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 20 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 (48 freshmen and 48 2nd year students) in the Master's program and 69 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, Forest Environment Planning, 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 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 Information

4. Event in 2006

The orientation course for freshmen on April 7 at the Graduate School of Agriculture in Kitashirakawa Campus offered a curriculum-guidance. On May 27, general profiles in our division and recent research activities in the belonging 20 laboratories were introduced at Kamigamo Experimental Station. After the introduction, 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. Students and research fellows Doctor's program : (2) Master's program : (2)

A. Reseach Activities (2006.4-2007.3)

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 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

- Iwai,Y.: Historical Development and Current State of Bamboo Loggers-The case of Kameoka City in Kyoto prefecture-. Bamboo Journal No.24.; 1-11,2007(in Japanese)
- Morita, E., Fukuda, S., Nagano, J., Hamajima, N., Yamamoto, H., <u>Iwai, Y.</u>, Nakashima, T., Ohira, H., Shirakawa, T.; Psychological effects of forest environments on healthy adults. Shinrin-yoku (forest-air bathing, walking) as a possible method of stress reduction, Public Health 121; 54-63,2007

Murakami, Y.: The Development of Improved and Specialized Japanese Paper during the Meiji Era. Journal of the Japanese Forest Society, Vol.88 No.6; 465-462, 2006(in Japanese)

Reports

- Iwai,Y.: Merits and Demerits of Bamboo Import in Japan, Journal of "Take" No.98.; 6-8, 2006 (in Japanese)
- b) Conference and seminar papers presented

The 2006 Autumn meeting of The Japanese Forest Economic Society (1)

B. Educational Activities (2006.4-2007.3)

B-1. On-campus teaching

a) Courses given

Undergraduate Level: World Forest Resources (Iwai), Graduation Thesis (Iwai)

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

C. Other remarks

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

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

Research fellow : (1) Doctor's program : (11) Master's program : (9) Undergraduate : (4)

A. Research Activities (2006.4-2007.3) 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

Original papers

- Araki M., Shimizu A., Toriyama J., Ito E., Kabeya N., Nobuhiro T., Tith B., Pol S., Lim S., Khorn S., Pith P., Det S., Ohta S., and Kanzaki M.: Changes of vertical soil moisture conditions of a dry evergreen forest in Kampong Thom, Cambodia. In Sawada H., Araki M., Chappell N.A., LaFrankie J.V., Shimizu A., Eds. Forest Environments in the Mekong River Basin, pp.112-124. Springer, Tokyo, 2007
- Tani A., E. Ito, M. Kanzaki, S. Ohta, S. Khorn, P. Pith, B. Tith, S. Pol, & S. Lim.:Principal Forest Types of Three Regions of Cambodia: Kampong Thom, Kratie, and Mondolkiri. In Sawada H., Araki M., Chappell N.A., LaFrankie J.V., Shimizu A., Eds., orest Environment in Continental River Basins, pp.201-213. Springer-Verlag, Tokyo, Japan, 2007
- Ito E., Khorn S., Lim S., Pol S., Tith B., Pith P., Tani A., Kanzaki M., Kaneko T., Okuda Y., Kabeya N., Nobuhiro T., Araki M.: Comparison of the leaf area index (LAI) of two types of dipterocarp forest on the west bank of the Mekong river, Cambodia. In Sawada H., Araki M., Chappell N.A., LaFrankie J.V., Shimizu A., Eds. Forest Environments in the Mekong River Basin, pp.214-221. Springer, Tokyo, 2007
- Hiramatsu R., Kanzaki M., Toriyama J., Kaneko T., Okuda Y., Ohta S., Khorn S., Pith P., Lim S., Pol S., Ito E., Araki M.: Open woodland patches in an evergreen forest of Kampong Thom, Cambodia: Correlation of structure and composition with microtopography. In Sawada H., Araki M., Chappell N.A., LaFrankie J.V., Shimizu A., Eds. Forest Environments in the Mekong River Basin, pp.222-231. Springer, Tokyo, 2007
- Ito E., Lim S., Pol S., Tith B., Pith P., Khorn S., Tani A., Kanzaki M., Kaneko T., Okuda Y., Araki M.: Use of ASTER optical indices to estimate spatial variation in tropical seasonal forests on the west bank of the Mekong river, Cambodia. In Sawada H., Araki M., Chappell N.A., LaFrankie J.V., Shimizu A., Eds. Forest Environments in the Mekong River Basin, pp.232-240. Springer, Tokyo, 2007
- Toriyama J, Ohta S, Araki M, Kanzaki M, Khorn S, Pith P, Lim S, Pol S.: Soils under different forest types in the dry evergreen forest zone of Cambodia: Morphology, physicochemical properties, and classification. In Sawada H et al. (Eds) Forest Environment in the Mekong River Basin. Springer Tokyo. pp.241-253. 2007
- Araki M., Toriyama J., Ohta S., Kanzaki M., Ito E., Tith B., Pol S., Lim S., Khorn S., Pith P., Det S.: Soil moisture conditions in four types of forests in Kampong Thom, Cambodia. In Sawada H., Araki M., Chappell N.A., LaFrankie J.V., Shimizu A., Eds. Forest Environments in the Mekong River Basin, pp.254-262. Springer, Tokyo, 2007
- Ohnuki Y, Chansopheaktra K, Shinomiya Y, Sethik S, Toriyama J, Ohta S, Araki M. 2007.

Apparent change in soil depth and soil hardness in forest areas in Kampong Thom Province, Cambodia. In: Sawada H et al. (Eds) Forest Environment in the Mekong River Basin, Springer-Verlag, Tokyo. pp.263-272. 2007

- Shinomiya Y, Araki M, Toriyama J, Ohnuki Y, Shimizu A, Kabeya N, Nobuhiro T, Kimhean C, So S. Effect of soil water content on water storage capacity - Comparison between the forested areas in Cambodia and Japan -. In: Sawada H, et al. (Eds) Forest Environment in Continental River Basins, Springer-Verlag, Tokyo. pp.273-280. 2007
- Nishimura S., Yoneda T., Fujii S., Erizal Mukhtar, Abe H., & Kanzaki M.: Factors influencing the floristic composition of a hill forest in West Sumatra. *TROPICS* 15(2):165-176, 2006
- Yamada T., Tomita A., Itoh A., Yamakura T., Ohkubo T., Kanzaki M., Sylvester T., & Ashton P.S.: Habitat associations of Sterculiaceae trees in a Bornean rain forest plot. *Journal of Vegetation Science* 17:559-599, 2006
- Hosaka, T., Arita, Y., and Kirton, L. G.: Seed predation on the dipterocarp Neobalanocarpus heimii (Dipterocarpaceae) by the clearwing moth Synanthedon nautica (Lepidoptera, Sessidae) in Peninsular Malaysia. Transactions of lepidopterological Society of Japan 58:165-171. 2007
- Toda, T., Takeda, H., Tokuchi, N., Ohta S., Wacharinrat, C., and Kaitpraneet, S.:Effects of forest fire on the nitrogen cycle in a dry dipterocarp forest, Thailand. Tropics 16; 41-45, 2007

Review

- Sasaki, A.: Two aspect of miang (chewing tea) production in northern Thailand:Changing traditional agriculture and the origin of Japanese tea culture. Tropical Ecology Letters 63:5-11, 2006
- KURASHIMA, Takayuki: Thai National Land Boundary Fixing Project: A Policy Left by Thaksin Government. Japan. Tropical Ecology Letters 66:4-6, 2006
- b) Conference and seminar papers presented
- The 117th Ann. Meeting of Japanese Forest Society (6)

The 17th Ann. Meeting of Japanese Society of Tropical Ecology (Symposium 1, Oral 3)

The 54th Ann. Meeting of Ecological Society of Japan (2)

A-3. Off-campus activities

Membership in academic societies (roles)

- Ohta, S.: The Japanese Forestry Society (Council member), Japanese Society of Forest Environment (Council member), Editorial board of The Pedorogist (Editor)
- Kanzaki, M.: The Japanese Association of Tropical Ecology (Council member, Secretary), The Society of Vegetation Science (Editor), Kansai Organization of Nature Conservation (Council member)

Research grants

JSPS research grant: Kiban-kenkyu A -2; Clarification and prediction of soil acidification under leguminous fast-growing tree plantation in humid tropic. (Rep. Ohta, Kaneko, Kanzaki), 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, Kanzaki. 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, Kanzaki, Kaneko. Rep.: K. Takeuchi), Kiban-kenkyu A; Function in carbon, nutrients and water cycling within seasonally dry tropical forests. (Ohta, Kanzaki, Rep. A. Ishida), 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), Kibankenkyu-A; Ecological study of gregarious flowering of Melocannna baccifera in Mizoram, India. (Kanzaki. Rep. S. Shibata), Grant for Research Fellow DC1; Forest utilization pattern of Karen people under different forest management policies (M. Fukushima), Grant for Research Fellow DC2; Asynchronism of Nitrogen budget and it's effects on soil elements dynamics in fast-growing tree plantations of Acacia mangium in the tropics (M. Sugimoto)

Co-research Grant of Ministry of Environment; Study of Terrestrial Ecosystem of Asia for the Carbon Management of 21st Century. (Ohta, Kanzaki, Kaneko. Rep.: Tani)

A-4. International cooperation and overseas activities

International meetings

Kanzaki M.: International Symposium "Sustainable Management for Natural Environment in Asia", Nara Women's University. (Commentator)

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), Study of bamboo flowering (India), Study on the utilization of ecological resource in Myanmar (Myanmar)
- Kaneko, T.: Study on clarifying the soil acidification under leguminous fast-growing tree plantation in humid tropic (Indonesia)

B. Educational Activities (2006.4-2007.3)

B-1. On-campus teaching

- a) Courses given
- Undergraduate level: Forest Science I (Ohta, Kanzaki), 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). Practice in University Forest III (Kanzaki). Environmental Studies A (Kanzaki)

Graduate level: Tropical Forest Resources (Kanzaki), Seminar in Tropical Forest Resources and

Environments (Ohta, Kanzaki), Practice in Tropical Forest Environments (Ohta, Kanzaki), Scientific Writing and presentation in English (Kanzaki)

B-2. Off-campus teaching, etc.

Part-time Lectures

Kanzaki, M.: Practice in Environmental Biology I (Faculty of Science: Osaka Women's University) Kanzaki, M.:Tropical Rain Forest Resources (Faculty of Agriculture: Tottori University)

Kanzaki, M.: JICA Training Course: Conservation and Sustainable Management of Mangrove Ecosystem (Lecturer)

Open Lectures

Kanzaki, M.: NPO Senior Nature University: Global Environmental Ecosystem Science (Lecturer)

B-3. Overseas teaching

Students and research fellows from abroad

Master Course Student 1 (Myanmar)

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); Japan Society for the Promotion of Science, funding for science research (Technical committee member)

Kanzaki, M.: Environmental Committee of Higashiomi City (Committee member)

2.2.3 Laboratory of Forest Environment Planning

Staff Professor : Ohta, Seiichi, Dr. Agric. Sci. Associate Professor: Matsushita, Koji, Dr. Agric. Sci. Students and research fellows Undergraduate : (4)

A. Reseach Activities (2006.4-2007.3)

A-1. Main subjects

a) Forest planning system

Social demands for forest resources are multiple and changing. The most recent change is the increase of forest management problems related to global warming. To solve these current problems, we are conducting research to change the forest planning system and forest survey methods to include a broader range of public benefits.

b) Laws relating to forest management

The development of legal systems is necessary for forest management because the forest resources are connected to various public benefits. In our laboratory, the following laws relating to the forest are being examined: Forest Law, Basic Forest and Forestry Law, National Forest Management Law, Law to Promote the Modernization of the Rights for the Common Forest.

c) Sustainable forest tourism

The national forest has a protective forest system. The area of protective forest and the surroundings also have importance from the point of tourism. Protection forest for scenic beauty and recreational use are contributing to tourism. We conduct research on how to develop sustainable forest tourism.

A-2. Publications and presentations

a) Publications

Original papers

Matsushita, K. and Taguchi, K.: The Kyoto Protocol and Private Forest Policy by Local Governments in Japan, Small-scale forestry and rural development, the intersection of ecosystems, economics ad society, Proceedings of IUFRO 3.08 Conference, 262-275, 2006

Reports

Matsushita, K.: Forest Conservation, Proceedings of Common Forest Society of Middle Japan, 27, 262-275, 2007

A-3. Off-campus activities

Membership in academic societies (roles)

Matsushita, K.: Kansai Branch of the Japanese Forest Society (Editor), Common Forest Society of Middle Japan (Council, Secretary General, Executive Committee of 27th Annual Meeting)

B. Educational Activities (2006.4-2007.3)

B-1. On-campus teaching

- a) Courses given
- Undergraduate Level: Exercises in Information Processing Basics (Matsushita), Forest and Biomaterial Science IV (Matsushita), Laboratory Course in Forest and Biomaterials Science IV (Matsushita), Laboratory Course in Applied Forest and Biomaterial Science (Matsushita), Forest Planning (Matsushita), Forest Law (Matsushita), Seminar in Forest and Biomaterial Science (Matsushita)

Graduate level: Forest Environment Planning (Matsushita)

b) Part-time Lectures

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

C. Other remarks

Matsushita, K.: Member of the management board of Shiga Prefectural Biwako Afforestation Corporation; Policy consultant of Nara Prefecture on the promotion of the effective utilization of common forests; Member of the advisory body of Kyoto Prefectural Forestry Workers Support Center; Member of the exploratory committee on Kyoto Prefectural Afforestation Corporation

Chair of Forest and Forestry Production

2.2.4 Laboratory of Forest Utilization

Staff	Professor	: Osawa, Akira, Ph.D.
	Associate Professor: Okada, Naoki, Dr. Agric. Sci.	
	Instructor	: Hasegawa, Hisashi, Dr. Agric. Sci.

Students and research fellows

Doctor's program : (4) Master's program : (3) Undergraduate : (7)

A. Research Activities (2006.4-2007.3)

A-1. Main subjects

a) Stand development and carbon dynamics of boreal forests

Stand development and carbon accumulation and dynamics after large-scale disturbances are studied in boreal forest ecosystems, particularly of high-latitude coniferous forests in the northern hemisphere. Chronosequence stands have been selected, their stand structures measured, and carbon dynamics patterns estimated by the ecological summation method in Gmelin larch forests of central Siberia in the continuous permafrost zone, black spruce forests of central Alaska, and jack pine forests of northwestern Canada. Sum of fine-root ingrowth and mortality was estimated as 365 gC/m^2 /year for the jack pine forest, indicating that 83% of NPP of this forest ecosystem goes to the fine-root compartment. Compared to published literature, this proportion is unusually large for a forest ecosystem. Generality of this estimate needs to be examined by further analyses.

b) Growth of tropical trees

Photosynthetic capacity of trees in the deciduous dipterocarp forest (DDF) and the dry evergreen forest in Sakaerat, northeast Thailand were compared. The mean maximum photosynsetic capacity (A_{max}) of DDF species was greater than that of DEF species, but the difference was not significant. However, the DDF species except Dipterocarpaceae had greater A_{max} than DEF species.

Carbon isotopic composition (δ^{13} C) of xylem in representative Dipterocarpaceae species in Sakaerat was determined to detect carbon isotopic growth rings. Usually, the species do not have distinct growth rings, but all the trees analyzed in 0.1 mm increment showed periodical changes of δ^{13} C values. The changes seemed to reflect the water stress during the dry season and/or use of reserved materials at the early stage of the growing season.

c) Vessel formation, phenology and water relations of broad-leaved trees

The timing of vessel formation and leaf flush was compared for deciduous and evergreen broad-leaved tree species. The former started vessel formation and leaf flush earlier than the latter. This suggested that the two events have close linkage in both deciduous and evergreen species.

Dorught tolerance of deciduous and evergreen broad-leaved trees were compared by P-V curve and drying experiement of shoots. Some of the deciduous species enhanced their drought tolerance by osmotic regulation, but the trend was not observed for evergreen species. Instead, evergreen species showed very slow drying rates, indicating that they can tolerate to drought with much less stomatal conductance compared to deciduous species.

d) Studies on risk management for sustainable forest management

There exists many risks, such as storm damages, during the term from planting to final cutting in foresty. We examined the forest recovery project from the storm damages caused by typhoons on 2004 in Hyogo Prefecture in order to establish a forest risk management.

e) Studies on precision forestry for 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. Site-adapted forest management with precision forestry technologies is 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) development of estimation method for forest production system using system dinamics, and (4) development of silvicultural process for extensive forestry with early intensive thinning, were discussed.

A-2. Publications and presentations

a) Publications

Original papers

- Kajimoto, T., Y. Matsuura, A. Osawa, A.P. Abaimov, O.A. Zyryanova, A.P. Isaev, D.P. Yefremov, S. Mori, and T. Koike: 2006. Size-mass allometry and biomass allocation of two larch species growing on the continuous permafrost region in Siberia. Forest Ecology and Management 222:314-325.
- Kajimoto, T., A. Osawa, Y. Matsuura, A.P. Abaimov, O.A. Zyryanova, K. Kondo, N. Tokuchi, and M. Hirobe: 2007. Individual-based measurement and analysis of root system development: case studies for *Larix gmelinii* trees growing on the permafrost region in Siberia. Journal of Forest Research 12:103-112
- Hasegawa, H. and Yoshimura, T.: Positional accuracy and error management of static surveying using dual-frequency GPS receivers under different forest conditions. Journal of Forest Research 12(1), 1-7, 2007
- Nakano, T. S. Morohashi, H. Yasuda, M. Sakai, S. Aizawa, K. Shichi, T. Morisawa, M. Takahashi, M. Sanada, Y. Matsuura, H. Sakai, A. Akama and N. Okada (2006): Determination of seasonal and regional variation in the provenance of dissolved cations in rain in Japan based on Sr and Pb isotopes. Atmospheric Environment, 40, 7409-7420
- Yamashita, K. N. Okada, T. Fujiwara: Use of the pilodyn for estimating basic density and its applicability to density-based classifying of *Cryptomeria japonica* green wood. Mokuzai Gakkaishi, **53**(2); 72-81, 2007

Reports

- Osawa, A., T. Kajimoto, Y. Matsuura, A.P. Abaimov, O.A. Zyryanova, N. Tokuchi, M. Hirobe, K. Kondo, Y. Nakai, H. Daimaru, A.S. Prokushkin, A.V. Volokitina, and M.A. Sofronov: 2007. Age sequence of stand structure, carbon accumulation and allocation, and net primary production in permafrost larch (*Larix gmelinii*) ecosystems in Siberia: current knowledge and future study. Pp.208-211. *In* Committee of the Consortium for GCCA. Proceedings of the 7th International Conference on Global Change: Connection to the Arctic (GCCA7). February 19-20, International Arctic Research Center, University of Alaska, Fairbanks, USA.
- Matsuura, Y., T. Kajimoto, Y. Nakai, A. Osawa, T. Morishita, O.A. Zyryanova, and A.P. Abaimov: 2007. Carbon budget in a larch (*Larix gmelinii*) ecosystem of continuous permafrost region in central Siberia. Pp 258-261. In Committee of the Consortium for GCCA. Proceedings of the 7th International Conference on Global Change: Connection to the Arctic (GCCA7). February 19-20, International Arctic Research Center, University of Alaska, Fairbanks, USA
- Hasegawa, H. and Yonetsu, K.: Developing GPS Positioning Algorithm Suitable for Under Tree Canopies. Proceedings of the 29th Council on Forest Engineering Conference: 553, 2006
- Hasegawa, H. and Yoshimura, T.: Error management of GPS positioning under tree canopies using SIP. Trans. J. For. Soc. 118: 152, 2007 (in Japanese)
- Hasegawa, H.: Report on the Field Meeting of the 14th Workshop on Forest Production System. J.Jpn. For. Eng. Soc.22(1): 7-12, 2007 (in Japanese)
- Hasegawa, H.: Report on the Symposium of the 14th Workshop on Forest Production System. J.Jpn. For. Eng. Soc.22(1): 13-19, 2007 (in Japanese)

- Hyogo Project of Forest Management on 2006 (Hasegawa, H., Niinaga, S., and Sugimoto K.):
 Forest Recovery from the Storm Damages Caused by Typhoons in 2004, Hyogo
 Prefecturel Technology Center for Agriculture, Forestry and Fisheries, Fisheries
 Technology Institute, 88pp, 2007 (in Japanese)
- Niinaga S. and Hasegawa, H.: Analysis of Work Element Times on the Thinning System. Trans. J. For. Soc. 118: 419, 2007 (in Japanese)
- Otsuka, K., Hasegawa, H., and Yoshimura, T.: Effects of Intensive Thinning on the Growth of Japanese Cedar. Trans. J. For. Soc. 118: 601, 2007 (in Japanese)
- Sugimoto, K. and Hasegawa, H.: Operation Systems used for Forest Recovery from the Storm Damages in Hyogo Prefecture. Trans. J. For. Soc. 118: 313, 2007 (in Japanese)
- Yoshimura, T. and Hasegawa, H.: Does a consumer GPS receiver achieve submeter accuracy under forest canopy?. Proceedings of the 29th Council on Forest Engineering Conference: 355-362, 2006
- b) Conference and Seminar papers presented

The 117th Ann. Meet. Jpn. For. Soc. (1 presentation)

The 118th Ann. Meet. Jpn. For. Soc. (4 presentations)

The 14th Meet. Forest Production (2 presentations)

The 54th Ann. Meet. Eco. Soc. Jpn. (3 presentations)

The 16th Ann. Meet. Jpn. Soc. Trop. Eco. (1 presentation)

The 29th COFE Conference (2 presentations)

7th International Conference on Global Change: Connection to the Arctic (GCCA7). (Fairbanks, USA) (1 presentation)

A-3. Off-campus activities

Membership in academic society (roles)

Hasegawa, H.: Society of Forest Spatial Utilization (executive), Society of Forest Production (executive)

Research grant

Monbu-Kagakusho Research Grant: Scientific Research (A) (Overseas) Ecological wood anatomy of tropical trees (Okada, PI), Scientific Research (A) (Overseas) Phosphorous limitation in the tropical forest in Borneo: bottom up effect and adaptation of plants (Okada), Scientific Research (A) (Overseas) Ecological research on the large-scale bamboo flowering in Mizoram, India (Hasegawa), Scientific Research (B) (Overseas) Inter-relationships between stand development and patterns of nitrogen dynamics in Siberian taiga (Osawa, PI), Scientific Research (B) Influence of yellow sand on the forests in Japan, and the origin of dry fallout and its contribution to acidification (Okada); Japan Ministry of Environment Grant for Global Environmental Research (B-053) Estmation of Carbon Accumulation and Carbon Sequestration in Russian Boreal Forests (Osawa),

A-4. International cooperation and overseas activities

International meetings (roles)

Osawa, A.: 7th International Conference on Global Change: Connection to the Arctic GCCA7.

