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Ornis Hungarica 2024. 32(2): 298–308.
DOI: 10.2478/orhu-2024-0037

The recolonization of the Collared Pratincole *(Glareola pratincola)* in its natural steppe habitats in Hungary – an overview of the species' grassland activities between 1995 and 2024

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Received: August 29, 2024 – Revised: October 17, 2024 – Accepted: October 18, 2024

Kiss, Á., Takács, Á. & Pigniczki, Cs. 2024.The recolonization of the Collared Pratincole *(Glareola pratincola)* in its natural steppe habitats in Hungary – an overview of the species' grassland activities between 1995 and 2024. – Ornis Hungarica 32(2): 298–308. DOI: 10.2478/orhu-2024-0037

Abstract The Collared Pratincole *(Glareola pratincola)* is an endangered shorebird in Hungary, which disappeared as a character breeding species from its sodic grassland habitats during the mid-1990s. Therefore, it was a positive experience to witness the return of this species to its natural habitats, which we observed and documented in 2022 and 2024, and suggested in 2023. During the 2022 observation, one of the three pairs nesting in the Alsó-Szúnyog-puszta reached the chick-rearing stage. We have summarised twenty-one observations of the species in its natural habitat during the breeding season between 2013 and 2024. Based on our data, Collared Pratincole has been confirmed to breed three times in Hungary in its natural habitats, with five additional instances of assumed breeding between 1995 and 2021. In 2022, the species bred in sodic grassland *(Camphorosmetum annuae)* grazed with livestock. Pratincoles nested in colonies mixed with Kentish Plovers *(Charadrius alexandrinus)* and other shorebirds, such as Northern Lapwings *(Vanellus vanellus),* Black-tailed Godwits *(Limosa limosa)*, and Common Redshanks *(Tringa totanus)*.

Keywords: shorebird, sodic grassland, grazing management, nesting behaviour

Összefoglalás A székicsér *(Glareola pratincola)* egy kritikusan veszélyeztetett partimadár-faj Magyarországon amely, mint sziki fészkelő karakterfaj eltűnt természetes élőhelyeiről az 1990-es évek közepén. Ebben a tanulmányban a faj szikes pusztai élőhelyeire történő visszatérését dokumentáltuk, hiszen az eredeti szikes pusztai környezetben hosszú idő eltelte után 2022-ben jelent meg és fészkelt sikeresen Magyarországon. Feltehetően 2023-ban is fészkelt a faj gyepen, de 2024-ben a gyepi költését újra sikerült bizonyítani. A 2022-es megfigyelés során az Alsó-Szúnyog pusztán fészkelő maximum három párból legalább egy pár eljutott a fiókanevelési időszakig. Adataink alapján 2013 és 2024 között huszonegyszer észleltek a székicsért kóborlóként a költési időszakban gyepeken, továbbá három bizonyított és öt feltételezett költése ismert 1995 és 2021 között. Az Apaj határában fekvő Alsó-Szúnyog-pusztán bizonyított fészkelése magyar szürke szarvasmarhákkal illetve bivalyokkal legeltetett vakszikes területen *(Camphorosmetum annuae)* történt, ahol többek között széki lilékkel *(Charadrius alexandrinus)*, bíbicekkel *(Vanellus vanellus),* nagy godákkal *(Limosa limosa)* és piroslábú cankókkal *(Tringa totanus)* vegyes kolóniában költöttek.

Kulcsszavak: partimadár, szikes puszta, legeltetéses élőhelykezelés, fészkelési viselkedés

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Introduction

The Collared Pratincole *(Glareola pratincola)* is an insectivorous shorebird species that typically breeds in open, flat sodic areas interspersed with shallow wetlands and low vegetation in its surroundings (Cramp & Simmons 1983). The global population is presumed to be stable (BirdLife International 2021); however, European populations have shown a declining trend in recent decades (Lokhman *et al.* 2020). Within Europe, its populations are isolated and population declines were observed in both western and eastern regions (Lokhman *et al.* 2020). Threat factors include the degradation and loss of traditional steppe areas and wetland habitats. Due to these effects, the species has appeared to breed in alternative habitats, such as agricultural areas, similarly to many other shorebirds – a phenomenon increasingly observed over the past decades (Calvo 1994, Lokhman *et al.* 2020).

