

FIELD SCIENCE EDUCATION AND RESEARCH CENTER

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FIELD SCIENCE EDUCATION AND RESEARCH CENTER

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HISTORY AND ORGANIZATION

The Field Science Education and Research Center (FSERC) was founded in 2003 by integrating the University Forests, the Subtropical Plant Institute and the Maizuru Fisheries Research Station affiliated with the Graduate School of Agriculture, and the Seto Marine Biological Laboratory with the Graduate School of Science. The year of foundation of each facility is as follows:

- 1922 Seto Marine Biological Laboratory founded as Marine Biological Research Station
- 1924 Kyoto University Forests founded
- 1937 Kii-Oshima Research Station founded as Oshima Warm Temperate Flora Station
- 1972 Maizuru Fisheries Research Station founded
- 2003 Integration of these four facilities into FSERC

The FSERC comprises the following three divisions each consisting of several laboratories:

DIVISION OF FOREST BIOSPHERE

- LABORATORY OF FOREST SPECIES AND ECOSYSTEM CONSERVATION
- LABORATORY OF FOREST RESOURCE MANAGEMENT
- LABORATORY OF FOREST INFORMATION AND ENVIRONMENTAL RISK ASSESSMENT SCIENCES

DIVISION OF HUMAN ECOSYSTEM

- LABORATORY OF SATOYAMA RESOURCE CONSERVATION
- LABORATORY OF HUMAN ECOSYSTEM CONSERVATION
- LABORATORY OF COASTAL FISHERIES ECOLOGY
- LABORATORY OF COASTAL FISHERIES RESOURCE MANAGEMENT
- LABORATORY OF ESTUARINE ECOLOGY

DIVISION OF BASIC MARINE BIOLOGY

- LABORATORY OF SYSTEMATICS AND TAXONOMY FOR MARINE ORGANISMS
- LABORATORY OF EVOLUTIONARY MORPHOLOGY OF MARINE ORGANISMS
- LABORATORY OF MARINE BIODIVERSITY CONSERVATION BIOLOGY
- NaGISA PROJECT

DIVISION OF INTEGRATED COASTAL MANAGEMENT

AIMS

The forest and coastal biospheres have been tightly related to one another, and have given plenty of benefits to human beings. The rapid expansion of human activity in recent times, however, threatens to sever this long-existing relationship and causes a severe environmental problem. In order to recover these biospheres and their proper relationship, and to make sustainable use of the benefits from them, the progress of the study on human ecosystem is much desired.

Under the circumstances above, the FSERC aims to establish the "Connected Rings of Forest-Human Habitation-Marine", a

new frontier of field science which aids the coexistence of nature and human beings, and to become a hub organization of the field science in the temperate zone of East Asia. The details of research and education are shown in the description of each division.

PUBLICATIONS

The FSERC and its facilities publish the following periodicals: FSERC News (Newsletter in Japanese from the FSERC since 2004)

Forest Research, Kyoto (Scientific journal in Japanese from the University Forests since 1930)

The Report of the Kyoto University Forests (Annual report in Japanese from the University Forests since 1951)

Report of Fisheries Research Station, Kyoto University (Scientific journal in Japanese from the Maizuru Fisheries Research Station since 1992)

Publication of the Seto Marine Biological Laboratory (Scientific journal in English from the Seto Marine Biological Laboratory since 1949)

Special Publication Series (Irregularly published series of the above journal since 1958)

Annual Report of the Seto Marine Biological Laboratory (Annual report in Japanese from the Seto Marine Biological Laboratory since 1987)

DIVISION OF FOREST BIOSPHERE

In this section three affiliated forest research stations and three experimental stations, field-based research and educational activities in diverse areas of forest and wood sciences are being undertaken mainly at the graduate school level of Kyoto University. These activities include research and educational instruction on integrated acquisition and analysis system for forest resource informatics, functional evaluation and spatial zoning technology of forested landscape based upon natural environment, ecological structure and socio-economic conditions, sustainable forest resource management system, and promotion of sustained forest resource and ecosystem productivities from silvicultural viewpoints.

LABORATORY OF FOREST SPECIES AND ECOSYSTEM CONSERVATION

Associate Professor

TOKUCHI, Naoko, D.Agr. (Kyoto Univ.), *Forest Ecosystem Ecology, Nitrogen Dynamics*
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Purwanto, R. H. and Tokuchi, N. (2005) Production and seasonal patterns of leaf litter in moist deciduous forests in eastern Java, Indonesia. *Tropics* 14: 371-376

Hobara, S., Koba, K., Osono, T., Tokuchi, N., Ishida, A. and Kamada, K. (2005) Nitrogen and phosphorus enrichment and balance in forests colonized by cormorants: Implications of the influence of soil absorption. *Plant and Soil* 268: 89-101

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

Assistant Professor

SAKIMOTO, Michinori, D.Agr. (Kyoto Univ.), *Forest Ecology; Tree Behavior Ecology and Eco-morphology*

sakimoto@kais.kyoto-u.ac.jp

Hirayama, K. and Sakimoto, M. (2003) Regeneration of *Cryptomeria japonica* on a sloping topography in a cool-temperate mixed forest in the snowy region of Japan. *Canadian Journal of Forest Research* 33: 543-551

Sakimoto, M. and Hirayama, K. (2002) Morphology, structure and dynamics of modules of *Cryptomeria japonica* saplings in closed canopy and in canopy gaps. *Forest Research, Kyoto* 74:53-59

Sakimoto, M. (1996) Plastic architecture and allometry of *Abies sachalinensis* saplings in a northern conifer-hardwood forest. *Bull. Kyoto Univ. Forests* 68:1-8

The studies of our laboratory are focused on analyses of the formation and maintenance mechanisms of diversity and ecological systems at different levels (i.e. species, individual or gene, population, community, watershed, and landscape) in natural and artificial forests. We also focus on analyses of the life histories of forest species, especially plant species. In addition, to develop the methods for conservation of forest ecosystems and for sustainable utilization of forest resources, we are challenging the studies of large- and small-scaled experimental manipulations in forest fields.

