

Physiological state of spruce plants (*Picea abies* Karst. L.) in a vessel experiment conditions

Lubica Ditmarová¹, Jaroslav Kmet'², Dušan Gömöry², Katarína Štrelcová²

¹Institute of Forest Ecology of the Slovak Academy of Sciences, Štúrova 2,
960 53 Zvolen, Slovak Republic, E-mail: ditmarova@sav.savzv.sk

²Faculty of Forestry, Technical University in Zvolen, T. G. Masaryka 24, 960 53 Zvolen,
Slovak Republic

Abstract

DITMAROVÁ, L., KMEŤ J., GÖMÖRY, D., ŠTRELCOVÁ, K. 2006. Physiological state of spruce plants (*Picea abies* Karst. L.) in a vessel experiment conditions. *Folia oecol.*, 33: 77–83.

In this paper we are facing the issue of multiple dieback of spruce stands in the region of Horný Spiš. The range of detrimental factors in this area is considerable, and the identification of causal agents of damage to the stands is intricate. We summarise the results of an ecophysiological research pursued in 2004, focussing on evaluation of physiological state of spruce seedlings grown in a vessel experiment consisting of six variants. The primary aim of the experiment was to study the influence of soil properties on health state of the plants. We have evaluated the measured values of parameters of chlorophyll *a* fluorescence, concentrations of assimilatory pigments (chlorophyll *a*, *b*, carotenoids in mg g⁻¹ of dry matter), and analysed the influence of selected factors on the studied parameters.

Key words

multiple stress, decline, ecophysiology, seedlings, *Picea abies*

Changes in water chemistry after flowing from the spring

Margita Dubová¹, Ferdinand Kundrík²

Institute of Forest Ecology of the Slovak Academy of Sciences, Štúrova 2,
960 53 Zvolen, Slovak Republic,

¹E-mail: dubova@sav.savzv.sk, ²E-mail: kundrik@sav.savzv.sk

Abstract

DUBOVÁ, M., KUNDRÍK, F. 2006. Changes in water chemistry after flowing from the spring. *Folia oecol.*, 33: 84–93.

In this work we evaluate changes in chemical composition of water flowing out from its spring (I) and passing through a meadow ecosystem (II–VI). There are the quantitative changes in chemistry of water flowing from sampling sites (I) to (VI): potassium (68.5%), calcium (31%), magnesium (19%), sodium (16%), nitrogen (15%), electric conductivity (24%) and dissolved substances (5.2%) decrease. In opposite, sulphur (25.6%) and pH value (6.6%) increase. We study the influence of this water flow on the given ecosystem and compare the examined water with surface water in streams passing several other sites with similar geological substrate. Values of indicators in the studied samples confirm the nature of surface water. Calcium is the most abundant alkaline nutrient component (7.47 mg l⁻¹), followed by magnesium (3.63 mg l⁻¹) and potassium (1.92 mg l⁻¹). From airborne pollutants, there are present sulphates 31.46 mg l⁻¹, nitrates 10.07 mg l⁻¹ and ammonium ions 0.03 mg l⁻¹. The pH value (water reaction) is 6.73, electric conductivity is 131.2 μS cm⁻¹. The amount of dissolved substances is 128.3 mg l⁻¹, from which 50.4% are inorganic and 49.6% are organic. The value of sodium concentration is 6.05 mg l⁻¹. All the indicators, with exception of nitrates ranking the water to the II-nd quality class (clear water), classify it to the first quality class (very clear water). No significant differences were found comparing the examined water with water in other surface streams in the Protected Landscape Area (PLA) Poľana Mts and in the Kremnické vrchy Mts. The changes in water chemistry indicate a favourable influence on the meadow ecosystem – its stability or also the soil cover.

Key words

surface water, changes in water chemistry, meadow ecosystem

Contents of bioelements and energy equivalent in assimilatory organs of European chestnut (*Castanea sativa* Mill.)

Jana Konôpková

Arboretum Mlyňany Slovak Academy of Sciences, Vieska nad Žitavou,
951 52 Slepčany, Slovak Republic,
E-mail: aurelia@nr.sanet.sk

Abstract

KONÔPKOVÁ, J. 2006. Contents of bioelements and energy equivalent in assimilatory organs of European chestnut (*Castanea sativa* Mill.). *Folia oecol.*, 33: 94–101.

