2.2 DIVISION OF FOREST AND BIOMATERIALS SCIENCE

1. Outline of the Division

Forests play a very important role in the environment of the earth and provide wood resources that are continuously renewable in contrast with fossil resources such as petroleum and coal. Research and educational activities of this division cover not only preservation, cultivation, and continuous production of forest resources, but also utilization of forest products for our life and culture with the aim of coexistence of forest and human beings.

This division consists of 19 laboratories, including 2 laboratories of Field Science Education and Research Center and 5 laboratories of Research Institute for Sustainable Humanosphere (renamed Wood Research Institute reconstructed in April, 2005), and their activities are international and interdisciplinary.

2. Number of students

There are 96 students （44 freshmen and 52 2nd year students） in the Master's program and 78 students in the doctor's program of this division.

3. Divisions and laboratories offering lectures

Division of Forest and Biomaterials Science: Laboratories of Forest Resources and Society, Tropical Forest Resources and Environments, Forest Utilization, Forest Biology, Landscape Architecture, Erosion Control, Biomaterials Design, Wood Processing, Biofibrous Materials, Tree Cell Biology, Composite Materials Chemistry, and the Chemistry of Biomaterials.

Field Science Education and Research Center:

Laboratories of Forest Information, and Silviculture.

Research Institute for Sustainable Humanosphere:

Laboratories of Active Bio-based Materials, Sustainable Materials, Structural Function, Innovative Humano-habitability, Biomass morphologenesis and Function

4. Event in 2004

The orientation course for freshmen on April, 17 at Kamigamo Experimental Station offered a curriculum-guidance. After the orientation, a short Station-tour and subsequent welcome party were carried out.

Chair of Forest Resource Management

2.2.1 Laboratory of Forest Resources and Society

Staff *Professor* *: Iwai,Yoshiya,Dr.Agric.Sci.*
Associate Professor: Matsushita,Koji,Dr.Agric.Sci.
Assistant Professor : Taguchi,Kozue,M.Agric.Sci

Students and research fellows
Doctor's program : (5)
Master's program: (8)
Undergraduate : (3)

A. Reseach Activities (2004.4-2005.3)

A-1. Main subjects

a) World forestry and global forest resources management

The topics include forest, forestry and forest industry in the world, and correlation between developed and developing countries through wood trade.The new forestry with fast growing species is analysed.

b) Recreational and environmental uses of forests

Research is on the meanings of recreational activities (including rural-tourism and eco-tourism) and the environmental meanings of forest from the view point of socio-economic and cultural side.

c) Production and uses of forest products

The topics include wood, non-wood products and bamboo from the view point of socio-economic, cultural and historical side.

A-2. Publications and presentations

a) Publications

Original papers

Naoko Sasaki, Tatsuichiro Kawano, Hikaru Takahara and Shinya Sugita: Phytolith evidence for the 700-years history of a dwarf-bamboo community in the sub-alpine zone of Mt. Kamegamori, Shikoku Island, Japan. Japanese Journal of Historical Botany 13 (1); 35-40, 2004

Saito, H.: Wild edible plant gathering activities practiced at ecotones: Two contrasting case studies of villages in Japan. Bulletin of the National Museum of Japanese History. No.123; 325-353, 2005

Reports

Saito, H., Mitsumata, G. and Tanaka, T.: Seekin for better solution for water allocation problems: Who benefits from water ? , Working paper of the Project 3-1, Reserch Istitute for Humanity and Nature, No.J-9, 2004 (in Japanese)

Saito, H.: An eco-historical study on mushroom use in Laos; Why and how does people get and use mushrooms?. Annual report on Project 4-2, Reserch Istitute for Humanity and Nature;

238-240, 2004 (in Japanese)

Ando,N : The lumber distribution in Kashimo village, Gifu Prefecture, Proceedings of Japanese Forestry Society, Kansai Branch 55th Annual Meeting 5, 2004 (in Japanese)

b) Conference and seminar papers presented

The 116th Annual Meeting of the Japanese Forest Society (1)

The 54th Annual Meeting of the Japanese Forestry Society,Kansai Branch (2)

XI International Palynological Congress (1)

The 51th annual meeting of the Ecological Society of Japan (1)

A-3. Off-campus activities

Membership in academic societies

Iwai, Y.: Kansai Branch of Japanese Forestry Society (Council), Forest Economic Research Institute (Council)

Matsushita, K.: Common Forest Society of Middle Japan (Secretary General, Executive Committee of 25th Annual Meeting), Center for Environmental Information Science (Reviewer)

B. Educational Activities (2004.4-2005.3)

B-1. On-campus teaching

a) Courses given

Undergraduate Level: Science of Biosphere-Life,Food and Environment- (Iwai), Outline of Agricultural Science Ⅱ (Iwai), Forest and Biomaterial Science Ⅳ (Iwai), World Forest Resources (Iwai), Graduation Thesis (Iwai), Forest Management Planning (Matsushita), Forest Tourism (Matsushita), Laboratory Course in Forest and Biomaterial Science IV (Matsushita and Taguchi), Laboratory Course in Applied Forest and Biomaterials Science (Matsushita and Taguchi), Exercises in Information Processing Basics (Matsushita), Forest Planning (Matsushita)

Graduate level: Forest Resources and Society(Iwai),Seminar in Forest Resources and Society (Iwai and Matsushita), Laboratory Course in Forest Resources and Society (Iwai and Matsushita)

B-2. Off-campus teaching, etc.

Part-time lecturers

Iwai, Y: Faculty of Agriculture,Kyoto Prefectural University (Forest Management Calculation), Graduate School of Agriculture, Kyoto Prefectural University (Special Lecture of Forest Management Planning II)

Matsushita, K.: Faculty of Agriculture, Kyoto Prefectural University (Forest Policy I, Forest Policy II),

C. Other remarks

Iwai, Y: Commiteeman of Forest Policy in Osaka Prefecture,Commiteeman of Agriculture,Forest and Fishery in Hyogo Prefecture,Commiteeman of Forest Policy in Kyoto Prefecture, Commiteeman of Agriculture, Forestry and Fishery in Osaka Prefecture, Commiteeman of Public Works Evaluation in Shiga Prefecture.Commiteeman of Old Capital Scenery in

Nara Prefecture,Consultant of Community Forest Management in Kyoto Prefecture, Commiteeman of National Forest Management in Kinki and Chugoku Area

Ito, H ：Receiving a price,The choicest prize of NPO Kyoiku Gakusha'Inaka' 2004, 2005

2.2.2 Laboratory of Tropical Forest Resources and Environments

Staff *Professor* *: Ohta, Seiich, D. Agric. Sci.*
Ass. Professor *: Kanzaki, Mamoru, D. Sci.*
Assistant Professor : Kaneko, Takayuki

Students and research fellows
Doctor's program : (8)
Master's program : (9)
Undergraduate : (4)
Research student : (2)

A. Research Activities (2004.4-2005.3)

A-1. Main subjects

a) Elements cycling and sustainable management of industrial tree plantations in the tropics

To evaluate and predict the sustainability of industrial plantation rapidly expanding in the devastated land in the tropics, and to present the measures to solve the related problems, the researches have been initiated on budget of nutrient elements and GHEG in soil-plant systems of industrial tree plantation of leguminous species and also on the mechanism of their fluctuation with forestry practices.

b) Soil ecology and forest distribution in the area of tropical seasonal forests

To elucidate and predict the influence of forest change in the Mekong basin on hydrological cycling in the area, the researches are in progress to demonstrate the soil physical characteristics as mechanical composition, pore distribution and hydraulic conductivity, and structure, species composition and leaf area index of forests for major soil-forest combinations which are extracted by analyzing the distributions pattern of soil and vegetation in the area.

c) Carbon sequestration function of tropical seasonal forests and its fluctuation

For the quantitative evaluation of the carbon sequestration function of forest, members of the laboratory are studying at a tropical seasonal evergreen forest of Thailand, with special reference to coarse woody debris (CWD) and long-term forest dynamics.

d) Maintenance and regeneration mechanism of tropical forests

For elucidating the maintenance and natural regeneration mechanisms of tropical forests, dynamics of seedlings and saplings and insect-plant interactions of several forest types are being studied. Furthermore, various disturbances to forests, such as fire and slash-and-burn activity of human beings in the areas of rainforest, seasonal forests and montane forests in Asian tropics are also being studied.

A-2. Publications and presentations

a) Publications

Books

Ohta, S.: Forest and soil environment, The Forest Protection (Suzuki K. Eds.), pp.72-79, Asakura Publishing, Tokyo, 2004 (in Japanese)

Itoh A, Rokujo N, Kanzaki M, Yamakura T, LaFrankie JV, Ashton PS & Lee HS: An approach for assessing species-specific density-dependence and habitat effects on recruitment of a tropical rain forest tree. In E. C. Losos, R. Condit, J. V. LaFrankie and E. G. Leigh, Eds. Tropical Forest Diversity and Dynamism: Findings from a Network of Large-Scale Forest Dynamics Plots, pp.320-339. University of Chicago Press, Chicago, Illinois, USA. 2004

Kanzaki, M. Hara, T. Yamakura, M. N. Tamura, T. Ohkubo,K. Sri-ngernyuang, P. Sahunalu. S. Teejuntuk, & S. Bunyavejchewin: 2004. Doi Inthanon Forest Dynamic Plot, Thailand. In E. C. Losos, R. Condit, J. V. LaFrankie and E. G. Leigh, Eds. Tropical Forest Diversity and Dynamism: Findings from a Network of Large-Scale Forest Dynamics Plots, pp474-481. Chicago University Press, Chicago, Illinois, USA. 2004

Report etc.

Toriyama Jumpei, Seiichi Ohta, Makoto Araki, Mamoru Kanzaki, Saret Khorn, Phearak Pith, Sopheap Lim and Sopheavuth Pol: Properties and Distribution of Soils in Kampong Thom, Cambodia. Trans. J. For. Soc. 115 :65, 2004 (in Japanese)

Araki Makoto, Mamoru Kanzaki, Seiichi Ohta, khorn Saret, Pith Phearak, Lim Sopheap and Pol Sopheavuth: Forest and soil moisture conditions in Kampong Thom province Cambodia. Trans. J. For. Soc. 115 :67, 2004 (in Japanese)

ITO Eriko, mamoru Kanzaki, Takayuki Kaneko, Khorn Saret, Pith Phearak, Lim Sopheap and Pol Sopheavuth: Seasonal change of Leaf Area Index in Tropical Seasonal Forests in Kompong Thom Province, Cambodia. Trans. J. For. Soc. 115 :68, 2004 (in Japanese)

Yamashita, N., Ohta, S., Saifuddin, A., Hardjono, A.: Soil change caused by establishment of Acacia mangium plantation. Trans. J. For. Soc. 115 :73, 2004 (in Japanese)

Suzuki, R., S. Takeda, M. Kanzaki, Saw Kelvin Keh and Hla Maung Thein : Is taungya teak reforestation sustainable?Ecological problems of teak plantations from the viewpoint of vegetation dynamics during the last 100 years. Trans. J. For. Soc. 115 : 307, 2004

Kanzaki, M., Fukushima M., Hla Maung, Thein Yaza Min: Structure and Composition of Teak Bearing Forest :Impact of Selective Logging. Trans. J. For. Soc. 115 : 308, 2004

Kaneko, T. and Research group The MONDORI-Dani: Long Term and Large Scale Studies at the MONDORI-Dani 16ha Forest Plot in Ashu, Kyoto. Trans. J. For. Soc. 115 : 360, 2004 (in Japanese)

Kaneko Y., Takada S., Kaneko T.: Effects of natural disturbances on dynamics of two riparian canopy species at the MONDORI-Dani Forest Plot in Ashiu, Kyoto. Trans. J. For. Soc. 115 :445, 2004 (in Japanese)

Ando M., Kaneko T., Yamasaki K., Yamanaka N., Hasegawa N., Sakai, T., Kaneko Y., Ohata S., Takeuchi N.: 10 years stand dynamics of 16-ha natural forest of Mondoridani watershed:Effect of topography on lower cooltemperate natural forest mixing Sugi. Trans. J. For. Soc. 115 :446, 2004 (in Japanese)

Hiramatsu R., Kanzaki M., Kaneko T., Okuda E., Ohta S., Khorn Saret, Pith Phearakm Lim Sopheap, Pol Sopheavuth: Forest distribution pattern and microtopigraphy in Kompong

Thom, Cambodia. Trans. J. For. Soc. 115 : 469, 2004 (in Japanese)

Toda, T., Takeda, H., Tokuchi, N., Ohta, S., Wacharinrat, C., and Kaitpraneet, S.: Influence of fire protection to the pattern of nitrogen return into soil through litterfall -Analysis of litterfall and A0 layer in dry deciduous forests, Thailand. Trans. J. For. Soc. 115 : 534, 2004 (in Japanese)

Mukai Y., Ohta S., Kaneko T., Okimori Y. Dwi Sulistyyono, Saifuddin Anshori: Nutrient export and return with harvesting of Acacia mangium: Example in the island of Sumatora, Indonesia. Trans. J. For. Soc. 115 :539, 2004 (in Japanese)

Naito, Y., Kanzaki, M., Numata, S., Konuma, A., Nishimura, S., Ohta, S., Tsumura, Y., Okuda, T., Lee, S.L. and Norwati, M. (2004) Reproductive ecology of Shorea acuminata (Dipterocarpaceae): Flower/seed production and factors affecting seed set. Research report of the NIES/FRIM/UPM joint research project 2003

Kiyohara Shoko, Kanzaki Mamoru, Ohta Seiichi, Kajiwara Tsuguaki, Chongrak Wachrinrat and Pongsak Sahunalu The role of Coarse Woody Debris dynamics in carbon Sequestration of Tropical Dry Evergreen Forest, Northeast Thailand Proceedings of The 51st Annual Meeting of the Ecological Society of Japan. p.125 2004

Naito, Y., Kanzaki, M., Numata, S., Konuma, A., Nishimura, S., Ohta, S., Tsumura, Y., Okuda, T., Lee, S.L., and Norwati, M.: Reproductive strategy of Shorea acuminata: Significance of mass reproduction at irregular intervals. Proceedings of The 51st Annual Meeting of the Ecological Society of Japan. p.145 2004

Ito E., Kanzaki M. Khorn Saret, Det Seila, Pith Phearak, Lim Sopheap, Pol Sopheavuth: Estimation of defoliation phenology of a tropical dry deciduous forest using NOAA data. Proceedings of The 51st Annual Meeting of the Ecological Society of Japan; p.249 2004 (in Japanese)

Maesako Y., Nanami S., Kanzaki M.: Characteristics of distribution of two alien species, Podocarpus nagi and Sapium sebiferum, in a warm-temperate evergreen forest of Kasugayama, Nara, Japan. Proceedings of The 51st Annual Meeting of the Ecological Society of Japan.p.311. 2004 (in Japanese)

Nanami Satoshi, Maesako Yuri, and Kanzaki Mamoru: Spatial variation of population structures of Podocarpus angi and Sapium sebiferum invading into a primary forest at Kasugayama Hill. Proceedings of The 51st Annual Meeting of the Ecological Society of Japan.p.311 2004 (in Japanese)

Kanzaki, M.: Dynamic Survival Strategies of Trees in Tropical Forests. Proceedings of the Kyoto University Open Lecture "World viewed from forests and trees" p.9-16. Graduate School of Agriculture, Kyoto University 2004 (in Japanese)

Ryota Konda1), Seiichi Ohta2), Shigehiro Ishizuka3), Seiko Arai2), Saifuddin Ansori4), Nagaharu Tanaka3) and Hardjono Arisman4): Spacial variability of N2O flux and soil parameters in soils of Acacia mangium plantation:Dry season measurement in South Sumatra. The Proceedings of the 116th Japanese Forest Society Conference; 3A09, 2005

Wakita, C., Hara, M., Jiyana, Wicaksono, A., Kanzaki, M. and Kiyono, Y: Land-use Change and the Distribution of a Pioneer Tree, Schima wallichii, in South Sumatra, Indonesia. The Proceedings of The 116th Ann. Meeting of Japanese Forestry Society; 3B23, 2005 (in Japanese)

Fukushima, F., Kanzaki, M., Hara, M., Ohkubo, T., Nishio, T., Preechapanya, P.: Dynamics of

secondary forest after the cessation of shifting cultivation and the utilization of forest by Karen in Doi Inthanon national park, northern Thailand. The Proceedings of the 116th Japanese Forest Society Conference; 3B26, 2005 (in Japanese)

Kanzaki Mamoru, Ayako Sasaki, Maki Fukushima, Pornchai Preechapanya and Hla Maung Thein: Evaluation of Ecological Function of Forests in Shifting Cultivation and Miang Cultivation Systems. The Proceedings of the 116th Japanese Forest Society Conference; 3B30, 2005 (in Japanese)

Sasaki, A., Kanzaki, M., Takeda, S., and Preechapanya, P.: Changes in Subsistence and its Socio-economic Factors in Miang (Chewing Tea) Village, Northern Thailand. The Proceedings of the 116th Japanese Forest Society Conference; 3B32, 2005 (in Japanese)

Kumagai Naoki, Mamoru Kannzaki, Takuo Yamakura and Kuriangsak Sri-ngernyuang: Diameter growth analysis of tropical montane forest species of Doi Inthanon Forest Dynamics Plot. The Proceedings of the 116th Japanese Forest Society Conference; PA140, 2005 (in Japanese)

Yonekura, Y., Ohta, S., Kiyono, Y., Aksa, D., Morisada, K., Tanaka, N.: Twelve Years' changes of Soil Organic Carbon in Imperata Grassland, East Kalimantan. The Proceedings of the 116th Japanese Forest Society Conference; PB088, 2005 (in Japanese)

Toriyama Jumpei, Seiichi Ohta, Makoto Araki, Mamoru Kanzaki, Seila Det, Sopheap Lim, Sopheavuth Pol and Phearak Pith: Soil physicochemical properties of deciduous dipterocarp forests in the east bank of Mekong, Cambodia. The Proceedings of the 116th Japanese Forest Society Conference; PB099, 2005 (in Japanese)

Arai Seiko, Seiichi Ohta, Shigehiro Ishizuka, Saifuddin Anshori, Naoko Tokuchi, Nagaharu Tanaka and Arisman Harjdono: Seasonal change of N2O flux from soils of Acacia mangium plantation:Comparison with fallow forests in South Sumatra. The Proceedings of the 116th Japanese Forest Society Conference; PB115, 2005

Yashiro Naoki, Naoyuki Yamashita, Seiichi Ohta, Saifuddin Ansori and Arisman Hardjono:Soil phosphorus forms in Acacia mangium plantation on Southern Sumatra with special attention to Organic phosphorus. The Proceedings of the 116th Japanese Forest Society Conference; PB120, 2005 (in Japanese)

Kaneko Takayuki, Yasuyuki Okimori, Anshori Saifuddinand Seiichi Ohta: Biomass and Stand Structure of Accacia mangium, Indonesia. Proceedings of The 52nd Annual Meeting of the Ecological Society of Japan; 183, 2005 (in Japanese)

Toda, T., Takeda, H., Tokuchi, N., Ohta, S., Wacharinrat, C., and Kaitpraneet, S.: Nitrogen cycling under the different fire regimes in dry deciduous forest, Thailand -The amount of belowground biomass and estimation of nitrogen return-. Proceedings of The 52nd Annual Meeting of the Ecological Society of Japan; 184, 2005 (in Japanese)

Kajiwara T., Kanzaki M. and Chongrak Wachrinrat: Spatial characteristic of understory light regime with population dynamics of Hopea ferrea seedling. Proceedings of The 52nd Annual Meeting of the Ecological Society of Japan; 191, 2005 (in Japanese)

Tani Akihiro, Eriko Ito, Mamoru Kanzaki, Seiichi Ohta, Saret Khorn, Phearak Pith, Sopheap Lim, Bora Tith and Sopheavuth Pol: Extraction and classification of main forest types in Cambodia. Proceedings of The 52nd Annual Meeting of the Ecological Society of Japan; 236, 2005 (in Japanese)

Teraok Ari, Takayuki Kaneko, Tsuguaki Kajiwara and Mamoru Kanzaki: Ecological role of

resprouting of Heritiera littoralis growing on the disturbance site. Proceedings of The 52nd Annual Meeting of the Ecological Society of Japan; 288, 2005 (in Japanese)

b) Conference and seminar papers presented

The 115th Ann. Meeting of Japanese Forestry Society (11)

The 51th Ann. Meeting of Ecological Society of Japan (5)

The 2nd Meeting of Kinki Branch, Ecological Society of Japan (1)

The 116th Ann. Meeting of Japanese Forestry Society (10)

The 52th Ann. Meeting of Ecological Society of Japan (5)

A-3. Off-campus activities

Membership in academic societies (roles)

Ohta, S.: Japanese Society of Forest Environment (Council member), Editorial board of The Tropical Forestry (Editor)

Kanzaki, M.: The Japanese Association of Tropical Ecology (Council member, Secretary), The Society of Vegetation Science (Editor), Kansai Organization of Nature Conservation (Executive member)

Research grants

Ohta, S.: JSPS research grant: Kiban-kenkyu A -2; Clarification and prediction of soil acidification under leguminous fast-growing tree plantation in humid tropic. (Rep. Ohta), JSPS research grant: Kiban-kenkyu B -2; Elucidation of the mechanism of the changes in species composition and the prediction of Carbon sink function of tropical forests under the effect of fire. (Ohta, Rep. Y. Kiyono), Research Revolution 2002; Model Development for the Predication of Water Resources Changes due to Natural Variation and Human Modification in the Asia Monsoon Region. (3) The study on processes related to hydrological cycling and model development. (Ohta, Rep.: K. Takeuchi), Co-research Grant of Ministry of Environment; Study of Terrestrial Ecosystem of Asia for the Carbon Management of 21st Century. (Ohta, Rep.: Tani)

Kanzaki, M.: JSPS research grant: Kiban-kenkyu B-2; Ecological resouece utilization and the household strategies of minor ethnic groups of Myanmar: Perspective to the regional comparison. (Kanzaki, Rep.: Y. Hayami), JSPS research grant: Kiban-kenkyu B-2;Elucidation of the mechanism of the changes in species composition and the prediction of Carbon sink function of tropical forests under the effect of fire. (Kanzaki, Rep. Y. Kiyono), Nippon Life Insurance Foundation; Ecological restoration of tropical montane forest based on traditional local knowledge of hill tribes. (Rep.: M. Kanzaki), Co-research Grant of Ministry of Environment; Study of Terrestrial Ecosystem of Asia for the Carbon Management of 21st Century. (Kanzaki, Rep.: Tani), Research Revolution 2002; Model Development for the Predication of Water Resources Changes due to Natural Variation and Human Modification in the Asia Monsoon Region. (3) The study on processes related to hydrological cycling and model development (Kanzaki, Rep.: K. Takeuchi)

Kaneko, T.: JSPS research grant: Kiban-kenkyu A -2; Clarification and prediction of soil acidification under leguminous fast-growing tree plantation in humid tropic. (Kaneko, Rep. S. Ohta), JSPS research grant: Young Scientists B; Tree flora of tropical lowland forest in Jambi, Sumatra Island, Indonesia

A-4. International cooperation and overseas activities

International joint researches, overseas research surveys

Ohta, S.: Study on clarifying the soil acidification under leguminous fast-growing tree plantation in humid tropic (Indonesia), Short-term expert for Japan International Cooperation Agency Project of Forest management for carbon sequestration in Indonesia. (Indonesia), Survey for the study on processes related to hydrological cycling and model development (Cambodia, Thailand), Survey for the Project of technical development for promoting CDM tree plantation (Indonesia)

Kanzaki, M.: The study on processes related to hydrological cycling and model development (Cambodia, Thailand), Study of Ecological restoration of tropical montane forest based on traditional local knowledge of hill tribes (Thailand), Stuty of Elucidation of the mechanism of the changes in species composition and the prediction of Carbon sink function of tropical forests under the effect of fire (Indonesia)

Kaneko, T.: Study on clarifying the soil acidification under leguminous fast-growing tree plantation in humid tropic (Indonesia)

B. Educational Activities (2004.4-2005.3)

B-1. On-campus teaching

a) Courses given

Undergraduate level: Forest Science I (Ohta), Tropical Forest Environment (Ohta), Tropical Forest Resources (Kanzaki), Practice in Environmental Science (Ohta, Kanzaki), Laboratory Course in Biological and Environmental Science I (Kanzaki, Kaneko), Laboratory Course in Forest and Biomaterials Biology (Kanzak, Kaneko), Laboratory Course in Ecology (Kanzaki, Kaneko), Practice in University Forest I (Kanzaki, Kaneko). KUINEP (Ohta, Kanzaki), Environmental Studies A (Kanzaki)

Graduate level: Tropical Forest Environment (Ohta), Seminar in Tropical Forest Resources and Environments (Ohta, Kanzaki), Practice in Tropical Forest Environments (Ohta, Kanzaki)

B-2. Off-campus teaching, etc.

Part-time Lectures

Kanzaki, M.: Special lecture (Faculty of Agriculture, Tottori University), Practice in Environmental Biology I (Faculty of Science: Osaka Women's University)

Open Lectures

Kanzaki, M.: Open Lecture of Kyoto University "World Viewed from Forests and trees" (Lecturer)

Kaneko, T.: Open Lecture of Kyoto University "World Viewed from Forests and trees" (Field training)

B-3. Overseas teaching

Students and research fellows from abroad

Kanzaki, M.: University of Forestry, Myanmar (Special Lecture; Japan Student Services Organization)

C. Other remarks

Ohta, S.: UFJ Research Institute, the issues of forest carbon sink (Working group member); Japanese Center for Environment and Health, Acid Deposition and Oxidants Research Center, Soil and vegetation monitoring (Analyzing group member), Interior data verification group (Committee member), Working group for soil and vegetation (Committee member), Supporting group for soil and vegetation task force (Committee member), Group for methodological development of catchment analysis (Committee member); JIFPRO, Project of technical development for promotion of CDM tree plantation (Committee member); Ministry of Environment, Project of counter-measure for acid deposition (Committee member); Japanese Center for Overseas Plantation Promotion, Project of environmental impacts of artificial forest in developing countries (Committee member); Japan Forestry Technology Association, Project of system development for identification of carbon sink forests (Committee member); Forestry Agency, Monitoring of acid deposition and forest decline (Committee member); Japan Society for the Promotion of Science, funding for science research (Technical committee member).

Chair of Forest and Forestry Production

2.2.3 Laboratory of Forest Utilization

Staff *Professor* *: Nobuchi, Tadashi, Dr. Agric. Sci.*
Associate Professor: Okada, Naoki, Dr. Agric. Sci.
Assistant Professor : Hasegawa, Hisashi, Dr. Agric. Sci.

Students and research fellows
Doctor's program: (3)
Master's program: (6)
Undergraduate : (7)

A. Research Activities (2004.4-2005.3)

A-1. Main subjects

a) Relationship between tree growth characteristics and wood quality of plantation grown trees.

To clarify wood properties of old-aged sugi plantation, volume growth was analyzed. Until about 100-year-old current growth exceeded mean annual growth. The result offered fundamental data to evaluate old-aged plantation from the viewpoint of volume growth.

b) Characterization of wood formation in tropical trees

For the sustainable management of tropical forests together with the improved utilization of tropical woods, eco-physiological study is necessary. For this purpose Thailand and Malaysia were selected as the research sites. In Thailand trees belonging to Dipterocarpaceae were exclusively studied in two sites, Sakaerat (northeast) and Trang (south). In Sakaerat wood

C. Other remarks

Ohta, S.: UFJ Research Institute, the issues of forest carbon sink (Working group member); Japanese Center for Environment and Health, Acid Deposition and Oxidants Research Center, Soil and vegetation monitoring (Analyzing group member), Interior data verification group (Committee member), Working group for soil and vegetation (Committee member), Supporting group for soil and vegetation task force (Committee member), Group for methodological development of catchment analysis (Committee member); JIFPRO, Project of technical development for promotion of CDM tree plantation (Committee member); Ministry of Environment, Project of counter-measure for acid deposition (Committee member); Japanese Center for Overseas Plantation Promotion, Project of environmental impacts of artificial forest in developing countries (Committee member); Japan Forestry Technology Association, Project of system development for identification of carbon sink forests (Committee member); Forestry Agency, Monitoring of acid deposition and forest decline (Committee member); Japan Society for the Promotion of Science, funding for science research (Technical committee member).

