

## Local Seeds for Local Needs

by Glenn I. Teves, County Extension Agent <email: [tevesg@ctahr.hawaii.edu](mailto:tevesg@ctahr.hawaii.edu)>  
University of Hawaii College of Tropical Agriculture and Human Resources, Cooperative  
Extension Service - Molokai

Our islands are a diversity of not only people, culture, and ideas, but also climatic diversity. From the mountain to the shore, we have over 140 soil types and most of the climatic zones in the world. We have thousands of microclimates when you add in topography and how trees and windbreaks affect surface and air temperatures.

With all of these unique environments, we have special challenges in farming. It's no wonder a crop variety from France and Italy or even Canada might not survive here. Each area of the world tries to create varieties for their specific challenges, conditions, and tastes, and many of these areas deal with short seasons or cold conditions. Our climate may come to that someday, but for now we have to deal with what we have, which is changing more than we realize.

Slight changes in wind direction can dramatically affect our climate. For Molokai, a decrease in trade winds means less recharge to our aquifer; a few years ago there was a 25% decrease in trade winds with dramatic consequences in not only field temperatures but also rainfall quality. Our island is designed for trade wind storms where clouds hit our north cliffs and dump rain into our forest reserve

before rising as they reach our warm central plains and west side.



*Molokai's North Shore cliffs provide the perfect 'rain catcher', forcing clouds up the cliffs and dropping rain in our water shed.*



*When the rainbows appear, misty rains are here.*

Slow moving southerly storms inundate our island with massive flooding and run-off, and as a result we're unable to capture much of this rainfall to recharge our aquifer in a place where water is so precious and where we can't steal it from another nearby state. Hawaii already has some of the highest erosion rates nationally, and these climatic temper tantrums can only accelerate soil loss.



*The drier west coast of Molokai after a slow moving westerly storm inundated this area. A usually dry Kakaako River overflowed into Kepuhi Beach at Kaluakoi.*

Climate change is becoming the new norm, and we have to adapt by keeping our soil covered whenever possible through the use of permanent or seasonal cover crops, but it's difficult when long, hot dry summers arrive and there's insufficient water to keep plants alive. Increasing organic matter is an ongoing challenge.

As a result of our diverse microclimates, one island may be drier than normal while another is getting more than their share of rain. Farming is about predicting tomorrow's weather in order

to plan your crop seasons, and to a large extent this is flying out the window.

In farming, it's about controlling the things you have control over, and you can have a lot of control when you really look at it. If you have access to irrigation, you can control how much water your plants will receive and when they will receive it, especially if you're in a dry area. You can also control placement of water when utilizing drip irrigation. Plant microclimates can be influenced by the use of windbreaks and also plant spacing.

Choosing the right seed variety can positively influence your production outcomes, and can mean the difference between success and failure. But many times we don't pay attention to this seemingly unimportant detail or we don't have a choice; we just buy what seeds we can access and hope that it does well in our location. But so often it's not adapted to our climatic conditions, and crashes when the weather gets nasty.



*Many landraces of Squash, Cucurbita moschata can be found in Hawaii mostly originating from the Philippines.*

Having the right crop variety is the theme of this quarter's newsletter. We have opportunities before us to improve the varieties we grow, and if someone isn't creating great varieties for us, then we have to do it ourselves. We cannot wait for the next best variety to come along because NOW is too important.

Midwest corn seed growers 'discovered' Molokai in the 1960's as the 'banana belt' around Kaunakakai proved to be some of the best corn-growing weather during winter months. While it was just another reason for corn breeders and their families to escape Midwest blizzards, seed growing opportunities are still here for local farmers large and small on other islands as well.



*Corn Country: Monsanto and Dow Mycogen fields in Hoolehua, Molokai*

Corporate agriculture in Hawaii is in flux, and soon they'll find another place like the sugar and pineapple companies, seeking more business-friendly 'third world countries'. Or they will utilize robots, so they won't need most of us to work in the fields. On Molokai this year, over 120 residents were laid off by the

corn companies with more anticipated by mid-year. Through all of this, we still have to survive and growing more food will need to be an important state agenda item.

