

Contents and Abstracts of the Bulletin of Forest Science

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Klára CSEKE, Zoltán Attila KÖBÖLKUTI, Attila BENKE, Andrea RUMI, Mátyás BÁDER, Attila BOROVIKS and Róbert NÉMETH:

Allelic variation in candidate genes associated with wood properties of cultivated poplars...5–16

Abstract - Poplars represent high economic value. The aim of the present study was to initiate a research methodology that at first identifies candidate genes encoding enzymes with wood property phenotypic traits, towards the aim of developing a genomics-based breeding technology. As a first step, primer pairs were designed on the coding region of 24 candidate genes. 55 primer pairs were tested with 47.27% success rate. In the next phase, eight enzymes were selected for further analysis on 23 genotypes containing seven different poplar species and 11 hybrids. One group of the analyzed enzymes is involved in the lignification process (COMT, CCoAOMT, SAMS), another group (Kt, ptk2, SKOR) holds a key function in K⁺-dependent xylogenesis, while two more enzymes (endo-1,4-b-xylanase, Araf-ase) have a role in determining microfibril angle. 13 different marker regions were successfully amplified, and 188 sequences were analyzed, altogether resulting in 90 SNPs. The number of polymorphic sites, nucleotide diversity, the number of insertions/deletions, the minimum number of recombination events and the linkage disequilibrium were calculated, while the character of SNPs and conserved DNA regions were identified as well. Potential application fields are discussed along with the presented results.

<https://doi.org/10.17164/EK.2020.001>

Zoltán BÖRCSÖK and Zoltán PÁSZTORY:

Changes in the heat conducting properties of wood materials as a result of thermal treatment...17–27

Abstract - The aim of the research is to detect correlations between the heat treatment of wood at different durations and some of its physical properties and thermal conductivity. During the experiments, spruce (*Picea abies*), Pannonia poplar (*Populus ×euramericana* cv. Pannonia) and rubber wood (*Hevea brasiliensis*) were subjected to heat treatment at 180°C

for 15, 25 and 35 hours. Measurements confirmed that the equilibrium moisture content, the density and the thermal conductivity of the specimens made of heat-treated material were lower than those of the untreated specimens. The average equilibrium moisture content decreased from an initial value of around 12% to around 6% during the treatments in case of all three tree species. The decrease in density after 15, 25 and 35 hours of treatment was 9.1, 12.1 and 13.4% for poplar, 5.2, 7.6 and 8.7% for spruce and 3.5, 5.1% and 7.1% for rubber wood, respectively. The decrease in density after 15, 25 and 35 hours of treatment was 17.0, 24.2, 25.2% for poplar, 8.5, 11.6, 19.2% for spruce and 3.6, 4.1, and 8.0% for rubber wood, respectively. Literature data supports that heat treatment decreases the equilibrium wood moisture and density of the wood which explains the lower thermal conductivity compared to the control sample made from the same raw material.

<https://doi.org/10.17164/EK.2020.002>

Zoltán BÖRCÖK and Zoltán PÁSZTORY:

Improving the properties of bark based insulation panels...29–39

Abstract - Several studies have investigated natural-based insulation materials, including bark. The physical and mechanical properties of the bark panels are worse than those of wood panels. The aims of this study were to manufacture an insulation panel from Pannónia poplar bark and investigate the reinforcement possibilities with short glass fiber, overlaying fibreglass mesh, fibreglass mat and fibreglass woven fabric and two types of paper, as well as inner glass fiber mesh. Further, we tried to improve the thermal conductivity of the panels by heat treating the bark particles. We studied their physical and mechanical properties and thermal conductivity. The target density was 350 kg/m³, the thermal conductivity of the panels ranged from 0.067 to 0.078 W/m·K. The reinforcement slightly decreased thermal conductivity and significantly increased mechanical properties. Thermal conductivity is determined by density. The heat pre-treatment of the raw material slightly decreased the thermal conductivity.

<https://doi.org/10.17164/EK.2020.003>

Bence BOLLA and András SZABÓ:

Early results of the NARIC-FRI hydrological and meteorological monitoring system...41–54

Abstract - The growing extremities of our changing climate has its effects on agriculture, on horticulture and on everyday forestry activities as well. Establishing and maintaining a meteorological monitoring system which measure and collecting data in highly forested areas are the most suitable ways to monitor and keep track of meteorological extremities affecting forests. With the continuous intention to achieve nation-wide coverage, the Forest Research Institute operates 18 GPRS meteorological stations in Hungary. Through analysis of the collected data, we concluded that the meteorological extremities occur at uncommon dates at different points of the country.

The results of the groundwater monitoring system, which is operating alongside the meteorological monitoring, also show significant differences between the hydrological processes of the examined study sites.

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Norbert FRANK and Béla LETT:

Quo vadis forest reproductive material production? (Forest reproductive materials production after the 2nd World War)...55–66

Abstract - After World War II, the forest reproductive material sector was radically reorganized based on central policy instructions, especially in the management and ownership structure. Privately owned forest nurseries have been replaced by small local nurseries of state forest companies, which have produced the necessary reproductive materials next to reforestation and afforestation projects. The Central Instruction for Seedling Production, issued in 1955, already set the goals of rapidly improving quality seedling production, for which purpose the seedling production was concentrated. During the period of 1949–1979, the number of registered forest nurseries decreased from 1,126 to 566. The aim of our study is to analyze the process and trend of seedling production and use over this period and to analyze the data and changes of certain tree species and groups of tree species. Overall, the number of nurseries was significantly decreased during the period under review, the volume of seedlings produced and proportion of tree species were also changed, unevenly over time. In the centrally planned economy period we examined, the difference in the amount of seedlings produced and used per year averaged 66.89 million; the production surplus reached its lowest level in 1975 (21.1 million). The average gross nursery area of the studied period was 3,396 hectares but the average area from 5.55–2.26 hectares in 1954–1959 increased to 5.45 hectares by the end of the period (1979), thus it exceeded the average area typical for the period (3.5 hectares) by 1.95 hectares.