Chair of Forest and Forestry Production

2.2.3 Laboratory of Forest Utilization

Staff *Professor* *: Nobuchi, Tadashi, Dr. Agric. Sci.*
Associate Professor: Okada, Naoki, Dr. Agric. Sci.
Assistant Professor : Hasegawa, Hisashi, Dr. Agric. Sci.

Students and research fellows
Doctor's program: (3)
Master's program: (6)
Undergraduate : (7)

A. Research Activities (2004.4-2005.3)

A-1. Main subjects

a) Relationship between tree growth characteristics and wood quality of plantation grown trees.

To clarify wood properties of old-aged sugi plantation, volume growth was analyzed. Until about 100-year-old current growth exceeded mean annual growth. The result offered fundamental data to evaluate old-aged plantation from the viewpoint of volume growth.

b) Characterization of wood formation in tropical trees

For the sustainable management of tropical forests together with the improved utilization of tropical woods, eco-physiological study is necessary. For this purpose Thailand and Malaysia were selected as the research sites. In Thailand trees belonging to Dipterocarpaceae were exclusively studied in two sites, Sakaerat (northeast) and Trang (south). In Sakaerat wood

anatomical features and water conditions were compared between dry evergreen forest and dry deciduous forest using 10 species. The importance of small diameter vessels in water conduction was noted under water stressed condition. In Trang seasonal characteristics of wood formation in relation to water conditions were also investigated. In Malaysia second-year's measurements of monthly radial growth of plantation grown *Dryobalanops lanceolata* were carried out by means of dendrometer and pinning method.

c) Vessel formation and phenology of broad-leaved trees

The timing of vessel formation and leaf flush was compared for 9 broad-leaved tree species. As a result, there was conspicuous difference between ring-porous and deffuse-porous species. In ring-porous species, lignification of the first vessels in the trunk and the branches completed almost as same as leaf flush. On the other hand, lignification of the first vessels in the branches completed just after leaf flush, and in the trunk one month after. The leaf flush in ring-porous species was later than that in the deffuse-porous species. However, the former species form large-diameter vessels, which enable the species efficiently to transport water, and hence to photosynthesize.

d) Studies on sustainable use of forest resources

Forests are expected to be one of the most important resources not only as environmental resources but also material and energy resources for the future society with an environmentally-sound material cycle. Forest information and new forest management and utilization technologies are essential for highly sustainable utilization of diverse forest functions. Therefore, (1) monitoring forest resources by using remote-sensing data, (2) GPS performance under tree canopies, (3) estimation of wildlife habitat by using GIS and GPS, and (4) environmental impacts of forest management and utilization activities, were discussed.

e) Evaluation of the effect of thinning on forest environment and tree growth

(1) Relationship between recovery of forest floor vegetation and topsoil run-off after the line thinning was investigated in sugi and hinoki plantations. In sugi plantation recovery of vegetation combined with litter effectively decreased topsoil run-off. In hinoki stand, however, topsoil run-off was not much decreased because of different characteristics of litter with scaly leaves.

(2) Recovery of vegetation and tree growth characteristics after intensive thinning were studied in sugi plantation in Tokushima prefecture. The recovery of vegetation was evaluated using biological diversity indexes. To evaluate the changes of tree growth, stem analysis was carried out. In the stand in which thinning was performed at about 30-year-old, radial growth was not much affected even after intensive thinning.

f) Study on the recovery of active and attractive village forest

To propose an idea for recovering active and attractive village forest, a field site in Ide-cho (Kyoto prefecture) was selected. As the first step forest and vegetation types as well as tree biomass were analyzed through field survey and aerial photography analysis.

g) Evaluation of productivity of thinning by logging systems using forest vehicles in the steep stand.

An evaluation of productivity and the cost analysis of thinning by logging systems using forest vehicles were carried out in a forest stand with steep slope. In the investigation of a company in Okayama prefecture, it was clarified to make a profit even under the severe market condition of low priced thinnings.

A-2. Publications and presentations

a) Publications

Original papers

Seino, T., N. Okada and K. Kitayama: Changes of wood anatomy linked to canopy height in a Hawaiian wet montane forest along a gradient of substrate age. TROPICS. 14(2); 173-178, 2005

Reports

Nobuchi, T.: Fundamental study for the establishment of dendrochronology in tropical trees, Final report of Monbu-Kagakusho Research Grant, Scientific Research (B) (Overseas), May, 2004 (in Japanese)

Yoshimura, T. and H. Hasegawa: Effects of post-processed and real-time DGPS on the precision and accuracy of GPS positioning in forested areas. Journal of the Japan Forest Engineering Society 19(2); 135-140, 2004

Tachiki, Y., T. Yoshimura, H. Hasegawa, T. Mita, T. Sakai, and F. Nakamura: GPS positioning accuracy while walking under forest canopy in summer and winter seasons. Journal of the Japan Forest Engineering Society 20(1); 23-28, 2005

Hasegawa, H.: How can we thin plantation trees sustainably, use them thoroughly, and make profits by them. - Report on the 12th Workshop on Forest Production System -, J. Jpn. For. Eng. Soc.20(1); 35-40, 2005 (in Japanese)

b) Conference and Seminar papers presented

The 116th Ann. Meet. Jpn. For. Soc. (1 presentation)

The 11th Ann. Meet. Jpn. For. Eng. Soc. (2 presentations)

The 14th Ann. Meet. Jpn. Soc. Trop. Eco. (1 presentation)

The 55rd Ann. Meet. Jpn. Wood Res. Soc. (1 presentation)

The 52th Ann. Meet. Eco. Soc. Jpn. (1 presentation)

A-3. Off-campus activities

Membership in academic society (roles)

Hasegawa, H.: Japanese Forestry Society (Secretary of the Awards Committee)

Research grants

Monbu-Kagakusho Research Grant: Scientific Research (A) (Overseas) Ecological wood anatomy of tropical trees (Okada, head; Nobuchi), Scientific Research (B) Influence of yellow sand on the forests in Japan, and the origin of dry fallout and its contribution to acidification (Okada), Young Scientists (B) Studies on forest management units considering wildlife habitat uses (Hasegawa)

A-4. International cooperation and overseas activities

International joint researches and overseas research survey

Nobuchi, T., Okada, N.: Characterization of wood formation in tropical trees (Thailand, Malaysia).

Nobuchi, T.: Reaction wood formation of plantation grown *Agathis* in Java Island (Indonesia).

Nobuchi T.: Wood formation and xylem structure in elite genetic-based *Eucalyptus camaldulensis* (Thailand).

Nobuchi, T.: External evaluation committee member of the Universiti Putra Malaysia, Faculty of Forestry (Malaysia).

Nobuchi, T.: A JICA project of “Promotion of plantation and wood utilization in semi arid area in northeast Brazil” (Short term expert).

B. Educational Activities (2004.4-2005.3)

B-1. On-campus teaching

a) Course given

Undergraduate level: Basic Science for Forest and Biomaterials IV (Nobuchi), Forest Utilization (Nobuchi), Tree Physiology (Okada), Reading of foreign literature II (Nobuchi), Computer Aided Forest Science (Hasegawa), Laboratory Course in Forestry and Biomaterial Science IV (Okada, Nobuchi, Hasegawa), Comprehensive Practice in Forest (Okada, Nobuchi, Hasegawa), Practice for Forest Utilization (Okada, Nobuchi, Hasegawa), Seminar in Forest Utilization (Nobuchi, Okada, Hasegawa), Introduction to Research (Nobuchi, Okada, Hasegawa)

Graduate level: Special Lecture on Forest Utilization I (Nobuchi), Scientific writing and presentation in English (Okada), Seminar in Forest Utilization (Nobuchi, Okada, Hasegawa), Laboratory course in Forest Utilization (Nobuchi, Okada, Hasegawa)

B-3. Overseas teaching

Students and research fellows from abroad

Visiting scientists: JSPS 1 (Malaysia). Monbu-Kagakusho 2 (Thailand)

2.2.4 Laboratory of Forest Biology

Staff *Professor* *: Kikuzawa, Kihachiro, Dr. Agric. Sci*
Lecturer *: Takayanagi, Atsushi, Dr. Agric. Sci*
Assistant Professor : Yamasaki, Michimasa, Dr. Agric. Sci

Students and research fellows
Doctor's program : (8)
Master's program: (8)
Undergraduate : (3)
Research fellow : (1)

A. Research Activities (2004.4-2005.3)

A-1. Main subjects

a) Construction of a model for carbon absorption by forests

In order to construct a model for carbon absorption by forests, Both a model for shoots photosynthesis and integral model for shoots making up crown were constructed. Production rate of forests was estimated by integral methods and flux methods. Estimation model for yearly photosynthetic rate of a shoot was constructed based on the facts that the total numbers of leaves produced in one growing season differ between flushing species and successive species but the number of live leaves on the shoots is almost the same.

b) Turn over rate of leaves

A single theoretical equation can explain leaf longevity, evergreenness and deciduousness. It was clarified that the theory can be held in wider plant populations. A new theory was developed by incorporating new parameter, or supporting costs of leaves. The new theory well explains the difference in mean leaf longevity among different ecosystems as well as ontogenic difference in leaf longevity of tree species.

c) Tree leave herbivory by animals

A long term study of fecal pellet drops in a temperate deciduous forest was carried out. Outbreak of herbivorous insect population occurs in the temperate forest once 5 or ten yrs. The probability of insect outbreak is lower in tropical forests than in temperate forests. Various phenolic compounds as the defensive material of trees against herbivores were investigated.

d) Wildlife damage protection and conservation

In order to know the mechanism of black bear bark stripping damage, we investigated the nutritional traits of inner-bark of *Crytomeria japonica*, damages in natural forests, DNA analysis of hairs and saliva sticking on scars. Experimental studis on stable isotopic ratio of Hokkaido brown bear were conducted at Noboribetsu-Zoo. Effects of herbivory on understory species were studied in Ashu forest research station. The relationships of two Amami rabbit population was investigated by DNA analysis.

e) Seed disperser and plants

Interaction between seed eating bird species and plant are investigated. Comparative study on wind-dispersal and scatter hording by field mice was conducted.

A-2. Publications and presentations

a) Publications

Books

Kikuzawa, K.: Ecology of Leaf Longevity – from individual leaves to ecosystems, pp.212, 2005

Kikuzawa, K.: With Sketchbook in My Pocket, pp.139, 2005

Original articles

Ali, M.S. and K. Kikuzawa: Anisophylly in *Aucuba japonica* (Cornaceae): An outcome of spatial crowding in the bud. CANADIAN JOURNAL OF BOTANY 83 (2); 143-154, 2005

Miyazawa, Y. and K. Kikuzawa: Winter photosynthesis by saplings of evergreen broad-leaved trees in a deciduous temperate forest. NEW PHYTOLOGIST 165 (3); 857-866, 2005

Ishihara, M. and K. Kikuzawa: Species-specific variation in shoot production patterns of five birch species with respect to vegetative and reproductive shoots. CANADIAN JOURNAL OF BOTANY 82 (9); 1393-1401, 2004

Miyazawa, Y. and K. Kikuzawa, Phenology and photosynthetic traits of short shoots and long shoots in *Betula grossa*. TREE PHYSIOLOGY 24 (6); 631-637, 2004

Kikuzawa, K., H. Shirakawa, M. Suzuki and K. Umeki: Mean labor time of a leaf. ECOLOGICAL RESEARCH 19 (4); 365-374, 2004

b) Conference and seminar papers presented

115th Annual Meeting of The Forestry Society of Japan (2 presentations)

89th ESA Annual Meeting (1 presentation)

51th Annual Meeting of The Japanese Ecological Society (7 presentations)

1st EAFES International Congress (5 presentations)

52th Annual Meeting of The Japanese Ecological Society (9 presentations)

A-3. Off-campus activities

Membership in academic societies

Kikuzawa, K. Ecological Society of Japan (Secretary General),

Takayanagi, A. Mammalogical Society of Japan (Audit)

Research grants

Kikuzawa, K.: Ministry of Education, Science, Sports and Culture of Japan; Analysis of Biodiversity of Natural Beech Forest using Molecular Marker (share)

Yamasaki, M.: Ministry of Education, Science, Sports and Culture of Japan; Survey and Application of antagonistic fungi in controlling of a forest epidemic, Japanese Oak Wilt (share)

B. Educational Activities (2004.4-2005.3)

B-1. On-campus teaching

a) Courses given

Undergraduate level: Reproductive Ecology in Forest Plants (Kikuzawa), Wildlife Conservation Science (Takayanagi), Laboratory Course in Forest and Biomaterials Science I (Kikuzawa, Takayanagi, Yamasaki), Laboratory Course in Forest and Biomaterials Biology (Takayanagi), Laboratory Course in Ecology (Takayanagi, Yamasaki), Practice in University Forests II (Takayanagi)

Graduate level: Forest biology I (Kikuzawa), Seminar in Forest Biology (Kikuzawa, Takayanagi,

Yamasaki), Laboratory Course in Forest Biology (Kikuzawa, Takayanagi, Yamasaki)

B-2. Off-campus teaching, etc.

Takayanagi: Lecture at Fukui Prefectural School of Agriculture and Forestry (2004.7.22), Agricultural Research Promotion meeting (2004.8.26), Special Nature Watching in Shiga Prefectural Visitor Center in Kutsuki (2004.9.20), Lecture in Kyoto Municipal Hanase Dai2 Jr. High School (2004.9.22), 2005 Annual meeting of Management officers of Special National Natural Monument Japanese Serow (2004.10.28), 10th Gutara-Agriculture Seminar in Earth Design School (2004.11.27), Kyoto Prefecture Wildlife Damage Policy Meeting (2004.11.29), Urgent Workshop on Bear (2004.12.11), Urgent Symposium on Bear (ERCA, 2005.1.29), Japanese Black Bear Symposium (2005.3.12)

Chair of Forest Environment Conservation

2.2.5 Laboratory of Landscape Architecture

Staff *Professor* *: Morimoto, Yukihiro, Dr. Agri. Sci.*
Lecturer *: Yoshida, Tetsuya, Dr. Agri. Sci.*
Assistant Professor : Imanishi, Junichi, Dr. Agri. Sci.

Students and research fellows
Doctor's program : (6)
Master's program : (9)
Undergraduate : (4)
Research Fellow : (1)

A. Research Activities (2004.4-2005.3)

A-1. Main subjects

a) Theory and history of landscape design

History and theory of modern landscape design have been researched continuously. The purpose of the studies is to clarify the social significance of public open spaces through the researches on economic and political backgrounds.

b) Re-vegetation and conservation research

Technological studies on conservation of forest and wildlife habitat have been researched through works in urban forest.

c) Landscape and land-use planning research

Landscape and land-use preference studies on open space in urban and urban fringe areas are conducted in order to get landscape and land-use planning theory.

d) Practice in landscape design

This laboratory has participated in the practical processes of several projects such as parks

Yamasaki), Laboratory Course in Forest Biology (Kikuzawa, Takayanagi, Yamasaki)

B-2. Off-campus teaching, etc.

Takayanagi: Lecture at Fukui Prefectural School of Agriculture and Forestry (2004.7.22), Agricultural Research Promotion meeting (2004.8.26), Special Nature Watching in Shiga Prefectural Visitor Center in Kutsuki (2004.9.20), Lecture in Kyoto Municipal Hanase Dai2 Jr. High School (2004.9.22), 2005 Annual meeting of Management officers of Special National Natural Monument Japanese Serow (2004.10.28), 10th Gutara-Agriculture Seminar in Earth Design School (2004.11.27), Kyoto Prefecture Wildlife Damage Policy Meeting (2004.11.29), Urgent Workshop on Bear (2004.12.11), Urgent Symposium on Bear (ERCA, 2005.1.29), Japanese Black Bear Symposium (2005.3.12)

Chair of Forest Environment Conservation

2.2.5 Laboratory of Landscape Architecture

Staff *Professor* *: Morimoto, Yukihiro, Dr. Agri. Sci.*
Lecturer *: Yoshida, Tetsuya, Dr. Agri. Sci.*
Assistant Professor : Imanishi, Junichi, Dr. Agri. Sci.

Students and research fellows
Doctor's program : (6)
Master's program : (9)
Undergraduate : (4)
Research Fellow : (1)

A. Research Activities (2004.4-2005.3)

A-1. Main subjects

a) Theory and history of landscape design

History and theory of modern landscape design have been researched continuously. The purpose of the studies is to clarify the social significance of public open spaces through the researches on economic and political backgrounds.

b) Re-vegetation and conservation research

Technological studies on conservation of forest and wildlife habitat have been researched through works in urban forest.

c) Landscape and land-use planning research

Landscape and land-use preference studies on open space in urban and urban fringe areas are conducted in order to get landscape and land-use planning theory.

d) Practice in landscape design

This laboratory has participated in the practical processes of several projects such as parks

and urban planning.

A-2. Publications and presentations

a) Publications

Books

Morimoto, Y. and 24others: The Forest Environment 2005(Forest Culture Association ed.), 271pp, The Asahi Shimbun Company, Tokyo, 2005

Morimoto, Y. and Natuhara, Y. (Eds) : Living Forest – theories and practices of coexistence with living creatures, 397pp. , Kyoto University Press, Kyoto, 2005

Hashimoto, H.: Birds in fragmented forests. Living Forest (Morimoto, Y. and Y. Natuhara ed.). p.152-181, Kyoto University Press, Kyoto, 2005

Hashimoto, H.: Urban greenery planning considered birds habitat. Living Forest (Morimoto,Y. and Y. Natuhara ed.). p.346-365, Kyoto University Press, Kyoto, 2005

Morimoto, Y.: Ecological dynamics of urban and rural landscapes – The need for landscape that considers the biodiversity crisis in Japan, Ecological Issues in a changing world(edited by Hong et al.), pp.325-336, Kluwer Accademic Publishers, Dordrecht, 2004

Original papers

Koh, J., T. Ueda, Y. Sasaki and Y. Morimoto: Experimental study using forest topsoil for natural environmental revegetation method in constructed area. Jap J of Reveg Tech 30; 15-20, 2004

Tabata, K., H. Hashimoto, Y. Morimoto and H. Maenaka: The effect of neighbouring tree size and disturbance on mortality of trees in Tadasu-No-Mori forest. Jap J of Reveg Tech 30; 27-32, 2004

Sasaki, Y. and Y. Morimoto: The relationship between the coastal vegetation and environmental factors on natural coast of Seto Inland Sea. Jap J of Reveg Tech 30; 62-67, 2004

Ueda, T., J. Koh, Y. Sasaki and Y. Morimoto: The possibility experiment of existing forest revegetation in a nature park zone (1) - Topsoil seedbank potential experiment. Jap J of Reveg Tech 30; 257-260, 2004

Murakami, K., R. Matsui, Y. Morimoto and H. Maenaka: Wildlife habitat evaluation of a reclaimed habitat garden in urban areas using pteridophyte species diversity. Jap J of Reveg Tech 30; 139-144, 2004

Hashimoto, H., S. Nakamura, M. Hasegawa, Y. Natuhara and Y. Morimoto: The early successional stage of avifauna in an urban wildlife habitat park. J of Jap Inst of Landscape Arch 68; 559-562, 2005

Kashihara, K., Y. Natuhara and Y. Morimoto: Changes in vegetation of abandoned paddies with different environment and vegetation by mowing and plowing. J of Jap Inst of Landscape Arch 68; 669-674, 2005

Tabata, K., Y. Morimoto and H. Maenaka: Simulation model of size frequencies on saplings in restored natural habitat in urban area by using exponential distribution. J of Jap Inst of Landscape Arch 68; 669-674, 2005

Ogawa, N., K. Oku, S. Shibata and Y. Morimoto: Study on transition and succession of village landscape os Sasabuki in the Tango penisula, J of Jap Inst of Landscape Arch 68; 627-632, 2005

Murakami, K., A. Makino, Y. Morimoto and A. Satomura: Is a single large patch or several small

patches more important in strategies for conservation of plant species richness in urban fragmented woodlots?. J of Jap Inst of Landscape Arch 68; 633-636, 2005

Imanishi, J., K. Sugimoto and Y. Morimoto: Detecting drought status and LAI of two *Quercus* species canopies using derivative spectra. Computers and Electronics in Agri 43(2): 109-129, 2004

Murakami, K., H. Maenaka and Y. Morimoto: Factors influencing species diversity of ferns and fern allies in fragmented forest patches in the Kyoto city area, Landscape and Urban Planning 70: 221-229, 2005

Hashimoto, H., Y. Natuhara and Y. Morimoto: A habitat model for *Parus major minor* using a logistic regression model for the urban area of Osaka, Japan, Landscape and Urban Planning 70: 245-250, 2005

Nakamura, A., Y. Morimoto and Y. Mizutani: Adaptive management approach to increasing the diversity of a 30-year-old planted forest in an urban area of Japan, Landscape and Urban Planning 70: 291-300, 2005

Ohishi, Y. and Y. Yukihiro Morimoto: A study on effects of artificial structures on bryophyte diversity in urban greenery, J of Korean Inst of Landscape Arch Int Ed (2); 109-113, 2004

Reviews

Morimoto, Y.: Urban environment and ecological restoration. Urban Green Tech 49; 6-10, 2003

Morimoto, Y.: Conservation and creation of wildlife habitats in urban space. Parks and Open Space 64(5); 24-28, 2004

Reports

Morimoto, Y.: Forest of life No.8. (Monitoring group of the Forest of life ed.), Osaka, 47pp, 2004

Inoue, N., Y. Natuhara and H. Hashimoto: The effect of percentage of tree cover on breeding performance of Great tit (*Parus major*). Landscape Ecology and Management 9(2); 33-39, 2005

Hiroshi H., Dong,J., Imanishi J. and Morimoto Y.: Extraction of stepping-stone corridors for birds in urban areas using remote sensing and GIS, IUFRO International Workshop Landscape Ecology 2004, Japan

b) Conference and seminar papers presented

Annual meeting of JILA (6)

Annual meeting of JILA Kansai Branch (1)

Annual meeting of the Japanese Society of Revegetation Technology (7)

Annual meeting of the Japanese Forestry Society (1)

Annual meeting of the Ecological Society of Japan (4)

Annual meeting of the Society of Vegetation Science (1)

Annual meeting of the Japan Society of Civil Engineers (1)

EAFES International Congress (4)

International Conference on Laser Scanners for Forest and Landscape Assessment (2)

IUFRO International Workshop Landscape Ecology 2004 (1)

IFLA World Congress (1)

A-3. Off-campus activities

Membership in academic societies

Morimoto, Y.: Japanese Society of Revegetaion Technology (Vice President), Japanese Institute of

Landscape Architecture (Auditor), Japanese Society of Landscape Ecology (Vice President), Environmental Information Center (Councilor)

Imanishi, J.: JILA (Member of Editorial Board for Techinical Report), JILA (Secretary of the Kansai Branch)

Membership in Science Council of Japan, etc.

Morimoto, Y.: Member of the Research Committee on Forest Engineering in Science Council in Japan

Research grants

Morimoto, Y.: JSPS Grants-in-Aid for Scientific Research. (A)(1) Development of the HEP in ecosystem assessment process. (delegate: Morimoto, Y.)

Morimoto, Y.: JSPS Grants-in-Aid for Scientific Research. (B)(1). (delegate: Nakagoshi, N.)

Morimoto, Y.: Nihon Seimei Foundation Grant for Publication on Environmental Studies, Theories and practices of coexistence with living creatures (delegate: Morimoto, Y.)

A-4. International cooperation and overseas activities

International meetings

Morimoto, Y. : The First EAFES International Congress, Mokpo, Korea, Chirman(2 sessions)

Morimoto, Y. : the 41st IFLA World Congress Taiwan, Taipei, Taiwan, Presentation,

Morimoto, Y. : Internaional Federation of Landscape Architects - Japan, board member

Morimoto, Y. : IUFRO International Workshop Landscape Ecology 2004, Japan

Hashimoto, H., Dong, J., Imanishi, J., and Morimoto, Y. 2004. Extraction of stepping-stone corridors for birds in urban areas using remote sensing and GIS. IUFRO International Workshop Landscape Ecology 2004, Japan. Tsukuba, Japan.

Imanishi, J., Morimoto, Y., Makino, A., Sugimoto, K., and Isoda, K. 2004. A research on drought stress detection of broadleaved tree species using hyperspectral remote sensing. The First EAFES International Congress. Mokpo, Korea.

Hashimoto, H., Imanishi, J., Hagiwara, A., Morimoto, Y., and Kitada, K. 2004. Creating vegetation maps for evaluation of woodland bird habitats using remote sensing. The First EAFES International Congress. Mokpo, Korea.

Makino, A., Murakami, K., Imanishi, J., and Morimoto, Y. 2004. An analysis on the nested subset patterns of herbaceous plant species at fragmented forest patches in Kyoto city, Japan: a hint about the SLOSS issue. The First EAFES International Congress. Mokpo, Korea.

Hashimoto, H., Imanishi, J., Hagiwara, A., Morimoto, Y., and Kitada, K. 2004. Estimating forest structure indices for evaluation of forest bird habitats by an airborne laser scanner. International Conference on Laser Scanners for Forest and Landscape Assessment. Freiburg im Breisgau, Germany.

Hagiwara, A., Hashimoto, H., Imanishi, J., and Morimoto, Y. 2004.Estimating leaf area index in mixed forest using an airborne laser scanner. International Conference on Laser Scanners for Forest and Landscape Assessment. Freiburg im Breisgau, Germany.

Ohishi, Y. and Morimoto, Y. Preliminary study on a function of Japanese gardens which contribute to conservation of bryophyte diversity in urban areas. The 41st IFLA World Congress, S5-3, Taipei (Taiwan), Sep. 2004

Ohishi, Y. and Morimoto, Y. Role of management on bryophyte biodiversity in Japanese gardens in urban areas - a preliminary report, The 1st EAFES international congress of ecology,

Symposium#5, Mokpo (Korea), Oct. 2004

International joint researches, overseas research surveys

Morimoto, Y.: Ecosystem Monitoring in relation to Aral Sea Crisis (Kazakhstan)

Morimoto, Y.: Prevention of desertification in Xinjiang (China)

B. Education Activities (2004.4-2005.3)

B-1. On campus teaching

a) Courses given

Undergraduate level: Landscape Architecture Part I, II (Morimoto, Y.), Planting Design for Landscape (Morimoto, Y. and Shibata, S.), Landscape Design (Yoshida, T.), Practice in Landscape Design Part I, II (Morimoto, Y. and Yoshida, T.), Practice in Surveying (Yoshida, T.), Forest and Biomaterials Science, IV (Morimoto, Y.)

Graduate level: Seminar in Landscape Architecture (Morimoto, Y. and Yoshida, T.), Laboratory Works in Landscape Architecture (Morimoto, Y. and Yoshida, T.)

Graduate School of Global Environmental Studies: Landscape Ecology and Planning (Morimoto, Y.), Seminar in Landscape Ecological Conservation (Morimoto, Y.), Internship in Environmental Management (Morimoto, Y.)

B-2. Off-campus teaching, etc.

Part-time lecturer

Morimoto, Y.: Kyoto Prefecture University (Landscape Design, Forest Management), Nagoya University (Theories of Forest Amenity)

Yoshida, T.: Kobe University (Landscape Design)

Imanishi, J.: Kyoto Seika University (Landscape Design)

Open seminar

Morimoto, Y.: Kyoto University Open Seminar “World of forests and woods”, Division of Forest Scienses, Graduate School of Agriculture, Kyoto University, Oct.16 and 17, 2004, Chairman.

