

## *Local Seeds for Local Needs*

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*“Don’t judge each day by the harvest you reap, but by the seeds that you plant.”*

**Robert Louis Stevenson**



*Manoa Lettuce, a local favorite and the gold standard by which all other lettuce cultivars are judged.*

In Hawaii today, we rely on other areas of the world to produce most of the basic materials and supplies critical to our survival. It’s kind of pathetic when you consider that only 200 years ago, these islands were 100% self-sufficient. We’ve forgotten how to take care of ourselves, and instead have turned into an opihī on the rock of the U.S.

This kind of ethic can be addicting if we don’t look at ways of turning this scenario around, but there’s a lot of money and politics at play to keep it that way. We’re the most central and influential cargo cult in the Pacific and other island nations want to emulate us, but with it they give up their food

sovereignty. This is already happening, as many have given up growing native foods and relying on imported foods, and this can only lead to a major health collapse of its native people.

But this is not the purpose of this newsletter. It’s about seeds of positive change. From an ancient perspective, Hawaii was a food growing nation who dabbled in fishing and gathering of near shore delicacies. They were land-based food farmers first. Today, we still grow some of our basic Polynesian food crops, but we’ve added a huge diversity of foods found nowhere else in the world! It’s a collision of foods of east, west, north, and south.



*Today, we can choose from a stunning array of lettuce, such as this oak leaf type.*



*Long eggplant is a local favorite in Hawaii. This is a mix of varieties Farmer's Long, Pingtung Long, and Nitta Molokai Hybrid.*

As farmers, one of our most basic needs are seeds; seeds to grow food, that thing that keeps us alive. In the not too distant past, Hawaii farmers shared and produced their own seeds. This was a basic skill that all farmers had to learn, like plowing a field or planting a seed.

Hawaii farmers took their isolation from the rest of the world very seriously, and having a nest egg of seeds stashed away for the next season was a matter of survival. Through the process of planting and harvesting, they saved the best seeds from each season as insurance from impending storms and disasters, to perpetuate their farm from generation to generation.

Man has been saving seed for millennia and this skill seems to have been lost as we continue to depend on others for our survival in these little dots of islands in the middle of nowhere. For those who understood the importance of healthy, viable, and adapted seed, they would select for the different seasons because they knew that changing weather would

bring new challenges such as insects and diseases.

Sometimes, their gene pool of seeds was limited and they couldn't address all the challenges they faced, so they needed to acquire other seeds from faraway places or from neighboring farmers. But some farmers were not as generous with their seed, and would closely guard them, even today.

As a child, I remember playing hide-and-seek in the Manoa lettuce fields with the farmer's children as their parents labored on sloped land that ran from East Manoa Road to the edge of Manoa Stream, raised beds of Manoa lettuce, a tropically-stressed selection of Green Mignonette grown in Hawaii as long as I can remember and an heirloom from the mid-1800's.



*Today, there's an array of lettuce leaf textures, leaf shapes, and color combinations. Cells of lettuce varieties heading for the ground.*

For long-time Hawaii residents, there's only one real lettuce because it was the only lettuce they ate for generations. Today we can select from a plethora of lettuce varieties from around the globe

with a kaleidoscope of colors, tastes, and textures that just boggles the imagination. We eat a pile of lettuce in Hawaii and most of it is imported from California, but Manoa lettuce is still the gold standard by which all others are judged for taste, juiciness, and crunch.



*Last One Standing, Summer 2011: The last variety to bolt was Kauwela (Manoa X Great Lakes), a sibling of Anuenue, developed at UH by Dr. Charles Poole in the early 1950's.*

A term that is used to describe characteristics of a lettuce leaf in a salad bowl is 'loft', and this relates to the ability of a lettuce variety to take up space in a salad as opposed to being pages in a book stacked one on top of the each other with little space between them. Manoa lettuce leaf surfaces are puckered with lots of undulations, peaks and valleys, creating a lot of air space when leaves are stacked on each other.