LABORATORY OF FOREST RESOURCE MANAGEMENT

Professor

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T. Yoshioka, T., K. M. G. Mostofa, E. Konohira, E. Tanoue, K. Hayakawa, M. Takahashi, S. Ueda, M. Katsuyama, T. Khodzher, N. Bashenkaeva, I. Korovyakova, L. Sorokovikova and L. Gorbunova. 2007. Distribution and characteristics of molecular size fractions of freshwater dissolved organic matter in watershed environments: Its implication to degradation. *Limnology*, 8:29-44.

K. M. G. Mostofa, Takahito Yoshioka, Eiichi Konohira, Eiichiro Tanoue. 2007. Photodegradation of fluorescent dissolved organic matter in river waters. *Geochemical Journal*, 41:323-331.

K. M. G. Mostofa, Takahito Yoshioka, Eiichi Konohira and Eiichiro Tanoue. 2007. Dynamics and characteristics of fluorescent dissolved organic matter in the groundwater, river and lake water. *Water Air and Soil Pollution*, 184:157-176.

Associate Professor

ANDO, Makoto, D.Agr. (Kyoto Univ.), *Forest Ecology*

ando@kais.kyoto-u.ac.jp

Ando, M., Kawanabe, S. and Noborio, H. (1986) Studies on the growth of planted stands in Kyoto University Forest in Ashiu -Stand condition at the setting of study area in planted Sugi (*Cryptomeria japonica*) forest. *Bull. Kyoto Univ. Forests* 57:93-111

Ando, M., Noborio, H., Oniishi, C. and Kawanabe, S. (1995) Regeneration of natural cool temperate forest mixed with Sugi (*Cryptomeria japonica*) 13 years change in stand structure after a selective cutting. *Trans. Jpn. For. Soc.* 106:265-266

Ando, M. (1995) Dynamics of natural forest at University Forest in Ashiu. *Ringyo Gijutsu* 644:19-24

Assistant Professor

SAKANOUÉ, Nao, D.Agr. (Kyoto Univ.), *Distribution System of*

Forest Productions

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Sakanoué, N. (1998) Laminated lumber and Improved Wooden Constructions: Japanese Housing Constructors' Choice of Materials. *Journal of Forest Economics* 44(1):69-74

Sakanoué, N. and Endo, K. (2000) Sugi timber as the parts of wood construction. The New Marketing Strategy of Sugi Timber I. (Ed. Endo, K.) *Nihon Ringyo Chousakai*, Tokyo, 118-140

Sakanoué, N. (2001) Qualitative Changes of the Needs for Wood Used in Housing. *Forest Economy* 54(7):1-14

Targets of our laboratory are the quantification and evaluation of multi-functions (e.g., biological and environmental resources) of forest ecosystems, environmental impact analyses of the forested watershed environment, and analyses of the distribution system of forest productions. We also survey the importance of the environmental value judgment and the public involvement in processes on the planning and decision-making for environmental measures.

LABORATORY OF FOREST INFORMATION AND ENVIRONMENTAL RISK ASSESSMENT SCIENCES

Associate Professor

SHIBA, Masami, D.Agr. (Kyoto Univ.), *Forest Resource and Environmental Management Planning*

mshiba@kais.kyoto-u.ac.jp

Shiba, M. and Ohta, I. (2002) Chapter 6. Harvesting Ecology and Economics, Chapter 7. Opportunities for Private Timber Owners in Sustainable Forestry. The Business of Sustainable Forestry. Tsukiji-syokan, Tokyo, 129-181

Shiba, M. (2005) Compatibility of Forest Certification and Forest Harvest Practice Code Approach to Sustainable Forest Management. *Journal of the Japanese Forest Society* Vol.87(4): 358-363

Shiba, M. (2005) Status quo of forestry production circumstances in Japan and new trends of wood logistics based upon the international forest certification and CoC-labeling schemes. Proceeding of Seminar on the Sustainable Management and Utilization of Japanese Cedar, Korea Forest Research Institute (KFRI) – Warm-Temperate Forest Research Center, Seogwipo, Korea: 40-74.

Lecturer

NAKASHIMA, Tadashi, D.Agr. (Kyoto Univ.), *Forest Conservation and Natural Disasters in Mountain Regions*

tnakashi@kais.kyoto-u.ac.jp

Nakashima, T. and Takei, A. (1992) Experimental study on the motion of coarse material debris low. *International Congress Interpraevent 1992 in Bern, vol.2:285-296*

Nakashima, T. and Kawanabe, S. (1995) Damage to the Forests in the Western Part of Japan Caused by Typhoon No.19 in 1991. *Proc.XX IUFRO World Congress, Finland:195-207*

Nakashima, T. (2004) What forest gives river -Transported debris in a natural forest watershed -The relation of forest, "sato" and sea. The Field Science Education and Research Center, Kyoto University edited, Kyoto University Museum, Tokyo, 110-111

Keynote research theme of the laboratory is focused on the overall application of the state-of-the-art information technologies for sustainable forest management system interacting with socio-economic and environmental context, and concentrates on solving the problems faced by diverse forest stakeholders such as policy makers, managers, engineers, and general publics.

