Acrocephalus 33 (154/155): 173–179, 2012
10.2478/v10100-012-0004-x

# Raptors in Bosnia and Herzegovina – their status and perspectives for monitoring development

## Ptice roparice v Bosni in Hercegovini – njihov status in perspektive za razvoj monitoringa

Dražen Kotrošan[1] & Ena Hatibović[2]

[1] National Museum of Bosnia and Herzegovina, Zmaja od Bosne 3, BA–71000 Sarajevo, e–mail: kotrosan@bih.net.ba
[2] Ornithological Society "Naše ptice", Semira Frašte 6, BA–71000 Sarajevo, e–mail: ena_simic@yahoo.co.uk

In the last 150 years, 49 raptor species belonging to the families Pandionidae, Accipitridae, Falconidae, Tytonidae, Strigidae and Laniidae have been recorded in Bosnia and Herzegovina. However, little is known about their populations. In comparison with historical data, their status has changed significantly, while nine species became extinct or probably extinct as breeders. In this paper, data on the present status of raptor populations is presented, as well as problems and the possibilities of developing species monitoring in Bosnia and Herzegovina. So far, no raptor monitoring has been established in the form of a long-term programme. The establishment of such programme is hampered by a number of reasons (lack of observers, lack of financial resources, lack of experience and knowledge, etc.). Monitoring of raptors in Bosnia and Herzegovina is needed to improve knowledge of the local populations as well as to protect these birds and their habitats. Also, this programme would be significant for the studies concerning the construction of various facilities (e.g. wind turbines). One of the important points of the development programme is to mobilize international cooperation and projects to solve current problems.

**Key words**: raptors, history, research, monitoring, Bosnia and Herzegovina
**Ključne besede**: ptice roparice, zgodovina, raziskave, monitoring, Bosna in Hercegovina

### 1. Introduction

Systematic studies of the avifauna of Bosnia and Herzegovina started in the second half of the 19th century. These studies revealed that Bosnia and Herzegovina was one of the most important European countries concerning different raptor populations. This is supported by the studies carried out by Otmar Reiser, one of the leading European ornithologists at that time (Rajzer 1889, Reiser 1939), who ascertained that Spain, Greece and Bosnia and Herzegovina were the only European countries where all four vulture species, Lammergeier *Gypaetus barbatus*, Griffon Vulture *Gyps fulvus*, Black Vulture *Aegypius monachus* and Egyptian Vulture *Neophron percnopterus*, were known to breed.

In the last 150 years, significant changes concerning major impacts on raptor populations in Bosnia and Herzegovina have taken place. Even though no long-term monitoring scheme is conducted in the country at the present time, the basic faunistic data collected in recent years on the distribution of observed raptor species show significant changes in the country's raptor populations. The most drastic example of these changes is the fact that none of the four vulture species currently breeds in Bosnia and Herzegovina (Kotrošan *et al.* 2009).

### 2. Overview of raptor species

Based on the last historical review of the avifauna in Bosnia and Herzegovina (Kotrošan & Drocić 2010/2011), 49 raptor species have been recorded (Table 1). Systematically, the species belong to three orders (Falconiformes, Strigiformes, Passeriformes) and six families (Pandionidae, Accipitridae, Falconidae,

**Table 1:** Review of raptor species in Bosnia and Herzegovina (B – breeder, B? – probable breeder, Ex – extinct breeder, Ex? – probably extinct breeder, N – regularly occurring non-breeder, V – vagrant, V? – probable vagrant)

