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Odprli ste novo številko Acrocephalusa, že pred tem pa ste najverjetneje opazili nekoliko spremenjeno grafično podobo revije. Morda se vam zdi, da ta kljub zamudi v izhajanju revije ni bistvenega pomena, a vendarle nekoliko pripomore k optimizaciji uredniškega procesa. Pred vami je celoten letnik 2021, temu pa bo letos sledil še celoten letnik 2022. V preteklih letih smo "pridelali" zamudo, zdaj pa se na vso moč trudimo, da jo čim prej "zakrpamo". K temu izdatno pripomorete tudi pisci, zato se ne obotavljajte pri pripravi in oddaji prispevkov. Veselim se prebiranja vaših raziskovalnih izsledkov in upam, da se naše poti kmalu srečajo, na papirju, elektronsko ali v živo.

* * *

You just opened the new issue of Acrocephalus, but even before doing so you must have noticed a slightly changed graphic image of the magazine. You may think that this change, despite the delay in the publication of the magazine, is not of primary importance, yet it certainly helps in the optimization of the editorial process. All issues published in 2021 are in front of you, and will this year be followed by all 2022 issues. This will greatly be contributed by you, the authors of the articles, so don't hesitate to prepare and submit your contributions. I look forward to reading your research findings and hope our paths will cross soon, on paper, electronically, or in person.

Tilen Basle
urednik / Editor-in-Chief

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Habitat use by waterbirds at Rački ribniki, NE Slovenia

Raba habitata vodnih ptic račkih ribnikov, SV Slovenija.

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The difference in habitat use by the observed waterbird species at Rački ribniki (Rače Ponds, NE Slovenia) was studied between June and August 2011. It was assessed that different waterbird species, even closely related species like *Aythya* ducks, use wetlands differently, with Tufted Ducks *A. fuligula* observed more on Open water and Ferruginous Ducks *A. nyroca* more often amongst Floating vegetation. The latter was used more often probably due to the abundance of food in the habitat. Highest species richness was recorded on Floating vegetation as well. This was reflected in species richness of individual ponds, where ponds with more floating vegetation had higher species richness. Although Coots *Fulica atra* were expected to utilize Floating vegetation more often due to their feeding preferences, they were observed more often on Open water probably feeding on fish fodder available there. The difference in habitat use by the families and nonbreeding individuals of the same species was noted, too, mostly by observing families in habitats that provide more cover from predators (Reeds), or more invertebrate food (Floating vegetation) for the young that often feed on different food than adults. Furthermore, it was suggested that overall management of wetlands should consider providing more suitable wetlands with larger aquatic vegetation cover.

Keywords: Rački ribniki, waterbirds, habitat use
Ključne besede: Rački ribniki, vodne ptice, raba habitata

1. Introduction

The type of habitat a species uses and the extent of overlap with habitat of other species are dependent on how we describe the habitat (Jones 2001). We tend to lump all wetland species in the same basket, but detailed analysis of their feeding habitat usually reveals a considerably different picture (Murkin *et al.* 1997, Clark & Shutler 1999). For example, many wader species use their own strategy and a different microhabitat when foraging together (Granadeiro *et al.* 2007; Lantz *et al.* 2011). The same applies for dabbling ducks, where some feed mainly on land (i.e. Wigeon *Mareca penelope*), while others, like Shoveler *Spatula clypeata*, feed mainly from the water surface (Arzel & Elmberg 2004).

Since similar species may use the same habitat in a different way (Clark & Shutler 1999; Hino *et al.* 2002), the habitat use has an important consequence for nature conservation. For a successful conservation it is necessary to know which species are using what habitat and how (Ma *et al.* 2010). This is especially important for the areas used for both economical activities and conservation. Due to the

importance of habitat use for conservation purpose, it is more and more often part of bird studies in Slovenia, including studies of waterbirds such as of five riverbed species on the Drava river (Božič & Denac 2017), the Mediterranean Shag *Gulosus aristotelis* (Bordjan *et al.* 2013), Harriers *Circus* sp. (Vogrin 1997) and the Mallard *Anas platyrhynchos* (Bordjan 2020). Also, three studies have been published in Slovenia so far, showing distribution of different wetland species within a selected wetland (Bordjan 2012, Deberšek & Bordjan 2016, Koce 2018), indicating habitat partitioning in those species/groups. While several studies on waterbirds have been carried out at Rački ribniki (Vogrin 1998, Vogrin 1999, Vogrin 2001, Vogrin 2002, Denac *et al.* 2011), none have dealt with habitat partitioning or conservation resulting from habitat use. The site is an Important Bird Area (Denac *et al.* 2011) and as such part of Nature 2000 network (Ur. l. 2013). Several conservationally important species nest in the area and since ponds are privately owned it is important to evaluate the significance of different habitats for these species for future management purposes.

Slovenia is considered a country with many wetlands (Uhan & Bat 2003) that cover less than 1% of the entire country. 0.3% of Slovenia is covered by about 1,300 bodies of standing water (Remec-Rekar & Bat 2003). Most of them are artificial in their origin, such as gravel and clay pits, accumulations and created ponds comprising 31.01km^2 or approximately half of all lakes and ponds (Remec-Rekar & Bat 2003). Artificial water bodies usually look different from natural ones and have different ecological role (Georgiadis *et al.* 2010). Artificial lakes and ponds in Slovenia look mostly similar in their appearance. They are often small with more or less steep banks, with little or no riparian or aquatic vegetation. The consequence is that only a few sites are internationally important for breeding wetland birds (Denac *et al.* 2011). Wetlands with higher species richness are shallower, have more varied topography, are larger and have vegetation with variable cover-to-water ratios (Gibbs *et al.* 1991; Ma *et al.* 2010).

The aim of the paper was to study the difference in habitat use among the observed waterbird species and to evaluate the importance of separate fishponds depending on aquatic vegetation. Additionally, we wished to consider conservational importance of different habitats.

2. Study area and Methods

2.1. Study area

Rački ribniki are part of the Rački ribniki – Požeg Landscape Park situated in the western part of Dravsko polje in NE Slovenia. The park measures 484 ha (Municipality Rače-Fram 2020) of which 76 ha are covered by standing water bodies (Vogrin 1994; Vogrin 1999). Rački ribniki are composed of three fairly large fishponds (Veliki, Mali and Gajič) and several smaller fish rearing ponds. They are surrounded by forests on the western and southern sides and by a tree hedge that cuts into arable land and meadows on the eastern side. Fishponds are divided by a dike with paved road that is frequently used by visitors. The road is lined with trees towards Gajič and reeds toward Veliki ribnik. All fishponds are shallow (less than 1m on average) and used as a fish farm for warm-water fish like the Common Carp *Cyprinus carpio*. Veliki ribnik is the largest of the three, covering 20 ha. On its northern side, it is lined with the Cattail *Typha* stand and covered with the Yellow Floating Heart *Nymphoides peltata* (Vogrin 1999). Thin belt of Reeds *Phragmites australis* is present on the eastern and south-eastern sides. In the recent years, the Water Caltrop *Trapa natans* has been spreading on the southern side. The youngest, constructed in the seventies, and the second largest with 8.5 ha is Gajič (Vogrin 1994). It has less water vegetation than other fishponds and its banks are mostly bare or overgrown by bushes and trees. Mali ribnik is the smallest of the three with 4.5 ha. On the northern side it is covered by a sizable Cattail stand and predominantly by Water Caltrop (Vogrin 1999). For the purpose of this survey, fishponds were termed A (Veliki ribnik), B (Gajič), C (Mali ribnik) and D (smaller ponds in the N), as shown in Figure 1. Birds, especially waterbirds, were under thorough research in the 1990s. The species richness and abundance was studied (Vogrin 1999), as well as breeding (Vogrin 2001; Vogrin 2002) or migration of the selected species (Vogrin 1998). Data from these and later surveys were used for IBA proposal (Denac *et al.* 2011) and in a designation of SPA Črete (SI5000027).

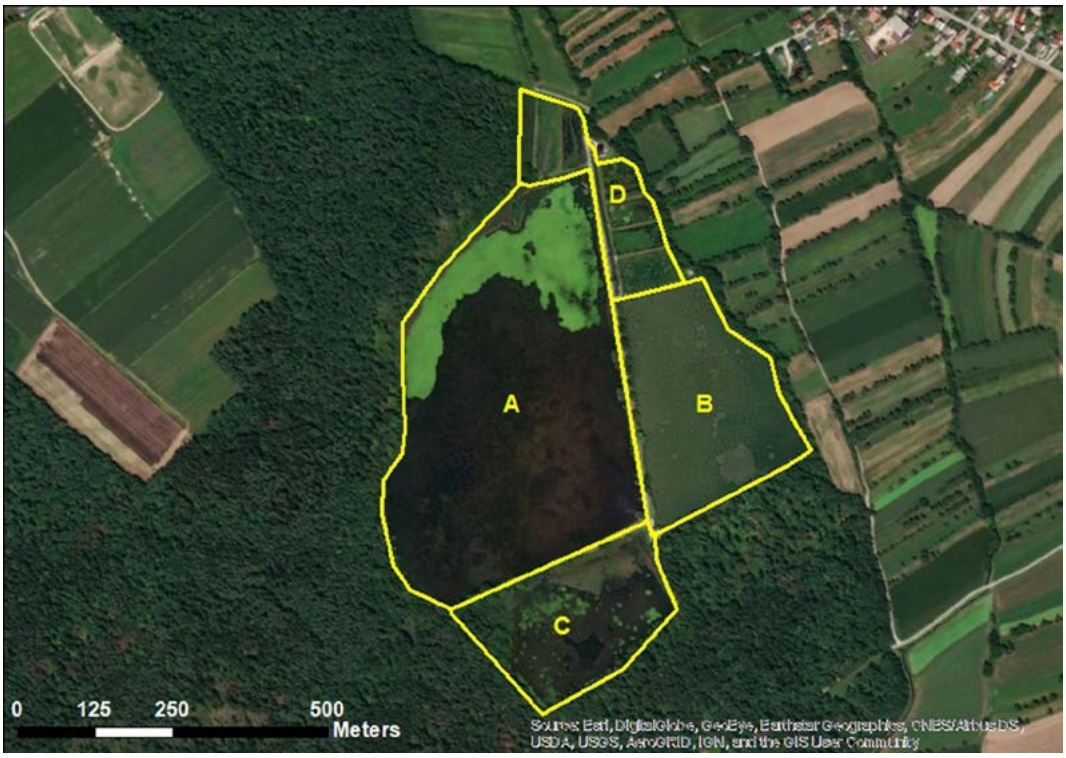

Figure 1: Study area with Fishponds: A – Veliki ribnik, B – Gajič, C – Mali ribnik, D – several smaller fishponds

Slika 1: Območje raziskave z ribniki: A – Veliki ribnik, B – Gajič, C – Mali ribnik, D – manjši ribniki

2.2. Methods

Waterbirds were surveyed 16 times in several-day intervals between 26 June 2011 and 14 August 2011, using binoculars and a spotting scope (20–60x). Survey was carried out at different times of day for at least 30 minutes on every occasion from the paved road or from a watchtower at the southern side of Fishpond B. Fishponds were surveyed to the greatest extent possible, with no major differences between the surveys. In the previously prepared form we recorded date and time of the survey, the number of observed species, the location, the habitat and the behaviour of observed individuals. We classified all habitats in five groups: Bank (shoreline around all fishponds), Reeds (both Cattail and Common Reed), Floating vegetation (including Pondweed *Potamogeton natans* in smaller ponds D), Mixed vegetation (including both reeds and floating vegetation) and Open water. Due to the low visibility in reeds we grouped both reeds and mixed habitat together in Reeds (both characterized by a different density of emergent vegetation) for analysis. We calculated the surface of each habitat with the use of satellite image in ArcMap 10.5 program (ESRI 2015), where we combined the map with an approximation from observations in the field (e.g. border between Open water and Floating vegetation). For calculating the area of the Bank, we used arbitrary distance of 1m from the edge of the water. Since the area of individual habitats was more or less estimated and not measured, some error was expected. For this reason, we approximated the area of individual habitats to the nearest 1%. All habitats were present in all fishponds with the exception of Fishpond B (Table 1). Individuals of all species were counted separately even if in a flock. Families and immature

individuals were treated as one unit regardless of the number of fledglings in a family. All herons and egrets were grouped into one taxonomic category. Of all observed behaviours, only feeding and resting had enough observations for statistical analysis.

Chi-square test was used for testing the habitat use. For this, the share of estimated area of habitat with the share of individuals in that habitat was compared. Herons and Tufted Ducks were excluded from this test, since they were present in only one and two habitats, respectively. Furthermore, the difference in habitat use between families and other individuals for species with more than a minimum of ten observations (Fay & Gerow 2018) of families was tested. The difference between habitat use for resting and feeding behaviours for species, where the selected behaviour in at least three habitats was observed, was also tested. Program R (R Core Team 2017) was used for all chi-square tests.

3. Results

3.1. Habitat use of observed waterbirds

More than half of the individuals of all species were observed on Open water and a third on Floating vegetation. Three species of *Aythya* ducks were absent from at least one habitat, while herons as a group were observed in one habitat only (Table 2). Tufted Duck *Aythya fuligula* was the only species that was observed almost entirely on Open water, while almost three quarters of Crested Grebe *Podiceps cristatus* were observed in the same habitat. Mute Swan *Cygnus olor*, Crested Grebes and Coot *Fulica atra* were evenly distributed among the observed habitats compared to what was available, while the rest were distributed unevenly with one or two habitats being preferred (Table 2). There was a difference in habitat use in the observed individuals compared to families in Mallards (Chi^2: 53.9, df = 3, $p < 0.001$), Crested Grebes (Chi^2: 27.0, df = 2, $p < 0.001$) and Coots (Chi^2: 146.3, df = 3, p = $p < 0.001$) but not in Little Grebe (Chi^2: 2.9, df = 2, p = 0.238). Mallard families were observed more often amongst Floating vegetation and Open water, whereas Crested Grebe and Coot families were observed more often amongst Floating vegetation and Reeds.

Five species observed in all habitats and with enough collected data (Table 2) used different habitat while resting compared to feeding (Table 3) and three species with both behaviours observed in the same three habitats used habitat differently for each behaviour (Crested Grebe: Chi^2: 16.6, df = 2, $p < 0.001$; Little Grebe: Chi^2: 7.5, df = 2, $p < 0.001$; Coot: Chi^2: 106.9, df = 2, $p < 0.001$). Mallard, Little Grebe and Common Moorhen predominantly fed on Floating vegetation, while Crested Grebes and Coots fed largely on Open water (Table 3). The preferred habitat was similar for resting. Mallard was an exception with the majority of individuals resting on Bank and only some on Floating vegetation. Reeds were important for feeding Little Grebe and resting Common Moorhen.

3.2. Presence of waterbirds on individual Fishponds

Most waterbirds were counted on Fishpond A (81.7%) and the least on Fishponds D (1%; Table 4). Although the majority of individuals were observed

Table 1: Percentage of habitats on fishponds rounded to 1%

Tabela 1: Odstotki habitatov na ribnikih zaokroženi na 1 %

Fishpond / Ribnik	Reeds / Trstičje	Floating vegetation / Plavajoča vegetacija	Open water / Odprta vodna površina	Bank / Brežina
Veliki ribnik(A)	11	21	67	1
Gajič (B)	0	5	94	2
Mali ribnik(C)	23	53	22	2
Small fishponds / manjši ribniki (D)	26	25	42	7
All / Skupaj	11	22	65	2

Table 2: Number and percentage of individuals of waterbirds observed in different habitats and results of Chi² test between available area of individual habitat and the number of individuals counted. Statistically significant results are presented in bold.

Tabela 2: Število in odstotek osebkov vodnih ptic, opazovanih v različnih habitatih, in rezultati Chi² testa med posameznimi habitati in številom preštetih osebkov. Statistično značilni rezultati so označeni krepko.

		% of individuals in different habitat / % osebkov v različnih habitatih				Chi² test		
Species / Vrsta	Number / Število	Bank / Brežina	Floating vegetation / Plavajoča vegetacija	Open water / Odprta vodna površina	Reeds / Trstičje	Chi2	df	p
Cygnus olor	16	18.8	18.8	43.8	18.8	5.0	3.0	0.172
Anas platyrhynchos	429	19.1	28.7	21.7	30.5	**37.4**	**3.0**	**< 0.001**
Aythya ferina	90	0.0	76.7	22.2	1.1	**332.4**	**2.0**	**< 0.001**
Aythya fuligula	53	0.0	13.2	86.8	0.0			
Aythya nyroca	404	0.0	95.0	2.7	2.2	**193.0**	**2.0**	**< 0.001**
Herons / Čaplje	18	100.0	0.0	0.0	0.0			
Podiceps cristatus	355	0.3	19.2	74.6	5.9	6.0	3.0	0.110
Tachybaptus ruficollis	224	0.9	32.1	35.7	31.3	**9.0**	**3.0**	**0.030**
Fulica atra	5,729	3.2	30.6	62.4	3.7	6.1	3.0	0.109
Gallinula chloropus	85	9.4	70.6	1.2	18.8	**34.0**	**3.0**	**< 0.001**
Totall /Skupaj	7,403	4.0	34.3	55.4	6.3			

Table 3: Percentage of individuals of observed waterbird species resting or feeding in separate habitats

Tabela 3: Odstotek opazovanih osebkov vodnih ptic med počitkom in prehranjevanjem v različnih habitatih

		Bank / Brežina	Floating vegetation / Plavajoča vegetacija	Open water / Odprta vodna površina	Reeds / Trstičje
Anas platyrhynchos	Feeding / Prehranjevanje	0	93.5	0	6.5
	Resting / Počitek	87.8	10.0	0	2.2
Podiceps cristatus	Feeding / Prehranjevanje	0	5.0	88.3	6.7
	Resting / Počitek	0	34.6	57.7	7.7
Tachybaptus ruficollis	Feeding / Prehranjevanje	0	44.4	24.4	31.1
	Resting / Počitek	4.0	64.0	28.0	4.0
Fulica atra	Feeding / Prehranjevanje	0	8.1	81.1	10.8
	Resting / Počitek	0.1	34.5	63.6	1.8
Gallinula chloropus	Feeding / Prehranjevanje	0	89.1	0	10.9
	Resting / Počitek	29.4	47.1	0	23.5

Table 4: Number and percentage of individual waterbirds observed at separate fishponds

Tabela 4: Število in odstotek posameznih vrst vodnih ptic, opazovanih v posameznih ribnikih

		Fishpond / Ribnik [%]			
Species / Vrsta	Number / Število	Veliki ribnik (A)	Gajič (B)	Mali ribnik (C)	Small ponds / manjši ribniki (D)
Cygnus olor	18	77.8	11.1	5.6	11.1
Anas platyrhynchos	501	46.9	23.6	24.4	5.2
Aythya ferina	106	28.3	0.0	71.7	0.9
Aythya nyroca	574	7.3	0.0	92.7	0.0
Aythya fuligula	74	71.6	0.0	21.6	0.0
Herons / Čaplje	21	21.1	73.7	0.0	5.3
Podiceps cristatus	503	81.1	6.8	12.1	0.0
Tachybaptus ruficollis	314	39.2	14.5	45.8	1.3
Fulica atra	7,005	94.3	0.3	4.7	0.7
Gallinula chloropus	112	20.5	1.0	74.3	8.9
Total / Skupaj	9,223	81.7	2.6	14.7	1.0
Density (ind. / ha) / Gostota (os. / ha)	262.8	376.7	27.7	301.9	45.2

on Fishpond A, the density (individuals per hectare) was only slightly higher than on Fishpond C. The density at Fishponds D was almost twice as high as at the much larger Fishpond B (Table 4). All species were observed only on Fishpond A, whereas herons were absent from Fishpond C, the same as diving ducks from Fishpond B (Table 4). The majority of Common Pochards, Ferruginous Ducks, Common Moorhens and almost half of Little Grebes were observed on Fishpond C. Most herons were observed on Fishpond B, while the majority of Tufted Ducks, Mute Swans, Coots, Crested Grebes and nearly half of Mallards were observed on Fishpond A. None of the species were observed in any significant numbers on Fishponds D (Table 4).

4. Discussion

Different waterbird species, even closely related species like *Aythya* ducks, use wetlands differently, with Tufted Duck observed more on Open water and Ferruginous more amongst Floating vegetation. Habitat partitioning was noted for dabbling ducks (Arzel & Elmberg 2004), shorebirds (Burger *et al.* 1977), terns (Safina 1990) and also between Red-crested *Netta rufina* and Common Pochard (Amat 1984) among others. We also found difference in habitat use between families and nonbreeding individuals of the same species, mostly by observing families in habitats with more cover (Reeds) and with more invertebrate food (Floating vegetation). The young and immature birds are more susceptible to predation than adult birds (Hill 1984, Stafford & Pearse 2007) and in many cases have preference for different food. In Mallard, for instance, plant seeds are increasing in percentage with duckling age, while invertebrates are on decrease (Drilling *et al.* 2020). The studied species feed mostly on or amongst water vegetation (Billerman *et al.* 2020), so it is not surprising that almost all species were recorded in at least some parts amongst emergent or Floating vegetation. One of the species that is closely tied to Floating vegetation is Ferruginous Duck (Smole 2005, Petkov 2012, Carboneras & Kirwan 2020a), as confirmed in the present study. Our results also support the different preference for Floating vegetation among different *Aythya* ducks (Smole 2005, Billerman *et al.* 2020), with Ferruginous Duck having the highest preference and Tufted Duck the lowest. Although we observed major importance of water vegetation in most species, in

some studies Mallard was recorded among reeds in much greater percentage (Ulenaers & Dhondt 1991, Hattori & Mae 2001, Kloskowski *et al.* 2010). Apart from food and hunting, water birds use water vegetation also as a safe nesting or resting area (Kloskowski *et al.* 2010), as also noted at Rački ribniki (Martinc 2015).

