JaLTER Annual Report 2009

May 20, 2011

Contents

Overview of JaLTER . . . 1
Major activities of JaLTER in Fiscal Year 2009 . . . 1
Member of Executive Committee . . . 2

1 Akazu **3**
Contact . . . 3
Activities . . . 3

2 Awajishima **4**
Contact . . . 4
Publication list . . . 4

3 Aya **5**
Contact . . . 5
Activities . . . 5
Publication list . . . 5

4 Chichibu **6**
Contact . . . 6
Activities . . . 6

5 Kanumazawa **7**
Contact . . . 7
Activities . . . 7
Publication list . . . 7

6 Kasumigaura **8**
Contact . . . 8

7 Kasuya **9**
Contact . . . 9
Activities . . . 9
Publication list . . . 9

8 North Hokkaido **10**
Contact . . . 10
Activities . . . 10
Publication list . . . 10

9 Ogawa **12**
Contact . . . 12
Activities . . . 12
Publication list . . . 12

10 Takayama **13**
Contact . . . 13
Activities . . . 13

11 Tomakomai **14**
Contact . . . 14

12 Yona **15**
Contact . . . 15

13 Akkeshi **16**
Contact . . . 16
Activities . . . 16
Publication list . . . 16

14 Western part of Seto Inland Sea **18**
Contact . . . 18
Activities . . . 18
Publication list . . . 18

15 Ashoro **19**
Contact . . . 19
Activities . . . 19
Publication list . . . 19

16 Choshi **20**
Contact . . . 20
Activities . . . 20
Publication list . . . 20

17 Fuji Hokkuroku **21**
Contact . . . 21
Activities . . . 21
Publication list . . . 21

18 Fukuroyama **22**
Contact 22
Activities 22
Publication list 22

19 Fujinitayama **23**
Contact 23
Activities 23
Publication list 23

20 Fukuroyama **25**
Contact 25
Activities 25
Publication list 25

21 Kanamekawa **26**
Contact 26

22 Kawatabi **27**
Contact 27
Activities 27

23 Kiryu **28**
Contact 28
Activities 28
Publication list 28

24 Kominato **29**
Contact 29
Activities 29
Publication list 29

25 Lake Toya **30**
Activities 30
Publication list 30

26 Nobeyama **32**
Contact 32
Activities 32

27 North Tomakomai **33**
Contact 33
Activities 33

28 Ooyamazawa **34**
Contact 34
Activities 34
Publication list 34

29 Reihoku **35**
Contact 35
Activities 35

30 Shiiba **36**
Contact 36
Activities 36

31 Takaharayama **37**
Contact 37

32 Tano **38**
Contact 38
Activities 38

33 Nagaura **39**
Contact 39
Activities 39
Publication list 39

34 Kagoshima Bay **40**
Contact 40
Activities 40
Publication list 40

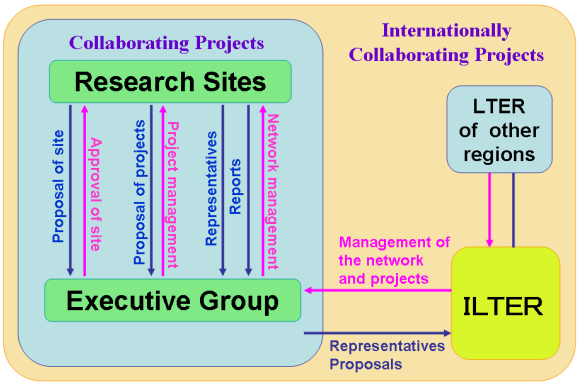
Overview of JaLTER

JaLTER (Japan Long-Term Ecological Research Network) was established in November 2006 to provide scientific knowledge which contributes to conservation, advancement and sustainability of environment, ecosystem services, productivity and biodiversity for a society by conducting long-term and interdisciplinary research in ecological science including human dimensions. The JaLTER is a formal member network of the International Long-Term Ecological Research Network (ILTER Network).

Goal

- Creation of general knowledge based on multidisciplinary long-term and large-scale research
- Creation of well-designed database to exchange and share original data to support scientific communities, general public people and policy makers, and to find better solutions for critical ecological and environmental problems
- Promotion of education regarding long-term and large-scale changes of ecosystem and environment
- Facilitation of collaboration and coordination among scientists of long-term ecological researches.

Structure



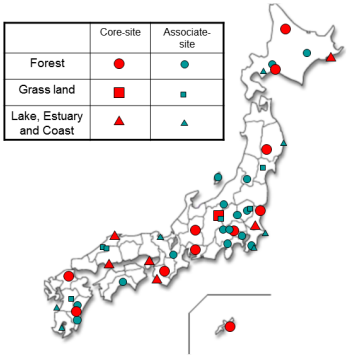
Outline of the JaLTER bylaw

Research theme

- Response and feedback of biodiversity and ecosystem functioning under the climate changes
- Hydro-biogeochemical processes and ecosystem interaction from terrestrial to marine ecosystem
- Development and establishment of ecosystem monitoring network and techniques with multiple scales and dimensions

JaLTER-network

The JaLTER sites consist of JaLTER core-site and JaLTER associate-site to fulfill the vision, mission and goals of the JaLTER. Long-term and interdisciplinary ecological research, date sharing and archiving are conducted in both sites. In addition, an endorsement from the organization (institute, research center, dechapterment of university or their higher entity) to support long-term stability is necessary for core-site. JaLTER site network is consisted by 18 core-site and 28 associate-site at end of FY 2009.



JaLTER site network (April 2009)

Major activities of JaLTER in Fiscal Year 2009

May 8-10, 2009: Key JaLTER members chapticipating JBON 1st Workshop ”Networking ecosystem and biodiversity research” in Tokyo.

- Jun. 15-19, 2009: Participating Information Management Workshop for Dynamic Plot Database 2009 in Taiwan (K. Niiyama; Forestry and Forest Products Research Institute)

- Jun. 14-20, 2009: Co-host Hokkaido University GCOE-INeT International Summer School 2009 ”Frontiers in Ecosystem Ecology of Northern Forest” at Hokkaido University Sapporo campus and North Hokkaido Experimental Forests (Teshio, Nakagawa and Uryu Experimental Forests)

- Aug. 22-24, 2009: Participating ILTER Coordinating Committee Meeting at Australia (T. Nakashizuka, H. Muraoka, M. Nakaoka and H. Shibata)

- Sep. 12-16, 2009: Participating LTER-ASM at Colorado, USA (M. Nakaoka and H. Shibata)

- Sep. 16, 2009: Participating the annual meeting of the Japanese Society of Limnology at Oita, Japan (H. Muraoka)

Oct. 5, 2009: 1st Steering Committee for FY 2009 at Sugadaira

Oct. 5-7, 2009: JaLTER All Scientist Meeting 2009 at Sugadaira

Oct. 27-29, 2010: Co-host ”AsiaFlux Workshop 2009” at Hokkaido University

Mar. 14, 2010: 2nd Steering Committee and 1st Representative Committee for FY 2009 at Tokyo

Member of Executive Committee

- Chair: Tohru Nakashizuka (Tohoku Univ.)