Morimoto, Y.: H16-Memorial meeting of Hyogo workshop on environment and greenery, July 16, 2004, Speaker

Morimoto, Y.: Shiga prefecture workshop on Natural environment, Aug. 21, 2004, Speaker

Morimoto, Y.: Workshop of Association of Shiga prefecture Construction Consultants , July 16, 2004, Speaker

Morimoto, Y.: Excursion of Temples for Kyoto University stuff members, Nov. 20, 2004, Instructor

Imanishi, J.: Summer Program of University of California, Davis “Tea Gardens in Kyoto”, Sep. 9, 2004, Instructor

Imanishi, J.: Kyoto Prefectural Shuchi High School “For the spiritually rich environment surronded by nature”, Nov. 22, 2004, Instructor

B-3. Overseas teaching

Students and research fellows from abroad

Doctor course (2) (Korea, U.S.A.)

C. Other remarks

Morimoto, Y.: temporary member of the committee of the Council of Environment., Ministry of environment, member of the committee of the council of environment, Osaka Prefecture, member of the committee of city planning, Osaka Prefecture, member of the committee of the council of park and greenery, Kobe city, member of the committee of the council of amenity, Kyoto City, Chairman of the council of urban greenery initiative, Kyoto City, Director of the Society of Urban Greenery initiative, Kyoto City. Councilor of Japan Highway Landscape Association, Member of the council of Kyoto Prefecture Public Corporation for greenery, chairman of the counsil of Tanakamiyama-100-nen-no-moridukuri, chairman of the committee of Yodo river conservation and use .

2.2.6 Laboratory of Erosion Control

Staff *Professor : Mizuyama, Takahisa, Dr. Agric. Sci.*
Associate Professor: Satofuka, Yoshifumi, Dr. Eng.
Assistant Professor : Kosugi, Ken'ichirou, Dr. Agric. Sci.

Students and research fellows
Doctor's program: (3)
Master's program: (9)
Undergraduate : (3)

A. Research Activities (2004.4-2005.3)

A-1. Main subjects

a) Mechanism of sediment movement

Basic research has been carried out on debris flow, flash flood, and shallow landslide. The relationship between shallow landslide and underground pipe flow and the flow in bedrock are studied particularly.

b) Countermeasures to prevent or reduce sediment disasters and the Sabo-planning being compatible with environmental concerns. More effective permeable dams are experimentally investigated in order to store the excessive sediment and, at the same time, not to damage the eco-system established in the streams. A function of a series of slit sabo dams was studied by flume experiments and computer simulation.

c) Forest influence on the hydrologic cycle

Elements controlling hydrologic cycle in forest are studied. Effects of forest soil hydraulic properties on water discharge from forested watersheds are analyzed by laboratory experiments, field measurements, and numerical simulation methods. Evapo-transpiration is one of the major factors. Models to interpret the phenomena are built.

d) Sediment movement and integrated sediment management in river system

Sediment production process and sediment movement process in mountain region are investigated using a video camera system and turbidity meters. A numerical model for calculating

sediment routing is also developed. Using these results, the sediment management for mitigating sediment-related disaster and providing better natural environment from mountains to seashore is studied.

e) Sediment related disasters

Debris flow disasters were surveyed in Venezuela where debris flows and landslides occurred in December, 1999. Following debris flows from landslides, landslide dams and other damages by September 21 Taiwan Earthquake were surveyed in the field. Mudflow was studied in Miyake Island after eruptions.

f) Buffer green belt against sediment hazards

The effects of trees against debris flow and landslide are studied to design buffer green belts. Infiltration and water storage characteristics are studied in different tree kinds.

A-2. Publications and presentations

a) Publications

Books

Mizuyama,T., T.Uchida and A.Kimoto : Effect of hillside works on granite slopes: Terracing and planting Ground and water bioengineering for erosion control and slope stabilization, edited by D.Barker et al., Science Publishers, Inc. 2004, p.151-160, 2004

Kosugi, K.: Function of forest as dam (Ed. by Kurachi, K. and Hoyano, H.), Tsukijishokan, Tokyo, 2004

Kosugi, K.: Evaluation of unsaturated soil, (Ed. by Japanese Geotechnical Society), Japanese Geotechnical Society, Tokyo, 2004

Kosugi, K.: Sabo Technical Dictionary, (Ed. by Japan Society of Erosion Control Engineering), Sankaido, Tokyo, 2004

Original papers

Okuda, S., T. Mizuyama, S. Tabata, K. Seno, T. Yanagimachi; Current development status of hydrometric systems, sediment monitoring systems and information transmission technique for the purpose of preventing sediment disasters, INTERPRAEVENT 2004, I/87-96, 2004

Mizuyama,T., S. Tabata, T. Mori, F. Watanabe, K.Inoue; Outbursts of landslide dams and prevention, INTERPRAEVENT 2004, IV/221-229, 2004

Hasagawa, Y., A. Oda, T. Mizuyama, I.Izumi, H.Abe; Evaluation of the function of slit sabo dams through hydraulic model experiments, INTERPRAEVENT 2004 VII/107-118, 2004

Ono, G., T.Mizuyama, K.Matsumura; Current practices in the design and evaluation of steel sabo facilities in Japan, INTERPRAEVENT 2004, VII/253-264, 2004

Takanashi, K., S.Tabata, T.Mizuyama, N.Tsuzuki; Developing and applying the system to set areas automatically, where need to take warning against sediment-related disasters, INTERPRAEVENT 2004, VII/325-336, 2004

Takemoto,H.,S.Sugihara,T.Sato,Y.Araki,T.Nkayama,T.Mizuyama,K.Furukawa; Astudy on setup of the risk of debris dlow on rough set theory, JJSECE (Journal of the Japan Society Erosion Control Engineering) 57-2, p.4-15, 2004

Kosugi, K., D. Tsutsumi, T. Mizuyama and S. Hasegawa; Combined penetrometer-moisture probe for measuring water content distribution in hillslope, JJSECE 57-3, p.3-13,2004

Kosugi, K.; Modeling of rainwater infiltration and discharge at forested hillslope, J. Japan Soc.

Erosion Control Engineering, 57-3, 71-79, 2004

Mizuyama,T.;Sabo dams with shutters and shutter operating information system, JJSECE 57-4, p.66-67, 2004

Uchida, T., Y. Asano, T.Mizuyama and J.J. McDonnell; Role of upslope soil pore pressure on lateral subsurface storm flow dynamics, Water Resources Research, vol.40-W12401, 2004

Muhammad Mukhlisin, K. Kosugi and T. Mizuyama; Temporal and spatial variations in the probability of debris flow initiation in volcanic watersheds, JJSECE 7-5, 3-14, 2005

Usuki,N., Y. Tanaka and T.Mizuyama; Investigation on the distribution of long traveling landslides, Journal of JSECE 57-5, p.47-52, 2005

Nishiguchi, Y., T.Uchida, T.Mizuyama and K.Kosugi; An observation of spatial pore water pattern in a mountain hollow, J.JSECE 57-5,53-58, 2005

Fujita, M. and T. Mizuyama: A diffusion equation of suspended load with a source term and its application, J.JSECE 57-6,3-12, 2005

Satofuka, Y. and T. Mizuyama: Numerical simulation on debris flow control by a grid dam, J.JSECE 57-6,21-27,2005

KATO,Y., T. Miyano, T. MIZUYAMA: Outburst of a small landslide dam on the Imokawa River(prompt report), J.JSECE 57-6,47-50, 2005

MIZUYAMA,T., M. Watari, O. Watanabe, A. Ikeda and Y. Satofuka: Collection and application of hydrologic information for sabo management, J.JSECE 57-6,56-59,2005

Reviews

Mizuyama,T.; Introduction to Sabo Engineering (8) Steel sabo strucures, Sabo and Chisui 157, 37-1, 69-71, 2004

Mizuyama,T.; Introduction to Sabo Engineering (9) Debris flow, Sabo and Chisui 158, 37-2, 66-68, 2004

Mizuyama,T.; Introduction to Sabo Engineering (10) Sabo hill-side works, Sabo and Chisui 159, 37-3, 93-94, 2004

Mizuyama,T.; Survival rooms from sediment hazards, J.JSECE, 57-3, 82, 2004

Mizuyama,T.; Introduction to Sabo Engineering (11) Volcanic sabo, Sabo and Chisui 161, 37-5, 81-83, 2004

Mizuyama,T.; Introduction to Sabo Engineering (12) Sabo soil cement, Sabo and Chisui 162, 37-6, 81-83, 2004

Mizuyama,T.; Introduction to Sabo Engineering (13) Woody debris control, Sabo and Chisui 163, 38-1, ????, 2005

Mizuyama,T.; Introduction to Sabo Engineering (14) Landslide dams, Sabo and Chisui 164, 38-2, 111-114, 2005

Kosugi, K.: Scientific evaluation of forest function as dam, Suirikagaku, 281, 18-31, 2005

Hayashi, S., S. Tsuchiya, K. Kondo, H. Shibano, S. Numamoto, K. Kosugi, T. Yamakoshi and A. Ikeda, Sediment related disasters caused by typhoon Meari (T 0421) in Miyagawa village, Mie prefecture on September 29, 2004 (prompt report), J. Japan Soc. Erosion Control Engineering, 57-4, 48-55, 2004

b) Conference and seminar papers presented

The 115th annual meeting of Japanese Forestry Society (6 presentations)

2004 annual meeting of Japan Society of Erosion Control Engineering (20 presentations)

2004 annual conference of Japan Society of Civil Engineers (2 presentation)

IUFRO workshop on forest hydrology (2 presentation)

A-3. Off-campus activities

Membership in academic societies (roles)

Mizuyama, T.: Japan Society of Erosion Control Engineering (director, vice president), Japanese Geomorphological Union (member of committee), Japan Society of Revegetation Technology (councilor)

Satofuka, Y.: Japan Society of Erosion Control Engineering (member), Japan Society of Civil Engineering (member), Japan Society for Natural Disaster Science (member)

Kosugi, K.: Japan Society of Erosion Control Engineering (member), Japanese Forestry Society (member), Japan Society of Revegetation Technology (member), Japan Society of Hydrology & Water Resources (member)

Research grants

Monbusho research grant:

General scientific research (A) International; Taiwan 1999 earthquake (Mizuyama), General scientific research (B)(2); Joint Research on control of floods and sediment movement in Semalang, Brantas and Toba Basins (Fujita and Satofuka), General scientific research(C)(2); Sediment Run-off from sabo dams and its impact on river environment (Head: Fujita, Mizuyama), Encouragement (B); Real-time prediction of sediment disasters using high resolution rainfall data (Head: Satofuka) , General scientific research (B)(1); A new hydrology model for small forest watersheds by considering water movement in weathered rocks (Head: Kosugi)

A-4. International cooperations and overseas activities

International Meetings

Mizuyama,T.: Interpraevent (Chairman, Presentation)

Satofuka, Y.: 13th Congress of APD-IAHR, Singapore (Presentation)

Kosugi, K: IUFRO workshop on forest hydrology (Presentation)

Membership in international academic societies

Mizuyama, T.: IAHR, IAHS, IUFRO-J, International INTERPRAREVENT, International Erosion Control Association

Satofuka, Y.: IAHR

Kosugi, K.: SSSA, IAHS, IUFRO-J

International joint researches, overseas research surveys

Mizuyama, T.: Research on erosion in sediment movement after the 1999 eathquake (Taiwan)

Satofuka, Y.: Joint Research on control of floods and sediment movement in Semalang, Brantas and Toba Basins (Indonesia)

Editors of International Journals

Mizuyama, T.: Editor of Journal of Hydrological Sciences

B. Educational Activities (2004.4-2005.3)

B-1. On-campus teaching

a) Courses given

Undergraduate level: Regional Environment Creation (Mizuyama), Theory of Erosion Control 1,2

(Mizuyama), Practice in Erosion Control (Mizuyama, Fujita), Planning of Erosion Control (Mizuyama, Fujita), Foreign Literature in Forestry 3 (Mizuyama, Fujita), Practice of Surveying (Fujita), Special Seminar on Erosion Control 1,2 (Mizuyama, Fujita), Science of Water, soil and vegetation (Fujita)

Graduate level: Theory of sediment induceddisaster control(Satofuka), Advanced theory of Erosion Control (Mizuyama), Advanced experiment of Erosion Control (Mizuyama, Satofuka), Seminar of Erosion Control (Mizuyama, Satofuka)

B-2. Off-campus teaching, etc.

Part-time lecturer

Mizuyama, T.: Fac. Agriculture, Kyoto Prefectural Univ. (Materials and constructive methods), Japan International Co-operation Agency (Infrastructure)

Extension Lecture

Kosugi, K.: Forest and Culture

B-3. Overseas teaching

Students from abroad: 2 (Indonesia, Taiwan)

Researchers from abroad: 1 (Czech)

Chair of Biomaterials Technology

2.2.7 Laboratory of Biomaterials Design

Staff *Professor* *: Masuda, Minoru, D. Agric. Sci.* (～2005.2.27)

Lecturer *: Nakamura, Masashi, D. Agric. Sci.*

Assistant Professor : Murata, Koji, M. Agric. Sci.

Students and research fellows

Doctor's program : (2)

Master's program: (6)

Undergraduate : (4)

A. Research Activities (2004.4-2005.3)

A-1. Main subjects

a) Sensory properties of wood: Wood is one of the most friendly and comfort giving material for human life. Dominant factors of such effects are investigated scientifically and its application to interior designing were studied. For example; i) Investigation on visual characteristics of wood, especially, grain figure, color and glossiness, and its application to the designing of interior space and furniture. ii) Generation of wood grain figures by computer graphics, iii) Formulation of relations between psychological images, especially 'natural' and 'comfortable' images and physical characteristics of visual images, iv) Psycho-rheological studies of wood *i.e.* relations between

(Mizuyama), Practice in Erosion Control (Mizuyama, Fujita), Planning of Erosion Control (Mizuyama, Fujita), Foreign Literature in Forestry 3 (Mizuyama, Fujita), Practice of Surveying (Fujita), Special Seminar on Erosion Control 1,2 (Mizuyama, Fujita), Science of Water, soil and vegetation (Fujita)

Graduate level: Theory of sediment induceddisaster control(Satofuka), Advanced theory of Erosion Control (Mizuyama), Advanced experiment of Erosion Control (Mizuyama, Satofuka), Seminar of Erosion Control (Mizuyama, Satofuka)

B-2. Off-campus teaching, etc.

Part-time lecturer

Mizuyama, T.: Fac. Agriculture, Kyoto Prefectural Univ. (Materials and constructive methods), Japan International Co-operation Agency (Infrastructure)

Extension Lecture

Kosugi, K.: Forest and Culture

B-3. Overseas teaching

Students from abroad: 2 (Indonesia, Taiwan)

Researchers from abroad: 1 (Czech)

Chair of Biomaterials Technology

2.2.7 Laboratory of Biomaterials Design

Staff *Professor* *: Masuda, Minoru, D. Agric. Sci.* (～2005.2.27)

Lecturer *: Nakamura, Masashi, D. Agric. Sci.*

Assistant Professor : Murata, Koji, M. Agric. Sci.

Students and research fellows

Doctor's program : (2)

Master's program: (6)

Undergraduate : (4)

A. Research Activities (2004.4-2005.3)

A-1. Main subjects

a) Sensory properties of wood: Wood is one of the most friendly and comfort giving material for human life. Dominant factors of such effects are investigated scientifically and its application to interior designing were studied. For example; i) Investigation on visual characteristics of wood, especially, grain figure, color and glossiness, and its application to the designing of interior space and furniture. ii) Generation of wood grain figures by computer graphics, iii) Formulation of relations between psychological images, especially 'natural' and 'comfortable' images and physical characteristics of visual images, iv) Psycho-rheological studies of wood *i.e.* relations between

human responses and thermal insulating, tactile and impact absorbing properties of wood, walkability of wooden floor. v) Studies on the psychological characteristics of sound generated by wooden musical instruments, for example, piano, violin, guitar and xylophone, and their synthesizing by computer.

b) Fracture Mechanics of anisotropic materials, and strength designing for wooden structural elements: Metal and plastics are isotropic materials but wood is an anisotropic material. Strength of wood parallel to the grain is extremely high because of its cellulose filament winding around the cell walls. This is the reason why wood is light and strong. Because of this reason wood is consequently used for building and furniture in large quantities. Mechanics of anisotropic material is necessary for designing of these structural elements. Theory of "small area average stresses (strains) fracture criterion" was proposed, and its application for the designing of bolt joints and notched beams were studied. Real stresses-strains curve was measured using image correlation technique.

c) Nondestructive grading of lumber: Wood has large deviation in strength like as other natural products. Since strength of fifth percentile exclusive limit is generally used for strength designing, nondestructive grading is important for effective use of wood resources. Thermal changes during repeated bending were tried to use for detecting defects (knot and others), and deflection distribution curves and optical properties were also used for evaluating strength.

d) Studies on mechanism of anisotropy of swelling of wood and wood cell walls under a laser microscope using digital image correlation method.

A-2. Publications and presentation

a) Publications

Original papers

S. Ukyo and M. Masuda: Investigation of the True Stress-Strain Relation in Shear Using the Digital Image Correlation Method. Mokuzai Gakkaishi, 50(3); 146-150, 2004 (in Japanese with English summary)

K. Muata, M. Masuda and K. Yokoo: Mitigation of Bowing of LVL by Alternately Laminating Rebberwood and Falcata Veneer, and Observation of its Swelling Behavior. Mokuzai Gakkaishi, 50(5); 294-300, 2004 (in Japanese with English summary)

M. Nakamura and M. Masuda: Effect of Form and Amount of Wood-members in Interior Space on Psychological Imges. Mokuzai Gakkaishi, 50(6); 376-383, 2004 (in Japanese with English summary)

J. Itoh, M. Nakamura and M. Masuda: Relations between Combinations of Interior Components and the Image of "Japanese-style vs. Western-style." Trans. of Japan Society for Interior Studies, 15; 19-24, 2005 (in Japanese with English summary)

K. Murata: Application of Strain Distribution Analysis using Digital Image Correlation Method. Wood Industry, 60(3); 110-114, 2005 (in Japanese)

Review

M. Masuda: Circumstances and Impressions of Sensory and Living Comfort Studies in the Japan Wood Research Society. Mokuzai Gakkaishi, 51(1); 22-24, 2005 (in Japanese)

b) Conference and seminar papers presented

The 51st Annual Meeting of Japan Society of Physiological Anthropology, Sapporo, Jun. 15-16, 2004: 1 presentation (Nakamura)

The 54th Annual Meeting of Japan Wood Research Society, Sapporo, Aug. 3-5, 2004: 13 presentations (Masuda, Nakamura, Murata).

The 52nd Annual Meeting of Japan Society of Physiological Anthropology, Tokyo, Oct. 22-23, 2004: a nominated debater in the symposium (Nakamura)

The 55th Annual Meeting of Japan Wood Research Society, Kyoto, Mar. 16-18, 2005: 10 presentations (Nakamura, Murata).

A-3. Off-campus activities

Membership in academic societies

Masuda, M.: The Japan Wood Research Society (Councilor, Chairman of the 55th annual meeting); Wood Technological Association of Japan (Councilor, Trustee of Kansai Branch, member of the planning committee), Association for Promoting Advanced Technology of Forest Resources of Utilization (Editorial board member of the journal).

Nakamura, M.: The Japan Wood Research Society (Editorial board member of the journal, Member of the committee for information processing, Secretary of the Division of Living Comfort, Member of the executive committee for the 55th annual meeting); Japan Society of Physiological Anthropology (Trustee for public relations); Wood Technological Association of Japan (Member of the planning committee of Kansai Branch, Editorial board member of the journal); The Society of Materials Science, Japan (Editorial board member of the journal).

Murata, K.: The Japan Wood Research Society (Member of the executive committee for the 55th annual meeting); The Society of Matreials Science, Japan (committee member of the Division of Wood Based Materials).

Research grants

Nakamura, M.: JSPS Grants-in-Aid for Scientific Research. (A)(2) Study on physiological polytypism in technological adaptability of human.(Partial), JSPS Grants-in-Aid for Scientific Research. (C) Study on design and manufacturing based on physiological polytypism.(Partial)

B. Educational Activities (2004.4-2005.3)

B-1. On-campus teaching

a) Courses given

Under graduate level: Properties of Biomaterials (Masuda, Nakamura), Wood and Timber Construction (Masuda), Reading of Foreign Literature I (Masuda), Basic Science for Forest and Biomaterials III (Masuda), Forest and Biomaterials Science III (Masuda), Practice in Biomaterials Design (Masuda, Nakamura, Murata), Information Technology in Forest and Biomaterials Science (Nakamura), Laboratory Course in Forest and Biomaterials Science III (Nakamura, Murata), Laboratory Course in Physics of Forest and Biomaterials (Nakamura, Murata), Laboratory Course in Wood Technology (Nakamura, Murata)

Graduate level: Seminar in Biomaterials Design (Masuda, Nakamura, Murata), Laboratory Course in Biomaterials Design (Masuda, Nakamura, Murata), Biomaterials Design I (Masuda) .

B-2. Off-campus teaching, etc.

Part time lecturer

Masuda, M.: Special lecture II "Characteristics of Wood for Interior and Structural Use in Architecture", Department of Architecture, Faculty of Engineering, Mie University.

Nakamura, M.: Materials Science V (Wood), Faculty of Fine Art, Kyoto City University of Art.

Open seminar, etc.

Nakamura, M.: "Wood and living environment" in wood science seminar of wood technological association Japan Kansai branch, Nara, 11 Dec. 2004 (lecture); "Wood Wonderland 2004" in the 20th Osaka wood technology fair, Osaka, 30 Sep. – 3 Oct. 2004 (planning and secretary).

Murata, K.: "Wood Wonderland 2004" in the 20th Osaka wood technology fair, Osaka, 30 Sep. – 3 Oct. 2004 (exhibition management for the division); "Beautiful world seeing through forest and wood" in the public seminar of Kyoto Univ., 16-17 Oct. 2004 (member of executive committee).

C. Other remarks

Masuda, M.: Member of Consideration Committee for Office Clerk System of the Graduate School of Agriculture, Member of the Judging Committee for Special Researcher of Japan Society for Promotion of Science, Member of the Consideration Committee for Evaluation of Large Scale Public Institutions in Gifu Prefecture, Member of Planning Committee for the Information Data Base on Wood and Bamboo (Shizuoka Prefecture).

Nakamura, M.: Member of Advisory Board for Information Systems in Faculty of Agriculture; Member of Committee for Public Relations in Faculty of Agriculture; Member of Committee for Computer Literacy in Center of Information and Multimedia Studies.

Muarata, K.: Japan Wood Research Society's Award for Young Researchers (Sapporo, 4 Aug. 2004)

2.2.8 Laboratory of Wood Processing

Staff *Professor : Okumura, Shogo, Dr. Agric. Sci.*
Associate Professor: Fujii, Yoshihisa, Dr. Agric. Sci.
Assistant Professor : Sawada, Yutaka, M. Agric. Sci.
Assistant Professor : Yanase, Yoshiyuki, M. Agric. Sci.
Educational Assitant (part time): Fujiwara, Yuko, Dr. Agric. Sci.

Students and research fellows
Doctor's program :(1)
Master's program :(3)
Undergraduate :(2)
Research Student:(1)

A. Research Activities (2004.4-2005.3)

A-1. Main subjects

a) Fundamental problems in wood machining

The main subjects are concerned with solution of cutting mechanism of wood and wood based materials and of phenomena in wood cutting, by thermographic measurement and analysis of tool-chip-work system in wood cutting. For the evaluation of the surface roughness of wood, the novel filtering method and 2D and 3D roughness parameters that coincide with tactile sensation are proposed.

b) Improvements of woodworking machines and cutting tools and automatization of machining process. For the improvements of accuracy, efficiency and safety of the wood cutting and grinding, following subjects are studied: analysis of deformation and vibration of tool using FEM, analysis of stress generated on the tool, and prediction of concentration of airborne dust in the woodworking chamber using computer simulation and the optimization of a condition of dust collection. An algorithm of pattern recognition of the processing sound to simulate the auditory sense of the skilled worker and its master process is developed. It is also applied to the control of the grinding machine of band saw tooth to realize fully automatic control using artificial intelligence technique. Another subjects are pattern recognition of the transient signals from wood using wavelet analysis, simulation of distribution of temperature and stress during drying wood, and simulation of roll pressing of wood using FEM as an application of CAE to the woodworking process.

c) Scanning of wood and wood based materials

The subjects on this field are use of acoustic emission (AE) for prediction of checks and for solution of mechanism of AE generation during the drying of wood, and thermographic detection of starved joints of wood and the grain direction. Fundamental researches for the analysis of biology of wood-destroy insects and practical application for detection of termite attack using AE monitoring are studied, including developments of portable AE detector, new AE sensor using PVDF film, waveguides, and AE monitoring system for wooden house. Detection of metabolic gas components from termite colony such as H_2, CH_3 and CO_2 are also studied. Development of physical barrier using crushed cement-stabilized sludge for termite attack. Fact-findings of the damages by termite and other wood-destroy insects in the houses and cultural properties, and

research of damage using AE monitoring. Detection of cavity and deterioration points in the material using radar for the non-destructive inspection of decay and damage by wood-destroy insects in the wooden house.

d) Noise and vibration of wooden house

Application of simulation of vibration property using FEM to the optimization of floor-wall structure with consideration of a measure of floor impact sound. Modal analysis of string musical instruments such as violin using FEM.

A-2. Publications and presentations

a) Publications

Books

Fujii Y.: Chaper 2, Temite and Dacay control techniques friendly to human health.edited by Architecture Association of Kyoto Prefecture, p.32-57, 2004

Fujii Y.: Chaper 3 Manual for diagnose of wooden house, edited by Technical committee for diagnose of the biological deterioration of wooden house, Japan Wood Preserving Association, p.97-104, JWPA, Tokyo, 2004

Original Papers

Miura M., Y. Yanase, Y. Fujii, S. Okumura, T.Yoshimura, Y.Imamura T. Maekawa, K. Suzuki: Detection of Hydrogen and Methane from feeding actvitiy of termites using a gas analyzer, Proc. of 5th. Int. Wood Science Sympodium, Kyoto, Sep. 17-19, p.151-156, 2004

Yoshimura T., N. Kagemori, J. Sugiyama, S. Kawai, K. Sera, S. Futatsugawa, M. Yukawa, H. Imazeki, K. Sakuma, S. Ozeki, M. Oyoshi, Y. Yanase, Y. Fujii, S. Okumura: Mandibles of Japanese subterranean termites, *Coptotermes formosanus* Shiraki and Reticulitermes speratus (Kolbe), Proc. of 5th. Int. Wood Science Sympodium, Kyoto, Sep. 17-19, p.102-107, 2004

Indrayani Y., T. Yoshimura, Y. Yanase, Y. Fujii, H. Matsuoka, Y. Imamura: Feeding behavior of the exotic dry-wood termites *Incictermes minor* (Hagen) , Proc. of 5th. Int. Wood Science Sympodium, Kyoto, Sep. 17-19, p.108-113, 2004

Fujii Y., T.Kawano, Y. Sawada, S.Okumura: Optimization of fine air-borne dust collecting system in woodworking factories using computer simulation and finite elements method(FEM), Proc. of 1st. Int. Conference on Environmentally-compatible Forest Products, Porto, Sep. 22-24, p.333-341, 2004

Fujii Y.: Recent developments of the maintenance techniques for wooden constructions based on destructive and non-destructive inspection methods. Proc. of 3rd. Int. Sympodium on Surfacing and Finishing of Wood, Kyoto, Nov. 24-26, p.43-50, 2004

Yanase Y., Y. Fujii, S. Okumura, T.Yoshimura, Y.Imamura, M. Ishida, H. Kawaguchi, H. Shiozaki, T.Okumura: Feasibility of several particulate materials as a physical barrier against termites. Proc. of 3rd. Int. Sympodium on Surfacing and Finishing of Wood, Kyoto, Nov. 24-26, p.439-444, 2004

Fujiwara Y., Y. Fujii, S. Okumura, A. Tsuchiya, H. Takiuchi: Effect of wood surface roughness on depth of penetration of wood preservatives. Proc. of 3rd. Int. Sympodium on Surfacing and Finishing of Wood, Kyoto, Nov. 24-26, p.343-347, 2004

Indrayani Y., T. Yoshimura, Y. Yanase, Y. Fujii, H. Matsuoka, Y. Imamura: Wood-feeding behavior of four termites species covering three different habitation. Proc. of 3rd. Int. Sympodium

on Surfacing and Finishing of Wood, Kyoto, Nov. 24-26, p.426-431, 2004

Nakayama T., T. Yoshimura, Y. Yanase, Y. Fujii, Y. Imamura: Monitoirng of the change of feeding activites of Japanese subterranean termites under various humidity conditions. Proc. of 3rd. Int. Sympodium on Surfacing and Finishing of Wood, Kyoto, Nov. 24-26, p.434-438, 2004

Indrayani Y., T.Yoshimura, Y.Imamura, Y.Yanase, Y.Fujii: Survey on the infestation of houses by *Incictermes minor* (Hagen) in Kansai ans Hokuriku areas, Jpn. J. Environ. Entmol. Zool. 15(4), 261-168, 2004

Reports

Okumura S.: Introduction of database into editorial process. Mokuzai Gakkaishi 51(2); S14-S15, 2005

b) Conference and seminar papers presented

The 54nd Annual Meeting of the Japan Wood Research Society (Sapporo, 2004.8.3-5): 6 (Okumura, Fujii, Sawada, Yanase fujiwara et al.)

