

HISTORICAL OCCURRENCE OF THE HOODED/CARRION CROW (*CORVUS CORNIX/CORONE*) IN URBAN AREAS OF EUROPE WITH EMPHASIS ON SLOVENIA

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ABSTRACT

*In order to establish past changes in the status of the Hooded (*Corvus cornix*) and Carrion Crow (*Corvus corone*) in urban areas of Europe, an overview of historical sources regarding species biology and ecology from the ancient period to nowadays with special emphasis to Slovenia is given. In written sources related to five historical time periods, the species status and frequency of occurrence in urban environments (breeding, winter period) was checked as well as the Crow-Human interactions over time. The Hooded/Carrion Crow was known as an urban breeding bird from the ancient times till 18th century, when it disappeared from the cities. The recolonisation of urban areas started at the end of 19th century and is still in progress.*

Key words: *Corvus cornix*, *Corvus corone*, urban population, historical analysis, Europe, Slovenia

PRESENZA STORICA DI CORNACCHIE GRIGIA E NERA (*CORVUS CORNIX/CORONE*) IN AREE URBANE EUROPEE, CON PARTICOLARE ATTENZIONE ALLA SLOVENIA

SINTESI

*Al fine di stabilire variazioni nello stato della cornacchia grigia (*Corvus cornix*) e della cornacchia nera (*Corvus corone*) in aree urbane dell'Europa nel passato, l'articolo presenta una rassegna delle fonti storiche che trattano la biologia e l'ecologia delle due specie, dall'antichità fino ai giorni nostri, con particolare attenzione al territorio sloveno. Sono state esaminate le fonti stampate che si riferiscono a cinque periodi storici, al fine di trovare dati sullo stato delle specie e sulla frequenza di avvistamento in ambienti urbani (riproduzione, periodo invernale), nonché testimonianze di interazioni fra corvidi ed umani. La cornacchia grigia e quella nera sono specie che si riproducono in aree urbane e pertanto erano conosciute dall'antichità fino al diciottesimo secolo, quando sono sparite dalle città. La ricolonizzazione delle aree urbane è cominciata verso la fine del diciannovesimo secolo ed è attualmente ancora in progresso.*

Parole chiave: *Parole chiave:* *Corvus cornix*, *Corvus corone*, popolazione urbana, analisi storica, Europa, Slovenia

INTRODUCTION

Despite the fact that urbanization always results in destruction of natural ecosystems and habitats, it also creates new ecosystem with very unique abiotic and biotic characteristics, e.g., relatively large and specific food sources or lack of predators (Tarman, 1992; Shochat *et al.*, 2004). This new synthetic environment is opened to colonisation of species, which are able to use specific resources and are adaptable to the changing environment (Emlen, 1974). Urban fauna is thus represented by synanthropic species adapted to the life in or near human settlements. Faunal structure is substantially changed in urbanisation gradient (Emlen, 1974; Beissinger & Osborne, 1982; Niemelä *et al.*, 2002; Tratalos *et al.*, 2007). The assemblage structure is alternating according to the urbanisation sensibility of species, and in birds three species groups were identified (Crooks *et al.*, 2004): (1) urbanisation-enhanced (species reaching the highest density in urban environment), (2) urbanisation-intermediate (suburban species reaching the highest density in nonurban habitat patches inside urban areas), and (3) urbanisation-sensitive (species reaching the highest density outside urban areas). In general, urban areas are settled by native species from neighbouring natural ecosystems (Evans *et al.*, 2009; Loss *et al.*, 2009). Among the native species which have successfully colonized urban areas in Europe are the Hooded (*Corvus cornix*) and Carrion Crow (*Corvus corone*) (Houston, 1997).