Current researches include the development of optimum forest management planning alternatives based on forest information technology and training program, applicability of GIS/GPS tools for forest management strategies, quantification of appropriate

mechanisms between forests and water environments, forest certification and appropriate harvesting systems, development of environmentally friendly timber harvest and road network systems, forests and their role in water supply and quality, life cycle assessment and risk analysis of production activities in forestry, and economical development through better value chains from forest to forest products.

DIVISION OF HUMAN ECOSYSTEM

In the broad and varied areas from mountainous zones to coastal zones, a lot of moderate interferences of human beings have been continued for a long time in various intensities. As a result characteristic ecosystems have been formed by the interaction between nature and human beings and/or by the coexistence of human beings and nature. This ecosystem is under the strong influence of human activities for survival, specifically in the forms of agriculture, forestry, fisheries and so on, and also including the villages, towns and cities that are human residential areas. The understanding of these ecosystems, which is one of the main subjects of this division, leads the solution of essence to the global environmental problems. Here we are trying to analyze of interactions between human activities and nature, and practicing the education and research to build up the coexistence system.

LABORATORY OF SATOYAMA RESOURCE CONSERVATION

Professor

SHIBATA, Shozo, D.Agr. (Kyoto Univ.), *Nature Restoration and Bamboo Ecology*

sho@kais.kyoto-u.ac.jp

Shibata, S. (2006) Effect of density control on tree growth at ecological tree planting sites in Japan, *Landscape and Ecological Engineering* 2(1): 13-19

Shibata, S., Kumar, A., I.V. Ramanuja Rao and Sastry, Ch. (2002) Flowering of *Phyllostachys pubescens* Mazel ex Houzeau Lehaie in the sixty-seventh year, and germination of caryopses produced at Kamigamo, Kyoto University Forests, Japan. In *Bamboo for Sustainable Development*: 345-365

Shibata, S. (1989) Study on the utilization of dwarf bamboo for landscape architecture as a ground cover material. *Revegetation Research* 3:1-171

Associate Professor

HASEGAWA, Hisashi, D.Agr. (Kyoto Univ.), *Forestry/forest engineering*

hase@kais.kyoto-u.ac.jp

Hasegawa, H. and Yoshimura, T. (2003) Application of dual-frequency receivers to static surveying under tree canopies. *Journal of Forest Research* 8(2): 103-110

Tachiki, Y., Yoshimura, T., Hasegawa, H., Mita, T., Sakai, T., and Nakamura, F. (2005) Effects of polyline simplification of dynamic GPS data under forest canopy on area and perimeter estimations. *Journal of Forest Research* 10(6): 419-427

Hasegawa, H. and Yoshimura, T. (2007) 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

At present *Satoyama* (village forests) are declining in value for use and are being neglected in many places. This laboratory designs courses and researches relating to the development of new methods for the utilization of *Satoyama* to coexist with it again. *Satoyama* also has been keeping peculiar ecosystems as the secondary nature by the interaction between human beings and na-

ture. The researches to restore these ecosystems, to evaluate them from the view of regional characteristics by making up the inventory, and to develop the relationship to adjacent agricultural ecosystems and urban ecosystems and so on are also the important subjects.

LABORATORY OF HUMAN ECOSYSTEM CONSERVATION

Associate Professor

UMEMOTO, Shinya, D. Agr. (Kyoto Univ.), *Weed Science and Economic Botany, Human Ecosystem, Plant Resource, Culture Conservation*

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Umemoto, S. (2002) The elements of ethnobotanical classification in Kii Province, Japan, Kyoto, 195pp.

Umemoto, S. (2003) The natural elements of Kii-oshima Island, Japan, Kyoto, 52pp.

The earth may be divided into nature and human ecosystems. In this laboratory, discussions are regarding where, when and how the human ecosystem evolved from the natural ecosystem and how the human ecosystem should be managed, in relation to the conservation of a natural ecosystem. The vegetation evolution and domestication continuum from the wild to the weed, the encouraged, the semi-tamed to the tamed in human ecosystems of Asian civilization and regional cultures are also field-surveyed.

LABORATORY OF ESTUARINE ECOLOGY

Associate Professor

TAGAWA, Masatomo, D. Sc. (Univ. of Tokyo), *Fish Physiology, Hormone, Fish Development*

tagawa@kais.kyoto-u.ac.jp

Tagawa, M. and Hirano, T. (1987) Presence of thyroxine in eggs and changes in its content during early development of chum salmon, *Oncorhynchus keta*. *Gen. Comp. Endocrinol.* 68:129-135

Tagawa, M. and Hirano, T. (1991) Effects of thyroid hormone deficiency in eggs on early development of the medaka, *Oryzias latipes*. *J. Exp. Zool.* 257:360-366

Tagawa, M. and Aritaki, M. (2005) Production of symmetrical flatfish by controlling the timing of thyroid hormone treatment in spotted halibut *Verasper variegatus*. *Gen. Comp. Endocrinol.* 141: 184-189

Assistant Professor

NAKAYAMA, Kouji, D. Agr. (Kyoto Univ.), *Molecular Genetics of Fish, Phylogeny, Molecular Ecology*

nakayama@kais.kyoto-u.ac.jp

Nakayama, K. (2002) Intrastructure of Ariake population. in *Temperate bass and biodiversity-new perspective for fisheries biology*, Koseisha-koseikaku, Tokyo, 127-139

Nakayama, K. (2005) Molecular analysis of population structure and phylogeny. in *Encyclopedia of fish science*, Asakurashoten, 13-18.

