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Conference Abstract

# Combinations of habitats occupied by naturalized aliens reflect the historical and biogeographical legacy of plant invasions

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## Abstract

The character of invaded habitats provides a complex information about the ecology of naturalized aliens and suggests the type of processes associated with their establishment at a landscape level. While single-habitat affiliations are typically studied,

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the synergistic combinations of habitats occupied by species offer more detailed and complete information about plant naturalizations. We performed

1. cluster analysis to reveal the similarity of 14 habitat categories, based on the composition of affiliated naturalized species;
2. tested if the globally most represented habitat combinations occur more frequently than expected by random;
3. tested if the species affiliated in a given combination of habitats are globally more successful, compared to species affiliated in the corresponding single habitats; and
4. tested, if the frequency of the most represented habitat combinations differs between the Old World and New World and between the Northern and Southern hemisphere.

Preliminary results of the cluster analysis revealed predictable groupings of invaded habitats similar in environmental conditions, such as Open forests – Scrub, Aquatic – Wetlands, Dryland – Rocky, Agricultural – Ruderal clusters. However, we found that Human-maintained grasslands and Natural grasslands are occupied by very different suites of naturalized alien species. Globally, the combinations of human-disturbed habitats containing either Ruderal or Agricultural habitat occurred with a significantly higher frequency than expected at random and occupied more regions than those restricted to either habitat alone. This suggests that habitat generalism – specifically across anthropogenic disturbance regimes – is a key predictor of global invasion success. Biogeographic patterns in the habitat combinations frequencies differ between the Old World and New World and between the Northern and Southern hemisphere. The most overrepresented habitat combinations in the Old World and Northern hemisphere were Open forests – Ruderal habitats and Agricultural habitats – Ruderal habitats, respectively, reflecting a legacy of prolonged human settlement and intensive landscape modification in regions where modern invasions originated. In contrast, the most overrepresented combination in the New World was Human-maintained grasslands – Ruderal habitats, a pattern likely driven by the historical expansion of European-style pastoralism and livestock management. Further, the most overrepresented combination in the South was Forests - Ruderal habitats, which may be linked to human-induced disturbances of (semi-) natural vegetation.

## Keywords

naturalized alien plants; invaded habitat combinations; geography; invasion history

## Presenting author

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M. Hejda came up with the basic idea, A. Kortz was supervising the creation and development of the SynHab database and J. Čuda did most of the analyses. Prof. Petr Pyšek lead the whole SynHab project and conceptualized its main scope.

## Conflicts of interest

The authors have declared that no competing interests exist.
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