Corn bunting's (*Emberiza calandra*) local dialect and song-sharing patterns in intensive arable landscapes

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Introduction

Bioacoustics monitoring has become a widespread tool in wildlife conservation, which provides complementary information to genetic analyses. Habitat fragmentation and degradation due to anthropogenic factors are now well-known to have also detrimental effects on the cultural integrity of wild species populations, in particular on bird's song. The objectives of this study are to analyse the microgeographic song variation and song dissimilarity within groups of close territorial males, in a threatened farmland bird species in Europe, the corn bunting.

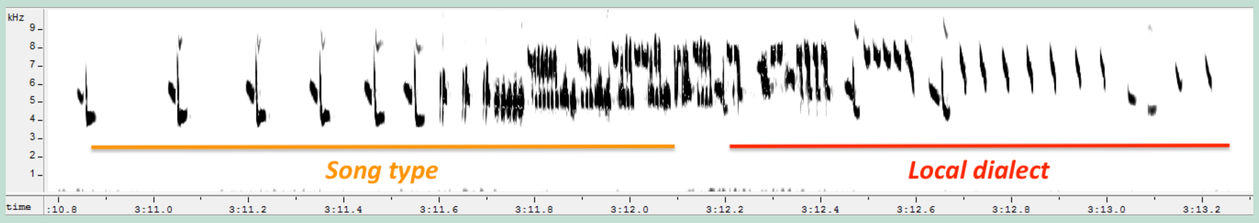

***Fig.1: S**onagram of a corn bunting's strophe in Belgium. Dialect can be identified in the second part of the strophe, and the song type is identified in the first part.*

Material and Methods

Corn bunting has a local dialect pattern which consists in a set of small groups of males all singing the same dialect. Those groups are spatially close to each other but the song variations are distinct and boundaries between them are clear. Each male has a song repertoire of usually one dialect and two or three song types (**Fig.1**).

Recording of territorial males were made during the breeding season in three regions dominated by arable lands. Conservation status of the corn bunting and regional farming intensities were different: Belgium (2016; threatened population in intensive arable lands), North of France (2017; declining population in intensive arable lands) and West of Poland (2018; good population in extensive arable lands). Groups were spatially delimitated using two spatial distances (600m and 1000m), which were used as maximum distance between two males to belong to the same group. Within-group dissimilarity were measured with the Bray-Curtis index and compared with GLMM analysis.

Results and discussion

- → Radius of 600m : Results support the hypothesis that local dialect is a density-dependant process. This pattern was observed only when corn buntings were abundant with high local densities.(**Fig.2**).
- → In intensive arable lands, we could observe clear disturbance and a progressive erosion of the local dialect pattern with the severity of the decline: classical pattern in Poland, patchy distribution in France but with almost all males within-group sharing the same local dialect, and patchy distribution and high within-group song dissimilarity in Belgium (**Fig.3**).
- → Radius of 1000m : Unsuitable habitat proportion seemed to promote song variation diversity (local dialect and song type), as local dialect's boundaries fit well with habitat discontinuities.