The Hooded and Carrion Crows are middle sized corvids (48–56 cm; Madge & Burn, 1994). Until recently, their taxonomic position was unclear. The Hooded Crow was regarded as a subspecies of the Carrion Crow, but with recent genetic studies both taxa were recognized as clearly separate species (reviewed in Vrezec, 2005). However, it is still not possible to separate them in some specific studies, e.g., taphonomic studies of skeleton material (Tomek & Bochenski, 2000). The distribution range of both species in Europe is more or less parapatric, with a narrow zone of contact (Svensson *et al.*, 2009). Therefore for the discussed regions it is usually the case of one species being common and the other rare or even absent. Although both crow taxa were recognized already in the older ornithological literature (Fig. 1), the biology and ecology was usually described only for one taxon, the one more common for the studied region, or both taxa were simply dealt with together (e.g., Houston, 1997). For the purpose of this study I therefore regard both species together in order to reveal a better insight into the crow inhabitation of human settlements across Europe over time, taking into account larger amount of sources with different level of crow taxa consideration. In the following I will refer to the

combined Hooded/Carrion Crow taxa as Crow, and as separate species only in cases when it is relevant.

Both crow species inhabit urban areas, although synanthropy is more conspicuous in the Hooded than in the Carrion Crow (Madge & Burn, 1994). However, they were widespread in Europe already in the Lower Pleistocene period more than 730,000 years ago and before large human expansion (Tyrberg, 1998; Boev, 2009). This indicates that they were not human followers or in the past introduced exotic species, which are usually more related to human presence.

Although some species closely related to the Crow are typical urbanisation-enhanced birds, e.g., American Crow (*Corvus brachyrhynchus*) (Crooks *et al.*, 2004), this is not true for the Crow. Urban areas appeared to be suboptimal habitat for the discussed species since the breeding success in urban environments is much lower compared to non-urban habitats (Richner, 1989). Many studies claim that Crows actually colonized urban areas

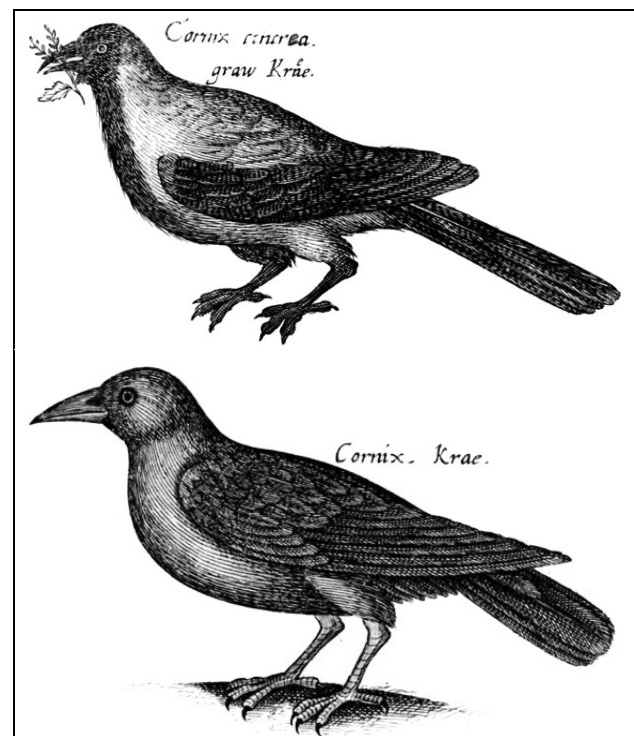


Fig. 1: The Hooded Crow (*Corvus cornix*; *Cornix cinerea. graw Krae.*) and Carrion Crow (*Corvus corone*; *Cornix. Krae.*) were recognized taxa already in older ornithological literature (an example from Jonston, 1650).

Sl. 1: *Siva vrana* (*Corvus cornix*; *Cornix cinerea. graw Krae.*) in *črna vrana* (*Corvus corone*; *Cornix. Krae.*) sta bili ločeno prepoznani že v starejši ornitološki literaturi (primer iz Jonston, 1650).

in some parts of Europe only recently, in 20th century, due to the species population increase and significant habitat changes in the cities in the last 100 years (Tomialojć & Stawarczky, 2003; Vuorisalo *et al.*, 2003; PECBMS, 2009). The aim of this study is to describe the status of the Crow in urban areas of Europe from the ancient period to nowadays. The author has overviewed historical sources with special emphasis on Slovenia, where nowadays the Hooded Crow is one of the most common bird species (Geister, 1995).