The 55nd Annual Meeting of the Japan Wood Research Society (Kyoto, 2005.3.16-18): 7 (Okumura, Fujii, Sawada, Yanase fujiwara et al.)

The 21th Annual Meeting of Japan Scientific Society of cultural properties (Kyoto, 2004.5.15-16): 1 (Fujii et al.)

The 20th Annual Meeting of Japan Wood Preserving Association (Tokyo, 2004.5.22): 1 (Fujii et al.)

Annual Technical Meeting of Japan Society of Colour Material 2004 (Matsudo, 2004.8.26-27) : 1 (Fujii, Fujiwara et al.)

The 22th Annual Meeting of Wood Technological Association of Japan (Nagoya, 2004.9.28-29): 1 (Fujii, Fujiwara et al.)

A-3. Off-campus activities

Membership in academic societies (roles)

Okumura, S.: The Japan Wood Research Society (director, chairperson of Information Processing Committee), Wood Technological Association of Japan (councilor, director of Kansai Branch)

Fujii, Y.: The Japan Wood Research Society (Publishment committee, Editorial committee), Wood Technological Association of Japan (Kansai branch, Organizing committee), The Society of Materials Science, Japan (editorial committee), Japan Wood Preserving Association (Chairman of technical committee for diagnose of the biological deterioration of wooden house)

Sawada, Y.: Wood Technological Association of Japan (Kansai branch, Secretary of Organizing committee)

Reserach grants

Grant-in-Aid for Scientific Research (KAKENHI)

Okumura S.: Exploratory Research “Visualization of free water movement in wood during drying using a micro-focus X-ray CT system” (Representative)

Yanase Y.: Grant-in-Aid for Young Scientists (A) “Development of nondestructive monitoring system of termite infestation into bait-station”

A-4. International co-operations and overseas activities

International meetings (roles)

Okumura, S.: The 17th International Wood Machining Seminar (member of Advisory Committee)

B. Educational Activities (2004.4-2005.3)

B-1. On-Campus teaching

a) Courses given

Undergraduate level: Forest and Biomaterials Science III (Okumura), Basic Forest and Biomaterials Science III (Fujii), Wood Processing I (Okumura), Wood Processing II (Fujii), Laboratory course in physics of forest and biomaterials (Fujii, Sawada, Yanase), Laboratory course in wood processing (Fujii, Sawada, Yanase), Seminar for Forest Products Engineering (Okumura, Fujii), Information Technology in Forest and Biomaterials Science (Sawada)

Graduate level: Wood Processing I (Okumura), Seminar in Wood Processing (Okumura, Fujii), Laboratory Course in Wood Processing (Okumura, Fujii, Sawada, Yanase)

B-2. Off-campus teaching, etc.

Part-time lecturer

Okumura, S.: Faculty of Agriculture, Kyoto Prefectural University (Woodworking Machinery); Graduate School of Agriculture, Kyoto Prefectural University (Special Lecture on Woodworking Machinery)

B-3. Overseas teaching

Students and research fellows from abroad

Studuent (Master course) 1 (China)

Research fellow 1 (Ghana)

C. Other Remarks

Okumura, S.: Vice-Dean, Graduate School of Agriculture, Kyoto University; Member, Committee for General Education System, Kyoto University; Member, Committee for Educational System, Kyoto University; Technical Development Adviser, Hyogo Prefecture

2.2.9 Laboratory of Natural Fibrous Materials

Staff *Professor* *: Matsumoto,Takayoshi,Dr.Eng.Sci.*
Associate Professor: Yamauchi,Tatsuo, Dr.Agric.Sci.
Assistant Professor : Tatsumi,Daisuke, M.Agric.Sci.
Students and research fellows
Doctor's program : (2)
Master's program : (2)
Undergraduate : (3)

A. Research Activities (2004.4-2005.3)

A-1. Main subjects

a) Diversity of Solution Properties of Celluloses from Different Biological Origins

Cellulose is produced in nature by not only plants but also bacteria, slime mold, sea-squirts. These celluloses have been considered to have the identical molecular structure in spite of the difference of their biological origins. To clarify this, we have examined the solution properties of cellulose, using rheological measurements, light scattering measurements, and so on. As the result, it becomes clear that the molecular properties of these celluloses differ from each other in the solution. Chemically processed (i.e., mercerized) cellulose also has a unique solution property differed from that of native cellulose. The molecular properties of other related polysaccharides have also been examined.

b) Relation between Cellulose Solid Structure and Solubility

The detailed reason why cellulose is slightly soluble in general solvents is still uncertain. If the reason is made clear, novel applications of cellulose will be developed. We have examined the dissolution mechanism of cellulose, using LiCl/dimethylacetamide as a solvent. It has become clear that the celluloses from different origins dissolve in the solvent in different manners. The reason why the pretreatment by solvent substitution is required to make cellulose dissolve in the solvent at the room temperature is also uncertain. To clarify this, we have also examined the molecular mobility and surface structure of cellulose with solid-state NMR and small-angle X-ray scattering measurements. It becomes clear that the solvent substitution processing promotes the molecular mobility and the surface properties of cellulose.

c) Creation of Novel Fibrous Materials from Natural Polymer Solutions

It was found in our laboratory that LiCl/dimethylacetamide solution of bacterial cellulose forms lyotropic liquid crystal, and that tunicin (i.e., the cellulose got from sea-squirts) has very large molecular weight. We have examined the mechanism how these features appear and these characteristics as functional materials. Now we explore the manufacturing method of fiber, film, and gel which utilized features of various celluloses from different origins. The application of these materials to electrolyte membranes in fuel cells is also studied.

d) Floc Structure and Rheological Properties of Fiber Suspension

Fiber suspensions generally have remarkably higher viscosity and elasticity than spherical particle suspensions of equal volume concentration. In addition, fiber suspensions are easy to form aggregation called floc in the flow conditions. This makes them hard to deal with in various industrial fields. To clarify and improve such characteristics, we have studied on the fiber

suspensions from various approaches using theories and experimental technique such as rheological measurements and image analysis. We also try to control the flow properties and floc formation by adding mucilage such as water-soluble polysaccharides to the suspensions.

e) Deformation and Fracture of Paper

Acoustic emission that occurred during the tensile straining of handsheets made from softwood or hardwood kraft pulp beaten to various degrees was measured and analysed to investigate the effect of notch application and notch geometry on micro failures occurred during the tensile deforming and fracturing. Notch application causes a higher proportion of failure of fairly strong fiber bonds and fiber failure throughout almost all of the tensile straining period irrespective of notch geometry. Furthermore, an increase in beating degree causes a higher proportion of failure of fairly strong fiber bonds and fiber failure for both specimen with and without notch. Notch geometry little affects on the micro failure occurrence mentioned above, while maximum tensile load per width and the period required for sheet breaking after maximum load are affected by notch geometry.

f) Role of the additives for new function development in paper materials

Many commercial papers are basically made up with pulp fibers, and further some additives are added to them in order to enhance or give the specific functions corresponding to their final usages. A new lumen-loading technology allows fillers particles to be introduced exclusively into the lumens of fibers while leaving the external surfaces free of filler. This study focuses on the development of lumen-loading process for the preparation of magnetic pulp. Magnetic pulp was prepared from unbleached never-dried kraft pulp with magnetite (Fe_3O_4). Cationic polyethylenimine(PEI) or alum as retention aids in the lumen-loading process produced a better retention of the pigments in the preparation of this magnetic pulp. The physical properties of loaded pulp showed a decreased value as the filler content increased.

A-2. Publications and presentations

a) Publications

Books

Masumoto, T.: Introduction to Physical Chemistry for the Biosciences. Maruzen, Tokyo, 2005

Yamauchi,T.:In “Kamino bunkajiten” edited by Onabe, F., Physical properties of paper, Asakura-Pub. Tokyo,2005

Original papers

Yamauchi, T.:Effect of notches on micro failures during tensile straining of paper, Jpn. Tappi J.58(11) 88-95(2004)

Tatsumi, D., M. Yanagisawa, T. Matsumoto: Rheological properties of blended solutions of tunicate and plant celluloses. Zairyo 53(12); 1267-1271, 2004 (in Japanese)

Tatsumi, D., T. Matsumoto: Rheological properties and network structures of cellulose fiber suspensions. Proc. XIVth Int. Congr. on Rheology SU43; 1-3, 2004

Aono, H., N. Tamai, D. Tatsumi, T. Matsumoto: Aggregate structure and rheological properties of mercerized cellulose/LiCl.DMAc solution. Nihon Reoroji Gakkaishi 32(4); 169-177, 2004

Chen, B., D. Tatsumi, T. Matsumoto: Sedimentation method to evaluate PFI mill beating degree of wood pulp fibers. Sen’i Gakkaishi 60(4); 112-117, 2004

Zakaria, S., Ong, B.H., Ahmad, S.H., Abdullah, M. and Yamauchi, T. :Preparation of lumen-loaded kanaf pulp with magnetite (Fe_3O_4)” Materials Chemistry and Physics 89, 216-220 (2005)

Tanaka, A. and Yamauchi, T: A thermographic observation of out of plane tearing process of paper, Appita J. 58(3) 186-189, 217 (2005)

Reviews

Yamauchi, T.:Creep property of paper, J. Pack Sci and Technol 13(5) 310, 2005(in Japanese)

Tatsumi, D., T. Matsumoto: Viscoelastic properties of fiber networks. Sen'i Gakkaishi 61(2); P48-P51, 2005 (in Japanese)

Tatsumi, D., T. Matsumoto: Recent rheological study of cellulose fiber dispersion. Kobunshi Kako 53(5); 195-201, 2004 (in Japanese)

b) Conference and seminar papers presented

The 54th Annual Meeting of the Japan Wood Research Society, 3 papers

The 71st Symposium on Paper and Pulp Research, 2 papers

The 31st Annual Meeting of the Society of Rheology, Japan, 1 paper

The 52nd the Rheology Symposium, 1 paper

The 11st Annual Meeting of the Cellulose Society of Japan, 3 papers

The 14th Symposium on Polymeric Materials, 1 paper

The 53rd Symposium on Macromolecules, 2 papers

The 48th Japan Congress on Material Research, 1 paper

The 59th Annual Meeting of the Japan Fiber Science and Technology, 1paper

The 13th Annual Meeting of the Society of Packaging Science and Technology Japan, 1 paper

A-3. Off-campus activities

Membership in academic societies

Matsumoto, T.: The Society of Rheology, Japan (divisional chairman), The Cellulose Society of Japan (councilor), The Society of Materials Science, Japan (divisional chairman)

Yamauchi, T.:The Japan Wood Research Society(editorial committee), Japan Technical Association of Pulp and Paper Industry(committee member for wood science and technology), The society of Japan Packaging Science and Technology (councilor)

Tatsumi, D.: The Society of Rheology, Japan (divisional committee member), The Cellulose Society of Japan (branch councilor), The Society of Materials Science, Japan (editorial board, divisional committee member)

Research grants

Matsumoto, T.: Scientific Basic Research (B), Elucidation of the diversity of cellulose molecules on biological origins and the advanced application of it (head: Matsumoto, coworker: Tatsumi)

Tatsumi, D.: Young Scientists (B), Prediction of viscoelastic properties of 3D fiber network structures

A-4. International cooperations and overseas activities

International meetings (roles)

Tatsumi, D.: The XIVth International Congress on Rheology, Seoul, Korea (Presentation)

B. Educational Activities (2004.4-2005.3)

B-1. On-campus teaching

a) Courses given

Undergraduate level: Forest and Biomaterials Science II (Matsumoto), Biophysical Chemistry (Matsumoto), Physical Properties of Polymers (Matsumoto), Pulp and Paper (Yamauchi), Information Technology in Forest and Biomaterials Science (Tatsumi), Laboratory Course in Forest and Biomaterials Science II (Yamauchi, Tatsumi), Laboratory Course in the Basic Forest and Biomaterials Chemistry (Yamauchi, Tatsumi), Laboratory Course in the Biomaterials Chemistry II (Matsumoto, Yamauchi, Tatsumi), Seminar in Forest and Biomaterials Science (Matsumoto, Yamauchi, Tatsumi)

Graduate level: Fibrous Biomaterials II (Yamauchi), Seminars in Fibrous Biomaterials (Matsumoto, Yamauchi, Tatsumi), Laboratory Course in Fibrous Biomaterials (Matsumoto, Yamauchi, Tatsumi)

B-2. Off Campus teaching, etc.

Part-time lecturer

Matsumoto, T.: Physical Chemistry, Kyoto Sangyo University

Yamauchi, T: Forest Products Chemistry, Kyoto Prefectural University

Open Seminar

Tatsumi, D.: Kyoto University Open Seminar “World that can be seen through forest and wood” (committee member)

C. Other Remarks

Yamauchi, T: Representative of “Paper Science Forum”

Committee Member of JSPS (Japan Society for the Promotion of Science)

Chair of Biomaterials Function

2.2.10 Laboratory of Tree Cell Biology

Staff *Professor* *: Fujita, Minoru, Dr. Agric. Sci.*
Associate Professor: Takabe, Keiji, Dr. Agric. Sci.
Assistant Professor : Yoshinaga, Arata, Dr. Agric. Sci.
Assistant Professor : Awano, Tatsuya, Dr. Agric. Sci.

Students and research fellows
Part-time assistant : (2)
Doctor's program : (2)
Master's program : (2)
Undergraduate : (4)

A. Research Activities (2004.4-2005.3)

A-1. Main subjects

a) Formation and ultrastructure of plant cell walls

Many subjects on the formation and ultrastructure of plant cell walls were investigated as the basic studies on plant materials. Immuno-electron microscopic methods were applied to the investigations of cell wall formation in *Populus*, *Eucalyptus* and softwood species. Deposition and arrangement of cellulose microfibrils in differentiating fibers in Eucalyptus were studied by using a newly equipped apparatus for freeze fracture. Formation of cellulose microfibrils by Acetobactor in mediums containing xylan, mannan and pectin, and their crystalline structures were studied by using a transmission electron microscope, FT-IR and NMR. Immunocytochemistry revealed the distribution of enzymes involved in lignin biosynthesis. It also showed the deposition process and distribution of hemicelluloses and lignins.

b) Diversity of wood structure and the quantitative evaluation

Structures and properties of woods considerably vary between and within species. In order to use wood effectively, variations in structures and properties should be characterized in detail and evaluated quantitatively. Then, the variations are ordered on several levels such as macro, micro and chemical levels, and analyzed by proper methods. For instance, quantitative evaluation of wood cell structures became possible by the image processing, especially by the Fourier transform and soft X-ray and cell shaped and arrangements were analyzed. Also minute shape changes in the wood drying were evaluated by the method : Three dimensional graphics were applied to the investigation of vessels and cellular structure of wood during differentiation. As to the chemical components of the cell wall, particularly characteristics of lignin composition and its variation among cellular elements were examined by the combination of the microscopic spectrophotometry, chemical analysis and immunocytochemistry.

c) Structural studies on the formation , physiology and functions of the cells in vascular bundles in plants. Structures and behaviors of cell organellae, stored substances and walls in xylem and phloem cells are investigated mainly in trees, bamboos and grass in relation to their development, physiological events and functions. As a study on cambial activity, the seasonal variation of cell

productions was investigated on dipterocarp trees grown in Thailand and Malaysia using a nailing method.

A-2. Publications and presentations

a) Publications

Original papers

Zhang C, Fujita M, Takabe K : Extracellular diffusion pathway for heartwood substances in Albizia julibrissin Durazz. Holzforschung 58, 495-500 (2004)

Terashima N, Awano T, Takabe K, Yoshida M : Formation of macromolecular lignin in ginkgo xylem cell walls as observed by field emission scanning electron microscopy. Compte Rendu Biologies, 327, 903-910 (2004)

Sato T, Takabe K, Fujita M : Immunolocalization of phenylalanine ammonia-lyase and cinnamate-4-hydroxylase in differentiating xylem of poplar. Compte Rendu Biologies, 327, 827-836 (2004)

Pilate G, Chabbert B, Cathala B, Yoshinaga A, Lepl_ JC, Laurans F, Lapierre C, Ruel K : Lignification and tension wood. Compte Rendu Biologies, 327, 889-901 (2004)

Yoshinaga A, Ohno S, Fujita M : Delignification of cell walls of Chamaecyparis obtusa during alkaline nitrobenzene oxidation. J. Wood Sci., 50 (4), 287-294 (2004)

b) Conference and seminar papers presented

The 54th Annual Meeting of the Japan Wood Research Society :6 papers

A-3. Off-campus activities

Membership in academic societies (roles)

Fujita, M.: International Academy of Wood Science (fellow).

Takabe, K.: International Academy of Wood Science (fellow).

Research grants

Monbukagakusho Research Grant : Grant in Aid for fundamental Research (A): Ecological wood anatomy of tropical trees (Fujita)

Monbukagakusho Research Grant : Grant in Aid for fundamental Research (A) : Production of artificial cell wall by simulating lignified cell wall formation (Takabe)

The Japan Society for the Promotion of Science Research Grants : Encouragement of Young Scientists (B) : Selective labeling of guaiacyl and syringyl lignins using immunocytochemistry (Yoshinaga)

A-4. International cooperation and overseas activities

International meetings (roles)

Takabe : WURC (Wood Ultrastructure Research Centre) International Seminar in Uppsala, Sweden (Invited speaker).

International Joint Reserches

Awano : Using transgenic trees to elucidate the function of hemicelluloses (Sweden)

Yoshinaga : Tension wood formation in transgenic trees with altered lignin metabolism (France)

Acceptance of foreign researcher

Foreign visiting professor (1) (Poland, Wroclaw University)

B. Educational Activities (2004.4-2005.3)

B-1. On-Campus teaching

a) Courses given

Undergraduate level: Basic Forest and Biomaterials Science I (Fujita), Structural and Physiological Biology of Woody Plant Cells (Fujita, Takabe), Formation of Plant Cell Walls (Takabe), Laboratory Course in Forest and Biomaterials Science (Takabe, Yoshinaga, Awano), Laboratory Course in Ultrastructural Observation of Wood (Takabe, Yoshinaga, Awano), Practice in University Forests I (Fujita, Takabe), Seminar in Forest and Biomaterials Science (Fujita, Takabe)

Graduate level: Tree Cell Biology II (Takabe), Seminor on Tree Cell Biology (Fujita, Takabe), Laboratory Course in Tree Cell Biology (Fujita, Takabe).

B-2. Off-Campus teaching

Part-time lecturer

Fujita, M : Faculty of Agriculture,Tokyo University of Agriculture and Technology (Structure of Wood)

Open Seminar

Awano, T : Kyoto University Open Seminar (Staff)

2.2.11 Laboratory of Chemistry of Composite Materials

Staff *Professor : Nishio, Yoshiyuki, Dr. Eng. Sci.*

Lecturer : Yoshioka, Mariko, Dr. Agrc. Sci.

Students and research fellows

Doctor's program: (2)

Master's program: (7)

Undergraduate : (4)

A. Research Activities (2004.4-2005.3)

A-1. Main subjects

The major specialization of this laboratory is the chemical conversion of renewable natural resources such as wood and its constituents (cellulose, lignin, etc.), starch, chitin, lipids, and so forth into useful materials possessing adequate conformity with the environment and/or specific functions in some advanced applications. Various kinds of chemical techniques are employed, including interfacial reactions in bulk, solvolysis, molecular modifications, and microscopic hybridization with supplementary compounds, to design and fabricate new types of biodegradable polymers and composites, liquid crystals, and intellectual polymer networks, and so on.

a) Thermoplasticization and Liquefaction of Wood, its Constituents, and Related Biomasses

Wood can be converted to a thermally flowable material directly by chemical modifications in various structural levels, which may be termed "internal plasticization" of wood. In some cases, the thermoplastic property can be attained by blending the modified wood with supplementary

plasticizers. By virtue of such plasticizing techniques, we can design and fabricate a variety of wood-based, melt-moldable composites, applicable to many articles of daily use, housing materials, and so on. Wood can also be liquefied through reaction and solvolysis in phenols or polyhydric alcohols. In addition to fundamental studies to elucidate the liquefaction mechanism, we are making efforts to apply the high reactivity of the liquefied wood and ingredients, e.g., to preparations of composites for adhesives, molding materials, and foams, which are desirable to be environmentally friendly or biodegradable in view of practical uses. Studies directed towards utilization of other biomasses along the above-mentioned line are also in progress.

b) New Functionalization of Polysaccharides and Related Natural Compounds

Naturally occurring polysaccharides represented by cellulose and chitin, and a polyphenol lignin have been re-evaluated recently as renewable organic resources. They are environmentally benign substances and possess a high potential to be newly developed for industrial and medical applications in themselves or in combination with various synthetic compounds. Our current research is concerned with utilization of the inexhaustible natural polymers as new functional chemicals or high-performance materials. Efforts are also devoted to elucidating several fundamental problems on the molecular and supramolecular structures and physical properties of carbohydrate polymers and related natural compounds. Of particular interest are (1) the microscopic incorporation (including graft-copolymerization) of cellulose and chitin with other polymers or inorganic substances, (2) the liquid crystallinity and chiroptical properties of cellulose and chitin derivatives, (3) the complex formation and crosslinking or gelation behavior of electrolytic carbohydrate polymers and lignin derivatives, and (4) the molecular assembly of cholesterol-based lipids, each directed toward the design and fabrication of novel and useful functional materials.

A-2. Publications and presentations

a) Publications

Books

Y. Nishio and Y. Teramoto: Advances in Carbohydrate Chemistry (K. Kobayashi and S. Shoda, eds.), Part 2, Chapter 1, Chemical Designing and Functionalization of Polysaccharides, CMC Pub., p.133-143, 2005

Original papers

Y. Teramoto, S. Ama, T. Higeshiro, and Y. Nishio: Cellulose Acetate-*graft*-Poly(hydroxyalkanoate)s: Synthesis and Dependence of the Thermal Properties on Copolymer Composition, *Macromol. Chem. Phys.*, **205**, 1904-1915 (2004)

Y. Nishio, A. Yamada, K. Ezaki, Y. Miyashita, H. Furukawa, and K. Horie: Preparation and Magnetometric Characterization of Iron oxide-containing Alginate/Poly(vinyl alcohol) Networks, *Polymer*, **45**, 7129-7136 (2004)

Mariko Yoshioka, Atsushi Miyata, Yoshiyuki Nishio: Preparation of liquid polyesterpolyols from glucose and its methyl derivative, *Journal of Wood Science*, **50** (6), 504-510 (2004)

Mariko Yoshioka, Atsushi Miyata, Tadashi Yagi, Yoshiyuki Nishio: Preparation of polyols from methyl-α-D-glucoside and cyclic esters for design and fabrication of biodegradable polyurethane foams, *Journal of Wood Science*, **50** (6), 511-518 (2004)

Reviews

Y. Teramoto and Y. Nishio: Structural Designing and Functionalization of Biodegradable

Cellulosic Graft Copolymers, *Cellulose Commun.*, **11**(3), 115-120 (2004)

b) Conference and seminar papers presented

The 53rd Annual Meeting of the Society of Polymer Science, Japan (Kobe), 5 papers

The 11th Annual Meeting of the Cellulose Society of Japan (Sendai), 2 papers

The 54th Annual Meeting of the Japan Wood Research Society (Sapporo), 2 papers

The 53rd Symposium of the Society of Polymer Science, Japan (Sapporo), 1 paper

Seminar on Advanced Polymer Materials, Inst. Chem. Res., Kyoto University (Kyoto), 1paper (invited)

Symposium on Eco-Materials Research, the Society of Polymer Science, Japan (Kyoto), 1 paper (invited)

Seminar on Wood and Related Materials, the Society of Materials Science, Japan (Kyoto), 1 paper (invited)

2004 Annual Meeting of Research Center for Low Temperature and Materials Sciences, Kyoto University (Kyoto), 1 paper

The 55th Annual Meeting of the Japan Wood Research Society (Kyoto), 4 papers

A-3. Off-campus activities

Membership in academic societies (roles)

Nishio, Y.: The Japan Wood Research Society (Committee staff for the 55th Annual Meeting of the Japan Wood Research Society), The Cellulose Society of Japan (Member of Board of Directors), The Society of Polymer Science, Japan (Assoc. Editor of *Polymer Journal*), The Society of Fiber Science and Technology, Japan (Councilor)

Yoshioka, M.: The Japan Wood Research Society (Institutional Secretary, Member of Public Affairs Committee), The Society of Materials Science, Japan (Organizer of Polymer Materials Section Committee), Research Group of Wood/Plastics Composite Materials (Office Member), The Society of Polymer Science, Japan (Member of Steering Committee for Research Group of Ecological Materials), Wood Technological Association of Japan (Organizer of Research Group of plywood)

Research grants

Monbu-Kagakusho/JSPS Research Grants:

Nishio, Y.: Grant-in-Aid for Scientific Research (B), Ion-aided Dynamic Control of Mesoscopic Structure and Functions of Polysaccharides (Head investigator)

Others:

Nishio, Y.: Trust Research via NEDO/Toray Co., 1) Fundamental Analysis and Estimation of Thermally Moldable and Drawable Cellulosic Materials; 2) Molecular Orientation Analysis for Cellulosic Materials on Stretching; 3) Spatiotemporal Control of Biodegradation of Cellulose-based Microcompositional Materials (Head investigator)

Yoshioka, M: Trust Research via the Ministry of Agriculture, Forestry and Fisheries of Japan and the Ministry of Economy, Trade and Industry/ Agrifuture Joetsu Co. (1) Development of nanocomposites from plant-based polyurethane and plant-based phenolic resin; (2) Utilization of waste biomass by using the plasticization method of oligoesterification.

A-4. International cooperations and overseas activities

International cooperations

Nishio, Y.: Member of Editorial Board of the Journal "*Cellulose*"

International meetings (roles)

Nishio, Y.: The 2005 International Chemical Congress of Pacific Basin Societies (PACIFICHEM 2005), Organizer of Cellulose Session and Staff of Program Committee

B. Educational Activities (2004.4-2005.3)

B-1. On-campus teaching

a) Courses given

Undergraduate level: Forest and Biomaterials Science II (Nishio), Chemistry of Polymer Synthesis (Nishio), Materials Chemistry of Biomass Composites (Yoshioka), Laboratory Course in Forest and Biomaterials Science II (in part; Nishio, Yoshioka), Laboratory Course in the Basic Forest and Biomaterial Chemistry (in part; Nishio, Yoshioka), Laboratory Course in the Biomaterials Chemistry II (in Part; Nishio, Yoshioka).