- Vice-Chair: Tsutomu Hiura (Hokkaido Univ.), Hiroyuki Muraoka (Gifu University)

- IMC Chair: Nobuhito Ohte (Univ. of Tokyo)

- Secretary-General: Masahiro Nakaoka (Hokkaido Univ.)

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Akazu

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Activities

Within a permanent ecological plot with an area of 1 ha (or 100 m x 100 m) in Akadu Research Forest at Tokyo University Forest in Aichi, an annual survey of mortality, recruitment and growth of trees with girth at breast height (gbh) $>$ 15 cm was conducted. Also observed in the plot was the presence of bores around boles of oak trees, that were made by ambrosia beetles *Platypus quercivorus*. In the same plot monthly litterfall which was collected by litterfall traps was separated into leaves, branches, flowers, and seeds to obtain their dry weight. In addition to these tree ecological surveys, following investigations were made in the same plot; 1) monitoring of litter decomposition rate using filter packs, 2) ground beetle investigations using pitfall traps, 3) avifauna monitoring using the spot census method.

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Publication list

Original article

- Henkel SK, Kawai H, Hofmann G (2009) Interspecific and interhabitat variation in hsp70 gene expression in native and invasive kelp populations. Mar Ecol Prog Ser 386:1-13

- Kato A, Guimarães SMPB, Kawai H, Masuda M (2009) Characterization of the crustose red alga Peyssonnelia japonica (Rhodophyta, Gigartinales) and its taxonomic relationship with P. boudouresquei based on morphological and molecular data. Phycol Res 57:74-86

- Niwa K, Iida S, Kato A, Kawai H, Kikuchi N, Kobiyama A, Aruga Y (2009) Genetic diversity and introgression in two cultivated species (Porphyra yezoensis and P. tenera) and closely related wild species of Porphyra (Bangiales, Rhodophyta). J Phycol 45:493-502

- Uwai S, Kogame K, Yoshida G, Kawai H, Ajisaka T (2009) Geographical genetic structure and phylogeography of the Sargassum horneri/filicinum complex in Japan, based on the mitochondrial cox3 haplotype. Marine Biology 156:901-911

- Yamagishi T, Motomura T, Nagasato C, Kawai H (2009) Novel proteins composing the stramenopile trichapterite mastigoneme in Ochromonas danica (Chrysophyceae). J Phycol 45:1110-1115

- Yamaguchi T, Prabowo RE, Ohshiro Y, Shimono T, Jones D, Kawai H, Otani M, Oshino A, Inagawa S, Akaya T, Tamura I (2009) The introduction to Japan of the Titan barnacle, Megabalanus coccopoma (Darwin, 1854) (Cirripedia: Balanomorpha) and the role of shipping in its translocation. Biofouling 25:325-333

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Activities

We have studied on dynamics and coexistence mechanisms of tree species in a lucidophyllous forest, Aya Research Site. In 2009, we surveyed forest damage caused by strong winds and census of trees (dbh>5cm in size) in the field.

Publication list

Original article

Sato Tamotsu, Kominami Yohsuke, Saito Satoshi, Niiyama Kaoru, Tanouchi Hiroyuki, Nagamatsu Dai and Nomiya Haruto（2009）Temporal dynamics and resilience of fine litterfall in relation to typhoon disturbances over 14 years in an old-growth lucidophyllous forest in southwestern Japan. Plant Ecology Online.

Kana Kamimura and Satoshi Saito (2010) Comparing wind data at local meteorological stations and in forest areas using roughness length and topographic exposure indices. FORMATH 9:135-152.

Book and review

Saito Satoshi（2009） a.Typhoon disturbance.（Forestry and Forest Products Research Institute edt.）Forest Encyclopedia. Asakura-Shoten, Tokyo, pp51-53.

Report and others

Saito Satoshi（2009）One scene in lucidophyllous forests ~ various strategies of trees for surviving ~. Letters from lucidophyllous forests 16：4-5.

Saito Satoshi（2009）How cope with on forestry management when the number of typhoon increase on the effect of global warming? Global warming and Agriculture, Forestry and Fisheries -Present and future of environment and foods- pp92.

Masae Ishihara, Ken Ishida, Hideyuki Ida, Akira Itoh, Tsutomu Enoki, Tatsuhiro Ohkubo, Takayuki Kaneko, Nobuhiro Kaneko, Shigeo Kuramoto, Takeshi Sakai, Satoshi Saito, Hitoshi Sakio, Michinori Sakimoto, Hirofumi Shibano, Hisashi Sugita, Mitsuo Suzuki, Masahiro Takagi, Atsushi Takashima, Masaaki Takyu, Naoaki Tashiro, Nobuyuki Tanaka, Naoko Tokuchi, Kanji Namikawa, Kaoru Niiyama, Naoyuki Nishimura, Mahoko Noguchi, Haruto Nomiya, Tsutom Hiura, Akio Fujiwara, Daisuke Hoshino, Kosuke Homma, Akifumi Makita, Takashi Masaki, Takahito Yoshioka, Toshiya Yoshida (2010) An introduction to forest permanent plot data at Core and Subcore sites of the Forest and Grassland Survey of the Monitoring Sites1000 Project. Japanese Journal of Ecology 60:111-123.

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Activities

Forest dynamics census by measuring stem diameter of every tree and monitoring with automatic multimedia recording system have been continued. This year we measured diameter of all trees in the plot (6.875 ha) and identified new recruits. The newly developed multimedia system enabled real-time recording and broadcasting picture and sounds of LTER plot. This system records digital pictures and sounds in canopy layer every day. Data are sent by satellite communication channel to the web server, which broadcasts data on time.This system can be utilized as a long-term, quantitative records of phenology.Also, this system is utilized as a tool for environmental education. This year, the developers of this system (Dr. Saito and Dr. Fujiwara) had environmental education programs in cooperation with elementary schools and junior high schools.A chapter of the LTER plot is designated as a core plot of ”Monitoring Site 1000” by the Ministry of the Environment. There, tree diameter census, line census of birds and litter trap survey are carried out every year. The stem position of each tree was measured for the core plot.

