Queen Emma's Taro Patch

by Glenn I. Teves, UH CTAHR

Queen Emma is best known for establishing Queens Hospital to serve the Hawaiian people, but few of us know that she was quite knowledgeable about the culture of taro. The wife of Kamehameha IV, Queen Emma lived from 1836 to 1885 and was considered one of the most influential queens of the Hawaiian Monarchy. In one of her writings found in the Bishop Museum archives entitled 'Observations on Varieties and Culture of Taro', she discusses constructing a lo'i, the different varieties, different planting techniques, and harvesting.

Outlining the steps involved in making a lo'i or taro patch, she states, "*The banks are covered with mats and beaten with stalks of coconut leaves or smooth pieces of heavy wood until water tight. The loose soil is strewn on the bottom as level as possible and about a foot thick. The water was let in, and when it covers the soil about 6 or 8 inches, as many persons and oxen as can be procured enter it and trample it into soft, almost liquid, mud in order to amalgamate the soil and allow it to finds its own level and close any leaks there may be in the bottom… refreshments and merry making follow after this part of the performance, and by the next day the patch was ready for planting*."

Taro planting material or huli were hard to find and had to be purchased from others. "*Formerly they were given reciprocally, but now they have to be purchased, unless supplied by some rich and kind friend*." They would buy rows of plants in the patch, called lalani or even whole patches for huli. She understood fertility and mentions "when the soil became impoverished *from frequent use …the mud is collected in heaps, called pupu kolea and three or more plants are placed on each hill. When the patch is still more impoverished, for it's a very exhausting crop, larger heaps have to be formed and planted almost dry, with hills covered with rushes (sedges) 15 or 20 to a bed, as it is called pu'epu'e*." The plants growing in a lo'i would degenerate and become small and weak, so they would plant the huli "into wet vegetable soil" to regenerate them, and return them to the lo'i. The same variety can grow much larger in soil, and by starting with large huli, a higher yield can be realized. This was also a strategy to get rid of water-borne rots and diseases.

In securing huli, she mentions that "*plants should be selected from the varieties best adapted to the locality and nature of the soil*." Queen Emma mentions her favorite taro varieties and proceeds to name over 40 varieties. She indicated that "*Piko kea and Ipu-o-Lono were the most productive.*" Next came the hardy Apuwai, then Haokea Piko (Piko Ke'oke'o), the three Ka'i, and the tabued dark Pi'i Ali'i. Others included Ele ele naioea, and "the old favorite Lihilihi molina", which was thought to be extinct but recently found in Hanapepe, Kauai. Of those mentioned, about half are either not found today or are synonyms for some of the existing ones.

She also mentions that after cooking taro in the imu, it was eaten as-is in many places, while other places were pounded into poi. She observed differences in climate on the maturing of taro, noting that taro grown in Honolulu matured much quicker that those grown in the valleys. Her writings are very detailed and attest to the deep understanding of taro growing by the

ancient Hawaiians, even royalty. Today, the more we learn about taro, the more we realize how little we know. And try finding a place to grow taro in Honolulu.

Growing Dryland Taro Part I

Molokai is blessed with many Hawaiian taro varieties in part due to the vision of the late Martha and Cowboy Otsuka in seeking out and preserving these legacies, and also the annual Molokai Taro Field Day, under the direction of Alton Arakaki and Faith Tuipulotu, in making huli available each year.

With the advent of drip irrigation and water distribution systems, taro can be grown in areas where it could never grow before. In the past, dryland taro was only grown in the uplands in mulch where seasonal rains were sufficient to bring the taro to harvest. Most varieties will mature between 8 and 12 months, and keeping plants actively growing is the key. Taro loves water, and along with fertilizer, will flourish before your eyes. Dryland taro is distinguished from wetland taro in that the latter grows in water ponds or lo'i. Different varieties were selected for these two conditions. Taking a soil sample of your planting area is the first step in growing upland taro. Call our office at 567-6932 for more information on taking a soil sample.