Graduate level: Chemistry of Composite Materials I (Yoshioka), Laboratory Course in Chemistry of Composite Materials (Nishio, Yoshioka), Seminar in Chemistry of Composite Materials (Nishio, Yoshioka),

B-2. Off-campus teaching, etc.

Open seminar

Nishio, Y.: JMAC Open Seminar of Nippon Noritsu Kyokai Consulting Corporation and International Innovation Center of Kyoto University, Invited Lecturer

Yoshioka, M.: The 1st Lecture Meeting of Department of Forest and Forest products Sciences (Fukuoka, held by Kyushu University), Invited Lecturer

Yoshioka, M.: The 2nd Seminar of Research Group of Biomass Utilization Technology (Hiroshima, held by Hiroshima City Industrial Promotion Center), Invited Lecturer

Yoshioka, M.: Research Discussion for "Novel Fabrication of Artificial Cell Wall imitated Natural Cell Wall Formation Process" (Gifu, held by Graduate School of Agriculture, Hokkaido University), Invited Lecturer

Yoshioka, M.: Organized Session of No. 4 "Structure and Physical Property of high-polymer materials" in The 48th Annual meeting of Science Council of Japan Association for Material Research (Tokyo, Organizer and Chairperson)

C. Other Remarks

Nishio, Y.: Committee Member of JSPS (Japan Society for the Promotion of Science)

Yoshioka, M.: NEDO (New Energy and Industrial Technology Development Organization) advisory panel on Technology

2.2.12 Laboratory of The Chemistry of Biomaterials

Staff *Professor* *: Nakatsubo, Fumiaki, Dr. Agric. Sci.*
Associate Professor: Takano, Toshiyuki, Dr.Agric.Sci.
Assistant Professor : Kamitakahara, Hiroshi, Dr. Agric. Sci.
Students and research fellows
Doctor's Program: (3)
Master's Program: (5)
Undergraduate : (5)

A. Research Activities (2004.4-2005.3)

A-1. Main subjects

a) Chemical syntheses of natural polysaccharides and their function

We already succeeded in the first chemical synthesis of cellulose by the ring-opening polymerization of the glucose orthoester derivative. And then, the syntheses of regio-selective substituted cellulose derivatives by this method and their properties, especially solubility, thermal behavior, LB film-formability and so on, are investigating to develop novel functional cellulose derivatives. The ring-opening polymerization method is also applying to other stereo-regular polysaccharide synthesis such as β-1,6 glucan. From natural cellulose, another type of regio-selective substituted cellulose, which was obtained by the introduction of a hydrophobic group into the reducing-end of cellulose, and 6-amino-6-deoxycellulose, which is similar to chitosan, are also investigating. Based on these results, the conversions of natural polysaccharides to the functional polymers also are studying.

b) Elucidation of chemical structure of total lignin in wood

The determination of chemical structure of lignin is not completed yet, although many researchers have studied over 100 years. We are studying about the novel lignin degradation method named TIZ method for the analysis of chemical structure of the total lignin in woods. We are trying to clear Lignin-Carbohydrate-Complex (LCC) by the enzyme treatment of MWL extractive residue. The information by these studies will be applied to the development of the novel high-yield pulping method. The dehydrogenative polymerization of monolignol glucoside is also studying to give new functional synthetic lignin.

c) Chemical syntheses of the extractive in tropical wood species and their utilization

Wood extractives have been used as a natural dyestuff, perfume, medicine and so on, but there still seems to exist the interesting new chemical components, especially in tropical forest-woods. Recently, we are studying the extractives from the root of *Rubiaceae*. The chemical synthesis of the extractive by microwave heating and its color development are investigating.

A-2. Publications and presentations

a) Publications

Original papers

Ifuku, S., Nakai, S., Kamitakahara, H., Takano, T., Tsujii, Y., Nakatsubo, F.: Preparation and characterization of monolayer and multilayer langmuir-blodgett films of a series of 6-*O*-alkylcelluloses. Biomacromolecules **6** (4); 2067-2073 2005

Matsui, Y., Ishikawa, J., Kamitakahara, H., Takano, T., Nakatsubo F.: Facile synthesis of 6-amino-6-deoxycellulose. Carbohydrate Research **340** (7); 1403-1406 2005

Kamitakahara, H., Nakatsubo, F.: Synthesis of diblock copolymers with cellulose derivatives 1. Model study with azidoalkyl carboxylic acid and cellobiosylamine derivative. Cellulose **12** (2); 209-219 2005

Ifuku, S; Kamitakahara, H.; Nakatsubo, F.: Preparation of novel reagents 4-alkoxytrityl chlorides and their reaction with methyl D-glucoside *J. Wood Sci.* **50**(3), 248-252 2004

Patents

Patent application

Patent No.2004-3486822 "Surfactant comprised of oligosaccharides", inventor: Kamitakahara, H., patentee: Kamitakahara, H., Nakatsubo, F., Klemm, D.

Reports

Nakatsubo, F.: Final Report of Grant-in-Aid for Scientific Research (A) (2) General "The molecular design of organic-inorganic nano-composite from cellulose and its development for utilization."

Articles

Kamitakahara, H.: Woodience 66, "My studying abroad in Jena, Thuringia, Germany."

b) Conference and seminar papers presented

The 11th Annual Meeting of the Cellulose Society of Japan (Sendai, 2003.7.15-7.16) 4 papers in Japanese

The 54th Annual Meeting of the Japan Wood Research Society (Sapporo, 2004.8.03-8.05) 3 papers in Japanese

The 48th Japan Congress on Material Research (Tokyo, 2004.10.20-10.21) 1 paper in Japanese.

The 49th Lignin Symposium (Tsukuba, 2004.11.18-11.19) 2 papers in Japanese

The 55th Annual Meeting of the Japan Wood Research Society (Kyoto, 2005.3.16-3.18) 3 papers in Japanese

A-3. Off-campus activities

Membership in academic societies (roles)

Nakatsubo, F.: The Japan Wood Research Society (A member of Education-promotion committee, A vice-chairman of committee for the 55th Annual Meeting of the Japan Wood Research Society); The Cellulose Society of Japan (Vice-president); Steering Committee of the 9th Annual Meeting of the Cellulose Society (Commitee), The Society of Fiber Science and Technology, Japan (Kansai Regional Board), Wood Technical Association of Japan (Councilor), International Academy of Wood Science (Fellow), Cellulose (Editorial committee), J. Wood Chem. Technol. (Editorial committee).

Takano, T.; The Japan Wood Research Society (Editorial committee, A member of Steering Committee of the 55th Annual Meeting of the Japan Wood Research Society), The Society of Fiber Science and Technology, Japan (A member of Steering Committee of 35th Summer Seminar of The Society of Fiber Science and Technology, Japan).

Kamitakahara, H.: The Japan Wood Research Society (A member of Steering Committee of the 55th Annual Meeting of the Japan Wood Research Society).

Research grants

Monkasho Research Grant:

Nakatsubo, F.: Basic Research (A) (2) General "Molecular design of the organic－inorganic nano-composite from cellulose and its development for utilization" (Nakatsubo: head, Takano, Kamitakahara: coworker).

Kamitakahara, H.: Young Scientists (B) "The syntheses of block-like cell-oligosaccharides by the combination of ring-openning polymerization and glycosylation."

Kamitakahara, H.: Sekisui Chemical Grant Program for Research Projects Based on Learning from Nature; Encouragement prize "Creation of block copolymers based on bark components fixation cellulose learning from the self-defense mechanism of trees."

A-4. International cooperations and overseas activities

International meetings

Hiroshi Kamitakahara: 229th ACS meeting in San Diego, Anselme Payen Award Symposium honoring Prof. Dieter Klemm, San Diego, USA. (Invited paper) (2005.03.14)

International joint research, overseas research surveys

Nakatsubo, F.: Survey for original species of persimmon in China (China) (2004.10.26-10.30)

B. Educational Activities (2004.4-2005.3)

B-1. On-campus teaching

a) Courses given

Undergraduate level: Basic Forest and Biomaterials Sciences II (Nakatsubo), Cellulose Chemistry (Nakatsubo), Reading of Foreign Literature I (Nakatsubo), Biomass Chemistry (Takano),Laboratory Course in Forest and Biomaterials Science II (Takano, Kamitakahara), Laboratory Course in the Basic Forest and Biomaterial Chemistry (Takano, Kamitakahara), Laboratory Course in Biomaterials Chemistry I (Takano, Kamitakahara)

Graduate level: Biomaterials Chemistry II (Takano), Seminar in Biomaterials Chemistry (Nakatsubo, Takano, Kamitakahara), Laboratory Course in Biomaterials Chemistry (Nakatsubo, Takano, Kamitakahara)

B-2. Off-campus teaching, etc.

Part-time lecturer

Nakatsubo, F.: Kyoto Pref, University (Forest Resources Chemistry)

Open seminar

Nakatsubo, F.: Kyoto University Open Seminar, "The World of Forest and Wood" (Lecture)

B-3. Overseas teaching

Nakatsubo, F.: Special Lecture in Huazhong Agricultural University (2004.10.27)

Chair of Forest Resources (Field Science Education and Research Center: FSERC)

2.2.13 Laboratory of Forest Information

Staff *Professor* : *Takeuchi, Michiyuki, Dr. Agric. Sci.*
Associate Professor: *Shiba, Masami, Dr. Agric. Sci.*
Lecturer : *Nishimura, Kazuo, Dr. Agric. Sci.*
Lecturer : *Nakashima, Tadashi, Dr. Agric. Sci.*
Assistant Professor : *Sakanoue, Nao, Dr. Agric. Sci.*

Students and research fellows
Doctor's program : (1)
Master's program : (4)
Undergraduate : (2)
Research student: (1)

A. Research Activities (2004.4-2005.3)

A-1. Main subjects

Dealing with the sophistical issues of integrating forest resources management with environmental, and social values and objectives in a sustainable manners requires a more holistic and spatial approaches than has been traditionally applied to managing forest ecosystem condition at a stand level. By taking a landscape perspective, combined with improved analytical tools to support the consensus-based management decision-making, benchmarking forest management practices to meet the adequate scale or level of potential impacts caused by silvicultural and harvesting activities might be realized. The importance of the precise evaluation and monitoring for forest, changing with long-term cycle, therefore, is increasing. Our laboratory, based on FSERC's research & experimental forests, demonstrate the long-term conservation outlook of forest resources under alternative management strategies geared to multiple economic, environmental, and social issues as follows;

a) Long rotation forest management schemes and adaptive management technology for plantation forestry in Japan,
b) Study on water environment, soil production and plant-related substance-cycling,
c) Timber production, processing and trade strategies,
d) Site-specific functional categorization and donation of forest area,
e) Optimization of forest road network infrastructure,
f) Forest resource monitoring system based on GIS/image processing,
g) Strategies for forest certification and timber logistics, and
h) Operational efficiency and LCA/RM approaches for mechanized timber harvesting

A-2. Publications and presentations

a) Publications

Books

Takeuchi, M., Shiba, M., Nakashima, N., Nishimura, K., Sakanoue, N.: Spatial functional linkage

between forest, rural and sea-spheres (edited by Field Science Education and Research Center, Kyoto University). pp.96-123, The Kyoto University Museum, Kyoto, 2004(in Japanese)

Nishimura, K.: Skills of organic farming for slow life. pp.1-288, Nanatumori-Syokan Publishing Co. Ltd., Tokyo, 2004(in Japanese)

Original papers

Shiba, M.: FSC's forest certification and CoC system and its influence on forest management and timber harvesting activities. J. JFES, Vol.18, No.4; 263-266, 2004 (in Japanese with English summary)

Shiba, M.: A timber harvest scheduling/allocation model for simulating long term management alternatives of plantation forests. Transactions of the 11th Annual Meeting of the JFES;6, 2004 (in Japanese)

Shiba, M., Ishikawa, T. and Ishidoh,Y.: Timber harvest scheduling and allocation model for simulation long rotation plantation forest management system. J. JFES, Vol.19(4); 309-314, 2005 (in Japanese with English summary)

Shiba,M. and Ishikawa, T.: Some considerations on a timber harvest scheduling/allocation model THSAM. Transactions of the 116th Annual Meeting of the JFS;4B02, 2005 (in Japanese)

Reports

Sakanoue, N.: The needs for woods used for maintenance of important cultural properties (buildings) in Japan. Reports for the 2002-2004 activities of Grant-in Aid for Scientific Research: Scientific Research (A)(1); Study on wood for repair of wooden constructions as cultural property; 138-155, 2005

Shiba, M.: Development of computer simulation system and analytical model for timber harvest scheduling/allocation management alternatives. Summary report for research grant from Shinkoukousaikai Foundation ;63-245, 2004 (in Japanese)

Shiba, M.: Development of a forest management certification and a chain of custody scheme oriented towards Japanese plantation forestry. Mid-term research report for research grant from scientific and cultural promotion foundation of Asahi Breweries Ltd;1-132, 2004 (in Japanese)

Shiba, M.: Status issues on Japanese forest and forestry. Workshop summary report on forest environment education for the lower grades of school. SPP program between Kyoto University, National land Afforestation Promotion Organization, Kyoto, Osaka and Shiga Prefectures); 1-24, 2004 (in Japanese)

Shiba, M.: Compatible timber harvest system with environmental issues. Text book for Ringyojiku Seminar 2004 (organized by Forest production system Corp.); 1-68,2004 (in Japanese)

b) Conference and seminar papers presented

The 116th Annual Meeting of Japan Forest Society: (4)

The 11th Annual Meeting of The Japan Forest Engineering Society: (2)

A-3. Off-campus activities

Membership in academic societies

Shiba, M.: Society for Forest Certification System Research (Representative), Kansai Branch of Japanese Forest Society (Editorial board member)

Research grants

Monbukagakusyo Research Grant: Grant-in-Aid for Scientific Research (A) (1); Study on wood for repair of wooden constructions as cultural property. (Sakanoue, Co-researcher), Grant-in-Aid for Scientific Research (C) (2); Development of adaptive forest management system (AFMS) oriented towards the sustainable forest management for Japanese plantation forests. (Shiba, head)

Other Research Grant: Research grant from Shinkoukousaikai Foundation "Development of computer simulation system and analytical model for timber harvest scheduling/allocation management alternatives" (Shiba), Research grant from scientific and cultural promotion foundation of Asahi Breweries Ltd "Development of a forest management certification and a chain of custody scheme oriented towards Japanese plantation forestry" (Shiba).

A-4. International cooperations and overseas activities

International meetings(roles)

Shiba, M.: International Research Project on Forest Certification and CoC logistics in Germany (Germany)

International academic society and/or organizational officers

Shiba, M.: IUFRO S3.06 Coordinator, IUFRO S3.06.02 Duty coordinator, International Editorial Board for International Journal of Forest Engineering, Canada, International Member of Council on Forest Engineering, USA, FSC International (Japanese member)

B. Educational Activities (2004.4-2005.3)

B-1. On-campus teaching

a) Courses given

Undergraduate level: Basic Science for Forest and Biomaterials Ⅳ (Takeuchi), Forest Management System & Applied Technology (Shiba), Fundamental of Glaciology (Takeuchi, Nakashima), Practice Course in Forest Science Ⅳ (Shiba, Sakanoue), Integrated Practice and its Method on Forest Science (Shiba, Sakanoue), Practice in University Forest I (Takeuchi, Nakashima), Practice in University Forest Ⅲ (Takeuchi), Practice in University Forest Ⅳ (Takeuchi)

Graduate level: Special lecture on Forest Information Science I (Takeuchi), Special lecture on Forest Information Science (Takeuchi), Laboratory course in forest information (Takeuchi)

B-2. Off-campus teaching, etc.

Part-time lecturer

Shiba, M.: Faculty of Agriculture, Kyoto Prefecture University (Information Management Practice), Faculty of Agriculture, Ehime University (Forest operational environment)

Open seminar

Takeuchi, M., Nakashima, K., Nishimura, K., Sakanoue, N., Shiba, M.: Kyoto Univ. For., Open Seminar, Structure and function of Forests (Lecturer)

C. Other remarks

Shiba, M.: Mie Prefecture Environmental Conservation Agency (Technical advisor), Mie Biotope Research Association (Councilor), UFJ Institute Corp (Technical advisor for forest management strategies), World Wide Found For Nature, Japan (Council member of forest management system), Forest Planning Division, Mie Prefecture (Council member of developing perspective forest management strategies in Miyakawa watershed area in Mie), TOMIMURA Environment Research Institute (Technical advisor), AMITA Corporation (Technical advisor), SGS Japan (Technical advisor for forest certification)

2.2.14 Laboratory of Silviculture

Staff *Associate Professor: Ando, Makoto, Dr. Agric. Sci.*
Associate Professor: Shibata, Shozo, Dr. Agric. Sci.
Associate Professor: Tokuchi, Naoko, Dr. Agric. Sci.
Assistant Professor : Sakimoto, Michinori, Dr. Agric. Sci.

Students and research fellows
Doctor's program:(7) *Research fellow :(1)*
Master's program:(6)
Undergraduate :(1)

A. Research Activities (2004.4-2005.3)

A-1. Main subjects

a) Nitrogen cycling

Nitrogen is the limiting factor for plant growth. N dynamics is important for forest, especially in plant-soil system. Nitrogen dynamics is described the typical Japanese vegetation which belongs to Field Science and Education Center, Kyoto University.

b) Studies on dynamics, maintenance mechanisms of biological diversity, and life historical strategies of plant species in forests.

Natural forests are heterogeneous in time and space, and are composed of various many plant species. Those plant species have their own specific life history strategies. To develop the methods foe ecological management and conservation of forests, we are engaged in analyzing spatial structure, dynamics mechanisms of diversity, and reproductive ecology and demography of plant species in natural forests.

A-2. Publications and presentations

a) Publications

Books

Ando M.: Recovery of the forest landscape behind World's cultural heritage of Kyoto: Change of urban forests damaged by pine wilt disease in Kyoto City. Connected Rings of Forest – Human Habitation – Marine: challenged by Field Science Education and Research Center, Kyoto University (Museum of Kyoto University and Field Science Education and

Research Center, Kyoto University). 82-85, Daishinsha, Osaka, 2004

Ando M.: Can beech forest survive in Ashiu? : Long term dynamic research of natural forest. Connected Rings of Forest – Human Habitation – Marine: challenged by Field Science Education and Research Center, Kyoto University (Museum of Kyoto University and Field Science Education and Research Center, Kyoto University). 102-105, Daishinsha, Osaka, 2004

Ando M.: Animals living in forests: Damage of trees and forests by mammals. Connected Rings of Forest – Human Habitation – Marine: challenged by Field Science Education and Research Center, Kyoto University (Museum of Kyoto University and Field Science Education and Research Center, Kyoto University). 106-109, Daishinsha, Osaka, 2004

Shibata S.: Bamboo forest is the disturbance of *Satoyama*? –Egoism of Japanese abandon the management of Satoyama–. (Ed. Kyoto Univ., FSERC, Kyoto Univ. Museum), 112-115, 2004 (in Japanese)

Tokuchi N.: Save waster resources. (Ed. Kyoto Univ., FSERC, Kyoto Univ. Museum), 86-91, 2004 (in Japanese)

Nakanishi, A. and S. Shibata: *Satoyama*? –For its understanding and cinservation–. (Ed. Kyoto Univ., FSERC, Kyoto Univ. Museum), 78-81, 2004 (in Japanese)

Shibata S.: Het gebruik van dwergbamboe in de tuin., "BAMBUSEAE" (Ed. Jan Oprins & Harry van Trier, Stichting Kunstboek), 100-101, 2004

Original papers

Okuda, Y., S. Shibata, P. Preechapanya and I. Vonkaluang: Observation on mass flowering of *Dendrocalamus strictus* in Northern Thailand, Bamboo Journal 21; 18-23, 2004

Aoki, T. and Shibata, S: Quantitative analysys of above-ground part of dwarf bamboo. Bamboo Journal 21; 24-34, 2004

Hirayama, K. , Sakimoto, M.: Seedling demography and establishment of *Cryptomeria japonica* in a cool-temperate, old-growth, conifer hardwood forest in the snowy region of Japan. Journal of Forest Research 10: 67-71, 2005

Mizumachi, E., Osawa, N., Akiyama, R. and Tokuchi, N. : The effects of herbivory and soil fertility on the growth patterns of Quercus serrata and Q. crispula at the shoot and individual levels. Population Ecology 46: 203-211, 2004

Fujimaki, R., Tateno, R., Hirobe, M., Tokuchi, N. and Takeda, H.: Fine root mass in relation to soil N supply in a cool temperature forest. Ecological Research 19: 559-562, 2004

Tokuchi, N., Ohte, N., Hobara, S., Kim, S. and Katsuyama, M. : Changes in biogeochemical cycling following forest defoliation by pine wilt disease in Kiryu experimental catchment in Japan. Hydrological Processes 18:2727-2736, 2004

Tokuchi, N., Kondo, K., Hirobe, M., Kajimoto, T., Matsuura, Y., Ohsawa, A. and Abaimov, A. P.: N cycling at a larix stand in Tura, central Siberia. – Spatial and temporal variability in soil inorganic N pool – Proceeding of the 5th International Workshop on Global Change: Connection to the Arctic. 207-209,2004

Kondo, K., Tokuchi, N., Hirobe, M., Matsuura, Y., Kajimoto, T., Abaimov, A. P. and Ohsawa, A.: Does nitrogen limit for plant growth in larch forest in Tura, central Siberia? Proceeding of the 5th International Workshop on Global Change: Connection to the Arctic. 195-198, 2004

Kajimoto, T., Matsuura, Y., Ohsawa, A., Abaimov, A. P., Zyryanova, O. A., Ishii, A., Kondo K. and

Tokuchi, N. (2004) Biomass and spatial patterns of individual root system in Larix gmelinii stands on continuous permafrost region of centratl Siberia. Proceeding of the 5th International Workshop on Global Change: Connection to the Arctic. 187-190.

Ohsawa, A., Abaimov, A. P., Kajimoto, T., Matsuura, Y., Zyryanova, O. A., Tokuchi, N., Kondo K. and Hirobe, M. (2004) Long-term development of larch forest ecosystems on continuous permafrost of Siberia: structure constrains and implications to carbon accumulation. Proceeding of the 5th International Workshop on Global Change: Connection to the Arctic. 53-55

Mark Adams, Phil Ineson, Dan Binkley, George Cadisch, Naoko Tokuchi, Mary Scholes and Kevin Hicks (2004) Soil Functional Responses to Excess Nitrogen Inputs at Global State. Ambio 33(8): 530-536

Tateno, R., Osada, N., Terai, M., Tokuchi, N. and Takeda, H. (2004) Inorganic nitrogen source utilization by *Fagus crenata* on different soil types. Trees (accepted)

Reviews

Shibata, S: Familiar contact with trees – Issues given to us from tree–. Textbook for the open lecture of Fac. Agriculture, Kyoto Univ. in 2004; 17-26, 2004 (in Japanese)

Reports

Sano, J., S. Tamai and M. Ando: Effects of Global Warming on the Species Composition and Vegetation Productivity in Arid Areas -Species Composition and Stand Structure of Predominant Vegetation Types in the Eastern Mediterranean Region of Turkey-. Proceeding of International Workshop for the Research Project on the Impact of Climate Change on Agricultural Production System in Arid Area (ICCAP), 4; 57-59, 2005

Tamai S., M. Ando and J. Sano: Stand structure and characteristics of tree growth in plant communities of the eastern Mediterranean region, Turkey. Proceeding of International Workshop for the Research Project on the Impact of Climate Change on Agricultural Production System in Arid Area (ICCAP), 6; 36-38, 2005

Ando, M.: Report of vegetation research of forest around Hacchou-daira swamp, 2004. Kyoto City, 1-22, 2005

Go, H., H. Okada, Y. Shimizu and M. Ando: Effect of ground treatment on development, establishment and growth of current year Japanese red pine seedlings. Trans.116th Mtg.Jpn.For.Soc., PA 116, 2005

Kaneko T. and the research group of Mondoridani watershed: Long term and large scale research of 16 ha study plot in Mondoridani watershed, Ashiu. Trans.115th Mtg.Jpn.For.Soc., 360, 2004

Ando, M ., T. Kaneko, M. Yamasaki, A. Takayanagi, N. Yamanaka, T. Hasegawa, T. Sakai, Y. Kaneko, S. Ohata and M. Takeuchi: Dynamics of 16 ha study plot in Mondoridani watershed, Ashiu for 10 years -Difference by the topography in natural forest mixed Japanese cedar, Sugi of the lower part of cool temperate zone -. Trans.115th Mtg.Jpn.For.Soc., 446, 2004

Okada, H., H. Go, N. Shimizu and M. Ando: Differentiation of forest type in large scale study plot of cool temperate natural forest mixed Japanese cedar, Sugi in upper part of Mondoridani watershed, Ashiu. Trans.115th Mtg.Jpn.For.Soc., 456, 2004

Go, H., H. Okada, N. Shimizu and M. Ando: Dynamics of secondary forest around Kyoto City after damage by pine wilt disease. Trans. 51st Mtg.Jpn.Eco.Soc., 157, 2004

Okada, H., H. Go, N. Shimizu and M. Ando: Forest type of 16 ha natural forest in Mondoridani watershed, Ashiu. Trans. 51st Mtg.Jpn.Eco.Soc., 201, 2004

Tamai S., M. Ando, J. Sano and T. Yilmaz: Vegetation and community structure of Chikurova plains, southern part Turkey. Trans. 51st Mtg.Jpn.Eco.Soc., 268, 2004

Okada, H., H. Go, Y. Shimizu and M. Ando: Stand structure of cool-temperate forests in central Japan. Proceedings of the First EAFES International Congress; 174-175, 2004

Shibata, S.: Japanese Bmaboo Party in the 7th World Bamboo Congress. Bamboo 88; 16-17, 2004 (in Japanese)

Ishihara, K., A. Amou, K. Sano, N. Tanaka, K. Yoshida and S. Shibata: Trial to grow the coastal plants in the second island of Kansai International Airport. J. Jpn. Revegetation Technology 30(1); 231-234, 2004 (in Japanese)

Shibata, S., T. Yanagawa, K. Kamimura, M. Tokunaga and S. Tanaka: Effects of restoration of natural vegetation by top-soil blocks transplanting. Proc. 1st EAFES; 193-194, 2004

Shibata, S.: Maintenance of *Satoyama* in Japan and its problems. KIESS Booklet 3a; 38-44, 2004 (in Japanese)

Osaki, K. and S. Shibata: Seed bank in expanded bamboo forests and its contents of seed rain. Trans. 116th Mtg. Jpn. For. Soc., 2005 (in Japanese)

Abe, Y., S. Shibata and A. Nakanishi: Comparison of seed bank and dynamics of seedlings after the cutting in suburban forest. . Trans. 116th Mtg. Jpn. For. Soc., 2005 (in Japanese)

Ozaki, K., S. Shibata and M. Takeuchi: Vegetation of forest stands after the invasion of bamboo –case study in Yawata city and Yamashiro Town, Kyoto Pref. –. Trans. 116th Mtg. Jpn. For. Soc., 2005 (in Japanese)

Nakanishi A., Y. Inagaki, S. Shibata, K. Hirata, S. Sakai and N. Osawa: Influence of small acale cutting on the phenology and content of N on the litter of Chamaecyparis obtuse. Trans. 52nd Mtg. Jpn. Ecology; 178, 2005

Morishita, K., Sakimoto, M.: Response patterns of aboveground morphology to slope inclination in codominant three shrubs with different growth form. Trans. 115th Mtg. Jpn. For. Soc., p 417

Takahashi, M., Sakimoto, M.: Responses of canopy to different light conditions in saplings of 7 deciduous canopy species., Trans. 115th Mtg. Jpn. For. Soc., p 431

Matsuyama, S., Sakimoto, M: Relationships between seasonal patterns of vegetative and reproductive growth and annual reproductive behavior in 2 *Rhus* species. Proc. 51th Ann. Mtg, Ecol. Soc., p148, 2004

Morishita, K., Sakimoto, M.: Spatia pattern and concerning factors of co-dominant three shrub species in a natural conifer-hardwood forest. Proc. 51th Ann. Mtg, Ecol. Soc., p177, 2004

Morishita, K., Sakimoto, M.: Plastic responses of aboveground morphology to canopy conditions in the three co-dominant shrubs in a cool-temperate conifer-hardwood forest, central Japan. Proc. 1st EAFES Int. Cong., 2, 2004

Morishita, K., Sakimoto, M.: Plastic responses of aboveground morphology to different canopy conditions in codominant shrub species (*Lindera, Symplocos, Menziesia*). Proc. 36th Ann. Mtg, Species Biol. Soc., p3, 2004

Morishita, K., Sakimoto, M.: Response of aboveground morphology in three shrub species to heterogeneous conopy conditions in a natural forest. Proc. 1st Int. Symp. Entomol. Sci.

