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IMPACT REPORT
Q2

SECOND QUARTER

Of Innovation,
Collaboration,
and Compassion



**College of Tropical Agriculture
and Human Resources**
University of Hawai'i at Mānoa

*The founding college of the
University of Hawai'i, established 1907*

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1907

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College of Tropical Agriculture and Human Resources **Of Innovation, Collaboration, and Compassion**



“How we’ve gotten here—our history and traditions—is important, but we must also remember that equally important to our continued success and forward movement are new ideas, new techniques, and new participants in the field.”

The stories in this quarter’s Impact Report illustrate the importance of both continuity and change, of ensuring that Hawai‘i agriculture continues as a growing, flourishing field by using collaboration, innovation, and education.

We know that for farming, ranching, and other forms of agriculture to remain viable and vibrant, a periodic influx of fresh “sap” is needed. The LIFE Program, intended to help acclimate and assimilate immigrant farmers and other marginalized groups into the mainstream Hawai‘i ag community, discovers that there is also much to be learned from their clients. High school students are introduced to an exciting spectrum of agricultural and natural resource management possibilities in a concentrated session of the Hawaii AgDiscovery Program, in hopes that they’ll choose to enter these career paths. And cutting-edge genetic research helps to protect the Islands’ environment from dangerous plant bacteria—futuristic science in aid of the age-old cycle of planting, tending, and harvesting food from the soil.

How we’ve gotten here—our history and traditions—is important, but we must also remember that equally important to our continued success and forward movement are new ideas, new techniques, and new participants in the field.

Aloha,

Sylvia Yuen
Interim Dean and Director of CTAHR

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Bacteria Online

Ding-dong! Please sign here for your package of plant pathogens. With all the ag inspection protocols at the airport, it's surprising to think of deliberately sending pathogenic material in and out of Hawai'i. But researchers wanting to identify unknown strains of bacterial plant pathogens have had to do just that—until now.

Plant-associated bacterial pathogens cause billions of dollars in crop losses annually, so rapid and accurate identification is essential for agriculture. For example, the genus *Xanthomonas* contains many important plant pathogenic species, which altogether infect over 392 plant hosts. Quick identification of closely related strains helps agricultural workers make informed decisions about control methods, including quarantining and destroying infected plant material.

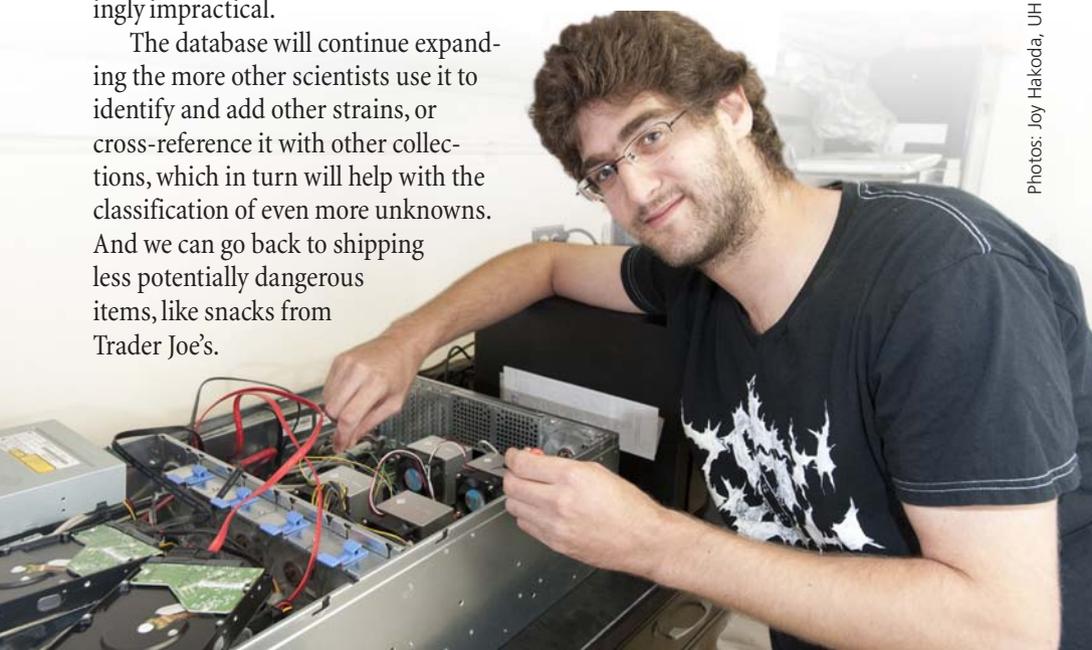
Using computational analysis to compare six sequenced genomes of *Xanthomonas*, Kevin Schneider, a graduate student in Gernot Presting's (MBBE) lab, discovered a DNA marker that distinguishes closely related strains of *Xanthomonas* as well or better than the widely used marker based on the ribosomal intergenic spacer region (ITS). This new marker, named *RIF*, can distinguish plant-associated bacteria below the species level and is also inherited more faithfully than the ITS marker. Kevin went on to genotype about 800 strains of phytopathogenic bacteria from Anne Alvarez's (PEPS) collection, and the system should be transferable to most other bacterial genera in the future.

