

Trick or treat? Treatment and trait combinations for successful urban grassland restoration.



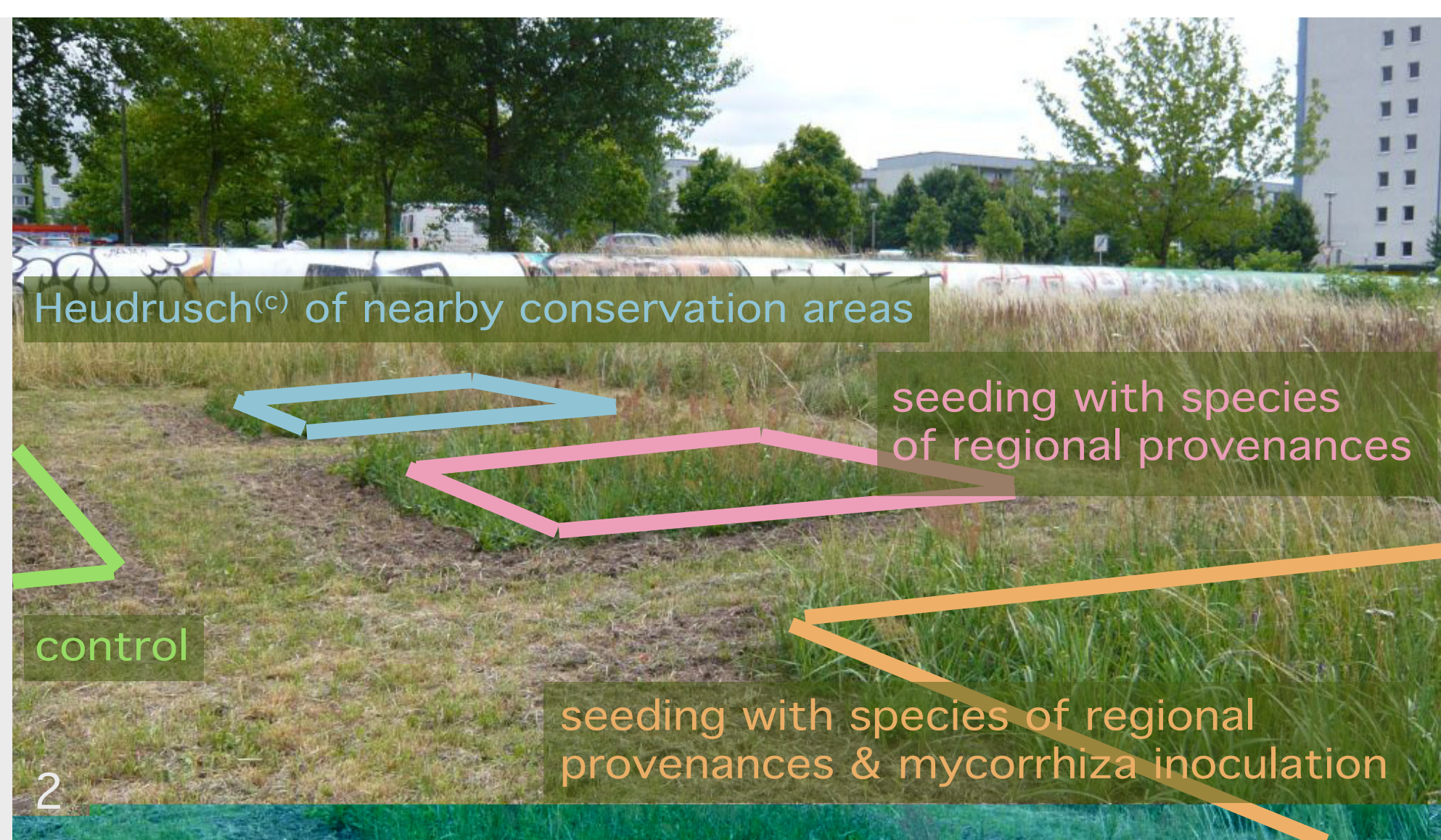
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Space for grasslands in shrinking cities

Species-rich grasslands are continuously declining in the European cultural landscape. Potential for the establishment of new low-maintenance grasslands arises in shrinking cities. Here, large open spaces evolve due to the demolition of surplus houses and the associated infrastructure (Fig. 1). One idea to deal with such open spaces is to establish attractive low-maintenance grasslands, which combine urban landscaping with nature conservation objectives.



