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Habitat characteristics assessmen of the wetlands with breeding Ferruginous Duck *Aythya nyroca* and Pochard *A. ferina* in Bulgaria

Ocena habitatnih značilnosti mokrišč z gnezdečimi kostanjevkami *Aythya nyroca* in sivkami *A. ferina* v Bolgariji

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The Ferruginous Duck *Aythya nyroca* and Pochard *A. ferina* are both regular breeders in Bulgaria. In the 19th and early 20th centuries, the Ferruginous Duck was a widely distributed and abundant breeding species in Bulgaria, while Pochard was first confirmed to breed in the country only in the 1950s. Breeding habitat characteristics of Ferruginous Duck and Pochard were assessed in 2002 during a national census of the former species in 30 and 23 wetlands, respectively, where the species were present. Preferred habitat characteristics were determined based on vegetation cover, water depth, and the presence of mosaic vegetation, bank side vegetation, floating vegetation, shallow or steep banks, shallow mudflats, shallow vegetated areas and woodland along the banks. In 2002, the Ferruginous Duck population in Bulgaria was restricted more to artificial wetlands, like fishponds and micro-reservoirs, while Pochard preferred more natural wetlands, predominantly natural marshes. The altitude of wetlands with Ferruginous Ducks varied markedly, with breeding recorded up to 880 m a.s.l., while Pochard bred at lower altitudes, mostly below 300 m a.s.l. Analysis revealed that Ferruginous Ducks preferred well-vegetated, comparatively shallow wetlands with well-structured mosaic vegetation and a diversity of microhabitats, like shallow mudflats and floating vegetation. The Pochard was found to be more of a generalist in wetland selection, significantly correlated with fewer wetland parameters, and showed preference only for larger, open-water bodies. These results could help explain and give some insight into the reasons for the differences in range size, numbers and distribution of the two species and their respective conservation status in Europe and worldwide. The Pochard, whilst close to the limits of the breeding range in Bulgaria, expands its range in Europe, occupying a variety of wetlands and thus having a favourable status. The Ferruginous Duck is more of a habitat specialist, which limits its distribution and makes it more susceptible to habitat changes. These habitat preferences and the deterioration of the wetland habitats in many parts of its range could probably explain the Ferruginous Duck decreasing population and shrinking breeding range, and thus its current unfavourable conservation status.

Key words: wetlands, Ferruginous Duck, *Aythya nyroca*, Pochard, *Aythya ferina*, breeding habitats, wetland selection
Ključne besede: mokrišča, kostanjevka, *Aythya nyroca*, sivka, *Aythya ferina*, gnezditveni habitati, izbor mokrišč

1. Introduction

The Ferruginous Duck *Aythya nyroca* and Pochard *A. ferina* are currently the only regularly breeding diving ducks in Bulgaria, but also rare species in the country, included in the national Red Data Book with breeding population of 150–230 pairs of Ferruginous Ducks and 100–150 pairs of Pochards (Petkov 2011a & 2011b). The Ferruginous Duck is a species of global conservation concern previously classified in the 1990s as Vulnerable (Collar *et al*. 1994). Within its Palearctic distribution, the Ferruginous Duck strongly associates with wetlands of forest steppe, steppe and semi-desert zones, which results in a patchy distribution across the whole range (Bankovics 1997). Following a few large counts during migration and winter in various Asian countries, the species was downlisted from Vulnerable to Near Threatened (BirdLife International 2000). However, breeding populations are in decline in many parts worldwide, and especially in Europe where the species has declined by 30% during the 1990–2000 period (BirdLife International 2004). Most studies on the Ferruginous Duck have focused on numbers and distribution, while habitat requirements and characteristics have been neglected (Robinson 2003). The Pochard is also Palearctic diving duck species breeding from the Lake Baikal region in the East to Iceland, Ireland and Spain in the West. Some isolated populations occur in NW Africa and Turkey (Fox & Stawarczyk 1997). Originating from the wetlands of the steppe region, the species has expanded its range westwards since the mid 20th century (Bauer & Glutz von Blotzheim 1969).