5

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Activities

The Kanumazawa Riparian Research Forest was established to study the dynamics and maintenance mechanisms of a riparian forest. In 2010, we continued the tree census for all stems in a 1.0 ha area for the evaluation of mortality, recruitment and growth and compiled the long-term data on the tree seed productions by various species and on the rodent censuses, which was personally collected in this site. Using these data, we undertook studies on the relationship between annual seed production patterns and rodent population fluctuation and on the effect of large-seed crops on the dispersal processes in a rodent, Apodemus speciosus.

Publication list

Book and review

- Hoshizaki, K. (2009) Aesculus turbinata Blume. In: Japan botanical history editing committee (ed) Botanical History of Trees in Japan. Japan Forestry Investigation Committee, Tokyo. (in Japanese)

6

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Activities

In Kasuya Forest Site, education, research, and extension program for public based on the monitoring of forest dynamics and hydrology were carried out taking advantages of site location as an urban forest.Tree growth, mortality, recruitment and litterfall production was measured in a monitoring plot in an abandoned Cryptomeria japonica plantation which had been establishded 140 years ago. Spatial heterogeneity of stand structure, litterfall production, accumlation of organicmatter on forest floor, soil animal community and nitrogen return in the litterfall were investigated in a experimental watershed in which Chamaecyparis obtusa was planted 50 years ago. Hydrological monitoring including measurement of water quality has been conducted in the watershed.

Publication list

Original article

Shinohara Y, Onozawa Y, Chiwa M, Kume T, Komatsu H, Otsuki K.(2010) Spatial variations in throughfall in a Moso bamboo forest: sampling design for the estimates of stand-scale throughfall. Hydrological Processes 24:253-259.

Kume T, Tsuruta K, Komatsu H, Kumagai T, Higashi N, Shinohara Y, Otsuki K. (2010) Effects of sample size on sap flux-based stand-scale transpiration estimates. Tree Physiology 30:129-138.

Komatsu H, Kume T, Otsuki K. (2010) Water resource management in Japan—forest management or dam reservoirs? Journal of Environmental Management 91:814-823.

Katayama A, Kume T, Komatsu H, Ohashi M, Nakagawa M, Yamashita M, Otsuki K, Suzuki M, Kumagai T. (2009) Effect of forest structure on the spatial variation in soil respiration in a Bornean tropical rainforest.Agricultural and Forest Meteorology 149:1666-1673.

Fujii S., Kubota Y. & Enoki T. (2009) Resilience of stand structure and tree species diversity in subtropical forest degraded by clear logging. Journal of Forest research 15:373-387.

Fujii S., Kubota Y. & Enoki T. (in press) Long-term ecological impacts of clear-fell logging on tree species diversity in a subtropical forest, southern Japan. Journal of Forest research

8

North Hokkaido

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Activities

The major research theme of North Hokkaido Experimental Forests is entitled, "The understanding the mechanisms of ecosystem structure and functioning and the development of sustainable forest management in boreal forest". The integrated and long-term research and education program is conducted in Teshio, Nakagawa and Uryu Experimental Forests and the Northern Forestry and Development Office of Forest Research Station, Field Science Center for Northern Biopsphere, Hokkaido University. In Teshio Experimental Forest, CO2 budgets and carbon cycling were conducted as a chapter of "CC-LaG (Carbon Cycling and Larch Growth) project". Research on possibility of unutilized biomass for energy production, manipulation experiments of soil respiration against the warming and study on long-term rehabilitation of forest after the fire disturbances were also conducted in the Teshio forest. Long-term and large scale study on sustainable forest management by selective logging was continuously conducted in Nakagawa experimental forest. Integrated study for prediction and assessment of the effect of road construction on the environment was carried out in the Kotohira watersheds in Nakagawa forest. In Uryu experimental forest, integrated research program on ecosystem conservation and sustainable utilization from forest to lake through the river in Lake Shumarinai watershed was conducted. The long-term monitoring of biodiversity and production of forest ecosystem was continued in Uryu forest as a part of the program entitled, "Monitoring-site 1000" funded by Ministry Environment, Japan. Teshio River project on land-use, bio-productivity and environment changes from upstream forest, farmland, wetland to estuary in the basin were carried out by the research group of Northern Forestry Research and Development Office. Regarding the educational programs, international field summer school, "Frontiers in ecosystem ecology of northern forest" was conducted in Teshio, Nakagawa and Uryu forest in June 2009 as a part of Global COE program entitled, "Establishment of Center for Integrated Field Environmental Science" organized by Graduate School of Environment and Division of Environmental Resources, Graduate School of Agriculture of Hokkaido University.

Publication list

Original article

Hayashi K, Takagi K, Noguchi I, Fukuzawa K, Takahashi H, Fukazawa T, Shibata H, Fujinuma Y (2009) Ammonia emission from a young larch ecosystem afforested after clear-cutting of a rristine forest in northernmost Japan. Water, Air, and Soil Pollution 200:33-46

Ileva NY, Shibata H, Satoh F, Sasa K, Ueda H (2009)

Relationship between the riverine nitrate-nitrogen concentration and the land use in the Teshio River watershed, North Japan. Sustainability Science 4:189-198

Katsuyama M, Shibata H, Yoshioka T, Yoshida T, Ogawa A, Ohte N (2009) Applications of a hydro-biogeochemical model and long-term simulations of the effects of logging in forested watersheds. Sustainability Science 4:179-188

Kayama M, Makoto K, Nomura M, Satoh F, Koike T (2009) Dynamics of elements in larch seedlings (Larix kaempferi) regenerated on serpentine soil in northern Japan. Landscape and Ecological Engineering 5:125-135

Kitaoka S, Watanabe M, Watanabe Y, Kayama M, Nomura M, Sasa K (2009) Growth of regenerated tree seedlings associated with microclimatic change in a mature Larch plantation after harvesting. Landscape and Ecological Engineering 5:137-145

Miya H, Yoshida T, Noguchi M, Nakamura F (2009) Individual growing conditions that affect diameter increment of tree saplings after selection harvesting in a mixed forest in northern Japan. Journal of Forest Research 14:302-310

Noguchi M, Yoshida T. (2009) Individual-scale responses of five dominant tree species to single-tree selection harvesting in a mixed forest in Hokkaido, northern Japan. Journal of Forest Research 14:311-320

Sumida A, Nakai T, Yamada M, Ono K, Uemura S, Hara T (2009) Ground-based estimation of leaf area index and vertical distribution of leaf area density in Betula ermanii forest. Silva Fennical 43:799-816