Open water was present on all larger fishponds and it is there that fish farmers fed the fish (Martinc 2015, *pers. observation*). Coots feed on different small animals and plant parts, including fish fodder, picked from the surface or in shallow water (Taylor & Kirwan 2020). They were observed picking and diving for food at places where fish were fed (*pers. observation*), thus explaining the presence of high number of Coots on Open water compared to Floating vegetation where they would feed naturally (Taylor & Kirwan 2020). Additionally, high percentage of Coots also rested on Open water, suggesting that many stayed close to feeding spots.

Many waterbirds use the shore for resting, preening or feeding (Billerman *et al.* 2020). One of these species is Mallard. Moreover, Mallards and Mute Swans are often habituated to human presence (Logar 2009), and can often find food out of water (Ciaranca *et al.* 2020, Drilling *et al.* 2020), thus it is not surprising that both were commonly observed on shore. While we did not record Mallard feeding on shore and did not classify Swans behaviour, both are often fed by local people (*pers. observation*). Apart from resting on shore, Mallards also rested amongst Floating vegetation and in Reeds. The latter was probably underestimated due to vegetation denseness (Hattori & Mae 2001) as was assumed for Common Pochard and Ferruginous Duck in Donji Miholjac (Smole 2005). Both Mallard and Mute Swan were observed in all habitats, reflecting their ecological plasticity (Ciaranca *et al.* 2020, Drilling *et al.* 2020) and at the same time explaining their wide distribution in Slovenia (Blažič 2019, Bordjan 2019c). On the other hand, both Common Pochard and Ferruginous Duck use only specific habitat within wetlands. Their preference for shallow sites with aquatic and emergent vegetation (Smole 2005, Bordjan 2019c, Bordjan 2019d, Carboneras *et al.* 2020, Carboneras & Kirwan 2020a) limits them to only a few suitable breeding sites in Slovenia (Bordjan 2013, Bordjan 2014, Bordjan 2015, Bordjan 2016, Bordjan 2017, Bordjan 2018, Bordjan 2019d, Bordjan 2019a, Bordjan 2019b). This confirms that the more specialised species is, the more threatened it is (Clavel *et al.* 2011).

Our study also confirmed that the size of the water body influences the species richness and abundance. This is not only through size (Sebastián-González & Green 2014) but also through higher habitat heterogeneity (Ma *et al.* 2010). Presence of different habitats in a small area enhances habitat heterogeneity that in turn enhances species richness (Moreno-Rueda & Pizarro 2009). In short, the more habitats one fishpond contains, the more species it can hold. This could explains the absence of certain species at Fishpond B compared to both Fishponds A and C. Water vegetation, being marginal, emergent or floating, influences the presence of many wetland species, with intermediate density being attractive for most (Gibbs *et al.* 1991), thus, explaining the presence of so many species at Fishpond C.

Considering solely the number of standing waterbodies in Slovenia (Remec-Rekar & Bat 2003), small population of some species is somewhat surprising, suggesting that most of our standing waterbodies are not suitable for most waterbird species. Indeed, the rarest breeding waterbirds in Slovenia are those that prefer shallow, richly vegetated waterbodies for their breeding. *Aythya* species, for example, need more naturally managed water bodies, e.g. shallow lakes with abundant emergent, floating and submerged vegetation (Carboneras *et al.* 2020, Carboneras & Kirwan 2020a, Carboneras & Kirwan 2020b), like Fishponds A and C compared to most water bodies in Slovenia that are more like Fishpond B. A more natural management would also benefit other duck species (*Anas* sp., *Mareca* sp., *Spatula* sp.) with rather small breeding populations in Slovenia (Mihelič *et al.* 2019) and unfavourable conservation status both in Slovenia and Europe (Denac *et al.* 2011, BirdLife International 2015). Although this was not part of this study, the depth and topography may be mainly due to the size and more or less evenly shallow ponds one of the key reasons apart from presence of water vegetation that influences the presence of waterbirds (Ma *et*

al. 2010). While topography has not been studied in Slovenia, the depth was proven important in the study at Šaleška lakes where most waterbirds were recorded near shore and deep centres of lakes were mostly devoid of birds (Deberšek & Bordjan 2016). Dabbling ducks use shallow inshore areas compared to offshore habitats disproportionally more frequently (Arzel & Elmberg 2004). The depths smaller than 25 cm have the greatest diversity of species (Ma *et al.* 2010). Overall management of wetlands should consider providing emergent, submerged and floating vegetation with variable cover-to-water ratios, accommodating species-specific habitat needs with focusing on species with unfavourable conservation status and low abundance (Gibbs *et al.* 1991).

5. Povzetek

Med junijem in avgustom 2011 smo spremljali rabo različnih habitatov na vodnih površinah Račkih ribnikov v Krajinskem parku Rački ribniki-Požeg (SV Slovenija). Razliko rabe trstičja, plavajoče vegetacije, odprte vodne površine in brežine smo preučevali na treh ribnikih in skupini manjših bazenov, ki so se med seboj razlikovali po velikosti in poraščenosti z vodno vegetacijo in obrežnim rastjem. V nalogi smo ugotovili razlike v rabi habitatov med posameznimi vrstami, tudi med ozko sorodnimi, kot so race potapljavke *Aythya* sp. Tako smo večino kostanjevk *A. nyroca* opazili med plavajočo vegetacijo, večino čopastih črnic *A. fuligula* pa na odprti vodni površini. Plavajoča vegetacija je bil tudi sicer habitat z največjo pestrostjo vrst. Najbolj enakomerna razporeditev med habitati je bila ugotovljena pri labodu grbcu *Cygnus olor* in liski *Fulica atra*. Zabeležili smo tudi razliko v rabi habitatov med posameznimi osebki ter družinami istih vrst, s pogostejšo izbiro plavajoče vegetacije pri družinah. Prav tako vrste uporabljajo v različnih deležih posamezne habitate za različna vedenja. Večina vrst je za počivanje pogosteje uporabljala plavajočo vegetacijo kot za prehranjevanje. Največja izjema je bila mlakarica *Anas platyrhynchos*, ki je počivala v glavnem na brežini, prehranjevala pa se je v glavnem med plavajočo vegetacijo. Potrdili smo tudi domnevo, da večje vodne površine premorejo več vrst, vendar pa ima izredno velik vpliv na to tudi heterogenost habitatov na posamezni vodni površini. Razumevanje rabe in pomena posameznih habitatov na vodnih površinah je zelo pomembno pri upravljanju mokrišč za namene ohranjanja redkih vrst.

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6 References

Amat J. A. (1984): Ecological segregation between red-crested pochard *Netta rufina* and pochard *Aythya ferina* in a fluctuating environment. – Ardea 72: 229–233.

Arzel C. & Elmberg, J. (2004): Time use, foraging behavior and microhabitat use in a temporary guild of spring-staging dabbling ducks (Anas spp.). – Ornis fennica 81 (4): 157–168.

Billerman S. M., Keeney B. K., Rodewald P. G. & Schulenberg T. S. (eds). (2020): Birds of the World. – Cornell Lab of Ornithology.

BirdLife International. (2015): European red list of birds. Office for Official Publications of the European Communities, Luxenburg.

Blažič B. (2019): Labod grbec *Cygnus olor*. Pp. 78–79. *In*: Mihelič T., Kmecl P., Denac K., Koce U., Vrezec A., & Denac D. (eds): Atlas ptic Slovenije. Popis gnezdilk 2002–2017. – DOPPS, Ljubljana.

Bordjan D. (2012): Vodne ptice in ujede Cerkniškega polja (južna Slovenija) v letih 2007 in 2008, s pregledom zanimivejših opazovanj do konca leta 2010 / Waterbirds and raptors of Cerknica polje (southern Slovenia) in 2007 and 2008, with an overview of interesting observations till the end of 2010. – Acrocephalus 33 (152–153): 25–104.

Bordjan D. (2013): Kostanjevka *Aythya nyroca*. P. 230. *In*: Denac K., Božič L., Mihelič T., Denac D., Kmecl P., Figelj J., & Bordjan D. (eds): Monitoring populacij izbranih vrst ptic – popisi gnezdilk 2012 in 2013. Poročilo. Naročnik: Ministrstvo za kmetijstvo in okolje. – DOPPS, Ljubljana.

Bordjan D. (2014): Kostanjevka *Aythya nyroca*. P. 230. *In*: Denac K., Božič L., Mihelič T., Kmecl P., Denac D., Bordjan D., Jančar T., & Figelj J. (eds): Monitoring populacij izbranih vrst ptic – popisi gnezdilk 2014. Poročilo. Naročnik: Ministrstvo za kmetijstvo in okolje. – DOPPS, Ljubljana.

Bordjan D. (2015): Kostanjevka *Aythya nyroca*. Pp. 15–21. *In*: Denac K., Mihelič T., Kmecl P., Denac D., Bordjan D., Figelj J., Božič L., & Jančar T. (eds): Monitoring populacij izbranih vrst ptic – popisi gnezdilk 2015. Poročilo. Naročnik: Ministrstvo za kmetijstvo in okolje. – DOPPS, Ljubljana.

Bordjan D. (2016): Kostanjevka *Aythya nyroca*. Pp. 26–36. *In*: Denac K., Kmecl P., Mihelič T., Božič L., Jančar T., Denac D., Bordjan D., & Figelj J. (eds): Monitoring populacij izbranih ciljnih vrst ptic na območjih Natura 2000 v letu 2016. Poročilo. Naročnik: Ministrstvo za kmetijstvo in okolje. – DOPPS, Ljubljana.

Bordjan D. (2017): Kostanjevka *Aythya nyroca*. Pp. 13–19. *In*: Denac K., Kmecl P., Mihelič T., Jančar T., Denac D., & Bordjan D. (eds): Monitoring populacij izbranih ciljnih vrst ptic na območjih Natura 2000 v letu 2017. Poročilo. Naročnik: Ministrstvo za kmetijstvo in okolje. – DOPPS, Ljubljana.

Bordjan D. (2018): Kostanjevka *Aythya nyroca*. Pp. 27–35. *In*: Denac K., Jančar T., Božič L., Mihelič T., Koce U., Kmecl P., Kljun I., Denac D., & Bordjan D. (eds): Monitoring populacij izbranih ciljnih vrst ptic na območjih Natura 2000 v letu 2018 in sinteza monitoringa 2016-2018. Poročilo. Naročnik: Ministrstvo za kmetijstvo in okolje. – DOPPS, Ljubljana.

Bordjan D. (2019a): Kostanjevka *Aythya nyroca*. Pp. 94–95. *In*: Mihelič T., Kmecl P., Denac K., Koce U., Vrezec A., & Denac D. (eds): Atlas ptic Slovenije. Popis gnezdilk 2002–2017. – DOPPS, Ljubljana.

Bordjan D. (2019b): Kostanjevka *Aythya nyroca*. Pp. 23–31. *In*: Denac K., Božič L., Jančar T., Kmecl P., Mihelič T., Denac D., & Bordjan D. (eds): Monitoring populacij izbranih ciljnih vrst ptic na območjih Natura 2000 v letu 2019. Poročilo. Naročnik: Ministrstvo za kmetijstvo in okolje. – DOPPS, Ljubljana.

Bordjan D. (2019c): Mlakarica *Anas platyrhynchos*. Pp. 104–105. *In*: Mihelič T., Kmecl P., Denac K., Koce U., Vrezec A., & Denac D. (eds): Atlas ptic Slovenije. Popis gnezdilk 2002–2017. – DOPPS, Ljubljana.

Bordjan D. (2019d): Sivka *Aythya ferina*. Pp. 92–93. *In*: Mihelič T., Kmecl P., Denac K., Koce U., Vrezec A., & Denac D. (eds): Atlas ptic Slovenije. Popis gnezdilk 2002–2017. – DOPPS, Ljubljana.

Bordjan D. (2020): The Mallard *Anas platyrhynchos* in Slovenia: a review with an estimation of its current population – Acrocephalus 41 (186–187): 69–118.

Bordjan D., Gamser M., Kozina A., Novak J. & Denac M. (2013): Roost-Site Characteristics of the Mediterranean Shag *Phalacrocorax aristotelis* desmarestii Along the Slovenian Coast. – Acrocephalus 34 (156–157): 5–11.

Božič L. & Denac D. (2017): Population dynamics of five riverbed breeding bird species on the lower Drava River, NE Slovenia. – Acrocephalus 38 (174–175): 85–126.

Burger J., Howe M. A., Hahn D. C. & Chase J. (1977): Effects of Tide Cycles on Habitat Selection and Habitat Partitioning by Migrating Shorebirds. – The Auk 94 (4): 743–758.

Carboneras C. & Kirwan G. M. (2020a): Ferruginous Duck (*Aythya nyroca*). *In*: Billerman S. M., Keeney B. K., Rodewald P.G., & Schulenberg T. S. (eds): Birds of the World. – Cornell Lab of Ornithology.

Carboneras C. & Kirwan G. M. (2020b): Tufted Duck (*Aythya fuligula*). *In*: Billerman S. M., Keeney B. K., Rodewald P. G., & Schulenberg T.S. (eds): Birds of the World. – Cornell Lab of Ornithology.

Carboneras C., Kirwan G. M. & Sharpe C. (2020): Common Pochard (*Aythya ferina*). *In*: Billerman S. M., Keeney B. K., Rodewald P. G., & Schulenberg T. S. (eds): Birds of the World. – Cornell Lab of Ornithology.

Ciaranca M. A., Allin, C. C. & Jones G. S. (2020): Mute Swan (*Cygnus olor*). *In*: Billerman S. M., Keeney B. K., Rodewald P. G., & Schulenberg T. S. (eds): Birds of the World. – Cornell Lab of Ornithology.

Clark R. G. & Shutler D. (1999): Avian habitat selection selection: pattern from process in nest-site use by ducks? – Ecology 80 (1): 272–287.

Clavel J., Julliard R. & Devictor V. (2011): Worldwide decline of specialist species: toward a global functional homogenization? – Frontiers in Ecology and the Environment 9 (4): 222–228.

Deberšek B. & Bordjan D. (2016): Annual dynamics, nature-conservancy evaluation and an overview of data on the occurrence of waterbirds at Šaleška Lakes (N Slovenia). – Acrocephalus 37 (168–169): 5–47.

Denac K., Mihelič T., Božič L., Kmecl P., Jančar T., Figelj J. & Rubinić B. (2011): Strokovni predlog za revizijo posebnih območij varstva (SPA) z uporabo najnovejših kriterijev za določitev mednarodno pomembnih območij za ptice (IBA) Končno poročilo (dopolnjena verzija). Naročnik: Ministrstvo za okolje in prostor. – DOPPS, Ljubljana.

Drilling N., Titman R. D. & McKinney F. (2020): Mallard (*Anas platyrhynchos*). *In*: Billerman S. M., Keeney B. K., Rodewald P. G., & Schulenberg T. S. (eds): Birds of the World. – Cornell Lab of Ornithology.

ESRI (2015): ARCGIS 10.4.1 for Desktop. – Redlands, California.

Fay D. S. & Gerow K. (2018): A biologist's guide to statistical thinking and analysis. – WormBook.

Georgiadis N. M., Paragamian K., Giannakakis T., Poursanidis D. & Catsadorakis G. (2010): Types of artificial water bodies in the Aegean

islands (Greece),their environmental impact and potential value for biodiversity. Pp. 1137–1142. *In*: Christodoulou G. C. & Stamou I. S. (eds): Environmental Hydraulics, Two Volume Set: Proceedings of the 6th International Symposium on Enviornmental Hydraulics, Athens, Greece, 23–25 June 2010. – Taylor & Francis Group, London.

Gibbs J. P., Longcore J. R., McAuley D. G. & Ringelman J. K. (1991): Use of Wetland Habitats by Selected Nongame Water Birds in Maine. – Fish and Wildlife Research.

Granadeiro J. P., Santos C. D., Dias M. P. & Palmeirim J. M. (2007): Environmental factors drive habitat partitioning in birds feeding in intertidal flats: implications for conservation. – Hydrobiologia 587 (1): 291–302.

Hattori A. & Mae S. (2001): Habitat use and diversity of waterbirds in a coastal lagoon around Lake Biwa, Japan: Waterbird diversity in a lake lagoon. – Ecological Research 16 (3): 543–553.

Hill, D. A. (1984): Population Regulation in the Mallard (*Anas platyrhynchos*). – *Journal of* Animal Ecology 53: 191–202.

Hino T., Unno A. & Nakano S. (2002): Prey distribution and foraging preference for tits. – Ornithological Science 1 (1): 81–87.

Jones J. (2001): Habitat Selection Studies in Avian Ecology: A Critical Review. – The Auk 118 (2): 557–562.

Kloskowski J., Nieoczym M., Polak M. & Pitucha P. (2010): Habitat selection by breeding waterbirds at ponds with size-structured fish populations. – Naturwissenschaften 97 (7): 673–682.

Koce U. (2018): New Marine IBAs For the Mediterranean Shag *Phalacrocorax aristotelis desmarestii* in Slovenia. – Acrocephalus 39 (178–179): 101–128.

Lantz S. M., Gawlik D. E. & Cook M. I. (2011): The Effects of Water Depth and Emergent Vegetation on Foraging Success and Habitat Selection of Wading Birds in the Everglades. – Waterbirds 34 (4): 439–447.

Logar K. (2009): Dinamika pojavljanja vodnih ptic na reki Dravi od Bresterniškega jezera do Meljskega jezu. Bachelor's. – Biotechnical Faculty, University of Ljubljana, Ljubljana.

Ma Z., Cai Y., Li B. & Chen J. (2010): Managing Wetland Habitats for Waterbirds: An International Perspective. – Wetlands 30 (1): 15–27.

Martinc U. (2015): Izbira habitata pri izbranih vrstah vodnih ptičev na Račkih ribnikih. Bachelor's. – Faculty of natural sciences and mathematics, Department of Biology, University of Mariboru, Maribor.

Mihelič T., Kmecl P., Denac K., Koce U., Vrezec A. & Denac D. (eds). (2019): Atlas ptic Slovenije. Popis gnezdilk 2002–2017. – DOPPS, Ljubljana.

Moreno-Rueda G. & Pizarro M. (2009): Relative influence of habitat heterogeneity, climate, human disturbance, and spatial structure on vertebrate species richness in Spain. – Ecological Research 24 (2): 335–344.

Municipality Rače-Fram. (2020): Krajinski park Rački ribniki-Požeg–[*https://www.race-fram.si/objava/227220*], 6/4/2020.

Murkin H. R., Murkin E. J. & Ball J. P. (1997): Avian habitat selection and prairie wetland dynamics: a 10-year experiment. – Ecological Applications 7 (4): 1144–1159.

Petkov N. (2012): Habitat characteristics assessmen of the wetlands with breeding Ferruginous Duck Aythya nyroca and Pochard A. ferina in Bulgaria. – Acrocephalus 32 (150–151): 127–134.

R Core Team. (2017): A language and environment for statistical computing. – R Foundation for Statistical Computing. Vienna, Austria.

Remec-Rekar Š. & Bat M. (2003): Jezera. *In*: Uhan J. & Bat M. (eds): Vodno bogastvo Slovenije. – Ministrstvo za okolje, prostor in energijo, Agencija Republike Slovenije za okolje, Ljubljana.

Safina C. (1990): Foraging Habitat Partitioning in Roseate and Common Terns. – The Auk 107 (2): 351–358.

Sebastián-González E. & Green A. J. (2014): Habitat Use by Waterbirds in Relation to Pond Size, Water Depth, and Isolation: Lessons from a Restoration in Southern Spain: Habitat Use by Waterbirds in a Restored Wetland. – Restoration Ecology 22 (3): 311–318.

Smole J. (2005): Race iz rodu Aythya na ribnikih v Donjem Miholjcu v času gnezdenja. Bachelor's. – Biotechnical Faculty, University of Ljubljana, Ljubljana.

Stafford J. D. & Pearse A. T. (2007): Survival of radio-marked mallard ducklings in South Dakota. – The Wilson Journal of Ornithology 119 (4): 585–591.

Taylor B. & Kirwan G. M. (2020): Eurasian Coot (Fulica atra). *In*: Billerman S.M., Keeney B.K., Rodewald P.G., & Schulenberg T.S. (eds): Birds of the World. – Cornell Lab of Ornithology.