This loft also allows the salad to be fluffed up and where salad dressing can easily deposit and adhere to little 'nooks and cranneys' on its leaves. These are the subtleties of lettuce and are important in the 'micros' of refined lettuce breeding. Chefs understand this, and farmers may not pay attention to

these details, but it separates a good lettuce from a great one.

When the weather gets down and dirty, we return to the cast iron of varieties that can make it through the hard times as we've experienced recently. There's balance between what variety can survive under stress and what variety tastes the best under ideal conditions, and you shoot for the middle when you don't know what tomorrow's weather will bring.

Even in Hawaii, Manoa lettuce can take some hits from hot, humid weather and especially warm nights. Lettuce evolved in a Mediterranean climate characterized by hot days and cool nights. Lettuce becomes stressed in a tropical environment, and manifests itself in burnt leaf edges or tip burn and premature bolting or flowering of lettuce, rendering the lettuce unsaleable.



*Tip-burn on Manoa lettuce, a physiological condition caused by a combination of heat and water stress creating a Calcium deficiency. High Nitrogen can also aggravate the problem.*

Tip burn or necrosis of the youngest leaf tips or edges is the result of many



factors combined to create the perfect storm. High temperatures create stress that increases the metabolic rate of lettuce similar to hyperventilation in humans. Water stress is a key factor when high temperatures require higher water uptake, and farmers don't adjust.



*The lettuce variety Leopard is a three-way cross selected for resistance to diseases such as Downy Mildew and Sclerotinia leaf drop fungus.*

Farmers can exacerbate the problem by not increasing their water applications during these especially hot days. Mobile nutrients, such as Calcium, cannot move to leaf edges without adequate water. High Nitrogen: low Calcium ratio can aggravate the situation, creating limp leaves with thin cell walls. Tip burn is especially troublesome when plants are starting to form heads since it seems to be a time of accelerated growth, stress, and increased nutrient and water uptake.

Plants will bolt or flower prematurely in response to stress thinking it's going to die, and will flower to perpetuate itself. Increased lactose or milk production from high temperatures also affects the quality and taste of lettuce, and no one wants milky tasting lettuce.

Luckily, there are some lettuce varieties that can withstand tropical conditions with high temperatures and high humidity, and won't bolt prematurely. In many instances, all it takes is growing a lot of one variety and selecting those individuals not exhibiting tip-burn and are relatively late bolting.

In Summer 2014, I set out to do just that. I had sent UH Manoa lettuce seed to a friend in Philomath, Oregon. Frank Morton is a seed grower on the cutting edge of organic lettuce breeding at Wild Garden Seeds. He crossed UH Manoa with Leopard, a cross of three disease-tolerant varieties, including intense red Merlot, a cast-iron Dark Green Romaine, and a red spotted Flashy Troutback or Forrelenchus, a German heirloom.



*Manoa Leopard showing its colors in Summer 2014*

Frank's strategy was to create a heat-tolerant, disease-resistant leaf lettuce with a lot of resilient genes to select from. Fifty plants were included in this observation trial, and progressed like clockwork as intense summer heat

moved in just at the last quarter of the lettuce's life cycle.



*Manoa Leopard segregating for premature bolting. Seven were selected for advanced testing.*

High temperatures in concert with high humidity and warm nights forced the plants to show their true colors. As soon as tip-burn showed up, I cut out the susceptible ones until I removed all of them. The plants started to bolt and I cut out all except the last seven as seed parents for the next generation of field testing.

Summer 2015 will go on record as one of the wildest summers in a test of extremes; extreme heat and torrential rains. In July alone, there were two 5" rain episodes a week apart. The entire field turned into a jungle in a month. Luckily, I got busy and couldn't install the Manoa Leopard trial, but in a quick-and-dirty variety trial of over 10 lettuce varieties harvested in June, the variety Sierra was the last to bolt. This research is timely as climate change rears its ugly head in Hawaii, and we need to adjust or perish.

