Published by Avanti Publishers

Global Journal of Agricultural Innovation, Research & Development

ISSN (online): 2409-9813

Recent Records of Breeding Stock Dove (*Columba oenas*) in Northern Bulgaria

Gradimir V. Gruychev* and Evlogi E. Angelov

Department of Wildlife Management, Faculty of Forestry, University of Forestry, 10 Kliment Ohridski Blvd. 1756 Sofia, Bulgaria

ARTICLE INFO

Article Type: Research Article

Academic Editor: A.K.M. Adham

Keywords:
Photo traps
Beech forest
Columba doves
Woodland birds
Balkan Mountain breeding birds

Timeline:
Received: October 27, 2025
Accepted: December 02, 2025
Published: December 10, 2025

Citation: Gruychev GV, Angelov EE. Recent records of breeding stock Dove (*Columba oenas*) in Northern Bulgaria. Glob J Agric Innov Res Dev. 2025; 12: 60-65.

DOI: https://doi.org/10.15377/2409-9813.2025.12.6

ABSTRACT

In this study we present new data on the breeding distribution of the Stock Dove (*Columba oenas*) in Bulgaria, focusing on mountain habitats. In 2025, nineteen 10-km squares from the European Terrestrial Reference System 1989 were surveyed. The selection was based on previously identified suitable habitats. The present of the species and breeding category was established through point counts and photo cameras. The Stock Dove was confirmed as a breeder in four squares, but also identified as a probable breeder in another two squares falling outside of known species distribution. The results indicate a localized and patchily distributed breeding presence. The findings emphasize the need for systematic monitoring and targeted ecological studies to better understand the species' breeding ecology, habitat use, and conservation status in the country.

*Corresponding Author
Email: gradi.val@gmail.com
Tel: +(359) 883301494

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1. Introduction

The Stock Dove is distributed throughout Eurasia and North Africa, and according to recent assessments, the species is classified as a Least Concern (LC) with global increasing population trend [1]. It has shown increasing population trends in several European countries, including Austria, Denmark, France, and others [2]. In the United Kingdom, its population increased by 51.1% over a 28-year period and by 18% during 2018-2023 [3]. The species is sometimes used as an indicator of habitat quality [4-7] up-to-date information on species' distribution and demography is important for wildlife management conservation.

The Stock Dove is both a resident species and a passage migrant in Bulgaria [1]. Although it is listed as a species of Least Concern globally, with an increasing population trend [1], in Bulgaria it is classified as Endangered [8] and is subject to a protection according to national legislation (Biodiversity Act, Annex III). Historically, the Stock Dove was widespread across the country, occurring at elevations up to 1400 m a.s.l. in mountainous areas [9]. Signs of a decline in distribution were already noted in the mid – 20th century [10], and these trends became increasingly evident during the 1980s and 1990s [11, 12]. Between 1980 and 2005, the area of occupied breeding territory decreased by more than 50%, with the decline counting until 2007 [13]. During this period, the species also disappeared as a breeder from the Ponor Mountain region [14]. In recent years, an expansion of the species' breeding range in Bulgaria has been observed, primarily encompassing several mountainous areas [15].

The aim of this study is to verify potential breeding habitats of the Stock Dove in northern Bulgaria in order to complete the breeding distribution map of the species. The present study provides information on new breeding sites of the Stock Dove in mountain habitats.

2. Materials and Methods

2.1. Study Area

A total of nineteen 10-km squares from the *European Terrestrial Reference System 1989* (referred to as ETRS) were surveyed in 2025 (Fig. **1**). The squares were selected based on a preliminary assessment of suitable breeding