The work evaluates the content of selected bioelements (Ca, Mg, K, P, Na, Fe, Mn, Zn, Cu) and energy amount in the assimilatory organs of various stand types of European chestnut (*Castanea sativa* Mill.). In assimilatory organs of the European chestnut were determined optimum contents of Ca, Mg, P and Zn. The content of Na, Fe and Cu was found slightly increased and Mn was high. Content of K was lower. Analysis of variance identified statistically very significant differences among all the analysed bioelements across several years and in various stand types. Energy values in leaves of European chestnut varied from 18.193 to 19.837 kJ g⁻¹. There were found high significant differences in energy contents among the stand types.

Key words

macroelements, microelements, energy equivalent, biomass, *Castanea sativa* Mill.

Phytoparameters and content of risk elements in *Dryopteris dilatata* (Hoffm.) A. Gray populations

Margita Kuklová, Ján Kukla

Institute of Forest Ecology of the Slovak Academy of Sciences, Štúrova 2, 960 53 Zvolen, Slovak Republic,
E-mail: kuklova@sav.savzv.sk

Abstract

KUKLOVÁ, M., KUKLA, J. 2006. Phytoparameters and content of risk elements in *Dryopteris dilatata* (Hoffm.) A. Gray populations. *Folia oecol.*, 33: 102–107.

The research plots were established in damaged – by pollutants, fungi and bark beetle, and parallel damaged (control) spruce geobiocoenoses pertaining to company Forest of Spišská Nová Ves city Ltd. (locality Muráň – 1,100 m asl, group of forest types Fageta abietino-piceosa, Skeli-Humic Podzol; locality Hliníky – 950 m asl, group of forest types Abieti-Fageta inferiora, very acid Dystric Cambisol). The higher mean shoot length, weight and energy content were found in populations of *Dryopteris dilatata* species growing on locality Hliníky and in damaged spruce stand on locality Muráň. On the other hand the higher ash content was in shoots sampled on non-damaged plots. Content of risk elements ranged in following intervals (mg kg⁻¹ of dry matter): Al (88.3–225.0), Pb (2.184–3.340), Ni (0.873–4.379), Cr (<0.050–0.220), Cd (0.571–1.918), Hg (0.0312–0.0423). Limit value Hg (0.02 mg kg⁻¹) was exceeded on all studied plots, while the normal value of Al (about 200 mg kg⁻¹) only in case of population growing in damaged stand on locality Hliníky.

Key words

spruce ecosystem, *Dryopteris dilatata*, growth parameters, risk elements

Plant communities on oil-contaminated ruderal sites in the Lopejská basin, district Brezno

Hana Ollerová

Department of Environmental Engineering, Faculty of Ecology and Environmental Sciences of the Technical University in Zvolen, T. G. Masaryka 24, 960 53 Zvolen, Slovak Republic,
E-mail: ollerova@vsld.tuzvo.sk

Abstract

OLLEROVÁ, H. 2006. Plant communities on oil-contaminated ruderal sites in the Lopejská-basin, district Brezno. *Folia oecol.*, 33: 108–120.

The paper deals with three plant communities with mono-dominance of the species *Carex hirta*, *Melilotus albus* and *Calamagrostis epigejos*, occurring within a territory affected by activity of an oil-processing plant, situated in the geomorphological unit Lopejská kotlina basin, in district Brezno. We describe their species composition, ecological conditions and taxonomic characteristics in relation to soil contents of non-polar extractable substances (NE) in localities loaded by hazardous waste material – acid oil residue. All the examined plant communities are developed under influence of oil substances in soil. In most cases, concentrations of non-polar extractable substances considerably exceed the maximum allowable limit – 500 mg kg⁻¹. In sites with dominance of *Carex hirta* species, the concentrations of oil substances range from 5,517.6 to 8,090.1 mg kg⁻¹. The plant community with dominance of *Melilotus albus* species is less influenced by waste materials in case of locality Predajná I. Much higher concentrations were found in locality No. 3 inside the oil processing plant area (2,125.5–3,822.5 mg kg⁻¹). The similar results were obtained for the community with dominance of species *Calamagrostis epigejos*. The highest content of oil substances in soil made 6,992.6 mg kg⁻¹. The NE concentrations in soil are so high, that the species *Carex hirta*, *Melilotus albus* and *Calamagrostis epigejos* can be considered as very resistant to pollution by oil substances.

