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Effect of forest management on the amount of dead wood and saproxylic diversity in the Hungarian Carpathians

Péter ÓDOR[1], Viktor PAPP[2], Gergely KUTSZEGI[1], Lajos BENEDEK[2], Erika GUBA[1], Júlia JÓZSEF[3]
[1]MTA Centre for Ecological Research*;Hungary*
E-mail: (odor.peter@okologia.mta.hu)
[2]Corvinus University, Department of Botany, Hungary
[3]Eötvös University, Hungary

Large proportion of forest biodiversity is connected to dead wood. Forest management considerably decreased the amount and quality of this important structural component. While most of the studies concerning the effect of dead wood on forest biodiversity were focused on near natural reserves, its amount and importance in biodiversity is less studied in managed stands. This project investigated the amount and quality of dead wood and the biodiversity of fungi and bryophytes connected to it in Mátra Hills, Hungarian Carpathians. Near natural forest reserves were compared to managed stands structured according to forest types (turkey oak – sessile oak forests, sessile oak – hornbeam forests, beech forests) and stand age (20-50, 50-80, more than 80 years).

Approximately 100 forest stands were studied, living volume were estimated by relascope sampling, standing dead wood was inventoried in 1000 m^2 sized plots, while lying dead wood by line intercept method. Bryophytes, corticoid and poroid fungi occurring on dead wood were surveyed in 1000 m^2 sized plots.

The amount of dead wood was 27.6 m^3/ha, which was 7.4% of the living volume. The amount in the reserves was considerably higher (82.4 m^3/ha) than in the managed stands (22 m^3/ha). The proportion of standing dead wood was higher (40.1%) in managed stands than in the reserves (22.4%). In the third age class the amount was higher (38.5 m^3/ha) than in the first two classes (20 m^3/ha). According to forest types in beech forest the amount was 31.2 m^3/ha, in turkey oak – sessile oak forests 26.9 m^3/ha and in oak – hornbeam forests 23.6 m^3/ha.

Species richness of bryophytes considerably depended on the amount of dead wood, but true epixylic species were missing from managed stands, dead wood was colonized mainly by epiphytic and opportunistic species. The species richness of fungi was much higher than that of bryophytes, their biodiversity depended considerably on the amount of fine woody debris in managed forests.

Although the amount of dead wood is reduced in managed forests still it plays a key role in their biodiversity. Because the near natural forests can maintain the source populations in the region, the increment of dead wood in managed stands could considerably increase the biodiversity of bryophytes and fungi.

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[1]MTA Centre for Ecological Research, Institute of Ecology and Botany;Hungary
E-mail: (odor.peter@okologia.mta.hu)
[2]Corvinus University, Department of Botany, Hungary
[3]Eötvös University, Hungary

Motivation

Dead wood studies were mainly focused on forest reserves, few information about dead wood conditions and saproxylic biodiversity in managed forests.

Aims

Evaluation the amount and quality of dead wood in managed forests.
Compare managed forests with forest reserves.
Study bryophyte and fungi (Polypore) diversity on dead wood.

Site selection for managed forests

Five regions
3 age categories: 20-50 yr, 50-80 yr, 80< yr
3 forest zone: beech, sessile oak –hornbeam, turkey oak-sessile oak

Methods

Snags, stumps: plot size 500 or 1000 m^2
Logs: line intercept method (90 m)
Bryophyte, fungi: species list on dead wood, plot size 1000 m^2

Results for dead wood amount

Dead wood was 80 m^3/ha in reserves 24 m^3/ha in managed forests (1).
Proportion of snags was higher in managed stands (2).
In managed forests dead wood amount did not differ among age classes (3) and forest zones (4).

Results for biodiversity

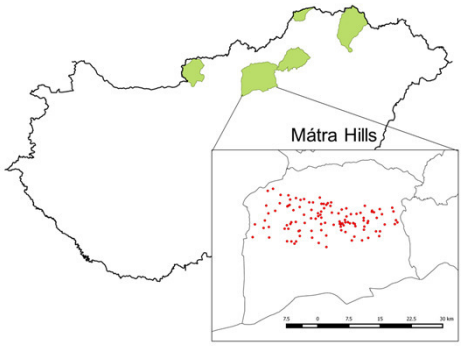
Bryophyte species richness 54, 4.1/plot.
Fungi (polypore) species richness 116, 5.4/plot.
Diversity was higher in reserves for bryophytes (5) but not for fungi (6).
Bryophytes were related to dead wood volume (7, r=0.54).
Fungi were related to lying fine woody debris (8, r=0.44)

Study area

Five regions of the Hungarian Carpathians, in this presentation only Mátra Hills are analyzed.

Sample size

Whole projekt (2012-2016): 450 managed, 50 forest reserve stands.
This presentation: 117 stands.

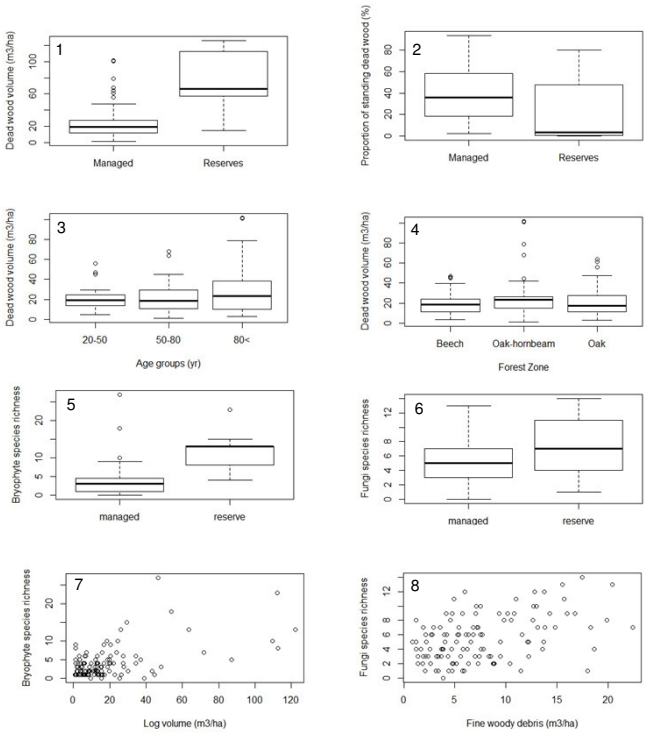



Young


Medium aged


Mature


Forest Reserve



Support:

Sustainable Nature conservation On Hungarian Natura 2000 sites

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