GEOSPATIAL ASSESSMENT OF SOIL DETERMINANTS DRIVING THE DISTRIBUTION AND INVASION RISK OF *ASCLEPIAS SYRIACA* ACROSS HUNGARY

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Abstract

Following habitat loss and fragmentation, biological invasion represents the greatest threat to biodiversity conservation, and in protected areas it poses the most significant conservation challenge. Invasive plant species are generally superior competitors in newly colonized habitats, as they often exploit resources more efficiently, have lower resource requirements, tolerate disturbances better, and lack natural enemies. Nevertheless, their environmental requirements may differ substantially among species. Since the eradication of already established populations and the restoration of the damage they cause are both costly and labor-intensive, the most effective management strategy is to prevent their spread. This requires mapping their current distribution, identifying the environmental factors that determine their occurrence, and predicting areas most at risk of invasion.

Here, we investigated how soil parameters (clay, lime, and sand content; organic matter content; water-holding capacity; groundwater depth; rooting depth) influence the distribution of Common milkweed (*Asclepias syriaca*), one of the most widespread invasive plant species in Hungary. We applied a generalized linear model (GLM) to compare soil parameter values between invaded and non-invaded sites, aiming to identify the factors that influence the species' occurrence. Furthermore, we mapped areas currently non- invaded but potentially at risk of invasion based on the examined soil parameters. We identified the soil parameter values most characteristic of invaded points and examined which currently non- invaded locations share these values. Our results demonstrate that all examined soil parameters significantly affect the occurrence of *A. syriaca*, and that a substantial proportion of non- invaded areas in Hungary show high susceptibility to invasion according to their soil characteristics. These findings provide a valuable basis for targeted monitoring and early detection efforts, enabling more effective prevention of *A. syriaca* invasion in vulnerable habitats.