
Large microclimatic variations do not affect breeding success in artificial nests occupied by an obligate secondary cavity breeder

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Abstract

Recent development of environmental impact assessment policy has led to the multiplication of mitigation processes such as biodiversity offsetting. These are largely based on direct human interventions, which raise ethical questions. Furthermore, created or restored habitats may at first appear identical to good natural habitats but might however be of lesser quality. They may lead to low survival or reproduction of individuals that occupy them and thus be so-called ecological traps. This risk is particularly strong in case of the use of artificial tools such as nest boxes for vertebrates.

In this study, we tested the hypothesis that artificial nest boxes might be ecological traps. To do that, we compared reproductive parameters of European rollers *Coracias garrulus* in natural cavities (n=22) versus nest boxes (n=17) by monitoring its reproduction in each nest from egg laying stage to chick fledging. We also compared microclimate conditions in cavities (n=41) and nest boxes (n=33), using temperature and humidity loggers placed inside the nest as well as temperature loggers placed outside each nest. We then explored potential effects of microclimate on breeding parameters.

We found strong microclimate differences between natural and artificial nests, with cavities buffering temperature much better, and having a much higher humidity rate. However, we found no significant differences in breeding parameters between rollers occupying both nest types. Our results on breeding parameters suggest that, despite providing microclimate conditions very different from natural cavities, artificial nest boxes are not ecological traps for European rollers in South of France. However, other fitness parameters such as chick development should be explored in order to conclude for the innocuousness of artificial nests for rollers. The low temperature buffering capacity of nest boxes suggests that, – in Mediterranean regions – they should be placed in shaded conditions and built using materials with good insulation properties.

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