

Silvoarable Agroforestry to foster Swiss Agri-Environmental Objective birds

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Highlights

- Bird communities differ between young-silvoarable agroforestry and control sites
- Many Agri-Environmental Objective bird species benefit from young agroforestry
- They mainly benefit from the understorey vegetation strip

Introduction

Silvoarable agroforestry systems harbour the potential to promote both agricultural productivity through crop production and biodiversity through increased structure and added habitats for wild species, including birds. In Switzerland, agriculture has the responsibility of promoting particular species, which are bound to agroecosystems (AEO-Species: Agriculture-related environmental objectives). Silvoarable Agroforestry Systems (SAS) can contribute to increase bird diversity in the agricultural landscape and foster specialized communities, which benefit from the presence of trees.

Method

The Swiss Agro4estrie project comprehends around 100 farmers, which established new agroforestry systems between 2020-2025. In this context, we selected 17 silvoarable systems and 17 control sites (in the same landscape as the SAS) without trees, but with similar management and crops. We recorded bird songs using AudioMoth recording devices. They were active for two periods of 10 days (April and Mai) and recorder every day from sunrise on for 2 hours. The presence of 20 AEO-Species in SAS and in control plots was modeled using single species occupancy models from the R package *unmarked*. We included and analyzed the effect of covariables like amount of semi-natural habitats in the landscape and management (organic or conventional). Community compositions were analysed using nonparametric multidimensional scaling (nMDS) with the R package *vegan*.

Results

The results of the nMDS show that bird communities differ between young agroforestry plots and control plots. Occupancy models indicate that SAS mostly have positive effects or tend to foster the presence of AEO-species. While there were also species showing no effect or negative trends, the majority of the modeled AEO-species (12) were positively influenced by SAS. Especially species which are related to structured landscapes profit more from SAS, while species preferring open landscapes seem to react less positively with the presence of trees (Figure 1). Based on our results, we can conclude that 4-year old silvoarable agroforestry systems already affect local bird diversity, and that the majority of AEO bird species benefits from agroforestry, underlining the potential of SAS to foster bird diversity in agroecosystems.

Figure

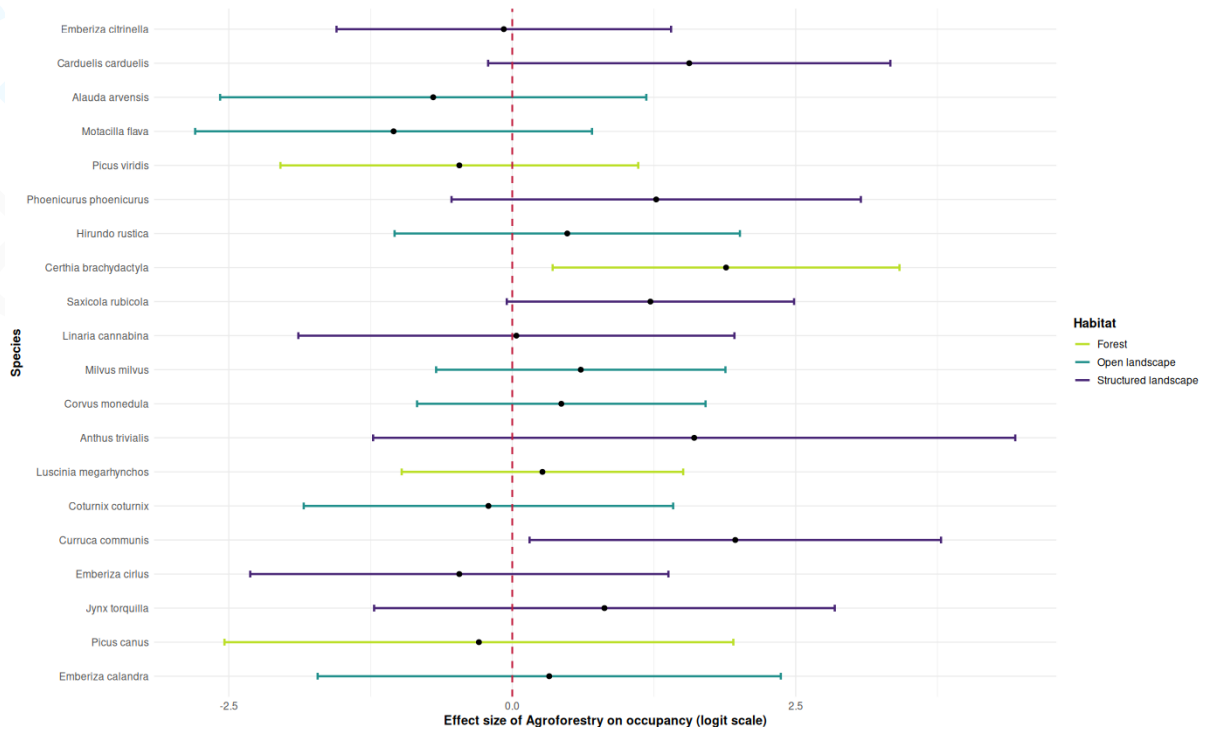


Figure 1: Effect size of Agroforestry on occupancy as compared to Control plots for the 20 bird species.

Keywords

Biodiversity, priority birds, bioacoustics