Year-round seed nurseries can support the development of tropically-stressed varieties to fit our special conditions and challenges, and some of our selections may have wide adaptability to other areas of the world. Developing new varieties takes time and we have to be in it for the long haul, but by pooling our resources, especially human resources as a statewide team, we can accelerate the development of new varieties of existing crops and also expand our portfolio of crops we grow through field evaluation and crop improvement.



*Over 90 years of age, Dr. Jim Brewbaker has been breeding tropical sweet and field corn at UH for over 50 years. The grandfather of tropical corn breeding, including the development of Hawaiian Supersweet #9 and #10, he gave an inspirational talk at the Organic Vegetable Breeding Workshop at Waimanalo Experimental Station.*

It's called empowerment; we cannot wait for the next sugar daddy to come along and save us because they're not coming here to save us; they're coming here to expand THEIR portfolio! The only ones who are worrying about us are US!

We're not doing this from scratch because we can build upon varieties, including heirlooms and old work horses, and even new introductions from elsewhere, especially from other tropical and sub-tropical areas. We can seek out varieties that have special qualities such as resistance to our pressing diseases or that can endure attacks from endless varieties of insects and arthropods.

*We can build upon varieties developed by the University of Hawaii College of Tropical Agriculture and Human Resources and also those developed by Hawaii farmers and gardeners.*



*Chef Ignacio Fleishour of Makana Market & Deli with Ted Radovich, UH CTAHR Sustainable and Organic Specialist highlighting Hawaiian and introduced sweet potato varieties incorporated into special gourmet dishes. Ancient Hawaiians had hundreds of sweet potato varieties. Culinary Breeding Network Variety Showcase in Hawaii. Photo courtesy Shawn Linehan*

We also underestimate the importance of gardeners in enhancing our food security. Before World War II, Hawaii gardeners grew most of our food and this group is still very important today.

In Russia, home gardeners still produce a substantial percentage of their food and this type of farming system is insurance against famine and food insecurity in the event of crop loss, which is common in that country. We could all keep busy and out of trouble if we grew gardens in our back yards.

We can start with 'meat and potato' crops, and when you really look at it we have many crops to choose from. I remember a few decades ago when a group of extension agents got together to identify all the vegetables and herbs grown in Hawaii, and I think we stopped at about 250 crops, and I'm sure there's much more today.

Starting with beans, the 'meat' of vegetable world, this is a vitally important protein source for those who prefer not to eat meat, and pole beans are the bean of choice for both Hawaii farmers and gardeners because they produce over a longer season than bush beans.

I remember Oregon organic plant breeder Carol Deppe telling me that brown-colored bean seeds are tastier than white seeds, but others say taste habits can change like the weather and with food trends, so having lots of farmer friends and neighbors to taste your bean varieties can help you decide

which is best. The brown-seeded ‘Kentucky Wonder’ pole beans are considered the gold standard for green bean taste.

There’s an assortment of bean seed colors and each has different combinations of nutrients and antioxidants. I would think darker seeds have more antioxidants, and that’s another important consideration in plant breeding is to look at ‘nutrient density’ of a variety because this is the wave of the future.

In a UH publication from the early 1940’s entitled ‘Home Gardening in Hawaii’, Walt ‘Tex’ Frazier alludes to this at a time when the nation was at war and food was more critical to our survival than we realize today. From the standpoint of nutrition, he recommended that shouldn’t waste our time growing crops with low nutritional value, such as cucumbers.

To breed a truly great variety takes a team and even generations of breeders, building on the successes of the past to improve on what we have today. At times, it’s difficult to determine who should receive recognition when it’s truly a group effort.

An important consideration in breeding and selection is market preference and acceptance. Until round-podded Blue Lake beans finally caught on less than 30 years ago in Hawaii, flat-podded beans were the preferred fresh market and home garden type. Hawaii’s ethnic markets also prefer green cow peas,

yard long beans, wing beans, and others.

In the 1940’s, the main pole bean variety in Hawaii was ‘Kentucky Wonder’, but in many parts of Hawaii, especially in wet areas, Rust Fungus *Uromyces appendiculatus* was a big problem. A foliar disease with orange pustules on the lower surface of leaves, it will defoliate the plant leading to decreased production and early death.