Prior to this study, most information on habitat characteristics of Ferruginous Duck has been descriptive and, with the exception of Green (1998a & 1998b) and Zogaris & Handrinos (2003), little quantitative and qualitative study has been performed, with most of the studies focused on distribution and numbers. The Ferruginous Ducks tend to inhabit shallower, well-vegetated wetlands (Cramp & Simmons 1977). Knowledge of habitat requirements is essential for habitat management of breeding sites and, ultimately, the species' conservation. Therefore the purpose of the study was to quantify which wetland characteristics, generally described in literature as typical for the species, are statistically significant for the presence of the Ferruginous Duck during the breeding period. At the same time, the purpose of the study was to look at the preferences of the Pochard and see if there are any indications why the species is much more successful, numerous and widespread in Europe than its congener, which is suffering from shrinking European and global range and dwindling global population.

2. Methods

Data were collected during a national breeding survey of Ferruginous Ducks in Bulgaria, between 15 May and 20 Jun 2002 – being the core of the breeding season for the species in the country. Breeding sites were defined as wetlands in which breeding pairs or females were observed in this period. Wetland types were classified using the same categories used during the first national Bulgarian Ferruginous Duck census (Petkov 1997): natural lakes, large reservoirs, natural marshes, river mouths, canals, lagoons, micro-reservoirs, extensive fishponds and rice fields. A total of 153 wetlands, assessed vaguely as potentially suitable for investigated species in Bulgaria, were visited during the census. These included all natural marshes, large reservoirs and suitable natural lakes, significant part of the suitable micro-reservoirs, fishponds, rice fields and sections of rivers and river mouths assessed as potential for diving ducks breeding. For the purpose of the breeding habitat description, wetland characteristics data and habitat parameters were collected from 30 wetlands for Ferruginous Duck and 23 for Pochard, where the species were present during the breeding season. Altitudinal data were collected for 25 Ferruginous Duck breeding sites and 11 for Pochard using a GPS Garmin Etrex 12. Selection of habitat parameters was based on general descriptions given in Cramp & Simmons (1977) and Bauer & Glutz von Blotzheim (1969). However, some of the parameters were included based on my previous research on the species (Petkov 1997).

For each wetland, the following qualitative and quantitative data were collected: (1) vegetation cover (VC) – percentage of the water surface covered by vegetation; (2) water depth (WD) – measured with a stick near or around the central part of the wetlands or data from other studies of the specific wetland were used; (3) mosaic distribution of the vegetation (MV) – emergent and floating marsh vegetation is patchily distributed making a mosaic of habitats with alternating vegetated and open-water areas of the water body (presence / absence); (4) vegetation along the bank of the wetland (VB) – when the reedbeds or other emergent vegetation is situated only along the banks of the wetland (presence / absence); (5) mats of floating vegetation (FV) – these are composed of hydrophytic vegetation like *Nymphaea alba*, *Nymphoides peltata*, *Persicaria amphibia*, *Trapa natans* etc., considered typical and widespread in

Table 1: Correlation between wetland habitat characteristics and presence of Ferruginous Duck *Aythya nyroca* breeding pairs (n = 30 sites)

Tabela 1: Korelacija med značilnostmi mokriščnih habitatov in navzočnostjo gnezdečih parov kostanjevke *Aythya nyroca* (n = 30 lokalitet)

Wetland parameter / Parameter mokrišča	Kendall Tau	*Z*	*P*
Vegetation cover / Pokrovnost vegetacije	0.73	5.65	< 0.001
Water depth / Globina vode	−0.68	−5.28	< 0.001
Mosaic vegetation / Mozaičnost vegetacije	0.59	4.60	< 0.005
Vegetation along the bank / Obrežna vegetacija	−0.59	−4.60	< 0.005
Floating vegetation / Plavajoča vegetacija	0.87	6.79	< 0.001
Steep banks / Strmi bregovi	−0.67	−5.16	< 0.001
Shallow banks / Plitki bregovi	0.67	5.16	< 0.001
Shallow mudflats / Plitki poloji	0.93	7.26	< 0.001
Shallow vegetated area / Plitke poraščene površine	0.58	4.48	< 0.001
Wood vegetation / Gozd	−0.52	−4.05	< 0.005

Ferruginous Duck habitats (presence / absence); (6) steep banks (StB) – when the banks of the wetland are steep with no shallow areas along them (presence / absence); (7) shallow banks (ShB) – when the banks descend gradually into water and shallow water areas exist along the banks (presence / absence); (8) shallow mudflats (SM) – flooded shallow areas with bare mud or detritus without vegetation usually rich in invertebrates like Chironomidae larvae (presence / absence); (9) shallow vegetated areas (SV) – shallow waters along the banks with rich submerged or short emergent hygrophilic vegetation (presence / absence); (10) wood vegetation along banks (WV) – trees and wood patches along the banks (presence / absence).

