

Abstract

Military disturbances, such as artillery shelling and the resulting fires from shell explosions during military training, are known to influence species diversity and community composition. This study examines a complex response of moth communities to a military disturbance intensity gradient in the Brdy Mountains, a former military training area in the Czech Republic. The disturbance regimes range from high-intensity zones near former artillery targets, through intermediate areas, where fire occurred only several times during decades, to long-term undisturbed habitats, which have remained largely untouched since forest clearing a century ago. Using data on moth abundances, life-history traits, and environmental characteristics, I analyzed how species diversity, community structure, and trait-environment relationships vary along this gradient.

Species diversity peaked in undisturbed plots, while in all the disturbed plots it was lower. RLQ analysis, Community Weighted Means-Redundancy analysis and Fourth-corner analysis revealed strong links between disturbance intensity and moth life-history traits. Open habitats with heath cover supported disturbance-dependent xerophilous species, while undisturbed closed plots with dense tree cover favored more hygrophilous species feeding on woody plants. Rare moth species showed a positive correlation with disturbance intensity, while also showing a negative correlation with deciduous tree cover.

My findings emphasize the importance of disturbance heterogeneity for maintaining moth species diversity and the habitats of rare moth species. Post-military landscapes like Brdy Mts. hold unique conservation value, supporting both disturbance-sensitive and disturbance-dependent heathland moth communities. Conservation efforts should focus on maintaining habitat mosaics via restoring the disturbance regime through prescribed burning or grazing, to support rare species and high species diversity in the open areas of the Brdy Mts.

Key words: military disturbance, moths, life-history traits, fire, conservation