TÜBİTAK

Turkish Journal of Zoology

http://journals.tubitak.gov.tr/zoology/

Short Communication

Turk J Zool
(2016) 40: 818-823

doi:10.3906/zoo-1508-5

Declining populations of Chukar Partridge (*Alectoris chukar*) in Bulgaria

Gradimir GRUYCHEV*
Department of Wildlife Management, University of Forestry, Sofia, Bulgaria

Received: 03.08.2015 • **Accepted/Published Online:** 09.03.2016 • **Final Version:** 24.10.2016

Abstract: Between 2007 and 2011, the distribution and breeding density of Chukar Partridges in Bulgaria were examined. Seventy-six UTM squares of the study area were deemed as including suitable habitat for the Chukar. In 14 of them varying degrees of breeding evidence of the Chukar Partridge were observed. Confirmed breeding was found in only 6 habitats, with breeding densities of 2 to 4 pairs/100 ha. In applying the IUCN criteria to data from this study, the Chukar Partridge falls within the category of critically endangered species in Bulgaria.

Key words: *Alectoris chukar*, Chukar Partridge, distribution, population trend, IUCN criteria, breeding density

The Chukar Partridge (*Alectoris chukar* [Gray, 1830]) is listed as a Least Concern species, with its population being stable or increasing in size in many locations (Birdlife International, 2012). However, the reduction in habitat and overexploitation negatively affects some parts of its range (del Hoyo et al., 1994). In the European part of the Republic of Turkey, the Chukar Partridge is a rare species (Yurtsever and Kurtunur, 2003; Özkan, 2010), while in Greece the nesting population is about 10,000 pairs (Birdlife International, 2004). Its distribution in Bulgaria lies in the northwestern portion of its natural range in Europe (Simeonov et al., 1990). During the 1950s and 1960s, it was considered widespread in rocky places overgrown with thorny brush (*Paliurus spina-christi* Mill.) and blackberry bushes (*Rubus* sp.) in southeastern Bulgaria (Patev, 1950; Boev et al., 1964). The size of the Bulgarian population in 1989 was about 75,000 individuals (Simeonov et al., 1990), which had decreased to about 39,000 individuals by 1999 (Iankulov and Irgeva, 1999). Other estimates indicate that the population consists of just 1500–3000 breeding pairs (Birdlife International, 2004; Nankinov et al., 2004). Recent data on the species in Bulgaria show decreasing trends and even complete extirpation from previous traditional breeding areas (Stoychev et al., 2007, 2008; Delov, 2015). Milchev (2010) reported that the Chukar Partridge was missing in the western part of the Strandja Mountains during the period 1995 to 2000. Attempts to revive the species by releasing farm-bred Chukars were unsuccessful, most likely because those birds suffered great losses after release and were unable to form stable groups (Gruychev, 2012). Today, the Chukar Partridge is included as Endangered in the Red Data Book of Bulgaria, with declining population trends (Golemanski, 2015). The aim of this study was to quantitatively determine the current distribution, breeding density, and preservation status of the Chukar Partridge in its natural range in Bulgaria.

The distribution and breeding density of Chukar Partridges was identified by field observations in the period 2007–2011 in the area falling within the natural range of the species. Seventy-six squares in a 10-km Universal Transverse Mercator grid (UTM grid) were visited (Lehrer and Delchev, 1978) where there were suitable habitats (as described by Simeonov et al., 1990). This mapping protocol corresponds to the method for the mapping of birds according to Bibby et al. (1992). Suitable Chukar habitats included all areas located in the region east of the line between the towns of Asenovgrad and Zlatograd to the Black Sea coast on the south to the state border of Bulgaria with the Republic of Turkey and the Republic of Greece, and in the north to the town of Nova Zagora (Patev, 1950; Botev, 1981). These areas correspond to the description made by Simeonov et al. (1990). Field observations were made in all areas that included plant communities of the following types: *Centaurea diffusa* + *Bromus tectorum* + *Carduus acanthoides*; *Paliurus spina-christi* + *Poa bulbosa*; *Paliurus spina-christi* + *Eryngium campestre* + *Anthoxanthum odoratum*; *Paliurus spina-christi* + *Dichanthium ischaemum*; *Paliurus spina-christi* + *Dichanthium ischaemum* + *Chrysopogon gryllus*; *Dichanthium ischaemum* + *Achillea compacta* (Gruychev

* Correspondence: gradi.val@gmail.com

et al., 2014), and within the distribution of the species according to Iankov (2007). Each square was visited 4–6 times during the breeding season (March–June) and up to 10 times in the nonbreeding season (July–February of the following year). Data on the distribution of the Chukar Partridge were collected partly by analyzing the diet of the Eurasian Eagle Owl (*Bubo bubo* [Linnaeus, 1758]) in southeast Bulgaria and of the Long-legged Buzzard (*Buteo rufinus* [Cretzchmar, 1827]) (Milchev, 2009).

