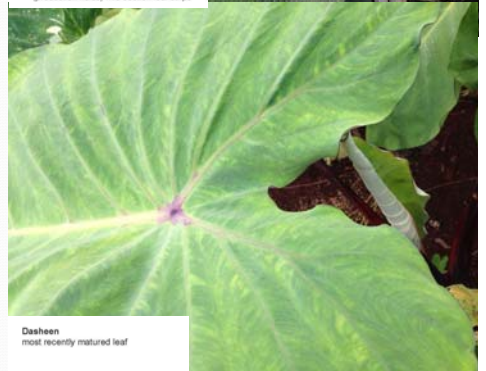




Tissue Testing

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- Tissue sampling can help understand what the plant has taken up
 - Provides a snap shot of nutrient uptake in plants
 - Indicator of soil nutrient levels
 - Confirm or rule out deficiency / toxicity issues
- Accurate sampling is important
 - Results are only as good as the sample you take
 - When in doubt, sample most recent mature leaf
- Specific guidelines established for crops
 - Location on plant
 - Crop cycle
 - Timing of sampling
- Provides crop specific recommendations
- How much does a sample cost?
 - Samples Run about \$25-30 / each
 - All of the following nutrients:
(B, Ca, Cu, Fe, Mg, Mn, P, K, Na, Zn)
 - Total Nitrogen (N); Nitrates (NO₃-N); Sulfur (S); Silicon (Si); Other Elements
- Example of results:



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1910 East-West Road
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Honolulu, Hawaii 96822

EX. TARO

PLANT TISSUE ANALYSES WORKSHEET													
CLIENT ID	RECEIVED	DATE	PLANT TISSUE	REASON	CAT/COMMON NAME	OTHER							
Sugano, Jari	7/13/12	7/13	Taro										
ATTN:	CROP:	VARIETY:	PROBLEM:	COLLECTED:	MATERIAL:								
ADDRESS:	KOE:	TISSUE:	MONITOR:	COMPLETED:									
CITY:	TISSUE:	Leaf	SURVEY:	COLLECTOR:									
PHONE:	TOTAL SAMPLE:	1	EXP:	SITE:									
	SOIL SUBMITTED:	YES	NO										

Sample Lab No	Description	Analy Code	%											ug/g							
1	2	3	N	P	K	Ca	Mg	Na	S	Fe	Mn	Zn	Cu	B	Mo	Al	NO ₃ -N	NH ₄ -N	NO ₂ -N	Si	
1121-2390		11.2	4.45	0.42	3.24	0.21	0.20	0.03		148	235	39	13	102							
2																					
3																					
4																					
5																					

Table 1. Taro leaf blade nutrient concentrations associated with deficiency, sufficiency, and toxicity.^a

Mineral element	Measured in	Deficiency range	Sufficiency range ^a	Toxicity range
N	%	< 4.0 ^a	4.0-4.5 ^a	
P	%		0.3-0.5	
K	%		3.2-5.5 ^a	
Ca	%	< 0.7 ^a	0.7-1.5	
Mg	%	< 0.2 ^a	0.2-0.5	
S	%	< 0.2 ^a	0.2-0.3	
Cl	%			> 2.0 ^a
Fe	ppm	< 100 ^a	100-200 ^a	
B	ppm		20-50 ^a	
Mn	ppm		50-300 ^a	> 2000 ^a **
Zn	ppm		20-40 ^a	> 400 ^a
Cu	ppm		10-20 ^a	Unrelated ^a

^aActual deficient, sufficient, and toxic concentrations of elements in leaf blades may vary depending on taro variety, environmental conditions, and quantities of other nutrients present. ^bSufficiency ranges are based on concentrations of elements in leaf blades of healthy taro plants grown under upland or wetland conditions (Uchida, 2002). ^cChen et al. (2002). ^dShaw, J.A. (personal communications). ^eMiyasaka (1979). ^fAshton et al. (1994) found that 0.14% Mg was associated with 95% of maximum growth. ^gKelly and Jansen (unpublished) showed that 0.18% S was associated with 95% of maximum growth. ^hHill et al. (1998). ⁱAras et al. (1996) found that a range of 55-70 ppm Fe was associated with 95% of maximum growth. ^jR.T. Hamasaki (personal communications). ^kTaro is tolerant to high levels of Mn and foliar concentrations between 1400-2000 ppm have been observed without detrimental effects. ^lMiyasaka and Webster (1994). ^mSullivan et al. (1996). ⁿHill et al. (2000) found levels ranging from 14-18 ppm Cu in taro plants supplied with sufficient Cu. Foliar Cu concentrations cannot be used to predict toxicity, because they did not increase in leaf blades under toxic Cu levels.

- Call the CTAHR ADSC Lab for more information at: (808) 956-6706