**Tabela 1:** Pregled ptic roparic v Bosni in Hercegovini (B – gnezdilec, B? – verjetni gnezdilec, Ex – izumrli gnezdilec, Ex? – verjetno izumrl gnezdilec, N – redno pojavljajoči se negnezdilec, V – izjemen gost, V? – verjetni izjemen gost)

| Species / Vrsta | Status | Distribution and estimate of population size/ Razširjenost in ocena velikosti populacije |
|---|---|---|
| Honey Buzzard *Pernis apivorus* | B | Regular breeder. Preliminary estimate: 1,000–1,500 breeding pairs (Kotrošan *et al.* 2012). |
| Black Kite *Milvus migrans* | B?, V | Formerly bred locally in the Posavina region (Delić 1999). In recent years, it has been rarely recorded, with single individuals considered vagrants (N. Drocić *pers. comm.*). Breeding at potential sites in the Sava River region not confirmed in recent years. |
| Red Kite *Milvus milvus* | Ex, V | Formerly bred locally in the Sava valley. Rarely recorded in recent years, with single individuals considered vagrants (N. Drocić *pers. comm.*). |
| White-tailed Eagle *Haliaeetus albicilla* | B | Regular breeder (e.g. in the Posavina region). Preliminary estimates indicate 5–10 breeding pairs (Kotrošan *et al.* 2012). |
| Lammergeier *Gypaetus barbatus* | Ex | On the basis of recorded young individuals, it was believed to be a breeder at the end of the 20th century (Marinković *et al.* 2007). In the last 10 years, no presence of this species in Bosnia and Herzegovina has been confirmed (Kotrošan *et al.* 2009). |
| Egyptian Vulture *Neophron percnopterus* | Ex | There are records of the species breeding in the late 20th century in Herzegovina. Last estimate for 1990 was three pairs (Marinković *et al.* 2007). It was allegedly seen in the early 21st century in Herzegovina, but recent surveys have failed to confirm the presence of this species (Kotrošan *et al.* 2009). |
| Griffon Vulture *Gyps fulvus* | Ex, N | Recent examples of its breeding recorded in the late 20th century (Kotrošan *et al.* 2009). In the last 10 years, less than 10 records of individual birds flying over the country have been made. At the moment, satellite tracking data show that individual birds fly in from Serbia and Croatia (Kulijer 2007, Bešo 2011/2012, S. Marinković & G. Sušić *pers. comm.*). |
| Black Vulture *Aegypius monachus* | Ex | Although not fully proven, it was assumed a breeder in Bosnia and Herzegovina on the basis of the registered young individuals. Extinct in the early 20th century (Kotrošan *et al.* 2009). |
| Short-toed Eagle *Circaetus gallicus* | B | Regular breeder. Preliminary estimates indicate 50–150 breeding pairs (Kotrošan *et al.* 2012). |
| Marsh Harrier *Circus aeruginosus* | B | Regular breeder. No estimations of its population size have been made so far. |
| Hen Harrier *Circus cyaneus* | N | Regularly recorded in winter and on migration, with no estimations of its winter population made so far. |
| Pallid Harrier *Circus macrourus* | V | Less than 20 observations in the last 10 years (N. Drocić, I. Dervović & D. Kulijer *pers. comm.*). |
| Montagu's Harrier *Circus pygargus* | B | Regular breeder. Preliminary estimates indicate 100–150 breeding pairs (Kotrošan *et al.* 2012). |
| Goshawk *Accipiter gentilis* | B | Regular breeder. Estimations of its population size have not been made. |
| Sparrowhawk *Accipiter nisus* | B | Regular breeder. Estimations of its population size have not been made. |