COE “Development and Metamorphosis”, p24, 2005

b) Conference and seminar papers presented

Ando, M.: the 115th Mtg. of Jpn. For. Soc.: 3 presentations, the 51st Mtg.Jpn.Eco.Soc. : 3 presentations, the First EAFES International Congress: 1 presentation

Shibata: 1st East Asian Federation of Ecological Societies (1), Society of Jpn. Revegetation Technology (1), Forest Society of Japan (3), Jpn. Ecology Society (1)

A-3. Off-campus activities

Membership in academic societies

Shibata, S.: Jpn. Inst. Landscape Architecture (Project committee member), Jpn. Soc. Revegetation Technol. (Director, Chairman of environmental forest section, Chairman of editorial boards, Member for the selection of award),

Membership in Science Council of Japan, etc.

Shibata, S.: Jpn. Bamboo Soc. (Coumcilor, Editorial member), Soc. Study of Bamboo (Rep.), Center for Support of Forest regeneration (Councilor), Foundation for the promotion of bamboo culture (Councilor), Consortium for Bamboo Resources Effective Uses (Advisor), Consortium for green purchase (Advisor), CDM Network in Osaka (Advisor)

Research grants

Ando, M.: Vegetation research of forest around Hacchou-daira swamp (Ando rep.)

Grant-in Aid for Scientific Research: Basic Research (A) (2); Development of HEP in ecosystem mitigation (Shibata part.)

Grant-in Aid for Scientific Research: Basic Research (B) (2); Carbon and nitrogen fixing mechanism and estimation of potential pool (Tokuchi rep.)

Grant-in Aid for Scientific Research: Basic Research (B) (2); Evaluation method for forest environment change by modeling of formation mechanism of stream-water chemistry (Tokuchi part.)

Grant-in Aid for Scientific Research: Basic Research (A) (1); Long-term monitoring and large scale observation of water, heat and nutrient in stream ecosystem (Tokuchi part.)

Grant-in Aid for Scientific Research: Basic Research (B); The interaction between forest structure development and nitrogen dynamics in Siberia (Tokuchi part)

Ministry of Environment; Nitrogen dynamics in Larix ecosystem (Tokuchi part)

Shiga prefecture grant; Evaluation of forest environment change by forest management (Tokuchi part.)

Stream Foundation; The influences of stream water amount and chemistry by forest management (Tokuchi rep.)

A-4. International cooperations and overseas activities

International meetings (roles)

Ando, M.: the First EAFES International Congress, Moppo, Korea (presentation)

Membership in international academic societies

Shibata S.: International Consortium of Landscape and Ecological Engineering (Associate Editor-in-Chief)of journal), World Bamboo Organization (Board member)

International joint researches, overseas research surveys

Ando, M.: Ecological investigation and experiment about physiology of a poplar (China)

Ando, M.: Impact of Climate Change on Agricultural Production System in the Arid Areas (Turkey)

Shibata, S.: Research of bamboo forest management and bamboo industry (Taiwan), Research of revegetation sites for natural restoration (Korea), Preliminary survey of *Melocanna baccifera* forests (India), Arrangement of the site in natural history museum, Tribhuvan Univ. (Nepal), Preliminary survey for research of traditional techniques against the disaster (Vietnam)

Tokuchi, N: Nitrogen dynamics in Larix ecosystem (Russia), Nutrient cycling in arid area (China)

Scholars from abroad

2 persons (Mustafa Kendal University, Turkey, assistant professor)

B. Educational activities

B-1. On-campus teaching

a) Courses given

Undergraduate level: Silviculture (Tokuchi), Forest Botany (Ando), Science of Biosphere – life, food and environment (Ando and Tokuchi), Laboratory Course in Biological and Environmental Science II (Ando and Sakimoto), Practice of Biological and Environmental Science I (Ando and Sakimoto), Practice of University Forest I (Ando), Laboratory Course in Forest and Biomaterials Science IV (Ando), Planting design for landscaping (Shibata & Morimoto)

Graduate level: Seminar in Silviculture (Ando, Shibata, Tokuchi, and Sakimoto), Practice Course in Silviculture (Ando, Shibata, Tokuchi, and Sakimoto), Landscape ecology and planning (Morimoto & Shibata), Regeneration of woodland in countryside (Shibata), Practice of field works in forests (Shibata)

B-2. Off-campus teaching, etc.

Part-time lecturer

Shibata, S.: Kochi Univ. (Special lectures for silviculture IV), Kyoto Junior College of Art (Revegetation Technology), Kyoto College of Art (Correspondence course, Landscape Design and Nature conservation)

Open seminar, etc

Shibata, S.: Workshop of Japan Bamboo Society (lecturer), General lecture in Fukui Pref. College for Agriculture, Forestry and Fishery (lecturer), Open lecture of Fac. Agriculture, Kyoto Univ. (lecturer), Workshop of Japanese Tree Doctors (lecturer), 5th Younger Forum, Japan Bamboo Association (coordinator), Lecture meeting of Japan Bamboo Association in 2004 (lecturer), Annual meeting for revegetation of *Satoyama* in Haruno town, Kochi (lecturer), Lecture in Awaji Landscape Planning and Horticulture Academy (lecturer)

Sakimoto, M.: Open Seminar in Ashiu Forest Research Station (lecture), Open Seminar of Kamigamo Experimental Forest, Kyoto University (lecturer)

C. Other remarks

Shibata, S.: Member of working group for preservation of wall paintings in Takamatsuzuka tomb (Agency for Cultural Affairs), Green Management Technical Com. (Ministry of Infrastructure and Transport), Member of political discussion committee for Green Public

Project (Kyoto Pref.), Member of committee for conservation of nature in Ide (Ide Town), Chairman of research committee for revegetation of the second island in Kansai International Airport (Kansai Airport), Member of committee for recycle techniques of biomass resources in Kansai District (Japan Highway), Member of committee for making-up programme the promotion of bamboo resource use (Ehime Pref.), Chairman of committee for the improvement of forest path in Tango Peninsula (Kyoto Pref.), Member of committee for the preservation and application of cultural landscape of Kitayama forestry landscape (Agency of Forestry), Chairman of committee for the making-up of manual for maintenance of neglecfed bamboo forests (Osaka Pref.), Member of committee for making-up the principal to maintain the Kidu River Sports Park (Kyoto Pref.), Project leader of CENEED (Centre for Nepal of Environmental and Educational Development) Supporting Group

TV interview of Fuji TV about the growth of bamboo shoots,

Newpaper Interview of Kyoto Shimbun in 8 May 2004 and 26 May 2004

Chair of Wood Biomass Science (Wood Research Institute)

2.2.15 Laboratory of Biomass Morphogenesis and Information (Research Institute for Sustainable Humanosphere)

Staff *Professor* *: Itoh, Takao, Dr. Agric. Sci.*

Associate Professor: Sugiyama, Junji, Dr. Agric. Sci.

Assistant Professor: Baba, Kei'ichi, Dr. Agric. Sci.

Students and research fellows

Doctor's program : (1)

Master's program : (1)

Postdoctoral Fellow : (3)

Research Staff : (1)

Research Student : (1)

A. Research Activities (2004.4-2005.3)

A-1. Main subjects

a) Structure and Function of Cell Wall

Structure and organization of cell wall during evolution of living organism, three-dimensional organization of cell wall components, biogenesis and orientation-control mechanism of cellulose microfibrils are now being studied by using the following methods: electron microscopy, immunology, molecular biology, and polysaccharide analysis.

b) Crystal structure of cellulose and its variation from the view point of biological diversity

Native celluloses yield two types of crystal structure, namely monoclinic and triclinic crystal forms, whose ratio varies depending on cellulose origins. The objectives are to determine their

Project (Kyoto Pref.), Member of committee for conservation of nature in Ide (Ide Town), Chairman of research committee for revegetation of the second island in Kansai International Airport (Kansai Airport), Member of committee for recycle techniques of biomass resources in Kansai District (Japan Highway), Member of committee for making-up programme the promotion of bamboo resource use (Ehime Pref.), Chairman of committee for the improvement of forest path in Tango Peninsula (Kyoto Pref.), Member of committee for the preservation and application of cultural landscape of Kitayama forestry landscape (Agency of Forestry), Chairman of committee for the making-up of manual for maintenance of neglecfed bamboo forests (Osaka Pref.), Member of committee for making-up the principal to maintain the Kidu River Sports Park (Kyoto Pref.), Project leader of CENEED (Centre for Nepal of Environmental and Educational Development) Supporting Group

TV interview of Fuji TV about the growth of bamboo shoots,

Newpaper Interview of Kyoto Shimbun in 8 May 2004 and 26 May 2004

Chair of Wood Biomass Science

2.2.15 Laboratory of Biomass Morphogenesis and Information (Research Institute for Sustainable Humanosphere)

Staff *Professor* *: Itoh, Takao, Dr. Agric. Sci.*

Associate Professor: Sugiyama, Junji, Dr. Agric. Sci.

Assistant Professor: Baba, Kei'ichi, Dr. Agric. Sci.

Students and research fellows

Doctor's program : (1)

Master's program : (1)

Postdoctoral Fellow : (3)

Research Staff : (1)

Research Student : (1)

A. Research Activities (2004.4-2005.3)

A-1. Main subjects

a) Structure and Function of Cell Wall

Structure and organization of cell wall during evolution of living organism, three-dimensional organization of cell wall components, biogenesis and orientation-control mechanism of cellulose microfibrils are now being studied by using the following methods: electron microscopy, immunology, molecular biology, and polysaccharide analysis.

b) Crystal structure of cellulose and its variation from the view point of biological diversity

Native celluloses yield two types of crystal structure, namely monoclinic and triclinic crystal forms, whose ratio varies depending on cellulose origins. The objectives are to determine their

structures as well as to relate the cause of structural variation with factors such as evolution, biogenesis and the crystallization mechanism, environment and so on.

c) Physiology of Growth in Forest Trees

Trees are distinguished from herbs or grasses by their longer life, larger size and slower maturity. Physiological mechanisms characterizing trees are studied by the methods on anatomy, histochemistry, cytochemistry, biochemistry and molecular biology. Now, we are targeting the response of xylem differentiating tissue against inclination stimulus and formation of tension wood.

d) Tree Species of Excavated Wood and Relevant Environment

Japan is characterized by wooden culture and many wooden articles have been used for living from ancient time. However, the materialized data to demonstrate those mentioned above are lacking. We are now studying the tree species and uses of wood excavated from the relics in our country in relation to the region and era. We are also aiming to reconstruct the forest around the ancient relics.

A-2. Publications and presentations

a) Publications

Books

Itoh, T.: Wood archaeology, pp.247-253, In, "Handbook for Environmental Archaeology", ed. Y. Yasuda, Asakura press, 2004

Original papers

Kimura, S. and Itoh, T.: Cellulose synthesizing terminal complexes in the ascidians, Cellulose 11, 377-383 (2004)

Itoh, T., Kimura, S. and R. Malcolm Brown, Jr.: Theoretical considerations of immunogold labeling of cellulose synthesizing terminal complexes, Cellulose 11, 385-394 (2004)

Kanno M., Yokoyama, J., Suyama, Y., Ohyama, M., Itoh, T., Suzuki, M.(2004): Geographical distribution of two haplotypes of chloroplast DNA in four oak species (Quercus) in Japan, J. Plant Res. 117, 311-317.

Yano, H., Sugiyama, J., Nakagaito A.N., Nogi, M., Matsuura, T., Kurihara, T., and Handa, K.: Opticall transparent composites reinforced with networks of bacterial nanofibers. Adv. Mater. 17; 153-155, 2005

Nishikawa, T., Morita, T., Sugiyama, J., and S. Kimura: Formation of gold nanomarticles in microreactor composed of helical peptide assembly in water J. Coolloid Interface Sci., 280; 506-510, 2004

Katouno, F., Taguchi, M., Sakurai, K., Uchiyama, T., Nikaidou, N., Sugiyama, J., and Watanabe, T.:Improtance of exposed aromatic residues in chitinase B from Serratia marcescens 2170 in crystalline chitin hydrolysis. J. Biochem. 136;163-168, 2004

Fujimura, F., M. Fukuda, J. Sugiyama, T. Morita, and S. Kimura:Sponaneous assembly formation of cyclic dimer of b-amino acid in water. Chem. Lett., 33; 810-811, 2004

Wada, M., Heux, L. and Sugiyama, J. : Polymorphism of Cellulose I Family: Reinvestigation of cellulose IVI. Biomacromolecules 5; 1385-1391, 2004

Sturcova, A., His, I., Apperley, D.C., Sugiyama, J., and Jarvis, M.C. : Structural details of crystalline cellulose from higher plants. Biomacromolecules 5; 1333-1339, 2004

Park, Y. W., K. Baba, Y. Furuta, I. Iida, K. Sameshima, M. Arai, T. Hayashi: Enhancement of

growth and cellulose accumulation by overexpression of xyloglucanase in poplar. FEBS letters; 564, 183-187, 2004

Reports

Itoh, T.:Forest in Japan, Symposium of Sakuramachi Historic Site, pp. 247-253, Oyabe City Board of Education, 2004

Itoh, T.:Utilization of Japanese cypress (Chamaecyparis obtusa) and wooden cultural properties in Japan, pp. 32-45, "In", Proceedings of International Symposium of Cultural Heritage Re-utilization in Forestry, Ministry of culture in Taiwan, 2004

Itoh, T.:Traditional wood culture, "craftsman and techniques", 6, The spirit of wood, No.29, 52-61, 2004

Itoh, T.:Traditional wood culture, "craftsman and techniques", 5, The spirit of wood, No.28, 22-27, 2004

Itoh, T.:Traditional wood culture, "craftsman and techniques", 4, The spirit of wood, No.27, 33-37, 2004

Itoh, T.:Traditional wood culture, "craftsman and techniques", 3, The spirit of wood, No.26, 46-49, 2004

Park, Y. W., K. Baba, T. Hayashi, Y. Furuta, I Iida, K. Sameshima, M. Arai: Promotion of cellulose accumulation by degradation of xyloglucan in poplar. Proc. 5th Internatl. Wood Sci. Symposium; 395, 2004

Baba, K., M. Takeuchi, Y. W. Park, B. Clair, M. Yoshida, Y. Ohmiya, T. Taniguchi, Y. Ojio, T. Kondoh, T. Okuyama, T. Hayashi: Gravitropic response of poplar stem over expressing xyloglucanase. Proc. 5th Internatl. Wood Sci. Symposium; 394, 2004

Tsutsumi, Y., S. Sasaki, K. Baba, T. Nishida, R. Kondo: Isolation, Expression, and Localization Profile of the Lignin Polymer Oxidizing Cationic cell-wall-peroxidase in *Populus alba* L.. Internatl. Conference on Biotech. in the Pulp and Paper Industry; 77-78, 2004

b) Conference and seminar papers presented

54th Annual meeting of the Japan Wood Research Society (12)

46th Annual meeting of Japan Society of Plant Physiologist (2)

55th Annual meeting of the Japan Wood Research Society (5)

11th Annual meeting of the Cellulose Society of Japan (1)

Chitin Chitosan Symposium (1)

10th Microsymposium of the Cellulose Society of Japan (1)

Sympojium of the Japanese Society of Microscopy, Hokkaido Branch (1)

JWRS symposium on material biology for the 21st century (1)

A-3. Off-campus activities

Membership in academic societies

Itoh Takao:Cellulose society of Japan (Council), The Japanese Society of Microscopy (Council), Japan Wood Research Society (Editor)

Sugiyama Junji: Cellulose society of Japan (Council, Regional council, Editor), The Japanese Society of Microsocpy (Council, Regional manager, Regional Council), Japan Wood Research Society (IT committee member)

Membership in Science Council of Japan, etc.

Research grants

Itoh Takao: Grant-in-Aid for scientific Research (JSPS fellow: Mechtild Mertz) Studies on wood culture in East Asia-from the aspects of tree species used for wood sculptures and excavated wood (coordinator)

Sugiyama Junji: Grant-in-Aid for scientific Research (JSPS fellow: Thi Thi NGE) Development of chitin-based biomimetic composite material (coordinator)

Baba Kei'ichi: Program of Basic Research Activities for Innovative Biosciences (PROBRAIN), "Functions and control of polysaccharides in plant cell wall" (share)

A-4. International cooperations and overseas activities

International meetings (roles)

Itoh, T.: International Symposium of Cultural Heritage Re-utilization in Forestry (Invited speaker)

Itoh, T.: Europian IAWA and IWSS joint Conference, Montpellier, France (presentation)

Itoh, T.: Japan-Korea two country Seminor, Daejun, Korea (Invited speaker)

Itoh, T.: 5th Internatl. Wood Sci. Symposium, Kyoto (chairperson)

Sugiyama, J.: 5th Int'l. Wood Sci. Symp., Kyoto (presentation)

Baba, K: JSPS-LIPI Core Univ. in the Field of Wood Sci. Seminar, Indonesia (invited speaker)

Baba, K: 5th Internatl. Wood Sci. Symposium, Kyoto (presentation)

Membership in international academic societies

Sugiyama, J.: American Chemical Society, cellulose and renewable materials division(program committee), Cellulose (editorial board)

International joint researches, overseas research surveys

Itoh, T.: Studies on wood culture in East Asia, from the aspects of tree species used for wooden sculptures and excavated wood

Itoh, T.: Bio-diversity of Chinese wood

Sugiyama J.: Hierarchical structural analysis of wood cell wall (Germany and U.K.)

Scholars from abroad

2 JSPS postdoctoral fellows

1 Invited foreign researcher

2 foreign cooperative researchers

B. Educational Activities (2004.4-2005.3)

B-1. On-campus teaching

a) Courses given

Undergraduate level: Kyoto University General Education Course: Wood Biomass (Sugiyama), Pocket-seminar (Sugiyama, Baba)

Graduate level: Graduate school of Pharmacology (Itoh)

B-2. Off-campus teaching, etc.

Part-time lecturer

Nara Institute for Cultural properties (Itoh)

Symposium of Sakuramachi Historic Site (Itoh)

B-3. Overseas teaching

Seminar

Itoh, T.: Nanjing Forestry University, Nanjing, China

Itoh, T.: Peking University, Beijing, China

Itoh, T.: Chinese Academy of Forestry, Wood Industry Institute, Beijing, China

Baba, K: Faculty of Forestry, University Putra Malaysia, Malaysia

C. Other remarks

Itoh, T.: Committee member for JSPS Postdoctoral fellows

Itoh, T.: Committee member of Research Center for Buried Cultural Properties

Itoh, T.: a member for Invention Evaluation Committee at Yoshida Base

Sugiyama, J.: Committee member for the home page administration

2.2.16 Laboratory of Active Bio-based Materials (Institute for Sustainable Humanosphere)

Staff *Professor* : *Yano, Hiroyuki*

Associate Professor : *Morooka, Toshiro*

Associate Professor : *Tanaka, Fumio*

Students and research fellows

Doctor's program: (4)

Master's program: (2)

A. Research Activities (2004.4-2005.3)

A-1. Main subjects

a) Development of cellulose nanocomposites

b) Production of high performance materials based on bacterial cellulose

c) Studies on compressive deformation of resin impregnated wood

d) Adhesives and molded products made from acacia mangium and radiata pine bark or their extractives.

e) Total utilization of acacia mangium

f) Utilization of cellulose nanofiber for organic electronic devices

g) Investigation of mechanism of compressive deformation of wood and its permanent fixation
Processing technique such as wood bending, compressive wood, surface compression wood using softening properties of wood are developed.

h) Studies on house climate
Regulation mechanism of temperature and humidity in wooden house is investigated.

i) Molecular design of high-performance polysaccharides
New high-performance materials based on polysaccharide derivatives are designed using molecular simulation technique.

A-2. Publications and presentations

a) Publications

Books

Yano, H., A.N. Nakagaito, S. Iwamoto and M. Nogi: bionanofiber: future possibilities in cellulose microfibril, p. 173-183, CMC publishing, Tokyo, 2005

Original papers

Nakagaito, A.N. and H. Yano: Novel high-strength biocomposites based on microfibrillated cellulose having nano-order-unit web-like network structure. Applied Physics A, **80**; 155-159, 2005

Yano, H. and S. Nakahara: Bio-composites produced from plant microfiber bundles with a nanometer unit web-like network. J. Materials Science, **39**; 1635-1638, 2004

Nakagaito, A.N., S. Iwamoto and H. Yano: Bacterial cellulose: the ultimate nano-scalar cellulose morphology for the production of high-strength composites. Applied Physicis A, **80**; 93-97, 2005

Yano, H., J. Sugiyama, A.N. Nakagaito, M. Nogi, T. Matsuura, M. Hikita and K. Handa: Optically transparent composites reinforced with networks of bacterial nanofibers. Advanced Materials, **17**(2); 153-155, 2005

Ozaki, S.K., M.B.B. Monteiro, H. Yano, Y. Imamura and M. F.Souza: Biodegradable composites from waste wood and poly(vinyl alcohol). Polymer Degradation and Stability, **87**; 293-299, 2005

Shams, M.I., H. Yano and K. Endou: Compressive deformation of wood impregnated with low molecular weight phenol formaldehyde (PF) resin I: Effects of pressing pressure and pressure holding. J. Wood Science, **50**; 343-350, 2004

Shams, M.I. and H. Yano: Compressive deformation of wood impregnated with low molecular weight phenol formaldehyde (PF) resin II: Effects of processing parameters. J. Wood Science, **50**; 351-357, 2004

Yano, H. and S. Nakahara: Bio-composites produced from plant microfiber bundles with a nanometer unit web-like network. J. Materials Science, **39**; 1635-1638, 2004

Nakagaito, A.N. and H. Yano: The effect of morphological changes from pulp fiber towards nano-scale fibrillated cellulose on the mechanical properties of high-strength plant fiber based composites. Applied Physics A, **78**; 547-552, 2004

Wahyu Dwianto, T. Morooka and M. Norimoto: Fixation of gombong and tali bamboo. J.IImu dan Teknologi Kayu Tropis (J. Tropical Wood Science and Technology), **2**(1); 40-45, 2004

Higashihara, T., T. Morooka, S. Hirosawa and M. Norimoto: The relationship between change of chemical components and permanent fixation of compressed wood by steaming or heating. MokuzaiGakkaishi, **50**; 159-167, 2004 (in Japanese)

Cheng, W., T. Morooka and M. Norimoto: Shrinkage stress of wood during drying under superheated steam above 100C. Holzforshung, **58**(4); 423-427, 2004

Cheng, W., Y. Liu, T. Morooka and M. Norimoto: The characteristic feature of Shrinkage stress of wood during drying under high temperature and high pressure steam conditions. Journal of Beijing Forestry University, **27**(2); 101-106, 2005

Fujisawa, M., T. Hata, P. Bronsveld, V. Castro, F. Tanaka, H. Kikuchi, T. Furuno and Y. Imamura: SiC/C composites prepared from wood-based carbons by pulse current sintering with SiO2: Electrical and thermal properties. Journal of the European Ceramic

Society, **24**(13); 3575-3580, 2004

Ifuku, S., H. Kamitakahara, T. Takano, F. Tanaka and F. Nakatsubo: Preparation of 6-O-(4-alkoxytrityl)celluloses and their properties. Organic & Biomolecular Chemistry, **2**(3); 402-407, 2004

Tanaka, F. and N. Fukui: The behavior of cellulose molecules in aqueous environments. Cellulose, **11**(1); 33-38, 2004

Tanaka, F., Y. Doi and T. Iwata: The deformation of the chain molecules and crystallites for poly([R]-3-hydroxybutyrate) and poly(4-hydroxybutyrate) under the tensile stress. Polymer Degradation and Stability, **85**(2); 893-901, 2004

Tanaka, F. and N. Fukui: Molecular motion of an isolated single chain cellulose molecule. Sen'I Gakkaishi (Journal of the Society of Fiber Science and Technology, Japan), **60**(9); 261-265, 2004

Reviews

Yano, H.: Resounding wood –Wood for musical instruments-. Expected Materials for the Future, **4**(5); 2-5, 2004

Yano, H.: Wood and musical instruments. WIDE, **188**; 14-15, 2005

Yano, H.: Wood physics, Present and Future. Mokuzai Gakkaishi, **51**(1); 13-15, 2005

Reports

Yano, H., S. Kawai, S. Ogawa, A. Inai, H. Yamauchi, H. Nasu, M. Yamazaki and G. Yada: Production of light and thick plywood using Acacia mangium bark powder mixed resin. Special reports of RISH project (Mission 4), Uji, 73-80, February, 2005

Tanaka, F. and K. Okamura: Characterization of Cellulose Molecules in Bio- System Studied by Modeling Methods. Proceedings of the 22nd International Carbohydrate Symposium, at Glasgow, Scotland, 23 - 27, July, 2004

b) Conference and seminar papers presented

54th Annual Meeting of the Jpn. Wood Res. Soc. (8 presentations, Yano, H. and Morooka, T)

55th Annual Meeting of the Jpn. Wood Res. Soc. (6 presentations, Yano, H. and Morooka, T.)

11th Annual meeting of cellulose society of Japan (1 presentation, Yano, H.)

5th International Wood Science Symoposium (3 presentations, Yano, H.)

The Fiber Society 2004 Fall Technical Conference (2 presentations, Yano, H.)

3rd International Conference of the European Society for Wood Mechanics (1 presentation, Yano, H.)

The 22nd International Carbohydrate Symposium (1 presentation, Tanaka, F.)

48th JSPS material science union symposium (1presentation, Yano, H.)

A-3. Off-campus activities

Membership in academic societies

Yano, H.: Member of The Japan Wood Research Society, The Wood Technological Association of Japan, Member of The Society of Materials Science, Japan

Morooka, T.: Member of The Japan Wood Research Society

Research grants

Yano, H. Grant-in-Aid for Scientific Research (B) (2), Injection moldings of microfibrillated cellulose reinforced bio-plastic (Head Investigator)

Grant-in-Aid for Scientific Research (Houga), Production of nano-fibrillated fiber from

plant fiber and creation of green nanocomposites (Head Investigator)

Morooka,T. Grant for a project for high speed drying of sugi from Forestry and Forest Product Research Institute(Head Investigator)

A-4. International cooperations and overseas activities

International meetings (roles)

5th International Wood Science Seminar (Committee member)

International joint researches, overseas research surveys

Yano, H.: Total Utilization of Acacia Mangium (Indonesia, JSPS core university program)

Scholars from abroad

Invited Scholar: 1 (China, Associate professor)

Collaborating researcher: 1 (Sweden, Professor)

B. Educational activities (2004.4-2005.3)

B-1. On-campus teaching

a) Courses given

Undergraduate level: Wood Composite Products (Yano)

Graduate level: High Functional Polymers (Tanaka), Wood science and technology seminar (Yano, Morooka, Tanaka), Laboratory course in property enhancement of wood (Yano, Morooka, Tanaka

B-2. Off-campus teaching, etc.