In Hungary, the Collared Pratincole is a critically endangered breeding shorebird, with a fluctuating population trend, though due to direct nest protection efforts, the number of breeding pairs increased significantly from 30–31 pairs to 78–86 pairs during the past twelve years (Kiss 2021, Kiss *et al*. 2024). Currently, two breeding populations are known within the Carpathian Basin, which are located in the cultivated fields near the sodic steppes of the Kiskunság region, and the agricultural habitats close to the rice fields in the Nagykunság, in the middle of the Great Hungarian Plain (Kiss *et al.* 2024). Pairs nesting in intensively cultivated farmlands are particularly vulnerable to direct and indirect impacts of agricultural practices, such as disturbance, trampling, ploughing, adverse weather conditions, and increased nest predation (Kiss *et al.* 2018). In the early 20th century, the previously stable population began to decline significantly following the changes that occurred after the Second World War, including the rapid decrease of grazing livestock. Traditionally, the Collared Pratincole was a characteristic and unique nesting species in sodic grasslands grazed by cattles and sheeps, typically near soda pans, marshes, and fishponds, which served as its typical feeding, and roosting places (Sterbetz 1974). The last stable breeding populations of the Collared Pratincole disappeared from the Southern Hortobágy in the mid-1990s (Kovács & Kapocsi 2004). In addition to disappearing from their traditional nesting sites, nesting pairs began to appear sporadically in various arable lands with sparse vegetation, typically in fallow fields. This phenomenon was documented by several ornithologists working in Hungary in the 1970s, 1980s, 1990s, and 2000s. Such nesting records were also known from Békési-sík, Hortobágy, Nagykunság, and Kiskunság (Haraszthy 2019). One of the last confirmed nesting events with parenting chicks in a natural habitat was recorded in 2000 (Pigniczki 2000).

The aim of the study is 1) to describe the recolonization of the species to its natural sodic habitat based on observations in the last three years; 2) to summarise the sightings at former breeding sites during the breeding seasons of Collared Pratincole between 2013 and 2024; and 3) to aggregate probable, suspected, and confirmed breeding data from grassland between 1995 and 2021.

Material and Methods

Collared Pratincole observation data in the former nesting sites were collected between 2013 and 2024 in Hungary, and these traditional breeding sites were documented by Sterbetz (1974) between the early 1900s and early 1970s. Further data were collected from the databases of Hortobágy National Park Directorate and Hortobágy Environmental Association, supplemented by additional records from the database of www.birding.hu and Gábor Kovács personal observations (Kovács 2017). Observations were filtered to the regional nesting period of Pratincoles, specifically between 1 April and 30 June, and include records on wandering individuals as well as typical breeding behaviours such as courtship activities, nest building, and incubation, if there are no other observations on breeding success.

Nesting events were confirmed via the observation of typical behavioural traits associated with the current breeding stage using binoculars and spotting scopes from a hotspot point (Kiss *et al.* 2018), supplemented by field methods developed by Székely *et al.* (2006) for documenting behavioural cues.

Results

Observations in the traditional nesting sites between 2013 and 2024

Based on available data, we collated twenty-one observations of Collared Pratincoles from grasslands during the nesting seasons in four counties *(Table 1, Figure 1)*. Among these observations, courtship activities were noted in three instances, although these did not continue with nesting at the observed locations.

Suspected and confirmed breeding attempts between 1995 and 2021

Between 1995 and 2021, eight breeding events were previously recorded *(Table 2, Figure 2)*. These data typically reflect the recolonization of nesting at traditional sites between the 1970s and 1990s. The data from Kiskunság can be considered verified nesting, as the nests were found and/or young chicks were observed with the parents. In the cases from Hortobágy, nests were not found after 1992, however, the observation in 2001 was documented as a colony. In other cases, based on the ageing condition of the juveniles, they could have come from nearby nesting sites in Nagykunság.