February 19-20, International Arctic Research Center, University of Alaska, Fairbanks, USA. (Presentation)

Hasegawa, H.: The 29th COFE Conference (Presentation, USA)

International joint researches and overseas research survey

- Osawa, A.: Inter-relationships between stand development and patterns of nitrogen dynamics in Siberian taiga (Russia),
- Osawa, A.: Carbon accumulation and carbon sequesteration in permafrost forest ecosystems (Russia), Self-thinning processes in permafrost larch ecosystems (Russia),
- Osawa, A.: Carbon budget of Canadian boreal forests (Canada),
- Osawa, A.: Reconnaissance study of black spruce forests of Alaska (U.S.A.)
- Okada, N.: Characterization of wood formation in tropical trees (Thailand, Malaysia)
- Hasegawa, H.: Ecological research on the large-scale bamboo flowering in Mizoram, India (India)

B. Educational Activities (2006.4-2007.3)

B-1. On-campus teaching

a) Course given

- Undergraduate level: Basic Science for Forest and Biomaterials IV (Osawa), Forest Utilization (Osawa), Tree Physiology (Okada), Mushroom Science (Okada), Reading of foreign literature II (Okada), Laboratory Course in Forestry and Biomaterial Science IV (Okada, Hasegawa), Comprehensive Practice in Forest (Okada, Hasegawa), Practice for Forest Utilization (Osawa, Okada, Hasegawa), Seminar in Forest Utilization (Osawa, Okada, Hasegawa), Introduction to Research (Osawa, Okada, Hasegawa), Forest Science using Computer (Hasegawa), Practice in University Forest IV (Hasegawa),
- Graduate level: Special Lecture on Forest Utilization II (Okada), Scientific writing and presentation in English (Okada), Seminar in Forest Utilization (Osawa, Okada, Hasegawa), Laboratory course in Forest Utilization (Osawa, Okada, Hasegawa)

B-2. Off-campus teaching, etc.

Part-time lecturer

Osawa, A.: Ryukoku University, Faculty of Intercultural Communication (Seminar IV, Pre-Seminar, Methods in Intercultural Communication C)

Open Lecture

Hasegawa, H.: Training Lectures for Foresters in Hyogo (Lecturer), Technical Meeting for Thninning in Tokushima (Lecturer)

C. Other remarks

- Osawa, A.: Preparatory committee on Arctic research (Member), Committee on Arctic research (Member)
- Hasegawa, H.: Preparatory Committee of Forest Database in North Okayama (Chairman), Committee to Conserve Rich Forests and Clear Streams in Ide (Vice-chairman), Forest Management Project Team in Hyogo, Low Cost Forestry Project Team in Wakayama

2.2.5 Laboratory of Forest Biology

Staff Professor : Isagi, Yuji, Ph. D. Lecturer : Takayanagi, Atsushi, Dr. Agric. Sci Assistant Professor : Yamasaki, Michimasa, Dr. Agric. Sci

Students and research fellows

Doctor's program : (6) Master's program : (5) Undergraduate : (3) Research fellow : (1)

A. Research Activities (2006.4-2007.3)

A-1. Main subjects

a) Regeneration and genetic structure of tree populations

In order to identify the factors that cause effective pollen movement in tree populations, analyses of the genetic structure of reproductive trees and parentage analyses for seedlings and saplings were conducted in a population of *Aesculus turbinata*. We found the genetic structure of the adult population of *A. turbinata* affected the survival of offspring through biparental inbreeding depression, and then, removal of individuals resulting from crosses between related adults promoted effective pollination over longer distances.

b) Biological conservation of forest trees

In order to evaluate the consequence of forest fragmentation, we compared genetic and reproductive characteristics at two nearby sites, one conserved and one fragmented for populations of *Magnolia obovata*. The density of the adult trees was significantly related to reproductive traits analyzed (fertilization of ovules, insect attack to seeds, ovules that developed into seeds and outcrossing at the stage of seeds) at both sites. The probability of ovules developing into outcrossed seeds showed a negative correlation with adult tree density at both sites, indicating the advantage of low density for this species and possibly implying a resilience to habitat fragmentation.

c) Forest damage by big mammals

In order to know the mechanism of black bear bark stripping damage, we investigated the nutritional traits of inner-bark of *Cryptomeria japonica*, damages in natural forests. DNA analysis of hairs sticking on scars can identify black bear. Shoot breakage by Sika deer was happened mostly from April to July and strong relationships with phenology of plants. Vegetation change processes were compared between different browsing pressure at herbaceous community dominated by low-preference species. Biomass under several artificial *Cryptomeria japonica* stands were estimated.

d) Food habits of bears

Comparative studies on Hokkaido brown bear using stable isotope clarified the differences of food habits between eastern area and Oshima peninsula.

e) Mass mortality of oak trees

The ambrosia beetle, *Platypus quercivorus*, causes mass mortality of oak trees by transporting pathogenic fungi from trees to trees. Studies on the spreading pattern of this disease,

which was conducted at Ashiu Forest Research Station, revealed that beetle-infested trees were not concentrated around trees attacked in the previous year. Logistic regression analysis showed the significant effects of the objective tree size and the direction from trees attacked in the previous year on the spreading of this disease, however, distance from trees attacked in the previous year had no significant effect.

A-2. Publications and presentations

a) Publications

Original papers

- Matsuki, Y., Y. Isagi and Y. Suyama: The determination of multiple microsatellite genotypes and DNA sequences from a single pollen grain. Molecular Ecology Notes 7; 194-198, 2007
- Ozeki, M., Y. Isagi, H. Tsubota, P. Jacklyn, and D.M.J.S. Bowman: Phylogeography of Australian termite, *Amitermes laurensis* (Isoptera, Termitidae), with special reference to the variety of mound shapes. Molecular Phylogenetics and Evolution 42; 236-247, 2007
- Narita, R., A. Sugimoto and A. Takayanagi: Animal components in the diet of Japanese black bears Ursus thibetanus japonicus in Kyoto area, Japan. Wildlife Biology 12; 375-384, 2006
- Bradshaw, C.J.A., Y. Isagi S. Kaneko, D.M.J.S. Bowman, B.W. Brook and B.M. Campbell: Conservation value of non-native banteng in northern Australia. Conservation Biology 20; 1306-1311, 2006
- Shiga, T., J. Ishii, Y. Isagi and Y. Kadono: *Nuphar submersa* (Nymphaeaceae), a new species, from central Japan. Acta Phytotaxonomica et Geobotanica 57; 113-122, 2006
- Narita, R., K. Sasaki, K. Goda, N. Maeda and A. Takayanagi: Turnover of stable isotopes in Hokkaido brown bear (*Ursus arctos yesoyensis*). Mammal Study 31; 59-63, 2006
- Mabuhay, J.A., N. Nakagoshi and Y. Isagi: Microbial responses to organic and inorganic amendments in eroded soil. Land Degradation & Development 17; 321-332, 2006
- Mabuhay, J.A., N. Nakagoshi and Y. Isagi: Soil microbial biomass, abundance and diversity in a pine forest: first year after fire. Journal of Forest Research 11; 165-173, 2006
- Fujimori, N., T. Kenta, T. Kondo, Y. Kameyama, Y. Isagi and T. Nakashizuka: Microsatellite loci for a sparsely distributed species, *Kalopanax pictus* (Araliaceae) in Japanese temperate forests. Molecular Ecology Notes 6; 468-469, 2006
- Fujiki, D. and K. Kikuzawa: Stem turnover strategy of multiple-stemmed woody plants. Ecological Research 21; 380-386, 2006
- Hirao, A.S., Y. Kameyama, M. Ohara, Y. Isagi and G. Kudo: Seasonal changes in pollinator activity influence pollen dispersal and seed production in the alpine shrub *Rhododendron aureum* (Ericaceae). Molecular Ecology 15; 1165-1173, 2006

Reports

- Yoshikawa, T.: Feeding behaviors of masked grosbeak *Eophona personata* on acorns of Fagaceous species (in Japanese with English summary). Journal of Yamashina Institute for Orinithology 38; 143-146, 2007
- b) Conference and seminar papers presented

International Deer Biology Congress (2 presentations)

The Mammalogical Society of Japan 2006 Annual Meeting (6 presentations)

17th International Conference on Bear Research and Management (2 presentations)

54th Annual Meeting of The Japanese Ecological Society (7 presentations) 51st Annual Meeting of the Japanese Society of Applied Entomology and Zoology (1 presentation)

A-3. Off-campus activities

Membership in academic societies (roles)

Isagi, Y.: The Ecological Society of Japan (Ecological Research, Associate Editor-in-Chief; Journal of the Ecological Society of Japan, Editor; Committee for the Natural Conservation), The Japanese Forest Society (Journal of the Japanese Forest Society, Editor)

Takayanagi, A.: Mammalogical Society of Japan (Audit)

Research grants

- Isagi, Y.: JSPS research grant: Kiban-kenkyu B; Analyses of pollination processes of tree species based on genotyping of a single pollen grain (Rep.: Y. Isagi)
- Takayanagi, A.: JSPS research grant: Kiban-kenkyu C; Study on effects of habitat quality and protection fences on crop damage intensity by sika deer (Rep.: A. Takayanagi)

B. Educational Activities (2006.4-2007.3)

B-1. On-campus teaching

a) Courses given

- Undergraduate level: Reproductive Ecology in Forest Trees (Isagi), Wildlife Conservation Science (Takayanagi), Information Technology in Forest and Biomaterials Science (Yamasaki), Laboratory Course in Forest and Biomaterials Science I (Takayanagi), Laboratory Course in Forest and Biomaterials Biology (Takayanagi, Yamasaki), Laboratory Course in Ecology (Takayanagi, Yamasaki), Practice in University Forests II (Takayanagi), Seminar in Forest and Biomaterials Science (Isagi, Takayanagi, Yamasaki)
- Graduate level: Forest biology II (Takayanagi), Seminar in Forest Biology (Isagi, Takayanagi), Laboratory Course in Forest Biology (Isagi, Takayanagi)

B-2. Off-campus teaching, etc.

Part-time lecturer

Isagi, Y.: Graduate School of Science, Kobe University (Molecular Ecology), Faculty of Integrated Arts & Sciences, Hiroshima University (Conservation Biology), Graduatge School of Integrated Arts and Scinences (Symbiotic Microbial Biology)

Yamasaki, M.: Faculty of Engineering, Doshisha University (Life Science II, Animal Behavior)

Open seminar

Isagi, Y.: Open Seminar of Hiroshima University Museum (Lecturer)

Takayanagi, A.: Open Seminar of Field Science Education and Research Center, Kyoto University (Lecturer)

Yamasaki, M.: Open Seminar of Forest Science, Kyoto University (Lecturer)

B-3. Overseas teaching

Students and research fellows from abroad

Doctor course (1) (Brazil)

C. Other remarks

Isagi, Y.: The Hiroshima City Association of the Botanical Garden, Zoo and Parks (trustee), Committee for evaluation of research and development of Hiroshima Prefecture (working stuff), Japan Society for the Promotion of Science, Research fellowships for young scientists (technical committee member), Research Institute for Humanity and Nature (project researcher)

Chair of Forest Environment Conservation

2.2.6 Laboratory of Landscape Architecture

Staff Professor : Morimoto, Yukihiro, Dr. Agri. Sci. Assistant Professor : Imanishi, Junichi, Dr. Agri. Sci.

Students and research fellows

Doctor's program : (6) Master's program : (8) Undergraduate : (5)

A. Research Activities (2006.4-2007.3)

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) Habitat restoration 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. et al.: The Forest Environment 2007 (Forest Culture Association ed.), 199pp, The Asahi Shimbun Company, Tokyo, 271pp., 2007.2

Hong, S, Nakagoshi, N., Fu, B. Morimoto, Y. eds.: Landscape Ecological Applications in

Man-Influenced Areas, Dordrecht, Springer, 535pp., 2007.1

- Morimoto, Y.: Kyoto as a Garden City: A landscape Ecological Perception of Japanese Garden design., in Hong, S. et al. Eds. Landscape Ecological Applications in Man-Influenced Areas, Dordrecht, Springer, 375-388, 2007.1.
- Original papers
- Imanishi, A., Kitagawa, C., Nakamura, S., Hashimoto, H., Tabata, K., Imanishi, J., Murakami, K., Morimoto, Y. and Miyamoto, M.: Changes in herbaceous plants in an urban habitat garden in Kyoto city, Japan, 9 years after construction. Landscape and Ecological Engineering 3(1); 67-77, 2007
- Imanishi, J., Morimoto, Y., Imanishi, A., Sugimoto, K. and Isoda, K.: The independent detection of drought stress and leaf density using hyperspectral resolution data. Landscape and Ecological Engineering 3(1); 55-65, 2007
- Morimoto Y, et al.: Role of the EXPO '70 forest project in forest restoration in urban areas. Landscape and Ecological Engineering 2(2); 119-127, 2006
- Koh, J., Ueda, T., Morimoto, Y., Shibata, S.: Evaluation of using soil seed band and commercial seeds in nature revegetation. J. Jpn. Soc. Reveget. Tech. 32(1); 62-67, 2006
- Onishi, T., Simomura, T., Mizuno, S., Imanishi, J.: The estimation of performance of a growing system for green roof consisted of high density unwoven cloths and a mat plant. J. Jpn. Soc. Reveget. Tech. 32(1); 68-73, 2006
- Ohgishi, M., Oku, H., Fukamachi, K., Morimoto, Y.: A study of landscape evaluation schema and differences of large wind power generator between residents and visitors. Landscape Research Japan 69(5); 711-716, 2006
- Horiuchi, M., Fukamachi, K., Oku, H., Morimoto, Y.: Patterns in the use of forest resources in satoyama landscape in the western part of Shiga prefecture based on two diaries of the late Meiji period. Landscape Research Japan 69(5); 705-710, 2006
- Hashimoto, H., Sawa, K., Tabata, K., Morimoto, Y., Nishio, S.: Characteristics of legacy trees with hollows in the urban area of Kyoto City, Japan. Landscape Research Japan 69(5); 529-536, 2006
- Ukai, K., Oku, H., Fukamachi, K., Horiuchi, M., Terakawa, S., Morimoto, Y.: A relationship between fish communities and habitat environments in small erosion-controlled rivers in the lake Biwa basin. Landscape Research Japan 69(5); 561-564, 2006.

Reports

- Morimoto, Y.: Promotion of revegetation and alien species. Green Age 33(10); 4-8, 2006
- Morimoto, Y.: The origin of the landscape of Kyoto: *Rhododendron macrosepalum* in Mt. Yoshida. Green Power 2006(4); 13, 2006
- Morimoto, Y.: The origin of the landscape of Kyoto: The row of cherry blossom trees at Sosui canal and *Spindasis takanonis*. Green Power 2006(5); 13, 2006
- Morimoto, Y.: The origin of the landscape of Kyoto: *Iris laevigata* in Mizorogaike pond. Green Power 2006(6); 13, 2006
- Morimoto, Y.: The origin of the landscape of Kyoto: Higashiyama mountains and *Castanopsis* trees. Green Power 2006(7); 13, 2006
- Morimoto, Y.: The origin of the landscape of Kyoto: Oguraike wetland and headland of Zizania latifolia. Green Power 2006(8); 13, 2006
- Morimoto, Y.: The origin of the landscape of Kyoto: Katsura-style hedge and the landscape of

Phyllostachys nigra. Green Power 2006(9); 13, 2006

- Morimoto, Y.: The origin of the landscape of Kyoto: The borrowing landscape of Daimonji mountain and avian species can be conserved by tree thinning. Green Power 2006(10); 13, 2006
- Morimoto, Y.: The origin of the landscape of Kyoto: The row of *Ulmaceae* trees at Kamo road. Green Power 2006(11); 13, 2006
- Morimoto, Y.: The origin of the landscape of Kyoto: *Hestina japonica* at Inochi-no-mori forest. Green Power 2006(12); 13, 2006
- Araki, N., Koyama, S., Morimoto, Y.: Forest of self-sustainability at Banpaku Park. Shin Hakken 1; 2-7
- Imanishi, J., Imanishi, J.: Utilization of natural environment as complementary and alternative medicine. Environmental Information Science 35(4); 31-36, 2007
- Imanishi, J., Imanishi, A., Baba, T., Morimoto, Y., Imanishi, J.: Relaxation effect of forest therapy at forested and urbanized areas in Kansai region. Proceedings of section meetings in annual meeting of JILA, 64-65, 2006
- b) Conference and seminar papers presented
- Annual meeting of JALE (2)
- Annual meeting of Japanese Forest Society (1)
- Annual meeting of the Ecological Society of Japan (1)

Annual meeting of JILA (4)

Annual meeting of JILA Kansai Branch (4)

Annual meeting of the Japanese Society of Revegetation Technology (2)

Symposium of Environmental Information Science (1)

International Conference on Ecological Restoration in East Asia 2006. Osaka, Japan (6)

A-3. Off-campus activities

Membership in academic societies

- Morimoto, Y.: Japanese Institute of Landscape Architecture (Head of Kansai Branch), Japanese Society of Revegetaion Technology (President), Japanese Society of Landscape Ecology (Vice President), Environmental Information Center (Councilor), Science Council of Japan (cooperation member), Landscape and Ecological Engineering (Chief Editor), Internaional Federation of Landscape Architects - Japan, board member, JILA Kansai Branch 40th anniversary meeting executive committee, International conference of ICLEE 2006 Osaka executive committee
- Imanishi, J.: International Consortium on Landscape and Ecological Engineering (Editorial Office), Japanese Institute of Landscape Architecture (Member of Editorial Board for Techinical Report), Japanese Institute of Landscape Architecture Kansai Branch (Secretary and Branch Office), Japanese Association for Landscape Ecology (Expert Member)

Research grants

Morimoto, Y.: JSPS Grants-in-Aid for Scientific Research. (A) (1) Studies on ground design of hierarchical nature restoration. (delegate: Morimoto, Y.)

A-4. International cooperation and overseas activities International meetings

- Morimoto, Y.: Role of EXPO '70 forest project in the development of forest restoration in urban areas. Proceedings of the International Conference on Ecological Restoration in East Asia 2006, Osaka; p.224, ICLEE (Invited Lecture) 2006.6.17
- Imanishi, J., Suzuki, A., Imanishi, A., Morimoto, Y., and Fujita, T.: Greenery on vertical walls: lessons from Biolung in Expo 2005, Aichi, Japan. International Conference on Ecological Restoration in East Asia 2006. Osaka, Japan; 2006
- Zhu, W-H., Nan, Y., Kim, K-G., Imanishi, J., and Morimoto, Y. 2006.: Characteritics of the spatial distribution of wetlands in Tumen River Lower Down Stream Area. International Conference on Ecological Restoration in East Asia 2006. Osaka, Japan; 2006
- Imanishi, A., Kitagawa, C., Nakamura, S., Hashimoto, H., Tabata, K., Imanishi, J., Morimoto, Y., and Miyamoto, M.: Changes in herbaceous plants at an urban ecological park for 9 years after construction. International Conference on Ecological Restoration in East Asia 2006. Osaka, Japan; 2006
- Sasaki, T., Morimoto, Y., and Imanishi, J.: Monitoring of the forested area in Expo '70 Park for 30 years after reclamation. International Conference on Ecological Restoration in East Asia 2006. Osaka, Japan; 2006
- Hashimoto, H., Imanishi, J., Sasaki, T., Morimoto, Y., Tanaka, T., Senda, Y., Ukai, N., and Kitada,
 K.: Evaluationg airborne laser scanners as a tool for detecting stratification of urban forests. International Conference on Ecological Restoration in East Asia 2006. Osaka, Japan; 2006

B. Education Activities (2006.4-2007.3)

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 Planning (Hayashi, M.), Practice in Landscape Planning and Design Part I, II (Morimoto, Y. and Imanishi, J.), Laboratory Course in Applied Forest and Biomaterials Science (Morimoto, Y. and Imanishi, J.), Laboratory Course in Forest and Biomaterials Science IV (Morimoto, Y. and Imanishi, J.), Forest and Biomaterials Science, IV (Morimoto, Y.)
- Graduate level: Seminar in Landscape Architecture (Morimoto, Y.), Laboratory Works in Landscape Architecture (Morimoto, Y.)
- Graduate School of Global Environmental Studies: Landscape Ecology and Planning (Morimoto, Y.), Seminar in Landscape Ecological Conservation (Morimoto, Y.), Theory of Ecological Impact Mitigation (Morimoto, Y.), Internship in Environmental Management (Morimoto, Y.), Seminar on Environmental Management (Morimoto, Y. and Imanishi, J.)