Keywords

oil waste, soil contamination, ruderal phytocoenoses

Home range sizes and roosting places in capercaillie (*Tetrao urogallus* L.) cocks living solitary in the West Carpathians

Miroslav Saniga

Institute of Forest Ecology of the Slovak Academy of Sciences, Research Station,
976 02 Staré Hory, Slovak Republic,
E-mail: uelsav@bb.sanet.sk

Abstract

SANIGA, M. 2006. Home range sizes and roosting places in capercaillie (*Tetrao urogallus* L.) cocks living solitary in the West Carpathians. *Folia oecol.*, 33: 121–128.

From 1988–2005, home range sizes and roosting places in capercaillie cocks leaving solitary were studied in the mountains of central Slovakia (Veľká Fatra Mts., Malá Fatra Mts., Kremnické vrchy Mts., Starohorské vrchy Mts., and Nízke Tatry Mts., West Carpathians, 18°50'–19°10'E; 48°47'–49°19'N). Home range sizes in males living solitary were largest in summer (82 ha) and smallest during the display period (only 34 ha). Capercaillie males roosted during day prevalingly on the ground all year long (maximally in spring – 96%). Most roosting sites were located at the base of the tree trunks underneath the low branches (77%), then near wind-falls or stumps (9%) and rock boulders (5%). Capercaillie males roosted during night almost exclusively on trees. Only when conditions for snow-roosting were good (sufficient amount of powder snow) and temperature dropped below –15 °C, capercaillies also roosted in snow burrows (13% during winter and 3% in autumn).

Key words

capercaillie *Tetrao urogallus*, home range, roosting, Carpathians

Occurrence of fungus *Cryphonectria parasitica* (Murr.) Barr on oak trees in the Carpathian-basin

Gábor Tarcali¹, László Radócz

Department of Plant University of Debrecen, Centre for Agricultural Sciences, Protection,
Böszörményi str. 138., H-4032 Debrecen, Hungary,

¹E-mail: tarcali@agr.unideb.hu

Abstract

TARCALI, G., RADÓCZ, L. 2006. Occurrence of fungus *Cryphonectria parasitica* (Murr.) Barr on oak trees in the Carpathian-basin. *Folia oecol.*, 33: 129–132.

“Chestnut blight“ caused by the fungus *Cryphonectria parasitica* (Murr.) Barr is the most important disease of *Castanea* spp. in Europe. In the 20-th century, this serious disease caused serious damage to chestnut populations throughout the world, including the Carpathian-basin. Towards the end of the last century, typical blight symptoms were observed on oak trees in several other European countries as well, and the fungus was also detected on some young *Quercus petraea* trees in Hungary. We studied the manifestation of *C. parasitica* on oaks, in several regions across the Carpathian-basin. Our examinations confirmed that the blight fungus has infected several oak trees in Romania and in Hungary, and potentially it could be a serious disease agent for the oak species.

Key words

Cryphonectria parasitica, *Castanea sativa*, *Quercus petraea*

Short communication

Introduction of species of the *Juglans* genus in the West of Ukraine

Boris Termena, Hanna Batsura, Illya Kotsyuban

Yuriy Fedkowich Chernivtsi National University, Bul. Fedkowich, 11,
Chernivtsi, 58022, Ukraine

Abstract

TERMENA, B., BATSURA, H., KOTSYUBAN, I. 2006. Introduction of species of the *Juglans* genus in the West of Ukraine. *Folia oecol.*, 33: 133–136.

This article is dealing with occurrence of species of the genus *Juglans* L. in 36 woodland subjects in the Western Ukraine: old parks, arboretums, forests and artificial plantations. We evaluate the tree age, growth (height, $d_{1,3}$ diameter), abundance (tree number), fecundity and germination capacity. The most frequently cultivated species is *Juglans nigra* L. (21 subjects), the most rare are *Juglans cordiformis* Maxim. and *Juglans manshurica* Maxim. (in 3 subjects each). The cultivated *Juglans* trees are the most abundant in the Precarpathian region Opollya (24 subjects).

Key words

Introduction of woody plants, *Juglans*, West of Ukraine, fecundity, germination rate