METHODS

In the analysis of historical sources on the Crow occurrence in urban areas, the whole Europe was taken into account with special emphasis given to the region of Southern Europe and Slovenia. Five time periods were considered (Tab. 1). Data were obtained from different written sources, which considered the Hooded or Carrion Crow or Crow in general in a given time period (Tab. 1). Most of the written sources from the period of 16th to 18th century were obtained from the Gottingen State and University Library online system of digitalized documents (<http://gdz.sub.uni-goettingen.de>). In the recent period of 20th–21st century the amount of sources is

incomparably larger than in other periods, therefore only avifaunal works of some larger areas, *i.e.*, European or national ornithological atlases, and ornithological atlases of cities were considered. The frequency of the Crow occurrence during breeding and non-breeding period in urban areas was estimated as a proportion of sources confirming species urban presence. Additionally, for the explanation of urban conditions in the past and crow-human interactions, also some artistic works were considered, *e.g.*, wall paintings (caves, frescos, Roman garden paintings), illuminations in handwritings, sculptures and other animal imaginations.

From the sources the following data were extracted: (1) occurrence and species status in urban environments (breeding, winter period), and (2) the type of crow-human interaction. For the purpose of this study, all kinds of small or large groups of man-made buildings inhabited by humans were considered urban environment, even though ancient Greek or Roman settlements would probably be classified as suburban according to the nowadays standards. The relevant point in defining urban environment was therefore synthetic or artificial environment in which colonizing wild animals are at least partly using human produced sources and are in frequent contacts with human population.

Tab. 1: Historical time periods and the list of considered written sources for each period.

Tab. 1: Določitev zgodovinskih obdobj in seznam pregledanih virov za posamezna obdobja.

Period	Time frame	Considered sources
Ancient period	7 th century BC – 5 th century AD	Aristoteles, Plinius, Jashemski & Meyer (2002), Foufopoulos & Litinas (2005)
Middle Ages and Renaissance	6 th – 17 th century	Gesner (1555), Aldrovandus (1646), Jonston (1650), Willoughby (1676), Ray (1713)
18 th century	18 th century	Linnaeus (1746, 1758), Klein (1750), Kramer (1756), Brisson (1763), Pennant (1768), Scopoli (1769), Buffon (1788)
19 th century	19 th century	Seidensacher (1858, 1864), Erjavec (1870), Fritsch (1870), Savi (1873), Brehm (1879), Gjurašin (1899), Blasius <i>et al.</i> (1905), Reiser & von Führer (1896), Reiser (1894, 1905, 1925, 1939)
20 th and 21 st century	1900–2009	Parslow (1973), Matvejev (1976), Witt (1984), Sovinc (1994), Geister (1995), Rabosee (1995), Spadea (1995), Cignini & Zapparoli (1996), Biagioni <i>et al.</i> (1996), Kuzniak (1996), Handrinos & Akriotis (1997), Houston (1997), Bernini <i>et al.</i> (1998), Thibault & Bonaccorsi (1999), Luniak <i>et al.</i> (2001), Danko <i>et al.</i> (2002), Tomialojć & Stawarczky (2003), Bezzel <i>et al.</i> (2005), Mihelič (2005), Cairo & Facchetti (2006), Feldner <i>et al.</i> (2006), Betleja <i>et al.</i> (2007), Maumary <i>et al.</i> (2007)

RESULTS AND DISCUSSION

The ancient period (7th century BC to 5th century AD)

Relationship between crows and humans is known already from Ancient Egypt (Foufopoulos & Litinas, 2005). Crows were common along the Nile River and were as scavengers in regular contact with humans, although it is not known whether they also bred in human settlements. For the area of Slovenia and adjacent lands, ancient Greek (between 5th and 4th century BC) and Roman sources (between years 753 BC and AD 476) are much more important. Sources from both periods are reporting on regular occurrence of crows in urban areas (Aristoteles; Plinius). In archaeological investigations of ancient Roman settlements, bone remains of the Hooded Crows were found, and the species was found illustrated in wall paintings together with other characteristically

synantropic species, e.g., House/Italian Sparrow (*Passer domesticus/italiae*) (Jashemski & Meyer, 2002). Similar as the Raven (*Corvus corax*), it seems that the Crow was a common urban species in Southern Europe in ancient times (Vrezec *et al.*, 2009). The human attitude towards the species included positive and negative perceptions. On one hand the crow was connected to longevity, and on the other it was a symbol of widowhood (Foufopoulos & Litinas, 2005).

