Effects of forest fragmentation on the beetle assemblage at the relict forest of Fray Jorge, Chile

Barbosa, O., & Marquet, P. A. (2002). Effects of forest fragmentation on the beetle assemblage at the relict forest of Fray Jorge, Chile. Oecologia, 132(2), 296-306. <10.1007/s00442-002-0951-3> Accessed 24 Oct 2022.

Abstract

Habitat fragmentation is recognized as one of the main factors associated with species extinction and is particularly acute in South American forest habitats. In this study, we examined the effects of forest fragmentation on the beetle assemblage at the relict temperate forest of Fray Jorge (Chile). We evaluated the following hypotheses: (1) there is a strong edge effect, so that the number of beetle species and individuals increases away from the edge, towards the inner part of each fragment, (2) this pattern should be apparent in the larger fragments but not in the smaller ones, where edge effects are expected to be stronger, and (3) there should be a significant interaction between number of species/individuals found inside and outside fragments (i.e., in the matrix) and season, because of an increase in aridity and water stress during austral summer months. We found that the relationship between the number of individuals and number of species vs distance from the matrix towards the forest interior was affected by fragment size and season. In general, both number of species and individuals tended to increase from the matrix towards the forest edge and then either decrease, increase or maintain a constant level, depending on fragment size and season. The result of an ANOVA analysis, which used season, size, and position (inside vs outside fragments) as factors and number of individuals as the response variable, showed a significant effect of fragment size, position, and season and a significant interaction between fragment size and season, season and position, and size and position. ANOVA analysis using number of species as the response variable showed that area, season, and position all had significant effects. The results also showed a significant interaction between size and season and between season and position. Our results emphasize the existence of strong fragment-size and seasonal effects modulating both the response of beetles to fragmentation and their abundance and distribution in temperate areas. Thus, seasonal dynamic effects can be of paramount importance to demonstrate and understand the effect of habitat fragmentation upon arthropod assemblages in temperate areas.

Keywords

Temperate forest, Insects, Fragmentation, South America.