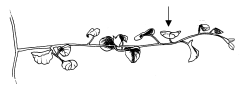




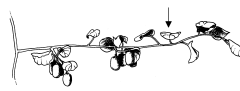
Sampling Notes

Leaf analysis provides a more accurate and reliable assessment of the nutrient status of the kiwifruit plant than does soil testing. Greater emphasis, therefore, should be placed on the plant tissue results. Four sampling options are described below. Data is available for optimum levels for virtually the whole growing season, from late September to early April.


Leaf (1) (Before Fruit Set)

Sampling Time:	September-October (Before fruit set)	
Plant Part	Leaf & petiole	
Collect From:	Youngest mature leaf	
Quantity per Sample:	2-4 leaves from each of 20 vines	
Recommended Tests:	Basic Plant (BP), Chloride (Cl)	
Comments:	Diagnosing deficiencies at this early stage may allow time to correct them for the current season's crop, whereas sampling after November is considered too late. These deficiencies will be more pronounced than later in the season, when the plants will have adapted to their growing conditions.	

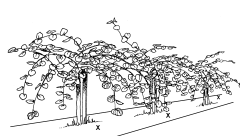
Leaf (2) (November - January)

Sampling Time:	November-January	
Plant Part	Leaf & petiole	
Collect From:	Second leaf past the final fruit cluster on the fruiting lateral	
Quantity per Sample:	2-4 leaves from each of 20 vines	
Recommended Tests:	Basic Plant (BP), Chloride (Cl)	
Comments:	Autumn is regarded as the standard sampling time because nutrient levels will have stabilised. These mid-season samples should also reflect the effectiveness of the fertiliser programme adopted and the nutrient availability during the spring growth period.	

Leaf (3) (February to March)

Sampling Time:	February-March	
Plant Part	Leaf & petiole	
Collect From:	Second leaf past the final fruit cluster on the fruiting lateral	
Quantity per Sample:	2-4 leaves from each of 20 vines	
Recommended Tests:	Basic Plant (BP), Chloride (Cl)	
Comments:	Autumn is regarded as the standard sampling time because nutrient levels will have stabilised. These mid-season samples should also reflect the effectiveness of the fertiliser programme adopted and the nutrient availability during the spring growth period.	

Soil

Sampling Time:	Prior to crop establishment and annually during autumn and early winter	
Core Depth	15cm	
Collect From:	From the root zone of the vines	
Quantity per Sample:	15 - 20 cores	
Recommended Tests:	Basic Soil (BS), Available Nitrogen (AN)	
Comments:	<p>Separate samples should be taken from blocks that differ in age, cultivar types, tree performance, soil types, topography and fertiliser history.</p> <p>Where fertiliser has been broadcast, sample from the root zone of the vines. Where fertiliser has been banded, samples should only be taken from areas under the vines which have previously received fertiliser.</p> <p>If the orchard has herbicide treated strips, then it is best if these are sampled separately from the grassed areas between rows. Quite different nutrient levels may exist between these two areas.</p> <p>When sampling prior to orchard establishment, a 15 - 40 cm depth sample should also be taken, primarily to check the sub-soil pH.</p>	

Interpretation

Interpretation of the laboratory's results is possible by comparison with normal levels expected for the crop in question. The interpretation given is based on the best information available and relate specifically to the sampling instructions given.

