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Additional data to the historical breeding of the Eurasian Woodcock in the Carpathian Basin

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Abstract The Eurasian Woodcock is a regular breeder in the wooded areas of the Carpathian Basin. In the past, several literature reviews on the distribution and breeding biology of the species in the Carpathian Basin have been published, but these have ignored the annual reports on spring returns collected between 1894 and 1926 under the coordination of the Hungarian Ornithological Centre. These included 379 nesting records from the present area of Austria, Croatia, Hungary, Romania, Serbia, Slovakia, Slovenia, and Ukraine. The majority of the data came from the Carpathians, with a smaller number from forested areas in the lower mountains and hills. It was particularly rare in lowland areas, with most of the records coming from floodplain forests. The spatial distribution of the data is somewhat at odds with that described in recent summary works. From the Northern Carpathians and the Eastern Alps, however, these sources report fewer nestings, and most of the data come from Transylvania. The temporal distribution of the data is consistent with previously published results. In some cases nestings were found in late February and early March. The peak of nesting was in April, with only a small number of nestings reported in the second half of May. Breeding occurred significantly later in areas at higher altitudes. Nevertheless, it can be concluded that knowledge of the species' nesting in the Carpathian Basin is still incomplete.

Keywords: Austria, Croatia, historical bird observation data, Hungary, nesting, Romania, *Scolopax rusticola*, Serbia, Slovakia, Slovenia, Ukraine

Összefoglalás Az erdei szalonka rendszeres fészkelő a Kárpát-medence erdős vidékein. Az elmúlt évszázadban több szakirodalmi feldolgozás is napvilágot látott a faj kárpát-medencei elterjedésére és költésbiológiájára vonatkozóan, ezek azonban figyelmen kívül hagyták az 1894 és 1926 között a Magyar Ornitológiai Központ koordinálásában gyűjtött tavaszi visszaérkezési adatokat közlő éves jelentéseket, amelyekben 379 fészkelési adatot is említettek Ausztria, Horvátország, Magyarország, Románia, Szerbia, Szlovákia, Szlovénia és Ukrajna mai területéről. Az adatok többsége a Kárpátokból, kisebb része középhegységi és dombvidéki erdős területekről származik. Síkvidéki területeken kifejezetten ritka volt, az ottani adatok többsége ártéri erdőkből ismert. Az adatok térbeli eloszlása némiképp ellentmond az utóbbi évek összefoglaló munkáiban leírtakkal, ugyanis az Északi-Kárpátokból és a Keleti-Alpokból ezek a források kevesebb fészkelésről számolnak be, ellenben a legtöbb adat Erdélyből származik. A fészkelési adatok időbeni eloszlása megegyezik az eddig publikált eredményekkel, néhány esetben február végén és március elején is találtak fészket, de a fészkelések csúcsa áprilisban volt, május második felében pedig már csak kis számban jelezték fészkelését. A tengerszint felett magasabban fekvő területeken szignifikánsan későbbre estek a költések, mint az alacsonyabban fekvő régiókban. Az újabb eredmények mellett is megállapítható, hogy a faj kárpát-medencei fészkeléséről még napjainkban is hiányosak az ismereteink.

Kulcsszavak: Ausztria, fészkelés, Horvátország, Magyarország, Románia, *Scolopax rusticola*, Szerbia, Szlovákia, Szlovénia, történelmi madártani adatatok, Ukrajna

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Introduction

The breeding range of the Eurasian Woodcock *(Scolopax rusticola)* extends from Norway, the British Isles, Western France to Northern Spain, and from the Azores, Canary Islands and Madeira eastwards to Hokkaido and Northern Honshu (Van Gils *et al.* 2020). In recent years, it has also been recorded as a breeding species in Iceland and Northern Finland, and has generally expanded eastwards and northwards. In contrast, its distribution has become patchy in the western and southern peripheral areas (Sørensen 2020). Hungary is not a typical nesting area for this species (Bende 2021), but small numbers of nesting records are known from year to year, with a population estimated at only 50–100 'pairs' in 2017–2018 (Hadarics 2021).