6th to 17th century

The Middle Ages are very poorly documented, considering technological development and natural science knowledge of the time. The oldest reliable written sources from the area of Southern Europe date back to 16th century, but interpretations of earlier times are somehow possible from numerous illustrations, frescos,

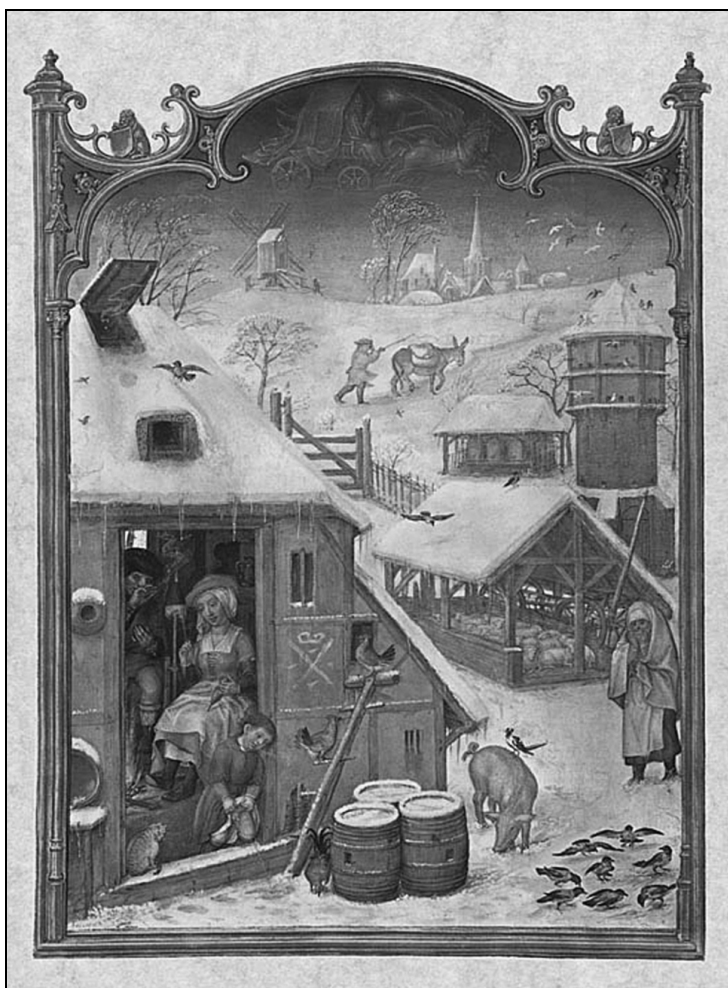


Fig. 2: An example of miniature from *Breviarium Grimani*, a manuscript made in Belgium between years 1510 and 1520, is indicating regular occurrence of Hooded Crows in human settlements.

Sl. 2: Primer miniature iz rokopisa *Breviarium Grimani*, izdelanega v Belgiji med leti 1510 in 1520, nakazuje na redno pojavljanje sive vrane v naseljih.

miniatures, reliefs, heraldic symbols etc. (Wiet *et al.*, 1975). From the territory of Slovenia, the image of the Crow is known from the coat of arms of Vransko, which originates from 13th century. The images of Crows can also be found in the Hrastovlje church frescos made in 1490 (Zadnikar, 1988), but these images are quite unclear. More accurate are images in miniatures of manuscripts. In the Belgian manuscript *Breviarium Grimani*, written between 1510 and 1520, it is clearly shown that Crows were following humans in the fields and settlements (Fig. 2) (Walther & Wolf, 2001).

In the late Middle Age and Renaissance periods, the Crows were common breeding birds in urban areas of Europe (Gesner, 1555; Aldrovandus, 1646; Jonston, 1650; Willoughby, 1676). Beside settlements the Crows were very common also on agricultural land, and large flocks frequently gathered at rubbish dumps, and at river and sea shores (Aldrovandus, 1646; Jonston, 1650). The human settlements in the Renaissance were in general attractive to scavenger birds, beside Crows also Ravens, Egyptian Vultures (*Neophron percnopterus*) and Black Kites (*Milvus migrans*) (Aldrovandus, 1646; Jonston, 1650). The last two species are nowadays absent from European cities, but the Raven and Crow are recolonizing urban areas (Houston, 1997; Vrezec *et al.*, 2009). It is documented that Carrion Crows increased greatly in England in the time of Henry VIII (1509–1547), and that crows had been extirpated for the following ten years at the least (Pennant, 1768). Otherwise, there are no reports on Crow extermination from other parts of Europe from this period.

