

# Population size of the Bluethroat (*Cyanecula svecica*) in the lower course of Great Bačka Canal

Original Article

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## Abstract:

A census of the territorial males of the Bluethroat (*Cyanecula svecica*) was conducted in the year 2014 on the Great Bačka Canal and surrounding wetlands. A total of 32 territorial males were recorded on the total transect length of 67.9 km. Bluethroat population in the study area presents 12-20% of the total estimated population of this species in Serbia. A significant short-term threat recorded was surface water regime maintenance since the removal of vegetation during this activity led to the destruction of habitat in several potential Bluethroat territories.

## Key words:

breeding birds, habitat destruction, population density, wetland

## Apstrakt:

### Veličina populacije modrovoljke (*Cyanecula svecica*) u donjem toku Velikog bačkog kanala

Tokom 2014. godine sproveden je popis teritorijalnih mužjaka modrovoljke (*Cyanecula svecica*) na Velikom bačkom kanalu i okolnim vlažnim područjima. Ukupno je zabeleženo 34 teritorijalna mužjaka na pređenih 67.9 km transekata. Populacija modrovoljke zabeležena na ovom području predstavlja 11-19% celokupne procenjene populacije ove vrste u Srbiji. Kao značajan kratkoročni ugrožavajući činioc zabeleženo je održavanje kanalske mreže, pošto je uklanjanjem vegetacije tokom ove aktivnosti uništeno stanište na nekoliko mogućih teritorija modrovoljke.

## Ključne reči:

reproduktivno zrele ptice, uništavanje staništa, gustina populacije, vlažno

## Introduction

The Bluethroat (*Cyanecula svecica*) is a species of passerine bird belonging to the flycatcher family (Muscicapidae). Its breeding range covers a vast area from Western Europe across Northern Asia to the Western coast of Alaska (Cramp, 1988). The species prefers ecotone habitats such as forest-tundra, mountain steps, subalpine bush, coasts of lakes, ponds, and rivers with willows, reed beds, and other emergent vegetation (Collar, 2019). It nests under the dense cover of mid-height vegetation with patches of bare ground (Collar, 2019). There are 11 subspecies recognized in the world of which two are recorded in Serbia. *Cyanecula svecica* is a sporadic migrant, while *C. cyanecula* is a regular breeder in the northern part of the country. The population breeding in Central Europe prefers habitats covered with reeds natural and man-made ditches, canals, sewage farms, and fishponds (Krüger, 1997; Orłowski & Sęk, 2005; Petersen et al., 2005; van Turnhout et al., 2010). The breeding period lasts from April to July,

after which it remains in the vicinity until August and even mid-September (Tomik, 2011). Wintering range covers the Mediterranean, Sub-Saharan Africa, and South Asia (Kováts, 2009; Collar, 2019). The breeding population in Serbia is estimated at 170-280 breeding pairs with a stable population trend (Puzović et al., 2015). Although the current population is considered stable, historical data from the 19<sup>th</sup> century suggest a severe reduction of the breeding range (Šćiban et al., 2015). In addition, we assume that Bluethroat suffered a severe decline in Serbia as a result of wetland drainage and vegetation succession as it happened in neighbouring countries (Grüll, 2001). Because threatening factors are still abundant, the species is considered Near Threatened in the Red Book of the Fauna of Serbia (Mirić et al., 2018).

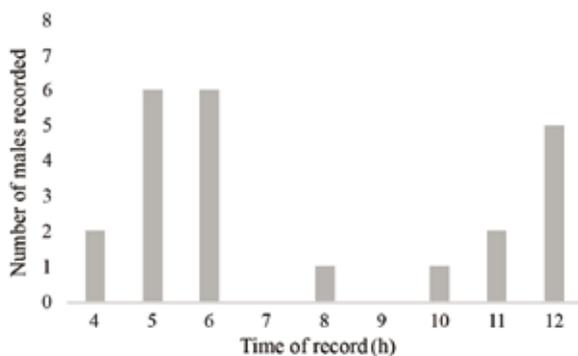
The main aim of this paper is to quantify the population size and density of Bluethroat in the lower course of the Great Bačka Canal with surrounding wetlands and to evaluate its significance in comparison with a total country population.



