Evaluation of Four Varieties of Tea on Oahu (Final Notes)

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Oahu County, Cooperative Extension agents met with interested tea growers in 2011. Growers identified the following issues of concern regarding Extension related supports needed in establishing a commercial tea industry on Oahu: 1) lack of access to quality tea cultivars, 2) slow and low success with propagation methods (above ground systems), 3) length of time needed to get an industry started on Oahu.

In response to these concerns, a tea planting was installed at the Poamoho Research Station in 2012.

Photo 1: Newly established tea plants in 2012
in collaboration with the CTAHR Tea Project. In 2011, the original pH of the soil was 5.5. We lowered the pH by applying sulfur (90%) at a rate of 1,000 pounds / acre to half of the field. The pH dropped to 4.7 after the sulfur treatment was applied. We planted four varieties of tea with a row spacing of 5 feet and plant spacing of 2 feet. Fifty plants of each variety were planted in a 175-foot row. Japanese tea varieties included, Benikaori, Yabukita, Bohea and Yutaka Midori (Photo 7 & 8). Two-year-old plants were obtained from the Mealani Research Station in Waimea, Hawaii and cultivated at the Poamoho Research Station from 2012-2019.

In April 2013, we received a request to help interested growers with the propagation of tea cuttings. We conducted a review of literature and found that camellia cuttings were typically rooted using the tip, 1, 2, and 5 node cutting method in a media of perlite and vermiculite when grown for ornamental purposes. Yamasaki et al. (2008) at UH CTAHR developed an inground propagation system. Bidarigh et al. (2012) found that the use of indole-3-butyric acid (IBA) significantly increased the root number and length via invitro culture. We aimed to produce cuttings in a greenhouse setting. We integrated the use of IBA into our propagation procedures and increased the humidity in the propagation area by using a mist irrigation system.

In summary, we found:

- Rooting of tea cuttings could be generated in 1.5 months in the summer using IBA.
- Rooting took longer (3-4 months) in the cooler fall/winter season.
- After ~3 months, stems callused.
- Cuttings could be transplanted as early as 3-4 months after root establishment in the summer. Whereas, cutting to transplant days were longer in the fall and winter (5-6 months).
- Plants should be hardened off before planted in an open field system.
- If cuttings were started in the spring, under optimal conditions, plants could be transferred to the field in 3-4 months.

Photo 2. Cuttings (4-5 inches) (left) which received IBA rooted faster (90%) than cuttings which received no IBA treatment (right). Shorter cuttings did better than longer (8-9 inches) cuttings with IBA.
Photo 3. The Hormodin 3 (0.8% IBA) rooting compound (top) had less IBA than the Dip ‘n Grow® (1.0% IBA) liquid solution. However, cuttings with Hormodin 3 produced roots faster than the Dip ‘n Grow® hormone. Cuttings were moved into grow tubes and hardened off before field planted (bottom).

There was a noticeable observable difference between the plants which received sulfur applications and those that received no treatment. Plants grown in soils with a natural pH of 5.5 (Photo 4-right) did not grow as well as the plants grown in the modified soils (pH of 4.7) (Photo 4-left). Based on this information, growers are advised to test soils before crop installation. Consult with a CTAHR Extension agent regarding your soil type, its buffering capacity and ultimately, whether it’s a good candidate for soil acidification.
Photo 4. Plants on the left have a soil pH of 4.7 while the plants on the right have a soil pH of 5.5. In March 2015, the tea plantings which received no sulfur (Photo 4-right) were removed due to poor growth (minimal new shoots, slow to fill in, etc.). Mamaki was grown in its place.

Tea plants took about 18 months to fill in and ‘hedge’ at the Poamoho Research Station (Photo 5). To keep pH levels low, we used 21-0-0 at a rate of 100 pounds of N for year one and 200 pounds of N per acre after year one.

Photo 5: In the first year, we tried to break apical dominance (upward growth) and encourage lateral growth. Plants were pruned frequently in an attempt to create a “hedge” or flat top effect. The “hedge” effect was desired for ease of new shoot harvest and long-term maintenance.
Photo 6. Interested growers and other participants had an opportunity to come to the Poamoho Station to obtain germplasm and learn about growing and processing tea.

Workshops and field events were held in collaboration with the CTAHR Tea Project. We worked with various agribusinesses over the past 7 years on propagation and processing techniques to expand tea production on Oahu. Due to the loss of acreage (land sale) at the Poamoho Research Station, we decided to terminate the project in 2019.

REFERENCE


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Tea cultivars grown at the Poamoho Research Station from 2012-2019.

Photo 7. Yabukita on left and Yutaka Midori on right.

Photo 8. Bohea on left and Benikaori on right.