The vegetation coverage was determined from maps, aerial photos and by visual observation on the spot and assigned in three classes; 0–20%, 21–50% and > 50% coverage. The vegetation coverage includes emergent vegetation and floating vegetation in the water body, excluding the reedbeds on dry land along the banks. The water depth was grouped in three classes as well; 0.0–1.5 m, 1.6–2.0 m and > 2.0 m. The MV and VB parameters are mutually excluding opposite variants as well as StB and ShB.

Correlations between wetland parameters and breeding pairs presence were analysed using the Kendal Tau nonparametric test in the STATISTICA for Windows 4.0 package. Stepwise forward regression was used to determine the most important wetland parameters explaining the presence of the species during the breeding season.

3. Results

Of the 30 sites holding a total of 185 breeding pairs of Ferruginous Duck in 2002, most were natural marshes (42.8%) or fishponds (42.2%), with 8.7% micro-reservoirs, 4.3% natural lakes, and 2% rice fields. The altitude of breeding sites varied markedly, from sea level (wetlands along the Black Sea coast) to 880 m a.s.l. (mean ± SD = 191.4 m ± 175.8, n = 25). Thus the species occupied somewhat more of artificial type of wetlands compared to natural wetlands (52.9% vs. 47.1%).

In 2002, the registered 102 breeding Pochard pairs occupied predominantly natural marshes (54.5%) and fishponds (34.3%) and, to a lesser extent, natural lakes (6.4%) and large reservoirs (4.8%). Thus breeding Pochards were found relatively less frequently on artificial wetlands, like fishponds and reservoirs than Ferruginous Duck (artificial vs. natural = 39.1% vs. 60.9%), obviously showing preference for natural wetlands. Most of the Pochard breeding sites were situated at low altitude, from sea level to 300 m a.s.l. (mean ± SD = 111.8 m ± 152.1, n = 11).

The presence of Ferruginous Duck breeding pairs was correlated significantly with all selected habitat characteristics. Among others there were positive correlations with the availability of mudflats, floating vegetation and total vegetation cover; and negative correlations with water depth, vegetation along the banks, steep banks, and wood vegetation along banks (Table 1). Regression analysis identified four key variables explaining the presence of breeding pairs (Table 2). Ferruginous Duck numbers were negatively correlated with water depth, and positively

Table 2: Regression analysis of wetland habitat characteristics on presence of Ferruginous Duck *Aythya nyroca* breeding pairs (n = 30 sites); total for the regression model $F = 114.2$, $P < 0.0001$

Tabela 2: Regresijska analiza značilnosti mokriščnih habitatov za navzočnost gnezdečih parov kostanjevke *Aythya nyroca* (n = 30 lokalitet); skupaj za regresijski model $F = 114.2$, $P < 0.0001$

Wetland parameter / Parameter mokrišča	Coefficient/ Koeficient	*P*	R^2
Vegetation cover / Pokrovnost vegetacije	0.11	< 0.01	0.933
Water depth / Globina vode	–0.12	< 0.01	0.948
Floating vegetation / Plavajoča vegetacija	0.26	< 0.01	0.918
Shallow mudflats / Plitki poloji	0.51	< 0.01	0.874

Figure 1: Aldomirovtsi Marsh, W Bulgaria – a typical breeding site of Ferruginous Duck *Aythya nyroca* with mosaic of emergent vegetation, mats of floating vegetation and open water (top); mosaic vegetation in a Tatary micro-reservoir (N Bulgaria, near Danube River), utilized by breeding Ferruginous Ducks (bottom left); Ferruginous Ducks flying over stands of emergent and floating vegetation in the Orsoya Fishponds, NW Bulgaria (bottom right) (photo: N. Petkov)

Slika 1: Močvirje Aldomirovci, Z Bolgarija – tipično gnezdišče kostanjevke *Aythya nyroca* z mozaikom emerzne vegetacije, preprogami plavajoče vegetacije in odprto vodno površino (zgoraj); mozaična vegetacija v majhnem vodnem zbiralniku Tatari (S Bolgarija v bližini Donave), kjer gnezdijo kostanjevke (spodaj levo); kostanjevke v letu prek sestojev emerzne in plavajoče vegetacije na ribnikih Orsoja, SZ Bolgarija (spodaj desno) (foto: N. Petkov)