B-2. Off-campus teaching, etc.

Part-time lecturer

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

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

Open seminar

Morimoto, Y.: Instructor of Temple Visits (Jikoh-in)

- Morimoto, Y.: Research meeting of ground desing of nature restoration (1), Kyoto
- Morimoto, Y.: Research meeting of ground desing of nature restoration (2), Kyoto
- Morimoto, Y.: Research meeting of ground desing of nature restoration (3), Chiba

Morimoto, Y.: Instructor of planting ceremony (Kamigamo Shrine) 2006.4.29

- Morimoto, Y.: Instructor of special open seminar of Kyoto University of Art and Design "Environmental design of eco-compatible city" 2006.10.8
- Morimoto, Y.: Instructor of Nature Conservation Society of Osaka "Forest management of Banpaku Park" 2006.10.7
- Imanishi, J.: Instructor of Kyoto University Open Seminar "Assessment of natural environment: how to assess the impacts on ecosystem", 2006.10.28

B-3. Overseas teaching

Students and research fellows from abroad

Doctor course (1) (U.S.A.)

C. Other remarks

Morimoto, Y.: Central Environmental Council (Temporary Members of the Natural Environment Group and the 21st Century of Environmentally Conscious National Strategy Special Group), Assessment Member of Independent Administrative Agencies of Ministry of Environment, Expert Comittee for Environmental Research and Technology Promotion of Ministry of Environment, Chair of Natural Environmental General Review of Kinki Region of MLIT, Commitee Member of Environment of Osaka Prefecture, Kyoto City Scenice Beauty Committee, Kyoto City Scenic Beauty Consultant, Kyoto City Environment Board Member, Committee Member of City Planning of Osaka Prefecture, Committee Member of the Council of Park and Greenery of Kobe City, Chairman of the Council of Urban Greenery Initiative of Kyoto City, Director of the Society of Urban Greenery Initiative of Kyoto City, Councilor of Japan Highway Landscape Association, Director of Kyoto Model Forest Association, Chair of Committee of Utilization and Conservation of Yodo Main River, President of Council of 100-year Forest at Mt. Tanakami, Research Advisor of Organization for Landscape and Urban Greenery Technology Development, Committee Member of Future Landscape Creation of Kyoto (Kyoto City), Committee Member of Satochi Satoyama Model Projects (Ministry of Environment), Committee Member of Natural Environment of Yokoo River Dam (Osaka Prefecture), Committee Member of Wetland Restoration of Hayasaki Inner Lake (Ohtsu City)

2.2.7 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 : (4) Master's program : (8) Undergraduate : (3)

A. Research Activities (2006.4-2007.3)

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) Bedload measurement with hydrophone and pits

New bedload measurement method is developed. One is hydrophone; a steel pipe is installed on a torrent bed and number of pulses caused when sand and gravel hit the pipe is counted through a microphone. Another one is a pit sediment sampler; a pit is prepare on a torrent bed. Sediment trapped in it is weighted continuously Sediment related disasters

f) Debris flow disasters were surveyed in Okaya city. Damages of houses and situation of flash flood were mainly focused.

g) 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., Y. Satofuka and K. Nakatani; Kanako Ver.1.00, Sabo Laboratory of Kyoto University and Sabo Technical Center (STC), 2006
- Kosugi, K. (coauthoring), Forest Hydrology –Exploring the Fate of Water in Forest Ecosystem, Morikita, 2007

Original papers

- Oda, A., T. Mizuyama, Y. Hasegawa, T. Mori and K. Kawata; Experimental study of process and outflow rate when landslide dams outburst, Jour. of JSECE 59-1, 29-34, 2006
- Kinoshita, A., M. Fujita, T.Mizuyama and T.Sawada; The decrease in the dissolved oxygen concentration caused by sediment flushing from sabo dams and its prediction, Jour.of JSECE 59-2, 13-20, 2006
- Liang, W.,K.Kosugi, Y.Hayashi, T.Mizuyama; Methods for determining soil hydraulic parameters related to vertical rainwater infiltration, Jour.of JSECE 59-3, 3-12, 2006
- Mizuyama,T., Y.Satofuka, K.Ogawa, T.Mori; Estimating the outflow discharge rate from landslide dam outbursts, Disaster Mitigation of debris flows, slopefailures and landslides, vol.1, Proceedings of INTERPRAEVENT, 365-378, 2006
- Satofuka, Y. and T. Mizuyama: Numerical Simulation on Debris Flow Control by a Grid Dam, Proc. of the 6th Japan - Taiwan Joint Seminar on Natural Hazard Mitigation, CD-ROM, 2006
- Usuki, N., Y.Tanaka, T.Mizuyama; Investigation of the distribution of long-traveling landslides, Disaster Mitigation of debris flows, slope failures and landslides, vol.1, Proceedings of INTERPRAEVENT, 101-112, 2006
- Yasuda, T., S.Tsuchiya, T.Mizuyama, K.Matsumura, H.Ochiai, M.Takahashi and Wendong Tang; Topographic effects of the seismic slope displacement and ground acceleration by earthquake using a dynamic response analysis, Jour. of JSECE, 59-4, p.3-11, 2006
- Kasai, S., T.Mizuyama and S.Inagaki; Debris flow comtrol with steel open-type Sabo dams constructed at base point, Jour. of JSECE, 59-4, p.48-53, 2006
- Hashinoki, T., T.Mizuyama, K.Sato and T.Mizuyama; Research on sediment yield and sediment discharge which considers timing of sediment yield, Jour. Of JSECE, 59-5, p.15-22, 2007
- Taniguchi,K., T.Matsubara, T.Kumakura, T.Kikui and T.Mizuyama; Case study about sediment control by a series of slit sabo dams, Jour. Of JSECE, 59-5, p.43-55, 2007
- Oda,A., T.Mizuyama,K.Miyamoto and Y.Hasegawa; The estimate method of erosion rate of cohesive materials, Jour. Of JSECE, 59-5, p.56-61, 2007
- Satofuka, Y. and T.Mizuyama; Typhoon 0410 causes sediment disaster in Tokushima prefecture, Jour. of Disaster Research 2-1, p.37-43, 2007
- Satofuka,Y., K.Yoshino, T.Mizuyama, K.Ogawa,T. Uchikawa and T. Mori; Prediction of floods caused by landslide dam collapse, Annual Journal of Hydraulic Engineering, JSCE, Vol.51, p.901-906, 2007
- Tsutsumi,D., M. Fujita, M. Ito, H. Teshima, T. Sawada, K. Kosugi and T. Mizuyama; Fundamental study on sediment yield due to freeze and thaw process—Field observation on bare slope in Tanakami Mountains and its numerical simulation—, Jour. of JSECE 59-6, p.3-13, 2007

- Satofuka,Y., K. Yoshino, K. Ogawa, T. Mori, T. Mizuyama and J. Takahama ; Reproduction of the flood that occurred by outburst of Takaiso - yama landslide dam, Jour.of JSECE 59-6, p.32-37, 2007
- Satofuka, Y., K. Yoshino, K. Ogawa and T. Mizuyama ; Prediction of flood peak discharge at landslide dam outburst, Jour.of JSECE 59-6, p.55-59, 2007
- Seyed Hamidreza Sadeghi1, T.Mizuyama, and Babak Ghaderi Vangah; Conformity of MUSLE Estimates and Erosion Plot Data for Storm-Wise Sediment Yield Estimation, Terr. Atmos. Ocean. Sci., Vol. 18, No. 1, 117-128, March 2007
- Mizuyama, T.; Countermeasures to cope with landslide dams Prediction of outburst discharge -, The 6 th Japan-Taiwan Joint Seminar on Natural Hazard Mitigation, 2006, CD, 2006
- Seyed Hamidreza Sadeghi, T.Mizuyama; Discussion to Application of the USLE and sediment delivery models in a mountainous catchment by Ambika Dhakal, S. Tsuchiya and O. Osaka, Jour. of JSECE, 59-4, p.58-59, 2006
- Hayashi, Y., K. Kosugi, and T. Mizuyama, Changes in pore size distribution and hydraulic properties of forest soil resulting from structural development, J. Hydrol., 331, p.85-102, 2006

Reviews

- Mizuyama, T.; Past, present and future of the Japan Society of Erosion Control Engineering, Jour. of JSECE 59-2, 1-2 and 2006
- Mizuyama, T.; Sediment related hazards and information, Sabo and Chisui, 39-3, 172 and p. 7-8, 2006
- Mizuyama, T.; The present condition of the land use regulation for sediment disaster mitigation, Journal of Natural Disaster Science 78 (25-2), 139-142 and 2006
- Mizuyama, T. and Y. Satofuka; Processes of landslide dam outburst and prediction of the peak outflow discharge, 2006 Annual report of Sabo Technical Center, 1-25, 2006
- Mizuyama, T.; Simulation and its application to Sabo, JACIC Information 84 (21-4), 2007
- Mizuyama, T.; Prevention and mitigation of sediment related hazards, Journal of Natural Disaster Science, 25-4, 421-422 and 2007

b) Conference and seminar papers presented

The 117th annual meeting of Japanese Forestry Society (7 presentations)

2006 annual meeting of Japan Society of Erosion Control Engineering (22 presentations)

2006 annual conference of American Society of Soil Science (4 presentation)

A-3. Off-campus activities

Membership in academic societies (roles)

- Mizuyama, T.: Japan Society of Erosion Control Engineering (director, 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 Hydrology & Water Resources (member)

Research grants

Monbusho research grant:

- 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)
- General scientific research (A) (1); Development of a combined rock-soil-plan-atmosphere model, and flood and draught predictions at ungauged mountainous watersheds (Head: Tani, Member: Kosugi et al.)

A-4. International cooperations and overseas activities

International Meetings

Kosugi, K: Annual conference of American Society of Soil Science (Presentation)

Membership in international academic societies

Mizuyama, T.: IAHR, IAHS, IUFRO-J, International INTERPRAREVENT, Bedload Research International Cooperative (BRIC)

Satofuka, Y.: IAHR

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

International joint researches, overseas research surveys

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 (2006.4-2007.3)

B-1. On-campus teaching

a) Courses given

- Undergraduate level: Theory of Erosion Control 1,2 (Mizuyama), Practice in Erosion Control (Mizuyama, Satofuka), Planning of Erosion Control (Mizuyama, Satofuka), Reading of Foreign Literature II (Mizuyama, Satohuka), Special Seminar on Erosion Control 1,2 (Mizuyama, Satofuka), Basic Science for Forest and Biomaterials III (Mizuyama), Forest and Biomaterial Science III (Satofuka), Laboratory Course in Forest and Biomaterials Science III (Mizuyama, Satofuka, Kosugi)
- 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), Fac. Agriculture, Kobe University (Environmental Engineering), Japan International Cooperation Agency (Infrastructure)
- Satofuka, Y.; Fac. Engineering, Ritsumeikan Univ. (Hydraulic experiment)

B-3. Overseas teaching

Students and research fellows from abroad

Students from abroad: 1 (Taiwan) Researchers from abroad: 2 (Israel, Iran) JICA trainee: 1 (Indonesia)

Chair of Biomaterials Technology

2.2.8 Laboratory of Biomaterials Design

Staff Professor : Nakano, Takato, D. Agric. Sci. Lecturer : Nakamura, Masashi, D. Agric. Sci. Assistant Professor : Murata, Koji, D. Agric. Sci.

Students and research fellows

Doctor's program : (2) Master's program : (6) Undergraduate : (6)

A. Research Activities (2006.4-2007.3)

A-1. Main subjects

a) Characterization of physical properties of wood: Pysical properties of wood such as relaxational behavior, fatigue properties, and water adsorption are affected by ultrastructure and various factors, for example moisture content, temperature and so on Effects of theie factors on physical properties are thermodynamically researched by relating to ultra-structure of wood. Prediction of fatigue life of wood is analytically examined on the basis of various factors associated in fatigue life. Additionally, relationship between adsorption water and the above properties is also researched.

b) Swelling mechanism of cell wall and physical properties: Swelling behaviour of cell wall with water adsorption is tighitly related to physical properteris of wood and gives many information. Relationship between adsorption water and swelling behaviour is examined using a model of cell wall. Swelling behaviour of wood and wood cell walls is also visualized and analyzed by using digital image correlation method.

c) 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. Real stresses-strains curve is measured using image correlation technique.

d) 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 are tried to use for detecting defects (knot and others), and deflection distribution curves and optical properties are also used for evaluating strength.

e) Properties of wood as sensory stimuli to human: Wood is one of the most friendly and comfortable material for human. Dominant factors of such effects are investigated scientifically and its application to interior designing are studied. For example; i) Investigation on characteristics of wood as visual stimuli, 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 impressions, especially 'natural' and 'comfortable' images and physical characteristics of visual images. iv) Evaluation of visual inducement of wood by using eye-tracking method.

A-2. Publications and presentation

a) Publications

Books

Nakano T.: Hand book of wood science, 307-317, Asakura shoten, 2006

Nakamura M.: Encyclopedia of forest and wood utilization, 344-349, Sancho shuppan, 2007

Original papers

- Ishikura, Y and Nakano, T.: Contraction of the microfibrils of wood treated with aqueous NaOH, J. Wood Sci.; on line fast, 2007
- Nakano, T., Yamamoto, S., Norimoto, M., Nakai, T., Ishikura, Y.: Effects of Ultrastructure on Water Adsorption of Bamboo, Mokuzai Gakkaishi, 52; 352-357, 2006 (in Japanese with English summary)
- Nakano, T.: Analysis of the temperature dependence of water sorption for wood on the basis of dual mode theory, J. Wood Sci., 52; 490-495, 2006
- Nakamura, M., Kondo, T.: Visual Attraction of Wood-grain Figures (III): Individual Variations in Distribution of Eye-pausing Points and Classification of them, Japanese Journal of Physiological Anthropology, 11 (Special issue 1); 160-161, 2006 (in Japanese)
- Itoh, J., Nakamura, M., Masuda, M.: The Influence of Colors on the Psychological Image of the Wooden Interior: Application of the Image Analysis in Consideration of the Accent Color, J. of the Society of Materials Science Japa, 55 (4); 373-377, 2006 (in Japanese with English summary)
- Nakamura, M., Kondo, T.: Characterization of Distribution Pattern of Eye Fixation Pauses in Observation of Knotty Wood Panel Images, Journal of Physiological Anthropology, 26; 129-133, 2007
- Murata, K., Masuda, M.,: Microscopic observation of transverse swelling of latewood tracheid effect of macroscopic/mesoscopic structure, Journal of Wood Science, 52; 283-375, 2006
- Miyauchi, K., Masuda, M., Murata, K: Analysis of Strain Distribution of Wooden Dovetail Joints Using Digital Image Correlation Method, J. of the Society of Materials Science Japan, 55 (4); 367-372, 2006 (in Japanese with English summary)
- Ikeda, M., Masuda, M., Murata, K., Ukyo, S.: Analysis of In-plane Shear Behavior of Wood Based Panels by Digital Image Correlation, J. of the Society of Materials Science Japan, 55 (6); 569-575, 2006 (in Japanese with English summary)

- b) Conference and seminar papers presented
- The 55th Annual Meeting of Japan Society of Physiological Anthropology, Tokyo, Jun. 17-18, 2006: 1 presentation (Nakamura)
- The 56th Annual Meeting of Japan Wood Research Society, Akita, Aug. 8-10, 2006: 13 presentations (Nakano, Nakamura, Murata)
- The 8th International Congress of Physiological Anthropology (ICPA2006), Kamakura, Oct. 9-14, 2006: 1 presentation (Nakamura)
- The 18th Annual Conference of Japan Society for Interior Studies, Osaka, Oct. 29, 2006: 1 presentation (Nakamura)
- The 55th Annual Conference of the Society of Material Science Japan, Nagaoka, May 26-28, 2006: 3 presentaions (Murata)

A-3. Off-campus activities

Membership in academic societies

- Nakano, T.: The Japan Wood Research Society (Member of the scrrening committee for the awards)
- 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 working committee for annual meetings); 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 Society of Matreials Science, Japan (committee member of the Division of Wood Based Materials, Editorial board member of the journal, Member of the planning committe); Wood Technological Association of Japan (Member of the committee for fast growing trees of Kansai Branch)

Research grants

Nakano, T.: JSPS Grant-in-Aid for Scientific Research (C), Water in wood substance and Swelling properties of Cell wall (Head)

A-4. International cooperation and overseas activities

International meetings

Nakamura, M.: The 8th International Congress of Physiological Anthropology (ICPA2006), Kamakura, Oct. 9-14, 2006 (Member of the executive committee)

B. Educational Activities (2006.4-2007.3)

B-1. On-campus teaching

a) Courses given

Under graduate level: Basic Science for Forest and Biomaterials III (Nakano), Forest and Biomaterials Science III (Nakano), Properties of Biomaterials (Nakamura), Wood and Timber Construction (Nakamura), Practice in Biomaterials Design (Nakano, 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: Biomaterials Design I (Nakano), Seminar in Biomaterials Design (Nakano, Nakamura, Murata), Laboratory Course in Biomaterials Design (Nakano, Nakamura, Murata)

B-2. Off-campus teaching, etc.

Part-time lecturer

Nakamura, M.: Kyoto City University of Arts (Materials Science 5)

Open seminar, etc.

- Nakamura, M.: "Wood and living environment" in wood science seminar of wood technological association Japan Kansai branch, Osaka, 10 Nov. 2006 (lecture); "Life and Wood" in Sumai-juku seminar (produced by Sekisui House Corp.), Nara, 27 May, 2006 (lecture); "Mystery of Wood Grain Figures" in JSPA symposium, Tokyo, 4 March, 2007 (lecture)
- Murata, K.: "Wood based material from fast growing trees" in symposium for young scientists '-the propersal for material research from new generation-' of JSMS kansai branch, Ohtsu, 1-2 Dec., 2006 (lecture)

C. Other remarks

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; Member of Committee for Environment, Security and Hygiene in Faculty of Agriculture

2.2.9. 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)

A. Research Activities (2006.4-2007.3)

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. Influence of machine surface finishing on the performance of painted surface is also studied.