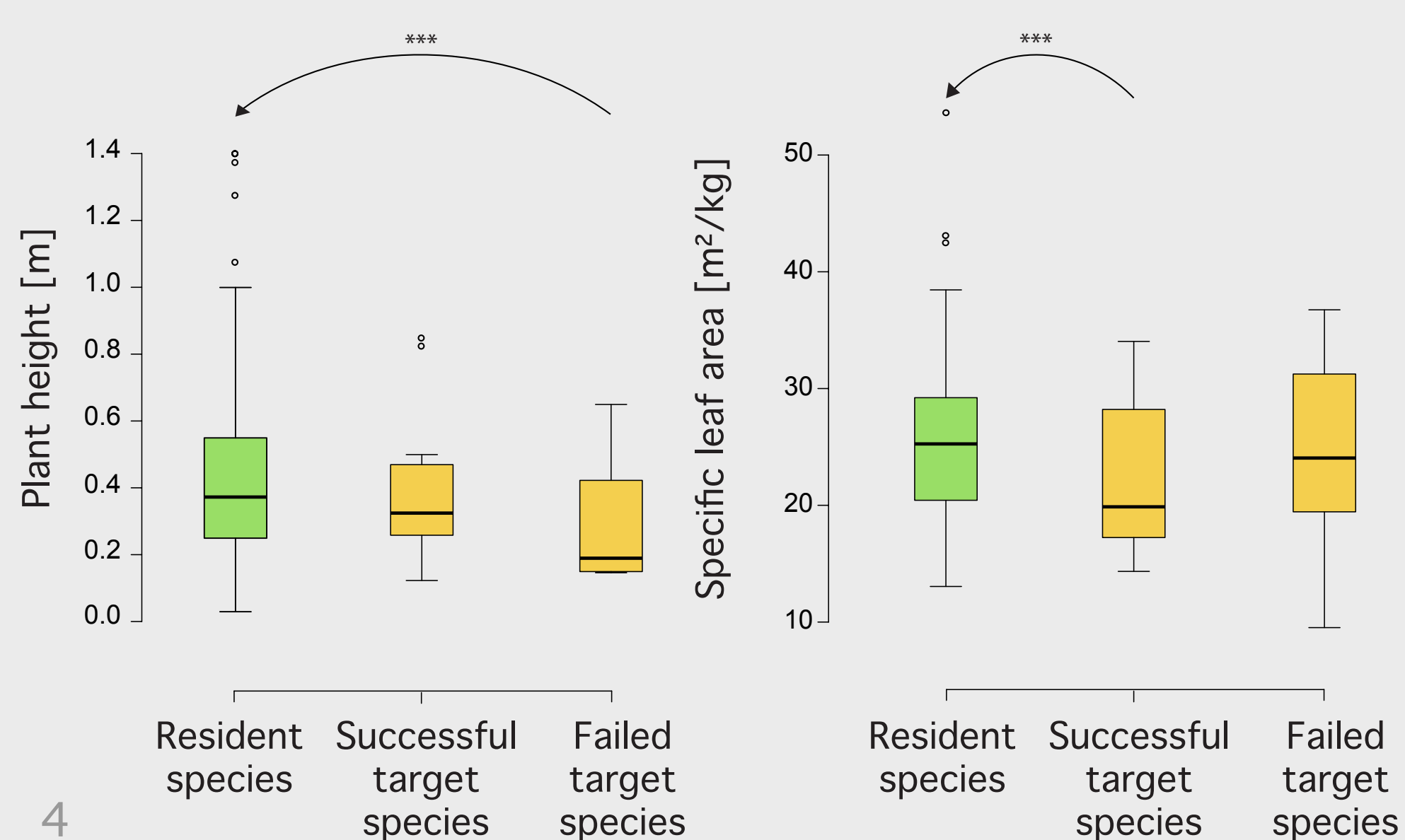
What matters?

We therefore tested three treatments of grassland restoration directly on 11 degraded demolition sites in Berlin Mahrzahn-Hellersdorf, close to remaining apartment houses in a randomized block design (Fig. 2). We analyze, which environmental variables, e.g., chemical and physical soil parameters or the frequency of dogs and people, influence the establishment success of sown target species. We characterize successful and failed target species by plant traits and compare them to the traits of resident vegetation.



Treatments, traits & the surrounding

In the third year after establishment, successful restoration treatments for former demolition sites could be determined (Fig. 3): Seeding treatments showed the highest increase in target species richness. Hereby, target species richness was not influenced by human mediated impacts. However, abiotic variables such as a high stone content of the soil were influencing target species richness negatively.



Traits of target species differ

Plant traits of successful target species differed from traits of failed target species and resident vegetation (Fig. 4): successful target species were of similar height as the resident vegetation. Failed target species were smaller, which could result in insufficient competitive behavior of these target species. Successful target species had a higher specific leaf area compared to resident vegetation and failed target species, suggesting successful targets to deal with high light incidence, a resource-limited setting such as low water availability or an advantage of structural strength of the leaves.



Successful relations

Our results demonstrate successful grassland restoration in urban demolition sites also under human pressure to the sites (Fig. 5). Treatments and target species should be carefully adjusted to the abiotic settings though. The combination of environmental and trait data lead to a characterization for promising treatment-species combinations.