

Nest-site selection and nest design of Iberian bullfinches *Pyrrhula pyrrhula iberiae* in northwestern Spain

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Abstract

Nest-habitat selection and nest design in a Eurasian bullfinch population in the Iberian Peninsula are thoroughly addressed in this study for the first time. Hedgerows and meadows were found around all of the nests and most of them were supported by hedgerows, so bullfinches consistently used the general woody vegetation available as reproduction habitat and site. Also, poplar plantations appeared preferentially in the immediate surroundings of the nests. Partly reflecting these results, bullfinches chose zones with greater shrub and tree cover than that available. Bullfinches placed their nests on a wide variety of plant species, but showed predilection for thorny species. Overall mean height of nests above the ground was 1.43 m and large-sized shrubs/trees were preferred. The most predominant bullfinch nest orientations were S, E and centered, which arguably provided thermal benefits and protected from severe weather. In general, there were no significant temporal variations in nest-site selection. With the exception of thorny support and favourable orientation, acting jointly, there was no significant association between nest-site characteristics and nesting success, presumably because many nests were already located in the most advantageous places at each time, and because despite this, predation pressure was high. Nest external dimensions were relatively variable, whereas internal width was the least variable nest dimension. No significant monthly or interannual variations in nest weight were observed. Larger nests did not hold larger clutches. Successful nests were larger than unsuccessful ones. The bullfinch nests were of simple construction, with two clearly different regions, the outer nest and the internal cup, with no significant temporal variations in the weight of either. The outer, structural nest consisted mainly of twigs, whereas roots and herbaceous shoots were the highest fractions lining the cup. Hair was the only animal-derived material used by bullfinches.

Keywords

Building materials, Fringillidae, nest location, nest size, nesting success, vegetation structure

Introduction

Bird nests are multifunctional structures relating principally to the creation of an optimum microclimate and a safe place for parents and offspring, but also to sexual selection, through habitat choice and structural design (e.g. size, building materials).^{1–3} With regard to the analysis of nest-habitat preferences, it is important to consider several spatial and temporal scales in which birds respond to different changing factors.^{4–7} For many typical passerine bird species in forested areas, farmlands with hedgerows provide key habitats and resources, or at least are important in movement between woods, during the breeding season.^{8–11} Unfortunately, hedgerows have declined sharply over recent decades in Europe due to the intensification of agricultural practices.¹² On the other hand, only recently has the design of bird nests –for example, intraspecific variations or biomechanical properties of different materials in different nest parts– begun to be examined in depth, with less being known about open-cup nests built by females.^{2,3,13–15} Availability of nest materials is included amongst the most

important factors in avian breeding-site selection, although it does not seem to be limiting for most species.^{2,4}

In passerine birds in general, especially those with a long breeding season, considerable monthly variations have been observed in nesting habitat and nesting site (e.g. nest height from the ground), linked to environmental changes (e.g. in availability of optimal habitat or weather conditions).^{4,16,17} It is common for birds, including small passerines nesting in shrubs and trees, to prefer to place

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