Uhan J. & Bat M. (2003): Vodno bogastvo Slovenije. – Ministrstvo za okolje, prostor in energijo, Agencija Republike Slovenije za okolje, Ljubljana.

Ulenaers P. & Dhondt A. A. (1991): Phenology, habitat choice and reproduction of the Great Creasted Grebe Podiceps cristatus L., on a fish-farm. – Ardea 79 (6): 395–407.

Uradni list RS (2013): Uredba o spremembah in dopolnitvah Uredbe o posebnih varstvenih območjih (območjih Natura 2000) (št. 33/2013).

Vogrin M. (1994): Rački in Turnovi ribniki. – Acrocephalus 15(65/66): 144–145.

Vogrin M. (1997): Niche separation of the Marsh Harrier (*Circus earuginosus*) and Hen Harrier (*Circus cyaneus*) during migration trhough Dravsko Polje (NE Slovenia). – Buteo 9: 31–34.

Vogrin M. (1998): Prelet in pojavljanje sivke *Aythya ferina* v Krajinskem parku Rački ribniki - Požeg v severovzhodni Sloveniji. – Acrocephalus 19(89): 109–114.
Vogrin M. (1999): Breeding birds of Race ponds in NE Slovenia and their trends during 13 years. – Ornis svecica 9: 127–132.
Vogrin M. (2001): Breeding of Little Grebe *Tachybaptus ruficollis* and Great Crested Grebe *Podiceps cristatus* on Race Ponds in Northestern Slovenia (Central Europe) - A 13-years Study. – Pakistan Journal of Biological Sciences 4 (3): 241–243.
Vogrin M. (2002): Breeding success of Great Crested Grebe *Podiceps cristatus* on fishponds. – Ornis svecica 12: 203–210.

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sciendo

Temporal variation in the population density and structure of the Eurasian Bullfinch *Pyrrhula pyrrhula* in the Iberian Peninsula

Časovne spremembe populacijske strukture in gostote kalina *Pyrrhula pyrrhula* na Iberskem polotoku

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The population ecology of the Eurasian Bullfinch *Pyrrhula pyrrhula* is almost unknown in Iberia, where the subspecies *iberiae* lives. The present study provides a first approach to the population attributes of this subspecies in an area located in northern Spain, characterised by a landscape dominated by hedgerows and meadows. In particular, I analysed the population density, age distribution and sex ratio during a six-year period (2001–2006). By exploring the entire area, I estimated the density in each month, and distinguished males, females and juveniles. In winter, samplings by line transect were also used to obtain abundance indices to compare different days, months and years (1999–2005 period). Density values during the breeding season were similar between years, but winter abundances changed considerably at different temporal scales. A density peak was found in July–August, with the highest percentages of juvenile individuals occurring in August–September. Individuals clearly performing post-juvenile moult were seen during August–November. Sex ratio was markedly biased towards males throughout the year. Several biological and ecological characteristics of the Bullfinch, together with a favourable habitat and small changes of environmental conditions from year to year, seemingly promoted the relatively high stable breeding population densities estimated during the study period. The high variation in winter abundances was likely due to short-medium range movements. The high population density in late summer was a consequence of the addition of juveniles each year. The greater parental effort of females compared to males – since the former are responsible for most of the reproductive tasks and directly suffer considerable predation during incubation – was probably a root cause of the skewed sex ratio.

Key words: age distribution, bird numbers, *Pyrrhula pyrrhula iberiae*, seasonality, sex ratio
Ključne Besede: starostna porazdelitev, števila ptic, *Pyrrhula pyrrhula iberiae,* sezonskost, spolno razmerje

1. Introduction

The main factors influencing size and structure of bird populations are fecundity, mortality (or survival) and mobility (immigration/emigration) (Temple 2004, Scott 2020). These factors are, in turn, influenced by others that can be density-dependent such as predation, diseases, parasites and competition for resources (e.g., habitat, mates), or density-independent such as weather conditions, food supply and natural disasters (Ricklefs 1983, Newton 1998, Temple 2004, White 2008, Scott 2020). In short, many life-history traits, which are both interlinked and associated with variation in the environment, determine avian demography (Ricklefs 1983, Alves 2013, Scott 2020). Avian nest success varies significantly between years if one of the influencing factors such as predation or weather also varies markedly; however, long-term studies are necessary to detect these events with large effects on populations, which usually occur episodically (Winkler 2004, Crombie & Arcese 2018). At the end of each breeding season, the proportion of juveniles in bird populations is temporarily high, and age distribution, which is usually quite stable from one year to the next, is re-established prior to the start of the following breeding season (Temple 2004). Skewed juvenile sex ratios and, especially, adult sex ratios are common in wild bird populations, including passerines, and are normally male-biased, despite the fact that sex ratio in eggs, nestlings and fledglings is generally no different from equality, that is, females suffer from higher mortality due to causes not yet fully understood (McClure 1955, Breitwisch 1989, Temple 2004, Donald 2007, Payevsky 2016).

Considering overall information on some of the most studied populations of the Eurasian Bullfinch *Pyrrhula pyrrhula* (hereinafter referred to as the Bullfinch), in particular those in western Europe – central regions (subspecies *europaea*), the British Isles (subspecies *pileata*) and Scandinavia (nominate subspecies *pyrrhula*) – breeding densities vary widely at different spatial scales, and movements during autumn and winter are of varying intensity depending on the subspecies, food availability and weather conditions, although they do not seem to be particularly sensitive to severe winters (Cawthorne & Marchant 1980, Cramp & Perrins 1994A, Fox *et al.* 2009, Clement 2010). Average annual mortality of Bullfinches is about 50%, males outnumber females, the proportion of juvenile individuals gradually increases, as expected, from summer to early autumn, and adult post-breeding and post-juvenile moults occur mainly in August–October (Newton 1966, 1999A, 2000, Cramp & Perrins 1994A, Hogstad 2006). The Eurasian Sparrowhawk *Accipiter nisus* is the main predator of juvenile and adult individuals of this fringilid (Newton 1986, Marquiss 2007).

Nevertheless, in different regions and habitats in the Iberian Peninsula, occupied by the very little known subspecies *Pyrrhula pyrrhula iberiae*, only a few estimates of breeding and winter density are available, as well as incomplete information on movements during autumn and winter, and some data on its role as Eurasian Sparrowhawk prey (Noval 1971, Belamendia 2003, 2012, Carrascal & Palomino 2008, Hernández 2008, 2018, Munilla & Guitián 2012, Fernández & García 2014, Zuberogoitia 2016, Quirós 2020). In order to partly fill this knowledge gap, the main aim of this study is to provide an overview to the population size and structure of the Bullfinch in an area located in northwestern Spain, close to the south-western distribution limits of the species. The target population inhabited mainly hedgerows. The following particular issues and their variation at different temporal scales were assessed: (1) population density, (2) age distribution, and (3) sex ratio. As additional aspect, the seasonal variation in post-juvenile feather moult was briefly analysed. Regarding aspects that are not examined here, habitat, reproductive ecology, food preferences, gregariousness, intraspecific aggression and interspecific competition, are dealt with in detail in separate investigations which provide novel findings relating to this Iberian population (Hernández 2020, 2021, 2022A, B, Hernández & Zaldívar 2021, Á. H. *unpubl. data*). Overall, the Iberian Bullfinch can be considered a multi-brooded and mostly seed-eating bird – obtained from fleshy fruit and herbaceous plants – that forages for food in shrubs/trees or, less frequently, on the ground very close to woody vegetation (Díaz 2016, Hernández 2020, 2021, 2022A). It only breeds in SW France

(Pyrenees) and the mountains of N Portugal and N Spain, and is considered a sedentary bird. However, in the non-breeding season, it can move medium distance outside its breeding distribution, with some individuals reaching even the centre and south of the peninsula or as far as North Africa (Tellería *et al.* 1999, Hernández 2008, Belamendia 2012, Díaz 2016, Quirós 2020). In Spain, at the national level, it is considered that the Bullfinch breeding population was in moderate decline during 1998–2020 (Escandell & Escudero 2021A), and the wintering population in moderate increase from 2008/2009 to 2019/2020 (Escandell & Escudero 2021B). The average breeding population size is estimated at 340,000 individuals for the whole of Spain (Carrascal & Palomino 2008), and the wintering population size is unknown (Belamendia 2012).

It can be expected that the studied population shows seasonal characteristics within the normal patterns and limits known among Bullfinches and temperate zone passerines, without notable inter-annual variations, based on several assumptions: (1) habitat resources seemed to be plentiful and an absence of significant between-year variation in breeding productivity rate has been documented for this Bullfinch population (Hernández 2020, 2021, 2022A), (2) Bullfinches were secondary prey for Eurasian Sparrowhawks in the study area and, in general, predation is not a limiting factor for European songbird populations, particularly in multi-brooded species (Thomson *et al.* 1998, Hernández 2018, Roos *et al.* 2018), (3) tree-feeding birds resist very cold and snowy winters better than ground-feeders, and amongst the former, seed-eaters do so more successfully than insect-eaters (Newton 1998), and (4) most bird populations remain relatively constant in size due to homeostatic mechanisms (e.g., when density decreases, birth and immigration rates increase) (Temple 2004), unless their environment changes significantly (e.g., Rosamond et al. 2020). Although the prevailing resident lifestyle of the Iberian Bullfinch (Belamendia 2012) might seem likely to give it an advantage over migratory birds, which face unique challenges as a result of travelling, the greater dispersal capacity of the latter allows them to better escape habitat degradation and loss, thus balancing the threats (Horns & Şekercioğlu 2018). Also, based on the information above, about sex ratio in birds including the Bullfinch, it is expected that males outnumber females in this Iberian population.

This study is in line with the need to compensate for the noticeable increment in modelling and existing data analyses in biological sciences, so that ornithologists have been urged to determine the ecology of poorly investigated avian taxa by means of field investigation (Ríos-Saldaña *et al.* 2018). Bird subspecies may be of great relevance in this respect as they are generally the best representatives of genetic and ecological diversity found within species (Phillimore & Owens 2006).

2. Methods

2.1. Study area

The study area covers 78 ha and is located in the middle-lower Torío river valley, between Palacio and Manzaneda (42°43'–42°44' N, 5°30'–5°31' W; 900 m a.s.l.; León province, Castile and León autonomous community) in North-West Spain. Biogeographically, it forms part of the Carpetano-Leonese sector in the Mediterranean West Iberian province (Rivas-Martínez 2007). Hot summers (average temperature of ≈ 20 °C), cold winters (≈ 4 °C) with some snowfall, and moderate rainfall (average annual precipitation of ≈ 500 mm) with a relatively short dry summer season, characterise the area (for details of weather during the study period, see Hernández 2020). The landscape is mainly composed of hedgerows that separate irrigated meadows grazed by livestock and cut for hay, bordered by riparian woodland on the west side and slopes covered in Pyrenean oak *Quercus pyrenaica* woods interspersed with very small Scots pine *Pinus sylvestris* plantations on the east side (Figure 1). Some hedgerows border small Canadian poplar *Populus* x *canadensis* plantations. Estimated hedgerow density is 3.3 km per 10 ha. This area is located in a transition zone to the Eurosiberian region, south of the Cantabrian mountain range, in an extensive hedgerow network of great conservation value for flora and fauna (Hernández 2009A, 2014, 2018, Hernández & Zaldívar 2013, 2016). About thirty species of broadleaved, chiefly deciduous shrubs, trees

and climbers, are found in the hedgerows. The landscape, and hedgerow density and structure, are very similar throughout the study area and have hardly changed in recent years and decades, except for a moderate increase in the number of Canadian poplar plantations and an incipient abandonment of traditional hedgerow management practices.

2.2. Data collection

2.2.1 General procedures

The Bullfinch was present in the study area in all months of the year. Throughout 2001–2006, I observed the bullfinches directly during field trips conducted to investigate their general ecology, and I recorded every detail of each sighting. In a systematic way, I conducted 41 field trips in winter (13 in December, 13 in January, 15 in February), 113 in spring (31 in March, 33 in April, 49 in May), 155 in summer (49 in June, 54 in July, 52 in August), and 84 in autumn (39 in September, 26 in October, 19 in November). By year, 73 field trips were conducted in 2001, 83 in 2002, 81 in 2003, 59 in 2004, 73 in 2005, and 24 in 2006. The total number of field trips in each season was equally distributed among the years of study as far as possible, except for 2006 when the sampling effort was considerably lower. I usually needed two field trips to cover the entire area: approximately

Figure 1: Eurasian Bullfinch subspecies *Pyrrhula pyrrhula iberiae* in northwestern Spain, and partial view of the study area. Above: female in January on the left, male in February on the right. Below: juvenile in July on the left, meadows and hedgerows in May on the right (photos: Á. Hernández)

Slika 1: Kalin podvrste *Pyrrhula pyrrhula iberiae* v severozahodni Španiji in značilna pokrajina območja raziskave. Zgoraj: levo samica v mesecu januarju, desno samec v mesecu februarju. Spodaj: levo juvenilen osebek v juliju, desno travniki in mejice v mesecu maju. (foto: Á. Hernández)

half of the area (36 ha) on one field trip, and the other (42 ha) on the following day. On each field trip, I explored the corresponding zone by slowly walking around it, stopping frequently, following the edge of the hedgerows and marginally (≈ 10% sampling effort) the edge of the oak woods (area search method, in the sense of Dunn *et al.* 2006, Pascoe *et al.* 2019), which made it possible to detect the bulk of Bullfinches. Several factors could influence the detectability in different seasons (e.g., singing and other reproductive activities, moulting process, vegetation foliage), but specific research would be necessary to assess the importance of each of them. Small European birds generally show a bimodal pattern of daily locomotor activity, but mobility tends to decrease throughout the day (Bas *et al.* 2007 and references therein). Accordingly, I conducted more than 85% of field trips in the morning in all seasons, and the remainder in the afternoon. The morning field trips lasted from 1 hour after sunrise to 12:00 h (solar time) and the afternoon field trips from 12:00 h (solar time) to 1 hour before sunset, as there was insufficient light at dawn or dusk for reliable sampling. The birds were not individually marked, so their identity could not be determined. Nevertheless, records from the same sampling day most likely corresponded to different individuals, since they were successively left behind during the visits. For the longer term, the study period covering many years, the mentioned Bullfinch movements, which can even occur during their long breeding season (Newton 2000 for British birds), and the short life-span of this species –averaging 2 years (Robinson 2005) – together provide for a high degree of independence between records. If not otherwise specified, males and females refer to individuals in full adult plumage, which could have been non-moulting adults, moulting adults, or individuals recently moulted from juvenile plumage, and juveniles refer to individuals in juvenile plumage (complete or already moulting) either still dependent on their parents or independent. Male, female and juvenile Bullfinches have very different plumage colourations to each other, which enabled them to be easily differentiated in the field under good weather conditions (Figure 1). Non-moulting juveniles are predominantly brown in colour, and do not have the male's red or female's grey-buff underparts, black cap, or pale greyish-white tips of greater wing coverts, these being the most noticeable differences with adult plumage (Clement *et al.* 1993). Consequently, clearly moulting juveniles were distinguished in the field by the colouration that they progressively acquired. An "identified" Bullfinch means that its age and/or sex has been differentiated. I used standard optical equipment, i.e., binoculars and a telescope, to observe birds.

2.2.2. Population density

I estimated the Bullfinch density in each month of each year considering the census with the maximum abundance covering each established sub-area (36 and 42 ha) entirely, and then considering the sum of both abundances in relation to the total surface (78 ha). Only in 2002 and 2003 could this analysis be carried out for most months (12 and 8 months, respectively), since censuses made on bad weather days were discarded. However, I obtained reliable results for July and August, 2002, 2003, 2004 and 2005, months that plainly reflect Bullfinch breeding productivity (Hernández 2020). In the study area, active Bullfinch nests (under construction or containing eggs/nestlings) were found from April to August (Hernández 2020). In addition, a 1.6 km line transect crossing the study area was established and covered on foot from 1 hour after sunrise in different months during 1999–2005, recording the birds seen or heard in a 50 m band on either side of the transect (16 ha sampling surface). I recorded passerines (including the Bullfinch), pigeons, cuckoos and woodpeckers. In spring and summer, a singing male was considered a pair. Line transect is a widely used method for estimating bird abundances (Järvinen & Väisänen 1975, Gregory *et al.* 2004). Considering all of these years together, the number of samplings was 13 in winter, eight in spring, five in summer, and three in autumn. The sampling effort was greater in winter, when the avian community was more variable due to bird movements, increased due to episodes of adverse weather (Á. H. *pers. observ.*). In contrast to censuses covering the entire hedgerow network, I verified that samplings by line transect underestimated Bullfinch density, especially during the breeding season (values were usually below half). The Bullfinch is particularly inconspicuous when breeding, emitting contact

calls and songs at fairly low volume (Newton 1985, Hernández 2020). Area search methods allow the observer to examine thicker patches of woody vegetation more closely than with transect methods, thus enabling a more efficient detection of elusive bird species (Pascoe *et al.* 2019). Also, for greater accuracy of the density results provided by a line transect it is advisable to consider bird detectability, which decreases with distance from the observer, and to achieve a minimum of about 40 registrations of the target species (Bibby *et al.* 1992, Gregory *et al.* 2004). Such requirements were not met in the present study. Therefore, I used line transects just to compare different days, months and years in winter, i.e., 13 samplings during December (three samplings), January (six) and February (four), distributed amongst 1999, 2000, 2001, 2002, 2004 and 2005, understanding the density values as abundance indices rather than as rigorous density results.

2.2.3. Population age-sex structure

To establish monthly variation in age structure, each record refers to an identified individual regarding age (adult or juvenile). Adults are males or females in adult plumage (based on colouration), and juveniles individuals in juvenile plumage, complete or already performing post-juvenile moult. To establish seasonal variation in sex structure, each record refers to an identified individual regarding sex (male or female). Males and females are the same class of individuals considered for age structure, with the addition of moulting juveniles when their sex could be determined. To establish whether the sex ratio changed from one year to the next, I evaluated interannual variation for each season considering only individuals in adult plumage, excluding cases with a sample size < 30 (males plus females), the latter occurring in all seasons in 2006, winter in 2003, 2004 and 2005, and autumn in 2005. The mean size of the samples considered for this analysis was 107.63 ± 77.60 individuals (range = 30–279 individuals, n = 16 season-year combinations: 2 different years in winter, 5 in spring, 5 in summer, 4 in autumn). I assessed monthly variation in proportion of moulting juveniles, differentiating between individuals in adult plumage, non-moulting juveniles and moulting juveniles.

2.3. Statistical analyses

Mann-Whitney U test was used to compare two mean ranks of two independent groups (different time periods) considering the two-tailed way, and the chi-square test (χ^2) (with Yates correction for 1 degree of freedom) to compare series of absolute frequencies (Fowler *et al.* 1998, Lowry 1998-2022). When comparing an observed sex ratio with a hypothetical 1:1 sex ratio, I adjusted hypothetical frequencies to the whole next number if the sample size was an odd number (for example, in a sample of 49 individuals observed, 25 males and 25 females would be considered). I estimated standard deviation (SD) as a measurement of dispersion. If not otherwise specified, all years were pooled together, mainly to avoid analysing small sample sizes. During the main study period, nest success and breeding productivity were fairly constant from one year to the next (Hernández 2020).

3. Results

3.1. Population density

Considering censuses covering the entire area and the set of years, a peak was found in the Bullfinch density in July–August (usually above 7.0 birds/10 ha) and values normally in the 4.0–6.0 birds/10 ha interval throughout the rest of the year (Figure 2). Mean densities for July–August in 2002, 2003, 2004, and 2005 were 7.4, 7.6, 7.7, and 9.2 birds/10 ha, respectively. During April-May, approximately 2.5–3.5 pairs/10 ha were estimated. Population density apparently decreased in September–October, and it increased in November. Similarly, the number of Bullfinches identified per systematic field trip decreased from August (488 individuals/52 field trips = 9.4) to September (223/39 = 5.7) and October (112/26 = 4.3), and increased in November (133/19 = 7.0), considering the entire study period (2001–2006). Statistically, there was no significant difference in density between 2002 and 2003, considering the values of all the months of the reproductive period, i.e., April–August (U = 12, n = 5 and 5, P > 0.05), but the density increased significantly from April–June to July–August grouping the values

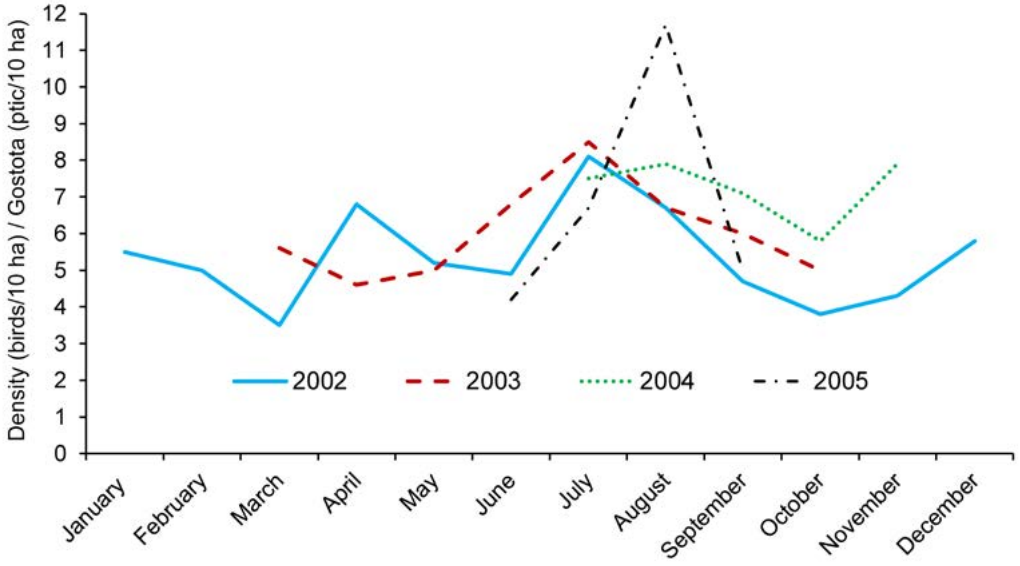

Figure 2: Monthly density of Eurasian Bullfinches in NW Spain. Maximum values for each month during the 2002–2005 period in an area of 78 ha, by inspection of its entire surface

Slika 2: Mesečne gostote kalinov v severozahodni Španiji. Maksimalne vrednosti za vsak mesec v obdobju 2002–2005 na podlagi pregleda celotnega območja raziskave (78 ha).