*A kaleidoscope of carrot varieties, part of the Organic Seed Alliance and Northern Organic Vegetable Improvement Collaborative carrot breeding program. Color, antioxidant content, and taste are being exploited in carrot breeding. Culinary Breeding Network Variety Showcase in Hawaii.*

UH plant breeders ‘Tex’ Frazier and John Hendrix decided to tackle the problem by crossing ‘Kentucky Wonder’ with a rust-resistant bush bean developed in the late 1800’s by Peter Henderson & Company called ‘Bountiful’ to create a rust-resistant pole bean they named ‘Lualualei’.

Although ‘Kentucky Wonder’ has resistance to rust in some parts of the U.S., it couldn’t hold up under Hawaii’s

challenging conditions, so ‘stacking’ genes from both parents could fortify disease resistance. ‘Lualualei’ was later crossed back to Kentucky Wonder to magnify the superior eating quality of ‘Kentucky Wonder’ to create ‘Hawaiian Wonder’.

Good breeders don’t have time on their laurels because they’re constantly playing catch up with a host of diseases waiting in line to devour our crops in Hawaii, so root-knot nematode infestation was the next problem waiting to be solved. Of the four species of root-knot nematodes found globally, *Meloidogyne incognita* and *Meloidogyne javanica* are among the most serious pests of vegetables in Hawaii.



*Early stages of Javanica Root-knot Nematode Meloidogyne javanica infection on taro*

Dick Hartmann came onto the scene and built on the success of Frazier and Hendrix’s ‘Hawaiian Wonder’ by crossing it with a variety called ‘Alabama No. 1’, a root-knot nematode resistant bean, to create ‘Manoa Wonder’.

In plant breeding, it’s not always a win-win because with something gained,

usually something is lost. ‘Manoa Wonder’ wasn’t as resistant to rust fungus as ‘Hawaiian Wonder’ but provided good protection from root-knot nematodes. Now you had a choice of what problem was the most pressing by selecting either ‘Hawaiian Wonder’ or ‘Manoa Wonder’ as your main variety.

Dick Hartmann moved to the next level by increasing disease resistance, and improving bean quality. A variety can have a very attractive disease resistance package, but has tough and stringy pods with poor taste. Tough bean pods may be able tolerate a lot of insect damage but are too fibrous and stringy for Tom and Susie Homemaker.

The next step was a little more complex and involved crossing a bunch of varieties together, not just a simple cross to combine disease resistance, tender pods, and good taste. Dick Hartmann grew and selected the crosses for 10 generations, a little more than is usually required to breed a new variety, in order to select for long tender pods with good disease resistance.

He started by adding in new genes from a Hungarian bean with unusually long pod length combined with a relative lack of strings on the pods. However, it had weak growth and poor productivity in Hawaii’s growing conditions, even when free of diseases. This is the gene-for-gene issue mentioned previously. In life, you cannot have it all, and in the words of a Rolling Stones song, “You can’t always get what you want, but if try

sometime you just might find, you get what you need.”

A group of progeny from this cross were selected and crossed with a highly nematode-resistant introduction from Mexico via Ferry Morse Seed Company and USDA Western Regional Plant Introduction in Pullman, Washington. After six generations of grow-out and selection, Dick Hartmann still couldn't combine all the attributes he was seeking, so he did a backcross to 'Manoa Wonder'.

You can expect Murphy's Law to play into whatever breeding you're trying to accomplish, especially when things are growing great. There was variability in flower color which would indicate either outcrossing or just a lot of variability in the line. Flower color can also be linked to resistance or susceptibility to other challenges. Most farmers want to have each plant germinate and mature around the same time to make harvesting more cost-efficient.

Six more generations of selection created the 'Poamoho' pole bean, named after the Poamoho Experiment Station near Oahu's North Shore where much of the work was conducted. A huge advantage in creating new crop varieties in Hawaii is that it can be field tested in many locations, at different elevations with varied climatic schemes, simultaneously.

In this way, a selection's true colors over a range of climatic conditions will manifest itself. There were many more

functioning UH field stations than we have today, and with adequate field crews, trials could be run in five locations simultaneously. Results of field trials at Kapa'a on Kauai, Pulehu on Maui, Waiakea and Lalamilo on the Big Island, and Poamoho on Oahu were interesting and varied, but in a few locations 'Poamoho' yielded almost double that of 'Hawaiian Wonder' and 'Manoa Wonder'.