Heading lettuce seems to be most susceptible to tip-burn, and many

varieties of lettuce, including Manoa lettuce, have some head lettuce blood in them. This past summer with record heat, even baby salad lettuce operations such as Nalo Farms in Waimanalo encountered major problems with premature bolting and tipburn, and couldn't adequately supply their markets.

Seeds are the backbone of the farm operation. And in many respects, farming starts with seeds, and if we're farming holistically, it ends with seed as we continue to improve and tease out the good genes for our farming situation to create the next generation of seed.

Or we can buy seeds from elsewhere. In many respects, when we do this, we put our farming future in someone else's hands. What if the seed is of a poor quality or the adapted variety is not available or there's a crop failure where you couldn't secure the seed you need in a timely manner? And I mean secure your seed, because it's about seed security, which is also related to food security.



*Summer 2014 - Harvesting seed of the most tip-burn and bolt-tolerant selections of Manoa Leopard*





*Okra is a local favorite in Filipino and Southern cuisine, and is catching on with other ethnic groups. It's used to thicken soups and stews, is battered and fried, and even eaten raw. This variety is Filipino Ladyfinger, one of the best round-type varieties grown in Hawaii.*

Hawaii Public Seed Initiative is a statewide network of seed growers who are focused on creating tropically-stressed and tested seed for their climates. It's a project who time has come and is long overdue. Housed in Kohala Center and funded by the CERES Trust, they're laying the groundwork for a farmer-driven seed industry to support the expansion of community-based agriculture in Hawaii.

Locally-selected and produced seed can enhance the success of family farm operations in Hawaii, and since we're doing it for ourselves and our communities, it makes the journey even sweeter. It's about taking care of ourselves instead of waiting from someone else to take care of us, again. And these are major seeds of change.

This is what Eliot Coleman, Maine farmers, writer, and tool inventor had to say about the importance of seed:

*"I doubt that the direction of present-day seed breeding, selection, and genetic manipulation is favorable to the producer of high quality organic vegetables ... For most crops the vigor and viability of seed grown under careful cultural practices of this production system will far excel seeds that are purchased... Seeds are the spark of the farm operation..."*

When I think of a spark, a spark plug comes to mind. This is what ignites the gas in a combustion engine, moving the piston which turns the drive train of an automobile. If your engine doesn't turn over, you're going nowhere! So where do we get your spark, or your seed? From a seed rack outside the door at Whole Foods, or a supermarket, or a big box store? If you have a bad start in a race, the chances of recovering are slim that you will get to the front of the pack before the finish line. The same with junk seed.



*Okra seed grown from a selection maintained by home gardener at the UH CTAHR Pearl City Urban Garden, Oahu. This plant is a monster!*

Today, we deal with a whole new world of weather challenges. Call it what you like, a change in the weather brings

added unpredictability which makes farming even more difficult.



*Green and Red Long Beans, probably the most resilient bean grown in Hawaii in our wild weather. Most of this seed originates from Southeast Asia.*

Farmers pride themselves in predicting the weather, ensuring them a certain amount of success in bringing in the harvest. In a time of changing weather regimes with El Nino, drought, monsoons, and hurricanes, the degree of difficulty has now increased. And when you have all of this in the same month, then you really have your hands full as a farmer and probably wished you were in another profession.

I remember a few years ago when an intense monsoon season in Southeast Asia destroyed much of the seed crop and affected the quality of survivors in areas such as Burma, Thailand, Laos, and Vietnam where a lot of tropical seeds are produced. A friend called me and said, "You better get your seed before they run out because this year's crop was destroyed." Or another time when speaking to a major seed distributor in California, he mentioned that the bulb onion seed is of poor quality due to storms and it will take a

couple of years to get the quality back up.

I don't think most farmers understand the importance of having good seed in your back pocket in case the weather runs over the seed you were supposed to buy. In any good plan, you need backup, especially surviving in Hawaii.

I've come to understand that much of the seed packets bought in a grocery or even a big box store are inferior and contain smaller seed compared to seed available to large farmers or grown yourself. You're buying the left overs. I don't know how many home gardeners have approached me and mentioned that their seeds didn't germinate. And how many times are you going to buy seed that doesn't germinate before you just give up growing a garden?



