



Conference Abstract

Trophic level and edge history modulate the depth of edge influence

Tibor Magura[‡], Bela Tóthmérész[‡]

[‡] University of Debrecen, Debrecen, Hungary

Corresponding author: Tibor Magura (maguratibor@gmail.com)

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Abstract

Habitat edges are increasingly important worldwide because of forest fragmentation and the loss of natural habitats. Reduction in habitat area, increased isolation of fragments are considered to be the primary cause of species decline and extinction in fragmented landscapes. Edge effect is a key determinant, since most effects of fragmentation attributed to patch area may be scaled-up edge effect. Moreover, the isolation of patches is basically determined by the filter function (permeability) of edges. The distance that edge effects extend into the adjacent core (interior) habitat (the depth of edge influence, DEI) is a central issue in edge studies, as it fundamentally influences environmental properties, composition and structure of core habitats, all which significantly control species occurrences. Most previous studies on DEI neglected the impact of origin and the processes maintaining edges, although the structural and functional properties of edges determined by their history may modulate the permeability of edges, and consequently DEI. Evaluating available information on ground beetles (Coleoptera: Carabidae) in forest edges, we show that both species traits and edge history affect DEI on ground beetles. We found that DEI on abundance of herbivore, omnivore and predator ground beetle species is similar in natural edges, and edges maintained by agriculture, while it is generally penetrated over greater distances into the forests across edges repeatedly disturbed by forestry or other anthropogenic interventions than across edges maintained by natural processes. We found extreme edge effect across edges under forestry activities, as DEI on abundance of predator species is penetrated into the forest interiors up to ≤ 300 m. According to our findings DEI is more pronounced for predators and across edges created

and maintained by forestry operations, suggesting outstanding sensitivity of higher trophic level organisms to fragmentation caused by forestry activities. Our result suggests that in planning the optimal size and shape of fragments for ecosystem-based forest management, to provide a core zone, a minimum area of 50 ha of circular forest fragments is required for maintaining an intact ground beetle assemblage.

Keywords

carabids, dispersal, edge effect, filter function, forest edges, invasion, meta-analysis

Presenting author

Tibor Magura

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