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Could meadow passerine distribution within a grassland system be influenced by spatial variation in the mowing schedule?

Joël BROYER*, Laurence CURTET & Romain CHAZAL

Office National de la Chasse et de la Faune Sauvage, Direction de la Recherche et de l'Expertise, Montfort, 01330 Birieux, FRANCE
*Corresponding author, e-mail: joel.broyer@oncfs.gouv.fr

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Abstract. This study explored meadow passerine capacity to select habitat conditions likely to preserve their breeding success. We observed the variation in bird abundance, assessed with the point count method, over a 25-year period (1993–2017) within two phytosociological facies of the hay-meadows in the lower Saône Valley (3.000 ha), eastern France: a meso-hygrophilic facies characterized by increasingly early mowing, and a hygrophilic facies mown later, with thereby a lower risk of nesting failure. At the beginning of the monitoring (1993–2001), birds were evenly distributed within the two facies. Later on, as more than 90% of meso-hygrophilic meadows were already mown by July 1, birds became more abundant in the hygrophilic facies. This trend was observed in each of the two most abundant species, the Whinchat *Saxicola rubetra* and the Corn Bunting *Emberiza calandra*. In two hygrophilic areas (55 and 76 ha) and two meso-hygrophilic areas (49 and 116 ha), passerine territories were mapped in 2011 with the territory mapping method and invertebrates were captured weekly on transects with colour plates and Barber traps. In spite of substantially higher invertebrate abundance, passerine territory density was lower in meso-hygrophilic study sites (6.4 territories/ 10 ha vs. 10.6). Within each study site however, captured invertebrates were more abundant in the areas selected by territorial birds. In fact, bird abundance estimated from point counts in 2011 varied negatively with the percentage mown by July 1 within a 200m-radius in 2010. This apparently adaptive behaviour leading to a selection of later mown fields seemed to be successful since bird abundance increased until 2010. However, after a succession of extreme climatic events (droughts, late floods), passerine abundance declined thereafter in both facies.

Key words: adaptive habitat selection, invertebrate abundance, late mowing, meadow passerines

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INTRODUCTION

Evolution within agricultural ecosystems provides several examples of mismatch between the cues used by birds for habitat selection and the possibility left to breed successfully (Gilroy & Sutherland 2007). Population dynamics may be dramatically affected by changes in landscape or in farming practices that occur so quickly that birds no longer make optimal decisions (Remeš 2000, Hollander et al. 2011). This phenomenon has been mainly detected in open habitats: arable fields or meadows (Suvorov & Svobodova 2012). Natal and breeding philopatry in many species may lead individuals to return more often to or close to the same territories, even to the same nest sites, after succeeding in previous nesting attempts (Gavin & Bollinger 1988, Haas 1998, Gauthier 1990, Simek 2001, Fowler 2005). Such behaviour could help them to avoid unfavourable breeding places (Schmidt 2004). In North America, grassland birds however may prefer to nest in areas where arthropod-prey abundance is higher, even though nest success is substantially lower (Shochat et al. 2005). In Kazakhstan, population densities of the Black Lark *Melanocorypha yeltoniensis* are three times higher in abandoned cropland where insects are more abundant, compared to those in natural steppe where nest survival rates are significantly higher (Lameris et al. 2016). In Poland, the Quail *Coturnix coturnix* is more likely to occur in areas with crop growth improved by the input of mineral fertilizers. Indeed, the use of fertilizers enhances the quality of seeds which form the basic component of granivorous birds' diet. On the other hand, the luxuriant tall crops are harvested too early, thus inhibiting chick survival (Kosicki et al. 2014). In