18th century

In 18th century, the Crow was distributed over the whole Europe (Linnaeus, 1758). However, there were remarkable changes considering the species urban occurrence. In the published studies from 18th century, the Crow was no longer considered as an urban breeder, but as a common breeder of fields, meadows, forests and montane areas (Linnaeus, 1746; Kramer, 1756; Brisson, 1763; Pennant, 1768; Scopoli, 1769). Only in winter the birds aggregated in flocks which came near the settlements (Kramer, 1756; Scopoli, 1769; Buffon, 1788). The most probable cause for this change was an intensive human persecution of the corvid and raptor species, which for example drastically reduced also the Raven population in Europe (Vrezec *et al.*, 2009). The Crow remained a common species in Europe, but retreated from former breeding places in urban areas.

19th century

Similarly as in 18th century, the Crows were absent from the urban areas at the beginning of 19th century,

but occurred there more frequently in winter time (Erjavec, 1870; Fritsch, 1870; Blasius *et al.*, 1905). The first urban colonisations were recorded at the end of the century (Brehm, 1879), also in Slovenia and adjacent countries (Reiser, 1925, 1939), but these colonisations were not as rapid and permanent as later ones at the end of 20th century. Although even naturalists in that time supported intensive extermination of raptorial pests, *i.e.*, the Raven (Vrezec *et al.*, 2009), at least the Hooded Crow was treated in a more positive manner. Despite the damage crows did from time to time on the fields, they were regarded as useful due to their habit of feeding on different pest insects (Erjavec, 1870; Gjurašin, 1899).

20th and 21st century

In 20th century, Crows rapidly colonised urban areas. The process started already at the end of 19th century (Houston, 1997). In Poland, for example, the colonisation started in 1930 in Warszawa, followed in Poznan in 1951, in Wroclaw in 1972, in Krakow in 1974 and in cities at the Baltic Sea shore in the 70.-ties (Tomialojć & Stawarczky, 2003). But the colonisation rate was not equal around Europe. In some countries, there was no urban population in the 70s (*e.g.*, Matvejev, 1976; Thibault & Bonaccorsi, 1999), and breeding densities of Crows today are still different between cities (Tab. 2). The last is probably due to different ecological conditions, *i.e.*, food availability, size of non-urban populations in the surrounding, intensity of prosecution etc. Compared to Middle Europe, densities in Southern and Northern Europe are lower, since the urban colonisation there is a fairly recent event (Tab. 2) (Vuorisalo *et al.*, 2003). In Slovenia, urban breeding Hooded Crows are nowadays known for the majority of cities, namely Nova Gorica, Kranj, Ljubljana, Domžale, Kočevje, Novo mesto, Celje, Ptuj, Slovenska Bistrica, Maribor, Murska Sobota, but locally still absent in some, *e.g.*, Žalec, Slovenj Gradec, Velenje, Slovenske Konjice (Vogrin, 2003; Mihelič, 2005; DOPPS, unpubl. data of New Ornithological Atlas of Slovenia for the period 2002–2009). However, according to the published observations from Ljubljana and some NE Slovenian cities, it can be concluded that rapid urban colonization of the Hooded Crow had happened relatively recently in Slovenia, starting probably not before the 80.-ties of 20th century (Sovinc, 1994; Vogrin, 2003). In general, further urban colonisation in Europe is expected to take place especially in Southern and Northern Europe since expected climatic changes are not going to drastically influence the Crow population in Europe (Huntley *et al.*, 2007).