Data on the nesting of the species in the Carpathian Basin were first reviewed in detail by Schenk (1943). He published 409 nesting records in a map, mainly from the period between 1908 and 1917. At that time, the Hungarian Ornithological Centre sent out questionnaires to forest authorities to collect spring return and nesting data. As pointed out by the author, the forestry staff were able to access even the most untouched forests, so that the data collection effectively covered the most important potential nesting sites. Unfortunately, he did not provided the database on which the study was based, but according to his own summary, the species nested in the highest numbers in forested areas, which basically covers the mountainous areas of the Carpathian Basin. He also pointed out that the areas around Budapest had a high number of nesting records because the data collection work of the monitoring network was more active there.

The next – and so far the last – analysis of distribution patterns was carried out by Bende (2021) and Bende and László (2020a, 2020b). In their studies, they processed nesting data published between 1846 and 2019, including the data of the map published by Schenk (1943). In the data collection, they treated separately the publications on nests found, chicks and summer roding. In the period 1846–1921, 72% of the nesting records fell in the Northern, Eastern and Southern Carpathians (Romania) and Western Transdanubia (Hungary), while in the period 1921–2019, nesting records were mainly found in the Northern Central Highlands (Hungary) and Transdanubia (Hungary).

Information on the breeding biology of the species was first reviewed by Haraszthy (2019). On the basis of egg collections, publications and personal communications, he concluded that the species breeds typically only once in the present-day area of Hungary, but occasional second broods may occur. The main egg-laying period is in April, but complete broods have been found as early as the first ten days of March, and the first broods may be laid in early June. Broods after early June until August are likely to be second broods.

Bende and László (2020b), based on the ornithological and hunting literature between 1846 and 2019, also found that the breeding of the species is prolonged, but the main period is April – May. Based on the available data, they could not clearly confirm the second breeding either.

These publications were very detailed in reporting the available data, but they did not use all the sources. In Hungary, at the turn of the 19th and 20th centuries, ornithological work was outstanding on a global scale. One of the best examples is the spring bird migration monitoring

initiated by Ottó Herman in 1894. Between 1894 and 1926, data on migratory birds in the Carpathian Basin were collected in an organised way during the spring period and published in the form of annual reports. The data collection covered the whole area of the Carpathian Basin, including the entire or part of the present area of Hungary, Slovakia, Ukraine, Romania, Serbia, Croatia, Slovenia and Austria. Each year, thousands of returning records of more than 150 migratory bird species were published, including data on Eurasian Woodcock. Given that a large part of the data was provided by foresters, more observations of Eurasian Woodcocks were published than for most species (nearly 15,000 records), and not only spring return data were published, but often nesting information was also provided. This certainly overlaps with Schenk's (1943) published map, but on closer examination the overlap is not complete. Accordingly, the annual reports also include nesting data that were previously unknown or at least unprocessed. In addition, the exact location and date are also given in these data, which further clarifies the breeding biology of the species within the Carpathian Basin.

The aim of this short communication is to present a detailed account of the nesting data reported in the annual reports, and to compare them with the results of the papers and book chapters published so far.

Material and Methods

The dataset, spanning from the years 1894 to 1926, was collected manually from published annual reports of the Hungarian Ornithological Centre (MOK) (Magyar Ornitológiai Központ 1895, Gaal 1896, 1897, 1898, Schenk 1899, 1901, 1905, 1906, 1907, 1908, 1909, 1914, 1915, 1916, 1919, 1920, 1921, Vezényi 1902, 1903, 1905, Greschik 1910, Lambrecht 1911, 1912, 1913, Hegyfoky 1917, Warga 1922, 1924, 1926, 1928). No information was given by the data providers in these reports as to the stage of nesting at which the birds were found, it was only stated that they were „at the nests". The Carpathian Basin was divided into 11 major regions for the purpose of data processing. We have plotted the temporal distribution of the data and also compared median values of nesting times for Transylvania (Romania) and Upper Hungary (Slovakia) using the Mann-Whitney U test.