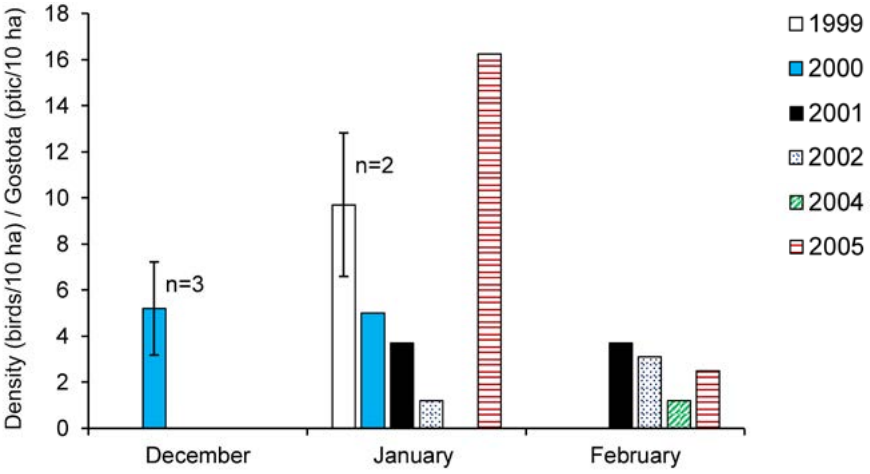

Figure 3: Comparative winter density values of Eurasian Bullfinches in northwestern Spain during different months and years. Each bar corresponds to one sampling by line transect covering an area of 16 ha, except for December 2000 (3 samplings on different days following this itinerary, mean ± SD is shown) and January 1999 (2 samplings on different days following this itinerary, mean ± SD is shown). Density values should be considered as abundance indices rather than as rigorous density results.

Slika 3: Primerjava vrednosti zimskih gostot kalinov v severozahodni Španiji v različnim mesecih in letih. Vsak stolpec ponazarja posamezno vzorčenje z linijskim transektom območja velikosti 16 ha, razen decembra 2000 (3 vzorčenja v različnih dneh po enaki metodi, podana je povprečna ± SD) in januarja 1999 (2 vzorčenji v različnih dneh po enaki metodi, podana je povprečna ± SD). Vrednosti za gostote je treba obravnavati kot indikatorje številčnosti in ne strogo kot rezultate gostot.

from 2002–2005 ($U = 6$, $n = 7$ and 8, $P < 0.05$). As for censuses by line transect, winter density varied noticeably among years from fewer than 1.5 birds/10 ha to over 16 birds/10 ha, and there were also considerable winter density fluctuations between months in the same year and even between censuses in the same month and year (Figure 3).

3.2. Population age-sex structure

The proportion of individuals in juvenile plumage increased progressively from June (≈ 30%) to July (≈ 60%) and August–September (≈ 70–75%), decreased sharply in October (< 15%), and was very low in November (< 1%) (Figure 4). For the June–October period, the difference between months in the age distribution (adults *versus* juveniles) was significant ($\chi^2_4 = 264.21$, $P < 0.001$). Considering all years together, sex ratio did not vary significantly between seasons, with males accounting for approximately 58–64% and females 36–42% ($\chi^2_3 = 3.77$, $P = 0.29$) (Figure 5). There was no significant association between abundance of each sex and year in any season, with males predominating in all cases (winter: $\chi^2_1 = 2.27$, $P = 0.13$; spring: $\chi^2_4 = 1.26$, $P = 0.87$; summer: $\chi^2_4 = 6.69$, $P = 0.15$; autumn: $\chi^2_3 = 7.10$, $P = 0.069$). In eight of 16 season-year combinations the proportion of males was within the 51–60% interval, and in the other eight above 60% (reaching 72%). In all seasons, considering all years together, observed frequencies of males and females were significantly different to those corresponding to a hypothetical 1:1 sex ratio, with increasing significance in the order autumn < winter < spring < summer ($\chi^2_1 = 4.58$, $P = 0.032$; $\chi^2_1 = 7.62$, $P = 0.006$; $\chi^2_1 = 14.39$, $P < 0.001$; $\chi^2_1 = 19.39$, $P < 0.001$; respectively). Of the 91 juveniles whose sex was identified from their body colouration, 55 (60%) were males and 36 (40%) females, but with no significant deviation

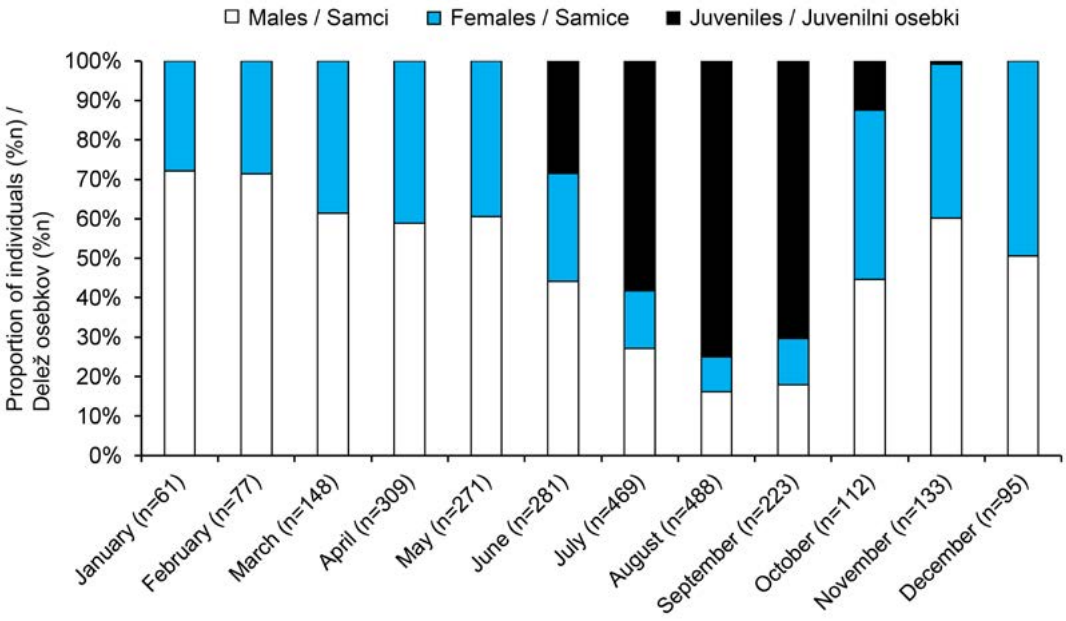

Figure 4: Monthly variation in age of Eurasian Bullfinches in northwestern Spain, by direct observation. *n:* total number of identified individuals regarding age in each month. Males and females are individuals in adult plumage. Pooled data for 2001–2006.

Slika 4: Mesečne spremembe v starosti kalinov v severozahodni Španiji. *n:* skupno število opazovanih osebkov glede na starosti v posameznem mesecu. Samci in samice so osebki v odraslem perju. Podatki zajemajo obdobje 2001–2006.

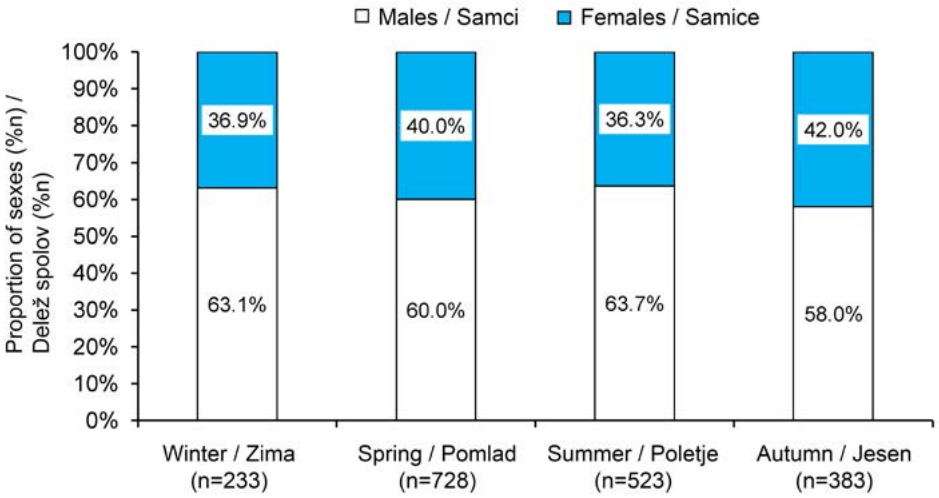

Figure 5: Seasonal variation in sex proportion of Eurasian Bullfinches in northwestern Spain, by direct observation. *n*: total number of identified individuals regarding sex, including moulting juveniles, in each season. Winter: December to February. Spring: March to May. Summer: June to August. Autumn: September to November. Pooled data for 2001–2006.

Slika 5: Sezonske spremembe v spolnem razmerju kalinov v severozahodni Španiji. n: skupno število opazovanih osebkov glede na spol, vključno z juvenilnimi osebki v času golitve, po letnih časih. Zima: december do februar. Pomlad: marec do maj. Poletje: junij do avgust. Jesen: September do November. Podatki zajemajo obdobje 2001–2006.

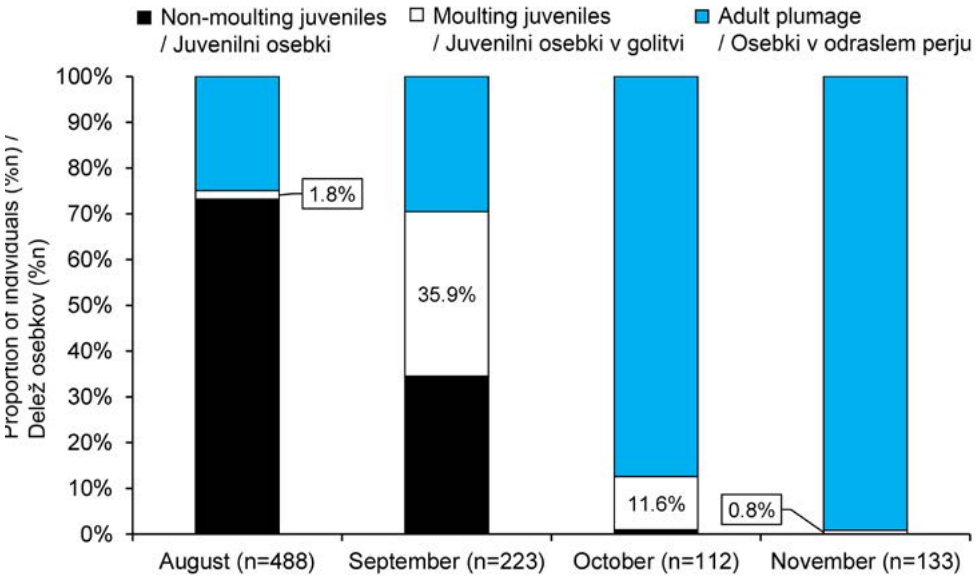

Figure 6: Monthly variation in proportion of moulting Eurasian Bullfinch juveniles in northwestern Spain, by direct observation. *n:* total number of identified individuals (non-moulting and moulting juveniles, and individuals in adult plumage) in each month. Pooled data for 2001–2006.

Slika 6: Mesečne spremembe v deležu juvenilnih kalinov v času golitve v severozahodni Španiji. *n:* skupno število opazovanih osebkov (juvenilni osebki, juvenilni osebki v času golitve in osebki v odraslem perju) po mesecih. Podatki zajemajo obdobje 2001–2006.

from a hypothetical 1:1 sex ratio (χ^2_1 = 1.62, P = 0.20). Records of moulting juveniles increased remarkably from August (nine individuals out of 488 total Bullfinches) to September (80 out of 223), and then decreased in October (13 out of 112) and November (only one out of 133) (Figure 6).

4. Discussion

4.1. Population density

Estimates of breeding Bullfinch density in the study area (≈ 3 pairs/10 ha in April–May) are higher than those documented for other areas in León province and other regions in northern Iberia, where values in the interval 0.2–1.5 pairs/10 ha are normal and maximum values do not exceed 2.4 pairs/10 ha, appearing to be more abundant in woodland (e.g., birch, oak, beech, fir, mixed) than farmland (Costa 1993, Belamendia 2003, Carrascal & Palomino 2008, Hernández 2008, Fernández & García 2014, Díaz 2016). In its entire range, the Bullfinch occupies many types of forests and other habitats with woody vegetation and shows highly varied breeding densities, in general up to 1 pair/10 ha but it can reach almost 7 pairs/10 ha, with mean values in farmland of about 0.5 pairs/10 ha (Cramp & Perrins 1994A, Clement 2010). Density is difficult to assess in this finch as it goes unnoticed during the breeding season and is presumably underestimated if intensive specific methods have not been used (Newton 1985, Cramp & Perrins 1994A, Hernández 2008, 2020), which was also confirmed in the present study. Also, Bullfinch breeding population size can change during its prolonged breeding season, due to causes other than mortality, at different spatial scales. In the study area, nesting habitat varied as the breeding season progressed, the use of sites with more trees and shade gradually increasing (Hernández & Zaldívar 2021). In Britain, Newton (2000) verified that, although many Bullfinch pairs remain in the same locality throughout the breeding season, it is not unusual for some adult individuals to move long distances during May–August (19% ring recoveries at a distance of over 5 km, further than expected for foraging trips from the nest), and proposed that these are movements between broods. According to Brambilla *et al.* (2013), a large number of multi-brooded bird species are likely to show varying density and changes in species-habitat relationships between successive breeding attempts.

Logically, the Bullfinch density peak found in July–August was due to the addition of the juveniles each year. The perceptible decrease in September–October was likely linked to lower detectability during the post-fledging period and moulting process, when Bullfinches and forest passerines in general select dense vegetation, are quieter and seem to be less mobile (Noval 1971, Vitz & Rodewald 2011, Hernández 2021), apart from mortality and perhaps dispersal to an unknown range. Considering all of the years studied together, Bullfinches clearly showing post-juvenile moult were observed between August and November, but records were concentrated in September–October. Survival of songbirds during their first autumn–winter, when they are still inexperienced, is approximately 50% lower than in individuals that have reached their first breeding season (Cody 1971, von Haartman 1971, Temple 2004). In November, a certain level of increase in density coincided with the fact that almost all individuals presented adult plumage, that is, seemingly, they had moulted, and were more mobile and visible (Á. H. *pers. observ.*). Bullfinch densities from spring to autumn were quite similar from year to year. Absence of significant interannual variation in important reproductive parameters, such as nest success or breeding productivity rate, has been documented for this population, probably due to lack of interannual variation in the availability of food resources (Hernández 2020). According to visual assessment carried out at least on a monthly basis, herb seed availability was very high all years, as was shrub/tree bud and arthropod availability – buds formed part of the Bullfinch diet during late winter and spring, and insects and spiders during the breeding season– (Hernández 2022A, Á. H. *unpubl. data*). As regards general fleshy fruit availability, including the particular fruits preferred by the Bullfinch, it was consistently high or very high, except in autumn–winter 2005–2006 when it was moderate, and in autumn–winter 2006–2007 when it was very low (Hernández 2022A, Á. H. *unpubl. data*). Note that the year 2007 is not considered in this study.

Nevertheless, winter abundance changed considerably at different temporal scales. In January 1999, 2000 and 2005, with heavy snowfall in the study area, even heavier at greater altitudes in the valley, where the Bullfinch also breeds, higher densities were recorded than in the same month in 2001 and 2002 when weather conditions were milder. In the first 3 years mentioned, Bullfinch was the first (27% of total number of birds), third (8%) and second (22%) most abundant species in January samplings, respectively, whereas in the other 2 years it was the fifth (8%) and ninth (3%), respectively. Of the three samplings conducted in December 2000, the one in which higher Bullfinch density and greater relative abundance (the most abundant species, 17%) were recorded, was the only sampling that coincided with snow on the ground (on the other 2 days, it was the fourth and sixth species in abundance, 6–7%). Iberian Bullfinches are considered resident birds, but in winter they often move short and medium distances, mainly downwards from mountainous regions to lower areas where shrub and tree seeds are more abundant and/or accessible, sometimes outside their breeding range (Hernández 2008, Munilla & Guitián 2012, Fernández & García 2014). Therefore, the concentration of Bullfinches in certain places rich in favourite seeds, occupation of more open habitats, and greater tendency towards gregariousness, may result in markedly high density values during winter in Spain, exceeding 10 birds/10 ha (Belamendia 2012, Hernández 2021, 2022B, present study). Records of individuals belonging to more northern subspecies arriving in the peninsula are very scarce (Tellería *et al.* 1999, Clement 2010, Díaz 2016). Although small resident bird species generally show the largest population declines after hard winters (Newton 1998), this did not seem to affect the Bullfinch, presumably partly due to its ability to escape and trace food. In Britain, Bullfinch does not usually suffer population declines after severe winter weather (e.g., Cawthorne & Marchant 1980). According to Senar & Borras (2004), flocking and altitudinal movements are amongst the strategies developed by birds to survive winter in Iberia, and certain tree seeds are crucial for some granivorous passerines, including Bullfinches, in this season. The lack of concordance between the suggested trend of the breeding (Escandell & Escudero 2021A) and wintering (Escandell & Escudero 2021B) populations of Bullfinch during the last two decades in Spain (moderate decline and moderate increase, respectively) may be due to the limited reliability of the spring samplings, since they were not exhaustive, and the higher detectability in winter.

4.2. Population age-sex structure

The highest percentages of Bullfinches in juvenile plumage were found in August–September, which fits the timing of breeding of the population under study, whose latest fledging dates were within 11–20 August (Hernández 2020). In an area in England, the proportion of first-year individuals (identified from retained juvenile feathers) among netted Bullfinches increased progressively from July or August until October, and the highest October ratios occurred in the years when the largest proportions of pairs extended their breeding beyond July into August and September (Newton 1999B). As already stated, breeding productivity did not vary significantly from one year to the next in the study area, where there were very few late nests, and none after August (Hernández 2020).

Bullfinch sex ratio was significantly skewed towards males all year (between 1.4:1 and 1.75:1), the same tendency being found by other authors (Newton 2000, Hogstad 2006). In monogamous species, bias in favour of males between 1.1:1 and 4.8:1 has been documented, with ≥ 1.5:1 in many of them (Breitwisch 1989), and for birds in general, males outnumber females by a mean of around 33% (Donald 2007). Therefore, although estimates of avian sex ratios could be influenced by factors such as differences in ecology and behaviour between males and females not completely corrected by the sampling methods employed, survival in females after independence from their parents does actually seem to be lower in comparison with males (Breitwisch 1989, Temple 2004, Donald 2007). Accordingly, statistical significance of male-bias in Bullfinch increased progressively from autumn, when the population should have a higher percentage of first-year individuals, to the following summer, and male-bias was not significant for moulting juveniles. In a Bullfinch population in England, males tended to outnumber

females throughout the year in netted samples, with the biggest divergence in the breeding season, attributed to females being confined to their nests during incubation and brooding periods, but with a sex ratio of 1.2:1 also in favour of males between November and March (Newton 2000). In Norway, Hogstad (2006) estimated a male:female ratio of 1.1:1 in Bullfinch for October–April. Perhaps in spring and summer, the combination of both higher accumulated female mortality and permanence in the nest produces the most significant skewed sex ratios in this species. Also, females show more secretive behaviour and appear to be less mobile in their daily routines than males throughout the year (Hernández 2022B). Some events at specific moments could have a certain balancing effect on the estimates, such as high detectability of females during nest building (they do most of the work, accompanied by the male) or decreased detectability of both males and females during moult, when the birds are less active and more hidden from view (Newton 1966, Hernández 2021, Á. H. *pers. observ.*). In the study area, in winter 2004 to 2005, 71% of feeding visits by Bullfinches to guelder roses *Viburnum opulus* corresponded to males and the rest to females (2.5:1) (Hernández 2009B), without this being significantly associated with sexual differences in food preferences (Hernández 2022A).

