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IMPACT REPORT
Q4

FOURTH QUARTER

People,
Place,
Promise



COLLEGE OF TROPICAL AGRICULTURE
AND HUMAN RESOURCES
UNIVERSITY OF HAWAII AT MĀNOA

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Renewal

As the campfire song goes, “Make new friends, but keep the old...”

In the last quarter’s *Impact Report* we looked at new crops and products that are expanding our state’s edible and economic horizons. In this quarter’s *Report*, we take a new look at some traditional and well-established horticultural and agricultural possibilities and at how the college’s research and Extension are giving them new life. When the big pineapple plantations closed down operations, CTAHR helped smaller growers find an alternate market with a sweeter pineapple. When the Islands’ anthurium industry was devastated by blight, our researchers bred resistant varieties and discovered other methods of managing the disease. Now that the health and nutrition benefits of the moringa tree have become known, Extension agents and specialists are moving to help growers make the transition from backyard planting to commercial production. And on the eve of a breadfruit revolution, CTAHR stands ready to help producers, processors, and cooks to make optimum use of this traditional staple.



“The college is taking a new look at some traditional and long-established crops.”

Aloha,

Maria Gallo

Maria Gallo, Ph.D.

Dean and Director for Research and Cooperative Extension

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From the Backyard to the World

It's the tree with numerous names and even more uses: *Moringa oleifera*, also known as kalamungay, malunggay, drumstick tree, ben oil tree, or horseradish tree. Most recently, however, it's been dubbed "miracle tree" in the popular press, and that's not surprising. Now CTAHR is working to help bring its many benefits to a larger group of growers and consumers.

Almost all parts of the moringa are useful: the leaves, young pods, flowers, and seeds are high in protein, calcium, and many other nutrients, making it ideal for combatting malnutrition. It also has medicinal uses: the root, besides being eaten as a horseradish-like condiment, has long been used to combat inflammation and kidney disease. More recently, scientists have discovered that the leaves can be used to lower blood sugar, giving hope to people with diabetes or pre-diabetic conditions. It is just as versatile agriculturally, being able to grow under near-drought conditions and in poor soil; the fast growth of this nitrogen-fixer also makes it ideal as a windbreak.



The long pods of the moringa can be harvested and cooked like green beans.

Moringa is common in Hawai'i, but only as a backyard tree. It's grown commercially elsewhere, though, and increased understanding of the tree's many benefits has expanded its market potential. CTAHR is researching multiple aspects of the tree's selection, propagation, cultivation, and processing, sharing this knowledge with local growers eager to enter the miracle tree market.

Specialist Ted Radovich organized a moringa field day for growers featuring research and marketing updates and demonstrating new tree types being screened at CTAHR. Plant and Environmental Protection Sciences faculty Christine Lynch and Helen Spafford have taken important steps towards easing shipping restrictions for kalamungay by proving that the pods are not hosts for fruit flies. The process is now underway to classify them as non-hosts, allowing them to be exported to the Mainland without irradiation treatment.

Hawai'i's place in the global moringa community was cemented when Tropical Plant and Soil Sciences faculty and Extension agents were invited to join 300 scientists at the first international symposium on moringa held in Manila, Philippines. Ted Radovich presented a talk with CTAHR coauthors Russell Nagata, Glenn Teves, Amjad Ahmad, and Robert Paull, and DuPont Pioneer's John McHugh, on germplasm evaluation and selection, important for matching the right cultivars for the right growing conditions.

Dr. Ted Radovich tends a row of moringa trees in a test plot in Kunia.



Pineapple in Paradise

The last of the state's pineapple canneries closed in 2007. But the reasons for Big Pine's decline were economic, not agricultural; the Islands' soils and climate are ideal for the fruit. Pineapple is still a very viable crop; all that's required is a different economic model...and a different pineapple. Two CTAHR-associated pineapple businesses thriving under these new conditions are Haliimaile Pineapple Company and Hawaiian Crown—the former is a client of the college's Agribusiness Incubator, which advised them as to their business plan and start-up, while the latter is owned and operated by two CTAHR alumni. At the same time, a new generation of pineapple research has implications beyond the field.

The big plantations were mainly involved in canning, which requires a more acid pineapple. But today's local growers primarily capture the fresh market, which prizes a much sweeter fruit. Haliimaile delivers with its Maui Gold® supersweet pineapple, a variant of which was originally discovered by the CTAHR-affiliated Pineapple Research Institute in the 1970s. The company emphasizes

ripeness and freshness, delivering 80% of the weekly harvest to local markets within three days. Haliimaile has also diversified their customer base, partnering with Maui's Winery at Ulupalakua Ranch for pineapple wine, Haliimaile Distilling Company for Pau Vodka, and the Maui Culinary Academy at UH Maui College for roasted pineapple jam.

Hawaiian Crown founders and former CTAHRites Craig Bowden, Lisa Yamaguchi Bowden, and Tom Menezes offer their own exclusive supersweet variety, Sweet Gold™. The company not only has its own farms; it partners with other family farms on O'ahu, Kaua'i, and the Big Island, providing an alternative to plantation-scale production that creates an opportunity for local growers. Hawaiian Crown has also moved into value-added and diversified agriculture products, producing chocolate from its certified organic cacao orchards and Hawaiian Crown™ products from partner farms growing coffee, macadamia nuts, banana, and coconuts.

Nor is all the exciting news in pineapple in marketing and processing. Though the Pineapple Research Institute no longer exists, important pineapple research continues at the college. Tropical Plant and Soil Sciences (TPSS) researchers Nancy Jung Chen and Robert Paull were part of the international team—led by TPSS graduate Ray Ming—that recently sequenced the genes in the pineapple genome. This work provides an important step towards understanding what makes pineapple able to thrive in arid conditions where few other crops can survive, and how this knowledge can be used for other crops in drought-stricken areas.