*Many seeds are easy to grow and preserve for the upcoming seasons. Molokai Grown*

Some seeds are easy to grow. Beans are probably one of the easiest unless you have a lot of mice in the field like this year. Some seeds are exacting in their growing requirements, and probably the most important prerequisite

is having a defined dry season to dry down and harvest your seed.



*A mixed harvest of kabocha, Cucurbita maxima with large handles, and a few Southeast Asian squash, Cucurbita moschata*

This seems to be a moving target and again related to the predictability of weather. Who would think there would be a couple episodes of flooding rain last July? As a seed grower, this kind weather could put you out of business if you're drying down seeds in the field. And this erratic weather is a global problem, not just here in Hawaii.

Without predictable weather conditions, you may have to focus on a few seeds that don't require field drying such tomatoes or peppers or eggplant. You can just harvest over-mature fruit, mash it, ferment it for a little for a week, wash it in a sieve or colander, dry it indoors, and voila, you have seeds for the next season. Or even squashes and pumpkins if you have healthy bees to pollinate them and can get them to harvest without being attacked by melon flies followed by rots.

Farming isn't easy, and growing seed provides another crop option for farmers. It's about assessing the risks involved in growing each crop and balancing your portfolio of crops for the

season and beyond with low-, medium-, and high-risk and return to get a better idea of return on investment because farming needs to be a business first, and a way of life second. It's just another way of controlling a larger swath of your business.

Some farmers like to grow hybrids so they're restrained in making their own seed, but it can be done. The problem is most farmers are drinking through a fire hose with not a whole lot of daylight hours to play with, and they really have to pick and choose between what they have to and want to do and what they would rather pay others to do. And many don't want to have to worry about growing seeds, because it so much easier to buy it. That is if you can get the seed when you need it.



*Akakai or Hawaiian Shallots are a Hawaiian heirloom and can only be propagated from bulbets. This local favorite is traditionally eaten with Hawaiian salt and poi.*

If you grow local vegetable varieties such as long eggplant, pole beans, and green onion, two of these seeds are not available due to crop failure in the past year from this crazy weather, and another is having genetic problems



associated with inbreeding depression. Inbreeding depression is a problem when a small gene pool of a variety is saved. This weakens the gene pool, and can accentuate a lot of genetic defects or bad genes and bring out the worst in a variety, such as slowed growth, poor yield or fruit quality or susceptibility to disease.



*It seems we can't live without green onions in Hawaii, and we add it to everything from Saimin to Poke.*

So what are your options if you have to find a substitute or alternative variety? For one thing, farmers are creatures of habit just like deer. They walk on the same paths, put their pants on one leg at a time, and grow the same varieties. They're accustomed to growing a certain variety and understand its idiosyncrasies. They learn how to grow the variety.

Each time you grow a new variety, you have to relearn to grow this crop; what are its likes and dislikes, how much fertilizer it requires, what is its shelf life, on and on and on. In many instances, you know you're not growing the best variety for your area, but what you see if

what you get, and a seed in the hand is worth more than the one in the picture of the seed catalog.

Without conducting variety trials, and running them through the gauntlet of changing weather, ravaging insects, and below-ground transformers, you really don't know what variety is best adapted to your farm. And most farmers are not willing to spend all their time evaluating new varieties because time is tight and other things are more important.

Some seeds are difficult to produce, such as hybrids or F1's, because now you have to maintain two parental lines and cross them together when you need seed. For crops such as hybrid broccoli or onion, you need to maintain a sterile male line as the female, and another male line as the pollen donor, and seed companies jealously guard their



*Filipino Shallots look very similar to Akakai, but will produce true seed in the winter.*

If you have extra time or labor to hand-pollinate varieties, you can take pollen from one variety and transfer it to another line as in squash or

watermelon, making sure the bees don't beat you to the punch. In developing new hybrid onion seed variety, cages are placed over two varieties to assure only those two varieties are crossed and utilizing flies to enhance pollination.