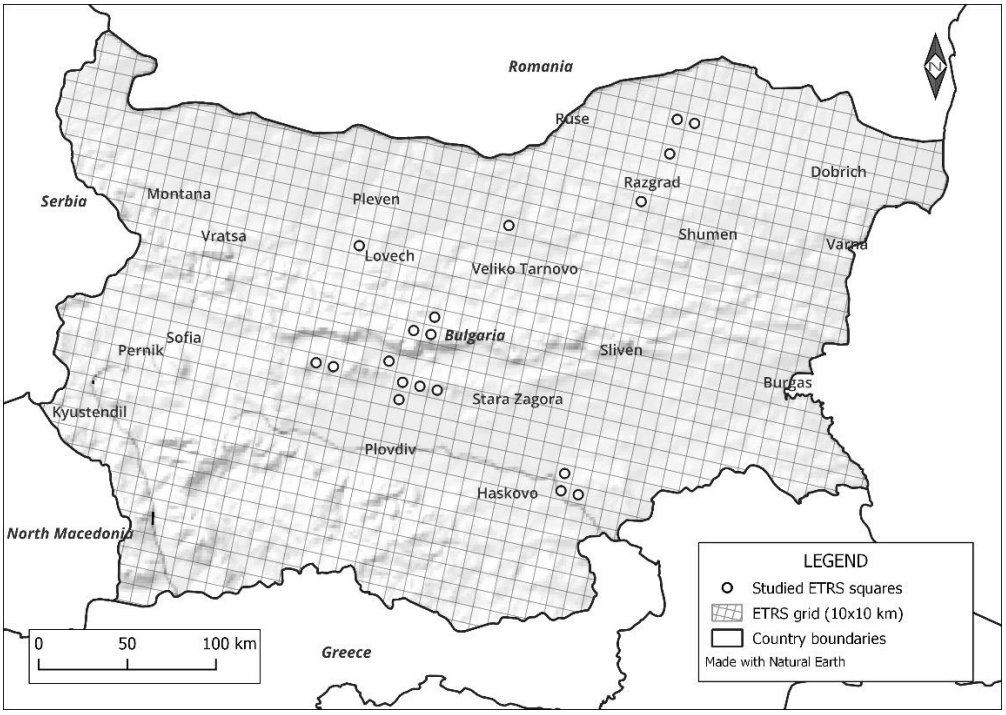

Figure 1: Study area for breeding distribution of Stock Dove (*Columba oenas*) in 19 ETRS squares in different part and habitat in Bulgaria.

habitats of the species in Bulgaria, according to data from previous authors [10-15]. The surveyed plots were preliminarily confirmed to contain suitable habitats, including old-growth deciduous forests with hollow bearing trees and old Temperate broad-leaved deciduous forests [12, 13]. In four of the squares, the presence of Stock Dove an assigned category had been recorded in previous years [15].

The main habitats within the surveyed squares include both forested and open areas. The forest habitats are represented by beech stands (*Fagus sylvatica* L.), oak forests (*Quercus* spp.), and mixed broadleaf woodlands dominated by Oriental hornbeam (*Carpinus orientalis* Mill.) and various oak species. Small patches of coniferous plantations, primarily composed of Scots pine (*Pinus silvestris* L.), are also present [16, 17]. Open habitats consist of mountain pastures and meadows, while cultivated land occupies only a minor portion of the study area. The arable plots – mostly sown with cereal crops – cover only a few acres and are intended to enhance natural food resources for game species. The only exceptions are the squares in northeastern Bulgaria, where the forest habitats are adjacent to extensive arable lands.

2.2. Data Collection

The study area was surveyed twice annually in 2025, from April to August. All macro habitats within each square were visited. Stock Doves were recorded through visual observations and acoustic detections. We used the point count method [18, 19] to determine the species' distribution. Twenty-five count points were selected in each surveyed quadrant. The points were positioned, and we excluded the territories of villages and water mirror. Every report was made between 04:30 and 07:30 am, when pigeons are most active. According to some authors, in the morning hours the birds are most active, and then we have a higher detectability [19, 20]. The data was collected in clear and quiet weather, with no rainfall. Sometimes birds may respond to the observer's presence [18, 21]. To avoid this effect, the number of birds singing at each point was counted for 5 minutes, having previously stood quietly for 2 minutes at the point to eliminate observer effects on birds' song intensity and for better detection probability [18, 19, 22]. Additional data were obtained from camera traps placed at game feeding sites in 3 squares of the Balkan Mountains. Camera traps were deployed at 13 locations between early April and mid-May. Breeding probability was assessed following Yetman (1976) and as applied by Hägemejer and Blair [23, 24]. Breeding was classified as possible, probable, or confirmed following the standard 16-category scale of the European Breeding Bird Atlas [24].

