2.2.4 Laboratory : Forest Biology

Member :	Professor	Isagi, Yuji, Ph. D.
	Senior Lecturer	Takayanagi, Atsushi, Dr. Agric. Sci.
	Assistant Professor	Yamasaki, Michimasa, Dr. Agric. Sci.
	Doctor's program	3
	Master's Program	8
	Undergraduate	2
	Post-Doctoral fellow	1
	Program-Specific Researcher	1

A. Research Activities (2009.4-2010.3)

A-1. Main Subjects

a) Genetic traits and biological conservation of forest plants

Regeneration process and genetic structure of plant community in forest ecosystems were analysed by means of field researches and genetic analysis. In order to conserve biological diversity of forest, fine genetic markers were developed for a variety of plant species. Analyses of genetic structure and genetic diversity for endangered plant species were conducted.

b) Biodiversity conservation based on ubiquitous genotyping of critically endangered plant species

We conducted research to obtain general understanding of biological/genetic characteristics of endangered plant species, and establish rational methods to conserve biodiversity based on the genetic analysis for all remnant individuals of critically endangered plant species. The result of the research will directly contribute to the conservation measures of endangered species and the establishment of new approach for biodiversity conservation.

c) Big mammals management and forest conservation

The influence of Habitat Use Intensity (HUI) of sika deer (Cervus nippon) on vegetation was studied under controled foraging conditions. Deer herbivory was controled by periodically closed fences. As Deer HUI go down, then biodiversity goes up. But some species will decrease according to HUI declining, even though they are palatable. To conserve plant community with higher biodiversity, it is better that various HUI sites exist in a mosaic.

d) Studies on Japanese Oak Wilt

The ambrosia beetle, Platypus quercivorus, causes Japanese Oak Wilt by transporting pathogenic fungi from trees to trees. We examined the survival of Quercus crispula which have been attacked by P. quercivorus in 2008 at the secondary forest, 90 ha in area, dominated by Q. crispula and Castanea crenata. Death probability of attacked trees was fitted by a generalized additive model, and the best fit model did not included the diameter of trees though it showed the spatial heterogeneity in the probability. It was suggested that once P. quercivorus started to come flying, death probability of trees (as a result of mass attack by the beetle) would not be affected by their individual properties such as size but by the topography and the location.

A-2.Publications and presentations

a) Publications

Books

- Yamasaki, M.: Forest decline caused by environmental changes: Japanese oak wilt and the ambrosia beetle Platypus quercivorus. In Fujisaki, K., R. Nishida and M. Sakuma (eds.) Entomological Science and its Perspective, p.99-113, Kyoto University Press, 2009 (in Japanese)
- Matsuki Y, Isagi Y (2009) Real efficiency of pollination inferred by single pollen genotyping. In Fujisaki, K., R. Nishida and M. Sakuma (eds.) Entomological Science and its Perspective, p.95-98, Kyoto University Press, 2009 (in Japanese)

Original Papers

- Yamasaki, M. and M. Sakimoto: Predicting oak tree mortality caused by the ambrosia beetle Platypus quercivorus in a cool-temperate forest. Journal of Applied Entomology 133; 673-681, 2009
- Yoshikawa T, Isagi Y, Kikuzawa K (2009) Relationships between bird-dispersed plants and avian fruit consumers with different feeding strategies in Japan. Ecological Research 24: 1301-1312.
- Tsuneki S, Mori K, Kaneko S, Isagi Y, Murakami N, Kato H (2009) Identification and characterization of eight microsatellite loci in Machilus pseudokobu (Lauraceae), an endemic species of the Bonin Islands. Conservation Genetics 10: 2009-2011.
- Kondo T, Nakagoshi N, Isagi Y (2009) Shaping of the genetic structure along Pleistocene and modern river systems in hydrochorous riparian azarea, Rhododendron ripense (Ericaceae). American Journal of Botany 96: 1532-1543.