*Koba Green Onion seed produced at the CTAHR Volcano Research Station on the Big Island.*

But a larger problem we face in Hawaii is no one is really breeding for us unless there's an economic benefit for them such as producing a new tropical variety for other parts of the world. Many times, an excellent variety for Hawaii is discontinued because only farmers in Hawaii are buying it, so there's no economic benefit for a seed company to continue producing it.

So the question begs to be answered, "Who breeding for us?" Well, only a very few. They're breeding for us only if there's economic benefit to them such as wider adaptation in other parts of the world. We're just a speck on a fly on the back of an elephant when it comes to global seed, so we really don't count in the greater scheme of things. We may be in the middle of the world, but we're like a single seed in a huge pile of seed.

If you look at the vegetable breeding priorities in the continental US, the main priorities are frost tolerance and earliness first, followed by disease resistance and other stuff. And disease resistance has a regional focus; Florida has its problems as well as North Carolina, and so does the Northeast. The one thing they have in common is frost and a short growing season, but this doesn't apply to us, at least not right now.

So who's breeding for us? With the exception of tropical corn breeding at UH, all other vegetable breeding had fizzled out about 20 years ago, so some farmers have taken it into their own hands to share their seed with other farmers and UH, including names such as Kobayashi, Nitta, Hirayama, and Tolentino, and there are other farmers out there with seed jewels as well.



*Similar to Tip-burn on lettuce as causal agents, Blossom-end rot on tomato is especially troublesome under high temperature conditions, rendering fruits unsaleable.*

Coupled with seed shortages even in Hawaii, we have no backup. It seems it's not important to breed vegetables for

Hawaii or for your neck of the woods. But it should be. And who should be responsible to do this. We can wait for someone to do it or we can do it ourselves. As the pidgin saying goes, "You wait, you late!"



*Tomato diversity waiting to be tapped resulting from a vast gene pool of wild species found throughout South America, including outlying islands such as Galapagos Islands.*

There are great models of seed producing and marketing networks in Willamette Valley in Central Oregon where many small farmers produce seed for their area in hopes the idea will catch on because there's strength in numbers. Also, the more farmers grow a diversity of seeds, the better for all the farmers because now they can pick and choose or at least test out a variety of what does best in their area.

The next step would be to take the best varieties they have and the best that we have and do some cross-pollination of sorts, of seeds, of ideas, and of basic concepts in farming. I took some vegetable seeds to Oregon from Hawaii a few years ago, and growers and seed producers were very interested in growing them. In fact they even crossed

some of their stuff with our stuff. Many are organic growers.

The average Joe or Josephine doesn't understand that breeding for organic systems can be very different from breeding for conventional systems. Most conventional systems require high input and as a result breeders will select individuals that thrive in high input farming systems.

High yield requires high inputs of nutrients and doesn't focus as much on soil health. Growing in a sustained or low input system will favor those resilient individuals who can do well in this system. Some will disagree with me, but this is my take on the situation.

I've heard astute individuals say, "What's the difference between conventional and organic seed?" It's more than a philosophy; it's an approach that focuses on feeding the soil versus feeding the crop and just getting through a crop season.



*Blue tomatoes are result of breeding with a wild tomato species high in anti-oxidants called bioflavonoids.*

It's also matching the variety to the growing conditions such as a slower release of nutrients in the soil and a



greater focus on soil-plant interactions. High fertilizer applications can harm the environment when wild weather washes your fertilizer down the road and into the ocean.



*Indeterminate tomatoes are grown on trellises with side shoots removed to produce high yields in a small area.*

One area requiring more research is the idea of late maturing plants with large scavenging root systems. These plants can forage from a larger soil area and create a more resilient plant, less susceptible to quantum changes in weather.

Over 25 years ago, I conducted an observation trial with two tomato varieties on a Molokai farm. The old standard was N-52, a well-known U.H. hybrid indeterminate tomato developed by Dr. Jim Gilbert, Vegetable Crops Breeder at CTAHR. Dr. Gilbert focused on disease resistance by incorporating wild tomato lines with a larger fruited line with high fruit quality.

