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Conference Abstract

Integrating citizen science and biodiversity monitoring to improve detection of invasive species

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Abstract

Citizen science (CS) has become an increasingly important tool in ecological research, particularly for monitoring non-native and invasive alien species (IAS). By enabling large-scale data collection across broad spatial and temporal gradients, CS provides new opportunities for understanding invasion dynamics while engaging the public in biodiversity monitoring Brown P. et al. 2023. This study evaluates the contribution of integrating CS-based invasive species monitoring with biodiversity monitoring to improve the detection and ecological understanding of IAS in Poland. Since 2019, our team has run two complementary CS projects during the same observation period using the iNaturalist platform: one focused on non-native species and the other on biodiversity in semi-natural ecosystems.

We tested whether integrating these monitoring approaches improves IAS detection efficiency, spatial coverage, and ecological interpretation compared with invasive-species-focused monitoring alone.

Multi-year datasets (2019–2026) were analysed using statistical approaches evaluating detection probability, spatial coverage, sampling effort, and species co-occurrence patterns. Since 2019, the projects have generated more than 24,000 observations of more than 2,000 species submitted by over 300 contributors across Poland. The integration of invasive species monitoring with broader biodiversity surveys increased

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spatial coverage compared with invasive-species-focused monitoring alone and improved detection of IAS in habitats where their occurrence had previously been underreported. By combining records of native and non-native species, the integrated monitoring framework provided additional ecological context, allowing identification of habitat associations and potential species interactions that would remain undetected in invasive-species-only datasets.

The projects also supported long-term participant engagement, with many contributors progressing from casual observers to advanced identifiers and collaborators. Our findings demonstrate that a structured, hypothesis-driven CS framework can substantially improve early detection and mapping of invasive species while generating datasets suitable for ecological analyses.

Importantly, the integration of CS-based biodiversity monitoring with invasive species surveys enhances the detection of biological invasions, improves ecological interpretation of invasion processes, and provides a scalable framework for biodiversity conservation, public engagement, and early-warning systems.

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Conflicts of interest

The authors have declared that no competing interests exist.

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