Suzuki, K., Kasai A., Nakayama K., and Tanaka M. (2005) Differential trophic enrichment and half-life of stable carbon and nitrogen isotopes among tissues observed in a diet-switch experiment of Japanese temperate bass (*Lateolabrax japonicus*) juveniles: implications for analyzing fish migration. *Canadian Journal of Fisheries and Aquatic Science* 62:671-678.

The main research subjects in our laboratory are the following:
1) The early life history of fish, especially flatfishes and seabass, pursued with the goal of elucidating possible mechanisms of early mortality by means of field observations and rearing experiments.
2) Fish systematics of Indo-Pacific species, focusing on phylogenetic relationships based on morphology, mtDNA, and patterns of geographical distribution.
3) Fish physiology in the early de-

velopmental stages, focusing on hormones in eggs, metamorphosis, and osmoregulation.

LABORATORY OF COASTAL FISHERIES ECOLOGY

Professor

YAMASHITA, Yoh, D. Agr. (Univ. of Tokyo), *Coastal Ecology, Ecophysiology, Nursery Habitats*

yoh@kais.kyoto-u.ac.jp

Bolasina, S.N., Tagawa, M., Yamashita, Y. and Tanaka, M. (2006) Effect of stocking density on growth, digestive enzyme activity and cortisol level in larvae and juveniles of Japanese flounder, *Paralichthys olivaceus*. *Aquaculture*, 259, 432-443.

Chin, B.S., Nakagawa, M. and Yamashita, Y. (2007) Effects of feeding and temperature on survival and growth of larval black rockfish *Sebastes schlegelii* in rearing conditions. *Aquaculture Science*, 55, 619-627.

Okumura, Y., Kohno Y. and Yamashita, Y. (2008) Dioxin concentrations and estimation of sources in four major rivers in Miyagi Prefecture, Japan. *Fres. Env. Bull.*, 17, 173-181.

Assistant Professor

NAKANISHI, Asami, M. Agr. (Kyoto Univ.), *Forest Ecology, Nitrogen Cycling*

asa@kais.kyoto-u.ac.jp

Osawa, N., Terai, A., Hirata, K., Nakanishi, A., Makino, A., Sakai, S. and Shibata, S. (2005) Logging impacts on forest carabid assemblages in Japan. *Canadian Journal of Forest Research* 35: 2698-2708

Hirota, I., Nawata, E., Nakanishi, A. and Sipasak, S. (2008) Allometric equations to estimate the aboveground biomass of four bamboo species in shifting cultivation fields in northern Laos. *Bamboo Journal* 25: 18-25

Nakanishi, A., Inagaki, Y., Fukata, H., Shibata, S. and Osawa, N. (2008) Effects of soil properties and high intensity thinning on male flower production in hinoki cypress (*Chamaecyparis obtusa* Endlicher) forests. *Japanese Journal of Forest Environment* in press

Assistant Professor

KAI, Yoshiaki, D. Agr. (Kyoto Univ.) *Systematics of Fishes, Phylogenetics, Taxonomy*

mebaru@kais.kyoto-u.ac.jp

Kikko, T., Kuwahara, M., Iguchi, K., Kurumi, S., Yamamoto, S., Kai, Y. and Nakayama, K. (2008) Phylogeography of white-spotted charr (*Salvelinus leucomaenis*) in the Lake Biwa water system Inferred from Mitochondrial DNA Sequences. *Zoological Science* 25:146-153

Kai, Y. and Nakabo, T. (2008) Taxonomic review of the *Sebastes inermis* species complex (Scorpaeniformes: Scorpaenidae). *Ichthyological Research* 55: 238-259

Kai, Y. and Nakabo, T. (2009) Taxonomic review of the genus *Cottiusculus* (Cottoidei: Cottidae) with description of a new species from the Sea of Japan. *Ichthyological Research* in press

The laboratory is mainly dealing with studies on ecosystem and biological production structure in coastal waters. We focus on the relationship between early life ecology of commercially important fishes such as flounders, sea breams and rockfishes and the environmental conditions in coastal nursery habitats. Current interests have expanded to the elucidation of effects of terrestrial areas including forests, agricultural fields and towns on coastal ecosystems through river discharge.

LABORATORY OF COASTAL FISHERIES RESOURCE MANAGEMENT

Associate Professor

MASUDA, Reiji, D. Agr. (Univ. of Tokyo), *Fish Behavior, Ecology*

and Psychology

reiji@kais.kyoto-u.ac.jp

Nakayama S, Masuda R, Tanaka M (2007). Onset of schooling behavior and social transmission in chub mackerel *Scomber japonicus*. *Behavioral Ecology and Sociobiology* 61: 1383-1390.

Masuda R (2008). Seasonal and interannual variation of subtidal fish assemblages in Wakasa Bay with reference to the warming trend in the Sea of Japan. *Environmental Biology of Fishes* 82: 387-399.

Masuda R, Yamashita Y, Matsuyama M (2008). Jack mackerel *Trachurus japonicus* juveniles utilize jellyfish for predator avoidance and as a prey collector. *Fisheries Science* 74: 282-290.