Breeding density was determined by walking 28 linear transects (Figure 1) and playing the mating call of the male Chukar during the breeding season. A hunting dog (typically a German wirehaired pointer) was used on each transect in the nonbreeding season, in order to increase the chances of observing the birds (Bibby et al., 1992). The average length of transects was 3.96 ± 1.73 (range 1.5–7) km with a width of 100 m, which represented the average distance between the dog and the observer and the utmost distance at which the recorded mating call could be heard. The breeding density was determined by taking the maximum of breeding pairs through the entire breeding period in the area of the relevant transect and recalculating per 100 ha (Bibby et al., 1992).

During the study, it was easy to determine if the Chukars were raised on a farm, as farm-reared birds were not afraid of humans, usually occurred in spring and autumn in large groups, and were poorly feathered. Information about the release of farm-raised Chukar Partridge was also obtained from hunting associations. In that way, it was possible to identify the origin of the Chukars. Based on the origin, the habitats were divided into 2 major groups: 1) natural breeding habitats; 2) habitats populated only by released Chukar Partridge. To define the level of reliability of breeding, a 16-degree scale following Hagemeijer and Blair (1997) was used. The species threat level was determined according to the Guidance for the Use of Global Categories and Criteria (IUCN, 2005).

Seventy-six UTM squares of the study area included suitable habitat for Chukars. In 14 UTM squares, there was a difference in the level of breeding reliability of the Chukar Partridge. Confirmed breeding was found in only 6 (7.9%, n = 76 squares) in the eastern Rhodope Mountains (Figure 2). Single nonbreeding birds from artificial releases