*Continuation of Table 1 / Nadaljevanje tabele 1*

| Species / Vrsta | Status | Distribution and estimate of population size/ Razširjenost in ocena velikosti populacije |
|---|---|---|
| Levant Sparrowhawk *Accipiter brevipes* | B? | It has bred locally only in Herzegovina, with the last estimate for the 1985–1992 period indicating max. 5 pairs (Grubač & Rašajski 2000). No confirmation as to its breeding in the last 10 years. If it does breed, its breeding is probably limited to a very small number of pairs. |
| Buzzard *Buteo buteo* | B | Regular breeder. Estimations of its population size have not been made. Generally, it is one of the most numerous raptors in the country. |
| Long-legged Buzzard *Buteo rufinus* | B | Regular breeder (e.g. karst poljes). Preliminary estimates indicate 20–40 breeding pairs (Kotrošan *et al.* 2012). |
| Rough-legged Buzzard *Buteo lagopus* | N | Regularly recorded during wintering and migration periods (e.g. Drocić 2005, Kotrošan *et al.* 2008). Estimations as to its winter population size have not been made. |
| Lesser Spotted Eagle *Aquila pomarina* | B | Regular breeder. In the last 10 years, it has been known to nest at Livanjsko polje, with some pairs probably breeding along the Sava River (Kotrošan 2008/2009). Preliminary estimates indicate less than 10 breeding pairs (Kotrošan *et. al* 2012). |
| Greater Spotted Eagle *Aquila clanga* | V | Rarely recorded, flies over a small number of sites (Obratil 1972). No new data. |
| Imperial Eagle *Aquila heliaca* | Ex | Once bred locally in the Sava valley. Went extinct during the 20th century. In the estimation for the 1985–1992 period marked as extinct (Ham & Puzović 2000). No new data. |
| Golden Eagle *Aquila chrysaetos* | B | Regular breeder. Preliminary estimates indicate less than 50 breeding pairs (Kotrošan *et. al* 2012). |
| Booted Eagle *Aquila pennata* | B?, V | There has been no confirmation of this species breeding in the last 20 years. Rarely registered in the last few years (e.g. Gašić & Ristić - Gašić 2010). |
| Bonelli's Eagle *Aquila fasciata* | Ex? | At the end of the 20th century bred at a single locality in Herzegovina (Kotrošan 2008/2009). In the last 20 years, no confirmation as to its breeding has been made. It probably became extinct. |
| Osprey *Pandion haliaetus* | Ex, N | Reliable data on nesting lacking, but it is assumed that a small number of this species bred here in the 20th century. Obratil & Matvejev (1989) marked it as extinct breeder. In the last 10 years, it has been regularly recorded, but no breeding has been proven so far. |
| Lesser Kestrel *Falco naumanni* | B | Regular breeder. Preliminary estimates indicate breeding of less than 10 pairs (Kotrošan *et al.* 2012). |
| Kestrel *Falco tinnunculus* | B | Regular breeder. Preliminary estimates refer to 3,000–4,000 breeding pairs (Kotrošan *et al.* 2012). |
| Red-footed Falcon *Falco vespertinus* | N | Mostly recorded on migration. Estimations of migrating numbers have not been made. |
| Merlin *Falco columbarius* | N | Mostly recorded on migration. Estimations of migrating numbers have not been made. |
| Hobby *Falco subbuteo* | B | Regular breeder. Estimations as to its population size have not been made, but there is probably a small number of pairs. |