Takagi K, Fukuzawa K, Liang N, Kayama M, Nomura M, Hojyo H, Sugata S, Shibata H, Fukazawa T, Takahashi Y, Nakaji T, Oguma H, Mano M, Akibayashi Y, Murayama T, Koike T, Sasa K, Jujinuma Y (2009) Change in CO2 balance under a series of forestry activities in a cool-temperate mixed forest with dense undergrowth. Global Change Biology15:1275-1288

Tsutsumi M, Kojima H, Uemura S, Ono K, Sumida A, Hara T, Fukui M (2009) Structure and activity of soil-inhabiting methanotrophic communities in northern forest of Japan. Soil Biology and Biochemistry 41:403-408

Ueyama M, Ichii K, Hirata R, Takagi K, Asanuma J, Machimura T, Nakai Y, Ohta T, Saigusa N, Takahashi Y, Hirano T (2010) Simulating carbon and water cycles of larch forests in East Asia by the BIOME-BGC model with AsiaFlux data. Biogeosciences 7:959-977

Yoshida T, Noguchi M (2009) Vulnerability to strong winds for major tree species in a northern Japanese mixed forest: analyses of historical data. Ecological Research 24:909-919

Yoshida T, Noguchi M (2010) Growth and survival of Abies sachalinensis seedlings for three years after selection harvesting in northern Hokkaido, Japan. Landscape and Ecological Engineering 6:37-42

Book and review

Ryu, K., Watanabe, M., Shibata, H., Takagi, K., Nomura, M. and Koike, T. (2009) Ecophysiological responses of the larch species in northern Japan to environmental changes as a basis for afforestation. Landscape and Ecological Engineering 5:99-106

Report and others

Shibata H, Fukuzawa K, Mitchell MJ (2010) “Frontier in Ecosystem Ecology of Northern Forests” in Japanese LTER sites. LTER network news, Spring 2010, http://news.lternet.edu/Article282.html

Takagi K (2010) Report of the AsiaFlux Workshop 2009 Integrating Cross-scale Ecosystem Knowledge: Bridges and Barriers. AsiaFlux Newsletter 31:2-5

9

Ogawa

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Activities

The 6-ha plot established in the Ogawa Forest Reserve is the main research area of this site. The demographic data on seeds, seedlings, saplings, juveniles and adult trees have been obtained. Additionally, censuses of birds are also conducted in and around the plot. In this 2009, trees with DBH >5 cm were re-censused within the 6-ha plot. Distribution of seed rain was investigated within this plot using >300 seed traps (each 0.5 m2). New seedling emergence and their survival were also checked by 143 quadrates (each 1 m2) at the 1.2-ha subplot installed within the 6-ha plot.

Publication list

Original article

- Sawa A, Kaneko S, Mariko S, Masaki T (2009) Development and characterization of microsatellite markers for Prunus verecunda and Prunus grayana (Rosaceae). Conservation Genetics. DOI 10.1007/s10592-009-9909-x
- Aiba M, Nakashizuka T (2009) Architectural differences associated with adult stature and wood density in 30 temperate tree species. Functional Ecology 23:265-273

Book and review

- Niiyama K, Takyu M, Kawarazaki S (2007) The merits and demerits of a database: The case of the Forest Dynamics Database (FDDB). Journal of the Japanese Forest Society 89:340-345

10

Takayama

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Activities

The Takayama site (TKY: deciduous broadleaf forest, TKC: evergreen coniferous forest) has been an intensive research site for interdisciplinary approach including flux measurements, ecological process researcn and remote sensing for forest ecosystem strucuture and function. The two flux sites are registered to AsiaFlux activity. The research in the sites have been made by not only the disciplinary approach but also by mane scientists and students from some national institutes and universities.In year of 2009, we have progressed several long-term measurements such as CO2 flux by eddy covariance method, soil CO2 emission, plant ecophysiology, remote sensing and model simulations.

11

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Activities

Akkeshi JaLTER site locate along the Pacific coast of Eastern Hokkaido. It consists of various habitats such as Bekanbeushi river system, Akkeshi-ko estuary and Akkeshi Bay, which formed an ecotone connecting freshwater, brackish water and marine environment. Main research and educational activities in Akkeshi includes various research topics such as "Interactions between terrestrial and coastal ecosystems" and "Long-term, broad-scale dynamics of community and ecosystem functions in coastal ecosystems". To carry on these projects, the long-term data on oceanography and marine ecosystem dynamics have been collected and analyzed in Akkeshi Marine Station, Field Science Center for Northern Biosphere, Hokkaido University.

Publication list

Original article

Noda, T., M. Nakaoka, et al. (2009). Spatial connectivity and scaling for populations and communities. Population Ecology 51(1): 3-4.

Brannock P. M., Wethey D. S. & Hilbish T. J. (2009) Extensive hybridization with minimal introgression in *Mytilus galloprovincialis* and *M. trossulus* in Hokkaido, Japan. Marine Ecology Progress Series 383: 161-171.

Hayashi S. & Shingyojoi C. (2009) Bending-induced switching of dynein activity in elstase-treated axonemes of sea urchin sperm-Roles of Ca2+ and ADP. Cell Motility and the Cytoskelton 66: 292-301.

Hori M., Suzuki T., Monthum Y., Srisombat T., Tanaka Y., Nakaoka M. & Mukai H. (Online published (March 2009)) High seagrass diversity and canopy height increase associated fish diversity and abundance. Marine Biology.

Kasim M. & Mukai H. (2009) Food sources of the oyster (Crassostrea gigas) and the clam (Ruditapes philippinarum) in the Akkeshi-ko estuary. Plankton and Benthos Research 4: 104-114.

Munroe D. & Noda T. (2009) Spatial Pattern of rocky intertidal barnacle recruitment: comparison over multiple tidal levels and years. Journal of the Marine Biological Association of the United Kingdom 89: 345-353.

Nifuku K., Kodama K., Shigeta Y. & Naruse H. (2009) Faunal turnover at the end of the Cretaceous in the North Pacific region: Implications from combined magnetostratigraphy and biostratigraphy of the Maastrichtian Senpohshi Formation in the eastern Hokkaido Island,

northern Japan. Palaeogeography, Palaeoclimatology, Palaeoecology 271: 84-95.

Okuda T., Noda T., Yamamoto T., Hori M. & Nakaoka M. (2009) Latitudinal gradients in species richness in assemblages of sessile animals in rocky intertidal zone: mechanisms determining scale-dependent variability. Journal of Animal Ecology 78: 328-337.

Sasil-Orbita M. L. W. & Mukai H. (2009) Effects of epiphyte density on seagrass leaf turnover rate. Philippine Journal of Science 138: 75-80.