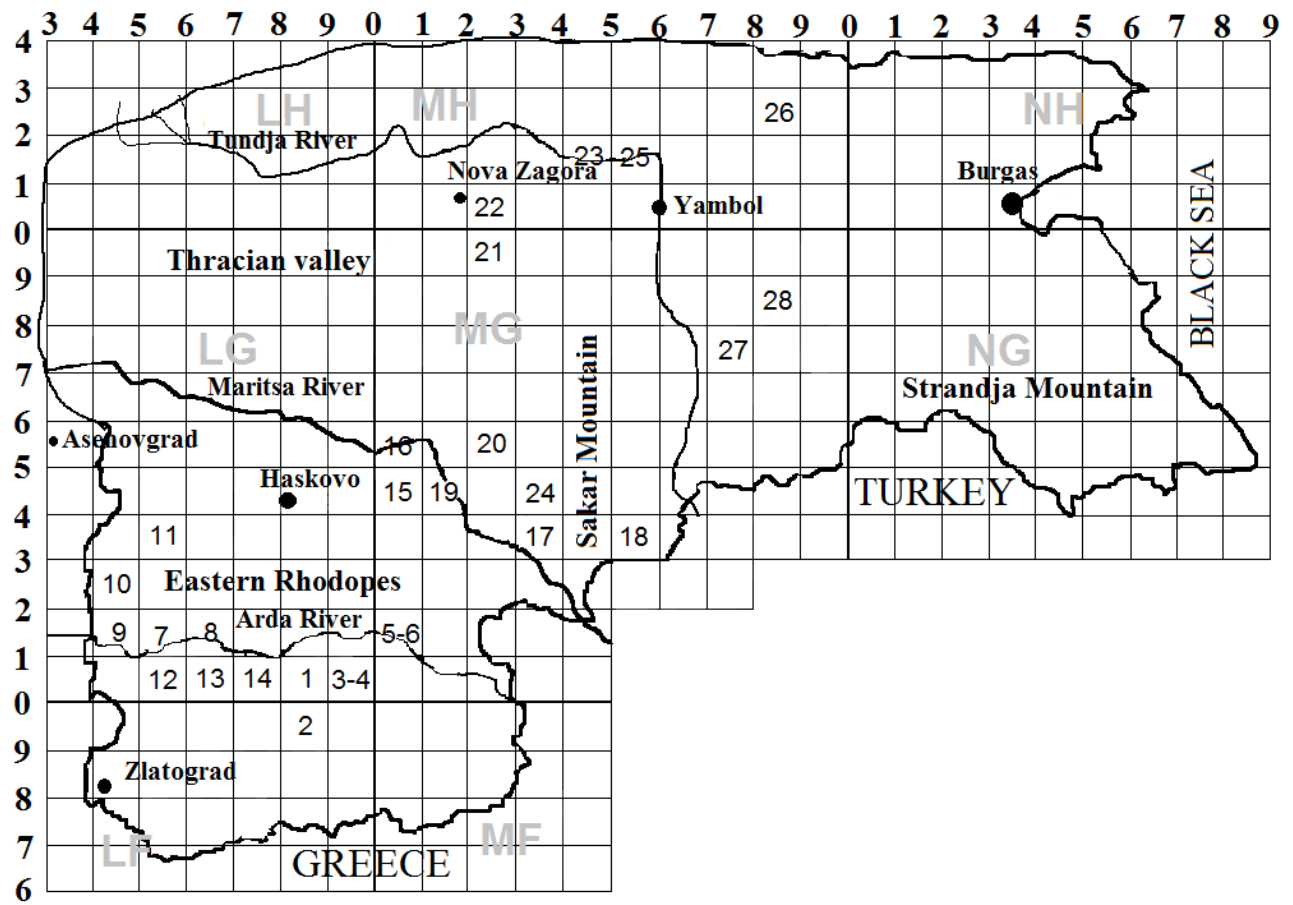

Figure 1. Study area and planned transects to determine the number of breeding pairs of Chukar Partridge (*Alectoris chukar*) in Bulgaria.