Observations in 2022

- May 18, 2022: Four Collared Pratincoles displayed intense courtship behaviour at the Alsó-Szúnyog-puszta flooding area. The site appeared highly suitable for potential resettlement, prompting its monitoring initiation (Á. Takács).
- Between May 20 and June 1, 2022: Fluctuating numbers of three to six individuals were observed in the area, showing varying levels of nesting activities (Cs. Pigniczki; Á. Takács).

Table 1. Observations of Collared Pratincoles at former grassland breeding sites during the nesting period between 2013 and 2024

1. táblázat Adatok a székicsérek előfordulásairól az egykori gyepi költőhelyeken 2013 és 2024 között, a fészkelési időszakokban

Date	Location	Number of individuals	Breeding behaviour	Observers
29.04.2014 – 19.06.2014	Apaj Alsó-Szúnyog-puszta	2	No	N. Kovács, Z. Cserna, Zs. Semperger, Á. Kiss
28.06.2014 – 28.06.2014	Sándorfalva, Fertő (fishponds)	3	No	O. Kiss, Zs. Kiss, B. Csibrány
09.06.2015	Hortobágy, Hortobágy-fishponds	1	No	D. Balla
28.06.2015 – 30.06.2015	Hortobágy, Hortobágy-fishponds	2	No	T. Emri, M. Barna Zöld, J. Tar
14.05.2016	Nagyhegyes, Kis-Álomzug	1	No	A. Szilágyi
17.05.2016 – 20.05.2016	Balmazújváros, Magdolna-puszta	1	No	J. Tar, Z. Ecsedi, D. Balla, J. Kecskés *et al*.
24.05.2016	Sándorfalva, Fertő (fishponds)	1	No	Á. Bede
22.04.2018	Nagyhegyes, Nagy-Álomzug	1	No	S. Konyhás
22.05.2018	Hortobágy, Hortobágy-fishponds	1	No	G. Kovács
16.05.2020	Hortobágy, Akadémiai-libanevelő	2	Yes, displaying male and female	J. Katona, A. Szilágyi, P. Gyüre, M. Nagy, J. Oláh
26.04.2021	Apaj, Alsó-Szúnyog-puszta	2	No	Zs. Paráda
26.06.2021	Kardoskút, Fehér-tó	1	No	E. Kovács
11.05.2023	Kunmadaras, Kunmadarasi-puszta	1	No	S. Borza, S. Ujfalusi
14.05.2023 – 24.05.2023	Hortobágy, Vincze-fenék	1	No	J. Tar, T. Zalai, T. Emri, M. Barna Zöld
01.05.2024	Hortobágy, Fényes-fishponds	1	No	M. Nagy, E. Tóth
02.05.2024	Akasztó, Miklapuszta	1	No	T. Bárdos, A. Liker, L. Kocsis
12.05.2024	Hortobágy, Hármas-puszta	1	No	M. Nagy, E. Tóth
12.05.2024 – 26.05.2024	Karcag, Kecskeri-puszta	6	Yes, displaying pairs (3)	Á. Kiss
27.05.2024	Pusztaszer, Vesszős-szék	1	No	Cs. Mészáros
27.05.2024	Mórahalom, Nagy-Széksós-tó	2	Yes, displaying pair	Cs. Mészáros, B. Tokody
17.06.2024	Kunmadaras, Kunmadarasi-puszta	3	No	S. Borza