*Continuation of Table 1 / Nadaljevanje tabele 1*

| Species / Vrsta | Status | Distribution and estimate of population size/ Razširjenost in ocena velikosti populacije |
|---|---|---|
| Lanner Falcon *Falco biarmicus* | B | Regular breeder locally in Herzegovina. Last estimation for 1993 was 12 breeding pairs (Marinković & Grubač 2000). Estimations of its population size have not been made, but there is probably a small number of pairs. |
| Saker Falcon *Falco cherrug* | Ex, V | Breeding was recorded locally in the Posavina area. No breeding data in the last 20 years. Satellite tracking data indicate that this species rarely flies over Bosnia and Herzegovina today (http://milvus.ro/en/tag/falco-cherrug). |
| Peregrine Falcon *Falco peregrinus* | B | Regular breeder, with no estimations of its population size made so far. |
| Barn Owl *Tyto alba* | B | Regular breeder. Preliminary estimates indicate 300–600 breeding pairs (Kotrošan *et. al* 2012). |
| Scops Owl *Otus scops* | B | Regular breeder. Preliminary estimates indicate 8,000–12,000 breeding pairs (Kotrošan *et al.* 2012). |
| Eagle Owl *Bubo bubo* | B | Regular breeder, with preliminary estimates indicating 400–500 breeding pairs (Kotrošan *et al.* 2012). |
| Hawk Owl *Surnia ulula* | V? | Only one record of this species known (Drocić 2010). This registration, however, has not been fully proven. If some of the new findings confirm this species occurring in Bosnia and Herzegovina, it will definitely be marked as vagrant. |
| Pygmy Owl *Glaucidium passerinum* | B | Regular breeder. Preliminary estimates indicate 50–100 breeding pairs (Kotrošan *et al.* 2012). |
| Little Owl *Athene noctua* | B | Regular breeder. Preliminary estimates indicate 2,000–3,500 breeding pairs (Kotrošan *et al.* 2012). |
| Tawny Owl *Strix aluco* | B | Regular breeder. Preliminary estimates indicate 15,000–20,000 breeding pairs (Kotrošan *et al.* 2012). |
| Ural Owl *Strix uralensis* | B | Regular breeder. Preliminary estimates indicate 200–400 breeding pairs (Kotrošan *et al.* 2012). |
| Long-eared Owl *Asio otus* | B | Regular breeder. Preliminary estimates indicate 5,000–10,000 breeding pairs (Kotrošan *et al.* 2012). |
| Short-eared Owl *Asio flammeus* | B | Regular breeder. Preliminary estimates indicate breeding of less than 10 pairs (Kotrošan *et al.* 2012). |
| Tengmalm's Owl *Aegolius funereus* | B | Regular breeder. Preliminary estimates indicate 100–300 breeding pairs (Kotrošan *et al.* 2012). |
| Red-backed Shrike *Lanius collurio* | B | Regular breeder. Preliminary estimates indicate 45,000–90,000 breeding pairs (Kotrošan *et al.* 2012). |
| Lesser Grey Shrike *Lanius minor* | B | Regular breeder. Preliminary estimates indicate 250–500 breeding pairs (Kotrošan *et al.* 2012). |
| Great Grey Shrike *Lanius excubitor* | N | Regularly recorded during wintering and migration periods. Estimations of its winter population size have not been made. |
| Woodchat Shrike *Lanius senator* | B | Regular breeder. Preliminary estimates indicate 100–300 breeding pairs (Kotrošan *et al.* 2012). |

Tytonidae, Strigidae and Laniidae). 29 species breed here, three species are probable breeders (breeding not confirmed recently), while nine species are extinct or probably extinct breeders. The remaining species do not breed in Bosnia and Herzegovina and occur only as passage migrants or winter residents (Kotrošan 2008/2009). The information on Steppe Eagle *Aquila nipalensis* (Sage 1964) occurring in the country is not included in the list, given that the record of this species is highly controversial.

## 3. Current research and monitoring of raptors

After the last war (1992–1995), when all ornithological studies in Bosnia and Herzegovina were stopped, there was a tendency to refresh the research of local avifauna by following modern trends of research in ornithology. Of great significance was no doubt the founding of the Ornithological Society "Naše ptice" (Our Birds) in 2003, and the start of an informal network of birdwatchers in Bosnia and Herzegovina (Kotrošan & Papes 2007).

In 2000, systematic data collection for the preparation and development of long-term raptor monitoring began. After the war, no data on most raptor species were available to indicate the sizes of their populations. It was necessary, therefore, to collect the initial data to obtain recent estimates, in particular as there were significant changes as far as nesting of some species is concerned.

The first preliminary raptor data collection was made in the 2007–2009 period, when taking part in the "Balkan Vulture Action Plan" project (Kotrošan 2009, Kotrošan *et al.* 2009), aimed at developing a long-term strategy for the recovery of the four vulture species in the Balkan Peninsula in cooperation with numerous international and local partners. Given that the data from 1991 indicated 20 breeding Griffon Vulture pairs (Marinković & Grubač 2000), one of the project's aims was to determine the current status of the species in Bosnia and Herzegovina. Since the beginning of 1990, this species has been exposed to severe potential threats (poisoning, harassment during the war, etc.), so it was assumed that it completely disappeared as a breeder. The same goes with Egyptian Vulture now that certain accounts as to its breeding in Herzegovina have been heard. Data on a number of other raptors were also collected during the project (e.g. Sparrowhawk *Accipiter nisus* and Golden Eagle *A. chrysaetos*) in Herzegovina.

