1. Paper project

Preliminary title: Managed forests are a stronghold of introduced species in Europe.

Target journals: PNAS, **Frontiers in Ecology and the Environment**, Global Change Biology

Outline: Based on the DAISIE database (Vilà et al., 2010), the BOTTOMS-UP database (Burrascano et al., 2021) includes 210 introduced species. In the context of this proposal, introduced species are all species occurring in Europe as invasive, planted or naturalised, from typical forest pests (e.g., *Xilosandrus germanus*) to species introduced outside of their natural distribution (e.g., *Abies alba* is considered introduced in Denmark in the context of this Opt-In). The list of introduced species in the BOTTOMS-UP database includes 7 high-level taxa: Tracheophyta, Basidiomycota, Bryophyta, Coleoptera, Heteroptera, Araneae, Mammalia. The proportion of introduced-to-native species can be considered as an indicator of the level of disturbance (Enders et al., 2020). In fact, highly disturbed communities are particularly exposed to the establishment of introduced species, with a detrimental impact on the occurrence of native species (Hobbs and Huenneke, 1992; Wang et al., 2018). We will focus on introduced tree and beetle species, since previous research clearly indicated that the diversity of introduced pest and tree diversity have a hump-shaped relationship (Guo et al., 2019). In addition, the quality and consistency of the BOTTOMS-UP data for Tracheophyta (**160 introduced**; **1052 native**) and Coleoptera (**29 introduced**; **2375 native**) is better suited for a comparison among silvicultural treatments and has a good coverage among countries (figure 1). Therefore, we aim to investigate (1) if the proportion of introduced-to-native species for each taxon differs among silvicultural treatments. We also aim (2) to model using binomial GLMM the proportion of introduced-to-native beetles as a function of several forest predictors, including deadwood volume and stem volume, to understand the drivers and differences in different management systems. Finally, we plan (3) to use quantile non-linear regressions to understand whether the predicted hump-shaped relationship between introduced pests and tree diversity is congruent between managed and unmanaged forests.
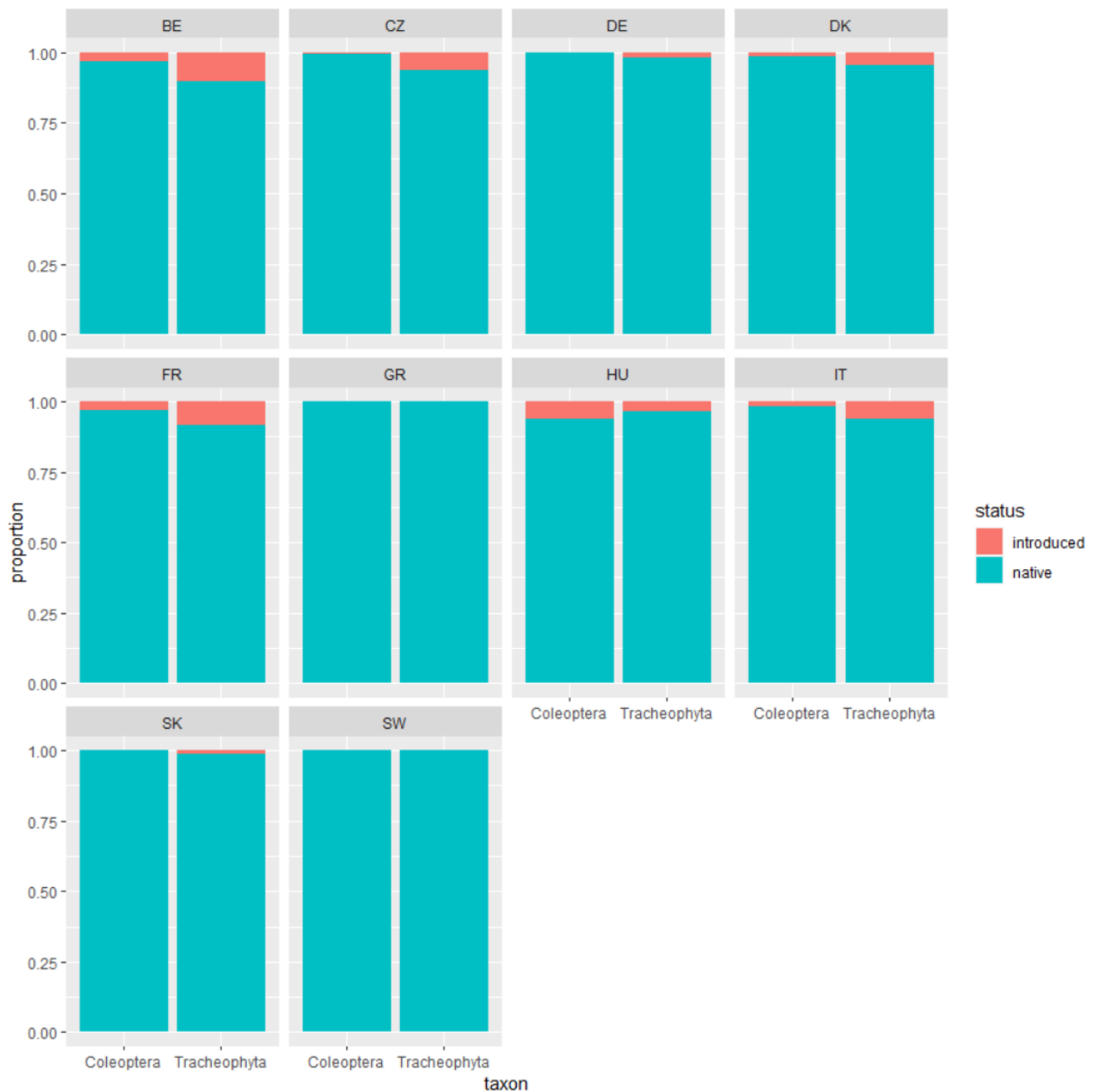
Figure 1: Proportion of introduced-to-native species in the BOTTOMS-UP database. In this Opt-In, introduced species are those species occurring outside of their natural distribution, independently of their geographical origin, and established or naturalised through human activities.

