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2017 Prize and Award Winners

The Japan Wood Research Society Prize

The Japan Wood Research Society Prize was awarded to Takuya AKIYAMA, Graduate School of Agricultural and Life Sciences, The University of Tokyo, for his work “Study on the chemical structure of lignins and their structural diversity”, and to Yoshio KIJIDANI, Faculty of Agriculture, Miyazaki University, for his work “Studies on the effects of phytohormones on the mechanism of variation of wood properties in Japanese cedar and Japanese cypress”.

The Japan Wood Research Society Progress Award

The Japan Wood Research Society Progress Award was awarded to Soichi TANAKA, Research Institute for Sustainable Humanosphere, Kyoto University, for his work “Fundamental studies for wood on controlling process of chemical treatment and on nondestructive evaluation by using millimeter and terahertz waves”, and to Kosei YAMAUCHI, Faculty of Applied Biological Sciences, Gifu University, for his work “Chemical biological study of polyphenols from plants resources aimed for drug discovery”.

The Japan Wood Research Society Regional Scientific Promotion Award

The Japan Wood Research Society Regional Scientific Promotion Award was awarded to Satoshi SAKURAGAWA, Industrial Research Institute of Shizuoka Prefecture, for his work “Regional promotion and development of wood products based on physiological-psychological evaluations”, and to Sanro TACHIBANA, Faculty of Agriculture, Ehime University, for his work “Contribution to promotion of science through advanced fundamental research into intensive utilization of wood resources in the Chugoku and Shikoku regions, Japan”.

The Japan Wood Research Society Technology Award

The Japan Wood Research Society Technology Award was awarded to Mayumi SATO and Shozo YONEYAMA, Forest Products Research Institute, Hokkaido Research Organization, and Jun NISHIHARA, Department of Medical Management and Informatics, Hokkaido Information University, for their work “Breeding of maitake “Taisetsu hananomai No. 1” and development of its food functionality”.

The Japan Wood Research Society Outstanding Woman Student Award

The Japan Wood Research Society Outstanding Woman Student Award was awarded to Yuka KOJIMA, United Graduate School of Agricultural Science, Tokyo University of Agriculture and Technology, for her work “Functional study of the fungal cellulase by mutagenesis and structure analysis”, to Hiromi SHIBUI, Graduate School of Agriculture, Hokkaido University, for her work “Structure, formation and mechanical properties of outer bark of *Betula* species”, and to Chih-Ying CHIEN, Graduate School of Agricultural and Life Sciences, The University of Tokyo, for her work “Synthesis, functionalization and characterization of regioselectively substituted curdlan derivatives”.

The Japan Wood Research Society Best Paper Award

The Japan Wood Research Society Best Paper Award was awarded to Ken WATANABE, Hideaki KORAI, Isao KOBAYASHI, Takashi YANAGIDA and Keisuke TOBA, Forestry and Forest Products Research Institute, Forest Research and Management Organization, and to Kosei MITSUI, Department of Agriculture, Forestry and Fisheries, Kumamoto Prefecture, for their work “Estimation of drying time for air-drying of logs and evaluation of log properties affecting drying characteristics of logs using a hierarchical Bayesian model”, *Mokuzai Gakkaishi*, Vol. 63, No. 2, and to Hiroki WATANABE, Yoshiyuki YANASE and Yoshihisa FUJII, Graduate School of Agriculture, Kyoto University, for their work “Nondestructive evaluation of egg-to-adult development and feeding behavior of the bamboo powderpost beetle *Dinoderus minutus* using X-ray computed tomography”, *Journal of Wood Science*, Vol. 63, No.5.

Mokuzai Gakkaishi (Journal of the Japan Wood Research Society)

Mokuzai Gakkaishi is another official journal of the Japan Wood Research Society. This journal publishes original articles, notes, review articles, and announcements from the Society in Japanese but with English abstracts, tables, and figure captions for original reports. Contents of the latest issue of *Mokuzai Gakkaishi* are as follows:

Volume 64, Number 2, 2017

Review article

Ryogo Nakada

Recent advances in the study of heartwood formation

Heartwood formation is an important feature both for the life of trees and for wood utilization by humans. It is unique to trees and can never be observed in herbaceous plants. The author reviews recent advances in the field of heartwood formation, which were achieved mainly in the first half of the 2010s, based on a lecture by the author in a symposium “Dynamics of Heartwood Substance”, held at Nagoya in March 2016. It was jointly organized by the Research Groups on Wood Anatomy and Wood Properties, and on Extractive Utilization, of the Japan Wood Research Society. Recent progress in the study of heartwood formation has been remarkable while the number of published papers was not large. It can be expected that the field will develop rapidly in the near future by the application of novel approaches with innovative ideas.