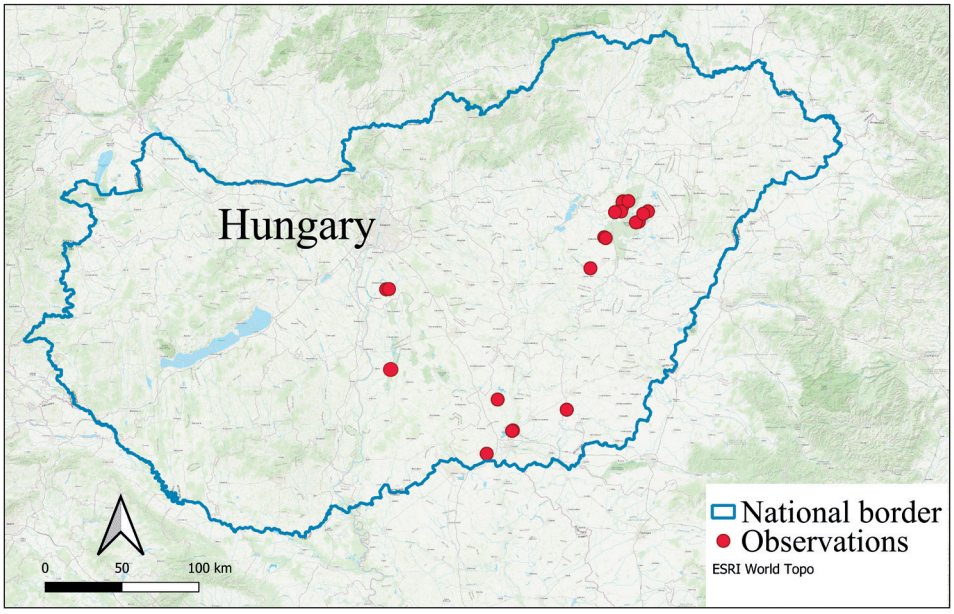

Figure 1. Data of Collared Pratincoles at traditional breeding sites during the nesting period between 2013 and 2024

1. ábra Költési időszakban mutatott székicsér-előfordulások az egykori költőhelyeken 2013 és 2024 között

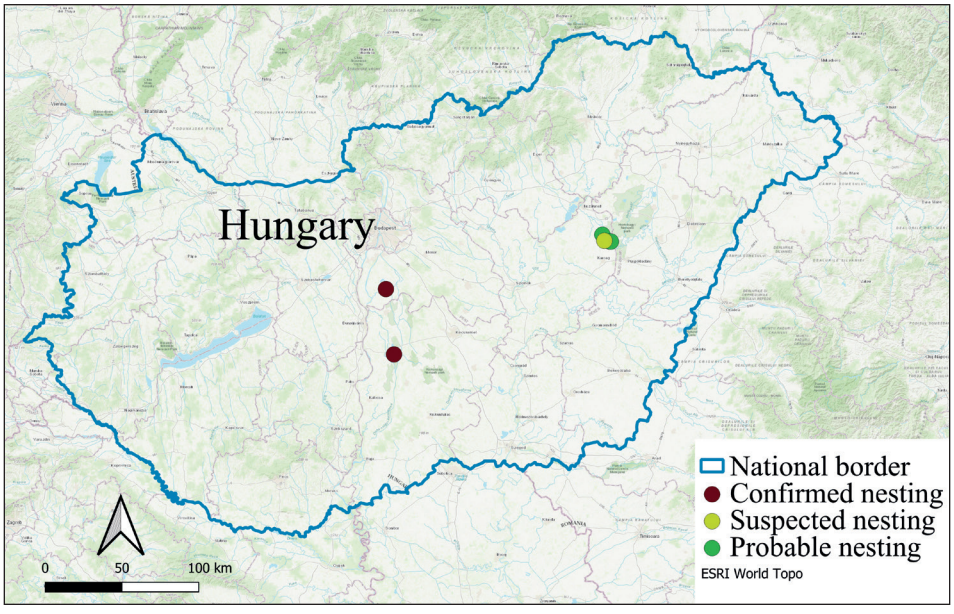

Figure 2. Probable, suspected and confirmed breeding data of Collared Pratincole in grasslands, Hungary between 1995 and 2021

2. ábra Valószínű, feltételezett és bizonyított székicsér-fészkelések gyepeken, Magyarországon 1995 és 2021 között

Table 2. Assumed and verified nesting performances of Collared Pratincoles in grassland habitats in Hungary between 1995 and 2021

