

### 2.5.1 Laboratory : Forest Ecology

Member:	Professor	Kitayama, Kanehiro Ph. D.
	Senior Lecturer	Osawa, Naoya Dr. Agric. Sci.
	Doctor's program	4
	Master's Program	6
	Undergraduate	6
	Post-Doctoral fellow	4

#### **A. Research Activities (2009.4-2010.3)**

##### **A-1. Main Subjects**

- a) Biogeochemical mechanisms of long-term maintenance of forest ecosystems
  - 1) Phosphorus deficiency, and the P-use efficiency and adaptation of tropical rain forest trees,
  - 2) Ecosystem ecology of polyphenols, 3) Water-use and nutrient-use efficiencies of tree leaves, and 4) Acclimation to light environments through the adjustment of module structure
- b) Community structure and functions of trees and insects
  - 1) Habitat associations among co-existing tree species, and 2) Soil microbial communities and soil-nutrient dynamics
- c) Sustainable management of forest ecosystems
  - 1) Harvest intensity and soil organic carbon, and 2) Developing monitoring methods of and indicators of biological diversity for sustainable forest management

##### **A-2. Publications and presentations**

###### a) Publications

###### Original Papers

- Hidaka A., Kitayama K. (2009) Divergent patterns of photosynthetic phosphorus-use efficiency versus nitrogen-use efficiency of tree leaves along nutrient-availability gradients. *Journal of Ecology* 97: 984-991.
- Imai N., Samejima H., Langner A., Ong R.C., Kita S., Titin J., Chung A.Y.C., Lagan P., Lee Y.F., Kitayama K. (2009) Co-benefits of sustainable forest management in biodiversity conservation and carbon sequestration. *PLoS ONE* 4, Issue 12, December

2009, pp 1-7.

- Matsuyama S., Osawa N., Sakimoto M. (2009) Generalist pollinators in the dioecious shrub *Rhus trichocarpa* Mig. (Anacardiaceae) and their role in reproductive success. *Plant Species Biology* 24:215-224.
- Mohamed A., Samejima H., Wilting A. 2009 Records of five Bornean cat species from Deramakot Forest Reserve in Sabah, Malaysia. *Cat News* 51:12-15.
- Moritz L., Liang C., Wagai R., Kitayama K., Balser T. (2009) Vertical distribution and accumulation of microbial residues in two tropical forest soils formed from contrasting parent material. *Biogeochemistry* 92: 83-94.
- Nakanishi A., Inagaki N., Shibata S., Osawa N., Hirata K. (2009) Effects of patch cutting on leaf nitrogen nutrition in hinoki cypress (*Chamaecyparis obtusa* Endlicher) at different elevations along a slope in Japan. *Journal of Forest Research* 14: 388-393.
- Osawa N., Yoshinaga A. (2009) The presence of micropyles in the shells of developing and undeveloped eggs of the ladybird beetle *Harmonia axyridis* (Coleoptera: Coccinellidae). *European Journal of Entomology* 106: 607-610.
- Slik, J.W.F., Aiba, S., Brearley, F.Q., Cannon, C.H., Forshed, O., Kitayama, K., Nagamasu, H., Nilus, R., Payne, J., Paoli, G., Poulsen, A.D., Raes, N., Sheil, D., Sidiyasa, K., Suzuki, E., van Valkenburg, J.L.C.H. (2010) Environmental correlates of tree biomass, basal area, wood specific gravity and stem density gradients in Borneo's tropical forests. *Global Ecology and Biogeography* 19: 50-60.
- Takeuchi Y., Samejima H., Nakagawa M., Diway B., Nakashizuka T. (2009) Neighborhood aggregation effect and its effective scale on reproductive success in *Shorea laxa* (Dipterocarpaceae) *Journal of Plant Research* 123:249-259.
- Ushio M., Kitayama K., Balser T.C. (2010) Tree species effects on soil enzyme activities through effects on soil physicochemical and microbial properties in a tropical montane forest on Mt. Kinabalu, Borneo. *Pedobiologia* 53: 227-233.
- Wagai R., Mayer L.M., Kitayama K. (2009) Extent and nature of organic coverage of soil mineral assessed by a gas sorption approach. *Geoderma* 149: 152-160.
- Wagai R., Mayer L.M., Kitayama K. (2009) Nature of "occluded" low-density fraction in soil organic matter studies: a critical review. *Soil Science and Plant Nutrition* 55: 13-25.

### Reviews

- Kitayama K (2010) Secretariat of the Convention on Biological Diversity (2009) Connecting Biodiversity and Climate Change Mitigation and Adaptation: Report of the Second Ad Hoc Technical Expert Group on Biodiversity and Climate Change.

Montreal, Technical Series No. 41, 126 pages.

b) Conference and seminar papers presented

- The 57th annual meeting of The Japan Ecological Society (The University of Tokyo, 2010, March) Number of presentations 11
- The 69th annual meeting of The Japan Entomological Society (Mie University, 2009, October). Number of presentations 3
- The 54th annual meeting of The Japan Society of Applied Entomology and Zoology (Chiba University, 2010, May). Number of presentations 5

**A-3.Off-campus activities**

Research grants

1. Grants-in-aid for Scientific Research(KAKENHI)

- Scientific Research(A) : Kitayama, Kanehiro, Ph.D. : Phosphorus control of Bornean tropical rain forests: bottom-up effects on the ecosystem and plant adaptations
- Scientific Research(B) : Kitayama, Kanehiro, Ph.D. : The formation of localized soil microbial communities in relation to dissolved soil polyphenols in a species-diverse forest ecosystem
- Scientific Research(B) : Osawa, Naoya Dr. Agric. Sci. : Applied ecological study on management system for Japan-originated invaders in foreign countries

2.Other Research Grants

- Global Environment Research Fund of the Ministry of the Environment, Japan : Kitayama, Kanehiro, Ph.D. : Sustainable management of tropical production forests with the economic incentives of carbon sequestration and biodiversity conservation

**A-4.International cooperation and overseas activities**

International joint research, overseas research surveys

- JSPS Asia-Africa Science Platform Program: Building a Center for Ecosystem Ecology to Develop Societal Adaptability for the Land-use Change in Tropical Rain Forests (K. Kitayama)
- JSPS AA Science Platform Program Seminar: 3rd Seminar “Land-use Change and Societal Adaptation under Global Climate Change in Asian Tropical Rain Forests” (Kota Kinabalu, Malaysia) (K. Kitayama)

## **B.Educational Activities(2009.4-2010.3)**

### **B-1.On-campus teaching**

#### a) Courses given

- Undergraduate level: Practice of Forest Ecology (K. Kitayama and N. Osawa), Seminar of Forest Ecology (K. Kitayama and N. Osawa), Forest Ecology (K. Kitayama), Community Ecology (N. Osawa), Practice of Forest Sciences II &III (N. Osawa). The Practice of Ecology (N. Osawa).
- Graduate level: Practice of Forest Ecology (K. Kitayama and N. Osawa), Seminar of Forest Ecology (K. Kitayama and N. Osawa). Special Lecture of Forest Ecology (K. Kitayama)

### **B-2.Off-campus teaching etc.**

#### Part-time lecturer

- Kitayama, Kanehiro, Ph.D.: University of Hyogo, Faculty of Natural Sciences, (Ecology II) , Kyoto Institute of Technology, Division of Applied Biology, (Trends in Biology)