We also looked at whether there were differences in breeding timing between lowland (< 200 m a.s.l.), hilly (200–500 m a.s.l.), mountain (500–1500 m a.s.l.) and high mountain (> 1500 m a.s.l.) areas. For this purpose, in addition to the data we collected, we also used the data processed by Bende (2021) from 1863 to 1947 with specific location and date designation from 14 March to 25 May (n = 75). For comparison, we used the Kruskal-Wallis test.

Results

A total of 379 nestings were reported between 1894 and 1926. The data collection was concentrated on the period 1906–1912, from which 98.7% of the data originate. The data come from a total of 269 different settlements. 203 settlements have data from 1, 39 from 2, 18 from 3, 6 from 4, 2–2 from 5 and 6 different years *(Table 1)*. Most data come from

Table 1. The number of data by settlements
1. táblázat Az adatok száma településenként (mennyiségi csökkenő sorrendben)

Location	Data	Location	Data	Location	Data
Köblér (Kiblari)	6	Budatin (Budatín)	1	Nagymaros	1
Torja (Turia)	6	Bustyaháza (Bustino)	1	Nagysomkút (Şomcuta Mare)	1
Szvarin	5	Chizsné (Chyžné)	1	Nagyszeben (Sibiu)	1
Valkó	5	Czeméte (Cemjata)	1	Nagyvárad (Oradea)	1
Gyergyóborszék (Borsec)	4	Csém	1	Németújvár (Güssing)	1
Gyertyánliget (Kobilecka Poljana)	4	Csertés (Certege)	1	Nyárad	1
Karatnavolál (Turia)	4	Csikósgórond (Csikos-Goronda)	1	Nyárádremete (Eremitu)	1
Nagyhalmágy (Hălmagiu)	4	Csíkszentkirály (Sâncrăieni)	1	Nyögér	1
Ökörmező (Mizshirja)	4	Csomorta (Lutoasa)	1	Oása	1
Szikla (Sihla)	4	Csorbató (Štrbské Pleso)	1	Óbozinta	1
Bodzaiszoros	3	Csornarika	1	Óhuta	1
Bulz	3	Darány	1	Ojtoz (Oituz)	1
Dorgos (Dorgoş)	3	Denta (Comuna Denta)	1	Ósáncz	1
Dosz	3	Dipse (Dipşa)	1	Ósva (Olšovany)	1
Élesd (Aleşd)	3	Dobrest (Dobreşti)	1	Osztrika	1
Felsőmeczenzéf (Vyšný Medzev)	3	Dobróváralja (Podzámčok)	1	Ótohán (Tohanu Vechi)	1
Görgényüvegcsűr (Glăjărie)	3	Dömös	1	Palánka (Bačka Palanka)	1
Hajdúböszörmény	3	Erdőbénye	1	Parasztdubova (Sedliacka Dubová)	1
Kopacsel (Copăcel)	3	Erdőhorváti	1	Patacskó (Vtáčkovce)	1
Láposmező (Lugi)	3	Erzsébetliget	1	Patkányospuszta	1
Madarasalja (Kľak)	3	Esztelnek (Estelnic)	1	Pécsvárad	1
Márianosztra	3	Fazacsel (Făgeţel)	1	Pelyvás (Plevník)	1
Mocsolyás	3	Feketebalog (Čierny Balog)	1	Perhát (Priechod)	1
Ogradina (Eşelniţa)	3	Feketevág (Čierny Váh)	1	Petirs	1
Rezsőpart	3	Feketeváros (Purbach am Neusiedler See	1	Pilisszentkereszt	1
Sári (Tajná-Šárovce)	3	Felsőbotfalu (Bzince pod Javorinou)	1	Plasevicza	1
Sebes (Sebeş)	3	Felsődiós (Horné Orešany	1	Poroskő (Poroskovo)	1
Sóskás	3	Felsőszinevér (Szinevirszka Poljana)	1	Pölöske	1
Alsófancsal (Fâncel)	2	Felsőszombatfalva (Sâmbăta de Sus)	1	Prigona	1

