comm.*). However, a few odd breeding attempts may remain unnoticed, since the species breeds to the close proximity of the Polish border, both in Ukraine and Slovakia (*Danko & Haraszthy, 1997*).

Romania

Kalabér (1998), based on his earlier data, estimated the entire Romanian Imperial Eagle population at 18-25 pairs, out of which 15-18 pairs alone in Transylvania. According to *Zeitz & Daróczi (pers. comm.)* no published breeding record existed in the country since 1951. They have been conducting systematic surveys for the species in Romania since 1993. They had sight records of the species from the nesting period at 8 different locations in Transylvania and at 3 locations in Dobruja. Based on their own observations and on personal communications with others they presume the nesting of 5-20 pairs in Transylvania, 1-5 pairs in Dobruja, 3-10 pairs in Moldavia and 1-5 pairs in Walachia. Thus, the total Romanian population is somewhere between 10 to 40 pairs.

Russia

During 1996 and 1997, an Imperial Eagle survey was completed by *Belik et al. (2002)* in the European parts of Russia. Their survey provide more accurate data on the largest European population than ever before. They found four distinct populations, out of which 3 were considered stable or slightly increasing, and only one may have suffered from a decline in the past decades. The distribution range of the species in Russia was also considered stable based on their own findings. The survey resulted an estimated population of ca. 600-900 pairs in European Russia, three times larger than previously thought (e.g. 220-250 pairs in *Abuladze & Shergalin, 1996*).

	Country	Estimated population size	Known breeding pairs	Population trend in the last 10 years
1.	Austria	1	1	increasing
2.	Czech Republic	1	1	increasing
3.	Hungary	55-60	52	increasing
4.	Poland	0-1	0	unknown
5.	Slovakia	35-40	34	increasing
Central Europe together		**92-103**	**88**	**increasing**
6.	Albania	(0-10)	0	unknown
7.	Bosnia and Herzegovina	(0-2)	0	unknown
8.	Bulgaria	15-25	6	stable ?
9.	Croatia	0-2	0	unknown
10.	Cyprus	0	0	exterminated
11.	Greece	1-5	1	increasing ?
12.	FYR Macedonia	5-25	0	unknown
13.	Romania	10-40	0	unknown
14.	Turkey	35-70	3	unknown
15.	Yugoslavia	1-5	1	decreasing ?
SE Europe together		**67-184**	**11**	**unknown**
16.	Armenia	2-10*	0	unknown
17.	Azerbaijan	35-45*	2*	unknown
18.	Georgia	10-15	8*	stable
19.	Kazakhstan (European part)	200-300	0	unknown
20.	Moldova	0-5	0	unknown
21.	Russia (European part)	600-900	cc. 30	stable ?
22.	Ukraine	45-57	cc. 15	stable
Former Soviet Union together		**892-1332**	**cc. 55**	**stable ?**
Total population in Europe		**1051-1619**	**cc. 154**	**stable ?**

Table 1. The European populations of the Imperial Eagle (*Aquila heliaca*) in 2000. (See text for references). * : number refer to data collected before 1996

Slovakia

The breeding population of Imperial Eagle has been followed up by the Slovak Working Group on Research and Protection of Birds of Prey and Owls (SVODAS) since 1969 (*Danko & Chavko, 1996*). The East Slovakian population has doubled in the past decade to 21 known breeding pairs in 2000 (*Danko, pers. comm.*). Another 13 pairs are known in West Slovakia (*Chavko, pers. comm.*). The total Slovakian population in 2000 is estimated at 35 to 40 breeding pairs. In parallel to the population increase, reoccupation of lowland habitats was observed in Slovakia similarly to the findings in Hungary (*Danko & Haraszthy, 1997*).

Ukraine

Vetrov (1996) monitored approximately 20 pairs in eastern Ukraine and he estimated the total Ukrainean population at 50 pairs. *Belik et al. (2002)* gave 45-57 pairs as the national population, out of which 30-40 pairs breed eastwards from the Dnepr river and form a compact population with the Western Russian pairs. Further 10 pairs breed west of the Dnepr river and ca. 5-7 pairs in the Crimea.

