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Abstract

Effects of topography and tree stand characteristics on susceptibility of forests to natural disturbances (ice and wind) in the Börzsöny Mountains (Hungary)

K. Kenderes, R. Aszalós, J. Ruff, Zs. Barton and T. Standovár

We analysed the role of topography, tree stand characteristics and management on the susceptibility of forest stands to abiotic natural disturbance. In 1996, stands of Börzsöny Mts, Hungary were hit by a severe ice storm, then by strong winds three years later. Affected areas were mapped on aerial photos, and we built a GIS database containing variables describing topography and tree stand characteristics. The role of variables in predicting ice break and windfall was investigated by non-parametric statistical tests and by a series of C&RT (Classification and Regression Tree) analyses. Elevation, aspect and slope proved to have strong statistical relationships with the distribution of both ice break and windfall, with misclassification error (MER) of 18% and 15%, respectively, if studied without stand descriptors. Mixing ratio and age of beech were the most important stand descriptors to explain the distribution of ice break (MER=15%), whereas that of windfall was best described by the age and height of the two dominant tree species (MER=11%). The explanatory power could be increased if all variables (topographic + stand descriptors) were considered, though the increase in explanatory power was higher in the case of ice break (MER decreased

from 15% to 11%) than for windfall (MER decreased from 11% to 10%). Since management related stand variables (beech mixture ratio, age, height, amount of recently felled stock, slenderness) and susceptibility to disturbance events seemed to be related, our results suggest that the sensitivity of tree stands could be decreased by increasing compositional and structural heterogeneity.

forest structure: stand

ecosystem: disturbance, pollution

remote sensing: aerial photo

Notes

Effects of topography and tree stand characteristics on susceptibility of forests to natural disturbances (ice and wind) in the Börzsöny Mountains (Hungary)

K. Kenderes, R. Aszalós, J. Ruff, Zs. Barton and T. Standovár

Tartalom:

Introduction

Materials and methods

Study area

Ice break and windthrow in the Börzsöny Mountains

Data collection

Data analyses

Results

Extent of disturbance

Topographic characteristics of disturbed patches

Tree stand characteristics of disturbed patches

Factors determining the sensitivity of stands to ice and wind disturbance

Discussion

Effects of topography

Effects of stand characteristics

Conclusions

Acknowledgements

References

Beech, C&RT, *Fagus sylvatica*, Ice break, *Quercus petraea*, Sessile oak, Windthrow

Címszavazva - GE

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