



Mismatches between habitat preferences and risk avoidance for birds in intensive Mediterranean farmland

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Received: 27 February 2018 / Revised: 26 June 2018 / Accepted: 5 July 2018 / Published online: 21 July 2018
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Abstract

Land use intensification may create habitats that organisms perceive as suitable, but where reproduction or survival is insufficient to maintain self-sustaining populations. Such conditions may qualify as ecological traps, but their existence is often hard to prove. Here, we provide a practical framework to evaluate a potential ecological trap resulting from mismatch between habitat preferences and predation risk, focusing on ground-nesting farmland birds of conservation concern. The framework is based on species-specific associations with safe or unsafe habitat types (i.e. field and landscape types with high or low nest survival), and the occurrence of risk avoidance (i.e. negative responses to predator abundances or to nest failure rates after controlling for habitat effects). Bird densities were far more influenced by field characteristics than landscape context. Corn bunting and fan-tailed warbler were associated with tall swards (safe habitats), and did not show risk avoidance. Tawny pipit and *Galerida* larks were associated with short swards (unsafe habitats), with the former avoiding fields with high nest predation rates, and the later avoiding high mongoose abundances. Short-toed lark was associated with fields with short swards and low nest trampling rates. Results suggest that short-toed lark may be the most vulnerable to ecological trapping, because it nests on unsafe habitats and did not show predation risk avoidance. Our approach provides a practical first step to infer vulnerability to a potential ecological trap, though further research is needed to confirm this effect. Management actions increasing nest survival in short sward fields will likely favour grassland bird conservation in intensive Mediterranean farmland.

Keywords Corn bunting · Conservation management · Ecological trap · Fan-tailed warbler · *Galerida* larks · Grassland birds · Nest predation · Short-toed lark · Tawny pipit

Introduction

Land use change in Mediterranean agroecosystems, either associated with the conversion of semi-natural habitats to

intensive agriculture, or the abandonment of otherwise cultivated fields, has resulted in considerable loss of farmland biodiversity (e.g. Reino et al. 2010b; Sirami et al. 2010; Nainggolan et al. 2012; Carmona et al. 2017; Santana et al.

Electronic supplementary material The online version of this article (<https://doi.org/10.1007/s10344-018-1207-9>) contains supplementary material, which is available to authorized users.

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