2.3.5 Laboratory : Plant Nutrition

Member:	Professor	Matoh, Toru, D. Agric. Sci.
	Associate Professor	Kobayashi, Masaru, D. Agric. Sci.
	Assistant Professor	Ochiai, Kumiko, D. Agric. Sci.
	Doctor's program	1
	Master's Program	4
	Undergraduate	6
	Other	2
	Program-Specific Researcher	1

A. Research Activities (2009.4-2010.3)

A-1. Main Subjects

a) Function of inorganic constituents in plant cell walls

Boron and calcium are the major inorganic elements in cell walls, and they are likely to contribute to cell wall integrity. We have demonstrated that B cross-links two pectic chains at the rhamnogalacturonan II (RG-II) regions, and that Ca strengthens the bonding together. We will study the function of cell walls in terms of the function of inorganic elements which are localized there.

Tolerance mechanism of rice plants toward excessive B in soils is also our subject. Genetic difference between rice varieties tolerant to and sensitive to excessive B has been examined. b) Nitrogen-use efficiency of rice plants

We have studied the mechanism underlying difference of the nitrogen use efficiency among rice varieties to breed an efficient variety which is suitable for sustainable agriculture.

c) Sustainable agriculture

We are trying to find out a suitable chemical fertilizer to develop sustainable, low-input and consumer-conscious farming. We also try to establish a method to evaluate the quality of fermented manure.

A-2.Publications and presentations

a) Publications

Original Papers

- Koshiba, T., M. Kobayashi, A. Ishihara and T. Matoh:

Boron nutrition of cultured tobacco BY-2 cells. VI. Calcium is involved in early responses to boron deprivation. Plant and Cell Physiology 51; 323-327, 2010

Reviews

- Koshiba, T., M. Kobayashi and T. Matoh:

Boron deficiency. How does the defect in cell wall damage the cells? Plant Signaling and Behavior 4; 557-558, 2009

b) Conference and seminar papers presented

- 2009 Annual meeting of Japanese Society of Plant Nutrition and Soil Sciences: 7 Presentations

- The 51th annual meeting of the Japanese Society of Plant Physiologists: 1 Presentation

- The 463rd meeting of Kansai branch, Japan Society for Biosciences, Biotechnology, and Agrochemistry: 1 Presentation

A-3.Off-campus activities

Membership in academic societies

Matoh, Toru, D.Agric.Sci : Japanese Society of Plant Nutrition and Soil Sciences (Board member, Editor-in-Chief, Chair of excecutive committee of 2009 annual meeting), Japan Society for Biosciences, Biotechnology, and Agrochemistry (Vice-chair of Kansai branch)
Kobayashi, Masaru, D. Agric. Sci. : The Japanese Society of Plant Physiologists (Treasurer), Japanese Society of Plant Nutrition and Soil Sciences (excecutive committee of 2009 annual meeting)

- Ochiai, Kumiko, D. Agric. Sci. : Japanese Society of Plant Nutrition and Soil Sciences (excecutive committee of 2009 annual meeting)

Research grants

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

- Scientific Research (B) : Matoh, Toru : Identification of rice gene for excess boron-tolerance and its application to breeding

- Scientific Research(C) : Kobayashi, Masaru : Analyses of plant responses to boron deprivation

- Scientific Research on Priority Area (Plant Nutrition and Transport) : Kobayashi, Masaru :

Role of plant cell walls in nutrient uptake and abiotic stress tolerance

2. Other Research Grants

- Genomics for Agricultural Innovation: Matoh, Toru, : Creating the nitrogen- and phosphorus-efficent rice cultivars

- Commissioned research: Matoh, Toru, : Development of the method for evaluating fertilizer value of organic amendments

A-4.International cooperation and overseas activities

International joint research, overseas research surveys

- Trans-Disciplinary Study on the Regional Eco-History in Tropical Monsoon Asia (Thailand, Laos)

B.Educational Activities(2009.4-2010.3)

B-1.On-campus teaching

a) Courses given

- Undergraduate level:	Introduction to Applied Life Sciences I (Matoh), Biochemistry II
	(Matoh), Plant Nutrition (Matoh, Kobayashi), Plant Biochemistry I
	(Kobayashi, Matoh), Environmental Stress for Plants (Matoh)
- Graduate level:	Plant Biochemistry (advanced course) (Matoh, Kobayashi, Ochiai),
	Plant Nutrition Seminar (Matoh, Kobayashi, Ochiai), Experimental
	Course of Plant Nutrition (Matoh, Kobayashi, Ochiai)

B-2.Off-campus teaching etc.

Part-time lecturer

- Matoh, Toru: Faculty of Agriculture, Kyoto Prefectural University (Plant Nutrition 1, 2)

B-3.Overseas teaching

International students

- International students : Master 1 (Thailand) Doctral 1 (Thailand) Research Students

2 (China)

C.Other Remarks

- Matoh, Toru: Committee for Promoting Sustainable Agriculture (Advisory member), Kyoto City Survey Committee for Dioxins (member), Kyoto Organic Farmer's Association (Technical advisor)