Location	Data	Location	Data	Location	Data
Alvincz (Vinţu de Jos)	2	Felsővidra (Avram Iancu)	1	Resinár (Răşinari)	1
Apsinecz	2	Felsővisó (Vişeu de Sus)	1	Revisnye (Revišné)	1
Bekényerdő	2	Fenyőháza (Ľubochňa)	1	Románbudák	1
Bikfalva (Bicfalău)	2	Fintvág (Fintoag)	1	Sacza (Šaca)	1
Brusztura (Lopuhiv)	2	Garamberzence (Hronská Breznica)	1	Salgótarján	1
Fehéregyháza (Albeşti)	2	Garamrudas	1	Sebesváralja (Podhradík)	1
Feketepatak (Čierny Potok)	2	Gömörvég (Gemer)	1	Siter (Şişterea)	1
Felsőapsa (Verhnye Vogyane)	2	Gurahonc (Gurahonţ)	1	Solymos	1
Felsővist (Viştea de Sus)	2	Gyergyótölgyes (Tulgheş)	1	Somogyom (Şmig)	1
Garamsálfalva (Šalková)	2	Gyilkostó (Lacu Roşu)	1	Somogyudvarhely	1
Gyergyóbélbor (Bilbor)	2	Gyökeres	1	Sorokpuszta	1
Gyergyóditró (Ditrău)	2	Harangláb (Hărănglab)	1	Sósmező (Poiana Sărată)	1
Gyergyószentmiklós (Gheorgheni)	2	Hátszeg (Haţeg)	1	Stósz (Štós)	1
Hajdúhadház	2	Hédervár	1	Stréza (Cârţişoara)	1
Havasmező (Poienile de sub Munte)	2	Homonna (Humenné)	1	Szakadát	1
Hosszúfalu (Săcele)	2	Hosszúpatak	1	Szalárd (Sălard)	1
Kisbag (Bag)	2	Ipolyság (Šahy)	1	Szászdálya (Daia)	1
Lipót	2	Jászó (Jasov)	1	Szatmárzsadány (Sătmărel)	1
Nagybittse (Bytča)	2	Kallós (Kalište)	1	Székelyvarság (Vărşag)	1
Németlipcse (Partizánska Ľupča)	2	Kálnok (Calnic)	1	Szekszárd	1
Ósánciszoros	2	Kaposvár	1	Szentágota (Agnita)	1
Ozera	2	Kazár	1	Szenterzsébet	1
Párnicza (Párnica)	2	Kelebia (Kelebija)	1	Szentgotthárd	1
Pilisszentlászló	2	Kelecsény	1	Szentmihályfalva (Šarišské Michaľany)	1
Preguz	2	Kelmák (Chelmac)	1	Szeráta	1
Recsk	2	Kéménd	1	Szigetújfalu	1
Sóhát (Csornoholova)	2	Kererhavas	1	Szigetvár	1
Sóslak (Szil)	2	Keresztvár (Teliu)	1	Szkoré	1
Szásznádas (Nadeş)	2	Kisdemeter (Comuna Dumitriţa)	1	Szloboda	1
Szil	2	Kisherend	1	Szokolya	1
Tekerőpatak (Valea Strâmbă)	2	Kisterenye	1	Szombathely	1
Teplicska (Liptovská Teplička)	2	Klementka	1	Szomolnok (Smolník)	1

