Research Report

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Introduction

Kyoto University, Japan is a world-class institution of higher learning and research. My sabbatical leave in Kyoto University was planned to extend my academic network, update my knowledge in my research field, and explore potential collaboration with my host professor Hisashi Miyagawa as well as other colleagues. This sabbatical leave marks the beginning of pleasant and productive collaborations with colleagues in Kyoto University. During my stay in Kyoto University, I was privileged to be engaged in many memorable activities in instruction, research, field trips, meetings, and others.

Instruction activities

One of the enjoyable experiences I had in Kyoto University was the special lecture on comparative agricultural studies 5, entitled Environmental Biochemistry and Manuscript Writing that I taught. This course gave me opportunities to interact with Japanese and international students in Kyoto University. It was one lecture per week for 12 weeks. This course focused on biochemical and chemical principles of occurrence, distribution, biotic and abiotic conversion, fate, and impact of synthetic and natural molecules in the environment. Specific manuscripts were used as examples to discuss how to write a scientific manuscript. There were approximately 15-20 attendees in every lecture. They were undergraduates, master and doctoral students, as well as postdoctoral fellows.

Research and academic exchanges

I gave seven research seminars and had many scientific discussions with colleagues in Kyoto University as well as other institutions in Japan. My seminars were about introduction of the University of Hawaii and my research activities in agricultural chemistry and proteomics. I was privileged to attend weekly research meetings of Professor Hisashi Miyagawa’s laboratory and Professor Naoshi Kondo’s laboratory. I highly appreciated that students prepared their slides in English and spoke in English during their seminars. Their slide preparation, content and delivery were all excellent. I felt their sincerity and tireless efforts in their research projects. I was particularly impressed with the depth of research undergraduates carried out. I was also impressed with the collaboration attitudes, patience in discussions, research idea exchanges, constructive suggestions, attention to detailed matters, and persistence in experimental performance.

Research in Professor Miyagawa’s laboratory was focused on insect hormones, scorpion toxins, and chemicals regulating plant functions. I had many interesting and in-depth discussions with Professor Hisashi Miyagawa, Associate Professor Yoshiaki Nakagawa and Assistant Professor Masahiro Miyashita, particularly on (a) structural requirement and
stereospecificity of tetrahydroquinolines as potent ecdysone agonists and (b) inhibition of enzymatic degradation of the peptide elicitor plant immunity-activating peptide 1 on enhancing phytoalexin biosynthesis in tobacco cells via a prolonged activation of MAP kinase. My conversations and discussions with Associate Professor Miki Akamatsu and her students on quantitative structure and activity relationship were also intriguing. Much of Professor Naoshi Kondo’s sensor research overlapped with some of my research.

I was very pleased to have opportunities to meet and discuss research activities with many alumni and professors of Kyoto University as well as colleagues in other institutions in Japan. Those included Professors Hiroshi Amano, Toshio Fujita, Nobuhiro Hirai, Kazuhiro Irie, Mamoru Kanzaki, Tatsuo Kurihara, Toru Matoh, Hiteto Miyoshi, Eiji Nawata, Ritsu Nishida, Jun Ogawa, Tamio Ueno, and Toshiaki Umezawa, Associate Professors Hiroshi Fukuoka, Naoki Mori, and Kazuma Murakami, Assistant Professors Akinori Ando, Shigenobu Kishino, and Eiji Sakuradani, and Drs. Reiji Ichinose, Noriharu Ken Umetu and Hideki Uneme.

I was also pleased with opportunities arranged by Professor Miyagawa and Associate Professor Nakagawa for me to visit four institutions during my stay in Kyoto University, where I gave seminars, had exchanges in research and discussed potential collaboration in the future. One was the Bioinformatics Center, Institute for Chemical Research, Kyoto University at Uji, where I met Associate Professor Susumu Goto and Professor Minoru Kanehisa. The Kyoto Encyclopedia of Genes and Genomes (KEGG) database managed by the Bioinformatics Center is an internationally well-known resource for understanding high-level functions and utilities of the biological system. The second was the National Institute of Agrobiological Science in Tsukuba, where Dr. Takahiro Shiotuki hosted me and arranged my activities in the Insect Growth Regulation Laboratory of the Development and Differentiation Department. Remarkably, there are more than 1000 silkworm mutants. The third was Kinki University in Nara. After my seminar in front of about 200 audiences, there were good discussions with Professor Kazuhiko Matsuda, Associate Professor Masanori Morimoto, Lecturer Makoto Ihara and Dr. Keiji Tanaka. Finally, I was pleased to visit Professor Daisaku Ohta’s laboratory in Osaka Prefecture University in Osaka, where active research activities were in metabolomics, lipidomics and P450 biodiversity. I had wonderful discussions with Professor Daisaku Ohta, Associate Professor Atsushi Okazawa, Assistant Professor Takumi Ogawa, and Dr. Adchara Padermshoke.

