A preliminary comparison of two ready-to-use automated recognition software for Nocturnal Bird Migration (NOCMIG)

Laura Solé-Bujalance [a]	Robert Manzano [a]	Lluís Brotons [a]
Cristian Pérez-Granados [a]	Maguiña Ramilo-Henry [a]	Manuel B. Morales [b]
David González-del Portillo [b]	Rick Junker [c]	Gerard Bota [a]
Júlia Gómez-Catasús [b]	Simon Gillings [d]	

a Centre de Ciència i Tecnologia Forestal de Catalunya (CTFC)
b Universidad Autónoma de Madrid
c Aaaaaaaaaaaaaaa
d British Trust for Ornithology

Introduction

- ✓ Passive Acoustic Monitoring (PAM) opens the door for monitoring nocturnal bird migration (NOCMIG) at high temporal resolution.
- ✓ However, PAM generates extensive databases, requiring significant effort for analysis.
- ✓ Few algorithmic tools that can identify avian vocalizations are available for automatic data analysis. Two of these software programs are BirdNET and BTO's Acoustic Pipeline; the latter has a NOCMIG data analysis modality.
- ✓ This study provides the first comparative assessment between these two tools.

Objective

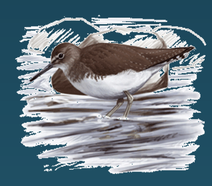
We aim to compare the performance of BirdNET and BTO's Acoustic Pipeline for monitoring two nocturnal migrant species.

- ✓ We estimated the precision and the confidence score (CS) threshold for considering only high-probability detections (50% probability) for each software and species.

Methods

Sampling: NOCMIG recording → 2,704.5 hours recorded during post-nuptial migration in Toledo, Spain

Automated detection → BirdNET; BTO's Acoustic Pipeline

Species selection →  

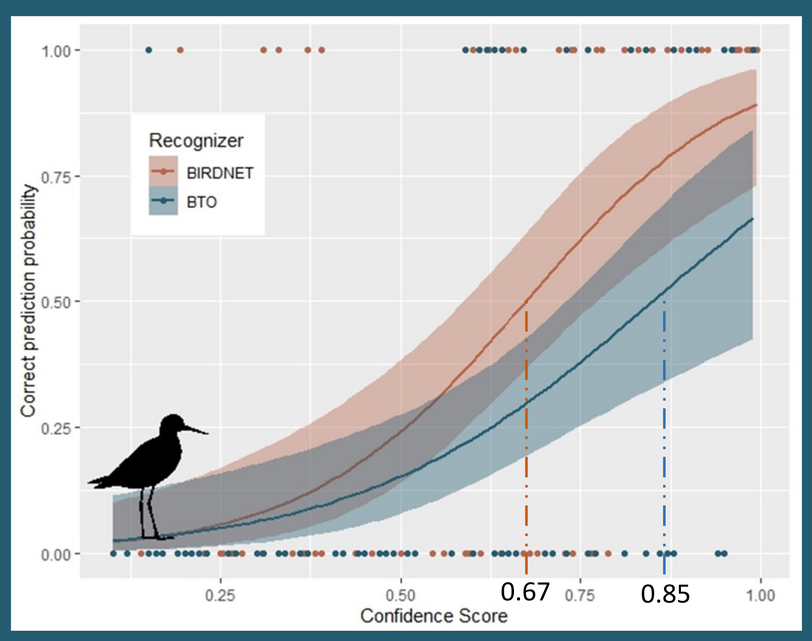
Manual validation → 90 predictions for each species and software (10 randomly chosen per 0.1 CS class)

Comparison between software → Precision (%) = $\frac{N\ true\ positives}{N\ true\ positives + N\ false\ positives}$; CS threshold

Results

- ✓ We found differences between software and species

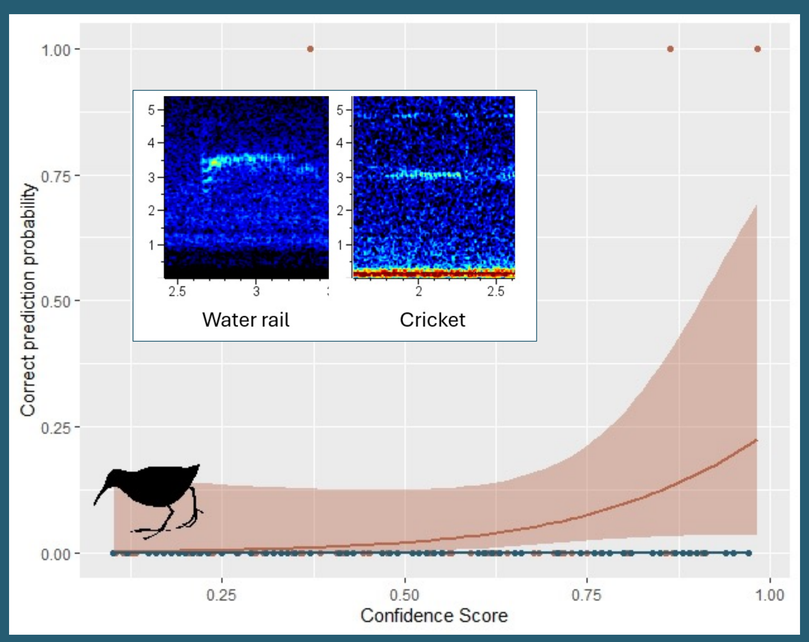
Green sandpiper (*Tringa ochropus*)



Precision: 52.87 %
CS threshold (50% prob.): 0.67

Precision: 40.96 %
CS threshold (50% prob.): 0.85

Water rail (*Rallus aquaticus*)



Precision: 3.95 %

Precision: 0 %

Several water rail false positives corresponded to cricket sound

Conclusions

- ✓ Software performance varied between species.
- ✓ BirdNET outperformed BTO's Acoustic Pipeline in detecting the Green Sandpiper.
- ✓ For the Green Sandpiper, the CS threshold for considering high-probability detections was too high for both recognizers.
- ✓ None of the recognizer software was able to correctly predict Water Rail calls.
- ✓ Local acoustic conditions (e.g., cricket sounds) may affect software performance.
- ✓ Further research with different migrant species and larger sample sizes (e.g., validated predictions) is required.

CÁTEDRA STEPPE FORWARD

CTFC

UAM Universidad Autónoma de Madrid

CONTACT
Laura Solé
Biodiversity and Animal Conservation Lab. Landscape Dynamics and Biodiversity programme. Forest Science and Technology Center of Catalonia (CTFC), Solsona, Catalonia, Spain.
laura.sole@ctfc.cat

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