



SUNY Cobleskill Foreign Exchange Student Gains Research Skills in Cornell Internship

By Lisa Fields

Eun Hong grew up in the city of Seoul, South Korea and worked in a flower shop before deciding to pursue a college degree. Hong explained, "I wanted more for my future than working as a florist. In South Korea, floriculture is a rapidly developing industry that relies on research information primarily from Germany and the Netherlands, so I was encouraged to study abroad." Hong decided to come to the U.S. rather than Europe because of family ties in Albany, NY. She entered the Floriculture program at SUNY Cobleskill in 2006. Hong noted, "I studied English in high school, but had not spoken it at all since then. This is still a big challenge for me." Despite that challenge, she was determined to earn an Associate's Degree in the subject she loved.

Plans changed when Hong took a soils course. "It was so interesting that I wanted to learn more and decided to continue college for a Plant Science Bachelor's (B.T.) degree."

Dr. John Kowal, SUNY Cobleskill's Plant Science Department Chair said, "Eun is an excellent student, very bright and highly motivated. I admire her courage, coming to a completely unfamiliar culture to pursue her education."



Eun Hong, Plant Science major at SUNY Cobleskill worked with the Cornell Nutrient Management Spear Program during her internship in the fall of 2009.

The B.T. degree includes a 16 week internship requirement. In Hong's last semester, Kowal connected her with Dr. Quirine Ketterings of Cornell University's Nutrient Management Spear Program (NMSP). Ketterings said, "We have had this cooperative program with SUNY Cobleskill since 2007 and Eun is our 5th student intern. The students have all come to us very well prepared. The soil fertility and plant nutrition courses the students take at Cobleskill give them the background for laboratory research and knowledge of the concepts applied in our extension projects."

Kowal noted the benefits of the Cornell NMSP internship. "The students get to work directly with the research projects. They are immersed in the whole process including the final objective of educational outreach."

Ketterings emphasized the importance of students in the NMSP's work. "Our mission involves improving both the environmental and economic sustainability of our dairy and crop farms. Our research efforts address pertinent soil fertility, production and environmental issues. Involving students not only trains them, it engages them as future contributors to science and its implementation."

During her NMSP internship Hong worked with undergraduate student Chang Lian on a project on potassium needs in alfalfa (Honor's thesis), and with graduate students Sarah Wharton and Anne Place. Sarah's thesis work includes a project on whole farm Corn Stalk Nitrate Test (CSNT) and Illinois Soil Nitrogen Test (ISNT) evaluation in collaboration with six dairy farms, and Anne Place's master's thesis includes a manure incorporation study that involved ten dairies.

Ketterings commented on NMSP's team structure. "Although each person has a primary project, there is the expectation of shifting your work to help complete whatever the others need to get done. It's a collaborative rather than a competitive system that enables all of us to succeed."

The field work for the research projects involved long days of physical work setting up plots, taking soil samples and cutting and gathering alfalfa plants and corn stalks for lab analysis. Hong and the others traveled to several farm sites across the state. She said, "The walking and soil sampling was a challenge, as I had to get used to the physical activity." In the laboratory, Hong learned to perform ISNT and the CSNT for Place's and Wharton's studies.

Hong's work on the CSNT with Wharton prepared her to do her own independent research projects. "I saw Eun's interest in our work and her performance in the laboratory and felt very comfortable assigning her two independent research projects," Ketterings explained. "Eun studied the effect of sampling protocol and field variability on CSNT results."

The CSNT is performed on corn stalks taken at the end of the growing season and evaluates the crop's nitrogen supply as either insufficient, sufficient, or in excess for optimal crop growth. The basis for Hong's sampling protocol study was the observation that in 2009, some stalks submitted for the test varied in length from the standard 8 inch protocol. Hong sampled ten corn fields to answer the questions of whether or not either sample length or cutting height of the corn stalk affect CSNT results. Hong took the samples, processed and analyzed them and then summarized the data in tables and charts and wrote an extension article and research report. Hong's work showed that 6-inch stalk samples could be taken as long as the sample was taken between 7 and 13 inches, or that 7-inch samples could be taken as long as they were taken between 6 and 13 inches above the ground. Both alternative sampling protocols result in a reduction in sample volume and allow for sampling after harvest as long as the corn harvest height is 13 inches or higher.

Hong's spatial variability study sought to answer whether plants from the same row or from different locations within one field would vary significantly in CSNT. Current sampling

density is one corn stalk per acre with a minimum of 15 stalks per field. Hong sampled six corn rows in a field, and took ten stalks per corn row (every 3rd stalk). She found no significant differences in CSNTs of stalks sampled within the same row, but significant differences among rows within the same field. This testing showed the need for future research to determine effective sampling density for the CSNT.

All SUNY Cobleskill NMSP interns are assigned the task of writing a 2-page factsheet for a farm and farm advising audience. Hong's factsheet was on boron. She described the role of boron in plant growth (primarily alfalfa), conditions that affect its availability to plant, and how to test for and address deficiency symptoms. She received guidance from both Dr. Tom Bruulsema of the International Plant Nutrition Institute and Dr. Ketterings.

Hong summarized her experience with NMSP. "All of the internship work was a great experience for me. My very favorite part was being assigned my own project, where I was responsible for the procedures and the quality of the results. It was a very satisfying accomplishment."

Hong's coursework at SUNY Cobleskill and her Cornell NMSP internship strongly influenced her plans. "I am so grateful to have had this internship opportunity with the NMSP. Working closely with knowledgeable researchers in the field is an eye-opening experience." Hong adds. "I want to continue my education by pursuing a graduate degree either in the U.S. or Korea. For my career, I would be happy to work in soil science, plant nutrition, hydroponics or irrigation."

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The **Nutrient Management Spear Program** (NMSP) is an applied research, teaching and extension program for field crop fertilizer and manure management on dairy and livestock farms. It is a collaboration among faculty, staff and students in the Department of Animal Science, Cornell Cooperative Extension, and PRO-DAIRY. Our vision is to assess current knowledge, identify research and educational needs, facilitate new research, technology and knowledge transfer, and aid in the on-farm implementation of strategies for field crop nutrient management including timely application of organic and inorganic nutrient sources to improve farm profitability while protecting the environment. An integrated network approach is used to address research, extension and teaching priorities in nutrient management in New York State. For more information on NMSP projects and extension/teaching activities, visit the program website (<http://nmsp.cals.cornell.edu>) or contact Quirine Ketterings at qmk2@cornell.edu or (607) 255-3061.