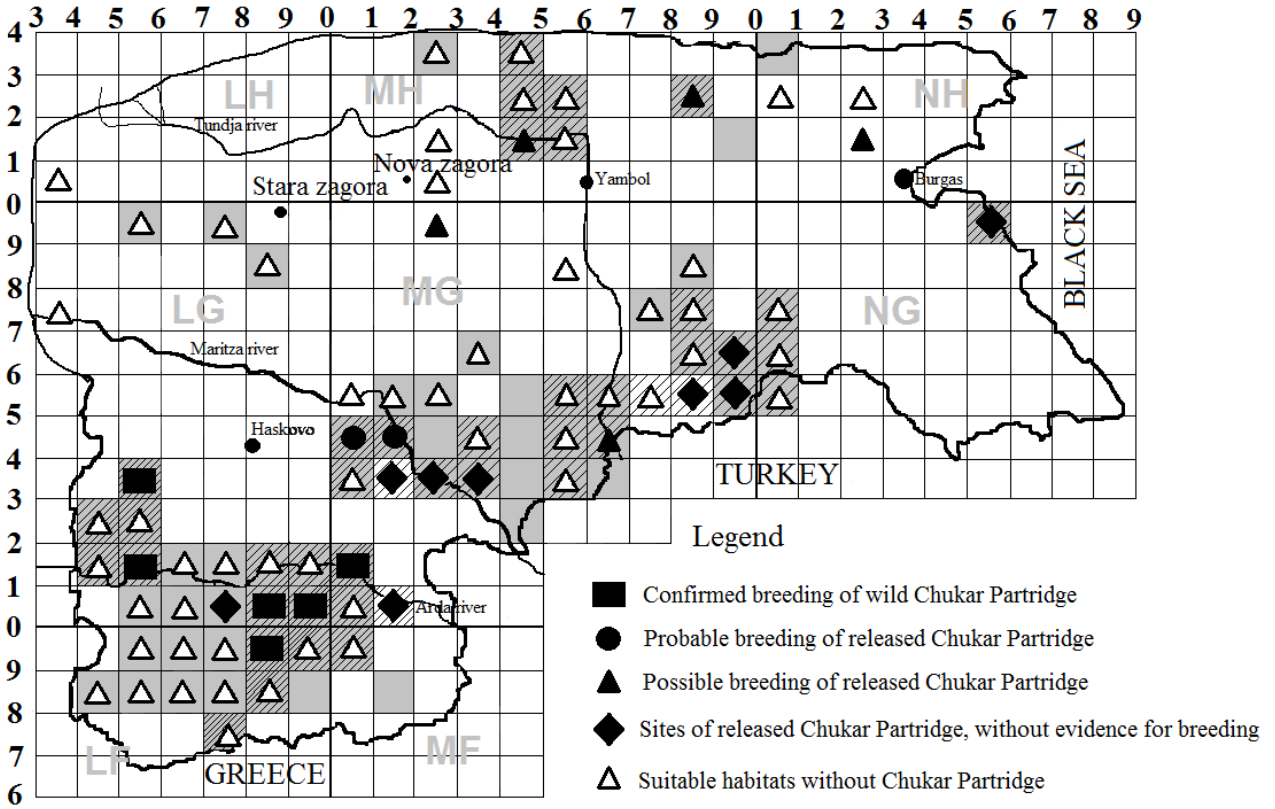

Figure 2. Distribution of the Chukar Partridge (*Alectoris chukar*) in Bulgaria since 1990. Background color of square: gray – nesting sites during 1990–2005 (Iankov, 2007); shaded square – protected zones, Natura 2000.

were found in 9 (11.8%, n = 76) squares, and hand-reared Chukars, with a different probability of breeding, were established in 7 (9.2%, n = 76) squares. The species was not confirmed as breeding in 51 squares that appeared to include suitable habitat according to Iankov (2007). The present study found 5 previously unknown locations with a different probability of breeding for hand-reared Chukar Partridge and 9 seemingly suitable habitats in which there were no Chukars, or a total number of 14 suitable habitats for the species that have not been listed up to the present (Figure 2).

From the 76 squares in which Chukar habitat is found, 45 (59.2%) are in the protected zones of Natura 2000 (Figure 2), 41 of these are areas under Directive 09/147/EEC, and 4 are in areas under Directive 92/43/EEC. Only 6 (13.3%) of the habitats within the Natura zones are natural breeding areas. For 13 of them (28.9%), there are no data for breeding of the species, and 26 (57.8%) are areas with no evidence of the presence of the Chukar Partridge. The present study reveals that information for the first time.

The breeding density in the 6 natural habitats is within 2 to 4 pairs/100 ha (Table 1).

In applying the IUCN criteria to data from this study, the following criteria are fulfilled: Criterion A – subcriterion 4 a + c + d; Criterion B – subcriterion B1bi + B1bii + B1biii + B1biv + B1bv; Chukar Partridge falls within the category of Critically Endangered species. Chukars also fall into this category according to criterion C of the IUCN, but it is hard to give the current real number of the Chukar population, due to fragmented distribution and indiscriminately uncontrolled release of farm birds.

This study establishes a limited and fragmented distribution of the Chukar Partridge in Bulgaria. Compared with the last mapping of the Chukar Partridge in Bulgaria for the period 1990–2005 (Iankov, 2007), this study does not establish confirmed breeding in the region east of the Maritsa River. Of the 34 squares with previously confirmed breeding of Chukar Partridge according to Iankov (2007), this study confirmed breeding in only 6. In 82.35% of the habitats described in the previous mapping, the Chukar Partridge is now extinct. The reason for such a large difference in the distribution of the Chukar is the fact that farm-raised released birds were considered as nesting when previous studies were mapping the fields. The Chukar Partridge has also been recorded as present in some parts of the Sakar Mountains: near the villages of Rogozinovo, Dositeevo, Pastrogor (Stoychev et al., 2008), and Levka (Gruychev, 2012). At the end of this study, there was no

Table 1. Breeding density of the Chukar Partridge (*Alectoris chukar*).

No. UTM square/transect	Maximum numbers of breeding pairs	Number of breeding pairs/100 ha
LG80/1	2	4
LF89/2	2	4
LG90/3	2	4
MG01/5	1	2
LG51/8	2	4
LG53/11	2	4

There are single birds released after farm raising reported as possible and probable breeding of Chukar found in the transects within the square (Figures 1 and 2) that are not included in Table 1 because of that fact.

evidence for natural breeding of Chukars in these regions. Chukars observed in the Sakar Mountains by Stoychev et al. (2008) were probably released farm-raised birds. Near the villages of Rogozinovo and Dositeevo in 2007–2009, farm-raised Chukars were released in order to study the possibility of bird recovery (Gruychev, 2014). Most likely, these are the same birds that have been observed. Chukars observed by the same authors near Pastrogor village were also probably released birds. According to hunting associations, farm-raised Chukars are annually released in the region. The natural nesting habitat near the village of Levka, described by Gruychev (2014), is declining and disappearing due to changes in habitats because of the high intensity of grazing farm animals and inconvenience caused (Gruychev et al., 2014).