Turkey

Only little is known on the Turkish Imperial Eagle population. A small area is monitored systematically in Northern Anatolia, with three known active nests. In the light of recent studies the total population of the country is estimated at 35 to 70 breeding pairs (*Gürsan & Bilgin, 2002*).

Yugoslavia

After a very heavy decline in the 20th century, the Imperial Eagle became almost extinct in Yugoslavia with only a few breeding pairs left in the northern parts of the country (Deliblato Sands and Fruska Gora mountains) (*Vasic & Misirlic, 2002*). The entire population is probably less than 5 pairs.

Discussion

Summing up the population estimates of the different countries the European population is estimated at around 1000 to 1600 breeding pairs, a number much higher than previous estimates (cf. 363–604 pairs: *Heredia, 1995* or 880–1100 pairs: *BirdLife International/European Bird Census Council, 2000*). We have only very limited information about the populations in Asia, but probably it is not larger than 1000-1500 pairs, with the majority in the Asian parts of Kazakhstan (*Bragin, 1999*) and Russia (*Ryabtsev, pers. comm.*). These data suggest that about half of the Imperial Eagle's world population (ca. 2000 to 3000 pairs) resides in Europe, further stressing the importance of the preservation of the European population of this globally threatened species.

European populations of the Imperial Eagle can be divided into three groups:

1. The Hungarian and Slovakian birds (including the recently established pairs in Austria and the Czech Republic) form a continuous and well studied population in the northern part of the Carpathian basin (*Bagyura et al., 2002; Danko & Chavko, pers. comm.*). This population consists 92-103 breeding pairs with population trends and densities most favourable when compared to the other two populations. Out of the 92-103 breeding pairs the occupied nests were located in 88 cases in these countries in 2000 (which is almost 60% of the nests with known locations in Europe).
2. The formerly abundant population in the Balkan declined significantly in the 20th century and by now exists only in a very small and scattered form. Based on recent

information (*Bourdakis, pers. comm.; Stoychev, pers. comm.*) it seems that this heavy decline stopped before the total extinction of the Balkan population. No information is available on population trends in Romania (*Zeitz & Daróczi, pers. comm.*) or in Turkey (*Gürsan & Bilgin, 2002*). In 2000 the total population in the Balkan, Romania and Turkey consists of ca. 67–184 breeding pairs.

3. The East European areas (in Russia, Ukraine and in the Caucasus) hold the largest populations of the Imperial Eagle on the continent with an estimated size of 892 to 1332 pairs. However promising the results of recent surveys are (*Belik et al., 2002*) we still only know a fraction of this population well, and the most important threats of the population still need further investigation.

Only about 10% of the nests of the European birds (cc. 154 pairs) have been located in the past 5 years, thus a more exact nest survey would be desirable for the future. For the preparation of detailed conservation programmes we will need more exact data on population size, breeding success, population trends, prey species repertoire and the main threats for the different populations. In those countries with an established monitoring programme further research would be desirable aimed at the conservation needs of the species (studies on habitat selection and on factors influencing breeding success and mortality e.g.).