Assistant Professor

UENO, Masahiro, D. Agr. (Kyoto Univ.), *Population Dynamics, Benthos Ecology*

siranami@kais.kyoto-u.ac.jp

Hosoi, M., Hosoi-Tanabe, S., Sawada, H., Ueno, M., Toyohara, H. and Hayashi, I. (2004) Sequence and polymerase chain reaction-restriction fragment length polymorphism analysis of the large subunit rRNA gene of bivalve: Simple and widely applicable technique for multiple species identification of bivalve larva. *Fisheries Science* 70(4): 629-637

Iguchi, A., Ito, H., Ueno, M., Maeda, T., Minami, T. and Hayashi, I. (2005) Morphological analysis of a deep-sea whelk *Buccinum tsubai* in the Sea of Japan. *Fisheries Science* 71(5):823-828

Yamaguchi, H., Takai, N., Ueno, M., and Hayashi, I. (2006) Changes of the trophic position of the Japanese flounder (*Paralichthys olivaceus*) juvenile in a sandy sublittoral area in Wakasa Bay, Sea of Japan, examined by carbon and nitrogen isotope analyses. *Fisheries Science* 72(2):449-451

We study the population dynamics of major fisheries resources in the Western Wakasa Bay to understand the marine environmental structure and oceanographic fluctuation in coastal waters. Research subjects include phylogeny, life-history, behavior and ecology of marine animals based on both field and laboratory studies. Our goal is to elucidate the mechanism of their natural population fluctuation.

DIVISION OF BASIC MARINE BIOLOGY

This division carries out various aspects of research and education in basic biology such as taxonomy, evolutionary biology, developmental biology, physiological ecology and biogeography from the molecular level to the ecosystem level using mainly temperate marine invertebrates as materials. Moreover, through extension of research fields into the global scale from tropical to boreal regions, the division also covers biology that has applied aspects such as environmental and conservation biology as subjects of research and education.

LABORATORY OF SYSTEMATICS AND TAXONOMY FOR MARINE ORGANISMS

Associate Professor

KUBOTA, Shin, D. Sc. (Hokkaido Univ.), *Invertebrate Zoology; Systematics, Cnidaria, Ctenophora, Life History, Natural History*

shkubota@medusanpolyp.mbox.media.kyoto-u.ac.jp

Kubota, S. (1983) Studies on life history and systematics of the Japanese commensal hydroids living in bivalves, with some reference to their evolution. *Jour. Fac. Sci. Hokkaido Univ. Ser. VI, Zool.* 23(3):296-402, pl. X.

Boero, F., Bouillon, J. and Kubota, S. (1997) The medusae of some species of *Hebella* Allman, 1888 and *Anthohebella* gen. nov. (Cnidaria, Hydrozoa, Lafoeidae). *Zool. Verh. Leiden* 310:1-53

Kubota, S. (2000) Parallel, paedomorphic evolutionary processes

of the bivalve-inhabiting hydrozoans (Leptomedusae, Eirenidae) deduced from the morphology, life cycle and biogeography, with special reference to taxonomic treatment of *Eugymnanthea*. *Sci. Mar.* 64(Supl. 1):241-247

Assistant Professor

YAMATO, Shigeyuki, D. Sc. (Hiroshima Univ.), *Invertebrate Zoology; Taxonomy, Crustacea, Natural History*
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Yamato, S. (1987) Four intertidal species of the genus *Melita* (Crustacea: Amphipoda) from Japanese waters, including descriptions of two new species. *Publ. Seto Mar. Biol. Lab.* 32(4/6):275-302

Yamato, S. (1992) A new species of Podocerus (Amphipoda: Podoceridae) from the carapace of a loggerhead sea turtle in Japan. *Publ. Seto Mar. Biol. Lab.* 35(4/5):281-288

Yusa, Y., Yamato, S. and Marumura, M. (2001) Ecology of a parasitic barnacle, *Koleolepas avis*: relationship to the hosts, distribution, left-right asymmetry and reproduction. *J. Mar. Biol. Ass. U.K.* 8:781-788

The main research subject of this laboratory is the systematics and taxonomy for marine organisms, which have been studied without interruption, since the Seto Marine Biological Laboratory was founded in 1922. Diversity of marine organisms is extremely high, and still remains to be studied. We aim at understanding comprehensively of this diversity, especially, on Cnidaria and Crustacea.

LABORATORY OF EVOLUTIONARY MORPHOLOGY OF MARINE ORGANISMS

Lecturer

MIYAZAKI, Katsumi, D. Sc. (Univ. of Tsukuba), *Invertebrate Zoology; Comparative Morphology and Embryology*
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Miyazaki, K. and Pass G. (2004) Morphology of the circulatory system in a sea spider, *Ammothella biunguiculata* (Pycnogonida, Ammotheidae), with special reference to the cephalic region. In *European Arachnology 2002* Plant Protection Institute & Berzsenyi College, Budapest, 89-92

Miyazaki, K. and Biliński, S. M. (2006) Ultrastructural investigations of the ovary and oogenesis in the pycnogonids, *Cilunculus armatus* and *Ammothella biunguiculata* (Pycnogonida, Ammotheidae). *Invertebrate Biology* 125: 346-353

Biliński, S. M., Beata S. and Miyazaki, K. (2008) Formation of an egg envelope in the pycnogonid, *Propallene longiceps* (Pycnogonida, Callipallenidae). *Arthropod Structure and Development* 37: 155-162