N-52 was a cross between Anahu, the workhorse of the UH Tomato Breeding Program with resistance to over six

diseases inherited from wild tomatoes such as *Lycopersicon peruvianum*, and a selection called STEP 305 developed by J.M Walter of Florida State known for high fruit quality and also resistance to diseases common in Florida.

The other variety was an extra-large hybrid beefsteak tomato from Goldsmith Seeds. At the end of the day, the Goldsmith suffered from severe blossom end rot, a physiological disease that can involve water, calcium, nitrogen, and high temperatures. N-52 had no instances of blossom-end rot.

There are basically two types of seed cycles that all vegetable seed falls under. The seed is either an annual or one that completes its life cycle within a year, or a biennial, one that requires two years to complete its life cycle. I don't know if one came before the other or that all seeds have a choice.



*Cosmic Purple Carrots, an Eastern 'tropical' carrot*

My theory, and I'm out to prove it, is that many vegetables probably started as weeds in the tropics near the equator, and slowly 'walked' into the cold north following man wherever he ventured. It

started in the Dawn of Civilization in areas such as the fertile crescent of Mesopotamia and other centers of civilization on different continents.



*Cosmic Purple Carrot seed head almost ready to harvest. Molokai 2013.*

This is based on recent discoveries growing three so-called biennial crops and finding some anomalies or rogues who were annuals. The first was when leaving some carrots in the ground in Summer 2013, it produced carrot seed. The variety is called Cosmic Purple, a dark red carrot with a spicy taste. I found out that the progenitor of all carrots was white-fleshed, and within those genes are these other colors.

The Dutch got their hands on these carrots and decided they wanted to create a carrot that matched their national colors, and the rest is history. Most of orange carrots can be traced to northern Europe. With the resurgence of heirlooms, along came these old carrots that are closer to the ancient ones colored yellow, purple, red, and white.

Today they're called eastern carrots to distinguish them from the recently evolved orange ones. Many of the colored carrots have annual genes in them that have to be fleshed out, and I believe that Cosmic Purple is just one of many that can be annualized, but I need to find out.

A few years ago, I attended the Organic Seed Alliance Conference in Corvallis, Oregon and in a session on vegetable breeding, I asked a bio-dynamic seed breeder from Switzerland if it was possible to produce annual carrot seed and his answer was emphatically "No". In fact, attendees in the audience were looking at me like I was from outer space.

Biennial carrots are evaluated by digging them out, identifying the best ones then planting them back in the ground the next spring for harvest in summer. But how do you improve root shape in an annual seed production system?



*A kaleidoscope of carrot colors, courtesy of USDA*



Lacinato Rainbow Kale (Lacinato X Red Bor), a beautiful variety with red-pink veins

One way would be to partner with a seed grower in a temperate area such as Oregon or Wisconsin, but you wouldn't be able to account for environmental influences since our climates are like summer and winter.

With this 'new found discovery', I set out to find other outliers. What other so-called biennials have tropical genes that have to be teased out. For every new discovery, more questions are produced than answers, and I'm trying to understand the downside to annualizing biennials.

Frank Morton of Wild Garden Seed crossed two excellent kale varieties, Lacinato and Red Bor to create Lacinato Rainbow. Lacinato, also known as Dinosaur Kale, Tuscan Kale, Cavolo Nero or Black Kale, among other names is undoubtedly the most popular kale in Hawaii and in the US for that matter, but I haven't seen it seed in Hawaii.

I actually stumbled upon this cross and the ability of some of its progeny to

produce seed in Hawaii when I thought I was planting purple cauliflower seed. When it flowered, the seed pods or siliques didn't match those of cauliflower.

Cauliflower has one row of seeds in a silique, while this one had two rows. It wasn't until I harvested the seed and shared it with farmers on other islands that some noticed I had given them kale seed. This was exciting because I had never heard of someone producing kale seed in Hawaii.