In birds in general, not enough is known about the main causes of higher mortality in females after independence from parents, or whether these causes change with age. They could be linked to the displayed level of parental effort (which may result in a delayed effect after breeding), to the risk arising from intensity in dispersal and migration (with females moving further away to worse habitats as they are usually subordinates of males), to smaller body size (particularly unfavourable under severe conditions), and even to a smaller relative brain size (associated with lower adaptability) and genetic differences (female birds are more sensitive to recessive mutations as they are the heterogametic sex) (Breitwisch 1989, Temple 2004, Donald 2007, Payevsky 2016). According to autumn–winter Bullfinch ringing results in the Madrid region, located in the centre of peninsular Spain far from its usual breeding range, sex ratio was balanced during 2000–2016 (Quirós 2020). Therefore, under-representation of female Bullfinches in northern Iberia does not seem to be primarily linked to remarkable medium- or long-range movements towards the south. On the contrary, North Eurasian Bullfinches are periodically irruptive, which is associated with weather and food supply, with females and immatures outnumbering or moving further than males and adults on their movements (Cramp & Perrins 1994A, Newton *et al.* 2006, Newton 2008, Fox *et al.* 2009, Clement 2010). The latter finding is in line with the most characteristic features of differential migration by sex among passerines, as males are normally the territorial sex and move away from breeding areas less frequently in order to reach them sooner in spring, they are usually larger than the females, and are typically the dominant sex (Newton 2008, Woodworth *et al.* 2016). However, the Bullfinch shows some distinctive features which theoretically would support what has been found for Iberian populations, namely non-territorial behaviour and a monogamous mating system with longlife faithfulness (Cramp & Perrins 1994A, Hogstad 2006, Clement 2010, Wright 2020), no clear differences in size and weight between sexes (Clement *et al.* 1993, Cramp & Perrins 1994A), and dominance of females over males (Wilkinson 1982, Hogstad 2006, Marquiss 2007, Hernández 2022B). According to Newton (1968), the body condition of Bullfinches does not deteriorate during moult, regardless of sex; to the contrary, they appear to gain weight in that process.

Therefore, greater parental investment by female Bullfinches could be a fundamental cause of skewed sex ratio in this species, as they are responsible for most of the breeding tasks until they share the feeding of nestlings with males (Cramp & Perrins 1994A, Hernández 2020). In the most immediate and extreme case, predation of females while incubating, presumably by stoats *Mustela erminea*, accounted for ≈ 10% of Bullfinch nest failure in the study area (Hernández 2020). But even nest construction is an energetically and temporally expensive activity for birds (review by Mainwaring & Hartley 2013). Although there is no full agreement on the age classes considered, average annual mortality in Bullfinches in European populations is around 50%, as many as 7 percentage

points more for adult females than adult males having been found (59% versus 52%) (Haukioja 1969, Bibby 1974, Cramp & Perrins 1994A). Mortality in adult passerine birds in temperate regions occurs especially during the breeding season (Cody 1971, von Haartman 1971). Also, the number of clutches has a negative effect on the survival of adults in winter, as it implies high time and energy expenditure (Dobson 1990, Hansell 2000). Further research needs to be carried out into Bullfinch sex ratio and causes of mortality in males and females.

Bullfinches plainly showing post-juvenile moult were observed during a period of approximately 80 days between August and November. In 2004, when the latest sighting of a moulting juvenile was recorded, nestlings were also observed until later dates (interval 11–20 August) (Hernández 2020), a logical correlation already known for this species (Newton 1999A). In other Bullfinch subspecies and populations, the first moulting juveniles were recorded between mid-July and early September and the last usually during November (hardly ever December), moult lasting between 7 and 9 weeks for each individual (Newton 1966, Cramp & Perrins 1994A, Jenni & Winkler 1994). During moult, juveniles of both sexes were frequently observed together in groups and seemingly separated from adults, as occurred for juveniles in general in summer and autumn (Hernández 2022B).

4.3. Conservation concerns

Different biological and ecological characteristics of the Bullfinch, together with a favourable habitat and little changing environmental conditions from year to year, seemed to promote the relatively high and steady breeding population densities estimated during the study period. Competition with other small passerines for food resources was apparently low, and also for nest sites, since suitable hedges were a plentiful element, and interspecific aggressive encounters involving Bullfinches only occurred very occasionally (Á. H. *unpubl. data*). Differentiated microhabitat, especially by avoiding open ground, and a considerable variety of types of food eaten, with marked changes in diet throughout the year and specialised bud-eating, presumably relaxed competition between Bullfinches and other granivorous and frugivorous birds (Hernández 2021, Hernández 2022A, Á. H. *unpubl. data*). Regarding the granivorous passerines more closely related to the Bullfinch in phylogeny and ecology (see Cramp & Perrins 1994A, B), seven other fringilid and three emberizid species were recorded via line transect. The Eurasian Sparrowhawk was probably the principal predator of Bullfinches in the study area during the non-breeding season, but these did not appear to be amongst the most vulnerable birds – 4.9% of birds caught and 1.3% of biomass consumed – as the bulk of its prey were medium-sized (*Turdus* species), frequently foraging on the ground at some distance from shrubs and trees (Hernández 2018). As far as the current situation in the study area is concerned, some visits for other purposes in 2021, 2022 and 2023 revealed that the Bullfinch was still present and in good conservation status.

The principal threat to this Bullfinch population in the near future is perhaps the gradual disappearance of borders between woody vegetation and meadows, which is slowly becoming more apparent due to the spread of shrubland, the decrease in livestock activities, the increase in land surface for Canadian poplar plantations, and the loss of hedgerows. In northern Spain, the mosaics of mixed land use composed largely of hedgerows, are of great interest for the conservation of many bird species, including the Bullfinch, in both spring and winter (Tellería 1992, Tellería *et al.* 2008). In Spain in general, the two major threats facing Bullfinches are degradation and loss of habitat (Belamendia 2003). In other European countries, the causes suggested for population decline episodes in Bullfinches are very varied, affecting all stages of the life cycle (breeding and non-breeding seasons) and all ages (nestlings, first year birds, adults), but have not been clearly established, underlining how important it is to deepen in the role of habitat components and their qualities (e.g., hedgerow structure and understorey vegetation of woodlands) in the conservation of this fringilid (Siriwardena *et al.* 2001, Robinson 2005). Also, it is essential to consider landscape connectivity for sedentary passerine species that use some habitat elements in preference to others during the year (Cale 2003), as is the case in the Bullfinch.

5. Povzetek

Populacijska ekologija kalina *Pyrrhula pyrrhula* na Iberskem polotoku, kjer je razširjena podvrsta *iberiae*, je skoraj nepoznana. Pričujoča raziskava ponuja prvi opis populacijskih lastnosti te podvrste na severu Španije, kjer pokrajino na območju raziskave sestavlja preplet travnikov in mejic. Raziskava v obdobju šestih let (2001–2006) analizira populacijsko gostoto, starostno strukturo in spolno razmerje. Gostote v gnezditveni sezono so bile med leti podobne, medtem ko so se v zimskih mesecih znatno razlikovale. Najvišje gostote so bile zabeležene julija in avgusta, največji deleži juvenilnih osebkov pa avgusta in septembra. Spolno razmerje je bilo skozi vso leto izrazito v prid samcev. V raziskavi je bila ugotovljena visoka in stabilna gostota gnezditvene populacije, posledica bioloških in ekoloških značilnosti kalinov, primernega habitata in majhnih okoljskih sprememb med leti raziskave. Velika gostota v poznem poletju je bila posledica večjega števila juvenilnih osebkov, velika nihanja v številčnosti v zimskem obdobju pa so najverjetneje posledica premikov osebkov. Razlog za neenakomerno spolno razmerje lahko najbolje pojasnimo z znatno večjim starševskim naporom samic (v primerjavi s samci) in posledično večjo smrtnostjo v obdobju gnezdenja.

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6. References

Alves J. A. (2013): Avian demography in a changing world: a report on the BOU's Annual Conference held at the University of Leicester, 1–3 April. – Ibis 155: 908–911.

Bas J. M., Pons P., Gómez C. (2007): Daily activity of Sardinian warbler *Sylvia melanocephala* in the breeding season. – Ardeola 54: 335–338.

Belamendia G. (2003): Camachuelo común *Pyrrhula pyrrhula* [Eurasian bullfinch *Pyrrhula pyrrhula*]. pp. 592–593. In: Martí R., del Moral J. C. (eds): Atlas de las Aves Reproductoras de España [Spain Breeding Bird Atlas]. – DGCONA-Sociedad Española de Ornitología, Madrid. (in Spanish)

Belamendia G. (2012): Camachuelo común *Pyrrhula pyrrhula* [Eurasian bullfinch *Pyrrhula pyrrhula*]. pp. 534–535. In: del Moral J. C., Molina B., Bermejo A., Palomino D. (eds.): Atlas de las Aves en Invierno en España 2007–2010 [Spain Winter Bird Atlas 2007–2010]. –Ministerio de Agricultura, Alimentación y Medio Ambiente-SEO/BirdLife, Madrid. (in Spanish)

Bibby C. J. (1974): Bullfinch survival and populations. – Wicken Fen Group Report 5: 25–27.

Bibby C. J., Burgess N. D., Hill D. A. (1992): Bird Census Techniques. – Academic Press, London.

Brambilla M., Martino G., Pedrini P. (2013): Changes in song thrush *Turdus philomelos* density and habitat association in apple orchards during the breeding season. – Ardeola 60: 73–83.

Breitwisch R. (1989): Mortality patterns, sex ratios, and parental investment in monogamous birds. pp. 1–50. In: Power D. M. (ed.): Current Ornithology. Volume 6. – Plenum Press, New York.

Cale P. G. (2003): The influence of social behaviour, dispersal and landscape fragmentation on population structure in a sedentary bird. – Biological Conservation 109: 237–248.

Carrascal L. M., Palomino D. (2008): Las Aves Comunes Reproductoras en España: Población en 2004–2006 [Common Breeding Birds in Spain: 2004–2006 Populations]. – SEO/BirdLife, Madrid. (in Spanish)

Cawthorne R. A., Marchant J. H. (1980): The effects of the 1978/79 winter on British bird populations. – Bird Study 27: 163–172.

Clement P. (2010): Eurasian Bullfinch *Pyrrhula pyrrhula*. pp. 609–610. In: Del Hoyo J., Elliott A., Christie D. A. (eds.): Handbook of the Birds of the World. Volume 15. Weavers to New World Warblers. – Lynx Edicions, Barcelona.

Clement P., Harris A., Davis J. (1993): Finches and Sparrows. – Helm, London.

Cody M. L. (1971): Ecological aspects of reproduction. pp. 461–512. In: Farner D. S., King J. R., Parkes K. C. (eds.): Avian Biology. Volume 1. – Academic Press, New York.

Costa L. (1993): Evolución estacional de la avifauna en hayedos de la montaña cantábrica [Seasonal changes in bird community of beech forests in the Cantabrian mountains]. – Ardeola 40: 1–11. (in Spanish)

Cramp S., Perrins C. M. (eds.) (1994A): The Birds of the Western Palearctic. Volume 8. Crows to Finches. – Oxford University Press, Oxford.

Cramp S., Perrins C. M. (eds.) (1994B): The Birds of the Western Palearctic. Volume 9. Buntings and New World Warblers. – Oxford University Press, Oxford.

Crombie M. D., Arcese P. (2018): Temporal variation in the effects of individual and environmental factors on nest success. – Auk 135: 326–341.

Díaz L. (2016): Camachuelo común *Pyrrhula pyrrhula* [Eurasian bullfinch *Pyrrhula pyrrhula*]. In: Salvador A., Morales M. B. (eds.): Enciclopedia Virtual de los Vertebrados Españoles [The Online Encyclopaedia of Spanish Vertebrates]. – Museo Nacional de Ciencias Naturales, Madrid [http://www.vertebradosibericos.org/aves/pyrpyr.html], 10/01/2022. (in Spanish)

Dobson A. (1990): Survival rates and their relationship to life-history traits in some common British birds. pp. 115–146. In: Power D. M. (ed.): Current Ornithology. Volume 7. – Plenum Press, New York.

Donald P. F. (2007): Adult sex ratios in wild bird populations. – Ibis 149: 671–692.

Dunn E. H., Bart J., Collins B. T., Craig B., Dale B., Downes C. M., Francis C. M., Woodley S., Zorn P. (2006): Monitoring Bird Populations in Small Geographic Areas. Special Publication. – Canadian Wildlife Service, Ottawa.

Escandell V., Escudero E. (2021A): Tendencia de las aves en primavera [Spring bird trends]. pp. 6–15. In: SEO/BirdLife: Programas de Seguimiento y Grupos de Trabajo de SEO/BirdLife 2020 [Monitoring Programs and Working Groups, SEO/BirdLife 2020]. – SEO/BirdLife, Madrid. (in Spanish)

Escandell V., Escudero E. (2021B): Tendencia de las aves en invierno [Winter bird trends]. pp. 16–19. In: SEO/BirdLife: Programas de Seguimiento y Grupos de Trabajo de SEO/BirdLife 2020 [Monitoring Programs and Working Groups, SEO/BirdLife 2020]. – SEO/BirdLife, Madrid. (in Spanish)

Fernández M. A., García E. (2014): Camachuelo común *Pyrrhula pyrrhula* [Eurasian bullfinch *Pyrrhula pyrrhula*]. pp. 516–517. In: García E., García-Rovés P., Vigil A., Alonso L. M., Fernández M. A., Silva G., Pascual D., Álvarez D. (eds.): Atlas de las Aves Nidificantes de Asturies (1990–2010) [Asturias Breeding Bird Atlas (1990–2010)]. – Coordinadora Ornitolóxica d'Asturies-INDUROT, Avilés. (in Spanish)

Fowler J., Cohen L., Jarvis P. (1998): Practical Statistics for Field Biology. 2nd Edition. – Wiley, Chichester.

Fox A. D., Kobro S., Lehikoinen A., Lyngs P., Väisänen R. A. (2009): Northern bullfinch *Pyrrhula p. pyrrhula* irruptive behaviour linked to rowanberry *Sorbus aucuparia* abundance. – Ornis Fennica 86: 51–60.

Gregory R. D., Gibbons D. W., Donald P. F. (2004): Bird census and survey techniques. pp. 17–55. In: Sutherland W. J., Newton I., Green R. E. (eds.): Bird Ecology and Conservation. A Handbook of Techniques. – Oxford University Press, Oxford.

Hansell M. (2000): Bird Nests and Construction Behaviour. – Cambridge University Press, Cambridge.

Haukioja E. (1969): Mortality rates of some Finnish passerines. – Ornis Fennica 46: 171–178.

Hernández Á. (2008): Camachuelo común *Pyrrhula pyrrhula* [Eurasian bullfinch *Pyrrhula pyrrhula*]. pp. 271–273. In: García J., Ramos L. A., Vázquez X. (eds.): Atlas de las Aves Reproductoras de León [León Breeding Bird Atlas]. – Diputación de León, León. (in Spanish)

Hernández Á. (2009A): Summer–autumn feeding ecology of pied flycatchers *Ficedula hypoleuca* and spotted flycatchers *Muscicapa striata*: the importance of frugivory in a stopover area in north-west Iberia. – Bird Conservation International 19: 224–238.

Hernández Á. (2009B): Birds and guelder rose *Viburnum opulus*: selective consumption and dispersal via regurgitation of small-sized fruits and seeds. – Plant Ecology 203: 111–122.

Hernández Á. (2014): Seasonal habitat use in Eurasian red squirrels residing in Iberian hedgerows. – Hystrix Italian Journal of Mammalogy 25: 95–100.

Hernández Á. (2018): Diet of Eurasian sparrowhawks in a Northwest Iberian hedgerow habitat throughout the year. – Ornithological Science 17: 95–101.

Hernández Á. (2020): Breeding ecology of Eurasian bullfinches *Pyrrhula pyrrhula* in an Iberian hedgerow habitat. – Journal of Natural History 54: 2613–2645.

Hernández Á. (2021): Habitat use and space preferences of Eurasian Bullfinches *Pyrrhula pyrrhula* in northwestern Iberia throughout the year. – Avian Research 12: 8.

Hernández Á. (2022A): Seasonal feeding habits of the Iberian bullfinch *Pyrrhula pyrrhula iberiae* in northwestern Spain. – Ornithology Research 30: 155–173.

Hernández Á. (2022B): Gregariousness and intraspecific aggression in Iberian bullfinches (*Pyrrhula pyrrhula iberiae*) throughout the year. – Behaviour 159: 615–642.

Hernández Á., Zaldívar P. (2013): Epizoochory in a hedgerow habitat: seasonal variation and selective diaspore adhesion. – Ecological Research 28: 283–295.

Hernández Á., Zaldívar P. (2016): Ecology of stoats *Mustela erminea* in a valley of the Cantabrian Mountains, northwestern Spain. – Vertebrate Zoology 66: 225–238.

Hernández Á., Zaldívar P. (2021): Nest-site selection and nest design of Iberian bullfinches *Pyrrhula pyrrhula iberiae* in northwestern Spain. – Avian Biology Research 14: 124–142.

Hogstad O. (2006): Flock composition, agonistic behaviour and body condition of wintering bullfinches *Pyrrhula pyrrhula*. – Ornis Fennica 83: 131–138.

Horns J. J., Şekercioğlu Ç. H. (2018): Conservation of migratory species. – Current Biology 28: R980–R983.

Järvinen O., Väisänen R. A. (1975): Estimating relative densities of breeding birds by the line transect method. – Oikos 26: 316–322.

Lowry R. (1998-2022): VassarStats: Website for Statistical Computation. – Vassar College, Poughkeepsie [http://vassarstats.net]., 17/01/2022.

Mainwaring M. C., Hartley I. R. (2013): The energetic costs of nest building in birds. – Avian Biology Research 6: 12–17.

Marquiss M. (2007): Seasonal pattern in hawk predation on common bullfinches *Pyrrhula pyrrhula*: evidence of an interaction with habitat affecting food availability. – Bird Study 54: 1–11.

McClure H. E. (1955): Sex and age ratios of some Japanese birds. – Wilson Bulletin 67: 287–290.

Munilla I., Guitián J. (2012): Numerical response of bullfinches *Pyrrhula pyrrhula* to winter seed abundance. – Ornis Fennica 89: 197–205.

Newton I. (1966): The moult of the bullfinch *Pyrrhula pyrrhula*. – Ibis 108: 41–87.

Newton I. (1968): The temperatures, weights, and body composition of molting bullfinches. –Condor 70: 323–332.

Newton I. (1985): Finches. Limpback Edition. – Collins, London.

Newton I. (1986): The Sparrowhawk. – Poyser, Calton.

Newton I. (1998): Population Limitation in Birds. – Academic Press, San Diego.

Newton I. (1999A): An alternative approach to the measurement of seasonal trends in bird breeding success: a case study of the bullfinch *Pyrrhula pyrrhula*. – Journal of Animal Ecology 68: 698–707.

Newton I. (1999B): Age ratios in a bullfinch *Pyrrhula pyrrhula* population over six years. – Bird Study 46: 330–335.

Newton I. (2000): Movements of Bullfinches *Pyrrhula pyrrhula* within the breeding season. – Bird Study 47: 372–376.

Newton I. (2008): The Migration Ecology of Birds. – Academic Press, London.

Newton I., Hobson K. A., Fox A. D., Marquiss M. (2006): An investigation into the provenance of northern bullfinches *Pyrrhula p. pyrrhula* found in winter in Scotland and Denmark. – Journal of Avian Biology 37: 431–435.

Noval A. (1971): Movimientos estacionales y distribucion del Camachuelo común, *Pyrrhula pyrrhula*, en el norte de España [Seasonal movements and distribution of the Eurasian bullfinch, *Pyrrhula pyrrhula*, in northern Spain]. – Ardeola (special issue): 491–507. (in Spanish)

Pascoe B. A., Schlesinger C. A., Pavey C. R., Morton S. R. (2019): Effectiveness of transects, point counts and area searches for bird surveys in arid *Acacia* shrubland. – Corella 43: 31–35.

Payevsky V. A. (2016): Sex-biased survival and philopatry in birds: do they interact? – Biology Bulletin 43(8): 1–15.

Phillimore A. B, Owens I. P. F. (2006): Are subspecies useful in evolutionary and conservation biology? – Proceedings of the Royal Society B 273: 1049–1053.

Quirós Á. (2020): El camachuelo común (*Pyrrhula pyrrhula*) en la Comunidad de Madrid [The Eurasian bullfinch (*Pyrrhula pyrrhula*) in the Madrid region]. pp. 23–36. In: Juan M., de la Torre V., Pérez-Granados C. (eds.): Anuario Ornitológico de Madrid 2018 [Madrid Ornithological Yearbook 2018]. – SEO-Monticola, Madrid. (in Spanish)

Ricklefs R. E. (1983): Comparative avian demography. pp. 1–32. In: Johnston R. F. (ed.): Current Ornithology. Volume 1. – Plenum Press, New York.