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Vivien SASS, Péter ÓDOR and András BIDLÓ:

The effects of different forestry treatments on litter conditions in an oak-hornbeam forest...69–82

Abstract - The long-term effects of different forestry treatments (clear-cutting, preparation cutting, retention tree groups, gap-cutting) on litter conditions were studied in the framework of the "Pilis Forestry Systems Experiment". During the four-year period described in this publication, the average litter features of the closed control forest area remained unchanged, however, the treatments significantly influenced all the studied litter-variable (quantity, moisture, pH). Litter quantity was the highest in retention tree groups, although this area was the driest. The lowest quantity of litter was measured in clear-cutting. The treatments had the highest effect on the acidity/alkalinity: pH increased in case of clear-cuttings and a less extent gap-cuttings, caused by the increased herbaceous understory cover. We can conclude that moderate partial cutting (preparation cutting) did not change the litter conditions, retention tree groups can buffer the extreme effect of clear-cuttings, and gaps only slightly modify the litter conditions compared to the clearcuts. These results show that continuous cover forestry maintain more favorable litter conditions than rotation forestry systems.

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Géza RIPKA:

Eriophoid mites (Acari: Eriophyoidea) of woody forest plants...83–95

Abstract - Eriophyoid mites are the smallest arthropods living on vascular plants. Representatives of this superfamily can be found on the shoots, foliage, flowers and fruits of herbaceous and woody plants. The majority of the host plants are woody species. An overview is given on the eriophyoid mite fauna of woody forest plants. In Hungary, out of the 238 eriophyoid species 45 are non-indigenous. The most species is recorded from the families Rosaceae and Salicaceae.

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András KOLTAY, Ágnes FÜRJES-MIKÓ, Imola TENORIO-BAIGORRIA, Csaba Béla EÖTVÖS and László HORVÁTH:

Health condition investigation of forests in Kaszó-Life project...97–108

Abstract - The „KASZÓ-LIFE” programme, which was developed between 2014 and 2018, aimed the restoration and improvement of the growing conditions of the Common alder (*Alnus glutinosa*) and the Pedunculate oak (*Quercus robur*) tree estimate. With the help of water retention facilities in the area, the reduction of the subsidence of groundwater was attempted, as well as the improvement of the water balance of the forest’s soil, and thus the health of the forests. Sampling areas have been designated in order to monitor the health conditions of the forests where the tree examination is carried out twice a year. Comparing the health data along with the results of groundwater, precipitation and meteorological measurements, we may come to a conclusion in the future concerning the forthcoming changes exhibited in the forests. Examinations so far have shown that both in the case of oaks and alders, from 2017 there was a slight improvement comparing to the control areas. However, due to the relative shortness of the period, this does not yet clearly indicate the success of the programme, which must be supported by many years of test results.

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László BALI, Katalin TUBA and Csaba SZINETÁR:

Arachnological survey of the Roth selection forest...109–124

Abstract - During our research, we surveyed the ground-dwelling spider fauna of the Roth selection forest (Sopron 182B) between April and July of 2020. Five distinct parts of the forest were investigated: pole stand (R, d=10–20 cm), high forests (Sz, d=20–50 cm), older high forests (L, d>50 cm), open/gap habitat (Ny) and stand mixed with spruce (F) patch, with the addition of three control (K) trappings. We also conducted stand structural surveys. We collected 3515 specimens of 69 species belonging to 21 families. *Linyphiidae* was the most species-rich family, while *Pardosa alacris* was the most abundant species. Diversity of the spider community was relatively high. Both the guild structure and the similarity indices showed disparities between the studied sites, however, there were no significant differences. To sum up, the ground-dwelling spider community of the Roth selection forest proved to be somewhat richer than that of the control sites.

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Ákos PALKÓ, Gábor ÓNODI, Tamás RÉDEI and Dániel WINKLER:

Soil eco-faunistic study in lowland relict steppe oak forests and in replacement non-native tree plantations...125–139

Abstract - The aim of the present study was to investigate the soil Collembola communities in the relict closed lowland steppe oak forests in the Kiskunság. Further goal was to carry out comparative analyses of Collembola community diversity and abundance between the autochton oak forests and the replacement allochton plantations of non-native tree species (hybrid poplar, black pine, black locust). Soil samples were taken from the above-mentioned four forest habitats in three replicates. A total of 3,033 specimens belonging to 56 Collembola species were collected and identified. Species richness was the highest (47) in the autochton steppe oak forests. In comparison, the number of species was less than a half in the hybrid poplar (19), black pine (22) and black locust (23) plantations. Regarding the relationships between the measured soil parameters and Collembola communities, positive correlations were found between the C/N ratio and Collembolan abundance ($r=0.71$; $F=10.44$, $p<0.05$) and between soil organic matter content and Collembola diversity ($r=0.61$, $F=5.98$, $p<0.05$). The canonical correspondence analysis (CCA) well separated the steppe oak forests and the non-native plantations along the axis mostly determined by soil pH and carbon content.

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