Table 3: Correlation between wetland habitat characteristics and presence of Pochard *Aythya ferina* breeding pairs (n = 23 sites)

Tabela 3: Korelacija med značilnostmi mokriščnih habitatov in navzočnostjo gnezdečih parov sivke *Aythya ferina* (n = 23 lokalitet)

Wetland parameter / Parameter mokrišča	Kendall Tau	*Z*	*P*
Vegetation cover / Pokrovnost vegetacije	–0.46	–3.05	< 0.01
Water depth / Globina vode	0.05	0.35	n.s.
Mosaic vegetation / Mozaičnost vegetacije	–0.34	–2.25	< 0.05
Vegetation along the bank / Obrežna vegetacija	0.34	2.25	< 0.05
Floating vegetation / Plavajoča vegetacija	0.19	1.31	n.s.
Steep banks / Strmi bregovi	–0.21	–1.41	n.s.
Shallow banks / Plitki bregovi	0.21	1.41	n.s.
Shallow mudflats / Plitki poloji	0.44	2.95	< 0.01
Shallow vegetated area / Plitke poraščene površine	0.05	0.36	n.s.
Wood vegetation / Gozd	–0.28	–1.86	n.s.

correlated with vegetation cover, shallow mudflats, and floating vegetation. Examples of different types of Ferruginous Duck breeding sites with favoured habitat characteristics are shown in Figure 1.

Pochard presence was significantly correlated with fewer wetland parameters than Ferruginous Ducks, with positive correlations with vegetation along the banks and shallow mudflats, and negative correlation with total vegetation cover (Table 3). Only total vegetation cover was significant in the regression model ($r = –0.379$, $P = 0.0192$; $R^2 = 0.234$, $F = 6.43$, $P < 0.05$).

4. Discussion

Ferruginous Duck breeding wetlands types differed significantly between the results of the surveys carried out in 1996–1997 and 2002. In 1996–1997, half of the breeding Ferruginous Ducks (49%) were found on fishponds (Petkov 1997 & 2000), while in 2002 only 42% were registered there, when more pairs were found in natural marshes. This is due to the combination of abandonment or intensification of fishponds and the partial restoration of some natural wetlands. For example, the Orsoya fishponds were abandoned and some others went completely dry or became overgrown with tall emergent vegetation, making them completely unsuitable for the species. Similarly, Mechka fishponds which used to be the key site for the species, now hold much smaller numbers as some of the ponds were drained and are no longer intended for fish farming. The higher total number of pairs in natural marshes in 2002 was mainly owing to big population breeding on a single site, which was semi-restored in the mid-1990s when reconnected with the Danube River on one hand, and abandonment of key fishponds, which lost some of their basins reducing the number of breeding pairs on the other hand. However, the species continues to rely heavily on artificial wetlands with more than 50% of breeding pairs occurring in man-made wetlands. If managed in suitable way, the fishponds could sustain more pairs than in the recent years. In 2002, Ferruginous Ducks were found breeding in rice fields for the first time in Bulgaria; this had previously been reported from other countries such as Hungary (Callaghan 2001). This type of habitat should be considered occasional as the rice fields are not managed in consistent way and could host breeding Ferruginous Ducks only occasionally. No breeding pairs were found in lagoons due to changes in the water regime (at the Shabla Tuzla lagoon, the water level dropped in 2002, making conditions unsuitable for breeding) and river mouths, presumably due to the increased disturbance from recreation activities and holidaymakers that took place around those breeding sites in the recent couple of decades. As most important wetlands for breeding Ferruginous Ducks are in an advanced stage of vegetation succession with unstable water levels, their suitability for Ferruginous Ducks varies from year to year, depending on rainfall and the water table, resulting in changes in numbers and breeding success (Petkov 2000 & 2003). In more rainy years with higher water level, the vegetation is suppressed temporarily and the species regains its population, but then drier years usually follow that favour vegetation growth.

The Pochard was less selective in its choice of breeding habitat, as no correlation to specific wetland habitat characteristics was found, save the preference for larger, natural wetlands with more open water (more than 60% of breeding pairs found on marshes and lakes). The bulk of the Pochard population is concentrated around the Burgas lakes complex. This includes four big lakes on the Black Sea coast of which two and adjacent smaller wetlands constitute key areas for the breeding population. Additional pairs breed in some larger wetlands along the Danube River. No pairs were recorded in micro-reservoirs, which were occupied and used by numbers of Ferruginous Duck, despite the fact these are the most widely available breeding habitats in large parts of inland Bulgaria. However, the species was found in large reservoirs, more resembling lake systems, which were not occupied by the Ferruginous Duck. This is another indication of the Pochard's preference for larger water bodies and more open wetlands.

