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Abstract

Seed banks of temperate deciduous forests during secondary succession

Jan Plue, Kris Verheyen, Hans Van Calster, Damien Marage, Ken Thompson, Rein Kalamees, Malgorzata Jankowska-Blaszczuk, Beatrijs Bossuyt & Martin Hermy

Abstract:
Question: (i) How does former land use and land use intensity affect seed bank development during post-agricultural succession? (ii) How does time since the last clear-cut change seed bank composition during post-clear-cut succession?
Methods: One data set was compiled per succession type using the following selection criteria: (i) the data set included a successional series, (ii) plots were located in mesotrophic forest plant communities and (iii) vegetation data were available. The post-agricultural succession data set comprised 76 recent forest plots (eight studies); the post-cleat-cut succession data set comprised 218 ancient forest plots (three studies). Each data set was analysed separately using either linear mixed models or generalized linear models, controlling for both environmental heterogeneity and variation between study locations.
Results: In the post-agricultural succession data set, land use and time significantly affected nearly all the studied seed bank characteristics. Seed banks on former arable land recovered poorly even after 150 year of restored forest cover, whereas moderate land use intensities (grasslands, heathlands) yielded

more rapid seed bank recovery. Time was a significant determinant of all but two seed bank characteristics during post-clear-cut succession. Seed banks in managed ancient forest differed strongly in their characteristics compared to primary forest seed banks.
Conclusions: Forest seed banks bear the marks of former land use and/or forest management and continue to do so for at least 150 years. Nevertheless, time since the last major disturbance, being either former land use or clear-cutting, remains a significant determinant of the seed bank.

forest dynamic, gap dynamic, succession
agriculture
landscape ecology, land use, history
Notes

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Ancient forest; Former land use; Land use intensity; Post-agricultural succession; Post-clear-cut succession; Recent forest

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