Using capture-recapture data gathered through participatory monitoring of migratory birds at stop-over sites to inform habitat management: application to the endangered Aquatic Warbler

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Résumé

Using capture-recapture data gathered through participatory monitoring of migratory birds at stop-over sites to inform habitat management: application to the endangered Aquatic Warbler
Trans-Saharan migratory passerines are among the bird species most threatened by global changes. Stopover sites are crucial for their conservation, as they allow these birds to refuel. Refuelling (fattening) is mandatory for small birds to overcome travel over thousands of kilometres.

The *Acrocephalus* (wetland) warblers challenge traditional monitoring methods mainly because they are difficult to observe during migration. Participatory protocols involving capture and banding have been developed by the national platform in charge of bird capture-mark-recapture survey in France (CRBPO-MNHN) to monitor migration phenology and the duration of stopovers. Among these species, the Aquatic Warbler considered a vulnerable species by the IUCN red list, which faces significant conservation challenges, benefits from a dedicated, standardised monitoring protocol to monitor its postnuptial migration throughout France (ACROLA).

However, implementing these protocols in the field shows considerable variability in dates, intensity, and duration of monitoring. In the context of migration, an ephemeral phenomenon,

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this variability makes comparing stopover sites challenging.

Using a theoretical approach and simulating migratory passage and bird capture data, we propose statistical modelling of the migration phenomenon to assess an indicator of relative bird abundance on the stopover sites. Hence, this model, thanks to this indicator of local abundance, allows us to identify and rank the importance of different sites based on their role in the conservation of the Aquatic Warbler.

Applying this method to data from the Aquatic Warbler monitoring program has demonstrated the significance of standardised monitoring for species conservation. We produce an indicator of relative importance for each monitored stopover site in terms of local relative abundance that could be used to define site conservation priority. Uncertainty in the level of priority per site is also accounted for.
Innovative approaches are crucial for conserving migratory passerines in the face of global changes. This research underscores the need for standardised and rigorous methods, such as the one presented here, to understand better and protect critical stopover sites. These methods are essential for ensuring the survival of vulnerable species like the Aquatic Warbler. Furthermore, the presented method should also be easily generalised to other large-scale capture-mark-recapture surveys of migratory songbirds, further highlighting the importance of your work in this context.

Mots-Clés: Aquatic warbler, Bird migration, stopover, conservation