3. Results and Discussion

The presence of Stock Doves during the breeding season was recorded in two new squares (Fig. **2**). At the same time, the species' breeding was confirmed in the previously known localities (Fig. **2**).

The birds at the newly identified breeding sites were regularly observed in beech forests in April and May. This supports the classification of their breeding status as probable breeding. The Stock Doves frequently visited feeders intended for supplemental feeding of cervids and wild boar. This confirms the hypothesis for probable regarding the positive influence of such food resources on non-game species [15].

The newly discovered breeding sites are located close to those recorded since 2020. This spatial proximity suggests a local increase in records rather than unequivocal evidence of an ongoing range expansion driven by increased breeding density in previously occupied sites.

All newly recorded localities are situated in beech forests within mountainous habitats on the northern slopes of the Balkan Mountains, corresponding to the habitat characteristics of sites documented in the Sredna Gora region during 2020 – 2023 [15]. This consistency indicates that beech-dominated forests in mountainous areas are regularly used by breeding Stock Doves in Bulgaria. However, given the limited number of breeding records and the restricted geographic coverage, the importance of this habitat type for the species cannot yet be generalized and requires further empirical support.

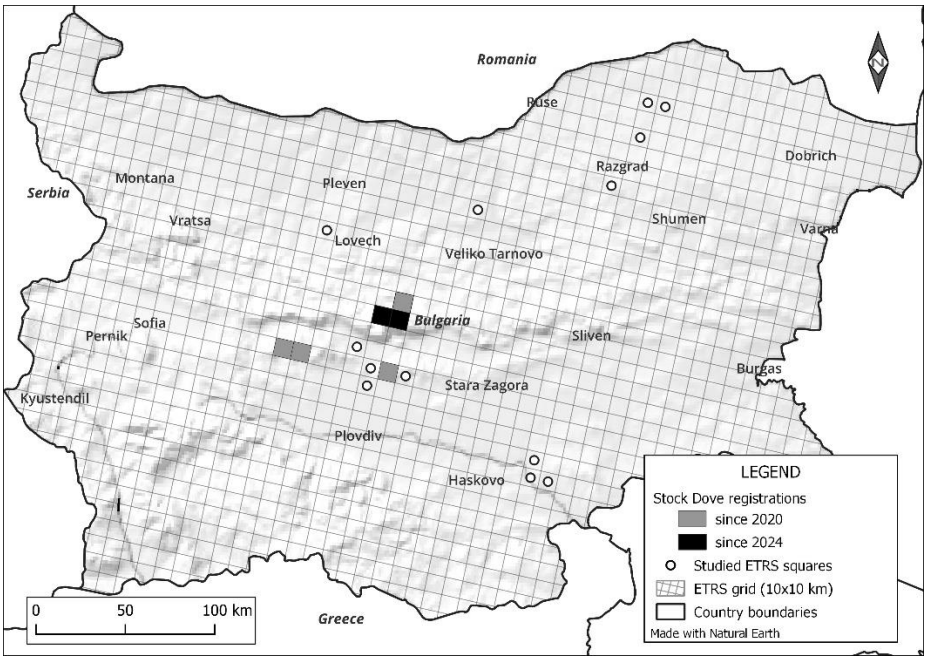

Figure 2: Breeding distribution of Stock Dove (*Columba oenas*) in 19 ETRS 10/10km squares studied between 2020-2025. The figure includes previously known breeding sites recorded after 2020 [15] and newly identified breeding sites in the present study.

In contrast, the Stock Dove was not recorded during the breeding season in surveyed lowland ETRS squares dominated by oak and mixed deciduous forests. Overall, out of 19 ETRS squares surveyed, breeding was confirmed in four, probable breeding was established in two additional squares, and the species was not detected in the remaining 13 squares. These results highlight a patchy and still poorly documented breeding distribution of the species in Bulgaria.

