

Predicting the Future

By Glenn I. Teves, County Extension Agent, UH CTAHR-CES-Molokai



Avocado - Sharwil

If there's one skill that everyone wishes they had, it's predicting the future. Economists, business leaders, astronauts, and farmers alike could benefit from this skill. Ali'i sought out these special individuals who could predict the future to provide inspired counsel on all things from aquaculture and agriculture to war. As an example, these individuals could predict the personality of a child while still in the womb through omens. For one such individual, his mother craved to eat the eye of a shark when carrying him. Through this craving, a kahuna predicted that her son would be 'a killer of chiefs'. His name was Kalani Pai'ea Wohi o Kaleikini Keali'ikui Kamehameha o 'Iolani i Kaiwikapu kaui Ka Liholiho Kūnuiākea, also known as Pai'ea or Kamehameha the Great.

Today, we don't expect our predictions to be this earth shattering, but only that we can position ourselves as farmers to run a tight business that allows us to make timely decisions that keep our business thriving, such as planting the right crop at the right time when the price is high. The only problem is you're not the only one thinking this way; there are many.

On a small island like Molokai, you can be the only one producing a crop at any given time, but on the grand scale of things, people and companies all over the world are thinking just like you. If you expect to grow a product for a larger market outside of Molokai, then you open yourself up to global competition with many players. Peppers from Arizona, tomatoes from Canada, okra from Nicaragua, and taro from the Dominican Republic are just a few examples of regional and global competition. What makes your product different? Product differentiation is what separates the sellers from the rest.

Super Sleuth

In 1990, I had the opportunity to visit and inspect produce coming into San Francisco masquerading as a California Department of Food and Agriculture (CDFA) produce inspector. My childhood friend from Hawaii was one of them, and he invited me to work with him, up close and dirty, by bringing a white shirt and acting like him. We drove to many wholesale markets and ports of entry, and asked vendors to inspect their imported produce.

I was interested in finding out what was been shipped in from Hawaii, and boy, was I surprised because I had never seen most of these herbs and vegetables before. Along with the usual won bok and basil, there was an array of strange Southeast Asian vegetables. I witnessed a 40 foot container load of won bok from Big Island get rejected and destroyed because they found some caterpillars in them; 340 cases of won bok!

I felt that they were just trying to keep our products out of their markets, but when you realize that the value of California agricultural products is over \$43 billion annually, you can understand why they're so vigilant about preventing invasive species from entering California. It may look like the same insect, but it could be an insecticide-resistant strain,

so they can't take any chances. There were 1000 pound bins of reef fish, including kala and palani from Hawaii destined for the Polynesian market in Oakland, but the biggest eye opener was taro from China, Puerto Rico, Dominican Republic, Mexico, Guatemala, Colombia, Fiji and other countries. We're not the only ones growing taro; in fact we're small potatoes compared to China, where one province grows over 50,000 acres of taro.



Cauliflower - Graffiti

Information is power, and finding relevant crop information for Molokai can be a challenge at times. Extrapolating data from other islands is probably the best bet, but hard to find, so we find ourselves pulling information from other parts of the US or even other tropical areas. Finding the right variety of crops is a real challenge because different areas have different breeding priorities than us, which is why crop variety trials are very important. The other vital area of information includes concepts on sustainable and organic farming, and disease and pest control strategies. They may not have the same insects, but these concepts may apply. There are areas of the world with the same kind of climate as Hawaii, but we don't have good communication with them. This is starting to change.

I was talking to a guy from Iran a few weeks ago in Honolulu who works for Kinko's, a subsidiary of FedEx near the university. He's been living in Hawaii for about 17 years, but still goes back to Iran to visit. Iran is part of the great cradle of civilization called Mesopotamia, and the same families have been farming there for thousands of years on the same piece of land, and they grow special varieties of crops that I would love to get my hands on. I asked him what he missed about the place, and he mentioned fruits and nuts such as pistachios and figs. He also talked about an herb called cardamon that they add to a lot of meals. I gotta talk to him again and check if he can bring some seeds back for me. This is the native home of many crops, such as wheat, figs, pomegranates, garlic, the list is endless, but we don't have access to seeds from this area due to our political differences. I gotta talk to this guy...Without the seed, you cannot grow the crop.

Lost then Found

I've been trying to find a tomato variety that UH lost in a flood several years ago. STEP 305 was the last seed of its kind, or so it thought. I knew it came from Florida, but the Florida tomato breeders, including Dr. Jay Scott couldn't find it and had never heard of it. I spent over 4 years trying to track down this variety, scanning through the USDA Plant Germplasm Preservation Research Unit, communicating with tomato breeders at several state universities, and also seed collections in Canada, Belgium, and Holland. Just recently, I finally found it through a friend who's a tomato breeder with USDA in Beltsville, Maryland. John Stommel had it in his reefer. He also knew a friend at the Asian Vegetable Research and Development Center in Taiwan who had this seed. The guy in Taiwan got this seed from Hawaii over 50 years ago. Things go round and round, and sometimes it stops at the place where it started.