Between the Chukar habitats in the eastern Rhodopes Mountains and the rest of the range, there is an observed disconnection (Figure 2). These results confirm previous mapping by Iankov (2007). The large forest cover and the small number of open areas in these squares make the habitat unsuitable for Chukars.

According to our study, after applying the IUCN criteria and according to criteria A and B, the Chukar falls within the category of Critically Endangered (CR) species. The trend of decreasing population size and area of distribution observed in previous ornithological studies (Nankinov et al., 2004; Stoychev et al., 2007, 2008; Delov, 2015) is confirmed by this study, too.

The information in our study does not confirm the official forest statistics data, according to which the number of Chukar Partridge is significantly higher than that indicated in other studies in Bulgaria (Table 2).

Data in Table 2 were collected by a number of people, most of them without any practical experience in methodology for determining the number and density of bird populations. It is unknown how the data were

Table 2. Population size of the Chukar Partridge (*Alectoris chukar*) in Bulgaria for the period 2006–2012, according to official hunting statistics.

Year	Number of Chukars, ind.	Annual use, ind.
2006	20,862	450
2007	13,227	520
2008	22,586	420
2009	21,402	680
2010	7248	600
2011	12,084	97
2012	11,413	40

collected, what the actual study area was, how many participants took part in the gathering of information, and from which areas. It is also not clear if released Chukars are included or not. The number of hunted Chukars during the last 2 years for the Struma River, outside the natural range of the species in Bulgaria, remains unexplained as well. Although every year in Bulgaria almost 6000 Chukars are released, official shooting activity remains too low. The small number of hunted birds is evidence for the low numbers of the birds from this species and calls into question the accuracy of hunting statistics in Bulgaria. The trends of decreasing numbers and distribution prove the inefficiency of releasing farm-raised Chukar Partridge. The Chukar is mentioned as present in areas where it has no habitats at all and which are outside its natural range. There are breeding Chukar Partridges given for the area along the Struma River (Golemanski, 2015) (FM 72, 73, 82, 83), where they are part of the natural habitat of the Rock Partridge (*Alectoris graeca* [Meisner, 1804]), and there is an actual risk of crossbreeding of the 2 species. The appearance of new fields with Chukars in the future is expected because of the uncontrolled release of farmed birds. It is necessary for hunting organizations to control the release of farm-raised birds.

In the protected zones announced in Directive 09/147/EEC on the preservation of wild birds, restrictive measures are provided to preserve and improve the quality of Chukar habitats, with no positive impact on the density of the species. The Chukar Partridge should be considered in the Natura zones as a species of the Red Data Book of Bulgaria (Golemanski, 2015). Measures to improve the habitats would not recover populations where the Chukar Partridge has disappeared. An introduction and launching of rehabilitation programs are necessary because of the actual risk of extinction. They should be performed together with preliminarily planned management of the habitats and control over factors of the environment that affect the population of the Chukar Partridge.

Acknowledgments

I express my deep gratitude to B Milchev for the data from the diet of Eurasian Eagle Owl. I am very indebted to the National Hunting Association and Executive Forest Agency for provided the data from hunting statistics. In addition, we express our gratitude to the reviewers for their valuable assistance and comments. The present study was funded by Grants 009/2007–2008 and 41/2009–2011 of the Fund for Scientific Research, University of Forestry.

References

Bibby CJ, Burgess ND, Hill DA (1992). Bird Census Techniques. San Diego, CA, USA: Academic Press.

Birdlife International (2004). Birds in Europe: Population Estimates, Trends and Conservation Status. Cambridge, UK: Birdlife International. Birdlife Conservation Series 12.

Birdlife International (2012). *Alectoris chukar*. The IUCN Red List of Threatened Species, v. 2014.3. Accessed: 24 November 2014.

Boev N, Georgiev J, Donchev St (1964). Bird of Trakia. Part I. Sofia: BAS (in Bulgarian).

Botev N (1981). Hunting Management. Sofia: Zemizdat (in Bulgarian).

Del Hoyo J, Elliot A, Sargatal J (1994). *Alectoris Chukar*. In: Handbook of the Birds of the World, Vol. 2: New World Vultures to Guinea Fowl. Barcelona: Lynx Edicions, pp. 485-486.

Delov V (2015). Chukar partridge (*Alectoris chukar*). In: Golemanski V, editor. Red Data Book of the Republic of Bulgaria. Vol. 2 Animals. Sofia: IBEI – BAS & MOSW (in Bulgarian and English).