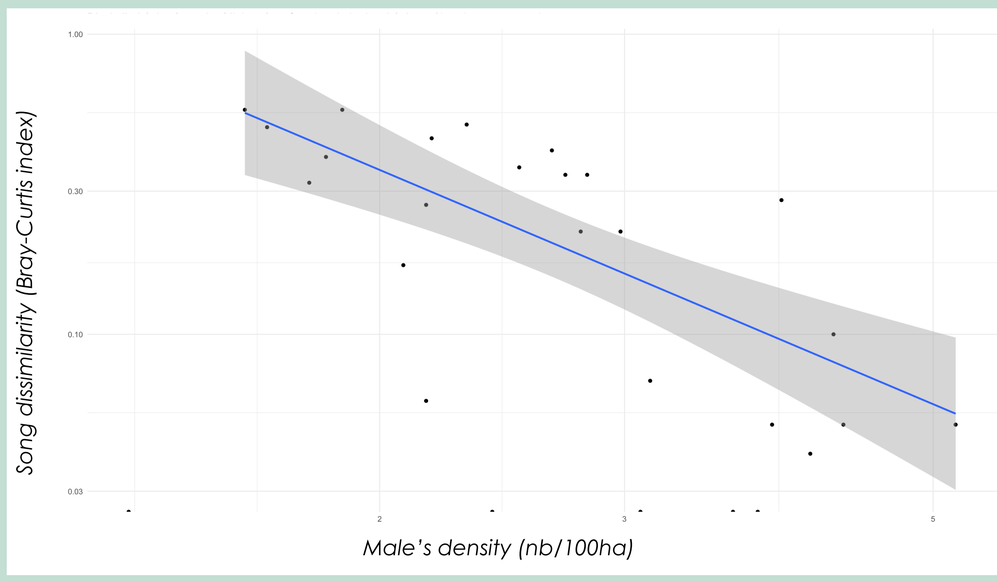

***Fig.2:** Linear regression between within-group repertoire dissimilarity and male's density (local dialect : adjusted R-squared: 0.28 (p<0.01))*

Increasing farming intensity

Declining of the corn bunting abundance and local densities

Erosion of local dialect pattern

Increasing within-group song dissimilarity

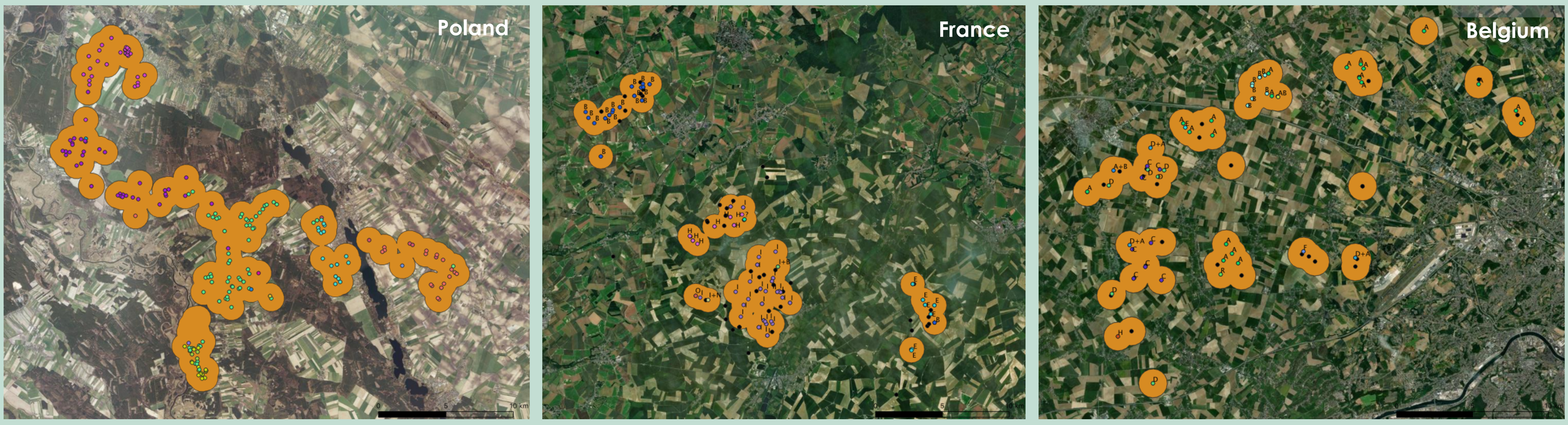

***Fig.3:** Map of the spatial distribution of local dialects in each of the three sampled regions. Each point represents a recording male and colours represents the local dialect identity (the set of colours are distinct in the three regions). Delimitated groups in orange are made within a radius a 600m between pairs of males. Each pair of males that are distant of max. 600m belonged to the same group.*