Assistant Professor

FUKAMI, Hironobu, D. Fish. (Tokyo Univ of Fisheries), *Invertebrate Zoology; Evolution and Ecology of Cnidaria*
hfukami@kais.kyoto-u.ac.jp

Fukami, H., Omori M., Shimoike K., Hayashibara T. and Hatta M. (2002) Ecological and genetic aspects of reproductive isolation by different spawning times in *Acropora* corals. *Marine Biology* 142: 679-684

Fukami, H., Budd A. F., Paulay G., Sole-Cava A., Chen C. A., Iwao K. and Knowlton N. (2004) Conventional taxonomy obscures deep divergence between Pacific and Atlantic corals. *Nature* 427: 832-835

Fukami, H., Budd A. F., Levitan D. R., Jara J., Kersanach R. and Knowlton N. (2004) Geographic differences in species boundaries among members of the *Montastraea annularis* complex based on molecular and morphological markers. *Evolution* 58: 324-337

The main research subject of this laboratory is comparative and evolutionary morphology and embryology of marine

invertebrates especially arthropods. Traditional anatomical and histological as well as recently advanced molecular and biochemical methods are applied to the research. The laboratory also covers a wide range of fields of research related to the evolutionary morphology, e.g. taxonomy, ecology, and physiology.

LABORATORY OF MARINE BIODIVERSITY CONSERVATION BIOLOGY

Professor

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Swinbanks, D. D. and Shirayama, Y. (1986) High levels of natural radionuclides in a deep-sea infaunal xenophyophore. *Nature* 320: 354-357

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Shirayama, Y. (ed.) (2000) Biodiversity and Phylogeny of Invertebrates. Shokabo, Tokyo, 327 pp.

To maintain marine organisms, it is necessary both to recognize its biodiversity and to understand how diversified fauna and flora will respond to the environmental fluctuation. For this purpose, it is prerequisite to monitor for a long-term the natural environment as well as the state and change of marine community. As a head quarter of an international field project named NaGISA (<http://www.nagisa.coml.org/>), this division has carried out monitoring of benthic fauna in Hatake Jima Is. In addition, utilizing the aquarium facility, long-term experiments to find the impact of global environmental change on marine organisms have been performed.

NaGISA PROJECT

Program-Specific Assistant Professor

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Iseto, T. (2002) *Loxocorone*, a new genus of the family Loxosomatidae (Entoprocta: Solitaria), with descriptions of two new *Loxomitra* (*sensu stricto*) and a new *Loxocorone* from Okinawa, the Ryukyu Archipelago, Japan. *Zool. Sci.* 19, 359-367

Iseto, T. (2003) Four new solitary entoprocts (Entoprocta: Loxosomatidae) from Okinawa Island, The Ryukyu Archipelago, Japan. *Proc. Biol. Soc. Washington*. 116(4), 1007-1020

Iseto, T., Y. Yokuta, E. Hirose (2007) Seasonal change of species composition, abundance, and reproduction of solitary entoprocts in Okinawa Island, the Ryukyu Archipelago, Japan. *Mar. Biol.* 151: 2099-2107

The elucidation of biogeography of near shore benthic communities rests on the clarification of the scale(s) of variability and the establishment of a global baseline of coastal biodiversity. Discovering 'where what lives', 'what lives where' and how these change over time is vital to the current issues of habitat resilience, species invasion and climate change. By working across scientific and national boundaries to improve the current state of marine knowledge at all levels NaGISA is attempting to form a network from which answers to these (and many more) questions will come. By creating and promoting standardized methods (protocol handbook available, Kyoto University Press) that have been adopted by research groups around the world the project is set to complete a habitat specific, qualitative survey of the world's ocean shores by 2010 and to repeat it over and over again during a 50-year time frame. As these global standards continue to be used to answer local questions NaGISA participants (researchers, managers and students) will be producing the world's first ongoing

near shore habitat specific global census while playing the vital role of coastal community ambassadors, increasing marine awareness and improving the state of benthic taxonomy.

DIVISION OF INTEGRATED COASTAL MANAGEMENT

Coastal marine ecosystems in Japan have serious problems to sustain the system with diverse marine organisms. As results of human operation and economic activities, pollution, disappear of seagrass beds and tidal flats, disturbance of water and sand flow system, reclamation, dike construction, and so on are undergoing to ruin the ecosystems. These disasters on coastal marine ecosystems cause from some kinds of land use by human. This division addresses these problems with special focusing on the interactions between land and coastal marine ecosystems. Also we attempt to form well-designed agreements among local people to conservation of the ecosystem in the target watershed. Finally, we try to achieve wholesome integrated coastal management.

Program-Specific Professor

MUKAI, Hiroshi, D. Sc. (Hiroshima Univ.), *Marine Ecology, Ecosystem Ecology*
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Mukai, H. : Seagrass ecosystem in the integrated systems of land and coastal marine ecosystems. *Monthly Kaiyo*, 37:148-155 (2005)

Kasim, M. and H. Mukai : Contribution of benthic and epiphytic diatoms to clam and oyster production in the Akkeshi-ko estuary. *Journal of Oceanography*, 62:267-281 (2006)

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Hasegawa, N., M. Hori and H. Mukai: Seasonal shifts in seagrass bed primary producers in a cold-temperate estuary: Dynamics of eelgrass *Zostera marina* and associated epiphytic algae. *Aquatic Botany*, 86:337-345 (2007)

Program-Specific Associate Professor

SATO, Masayuki, D. Econ. (kyoto Univ.), *Environmental Economics*,
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Sato, M. and Samreth, S. (2008) Assessing Sustainable Development by Genuine Saving Indicator from Multidimensional Perspectives, *MPRA papers*, No.9996, Munich University:1-13.