*'Jumbo' Romano-type beans, a large tender flat podded bean and 'EZ Pick', a round Blue Lake type. Puakala Farms-Molokai*

'Poamoho' is an improvement over its parent, 'Manoa Wonder' with a long straight flat pod, but is also stringless and tender even when beans are more mature. It's slightly earlier, yields significantly more, and is equal to 'Manoa Wonder' in resistance to root-knot nematodes and also tolerance of *Rhizoctonia* fungus, *Rhizoctonia solani* a root rot or damping-off fungus is troublesome on emerging seedlings especially in wet conditions. 'Poamoho' has white seed compared to the brown-seeded 'Hawaiian Wonder' and 'Manoa Wonder'.

As a youngster growing up in Manoa Valley, where everyone knew everyone and you couldn't get in trouble without your parents finding out, we used to play with the farmer's children in the Manoa lettuce fields at the end of East Manoa Road.

In the mid-1970's, Dick Hartmann embarked on improving Manoa lettuce. Derived from Green Mignonette, an heirloom from the mid 1800's, some of Manoa's attributes include a compact habit, soft leaves, a juicy and crunchy midrib, and superior heat-tolerance. However, the original Manoa lettuce had a more open habit especially when grown in the lowlands, and didn't hold up well on store shelves as it would shatter, dropping its outer leaves.



*Dick Hartmann's 'UH Manoa' right at home in the lowlands of Waimanalo. This variety will form a mini-head in cooler conditions. Waimanalo Experiment Station, Oahu.*

Dick Hartmann made numerous selections to create a compact 'Manoa' with a miniature head he dubbed 'UH Manoa'. 'UH Manoa' is the gold standard of lettuce quality and the preferred lettuce in Hawaii.

Sometimes the impact of breeding vegetables in Hawaii can be more far-reaching than we can ever imagine. Jim Gilbert is known for the development of tomato varieties that became the hallmark of breeding for disease resistance. In the late 1950's, he released 'Manoa Sugar' flat podded pea, AKA Chinese peas. 'Manoa Sugar' was resistant to Powdery Mildew *Erysiphe pisi*, a fungus that defoliates plants causing early decline, a major problem in pea production areas.



*Go Farm's Nora Rodli and OSU vegetable breeder Jim Myers highlight snow and snap peas grown at the Waimanalo Experiment Station. Culinary Breeding Network Variety Showcase at Kapiolani Community College. Photo courtesy Shawn Linehan*

Recently, I had the opportunity to attend the Organic Seed Alliance conference on the Oregon State University campus

in Corvallis in February, and was able to talk story with Jim Myers, vegetable breeder at OSU. OSU has been the epicenter of bean and pea breeding for decades, and we discussed snow and snap pea research.

I mentioned that it was great they developed a Powdery Mildew-resistant pea we could use to improve our snow pea. He said, “No, we got the resistance from you guys!” We can be ahead of the curve and Hawaii could be a major contributor to vegetable improvement in the U.S. and the world.



*U.H. snow pea varieties Manoa C and Manoa Sugar, known for their resistance to Powdery Mildew fungus. Photo courtesy Shawn Linehan*

Cauliflower is trending with cauliflower rice and other innovative dishes, but is not the easiest crop to grow in many areas of Hawaii. Hot humid day temperatures with warm nights are unbearable for most cauliflower varieties.

Not one to rest on his laurels, Jim Gilbert worked on many vegetable crops. In 1953, he released ‘Puakea’, an Indian-type cauliflower with good heat tolerance and less tendency to ‘button’

or bolt prematurely than other Indian lines. After 4 years of selection for earliness, improved quality, yield, and year-round performance in Hawaii’s lowlands, ‘Puakea’ was released.

High solar radiation and relatively predictable rain made Oahu’s leeward lowland areas some of the most productive areas to grow vegetables, from Hawaii-Kai to Waianae until urban sprawl turned most of these areas into the metropolis of Honolulu, Hawaii-Kai, and other bedroom communities.