Within a year from spring 2014 to spring 2015, I produced two generations of kale seed. This is four times faster than what is produced in temperate areas such as Oregon. Now I have sufficient seed to plant too many acres to comprehend.



Harvesting Lacinato Rainbow (Lacinato X Red Bor) kale seed. Molokai Summer 2015

The third seed crop was Swiss Chard or Chard, a leaf beet without a root. Beets are another biennial and a member of the Amaranth family along with spinach. I visited Taiwan and brought back a



chard variety referred to as Mountain Spinach.



*Chard is usually a biennial, but this variety from Taiwan will produce seed in a season. Variety is Mountain Spinach*

The main difference is that chard is usually a biennial and spinach is an annual, and rarely a biennial. There's even a subspecies, called the Cicla-Group of chard that can be considered a spinach chard and I suspect that Mountain Spinach might be one of these. The seeds are about the half the size of Swiss Chard varieties such as Rhubarb Chard.

Seeds are big business, and you can pay a pretty penny in seed count. Yesterday it was by the pound but a new seed sales mantra is 'seed count'. Try buying purple or orange cauliflower seed and see how big a hole it can burn in your pocket.

I heard that the markup from seed produced and sold off the farm to retail seed is 1000% so there's more than some chump change to be made if you can produce seed and sell it retail such as through your own internet site.

Sometimes we don't see the real value of seeds. The right variety can save on fertilizer because it utilizes nutrients efficiently. The right variety can be resistant to a disease that could cost you a lot of money to control, not to mention crop losses from the disease even if you sprayed to try and control it.

The right variety can be harvested a week earlier, getting you to the market before the great rush. The right variety can have a higher yield than the runner ups. And the right variety can attract attention in the marketplace, and put you in the celebrity class.

Sometimes it seems like insects know sweet and tender vegetable varieties better than us and are attracted to them. On Maui, many head cabbage farmers switched to a tougher variety, Scorpio because it could sustain more insect damage than they're old favorite, aptly named Tastie. In farming, it's give and take.



*Hawaiian Chili Pepper is grown by seed nurtured and saved by generations of residents is believed to have been introduced to Hawaii in the early 1800's.*

But I see opportunities in seed, not just as another crop in our farming tool box, but a whole industry. This is not about genetically-modified seed and it's surely not about corporate seed. This is about locally-produced, community-based, small business Hawaii regional seed.



*Koba Green Onion seed production at the UH CTAHR Volcano Research Station on the Big Island.*

And how many climatic regions do we have in Hawaii? We also have 7 of the 9 global climatic zones, but we also have over 140 types of soil in Hawaii, probably more than anywhere else in the world. Multiply the two and these are the possible combinations of soil and climatic interactions or farm environments in Hawaii. WOW!!!

You have thousands of combinations of weather probably sufficient to create an ideal climate for almost every vegetable crop there is, even wasabi. Rainfall, day and night temperature differential, and cloud cover or lack thereof is just some of the variables farmers have to deal with. It's difficult to create a variety that's all things to all farmers so we need to conduct regional breeding or at least variety trials in a lot of key farm communities in the state.

I know the corporate corn seed growers understand this better than most so we don't want to speak too loudly, but what they haven't figured out is how to make it work in a more environmentally friendly, diversified, holistic, and less dominating way. Monoculture is 'old school' and you create more problems than you solve, and can be likened to a dog chasing his tail and biting it in the process.

***In closing, seeds can make the man, but man can also make the seed, and it's what you do with the seed that really matters. There are so many products that can be created from a single seed including micro, mini, flower, and seed, but we just have to put on our thinking caps and come up with something new, every day!***



*Well, that's it for this year. It's been a wild one, and I can't recall when we ever had this kind of weather. What this means is we have to adjust or perish, and one way is by creating new, resilient Hawaiian*

*vegetable seed varieties. If we anticipate the worst weather, then we'll be ready for anything less. Have a Happy and Productive New Year!*



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