Location	Data	Location	Data	Location	Data
Terebesfehérpatak (Gyilove)	2	Kopács (Kopačevo)	1	Szováta (Sovata)	1
Tömösiszoros (Pasul Timiș)	2	Korbest (Corbești)	1	Teke (Teaca)	1
Vármező (Câmpu Cetății)	2	Kosna	1	Teles	1
Villány	2	Kóspallag	1	Tesmagolvár	1
Znióváralja (Kláštor pod Znievom)	2	Kostéj (Coșteiu)	1	Tesna (Teșna)	1
Aga (Brestovăț)	1	Kovácsfalva (Kováčová)	1	Tjej (Teiu)	1
Ájfalucska (Hačava)	1	Köröshegy	1	Topánfalva (Câmpeni)	1
Alsóhámor (Dolné Hámre)	1	Körösmező (Jaszinya)	1	Tömösvölgy	1
Alsóhunkócz (Choňkovce)	1	Kövesliget (Drahovo)	1	Trencsénpéteri (Petrovice)	1
Alsókomána (Comana de Jos)	1	Lakócsa	1	Turjamező (Turya Polyana)	1
Alsópalojta (Dolné Plachtince)	1	Láposbánya	1	Turjavágás (Turya Pasika)	1
Árok (Jarok)	1	Laposnya (Lăpușna)	1	Újegyház (Nocrich)	1
Ásvány (Tiszaasvany)	1	Lisza (Lisa)	1	Újmassa	1
Avasfelsőfalu (Negrești-Oaș)	1	Losonc (Lučenec)	1	Újsinka (Șinca Nouă)	1
Bácsordas (Karavukovo)	1	Lövéte (Lueta)	1	Újvidék (Novi Sad)	1
Bakabánya (Pukanec)	1	Luhi	1	Unin (Unín)	1
Bárkány	1	Lunkány	1	Valeamare	1
Berczel (Bercel)	1	Mácsa	1	Varannó (Vranov nad Topľou)	1
Berencsváralja (Podbranč)	1	Magura	1	Vaségető (Železná Breznica)	1
Bobró (Bobrov)	1	Magyarbodza (Întorsura Buzăului)	1	Vaskoh (Vașcău)	1
Bodony	1	Majdánka (Majdan)	1	Veresmart (Roșia)	1
Boldogasszonyfa	1	Maluzsina (Malužiná)	1	Vichodna (Východná)	1
Bolhó	1	Marosnagyvölgy (Valea Mare)	1	Vittencz (Chtelnica)	1
Borosznó (Brusno)	1	Marzsina (Comuna Margina)	1	Vledény (Vlădeni)	1
Borsmonostor (Klostermarienberg)	1	Meczenzéf (Medzev)	1	Vucskómező (Vucskovje)	1
Bős (Gabčíkovo)	1	Mészdorgos (Varnița)	1	Zágon (Zagon)	1
Bráza	1	Mihálytelek (Michalová)	1	Zalatna (Zlatna)	1
Brennbergbánya	1	Nagybocskó (Velikij Bicskiv)	1	Zetelaka (Zetea)	1
Bruckenau (Pișchia)	1	Nagyilva (Ilva Mare)	1		

Table 2. The number and proportion of data by large regions, and the number of settlements within these large regions where nestings were reported
2. táblázat Az adatok száma és százalékos eloszlása nagy régiónként, illetve a nagy régiókon belüli települések száma

Large region	N. of data	Proportion of data	N. of settlements
Burgenland (Austria)	3	0.8	3
South Transdanubia (Hungary)	14	3.7	13
Transylvania (Romania)	130	34.3	91
North Transdanubia (Hungary)	38	10.0	26
North Hungary (Hungary)	17	4.5	13
Upper Hungary (Slovakia)	85	22.4	65
Croatia	1	0.3	1
Transcarpathia (Ukraine)	51	13.5	29
Great Hungarian Plain (Hungary)	5	1.3	2
Partium (Romania)	31	8.1	22
Vojvodina (Serbia)	4	1,1	4

Transylvania (Romania) (n = 130) and the least from Croatia (n = 1) *(Table 2)*. The territory of present-day Hungary accounts for 19.5% of the whole dataset.

The earliest date of reported nesting was on 20 February and the latest was on 25 May. It is important to point out that the survey was primarily aimed at monitoring spring migration, so no data are available for the later period.