Tab. 2: Overview of breeding densities of Crows, Hooded *Corvus cornix* and Carrion Crow *C. corone*, in selected European cities.**Tab. 2: Pregled gnezditvenih gostot vran, sive *Corvus cornix* in črne vrane *C. corone* v izbranih evropskih mestih.**

State	City	Searched area (ha)	Crow (sub)species	Density (pairs per 10 ha)	Source
Slovenia	Ljubljana*	467	<i>cornix</i>	0.32-0.43	Mihelič (2005)
Slovenia	Maribor	118	<i>cornix</i>	0.17	Vogrin (2003)
Slovenia	Celje	99	<i>cornix</i>	0.15	Vogrin (2003)
Slovenia	Ptuj	46	<i>cornix</i>	0.22	Vogrin (2003)
Slovenia	Slovenska Bistrica	73	<i>cornix</i>	0.13	Vogrin (2003)
Italy	Napoli	11730	<i>cornix</i>	0.001	Spadea (1995)
Italy	Roma	36000	<i>cornix</i>	0.09	Cignini & Zapparoli (1996)
Italy	Spezia	5222	<i>cornix</i>	0.03	Biagioni <i>et al.</i> (1996)
Italy	Pavia	6286	<i>cornix</i>	0.16-0.48	Bernini <i>et al.</i> (1998)
Italy	Bergamo	3900	<i>cornix</i>	0.08-0.13	Cairo & Facchetti (2004)
Germany	W Berlin	48000	<i>cornix</i>	0.10-0.15	Witt (1984)
Belgium	Bruxelles	16178	<i>corone</i>	0.40-0.93	Rabosee (1995)
Poland	Warszawa	49400	<i>cornix</i>	0.20-0.30	Luniak <i>et al.</i> (2001)
Poland	Gliwic	13057	<i>cornix</i>	0.04-0.08	Betleja <i>et al.</i> (2006)
Poland	Leszna	3190	<i>cornix</i>	0.17-0.19	Kuzniak (1996)

* In Ljubljana only the area of city park Tivoli was surveyed and not the urban city centre.

* V Ljubljani je bil upoštevan samo predel mestnega parka Tivoli in ne urbano središče mesta.

CONCLUSION

As an urban breeding bird, the Crow was known already in ancient times. Therefore, recent colonisations of the cities by the species across Europe are not due to the actual ecological or behavioural changes of this highly adaptable species. It is simply a recolonisation process of breeding areas abandoned in the past due to heavy human persecution. Although there is no historical data available to estimate population dynamic of the Crow, its urban presence could be used as an indicator of its past population status. Urban areas are suboptimal habitat of the Crow (Richner, 1989). In general, the species first disappears from suboptimal habitats when its population declines (Begon *et al.*, 2006). Most of the references included in this study quote that the Crow has been a common and abundant bird throughout the history. However, the species absence from urban areas, especially in 18th and 19th century (Fig. 3), indicate large population decline in this period, when also populations of other corvids, e.g., the Raven, declined drastically (Glandt, 2008; Vrezec *et al.*, 2009). Even in winter time Crows were far less frequent in settlements during 18th and 19th century (Fig. 3). In 19th century more naturalist writers called against crow extermination, seeing the species as an efficient insect pest predator on agricultural land. Already at the end of 19th century, the recolonisation of urban areas began and is still continuing nowadays (Fig. 3). What contributed to the higher

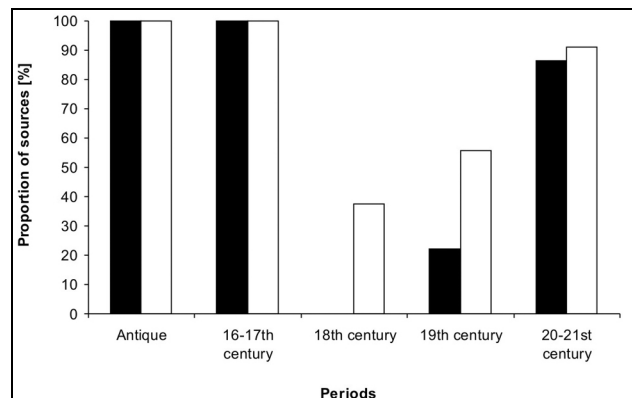


Fig. 3: Status of Hooded and Carrion Crows in urban areas of Europe in different historical periods (the Middle Age period is not included due to the lack of relevant written sources). The frequency of species occurrence in breeding (black bar) and winter (non-breeding; white bar) season is estimated as a proportion of examined sources (see Table 1 for the list) per period. Sl. 3: Status sive in črne vrane v urbanih predelih Evrope v različnih zgodovinskih obdobjih (obdobje srednjega veka ni vključeno zaradi pomanjkanja relevantnih pisnih virov). Pogostost pojavljanja vrste v obdobju gnezditve (črn stolpec) in prezimovanja (ko ni razmnoževanja; bel stolpec) je ocenjena skozi delež obravnavanih virov (glej Tabelo 1 za seznam) v posameznem obdobju.