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, thermographic detection of starved joints of wood and the grain direction and recognition of blue stained wood with image anlysis and pattern recognition technique. Movement of free water in wood tissues under drying is also evaluated by a micro-focus X-ray CT system. 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_4 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

Original Papers

- Fujii, Y., Y. Yanase, S. Okumura, T. Yoshimura and Y. Imamura: Non-destructive evaluation of biodegradation of wood and wooden structures using electromagnetic wave, The Japan-Hungary Joint Serminar of Cooperative Research Programs; pp.6, 2006
- Yanase, Y., Y. Fujii, S. Okumura, T. Yoshimura and Y. Imamura: Non-destructive evaluation of termite attack in wood and wooden constructions using acoustic emission (AE) monitoring and ceramic gas sensors, The Japan-Hungary Joint Serminar of Cooperative

Research Programs; pp.6, 2006

- Indrayani, Y., T. Yoshimura, Y. Yanase, Y. Fujii, H. Matsuoka and Y. Imamura: Observation of feeding behavior of three termite (Isoptera) species: *Incisitermes minor, Coptotermes formosanus* and *Reticulitermes speratus*, Sociobiology, 49(3), 121-134, 2007
- Indrayani, Y., T. Yoshimura, Y. Yanase, Y. Fujii and Y. Imamura: Evaluation of the temperature and relative humidity preferences of the western dry-wood termite *Incisitermes minor* (Hagen) using acoustic emission (AE) monitoring, J. Wood Sci., 53; 76-79, 2007
- Indrayani, Y., K., T. Yoshimura, Y. Yanase and Y. Imamura: A new method for testing wood preferences of dry-wood termite, Proceedings of the XV Congress of IUSSI; 202, 2006
- Yokoyama, M., K. Yano, Y. Fujiwara, Y. Fujii, S. Kawai: Cutting resistance of the accelerated aging treated Hinoki wood, J. Society of Mat. Sci., 55(8);772-776, 2006

Reviews

Fujiwara,Y: Research direction for evaluating surface roughness as related to tactile roughness in recent ten years, Wood Industry, 62(2) ; 56-60, 2007

Reports

Yoshimura, T., Y. Fujii, Y. Indrayani, Y. Yanase, Y. Fujiwara, A. Asdachi, S. Kawaguchi and M. Miura (Kyoto University *Incisitermes minor* infestation survey team): Survey of the infestation of *Incisitermes minor* (Hagen) and the control strategies - A case study in Wakayama Prefecture -. Shiroari (Termite Journal), No.147; 5-10, 2007

b) Conference and seminar papers presented

- The 22nd Annual Meeting of Japan Wood Preserving Association Sympodium (Tokyo, 2004.5.24): 1 (Yanase)
- The 22nd Annual Meeting of Japan Wood Preserving Association (Tokyo, 2004.5.24): 1 (Fujii)
- The 56th Annual Meeting of Japan Wood Research Society (Akita, 2006.8.8-8.10: 6 (Okumura, Fujii, Sawada, Yanase, Fujiwara
- The 262th Regular meeting of the Division of Wood and Wood-Based Material in Japan Society of Materials Science (Osaka, 2006. 9. 15): 1 (Fujiwara)

A-3. Off-campus activities

Membership in academic societies (roles)

- Okumura, S.: The Japan Wood Research Society (director, chief manager for Information Processing), Wood Technological Association of Japan (councilor, director of Kansai Branch)
- Fujii, Y.: The Japan Wood Research Society (editorial committee), Wood Technological Association of Japan (Kansai branch, organizing committee), The Society of Materials Science, Japan (director, councilor, editorial committee), Japan Wood Preserving Association (committee chair of wood degradation inspector)
- Sawada, Y.: Wood Technological Association of Japan (Kansai branch, secretary of organizing committee)

Reserach grants

Grant-in-Aid for Scientific Research (KAKENHI)

Fujii Y: Grant-in-Aid for Scientific Research (A),Nondestrutive testing of wood and wood based materials using millimeter wave imaging (Representative)

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 (2006.4-2007.3)

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), Reading of Foreign Literature II (Okumura)
- 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)

B-3. Overseas teaching

Students and research fellows from abroad

Studuent (Doctor course) 1 (Ghana)

C. Other Remarks

Okumura, S.: Councilor, Education and Research Council, Kyoto University; Vice-Dean, Graduate School of Agriculture, Kyoto University; Vice-Chairman, Health Committee at Yoshida Workplace, Kyoto University; Technical Development Adviser, Hyogo Prefecture

2.2.10 Laboratory of Fibrous Biomaterials

Staff Associate Professor: Yamauchi, Tatsuo, Dr. Agric. Sci. Assistant Professor : Tatsumi, Daisuke, Dr. Agric. Sci. (~2006.12.31)

Students and research fellows

Master's program : (3) Undergraduate : (1) Research fellow : (1) Research student : (1)

A. Research Activities (2006.4-2007.3)

A-1. Main subjects

a) 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.

b) 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.

c) Deformation and Fracture of Paper

Comparing with commercial papers from wood pulp, Japanese traditional papers, washi from kozo fibers show the following features; Sheet density and elastic modulus of washi are low, showing poor fiber-fiber bonding. However in-plane mechanical properties of washi are superior to those of wood pulp papers, especially tear strength and folding endurance are enormously excellent. On the other hand out- of- plane mechanical property such as peeling strength at paper failure is poor for washi

d) Paper friction at different atmospheres

Friction between equal surfaces of paper under dry, moderate and humid atmospheres was examined, comparing with those of cellulose film and aluminum foil. The surface wetting with a slight amount of water on aluminum caused a remarkable increase in the friction coefficient. It was also found that further wetting caused a rapid decrease in the coefficient. This phenomenon could be explained by capillary force and the lubrication by the water, and further could be occurred at paper surface. However, further wetting of paper surface caused a decrease in surface strength, leading to easy peel of fibers and the friction coefficient decreased

e) 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 Fundamental mechanical and optical properties of papers were considered to study the mechanism of strength development by addition of polyacrylamide dry strength resin (PAM) in relation to the application method. The internal application was performed by adding a thin aqueous PAM solution to fiber suspension, while the external application was performed by dipping a paper sheet into an aqueous PAM solution and further squeezing it out with a spongy rubber roller. ATR/FT-IR analysis combined with gradual etching method was used to clarify a difference in depth profile of PAM within a fiber wall between both application methods. Being distributed from fiber surface toward the center of fiber wall, PAM existed, on the whole, close to fiber surface at the internal application. On the other hand in case of external application, PAM existed mainly on fiber surface. An increase in optical reflectance after the tensile straining showed that the strength increase with PAM addition especially by internal application was mainly attributed to an increase in bond strength per unit bond area.

f) Characterization of recycled paper

Fundamental properties of paper from recycled kraft pulp were considered to study the mechanism of strength reduction by recycling. Handsheets made from recycled softwood and hardwood pulps subjected to only drying and rewetting cycle many times up to 30 and those from pulp recycled through drying-and-rewetting and disintegration processes same times were compared. Decrease of the properties including density, RBA(Relative Bonded Area), Young's modulus and tensile index at over ten times recycling with disintegration was quite small, while the properties continued to decrease even after ten times recycling for the sheets from pulp recycled without disintegration. The decrease in the fundamental properties of the sheets from softwood pulp, which showed a much bigger decrease in WRV ((Water Retention Value), was smaller than that from hardwood pulp which decrease in WRV was not bigger than that of softwood pulp. Furthermore, the decrease in the properties of the sheets from pulp recycled without disintegration, which showed a bigger decrease in WRV, was fairly smaller than that from pulp recycled with disintegration. These results suggest that the decrease of internal fibrillation, so called hornification, was not solo mechanism of the strength reduction caused by recycling. Observation of the wet sheets using scanning electron microscope suggested a loss of external fibrils was another candidate of main mechanism of the strength reduction caused by recycling.

A-2. Publications and presentations

a) Publications

Books

Yamauchi, T..; Know-How Series for Paper Analysis" (in part) Gijytsu-Jyoho-Kyokai 2006 (in Japanese)

Yamauchi, T.; "Pulp and Paper Science" Kyoto Univ Press., Kyoto: 2006 (in Japanese)

Original papers

Yamauchi,T.; Observation of polymer film drawing by use of thermography An introductory investigation on the thermodynamics" J. Appl. Polym. Sci 100, 2895-2900, 2006

Nakano, M., T. Shoji, S. Ohya, S. Yao, D. Tatsumi, T. Matsumoto: Investigation on the polymer

electrolyte Nafion by dynamic light scattering and rheological analysis, Nihon Reoroji Gakkaishi 34(2); 65-69, 2006.(in Japanese)

- Tatsumi, D., N. Zaima, T. Matsumoto, H. Sugiyama, H. Takahashi: Hydrotropic pulping and biobleaching of kenaf, Zairyo 55(4), 363-366, 2006.(in Japanese)
- Ishii, D., D. Tatsumi, T. Matsumoto, K. Murata, H. Hayashi, H. Yoshitani: Investigation of the structure of cellulose in LiCl/DMAc solution and its gelation behavior by small-angle X-ray scattering measurements, Macromol. Biosci., 6(4); 293-300, 2006
- Aono, H., D. Tatsumi, T. Matsumoto: Characterization of aggregate structure in mercerized cellulose/LiCl·DMAc solution using light scattering and rheological measurements, Biomacromolecules 7(4); 1311-1317, 2006
- Aono, H., D. Tatsumi, T. Matsumotoi: Scaling analysis of cotton cellulose/LiCl·DMAc solution using light scattering and rheological measurements, J. Polym. Sci. Part B 44, 2155-2160, 2006
- Ishii, D., Y. Kanazawa, D. Tatsumi, T. Matsumoto: Effect of solvent exchange on the pore structure and dissolution behavior of cellulose, J. Appl. Polym. Sci. 103, 3976-3984, 2007

Reviews

Yamauchi, T: Paper physics studies at Kyoto University, J. Pack Sci and Technol 16(3) 191-198, 2007 (in Japanese)

b) Conference and seminar papers presented

The 56th Annual Meeting of the Japan Wood Research Society, 2 paper

The 54th the Rheology Symposium, 2 papers

The 13th Annual Meeting of the Cellulose Society of Japan, 2 papers

The 55th Annual Meeting of the Society of Materials Science, 1 paper

The 55th Symposium Macromolecules, 1 paper

The 73rd Symposium on Paper and Pulp Research, 1 papers

A-3. Off-campus activities

Membership in academic societies

- Yamauchi, T.: The 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 Cellulose Society of Japan (branch councilor), The Society of Materials Science, Japan (editorial board, divisional committee member)

Research grants

Tatsumi, D.: Scientific Basic Research (B), Application of cellulose and its derivatives to electrolyte membrane for fuel cells (head)

B. Educational Activities (2006.4-2007.3)

B-1. On-campus teaching

a) Courses given

Undergraduate level: 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 (Yamauchi, Tatsumi), Seminar in Forest and Biomaterials Science (Yamauchi, Tatsumi) Graduate level: Fibrous Biomaterials II (Yamauchi), Seminars in Fibrous Biomaterials (Yamauchi, Tatsumi), Laboratory Course in Fibrous Biomaterials (Yamauchi, Tatsumi)

B-2. Off Campus teaching, etc.

Open seminar,etc Tatsumi, D.: Open lecture, Forest and Biomaterials Science, Kyoto University (lecturer)

C. Other Remarks

Yamauchi, T: Representative of "Paper Science Forum"

Chair of Biomaterials Function

2.2.11 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

> Doctor's program : (2) Master's program : (7) Undergraduate : (4)

A. Research Activities (2006.4-2007.3)

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, FTIR 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. In relation to the physiological function and also utilization, distribution and structure of silica were investigated on bamboo, grass and also rice husk.

A-2. Publications and presentations

a) Publications

Original papers

- Yoshioka M, Takabe K, Sugiyama J, Nishio Y: Newly developed nanocomposites from cellulose acetate/layered silicate/poly (epsilon-caprolactone): synthesis and morphological characterization J. Wood Sci., 52, 121-127 (2006)
- Honjo K, Ogata Y, Fujita M: Introduction and verification of a novel method for measuring wood fiber length using a single cross section in Acacia mangium Trees-Structure and Function, 20 (3), 356-362 (2006)
- Takabe, K, Yoshimura, T: Biological evaluation of woods harvested at waning moon phase in winter. Mokuzai Kogyo, 61(12), 577-583 (2006)

b) Conference and seminar papers presented

The 56th 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

The Japan Society for the Promotion of Science Research Grants: Grant in Aid for Fundamental Research (A): Ecological wood anatomy of tropical trees (Fujita), Grant in Aid for Fundamental Research (B): Silica deposition on rice husk and better utilization of rice husk ash using thermal treatment (Fujita), Grant in Aid for Fundamental Research (A): Production of artificial cell wall by simulating lignified cell wall formation (Takabe), Grant in Aid for Fundamental Research (B): Biosynthesis and transportation system of monolignols (Takabe), Grant in Aid for Fundamental Research (C): Preparation of monoclonal antibody against lignin (Yoshinaga), Grant in Aid for Young Scientists (B): Comprehensive histochemistry of enzymes in hemicellulose biosynthesis using DNA

A-4. International cooperation and overseas activities

International meetings (roles)

Takabe: International Microscopy Congress, Sapporo, Japan (Invited speaker)

International joint researches, overseas research survey

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

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

Scholars from abroad

Foreign visiting scientist (3) (France, French National Institute for agricultural research (INRA))

B. Educational Activities (2006.4-2007.3)

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

Takabe, K: Faculty of Agriculture, Tokyo University of Agriculture and Technology (Structure of Wood)

Takabe, K: Faculty of Agriculture, Shizuoka University (Structure of Wood)

2.2.12 Laboratory of Chemistry of Composite Materials

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

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

Students and research fellows

Doctor's program : (2) Master's program : (7) Undergraduate : (4)

A. Research Activities (2006.4-2007.3)

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

Original papers

- Fareha Zafar Khan, Toshikazu Sakaguchi, Masashi Shiotsuki, Yoshiyuki Nishio, and Toshio Masuda: Synthesis, Characterization, and Gas Permeation Properties of Silylated Derivatives of Ethyl Cellulose. *Macromolecules*, **39** (18), 6025-6030 (2006)
- Ryotaro Chiba, Yoshiyuki Nishio, Yuka Sato, Manabu Ohtaki, and Yoshiharu Miyashita: Preparation of Cholesteric (Hydroxypropyl) cellulose/Polymer Networks and Ion-Mediated Control of Their Optical Properties. *Biomacromolecules*, **7** (11), 3076-3082 (2006)

- Fareha Zafar Khan, Toshikazu Sakaguchi, Masashi Shiotsuki, Yoshiyuki Nishio, and Toshio Masuda: Perfluoroacylated Ethyl Cellulose: Synthesis, Characterization, and Gas Permeation Properties. *Macromolecules*, **39** (26), 9208-9214 (2006)
- Takahiro Ohno and Yoshiyuki Nishio: Estimation of Miscibility and Interaction for Cellulose Acetate and Butyrate Blends with N-Vinylpyrrolidone Copolymers. Macromol. Chem. Phys., 208, 622-634 (2007)
- Mariko Yoshioka, Keiji Takabe, Junji Sugiyama, Yoshiyuki Nishio: Newly developed nanocomposites from cellulose acetate/layered silicate/poly (ε- caprolactone): synthesis and morphological characterization, *Journal of Wood Science*, **52** (2), 121-127 (2006)

Books

- Yoshiyuki Nishio and Yoshitaka Aranishi: "Melt-spun Fibers of Thermoplasticized Cellulose", In "Fibers: Super Biomimetics ~New Technologies in the Near Future~" (Tatsuya Hongu, Ed.), Part 2, Chap. 1, Sec. 3, NTS Pub., Tokyo, pp.248-253 (2006)
- Yoshiyuki Nishio: "Modern Utilities of Polysaccharides as Functional Eco-materials", In "New Development of Bio-based Materials" (Yoshiharu Kimura and Hitomi Ohara, Eds.), Part 2, Chap. 2, CMC Pub., Tokyo, 132-141 (2007)

Reviews

- Yoshitaka Aranishi and Yoshiyuki Nishio: Thermoplasticization of Cellulose and Application to Melt-Spinning, *Cellulose Commun.*, **13**(2), 70-74 (2006)
- Yoshiyuki Nishio: Material Functionalization of Cellulose and Related Polysaccharides via Diverse Microcompositions, Adv. Polym. Sci., 205, 97-151 (2006)
- Yoshiyuki Nishio: Functional Development of Cellulosic Ester Derivatives, *Sen'i Gakkaishi*, **62**(8), P-232-236 (2006)
- Yoshiyuki Nishio and Mariko Yoshioka: Series: Introduction of Research Laboratories (57), Japan TAPPI Journal, **61**(2), 188-189 (2007)
- Yoshiyuki Nishio, Takahiro Ohno, and Ryosuke Kusumi: Optical Methods for Characterizing Cellulosic Materials, *Cellulose Commun.*, **14**(1), 30-36 (2007)
- Mariko Yoshioka: Biomass/Plastics Composite Materials, Journal of the Society of Materials Science, Japan, 55 (6), 537-544 (2006)
- Mariko Yoshioka: The reviews of the 9th meeting on wood-plastics composites (1. The efforts toward the development of wood-plastic composites, 2. The additives "OptiPak" for wood-plastic composites, 3. The development of high-efficiency crushing technology by using the multi-vibration mill, *Wood Industry*, **61** (7), 293-295, 2006

b) Conference and seminar papers presented

The 14th POLYCHAR World Forum on Advanced Materials (Nara), 2 papers The 55th Annual Meeting of the Society of Polymer Science, Japan (Nagoya), 5 papers 2006 Oil Chemical Seminar, the Oil Chemical Society, Japan (Nagoya), 1 paper (invited) 2006 Annual Meeting of the Society of Fiber Science and Technology, Japan (Tokyo), 2 papers The 13th Annual Meeting of the Cellulose Society of Japan (Tokyo), 4 papers The 56th Annual Meeting of the Japan Wood Research Society (Akita), 4 paper No Border Agriculture Symposium, Kyoto University (Kyoto), 1 paper

- The 39th Symposium on Plastic Polymer Films, the Society of Polymer Science, Japan (Tokyo), 1 paper (invited)
- The 30th Seminar of Advanced Fiber Materials Research Committee (AFMc), the Society of Fiber Science and Technology, Japan, 1 paper (invited)
- The 1st section meeting for green resource and energy (Fukui), 1 paper (invited)
- The 1st workshop of recycling technology and products for expediting Law on Promoting Green Purchasing, The Ecomaterials Forum, The Society of Non-Traditional Technology (Tokyo), 1 paper (invited)
- The 211th ordinary meeting of the composite materials committee, The Society of Materials Science, Japan (Osaka), 1 paper (invited)
- The 2nd periodic meeting of the wood-plastic composite materials committee, Wood Technological Association of Japan (Uji), 1 paper (invited)

A-3. Off-campus activities

Membership in academic societies (roles)

- Nishio, Y.: 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), Wood Technological Association of Japan; Wood-Plastic Composite Materials Committee (Academic Advisory Panel)
- Yoshioka, M.: The Japan Wood Research Society (Member of Editorial Board, Member of Publicity and Information Committee, Member of Committee for Considering the Future of The Japan Wood Research Society, Member of Working Group for Formulation of Educational Contents), The Society of Materials Science, Japan (Organizer of Polymer Materials Section Committee), Wood Technological Association of Japan (Academic Advisory Panel of the Wood-Plastic Composite Materials Committee, Organizer of the Plywood Committee), The Society of Polymer Science, Japan (Member of Steering Committee for Research Group of Ecological Materials)

Research grants

Monbu-Kagakusho/JSPS Research Grants:

- Nishio, Y.: Grant-in-Aid for Scientific Research (B), Structural Relaxation Characteristics and Functions of Liquid-Crystalline Glasses of Polysaccharides and Lipids (Head investigator)
- Yoshioka, M.: Grant-in-Aid for Scientific Research (C), Nanostructure control and Function Expression of Sugar biomass derivatives / Clay composite materials (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 Bio-oriented Technology Research Advancement Institution / Agrifuture Joetsu Co. (1)
 Development of nanocomposites from plant-based polyurethane and plant-based phenolic resin; (2) Functional plasticization of biomass and its application

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 2007 International Symposium on Nano-fibers, Member of Organizing Committee; International Cellulose Conference 2007 (ICC 2007 Tokyo), Member of Organizing Committee; European-Japanese Workshop on Cellulose and Functional Polysaccharides 2007, Chairman of Organizing Committee

B. Educational Activities (2006.4-2007.3)

B-1. On-campus teaching

- a) Courses given
- Undergraduate level: Forest and Biomaterials Science II (Nishio), Polymer Synthetic Chemistry (Nishio), Physical Properties of Polymers (Nishio), Reading of Foreign Literature I (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),

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

2.2.13 Laboratory of Chemistry of Biomaterials

Staff Professor : Nakatsubo, Fumiaki, Dr. Agric. Sci. Associate Professor: Takano, Toshiyuki, Dr.Agric.Sci. Instructor : Kamitakahara, Hiroshi, Dr. Agric. Sci. Students and research fellows Doctor's Program : (3) Master's Program : (8)

Undergraduate : (3)

A. Research Activities (2006.4-2007.3) A-1. Main subjects

a) Chemical syntheses of natural polysaccharides and their function

We already succeeded in the first chemical synthesis of cellulose (β -1,4 glucan) by the ring-opening polymerization of the glucose orthoester derivative. Using this method, a basic research concerning the relationship between chemical structure and its property in commercial cellulose derivatives, synthesis of β -1,6 glucan, and preparation of a photo-induced electron transfer material trying to make a new artificial phtosynthesis system are now studying. And, synthesis of the cellulose derivative which has a hydrophobic group at the reducing-end unit, synthesis of a chitosan-like polysaccharide by microwave heating are also investigating.

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 γ -substituted monolignol derivatives are also studying to give new functional synthetic lignin and to give fundamental knowledge of the dehydrogenative polymerization of lignin.

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

We are studying preparation of condensed-tannin from taxifolin, which is one of the components in heart wood of Larix species, and evaluation of its anti-oxidant. And a new functional polymer with galloyl group as a pendant is also investigating.

d) Chemical modification of wood

We are studying a chemical modification method of wood using super-critical carbon dioxide.