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Please note that if the outline changes substantially (more than 1 aim is revised substantially), or co-author(s) are added to the above lists the governing board should re-vote on the project.

Further opt-in authors:

According to the BOTTOMS-UP Bylaws any member of the BOTTOMS-UP Consortium can declare his/her interest to become opt-in author. The first author is required to preliminarily accept one such offer from each dataset that represents at least 2% of the data in the analysis. It is upon the discretion of the first author whether to accept any opt-in offer beyond this requirement.

Persons interested in opt-in authorship can be nominated until 01.03.2023 with e-mail to the first author (and cc: to the BOTTOMS-UP Governing Board), explaining which dataset(s) they represent and preferentially also how they could contribute. Note however that such a nomination only means the option to become co-author. In the end only those persons will be retained as actual co-authors who have made a significant intellectual contribution to the paper during the course of its preparation (in accordance with BOTTOMS-UP Bylaws and compliance to ethics in academy).

Data to be used:

I need presence and abundance data of species at plot-level. I need data on all available taxonomic groups for preliminary analysis. The final analysis may include only few taxa, e.g., beetles and vascular plants. I need data on standing trees (including snags, standing dead trees and stumps) and lying deadwood. I need data on management system and silvicultural practice at plot-level.

Based on the data subset that derives from your answers a group of data providers that should be included in the manuscript with least effort on the analytical and writing part will be identified according to the platform bylaws (providing more than 2% of the data needed).

Please note that always according to the bylaws all the consortium will be invited to participate in your project but in this case only in view of a substantial contribution to the analysis and writing.

Time line:

Deadline for permission of data usage from custodians: 01.03.2023

Extraction of data from BOTTOMS-UP: 01.04.2023

Data preparation and analysis: 01.08.2023

Raw results to be sent to the wider author team: 01.10.2023

Writing up of the paper (including preparation/optimization of figures): 01.12.2023

Feedback round of co-authors to MS: 01.01.2024

Submission: 01.03.2024

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Confirmation:

I confirm that I will adhere to the BOTTOMS-UP Bylaws.

Date

20.01.2023

Signature