- Kaneko S, Abe T, Isagi Y (2009) Development of microsatellite markers for Stachyurus macrocarpus and Stachyurus macrocarpus var. prunifolius (Stachyuraceae), critically endangered shrub species endemic to the Bonin Islands. Conservation Genetics 10: 1865-1867.
- Yokogawa M, Kaneko S, Isagi Y (2009) Development of microsatellite markers for Polemonium kiushianum (Polemoniaceae), a critically endangered grassland plant species in Japan. Conservation Genetics 10: 1445-1447.
- Nakamura M, Kaneko S, Isagi Y, Hata K, Sone K (2009) Development of microsatellite markers for Pasania edulis (Makino) Makino, one of the dominant species of lucidphyllous forest in southern Kyushu, Japan. Conservation Genetics 10: 981-983
- Kawaji M, Kaneko S, Tateno R, Isagi Y, Yoneda T (2009) Development of microsatellite markers for Quercus miyagii Koidz. (Fagaceae), an endemic species in the Ryukyu Iskands, Japan. Conservation Genetics 10: 1049-1051.
- Dan T, Ikeda H, Mitsui Y, Isagi Y, Setoguchi H (2009) Genetic structure of refugial populations of the temperate plant Shortia rotundifolia (Diapensiaceae) on a subtropical island. Conservation Genetics 10: 859-867.
- Kaneko S, Sei S, Takahashi Y, Isagi Y (2009) Current status of an endangered plant speceis, Echinops setifer in the Aso and Chyugoku regions. Japanese Journal of Conservation Ecology 14: 119-124 (in Japanese).
- Mitsui Y, Isagi Y, Setoguchi H (2009) Isolation and characterization of microsatellite loci in Ainsliaea faurieana (Asteraceae), an endemic plant species on Yakushima Island, Japan, and cross-species amplification in closely related taxa. Molecular Ecology Resorces 9: 877-879.
- Dan T, Mitsui Y, Ikeda H, Isagi Y, Setoguchi H (2009) Isolation and characterization of microsatellite loci in Shortia rotundifolia (Diapensiaceae), an endangered relict plant on the Ryukyu Islands and Taiwan. Conservation Genetics 10: 507-509.
- Terakawa M, Isagi Y, Matsui K, Yumoto T (2009) Microsatellite analysis of the maternal origin of Myrica rubra seeds in the feces of Japanese macaques. Ecological Research 24: 663-670.

<u>Reviews</u>

- Isagi Y (2009) Genetic diversity in forest ecosystems. Heredity 63: 39-43 (in Japanese).

b) Conference and seminar papers presented

- The Mammalogical Society of Japan 2009 Annual Meeting (1 presentation)

- The 57th Annual Meeting of The Japanese Ecological Society (11 presentations)
- The 121st Annual Meeting of Japanese Forestry Society (5 presentations)
- IUFRO Joint Conference 2010 (1presentation)

A-3.Off-campus activities

Membership in academic societies

- Yuji, Isagi, Ph. D. : The Japanese Forest Society (Exective Director), The Ecological Society of Japan (Journal of the Ecological Society of Japan, Editor; Committee for the Kinki District, Selection Committiee for the Prizes of the society), The Society for the Study of Species Biology (Selection Committiee for the Kataoka Encouragement Prize)
- Atsushi, Takayanagi, Dr. Agr. : The Mammalogical Society of Japan (Manegement Special Committee)

Research grants

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

- Kiban-kenkyu A : Yuji Isagi : Comprehensive conservation of biodiversity hot spots based on information from ubiquitous genotyping

2.Other Research Grants

- Enviromnent Research and Technology Development Fund : Yuji Isagi : Biodiversity conservation based on ubiquitous genotyping of critically endangered plant species

B.Educational Activities(2009.4-2010.3)

B-1.On-campus teaching

a) Courses given

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

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

B-2.Off-campus teaching etc.

Part-time lecturer

- Atsushi Takayanagi: Faculty of Bioenvironmental Sience, Kyoto Gakuen University (Wildlife Coservation Sience)
- Yamasaki, M.: Faculty of Engineering, Doshisha University (Life Science II, Animal Behavior)

B-3.Overseas teaching

Lectures and seminars

- Yuji, Isagi, Ph.D.

Conservation of endangered plant species based on ubiquitous genotyping(Lecturer) : Zhejiang University(The People's Republic of China)

Australia-Japan Workshop On Biodiversity, "Conservation of biodiversity based on information obtained by ubiquitous genotyping"(Lecturer) : Australian Academy of Science(Australia)

Processes of effective pollen flow inferred by single pollen genotyping and parentage analysis for different growth stages of trees(Plenary lecturer) : IUFRO(Malaysia)

C.Other Remarks

- Yuji Isagi : Tokyo Metropolitan University (guest scientist), Hiroshima University Museum (guest scientist), Hiroshima Prefecture (landscape adviser) , The 25th Kyoto Prize Selection Committee, JSPS committee
- Atsushi Takayanagi : Odaigahara nature restration projects evaluating committee, Isaki National Forest Cormorant Management Working Group, Kyoto Prefecture Wildlife-Village Relationship Construction Projects Adviser , Kyoto Prefecture Gree Action Plan Committee, Shiga Prefecture Deer Management Committee, Shiga Prefecture Blak bear Management Committee, Shiga Prefecture Japanese Mankey Management Committee, Shiga Prefecture Red Data Committee, Fukui Prefecture Deer Management Committee, Fukui Prefecture Black bear Management Working Group, Fukui Prefecture Environmental Council Wildlife Division, Hyogo Prefecutre Wildlife Management Council, Hyogo Prefecture Environmental Council Wildlife Division, Osaka Prefecture Goshork Conservation Committee