A-2. Publications and presentations

a) Publications

Original papers

Hirosawa S., Kamitakahara H., Takano T., Nakatsubo F.: Neutral sugar analysis (alditol acetate procedure) of wood assisted by microwave irradiation. Cellulose Chemistry and Technology 40(5), 319-323, 2006

- Nogi M., Abe K., Handa K., Nakatsubo F., Ifuku S., Yano H.: Property of enhancement of optically transparent bionanofiber composites by acetylation. Applied Physics Letters 89(23) 233123/1-233123/3, 2006
- Furuno H., Takano T., Hirosawa S., Kamitakahara H., Nakatsubo F., Chemical structure elucidation of total lignins in woods. Part II: analysis of a fraction of residual wood left after MWL isolation and solubilized in lithium chloride / N.N-deimethylacetamide. Holtzforshung 60(6), 653-658, 2006
- Tobimatsu Y., Takano T., Kamitakahara H., Nakatsubo F.: Studies on the dehydrogenative polymerizations of monolignol β-glycosides. Part 2: horseradish peroxidase-catalyzed dehydrogenative polymerizations of isoconiferin. Holtzforshung 60(5), 513-518, 2006
- Takano T., Tobimatsu Y., Hosoya T., Hattori T., Ohnishi J., Takano M., Kamitakahara H., Nakatsubo F.: Studies on the dehydrogenative polymerizations of monolignol 8-glycosides. Part 1: synthesis of monolignol8-glycosides, (E)-isoconiferin, (E)-isosyringin and (E)-triandrin. J. Wood Chem, & Technol. 26(3), 215-229, 2006
- Enomoto Y., Kamitakahara H., Takano T., Nakatsubo F.: Synthesis of diblock copolymers with cellulose derivatives. 3. Cellulose derivatives carrying a single pyrene group at the reducing-end and fluorescent studies of their self-assembly system in aqueous NaOH solutions. Cellulose 13(4), 437-448, 2006
- Kamitakahara H., Nakatsubo F., Klemm D., Block co-oligomers of tri-O-methylated and unmodified cello-oligosaccharides as model compounds for methylcellulose and its dissolution / gelation behavior. Cellulose 13(4), 375-392, 2006
- Katahira R., Kamitakahara H., Takano T., Nakatsubo F., Synthesis of β-O-4 type oligomeric lignin model compounds by the nucleophlic addition of carbanion to the aldehyde group. J. Wood Sci. 52 (3), 255-260, 2006
- Katahira R., Kamitakahara H., Takano T., Nakatsubo F., Stability of α-ther structures in lignins under TIZ reaction conditions. Cellulose Chemistry and Technology 40(1-2), 19-34, 2006

Article

- Kamitakahara, H.: Cellulose thin film immobilized bark components, Newton 26(12), 2006 (in the advertisement of Sekisui Chemical Co.)
- b) Conference and seminar papers presented
- The 13th Annual Meeting of the Cellulose Society of Japan (Tokyo, 2006.7.13-7.14), 2 papers
- The 56th Annual Meeting of the Japan Wood Research Society (Akita, 2006.8.8-8.10) 1 paper
- The 9th European Workshop on Lignocellulosics and Pulp, Vienna, Austria (2006.8.27-8.30) 1 paper

The 4th Sekisui Chemical Co. Forum (Kyoto, 2006.10.12) 1paper

The 51th Lignin Symposium (Sapporo, 2006.10.26-10.27) 3 papers

The 233rd ACS National Meeting, Chicago, USA (2007.3.25-3.29) 3 papers

A-3. Off-campus activities

Membership in academic societies (roles)

Nakatsubo, F.: The Japan Wood Research Society (A member of Education-promotion committee); The Cellulose Society of Japan (President); 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).

Research grant

Monkasho Research Grant:

- Nakatsubo, F.: Basic Research (B) General "Molecular design of the photo-induced electron transfer super material from cellulose and its development for utilization" (Nakatsubo: head, Takano, Kamitakahara: coworker)
- Takano, T.: Basic Research (C) General "Preparations of new functional DHPs from γ -substituted monolignol derivatives." (Takano: head, Nakatsubo, Kamitakahara: coworker)
- Kamitakahara, H.: Young Scientists (A) "Preparation of nano-particles from cello-oligosaccharaides and their dynamic functionalities."

A-4. International cooperations and overseas activities

International meetings

Nakatsubo F.: Caribbean wood science meeting "Fundamental and applied breakthroughs in lignocellulosic science, St.John Caribbean, USA (2006.5.25-6.2) (invited)

Nakatsubo F.: 233rd ACS National Meeting, Chicago, USA (2007.3.25-3.29) (invited)

International joint research, overseas research surveys

Nakatsubo, F.: Survey for original species of persimmon in China (Kunming) (2006.9.8-9.15)

Scholars from abroad

Research fellow of JSPS (short term) (2006.5.31-2007.4.30) Dr. Christian Adelwöhrer (from Austria)

B. Educational Activities (2006.4-2007.3)

B-1. On-campus teaching

- a) Courses given
- Undergraduate level: Basic Forest and Biomaterials Sciences II (Nakatsubo), Cellulose Chemistry (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), Practice in University Forests I (Kamitakahara)
- Graduate level: Biomaterials Chemistry II (Takano), Scientific writing and presentation in English (Takano), Seminar in Biomaterials Chemistry (Nakatsubo, Takano, Kamitakahara), Laboratory Course in Biomaterials Chemistry (Nakatsubo, Takano, Kamitakahara)

B-2. Off-campus teaching, etc.

Open seminar

Kamitakahara H. Open seminar of Division of Forest & Biomaterials Science, Kyoto University (Committee)

2.2.14 Laboratory of Forest Information

StaffProfessor: 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 : (0) Master's program : (5) Undergraduate : (2) Research student : (3)

A. Research Activities (2006.4-2007.3) 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
- T.Nakashima: 4.6 Soil erosion and sediment transportation, appendix. Forest field science: All University Forests Assos., Asakura, p.91, p.113-120, p.159, 2006 (in Japanese)
- T.Nakashima: Brief Note2 Sediment and Circulation. Connected Rings of Forest-Human Habitation-Marine: Y. Yamashita editor, Kyoto University Press, p.135-149, 2007 (in Japanese)
- Y. Konohira, T. Ebihara, N. Shiraishi, J. Tomita and M. Shiba (et al. 183): Encyclopedia on forest and wood utilization., Sangyochosakai Corp., Dictionary publish center, p.509; Part 2 Wood use for environmental benefit, 1-(5) Application of forest certification and labeling schemes: 72-73, 2006 (in Japanese)

Original papers

- Takahashi, E. and Takeuchi, M.: Number of species and biomass of stand floor vegetation at 110 year-old sugi plantation. Transaction of the 57th Kansai Branch Meeting of the JFS, 51, 2006(in Japanese)
- Ozaki, E., Takeuchi, M. and Nakashima. T.: Dynamics of the mixed forest with coniferous and broad-leaved species at Yuusen catchments in Ashiu research forest. Transaction of the 57th Kansai Branch Meeting of the JFS, 56, 2006(in Japanese)
- Shiba, M. and Itaya, A.: Using eCognition for improved forest management and monitoring systems in precision forestry. Proc. of the international Precision Forestry Symposium: 351-359. 2006
- Itaya, A. and Shiba, M.: Using eCognition for estimation of operational site units in forestry scheme and application of method of analysis -. Journal of the Japan Forest Engineering Society 20(4):299-303. 2006 (in Japanese with English summary)
- Akemi Itaya, Masami Shiba, Naoyuki Nishimura, Nobuhiro Tomaru and Shin-Ichi Yamamoto: Extraction of past forest canopy composition for landscape restoration by object-oriented image analysis using aerial photographs. Proc. of the international conference on ecological restoration in East Asia 2006, Osaka, Japan:160, 2006
- Shiba, M. and Itaya, A.: Using an object-based imagery processing scheme to increase the accuracy of delineating Operational Site Units (OSUs) in timber harvest area from IKONOS image and DEM data integration. Proc. of the Council on Forest Engineering (COFE) 29th Annual Meeting: Working Globally- Sharing Forest Engineering Challenges and Technologies around the World, Coeur d'Alene, Idaho, U.S.A.:375-381, 2006
- Itaya, A. and Shiba, M.: Classification of canopy density using an object-based image analysis. Using eCognition for estimation of operational site units in forestry - scheme and application of method of analysis . Transaction of the 13th Annual Meeting of JFES, 27, 2006(in Japanese)
- Shiba, M.: Cross model of forest certification and practice codes as a supporting tool for forest products reclamation. Transaction of the 13th Annual Meeting of JFES, 28, 2006(in Japanese)
- Itaya, A. and Shiba, M.: Canopy density identification by object-based image analysis with a high resolution satellite image data. Transaction of the 55th Cyubu Branch Meeting of the JFS, 33, 2006(in Japanese)
- Shiba, M.: Criteria and indicators on monitoring management of forest operational sites.

Transactions of the 117th Annual Meeting of the JFS: H09, 2006 (in Japanese)

E.Morita, S.Fukuda, J.Nagano, N.Hamajima, H.Yamamoto, Y.Iwai, T.Nakashima, H.Ohira, T.Shirakawa: Psychological effects of forest environments on healthy adults -Shinrin-yoku (forest-air bathing and walking) as a possible method of stress reduction: an evaluation study. J.Public Health, p.121:54-63, 2007

Reports

- Shiba, M.: Adaptive forest management system for SFM-oriented timber harvest strategies in Japanese plantations. Final reports for the 2005-2006 research project, Grant-in Aid for Scientific Research: Scientific Research (C)(2); 1-81, 2006(in Japanese)
- Shiba, M.: Development of a forest management certification and a chain of custody scheme oriented towards Japanese plantation forestry. Final research report for research grant from scientific and cultural promotion foundation of Asahi Breweries Ltd;1-128, 2006 (in Japanese)
- Shiba M.: Nippon⁻retto morizukuri hyakka [36]; Ashiu research forest, Kyoto University, Morizukuri forum No.116:4-7, NPO Corp., 2006(in Japanese)
- b) Conference and seminar papers presented

Annual Meeting of Japan Forest Society: (2)

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

Annual Branch Meeting of Japan Forest Society: (5)

International society meeting/world conference: (2)

A-3. Off-campus activities

Membership in academic societies

- Takeuchi, M.: Kansai Branch of Japanese Forest Society (Vice-chief), Kansai Branch of Japan Forest Technology Association (Auditor), Kyoto University Branch of JFTA (Chief)
- Shiba, M.: FSC-Japan establishment secretariat (Organizer), Kansai Branch of Japanese Forest Society (Editorial board member)

Research grants

- Monbukagakusyo Research Grant: Grant-in-Aid for Scientific Research (A) (1); Study on the procurement of vegetable materials for repair of wooden constructions as cultural property. (Sakanoue, N., Co-researcher)
- JSPS Research Grant: Grant-in-Aid for Scientific Research (C) (2); Dynamics and environmental preservation role of natural old stands. (Nakashima, T., head), 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, M., head),

A-4. International cooperations and overseas activities

International meetings(roles)

Shiba, M.: International Precision Forestry Symposium, Stellenbosch University, South Africa (Chairperson/presenter), Akemi Itaya · Masami Shiba: International Conference on Ecological Restoration in East Asia, Osaka, Japan (Presenters), Council on Forest Engineering 29th Annual Meeting, Fortuna CA, USA (Presenter)

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, USA, International Member of Council on Forest Engineering COFE, USA, FSC International (Japanese member), ISTVS (Japanese member), FSC forest certifiers (Japanese adjudicator)

B. Educational Activities (2006.4-2007.3)

B-1. On-campus teaching

a) Courses given

- Undergraduate level: Basic Science for Forest and Biomaterials IV (Takeuchi, M.), Forest Management System & Applied Technology (Shiba, M.), Fundamental of Glaciology (Takeuchi, M., Nakashima, T.), Practice Course in Forest Science IV (Shiba, M.), Integrated Practice and its Method on Forest Science (Shiba, M., Nakashima, T. Sakanoue, N.), Practice in Research Forest III (Sakanoue, N.)
- Graduate level: Special lecture on Forest Information Science I (Takeuchi, M., Nakashima, T.), Special lecture on Forest Information Science (Takeuchi, M., Shiba, M., Nakashima, T., Nishimura,K., Sakanoue, N.), Laboratory course in forest information (Takeuchi, M., Shiba, M., Nakashima, T. Nishimura,K., Sakanoue, N.)

B-2. Off-campus teaching, etc.

Part-time lecturer

Sakanoue, N.: Shimizu branch of Arida-Cyuo High School (Woods science)

Shiba, M.: Faculty of Agriculture, Kyoto Prefecture University(Biosphere resource management),
 Faculty of Agriculture, Ehime University (Forest operational environment), Forestry
 Research Institute of Toyama Prefecture (Forest management and forest certification),
 Osaka Science Center (Forest certification and CoC), Japan Green Resources Agency,
 Kansai and Hokuriku Management Regions (Timber harvesting and transport systems)

Open seminar

- Takeuchi, M.: Kyoto Univ. For., Open Seminar, Structure and function of Forests (Lecturer), ANA [Aozora-juku:Watashi no Aozora; Amagiyugashima's forest, Shibecya-shitugenn's forest, Asahi's forest, Niyodogawa's forest (Lecture), Senior campus(Lecture), Field study lecture of dispatch project (Lecture)
- Nakashima, T.: NPO Senior nature university (Lecture), Iwakura-minami elementary school (Lecture), ANA 「Aozora-juku:Watashi no Aozora(open seminar)」 (Lecture), The Board of Education of Kameoka City (Lecture), NPO Ecology-Café 「Eco no Terakoya (open seminar)」 (Lecture), Takakura elementary school (Lecture)
- Sakanoue, N.: Kyoto Univ. For., Open Seminar, Structure and function of Forests (Lecture)
- Shiba, M.: Kyoto Univ. For., Open Seminar, Structure and function of Forests (Lecturer), Nature experience class of elementary schools in Miyama (Lecture), University local open special project (Lecture), Forest experience practice program of Kitakuwada high school

C. Other remarks

Shiba, M.: Mie Prefecture Environmental Conservation Agency (Technical advisor), Mie Biotope Research Association (Councilor), World Wide Found For Nature, Japan (Council member of forest management system), TOMIMURA Environment Research Institute (Technical advisor), NPO Forsta (Director)

2.2.15 Laboratory of Silviculture

Staff Professor : Shibata, Shozo, Dr. Agric. Sci. Associate Professor: Ando, Makoto, 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) Master's program : (6) Undergraduate : (1)

A. Research Activities (2006.4-2007.3)

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.

A-2. Publications and presentations

a) Publications

Books

Shibata, S.: Gardens with bamboo, 158pp, Soshinsha, Tokyo, 2006 (in Japanese)

- Shibata, S. and Takeuchi, M.: Connecting rings and no connecting rings aiming. In "Conected Rings of Forest-Human Habitation-Marine" (Ed. FSERC), 3-28, Kyoto University Press, Kyoto, 2007 (in Japanese)
- Shibata S.: Satoyama and expansion of bamboo forests. In "Forest Environment 2007" (Ed. Association of Forest Environment), 139-144, Forest Culture Association, 2007 (in Japanese)
- Ando Makoto: Growth of Forest. Field Science of Forest, Edited by Conference of University Forests in Japan, 103-108, 2006, Asakura Shoten, Tokyo

Original papers

- Shibata, S.: Effect of density control on tree growth at ecological tree planting sites in Japan, LEE (Landscape and Ecological Engineering), 2 (1), 13-19, 2006
- Koh, J., Ueda, T., Morimoto, Y. and Shibata, S.: Evaluation of using soil seed bank and commercial seeds nature revegetation, J. Jpn. Soc. Revegetation Society 32(1); 13-19, 2006 (in Japanese)

Reports

- Shibata, S.: Bamboo resources in Vietnam and its propagation methods, GSGES Asia Platform (Annual Report 2005); 27-29, 2006
- Shibata, S., Abe, Y. and Okamoto,S: Expansion of bamboo forest in Tennnozan. Trans. 117th Mtg. Jpn. For. Soc., 2006 (in Japanese)
- Nakanishi, A., Inagaki, Y., Kuramoto, M., Shibata, S., Fukada, H. and Osawa, N.: Factors influenced to the male flower production of *Chamaecyparis obtusa*. Trans. 117th Mtg. Jpn. For. Soc., 2006 (in Japanese)
- Abe, Y. and Shibata, S.: Gregarious flowering of *Sasa hirsta* in Kyoto city. Trans. 117th Mtg. Jpn. For. Soc., 2006 (in Japanese)
- Ikeda, K., Kanzaki, M. and Shibata, S.: Vegetation recovery process of Melocanna baccifera dominated fallow farmlands in North-east India. Trans. 117th Mtg. Jpn. For. Soc., 2006 (in Japanese)
- Shibata, S., Kuroda, N. and Kita, A.: Change of forest landscape in Kitayama forestry area, Kyoto, Japan. Proc.of Intl. Conference on Ecological Restoration in East Asia 2006, Osaka; 72, 2006
- Motoe, M, Fujihara, M., Yamamoto, S., Oyabu, T., Mino, N.and Shibata, S.: Management of bamboo stands based on estimation of range expansion bamboo stands in Awaji Island.
 Proc. of Intl. Conference on Ecological Restoration in East Asia 2006, Osaka; 138, 2006
- Nakanishi, A., Inagaki, Y., Shibata, S., Hirata, K. and Osawa, N.: Influence of gap formation on the seed production style in Japanese cypress stands with different nitrogen condition, Proc. 54th Mtg. Jpn. Ecological Society of Japan, 45, 2007
- Abe, Y. and Shibata, S.: Flowering characteristics of Sasa veitchii v. hirsuta, Proc. 54th Mtg. Jpn. Ecological Society of Japan, 238, 2007
- Tamai Shigenobu, Ando Makoto, Sano Junji, Kato Keisuke and Altan Turker: An Advance Report of the Vegetation Sub-group of the ICCAP in FY2005 - Field research on the vegetation productivity and the estimation of future vegetation patterns -. The Advance Report of ICCAP, The Research Project on the Impact of Climate Change s on Agricultural Production System in Arid Area s (ICCAP), 9, 79-84, 2006
- Tamai Shigenobu, Kato Keisuke, Kishibe Yuki, Ando Makoto and Sano Junji: Effect of climate changes on the species composition and productivity of plant communities in the eastern Mediterranean region of Turkey. The Final Report of ICCAP, The Research Project on the Impact of Climate Changes on Agricultural Production System in Arid Areas (ICCAP), 10, 103-110, 2007
- Atik M., Tamai S., Altan T., Ando M., Sano J., Atmaca M., Aktoklu E., Kaplan K., Artar M., Guzelmansur A., Cincinoglu A. and Buyukasik Y.: Possible Scenario for the Vegetation Change in Seyhan River Basin and Role of Land Uses "Anthropozoic Pressures". The Final Report of ICCAP, The Research Project on the Impact of Climate Changes on Agricultural Production System in Arid Areas (ICCAP), 10, 111-118, 2007
- Sano Junji, Ando Makoto and Tamai Shigenobu: Field Research of Dominant Vegetation and Environmental factors on the Basin of Projection on the Vegetation Change after Global Warming in the Eastern Mediterranean Region of Turkey. The Final Report of ICCAP, The Research Project on the Impact of Climate Changes on Agricultural Production System in Arid Areas (ICCAP), 10, 119-124, 2007

- Ando Makoto, Sano Junji and Tamai Shigenobu: The Vertical Distribution of the Vegetation on Cukurova Plain in the Eastern Mediterranean Region of Turkey. The Final Report of ICCAP, The Research Project on the Impact of Climate Changes on Agricultural Production System in Arid Areas (ICCAP), 10, 125-130, 2007
- Go Hatsuhei and Ando Makoto: Distribution pattern of regenerated Pinus densiflora sapling in pine wilt disease forests. Trans. 118th Mtg. Jpn. For. Soc., P3b29, 2007
- b) Conference and seminar papers presented
- Shibata: Japanese Society of Revegetation Technology (1), The 54-th Annual Meeting of Ecological Society of Japan (4), International Conference on Ecological Restoration in East Asia 2006, Osaka (2)

Ando: the 118th Mtg. of Jpn. For. Soc. (1)

Sakimoto: The 54-th Annual Meeting of Ecological Society of Japan (3)

Tokuchi: American Geographical Union (1), Jpn. Soc. Hydrology, 2006 (1), The 54-th Annual Meeting of Ecological Society of Japan (4), The 53-th Annual Meeting of Ecological Society of Japan (1), Japanese Geoscience Union 2006 (2), the 118th Mtg. of Jpn. For. Soc. (2)

A-3. Off-campus activities

Membership in academic societies

Shibata, S.: Jpn. Inst. Landscape Architecture (Director, Associate chairman of special journal, Review committee member), Jpn. Soc. Revegetation Technol. (Director, Chairman of environmental forest section, Chairman of editorial boards, Member for the selection of award, International community commity member), Ecological Society of Japan (Editorial member of Japanese Journal of Conservation Ecology)

Membership in Science Council of Japan, etc.

Shibata, S.: Jpn. Bamboo Soc. (Councilor, 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

- Shibata, S.: Grant-in Aid for Scientific Research: Basic Research (A) (1); Ecological study of gregarious flowering of bamboo, *Melocanna baccifera* in North-east India (Shibata rep.), Grant-in Aid for Scientific Research: Basic Research (B) (1); Solution and application of regional recovery mechanism in the middle Vietnam (Shibata part.)
- Ando, A.: Grant-in Aid for Scientific Research: Basic Research (C); Recovery of the forest landscape behind world's cultural heritage in Kyoto
- Tokuchi, N: Grant-in Aid for Scientific Research: Basic Research (B) (2); Carbon and nitrogen accumulation mehcamnisms in forested ecosystem and its estimation (Tokuchi rep), Grant-in Aid for Scientific Research: Basic Research (B) (2); Evaluation method of environmental influences in forested ecosystem Using model of stream water chemistry (Tokuchi part.), Grant-in Aid for Scientific Research: Basic Research (B) (2); Relatioship between forest structure and nitrogen dynamics in the perm frost in central Siberia (Tokuchi part.)