Now, the UH Seed Store can make their famous tomato hybrid, N-52, one of the best tasting tomatoes from Hawaii. It has resistance to root problems, including root-knot

nematodes, viruses, and a host of common fungal problems. Some of the old tomato growers in Ho'olehua, including Dicky Hanchett and Johnny 'Pineapple' Keohulua could grow picture-perfect fruits from one of the best tasting slicing tomatoes. When it was first developed, it was identified as the best tomato in, or all places, Israel. Sometimes we develop something and we don't know how far-reaching the effects will be. Its other parent, Anahu, is probably one of the most important disease-resistant tomatoes developed in Hawaii and possibly the US. One of its progeny is a tomato called Celebrity, an All-American Selections winner. Resistance to diseases in vegetables is becoming a vital trait because its costs too much to spray them, and the trend is to move away from chemicals.

Concoctions

There's strong interest in compost teas in Hoolehua to enhance plant growth and also introduce beneficial microorganisms to our soil. There's a bunch of brew masters concocting all kinds of stuff utilizing bone and blood material from Island Commodities on Oahu, worm castings, chicken and cattle manure, compost, molasses, fish emulsion, EM, Bokashi, Bam, soil, and others. Finding the right combination of ingredients is the key, and understanding some of the science behind it really helps, but analyzing the results can be fleeting.

Cause and effect means what you gave the plant produced a desired result. In scientific research, you usually try to study one variable at a time to understand its impact on a crop. This could be different amounts of nitrogen, and effects of pH on the soil, or the amount of water. When you're brewing compost teas, it's very difficult to ascertain which compound is causing the positive effect, and what IS the effect. Was it the fertilizer produced from the manure or the microbes that help to release nutrients or something in the soil? Sometimes, there are hormonal effects such as branching and elongation of stems that can be attributed to hormones such as Cytokinins, especially when using plant juices in the compost tea. Scientists will question the results of using these 'witches brew' because it's not measurable, and they may go as far as to call it 'snake oil'.

When all is said and done, the plant still needs a certain amount of nutrients to grow, and if you're depending on the manure tea to provide all the nutrients for your crop cycle, you may be asking too much. Soil samples provide a recipe for our key ingredients, including phosphorus, potassium, calcium, magnesium, and pH. Soil samples assume you have no nitrogen, so many crops will require at least 100-150 pounds of nitrogen per acre per season, depending on the length of the crop. In order to get adequate nitrogen from the local blood and bone formulation containing 8% nitrogen, applying 1 ton of this stuff will provide 160 pounds of nitrogen, but some of this nitrogen will be lost due to volatilization, a fancy word for floating off in the air, and also may not be available until after the cropping season. However, using some of these manure teas may help to break down the blood and bone faster so that it can be available within this crop season.

When you're raising and applying microbes to the soil, they need nitrogen as their food source, so now you have to feed the microbes AND the crop. The same situation exists when you use mulch that's not totally broken down, since they will have a tendency to steal nitrogen from the crop. The take-home message here is that while manure teas can enhance plant growth, they're not a substitute for basic preplant fertilizer and the faster

everyone learns this, the better for the crop. You will see the problem when the crop flowers and will require an increased amount of food at that exact time. If you're short, the plant can stress out, drop flowers, or worse. Compost tea can serve as a supplement to your pre-plant fertilizer, but is not a substitute for pre-plant fertilizer!

Nana I Ke Kumu (Look to the Source)

Communication is what makes the world go round, and now it's spinning faster than ever before. Relevant information is hard to find, but you just gotta keep looking. I've been trying to look for great websites with information you all can use. Here's a few:

<http://organicroots.nal.usda.gov>

This is a USDA website located at the National Agricultural Library in Beltsville, Maryland and contains a treasure of information. I visited this library in 2011, and I could spend days in there. This site contains almost 800 documents published before 1942 when everything was organic because synthetic chemicals weren't being used in agriculture yet. It contains publications such as historic livestock breeds, plans for buildings and machinery, sustainability research, and production information and techniques.

<http://eorganic.info/>

eOrganic is an extension website with some of the cutting edge info on organic farming. They have webinars on many great topics, and I've already seen three of them. You just have to register and you'll get notices on the latest research topics and webinars.

<http://sfp.ucdavis.edu/>

The California Small Farm Center was created as a result of a suit by small farmers being driven out of farming by the development of a mechanical tomato harvester. Lots of relevant information for crops that can be grown in Hawaii. One of the closest of all the states to our kind of climate

<http://www.ctahr.hawaii.edu/Site/Info.aspx>

This is the UH College of Tropical Agriculture and Human Resources publications website, and believe it or not, this is usually my first stop when I'm surfing the web for agricultural info because I know it will be the most relevant to us on Molokai. Check it out!

Until next time, keep your eyes, hands and feet close to the ground. If you don't plant, you cannot harvest.