Birds in farmland habitats exhibit increased population variability beyond the impact of species population trends

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Résumé

The study of ecological stability, i.e. the ability of an ecological system to maintain itself and its processes in the face of perturbations, is increasingly demonstrating the critical contribution of biodiversity to the stabilization of ecosystem processes. However, at a local scale, recent anthropogenic pressures do not directly translate to biodiversity declines but rather to species population abundance trends, where many species decline in abundance while fewer species undergo population increases. The influence of these trends on the ability for populations to resist and recover from short-lived disturbances, so-called pulses, is not yet well known.

We analyzed community time series from protocoled citizen science bird surveys in France to investigate the drivers of population variability in natural communities. For a given local species abundance time series, we separated its temporal population trend from its variability around the trend and compared them with each other across bird habitats. We find that populations in farmland environments are more variable than in woodlands after accounting for population trends, while a possible link between detrended variability and the magnitude of the original trend was less clear.

Habitat-specific disturbance regimes in farmland areas are thus associated with higher detrended population variability, hinting that sensibility to these habitats' pressures co-occurs with sensibility to pulse perturbations. Our results contribute to paving the way for more explicit consideration of population trends in ecological stability analyses, highlighting that in real-world communities, pulse perturbations are applied on out-of-equilibrium population trajectories.

Mots-Clés: stability, population trends, land use, natural communities, bird conservation

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