Hill Laboratories
BETTER TESTING BETTER RESULTS

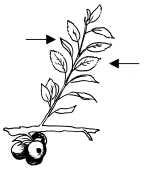
Crop Guide
Apple

KB Item: 3426v2

Sampling Notes

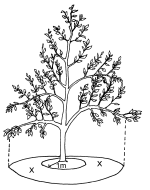
The nutritional status of apples trees is monitored using soil tests and plant analysis. Annual monitoring is important to help sustain optimum levels and avoid nutritional disorders. If disorders do occur, rapid diagnosis is necessary to assist correction.

Leaf



Sampling Time:	November and December (Early Season) or January and February (Mid Season)
Plant Part	Youngest mature leaf (blade & petiole).
Collect From:	Mid portion of the current season's non-fruiting laterals (extension growth), taken at shoulder height.
Quantity per Sample:	4 representative leaves from the periphery of each of 15 - 25 trees.
Recommended Tests:	Basic Plant (BP).
Comments:	To help diagnose an obvious problem, leaves showing the first signs of the distinctive symptoms should be collected as soon as abnormalities appear. If sampling outside the normal sampling time it is useful to take a second sample of similar, healthy leaves from nearby unaffected trees for analysis as a comparative standard.

Soil



Sampling Time:	Prior to crop establishment and annually at any time of the year, although autumn to early winter is recommended.
Core Depth	15cm.
Collect From:	From the drip zone of the trees.
Quantity per Sample:	12 - 20 cores from under trees selected at random from throughout the block.
Recommended Tests:	Basic Soil (BS).
Comments:	Separate samples should be taken from blocks that differ in age, cultivar types, tree performance, soil types, topography and fertiliser history. Where fertiliser has been broadcast, sample from the drip zone of the trees. Where fertiliser has been banded, samples should only be taken from areas under the drip zone which have previously received fertiliser. 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. When sampling prior to orchard establishment, a 20 - 40 cm depth sample should also be taken, primarily to check the sub-soil pH.

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Interpretation

Interpertation 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

Analyte	Unit	Range
Nitrogen	%	1.9 - 2.4
Phosphorus	%	0.14 - 0.20
Potassium	%	1.1 - 1.5
Sulphur	%	0.15 - 0.25
Calcium	%	1.0 - 2.0
Magnesium	%	0.25 - 0.35
Sodium	%	0.0 - 0.10
Iron	mg/kg	60 - 250
Manganese	mg/kg	50 - 160
Zinc	mg/kg	20 - 50
Copper	mg/kg	5.0 - 20
Boron	mg/kg	20 - 50

Soil

Analyte	Unit	Range
pH	pH	5.8 - 6.8
Olsen Phosphorus	mg/L	30 - 60
Potassium	me/100	0.50 - 1.0
Calcium	me/100	6.0 - 12
Magnesium	me/100	1.0 - 3.0
Sodium	me/100	0.0 - 0.50
CEC	me/100	12 - 25
Volume Weight	g/mL	0.60 - 1.0

Comments

Nitrogen, magnesium, calcium, manganese, zinc and boron nutrient disorders are the most common.

Adequate levels of nitrogen are required at blossoming and fruit set to ensure good fruit set, particularly for green skinned varieties.

Calcium related disorders, as well as magnesium deficiencies, may be induced by high levels of potassium that depress calcium and magnesium uptake. Foliar symptoms are not necessarily evident.

Manganese toxicity is more common than its deficiency, and is often related to low soil pH or poor drainage.

Boron is the most common deficiency, with symptoms resembling those of bitter pit and fruit shape distortion. Foliar symptoms are not necessarily evident.

It has been suggested that the soil potassium level should be 3-4% of the CEC. Calcium should occupy 70-80% of the CEC sites and magnesium 10-15%.

Pipfruit trees take up phosphorus efficiently, even in highly retentive soils. The suggested optimum Olsen P level is 30 or higher.

Pipfruit will grow within a soil pH range of 5.8 - 6.8. To minimise calcium disorders in fruit, a topsoil pH of 6.5 or greater is considered desirable.

Normal ranges for sulphur and iron have been lowered from the referenced data, based on levels more typically found in New Zealand.

References

Leece, D.R. 1976. Journal of the Australian Institute of Agricultural Science, March, pp 3-19.

Fertiliser recommendation for horticultural crops. HortResearch HortNET, 1997.

Bennett, W.F. (Ed) 1993. Nutrient deficiencies & toxicities in crop plants. College of Agricultural Sciences and Natural Resources, Texas Tech University, Lubbock.

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.

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