Category I

Tomoaki Kiryu, Keisuke Kojiro, Yuzo Furuta

The mechanism of improvement of physical properties of moso bamboo (*Phyllostachys pubescens*) with increasing age III: investigation from measurement by dimension changes for green bamboo by heating

The aim of this paper is to make clear the factors related to changes with increasing age of the physical properties of bamboo as a material. We measured the dimensional changes of green moso bamboo (*Phyllostachys pubescens*) at various ages (43 days–9 years since shooting) during heating. The dimensional changes which appeared in moso bamboo specimens were compared with the various components of the same individual moso bamboo found in our previous researches. The results of measurements in this paper were as follows; the dimensional changes in the tangential direction progressed with increasing age, from 43 days to 105 days since shooting, shrinkage was observed; and to 84 days since shooting, the degree of deformation became larger with increasing age. At 105 days since shooting, the deformation changed to extensional deformation. After that, the degree of deformation became greater with increasing age up to 9 years since shooting. In our past reports, it was

found that the ratio of lignin content increased in the period from 43 days to 84 days, and from the results of measurement of the temperature dependencies of the dynamic viscoelastic properties, it was anticipated that the degree of polymerization and/or crosslinking density increased with the maturing process of moso bamboo. Fourier-transform infrared spectroscopy suggested that the distance between the functional group and other functional groups decreases in the period from 84 days to 9 years since shooting. From these results, we proposed a schematic representation indicating the changes in components of moso bamboo with maturation.

Category I**Hiroyuki Sugimoto, Takuya Rikitake, Masatoshi Sugimori
Optical reflection and transmission of sugi wood in visible light**

To investigate the relationship between reflection and transmission intensities in the visible light region of wood, total light transmittance and total reflectance of sugi samples compressed at various compression rates were measured. Before compression, samples were impregnated with low molecular weight phenolic resin to maintain compressive deformation. Regardless of the rate of compression, both reflection and transmission were low in the short wavelength region. In the long wavelength region, the transmittance of the sample increased when exceeding the rate of compression to reduce lumen volume to less than 30% of initial volume, but the reflection of these samples decreased. These effects were not related to sample weight. This result contradicts the theory, proposed by Kataoka, that the transmission depends on the absorption of light. We checked the relationship between transmittance and reflection. We could confirm that the relationship is inversely proportional. Therefore, we presume that the amount of reflection within wood is important to transmit light in the long wavelength region. Assuming a model where the diameter of the cell is 30 μm and the refractive index of the cell wall is 1.6, there is strong agreement between the model and measured data in terms of the relationship between transmission and thickness. These results suggest that the reflection of light, that is, the lightness of wood, not only depends on density but also more on the amount of reflections in the layer, especially at long wavelengths.

Category I

Hideaki Korai, Ken Watanabe, Takashi Masaki, Tomoyuki Hayashi

Analyzing the modulus of rupture of particleboard subjected to outdoor exposure I: Bayesian inference of hierarchical model with gamma distribution

Particleboard was subjected to outdoor exposure for 5 years, and the relationship between exposure time and the reduction in the modulus of rupture (MOR) was inferred using either a generalized linear model (GLM) or a hierarchical model. Both models assumed gamma distribution for MOR. With the hierarchical model, MOR was inferred by Bayesian analysis. Using the GLM, the inferred variance in MOR was larger than the measured variance when the exposure time was 0 and 1 year but smaller than the measured

variance when the exposure time was 5 years. By contrast, using the hierarchical model, the inferred variance was similar to the measured variance. Moreover, the probability distribution inferred using the hierarchical model was similar to the measured probability distribution. Thus, the reduction in MOR could be correctly and suitably evaluated based on the correct inference of the probability distribution. A complex model could not be constructed for the GLM; therefore, the GLM could not correctly infer the probability distribution of MOR. However, a complex model could be constructed for the hierarchical model, and the probability distribution of MOR was inferred correctly by Bayesian analysis using the hierarchical model. Thus, Bayesian inference is an effective method for elucidating this complex phenomenon.