



Conference Abstract

Ground beetles (Coleoptera, Carabidae) as useful tool indicating the quality of restoration practices in post-industrial areas

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Abstract

Environmental disturbances, being a consequence of human industrial activity, strongly influence the communities of plants and animals, causing impoverishment of species pool and reduction of the overall biodiversity. Restoration of stable ecological systems in such areas is difficult and depends on many factors, that influence the rate and effectiveness of recolonization. The aim of the study was to compare the diversity and life history traits of ground beetle assemblages in recultivated and spontaneously regenerated postindustrial areas as well as reference forests. In addition the carabid co-occurrence pattern as a parameter evaluating the effectiveness of ecosystem restoration was studied. The following carabid life history traits were analysed: body size, dispersal power, food preferences, breeding type, and habitat preferences. During the field study 2036 specimens belonging to 36 Carabidae species were collected. NMDS analysis divided the ground beetle assemblages in relation to ecosystem types. ANOSIM showed significant differences in dissimilarity distances between assemblages from recultivated, spontaneously regenerated and reference areas. The analysis of the structure and life-history traits of ground beetle assemblages also showed significant differences. In recultivated dumps the rate of restoration was very slow and carabid assemblages structure and life history traits maintained the early successional character, revealing

significantly higher abundance of herbivorous open-area species with medium body size, high dispersal power, and a spring breeding cycle. Moreover the co-occurrence pattern of ground beetle assemblages showed a random pattern of co-occurrence, as an effect of high extinction rate reflecting high disturbance level. In case of spontaneously regenerated dumps more effective restoration processes was observed. The co-occurrence pattern of ground beetles assemblages showed a non-random pattern (the mean simulated C-score value was significantly lower than the value generated for the empirical data). Such conditions were beneficial for more sensitive carabid species (mainly medium body-sized predators with low dispersal power and an autumn breeding cycle). We conclude that ground beetles could be an useful tool indicating the direction and effectiveness of ecosystem restoration in post-industrial areas. This study indicated that recultivation techniques without proper biological soil regeneration do not guarantee full restoration of ecosystems and provide conditions for species with wide ecological ranges.

Keywords

Carabidae, recultivation, spontaneous succession, co-occurrence, life traits, dump

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