2. táblázat Feltételezett és igazolt gyepi székicsér fészkelések 1995 és 2021 között Magyarországon

Date	Location	Habitat *(Plant community)*	Comfirmed nesting (no. of pairs)	Details	Observer
1997	Apaj, Alsó-Szúnyog-puszta	Sodic grassland *Camphorosmetum annuae, Puccinellietum limosae*	Yes (10–12)	Found nests	A. Széll
09. 09. 1998	Kunmadaras, Ecsezug	Sodic grassland *Camphorosmetum annuae Puccinellietum limosae*	No (1)	Two chicks (unknown age of chicks) with two parents, nest not found	G. Kovács
24. 06. 2000	Fülöpszállás, Kelemen-szék	Soda pan	Yes (1)	Two freshly hatched chicks with parents	Cs. Pigniczki (Pigniczki 2000)
2001	Kunmadaras, Csíkos-hát	Sodic grassland *Camphorosmetum annuae*	No (4–5)	Alarming behaviour, no found nests	G. Kovács
2004	Apaj, Alsó-Szúnyog-puszta	Sodic grassland, *Puccinellietum limosae*	Yes (8–10)	Nesting, nests with eggs were flooded by water after a heavy rain	Cs. Pigniczki, A. Széll
07.08. 2004	Kunmadaras, Forrás-fenék	Sodic grassland *Camphorosmetum annuae*	No (3)	Alarming behaviour, nest not found	G. Kovács
10. 08. 2005	Karcag, Ecsezug	Sodic grassland *Camphorosmetum annuae, Puccinellietum limosae*	No (1)	One chick (unknown age of chicks) with two parents, nest not found	G. Kovács
16. 07. 2013	Karcag, Ecsezug	Sodic grassland *Camphorosmetum annuae, Puccinellietum limosae*	No (3)	Adults with freshly fledged juveniles	G. Kovács, S. Borza

- June 1, 2022: In the late afternoon and early evening, three adult Collared Pratincoles were present. At 18:15, three individuals aggressively attacked a Northern Lapwing. Twenty minutes later, two individuals rested on the shore of the floodplain. At 19:15, one individual flew approximately 300 metres to a barren area, exhibited typical nesting behaviour, including checking and adjusting eggs, and assumed a brooding posture (Á. Kiss, P. Ócsai, Cs. Pigniczki, Á. Takács).
- June 18, 2022: No Collared Pratincole sightings were reported in the area (Cs. Pigniczki).
- June 28, 2022: Three individuals displayed typical nesting behaviour for the species, chasing away European Magpies *(Pica pica)*. Later, they returned to roughly the same spots on the ground and remained vigilant (Á. Kiss, M. Lóránt, Á. Takács) *(Figure 3)*.
- July 22, 2022: Two pairs were observed feeding; at one pair, Á. Takács spotted a nestling estimated to be no more than one week old.

Figure 3. A sentinel adult Collared Pratincole at Alsó-Szúnyog-puszta in 2022 (Photo: Ádám Kiss)
3. ábra A fészkelőhelyen őrködő székicsér Alsó-Szúnyog-pusztán 2022-ben (Fotó: Kiss Ádám)