Ríos-Saldaña C. A., Delibes-Mateos M., Ferreira C. C. (2018): Are fieldwork studies being relegated to second place in conservation science? – Global Ecology and Conservation 14: e00389.

Rivas-Martínez S. (2007): Mapa de series, geoseries y geopermaseries de vegetación de España [Map of series, geoseries and geopermaseries of vegetation in Spain]. – Itinera Geobotanica 17: 1–436. (in Spanish)

Robinson R. A. (2005): Bullfinch *Pyrrhula pyrrhula*. In: BirdFacts. Profiles of Birds Occurring in Britain and Ireland. – British Trust for Ornithology, Thetford [https://app.bto.org/birdfacts/results/bob17100.htm], 01/02/2022.

Roos S., Smart J., Gibbons D. W., Wilson J. D. (2018): A review of predation as a limiting factor for bird populations in mesopredator-rich landscapes: a case study of the UK. – Biological Reviews of the Cambridge Philosophical Society 93: 1915–1937.

Rosamond K. M., Goded S., Soultan A., Kaplan R. H., Glass A., Kim D. H., Arcilla N. (2020): Not singing in the rain: linking migratory songbird declines with increasing precipitation and brood parasitism vulnerability. – Frontiers in Ecology and Evolution 8: 536769.

Scott G. (2020): Essential Ornithology. 2nd Edition. – Oxford University Press, Oxford.

Senar J. C., Borras A. (2004): Sobrevivir al invierno: estrategias de las aves invernantes en la península Ibérica [Surviving to winter: strategies of wintering birds in the Iberian Peninsula]. – Ardeola 51: 133-168. (in Spanish)

Siriwardena G. M., Freeman S. N., Crick H. Q. P. (2001): The decline of the bullfinch *Pyrrhula pyrrhula* in Britain: is the mechanism known? – Acta Ornithologica 36: 143–152.

Tellería J. L. (1992): Gestión forestal y conservación de las aves en España peninsular [Forestry and the conservation of woodland birds in mainland Spain]. – Ardeola 39: 99–114. (in Spanish)

Tellería J. L., Asensio B., Díaz M. (1999): Aves Ibéricas. Volumen 2. Passeriformes [Iberian Birds. Volume 2. Passeriformes]. – Reyero, Madrid. (in Spanish)

Tellería J. L., Ramírez A., Galarza A., Carbonell R., Pérez-Tris J., Santos T. (2008): Geographical, landscape and habitat effects on birds in northern Spanish farmlands: implications for conservation. – Ardeola 55: 203–219.

Temple S. A. (2004): Individuals, populations, and communities. The ecology of birds. pp. 9.1–9.134. In: Podulka S., Rohrbaugh R. W. Jr, Bonney R. (eds.): Handbook of Bird Biology. – Cornell Lab of Ornithology-Princeton University Press, Ithaca.

Thomson D. L., Green R. E., Gregory R. D., Baillie S. R. (1998): The widespread declines of songbirds in rural Britain do not correlate with the spread of their avian predators. –Proceedings of the Royal Society B 265: 2057–2062.

Vitz A. C., Rodewald A. D. (2011): Influence of condition and habitat use on survival of post-fledging songbirds. – Condor 113: 400–411.

von Haartman L. (1971): Population dynamics. pp. 391–459. In: Farner D. S., King J. R., Parkes K. C. (eds.): Avian Biology. Volume 1. – Academic Press, New York.

White T. C. R. (2008): The role of food, weather and climate in limiting the abundance of animals. – Biological Reviews of the Cambridge Philosophical Society 83: 227–248.

Wilkinson R. (1982): Group size and composition and the frequency of social interactions in bullfinches *Pyrrhula pyrrhula*. – Ornis Scandinavica 13: 117–122.

Winkler D. W. (2004): Nests, eggs, and young: breeding biology of birds. pp. 8.1–8.152. In: Podulka S., Rohrbaugh R. W. Jr, Bonney R. (eds.): Handbook of Bird Biology. – Cornell Lab of Ornithology-Princeton University Press, Ithaca.

Woodworth B. K., Newman A. E. M., Turbek S. P., Dossman B. C., Hobson K. A., Wassenaar L. I., Mitchell G. W., Wheelwright N. T., Norris D. R. (2016): Differential migration and the link between winter latitude, timing of migration, and breeding in a songbird. – Oecologia 181: 413–22.

Wright C. (2020): Pair bonding in Eurasian Bullfinches *Pyrrhula pyrrhula*: observations from a colour-ringing study. – Ringing and Migration 35: 103–113.

Zuberogoitia I. (2016): Gavilán común *Accipiter nisus*: dieta [Eurasian Sparrowhawk *Accipiter nisus*: diet]. In: Rapaces y Carnívoros de Bizkaia [Raptors and Carnivores of Bizkaia]. – [http://depredadoresdebizkaia.blogspot.com/2016/02]. (in Spanish), 04/02/2022. (in Spanish)

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sciendo

Zgodovina pojavljanja puščavskega tekalca *Cursorius cursor* v Sloveniji

History of the Cream-coloured Courser *Cursorius cursor* occurrence in Slovenia

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The article presents a historical revision of data on the occurrence of the Cream-coloured Courser *Cursorius cursor* in Slovenia. A review of historical sources revealed that the species occurred in Slovenia at least three times after 1800, for the first time between 27 and 31 December 1847 in Šentvid near Ljubljana (specimen in the collection of the Slovenian Museum of Natural History, Ljubljana, Slovenia), for the second time in November 1892 near St. Janž (present day Starše) on the Drava plain (specimen in the collection of the Joanneum Museum, Graz, Austria) and last on 3 October 1976 at the Sečovlje salt pans (observation was not documented with preserved specimen or photograph). All three data have previously been published in various historical sources, but some were overlooked during the preparation of lists of Slovenian avifauna.

Ključne besede: redkost, izjemni gost, zgodovinska analiza, arhiv, muzejska zbirka
Key words: rarity, vagrant, historical analysis, archive, museum collection

Uvod

Kot redek izjemen gost je bil puščavski tekalec *Cursorius cursor* zabeležen po bolj ali manj vsej Evropi, občasno pa celo gnezdi v Španiji in Grčiji, medtem ko nam najbližja stalna populacija gnezdi ob reki Evfrat v JV Turčiji (Lorenzo & Herrando 2020). V Evropi je zabeleženih največ opazovanj v Italiji (125 opazovanj do leta 2012), saj ima Apeninski polotok očitno znatnejši pomen med disperzijo vrste v Sredozemlju (Verducci *in sod.* 2012). V Italiji se puščavski tekalec pojavlja tako med spomladansko kot jesensko selitvijo, višek opazovanj pa so zabeležili med septembrom in novembrom.

V Sloveniji je puščavski tekalec izjemno redka vrsta, ki je bila nazadnje opazovana v Sečoveljskih solinah leta 1976 (Šmuc 1980). Podatek je veljal za prvega in edinega (Komisija za redkosti 1989, 1993, Božič 2001, Hanžel & Šere 2011), vendar je bil kasneje na seznam dodan še podatek iz novembra 1892 (Reiser 1925) iz Starš kot prvi podatek o pojavljanju vrste pri nas (Hanžel 2013), vendar Schulz (1890) navaja še starejši podatek iz leta 1847, a brez konkretne lokacije najdbe. Namen prispevka je podati kritičen zgodovinski pregled pojavljanja puščavskega tekalca v Sloveniji v 19. stoletju s pregledom do sedaj prezrtih zgodovinskih virov.

Metode dela

Revizija temelji na pregledu muzejskega in arhivskega gradiva v Prirodoslovnem in Narodnem muzeju Slovenije ter Narodni in univerzitetni knjižnici (digitalizirano gradivo dostopno prek portala Digitalna knjižnica Slovenije - dLib.si, https://www.dlib.si). V sklopu arhivskega pregleda za zgodovino Prirodoslovnega muzeja Slovenije (Križnar 2021) je bilo pregledanih in digitaliziranih okoli 2500 dokumentov (skenogramov), kjer so se izločili oziroma dokumentirali tudi ornitološki zapisi (seznami podarjenih ptic, ulovljenih ptic, prepariranih ptic in podobno). Zbrani podatki so bili kritično ovrednoteni z rekonstrukcijo čimbolj popolnega zapisa o zgodovinskih najdbah puščavskega tekalca v Sloveniji.

Rezultati in diskusija

V 20. stoletju je bil puščavski tekalec v Sloveniji opazovan le enkrat, in sicer 3. 10. 1976 v Sečoveljskih solinah (Šmuc 1980). Ptico je na območju Fontanigge opazoval Alojz Šmuc starejši, primerek pa ni bil shranjen v zbirki ali fotografiran (A. Šmuc ml. *pisno*). V 19. stoletju se je dokumentirano puščavski tekalec v Sloveniji pojavil vsaj dvakrat in v obeh primerih je bil dokazni primerek shranjen v muzejskih zbirkah:

1.) XI. 1892, Starše (Št. Janž) na Dravskem polju pri Ptuju, 1 ad., leg. Franz Bernhaut (Reiser 1925)

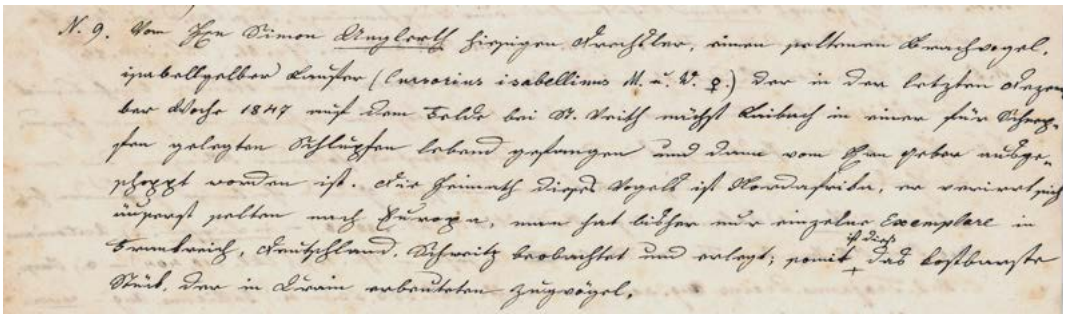
Primerek ustreljene odrasle ptice navaja že Reiser (1925), ki pravi, da je ptico ustrelil Franz Bernhaut pri Strašah na Dravskem polju (St. Johann am Draufeld) na Ptujski cesti. Primerek je hranil uplenitelj v svoji gostilni v Limbušu, kjer ga je našel Otmar Reiser in na njegovo prošnjo je lastnik primerek daroval muzeju Universalmuseum Joanneum v Gradcu (Avstrija), kjer ga hranijo še danes (inv. št. 20170; Albegger 2015).

2.) 27.–31. 12. 1847, Šentvid pri Ljubljani, 1 ad. ♀, leg. Simon Unglerth (Anonimus 1850)

V drugi posodobitvi seznama ugotovljenih ptic Slovenije sta Hanžel & Šere (2011) prvič omenila, da poleg podatka iz leta 1976 obstaja še primerek samice, ustreljene januarja 1847 na Kranjskem, ki jo hrani Prirodoslovni muzej Slovenije pod inventarno številko 5311 (slika 1). Ker je Vojvodina Kranjska segala tudi prek meja današnje Slovenije, podatek ni bil upoštevan kot nedvoumno slovenski zaradi neznane lokacije. Podatki o zgodovinskih primerkih ptic v ornitološki zbirki Prirodoslovnega muzeja Slovenije temeljijo na etiketah ali oznakah ob samih primerkih ali na Inventarni knjigi sesalcev, rib, ptic, plazilcev Prirodoslovnega muzeja Slovenije, t.i. Stari inventarni knjigi (SIK), ki vsebuje zapise o eksponatih, pridobljenih med letoma 1841 in 1974 (Vrezec & Kačar 2017). Podrobnejše analize etiket in zapisov v SIK so pokazale razlike, saj so podatki v SIK večinoma okvirni. Nasprotno pa so podatki na etiketah ob eksponatih natančnejši. Vendar je bilo veliko starejših eksponatov, pridobljenih pred letom 1900, kasneje zavrženih ali uničenih ali pa so bile etikete zamenjane ali izgubljene, s čimer se je izgubila podatkovna sled (Vrezec & Kačar 2017). Primerek samice puščavskega tekalca je bil očitno v preteklosti preetiketiran, saj je bil na podstavek nameščen nov napis brez navedbe kraja in datuma najdbe. V SIK je bil primerek vpisan pod inventarno številko 434 z imenom *Cursorius (europaeus) gallicus* Gmel. in z naslednjimi podatki: ♀, Kranjska, januar 1847. Slednji podatek iz SIK sta povzela tudi Hanžel & Šere (2011), navaja pa ga že Schulz (1890). Primerek puščavskega tekalca je prišel v muzej v času kustosa Henrika Freyerja, ki je v muzeju služboval med letoma 1832 in 1852 (Križnar 2021). Vendar je bila SIK vzpostavljena mnogo kasneje, leta 1888 v času Karla Dežmana, ko so napravili rekatalogizacijo vseh primerkov vretenčarjev (Kryštufek & Jernejc Kodrič 2013), pri čemer podrobnejših podatkov z etiket večinoma niso prepisovali. Primerek puščavskega tekalca pa morda že na samem začetku ni bil opremljen z ustreznimi podatki, saj natančnejših podatkov ni poznal niti muzejski preparator in ornitolog Ferdinand Schulz (1890). Kljub temu pa so v času Henrika Freyerja redno objavljali sezname daril različnih muzejskih darovalcev v časopisu *Laibacher Zeitung* in v prilogi *Illyrisches Blatt*, kjer pa so zapisali precej natančnejše podatke o pridobljenih primerkih (Križnar 2021). V *Laibacher Zeitung* z dne 10. 5. 1850 (št. 106) je naveden opis muzealij, pridobljenih v letu 1848, in pod številko 9 spodnji

Slika 1: Puščavski tekalec *Cursorius cursor* iz zbirke Prirodoslovnega muzeja Slovenije, inv. št. 5311 (foto: Ciril Mlinar Cic)

Figure 1: Cream-coloured Courser *Cursorius cursor* from the collection of the Slovenian Museum of Natural History, No. 5311 (photo: Ciril Mlinar Cic)



Slika 2: Rokopis kustosa Henrika Freyerja z opisom najdbe puščavskega tekalca *Cursorius cursor* konec decembra 1847, ki je bil leta 1850 objavljen v *Laibacher Zeitung* v številki 106. Rokopis hrani arhiv Narodnega muzeja Slovenije.

Figure 2: Manuscript by curator Henrik Freyer describing the finding of the Cream-coloured Courser *Cursorius cursor* at the end of December 1847, which was published in 1850 in the *Laibacher Zeitung*, issue 106. The manuscript is housed in the archives of the National Museum of Slovenia.

zapis (Anonimus 1850; prevod iz nemščine; originalni nemški zapis je podan v dodatku 1):

Št. 9. Od g. Simona Unglertha, lokalnega lesarja, smo prejeli izjemno redkega belonogega pobrežnika, imenovanega Isabelin rumeni tekalec *(Cursorius isabellinus,* Mayer in Wolf). Je samica, ki je bila zadnji teden decembra 1847. na polju blizu Šentvida pri Ljubljani živa ujeta v zanko za sloke, nato pa jo je prepariral g. Geber. Ta ptica živi v severni Afriki; zelo redko zaide v Evropo; doslej so opazili in ustrelili le nekaj primerkov v Nemčiji, Švici in Franciji; tako je to najdragocenejši primerek doslej opaženih ptic selivk na Kranjskem.

Gre za prvo zabeleženo pojavljanje puščavskega tekalca v Sloveniji, saj ga tudi sam Freyer pred tem na Kranjskem ni poznal (Freyer 1842). Avtor zapisa v *Laibacher Zeitung* je nedvomno kustos Henrik Freyer, saj je v arhivu Narodnega muzeja Slovenije ohranjen njegov rokopis kasneje objavljenega opisa najdbe (slika 2). Kot je navedeno v zapisu Anonimus (1850), je samico v Šentvidu pri Ljubljani ujel Simon Unglerth v zadnjem tednu decembra 1847, kar bi pomenilo nekje med 27. in 31. 12. 1847 in ne januarja 1847, kot se je prej zmotno domnevalo glede na napačen zapis v SIK. Ptico je glede na zapis prepariral preparator Geber, ki sicer ni poznan v literaturi, in ne kustos Freyer, kot se je sicer domnevalo.

Glede na zbrane zgodovinske podatke sklepamo, da je bil puščavski tekalec pri nas opazovan vsaj trikrat, in sicer v letih 1847, 1892 in 1976. Upoštevaje pogostejša pojavljanja vrste v sosednji Italiji (Parodi 2006, Verducci s sod. 2012) in nove gnezdilne lokalitete v Evropi (Lorenzo & Herrando 2020) je tudi pri nas pričakovano kakšno novo opazovanja te sicer v Evropi zelo redke vrste. Vsekakor pa nam primer tudi kaže, da so zgodovinski viri o slovenskih pticah še vedno premalo preučeni in so zaradi tega seznami v Sloveniji opazovanih vrst ptic verjetno nepopolni. Pri zadnji reviziji seznama so bile nekatere vrste z nepopolnimi podatki o pojavljanju pri nas v preteklosti, zlasti v kategoriji B, izločene iz seznama (Hanžel & Šere 2011). V tej reviziji so nekatere preveritve virov pokazale, da je bila interpretacija podatkov ali celo določitev napačna, kar je ustrezen razlog za izbris iz seznama, neustrezno pa je iz seznama izločevati vrste, ki jih obravnava slovenska literatura kot pojavljajoče se med letoma 1800 in 1950 (kategorija B), čeprav brez navedbe konkretnih podatkov. Slednje je značilno zlasti za sekundarne vire, kot kaže primer puščavskega tekalca pa tudi za muzejske zbirke, saj so podatki lahko bili zaradi neodgovornega ravnanja z njimi v preteklosti tudi spremenjeni ali izgubljeni. Zaradi tega zahtevajo takšne navedbe dodatne zgodovinske analize arhivskih gradiv, kjer so morda izvirni podatki o najdbah še ohranjeni. Tak primer je tudi danes domnevno izumrli tenkokljuni škurh

Numenius tenuirostris, katerega glavna selitvena pot je vodila prek Panonske nižine, Balkanskega in Apeninskega polotoka (Donald *s sod*. 2013), torej tudi čez naše kraje. Med vrstami slovenske avifavne ga navaja skoraj vsa starejša literatura (Schulz 1890, Orožen 1901, Bevk 1957, Krečič & Šušteršič 1963, Matvejev & Vasić 1973) in celo SIK v muzejski zbirki, kjer pa je bil primerek (inv. št. 510 v SIK) uničen, tako da so bili morda izgubljeni tudi podatki o najdbi. V primerjavi z današnjim beleženjem terenskih opazovanj redkih vrst z nedvoumnimi dokazi in jasnimi standardi glede zapisa datuma in kraja opazovanja je zgodovinska ornitologija precej bolj zapletena, saj mora črpati podatke iz zelo različnih virov in jih pravilno obravnavati ter pri tem uporabljati drugačne kriterije (Vrezec *in sod*. 2009, Yalden & Albarella 2009). Seznami ugotovljenih vrst ptic so ključno orodje pri tem in pomanjkljivosti zaradi preveč rigorozne ali celo neustrezne obravnave zgodovinskih podatkov lahko pripeljejo do nastajanja vzporednih seznamov in s tem do strokovno neenotne obravnave avifavne.

Povzetek

V članku je predstavljena zgodovinska revizija podatkov o pojavljanju puščavskega tekalca *Cursorius cursor* v Sloveniji. Ob pregledu zgodovinskih virov je bilo ugotovljeno, da se je vrsta po letu 1800 v Sloveniji pojavila vsaj trikrat, in sicer prvič med 27. in 31. 12. 1847 v Šentvidu pri Ljubljani (primerek v zbirki Prirodoslovnega muzeja Slovenije, Ljubljana, Slovenija), drugič novembra 1892 pri Staršah na Dravskem polju (Št. Janžu) pri Ptuju (primerek v zbirki muzeja Joanneum, Gradec, Avstrija) in tretjič 3. 10. 1976 v Sečoveljskih solinah (primerek ni bil dokumentiran s fotografijo ali dokaznim primerkom). Vsi trije podatki so bili predhodno že objavljeni v različnih zgodovinskih virih, nekateri pa so bili med pripravami seznamov ugotovljenih ptic v Sloveniji spregledani.

Zahvala

Za posredovane podrobnosti v zvezi z opazovanjem puščavskega tekalca v letu 1976 v Sečoveljskih solinah se zahvaljujeva Alojzu Šmucu.

Literatura

Albegger E. (2015): Interesting old specimens of rare birds found in Slovenia in the collection of the Universalmuseum Joanneum, Graz, Austria. – Acrocephalus 36 (166/167): 173–178.

