

Population Density, Habitat Preferences and Nest Predation of the River Warbler (*Locustella fluviatilis*) in the Donau-Auen National Park, Eastern Austria

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Abstract

The floodplain forest in the Donau-Auen National Park has been used for forestry and agriculture for centuries. These utilizations and several river regulation measures cause dramatic habitat changes. Nevertheless, the alluvial forests east of Vienna are still one of the most important breeding areas for the River Warbler in Austria and Central Europe. The aims of this study were to assess the present River Warbler density in the Donau-Auen National Park; to test if nest predation differs between randomly selected sites in the floodplain and River Warbler territories; and to evaluate important habitat requirements and food preferences for the River Warbler population in the alluvial forest east of Vienna. Our results show that the River Warbler density decreased over the last few decades. Published habitat requirements of the River Warbler are in line with the results of our study and in the Donau-Auen National Park River Warblers only colonize the regularly flooded forest area, where they prefer forest sites with a high herb layer and a high abundance of Hymenoptera. The artificial nest experiment showed a lower predation risk at River Warbler territories compared to control sites.

Keywords

ground breeding passerine, food availability, habitat requirements, artificial nests, dummy eggs, alluvial forest

Introduction

The River Warbler is a small socially monogamous passerine and a long-distance migrant wintering in South-East Africa (KENNERLEY & PEARSON 2010). In Austria the river warbler is highly dependent on alluvial forests. In human-dominated regions like Central Europe, floodplain forests belong to the most endangered ecosystems (BRINSON & MALVAREZ 2002; TOCKNER & STANFORD 2002). As known from other riverine floodplains, also the floodplains east of Vienna were used for agriculture and forestry for centuries and several river regulation measures lead to dramatic habitat changes and fragmentation of the remaining floodplain forests. These regulatory measures had and still have a strong impact on the characteristic periodic flooding events and resulted in far reaching changes of this ecosystem due to the reduced natural hydrological dynamics (ZULKA 1994; SCHRATT-EHRENDORFER 2000; RECKENDORFER et al. 2006).

Besides assessing the present River Warbler density in the Lower Austrian parts of the Donau-Auen National Park, this study aimed to evaluate the importance of published habitat requirements and food availability for River Warblers in the floodplain forest east of Vienna. Furthermore, we tested if nest predation differs between River Warbler territories and randomly selected sites in the floodplain.

Methods

The field work was conducted between April and August 2009. At the beginning of the breeding season River Warbler territories were mapped for a large part of the floodplain forests located north of the river Danube in the Donau-Auen National Park. Subsequently, different habitat variables like height of herb layer, number of trees, distance to next waterbody and food availability were measured or estimated for river warbler territories and randomly selected (control) sites. Food availability was quantified by standardized sweep netting in the herb layer. Potentially important prey organisms considered in this study were taxonomic groups such as Hymenoptera, Diptera, Arachnida and Pulmonata. For quantifying nest predation artificial nests with 4 dummy eggs, formed of the polymer clay "Fimo" (© Staedtler), were exposed in all breeding territories and at control sites for 13 days. This corresponds to the species' natural incubation period (GLUTZ VON PLOTZHEIM & BAUER 1991). Missing and/or damaged nests or dummy eggs were classified as evidence for nest predation.

Results and Discussion

Our data are supporting the assumed decline of River Warbler density since the 1980s in the Donau-Auen National Park (TEUFELBAUER & FRANK 2009). This is most likely linked to the loss of the formerly high hydrological dynamics and the associated transfer of former floodplain forests, dominated by flood-tolerant trees and nitrophilous understorey plants (e.g. stinging nettles), to forests of later successional stages. As a consequence,

bird assemblages of floodplain forests are progressively replaced by bird assemblages typical for hardwood forests (EICHELMANN 1994, TEUFELBAUER & FRANK 2009).