urban colonisation rate in the last decades is not only lower intensity of persecution but also other human influenced environmental factors; e.g., increased food sources at rubbish dumps (Meyer *et al.*, 2003) and low populations of main crow predators, i.e., Goshawk (*Accipiter gentilis*) and Peregrine Falcon (*Falco peregrinus*).

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ZGODOVINSKI PREGLED POJAVLJANJA SIVE/ČRNE VRANE (*CORVUS CORNIX/CORONE*) V URBANIH OKOLJIH EVROPE S Poudarkom NA SLOVENIJI

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POVZETEK

Siva (*Corvus cornix*) in črna vrana (*Corvus corone*) sta bili zelo razširjeni evropski vrsti že v obdobju spodnjega pleistocena pred večjo človeško kolonizacijo. Gre za eno tistih avtohtonih vrst, ki so se uspele naseliti tudi v urbana in od človeka spremenjena okolja, še posebej intenzivno v zadnjem stoletju. Cilj pričujoče študije je bil ugotoviti spremembe statusa urbane populacije vrste v preteklosti znotraj petih zgodovinskih obdobj. V ta namen je avtor zbral in pregledal relevantne pisne vire o biologiji in ekologiji vrste za posamezna obdobja od antike pa do danes s posebnim poudarkom na dogajanju v Sloveniji. Iz virov je ugotavljal status in pogostost pojavljanja vrane v urbanih okoljih v gnezditvenem in zimskem obdobju ter odnos ljudi do vrste. Kot urbana gnezdilka je bila siva vrana poznana že v obdobju antike. Prav tako je bila vrsta v obdobju srednjega veka in renesanse pogosta gnezdilka v takratnih mestih skupaj z nekaterimi drugimi mrhovinarskimi pticami kot so krokar (*Corvus corax*), egiptovski jastreb (*Neophron percnopterus*) in črni škarnik (*Milvus migrans*). Glede na vire je bila vrana (siva in črna vrana) v Evropi splošno razširjena vrsta tudi v 18. stoletju, vendar pa so urbane populacije v tem obdobju izginile. Jate vran so se naseljem približevale le v zimskem času. Razlog za spremembo in populacijski upad je najverjetneje intenzivno preganjanje vran in ujed, ki so jih v 18. in še v 19. stoletju imeli za velike škodljivce. Šele konec 19. stoletja se je gledanje vsaj na sivo vrano spremenilo v pozitivno smer, saj so v ptici prepoznali koristnega pokončevalca škodljivega mrčesa na poljih. Tako so bile že konec 19. stoletja zabeležene prve rekolonizacije vran v urbanih okoljih po Evropi. Rekolonizacija se je nato nadaljevala še v 20. stoletju in poteka še danes, še posebej intenzivno na območju Srednje Evrope. V Sloveniji je naseljevanje sivih vran v mesta dokaj novodoben pojav, če odmislimo posamezne zabeležene poskuse konec 19. stoletja. Glede na objavljena opazovanja iz nekaterih slovenskih mest naj bi se pospešena kolonizacija urbanega okolja pri nas začela šele v 80-tih letih 20. stoletja. Glede na populacijske trende je pričakovati, da se bo rekolonizacija mest v prihodnosti intenzivneje nadaljevala na območju severne in južne Evrope. K povečani stopnji kolonizacije mest pa verjetno ni prispevalo le zmanjševanje preganjanja vrste, pač pa tudi drugi ekološki dejavniki, ki so posledica delovanja človeka, npr. večja dostopnost prehranskih virov (smetišča) in zaradi preganjanja v nedavni preteklosti nižje populacije glavnih vranjih plenilcev.

Ključne besede: *Corvus cornix*, *Corvus corone*, urbana populacija, zgodovinska analiza, Evropa, Slovenija

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