Anonimus (1850): 1848 – Verzeichniß der eingegangenen Museums-Beiträge. – Amtsblatt zur Laibcher Zeitung, 10. Mai 1850, 106.

Bevk S. (1957): Vretenčarji Slovenije. – Kmečka knjiga, Ljubljana.

Božič L. (2001): Seznam ugotovljenih ptic Slovenije s pregledom redkih vrst. – Acrocephalus 22 (106/107): 115–120.

Donald P.F., N.J. Collar, S.J. Marsden, D.J. Pain (2013): Facing Extinction. 2nd Edition. – Christopher Helm, London.

Freyer H. (1842): Fauna der in Krain bekannten Säugethiere, Vögel, Reptilien und Fische. Eger'schen Gubernial – Buchdruckerei, Laibach.

Hanžel J. (2013): Redke vrste ptic v Sloveniji v letu 2012 – Poročilo Nacionalne komisije za redkosti. – Acrocephalus 34 (156/157): 83–91.

Hanžel J. & D. Šere (2011): Seznam ugotovljenih ptic Slovenije s pregledom redkih vrst. – Acrocephalus 32 (150/151): 143–203.

Komisija za redkosti (1993): Seznam dosedaj ugotovljenih ptic Slovenije s pregledom redkih vrst. – Acrocephalus 10 (41/42): 75–80.

Komisija za redkosti (1993): Seznam redkih vrst ptic Slovenije 1990. – Acrocephalus 14 (58/59): 99–119.

Krečič I. & F. Šušteršič (1963): Ptice Slovenije. – Državna založba Slovenije, Ljubljana.

Križnar M. (2021): Zgodovina in razvoj muzejskega naravoslovja do osamosvojitve Prirodoslovnega muzeja leta 1944. – Scopolia 100: 15–126.

Kryštufek B. & M. Jernejc Kodrič (2013): Catalogue of the mammals in the collection of the Slovenian Museum of Natural History. – Scopolia 79: 1–194.

Lorenzo J.A. & S. Herrando (2020). Cream-coloured Courser *Cursorius cursor*. pp. 283 In: Keller V., S. Herrando, P. Vorišek, M. Franch, M. Kipson, P. Milanesi, D. Marti, M. Anton, A. Klvanova, M. Kalyakin, H.G. Bauer, R.P.B. Foppen (eds): European Breeding Bird Atlas 2: Distribution, Abundance and Change. – EBCC, Lynx Edicions, Barcelona.

Matvejev S.D. & V.F. Vasič (1973): Catalogus Faunae Jugoslaviae, IV/3, Aves. – Academia Scientiarum et Artium Slovenica, Ljubljana.

Orožen F. (1901): Vojvodina Kranjska. Prirodoznanski, politični in kulturni opis. – Matica Slovenska, Ljubljana.

Parodi R. (2006): Check-list degli uccelli del Friuli Venezia Giulia. – Gortiana 28: 207–242.

Reiser O. (1925): Die Vögel von Marburg an der Drau. – Naturwissenschaftlichen Verein in Steiermark, Graz.
Schulz F. (1890): Verzeichnis der bisher in Krain beobachteten Vögel. – Mittheilungen des Musealvereines für Krain 3: 341–362.
Šmuc A. (1980): Ptice Sečoveljskih in Ulcinjskih solin. Diplomsko delo. – Univerza v Ljubljani, Biotehniška fakulteta, Ljubljana.
Verducci D., M. Biondi, M. Sighele, N. Norante (2012): Revisione degli avvistamenti e delle catture di Corrione Biondo *Cursorius cursor* in Italia con cenni sul suo status in Europa. – U.D.I. 37: 16–32.
Vrezec A., D. Denac, D. Tome (2009): Krokar *Corvus corax* na ozemlju Slovenije in bližnje okolice: analiza pojavljanja od pleistocena do danes ter odnos človeka do vrste. – Scopolia 66: 1–63.
Vrezec A. & U. Kačar (2017): Katalog vpijatov (Coraciiformes) ornitološke zbirke Prirodoslovnega muzeja Slovenije. – Scopolia 91: 41–112.
Yalden D.W. & U. Albarella (2009): The History of British Birds. – Oxford University Press, Oxford.

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DODATEK 1 / APPENDIX 1

Izvirni nemški prepis iz *Laibacher Zeitung,* 10. 5. 1850, št. 106
Original German transcription from *Laibacher Zeitung,* 10. 5. 1850, No. 106

Nr. 9. Vom Herrn Simon Unglerth, hiessigen Drechsler, einem höchst seltenen, weissfüßigen Brachvogel, der Isabellgelbe Laufer genannt (*Cursorius isabellinus*, Mayer und Wolf) Es ist ein Weibchen, welches in der letzten December-Woche im J. 1847 auf dem Felde bei St. Veit, nächst Laibach, in einer für Schnäpfen gelegten Schlupfen lebend gefangen und dann vom Herrn Geber ausgeschoppt worden ist. Die Heimath dieses Vogels ist Nordafrika; er verirrt sich äußerst selten nach Europa; man hat bisher nur einzelne Exemplare in Deutschland, Schweiz, Frankreich beobachtet und erlegt; somit ist dieß das kostbarste Stück der in Krain bisher beobachteten Zugvögel.

Iz ornitološke beležnice

From the ornithological notebook

Slovenija / Slovenia

Tibetanska gos *Anser indicus*

Bar-headed goose – one individual observed on 21 May 2021 in a field directly north of Medvedce reservoir (UTM WM53, E Slovenia). Second record of the species for Medvedce area and seventh observation for Slovenia

Med krajšim obiskom zadrževalnika Medvedce sem prvi avtor 21. maja 2021 približno 100 metrov severno od akumulacije na njivi v družbi prib *Vanellus vanellus* opazil večjo ptico, ki je že na daleč delovala dokaj neobičajno. Ob bližnjem ogledu se je osebek izkazal za odraslo tibetansko gos *Anser indicus*. Ptici se mi je posrečilo približati na vsega 50 metrov, njena neplašna narava pa daje misliti, da je šlo za osebek, ki je pobegnil iz ujetništva. Tibetanska gos ni bila obročkana, na območju zadrževalnika pa se je zadrževala vsaj še do 24. maja, ko se je prav tako zadrževala na poljih severno od zadrževalnika ter tudi v zadrževalniku samem. Čeprav jo je drugi avtor opazoval z nasipa iz oddaljenosti nekaj 100 m, je bila videti živčna, a ni odletela. Sodeč po Hanžel & Denac (2018) in Komisiji za redkosti gre za sedmo opažanje te vrste v Sloveniji in za drugo opažanje na območju Medvedc. Pretekla opažanja te zelo redko zabeležene vrste prihajajo, poleg Medvedc (3 os. 20. 4. 2019, S. Hren *osebno*), z Zbiljskega jezera (2 os. v 2010), Hraških mlak (1 os. v 2009), Ptujskega jezera (1 os. v 2008) in Ormoških lagun (1 os. v 2005 ; Hanžel & Šere 2012, Hanžel & Denac 2018). Tibetanska gos je prvotno naseljevala osrednjo Azijo, danes pa premore vnesene gnezdeče populacije tudi v Evropi (BirdLife International 2018). Ker so slednje maloštevilne in pogosto nestalne (Bauer 2020) in ker je bila dokaj neplašna, verjameva, da je šlo za ubežnico ali pripadnico negnezdeče vnesene populacije. Opazovanje je potrdila Nacionalna komisij za redkosti, ki jo je uvrstila v kategorijo E.

Slika 1 / Figure 1: Tibetanska gos / Bar-headed goose *Anser indicus*, Medvedce, 21. 5. 2021 (photo: J. Gojznikar)

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Srednji žagar *Mergus serrator*

Red-breasted Merganser – one female observed on 6 Feb 2021 on Lake Trboje (UTM VM51, C Slovenia); first winter observation for Gorenjska region since 1991

Dne 6. februarja 2021 popoldne sem se z Jakobom Florjančičem odpravil na Trbojsko jezero. Ob približno 16.30, ko se je začelo mračiti, sva ob zgornjem bregu jezera med 16 velikimi žagarji *Mergus merganser* zagledala samico, ki je bila nekoliko manjša in drugače obarvana od drugih. Strinjala sva se, da bi lahko šlo za srednjega žagarja, ker pa je bila vidljivost zaradi mraka že dokaj slaba in nisva bila prepričana o najini določitvi, sva posnela nekaj dokumentarnih fotografij. Mesec pozneje smo si fotografije ogledali z M. Sešlarjem in potrdili najino domnevo. Samec srednjega žagarja je bil opazovan tudi 17. 1. 2021 na Savi pri Ljubljani – Tacen (Poljanec pisno). Največkrat je bil srednji žagar na Gorenjskem zabeležen na Blejskem jezeru v času jesenske in spomladanske selitve leta 1995 in 1996 (Jančar *in sod*. 2007) ter v času prezimovanja januarja 1991 (Geister 1992). Zadnji zabeleženi podatek je iz obdobja spomladanske selitve leta 2002, ko se je maja in junija na Trbojskem jezeru zadrževalo 5 osebkov

Slika 2 / Figure 2: Srednji žagar / Red-breasted Merganser *Mergus serrator,* Trbojsko jezero, 6. 2. 2021 (foto: J. Florjančič)

Slika 3 / Figure 3: Jerebice / Grey Partrifge *Perdix perdix*, Lovrenc na Dravskem polju, 20. 1. 2021 (photo: M. Sešlar)

(Atlas ptic 2021). Opisano opazovanje je najnovejši podatek pojavljanja v času prezimovanja na Gorenjskem po letu 1991.

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Jerebica *Perdix perdix*

Grey Partridge – a flock of 11 birds observed and heard on 20 Jan 2021 in the field near Lovrenc na Dravskem polju (UTM WM53, SE Slovenia)

Na sončno soboto, 9. januarja 2021, sva se odpravila na Štajersko. Cilj je bilo opazovanje zimskih vodnih vrst na Ptujskem jezeru in Medvedcih. Ko sva v popoldanskem času prispela do opazovalnice na Ptujskem jezeru, sva srečala Ala in Eneja Vrezca, ki sta prav tako lep dan izkoristila za opazovanje ptic. V toku pogovora je beseda nanesla na jerebice ter kako redko in skoraj nemogoče je opazovanje te vrste v Sloveniji. Ko se je dan skoraj že prevešal v večer, sva se na poti domov ustavila še na njivskih površinah severno od vasi Lovrenc na Dravskem polju. Mogoče nama bo ornitološka sreča namenila srečanje s to čudovito vrsto poljske kure. In res, ko se je zvečerilo, sva iz pšenične njive zaslišala »*kirr-ek kirr-ek*« – naprej enega in nato vsaj treh osebkov. Sledilo pa je vprašanje, ali so to gojene ali gre za divje osebke, ter ali so res samo trije? Kontaktirala sva lovskega inšpektorja ter lokalno lovsko družino, ki so nama povedali, da na tem območju lovska družina ni vlagala gojenih osebkov jerebic. Naslednjič sva se na teren odpravila 20. januarja z željo, da ugotoviva, ali se na lokaciji res zadržujejo samo trije osebki. Kratek sprehod ob robu pšenične njive in že sva splašila jato vsaj 11 osebkov. Poljska jerebica je v Sloveniji redka gnezdilka in po podatkih Atlasa ptic Slovenije (Šumrada & Trilar 2019) je zabeležena le še na območjih Pomurja, Podravja, spodnjega Posavja in Ljubljanske kotline. Vrsta v slovenski kmetijski krajini v obdobju 2008–2019 kaže strm upad populacije, njena domorodna populacija pa je najverjetneje izumrla (Kmecl 2019).

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Strmoglavec *Morus bassanus*

Gannet – one adult individual observed at Belvedere Camp near Izola (UTM UL94, SW Slovenia) on 21 May 2021. Probably due to the strong southern wind that had pushed the bird towards the land, it flew approximately 100 m from the shore above the Camp. This is the 15th observation for Slovenia.

Dne 21. 5. 2021 se nas je del 2. letnika študentov biologije Biotehniške fakultete odpravilo na botanični teren na Primorsko. Po uvodnem postanku na travnikih v bližini Kozine smo se odpeljali do kampa Belvedere. Iz avtobusa smo stopili v močan jugozahodnik, ki je obetal kake zanimive ptičje vrste, ki bi jih veter prinesel iz južnejših delov Jadranskega morja. Ker smo načrtovali pot do Strunjana, sem se nadejal prečesavati morje na

Strunjanskih klifih. Na redkosti nam ni bilo treba dolgo čakati, saj nas je že med hojo po kampu, kakšnih 100 metrov od obale, nenadoma preletela velika belo-črno obarvana ptica. Ni mi bilo težko prepoznati strmoglavca *Morus bassanus*, saj je osebek letel kvečjemu kakšnih 20 metrov nad našimi glavami. Zanimivo je bilo opazovati njegov nespretni let, saj je bilo očitno, da mu močan jugozahodni veter povzroča težave. Ptico sem na podlagi črne obarvanosti koncev kril, brez dodatnih črnih lis na belini, in belega repa določil za odrasel osebek strmoglavca. Strmoglavec je nad nas priletel z zahoda, se obrnil in nadaljeval proti severozahodu. Celotno opazovanje je trajalo slabo minuto. Med kasnejšim opazovanjem morja s Strunjanskih klifov sem opazil bore malo ptic. Strmoglavec je bil v Sloveniji prvič opažen novembra 2006 pri Piranu (Hanžel 2008), to opazovanje pa je 15. podatek za Slovenijo.

Janez Leskošek †

Crane *Grus grus*

Žerjav – 28. 2. 2021 sva spremljala prelet žerjavov prek Menišije v okolici Pokojišča (UTM VL48, osrednja Slovenija); skupaj sva naštela 3113 žerjavov v 23 jatah, ki so štele 9–363 ptic, v povprečju 135; opazovanja kažejo na pomen Menišije za prelet žerjavov, ki vetrove nad pašniki na tem območju uporabljajo za pridobivanje višine na migraciji

Numbers of cranes migrating over Slovenia are steadily increasing, especially since 2010 (Bordjan 2021). Autumn migration takes place between September and January, and spring migration from February to mid-April, with vast majority of birds typically recorded during the few peak days of migration (Bordjan 2021). One of such days was 28 Feb 2021, when we systematically photographed flocks flying over the Menišija plateau to count the size of each flock and total number of birds based on the collected photographic material. Menišija is a high-karst Dinaric plateau and was already suggested to be an important migration corridor for larger birds, such as Marsh Harrier *Circus aeruginosus,* Honey Buzzard *Pernis apivorus,* Red Kite *Milvus milvus* (Krofel 2004, Bordjan 2007), Hen Harrier *Circus cyaneus,* Osprey *Pandion haliaetus* (Krofel & Žagar 2013), Montagu's Harrier *Circus pygargus* (M. Krofel *unpublished*), Griffon Vulture *Gyps fulvus* (Szymanski 2002), Black Stork *Ciconia nigra* (Krofel 2005), as well as cranes (Krofel 2004). The observations were made from a vicinity of Pokojišče (UTM VL48, Central Slovenia), where forests give way to open pastures that in a good weather, due to heating of the surface, provide thermal uplifting winds used by several migrating birds, as was the case on the day of our observations. We started collecting data at 14:40 and photographed migrating flocks of cranes until the sunset (the last flock was recorded at 16:54), which includes the period when the majority of cranes are recorded migrating over Slovenia (i.e. 15:00–17:00; Bordjan 2021). In total, we recorded 23 flocks and 3,113 cranes. The size of the flocks ranged from 9 to 363 with an average size of 135 cranes per flock. All of the flocks were flying in northern or north-western direction, although several of them started circling above the open pastures to gain height before flying further over Ljubljansko barje. We estimated that most of the flocks flew around 150–400 m above our observation point located at 740 m a.s.l. These observations fit well with the general migrating patterns for cranes reported flying over Slovenia during spring migration (Bordjan 2021). They also suggest that important part of the cranes migrating over Slovenia might use the Menišija plateau as a corridor, at least during the spring migration.

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Dular *Charadrius morinellus*

Dotterel – two individuals observed in a roughly ploughed field NE of Ig, Ljubljansko barje (UTM VL68, C Slovenia) on 2 Apr 2021; only second accepted record for this well-monitored site and a rare observation on the national scale

Z namenom popisa pribe in poljskega škrjanca sem se 2. aprila 2021 zgodaj zjutraj pripeljal na Barje in začel s pregledovanjem njiv ob glavni cesti Ljubljana – Matena. Vidljivost je poleg zgodnje ure slabšala še nizka oblačnost. Med pregledovanjem njiv z daljnogledom sem zagledal dva pobrežnika, ki sta s hitrimi zamahi letala tik nad tlemi, nato pa se dvignila višje, enkrat zaokrožila nad mano in izginila nad Parti. Kljub hitremu opazovanju sem v obeh zaradi enotne obarvanosti, velikosti in nekaj vidnih podrobnosti prepoznal dularja. O opazovanju sem obvestil Luko in Matijo, ki sta nato večji del dneva namenila iskanju dularjev na njivah med Parti in Igom. Šele pozno popoldne sta ju našla na grobo orani njivi

Slika 4 / Figure 4: Dular / Dotterel *Charadrius morinellus*, Ig, 2. 4. 2021 (foto: Luka Poljanec)

SV od Iga, kjer smo ju tudi dokaj dobro fotografirali (Slika 4). Opisano opazovanje je drugo objavljeno na Ljubljanskem barju (Poljanec 2015), še eno opazovanje iz leta 2015 pa je vneseno v spletni Atlas, a ga Nacionalna komisija za redkosti nikoli ni obravnavala (Atlas ptic 2021). Že naslednjega dne so novice o dularjih prišle tudi z drugih koncev Slovenije: opazovani so bili na zadrževalniku Medvedce (4 os. – J. Novak *pisno*) ter na letališču Črnotiče (1 os. – D. Bosch *pisno*). Očitno je obdobje konec marca in začetek aprila najboljše za opazovanje te vrste na pomladanski selitvi, kar je razvidno že iz podatkov prejšnjih let. Opazovanje je potrdila Nacionalna komisija za redkosti.

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Čoketa *Gallinago media*

Great Snipe – three individuals flushed from weedy fields near Notranje Gorice, Ljubljansko barje (UTM VL59, C Slovenia) on 12 May 2021; an unusually large number of individuals and a rare observation, although one of eight across Slovenia this spring, which is the largest number ever in a single spring

Zaradi nočnega deževja sva se z Matijo 12. maja 2021 odpravila na Ljubljansko barje. Obiskala sva običajne lokacije, kjer se po deževju nabere voda, žal pa te ni bilo dosti več kot nekaj dni pred tem. Med hojo po zapleveljeni njivi zahodno od Notranjih Goric sva iz velike bližine splašila čoketo. Ker je zletela od blizu, so bili dobro vidni vsi določevalni znaki, kot so belina na robu repa in v perutih, temno podperutje, krajši kljun itd. Čoketo sva splašila še dvakrat, ko sva jo poskušala fotografirati na tleh, nato pa je nisva več želela vznemirjati. Le kakšno uro zatem sva s prav takšne njive kakšnih 500 metrov južno splašila še dve čoketi. Tudi ti sta zleteli iz velike bližine, nekajkrat zaokrožili in se usedli na vlažen travnik. Ker sta se nenehno držali skupaj, sva zaključila, da gre gotovo za dve novi ptici. Skupno sva torej opazovala kar tri čokete, nabralo pa se je še nekaj drugih zanimivih vrst – 4 polojniki *Himantopus himantopus*, 5 čopastih čapelj *Ardeola ralloides* in mlada črna štorklja *Ciconia nigra*. Čoketa je pri nas redka gostja na selitvi, večina opazovanj pa je iz mesecev aprila in maja. Najino opazovanje je posebno predvsem zaradi velikega števila – trije osebki so največje število čoket, skupaj opazovanih v Sloveniji, obe prejšnji opazovanji treh osebkov pa sta prav tako iz letošnje pomladi na Ljubljanskem barju (B. Rubinić, A. Mulej *pisno*). Letošnja pomladanska sezona je bila rekordna tudi po številu podatkov (zbranih jih je bilo kar 8; Denac *in sod. v pripravi*), kar je gotovo posledica številnih vremenskih motenj v maju. Opazovanje je kot en podatek potrdila Nacionalna komisija za redkosti.

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Rjavi galeb *Larus fuscus*

Lesser Black-backed Gull – one adult individual observed on 8 May 2021 on Vrbje Pond (UTM WM12, E Slovenia) near Žalec in the Savinja Valley in a group of five Yellow-legged Gulls *Larus michahellis*. In Slovenia, the species rarely occurs outside the Drava River accumulations.