*Daniela Dutra-Elliott of Hawaii Seed Growers Network teamed up with Lauren Tamamoto of KCC’s Culinary Innovation Center to highlight new lowland cauliflower varieties from Indian lines, including ‘Puakea’ cauliflower.*

Tested in India, ‘Puakea’ was also shown to have resistance to *Alternaria* leaf spot fungus *Alternaria brassiccola*, and is one of the few cauliflower varieties that can be grown successfully in Hawaii’s lowlands today. It has also been used to create other heat-tolerant varieties. More cauliflower work is being conducted by Daniela Dutra-Elliott and Jay Bost of the Hawaii Seed Grower’s Network to identify other Indian lines

than can be used to improve on 'Puakea' cauliflower.

Sometimes, Hawaii farmers and gardeners make major strides in improving a crop because the existing varieties don't fare well in their location, and as result we become the beneficiaries of their work.

One of them was Chikara 'Chik' Hirayama of Kawela, Molokai who passed away last year at the age of 93. 'Chik' was an electrical engineer involved in the development of the sodium light bulb, and he also enjoyed hunting in the mountains near his home.



*Hirayama Kai Choy (right) alongside UH Manoa Lettuce crosses from Wild Garden Seed. Waimanalo Experiment Station, Oahu*

After retiring from Westinghouse in Pennsylvania, Chik and his wife Kay moved to Molokai and as consummate gardeners grew all kinds of vegetables in a challenging environment above Kawela in South Molokai. Growing Kai Choy was a challenge because a disease called White Rust *Candida albugo* hampered his crop. White Rust produces white pustules on the

undersides of leaves and renders the crop unsightly and unsaleable. This disease can also be seed-borne. Read about White Rust of Cruciferous Vegetables in Hawaii:

<https://www.ctahr.hawaii.edu/oc/freepubs/pdf/PD-94.pdf>

A natural problem solver, Chik selected individual plants that were highly tolerant to this disease until he had a resistant population. Today, 'Hirayama' has replaced Waianae Strain as the most sought after Kai Choy variety in Hawaii.



*Lane Selman and Jay Bost, coordinators of the Culinary Breeding Network Hawaii Variety Showcase at the Kapiolani Community College Ohia Room on March 13, 2018. Photo courtesy Shawn Linehan*

Through the Culinary Breeding Network overseen by Lane Selman at Oregon State University, special crops developed and also curated by farmers and plant breeders are receiving rock star billing in events matching chefs and curators with special varieties. The Culinary Breeding Network Variety Showcase was held at the Kapiolani Community College Ohia Room on March 13, 2019 where over 200

participants were on hand to witness this first-ever event and to taste a lot of ‘ono’ eats.

Through the efforts of Micaela Colley, Laurie McKenzie, Jared Zystro, Steve Peters and others at the Organic Seed Alliance (OSA) headquartered in Port Townsend, Washington, OSA has served as a catalyst to bring farmers and breeders together with a common goal of sharing ideas and seed, and especially crop improvement incorporating all the elements important to organic farmers and the market.

Participatory plant breeding is the buzzword for the future of superior organic seed, and the fruits of this effort include the Northern Organic Vegetable Improvement Collaborative (NOVIC) teaming up farmers and breeders in developing improved vegetable varieties.

Through this effort, a first-ever Organic Vegetable Breeding Workshop was held March 11-12 at the Waimanalo Experimental Station and also included tours to Counter Culture organic farm on Oahu’s North Shore. Participants included UH faculty, farmers, and students. Presenters included experts from OSA, Oregon State, University of Wisconsin-Madison, UH, and others, even a large scale seed farmer from Sequim, Washington Sam McCullogh.

Through this collaborative effort, Oregon State vegetable breeder Jim Myers and University of Wisconsin – Madison corn breeder Bill Tracy were in Hawaii to

share their expertise through classes and field demonstrations. Along with many other breeding projects, Jim Myers also created the first blue tomato ‘Indigo Rose’, the parent of most blue tomatoes found in the trendy new tomato market.