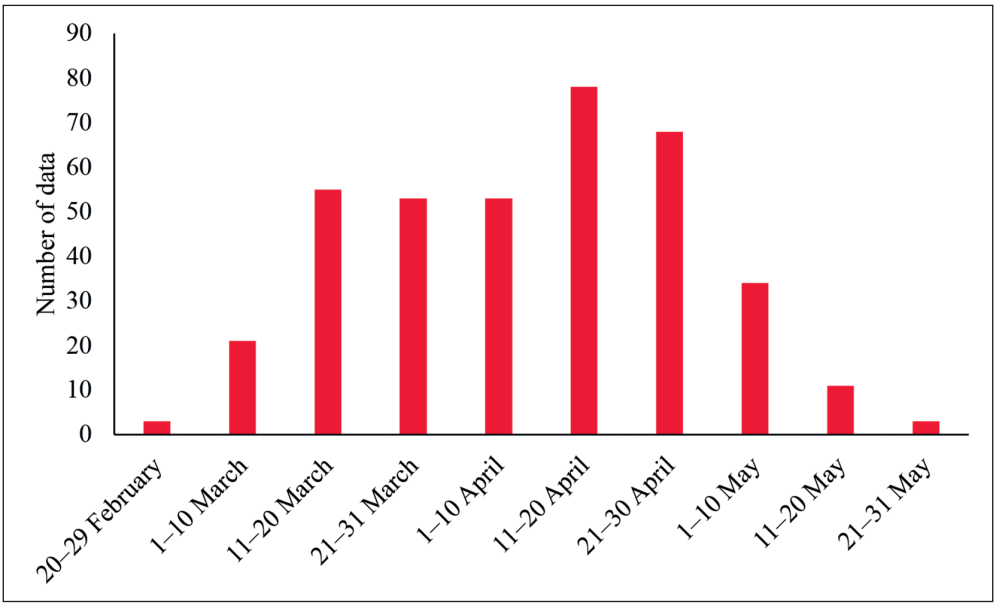

Figure 1. The temporal distribution of the Eurasian Woodcock's breeding data
1. ábra Az erdei szalonka fészkelések időbeni eloszlása

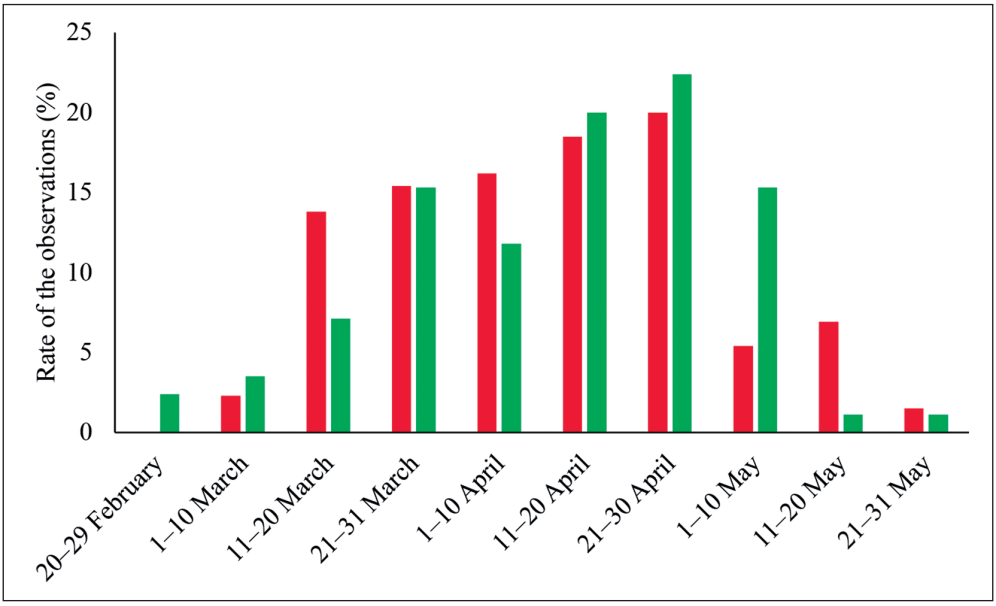

Figure 2. The temporal distribution of the rates of the Eurasian Woodcock's breeding data in Transylvania (Romania) (red bar) and Upper Hungary (Slovakia) (green bar)
2. ábra Az erdélyi (piros) és felvidéki (zöld) fészkelési adatok időbeli százalékos eloszlása

Only three nesting data were reported from the end of February, but the number remained low in the first ten days of March. The month between 11 March and 10 April show roughly the same amount of data, peaking between 11 and 30 April. Relatively high numbers of nestings were still reported in the first ten days of May, but after that the numbers dropped significantly *(Figure 1)*.

There was no significant difference ($U = 5140$, $z = -0.862$, $p = 0.388$) between the data of Transylvania (Romania) and Upper Hungary (Slovakia) *(Figure 2)*.