The altitude of breeding sites varies greatly, from sea level to the Chokljovo Marsh (W Bulgaria) which, at 880 m a.s.l., is one of the highest breeding sites in Europe (see Bauer & Glutz von Blotzheim 1969). Pochard breeding sites in Bulgaria were situated at a much lower altitude than those for Ferruginous Ducks, and well below the average altitude in Europe (500–800 m a.s.l., Cramp & Simmons 1977), mainly because most breeding pairs were found at sea level in wetlands along the Black Sea coast and along the Danube River. Very rarely, the species is found breeding in inland wetlands outside these migration corridors.

Ferruginous Ducks are known to prefer well-vegetated wetlands (Bauer & Glutz von Blotzheim 1969, Cramp & Simmons 1977), but this has rarely been quantified (but see Green 1998a & 1998b, Zogaris & Handrinos 2003). In general, duck species often associate with well-vegetated and highly productive wetlands during breeding season (Batt *et al.* 1992, Elmberg *et al.* 1993), with emergent vegetation providing shelter and also serving as habitat for various water invertebrates (Voigts 1976, Nummi & Poysa 1993). Beside the expected preference for well-vegetated wetlands with mosaic characteristics, the species is positively associated with floating vegetation. Mats of hydrophytic floating vegetation is typical of many breeding sites. They are often associated with submerged structures and vegetation that provide good conditions for development of water invertebrates taken as food. Moreover, Ferruginous Ducks were found on sites with shallow mudflats. Zogaris & Handrinos (2003) also found that Ferruginous Ducks at Louros Floodplain, Greece, inhabited sites with mudflats and considered it important microhabitat for the species. This could be due to the more accessible and abundant invertebrate food source in this microhabitat, as shallow mudflats often hold high densities of Chironomidae larvae and the species readily occupies foraging areas with high densities of benthic biomass and Chironomidae larvae (Petkov 2003). Pochards were also found on sites with more shallow mudflats, this being in accordance with studies such as Philips (1991) that have found ducks feed preferentially in areas with higher densities of chironomids and zoobenthic biomass in general. Nummi & Poysa (1995) also considered that mudflats and shallow flooded areas with littoral vegetation around wetland banks attracted waterfowl because of their rich diversity and density of invertebrates. Studies in Turkey suggest that the vicinity of littoral vegetation is a preferred foraging area for Ferruginous Ducks (Green 1998b). Contrary to some literature (e.g. Cramp & Simmons 1977), Ferruginous Ducks in Bulgaria avoided wetlands surrounded by rich wood vegetation and preferred wetlands with open shallow banks, which provide shallow flooded areas in spring where they prefer to feed. Previous studies have shown that Ferruginous Duck forages, unlike typical diving ducks, largely through bill dipping while skimming on or just below the water surface or by head dipping when they do not suffer the competition from dabbling ducks (Petkov 2000).

Compared to the Ferruginous Duck, the Pochard is more of a generalist in the occupied type of wetland habitats, with little correlation between Pochard breeding and wetland parameters. The species is one of the most widely distributed diving ducks in Europe (Fox & Stawarczyk 1997). In Europe, the Pochard extended its range expansion from the end of the 19th century to the mid-20th century. The species now occupies a wide variety of wetlands – from freshwater, acid oligotrophic wetlands through eutrophic, alkaline, brackish to hypersaline wetlands and even sea bays (Bauer & Glutz von Blotzheim 1969). In this study, it was found more in open wetlands and did not require specific structure of the wetland vegetation as far there were enough dense reedbeds suitable for breeding. Data from breeding sites across Europe suggest that Pochards require more than 5 ha of open water (Bauer & Glutz von Blotzheim 1969). This allows the species to occupy variable wetlands, but still in Bulgaria it is mainly distributed along its major water courses – the Danube River and the Black Sea coast. This might be linked to its recent expansion in the country and using those large water corridors for

colonising the territory of the country. On the other hand, the Ferruginous Duck that was historically widely distributed and numerous in the country has shrunk its distribution and numbers since the 19th century (Petkov & Kutsarov 2007).