Sasil-Orbita M. L. W. & Mukai H. (2009) Ontogenic change in the seedling photosynthetic activity of four temperate seagrass species in Northern Japan. Asia Life Sciences 18: 99-110.

Shimada D., Kajihara H. & Mawatari S. F. (2009) Three new species of free-living marine nematodes (Nematoda: Enoplida) from northern Japan. Species Diversity 14: 137-150.

Shingyoji C. (2009) Analysis of the Role of Nucleotides in Axonemal Dynein Function. Methods in Cell Biology, vol. 92, Cilia: Motors and Regulation (eds. S. M. King & G. J. Pazour) pp. 113-131.

Nanayama F. et al. (2009) The experiment on dating of the tsunami deposits using the luminescence method: A case study of samples from Nemuro coastal lowland, eastern Hokkaido. The Journal of the Geological Society of Japan 115: 249-260. (in japanease)

Book and review

(3 reviews were published in Japanese.)

Report and others

(1 master thesis, 3 doctoral thesis and 2reports were published in Japanese.)

14

Western part of Seto Inland Sea

Contact

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Activities

Western Seto Inland Sea is a JaLTER site located at the western chapter of Seto Inland Sea, Japan. This site consists of various kind of seagrass/algal beds and tidal flats. Main researches in the site include ecological studies on the biodiversity and ecosystem functions of tidal flat and seagrass/algal beds, as part of the monitoring program to secure the sustainable utilization of fisheries products. The systematic monitoring program began in 2005, and the data has been adopted to various comparison with the data taken in another research programs for past decades. Some of these analyses have evaluated the effects of environmental variation on the biota of tidal flat and seagrass/algal beds.

Publication list

Original article

- Hori M (2008) Between-habitat interactions in coastal ecosystems: current knowledge and future challenges. Plankton and Benthos Research.3 : 53-63.
- Yamada K, Hori M, Matsuno S, Hamano T, Hamaguchi M (2009) Spatial variation of quantitative color traits in green type and black types in the sea cucumber Apostichopus japonicus (Stichopodidae) using image processing. Fisheries Science. 75 : 601-610
- Niimura Y, Tamaki H, Yoshida G., Terawaki T, Iseki K (2009) Variation in biomass and species composition of epiphytic community on the different aged leaves of Zostera marina (Chlorophyta). Biosphere Science 48,55-62.
- Tanaka N. Distribution of Zostera species in Japan. I Zostera marina L. (Zosteraceae). Bull. Natl. Mus. Nat. Sci., Ser. B, 35,23-40,2009.
- Uwai S.,Kogame K., Yoshida G., Kawai H., Ajisaka T. (2009)Geopraphical genetic structure and phylogeography of the Sargassum horneri/filicinum complex in Japan, based on the mitochondrial cox3 haplotype. Marine Biology 156, 901-911.

15

Ashoro

Contact

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Activities

In Ashoro Forest Site, monitoring of forest dynamics and hydrology has been carried out.

1. Tree census was carried out in the Takuhoku Plot (100 m x 100 m) following the method of"Monitoring site 1000 (Biodiversity Center of Japan, Ministry of the Environment)".

2. A research project on the establishment of a sustainable production system for Quercus crispula timber has been conducted since 1972. Among 150 comchapterments, a new compartment (39th compartment) was regenerated and the number and size of Quercus crispula trees in several compartments were measured.

3. Precipitation, bulk precipitation and stream water were collected at the Takuhoku Watershed and they were analyzed.

4. Six education programs for University students and nine extension programs for public were also conducted.

Publication list

Original article

- Hishi T, Maeda Y, Tashiro N (2010) Characteristics of soil and soil macro-fauna in relation to slope directions in cool temperate natural forests and larch plantations of Ashoro Research Forest. Bulletin of the Kyushu University Forests. 91:1-6.

- Maeda Y, Hishi T, Tashiro N, Mabuchi T, Inoue S, Cho K, Yamauchi K, Ogata T, Kume A (2010) Tree species composition according to different slope direction and position on the slope in the cool temperate natural deciduous forests and larch plantations of Ashoro Research Forest. Bulletin of the Kyushu University Forests. 91:7-14.

- Hirano, Y, Noguchi K, Ohashi M, Hishi T, Fujii S, Finer L (2009) A new method for placing and lifting root meshes for estimating fine root production in forest ecosystems. Plant Root 3:26-31

- Fujimoto T, Koga S (2010) An application of mixed-effects modelto evaluate the effects of initial spacing on radial variation in wooddensity in Japanese larch (Larix kaempferi). Journal of Wood Science56:7-14

16

Choshi

Contact

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Activities

Choshi JaLTER site locate along the Pacific coast of Chiba Prefecture, Central Honshu. The coastal site consists of various types of habitats, including algal and seagrass beds, rocky intertidal and subtidal bottoms, boulder shore and high energy sandy beach. This site locates the region where the warm Kuroshio and the cold Oyashio meet, and is characterized by the co-occurrence of warm-water and cold-water derived marine organisms. Main research and educational activities in Choshi includes research topics such as "Biodiversity and distribution of marine algae and birds" and "Long-term, broad-scale dynamics of community and ecosystem functions in coastal ecosystems".

Publication list

Report and others

Nakaoka, M. (2009) Ecosystem and biodiversity monitoring in coastal area. Iden 63(6): 80-86.

17

Fuji Hokkuroku

Contact

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Activities

Fuji Hokuroku Flux Observation Site (35o 26'N, 138o 45'E, 1100 m above sea level) is located in a mature larch forest of 45-50 years old at the foot of Mt. Fuji. The flux measurement was started in 2006 as an alternative to the Tomakomai Flux Research Site.

Active studies are now conducted for technological development of various gas flux measurement methods, including the ones for isotopic flux of CO2 and other greenhouse gases such as methane. The site is also used for ground measurement to validate satellite remote sensing data, various training programs, and joint investigations with Asian researchers.

Publication list

Report and others

Saigusa N, Takagi K, Hirano T, 2009: Long-term monitoring of carbon and water cycles in larch forest ecosystems in East Asia, IGBP/iLEAPS Newsletter, No. 6 (Mar. 2009), 44-45.

18

Fukuroyama

Contact

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Activities

Paired watershed experiments were conducted in two adjacent, small watersheds (watershed A: 0.80ha, watershed B: 1.09ha) of the Fukuroyamasawa experimental watershed. Watershed B was clear-cut in the spring of 1999 and young trees were planted in 2000. Hydrological and biogeochemical research has focused mainly on assessing the influence of forest vegetation on water and solute budget in the mountainous watershed.