When examining the spatial distribution of the data, we found that there is a significant temporal shift between nesting data from lower altitudes and higher altitudes ($H = 66.49$, $p < 0.001$). Our results suggest that the median nesting date in the lowland region was on 4 April ($n = 111$), in the hilly region on 6 April ($n = 160$) and 22 April ($n = 181$) in the lower mountain regions, while we were unable to investigate the question at higher mountains due to low sample size ($n = 2$).

Discussion

The spatial and temporal distribution of the nesting data we processed also fits well the pattern reported in previous summaries (Schenk 1943, Haraszthy 2019, Bende & László 2020a, 2021). However, some important additions can be made based on the results obtained.

In terms of the spatial distribution of the data, the largest populations of the species were found in the Carpathians, with lower mountain and hilly areas being less frequent. According

to Schenk (1943), Bende and László (2020a) and Bende (2021) the Northern Carpathians were also the area with the largest number of records, but this is not supported by the data we have collected. Transylvania (Romania) – and thus the Eastern and Southern Carpathians – may have been a more dominant nesting site than the northern areas. According to the authors of previous studies, the Eastern Alps are not of particular importance for nesting, which is not confirmed by the few nesting records from Burgenland (Austria) and Western Transdanubia (Hungary) in the present study. Both studies mention that the lower forested areas of the Transdanubian region were also suitable for the species, but due to unfavourable climatic and precipitation conditions, no large populations could be established there. The data we have collected are consistent with this. The amount of data from the surroundings of Budapest was not as outstanding as Schenk (1943) reported. Thus, it is likely that the data at that time were in fact so numerous from this region because of the over-representation of the observer network.

It is worth mentioning the lowland nestings. Four nestings were reported from Vojvodina (Serbia) and five from the Great Hungarian Plain (Hungary). In Vojvodina (Serbia), nests were found in Kelebia (Kelebija), Bácsordas (Karavukovo), Újvidék (Novi Sad) and Bácspalánka (Bačka Palanka), while the data from the Great Hungarian Plain (Hungary) come from settlements of the Hajdúság (East Hungary). Schenk's (1943) map probably includes all these records, but the exact settlement names were not known until now. Nesting data from Bácspalánka (Bačka Palanka) were published as early as 1846 (Haraszthy 2015), and suggest that it may have been a regular nesting species in the floodplain forests along the Danube even in the early 1900s. Bende and László (2021) mention nesting of the species in Békés County (Sarkadremete) (Hungary) during the period 1921–2019, but our sources have not mentioned any data from this region. Here, it is worth mentioning an egg collected by Lajos Nemere in 1890 in Székudvar (Socodor) (Romania) (Haraszthy 2015), which provides further evidence for the former nesting of the species along the Körös rivers. These lowland records show that river floodplains were potential nesting site for the species at that time.

The most important result of this data collection regarding the timing of breeding is that nesting could sometimes occur as early as the end of February – beginning of March, but the results clearly show that the main nesting period is April and May. As mentioned above, we do not know at which stage of the nesting period the data providers were referring to. In most cases, the phrase „at the nest" was used, which makes it clear that at least the nest itself was built at the time of observation. Haraszthy (2019) reported the earliest complete brood from 1–10 March (n = 1). However, these were extremely rare, consistent with the results obtained by Haraszthy (2019) and Bende and László (2020b). Nesting was prolonged in the Carpathian Basin, with a peak in April and May, and there was no difference in this between the two regions with the most data. A specific feature of the data set is that there were no data later than the end of May, so we do not have data on second broods. It appears that proportionally far fewer nests were found in the second half of May than in the first half of the month or before. This finding is in line with the results of previous studies (Haraszthy 2019, Bende & László 2020b, Bende 2021).

By examining the relationship between nesting time and the altitude of nesting areas, we found that there is a significant difference in nesting times at higher elevations. We are unable

to compare this result with previous data from Hungary, but our finding on the nesting gradient is consistent with the results of a survey in England (Hoodless & Coulson 1998).

Overall, knowledge about the nesting of the species is still incomplete. Accordingly, any sporadic data could contribute to a better understanding of the nesting habits of the Eurasian Woodcock in Hungary and the Carpathian Basin.

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