Dne 8. 5. 2021 sem pregledoval gnezdilnice ob ribniku Vrbje, južno od Žalca v Savinjski dolini. Vreme je bilo jasno in toplo, pihal je rahel zahodni veter. Med hojo sem večkrat z daljnogledom na hitro pregledal vodno površino ribnika. Okoli pol enajste ure sem najprej zaslišal, nato pa še zagledal jato šestih galebov. Na hitro sem jih vse določil za rumenonoge, potem pa mi je pozornost zbudil osebek, ki je bil za malenkost manjši od drugih in po zgornji strani precej temen. Hitro sem pograbil daljnogled in si galeba bolje ogledal. Po hrbtu in zgornji strani peruti je bil zelo temen, konice peruti so bile le rahlo temnejše od ostalega dela peruti. Noge so bile rumene. Na podlagi omenjenih znakov sem ga določil za odrasel osebek rjavega galeba *Larus fuscus*. Zaradi zelo

temne obarvanosti zgornjega dela domnevam, da je šlo za podvrsto *fuscus*, vendar zaradi pomanjkanja izkušenj z drugimi podvrstami tega ne morem z gotovostjo trditi. To opazovanje je 3. podatek za ribnik Vrbje, Gamser & Novak (2013) navajata opazovanje štirih osebkov leta 2009 in enega osebka leta 2011. Vrsta se v Sloveniji redko pojavlja zunaj območja akumulacij na reki Dravi.

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Koconogi čuk *Aegolius funereus* & kozača *Strix uralensis*

Boreal & Ural Owl – one singing individual of the Boreal Owl and four Ural Owls heard in mixed forests around Mokrc 1059 m a.s.l. (UTM VL68, C Slovenia) on 8 and 16 Mar 2021; first record of Boreal Owl for the area and first record of singing Ural Owls after 2014

Pomladi 2020 in 2021 so zaznamovale omejitve gibanja na občine in regije stalnega prebivališča, kar sem pogosto izkoristil za obisk gozdnega masiva okrog Mokrca (1059 m n. v.) in Krvavškega griča (1029 m n. v.). Spričo obetavnega gozda ter izostanka ornitoloških podatkov sem tam 8. marca 2021 popisal 13 predhodno narisanih točk za koconogega čuka, 16. marca pa še dodatnih pet. Na točki severno od Malega Malinjeka (1001 m n. v.) sem 8. marca poslušal pojoči osebek koconogega čuka, na obeh popisih pa sem skupaj registriral še pet lesnih sov *Strix aluco* in tri kozače. Še eno kozačo sem na območju slišal dne 26. marca 2021, ko je en osebek podnevi pel na severnih pobočjih Mokrca. Vse kozače so pele spontano.

Da se kozača pojavlja na omenjenem območju, je znano že dolgo časa – leta 1995 so bili tam registrirani prvi teritorialni samci v Krimskem hribovju (Mihelič *in sod*. 2000). A kasnejših podatkov od tam je malo, v spletni bazi sta poleg mojih opazovanj le še dva podatka, in sicer o posameznih pojočih osebkih severno od Krvave Peči v letih 2004 in 2014 (Atlas ptic 2021a). Za koconogega čuka je to po meni dostopnih virih prvi podatek za ta del Krimskega hribovja, je pa vrsta sicer razširjena okrog Krima ter na Menišiji, zato njeno pojavljanje tu ni presenetljivo (Atlas ptic 2021b). Ali gre res za gnezdečo populacijo ali le za pojoče klateže iz bližnjih večjih populacij, bodo pokazali popisi v naslednjih letih.

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Rjavoglavi *Lanius senator* & *črnočeli srakoper Lanius minor*

Woodchat & Lesser Grey Shrike – one 2cy ♂ Woodchat and one individual of the Lesser Grey Shrike observed in agricultural landscape close to Notranje Gorice, Ljubljansko barje (UTM VL59, C Slovenia) on 16 May 2020; rare observations of both species, but Lesser Grey Shrike already appears to be rarer than Woodchat Shrike after lost as a breeding species at Ljubljansko barje

Dne 16. maja 2020 smo Nuša Kos Thaler ter Katarina, Damijan in Mitja Denac v okolici Notranjih Goric popisovali SIPKK-transekte in kvadrante za repaljščico *Saxicola rubetra*. Popis smo začeli nekoliko kasneje, saj je zgodaj zjutraj na območju še močno deževalo. Približno na polovici transekta sva z Nušo na nizki vrbi *Salix sp*. ob makadamski cesti zagledala rjavoglavega srakoperja, ki sva ga določila kot drugoletnega (2cy) samca. Ob povratku čez cca. 45 min ga nisva več opazila. Le 1,3 km južno, v bližini sotočja Ljubljanice in Bevškega jarka, je Damijan med popisom repaljščice na visokih sušicah opazoval črnočelega srakoperja, ki je lovil na njivah vzhodno od jarka. Kot tudi marsikje drugod po Sloveniji, velja črnočeli srakoper za izumrlo gnezdilko Ljubljanskega barja, ki je nazadnje gnezdila leta 1980. Od takrat se je do leta 2000 na Barju pojavljal približno enkrat na 2–3 leta (Tome *in sod*. 2005), med letoma 2000 in 2019 pa ni objavljenih podatkov (Atlas ptic 2020). Rjavoglavi srakoper na Barju že od nekdaj velja za redkega gosta na selitvi, ki se pojavlja vsakih nekaj let,

Slika 5 / Figure 5: Rjavoglavi srakoper / Woodchat Shirke *Lanius senator*, 2cy ♂, Notranje Gorice, Ljubljansko barje, 16. 5. 2020 (foto: M. Denac)

večina opazovanj pa je iz obdobja med koncem aprila in sredino junija (Tome *in sod*. 2005). S takšnim trendom je v zadnjih 20 letih na Barju celo pogostejši od črnočelega srakoperja (Hanžel 2016, *Šere & Fekonja 2015). L*eta 2020 sta bili sicer obe vrsti na Barju opazovani vsaj dvakrat: rjavoglavi srakoper še 18. 5. pri Drenovem Griču (U. Koce *pisno*), črnočeli pa 24. 5. na Iškem morostu (Ploj & Novak 2020). Morda so nenavadno »dobremu« letu za ti dve vrsti botrovale številne vremenske motnje konec maja 2020, ali pa le povečana aktivnost popisovalcev zaradi popisov repaljščice. Vsa opazovanja je potrdila Nacionalna komisija za redkosti.

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Domači vrabec x italijanski vrabec *Passer domesticus* x *italiae*

House Sparrow x Italian Sparrow – the hybrid was observed at Tivoli Park in Ljubljana (UTM VM60, C Slovenia) and was feeding in the flock of House Sparrows

Park Tivoli je odlična lokacija za opazovanje in fotografiranje ptic. Tako sva se v popoldanskem času 17. marca 2021 tja odpravila, da bi opazovala ptice urbanega okolja ter v fotografski objektiv morda ujela še kakšno pogosto vrsto ptice. Ustavila sva se ob Tivolskem ribniku, kjer se je zbrala jata domačih vrabcev in golobov. Med jato vrabcev sva opazila osebek, ki je zbujal pozornost predvsem zaradi ne popolnoma sive glave, v katero se je zajedala rjavina, ter izrazito belega lica. Takoj sva pomislila na križanca med domačim in italijanskim vrabcem. Pojavljanje italijanskega vrabca je v Sloveniji omejeno na zahodni del države, za notranjost Slovenije pa je do sedaj v Atlasu ptic bilo zabeleženo le eno opazovanje iz Ljubljane, in sicer leta 2016 (Figelj 2019). Fotografijo sva pokazala tudi Mitji Denacu, ki nama je potrdil, da gre resnično za križanca med italijanskim in domačim vrabcem.

Slika 6 / Figure 6: Križanec med domačim in italijanskim vrabcem / House/Italian Sparrow hybrid *Passer domesticus* x *italiae*, Ljubljana, 17. 3. 2021 (photo: M. Sešlar)

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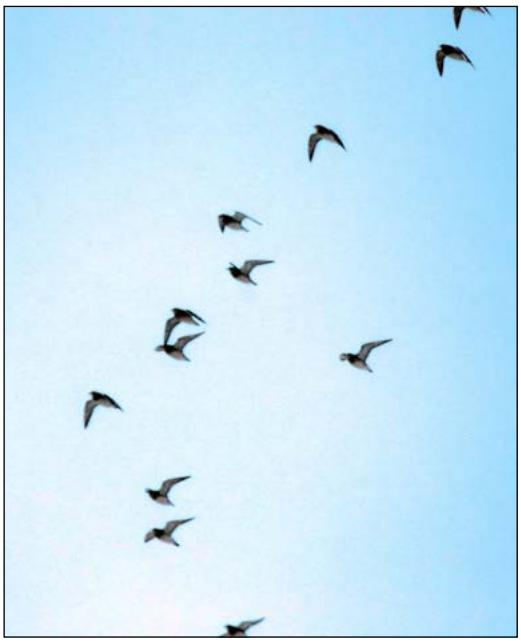
Srbija / Serbia

European Golden Plover *Pluvialis apricaria*

Zlata prosenka – v jeseni in zimi 2020/2021 je bila vrsta na območju Niša (UTM EN 69, EN 79, JV Srbija) opazovana kar trikrat

During the autumn-winter period of 2020/2021, the Golden Plover *Pluvialis apricaria* was observed three times in the territory of Niš, Serbia. On 23 Nov 2020, next to Highway E-75, few meters from toll booth named "Niš – Istok", a flock of 7 individuals was spotted in a wet meadow. For the second time, during a winter walk (14 Jan 2021) in the "Lalinačka slatina" saltmarsh, a flock of 14 birds flew in front of us from the wet snowy meadow. A couple of days later (20 Jan 2021) we revisited this location and photographed probably the same flock of 14 birds in flight (Figure 7).

The Golden Plover was a common bird during the migration period and a winter resident prior to the 20th century. Thereupon, it was rarely and irregularly observed mainly in the Province of Vojvodina and exclusively during migration (Šćiban *et al*. 2015). This species was very rarely observed south of the Sava and Danube Rivers (Hill 1985; Radaković 2010). Considering the published data regarding the wide area of the city of Niš, this species was for the last (and only) time recorded on 16 Mar 1985 near Draževac village, approximately 20 km from Niš (Hill 1985). During the 20th and at the beginning of 21st centuries, this species was not recorded during the winter period in Serbia (Šćiban *et al*. 2015). According to the literature



Slika 7 / Figure 7: Zlate prosenke / Golden Plovers *Pluvialis apricaria*, Lalinačka slatina, 20. 1. 2021 (foto: Marko Nikolić)

(Šćiban *et al*. 2015; Radišić *et al*. 2018), our data represent first records of the presence of the species in the wide area of Niš, and first record in the winter period for our country. The importance of this finding is also evidenced by the fact that the species is protected by the EU Birds Directive (Annexes I, IIb and IIIb), few other international agreements (Bern Convention, Bonn Convention and AEWA) and is a strictly protected species by law in Serbia.

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Short-eared Owl *Asio flammeus*

Močvirska uharica – 14. 1. 2021 je bilo na območju naravnega spomenika Lalinačka slatina (UTM EN 69, JV Srbija) opazovanih šest odraslih osebkov močvirskih uharic; prvo opazovanje vrste na območju Niša po letu 1976

During our field research carried out on 14 Jan 2021 in the "Lalinačka slatina" saltmarsh, a protected natural area (as Natural Monument), we recorded 23 bird species. The most significant finding was the notation of 6 adult individuals of Short-eared Owl *Asio flammeus*. The individuals flew in front of us from the snow-covered meadow and we had the opportunity to watch them for the next 5–10 minutes circling in the sky (Figure 8) in a characteristic flight. Few moments later we lost sight of them due to the heavy snowfall. The next day we tried to find them again, but we were unlucky this time. In addition, on the first day we recorded 25 individuals of Northern Lapwing *Vanellus vanellus*, Hen Harrier *Cicrus cyaneus*, Reed Bunting *Emberiza schoeniclus*, Cirl Bunting *Emberiza cirlus*, 5 individuals Common Buzzard *Buteo buteo* as well as some other species.

In the past, Short-eared Owl was considered an occasional breeding species in fields and marshes throughout Serbia (Matović *et al*. 2018), while in recent times it is considered an irregular nesting species exclusively in the north of the country, in Bačka and Banat (Puzović et al., 2015). Based on the latest estimate of the breeding population size (2008–2013), 0–45 pairs were listed for the whole country (Matović *et al*. 2018). For the non-breeding period (winter), the highest numbers of individuals were recorded at pastures, salt meadows and marshes and low grasslands of northern Bačka and Banat, where they were breeding. Some individual birds or small groups may have been recorded in human settlements throughout Vojvodina. In the south of the country, this species was recorded more than three generations ago (Matović *et al*. 2018), specifically (considering available published data) in the territory of

Slika 8 / Figure 8: Močvirska uharica / Short-eared Owl *Asio flammeus*, Lalinačka slatina, 14. 1. 2021 (foto: Marko Nikolić)

Niš on 12 Jan 1903 (one stuffed specimen is kept in the Belgrade Natural History Museum, see Novčić 2004), and one individual was shot in a vineyard in 1976 at Doljevac near Niš (Vasić & Grubač 1983). After that species was not recorded in non-breeding period in the territory of Niš. Keeping in mind some pronounced population fluctuations with pronounced irruptions in certain years (Đapić et al. 2005; Agošton et al. 2011), we may expect its presence during the nesting season.

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Literatura / References

Agošton A., Barna K., Gergelj J. (2011): Lokacije mogućeg gnežđenja ritske sove *Asio flammeus* u severnom Banatu. – Ciconia 20: 99.

Atlas ptic (2020): Črnočeli srakoper *Lanius minor*. – [https://atlas.ptice.si/atlas/grafika/pregled.php], 8/12/2020.

Atlas ptic (2021): Dular *Charadrius morinellus*. – [https://atlas.ptice.si/atlas/grafika/pregled.php], 21/4/2021.

Atlas ptic (2021): Srednji žagar *Mergus serrator* – [https://atlas.ptice.si/], 03/03/2021.

Atlas ptic (2021a): Kozača *Strix uralensis*. – [https://atlas.ptice.si/atlas/grafika/pregled.php], 9/4/2021.

Atlas ptic (2021b): Koconogi čuk *Aegolius funareus*. – [https://atlas.ptice.si/atlas/grafika/pregled.php], 9/4/2021.

Bauer H.-G. (2020): *Anser indicus* Bar-headed Goose. str:119 V: Billerman S.M., Keeney B.K., Rodewald P.G., Schulenberg T.S. (Ur.): Birds of the World. – Cornell Lab of Ornithology.

BirdLife International (2018): *Anser indicus*. The IUCN Red List of Threatened Species 2018: e.T22679893A131908564. – [https://dx.doi.org/10.2305/IUCN.UK.2018-2.RLTS.T22679893A131908564.en], 05/06/2021.

Bordjan D. (2007): Rjavi škarnik *Milvus milvus* & sršenar *Pernis apivorus*. – Acrocephalus 28 (132): 40.

Bordjan D. (2021): Vedno več žerjavov na selitvi čez Slovenijo. Svet ptic 27 (1): 38–39.

Đapić D., Balog I., Vig L., Verebelji Č. (2005): Gnežđenje ritske sove *Asio flammeus* u Bačkoj tokom 2005. godine: mala irupcija gnezdećih parova? – Ciconia 14: 84–88.

Figelj J. (2019): Italijanski vrabec *Passer italiae*. pp. 442–443. In. Mihelič T., Kmecl P., Denac K., Koce U., Vrezec A., Denac D. (eds.): Atlas ptic Slovenije. Popis gnezdilk 2002–2017. – DOPPS, Ljubljana.

Gamser M. & Novak J. (2013): Pojavljanje vodnih ptic in ujed na širšem območju ribnika Vrbje pri Žalcu: raziskovalna naloga. – Mestna občina Celje, Mladi za Celje, Celje.

Geister I. (1992): Srednji žagar *Mergus serrator*. – Acrocephalus 13: 22.

Hanžel J. (2008): Strmoglavec – *Morus bassanus* – nova vrsta v avifavni Slovenije. – Acrocephalus 29 (138/139): 181–183.

Hanžel J. (2016): Redke vrste ptic v Sloveniji v letu 2015 – Poročilo Nacionalne komisije za redkosti. – Acrocephalus 37 (168/169): 69–78.

Hanžel J., Denac M. (2018): Redke vrste ptic v Sloveniji v letu 2017 – Poročilo Nacionalne komisije za redkosti. – Acrocephalus 39 (178/179): 177–184.

Hanžel J., Šere D. (2012): Seznam ugotovljenih ptic Slovenije s pregledom redkih vrst. – Acrocephalus 32 (150/151): 143–203.

Hill DA. (1985): Neki prilozi za faunu ptica južnih delova SR Srbije. – Glasnik Prirodnjačkog Muzeja u Beogradu, Serija B - Biološke Nauke 40: 191–206.

Jančar T., Kmecl P., Mihelič T., Kozinc B. (2007): Pregled vodnih ptic Blejskega in Bohinjskega jezera ter jezera HE Moste (Gorenjska, SZ Slovenija). – Acrocephalus 28 (135): 141–157.

Kmecl P. (2019): Monitoring splošno razširjenih vrst ptic za določitev slovenskega indeksa ptic kmetijske krajine – delno poročilo za leto 2019. – DOPPS, Ljubljana.

Krofel M. (2004): Žerjav *Grus grus*. – Acrocephalus 25 (122): 163.

Krofel M. (2005): Črna štorklja *Ciconia nigra*. – Acrocephalus 26 (125): 107.

Krofel M., Žagar, A. (2013): Ribji orel *Pandion haliaetus*. – Acrocephalus 37(156/157): 111–112.

Matović D., Đapić D., Rajković D. (2018): Short-eared Owl – *Asio flammeus*. pp. 263–266 In Radišić D., Vasić V., Puzović S., Ružić M., Šćiban M., Grubač B., Vujić A. (eds.): Red Book of Fauna of Serbia III – BIRDS. – Institute for Nature Conservation of Serbia, University of Novi Sad, Faculty of Sciences, Department of Biology and Ecology and Bird Protection and Study Society of Serbia. Belgrade.

Mihelič T., Vrezec A., Perušek M., Svetličič J. (2000): Kozača *Strix uralensis* v Sloveniji. – Acrocephalus 21 (98–99): 9–22.

Novčić I. D. (2004): List of Strigiformes species in the Belgrade Natural History Museum bird collection. – Archives of Biological Sciences 56 (3–4): 79–88.

Ploj A., Novak J. (2020): Črnočeli srakoper *Lanius minor*. – Acrocephalus 41 (184/185): 63.

Poljanec N. (2015): Dular *Charadrius morinellus*. – Acrocephalus 36 (164/165): 86.

Puzović S., Radišić D., Ružić M., Rajković D., Radaković M., Pantović U., Janković M., Stojnić N., Šćiban M., Tucakov M., Gergelj J., Sekulić G.,

Agošton A., Raković M. (2015): Birds of Serbia: Breeding Population Estimates and Trends for the period 2008–2013. – Bird Protection and Study Society of Serbia and Department of Biology and Ecology, Faculty of Sciences, University of Novi Sad, Novi Sad.

Radaković M. (2010): [Fauna ptica IBA područja "Akumulacija Gruža" i valorizacija prema kriterijumima mreže Natura 2000] BSc thesis. – Institut za biologiju i ekologiju Prirodno-matematičkog fakulteta, Kragujevac (in Serbian).

Radišić D., Vasić V., Puzović S., Ružić M., Šćiban M., Grubač B., Vujić A. (eds.) (2018): Red Book of Fauna of Serbia III – BIRDS. – Institute for Nature Conservation of Serbia, University of Novi Sad, Faculty of Sciences, Department of Biology and Ecology and Bird Protection and Study Society of Serbia. Belgrade.

Szymanski M. (2002): Beloglavi jastreb *Gyps fulvus*. – Acrocephalus 23 (112): 110.

Šćiban M., Rajković D., Radišić D., Vasić V. Pantović U. (2015): Birds of Serbia - critical list of species. – Institute for Nature Conservation of Vojvodina Province and Bird Protection and Study Society of Serbia. Novi Sad.

Šere D., Fekonja D. (2015): Rjavoglavi srakoper *Lanius senator*. – Acrocephalus 36 (166/167): 191–192.

Šumrada T., Trilar T. (2019): Jerebica *Perdix perdix*. pp. 66–67. In: Mihelič T., Kmecl P., Denac K., Koce U., Vrezec A., Denac D. (eds.): Atlas ptic Slovenije. Popis gnezdilk 2002–2017. – DOPPS, Ljubljana.

Tome D., Sovinc A., Trontelj P. (2005): Ptice Ljubljanskega barja. – DOPPS, Monografija DOPPS Št. 3, Ljubljana.

Vasić V., Grubač B. (1983): Prilozi za faunu ptica južnih delova SR Srbije - drugi deo. – Zbornik radova o fauni SR Srbije, Beograd: Srpska akademija nauka i umetnosti / SANU, 2: 197–255.

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conference proceedings: Vrezec A. (2007): The Ural Owl (*Strix uralensis macroura*) – status and overview of studies in Slovenia. pp. 16-31. In: Moller J., Scherzinger W., Moning C. (eds.): European Ural Owl workshop: Bavarian forest national park. – Graphischer Atelier H, Prague.
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web source: Zois, S. (1790/1800): Aves terrestres Eurorae. - (http://www.dlib.si/details/URN:NBN:SI:DOC-YJ3DA9MZJ, 01/05/2014.
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