Rainfall-runoff processes, fluctuation of groundwater levels and tracer mass balance were monitored to estimate deep percolation and transit times in order to investigate hydrological processes. Solute concentrations in rainfall, stream flow and groundwater were monitored as well as soil CO2 concentrations and soil respiration to investigate biogeochemical processes. Meteorological data were obtained at the Shinta meteorological station located 200 m east of the study site.

Publication list

Original article

- Oda, T., Asano, Y. and Suzuki, M. (2009) Transit time evaluation using a chloride concentration input step shift after forest cutting in a Japanese headwater catchment. Hydrological Processes, 23, pp.2705-2713.

- Maita, E. and Suzuki, M. (2009) Quantitative analysis of direct runoff in a forested, mountainous, small watershed. Journal of Japan Society of Hydrology and Water Resources, 22 (5), pp.342-355.(in Japanese with English summary)

19

Fujinitayama

Contact

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Activities

In the Fujinita research site, much ecological research has been undertaken with the aim of elucidating the various functions of semi-natural grassland, and to support its proper management for future use and conservation. The following activities were conducted in 2009.

- 1. Zoysia japonica dominated pasture: continuous long-term vegetation monitoring over the last 35 years (since 1971). The responses of vegetation and productivity to grazing intensity have been examined. As in other pastures containing Zoysia, research into the effects of introduced exotic Zoysia-type grasses on local vegetation and grazing on hillside grasslands has been undertaken in relation to stream flow and surface water quality.

- 2. Miscanthus sinensis dominated pastures: responses of vegetation and production to the following management practices, harvesting and abandonment, have been investigated.

- 3. Pleioblastus chino dominated pasture subject to grazing and cutting: research on the maintenance of grasslands. Furthermore, the effects of introducing exotic Zoysia-type grass into the Pleioblastus-type pastures to convert them to Zoysia-type pastures have been examined.

- 4. A hyper-spectral sensor has been used to monitor the spectral characteristics in semi-natural grassland.

- 5. The following other activities were undertaken, including requests for inspection and education: examination of researchers and students in Ibaraki University (16 April 2009); examination of researchers in JICA (2 July 2009); examination of researchers and students in Utsunomiya University in Korea (24 July 2009); Mt. Fujinita field trip (17 October 2009).

Publication list

Original article

- Tomimatsu H, Itano S, Tsutsumi M, Nakamura T, Maeda S (2009) Seasonal Change in Statistics for the Floristic Composition of Miscanthus- and Zoysia-dominated Grasslands. Jpn J Grassl Sci 55:48-53 (In Japanese)

- Nakagami K, Hojito M, Itano S, Kohyama K, Miyaji T, Nishiwaki A, Matsuura, S, Tsutsumi, M, Kano, S (2009) Soil carbon stock in typical grasslands in Japan. Grassland Science 55:96-103

- Tomimatsu H, Itano S. (2009) Differences in spectrum reflectance and physiological indices

among three typical seminatural grasslands in Japan.Grassland Science 55:221-224

Report and others

- Itano S, Hojito M, Tomimatsu H, Matsuura S, Yamamoto H (2010) Production control-nitrogen dynamics model in harvest meadows: the modeling of soil chapter. Jpn J Grassl Sci 56(Suppl):127 (In Japanese)
- Itano S, Tomimatsu H, Nakagami K (2010) Periodical function calibration models of rising plate meter for estimating seasonal herbage mass in Zoysia dominated pastures. Jpn J Grassl Sci 56(Suppl):128 (In Japanese)

20

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Paired watershed experiments were conducted in two adjacent, small watersheds (watershed A: 0.80ha, watershed B: 1.09ha) of the Fukuroyamasawa experimental watershed. Watershed B was clear-cut in the spring of 1999 and young trees were planted in 2000. Hydrological and biogeochemical research has focused mainly on assessing the influence of forest vegetation on water and solute budget in the mountainous watershed.

Rainfall-runoff processes, fluctuation of groundwater levels and tracer mass balance were monitored to estimate deep percolation and transit times in order to investigate hydrological processes. Solute concentrations in rainfall, stream flow and groundwater were monitored as well as soil CO2 concentrations and soil respiration to investigate biogeochemical processes. Meteorological data were obtained at the Shinta meteorological station located 200 m east of the study site.

Publication list

Original article

- Oda, T., Asano, Y. and Suzuki, M. (2009) Transit time evaluation using a chloride concentration input step shift after forest cutting in a Japanese headwater catchment. Hydrological Processes, 23, pp.2705-2713.

- Maita, E. and Suzuki, M. (2009) Quantitative analysis of direct runoff in a forested, mountainous, small watershed. Journal of Japan Society of Hydrology and Water Resources, 22 (5), pp.342-355.(in Japanese with English summary)

21

Kanamekawa

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Kawatabi

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Activities

In the Kawatabi research site, long-term trends in vegetation in a Miscanthus sinensis dominated grassland were followed. This project aims to elucidate the mechanisms of succession in semi-natural grasslands. At this site, monitoring of vegetation and succession trends in response to three treatment regimes in Miscanthus-type grassland, cutting, grazing and abandonment since 1982, were continued. The long-term monitoring of changes in flora, vegetation heterogeneity, and differences in species diversity in response to the three treatments were reported. These long-term data have been analyzed in relation to the succession probability among dominant species following the three treatments.

23

Kiryu

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Activities

At the Kiryu Experimental Watershed in JAPAN, we have implemented a nested catchment design. We are conducting research at sites with a long historical record (since 1967) so that contemporary data can be evaluated in a historical context. Most importantly, several high quality long-term streamflow and meteorological data sets are continuing, which may be important in assessing global change.

Solute budgets are calculated using the watershed mass-balance approach. For water and chemicals this requires measuring inputs of water and solutes in precipitation, and outputs of water and solutes in streamflow. Differences between inputs and outputs indicate whether the watershed is net producer or consumer of a solute. In these processes, Hydrology plays important roles. More detailed research is ongoing in the catchment to directly assess Hydro-Biogeochemical processes. Mechanisms of Hydro-biogeochemistry of soilwater, groundwater (including bedrock groundwater), and streamwater has been tracked in detail. The study was designed with watersheds that are nested (smaller catchments in larger catchments) to investigate how watershed processes change as scale change.

Concerning evapotaranspirations and gas exchange in forest canopy and leaf scale, we have 28m and 16m height meteological towers. On the 28m tower, CO2 and H2O flux has been measuring at forest canopy by Eddy Correlation method with open- and closed path gas analysers. On the 16m tower, leaf scale gas exchanges have been measuring, and interactions of leaf scale and canopy scale are considering. Under the forest canopy, the trank and soil respirations are measured, which are important component of Energy imbalance problem.