For some raptor species (e.g. Montagu's Harrier *Circus pygargus*, Hen Harrier *C. cyaneus*), data on their distribution and population sizes are collected during the studies conducted at karst poljes, especially at Livanjsko polje (Stumberger & Schneider-Jacoby 2010). The data were collected during the background studies necessary for the nomination of the site on the IBA list. On the basis of the data collected through other projects that started at a later date (e.g. "Monitoring of the bird population and vegetation communities at Livanjsko Polje" within the 2011–2012 KARST project, and the project "Identification and Promotion of Karst Poljes in Bosnia - Herzegovina as Wetlands of National and International Importance" implemented between 2012 and 2013), collecting of data continued on the number of populations of individual species (e.g. Great Grey Shrike *Lanius excubitor*, Lesser Grey Shrike *L. minor*). At the same time, other data concerning the impacts of poaching and other negative factors on their populations began to be collected as well.

Through the International Waterbird Census (IWC) programme, data on the wintering White-tailed Eagle *Haliaetus albicilla*, Marsh Harrier *C. aeruginosus*, Hen Harrier and Short-eared Owl *Asio flammeus* have been collected since 2012. Part of the collected data was published in the IWC report for Bosnia and Herzegovina (Topić & Kotrošan 2011/2012), while the data on areas not included in the report (e.g. karst poljes) have not been published as yet.

Considering the lack of historical data on owls (Obratil 1977), it is of prime importance to determine the selected species' distribution and population sizes. The only current monitoring scheme is conducted for the Long-eared Owl *A. otus* with winter roost sites census, which started in 2010 (Kotrošan *et al.* 2011a).

## 4. Issues and perspectives of monitoring in Bosnia and Herzegovina

Regarding the establishment of monitoring of raptors in Bosnia and Herzegovina, several issues are to be underlined: (1) lack of observers (currently there are only 5–10 suitable educated observers in the country), (2) lack of equipment (there is only basic equipment, such as telescopes, binoculars and GPS devices, available, but no night research equipment, as well as special vehicles necessary for the hardly accessible mountain areas, etc.), (3) low funding of field research (the State support for the projects is small and the possibilities of getting projects from the EU and other recourses are limited), (4) poor best-practice training in raptor monitoring, (5) safety during field studies (mine fields, political issues, conflicts with poachers).

Currently, monitoring of raptors in Bosnia and

Herzegovina is not established as regards long-term programmes. Research is mostly driven by short-term actions to establish status of individual species, but the above issues continue and hinder the development of a long-term programme. At this point, the only long-term monitoring has been established within the IWC and monitoring wintering Long-eared Owls. One of the possibilities of establishing long-term monitoring is to begin international cooperation and projects, needed to overcome current problems. Establishment of monitoring would have multifold meanings: to gain insight into the populations of certain species for the first time, and to use these data to define threat status of individual species and their placement on the national red list. On the other hand, the data would be extremely important for the needs of defining potential Natura 2000 sites (which is to start in 2013). Also, it would be important for the study concerning the construction of power plants, particularly 52 wind farms planned to be built in Bosnia and Herzegovina (Kotrošan *et al.* 2011b).