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Sakagami, M., Sato, M. and Ueta, K. (2006) Measuring Consumer Preferences Regarding Organic Labelling and the JAS Label in Particular, *New Zealand Journal of Agricultural Research*, 49(3):247-254.

FOREST STATION

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Chief, Associate Professor

SHIBA, Masami, D.Agr. (Kyoto Univ.), *Forest Resource and Environmental Management Planning*

Ashiu research forest (total area: 4,186ha) is located in the northeastern border part of Kyoto Prefecture and stretches 6km east to west and 7km north to south in a rectangular shape. The area is characterized by high relief with altitudes ranging from 355 to 959m above the sea level and encompasses the headwater zones of Yura River flowing into Wakasa bay, the Sea of Japan. According to the recent meteorological observation records, mean annual temperature is 13.1°C and mean annual precipitation is 2,333mm respectively. There is a heavy snowfall ranging from 1 to 3m in winter seasons.

This region is situated in the transition part between temperate deciduous forest zone where the main species are *Aesculus turbinata* and *Pterocarya rhoifolia* in the lower valley sites, *Fagus japonica* and *Quercus crispula* in the upper slope above 600m, and *Cryptomeria japonica*, *Clethra barbinervis* and *Ilex pedunculosa* in the ridge portions above 700m, and warm temperate forest zone where the main species are *Quercus salicina* and *Quercus sessilifolia* under 600m altitude.

Dispersed various sizes of post-harvest units with coniferous plantation (approximate area: 250ha) and second-growth stands (approximate area: 1,200ha) now exist on the landscape previously dominated by extensive old natural forests.

The main subjects of study in the natural forest research area focus on the ecosystem, stand dynamics and regeneration of natural mixed forests. While in the forest management research area, the forest productivity, silvicultural treatment techniques of the plantation and young secondary mixed forest are mainly studied. Further the influence of heavy snowfall on the tree growth and of the bear damage to conifers are investigated in both research area.

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ANDO, Makoto, D.Agr. (Kyoto Univ.), *Forest Ecology*

This forest is composed of two parts, Shibeche (1,447ha) and Shiranuka (880ha). These forests are located in the eastern part of Hokkaido Prefecture and are situated close to three national parks: Akan, Shiretoko, and Kushiro-Shitsugen. The climate is greatly influenced by the Pacific Ocean. Consequently it is characterized by sea fog and cloudy weather in summer, and cold (min. temp. - 30 °C) and dry winter. The annual mean temperature and the annual precipitation are 5.7°C and 1,157mm in Shibeche, and 7.3°C and 1,318mm in Shiranuka respectively.

Three quarters of Shibeche forest is covered with natural deciduous broad-leaved trees and the rest is artificial forests, such as *Larix kaempferi*. Though the vegetation type is secondary forest, it is of great value since very few natural forests remain in the Kosen district. Shiranuka forest is mostly natural mixed stands with conifers and deciduous broad-leaved trees.

The main subjects of research are the stand dynamics of natural forests and the improvement of silvicultural techniques. Field practice for students involving the classification of vegetation in the eastern part of Hokkaido, methods of thinning, and investigation of the structure of snow and ice is available three times a year, during summer and winter.

WAKAYAMA FOREST RESEARCH STATION

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TOKUCHI, Naoko, D. Agr. (Kyoto Univ.), *Forest Ecosystem Ecology, Nitrogen Dynamics*

Assistant Professor

SAKANOUÉ, Nao, D.Agr. (Kyoto Univ.), *Distribution System of Forest Productions*

This forest is located in the central part of the Kii Peninsula. Most of this area has a steep mountainous topography and there are some waterfalls. The total area is 842ha, and more than half is covered by plantations of *Cryptomeria japonica* and *Chamaecyparis obtusa*. In natural forest areas, *Abies firma* and *Tsuga sieboldii* are dominant. In the deciduous broad-leaved forests located over 950m above sea level, *Fagus crenata* is observed. The annual mean temperature is 12.4°C and the annual precipitation is 2,622mm.

The subject of research focuses on the sustainable forest management of plantation forests; sustained yield management planning, site preparation and silvicultural practices, timber harvesting and road network planning, and operational efficiency and product utilization. In addition to these, the ecological biodiversity studies on the stand dynamics of natural forest, the ecosystem reserves program and the watershed management are made in this forest.

FIELD STATION

KAMIGAMO EXPERIMENTAL STATION

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SHIBATA, Shozo, D.Agr. (Kyoto Univ.), *Nature Restoration and Bamboo Ecology*

Assistant Professor

SAKIMOTO, Michinori, D.Agr. (Kyoto Univ.), *Forest Ecology ; Tree Behavior Ecology and Eco-morphology*

This forest, located in the suburbs of Kyoto City, about 5km north-west-north of the University campus, is convenient for research and education. The total area is 47ha, half of which is covered with secondary forest composed mainly of *Chamaecyparis obtusa* and deciduous tree species. There are some arboretum of indigenous and foreign tree species, and nurseries.