Publication list

Original article

Ohkubo, S., Yokoyama, N., Kosugi, Y., Takanashi, S., Matsuo, N., Tani, M.: Estimating vertical distribution of CO2 efflux in a temperate cypress forest, Journal of Agricultural Meteorology, 65, 339-348, 2009

24

Kominato

Contact

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Activities

Kominato JaLTER site locate along the Pacific coast of Chiba Prefecture, Central Honshu. Intertidal and subtidal rocky shores in front of Marine Biosystems Research Center, Chiba University are main habitat types of this site, which has been registered for marine protected area for scientific research. Main research and educational activities in Kominato includes various research topics such as "Species interactions among marine plankton", "Evolutionary ecology of marine organisms", and "Long-term, broad-scale dynamics of community and ecosystem functions in coastal ecosystems". To carry on these projects, the long-term data on marine biodiversity have been collected since 2002 in addition to some experimental analyses.

Rocky shore of Kominato site has been registered as monitoring sites of rocky intertidal community in the project of "Monitoring Site 1000 Coastal Ecosystem Program". The first census was carried out in May 2009 by establishing 30 permament plots at the intertidal zone.

Publication list

Original article

Togashi, T., Y. Sakisaka, T. Miyazaki, M. Nagisa, N. Nakagiri, J. Yoshimura, K. Tainaka, P.A. Cox and J.L. Bartelt. (2009) Evolution of gamete size in primitive taxa without mating types. Population Ecology 51: 83-88

Report and others

Nakaoka, M. (2009) Ecosystem and biodiversity monitoring in coastal area. Iden 63(6): 80-86.

25

Lake Toya

Activities

Lake Toya is an oligotrophic caldera lake in the southwestern chapter of Hokkaido, Japan. The lake water has initially served for hydroelectric power, agricultural irrigation, and a supply of drinking water for the public benefit, and additionally used for commercial fishery and recreational purposes. Unfortunately, the lake has been frequently subject to drastic disturbance caused by both natural disasters and human activities up to the present. As a result, these disturbances greatly affected the biota of the lake and then fish populations became greatly reduced. The demand of commercial and recreational fishers on abundance of lacustrine sockeye salmon rises higher and higher recently. Therefore, for the purpose of compatibility between the environmental conservation and high fishery production in Lake Toya, we have carried out the regular environmental and biological monitoring throughout the year since 1992.

The main results of the monitoring in 2009 are as follows: (1) surface temperatures changed from 3.9 ℃ in winter to 24.4 ℃ in summer as usual. The stratification pattern was also as in other years; (2) transparency gradually decreased from 20.0 m at February to 10.0 m early in May, fluctuating in the vicinity of 13 m thereafter. The annual average transparency took an downward turn; (3) PO4-P concentrations unusually tended to increase up to July but subsequently remained almost unchanged at a concentration of less than 0.005 ppm throughout the water column; (4) NO3-N concentrations of the hypolimnion were kept constant at about 0.2 ppm, while those of the epilimnion decreased to about 0.15 ppm because of primary production by phytoplanktons during the thermal stratification; (5) chlorophyll a concentration abruptly increased and then reached the highest value of 2.3 μ g/l in the photic zone at May. After a sudden drop in early summer, it returned to increase remarkably toward autumn; (6) the composition of zooplankton community was considerably simple and a small-bodied zooplankton such as Bosmina longirostris became dominant exclusively. The peak densities reached a maximum late in June (about 10000 individuals/m3) followed by a summer decline, and then a moderate increase was found in autumn; and (7) the monthly catch of lacustrine sockeye salmon went up to about 40 individuals/day in June but decreased gradually to less than 5 individuals/day until winter. Similarly, the monthly catch of pond smelt dropped from 350 individuals/day in April to less than 30 individuals/day in June and then stayed the same level during this year. Thus, the decrease in biomass of these planktivores may lead to the shift from small-bodied grazers (Bosmina) to large-bodied ones (Daphnia) in the zooplankton community of the oligotrophic lake next year.

Publication list

Original article

1. Makiguchi, Y. and Ueda, H. Effects of external and surgically implanted dummy radio transmitters on mortality, swimming performance and physiological status of juvenile masu salmon Oncorhynchus masou. Journal of Fish Biology, 74, 304-311 (2009).

2. Makiguchi, Y., Nagata, S., Kojima, T., Ichimura,

M., Konno, Y., Murata, H. and Ueda, H.: Cardiac arrest during gamete release in chum salmon regulated by the parasympathetic nerve system. PLoS ONE, 4(6), e-5993 (2009).

3. Kudo, H., Doi, Y., Ueda, H. and Kaeriyama, M.: Molecular characterization and histochemical demonstration of salmon olfactory marker protein in the olfactory epithelium of lacustrine sockeye salmon (Oncorhynchus nerka). Comparative Biochemistry and Physiology, Part A 154, 142-150 (2009).

4. Makiguchi, Y., Liao, L.Y., Konno, Y., Nii, H., Nakao, K., Gwo, J.C., Onozato, H., Huang, Y.S. and Ueda, H.: Site fidelity and habitat use of Formosan landlocked salmon (Oncorhynchus masou formosanus) during typhoon season in the Chichiawan stream, Taiwan assessed by nano-tag radio telemetry. Zoological Studies, 48, 460-467 (2009).

5. Ileva, N.Y., Shibata, H., Satoh, F., Sasa, K. and Ueda, H.: Relationship between the riverine nitrate-nitrogen concentration and the land use in the Teshio River watershed, North Japan. Sustainability Science, 4, 189-198 (2009).

6. Yamamoto, Y. and Ueda, H.: Behavioral responses to natal stream water amino acids in migratory chum salmon. Zoological Science, 26, 778-782 (2009).

7. Hino, H., Miles, N.G., Bandoh, H. and Ueda, H.: Molecular biological research on olfactory chemoreception in fishes (Review Paper). Journal of Fish Biology, 75, 945-959 (2009).

8. Tsuyuzaki, S. and Miyoshi C.: Effects of smoke, heat, darkness and cold stratification on seed germination of 40 species in a cool temperate zone, northern Japan. Plant Biology, 11: 363-378 (2009).

Book and review

1. Makiguchi, Y., Konno, Y., Nii, H., Nakao, K. and Ueda, H.: Biotelemetry research on upstream migration behavior of adult chum and pink salmon in a re-meandered segment of the Shibetsu River, Japan. "Telemetry: research, technology, and application"(eds. Barculo, D. and Daniels, J.) NOVA Publishers, pp145-174 (2009).