**Materials and Methods**

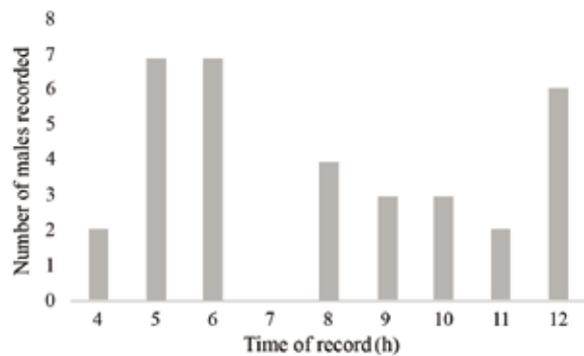
The study area is located within the Vojvodina province (N 45.54°, E 19.90°) and includes a section of the Great Bačka Canal that runs from Srbobran to Bačko Gradište, lower courses of Krivaja and Beljanska bara rivers which are medium-sized rivers with the slow flow (in the further text slow-flowing rivers). Adjacent 3-5 m wide and 1.5-3 m deep drainage ditches and surrounding ponds, that are in some cases completely overgrown with reed (ponds smaller than 10 ha) were part of the study area. Listed wetlands are predominantly surrounded by arable lands and have suffered significant changes after reclamation activity that has been undertaken from 19<sup>th</sup> to the mid-20<sup>th</sup> century (Tomić, 1974; Stojšić, 1977). The water level is maintained artificially with little fluctuation throughout the year. The width of the floodplain is 50 m on average. The majority of the banks are covered with reeds which form a belt from 1 to 130 m in width. The water surface is at 78 m a.s.l., whilst surrounding land rises to 85 m a.s.l. (Tomić, 1990). The dominant plant species is the common reed (*Phragmites australis*) which creates many communities with the other species such as cattail (*Typha sp.*), Grey willow (*Salix cinerea*), Crack willow (*Salix fragilis*), and White willow (*Salix alba*) (Lakušić et al., 2005; Dobretić & Stojšić, 2011).

The census of Bluethroats took place from the 10<sup>th</sup> to the 23<sup>rd</sup> of April 2014 on sunny days, without wind and rain, from 4 a.m. to 1 p.m. According to Merilä & Sorjonen (1994) the census should be ended before 10 a.m. because of a significant decrease in territorial male activity. In this study, since the level of Bluethroat activity remained stable well after 8 a.m., census lasted until 1 p.m. (Fig. 1, Fig. 2). A total transect length of 67.9 km was covered, of which: 19.8 km along Great Bačka Canal, 16.3 km along Beljanska bara river, 9.6 km along Krivaja river, 13.3 km along ponds and 8.9 km along drainage ditches.



**Fig. 1.** Time of song/song flight recorded without song playback

Sampling was undertaken based on the line transects with the stop points and the use of male call tape lure. Along each transect, every 300 m, Bluethroat song was played two times for 1 minute followed by 1 minute pause for listening after every song playback. Distance between count points in this census was increased compared to 200 m that Sorjonen & Merilä (2000) and Peris & Mendes (2010) propose in order to reduce the chance of double counting. Also, the terrain is deforested and flat, thus there are no obstacles for sound to spread. Every male recorded singing or in display flight, which stands for possible and probable breeding in



**Fig. 2.** Time of every song/song flight recorded

European breeding bird atlas methodology (EBCC 2015), is considered territorial.

Area of suitable habitat, used to calculate Bluethroat density, includes reed bed surface around surveyed water bodies, within a distance belt of 60 m from transects. The detection rate of Bluethroats diminishes dramatically when they are more than 60 meters away from the observer (Musseau & Beslic, 2018), hence this distance is chosen. Habitat surface was calculated using Google Earth Pro and ArcMap 10.8 software and in total it amounts to 171.88 ha, of which: 111.04 ha around slow-flowing rivers, 44.34 ha on ponds, and 16.5 ha along drainage ditches. Bluethroat density was estimated by dividing the number of territorial males by the area of suitable habitat. Google Earth Pro was also used to calculate reed bed width and to digitalize the location of recorded birds. ArcMap 10.8 was used for map production.

**Results**

During the study period 32 territorial males were recorded (Fig. 3). Out of this number 18 males were counted around slow-flowing rivers, 9 were situated on ponds and 5 of them were in drainage ditches. The average Bluethroat density is 1.86/10 ha. Separately for each habitat type, Bluethroat