A-4. International cooperations and overseas activities

International meetings (roles)

Shibata, S.: International Conference on Ecological Restoration in East Asia 2006, Osaka (presentation), International conference of Botanic Gardens Conservation International (presentation)

Tokuchi, N.: Global Climate Change in Arctic reeion 2006, Fairbanks, US (presentation)

Membership in international academic societies

Shibata S.: International Consortium of Landscape and Ecological Engineering (Associate Editor-in-Chief of journal, Secretary-general of international conference in 2006), World Bamboo Organization (Board member)

International joint researches, overseas research surveys

- Shibata, S.: Survey of *Melocanna baccifera* forests (India), Arrangement of the site in natural history museum, Tribhuvan Univ. (Nepal), Survey for research of traditional techniques against the disaster (Vietnam)
- Ando, M.: Impact of Climate Change on Agricultural Production System in the Arid Areas (Turkey)
- Tokuchi N.: Nitrogen cycling in the perm frost in central Siberia (Russia), Nitrogen cycling in arctic region (US)

B. Educational activities (2006.4-2007.3)

B-1. On-campus teaching

a) Courses given

- Undergraduate level: Planting design for landscaping (Shibata & Morimoto), Silbology (Sakimoto),
 Silviculture (Tokuchi), Forest Botany (Ando), Laboratory Course in applied Forest and
 Biomaterials Science (Ando,), Practice of University Forest III (Ando), Practice of
 University Forest IV (Ando), Basic Science for Forest and Biomaterials II (Ando and
 Sakimoto), Practice of Biological and Environmental Science I (Sakimoto and Ando),
 Science of Biosphere Life, Food and Environment (Ando and Tokuchi), Regeneration
 and Dynamics of Forests (Ando), Exercises in Ecological Interactions between Forest and
- 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), Insistence of global environmental studies (Shibata et al.)

B-2. Off-campus teaching, etc.

Part-time lecturer

Shibata, S.: 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 federation of the Diet for bamboo resource promotion (lecture), Lecture for *Satoyama* Network in Seya (lecture), Management course of Kohko-en garden in Himeji (lecturer), Lecture course of Association of Natural Environment conservation of Osaka Pref. (lecturer), Workshop of Semi-culture plants (lecture), Workshop of resilience seminar (lecture), 7th Younger Forum, Japan Bamboo Association (coordinator), Lecture meeting of Japan Bamboo Association in 2005 (lecture), Kyoto Neo Nishiyama Culture Forum (lecture), Lecture course of Awaji Landscape Planning and Horticulture Academy (lecturer), Lecture Course of Takeya project (lecture), Ashigara Bamboo Forest Forum (keynote speech, lecture, panelist), *Satoyama* symposium in Nara (keynote speech)

Ando Makoto: Open Seminar of Ashiu University Forest, Kyoto University (lecturer)

C. Other remarks

Shibata, S.: Member of committee for conservation of nature in Ide (Ide Town), Member of committee for green land axis analysis (Ministry of Land, Infrastructure and Transport), Member of grand design analysis of Ten-nozan area (Ministry of Land, Infrastructure and Transport), Member of committee for the preservation of cultural landscape of Residential woodland in Tonami (Agency of Cultural Affairs), Member of committee for evaluation of research project (Forestry and Forest Products Research Insitute, Kansai Branch), Project leader of CENEED (Centre for Nepal of Environmental and Educational Development) Supporting Group

TV interview: Asahi TV (2006.7.13), Yomiuri TV (2007.1.18), KBS Kyoto (2007.2.4)

Newsletter interview: Asahi Newsletter (2006.4.16)

Magazine Interview: Insight (Kansai Electric Company, 2006.4.3), Orange Page (2006. 7 15)

Chair of Wood Biomass Science

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

Staff 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 : (2) Postdoctoral Fellow : (2) Research Staff : (1)

A. Research Activities (2006.4-2007.3)

A-1. Main subjects

a) Structure and Function of Plant Macromolecules

Biogenesis, structure and function of plant macromolecules, especially cellulose, are studied by using state of art of electron microscopy together with in vitro biosynthesis technique.

b) 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.

c) 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. Man-Wood relation can thus be studied by identifying species used in old wooden building and wood statues. Especially, projects that stem from our unique collection of aged wood from national cultural heritages are of increasing interest.

A-2. Publications and presentations

a) Publications

Books

K. Baba: Models of Plant Cell Walls. in "The Science and Lore of the Plant Cell Wall", pp.3-10 ed. T.Hayashi, Brown Walker Press, Florida, 2006

Original papers

- Nge Thi Thi, and Sugiyama J: Surface functional groups dependent apatite formation on bacterial cellulose microfibrils network in a simulated body fluid. J Biomed Mater Res, 81A, 124-134, 2006
- Hirata, T, Fujimura F, Horikawa Y, Sugiyama J, Morita T, and Kimura S: Molecular assembly formation of cyclic hexa-8-peptide composed of acetylated clycosamino acids. Biopolymers (Peptide Sci), 88, 150-156, 2006
- Mueller M, Burghammer, M, and Sugiyama J: Direct investigation of the structural properties of tension wood cellulose microfibrils using microbeam x-ray fibre diffraction. Holzforschung, 60, 474-479, 2006
- Fukuda M, Sugiyama J, Morita T and Kimura S: Fully Hydrophobic Artificial Protein but Water Dispersible due to Large Dipole. Polymer J, 38, 381-386, 2006
- Fujimura F, Hirata T, Horikawa Y, Sugiyama J, Morita T and Kimura S: Columnar assembly of cyclic β-amino acid functionalized pyranose rings. Biomacromolecules, 7, 2394-2400, 2006
- Ding S-Y, Xu Q, Mursgeda K. Ali, Baker JO, Bayer EA,, Barak Y, Lamed R, Sugiyama J, Rumbles G, Himmel ME: Versatile derivatives of carbohydrate-binding modules for imaging of complex carbohydrates approaching the molecular level of resolution. BioTehcniques, 41, 435-442, 2006
- Fujimura F, Fukuda M, Sugiyama J, Morita T, Kimura S: Parallel assembling of dipolar columns composed of stacking cyclic tri-8-peptide. Org Biomol Chem, 4, 1896-1901, 2006
- Clair B, Almeras T, Yamamoto H, Okuyama T, Sugiyama J: Mechanical state of native cellulose microfibrils in tension wood. Biophys J, 91, 1128-1135, 2006
- Horikawa Y, Itoh T, Sugiyama J: Preferential uniplanar orientation of cellulose microfibrils re-investigated by FTIR technique. Cellulose, 13, 309-316, 2006
- Clair B, Almeras T, Sugiyama J: Compression stress in opposite wood of angiosperms: observations in chestnuts, mani and poplar. Annals of Forest Science, 63, 1-4, 2006
- Yoshioka Y, Takabe K, Sugiyama J, Nishio Y: Newly developed nanocomposites from cellulose

acetate/poly-e-caprolactone/layered silicate I: synthesis and morphological characterization. JWood Sci, 52, 121-127, 2006

- Ding S-Y, Smith S, Xu Q, Sugiyama J, Jones M, Rumbles G, Bayer EA, Himmel ME: Ordered arrays of quantum dots using cellulosomal proteins. Industrial biotechnol, 1, 198-206, 2006
- Kim N-H, Imai T, Wada M, Sugiyama J: Molecular directionality in cellulose polymorphs. Biomacromolecules, 7, 274-280, 2006
- Matthews JF, Skopec CE, Mason PE, Succato P, Torget RW, Sugiyama J, Himmel ME, Brady JW: Computer simulations of water structuring adjacent to microcrystalline cellulose Iß structure. Carbohydr Res, 341, 138-152, 2006
- S. Sasaki, K. Baba, T. Nishida, Y. Tsutsumi, R. Kondo: The cationic cell-wall-peroxidase having oxidation ability for polymeric substrate participates in the late stage of lignification of *Populus alba* L. Plant Mol. Biol. 62, 797-807, 2006
- S. Sakai, T. Nishide, E. Munir, K. Baba, H. Inui, Y nakano, T. Hattori, M. Shimada: Subcellular localization of glyoxylate cycle key enzymes involved in oxalate biosynthesis of wood-destroying basidiomycete *Fomitopsis palustris* grown in glucose. Microbiol., 152, 1857-1866, 2006
- b) Conference and seminar papers presented

48th Annual meeting of Japan Society of Plant Physiologist (4)

13th Annual meeting of the Cellulose Society of Japan (1)

56th Annual meeting of the Japan Wood Research Society (9)

A-3. Off-campus activities

Membership in academic societies

Sugiyama Junji: Cellulose society of Japan (Executive board, branch head, Editor), The Japanese Society of Microsocpy (Council, Regional manager, Regional Council), Japan Wood Research Society (member of future planning committee, public information committee)

Research grants

- Sugiyama Junji: Grant-in-Aid for scientific Research (C) Mechanical optimization of trees in relation with ultrastructure (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 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

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

Scholars from abroad

 $2\ \mathrm{JSPS}$ postdoctoral fellows

- 1 Invited foreign researcher
- 2 foreign cooperative researchers

Glasgow University (UK), NTNU(Norway)

B. Educational Activities (2006.4-2007.3)

B-1. On-campus teaching

a) Courses given

Graduate level: Graduate school of Agriculture (Sugiyama)

B-2. Off-campus teaching, etc.

Part-time lecturer

The University of Tokyo, Graduate school of Agriculatural Bioscience (Sugiyama) Nigata University, Graduate school of Agriculature (Sugiyama)

B-3. Overseas teaching

Sugiyama, J: Summer school in wood science (Chibinon, Indonesia)

C. Other remarks

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

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

Staff	Professor	: Yano, Hiroyuk	ci 🛛	
	Associate Professor: Morooka, Toshiro			
	Associate Professor: Tanaka, Fumio			
Students and research fellow				
	Post doctoral research fellow :(2)			
	Doctor's program	m : (1)		
	Master's progra	m : (4)		

A. Research Activities (2006.4-2007.3)

A-1. Main subjects

- a) Extraction of cellulose nanofibers from wood and agricultural wastes
- b) Development of cellulose nanocomposites
- c) Production of high performance materials based on bacterial cellulose
- 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

- Nakagaito A. N. and H. Yano: Nanocomposites Based on Cellulose Microfibril, Cellulose Nanocomposites Processing, Characterization and Properties, p.151-168, The American Chemical Society, Washington, D.C., 2005
- Yano H.: The total utilization of *Acacia mangium*, Sustainable Development and Utilization of Tropical Forest Resources, p.182-183, Research Institute for Sustainable Humanosphere, Uji, 2006
- Yano H.: Cellulosic Nano Composites, New Development of Bio-based Materials, p.63-70, CMC publishing, Tokyo, 2007

Original papers

Shams M. I., T. Morooka and H. Yano: Compressive deformation of wood impregnated with low molecular weight phenol formaldehyde (PF) resin V Effects of steaming pretreatment. J.

Wood Science, **52** (5); 389-394, 2006

- Nogi M., K. Abe, K. Handa, F. Nakatsubo, S. Ifuku and H. Yano: Property enhancement of optically transparent bio-nanofiber composites by acetylation. Applied Physics Letters, 89; 233123, 2006
- Ifuku S., M. Nogi, K. Abe, K. Handa, F. Nakatsubo and H. Yano: Surface Modification of Bacterial Cellulose Nanofibers for Property Enhancement of Optically Transparent Composites: Dependence on Acetyl-Group DS. Biomacromolecules, 8 (6); 1973-1978, 2007
- Tanaka, F. and T. Iwata: Estimation of the elastic modulus of cellulose crystal by molecular mechanics simulation. Cellulose, 13: 509-517, 2006

Reviews

- Yano H.: Development of natural resource-based materials, Kurenai Moyuru (Kyoto University Magazine), No.9; 9-12, 2006
- Yano H.: Cellulosic Nanocomposites, Sen'I Gakkaishi, 62 (12); 356-358, 2006

Reports

- Yano H.: Report on the investigation on the current research and development state of bio-nanofiber-based materials in Europe and North America, NEDO, March 2007
- Yano H.: Report on the regional consortium for research and development, Production of biomass-originated nanofiber and development of high plant resource content composites, March 2007

Articles, News paper and TV program

- Yano H.: Material innovation through plant fiber-based nanofibers, Cellulose Communications, 14 (1); 1, 2007
- Yano H.: [New materials using bio-nanofibers], 2006 July 14th, Nikkei Shimbun
- Yano H.: 「New era based on plant fiber potential (leading article)」, 2006 August 1st Nikkann Kogyo Shimbun
- Yano H.: [New materials using bio-nanofibers], 2006 December 28th, Kyoto Shimbun
- Yano H.: [Cost effective production of plant-based nanofibers], 2006 June 12th Nikkei Nano Business
- Yano H.: [Nata de coco for future materials], 2006 October, Nikkei ECO
- Yano H.: [Bio-nanofiber materials] 2006 September 4th PRESIDENT
- Yano H.: [Bioplastics, their potential], 2007 January 30th, ABC Broadcast, Move !
- b) Conference and seminar papers presented

The 56th Annual Meetings of the JWRS (9 presentations, Yano, H.)

233rd ACS national meeting & Exposition (4 presentations, Yano, H.)

4th Annual Meeting of Society of Nano Science and Technology (1 presentation, Yano, H.)

13th Annual meeting of cellulose society of Japan (1 presentation, Yano, H.)

2006 Annual Meeting of the Society of Fiber Science and Technology, Japan (1 presentation, 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, Member of the Cellulose Society of Japan

- Morooka T.: Member of The Japan Wood Research Society, Member of The Society of Materials Science, Japan, Member of the Society of Rheology, Japan
- Fumio F.: Member of The Society of Polymer Science, Japan, Member of he Crystallographic Society of Japan, Member of The Papanese Society of Carbohydrate Research, Member of The Society of Fiber Science and Technology, Japan, Member of The Society of Cyclodextrins, Japan, Member of Society of Computer Chemistry, Japan, Member of The Cellulose Society of Japan

Research grants

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

Grant for the production of organic electronics devices」 (Investigator)

Grant-in-Aid for regional consortium for research and development, Production of biomass-originated nanofiber and development of high plant resource content composites (Head Investigator)

Grant-in-Aid for Scientific Research (Tokubetsu Kenkyuin Shorei-hi), Development of MFC/Bio-plastic compounds using twin screw extruder (Head Investigator)

A-4. International cooperations and overseas activities

International joint researches, overseas research surveys

Yano H.: Japan-Sweden workshop on polymer nanocomposites(Invited speaker) (2005.11.07)

- Yano H.: International Symposium on Sustainable Humanosphere 2006 -Toward the harmonization of Economy and Ecology- (organizer) (2006.8.28-29)
- Yano H.: the investigation on the current research and development state of bio-nanofiber-based materials in Europe and North America, NEDO

Scholars from abroad

 $1\ \rm JSPS$ postdoctoral fellow

B. Educational Activities (2006.4-2007.3)

B-1. On-campus teaching

a) Courses given

Undergraduate level: Wood Composite Products (Yano)

Graduate level: Bio-based Materials Physics I (Yano, Morooka, Tanaka), Seminar in Bio-based Materials Physics (Yano, Morooka, Tanaka), Laboratory course in Bio-based Materials Science (Yano, Morooka, Tanaka)

B-2. Off-campus teaching, etc.

Open seminar, etc

Yano H.: Innovation forum at Katsura (Lecturer), 57th Sustainable Humanosphere Symposium, RISH (Lecturer, organizer), Osaka city research institute 71st New frontier materials symposium(Lecturer), 70th Sustainable Humanosphere Symposium, RISH (Lecturer), 67th Sustainable Humanosphere Symposium, RISH (Lecturer), Seminar for future bioscience activities in Kansai (Lecturer), Seminar of the Society of Fiber Science and Technology, Kansai branch section (Lecturer), Special seminar at annual meeting of Japan Society of Polymer Processing (Lecturer), Seminar of study group for polymer processing, The Society of Rheology, Japan (Lecturer), Seminar of study group for Eco-materials, The Society of Polymer Science, Japan (Lecturer)

Part-time Lecturer

Yano H.: Bio-seminar at Nagahama Institute of Bio-Science and Technology (Lecturer), "New nanomaterials prepared from plant resources, Nanofiber innovation, Tokyo Institute of Technology (Lecturer), "Extraction of plant-based nanofibers and their utilization" (Lecturer)

B-3. Overseas teaching

Lectures and seminars

Yano H.: "Cellulose nanocomposites", EMPA (Switzerland, Lecturer) *Student and research fellows from abroad* Master's program: 1 (Indonesia)

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

Staff	Professor	: Kawai, Sl	huichi, Dr. Agric. Sci.
	Assistant Professor	: Umemura	a, Kenji, Dr. Agric. Sci.
Students	and research fellows	5	

Doctor's program : (1)	Research fellow : (6)
Master's program : (2)	Resercher : (2)

A. Research Activities (2006.4-2007.3) 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 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. Development of New Wood Based Materials
 - 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 plant fiber reinforced composites by using plant fibers
 - e) Development of binderless boards from kenaf core, etc
 - f) Development of bamboo carbon composites
 - g) Rapid curing technology of cement bonded particleboard
 - h) High-performance gypsum bonded particleboard
 - i) Development of ultra-low density fiberboard

- 2. Adhesive Resins/ Durability of Adhesion
 - a) Durability of isocyanate resin adhesives
 - b) Application of polysaccharides as adhesives
 - c) Development of chitosan-based adheisves
 - d) Characterization of bonding mechanism of binderless board and its application to wood adhesives
 - e) Development and utilization of lignin binder
 - f) Production of high durable wood adhesives from bark of fast growing trees

3. Integrated Projects

- a) Analysis of material cycle in large-scale industrial plantation
- 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

A-2. Publications and presentations

a) Publications

Books

S Kawai: Proposals for Comfortable Country, Japan, 2nd Chapter Formation of Sustainalility for Regional Resource, Forest Prodcuts, Denki Shoin, p.37-50 (2006)

Original Papers

- M Yokoyama, K Yano, Y. Fujiwara, Y. Fujii and S Kawai: Cutting resistance of the accelerated aging treated Hinoki wood, J Soci Mater Sci Japan, 55(8); 772-776, 2006
- T Kawasaki, S Kawai: Thermal insulation properties of wood-based sandwich panel for use as structural insulated walls and floors, J Wood Sci, 52; 75-83, 2006
- T Kawasaki, M Zhang, Q Wang, K Komatsu, S Kawai: Elastic moduli and stiffness optimization in four-point bending of wood-based sandwich panel for use as structural insulated walls and floors, J Wood Sci, 52; 302-310, 2006
- A Firmanti, B. Subiyanto, S Kawai: Evaluation of the fire endurance of mechanically graded timber in bending, J Wood Sci, 52; 25-32, 2006
- J Xu, R Widyorini, H Yamauchi, S Kawai: Development of biderless fiberboard from kenaf core, J Wood Sci, 52; 236-243, 2006
- T Fujita, N Komatsu, S Kawai: Manufacture and properties of gypsum-bonded particleboard IV. Properties of gypsum-bonded particleboard made with raw material from waste gypsum boards, Mokuzai Gakkaishi, 52(6), 368-375, 2006
- K Umemura, S Kawai: Modification of Chitosan by the Maillard Reaction using Cellulose Model Compounds. Carbohydrate Polymers, 68(2); 242-248, 2007

Reviews

H Yano, S Ogawa, S Kawai, A Inai, Y Honda, H Yamauchi, H Nasu, M Yamazaki, Y Yada: Prodacution of High Tannnin Content Acacia Bark Powder and Its Application for Adhesive, Mokuzai Kogyo(Wood Industry), 60(10), 478-482(2005)

Reports

Pierre Berard, Yang Ping, Hidefumi Yamauchi, Kenji Umemura, Shuichi Kawai: Modelization of Cylindrical LVL: Finite Elements Models of a Flat Interlocked LVL and a Comparison of Standard and Non-standard Testing Methods in the Elastic Domain. Proc. the Second International Symposium of Veneer Processing and Products. 427-434, May 9-10 Vancouver Canada (2006)

- K Umemura: Low formaldehyde emission particleboard bonded by UF-MDI mixture adhesive (abridged translation), Plywood Industry, 158, 36-42 (2006)
- K Umemura: Japan Wood Research Society ed. Wood Science and Technology IX The volume 4, 2.1.2 [Safety of natural adhesives] p.19-24 (2007)
- b) Conference and seminar papers presented
- 57th Annual Meetings of the Japan Wood Reserch Society (Akita, 7 presentations, S Kawai, K Umemura)
- 24th Annual Meetings of the Wood Technnological Association of Japan (Tokyo, 1 presentaion, K Umemura)
- 9th the Meeting of Kenaf Reserch Group (Tokyo, 1 presentaion, S Kawai)
- 44th Symposium on Adhesion (Aichi, 1 presentaion, K Umemura)
- 55th JSMS Annual Meetings (Niigata, 1 presentaion, K Umemura)
- 67th RISH Symposium (Kyoto, 3 presentaions, S Kawai, K Umemura)
- JSPS Japan and Hungary Research Cooperative Program Seminar (Akita, 1 presentaion, S Kawai)
- 61th, 65th, and 71th RISH Symposia (Kyoto, 3 presentaion, S Kawai)

A-3. Off-campus activities

Membership in academic societies (roles)

- Kawai, S.: The Japan Wood Research Society (Member of directors board) The Society of Materials Science, Japan (Member of directors board, Vice-president, Members of the Committees of Wood Composite materials and Referee), The Japanese Forest Society, The Forest, Wood, and Environment Academy ((Member of directors board, Member of Steering Committee), The Wood Technological Association of Japan (Member of directors board), The Japan Wood Preserving Association (Head of LCA Committee), The Adhesion Society of Japan, Member of the Committees of Wood Research Field, Science Council of Japan
- Umemura, K.: The Wood Technological Association of Japan (Planning Committee and Officer of the Kansai Branch, Officer of the Plywood Section), The Japan Wood Research Society (Member of Editorial Board), The Adhesion Society of Japan, Japanese Society of Chitin and Chitosan

Membership in Science Council of Japan, etc.

