

Dynamics of the Abundance of Bird Species during Succession of Oak Forests in Southwestern Belarus

I. V. Abramova*

Pushkin Brest State University, Brest, 224016 Belarus

*e-mail: iva.abramova@gmail.com

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Abstract—During the period of secondary succession of oak forests in southwestern Belarus, six stages of vegetation development (from fresh cutting to mature 120–150 years old forest) were identified. Simultaneously with a change in the vegetation, the succession of bird population also proceeds, which is typical for bird communities and other formations in different regions of Europe and Asia. During the succession of oak forests, the species richness of birds increases from 10 to 58 species and the total abundance, from 153.2 to 1128.9 individuals/km². The abundance of species (individuals/km²) and interannual variability during 11 seasons were established. The coefficient of variation (CV) is the highest (50.0–116.0%) in species the abundance of which does not exceed 5.0 individuals/km². The average abundance of species varies significantly, for example, at the stage of age 120–150 years (from 1.0 (goshawk) to 275.0 individuals/km² (chaffinch)). In all six succession stages, nesting migratory birds dominate, which account for 80.0% of species at the first stage to 53.4% at the fifth and sixth stages. Near and distant migrants form the basis of the bird population at all stages; as a rule, sedentary species are not numerous and their involvement in the total abundance does not exceed 17.3%. At the initial stages of succession, the bird community is formed by members of European, Palearctic, European–Turkestan, and Afro-Eurasian types of fauna. At the stages of 80–100 and 120–150 years, the basis of the bird community is formed by the members of the Palearctic (50% of species, 34.5–35.2% of the total abundance) and European types of fauna (22.4 and 48.0–49.3, respectively).

Keywords: oak forests, bird community, species richness, population density, stability

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INTRODUCTION

Significant spatial and temporal changes within the landscape are typical for the disturbed forest ecosystems. A change in the population of birds in the forests is caused by the successive succession of forest plant communities, the main reason for which is currently human activity (forest management, melioration of agricultural land adjacent to the forests) (Inozemtsev, 1987; Abramova, 2007). Clear cuttings over large areas lead to fundamental changes in the habitats of birds, as a result of which dendrophilic species (for example, hazel grouse (*Tetrastes bonasia*), woodpeckers, thrushes, and tits) disappear from this territory; they are replaced by birds of open spaces and forest edges. Further changes in the structure of bird communities are primarily determined by the change in the life forms of edificatory plants. The bird species depending on the phytocenoses at different stages of secondary succession are strongly affected by dynamic environmental factors. As vegetation develops and the spatial structure of phytocenoses changes, the number of individual bird species changes significantly.

Changes in the bird population in the process of restorative succession of forest ecosystems in the tem-

perate zone of the Northern Hemisphere have been discussed by a number of authors (Danilov, 1958; Novikov, 1959; Vladyshevskii, 1980; Boguyskii and Bednorz, 1982; Inozemtsev, 1987; Preobrazhenskaya and Borisov, 1987; Głowaciński, 1975, 1979, 1981) and indicate an increase in the diversity of birds parallel to a change of phytocenoses. However, these works, as a rule, contain no information about the number of seasons and counts carried out when studying the successions, and the count data are not statistically processed. The bird communities that change during the succession of forest ecosystems differ in different regions; therefore, this topic requires further study.

The aim of this work was to study the interannual dynamics of the abundance of bird species, estimate the variability of populations of individual species during the restorative succession of oak forests, and detect the peculiarities of the structure of bird communities forming at different stages of succession.

MATERIALS AND METHODS

The collection of materials for this work was carried out in 1995–2017 in southwestern Belarus (Brest,