2.5.4 Laboratory: Tropical Agriculture

Member:	Professor	Nawata, Eiji, D. Agric. Sci.
	Associate Professor	Higuchi, Hirokazu, D. Agric. Sci.
	Doctor's program	2
	Master's Program	7
	Undergraduate	3
	Post-Doctoral fellow	1

A. Research Activities (2009.4-2010.3)

A-1. Main Subjects

a) Bio-resources, farming and cropping systems and sustainability in Mainland Southeast Asia In middle south Laos, integral analyses of relationship among used plant resources, ethnicity, topography and socio-economic environment of home gardens clarified that topography affected the scale of home gardens more conspicuously than ethnicity and that plant species composition in home gardens were affected mainly by ethnicity and socio-economic environment.

b) Evaluation of agricultural resources and sustainability in upland crop areas, developed on a large scale, in the tropics

In central Thailand, studies on the diversity of farming and cropping systems were carried out, and GIS maps of cropping systems in this area were drawn. In addition, agricultural productivity maps were also drawn, based on yield estimation models and resource databases using a feed maize variety "NK-48". In north Thailand, sampling of river water was practiced and dynamics of cropping systems were investigated and mapped, in upland fields, in which formerly shifting cultivation was carried out, in a village of Karen, one of the ethnic minorities in the north. In northeast Thailand, the dynamics of productivity of sugarcane were analyzed in the selected farmers' fields.

c) Utilization of tropical plant resources and Distribution and dissemination of tropical crops Leaf samples of local bamboos collected in northern Laos were analyzed for genetic traits by RAPD markers. Four types were observed in a major bamboo species, suggesting those local bamboos were originated from 4 parental plants. Field survey on the utilization and recognition and sample collection of wild mango species were continued expanding the survey areas including north-east Thailand, north-middle Laos, and north-west Vietnam, where Thai people are living. According to morphological features, the mangoes were divided into 4 groups. This categorization was somewhat in common throughout the survey areas. d) Agro-ecological physiology of tropical fruit trees

The research to develop the new cultivation technique to solve the fruit flesh disorder of mangosteen, in which the flesh turns to be hard and translucent and to be unpalatable to eat was continued. Among the factors that influence the flesh disorder of plant, nutrients such as Ca, soil water content, the development of rizosphere and water stress, especially the water stress surrounding the fruit, were found to be substantially effective. Cultivation practice to promote the surface transpiration of the fruit contributes to reduce the incidence of the fruit disorder.

High acid content is the largest problem of the passionfruit. A series of experiments were carried out under various form of nitrogen fertilizer. The results indicated that the acid content of the fruit was reduced on the trees fertilized with NH4-N mainly, in which the yield was also relatively higher.

A-2.Publications and presentations

a) Publications

Books

- Nawata, E. and S. Yamamoto: Domestication of vegetables. In "Domestication - Its ethnobiological studies-" (N. Yamamoto ed.), pp. 391-401, National Ethnology Museum, Osaka, 2009.

- Nawata, E., Y. Uchida and Y.Wada: Home gardens. In, "An illustrated eco-history of the Mekong River Basin" (T. Akimichi ed.). pp. 29-32, White Lotus Co. Ltd., Bangkok, 2009.

Original Papers

Yamamoto S. and E. Nawata: Use of Capsicum frutescens L. by the indigenous peoples of Taiwan and the Batanes Islands. Economic Bot., 63 : 43-59, 2009.
Yamamoto S. and E. Nawata: Effect of root zone on flower bud formation and flowering in species of genus Capsicum. Trop. Agric. Dev., 53 : 55-58, 2009.
Harigane, I., T. Sakuartani, H. Higuchi, E. Nawata, S. Asanao, S. Yamamoto and I. Maskow: Hydraulic lift in Mango trees (Mangifera indica L.) and early growth of intercropped groundnut (Arachis hypogaea L.). Trop. Agric. Dev., 53 : 90-94. 2009.

- Yonemoto, H., T. Ogata, N. Kozai, T. Kondo, H. Higuchi and K. Nomura: Growth and Fruit Characteristics of Pitanga (Eugenia uniflora L.) cvs. Lover and Vermilion in Okinawa. Res. Trop. Agric., 2 : 8-14, 2009.

b) Conference and seminar papers presented

- 106th Meeting, Japan. Soc. Trop. Agric. (4)

- 107th Meeting, Japan. Soc. Trop. Agric. (5)

A-3.Off-campus activities

Membership in academic societies

- Nawata, Eiji : Japanese Society for Tropical Agriculture (Vice-President, Council member, Editorial board member, Secretary for public relations).

- Nawata, Eiji : PlantRoot (Member of Editorial Board)

Research grants

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

- Scientific Research (A) : Nawata, Eiji : Evaluation and restoration of environmental degradation caused by agricultural intensification in mainland Southeast Asia

- Scientific Research (A) : Kosaki, Takashi (Faculty of Urban Environmental Science, Tokyo Metropolitan University, collaborator Nawata) : Proposal of optimized land use based on C dynamics model in humid tropics

- Scientific Research (A) : Funakawa Shinya (Laboratory of Soil Science, collaborator Nawata) : What has agriculture destroyed in ecosystems? - Towards the recovery of homeostasis of soil ecosystems

Scientific Research (B) : Nawata, Eiji (collaborator Higuhi) : Changes in traditional utilization of plant resources under the progress of economic development and globalization
Scientific Research (A) : Inamura, Tatsuya (Laboratory of Plant Cultivation Systems, collaborator Nawata) : Evaluation of influences of the improvement of contaminated matter balance in local agriculture on eutrophication of rivers and lakes in Yunnan Province, China

A-4.International cooperation and overseas activities

International joint research, overseas research surveys

- Nawata, E.: Evaluation and restoration of environmental degradation caused by agricultural intensification in mainland Southeast Asia (Thailand, Kasetsart University, Chiang Mai University, Khon Kaen University)

- Nawata, E.: Changes in tranditional uses of plant resources under the economic development and glovalization (Thailand, Khon Kaen University)

- Nawata, E.: Changes in tranditional uses of plant resources under the economic development and glovalization (Laos, National Agriculture and Forestry Research Institute)

- Nawata, E.: Utilization of bio-resources in homegardens in Phuthai people in Laos (Laos, National Agriculture and Forestry Research Institute)

Visiting Research Scholars

- Guesst Research Associate 1(Thailand)

B.Educational Activities(2009.4-2010.3)

B-1.On-campus teaching

a) Courses given

- Undergraduate level:	Outline of Bioresource Science IV (Nawata), Introduction to
	Tropical Agriculture (Nawata), Environmental Stresses for plants
	(Higuchi, Nawata), Laboratory Course in Bioresource Science I·II
	(Higuchi, Nawata), Seminar in Tropical Agriculture (Nawata,
	Higuchi)
- Graduate level:	Climatic ecology in the tropics (Higuchi), Seminar in Tropical
	Agronomy (Nawata, Higuchi), Special Laboratory Work in
	Tropical Agronomy (Nawata, Higuchi)