

THE CENSUS OF THE EURASIAN STONE-CURLEW *BURHINUS OEDICNEMUS* IN THE STEPPE HABITAT OF THE ZETA PLAIN (MONTENEGRO) DURING 2021

Popis prlivke *Burhinus oedicnemus* v stepskem habitatu Zetske ravni (Črna gora) leta 2021

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Census of Eurasian Stone-curlew *Burhinus oedicnemus* was carried out in the period from 16 to 25 April and from 29 May to 2 June 2021 in the area of Zeta plain (central Montenegro) using the playback method. Out of the total of 64 survey points, Stone-curlew presence was registered in 40 of them, with the breeding population estimated at 40–60 pairs. The first systematic census of the species confirmed the study area as a major nesting area for Stone-curlew in Montenegro with at least 67% of the total national population.

Introduction

Eurasian Stone-curlew *Burhinus oedicnemus* inhabits open, sparsely vegetated terrain, like plains, steppes, dry grasslands, arable fields, gravelly soil and sand dunes. It nests on bare ground or areas with sparse vegetation, but also in arable fields where crops are short during the nesting period (BIRDLIFE INTERNATIONAL 2018). Most of the European population winters in North Africa, but significant numbers remain to winter in Southern Europe. Return of migrants to the breeding sites usually begins in April, and departure is completed by the end of October. Nest is a scrape in the ground, lined with small stones, shells or rabbit droppings (CRAMP 1998, HUME & KIRWAN 2020). Stone-curlew is a very

secretive species, and is most active at dawn or dusk (KARAVAEV 1998). The species is widely but patchily distributed in the southern part of Europe, up to central Asia and northern Africa. The largest part of the European population nests in Spain, France and the Caspian Sea area (KELLER *et al.* 2020). Since the second half of the 19th century, the decline of Stone-curlew populations has been recorded in many countries and the overall population size is suspected to be decreasing in Europe. The main threats to the species are related to human activities, particularly those from agriculture sector (BIRDLIFE INTERNATIONAL 2018).

Data on Stone-curlew *Burhinus oedicnemus* in the area of the Zeta Plain in Montenegro have been very scarce until now. The first data on the occurrence of this species in Montenegro were recorded by REISER & VON FÜHRER (1896), who state that Stone-curlew is frequently nesting in the northeast of Lake Skadar as well as on the right bank of the Morača, near the village of Kurilo, but also on the Čemovsko polje. Another information dates from 2004, where it is stated that two pairs of Stone-curlew were nesting in the area of the Stari aerodrom near the city landfill (Čemovsko polje) (SAVELJIĆ 2004). The most recent estimate regarding the nesting of the species in the area of the Zeta plain prior to our survey was 5–10 pairs in the Čemovsko polje (RUBINIĆ *et al.* 2019). In Montenegro, Stone-curlew is a protected species (List of protected plant and animal species, Sl. CG 76/06) and is considered a threatened species, included in the Endangered category (EN) in the Red List of Birds of Montenegro (SAVELJIĆ *et al.* 2022). At the European level, the species is listed in Annex I of the Birds Directive and Annex II of the Berne Convention on the Conservation of European Wildlife and Natural Habitats.

The area covered herein has been poorly studied in general so far, so data on breeding birds is rather limited. The aim of our study was to confirm the current occurrence of Stone-curlew on the Zeta plain and to obtain the first breeding population estimate based on comprehensive field survey.

Study area and methods

The research was conducted in the steppe habitat of the Zeta plain. The plain is bounded on all sides by mountains, from the north by the Kučki Mts, from

the east by the steeply descending Prokletije, while from the west the hilly terrain gradually descends to the plain. From the south and SW, the plain is bounded by a belt of swamps belonging to Lake Skadar. The Zeta plain is gravitated by four rivers: the Morača, Cijevna, Sitnica and Ribnica, which divided the plain into several fields (poljes), the largest of which is Čemovsko polje (BEŠIĆ 1975). They consist of deposits about 70 m thick, consisting of pebbles, conglomerates and large limestone boulders mixed with sand, and the sediment is almost evenly distributed over the fields. The average elevation of the plain is 30 m a.s.l. The climate is Mediterranean. Most of this area is occupied by urban and suburban settlements, industrial zones, airports, intensively managed arable land, vineyards, as well as road networks that cross the entire plain.

The entire area (including the urban part) covers an area of about 250 km², but only parts to the south of Podgorica with suitable habitat for Stone-curlew were surveyed, while the majority of the plain is nowadays converted into vineyards and plantations. Natural and semi-natural fragments represent the remains of once extensive and unique steppe in Montenegro, which consists of a mosaic of pastures, dry stony meadows and traditional agricultural areas (Figure 1). Grazed areas were considered suitable for this species, because they maintain sparsely vegetated areas with short grass and patches of bare ground used by Stone-curlews (GIOVACCHINI *et al.* 2013).