Dragoev P (1971). Opportunities for wider dissemination of Chukar and Rock partridges in Bulgaria. Forestry 5: 63-70 (in Bulgarian).

Golemanski V, editor (2015). Red Data Book of the Republic of Bulgaria. Vol. 2, Animals. Sofia: IBEI – BAS & MOEW (in Bulgarian and English).

Gruychev G (2012). Results from radio-telemetric monitoring of hand-reared and released Chukar Partridges (*Alectoris chukar*, Gray 1830). Acta Zool Bul 64: 59-65.

Gruychev G (2014). Abundance and conservation of Chukar Partridge (*Alectoris chukar* Gray, 1830) in Bulgaria. PhD, University of Forestry, Sofia, Bulgaria (in Bulgarian).

Gruychev G, Dyakov N, Dimitrov D (2014). Habitat variables influencing Chukar Partridge decrease in southeastern Bulgaria. Folia Zool 63: 171-179.

Guerrini M, Panayides P, Hadjigerou P, Taglioli L, Dini F, Barbanera F (2007). Lack of genetic structure of Cypriot *Alectoris chukar* (Aves, Galliformes) populations as inferred from mtDNA sequencing data. Animal Biodiv Conserv 30: 105-114.

Hagemaijer W, Blair M (1997). The EBCC Atlas of European Breeding Birds: Their Distribution and Abundance. London: T & A. D. Poyser.

Iankov P (2007). Atlas of Breeding Birds in Bulgaria. Conservation Series, Book 10. Sofia: Bulgarian Society of the Protection of Birds (in Bulgarian and English).

Iankulov R, Irgeva L (1991). Dynamics of the population of wildlife in Bulgaria. Forest 6: 16-18.

IUCN (2001). IUCN Red List Categories and Criteria: Version 3.1. Gland, Switzerland and Cambridge, UK: IUCN Species Survival Commission.

IUCN (2003). Guidelines for Application of IUCN Red List Criteria at Regional Levels: Version 3.0. Gland, Switzerland and Cambridge, UK: IUCN Species Survival Commission.

IUCN (2005). Guidelines for Using the IUCN Red List Categories and Criteria. Gland, Switzerland and Cambridge, UK: IUCN.

Lehrer A, Delchev Ch (1978). Modern methods for biogeographical mapping of Bulgaria. Acta Zool Bul 10: 3-12 (in Bulgarian with English summary).

Milchev B (2009). Breeding biology of the Long-legged Buzzard (*Buteo rufinus*) in SE Bulgaria, nesting also in quarries. Avocetta 33: 25-32.

Milchev B (2010). Expansion of the breeding distribution of Common Redstart (*Phoenicurus phoenicurus*) in SE Bulgaria. Vogelwelt 131: 257-259.

Nankinov D, Dutzov A, Nikolov B, Borisov B, Stoyqnov G, Gradev G, Grorgiev D, Popov D, Domuschiev D, Kirov D et al. (2004). Breeding Totals of the Ornithofauna in Bulgaria. Plovdiv: Green Balkans (in Bulgarian and English).

Özkan K (2010). Diversity and distribution of birds in the Yildiz Mountains. Yildiz Mountains Biosphere Project Report Series 6: 54.

Panayides P, Guerrini M, Barbanera F (2011). Conservation genetics and management of the Chukar partridge *Alectoris chukar* in Cyprus and the Middle East. Sandgrouse 33: 34-43.

Patev P (1950). The Birds of Bulgaria. Sofia: Bulgarian Academic of Science (in Bulgarian).

Simeonov S, Mitchev T, Nankinov D (1990). Fauna of Bulgaria. 20. Aves. Part I. Sofia: Bulgarian Academic of Science (in Bulgarian with English summary).

Stoychev S, Boev Z, Delov V (2007). Chukar partridge (*Alectoris chukar*). In: Iankov P, editor. Atlas of Breeding Birds of Bulgaria. Conservation Series, Book 10. Sofia: Bulgarian Society of the Protection of Birds (in Bulgarian and English).

Stoychev S, Demerdjiev D, Gerdjikov G, Borisov B (2008). Birds of Sakar Mountain. Mineralni bani, Astrea, ISBN 978-954-92322-1-9 (in Bulgarian).

Yurtsever S, Kurtonur C (2003). A preliminary study on the birds of the Istranca Mountains, Turkey. Acta Zool Cracov 46: 19-28.