Range expansion of the Stock Dove have been reported in several European countries, including areas both within and beyond its traditional distribution range [25-27]. This expansion is also evident in some urbanized population of the species [28, 29]. However, recent studies addressing population density, breeding dynamics, and habitat use of the species remain scarce. In this context, our findings add new distributional data for Bulgaria but do not by themselves confirm a nationwide range expansion. Similarly, while breeding records were frequently associated with areas containing supplementary feeding sites for big game, the potential positive effect of such feeding grounds on the species should be regarded as a working hypothesis rather a demonstrated causal relationship.

Further research should focus on systematic monitoring of breeding populations, including repeated surveys of known and potential breeding sites, and the assessment of breeding success. In addition, studies examining the frequency of Stock Dove use of supplementary feeding sites and their seasonal importance could help clarify the role of such resources. Collectively, these approaches would provide a stronger basis for evaluating population trends, habitat preferences, and conservation-relevant factors affecting the species in Bulgaria.

4. Conclusion

This study provides new information on the breeding distribution of the Stock Dove in Bulgaria, documenting additional breeding sites mainly in mountainous beech forests. The results indicate a localized and patchily distributed breeding presence rather than clear evidence of a border expansion. Due to the absence of demographic and population density data, conclusions regarding population trends and drivers of distribution remain limited. The findings emphasize the need for systematic monitoring and targeted ecological studies to better understand the species' breeding ecology, habitat use, and conservation status in the country.

Conflict of Interest

The author declares that there is no conflict of interest.

Funding

This study is part of the activities under Grand 1409/2025 funded by University of Forestry.

Acknowledgements

We are greatly tankful to V. Futekov, D. Neykov for this help during the field observations and maintenance of the photo traps. We also thank the field assistance from the Voden – Iri Hisar, Cherni Lom and Rusalka-Apriltsi hunting estates.

References

[1] BirdLife International. Columba oenas. IUCN Red List Threat Species. 2024:e.T22690088A264541812. https://dx.doi.org/10.2305/IUCN.UK.2024-2.RLTS.T22690088A264541812.en (Accessed 18 Nov 2025)

[2] BirdLife International. European Red List of Birds. Luxemburg: Publication Office of the European Union; 2021

[3] Heywood JJN, Massimino D, Balmer D, Kelly L, Marion S, Noble D, *et al*. The Breeding Bird Survey 2024. BTO Research Report 765. Thetford: British Trust for Ornithology; 2025

[4] Lindenmayer DB, Margules CR, Botkin DB. Indicators of biodiversity for ecologically sustainable forest management. Conserv Biol. 2000; 14: 941-50. https://doi.org/10.1046/j.1523-1739.2000.98533.x

[5] Miller B, Reading R, Strittholt J, Carroll C, Noss R, Soule M, *et al*. Using focal species in the design of nature reserve networks. Wild Earth. 1998; 8: 81-92.

[6] Simberloff D. Flagships, umbrellas, and keystones: is single-species management passé in the landscape era? Biol Conserv. 1998; 83: 247-57. https://doi.org/10.1016/S0006-3207(97)00081-5

[7] Thompson ID, Guariguata MR, Okabe K, Bahamondez C, Nasi R, Heymell V, *et al*. An operational framework for defining and monitoring forest degradation. Ecol Soc. 2013; 18: 2-20. https://doi.org/10.5751/ES-05443-180220

[8] Golemanski V, Ed. Red Data Book of the Republic of Bulgaria. Vol II, Animals. BAS & MOEW; 2015.

[9] Patev P. Birds of Bulgaria. BAS, Sofia; 1950.

[10] Spiridonov J. Stock Dove Columba oenas. In: Golemanski V, Ed. Red Data Book of the Republic of Bulgaria. Vol II, Animals. BAS & MOEW; 2015. p.189.

[11] Spiridonov J. Stock Dove Columba oenas L., 1758. In: Botev B, Peshev C, Eds. Red Data Book of the Republic of Bulgaria. Vol II, Animals. BAS; 1985. p.121.

