

Historical landscape elements in preserving steppic species – vegetation responses on micro-topography and human disturbances

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Land use changes of past centuries resulted in a considerable loss and isolation of grassland habitats worldwide which also led to a serious loss in ecosystem functions. In intensively used agricultural landscapes remnants of natural flora persisted only in small habitat islands embedded in a hostile matrix, which are inadequate for arable farming or construction. In the steppe zone of Eurasia burial mounds, so-called kurgans, have a great potential to preserve the natural flora and habitats and act as local biodiversity hotspots. Their special micro-topography and historical origin makes kurgans characteristic landscape elements of the steppe region. These features also result in a specific soil development and micro-climate, which makes kurgans especially adequate habitats for several steppe specialist plant species. Furthermore, they are proper objects for studying the effects of present and past human disturbances on the vegetation of semi-natural habitats. Exploration of the main factors driving biodiversity in isolated habitat fragments is crucial for understanding the ecological processes shaping their vegetation and for designing effective strategies for their protection. We surveyed the vegetation of 44 isolated kurgans in East-Hungary and studied the effects of habitat area, slope, recent disturbance, past destruction and the level of woody encroachment on the species richness and cover of grassland specialist and weedy species. We used model selection techniques and linear models for testing relevant factors affecting specialist species in grassland fragments. We found that the biodiversity conservation potential of kurgans is supported by their steep slopes, which provide adequate habitat conditions and micro-climate for steppic specialist plant species. By harbouring several grassland specialist species, kurgans have a great potential for preserving the natural species pool of even considerably altered agricultural landscapes, and can mitigate the negative consequences of landscape-level human disturbances. Our results suggest that specialist species are threatened both by recent disturbances and encroachment of alien woody species, especially black locust. Factors supporting specialist species suppressed weedy species by providing unfavourable environmental conditions and putting them at a competitive disadvantage. We identified that woody encroachment and current disturbances affect the vast majority of kurgans, posing a serious threat to grassland specialist species. Thus, there is an urgent need to integrate active conservation measures into the current passive protection of kurgans.