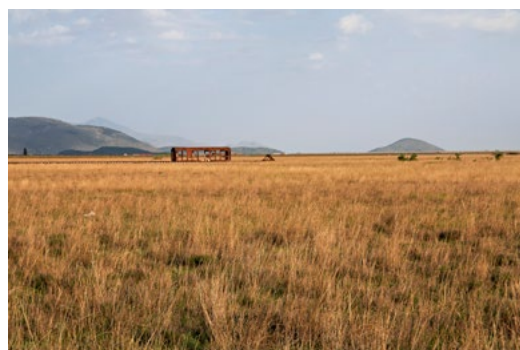


Figure 1: Steppe habitat of the Zeta plain south of Podgorica (photo: Marija Šoškić Popović)

Slika 1: Stepski habitat Zetske ravni južno od Podgorice (foto: Marija Šoškić Popović)

We determined survey transects in advance, based on previous experience from other fieldwork activities in the area and random observations of individuals. Satellite imagery was used to identify suitable areas that would otherwise be difficult to find and navigate to. The census was carried out from points, adjusted on-site at a distance of 1 km apart with few deviations, most often near settlements and houses. Although Stone-curlew typically has smaller territories during nesting (VAUGHAN & VAUGHAN JENNINGS 2005), we set points at selected distance due to its far-carrying vocal abilities and to avoid double-counting. As nesting at European breeding grounds usually begins in April (CRAMP 1998) we carried out the first visits between 16 and 25 April 2021, and the second visits in the time period from 29 May to 2 June 2021. Calm and clear nights with no or little wind were selected in order to avoid weather conditions interfering with the census. We started with the census after sunset, around 8:00 p.m., and continued with fieldwork until 02:00 a.m. During the census the playback method was used. For each individual that responded, we tried to determine and subsequently to map its exact location.

Results

Out of the total of 64 survey points used for the census, Stone-curlew presence was registered in 40 of them (Figure 2). There was no response at 24 points. Based on the proportion of points with response detected and the size of the sectors that could not be approached (private property, no access roads etc.) we conclude that up to 20 additional pairs could inhabit those areas. Thus, we estimate the breeding population of the Zeta plain at 40–60 pairs.

Discussion

The first dedicated census of Stone-curlew revealed an estimated 40–60 nesting pairs in the Zeta plain, which is significantly more than implied from a past estimate given for the central part of this area. In addition to the Zeta plain, Stone-curlew nests in Montenegro also in the Ulcinj area. According to the latest published data, there are 13–22 pairs nesting on the Ulcinj salina, and 6–7 pairs on the



Figure 2: Map of study area with registrations of Eurasian Stone-curlew *Burhinus oedicnemus* during the 2021 census depicted. Dots correspond to observations of individuals and do not necessarily indicate nesting pairs.

Slika 2: Zemljevid območja raziskave s prikazanimi registracijami prilivke *Burhinus oedicnemus* v popisu leta 2021. Pike ustrezajo opažanjem osebkov in ne označujejo nujno gnezdečih parov.

Velika plaža, Ada Bojana and the Bojana delta area (SACKL *et al.* 2020a, 2020b). The assessment based on our research indicates that the population in the Zeta plain constitutes at least 67% of the total national population of Stone-curlew (60–90 pairs), and therefore represents the major nesting area for this species in Montenegro. Furthermore, the Zeta plain population reaches about 3% of the total Balkan population (1200–1800 pairs) as based on the population estimates for 10 corresponding countries: Slovenia, Croatia, Bosnia and Herzegovina, Serbia, Kosovo, Montenegro, Albania, North Macedonia, Greece and Bulgaria (BIRDLIFE INTERNATIONAL 2017). Stone-curlew is recognized as one of the characteristic bird species associated with much threatened steppe grasslands of Europe and is thus of great conservation importance (GORIUP & BATTEN 1990).

Until the 1960s, before the "Plantaže 13. jul" company was founded, the study area certainly held a substantially larger number of Stone-curlew nesting pairs. In the period between 1977 and 1982, the area under vine and peach plantations increased to more than 23 km² which significantly reduced the extent of suitable habitat for the species (13. JUL – PLANTAŽE 2025). Apart from plantations, large parts of the steppe habitat are lost due to improperly planned expansion of the city suburbs and industrial zones. Additional pressures acting on Stone-curlews are caused by illegal waste disposal sites and constructions, further limiting the available nesting and foraging areas.

Further fieldwork for the purpose of confirming new Stone-curlew nesting territories in the parts of the Zeta Plain that remained unsurveyed in our study for the reasons specified above would

improve the assessment of the total breeding population and its distribution, necessary to inform the implementation of additional measures for the conservation of this threatened species and habitats of conservation importance in the entire area of the Zeta plain, facing many ongoing, severe pressures.

Parts of the Zeta Plain area legitimately deserve to be protected, both at the national and international level, especially since it is the only area in Montenegro with such habitat. Certain parts have already been proposed as potential SPA area within the Natura 2000 network (RUBINIĆ *et al.* 2019). Based on findings of our survey of nesting Stone-curlews, we can confirm that the wider Zeta plain area fulfills the criteria to be included in the network of the protected areas mentioned.

Povzetek

Leta 2021 je bil na območju Zetske ravni (osrednja Črna gora) z metodo predvajanja posnetka oglašanja v obdobju od 16. do 25. 4. in od 29. 5. do 2. 6. opravljen popis prilivke *Burbinus oedicnemus*. Od skupno 64 popisnih točk je bila vrsta zabeležena na štiridesetih, velikost gnezdeče populacije pa ocenjena na 40–60 parov. Prvi sistematični popis prilivke je potrdil, da je območje raziskave najpomembnejše gnezditveno območje za prilivko v Črni gori, kjer gnezdi vsaj 67 % celotne nacionalne populacije.

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