In the Donau-Auen National Park the River Warbler is only breeding in the river facing parts of alluvial forests which are not dammed by the flood protection dam. The differences in habitat variables between River Warbler territories and control sites correspond to the known habitat requirements documented in the literature.

Ants and other Hymenoptera, both representing potential prey, were significantly more abundant in River Warbler territories than at control sites. However, other taxonomic groups like Diptera, Hemiptera and Lepidoptera which are known as important food source of the River Warbler (e.g. INOSEMZEW 1963; MACKOWICZ 1989) did not show significant differences between the two groups of sites in our study.

Our results suggest that nest predation is an important factor driving the choice of nesting sites in the River Warbler. The lower risk of predation in territories compared to control sites could be caused by differences in herb layer density, which proved to be higher in territories. This can affect the probability of nest detection by predators (FILLIATER et al. 1994). The identification of nest predators was difficult because in most cases either the eggs from predated nests or the entire nests were missing. One reason for missing artificial nests could be the large number of wild boars (*Sus scrofa*) in our study area (own observation), which might find the nests by random when they are rummaging for food.

Conclusions

The decline of the River Warbler in the Donau-Auen National Park is most likely related to the shrinking of suitable habitats due to changes of the entire floodplain forest. Human activities may not only have influenced vegetation structure and food availability but also the risk of nest predation. We suppose that the main driver for all these changes in the entire floodplain forest ecosystem is the dramatically reduced hydrological dynamic.

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References

- BRINSON, M.M. & A.I. MALVAREZ 2002. Temperate freshwater wetlands: types, status, and threats. *Environmental Conservation* 29: 115–133.
- EICHELMANN, U. 1994. Vogelverbreitung und Hochwasserdynamik. *Wissenschaftliche Mitteilungen des Niederösterreichischen Landesmuseum* 8: 23–32.
- FILLIATER, T.S., BREITWISCH, R. & P.M. NEALEN 1994. Predation on Northern Cardinal nests – Does choice of nest site matter? *Condor* 96: 761–768.
- GLUTZ VON BLOTZHEIM, U.N. & U.K. BAUER 1991. *Handbuch der Vögel Mitteleuropas*, Band 12 (1). Wiesbaden.
- INOSEMZEW, A.A. 1963. Zur Ernährung nestjunger Heckenbraunellen und Schlagschwirle im Moskauer Gebiet. *Ornitologija* 6: 101–103.
- KENNERLEY, P. & D. PEARSON 2010. *Reed and Bush Warblers*. London.
- MACKOWICZ, R. 1989. Breeding biology of the River Warbler *Locustellafluviatilis* (Wolf, 1810) in north-eastern Poland. *Acta Zool. Cracov* 32: 331–437.
- RECKENDORFER, W., BARANYI, C. & A. FUNK 2006. Floodplain restoration by reinforcing hydrological connectivity: expected effects on aquatic mollusc communities. *Journal of Applied Ecology* 43: 474–484.
- SCHRATT-EHRENDORFER, L. 2000. Entwicklungstendenzen von Vegetationseinheiten an Sonderstandorten der Donauauen bei Wien (Untere Lobau). *Verhandlungen der Zoologisch-Botanischen Gesellschaft Österreich* 137: 137–145.
- TEUFELBAUER, N. & G. FRANK 2009. Donauauen östlich von Wien. In: Dvorak M. & H.M. Berg (eds.), *Important Bird Areas: Die wichtigsten Gebiete für den Vogelschutz in Österreich*: 130–147. Wien.
- TOCKNER, K. & J.A. STANFORD 2002. Riverine flood plains: present state and future trends. *Environmental Conservation* 29: 308–330.
- ZULKA, K.P. 1994. Natürliche Hochwasserdynamik als Voraussetzung für das Vorkommen seltener Laufkäferarten (Coleoptera, Carabidae). *Wissenschaftliche Mitteilungen des Niederösterreichischen Landesmuseum* 8: 203–215.

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