Bill Tracy is one of the last Land Grant corn breeders with a large corn breeding program based in Wisconsin. A few years ago, he won an award for his efforts in working with organic farmers to create ‘Who Gets Kissed’, an open-pollinated organic sweet corn. There may be an effort to create TROVIC, the tropical version of NOVIC if a team of individuals can be assembled to take on this monumental task.



*Most ‘blue’ tomatoes originate from the variety ‘Indigo Rose’ developed by Jim Myers. This variety is ‘Blue Tears X Black Cherry’. Puakala Farms*

Another ‘breed’ of vegetable breeder has lingered in the shadows and this is the County Extension Agent, who is up close and personal with many of the problems facing farmers, and is compelled to do something about it. Here are some examples of their efforts:



*Extension Agent Jari Sugano with The Pig and the Lady Chef Keaka Lee whipping up a few dishes utilizing new UH long eggplant varieties and UH Basil. Culinary Breeding Network Variety Showcase at Kapiolani Community College. Photo courtesy Shawn Lineham*

Fusarium Wilt of Basil, *Fusarium oxysporum f. sp. basilicum* was first discovered in the U.S. in 1991. A serious soil-borne fungus which can hang around in soil for a long time, it arrived in Hawaii in the mid-1990's and has plagued basil growers. The majority of farmer fields were decimated by this disease, probably spread by infected seed.

Oahu County Extension Agent Randy Hamasaki noticed that a few plants would survive in farmer's fields. A Fusarium wilt-infested field at the UH CTahr Pearl City Urban Garden was established to identify individual plants resistant to Fusarium Wilt and create a population of resistant individuals.

Row covers protected resistant individuals from ravenous birds eating these precious seeds. Several generations were planted in the Fusarium-infested plot until a large population of resistant plants was developed. Through Randy's efforts, 'UH Basil', was created. See his

publication:

<https://www.ctahr.hawaii.edu/oc/freepublic/pdf/NPH-3.pdf>

On an old edition of the Prairie Home Companion on Hawaii Public Radio, the question was asked, "What are two things that money cannot buy?" The answer was 'true love and home-grown tomatoes'.

After a trip to Taiwan, Hilo Extension Agents Andrew Kawabata and Mel Nishina brought back a grape tomato that they thought would fare well in Hawaii. After several generations of selections in a greenhouse at the Komohana Extension Center in Hilo, the 'Komohana' tomato was released; it's a durable, tasty grape tomato with thick skin making it excellent for drying, and also very little seed compared to other grape tomatoes which can be a problem for seed producers.

'Komohana' has an excellent shelf life; a friend, organic vegetable breeder Alan Kapuler of Corvallis Oregon, commented that he left Komohana tomatoes on the shelf for two months and it was still in good eating condition.



*'Komohana' tomato featured at the Culinary Breeding Network Variety Showcase at Kapiolani Community College. Photo courtesy Shawn Linehan*

Filling a void due to a lack of vegetable breeders at UH for over a decade, and also limited resources to maintain the UH Seed Program, Extension Agent Jari Sugano assembled a team to create new long eggplant varieties. This started when a UH long eggplant hybrid variety showed decreased yield and vigor as identified by a Leeward Oahu farmer.

The farmer noticed the plants weren't yielding as much as in the past, and believed it was related to seed genetics. In order to produce the UH long eggplant hybrids, both parents are sent to the Orient for hybrid seed production and it was believed that the parent lines were mixed up. The result was that some of the open-pollinated lines yielded more than the hybrids.



*Winter-grown long eggplant can be a challenge due to constantly changing weather and wind direction, and an explosion of spider mites. A mix of long eggplant varieties, including new UH varieties Hamasaki and Poamoho Dark Long grown on Molokai.*

Three disease-resistant long eggplant selections developed over 20 years ago by Ken Takeda, retired UH vegetable breeder, were field tested against other open pollinated lines, and they proved to be superior in many respects to Hawaii varieties on the market.

They were designated UH 201, UH 204, and UH 210, seedlings of a cross between 'Waimanalo Long' and a South Pacific variety with resistance to Bacterial Wilt *Ralstonia solanacearum*, a serious soil-borne bacterial disease that can remain in the soil for a long time. 'Waimanalo Long' is a cross between Molokai Long, a farmer variety from Molokai and Takii Long Black, a variety from Japan.

