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Abstract

Kékes Forest Reserve is the best relic of montane beech forests in Hungary. The aim of this study was to supplement the standard permanent plot studies on tree stand dynamics with that of the herbaceous layer. We were especially interested in the fine-scale dynamics related to simple stand dynamical events like opening and closure of small gaps. We studied abundance and diversity changes with special interest in the survival of closed forest specialists during the forest cycle. In 1996 we sampled a cca 1.5-ha patch using 576 plots of 0.25 m² placed along a 5 × 5m grid. All species and their cover estimates were recorded. In 1997 a complete stand position map was created. Resampling of 306 plots was done in 2013 in five patches within the area that represented different stand dynamical situations. As permanent marking of the old plots was not feasible, we used blocks of four 0.25 m² plots (altogether 1224 plots) around original locations so that we can test the effects of inaccuracies in relocation. Observed changes in the number and cumulative cover of herbaceous species reflected the effects of both stand dynamics and differences in precipitation in the two studied years. We showed characteristic differences in the change of rank-relative cover curves: in closed canopy patches it followed the geometric model – often reported for pioneer communities. In gaps created between 1996 and 2013 the curve moved towards a log-normal distribution, whereas an opposite shift was observed in the patch characterised by gap closure. Of the 61 species found, we tested 31 herbs of which 23 showed significant (Chi²-test) reaction to changes in canopy structure. We showed differences in the ecological traits of species with different

light reactions (shade-tolerant, light-flexible, light demanding). Light demanding gap species are characterised by higher moisture and nitrogen indicator values, late flowering, and they include species with different seed dispersal and seed bank types. Light flexible species have intermediate moisture and nitrogen indicator values, flower in mid-summer, transient seed bank but various seed dispersal mechanisms. The observed shade-tolerant species usually flower early in the season and have transient seed bank. We found that in spite of the dramatic local changes in absolute and relative importance of species, all closed forest specialists could survive within the patches characterised by different fine-scale stand dynamical processes.

biodiversity: higher plants
habitat: oak-hornbeam forests, beech forests
habitat: rocky woodlands
forest dynamic, gap dynamic, succession
forest ecology
Notes

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