Department of Biology and Ecology,
Faculty of Sciences and Mathematics, University of Niš
Institute for Nature Conservation of Serbia

13th Symposium on the Flora of Southeastern Serbia and Neighboring Regions

Stara planina Mt. 20 to 23 June 2019

13. Simpozijum o flori jugoistočne Srbije i susednih regiona

Stara planina 20. do 23. jun 2019.

ABSTRACTS
APSTRAKTI

Niš-Belgrade, 2019

Department of Biology and Ecology,
Faculty of Sciences and Mathematics, University of Niš
Institute for Nature Conservation of Serbia

13th Symposium on the Flora of Southeastern Serbia and Neighboring Regions

Stara planina Mt., 20th to 23th June, 2019

Abstracts

This Symposium is organized with the financial support of the Ministry of Education, Science and Technological Development of Republic of Serbia

13th Symposium on the Flora of Southeastern Serbia and Neighboring Regions, Stara planina Mt., 20th to 23th June 2019

Book of Abstracts

Organizers

Department of Biology and Ecology, Faculty of Science and Mathematics, University of Niš

Institute for Nature Conservation of Serbia

Printed by

Štamparija Beograd

Number of copies

200

INTRODUCTORY LECTURE

Serbian spruce, endemicity and advantages

Mitrović, A.Lj., Bogdanović Pristov, J., Simonović Radosavljević, J., Radotić, K.

Institute for Multidisciplinary Research, University of Belgrade, Kneza Višeslava 1, 11000 Belgrade, Serbia

* *mita@imsi.rs*

Picea omorika (Pančić) Purkyně is Balkan endemic coniferous species and Tertiary relict of the European flora. Its natural habitat is fragmented and reduced to the middle and upper courses of the Drina River, in Western Serbia and Eastern Bosnia and Herzegovina. This region represents species long-term, cryptic and last refugium. The current limited natural range of Serbian spruce is mainly the result of the species poor competing ability. It retreats to areas less inhabitable by its competitors, predominantly *Picea abies* and *Fagus orientalis*. It inhabits open habitats, comprising cliffs and forest clearings, characterized by strong northerlywind, snow and rockfalls. Since the middle of the 19th century, its natural range declines continuously. Planting Serbian spruce outside its natural range has a long tradition, either as an ornamental tree species, or for afforestation, throughout Central and Northern Europe. Despite its endemism, *P. omorika* is considered as one of the most adaptable spruces.

Wood properties are determined by cell arrangement, size and shape, and cell wall structure and thickness. Conifers, as a response to mechanical stress, such as wind and stem lean, form reaction wood called compression wood (CW). Its formation occurs on the lower side of the leaning stem, resulting in eccentric growth. Wood opposite to the CW in the same growth ring is termed opposite wood (OW), while wood from growth rings that do not contain any CW is termed normal wood (NW). CW is characterized by reduced tracheid length, rounder cell cross-sectional profile, presence of intercellular spaces, absence of the S3 cell wall layer and presence of helical cavities in S2 layer. Higher lignification, as one of the main characteristics of CW, is associated with changed lignin composition, increased amounts of p-hydroxyphenyl monomers and increased condensation of monomer units in the polymer. Consequently, CW contains less cellulose, with greatly increased amounts of galactan, and slightly lower amounts of mannan and xylan, and with higher angle of cellulose microfibrils in the S2 layer of the cell wall, compared to NW.

CW occurs in a range of gradations from near NW to severe CW (SCW), mild CW (MCW) forming a continuum between NW and SCW. The degree of development of particular features of CW does not necessarily change in parallel to each other, so the severity of a given tracheid is represented as a function of the degrees of development of individual features, mainly lignification, helical cavities and cell wall thickness. Visual detection of compression wood severity, more precisely the determination of MCW, is difficult. As the severity of CW affects mechanical and chemical properties of wood in forest products industry it is desirable to be able to measure CW severity.

We developed different morphometric and non-morphometric methods for distinguishing wood samples on a compression severity scale. They are based on tracheid double wall thickness, cellulose microfibrils order (distribution and alignment of cellulose microfibrils), or variation in lignin structure. We used confocal fluorescence microscopy and spectroscopy, and fluorescence-detected linear dichroism (FDLD) microscopy, combined with development of new algorithms and statistical analysis. We tested our methods on stem samples of *P. omorika* juvenile trees exposed to long term static bending. *P. omorika* belongs to slow-growing conifer species in which CW typically occurs in a severe form, while juvenile conifer wood is characterized by randomly distributed MCW, NW often being absent. These are the features that suggest *P. omorika* juvenile wood a good choice of samples for evaluation of the precision of methods suggested for estimation of compression wood severity.

Our methods for distinguishing wood samples on a compression severity scale provide a fine gradation of juvenile *P. omorika* wood samples from NW to the severest form of CW, compression severity scales being partially different. The presented results qualify our methods for use in estimation of compression wood severity in forest products industries, individually or in combination, and confirm juvenile *P. omorika* stem samples as a good choice of samples for evaluation of the precision of methods suggested for compression wood severity estimation.

Acknowledgements. This study was supported by Grant 173017 of the Ministry of Education, Science and Technological Development of the Republic of Serbia.