Open seminar, etc

Yano, H.: Seminar on Wood Technological Institute, Akita Pref. Univ. (Lecturer), AFMc Seminar of The Society of Fiber Science and Technology, Japan (Lecturer), Polymer Frontier Seminar of The Society of Polymer Science, Japan (Lecturer), Summer Seminar of The Society of Fiber Science and Technology, Japan (Lecturer), Polymer Materials Forum (Lecturer), Plastic-Techno Plaza (Lecturer), Seminar on Study Group "Wood Rheology" of Japan Wood Research Society (Lecture), Wood Adhesives Course of Wood Technological Association of Japan (Lecture), Wood Science Seminar on Kansai Branch of Wood Technological Association of Japan (Lecture), Special Symposium of WOOD 2005, Japan (Lecture)

B-3. Overseas teaching

Student and research fellows from abroad

Doctor's program: 2 (Brazil, Bangladesh)

2.2.17 Laboratory of Sustainable Materials (Research Institute for Sustainable Humanosphere)

Staff *Professor* *: Kawai, Shuichi , Dr. Agric. Sci.*
Assistant Professor : Inoue, Masafumi, Dr. Agric. Sci.
Assistant Professor : Umemura, Kenji, Dr. Agric. Sci.
Students and research fellows
Doctor's program: (3) *Research fellow : (1)*
Master's program: (3) *Reserch student: (1)*

A. Research Activities (2004.4-2005.3)

A-1. Main subjects

The laboratory aims to establish the sustainable cycle of forest and forest products by developing the production, utilization and recyling/desposal system of wood biomass. New wood based materials and wood carbon composites harmonized with both global and regional environment are being developed by making use of the functions of wood as a cellular solid;

The research projects are as follows:

1. Lumber Composite Products
   a) Continuous production process of cylindrical LVL by using spiral winding method.
   b) Numerical analysis of mechanical properties of cylindrical LVL and paper pipe.
   c) Prediction of mechanical properties of oriented materials from different element sizes based on fracture mechanics.
   d) Development of adhesive bonding technology of high functional materials appicable to outdoor condition
   e) Development of joint plates with compressed LVL and its application to the timber construction.
   f) Grading and fire-resistant performance of tropical fast-growing species
   g) Development of wood/bamboo nails.
   h) L or T shaped wooden connector and its structural design for furniture and the timber construction.
2. Panels Products
   a) Development of fiber reinforced composites by using plant fibers
   b) Development of binderless boards from kenaf core, etc
   c) Development of vertically oriented fiberboard from recycled materials
   d) Development of thick low-density fiberboard and its application to sandwich panels
   e) Shear performance of sandwich panels
   f) Development of straw board from non-wood lignocellulosics
3. Development of Bio Oil Production and of Recycling Technology from Waste Wood
   a) Recycling technique and system of preserved wood wastes
4. Wood Carbon Composites
   a) Development of high-functional carbon materials from oil palm
   b) Development of bamboo carbon composites

5. Densification/High-strength Wood Plastic Composites
   a) Adhesives and plastic-like molded products made from Acacia mangium bark or their extractives
   b) Transverse compression behavior of wood by roller pressing method
   c) Liquid impregnation and dehydration by large transverse compression of wood
   d) Replacement of free water with treatment liquid by roller-pressing method
   e) Development of thermoplastic materials using natural polymer
   f) Principle, manufacture and utilization of compressed wood
   g) Compression behavior of bamboo
   h) High-strength wood plastic composites from bamboo fiber
6. Mineral Bonded Composites
   a) High-strength and light-weight cement bonded particleboards from kenaf bast-fiber and core particles
   b) Rapid curing technology of cement bonded particleboard
   c) High-performance gypsum bonded particleboard
7. Adhesive Resins/ Durability of Adhesion
   a) Durability of isocyanate resin adhesives
   b) Development of chitosan based adhesives
   c) Characterization of bonding mechanism of binderless board and its application to wood adhesives
   d) Development and utilization of lignin binder
   e) Production of high durable wood adhesives from bark of fast growing trees
8. Fire retardancy/ Fire Resistance Tests
   a) Fire resistance of timber-frame Walls
9. Integrated Projects
   a) Life cycle assessment of wood composites
   b) Total processing and utilization system of domestic small-diameter low-grade logs
   c) Preservation of wooden cultural properties –thermal treatment of wood for the color and property control–
   d) Aging of wood and prediction of service life of wood
   e) Paleobotanical study on the fossil woods from the tertiary in Asia –a case study of the silicified woods from java island, Indonesia–
   f) Sustainable cycle of forest and forest products on humanosphere

A-2. Publications and presentations

a) Publications

Original Papers

K Adachi, M Inoue, S Kawai: Liquid impregnation into dry wood using a roller pressing methodII, Effect of specimen size and processing variables on amount of water impregnation, J Jpn. Wood Res. Soc., 50(4), 243-247, 2004

T Fujita, N Komatsu, S Kawai: Manufacture and properties of gypsum bonded partcleboardII, Improvement of bending properties by overlaying with non-woven glass fabric, J Jpn. Wood Res. Soc., 50(5), 316-324, 2004

Subyakto, H Hata, I Ide, T Yamane, S Kawai: Fire protection of a laminated veneer lumber joint

by wood carbon phenolic spheres sheeting, J Wood Science, **50**(2), 157-161, 2004

A Firmanti, B Subiyanto, S Takino, S Kawai: The critical stress in various stress levels of bending member on fire exposure for mechanical graded lumber, J Wood Science, **50** (5), 385-390, 2004

K Adachi, Inoue M, Kanayama K, Rowell R, Kawai S : Water removal of wet veneer by roller pressing, Wood Sci. **50**(6), 479-483, 2004

Kagemori N, Aikawa N, Ishimaru K, Kawai S, Yukawa M, Imaseki H, Sera K, Futatsugawa S: Sulfur in a fossil wood from the Pleistocene marine clay, International J PIXE, 14(1&2), 67-73, 2004

Widyorini R, J Xu, T Watanabe, S Kawai: Chemical changes of steam-pressed kenaf core binderless particleboard, J. Wood Science, **51**(1), 26-32, 2005

M. Inoue, K. Adachi, K. Omae, M. Kohara, K. Kanayama: Roller Compression of Wood, Mokuzai Gakkaishi, 51(2), 104-109, 2005

Reviews

Kawai S; Development of Wood based materials by applying the structure and functions of plant cell, Tacto (J. Dai-ichi Kogyou Seiyaku) No.528, 12-15, 2004

Umemura K; High-performance Adhesives using natural polymer, Materials Science and Technology, 41(2)12-16, 2004

Umemura K; Recent Progress in Natural Adhesives, The Adhesion Society of Japan. 40(11) 539-541, 2004

Reports

S. Kawai: Towards the sustainable utilization of domestic logs –Round-table meeting on the utilization of domestic logs for the sound forests and the review on the projects of 50th anniversary of Japan Wood Research Soceity, Sanrin, No,1449, 2-8, 2005

S. Kawai: Reccomending the utilization of the domestic logs, the proposal from the round-table meeting on the utilization of domestic logs for the sound forests, Mokuzai Joho, March, 1-3, 2005

Ragil Widyorini, Jianying Xu, Kenji Umemura, Shuichi Kawai: Binderless Particleboard from Baggasse Core and Baggase Face. Proc. The 5th International Wood Science Symposium, p.119-123, 2004

Widyorini R, J Xu, T Higashihara, T Watanabe and S Kawai: Bonding characterization of kenaf core composites by steam treatment, Proc. The 7th Pacific Rim Bio-Based Composites Symposium Vol.1, p.21-27, 2004

Kenji Umemura, Shuichi Kawai: Potentiality of chitosan as wood adhesives. Proc. The 7th Pacific Rim Bio-Based Composites Symposium Vol.1, p.159-165, 2004

Ragil Widyorini, Jianying Xu, Kenji Umemura, Shuichi Kawai: Binderless Particleboard from Baggasse Core and Baggase Face. Proc. The 5th International Wood Science Symposium, p.119-123, 2004

Tsuyoshi Yoshimura, Noriko Kagemori, Junji Sugiyama, Shiuichi Kawai, Koichiro Sera, Shoji Futatsugawa, Mesae Yukawa, Hitoshi Imazeki, Keiko Sakuma, Shuuya Ozeki, Mayumi Oyoshi, Yoshiyuki Yanase, Yoshihisa Fujii and Shogo Okumura: Mandibles of Japanese Subterranean Termites, *Coptotermes formosanus* Shiraki and *Reticulitermes speratus* (Kolbe), Proceedings of the 5th International Wood Science Symposium, Kyoto, p.402, 2004

Subyakto, Vinicius Castro, Kengo Ishimaru, Gustan Pari, Toshimitsu Hata, Yuji Imamura and Shiuichi Kawai: Biomass Carbon from Oil-palm Residues, Proceedings of the 5th International Wood Science Symposium, Kyoto, p.402, 2004

Misao Yokoyama and Shuich Kawai: Effect of Accelerated Aging Treatment on the Mechanical and Physical Properties of Different Wood Species, Proceedings of the 5th International Wood Science Symposium, Kyoto, p.402, 2004

Inoue, M., Norimoto, M.: Possibilities of Bamboo Based High Strength Materials, Sustainable Production and Effective Utilization of Tropical Forest Resources, Proceedings of the 5th International Wood Science Symposium, Kyoto, p.402, 2004

Mori, T., Inoue, M., Komatsu, K., Nakatani, M.: Development of Wooden Wall for House Using Natural Structural Materials, Sustainable Production and Effective Utilization of Tropical Forest Resources, Proceedings of the 5th International Wood Science Symposium, Kyoto, p.409, 2004

b) Conference and seminar papers presented

54rd Annual Meeting of the Jpn. Wood Res. Soc. (Sapporo, 9 presentations, Kawai S. Inoue M, Umemura K)

55rd Annual Meeting of the Jpn. Wood Res. Soc. (Kyoto, 16 presentations, Kawai S. Inoue M, Umemura K)

5th IWSS (Kyoto, 5 presentations, Kawai S. Inoue M, Umemura K)

7th Pacific-rim Bio-Based Composite Symposium (Nanjin, 2 presentations, Kawai S. Umemura K)

Symposium of the Wood Composites Res. Section, Japan Wood Res. Soc. (Tsukuba,1presentation, Kawai S)

Symposium of the Wood Res. Field Committee of the Science Council of Japan. (Tokyo, 1 presentation, Kawai S)

A-3. Off-campus activities

Membership in academic societies (roles)

Kawai, S.: The Japan Wood Research Society (Member of directors board, President The Society of Materials Science, Japan (Member of directors board, Members of the Committees of Wood Composite materials and Referee), The Wood Technological Association of Japan ((Member of directors board, Chief Secretary of the Kansai Branch), The Japan Wood Preserving Association (Head of LCA Committee), The Adhesion Society of Japan (Secretary of the Committee of Wood-Composites). Member of the Committees of Wood Research Field, Science Council of Japan.

Inoue, M.: The Wood Technological Association of Japan (Planning committee of the Kansai Branch), The Japan Wood Research Society (Committee of annual meeting), The Society of Materials Science, Japan (Member of research party on wood-based materials).

Umemura, K.: The Wood Technological Association of Japan (Planning committee of the Kansai Branch, Secretary of the Committee of Plywood), The Adhesion Society of Japan (Secretary of the Committee of Wood-Composites), The Society of Materials Science, Japan (Secretary of research party on wood-based materials).

Research grants

Kawai, S.: Project of Ministry of Agri., Forestry and Fichery, Tech. Development of eco-system in rural area for 21century (Fellows)

A-4. International cooperation and overseas activities

International meetings (roles)

Kawai, S.: 6th Pacific-Rim Bio-based Composites Symposium (Steering Committee, Session Chair)

Inoue, M.: 5th International Wood Science Seminar (Session Chair)

Umemura, K.: 5th International Wood Science Seminar (Session Chair)

International joint researches, overseas research surveys

Kawai, S.: Improvement of fire retardant performance of wood based materials (Indonesia, JSPS Ron-paku program), Development of kenaf composites (China). Sustainable and cyclic production and utilization of wood in the field of large-scale plantation of acacia mangium (Core University Program).

International Activities

Kawai, S.: IUFRO s5.05.01 Working Group Leader, International Academy of Wood Science, Fellow

Scholars from abroad

Zhang Ming: Prof. of Nanjing Forestry University

B. Educational Activities (2004.4-2005.3)

B-1. On-campus teaching

a) Courses given

Undergraduate level: Wood Composites (Kawai, Yano)

Graduate Level: Seminar in Wood Composites (Kawai, Inoue, Umemura).
Laboratory Course of Wood Composites (Kawai, Inoue, Umemura).
Wood Composite Products I (Kawai)

B-2. Off-campus teaching, etc.

Part-time lecturer

Kawai, S.: Seminar on Wood Adhesives, 2004 (Lecturer), Seminar of the Group linking between the forest and the city (Lecturer), Seminar for creating the new policy, Kyoto Pref. (Lecturer), Seminar of Fukui Pref. Agr., Forest and Fishery Univ. (Lecturer), Seminar of Aomori Pref. Frestry Experimental Station(Lecturer), Seminar of Oita Pref. Res. On Bamboo and Wood Utilization(Lecturer), Seminar of Assoc. for Promoting Advanced Sci. and Tech. of Forest Resources Utilization(Lecturer).

Umemura, K.: Seminar on Wood Adhesives, 2004 (Lecturer), Seminar of research party on wood-based materials, The Society of Materials Science, Japan (Lecturer), Seminar for the Reserch group of construction metod and material development (Lecturer), Wood Panel and Wood Based Composites Symposium (Lecturer).

Open seminar, etc

Kawai S: 1st and 2nd Symposia of the Sustainable Humanosphere, Res. Inst for the Sustainable Humanosphere (Lecture), Symposium of Kyoto University Res. Istitutes (Lecturer).

B-3. Overseas teaching

Lectures and seminars

Kawai, S.: Special Lecture of Zhejiang Forestry College (Zhejiang, Lecturer)

Inoue, M.: Special Lecture of Kasetsart University (Bangkok, Lecturer)

Umemura, K: Special Lecture of Zhejiang Forestry College (Zhejiang, Lecturer), Special Lecture of LIPI (Bogor, Lecturer)

Students and research fellows from abroad

Foreign Special Research Fellow: 4 persons from France and Indonesia

Doctor course student: 2 persons from China and Indonesia

Research student: 1 person from Indonesia

C. Other remarks

Kawai, S.: Members of the Committees of Safety, Kyoto University, Gifu Pref. Sci. and Tech. Adviser, Adviser of Okayama Pref. Wood Technology Center, Guest researcher of the Nara Pref. Forest Tech. Center, Committee member of ISO Standard on Wood Composite Boards, Program officer of JSPS Research Center for Science Systems.

2.2.18 Laboratory of Deterioration Control of Wood

Staff *Professor : Imamura, Yuji, Dr. Agric. Sci.*
Associate Professor: Tsunoda, Kunio, Dr. Agric. Sci.
Associate Professor: Yoshimura, Tsuyoshi, Dr. Kyoto Univ. (Agric. Sci.)
Lecturer : Hata, Toshimitsu, Dr. Agric. Sci.

Students and research fellows

Doctor's program : (8)
Master's program : (1)
Research fellow : (4)
Research student : (1)
Post Doctoral Fellow : (1)
Visiting Scientist : (1)
Foreign Visiting Scientist: (1)

A. Research Activities (2004.4-2005.3)

A-1. Main subjects

The laboratory aim is to establish the society with proper resource recycle system in the future humanosphere. Fundamental and innovative investigations are being conducted with emphasis on the symbiotic relations with forest and wood resources.

a) Comprehensive study on the improvement of durability of wood, wood-based materials and wooden constructions

The improvement of durability of wood and wood-based materials, and the long life-span of wooden constructions with the horizon to the environmental conservation and the prevention of the global warming.

b) Integrated termite control on the basis of fundamental research

Role of symbiotic micro-organisms in the cellulose metabolism of termite; Synthetic route of termite trail-following pheromone; Biological control of termites by entomogenous fungi;

Estimation of colony size of termites and fopraging territories and application of bait system to termites.

c) Application of low-toxicity wood preservatives and novel treatment methods to the wood preservation

Development of low-toxicity wood preservatives based on laboratory screening tests of various chemicals and field evaluation; Mode of actions of wood preservatives; Detoxificating pathways of chemicals under various conditions; Application of supercritical fluid to the preservative treatment of wood and wood-pbased composites..

d) Durability assessment of wooden houses and development of the reliable maintenance system

Assessment of the durability of wooden houses by means of various integrated techniques including the non-destructive detection of deterioration, and development of the reliable maintenance system

e) Improvement of properties of timbers and wood-based composites by various treatments

Development of high performance wood products by chemical modification, impregnation of polymerizing materials and complex of wood and inorganic chemicals, as well as introduction with natural components.

f) Conservation of wooden cultural properties

Conservation technology wooden cultural properties and waterlogged wood.

g) Bioremediation by wood-relating microorganisms

Bioremediation of environment with decay fungi and termite-symbionts; biological treatments of stable waste materials and insulation materials, and development of new energy optios by wood deteriorating organisms.

h) Wood deterioration in the space environment

Wood deterioration in the space environment consisting of radiations, heat cycles etc.

i) Development of advanced high functional biomass carbon materials by thermal conversion.

Based on the fundamental study on the structure of carbonized biomass, high functional carbonized materials such as SiC nanorods, nanotubes and graphite are developed with or without catalyst of SiO_2 or Al_2O_3 by thermal conversion such as pulse current sintering method or flush pyrolysis.

j) Development of purification or recycling technology from preservative treated wood waste

Development of novel technology for purification and recycling preserved wood wastes with pyrolysis or chemical extraction. Electron microscopic study is conducted for clarifying the mechanism of pyrolysis of CCA (chromium, copper and arsenic oxide)-treated wood. Selective separation of components of CCA, purification and recycling technique of preserved wood wastes.

k) Development for improving fire-resistant performance of wood composites.

Reduced scale fire resistance tests on traditional timber-frame soil walls are studied.

A-2. Publications and presentations

a) Publications

Original papers

Yoshimura, T., N. Kagemori, J. Sugiyama, S. Kawai, K. Sera, S. Futatsugawa, M. Yukawa and H. Imazeki: Elemental analysis of worker mandibles of *Coptotermes formosanus*. Sociobiology 45(2); 255-259, 2005

Hata, T., P. Bronsveld, T. Kakitani, D. Meier, T. Kajimoto and Y. Imamura: Recycling of

chronium-copper-arsenate (CCA) treated wood by thermochemical conversion. Management of Environmental Quality 15(5); 502-508, 2004

Muin, M. and K. Tsunoda: Biological performance of wood-based composites treated with a formulation of 3-iodo-2-propynyl butylcarbamate and silafluofen using supercritical carbon dioxide. J. Wood. Sci. 50; 535-539, 2004

Muin, M. and K. Tsunoda: Retention of silafluofen in wood-based composites after supercritical carbon dioxide impregnation. Forest Prod. J. 54 (12); 168-171, 2004

Nakayama, T., T. Yoshimura and Y. Imamura: The optimum temperature-humidity combination for the feeding activities of Japanese subterranean termites. J. Wood Sci. 50; 530-534, 2004

Nakayama, T., T. Yoshimura and Y. Imamura: Effects of the desiccation process on survival and food consumption of Japanese subetarranean termites (Isoptera: Rhinotermitidae), *Reticulitermes speratus* and *Coptotermes formosanus*. Sociobiology 44(1); 127-138, 2004

Fujisawa, M., T. Hata, P. Bronsveld, V. Castro, F. Tanaka, H. Kikuchi, T. Furuno, Y. Imamura: SiC/C composites from wood charcoal by pulse current sintering with SiO_2, electrical & thermal properties. Journal of the European Ceramics Society 24/13; 3575-3580, 2004

Indrayani, Y., T. Yoshimura, Y. Fujii, Y. Yanase, Y. Okahisa and Y. Imamura: Survey on the infestation by *Incisitermes minor* (Hagen) in Kansai and Hokuriku areas. Jpn. J. Environ. Entomol. Zool. 15; 261-268, 2004

Kartal, S. N., K. Shinoda and Y. Imamura: Laboratory evaluation of boron-containing quaternary ammonia compound, didecyl dimethyl ammonium tetrafluoroborate (DBF) for inhibition of mold and stain fungi. Holz als Roh und Werkstoff 63; 73-77, 2005

Kartal, S. N. and Y. Imamura: Effects of N'-N-(1, 8-Naphthalyl) hydroxylamine (NHA-Na) and hydroxynaphthalimide (NHA-H) on boron leachability and biological degradation of wood. Holz als Roh und Werkstoff 62; 378-385, 2004

Kartal, S. N. and Y. Imamura: Removal of copper, chromium, and arsenic from CCA-treated wood onto chitin and chitosan. Bioresource Technology 96; 389-392, 2004

Kartal, S. N., T. Yoshimura and Y. Imamura: Decay and termite resistance of boron-treated and cjemically modified wood by in situ co-polymerization allyl glycidyl ether (AGE) with methyl methacrylate (MMA). Int. Biodeter. Biodegr. 53; 111-117, 2004

Kakitani, T., T. Hata, T. Kajimoto, and Y. Imamura: Effect of pyrolysis on solvent extractability of toxic metals from chromated copper arsenate (CCA)-treated wood. Journal of Hazardous Materials B109; 53-57, 2004

Kakitani, T., T. Hata, T. Kajimoto and Y. Imamura: Two possible pathways for the release of arsenic during pyrolysis of chromated copper arsenate (CCA)-treated wood. Journal of Hazardous Materials 113(1-3); 247-252, 2004

Castro, V., M. Fujisawa, T. Hata, P. Bronsveld, T. Vystavel, J. De Hosson, H. Kikuchi, Y. Imamura: Silicon carbide nanorods and ceramics from wood. Key Eng. Mat. 264-268, 2267-2270, 2004

Ozaki, S. K., M. B. B. Monteiro, H. Yano, Y. Imamura and M. F. Souza: Biodegradable composites from waste wood and poly (vinyl alcohol). Polymer Degradation and Stability 87; 293-299, 2005

Furuno. T., Y. Imamura and H. Kajita: The modification of wood by treatment with low molecular weight phenol-formaldehyde resin: a properties enhancement with neutralized

phenolic-resin and resin penetration into wood cell walls, Wood Sci. Technol. 37; 349-361, 2004

Yamauchi, S., Y. Sudiyani, Y. Imamura and S. Doi: Depth profiling of weathered tropical wood using Fourier transform infrared photoacostic spectroscopy. J. Wood Sci. 50; 433-438, 2004

Reviews

Imamura, Y.: International collaborative research on the sustainable production and utilization of tropical forest resources. Gakujutu Geppou(JSPS) 57, 658-661, 2004(in Japanese)

Tsunoda, K.: Preservation treatments of wood and wood-based materials with supercritical carbon dioxide. Mokzuai Hozon (Wood Preservation) 30; 144-148, 2004 (in Japanese)

Tsunoda, K. and T. Yoshimura: Current termite management in Japan. Shiroari (Terrmite) No.138; 4-6, 2004 (in Japanese)

Ngee, P.-S., T. Yoshimura and C.-Y. Lee: Foraging populations and control strategies of subterranean termites in the urban environment, with special reference to baiting. Jpn. J. Environ. Entomol. Zool. 15; 197-215, 2004

Reports

Tsunoda, K., A. Byrne, P. I. Morris and J. K. Grace: Performance of borate-treated lumber in a protected, above-ground field test in Japan. The Int. Res. Group on Wood Preserv. Document No. IRG/WP 04-30344, 2004

Tsunoda, K.: International research groups and conferences on termites. Proceedings of the 2nd Conference of the Pacific-Rim Termite Research Group; 1-4, 2005

Tsunoda. K. and M. Yokoyama:Transfer of fipronil from exposed workers of the subterranean termite *Coptotermes formosanus* (Isoptera: Rhinotermitidae) to unexposed workers. Proc. 2nd Conf. Pacific-Rim Termite Research Group; 65-69, 2005

Yoshimura, T.: Trends in termite management against wooden houses. Nihon Jutaku Shinbun 15/May/2004, 12-13, 2004(in Japanese)

Yoshimura, T/: Termite – towards the integrated management-. Housing Tribune 266(13); 29-34, 2004(in Japanese)

Yoshimura, T.: Effective utilization of new wood resources in environmental technologies. A report of the research union on the effective utilization of wood extractives; 197-200, 2004(in Japanese)

Yoshimura, T., N. Kagemori, J. Sugiyama, S. Kawai, K. Sera, S. Futatsugawa, M. Yukawa, H. Imazeki, K. Sakuma, S. Ozeki, M. Oyoshi, Y. Yanase, Y. Fujii and S. Okumura: Mandibles of Japanese subterranean termites, *Coptotermes formosanus* Shiraki and *Reticulitermes speratus* (Kolbe). Proceedings of the 5th International Wood Science Symposium; 102-107, 2004

Hata, T., P. Bronsveld, T. Kakitani, D. Meier, T. Kajimoto and Y. Imamura: Recycling of Chronium-Copper-Arsenate (CCA) treated wood by thermochemical conversion. Proceedings of the 1st International Conference on Environmentally-Compatible Forest Products; 207-215, 2004

Hata T.: Distribution of arsenic fraction in solid residue of CCA treated wood. International Symposium on the Environmental Impacts of Preservative Treated Wood: For achieving safe and healthy environments: 5-6, 2005

Hata T., P. Bronsveld, T. Vystavel, J. De Hosson, H. Kikuchi, K. Ishimaru, M. Fujisawa, T.