The biggest challenge in growing taro is weeds, but there are strategies to minimize them. One is to prepare the ground for planting by adding the required fertilizer and amendments. Give the ground a few very good soakings so weeds emerge. Before weeds get a ½ inch high, scorch weeds with a propane torch. Be safe with fire, and have your water hose charged and ready for action. After killing most of the weeds, it's important not to disturb the soil since you have now wiped out all the weeds on the surface of the soil, and any soil disturbance will bring up more weeds from below the surface. The use of plastic mulch is also an option in controlling weeds, but can also cook the roots in hot months. Once plants cover the surface, temperatures under the mulch won't be as high. However, taro grows better without it since they prefer cool roots. Another option is the use of vegetative mulch to control weeds, retain water, and keep roots cool. However, additional nitrogen fertilizer is required to feed both mulch and taro because microorganisms that break down organic matter utilize nitrogen as a food source, and will steal it from the plant if it's in short supply.

Now you're ready to plant huli. It's a good idea to surface sterilize huli to kill any nematodes on the remaining corm, and also insects in the stalks or ha. This is done by dipping it in a solution of 1 part Clorox and 10 parts water for a couple of minutes. Don't need to rinse; just plant. It's a good idea to sort the huli by size, planting the larger ones at the end of the row so these are harvested first, with the smaller ones planted near the water source. When using drip irrigation, tie up the drip line as you harvest and the rest of the row can still be irrigated. Some farmers make a hole with a digging stick; I use a pineapple planter. Dig a small hole about 3-4" deep, drop in the huli and cover so it stands on its own. You can plant 2 feet apart in lines or zigzags along the water line or in a furrow or in beds 2 feet apart in all directions. Taro loves water, but water lightly when first planting until roots emerge. When healthy leaves unfurl, this is an indication that roots are emerging. Water can be increased and the surface kept moist since taro roots move laterally and stay close to the surface. There's such a thing as too much water for dryland taro because they also require air near their roots to grow well. More next time…

Growing Upland Taro, Part II

By Glenn I. Teves

In growing taro, water control is important. Using a timer is an efficient way to control water frequency and duration, and assures that surface roots are moist daily. Fertilizer and roots will only move where there is water. Clogging and pinching of the drip irrigation line is a major concern when growing taro, and some farmers will lay extra drip lines between the rows when there's first indication of this problem. Insufficient water is the greatest stressor of taro, so some farmers are converting to new kinds of drip line that's more rigid and less likely to pinch or clog.

Wind protection is important, but taro also needs good air circulation to deter diseases and pests. A major disease is leaf blight caused by a fungus called Phytophthora 'leaf destroyer' and is more prevalent at higher elevations than in the lowlands. This disease can melt the leaves and affect starch content and the sticky quality of poi. A week of cool wet weather creates ideal conditions for this disease, but increasing air circulation by planting farther apart during winter months can mitigate this problem. New hybrids developed by UH appear to be more tolerance to this disease. By crossing Hawaiian varieties with South Pacific and Asian varieties, hybrids have been created that are more vigorous and can overcome the disease quicker than the Hawaiian varieties. However, when conditions are ideal for the disease, it moves rapidly to affect all varieties, even the hybrids. Stories of ten feet tall plants with 20 pound taro throughout the state derived from these hybrids are not exaggerated. Still, the proof is in the poi, and it's hard to beat a well grown Hawaiian wetland taro, but upland taro growers are coming close to producing tasty, sticky poi that's difficult to distinguish from wetland poi.

Bringing the taro to harvest can be a challenge. Among the pests are aphids, ants and mealy bugs, root knot nematodes, and spider mites. The key to controlling most pests is to grow a healthy plant and not allow it to get stressed. For home gardeners, spraying the plants with water early in the day can control many pests, but be sure plants are dry when the sun goes down. Wet plants at night can create fungal and bacterial problems. Adding lots of organic matter prior to planting, planting green manure crops such as sunn hemp as a rotation, and practicing fallow can help to minimize nematodes. It's also a good idea not to plant in the same area for a year or more to break the pest cycle and give the soil a rest.

You can tell the taro is mature by the size of the huli. After reaching a peak in their height, the plant will drop back and shrink down. The top of the taro corm will start to form a dome. If you have a lot of taro, it's a good idea to start eating them before they're fully mature, so when you get to the end of your field, the last taro is not over-mature. Some taro, like Moi or Piko types can be held in the field after maturity while Lehua and Mana need to be harvested when mature or it will start to rot quickly. Growing your own taro can be a very gratifying experience, and even more gratifying when you share it with others.