UH 210 will be released this year as 'Poamoho Long Black' named after the Poamoho Experimental Station on North Shore Oahu where it was developed, but it was also tested in other areas of

the state. It was selected for its size, fruit set, and quality with few seeds concentrated on the bottom of the fruit. This was truly a group effort involving 14 individuals, including a retired vegetable breeder, county extension agents, research station staff, and also an organic vegetable specialist.



*Oahu County Extension Agent Jensen Uyeda conducting a taste test of new head cabbage cultivars previously field tested at the Poamoho Experiment Station. Culinary Breeding Network Variety Showcase at Kapiolani Community College. Photo courtesy Shawn Linehan.*

‘Hamasaki’ eggplant was refined by eggplant farmer Rolland Hamasaki of Laupahoehoe, Island of Hawaii from seed originating from Ken Takeda’s UH 200 lines, and selected in Bacterial Wilt-infected soil. After further verification of Bacterial Wilt resistance, this variety will also be released.

The new varieties have a larger diameter than oriental long eggplants of the past, and the larger diameter minimizes curving of the fruits which renders them off-grade, and this improvement will be a production plus for farmers.

The cost of hybrid seed is becoming cost-prohibitive for the UH Seed Store as minimum orders for the production of hybrid seed can exceed \$40,000. Only time will tell if the new open-pollinated long eggplants will be accepted by Hawaii farmers, who have been impressed by hybrids Nitta X Waimanalo Long and Nitta X Molokai Long for two decades.



*Long-time Oahu wetland taro growers Charley and Paul Reppun of Waiahole Valley with UH researchers Roshan Paudal, James Keach, and Solange Saxby with samples of Hawaiian and hybrid taro varieties. Culinary Breeding Network Variety Showcase at Kapiolani Community College. Photo courtesy Shawn Linehan*

The development of a community-based seed industry in Hawaii takes time. In 2010, The Kohala Center conducted a baseline assessment of island-wide interest in seed saving and community seed-saving capacity. This survey revealed the need to develop knowledgeable seed growers, increase seed education, and create a local source of quality seed. .



*Hawaii-Grown Seeds from Hawaii Seed Growers Network*

A two-day, island-wide Seed Symposium, “[Hua Ka Hua: Restore Our Seed](#),” was held in 2010 in Kailua-Kona, funded by the [USDA’s National Organic Program](#); the University of Hawai’i at Hilo College of Agriculture, Forestry, and Natural Resource Management; the University of Hawai’i at Mānoa College of Tropical Agriculture and Human Resources (UH CTahr); County of Hawai’i; and the [Keauhou-Kahalu’u Education Group of Kamehameha Schools](#). Out of this effort, the Hawaii Public Seed Initiative was born. Eight years later, after numerous workshops throughout the state to build the capacity of individuals, both gardeners and farmers, to shepherd, grow, and curate vegetable varieties adapted to Hawaii’s diverse climatic conditions, the Hawaii Seed Growers Network was formed. Experienced seed growers are encouraged to join.

*We honor those who brought their cherished seeds from the home country to their new home in Hawaii. We applaud the efforts of all vegetable breeders who came before us to create the varieties we grow in Hawaii today. Crop improvement, including breeding and selection, are long-term projects, and it may take generations to see the fruits of your labor. May we have more farmers, gardeners, volunteers, Extension Agents, and vegetable breeders taking on this important task to support the expansion of Hawaii agriculture to bolster food security in this, the most isolated place on this planet.*

**In Memoriam: This quarterly is dedicated to the memory of Kent Whealey co-founder of Seed Savers Exchange and a staunch supporter of organic agriculture and the saving of heirloom seeds. Through the financial support of Kent and Judy, many agricultural projects in Hawaii are in a better place, including the preservation of Hawaiian taro varieties, promotion of breadfruit, and especially the Hawaii Public Seed Initiative. He will be sorely missed.**

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*Well, that’s it for this quarter! Hope you enjoyed this newsletter. It’s been an unusually cold winter and maybe it’s the new normal so hold on to that extra blanket. If this trend of weather extremes holds up, we can expect to see a very interesting spring! The first day of spring has passed so get your seeds started. A tiny seed can change the world!*

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