2. Miyaki, M. and Kaji K.: Shift to litterfall as year-round forage for sika deer after a population crash, 171-180 (in D. R. McCullough, S. Takatsuki and K. Kaji editors, Sika deer: Biology and Management of Native and Introduced Populations, Springer) (2009).

3. Miyaki, M. and Kaji K.: The dynamics of forest stands affected by sika deer on Nakanoshima Island-changes of size structure similar to the thinning effect, 193-206 (in D. R. McCullough, S. Takatsuki and K. Kaji editors, Sika deer: Biology and Management of Native and Introduced Populations, Springer) (2009).

4. Kaji, K., Takahashi H., Okada H., Kohira M. and Yamanaka M.: Irruptive behavior of sika deer, 421-436 (in D. R. McCullough, S. Takatsuki and K. Kaji editors, Sika deer: Biology and Management of Native and Introduced Populations, Springer) (2009).

26

Nobeyama

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Activities

Long-term observation has carried out since 2007. Remeasurement of DBH in the intermediate moor plot was carried out. A migration of trainmilipede before their spawning was observed in 2009. We recorded their behaviour.

27

North Tomakomai

Contact

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Activities

The Tomakomai Research Site is a long-term ecological study site, which was established to obtain information on the dynamics and structure of a mixed broad-leaved and conifer-leaved forest. It is maintained jointly by the Hokkaido Research Center of the FFPRI and the Graduate School of Environmental Earth Science of Hokkaido University. In September 2009, we conducted tree (dbh5cm) census.

28

Ooyamazawa

Contact

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Activities

We have studied on regeneration dynamics and coexistence mechanisms of tree species in a cool-temperate forest, Ooyamazawa Riparian Research Site. In 2009, we checked the flowers and seeds production for each trees of Fraxinus platypoda. This site became the forest core site for the Monitoring Sites 1000 of Ministry of the Environment from 2008. In 2009, we surveyed tree size and litter production.

Publication list

•

Book and review

• Hitoshi Sakio (2009) Fraxinus platypoda.「Trees in Japan I」、401-416, Japan Forestry Investigation Committee, Tokyo

29

Reihoku

Contact

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Activities

One of the main themes in ecological research at the Reihoku site is to detect the effects of the quantitative defense of tree leaves on the decomposition subsystem. We have a secondary evergreen broad-leaved forest (EBF) and a secondary deciduous broad-leaved forest (DBF) contiguous with each other. Standing crop of the A0-layer is larger in EBF than DBE reflecting higher level of quantitative defense and lower rate of decomposition of leaf litter in EBF than DBF. However, the retardation of decomposition in EBF is not so serious for acidification of soil to be caused as in podzol soils. As a result, biomass of soil macro-invertebrates, especially earthworms is larger in EBF with larger food resource to them than DBF. Activity density of Carabina beetles, one of the most important food of which is earthworms, also is larger in EBF than DBF. Dominance of Carabus iaponicus and Leptocarabus hiurai in the Carabina beetle assemblage is common to EBF and DBF, although relative abundance of Carabus iaponicus is larger in EBF and that of Leptocarabus hiurai is larger in DBF. In 2009, inter relationship between the two Carabina species was studied in a field enclosure experiment. Interspecific relationship affecting foraging success of them was found where Carabus iaponicus was superior to Leptocarabus hiurai.

30

Shiiba

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Activities

In Shiiba Forest Site, the monitoring of forest dynamics and the chemical analysis of stream water have been conducted.

In 2009, Shiiba Forest Site was registered as a JaLTER associate-site.

In 2009, tree census was carried out in the Kasebaru Plot (100mx100m) following the method of "Monitoring site 1000 (Biodiversity Center of Japan, Ministry of the Environment) ".

Three monitoring plots for preserved forests（20m×20m）were established. The preserved forests were for Chamaecyparis obtusa, Pinus densiflora, Tsuga sieboldii, and Abies firma, and Larix kaempferi.

Stream water in 3 watersheds in the Sampoudake area has been routinely collected and chemically analyzed.

Population density of Sika deer has been monitored by light census in Sampoudake area and Tsunodake area.

Tree census was carried out in four plantation forest of Cryptomeria japonica (ca. 25 yr; two sites and 50 yr; two sites).

31

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32

Tano

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Activities

Meteorological, hydrological and biogeochemical observations were conducted. Tree census, litter and seed fall were monitored as the Monitoring 1000 project. Studies and excursions for students of the faculty of Agriculture, Univ. of Miyazaki were held.

33

Nagaura

Contact

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Activities

1. Benthic animals were researched in Nagaura tidalflat during the field class for undergraduate students of Kumamoto University.

2. Benthic animals and plants were monotored in the two tidalflats of Nagaura island during the Monitoring-sites 1000 of Ministry of the Environment, Japan.

3. Population dynamics of the amphioxus, *Branchiostoma japonicum* was monitored in the two shalow seas in Amakusa, Kumamoto and Shimabara, Nagasaki.

Publication list

Original article

1. Watanabe, T. and Henmi, Y. (2009) Morphological development of the commensal pea crab (*Arcotheres* sp.) in the laboratory reared specimens. J. Crust. Biol. 29: 217-223.

2. Henmi, Y. and Koga, H. (2009) Growth and reproduction of the intertidal dotillid crab, *Ilyoplax deschampsi*. J. Crust. Biol. 29: 516-522.

Book and review

1. HENMI Yasuhisa et al.（2009）. “Rare animals and plants in Kumamoto Prefecture”. Endangered Species of Wild Fauna and Flora Committee in Kumamoto Prefecture.

2. HENMI Yasuhisa et al.（2009）. “Red Data Book 2009, Kumamoto Prefecture”. Endangered Species of Wild Fauna and Flora Committee in Kumamoto Prefecture.

3. HENMI Yasuhisa et al. (2009). Resource Management and Branding of Higo Hamaguri. Sei- bundo, Japan.

34

Kagoshima Bay

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Activities

・Algae and benthic animals were investigated in the rocky intertidal of Sakurajima Island during the field class for undergraduate students of Kagoshima University.

・Distribution of the Batitillarua spp. was surveyed at the mud flats in the head of Kagoshima Bay closed-off subsection of bay for the undergraduate and master thesis of Kagoshima University.

Publication list

Original article

Yamamoto T., A. Masuya, K. Matsushita and M. Sato (2009) Changes in the macrobenthic fauna of the Shigetomi-higata tidal flats in Kagoshima Bay: Comparison between 1994 and 2005. Japanese Journal of Benthology 64：32-44.

Nishihara, G. N. and Terada, R. 2010. Spatial variations in nutrient supply to the red algae Eucheuma serra (J. Agardh) J. Agardh. Phycological Research 58: 29-34.