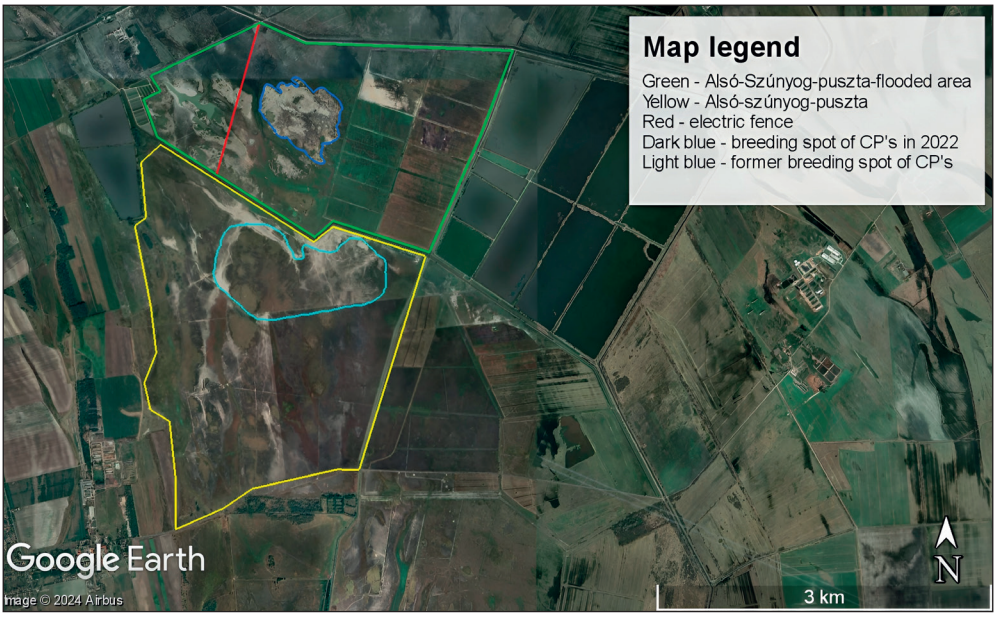

Figure 4. Distribution map of the breeding area of Apaj in 2022, important characteristics bordered by different coloured lines
4. ábra Az apaji fészkelőhely és jellemző szerkezeti elemei 2022-ben

Figure 5. Structure of the alkaline grassland as a breeding site of Collared Pratincoles in 2022 (Photo: Ádám Kiss)
5. ábra A székicsér gyepterületi fészkelőhelye 2022-ben (Fotó: Kiss Ádám)

Based on our observations, it is likely that between late May and early June in 2022, a minimum of one, and a maximum of three pairs of Collared Pratincoles began nesting under natural conditions on a grassland site. First clutches probably failed, however 1–2 pairs in the replacement clutches nested successfully.

This site covers approximately 329 hectares and has been managed through extensive grazing by local farmers under the professional supervision of the Kiskunság National Park Directorate. In 2022, the area was grazed by Hungarian grey cattle and water buffalo, enclosed by electric fencing *(Figure 4)*. This high-level grazing management served as habitat maintenance. The area was flooded by freshwater during the winter. Within the flooding zone, the livestock created a highly mosaic habitat structure through grazing and trampling, benefiting shorebirds with varying habitat requirements.

The Collared Pratincoles and Kentish Plovers *(Charadrius alexandrinus)* selected a barren, approximately 1.6 ha area in the central part of the grassland that sparsely covered with halophile vegetation, and the surface of the ground was poached because of the trampling of the cattles *(Figure 4)*. This white, sodic patch had a few larger areas with manure crust and scattered dung. This specific microhabitat was ideal for Pratincoles due to its unique structure and vegetation *(Figure 5)*.

In Alsó-Szúnyog-puszta, the area's conservation status has been consistently excellent over the years, indicated by the presence of numerous valuable and rare shorebirds as important character species nesting alongside Collared Pratincoles. These include numerous

pairs of Northern Lapwing *(Vanellus vanellus)*, 2–4 pairs of Kentish Plover, and a few pairs of Black-tailed Godwit *(Limosa limosa)*, and Common Redshank *(Tringa totanus)*, all confirmed as co-nesting shorebird species.

Visitors were closed out, thus direct and indirect human disturbance was eliminated. Trampling by grazing livestock in the flooded area likely destroyed some shorebird nests. Predation by mammalian and avian predators could have affected the nesting success of Collared Pratincoles and co-nesting shorebird species at the flooding site. We observed Red Foxes *(Vulpes vulpes)*, Western Marsh Harriers *(Circus aeruginosus)*, European Magpies, and Hooded Crows *(Corvus cornix)* in the area. Fox sightings occurred once, while Harriers were regularly present in small numbers (1–2 individuals). Hooded Crows occasionally flew alone above the area, however, did not establish a sustained presence due to the lack of suitable roosting sites. It is important to note that the medium-voltage power line in the area was removed in 2019, previously, the pylons and wires were both used as perching spots by predators, including Hooded Crows and other avian predators.