The University of Hawaii at Manoa and J.F. Oberlin University in Machida, Tokyo have had on-going student exchange programs. I was pleased to visit J.F. Oberlin University and met with my colleague Professor Wayne Iwaoka who taught there. In addition, the convenient train system between Kyoto and Osaka allowed me to visit my collaborator Dr. Tadahiro Makise in Osaka a couple of times to discuss our research findings and future research collaboration.

Pleasant interactions promote an idea to establish collaboration between the Graduate School of Agriculture of Kyoto University and the College of Tropical Agriculture and Human Resources of the University of Hawaii. Professor Kondo, Professor Miyagawa and I have had discussions and are working on potential agreement for student exchanges between the two institutions. It is our hope that this will occur in 2014.

Field trips
Ashiu Forest Research Station of Kyoto University was established in 1921. It has been a
site of research and education. A field trip to Ashiu Forest Experimental Station was organized by the Faculty of Agriculture’s International Office. The activities were highly appreciated for the promotion of interactions and communications among faculty, students and international scholars and students. Distinct differences in vegetation coverage were so apparent between the deer fenced area and the non-fenced area, which clearly showed the public about the impact of forest ecological research, being an excellent showcase.

Organic farming is a form of agriculture that uses compost rather than synthetic fertilizers and pesticides. Fujino town in Kanagawa Prefecture, Japan is quite well known of its organic farming. I attended an organic cotton field trip and workshop in Fujino and experienced Ladakh cultures in cotton farming, ginning and spinning as well as a traditional soup of Ladakh, called "sku".

Professor Mitsuyoshi Ueda and I had previously written a binational grant application proposal for the JST-NSF metabolomics program. Conversations with him had brought potential collaboration closer. With his introduction, I was pleased to have informative discussions with Mr. Yoshiyuki Togawa, Mr. Q. Yamay and Ms. Chihiro Kohsaka during my visit to Kyoto Municipal Institute of Industrial Technology and Culture. The institute is to provide R&D assistance and promote new business creation and commercialization for small and medium-sized enterprises.

Sake (i.e., rice wine) is usually at the center of Japanese ceremonies and traditional events. Gekkeikan Company is one of the biggest sake companies in Japan. Gekkeikan has been making and selling sake since 1637. Professor Jun Ogawa had organized his class of about 50 students for a wonderful tour of Gekkeikan, which Director Akitsugu Kawato, Director Yoji Hata, and Manager Hiroko Tsutsumi had informative introduction of Gekkeikan. Many Kyoto University graduates have worked in Gekkeikan and Gekkeikan has hosted many interns from Kyoto University; being a great example of academic and industrial cooperation between Kyoto University and Gekkeikan.

Other activities
Kyoto was the capital of Japan for more than 1000 years. Nara was the preceding capital of Japan from 710 to 784. There are 17 world culture heritage sites in Kyoto and 8 in Nara. It is difficult to not mention that I visited many temples, shrines, museums, and parks in Kyoto and Nara. The Jidai Matsuri festival and Kurama fire festival have a long history and are among the most remarkable festivals in Kyoto, while the Imperial palace is opened to the public only once a year. Those activities enriched my awareness of Japanese cultures. To increase cultural and academic exchanges, the Faculty of Agriculture’s International Office had organized seminars to cover a wide range of interests such as introduction of Myanmar People, Culture and Natural Resources by Ms. Mya Thandar Toe, and a seminar on palm cultivation and utilization in Indonesia by Visiting Professor Supiandi Sabiham from Bogor Agricultural University, Indonesia. Ms. Mari Watanabe is an excellent teacher. She makes her Japanese classes enjoyable and pleasant. I was fortunate to take her Japanese class once a week.

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