Kawai, S.: Associate Member of the Science Council of Japan

Research grants

- Kawai, S.: Project of Ministry of Agri., Forestry and Fichery, Tech. Development of eco-system in rural area for 21century (Fellows)
- Kawai, S.: Grants-in-Aid for Scientific Research: Service life of wood members: Investigation with the samples from histrical wooden buildings and cultural properties.
- Kawai, S.: Grants-in-Aid for Scientific Research: Development of plant fiber-polymer composites with high-durability and low-environmental impact
- Kawai, S.: Grants-in-Aid for Scientific Research: Elucidation and prediction of aging wood

Umemura, K.: Grants-in-Aid for Scientific Research: Development of high-performance adhesive without using fossil resources.

A-4. International cooperation and overseas activities

International joint researches, overseas research surveys

Kawai, S.: Mass flow analysis of large-scale platation forest and effective utilization of tropical fast growing trees (Indonesia)

Research and Development for Non-wood Lignocellulosic Materials (China)

International Activities

Kawai, S.: International Academy of Wood Science, Fellow

Scholars from abroad

Dr. Zhang Ming: Prof. of Nanjing Forestry University

Dr. Berard Pierre Regis: l'Université de Montpellier

Dr. Ragil Widyorini: Gadjah Mada University

Dr. Zhang Lianjie: Northeast Forestry University

B. Educational Activities (2006.4-2007.3)

B-1. On-campus teaching

a) Courses given

Undergraduate level: Wood Composites (Kawai, Yano), Science for Sustainable Humanosphere (Kawai)

Graduate Level: Seminar in Wood Composites (Kawai, Umemura)

Laboratory Course of Wood Composites (Kawai, Umemura) Wood Composite Products I (Kawai)

B-2. Off-campus teaching, etc.

Part-time lecturer

Kawai S: Graduate school of Tokyo University of Agriculture and Technology

Open seminar, etc

- Kawai, S.: Symposium of The Forest, Wood, and Environment Academy (Coordinator), The 56th Anniversal Symposium of Japan Wood Research Society ((Coordinator), Symposium of Kyoto Wood Industry Association (Lecturer), Research Group of Advance Technology of Biomaterials in Tokai Region (Lecturer), Science and Technology Symposium of Gifu-prefecture (Lecturer), The Symposium for Promoting Domestic Forest Products Utilization in Shizuoka (Lecturer), Symposium of Shin-Kibenkai (Lecturer), Symposium of JCII (Lecturer), Forum on Enviornment and House (Lecturer), Symposia for Sustainalbe Humanosphere (Lecturer)
- Umemura, K.: Wood Science Seminar of the Kansai Buranchi of the Wood Technological Association of Japan (Lecturer), Organized Session in JSMS Annual Meetings (Organizer and Chair)

B-3. Overseas teaching

Lectures and seminars

Kawai, S.: Wood Science Seminar (Indonesia), Special lecture in Central South University of Forestry and Technology (China)

Students and research fellows from abroad

Foreign Special Research Fellow: 1 persons from France Doctor course student: 1 person from Indonesia Research Trainee: 1 person from China

C. Other remarks

Kawai, S.: Director of the Research Inst. for Sustainable Humanosphere, Member of education and research council, Kyoto Univ., Program officer of JSPS Research Center for Science Systems. Councilor of Forst and Forest Products Lab. Japan, Councilor of Forest Management of Kyoto Prefecture, Gifu Pref. Sci. and Tech. Adviser, Adviser of Okayama Pref. Wood Technology Center, Guest researcher of the Nara Pref. Forest Tech. Center

2.2.19 Laboratory of Innovative Humano-habitability (Research Institute for Sustainable Humanosphere)

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. Kyoto Univ. (Agric. Sci.)			
Students	and research fellow	5			

Doctor's program: (9)Visiting Scientist: (1)Foreign Visiting Scientist : (2)

A. Research Activities (2006.4-2007.3)

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-based 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 options by wood deteriorating organisms.

h) Wood deterioration and development of electrical conductive wood in the space environment
 Wood deterioration in the space environment consisting of radiations, heat cycles etc and electrical conductive wood used as a body of monitoring environment in the space.

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 SiO₂ or Al₂O₃ 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

Books

Hata, T: Carbonization and Charcoal Utilization, Sancho Publisher; p.386-387, 2007

- Hata T., L. Cookson, Y.-C. Jang, Bollineni Tarakanadha, Y. Imamura, S. N. Kartal and T. Shibata: The Production and Management CCA-treated Wood in Asia and Oceania with Emphasis on Australia, India, Japan, and Korea, In "Environmental Impacts of Treated Wood", CRC Press, p.59-73, 2006
- Subyakto, T. Hata, Y. Imamurau and S. Kawai: Development of New Functions for Wood-based Carbons from Fast-growing Trees, In "Sustainable Development and Utilization of Tropical, Report of JSPS-LIPI Core University Program in the Field of Wood Science", RISH, Kyoto University, p.60-63, 2006

Reviews

- Imammura, Y.: Wood treatment by non-conventional methods. Wood Technology Letters, 24(1); 1-11, 2006
- Yoshimura, T. and Y. Indrayani: Infestation and control strategies of Incisitermes minor (hagen) in Japan. House and Household Insect Pests, 28(1), 37-45, 2006
- Indrayani, Y. and T. Yoshimura: Feeding ecology of the invasive dry-wood termite Incisitermes minor (Hagen) in Japan. Sustainable Humanosphere, No.2; 11, 2006
- Takabe, K. and T. Yohsimura: Biological evaluation of woods harvested at Waning Moon Phase in winter. Wood Industry, 61(12); 577-583, 2006

Original papers

- Tsunoda, K.: Transfer of fipronil, a nonrepellent termiticides, from exposed workers of *Coptotermes formosanus* (Isoptera: Rhinotermitidae9 to unexposed workers. Sociobiology, 47(2); 563-575, 2006
- Tsunoda, K.: Effect of 18-months' storage of treated sandy loam on the transfer of fipronil from exposed workers to unexposed workers of *Coptotermes fromosanus* (Isoptera: Rhinotermidae). Sociobiology, 48(2); 627-634, 2006
- Kartal, S. N., W. J. Hwang, Y. Imamura and Y. Sekine: Effect of essential oil compounds and plant extracts on decay and termite resistance of wood. Holz als Roh und Werkstoff, 64; 455-461, 2006
- Kartal, S. N., W. J. Hwang, T. Yoshimura and Y. Imamura: Evaluation of leaching medium effect on the release of copper, chromium, and arsenic from treated wood. Building and Environment, 42; 1188-1193, 2007
- Kartal, S. N., N. Ayrilmis and Y. Imamura: Decay and termite resistance of plywood treated with various fire retardants. Building and Environment, 42; 1207-1211, 2007
- Kartal, S. N., N. Katsumata and Y. Imamura: Removal of copper, chromium, and arsenic from CCA-treated wood by mold and staining fungi. For. Prod. J., 56(9), 33-37, 2006
- Kartal, S. N., C. Brischke, A. O. Rapp and Y. Imamura: Biological effectiveness of didecyl dimethyl ammonium tetrafluoroborate (DBF) against Basidiomycetes following preconditioning in soil bed test. Wood Sci. and Technol., 40; 63-71, 2006
- Kartal, S. N., W. J. Hwang, K. Shinoda and Y. Imamura: Laboratory evaluation of boron-containing quaternary ammonia compound didecyl dimethyl ammonium tetrafluoroborate (DBF) for control of decay and termite attack and fungal staining of

wood. Holz als Roh und Werkstoff, 64; 62-67, 2006

- Hwang, W., J., S. N. Kartal and Y. Imamura: Evaluation of new quaternary ammonium compound, didecyldimethylammonium tetrafluoroborate (DBF) imcompsrison with DDAC: Leachability and termite resistance tests. Holz als Roh und Werkstoff, 64; 111-116, 2006
- Hwang, W.-J., S. N. Kartal, T. Yoshimura and Y. Imamura: Synergistic effect of heartwood extractives and quaternary ammonium compounds on termite resistance of treated wood. Pest Manag. Sci., 63; 90-95, 2007
- Indrayani, Y., T. Yoshimura and Y. Imamura: Detection of the activities of the western dry-wood termite, *Incisitermes minor* (Hagen), in small infested logs by using a micriowave detector. Jpn. J. Environ. Entomol. Zool., 17; 29-32, 2006
- Indrayani, Y., K. Matsumura, T. Yoshimura, Y. Imamura and S. Itakura: Development of microsatellite markers for the drywood termite *Incisitermes minor* (Hagen). Mol. Ecol. Note, 6; 124-125, 2006
- Indrayani, Y., T. Yoshimura, Y. Yanase, Y. Fujii, H. Matsuoka and Y. Imamura: Observation of feeding behavior of three termite (Isoptera) species: *Incisitermes minor, Coptotermes* formosanus and Reticulitermes speratus. Sociobiology, 49(3), 121-134, 2007
- Indrayani, Y., T. Yoshimura, Y. Yanase, Y. Fujii and Y. Imamura: Evaluation of the temperature and relative humidity preferences of the western dry-wood termite Incisitermes minor (Hagen) using acoustic emission (AE) monitoring. J. Wood Sci., 53; 76-79, 2007
- Okahisa, Y., T. Yoshimura and Y. Imamura: Seasonal and height-dependent fluctuation of starch and free glucose contents in moso bamboo (*Phyllostachys pubescens*) and its relation to attack by termites and decay fungi. J. Wood Sci., 52; 445-451, 2006
- Katsumata, N., T. Yoshimura, K. Tsunoda and Y. Imamura: Difference in the termite feeding on gamma-irradiated wood specimens between three laboratory colonies of *Coptotermes formosanus* (Isoptera: Rhinotermitidae). Sociobiology, 49(3), 143-150, 2007
- Katsumata, N., K. Tsunoda, A. Toyoumi, T. Yoshimura and Y. Imamura: Comparative termite (Isoptera. Rhinotermitidae) feeding preference among gammma-irradiated and unirradiate wood. Sociobiology, 50(1), 155-162, 2007
- Kurosaki, F., H. Koyanaka, T. Hata and Y. Imamaura: Macroporous carbon prepared by flash heating of sawdust. Carbon, 45; 671-673, 2006
- Kakitani, T., T. Hata, T. Kajimoto and Y. Imamura: Designing a purification process for chromium-, copper- and arsenic-contaminated wood. Waste Management, 26(5); 453-458, 2006
- Kakitani T., T. Hata, T. Kajimoto and Y. Imamura: A novel extractant for removal of hazardous metals from preservative-treated wood waste. J. Environ. Quality, 35(3); 912-917, 2006
- Nakai, T., S. N. Kartal, T. Hata and Y. Imamura: Chemical characterization of pyrolysis liquids of wood-based composites and evaluation of their bio-efficiency. Building and Environment, 42; 1236-1241, 2007
- Kubota, S., Y. Shono. T. Matsunaga and K. Tsunoda: Laboratory evaluation of bistrifluron, a benzoylphenylurea compound, as a bait toxicant against *Coptotermes formosanus* (Isoptera: Rhinotermitidae). J. Econ. Entomol., 99(4), 1363-1368, 2006
- Yamaoka, Y. and K. and Tsunoda: Determination of the amount of fipronil recovered from freshly treated and treated/stored sandy loam. Sociobiology, 48(2); 621-626, 2006
- Tsujimoto, Y. and Y. Imamura: Development of an evaluation method photo-stability for house

interior materoals I. Newly designed photo-stability testing apparatus of a metal-halaide lamo with glass-filters. Mokuzai Gakkaishi, 52; 145-152, 2006

Commenatary

- Imamura, Y.: The dry-wood termite, *Incisitermes minor* (Hagen). Forest Technology, No.769; 7, 2006
- Imamura, Y.: Heat-treated wood. Forest Technology, No.776; 37, 2006
- Imamura, Y.: Heat-treated wood and charcoal. Wood Carbonazation Research, 2(1/2); 1-2, 2006
- Yoshimura, T., Y. Fujii, Y. Indrayani, Y. Yanase, Y. Fujiwara, A. Asdachi, S. Kawaguchi and M. Miura (Kyoto University *Incisitermes minor* infestation survey team): Surver of the infestation of Incisitermes minor (Hagen) and the control strategies A case study in Wakayama Prefecture -. Shiroari (Termite Journal), No.147; 5-10, 2007

Reports

- Tsunoda, K., A. Byrne, P.I. Morris, J. K. Grace: Perfromance of borate-treated lumber after 10 years in a protected.above-ground field test in Japan (Final report). The International Ressearch Group on Wood Protection; Document No. IRG/WP 06-30395, 2006
- Tsunoda, K.: Is *Coptotermes formosanus* (Isoptera: Rhinotermitidae) an exotic invader for Japan? Proceedings of the 2006 National Conference on Urban Entomology; 78-79, 2006
- Hata, T., S. Bonnamy, Y. Breton, P. Bronsveld and V. Castro: Development of Advanced Carbon Materials from Carbonised Cedar Wood. Proceedings of the Seventh International Conference on the Science and Application of Nanotubes; 64, 2006
- Hata, T, M. Fujisawa, Joko Sulistyo, K. Hashimoto, Y. Imamura: Development of Carbonized Wood-based Mmaterials for SPSS, The 3rd Symposium for Energy recycling for Sustainable Humanobility –SPSS and Biomass Conversion- ; 19-20, 2007
- Hata, T. and J. Sulistyo: Utilization of tropical biomasses as carbon resources. The 70th Rish Symposium; 39-40, 2007
- Hata, T., S. Bonnamy, Y. Breton, P. Bronsveld, V. Castro, Development of Advanced Carbon Materials from Carbonized Cedar-wood, The International Carbon Conference 2006, 420, 2007
- Koyanaka, H., M. Tsujimoto, H. Kurata, T. Hata, Y. Imamura, K. Takeuchi, K. Ui, N. Koura: Direct Convrsion of Hydrocarbon to Hydrogen by Porous Manganese Oxidedeposited Paradium, The 73rd Meeting of Electrochemistry ; 180, 2006
- Indrayani, Y., K., T. Yoshimura, Y. Yanase and Y. Imamura: A new method for testing wood preferences of dry-wood termite. Proceedings of the XV Congress of IUSSI; 202, 2006
- Indrayani, Y. and T. Yoshimura: Control of dry-wood termite *Incisitermes minor* (Hagen) infestation by bait system. Proceedings of the 4th Confetrence of the Pacific-Rim Termite Research Group; 27-32, 2007
- Katsumata, N., T. Yoshimura, K. Tsunoda and Y. Imamura: The relationship between termite feeding behavior and doses of gamma-irridiation to wood. Proceedings of the XV Congress of IUSSI; 210, 2006
- Kurosaki, F., H. Koyanaka, T. Hata, Y. Imaura: Macroporous Carbon from Biomass and Its Application, The74th Meeting of Electrochemistry ; 420, 2007
- Kawaguchi, S., T. Yoshimura, H. Aoyagi, Y. Imamura, M. Miura, Y. Yanase, Y. Fujii, S. Okumura and K. Suzuki: Energy gas production from wood biomasses by termites. Proceedings of the XV Congress of IUSSI; 205-206, 2006

- Fujii, Y., Y. Yanase, S. Okumura, T. Yoshimura and Y. Imamura: Non-destructive evaluation of biodegradation of wood and wooden structures using electromagnetic wave. The Japan-Hungary Joint Serminar of Cooperative Research Programs; pp.6, 2006
- Yanase, Y., Y. Fujii, S. Okumura, T. Yoshimura and Y. Imamura: Non-destructive evaluation of termite attack in wood and wooden constructions using acoustic emission (AE) monitoring and ceramic gas sensors. The Japan-Hungary Joint Serminar of Cooperative Research Programs; pp.6, 2006
- Itakura, S., Y. Indrayani, K. Matsumura and T. Yoshimura: Identification of microsatellite loci in the drywood termite *Incisitermes minor* (Hagen). Proceedings of the 4th Confetrence of the Pacific-Rim Termite Research Group; 47-50, 2007
- Tarakanadha, B., H. Koyanaka, T. Hata and Y.Imamura: Arsenic removal from aqueous solution by plant pumping system using activated aluminum oxide - a preliminary study. The International Research Group on Wood Protection; Document No. IRG/WP 06-50239, 2006
- Kikuchi, H., T. Hata, Y. Imamura: Sputtring of Wood Carbon and XPS analysis for Optimization of Sputtring Apparatus, The 67th RISH Symposium, 1-3, 2007
- Grace, J. K., A. Byrne, P. I. Morris, 角田邦夫: Perfromance of borate-treated lumber after 8 years in an.above-ground termite field test in Hawaii. The International Research Group on Wood Protection; Document No. IRG/WP 06-30390, 2006

b) Conference and seminar papers presented

The 24th Annual Meetingof the Wood Technological Association of Japan: 1 presentaion

The 18th Annual Meeting of the Japanese Society of Environmental Entomology and Zoology: 2 presentations

The 22nd Annual Meeting of Japan Wood Preservation Association: 1 presentation

The 2006 Annual Meeting of Architectural Institue of Japan: 3 presentations

The 56th Annula Meeting of the Japan Wood Research Society: 5 presentations

The 2006 Functionally Graded Materials Symposium: 1 presentatrion

2006 Autumn Meeting of Electrochemistry: 1 presentatrion

The 33st Annual Meeting of Carbon Materials: 2 presentations

The Autumun Meeting of the Electrochemical Society of Japan: 1 presentation

The 73rd Meeting of the Electrochemical Society of Japan: 1 presentation

The 74th Autumn Meeting of the Electrochemical Society of Japan: 1 presentation

The 4th Annual Meeting of The Wood Carbonization Research Society: 1 presentation

The Japan-Hungary Joint Seminar on Cooperative Research Program: 2 presentations

- The 37th Annual Conference of the International Research Group on Wood Preservation: 4 presentations
- The XY Congress of the Internationa Union for the Study of Social Insects (IUSSI): 3 presentations
- The 4th Conference of Pacific Rim Termite Research Group: 3 presentations
- Carbon 2006: 1 presentations

NT06: 1 presentations

The Spring Meeting of E-MRS IUMRS ICEM 2006: 1 presentation

A-3. Off-campus activities

Membership in academic societies (roles)

- Imamura, Y.: Japan Wood Research Society (President), Japanese Association of Wood Technology (Trustee and member of project committee in Kansai branch), Japan Wood Preserving Association (Trustee and vice president), Japanese Society of Environmental Entomology and Zoology (Trustee and vice president), Wood Carbonization Research Society (Vice president)
- Tsunoda, K.: Japan Wood Preserving Association (Chairman of the Committee for the Promotion of Nishinihon Project)
- Yoshimura, T.: Japanese Society of Environmental Entomology and Zoology (Trustee), Material Research Society, Japan (Editorial board and secretary of research party on wood-based materials), Japan Termite Control Association (Council, Editor-in chief, Vice president of Kansai Branch), Japan Wood Preserving Association (Editorial board)
- Hata, T.: Technical and Editorial Committee of Wood Carbonization Research Society (Member of the Steering Committee), Japan Wood Preserving Association (Member of the Committee for the Promotion of Nishinihon Project)

Research grants

- Imamura, Y: Grant-in-aid for Scientific Research (C), The development of wood-nano-capsule containing metals by fast heating system (Head investigator), Grant-in-aid for Scientific Research (B) (2) Development of thermal 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)
- Tsunoda, K.: Grant-in-Aid for Scientific Research (B) Recoverable soil treatment units against termites based on grooming behavior (Head investigator)
- 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), Grant-in-Aid for Scientific Research (萌芽) Mechanical and Material Characteristics of Termite Mandibles (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 New Type of lithium battery from carbonized wood with multiwall carbon nanotubes (Head investigator), Grant-in-Aid for Scientific Research: (Exploratory) Development of carbonized-wood substrate for diffusing heat in solar power satellite (Head investigator), Grant-in-Aid for JSPS Fellows: Novel extraction technology to purify environment contaminated by preservative treated wood (Head investigator), Sumitomo Foundation for Environmental Study: Purification by meso-porous materials of humano-environment contaminated by toxic elements (Head investigator), Grant-in-Aid for Scientific Research: (C) Utilization and Application of meso-porous carbons with crystal characteristic for

electrodes (Fellows)

A-4. International cooperation and overseas activities

International cooperations

Imamura, Y.: Special lecture in International Symposium on Sustainable Humanosphere 2006– "Toward the Harmonization of Economy and Ecology" (Indonesia)

Tsunoda, K.: Special Lecture in Bundesforschungsanstalt für Forst-und Holzwirtschaft

International meetings (roles)

- Imamura, Y.: Annual Meeting of the Korean Society of Wood Science and Technology (Invited speaker
- Tsunoda, K.: National Conference on Urban Entomology 2006, Raleigh, USA (Invited speaker), The 4th Conference of Pacific-Rim Termite Research Group, Kaoshung, Taiwan (President)