[12] Simeonov S, Mitchev T, Nankinov D. Fauna of Bulgaria. Vol 20, Aves, Part I. BAS, Sofia; 1990. p.345.

[13] Georgiev D, Spiridonov G. Stock Pigeon (Columba oenas). In: Iankov P, Ed. Atlas of Breeding Birds in Bulgaria. Conservation Series, Book 10. Sofia: Bulgarian Society for the Protection of Birds; 2007. p.304-5.

[14] Dyulgerova S, Nikolov S. Birds in Ponor Special Protection Area (Natura 2000), Western Bulgaria: composition, conservation status and changes over the last 30 years. Acta Zool Bulg. 2014; (Suppl 5): 97-106

[15] Gruychev G. New breeding localities of Stock Pigeon (Columba oenas Linnaeus, 1758) in Bulgaria: do game feeding grounds contribute to increasing distribution of the species? Glob J Agric Innov Res Dev. 2023; 10: 102-7. https://doi.org/10.15377/2409-9813.2023.10.6

[16] Bondev I. Vegetation in Bulgaria. Map 1:600,000 with explanatory text. St. Kliment Ohridski Univ Press, Sofia; 1991. p.180.

[17] Kopralev I, Ed. Geography of Bulgaria. ForKom, Sofia; 2002. p.760.

[18] Bibby C, Burgess N, Hill D, Mustoe H. Bird Census Techniques. 2nd ed. Academic Press, London; 2000

[19] Sutherland WJ, Ed. Ecological Census Techniques: a handbook. Cambridge University Press, New York; 2006

[20] Lynch F. Effects of point count duration, time of day, and aural stimuli on detectability of migratory and resident bird species in Quintana Roo, Mexico. In: Ralph C, Sauer J, Droege S, Eds. Monitoring bird populations by point counts. Gen Tech Rep CA: US Dept Agric, Forest Serv, Pac Southwest Res Stn; 1995. p.1-6

[21] Digby A, Towsey M, Bell B, Teal P. A practical comparison of manual and autonomous methods for acoustic monitoring. Methods Ecol Evol. 2013; 4: 675-83. https://doi.org/10.1111/2041-210X.12060

[22] Ralph C, Sauer J, Droege S. Monitoring bird populations by point counts. Gen Tech Rep CA: US Dept Agric, Forest Serv, Pac Southwest Res Stn; 1995. https://doi.org/10.2737/PSW-GTR-149

[23] Yetman L. Atlas des oiseaux nicheurs de France de 1979 à 1975. Société Française d'ornithologie, Paris; 1976. p.1-281

[24] Hägemejer W, Blair M. The EBCC Atlas of European Breeding Birds: their distribution and abundance. London: T & AD Poyser; 1997.

[25] Schulze ED, Craven D, Durso AM, Reif J, Guderle M, Kroiher F, *et al*. Positive association between forest management, environmental change, and forest bird abundance. For Ecosyst. 2019; 6: 3. https://doi.org/10.1186/s40663-019-0160-8

[26] Bowler D, Richter RL, Eskildsen D, Kamp J, Moshøj CM, Reif J, *et al*. Geographic variation in the population trends of common breeding birds across central Europe. Basic Appl Ecol. 2021; 56: 72-84. https://doi.org/10.1016/j.baae.2021.07.004

[27] Bouhissi EM, Benhamou A, Bekkouche A, Boulenouar Y, Khacheb Z, Chedad A. New distribution and breeding location of the Stock Dove Columba oenas in Algeria. Ornis Hung. 2024; 32: 209-21. https://doi.org/10.2478/orhu-2024-0015

[28] Richardson J, Lees A, Marsden S. Landscape-scale predictors of persistence of an urban Stock Dove Columba oenas population. Urban Ecosyst. 2023; 26: 249-59. https://doi.org/10.1007/s11252-022-01283-y

[29] Guenzani W, Aletti R, Giussani L. Nidificazione della Colombella (Columba oenas) in provincia di Varese. Boll Ornitol Lombardia online. 2020; 2: 2-4.