## 5. Povzetek

V zadnjih 150 letih je bilo v Bosni in Hercegovini zabeleženih 49 ptic roparic, pripadajočih družinam Pandionidae, Accipitridae, Falconidae, Tytonidae, Strigidae in Laniidae. Toda o populacijah teh vrst je še vedno malo znanega. V primerjavi z zgodovinskimi podatki se je močno spremenil njihov status, medtem ko je devet nekoč gnezdečih vrst že izumrlo ali verjetno izumrlo. V pričujočem prispevku so predstavljeni podatki o trenutnem statusu ptic roparic, a tudi problemi in možnosti, ki se pojavljajo med razvijanjem monitoringa v Bosni in Hercegovini. Tako še do danes ni bil vzpostavljen monitoring ptic roparic v obliki dolgoročnega programa, saj te poskuse ovira več dejavnikov (pomanjkanje popisovalcev, finančnih virov, izkušenj in znanja itd.). Sicer pa je monitoring ptic roparic nujno potreben, če želimo izboljšati znanje o lokalnih populacijah ter hkrati zavarovati te ptice in njihove habitate. Poleg tega bi bil ta program pomemben pri pripravi študij, potrebnih pri gradnji različnih objektov (npr. vetrnih turbin). Ena izmed pomembnih točk razvojnega programa je vzpostavitev mednarodnega sodelovanja in projektov za reševanje trenutno najbolj perečih problemov na tem področju.

## 6. References

Bešo, A. (2011/2012): [Watching a Griffon Vulture (*Gyps fulvus*) near Nevesinje.] – Bilten Mreže posmatrača ptica u Bosni i Hercegovini 7/8: 91. (in Bosnian, English summary)

Delić, V. (1999): [Our breeding birds, Raptors.] – Lovački list 24: 10–11. (in Bosnian)

Drocić, N. (2005): [Contribution to the knowledge of bird fauna of Central Bosnia]. – Bilten Mreže posmatrača ptica u Bosni i Hercegovini 1: 18–25. (in Bosnian, English summary)

Drocić, N. (2010): [Contribution to the addition list of birds in Bosnia and Herzegovina]. – Bilten Mreže posmatrača ptica u Bosni i Hercegovini 6: 53–59. (in Bosnian, English summary)

Gašić, B. & Ristić - Gašić, S. (2010): [New observation of the Booted Eagle *Aquila pennata* (J. F. Gmelin, 1788) in Bosnia and Herzegovina.] – Bilten Mreže posmatrača ptica u Bosni i Hercegovini 6: 50–52. (in Bosnian, English summary)

Grubač, B. & Rašajski, J.(2000): [Levant Sparrowhawk (*Accipiter brevipes*).] pp. 99–104 In: Puzović, S. (ed.): Atlas ptica grabljivica Srbije. – Zavod za zaštitu prirode Srbije, Beograd. (in Serbian, English summary)

Ham, I. & Puzović, S. (2000): [Imperial Eagle *Aquila heliaca*.] pp. 123–128 In: Puzović, S. (ed.): Atlas ptica grabljivica Srbije. – Zavod za zaštitu prirode Srbije, Beograd. (in Serbian, English summary)

Kotrošan, D. (2008/2009): [Updates and corrections to the Bird Checklist of Bosnia and Herzegovina for the species registered from 1888 to 2006.] – Bilten Mreže posmatrača ptica u Bosni i Hercegovini, 4/5: 72–86. (in Bosnian, English summary)

Kotrošan, D. (2009): [Balkan action plan for the protection of Vultures – A new attempt at restoring the population of Griffon Vulture in Herzegovina.] – Naše šume, 8 (16/17): 22–26. (in Bosnian and English)

Kotrošan, D. & Papes, M. (2007): [Bird checklist of Bosnia and Herzegovina registered from 1888 to 2006.] – Bilten Mreže posmatrača ptica u Bosni i Hercegovini 3: 9–38. (in Bosnian, English summary)

Kotrošan, D. & Drocić, N. (2010/2011): [The third supplemented and revised systematic overview of birds of Bosnia and Herzegovina.] pp. 304–309 In: Lelo, S. (ed.): Fauna Bosne i Hercegovine. Biosistematski pregledi 6/7. Izmijenjeno i dopunjeno interno izdanje Udruženja za inventarizaciju i zaštitu životinja. – Ilijaš, Kanton Sarajevo. (in Bosnian)

Kotrošan, D., Obratil, S. & Gašić, B. (2008): [First results of recent ornithological reserach of mountain Ozren in Central Bosnia.] pp. 125–142 In: Proceedings of the 1st Symposium of Biologists of Republic of Srpska, Banja Luka. (in Serbian and English)