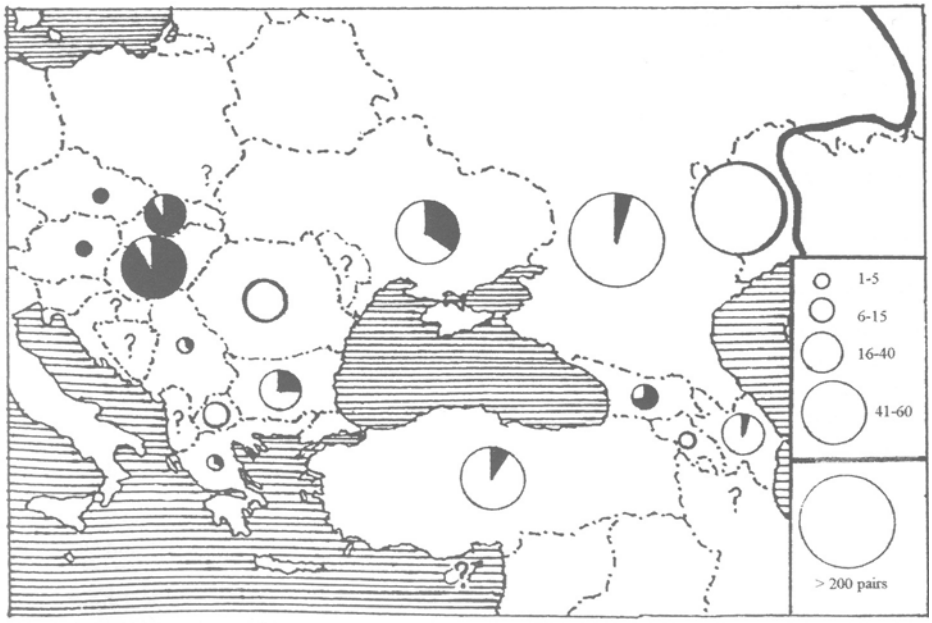

Figure 1. Imperial Eagle (*Aquila heliaca*) populations in the European countries.(Sectors in black show the ratio of breeding pairs with known nests compared to the estimated total population)

A more regular exchange of experience and information between experts of different countries would increase the effectiveness of the conservation efforts. A further intensification of the activity of the International Imperial Eagle Working Group is planned, especially in the field of close co-operation. From an exchange of experience with the research team on the Spanish Imperial Eagle the conservation programmes of both species would benefit greatly.

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References

Abuladze, A. (1996): Ecology of the Imperial Eagle *Aquila heliaca* in Georgia. In: *Meyburg, B. U. & Chancellor, R. D. (eds.) (1996):* Eagle Studies. World Working Group on Birds of Prey (WWGBP), Berlin, London & Paris, p. 447–457.

Abuladze, A. & Shergalin, J. (1996): On the present status of the Imperial Eagle *Aquila heliaca* in the European Part of the former Soviet Union. In: *Meyburg, B. U. & Chancellor, R. D. (eds.) (1996):* Eagle Studies. World Working Group on Birds of Prey (WWGBP), Berlin, London & Paris, p. 443–446.

Bagyura, J., Szitta, T., Haraszthy, L., Firmánszky, G., Kovács, A. & Horváth, M. (2002): Population increase of Imperial Eagle (*Aquila heliaca*) in Hungary between 1980 and 2000. *Aquila* **107-108,** p. 133-144.

Belik, V., Galushin, V. & Bogomolov, D. (2002): Results of the Imperial Eagle (*Aquila heliaca*) Project in Russia during 1996 and 1997. *Aquila* **107-108,** p. 177-181.

BirdLife International/European Bird Census Council (2000): European bird populations: Estimates and trends. BirdLife Conservation Series No. 10., BirdLife International, Cambridge, 160 p.

Bragin, E. (1999): Status of the Imperial Eagle (*Aquila heliaca*) in Kazakhstan. In: 3rd Eurasian Conference of the Raptor Research Foundation, Mikulov, Czech Republic. *Buteo* (Supplement 1999), p. 16.

Collar, N. J., Crosby, M. J. & Stattersfield, A. J. (1994): Birds to watch 2: the world list of threatened birds. BirdLife Conservation series No. 4., BirdLife International, Cambridge, 407 p.

Danko, S. (1996): Beringungsergebnisse am Kaiseradler *Aquila heliaca* im Nordwesten des Brutareals. In: *Meyburg, B. U. & Chancellor, R. D. (eds.) (1996):* Eagle Studies. World Working Group on Birds of Prey (WWGBP), Berlin, London & Paris, p. 389–403.

Danko, S. & Chavko, J. (1996): Breeding of the Imperial Eagle *Aquila heliaca* in Slovakia. In: *Meyburg, B. U. & Chancellor, R. D. (eds.) (1996):* Eagle Studies. World Working Group on Birds of Prey (WWGBP), Berlin, London & Paris, p. 415–423.