Membership in international academic societies

- Imamura, Y.: Member of the Exective Board of the International Research Group on Wood Preservation
- Tsunoda, K.: Pacific Rim Termite Research Group (President), IUFRO Working Party 5.03.05 (Moderator), UNEP Termite Expert Group (member)
- 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 synthetic plastic materials with field trials (Australia), Joint research on the colony structure of Coptotermes formosanus (Australia), Joint research on the novel natural wood preservatives (Finland), Joint research on heat-treated wood (Finland)
- 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), Town of Medley Scope of Service Online Project (USA)

Scholars from abroad

Collaborative researchers: 3 (Istanbul University • Turkey, Universiti Sains Malaysia • Malaysia, University of Hawai)

B. Educational Activities (2006.4-2007.3)

B-1. On-campus teaching

- a) Courses given
- Undergraduate level: Wood Preservation (Imamura and Yoshimura), Science for Humanosphere-[Development of science and technology through biomass and solar power satellite research toward a solar energy society] (Imamura, Yoshimura, Hata), Science for Humanosphere-[Development of technology and materials for cyclic
utilization of bio-based resources] (Hata)

Graduate level: Lecture on Wood Deterioration Control I (Imamura, Yoshimura, 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,, Undergraduate course in Nara Educational University

Open seminar, etc

- Imamura, Y.: Special Symposium of Wood Technological Association of Japan-Kansai Branch, Open seminar of Hiroshima Wood Resource Utilization Party, Open seminar of Kagoshima Industrial Technology Center, Lecture in Earth Environmet Course of NPO Nature University, Special lecture in the 50th Anniversary Meeting of Japan Mokuzai-Seisounenn-Dantai-
- Yoshimura, T.: Wood Science Seminar of Wood Technological Association of Japan (Lecturer), Super Science High School (SSH) Program of Kyoto Educational University High School (Lecturer), Kinki Fumakira Meeting (lecturer), Termite Control Operator Licencing Seminar of Japan Termite Control Association (Lecturer), Termite and Fungi Inspector Licencing Seminar of Japan Termite Control Association (Lecturer)

B-3. Overseas teaching

Students and research fellows from abroad

Foreign students: Doctor's Program: 5 (France, Korea, Indonesia), Post-doctorate Fellow: 1 (India) Lectures

Imamura, Y.: Special lecture in Wood Science School 2007, Indonesia

Tsunoda, K.: Special lecture in Faculty of Entomology, Georgia State University

Yoshimura, T.: Special lecture in Wood Science School 2007, Indonesia

C. Other remarks

- Imamura, Y.: Kyoto University (Council member of Kyoto University Rakuyukai, Council member of Resrach Center for Ecology), ISO/TC Wood Preservation Committee (Chair person), Japanese Agency for the Evaluation of Wood Preservatives (Chairman of technical committee),, Japan Housing and Wood Technology Center (Council member), Nara Prefecture (Member of Forestry Research Council), Kumiyama Town (Member of Town Planning Council), Architecture Research Association(Council member)
- 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), Toyama Prefecture (Member of Research Promotion Council, Forestry Technology Center)
- Hata, T.: Society for the Study of Functional Wood-based New Materials (Member of Professional Technical Committee), Burea of Kinki Economy and Industry, Ministry of Economy, Trade and Industry, 2006 Grant-in-aid Demonstration for Unused Biomass Energy, "Feasibility Study of Power Generation and Thermal availability system by Pyrolysis

Gasification of CCA-treated Waste Wood for that uses waste of CCA treated wood" (Member of Technical Committee)

2.2.20 Laboratory of Structural Function

Staff	Professor	: Komatsu, Kohei,	Dr. Agric. Sci.
	Assistant Professor	r : Takino, Shinjiro,	Dr. Agric.Sci.
	Assistant Professor	r : Mori, Takuro,	Dr. Engr
Students and research fellows			
	Overseas special research fellows : (2)		
	Doctor's program	: ((4)
	Master's program	:(1)

A. Research Activities (2006.4-2007.3)

A-1. Main subjects

In order to develop reliable wooden structures, it is important to select the optimum joint methods having high joint efficiency for both stiffness and strength. We are developing various engineered timber joints or/and structural units and analyzing their behaviors through full-scale experiments as well as theoretical modeling on the basis of timber engineering, wood science and technologies, and structural engineering.

- 1. Development of Engineered Timber Joint for Medium or/and Large Scale Timber Construction.
 - a) Research and development of large finger jointed glulam frame corners.

There is a jointing method called as "Large Finger Joint (LFJ)" to make glulam beams and columns glued joint on-site directly. As this joint method is completed by gluing literally large fingers joint on-site, it requires less steel connectors, is low-cost and has high initial stiffness. But the failure mode is quite brittle. Especially in the case where two members are jointed having finite angle, the joint part tends to fail most brittlely in the mode of tension perpendicular to the grain subjected to open mode moment. In this research subject, we are investigating strength expression mechanism and developing improvement methods for preventing brittle failures.

b) Evaluation of pull-out capacity of Lagscrewbolt and its application to glulam frame structures.

We developed screw-in type connector called as 'Lagscrewbolt (LSB)' as an innovating fastener using minimum steel and high aesthetic concealed joint, and are investigating its strength expression mechanism. At the same time, we are developing structural design method as well as recognizing safety of LSB by full-scale experiments in order to applying LSB to the actual glulam portal frame structures, thus we expect LSB would be used more widely in general wooden constructions.

c) Development of High Ductility and High Strength Wooden Portal Frames Using Mixed Species Glulam.

Mixed species glulam is constituted by domestic Sugi inner laminae whose mechanical

properties are relatively inferior to others and imported Douglas fir outer laminae whose mechanical properties are relatively superior. We are developing glulam portal frames which are composed of mixed species glulam for all members and their beam-column joints and leg joints are assembled by using steel gusset plates with flange parts though where embedment stresses can be transmitted to the glulam members so as to utilize stronger properties of outer laminae.

2. Development of Wooden Eco Hose Utilizing Natural Building Materials.

In order to establish one of the basic facilities for the mission researches as well as the domestic cooperative researches in Research Institute for Sustainable Humanosphere, we are developing a prototype wooden post & beam house composed of only such natural materials as wood, mud and bamboo etc. In 2005, a two story experimental house of 5.4m x 9.1m plane was built to make sure innovating points in practical works and to estimate structural performance by experienced in actual election process.

- 3. Estimation and Analyses of Mechanical Properties of Various Wooden Structural Components
 - a) Estimation of various wooden shear walls, floor system and semi-rigid frames.

We are estimating strength ratio (multiplier) of various shear walls and floor systems composed of such materials as plywood, oriented strand boards or mud shear wall, and braces made of sawn timbers cooperating with commercial based companies. In addition to this, we are also developing optimum evaluation system for timber semi-rigid frame systems by cooperating with independent estimation organization.

b) Investigation on the mechanism of stiffness and strength in ductile moment-resisting joints focused on the role of traditional Nuki or Kusabi joints.

Nuki or Kusabi is important structural component in traditional wooden structures. Its initial stiffness, however, is relatively low so that its application to modern wooden constructions seems to be difficult if traditional style is rigorously applied. In this research subject, we intend to develop a new ductile, stiff and strong moment-resisting joint based on traditional timber joint mechanism by mixing latest technology while keeping advantage points of traditional joint, which is essentially ductile.

c) Structural utilization of Sugi compressed dowels.

Compressing relatively low density Sugi timber up to 30 to 50 % of the original volume can easily produce high-density joint supplemental material. In this research subject, we are developing innovating timber joint method with less stress relaxation function by making use of both characteristics of 'high strength properties' and volume recovering with water absorption. Actually, we are investigating applicability of Sugi compression timber to Kusabi (wedge) or Syachi (shear connector).

d) Development of wooden blocks shear wall system

We are developing a new type of shear wall by using wooden block, which has grooves around each side face to interlock with other wooden blocks. Diamond shape Sugi compression wood keys were inserted into spaces, which were born by cutting off triangular area on each corner of the wooden blocks, to make in-plane stiffness of shear wall higher.

A-2. Publications and presentations

a) Publications

Books

<u>Kohei Komatsu</u>, Yakni Idris, Ee-Ding Wong, Sutadji Yuwasdiki, Anita Firmanti and Bamgbang Subiyanto: "Use of Mixed Species (Falcatria-Rubberwood) Laminated Veneer Board (LVB) for Structural Applications in Wooden Houses" p.51-59, in Sustainable Development and Utilization of Tropical Forest Resources, - Report of JSPS-LIPI Core University Program in the Field of Wood Science 1996-2005, edited by Y.Imamura, T.Umezawa and T.Hata, University Printing in Kyoto University, March 15, 2006

Original papers

- Kiho Jung, Kweonhwan Hwang and <u>Kohei Komatsu</u>: Effect of Changes in the Moisture Content due to Surrounding Relative Humidity on the Contact Stress in Traditional Mortise and Tenon Joints I. Effects of komisen insertion and joint drying on the contact stress between end grain of column and still-, Mokuzai Gakkaishi, 52(1), 44-49, 2006. (in Japanese)
- Kiho Jung, Kweonhwan Hwang and <u>Kohei Komatsu</u>: Effect of Changes in the Moisture Content due to Surrounding Relative Humidity on the Contact Stress in Traditional Mortise and Tenon Joints II. -Evaluation of anti-relaxation effects by deformation recovery of compressed wooden Komisen on the contact stress of joints-, Mokuzai Gakkaishi, 52(3), 153-159, 2006. (in Japanese)
- Makoto Nakatani and <u>Kohei Komatsu</u>: Mechanism of Pull-out Performance in Lagscrewbolted Timber Joints III. -Development of a theory of pull-out properties perpendicular to the grain, Mokuzai Gakkaishi, 52(3), 160-167, 2006. (in Japanese)
- Atsushi TABUCHI, Akihisa KITAMORI, <u>Takuro MORI</u> and <u>Kohei KOMATSU</u>: Lateral Shear Performance of Earth-wall in case of a Town House of Kyoto, Journal of Structural Engineering, AIJ, 605, 143-150, Jul., 2006. (in Japanese)
- Masanobu KAWAZOE, Yukitoshi TUCHIYA, <u>Takuro MORI</u> and <u>Kohei KOMATSU</u>: Effect of Crossbanded Laminates on the Bearing Properties of Mechanical Joints of Laminated Veneer Lumber with a Drift Pin, Mokuzai Gakkaishi, 52(4), 221-227, 2006. (in Japanese)
- Kiho Jung, Akihisa Kitamori, A. J. M. Leijten and <u>Kohei Komatsu</u>: Effect of Changes in the Moisture Content due to Surrounding Relative Humidity on the Contact Stress in Traditional Mortise and Tenon Joints III. •Pull•out strength of compressed Sugi komisen joints•, Mokuzai Gakkaishi, 52(6), 358•367, 2006. (in Japanese)
- Hideki Morita, Yoshiyasu Fujimoto, <u>Kohei Komatsu</u> and Yasuhide Murase: Development of a Shear Testing Method for Full-sized Structural Lumber, Mokuzai Gakkaishi, 52(6), 376-382, 2006. (in Japanese)
- Masahiro Noguchi, <u>Shinjiro Takino</u> and <u>Kohei Komats</u>u: Development of wooden portal frame structures with improved columns, Journal of Wood Science, 52(1), 51-57, 2006.
- Wen-Shao Chang, Min-Fu Hsu and <u>Kohei Komatsu</u>: Rotational performance of traditional Nuki joints with gap I: theory and verification, Journal of Wood Science, 52(1), 58-62, 2006.
- Tamami Kawasaki, Min Zhang, Qian Wang, <u>Kohei Komatsu</u>, Shuichi Kawai: Elastic moduli and stiffness optimization in four-point bending of wood based sandwich panel for use as structural insulated walls and floors, Journal of Wood Science, 52(4), 302-310, 2006.
- Masahiro Noguchi, Kohei Komatsu: "Estimation of stiffness and strength in timber knee joints

with adhesive and verification by experiment", Journal of Wood Science, 52(5), 411-421, 2006

- Shinya MURANISHI, Masami GOTOU, <u>Takuro MORI</u> and Yoshiyuki SUZUKI: Experimental study on measurement of strains of pillars in Higashi-Honganji Goeidou -Relationship between wood weight and strain due to the variation of humidity-, The 12th Japan Earthquake Engineering Symposium, 826-829, November, 2006. (in Japanese)
- Hiroshi ISODA, Toshio KITAMUR, Shigeo TAKAHASHI, <u>Takuro MORI</u> and Akira SASAGAWA: Calculation Methods on Creep Behavior of Glulam Beam with Joint under Normal Condition., J. of structural engineering, Vol.53B, 317-322, March, 2007. (in Japanese)

Reports

- Masahiro Murakami, Masaya Fujii, Toshikazu Sugimoto, <u>Kohei Komatsu</u>, Ryuuji Inoue, Toshiyuki Kanyama: Effect of Testing Methods on Mechanical Behaviors of Wooden Shear Walls (Part1 Shear Walls Nailed-on-Sheathing Material), GBRC, 31(1), 10-17, 2006. (in Japanese)
- Masami Gotou, <u>Takuro Mori</u>, <u>Kohei Komatsu</u>, Ryuuji Inoue, Toshiyuki Kanyama: Effect of Testing Methods on Mechanical Behaviors of Wooden Shear Walls (Part2 Braced Shear Walls and Solid Timber Boards Shear Walls), GBRC, 31(2), 46-51, 2006. (in Japanese)
- Kohei Komatsu, Yakni Idris, Ee-ding Wong and Shinjirou Takino: Aptitude Evaluation of Rubber-Falcataria Mixed Species Laminated Veneer Board (LVB) as the Sheathing Material for the Wooden Rigid Floor. Proceeding of the 55th Material Research Congress, 365-366, Nagaoka Institute of Technology, 2006. (in Japanese)
- <u>Kohei Komatsu,</u> Kiyoshi Hosokawa, Shingo Hattori, Hidenao Matsuoka, Kuniyoshi Yanaga and <u>Takuro Mori</u>: Development of Ductile and High-Strength Semi-Rigid Portal Frame Composed of Mixed-Species Glulams and H-shaped Steel Gusset Joints, Proceedings of the World Conference on Timber Engineering 2006, No. Page (CD-ROM only), Portland, Aug. 2006.
- Kohei Komatsu: Traditional Timber Structures in Japan, Seminar on Traditional Timber Construction, 7th September, Bath, UK, 2006
- Kohei Komatsu: Research & Development of Engineered Timber Joints for Medium or Large Scale Glulam Structures, The 2006 Global Forum for the Built-Environment Sustainable Technology, 31st September, Taipei, Taiwan, 2006
- <u>Kohei Komatsu</u>, Satoru Murakami, Munekazu Minami and Maryoko Hadi: Shear Wall made of Rubber Wood and Falcatalia Mixed Species LVL easily Built-Up with Power Driven Coarse-Thread Screws, Proceedings in the International Seminar on Tropical Eco-Settlements, Sanur Paradise Hotel, Denpasar, Bali - Indonesia, 14-16 November, 2006.
- <u>Kohei Komatsu</u>, Akihisa Kitamori and Atsushi Tabuchi: Mud-Shear Walls in Japanese Traditional Timber Town Houses -Evaluation of Structural Performance by Full-Scale Experiments-, Proceedings in the International Forum on Cultural Heritage Conservation in the Twenty-First Century, November 18, National Cheng-Kung University, Tainan, Taiwan, 2006
- Mori, T., A. Kitamori and <u>K. Komatsu</u>: Effect of Testing Methods on the Mechanical Behaviors of Shear Walls composed of Wooden Plates, Proceedings of 10th World Conference on Timber Engineering, CD-ROM, Portland, USA, 6-10th August, 2006

- Nakatani, M., <u>T.Mori</u> and <u>K. Komatsu</u>: Moment-Resisting Joints using Lagscrewbolts, Proceedings of 10th World Conference on Timber Engineering, CD-ROM, Portland, USA, 6-10th August, 2006
- Yasunobu Noda, <u>Takuro Mori</u> and <u>Kohei Komatsu</u>: Study on Strength Performance of Large Finger Joints, Proceedings of 10th Timber Engineering Forum, 48-51,2006. (in Japanese)
- <u>Kohei Komatsu</u>, Makoto Nakatani<u>, Takuro Mori</u> and Kenhou Okura: Development of Glulam Portal Frames Composed of LSB Joints. Proceedings of 10th Timber Engineering Forum, 22-25,2006. (in Japanese)
- Makoto Nakatani<u>, Takuro Mori</u> and <u>Kohei Komatsu</u>: Research and Development of Glulam Portal Frames Composed of Lagscrewbolts, 26-29,2006. (in Japanese)
- <u>Takuro Mori</u> and <u>Kohei Komatsu</u>, Makoto Nakatani, Takeshi Shimizu, Shigeaki Kawahara, Kazuma Matsuo and Kazuo Yonemoto: Research and Development of Glulam Portal Frames Composed of Lagscrewbolts Part3 Influence of the strength properties by the potion of LSB, 30-33,2006. (in Japanese)

b) Conference and seminar papers presented

The 2006 Annual Meeting of the Japan Wood Research Society (8-10, August, 2006): 2 papers The 2006 Annual Meeting of Arch. Inst. of Jap. (7-9, September, 2006): 4 papers

A-3. Off-campus activities

Membership in academic societies (roles)

Kohei Komatsu: The Japan Wood Research Society (Editor-in-Chief and board 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)

Shinjiro Takino.: The Japan Wood Research Society, Architectural Institute of Japan

Takuro Mori: The Japan Wood Research Society, Architectural Institute of Japan, The Society of Materials Science Japan, Wood Technological Association of Japan

Research grants

- Kohei Komatsu: Research Grant of Japan Society for the Promotion of Science (B2), Development of Pure Wooden Skeleton-Infill Residential House in which so called Traditional Structural Functions were Adopted. (Chief Investigator)
- Takuro Mori: Japan Society for the Promotion of Science (A), Development of wooden post and beam structure using light connectors. (Chief Investigator)
- Kohei Komatsu and Takuro Mori: Research Grant of Japan Society for the Promotion of Science (A), Research on Seismic Design and Improvement for Seismic Resistance Performance of Japanese Traditional Constructions
- Kohei Komatsu: TOSTEM Foundation for Construction Materials Industry Promotion, Research Grant, Development of Strong Wooden Floor System using Sugi Board Whose Slip Deformation Between Boards were Restricted by Newly Developed Connection. (Chief Investigator).
- Takuro Mori: TOSTEM Foundation for Construction Materials Industry Promotion, Research Grant, Investigate the damage of the beam material for termite. (Chief Investigator)
- Takuro Mori: Saneyoshi Foundation, Research Grant for Oversea Travel, Board Shear Wall

A-4. International cooperation and overseas activities

International meetings (roles)

- Kohei Komatsu: 10th World Conference on Timber Engineering, 6-10th August, Portland, USA, (Session Chairman)
- Takuro Mori: 10th World Conference on Timber Engineering, 6-10th August, Portland, USA, (Presenter)
- Takuro Mori: Wood Science School (Spring School) 2007, 26-27, February, 2007, Cibinong, Indonesia (Lecture)

B. Educational Activities (2006.4-2007.3)

B-1. On-campus teaching

- a) Courses given
- Undergraduate level: Science for Sustainable Humanosphere Development of Technology and Materials for Cyclical Utilization of Bio-based Resources (Komatsu)

Graduate Level: Wooden Structural Function II (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: Timber Engineering (University of Tokyo), Wood Based Materials and Timber structures (Kyusyu University)

Open Lectures

 Kohei Komatsu: Timber Engineering Calculation Course (Lecture), AIJ Design Standard Guidance(Lecture), Kyoto University Open Campus (Lecture), Kyoto Wood Cooperation Association Seminar (Lecture), Wooden Portal Frame Symposium (Lecture), RISH Co operational Utilization Symposium (Lecture), 56th RISH Symposium, Seminar for Kagawa Wood Association (Lecture), Emacyu Found Symposium (Lecture)

Takuro Mori: Japan Wood Research Society Timber Engineering Research Meeting (Lecture)

B-3. Overseas teaching

Overseas Lectures and Open Lectures

- Kohei Komatsu: Seminar on Traditional Timber Construction (Bath University, UK, Lecture), The 2006 Global Forum for the Built-Environment Sustainable Technology (Taipei, Taiwan, Lecture), International Workshop on Tropical Eco-Settlements (Denpasal, Indonesia, Lecture) International Forum on Cultural Heritage Conservation in the Twenty-First Century (National Cheng-Kung University, Tiawan, Lecture)
- Takuro Mori: Wooden Construction, Wood Science School (Spring School) 2007, 26-27, February, 2007, Cibinong, Indonesia
- Takuro Mori: Current research on Timber Engineering in Japan, Wood Science and Technology Center (Special seminar), 23rd August, University of New Brunswick, CANADA

Students and research fellows from abroad

RISH Invited Professor

Foreign cooperative researcher 2 (1 Taiwan, 1 UK)

C. Other remarks

- Kohei Komatsu: Technical Committee Member of General Building Research Cooperation of Japan, Estimator for FFPRI Project, Committee Member of Japan Housing and Wood Technology Center for ISO-TC-165, Committee Member for Research on Light Timber Frame Structures, 10th WCTE Advisory Committee Member
- Takuro Mori: WG member of Kansai-branch on Architectural Institute of Japan, Secretary of Wood and Wood-Based Materials Committee on the Society of Materials Science Japan.