Kotrošan, D., Marinković, S., Šimić, E. & Viada, C. (2009): [Handbook for education of birdwatchers in Bosnia and Herzegovina. Vultures I.] – Ornitološko društvo "Naše ptice", Sarajevo. (in Bosnian)

Kotrošan, D., Ružić, M., Radišić, D., Šimić, E., Sjeničić, J. & Dervović, I. (2011a): First results of the census of winter roost sites of the Long-eared Owl in Bosnia and Herzegovina. pp. 31 In: Abstract Book of International Conference on the Survey, Monitoring and Conservation of the Long-eared Owl *Asio otus,* 1–5 November 2011, Kikinda, Serbia.

Kotrošan, D., Trbojević, S. & Šimić, E. (2011b):

[Windfarms and birds.] – Ornitološko društvo „Naše ptice“, Sarajevo. (in Bosnian)

Kotrošan, D., Drocić, N., Trbojević, S., Šimić, E. & Dervović, I. (2012): [Program IBA, Important Birds Areas, in Bosnia and Herzegovina.] Internal publication for the project “Evaluation of IBA in FB&H.” – Ornitološko društvo “Naše ptice”, Sarajevo. (in Bosnian, English summary)

Kulijer, D. (2007): [Griffon Vulture (*Gyps fulvus*) registred on Čvrsnica.] – Bilten Mreže posmatrača ptica u Bosni i Hercegovini 3: 53. (in Bosnian, English summary)

Marinković, S. & Grubač, B. (2000): [Griffon Vulture (*Gyps fulvus*).] pp. 63–68 In: Puzović, S. (ed.): Atlas ptica grabljivica Srbije. – Zavod za zaštitu prirode Srbije, Beograd. (in Serbian, English summary)

Marinković, S., Orlandić, Lj., Micković, B. & Karadžić, B. (2007): [Census of vultures in Herzegovina.] – Vulture News 56: 14–28.

Obratil, S. (1972): [A review of research of ornithofauna of Bosnia and Herzegovina III (Falconiformes).] – Glasnik Zemaljskog muzeja Bosne i Hercegovine (PN) NS 10: 139–155. (in Bosnian)

Obratil, S. (1977): [A review of research of ornithofauna of Bosnia and Herzegovina VI (Columbiformes, Cuculiformes, Strigiformes, Caprimulgiformes, Apodiformes, Coraciformes, Piciformes).] – Glasnik Zemaljskog muzeja Bosne i Hercegovine (PN) NS 16: 203–223. (in Bosnian)

Obratil, S. & Matvejev, S. (1989): [The proposal “Red List” of endangered birds of SR Bosnia and Herzegovina.] – Naše starine 18/19: 227–235. (In Bosnian)

Rajzer, O. (1889): [Residence of four species of vultures in Bosnia and Herzegovina.] – Glasnik Zemaljskog muzeja 1 (1): 51–57. (in Bosnian)

Reiser, O. (1939): Materialien zu einer Ornis Balcanica. I. Bosnien und Herzegowina nebst Teilen von Serbien und Dalmatien. – Selbstverlag des Museums, Wien.

Sage, B.L. (1964): Notes on the Birds of the Lower Neretva valley. – Ardea 3/4: 202–218.

Stumberger, B. & Schneider-Jacoby, M. (2010): International importance of three Adriatic Flyway priority sites: Livanjsko polje, the Neretva Delta and Lake Skadar-Shkoder with Bojana-Buna Delta. pp. 53–59 In: Denac, D., Schneider-Jacoby, M. & Stumberger, B. (eds.): Adriatic flyway – closing the gap in bird conservation. – Euronatur, Radolfzell.

Topić, G. & Kotrošan, D. (2011/2012): [Results of the international waterbird census from Bosnia and Herzegovina in 2012.] – Bilten mreže posmatrača ptica u Bosni i Hercegovini 7/8: 56–74. (in Bosnian, English summary)

Arrived / Prispelo: 27. 3. 2013
Accepted / Sprejeto: 1. 7. 2013