Haliimaile's Darren Strand and Roderigo "Rudy" Balala make sure their sweet pineapple reaches customers at the peak of ripeness.



Hawaiian Crown's Craig Bowden, Lisa Yamaguchi Bowden, and Tom Menezes (left to right) provide opportunities for local growers to produce their sweet pineapple.

Bread(fruit), the Staff of Life

“T

he time for breadfruit is now,” says Noa Lincoln of the Department of Tropical Plant and Soil Sciences. The Islands are heading for an ‘ulu renaissance: at least 5,000 trees have been planted here in the last five to seven years. Soon they’ll start fruiting, eventually producing 500 pounds of breadfruit per tree per year, a total of 2.5 million pounds annually!

Dr. Lincoln credits the Breadfruit Institute and its director, Dr. Diane Ragone (CTAHR’s 2015 Outstanding Alumna), for their tremendous work in both research and outreach, discovering which cultivars were best suited to different locations and how best to grow them as well as giving away trees to NGOs and individuals. This bounty is great news for food security, but the burgeoning industry will need a lot of support in terms of organization, infrastructure, and information to use it most successfully.

Collaboration and shared vision are important, emphasizes Dr. Lincoln, for issues from shared processing equipment to coordinating harvest cycles to avoid periods of market glut and scarcity. He also prizes another kind of collaboration—between plants, explaining that breadfruit thrives in the mixed agroforestry conditions in which it’s traditionally been grown, rather than as a monocrop, something that probably explains why it’s so free of pests and diseases.

Collaborator and colleague Alvin Huang, of the Department of Human Nutrition, Food and Animal Sciences, has lots of ideas about how best to use ‘ulu. He is researching ways the perishable crop can be processed for longer shelf life, offering the potential for much-needed income to small Pacific islands and bringing an important new product to market: gluten-free breadfruit flour.

Dr. Huang is a key member of the Pacific Region Breadfruit Initiative, which won an Award of Excellence in 2014 from the University Economic Development Association. He’s created a prototype solar dryer built inside a used 20-foot freight container that can remove 300 pounds of water, which is about 90% of the moisture in a 500-pound batch of raw breadfruit, over a four-hour period. Containers will be able to move between the islands in Polynesia, Melanesia, and Micronesia, loading up breadfruit, drying it, and shipping it to food manufacturers to make a surprising variety of products. Those he’s already tested include pasta, senbei, areare, and a Cheerios-type cereal. Tasters, processors, and producers would agree—‘ulu is a crop whose time has come!

Dr. Noa Lincoln is excited about the tremendous potential of ‘ulu in the Islands.



Dr. Alvin Huang enlisted celebrated Italian pasta-makers to experiment with a gluten-free ‘ulu pasta.



We (Heart) Anthuriums

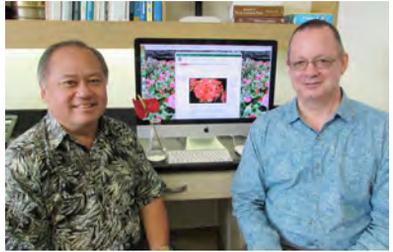
Though the anthurium has become one of Hawai'i's most iconic flowers, it's a relative newcomer. The industry began in the Islands in the 1940s; in 1950, researcher Haruyuki Kamemoto initiated anthurium research at what would become CTAHR with a breeding program for the commercial development and release of cultivars to growers. Over the next three decades, the industry gained momentum, supplying local, national, and international markets with 30 million flowers in 1980. Anthurium blight and the subsequent rise of cheaper overseas producers cut into Hawai'i's market share, but CTAHR's breeding program, which releases new varieties only to local growers; research into ways to curb the blight; and Extension work in teaching techniques to growers are keeping the exports of this dramatic flower strong.

Researcher Teresita Amore, of the department of Tropical Plant and Soil Sciences, continues CTAHR's tradition of anthurium research and breeding. Two new varieties were released in 2015, the culmination of a traditional breeding process that may take 15 years or more. Anthurium 'Kauai' is a pale green variety named in honor of Kaua'i, the Garden Isle, known for its lush green vegetation and verdant cliffs. 'Maui' is a dark red "obake," or green-edged, variety. The vibrant red flower, named as a tribute to the island, also evokes the image of the demi-god Maui as the catcher of the sun. Both are bred to be tolerant to bacterial blight.

Blight-resistant breeding is important, but non-resistant varieties can be grown successfully, with care. Interim Associate Dean for Extension Kelvin Sewake, who began working with the anthurium industry at the height of the blight epidemic, recalls the devastation wrought by the disease in fields and on livelihoods. Field sanitation to contain the pest is probably the single most effective technique, he explains, one which he taught out in the fields, grower by grower, and with a revolutionary video first shown in 1990. The history of the fight against the blight is described in a new website created by Scot Nelson, a specialist in the department of Plant and Environmental Protection Sciences, which explains the disease and traces its history in Hawai'i and the college's responses to it. The story, Dr. Nelson says, is one of the triumphs of Extension in the Islands: from large-scale devastation, today's fields are almost entirely blight-free.

Anthurium Blight: Pathogen, Symptoms and Management <http://cms.ctahr.hawaii.edu/anthuriumblight/Home.aspx>

Dr. Teresita Amore and graduate student Peter Toves hold beautiful and blight-resistant 'Kaua'i' and 'Maui' anthuriums.



Associate Dean Kelvin Sewake and Dr. Scot Nelson tell the story of anthurium blight in Hawai'i.