The generalist nature that the Pochard reveals by the selection of wetlands might have supported it to expand its range across Europe (Bauer & Glutz von Blotzheim 1969). The possibility to adapt to various wetland types allows the species to take wider range of wetlands. In Bulgaria, however, it seems to be occurring mostly along extensive wetland corridors like the coastal hinterland and river sides. The more specialised habitat requirements of the Ferruginous Duck probably can explain its restricted and shrinking distribution in Europe and in other parts of its range (Robinson 2003). It requires much more specific characteristics of the wetlands to be present for breeding, and if these characteristics are not met or altered by environmental conditions and human activities, the wetlands are abandoned or not occupied at all. Green (1998b) drew similar conclusions – namely, that selection of specific habitats by the species is the reason of its unfavourable status in Europe and in Asia. Overall, as this study confirms some specific habitat requirements of the Ferruginous Duck, suggesting it does not readily occupy all types of wetlands available, but need certain type of characteristics to be present. The results support the idea that the species needs more structured wetland habitats with mosaics of habitat characteristics. Selection of rather specific habitats makes Ferruginous Duck susceptible to alteration of wetlands and this might be one of the major causes of shrinks and fluctuations in its range and numbers, especially in Europe where most wetlands are under serious permanent pressure through human activity. At the same time, the Pochard is much more numerous and abundant, readily occupying wetlands available within the breeding range. It does not respond that quickly and significantly to loss of some wetlands and their deterioration unless being close to the limits of the breeding range, as it is the case in Bulgaria. Lower number of Pochard breeding pairs in Bulgaria compared to Ferruginous Duck and fewer breeding sites could be explained by the relatively recent colonisation of the country by the species.

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5. Povzetek

Kostanjevka *Aythya nyroca* in sivka *A. ferina* sta redni gnezdilki v Bolgariji. Medtem ko je bila kostanjevka v 19. in zgodnjem 20. stoletju tu splošno razširjena in številčna gnezdeča vrsta, pa je bila gnezditev sivke v Bolgariji prvič potrjena šele v 50-ih letih 20. stoletja. Značilnosti gnezditvenega habitata kostanjevke in sivke so bile ocenjene leta 2002 med nacionalnim popisom prve na 30 oziroma 23 mokriščih, ki sta jih naseljevali ti vrsti. Značilnosti habitatov, ki sta jih vrsti najraje izbirali, so bile ugotovljene na osnovi pokrovnosti vegetacije, globine vode in obstoja mozaičnosti vegetacije, obrežne in plavajoče vegetacije, plitkih oz. strmih bregov, plitkih polojev, plitkih poraščenih površin in gozdov vzdolž bregov. Leta 2002 je bila populacija kostanjevke v Bolgariji bolj vezana na umetna mokrišča, kot so ribniki in majhni vodni zbiralniki, medtem ko je sivka raje izbirala naravna mokrišča, predvsem naravna močvirja. Nadmorska višina mokrišč s kostanjevkami se je močno razlikovala, saj je bilo gnezdenje teh rac zabeleženo vse do 880 m n.v., medtem ko je sivka gnezdila na manjših nadmorskih višinah, večinoma pod 300 m. Analiza je pokazala, da so kostanjevke raje izbirale dobro zaraščena in razmeroma plitka mokrišča z dobro strukturirano mozaično vegetacijo in pestrostjo mikrohabitatov, kot so plitki poloji in plavajoča vegetacija. Za sivko, po drugi strani, pa je bilo ugotovljeno, da je bolj generalist pri izbiri habitatov, kar se kaže v manjšem številu značilnih korelacij z mokriščnimi parametri, in da daje prednost samo večjim, odprtim vodnim telesom. Ti rezultati bi lahko pomagali pojasniti in zagotoviti boljši vpogled v vzroke za razlike v velikosti areala, številu in razširjenosti obeh vrst ter v njun naravovarstveni status v Evropi in drugod po svetu. Sivka, ki je v Bolgariji

blizu meje svojega gnezditvenega areala, širi svoj areal v Evropi z naseljevanjem različnih tipov mokrišč, in ima torej tudi ugoden naravovarstveni status. Kostanjevka pa je bolj habitatni specialist, kar omejuje njeno razširjenost in hkrati povečuje njeno občutljivost za spremembe v habitatih. Prav prednostna izbira določenih habitatov in vse slabše stanje mokriščnih habitatov v mnogih delih kostanjevkinega areala pa bi morda lahko pojasnila, zakaj se njena populacija in gnezditveni areal krčita, kar je navsezadnje tudi razlog za njen neugodni naravovarstveni status.

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