In 2022, intensive rainfall likely did not cause nest failures as no significant precipitation events happened that year. However, in 2023 and 2024, the area was affected by larger amount of precipitation during spring and summer.

Observations in 2023

- One adult was observed on 29th April (Á. Takács).
- Between May 6 and July 3, five additional observations were recorded from the area, typically involving 1–4 individuals, either on the ground or feeding above the site, reported by observers and uploaded to the www.birding.hu database.

Observations in 2024

- Two displaying adults were observed on the site on 2nd May (Á. Takács). Cs. Pigniczki likely found and recorded an alarming, plus an incubating pair on 25 May. These birds attacked flying predators, too. The two pairs moved to the former, traditional breeding site. A few days later, nesting could no longer be confirmed as the breeding bird was not present, the cause of nest failure remained unknown.
- On June 3, T. Sápi observed a mating pair at Kelemen-szék near Fülöpszállás.
- On 5 June, Cs. Pigniczki also observed the same pair at Zab-halmi-szék, they arrived from the south, probably from Kelemen-szék and moved forward to the north while hunting above the area.

Discussion

Here, we presented the recolonization events of the Collared Pratincole in sodic grasslands habitats in Hungary in 2022–2024. Pratincoles are also nested in similar, low-vegetation and rarely covered nesting sites with huge bare areas on the ground, which

have historically characterized as the typical habitat of this species. This type of sodic grassland environment with this character plant community structure grazed mainly by cattle was similar to that was documented by Szabó (1980) in the Hortobágy. In southwest Spain, Collared Pratincoles chose breeding sites on dry mud spots close to marshlands, which were covered by cow pats in higher densities (Villanueva 1993). In 2022, Hungarian grey cattles often rested close to the breeding sites during the midday hours, leading to a higher density of cow pats.

The persistent emergence of Collared Pratincole nesting in natural habitats provides hope for conservation efforts, as the species' habitat selection likely involves a complex interplay of known and unknown factors. Indeed, it is a well-known fact in management processes that the grazing level of the area needs to be high. A similar habitat management practise was previously observed at the Kunmadarasi-puszta area, in the Hortobágy by Gábor Kovács, moreover in Doñana National Park, Spain, where the breeding habitats around the salt lakes were grazed by a mixed flock of cattle and horses before the breeding season in 2018 (Á. Kiss *pers. obs.*). The high level of grazing in the habitat likely increased the local insect density, making potential prey more easily available in the area, however, we did not investigate this at this time. Hopefully, in the coming years, the species will reappear in previous traditional steppe and soda pan habitats, especially following successful nesting events by resident pairs during the preceding years. If management conditions remain favourable and the presence and density of co-nesting shorebird species show similar patterns, Collared Pratincoles could potentially become regular breeders in the natural habitats of the Kiskunság region.

In recent years, grazing management changes have also taken place in various parts of the Hortobágy region, suggesting that the species may also appear there before and during the breeding season, with individuals or pairs exploring the area. The species regularly visited the wetlands and "pusztas" of Southern Hortobágy during the nesting period and immediately after, which assumes that the ecological conditions for the species were favourable at that time. Though less frequent, spring and early summer sightings indicate that individuals potentially wandering through the region or those starting their breeding season later or after failed attempts may return to former nesting sites if suitable feeding conditions persist, possibly staying longer. Moreover, after the end of the breeding season, individuals from the current population in Nagykunság also reach their former steppe nesting sites. This was evidenced by a colour-ringed individual marked as a chick near to Nagyrét (Kisújszállás) in 2022, and observed as a juvenile by S. Borza close to Nagyiván.

Acknowledgements

We would like to thank Gergely Károly Kovács, son of Dr Gábor Kovács †, for contributing to the processing of his father's field observations. We also thank all observers for consenting to the publication of their data. We are grateful to Miklós Lóránt, district supervisor of the Kiskunság National Park Directorate, for his practical advice.

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