Leaf (1) (Before Fruit Set)			Leaf (2) (November - January)			Leaf (3) (February to March)		
Analyte	Unit	Range	Analyte	Unit	Range	Analyte	Unit	Range
Nitrogen	%	2.3 - 4.0	Nitrogen	%	1.6 - 2.3	Nitrogen	%	1.5 - 2.0
Phosphorus	%	0.20 - 0.65	Phosphorus	%	0.12 - 0.24	Phosphorus	%	0.13 - 0.22
Potassium	%	2.2 - 3.5	Potassium	%	1.6 - 2.6	Potassium	%	1.4 - 2.3
Sulphur	%	0.30 - 0.50	Sulphur	%	0.22 - 0.40	Sulphur	%	0.22 - 0.40
Calcium	%	1.0 - 2.4	Calcium	%	1.9 - 3.5	Calcium	%	2.2 - 4.0
Magnesium	%	0.25 - 0.45	Magnesium	%	0.30 - 0.45	Magnesium	%	0.35 - 0.50
Sodium	%	0.0 - 0.10	Sodium	%	0.0 - 0.050	Sodium	%	0.0 - 0.050
Iron	mg/kg	50 - 150	Iron	mg/kg	45 - 100	Iron	mg/kg	50 - 120
Manganese	mg/kg	50 - 150	Manganese	mg/kg	50 - 200	Manganese	mg/kg	50 - 200
Zinc	mg/kg	20 - 60	Zinc	mg/kg	15 - 30	Zinc	mg/kg	15 - 30
Copper	mg/kg	7.0 - 20	Copper	mg/kg	7.0 - 20	Copper	mg/kg	7.0 - 15
Boron	mg/kg	20 - 35	Boron	mg/kg	25 - 40	Boron	mg/kg	20 - 40
Chloride	%	0.40 - 1.0	Chloride	%	0.50 - 1.0	Chloride	%	0.60 - 1.3

Soil		
Analyte	Unit	Range
pH	pH	5.8 - 6.5
Olsen Phosphorus	mg/L	30 - 60
Potassium	me/100	0.60 - 1.2
Calcium	me/100	6.0 - 12
Magnesium	me/100	1.0 - 3.0
Sodium	me/100	0.0 - 0.40
CEC	me/100	12 - 25
Volume Weight	g/mL	0.60 - 1.0
Available Nitrogen	kg/ha	100 - 150

Comments

As the rootstock of many Gold (Hort16A) vines are the same as for Green (Hayward) kiwifruit, similar nutrition problems may occur. For further information on these problems, see Crop Guide: Kiwifruit/Green.

The earlier maturing of Gold kiwifruit, together with different leaf levels observed for this variety (by way of original survey data carried out in-house and more recent statistical analysis of the results database), means that specific medium range criteria should be used for interpretation.

In general, the Gold kiwifruit vine is more vigorous and fruit yield higher compared to Green. Typical nutrient levels in the leaf overlap for both varieties for some elements in the early stages, but not others. Gold kiwifruit leaf samples tend to have slightly lower nutrient levels (than Green) in the later season samplings.

Interpretation of early-season leaf samples for Gold should consider that soil temperature would have an effect on root activity i.e. a low K level in the leaf may only be a reflection of the plant's ability to acquire this element (rather than inadequate soil levels).

Irrigation water should be monitored to avoid excessive salt (sodium) loading or boron application.

Fruit quality issues are more common with Gold than Green. Vine management, plant nutrition, environmental factors and post-harvest handling will all influence fruit quality.

Further nutrient information should become available after completion of vine compositional trial work currently underway within the industry (2006+).

References

- Smith, G.S.; Asher, C.J. and Clark, C.J. 1985. Kiwifruit nutrition. Diagnosis of nutritional disorders. AgPress Communications Ltd, Wellington.
 Blackmore, L.C.; Searle, P.L and Daly, B.K. 1987. Methods for chemical analysis of soils. NZ Soil Bureau Scientific Report 80. NZ Soil Bureau, DSIR.
 Clark, C. and Edwards, C. 2001. Seasonal analyses of Hort16A leaves reveal intriguing differences from Hayward. NZ Kiwifruit Journal, Sept/Oct.

Disclaimer

Normal Range levels quoted relate specifically to the sampling procedure given. The Normal Range levels and Comments provided are the most up to date levels available, but may be altered without notification. Such alterations are implemented immediately in the laboratory histogram reports. It is recommended that a consultant or crop specialist be involved with interpretations and recommendations.