Danko, S. & Haraszthy, L. (1997): Imperial Eagle (*Aquila heliaca*). In: Hagemeijer, W. J. M. & Blair, M. J. (eds.): The EBCC Atlas of European Breeding Birds: Their Distribution and Abundance. T & A D Poyser, London, p. 168–169.

Evans, M. I. (1994): Important Bird Areas in the Middle East. BirdLife Conservation series No. 2., BirdLife International, Cambridge, 410 p.

Ferrer, M. (2001): The Spanish Imperial Eagle. Lynx Edicions, Barcelona. 224 p.

Flint, P. R. & Stewart, P. F. (1992): The birds of Cyprus. British Ornithologists' Union, Tring, 210 p.

Gonzalez, L. M., Hiraldo, F., Delibes, M. & Calderon, J. (1989): Zoogeographic support for the Spanish Imperial Eagle as a distinct species. *Bull. B. O. C.* **109(2),** p. 86–93.

Grimmett, R. F. A. & Jones, T. A. (1989): Important Bird Areas in Europe. International Council for Bird Preservation Technical Publications 9, Cambridge, 888 p.

Gürsan, H. M. & Bilgin, C. C. (2002): The status of the Imperial Eagle (*Aquila heliaca*) in Turkey. *Aquila* **107-108,** p. 187-192.

Haraszthy, L., Bagyura, J., Szitta, T., Petrovics, Z. & Viszló, L. (1996): Biology, Status and Conservation of the Imperial Eagle (*Aquila heliaca*) in Hungary. In: *Meyburg, B.-U. & Chancellor, R. D. (eds.):* Eagle Studies. WWGBP: Berlin, London & Paris, p. 425–428.

Heredia, B., Rose, L. & Painter, M. (ed.) (1996): Globally Threatened Birds in Europe. Action Plans. Council of Europe Publishing, 408 p.

Kalabér, L. (1998): Data about the Romanian population of the Imperial Eagle (*Aquila heliaca*). 4th International Conference on the Imperial Eagle, 23–24 November 1998, Budapest, Hungary. Manuscript.

Kralj, J. (1997): Ornitofauna Hrvatske tijekom posljednjih dvjesto godina [Croatian Ornithofauna in the last 200 years; in Croatian]. *Larus* **46**, p. 1–112.

Leverkühn, P. (1907): Kaiseradler und Aasgeier am Horst. Proceedings of the 4th International Ornithological Congress, London, 1905, p. 218–230.

Meyburg, B. U. (1986): Threatened and near-threatened diurnal birds of prey of the world. *Birds of Prey Bull.* **3,** p. 1–12.

Meyburg, B. U., Haraszthy, L., Meyburg, C. & Viszló, L. (1995): Satelliten- und Bodentelemetrie bei einem jungen Kaiseradler *Aquila heliaca*: Familienauflösung and Dispersion. *Vogelwelt* **116,** p. 153–157.

Meyburg, B. U. & Chancellor, R. D. (eds.) (1996): Eagle Studies. World Working Group on Birds of Prey (WWGBP), Berlin, London & Paris, 548 p.

Roeck, E. (1993): The status of Europe's rarer birds of prey: Imperial Eagle. *Birding World* **6,** p. 239–242.

Sakoulis A., Bourdakis, S., Hallmann, B. & Alizivatos, H. (1997): The status of the Imperial Eagle (*Aquila heliaca*) in Greece. Hellenic Ornithological Society, Athens. p. 1–23.

Vasic, V. & Misirlic, R. (2002): The Eastern Imperial Eagle (*Aquila heliaca*) in Yugoslavia, with references to FYR Macedonia. *Aquila* **107-108,** p. 145-167.

Vetrov, V. (1996): Status of the Imperial Eagle *Aquila heliaca* in Ukraine between 1897 and 1993. In: *Meyburg, B. U. & Chancellor, R. D. (eds.) (1996):* Eagle Studies. World Working Group on Birds of Prey (WWGBP), Berlin, London & Paris, p. 435–438.