The other good news: The team created an online database <<http://genomics.hawaii.edu/cgi-bin/RIFdb/html.pl>> to make these "reference" sequences available to the public. This will allow comparison of specimens from all over the world without having to ship the organisms into or out of Hawai'i. This is important, both because accidental shipping of infected plant material has already led to global distribution of certain strains, and because the risk inherent in maintaining and shipping live pathogens into and out of our state makes side-by-side strain comparisons increasingly impractical.

The database will continue expanding the more other scientists use it to identify and add other strains, or cross-reference it with other collections, which in turn will help with the classification of even more unknowns. And we can go back to shipping less potentially dangerous items, like snacks from Trader Joe's.



(left to right) Graduate student team members Glorimar Marrero and Kevin Schneider with Drs. Anne Alvarez and Gernot Presting.



The Staff of LIFE

Could you grow a papaya? A pipicha? A bitter ball? Maybe not, but you might be able to find one in your local farmers market, thanks to a growing population of immigrant farmers bringing the techniques and products of their native lands to Hawai'i. But while there's much that these growers know, there are aspects of starting to farm in a different country, climate, and economy that can be confusing and even daunting.

This is where LIFE comes in. The Local Immigrant Farmer Education Program serves Southeast Asian farmers in Hawai'i whose small acreage, remote locations, and limited English language skills may make it difficult for them to connect with local growers. LIFE also serves other socially disadvantaged, limited-resource producers, including women and Native Hawaiians. The program is headed by Extension agent Jari Sugano; she and Randall Hamasaki, Maria Diaz-Lyke, Robin Shimabuku, and Glenn Sako are the training members of the group. Recently retired agent Steve Fukuda helped to make the program what it is today; project founder Sabina Swift stays involved, as does Stuart Nakamoto, and in 2010 Ming Yi-Chou and Elsie Burbano joined the team.

The hands-on aspect of the program is one that farmers appreciate the most. Trainers and growers get out into the fields and prune, spray, and build. At a recent "field day" event, participants were able to

take part in building aquaculture grow tanks, while other workshops have shown how to deal with small business taxes, ways to combat insecticide resistance, and the proper care and handling of papayas for shipping to the Mainland. Many of the program's materials and workshops are translated into the languages of their intended readers, something that has been lacking in previous training programs.

At LIFE's core is the one-on-one interaction provided by the "Farm Doctor" visits, where an agent meets with individual farmers on their land to "diagnose" any problems with the crops or soil. It's the interaction, the mutual teaching and learning, that's important. Clients can participate in the program by conducting "Cooperator-Inspired Field Trials" to investigate planting or agribusiness techniques and share their findings with LIFE, while program coordinators act as resources and aid in collecting and summarizing the data. And one of the program's stated measures of its own success is the number of participants who are able to start helping others in their community. What better way to reap the bounty of what different cultures can bring to the table?



LIFE project founder Sabina Swift (right) seen here with a coffee farmer on the Big Island.



On-farm interaction is key to the program's success.

Hawaii AgDiscovery Program 2011

Established 10 years ago by USDA's Animal and Plant Health Inspection Service (APHIS), AgDiscovery has grown into a nationwide program, held this year at 13 campuses throughout the nation. In June and July 2011, the University of Hawai'i, represented by CTAHR, participated in the program for the first time. Ten exceptional students were selected from over 70 applicants to take part in a transformational experience, blending technical learning and cultural immersion. The overall goal of the Hawaii AgDiscovery Program was to expose high school students to cutting-edge technologies and stimulating learning experiences that would encourage them to select an agricultural field as an academic major and as their future career choice.

The program was planned by a team of CTAHR faculty and staff, along with professionals from APHIS's Plant Protection and Quarantine, Veterinary Services, Biotechnology Regulatory Services, and Wildlife Services branches. The intensive two-week training program included numerous hands-on classroom exercises and lectures delivered by experts from CTAHR and APHIS, as well as visits to CTAHR laboratories and experiment stations, APHIS and other government facilities, and commercial agricultural operations. In the classroom and field training, students learned to perform water-quality analysis, use GPS devices, identify microorganisms under the microscope, extract DNA, and color fabric using natural dyes. In addition to learning by doing, students got to network with professionals across the agricultural spectrum and observe careers in agriculture and natural resources management. Besides the many APHIS branches, and other government institutions such as the Hawaii Department of Agriculture and the Honolulu Zoo, a number of private companies contributed to making the Hawaii AgDiscovery Program a success, including Kualoa Ranch, Mari's Garden, Monsanto, and Pioneer. The CTAHR Alumni Association also added their support.

The training program also included sessions to hone teamwork, leadership, and communication. Throughout, students were exposed to local culture, Native Hawaiian practices, and college life. In their exits surveys, without exception the student participants agreed they had had "fun," "educational," "engaging," "exciting," "amazing," and "memorable" experiences that would help them make future decisions about their field of study in college and the many career paths in agriculture and natural resource management.



AgDiscovery students releasing some of their summertime energy at CTAHR Waimānalo Research station (above) and in the UH-Mānoa Hawaiian Studies lo'i (below).



Photos: Miles Blackwell for the CTAHR Academic and Student Affairs Office

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