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DECLINE IN THE NUMBER OF BREEDING PAIRS OF BARN SWALLOWS *Hirundo rustica* IN MOKRICE, NORTHWESTERN CROATIA

Pad brojnosti gnijezdećih parova lastavica Hirundo rustica u Mokricama, sjeverozapadna Hrvatska

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ABSTRACT

The Barn Swallow *Hirundo rustica* is a small, insectivorous, monogamous, long-distance migratory bird and a common breeding species in Croatia. A substantial decline in population size has been recorded across Europe over recent decades in many farmland bird species, including the Barn Swallow. A census of active nests was conducted in the village of Mokrice (north-western Croatia) in 1974 and again in 2025. In 1974, I recorded 417 breeding pairs during the first breeding attempt, whereas in 2025 only 35 breeding pairs were recorded. The population in 2025 was 11.9 times smaller than in 1974, representing a decline of 91.6%.

A substantial decline in the populations of many farmland bird species, including the Barn Swallow, has been documented across Europe over recent decades (e.g. Rigal *et al.* 2023). The Barn Swallow is a typical long-distance migratory species exposed to numerous risk factors associated with population decline (Ambrosini *et al.* 2012). The decline in Barn Swallow numbers has been linked to the rapid transition from traditional farming practices to intensive agricultural systems (e.g. Musitelli *et al.* 2016), the reduction in livestock numbers on farms, resulting in lower food availability for this insectivorous species (e.g. Grüebler *et al.* 2010), changes in environmental conditions at African wintering grounds and migratory stopover sites (e.g. Sanderson *et al.* 2006, Zwarts *et al.* 2009), the dramatic decline in insect biomass caused by agricultural intensification (Hallmann *et al.* 2017), as well as other biotic and abiotic factors. The Barn Swallow *Hirundo rustica* is a small, insectivorous, socially monogamous

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bird and a common breeding species in north-western Croatia (Dolenec 2002, Dolenec 2003, Dolenec 2013).

A census of active nests was conducted in the village of Mokrice (6.4 km², 45°98′60″–46°00′75″ N; 15°87′80″–15°9′20″ E; altitude 135–163 m above sea level) in 1974 and again in 2025. In 1974, active nests were recorded during the first breeding attempt in cattle sheds, drying barns and hay barns, provided that they contained either eggs or nestlings. For comparative purposes, the same methodology for recording breeding pairs was applied in 2025. During the first breeding attempt, 417 breeding pairs were recorded in 1974, compared with only 35 pairs in 2025. As the surveys were conducted at the same site, using the same methodology and with equivalent sampling effort, the difference was analysed using an exact Poisson test for comparing rates. The results showed that abundance in 2025 was significantly lower than in 1974 (rate ratio = 11.9; $p < 0.001$). Thus, the population in 2025 was 11.9 times smaller than in 1974, representing an overall decline of 91.6%. It is noteworthy that during the same 51-year period the number of cattle in the village of Mokrice declined dramatically, from more than 300 head in 1974 (typically one to three cattle per farm) to only 10 cows in 2025. Furthermore, livestock housed indoors generate heat, and several studies have demonstrated higher breeding productivity of Barn Swallows in cattle sheds where livestock are present (e.g. Grüebler *et al.* 2010). More generally, insectivorous farmland and grassland bird species have experienced much steeper population declines across Europe in recent decades than omnivorous bird species (Bowler *et al.* 2019). In the village of Mokrice, the number of cattle sheds has not declined substantially; rather, most of them have simply remained empty. Hence, the observed decline was not caused by the lack of potential nest sites. It is therefore evident that the conservation of long-distance migratory Barn Swallows has become an increasingly complex challenge, requiring multidisciplinary approaches to identify effective conservation solutions.

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SAŽETAK

Lastavica *Hirundo rustica* mala je, kukcojedna, monogamna dalekoselidbena ptica i obična gnjezdarica na području Hrvatske. Kod mnogih vrsta ptica poljoprivrednih površina, uključujući i lastavicu, zabilježen je značajan pad veličine populacija posljednjih desetljeća diljem Europe. Cenzus aktivnih gnijezda obavljen je na području sela Mokrice (sjeverozapadna Hrvatska) 1974. i 2025. godine. Godine 1974. zabilježio sam 417 parova tijekom prvog gniježđenja, a 2025. godine 35 parova. Brojnost 2025. godine bila je 11,9 puta manja nego 1974. godine (smanjena za 91,6 %).