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## Dynamics of understorey biomass, production and turnover associated with long-term overstorey succession in boreal forest of Canada



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Understorey vegetation hosts the most species diversity in temperate and boreal forests and contributes substantially to ecosystem functions. Despite its ecological importance, the dynamics of understorey biomass, production and turnover rates following stand-replacing disturbance and throughout forest succession remain poorly understood. Using a replicated chronosequence spanning 8, 16, 34, 98, 146- and 210-years following fire, we examined the dynamics of understorey biomass, production and turnover associated with stand development and overstorey types (broadleaf, mixedwood, and conifer) in the central boreal forest of Canada. Across all ages and overstorey types, biomass, production and turnover rates of woody plants, herbs, and bryophytes were on average 2.71, 0.10, and 0.13 Mg ha-1; 0.24, 0.13, and 0.08 Mg ha-1 year-1 and 9.7%, 127.3%, and 67.6% year-1, respectively. Total understorey biomass and production increased continuously with stand age and reached the maximum in 146-year-old stands. Herbaceous biomass and production, peaked in 16-year-old stands, and remained stable thereafter with a slight increase in 146-year-old stands; in contrast, woody plant and bryophyte biomass and production peaked in 98- and 146-year-old stands. Herbaceous and woody vegetation turnover rates were higher in young stands, and those of bryophytes were higher in older stands. Total, woody and herbaceous biomass, production and turnover rates were higher under deciduous broadleaf overstorey, while values for bryophytes were higher in conifer stands, with mixedwood being intermediate. Overstorey mixture had no overall effect on total, woody, herbaceous biomass and production other than the expected from the averages of their broadleaf and conifer stands, but reduced bryophyte biomass and woody turnover. Our findings suggest that understorey biomass, production and turnover rates in the boreal forest are mainly driven

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