Nishizawa and Y. Imamura: Catalytic graphitization of biomass carbon with alumina by pulse current heating. Proceedings of the 5th International Wood Science Symposium; 417, 2004

Nakayama, T., T. Yoshimura and Y. Imamura: Effects of the moisture content of wood blocks on the feeding preferences of Japanese subterrnean termitesd. Proceedings of the 5th International Wood Science Symposium; 96-101, 2004

Nakayama, T., T. Yoshimura, Y. Yanase, Y. Fujii and Y. Imamura: Monitoring of the change of feeding activities of Japanese subterranean termites under various humidity conditions. Proceedings of 3rd International Symposium on Surfacing and Finishing of Wood; 434-438, 2004

Fujisawa M., T. Hata, P. Bronsveld, V. Castro, F. Tanaka, H. Kikuchi and Y. Imamura: Development of SiC/C composites from wood charcoal by pulse current sintering and their thermoelectric properties. Proceedings of the 5th International Wood Science Symposium; 418 (2004)

Hwang, W.-J, S. N. Kartal, Y. Imamura and K. Shinoda: Effect of alkyl ammonium compounds, DDAC and DBF, on wood of different natural durability, Proceedings of the 5th International Wood Science Symposium; 415, 2004

Hwang, W.-J, S. N. Kartal and Y. Imamura: Evaluation of Termite and Decay Resistance of Wood Treated with a Boron-Containing Quaternary Ammonium Compound, Didecyldimethylammonium Tetrafluoroborate (DBF): Effects of Wood Species with Different Natural Durability, Proceedings of 3rd International Symposium on Surfacing and Finishing of Wood; 393-402, 2004

Indrayani, Y., T. Yoshimura, Y. Yanase, Y. Fujii, H. Matsuoka and Y. Imamura: Feeding behavior of the exotic dry-wood termite *Incisitermes minor* (Hagen). Proceedings of the 5th International Wood Science Symposium; 108-113, 2004

Indrayani, Y., T. Yoshimura, Y. Yanase, Yoshihisa Fujii, Hiroaki Matsuoka and Yuji Imamura: Wood-feeding behavior of four termie species covering three different habitation. Proceedings of 3rd International Symposium on Surfacing and Finishing of Wood; 426-431, 2004

Indrayani, Y., T. Yoshimura, Y. Yanase, Y. Fujii, H. Matsuoka and Y. Imamura: Feeding behavior of *Incisitermes minor* (Hagen). Proceedings of the 2nd Conference of Pacific Rim Termite Research Group: 22-26, 2005

Okahisa, Y., T. Yoshimura and Y. Imamura: The potential of termite attack against Moso Bamboo(Phyllostachys pubescens Mazel)with special references to syrface characteristics. Proceedings of 3rd International Symposium on Surfacing and Finishing of Wood; 414-418, 2004

Katsumata, N., T. Yoshimura and Y. Imamura: Biological deterioration of gamma0irradiated wood. Proceedings of 3rd International Symposium on Surfacing and Finishing of Wood; 420-424, 2004

Kurosaki, F., K. Ishmaru, T. Hata, P. Bronsveld and Y. Imamura: The formation process of wood charcoal prepared by flash heating. Proceedings of the 5th International Wood Science Symposium; 419, 2004

Kartal, S. N., W.-J. Hwang, N. Katsumata, K. Shionoda, T. Yoshimura and Y. Imamura: Effect of acryl-silicon type resin on boron leachability. Proceedings of 3rd International

Symposium on Surfacing and Finishing of Wood; 208-213, 2004

Subyakto, V. Castro, K. Ishimaru, Gustan Pari, T. Hata, Y. Imamura and S. Kawai: Biomass carbons from oil-palm residues. Proceedings of the 5th International Wood Science Symposium; 301-306 (2004)

Kakitani T., T. Hata and Y. Imamura: Immobilization of toxic metals in chromated copper arsenate (CCA)-treated wood by thermo-chemical treatment. Proceedings of 3rd International Symposium on Surfacing and Finishing of Wood; 382-386, 2004

Kakitani, T., T. Kajimoto, T. Hata and Y. Imamura: Solvent extraction for pollution minimization of CCA-waste wood. International Symposium on the Environmental Impacts of Preservative Treated Wood: For achieving safe and healthy environments; 23-24, 2005

Sudiyani, S., K. Hanata, Y. Imamura and S. Doi: Effect of Weathering Process on Hyphal Penetration in Tropical Wood by *Pycnoporus coccineus*, Proceedings of 3rd International Symposium on Surfacing and Finishing of Wood; 99-112, 2004

Tsujimoto, T., N. Ohba and Y. Imamura: Proposal of a Simple Method for Deterioration Diagnosis of Roofing Sheet of Polyvinyl Chloride System, Proceedings of 3rd International Symposium on Surfacing and Finishing of Wood; 361-374, 2004

Lee, C.-Y., P.-S. Ngee, A. Tashiro, T. Yoshimura and J. Zairi: Resistance of Japanese wood species to attack by the Asian subterranean termite, *Coptotermes gestroi* (Wasnmann). Proceedings of the 5th International Wood Science Symposium; 145-150, 2004

Yanase, Y., Y. Fujii, S. Okumura, T. Yoshimura, Y. Imamura, M. Ishida, H. Kawaguchi, H. Shiozaki and T. Okumura: Feasibility of several particle materials as a physical barrier against termites. Proceedings of 3rd International Symposium on Surfacing and Finishing of Wood; 440-444, 2004

Miura, M., Y. Yanase, Y. Fujii, S. Okumura, T. Yoshimura, Y. Imamura, T. Maekawa and K. Suzuki: Detection of hydrogen and methane from teh feeding actiity of termites using a gas analyzer. Proceedings of the 5th International Wood Science Symposium; 151-156, 2004

Ishida, H., T. Ito, M. Yamai, H. Matsusaka and K. Tsunoda: Why did Japan replace CCA by alternatives. The Int. Res. Group on Wood Preserv. Document No. IRG/WP 04-50215, 2004

Grace, J. K., A. Byrne, P. I Morris and K. Tsunoda: Six-year report on the performance of borate-treated lumber in an above-ground termite field test in Hawaii. The Int. Res. Group on Wood Preserv. Document No. IRG/WP 04-30343, 2004

Taylor, A. M., B. L. Gardner, J. J. Morrell and K. Tsunoda: Effect of extractives of *Thuja plicata* and *Chamaecyparis nootkatensis* heartwood on *Coptotermes formosanus*. The Int. Res. Group on Wood Preserv. Document No. IRG/WP 04-10535, 2004

Kadekaru, Y., K. Kinjo, T. Yoshimura, A. Adachi, M. Takahashi and S. Yaga: A field test of termite tunnel formation on the surface of highly termite-resustant wood species. Shiroari (Termite) No.137; 3-7, 2004(in Japanese)

Hashimoto, M., N. Yasui, Y. Hasegawa, M. Shimizu, T. Hata, T. Kimura, H. Murakami, M. Kamijima, Y. Seki, G. Takezume, A. Ogawa and K. Sakata: Development of fire retardant structure by wooden post & beam frame (Part 2) Experimental study on performance of check to fire spread of wooden mud walls. Proceedings of Kanto Branch of Architectural Institute of Japan 2004; 345-348, 2004(in Japanese)

Sakata, K., N. Yasui, Y. Hasemi, M. Shimizu, T. Kimura, T. Hata, H. Murakami, M. Kamijima, Y. Seki, G. Takezume, A. Ogawa and M. Hashimoto: Development of fire retardant structure by wooden post & beam frame (Part 4) Small scale heating test for dry type mud wall panels and drop panel walls. Proceedings of Kanto Branch of Architectural Institute of Japan 2004; 353-356, 2004(in Japanese)

Inaba, S., Y. Seki, Y. Hasemi, K. One, T. Hata and M. Miyabayashi: Propose of model for heat balance in furnace for fire retardant test (Part 2) Verification of model equation by small scale experiment. Proceedings of Kanto Branch of Architectural Institute of Japan 2004; 369-372, 2004(in Japanese)

b) Conference and seminar papers presented

The 54th Annual Meeting of the Japan Wood Research Society: 15 presentations

The 55th Annual Meeting of the Japan Wood Research Society: 14 presentations

The 16th Annual Meeting of the Japanese Society of Environmental Entomology and Zoology: 4 presentations

The 22nd International Congress of Entomology: 2 presentations

The 2nd Conference of Pacific Rim Termite Research Group: 2 presentations

The 35th Annual Conference of the International Research Group on Wood Preservation: 3 presentations

The 41st Annual Meeting on Radioisotope and Radiation Research: 1 presentation

Annual Meeting of Kanto Branch of Architectural Institute of Japan: 3 presentations

The 53rd Academic Meeting of The Society of Materials Science, Japan: 3 presentation

E-MRS Spring Meeting 2004, Symposium B, Advanced Multifunctional Nanocarbon Materials and Nanosystems: 2 presentations

Electroceramics IX 2004, Session C7, Environmentally Friendly Materials: 1 presentation

The 3nd Annual Meeting of The Wood Carbonization Research Society: 1 presentation

Carbon 2004: 1 presentation

The 5th International Wood Science Symposium, Sustainable Production and Effective Utilization of Tropical Forest Resources: 10 persentations

The 1st International Conference on Environmentally-compatible Products (ICECFOP): 1 presentation

International Symposium on NanoCarbons (ISNC 2004): 3 presentations

The 3rd International Symposium on Surfacing and Finishing of Wood (SURFACE 2004): 7 presentation

The 31st Annual Meeting of Carbon Materials: 2 presentations

The 6th RISH Symposium on Wooden Post & Beam Frame Structure from Natural Materials for Domestic Collaborative Research (Kyoto, 1 presentation, T. Hata, Y. Imamura)

International Symposium on the Environmental Impacts of Preservative Treated Wood: For Achieving Safe and Healthy Environments: 2 presentations

The 52nd Spring Meeting, 2005, The Japan Society of Applied Physics and Related Societies: 1 presentation

A-3. Off-campus activities

Membership in academic societies (roles)

Imamura, Y.: Japan Wood Research Society (Editor-in-chief), Japanese Association of Wood

Technology (Council and member of project committee in Kansai branch), Japan Wood Preserving Association (Council and vice president), Japanese Society of Environmental Entomology and Zoology (Council and vice president), Wood Carbonization Research Society (Council and vice president)

Tsunoda, K.: Japan Wood Preserving Association (chairman of the committee for the promotion of Nishinihon project)

Yoshimura, T.: Japan Wood Research Society (member of editorial board), Japanese Society of Environmental Entomology and Zoology (trustee and secretary of the editorial board), Material Research Society, Japan (editorial board and secretaty of research party on wood-based materials), Japan Termite Control Association (council, executive council of Kansai branch and editor-in chief of Kansai branch), Japan Wood Preserving Association (editorial board)

Hata, T.: Project Committee of Japanese Wood Preserving Association (Member), Technical and Editorial Committee of Wood Carbonization Research Society (Executive Member)

Research grants

Imamura, Y: Grant-in-aid for Scientific Research (C), The Development of wood-nano-capsule containing metals by fast heating system (Head investgator), Grant-in-aid for Scientific Research (B)(2) Development of thermanl conversion technology of wood biomass to carbon nano-tubes (Fellows), Grant-in-Aid for Scientific Research (B) Non-destructive survey of wooden cultural products with AE and radar technologies and inspection of treatments (Fellows)

Yoshimura, T: Grant-in-Aid for Scientific Research (A) Bio-processing of preservative treated wood and wood-based materials with deteriorating organisms and the production of new energy resources (Head investigator), Grant-in-Aid for Scientific Research (B) Non-destructive survey of wooden cultural products with AE and radar technologies and inspection of treatments (Fellows), Grant-in-Aid for Scientific Research (B) Verification of anti-fungal and anti-termite effectiveness of non-chemical humidity regulating materials in houses (Fellows)

Hata, T.: Grant-in-Aid for Scientific Research: (C) Formation mechanism of nano-pore structure in wood charcoal (Fellows), Grant-in-Aid for Scientific Research: (B) Development of thermal conversion technology from wood biomass to carbon nanotubes (Head investigator), Grant-in-Aid for JSPS Fellows: Novel extraction technology to purify environment contaminated by preservative treated wood (Head investigator)

A-4. International cooperation and overseas activities

International cooperations

Imamura, Y.: Coordinator of JSPS-LIPI Core University Program in the Field of Wood Science

International meetings (roles)

Imamura, Y.: The 5th International Wood Science Symposium -Sustainable Production and Effective Utilization of Tropical Forest Resources: Kyoto (Organizing committee), The 3rd International Symposium on Surfacing and Finishing of Wood: Kyoto (Organizer), International Symposium on the Environmental Impacts of Preservative Treated Wood: For Achieving Safe and Healthy Environments: Kyoto (Organizer)

Tsunoda, K.: NPMA 2005: Honolulu (Invited speaker), Thailand PMA: Bangkok (Seminar

presenter), The 3rd International Symposium on Surfacing and Finishing of Wood: Kyoto (Chair person)

Yoshimura, T.: The 5th International Wood Science Symposium -Sustainable Production and Effective Utilization of Tropical Forest Resources: Kyoto (Organizing committee), The 3rd International Symposium on Surfacing and Finishing of Wood: Kyoto (Chair person), The 22nd International Congress of Entomology: Brisbane (Participation)

Hata, T.: 1st International Conference on Environmentally-compatible Products (ICECFOP): Portugal (Invited speaker and scientific committee), The 5th International Wood Science Symposium -Sustainable Production and Effective Utilization of Tropical Forest Resources: Kyoto (Organizing committee), International Symposium on the Environmental Impacts of Preservative Treated Wood: For Achieving Safe and Healthy Environments: Kyoto (Organizing committee)

Membership in international academic societies

Imamura, Y.: The International Research Group on Wood Preservation (Executive council)

Tsunoda, K.: IUFRO Working Party 5.03.05 (Coordinator), Pacific-Rim Termite Research Group (President)

Yoshimura, T.: Pacific Rim Termite Research Group (Secretary general)

International joint research, overseas research surveys

Imamura, Y.: Joint research on deterioration of wood by outdoor exposure (Indonesia, Malaysia), Properties enhancement of wood by chemical modification (Brazil), Joint research on wood preservation and recycling system of waste treated wood (Turkey)

Tsunoda, K.: Durability of sill plates under service conditions (USA, Canada), Filed evaluation of preservative-treated wood (New Zealand)

Yoshimura, T.: Joint research on anti-termite performances of Asian timbers (Malaysia), Joint research on anti-termite performances of synthetic plastic materials (Australia)

Hata, T.: Microstructural investigation of wood based carbon materials (The Netherlands), Development of SiC nanorods and MWNT from wood waste and its new utilization (France), Fundamental study of carbonized biomass and wood (Indonesia)

Scholars from abroad

Invited scholars: 1 (University of Hawaii)

Collaborative researchers: 6 (Istanbul University・Turkey, University Sarawak Malaysia・Malaysia, Indonesian Research Institute of Science・Indonesia (3), Forest Products research & Development Institute・Philippines)

B. Educational Activities (2004.4-2005.3)

B-1. On-campus teaching

a) Courses given

Undergraduate level: Wood Preservation (Imamura and Yoshimura), Wood Biomass (Yoshimura and Hata)

Graduate level: Lecture on Wood Deterioration Control I (Imamura, Yoshimura and Hata), Seminar on Wood Deterioration Control (Imamura, Tsunoda, Yoshimura and Hata), Laboratory Course of Wood Deterioration Control (Imamura, Tsunoda, Yoshimura and Hata)

B-2. Off-campus teaching, etc.

Part-time lecturer

Imamura, Y.: Special lectures in Graduate School of Agriculture, Shizuoka University, Special lectures in Graduate School of Bio-resources Science, Mie University

Open seminar, etc

Imamura, Y.: Toward the Establishment of Science for Sustainable Humanosphere, The Joint Meeting of Earth-Planet Science Societies (Keynote presentation), From Wood Science to Science for Sustainable Humanospher, The Annual Meeting of Japan Wood Preserve Industry Association (Special lecture), The Wood Preservation Technology in the View of Recycling Society of Resources, Research Meeting of Japan Wood Research Society (Lecture), The Traditional New Material-Wood Charcoal, Kyoto University Plant-science Forum (Lecture), Society for the Study of Advanced Wood Utilization Technology, APAST and Wood Chemicals (Lecture)

Yoshimura, T.: Wood Science Seminar of Wood Technological Society of Japan (Lecture), The Annual Meeting of the Japan Termite Control Association Kansai Branch (Special lecture), The Special Seminar of Super Science High School (SSH) Program (Lecture), The Special Seminar of Japan Wood Preserving Association (Lecture), Research Group on Biological Deterioration of Wood, The Japan Wood Research Society (Lecture)

Hata, T.: Society for the Study of Advanced Wood Utilization Technology, APAST and Wood Chemicals (Lecture), The 1st Open Seminar of Research Institute for Sustainable Humanosphere (Lecture), The 4th RISH Symposium on Space Environment and Utilization from SPS to Planetary Probe as RISH Frontier for Domestic Collaborative Research (Lecture), Kyoto University Open Seminar "Forest, Wood and Life" (Lecture), 3rd Meeting of Project in Wood Research Institute (Lecture), The 1st Meeting of High Utilization of Wood Resource in Wakayama (Lecture), The Study Meeting of Wood Carbonization Society (Lecture), The Study Meeting on Utilization Technology of Wood Resource (Lecture), Osaka Techno-mart 2004 (Lecture)

B-3. Overseas teaching

Students and research fellows from abroad

Foreign students: Doctor's Program: 2 (Korea, Indonesia), Post-doctorate Fellow: 2 (Turkey, India), Research Student: 1 (Indonesia)

Lectures

Imamura, Y.: Special Seminar at the Research & Development Unit for Biomaterials, Indonesia

C. Other remarks

Imamura, Y.: Kyoto University (Trustee of Rakuyukai (Trustee), Member of Uji Campus future perspectives), ISO/TC Wood Preservation Committee (Chair person), Japanese Agency for the Evaluation of Wood Preservatives (Member of technical committee), National Forestry Extension Association in Japan (Member of committee on sustainable utilization of wood resources), Japan Housing and Wood Technology Center (Trustee), Nara Prefecture (Member of Forestry Research Council), Kumiyama Town (Member of Town Planning Council)

Yoshimura, T.: Agriculture, Forestry and Fisheries Technical Information Society (Member of

professional technical committee), Japanese Agency for the Evaluation of Wood Preservatives (Member of technical committee)

Hata, T.: Society for the Study of Biomass Energy (Member of professional technical committee)

2.2.19 Laboratory of Structural Function

Staff *Professor* *: Komatsu, Kohei, Dr. Agric. Sci.*
Assistant Professor : Takino, Shinjiro, Dr. Agric.Sci.
Assistant Professor : Mori, Takuro, Dr. Engr..

Students and research fellows
Overseas special research fellows : (2)
Doctor's program : (5)
Master's program : (2)

A. Research Activities (2004.4-2005.3)

A-1. Main subjects

On the basis of timber engineering, wood science and technologies, and structural engineering, we 'timber engineering group' aim to develop reliable structural components and engineered joints for various timber structures as well as to make their mechanisms clear.

The projects taken are as follows:

1. Development of Engineered Timber Joint for Medium and/or Large Scale Timber Construction.
   a) Research and development of large finger jointed glulam frame corners.
   b) Evaluation of pull-out capacity of Lagscrewbolt and its application to glulam frame structures.
   c) Analysis of wood-to-wood bolted joints and its application to glulam moment-resisting joints.
   d) Analysis of cross-lapped-glued timber joints.
2. Evaluation and Analysis of Mechanical Performance of Various Sub-Assembly Systems.
   a) Lateral shear resistant performance of various wooden frame shear walls.
   b) Analysis on strength and stiffness of traditional wooden frame structures with mud shear walls.
   c) Analysis on moment-resistance performance in traditional 'Nuki' structures.
   d) Development of eco-wooden house utilizing various natural structural materials.
   e) Evaluation of capacity of column-shill joint composed of diagonal wooden dowel joints.
   f) Structural utilization of compressed Sugi wooden dowels.
3. Strength Properties of Wooden Structural Members.
   a) Re-evaluation of strength properties of plantation grown soft wood timber in Kyoto prefecture.
4. Development of Reliable and Durable Timber Bridges
   a) Promotion for encouraging development of timber bridges made of domestic softwood timbers.

A-2. Publications and presentations

Publications

Original papers

Tabuchi, A. and Komatsu, K.: Lateral shear performance of portal frame with small mad-wall, Journal of Structural Engineering, Vol.50 (B); 321-326, 2004 (in Japanese)

Komatsu, K., Idris, Y., Yuwasdiki, S., Subiyanto, B., and Firmanti, A : Development of structural LVL from tropical wood and evaluation of their performance for the structural components of wooden houses part-1. application of tropical LVL to a roof truss, Proceedings of the International Council for Research and Innovation in Building and Construction, Working Commission W18-Timber Structures, CIB-W18/37-12-2, Edingdurg, UK, 2004

Noguchi, M. and Komatsu, K. : Mechanical models of the knee joints with cross-lapped glued joints and glued in steel rods, Proceedings of the International Council for Research and Innovation in Building and Construction, Working Commission W18-Timber Structures, CIB-W18/37-7-2, Edingdurg, UK, 2004

Noguchi, M. and Komatsu, K. : New proposal for estimating method of stiffness and strength in the bolted timber-to-timber joints and its verification by experiments (II) : bolted cross-lapped beam to column joints, Journal of Wood Science, 50(5), 391-399, 2004

Harada, M., Komatsu, K., Hayashi, T. and Karube, M. : Dynamic excitation and static loading tests of glulam lattice floor, Journal of Wood Science, 50(5), 450-454, 2004

Nakatani, M. and Komatsu, K. : Mechanism of pull-out performance of Lagscrewbolted timber joints I. Effect of lead hole diameters, embedment depth, embedment direction and edge distance on pull-out performance. Mokuzai Gakkaishi, Vol.51(2),125-130, 2005

Mori, T., Isoda, H., Takahashi, S. and Sasagawa, A. : The Bending Creep Behavior of Glulam Beam under Different Temperature and Humidity Conditions Part 2, Influence of additional loads after long-term constant load, -*J of structural engineering*, Vol.50B, 315-320, (2004) (in Japanese)

Reports

Komatsu, K.: On the coming-back of modern timber bridges from view-point of timber engineering researcher, Proceedings of the 3rd Symposium on Timber Bridges, 1-8, Sub-committee for timber bridges in the committee of steel structure, Japan Society of Civil Engineers, 2004

Komatsu, K., Takino, S., Hwang, K.H., Mori, T. and Kataoka, Y.: Lateral shear performance of the wooden post & beam structure with prefabricated small mud shear walls, Proceedings of the 8th World Conference on Timber Engineering, WCTE2004, Vol.1, p.159-164, Lahti, Finland, 2004

Kataoka, Y., Komatsu, K. and Kitamori, A.: Structural correlations between Dong Race architectures in China and Japanese 'Nuki' construction, Proceedings of the 8th World Conference on Timber Engineering, WCTE2004, Vol.3, p.107-113, Lahti, Finland, 2004

Tabuchi, A. and Komatsu, K.: Evaluation of shear performance of earth-wall as a structural element in Japanese traditional timber structure, Proceedings of the 8th World Conference on Timber Engineering, WCTE2004, Vol.3, p.255-259, Lahti, Finland, 2004

Hwang, K.H., Kitagawa, M. and Komatsu, K.: Reinforcement of timber joints using wooden dowels and adhesive, Proceedings of the 8th World Conference on Timber Engineering, WCTE2004, Vol.3, p.297-311, Lahti, Finland, 2004

Noguchi, M. and Komatsu, K.: Design method of the knee joints using adhesive for the wooden portal frame structures, Proceedings of the 8th World Conference on Timber Engineering, WCTE2004, Vol.3, p.301-305, Lahti, Finland, 2004

Gong, M., Komatsu, K. and Nakatani, M.: Fatigue behaviour of lagscrewbolted timber joints, Proceedings of the 8th World Conference on Timber Engineering, WCTE2004, Vol.3, p.339-343, Lahti, Finland, 2004

Watanabe, H. and Komatsu, K.: Loading tests of two log beams for road bridges, Proceedings of the 8th World Conference on Timber Engineering, WCTE2004, Vol.3, p.417-420, Lahti, Finland, 2004

Komatsu, K., Idris, Y., Yuwasdiki, S., Subiyanto, B., Firmanti, A.and Yokoo, K.: Development of structural LVL from tropical wood and evaluation of their performance for the structural components of wooden houses Part-1. application of tropical LVL to a roof truss", Proceedings of the 5th International Wood Science Symposium, 17 September, Kyoto, 2004

Hadi, M., Subiyanto, B., Firmanti, A., Komatsu, K. and Yuwasdiki, S.: Application of some mechanical fasteners on Laminated Veneer Lumber (LVL) rafter joints", Proceedings of the 5th International Wood Science Symposium, 17 September, Kyoto, 2004

Idris, Y., Subiyanto, B., Yuwasdiki, S., Komatsu, K. and Takino, S. : In-plane shear cyclic load testing for shear resistance of LVB floor panels nailed to wood frame floor systems", Proceedings of the 5th International Wood Science Symposium, 17 September, Kyoto, 2004

Kitamori, A., Tabuchi, A., Mori, T., Takino, S. and Komatsu, K.: Evaluation of lateral resistance of structural components such as mud shear walls and wooden frames with small mad walls by lateral shear loading experiments. Proceedings of Kinki Branch in Architectural Institute of Japan, vol.44(6), 65-68, June, 2004 (in Japanese)

Mori, T., Noda, Y. and Komatsu, K.: Reinforcement of large finger-jointed corner frame connections, Proceedings of the 8th World Conference on Timber Engineering, WCTE2004, p.273-278, Lahti, Finland, 2004

Kambe, W., Mori, T., Hashizume, T., Takeda, T. and Sasagawa, A.: Bending strength of large dimension glue-laminated timber beam, Proceedings of the 8th World Conference on Timber Engineering, WCTE2004, CD-ROM, Lahti, Finland, 2004

Mori, T., Inoue, M., Komatsu, K. and Nakatani, M.: Development of wooden wall for house using natural structural materials, Proceedings of the 5th International Wood Science Symposium, 17 September, Kyoto, Japan, 2004

Nakatani, M., Mori, T. and Komatsu, K.: Pull-out properties of lagscrewbolted timber joints with epoxy resin adhesive, Proceedings of the 5th International Wood Science Symposum, 17 September, Kyoto, Japan, 2004

Tabuchi, A., Kitamori, A., Mori, T. and Komatsu, K.: Shear performance of earth-wall that is a typical town house of Kyoto, Proceedings of the 5th International Wood Science Symposium, 17 September, Kyoto, Japan, 2004

b) Conference and seminar papers presented

The 2004 Annual Meeting of the Japan Wood Research Scociety (Sapporo, August 2004): 12 papers

The 2004 Annual Meeting of Arch. Inst. of Jap. (Sapporo, September 2004): 6 papers

The 2005 Annual Meeting of the Japan Wood Research Scociety (Kyoto, March 2005): 13 papers

A-3. Off-campus activities

Membership in academic societies (roles)

Kohei Komatsu: The Japan Wood Research Society (Councilor, Editorial member and Publishing Committee Member, respectively), The Society of Materials Science (Reviewer), Architectural Institute of Japan (Committee Member of Timber Structure, Chief of Sub-Committee for Design of Timber Joints, and Sub-Committee Member for Revision of Timber Design Standards, respectively)

Shinjiro Takino.: The Japan Wood Research Society, Architectural Institute of Japan

Takuro Mori: The Japan Wood Research Society, Architectural Institute of Japan, Wood Technological Association of Japan

Research grants

Kohei Komatsu: Monbukagaku-sho Research Grant (B2), Development of wooden skeleton -infill structures by taking ideas from traditional timber structures. (Chief Investigator)

Kohei Komatsu: Innovative research development of timber joint utilizing compressed timber. (Chief Investigator)

Kohei Komatsu: 2004 MAFF Research Grant on Utilization of Latest Technologies, (Chief Investigator) , Development of Wooden Post and Beam Frame Structure by Utilizing Natural and Environmentally Friendly Structural Materials.

Takuro Mori: Japan Forest Technology Association Research Grant, Development of Wooden Fasteners for Resource Recyclable Wooden Dwelling Houses and Proposal of Shear Wall Composed of Thick Timber Boards (Head Investigator).

A-4. International cooperation and overseas activities

International meetings (roles)

Kohei Komatsu: World Conference on Timber Engineering 2004, 14-19, June, 2004, Lahti, Finland (Presenter)

Kohei Komatsu : International Council for Research and Innovation in Building and Construction, CIB W18 , 29 August –4 September, 2004. Edingdurg, UK (Presenter)

Takuro Mori: World Conference on Timber Engineering 2004, 14-19, June, 2004, Lahti, Finland (Presenter)

International joint researches, overseas research surveys

Kohei Komatsu: Structural Utilization of LVL (Cooperative research with Sriwijaya University as well as Research Institute for Human Settlement in conjunction with the JSPS-LIPI Core University Program),

B. Educational Activities (2004.4-2005.3)

B-1. On-campus teaching

a) Courses given

Undergraduate level: Pocket seminar (Mori)

Graduate Level: Wooden Structural Function I (Komatsu)

Seminar in Structural Functions (Komatsu, Takino, Mori).

Laboratory Course of Structural Functions (Komatsu, Takino, Mori).

B-2. Off-campus teaching, etc.

Part-time lecturer

Kohei Komatsu: Special lecture at Chubu University

B-3. Overseas teaching

Kohei Komatsu: Civil Engineering Dept, Univ. of Sriwijaya. (Special lecture on timber structures)., Palembang, Indonesia,27 March 2005

Foreign invited researcher

Foreign cooperative researcher 4 (1 Korea, 3 Indonesia)

C. Other remarks

Kohei Komatsu: Technical committee member of General Building Research Cooperation of Japan, Chairman of Technical Committee for Timber Bridge Development in Kyoto Prefecture, Committee members of Ministry of Agriculture, Fishery and Forestry (MAFF) for Mixed Species Glulam Project, Committee member of Japan Housing and Wood Technology Center for ISO-TC-165, Research Fellow in Nara Prefectural Forestry Research Center, Typhoon Damege Committee in Hyogo Prefecture

Takuro Mori: WG member of Kansai-branch, Architectural Institute of Japan