The main subjects of study are the afforestation and the breeding of foreign species. Many tree species are gathered by the exchange of tree seeds with over 100 biological institutes around the world and over 800 tree species are growing at present. 80 species of the genus *Pinus*, 70 species of the subfamily *Bambusoideae* and 80 species of the genus *Rhododendron* have been collected. Recently, study of the management of devastated urban forests has been started.

TOKUYAMA EXPERIMENTAL STATION

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NAKASHIMA, Tadashi, D.Agr. (Kyoto Univ.), *Forest Conservation and Natural Disasters in Mountain Regions*

This forest is located in Shunan City, 5km from the coast of the Seto Inland Sea and its total area is 42ha. Half of this area is

covered with plantations of mainly *Chamaecyparis obtusa* and the other half is secondary forest of broad-leaved trees.

Principal research efforts involve the breeding and growing tests. Also carried out are the silvicultural study on *Chamaecyparis obtusa* stands, the study on material cycling in these stands and the ecological study of natural forest succession.

KITASHIRAKAWA EXPERIMENTAL STATION

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HASEGAWA, Hisashi, D.Agr. (Kyoto Univ.), *Forestry/forest engineering*

This station is composed of a nursery (0.3ha) and an arboretum (0.7ha) on the northern campus of the University. The main study is the experimental cultivation of native and foreign trees. Many researchers and students utilize the Experimental Nursery for their investigations and fieldwork.

KII-OSHIMA RESEARCH STATION

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UMEMOTO, Shinya, D. Agr. (Kyoto Univ.), *Weed Science and Economic Botany*

The station was originated in 1937 as the Oshima Warm Temperate Flora Station, re-funded in 1967 and re-built as one of the FSERC in 2003 on Kii-oshima Island off the southernmost part of Honshu. The station occupies about 12 hectares of the Island in warm temperate climate with a high precipitation. Half of the site is covered by evergreen broad-leaved trees and plants from various habitats, consisting 135 families and 760 species. In these circumstances, *Camelliaceae* and other plant families introduced are also conserved. Undergraduate students attend pocket seminars, lectures and fundamental field works of the forest-human habitation-marine science, biota survey and human ecosystem conservation.

MARINE STATION

MAIZURU FISHERIES RESEARCH STATION

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Associate Professor

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Assistant Professors

UENO, Masahiro, D. Agr., (Kyoto Univ.) *Population Dynamics, Benthos Ecology*

NAKANISHI, Asami, M. Agr., (Kyoto Univ.) *Forest Ecology, Nutrient Cycling, Litterfall*

KAI, Yoshiaki, D. Agr., (Kyoto Univ.) *Systematics of Fishes, Phylogenetics, Taxonomy*

The Maizuru Fisheries Research Station was established in 1972 being located in Maizuru City, about 100 km north of Kyoto, on the coast of the central region of the Sea of Japan.

The main recent research activities by staff and students include: (1) field studies on the life history and ecology of fishes,

invertebrates and algae, (2) laboratory studies on the early life stages of fishes to understand development, behavior, endocrinology, physiology, growth and survival, (3) studies on technology for aquaculture and stock enhancement of commercially important fishes (4) studies on coastal oceanography, (5) taxonomic research of fishes from the Indo-Pacific region. A current important subject is the elucidation of the effects of terrestrial areas including forests, agricultural fields and towns on the biodiversity and biological productivity in coastal waters. Field work is conducted using the research vessel "Ryokuyo Maru" (18 t). Establishment of the Aquatic Natural Museum in 1984, which houses the second largest collection of fish specimens in Japan, has accelerated our taxonomic work.

The number of researchers working at the station has increased in recent years, exceeding 6800 person-days in the fiscal year 2007. The researchers include students and staff from Kyoto University and other universities in Japan as well as graduate students and visiting scientists from many countries such as the USA, Canada, China, Korea, India, Bangladesh, Philippine, Taiwan, Spain and Argentina. Dormitory accommodation is available for visiting scientists and students.

SETO MARINE BIOLOGICAL LABORATORY

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Lecturer

MIYAZAKI, Katsumi, D. Sc. (Univ. of Tsukuba), *Invertebrate Zoology; Comparative Morphology and Embryology*

Assistant Professors

YAMATO, Shigeyuki, D. Sc. (Hiroshima Univ.), *Invertebrate Zoology; Taxonomy*

FUKAMI, Hironobu, D. Fish. (Tokyo Univ. of Fisheries), *Invertebrate Zoology; Evolution and Ecology of Cnidaria*

Program-Specific Assistant Professor

ISETO, Tohru, D.Sc. (Univ. of the Ryukyus), *Invertebrate Zoology; Taxonomy of Entoprocta*

The Laboratory is situated on the southwest coast of Kii Peninsula, about 234 km from Kyoto. It was founded in 1922 as a field station to provide marine course for students and facility for visiting researchers. The Laboratory also accepts graduate students of the Graduate School of Science. The Laboratory provides accommodation and scientific equipments, e.g. research vessel and microscopes, to these students and visiting scientists. It also maintains an aquarium that is open to the public. The library of the Laboratory has one of the most comprehensive collections in the country regarding the marine biology. The Laboratory mainly has carried out researches on the natural history, e.g. taxonomy and ecology of marine organisms, particularly meiofauna, coelenterates, mollusks, annelids, arthropods and fishes. Recently, interests are expanded into studies on marine biodiversity and evolution of these organisms, using electron microscopy and molecular biological techniques.

<http://www.seto.kais.kyoto-u.ac.jp/>