

VEGETATION DIVERSITY ON THE MICROSITES CAUSED BY TREE UPROOTING DURING A CATASTROPHIC WINDTHROW IN TEMPERATE BROADLEAVED FORESTS

L. G. Khanina

Institute of Mathematical Problems of Biology of the Russian Academy of Sciences – branch of the M. V. Keldysh Institute of Applied Mathematics of the Russian Academy of Sciences, 1 Prof. Vitkevich street, Pushchino, 142290, Russia
E-mail: khanina.larisa@gmail.com

M. V. Bobrovsky

Institute of Physico-Chemical and Biological Problems in Soil Sciences of the Russian Academy of Sciences,
2 Institutskaya street, Pushchino, 142290, Russia
E-mail: maxim.bobrovsky@gmail.com

I. V. Zhmaylov

Russian Forest Museum, 4 5th Monetchikovsky lane, Moscow, 115054, Russia
E-mail: ulmus@yandex.ru

Abstract. We analyzed the diversity of vascular plant species growing on microsites formed after tree falls with uprooting as a result of catastrophic windthrow that occurred in the temperate broadleaved forests of the Kaluzhskie Zaseki Reserve in 2006. Size characteristics of pits and mounds formed by uprooting of 110 individuals of 9 tree species were measured. Vegetation on microsites formed by 45 fallen trees of 8 species was described. We distinguished the following microsites: 1) top of the mound; 2) back side of the mound; 3) front side of the mound (from the trunk side); 4) pit over the mound; 5) pit in front of the mound in the case of rotational treefalls; 6) part of the trunk close to the roots (deadwood). Vegetation on 45 plots of 1x1 m in size and located close to but not affected by tree uprooting (reference plots, or reference communities) was also described. The results of the indirect ordination analysis revealed that the ecological and phytocoenotic differences between the plant associations of *Querco* – *Tilietum cordatae* and *Aceri campestris* – *Tilietum cordatae* persisted in the areas of catastrophic windthrow both on the plots of reference communities and in vegetation overgrowing pits and mounds. Ordination showed differences between the vegetation in the microsites formed by tree uprooting in a series of mound – deadwood – pit – reference community. On 251 plots, 78 vascular plant species were totally registered, among them 26 species were not found in the reference plots but occurred in the pit-and-mound microsites; 6 species were not found before the windthrow study in the descriptions of broadleaved and aspen forests of the Reserve, and 8 species were found in the descriptions of those forests no more than three times. New species are mostly species from the boreal (*Phegopteris connectilis*, *Sambucus racemosa*), nitrophilous (*Rubus caesius*), water-marsh (*Epilobium hirsutum*, *Epilobium palustre*), meadow-edge (*Bromopsis inermis*, *Hypericum hirsutum*, *Conyzca canadensis*, *Vicia cracca*), and piny (*Calamagrostis epigeios*) ecological-coenotic groups. In general, the increase in plant diversity in the area of catastrophic windthrow is caused by the massive emergence of new microsites (pits, mounds and deadwood) and the subsequent appearance of species with different ecological and coenotic traits.

Keywords: windthrow, Kaluzhskie Zaseki Reserve, pit-and-mound topography, plant species diversity, DCA, ecological-coenotic groups.