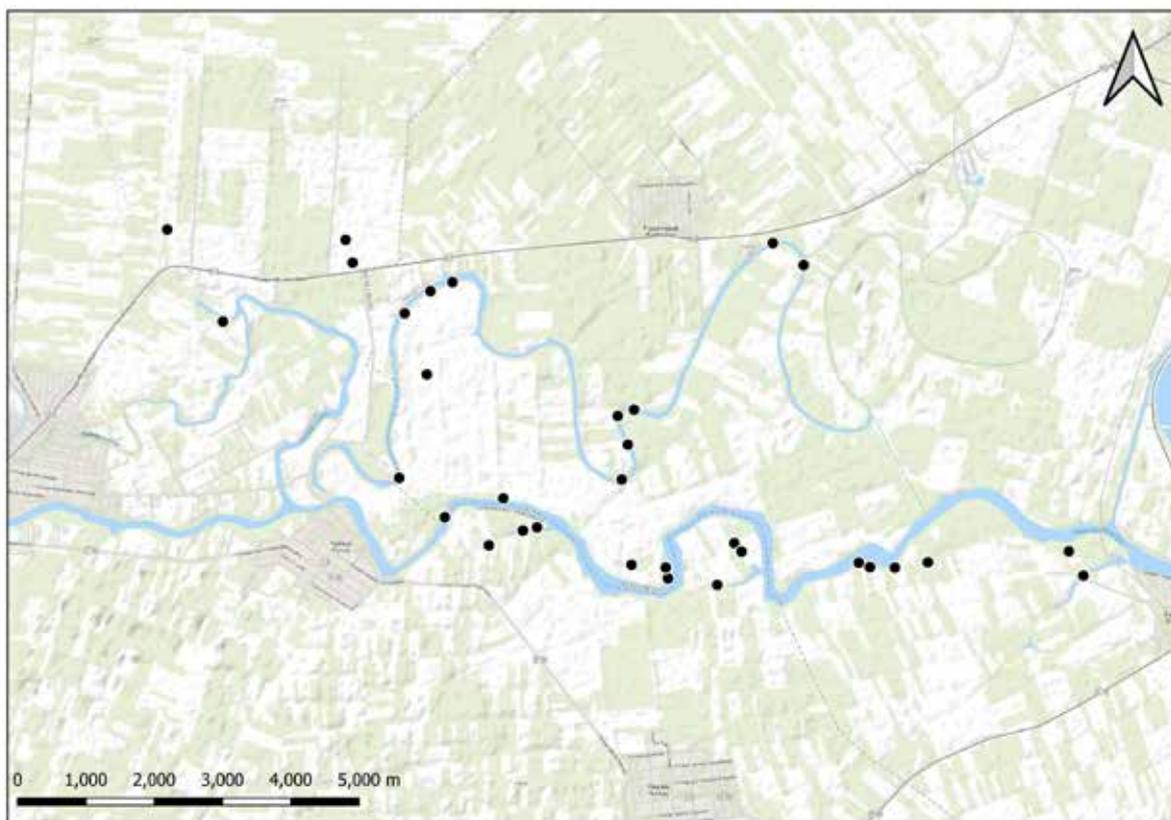
densities are the following: 1.62/10 ha for slow-flowing rivers, 2.03/10 ha for ponds and 3.03/10 ha for drainage ditches.

## Discussion

If we compare the number of territorial males registered in this study ( $N = 32$ ) with Puzović et al. (2015) population estimate for Bluethroat in Serbia, we can say it represents 11-19% of the total population of the country. Number of males registered in study area is minimal, as it is known that Bluethroat males significantly reduce their response to a tape lure after acquiring a mate (Sorjonen & Merilä, 2000) and since they have an evident habit of discretion if observer is too close to it (Musseau & Beslic, 2018).

drainage ditches. When we consider that the province of Vojvodina has over 20,000 km of drainage ditches (Vranešević, 2015), and we multiply it by the 5 males found on 8.9 km of the same habitat in this study, we get an estimate of over 11,000 males just on drainage ditches. Unfortunately, there is no available data from other parts of the country, so this estimate should be taken with reserve.

A few conspicuous but under-researched habitat-related occurrences were also noticed. On territories of 18 Bluethroat males some amount of burnt reed was registered. Some reed beds were reduced to only a few m<sup>2</sup> which males used for perch and shelter. A similar case was recorded in Poland where the fire occurred during the breeding season, but it did not chase birds away from their territories (Orłowski &



**Fig. 3.** Study area with potential Bluethroat territories

However, the estimate given by Puzović et al. (2015) was based on sporadic findings from large wetlands (e.g. Kormanjoš, 1989; Gergelj et al., 2000; Žuljević & Đapić, 2002; Vig et al., 2009; Radišić & Tucakov, 2010; Tucakov, 2011; Vig et al., 2012) without any systematic research. This study indicates that small wetlands such as drainage ditches and ponds are significant for this species. This is also shown in the research performed in Lower Saxony (Krüger, 2002), in which around 50% of territories are found on

Şek, 2005). Also, 24 Bluethroat males were recorded in habitats with the one-year-old reed, which is not in line with the findings of Vadász and Csörgő (2009) who assumed that such habitat is deprived of species diversity and abundance.

It is worth to mention that in the years following this study several cases of Bluethroat habitat destruction were recorded in study area. On seven locations where Bluethroats were recorded, habitats were destroyed, in some cases even during the breed-

ing season. Habitat destruction is the consequence of surface water regime maintenance, such as drainage ditch maintenance and reed bed removal. This problem was recorded earlier in the vicinity of the study area, where two males lost their territories because of drainage ditch maintenance (Šćiban, 2004). With this in mind, drainage ditches can be considered ecological traps for Bluethroat. Besides the aforementioned problem, additional threats for Bluethroat in the entirety of its range in Serbia and in Central Europe are e.g., long-term water level decrease, vegetation succession, reduction of wetlands, and possible predation pressure (Grüll, 2001; Vadász et al., 2011; Čížková et al., 2013). These threats have the greatest impact on the birds that live in the habitats surveyed in this study, such as ponds, so developing national conservation plans for them could be important for Bluethroat conservation in Serbia.

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