

Leaf Analyses Nutrient Levels, By Crop (from various sources)

Prepared by Harold J Larsen, W. Colo. Res. Center - Orchard Mesa, Grand Jct., CO

Crop: Grape		(Deficient) Adequate Range (Excessive)				
Information Source	N. Zealand (& CSU - Caspari)	A & L	A & L	Australia	Mich. St. U. **	CSU (Godin)
Macronutrient \ Sample	L @ V *	P @ B *	P @ pre-V *	L @ V *	L / P @ V *	?
N (%)	(<1.0) 1.5 - 2.8 (>4.0)	(<0.85) 1.25 - 2.81	2.00 - 2.30 (2.65)	(<1.6) 2.2 - 4.0	0.80 - 1.20	0.5 - 1.0
S (%)	0.21 - 0.40 (>0.50)	(< 0.12) 0.16 - 0.28	0.20 - 0.25			above 0.3
P (%)	(< 0.10) 0.16 - 0.25 (> 0.4)	(< 0.15) 0.30 - 0.59	(0.25) 0.30 - 0.40	(< 0.12) 0.15 - 0.3	0.16 - 0.30	0.35 - 0.65
K (%)	(< 0.6) 1.1 - 1.6 (> 2.6)	(< 0.6) 2.60 - 5.10	(0.75) 1.30 - 1.49	(< 0.6) 0.8 - 1.6	1.5 - 2.5	1.75 - 3.25
Mg (%)	(< 0.15) 0.2 - 0.5 (> 0.8)	(< 0.13) 0.15 - 0.40	0.25 - 0.50 (0.70)	(< 0.2) 0.3 - 0.6	0.25 - 0.40	above 0.6
Ca (%)	0 (> 4.0)	0.42 - 1.30	(1.50) 2.00 - 2.59	1.8 - 3.2	0.50 - 1.00	above 1.5
Na (%)	0.05 - 0.12 (> 0.25)	0.00 - 0.20	0.00 - 0.19	< 0.1 - 0.2 (> 0.5)		below 0.2
Cl (%)	---			< 1.3 (1.7)		below 0.2
Micronutrient (ppm)	2.0 - 4. (> 0.5)					
B	(< 25) 31 - 50 (> 300)	(< 25) 25 - 51	25 - 70	(25) 35 - 100 (>300)	25 - 50	above 45
Zn	(< 20) 26 - 40 (> 300)	(< 20) 20 - 31	(19) 25 - 100	(25) 36 - 60	30 - 60	above 40
Mn	(< 20) 41 - 100 (> 450)	(< 18) 20 - 101	30 - 300	(20) 25 - 200	30 - 60	above 40
Fe	(< 35) 40 - 100 (> 250)	(< 25) 50 - 181	60 - 175	(< 35) 40 - 100 (>250)	20 - 100	above 25
Cu	(< 4) 18 - 34 (> 100)	5 - 21 (35)	1-May	(5) 10 - 300	10 - 50	above 10
Al		0 - 250	0 - 250			
Mo	(< 4) ---					
* L = leaf blade, P = leaf petiole, B = at bloom, V = veraison, pre-V = pre-veraison				**http://www.msue.msu.edu/vanburen/e-852.htm		
Crop: Apple		(Deficient) Adequate Range (Excessive)				
Macronutrient \ Source	CSU - Past Reports	A & L	Bergmann	Mich. St. U. **	Westwood, 1978	CSU (Godin)
N (%)	1.80 - 2.30	1.80 - 2.30	2.20 - 2.80	1.9 - 2.6	(< 1.5) 2.0 - 2.3 (> 3.5)	2.5 - 3.0
S (%)	0.16 - 0.30	(< 0.15) 0.16 - 0.30				below 0.30
P (%)	(< 0.14) 0.15 - 0.50	(< 0.15) 0.15 - 0.50	0.18 - 0.30	0.16 - 0.30	(< 0.08) 0.12 - 0.30 (> 0.70)	0.25 - 0.30
K (%)	(<0.80) 1.25 - 1.80	(< 1.20) 1.25 - 1.80	1.10 - 1.60	1.3 - 1.5	(<0.9) 1.2 - 3.0 (>4.0)	1.25 - 1.75
Mg (%)	0.20 - 0.50	0.20 - 0.50	0.20 - 0.35	0.30 - 0.50	(< 0.18) 0.24 - 1.0 (> 2.0)	above 0.40
Ca (%)	1.00 - 2.00	1.00 - 2.00	1.30 - 2.00	1.1 - 1.6	(< 0.20) 1.0 - 2.5 (> 3.0)	above 1.80
Na (%)	below 0.20	0.00 - 0.20				above 0.70
Cl (%)						above 1.0
Micronutrient (ppm)						
B	25 - 60	25 - 60	25 - 50	25 - 50	(< 30) 35 - 80 (> 100)	above 30
Zn	(< 15) 20 - 50	(< 15) 20 - 50	(< 15) 20 - 50	20 - 40	(< 10) 18 - 100 (> 200)	above 30
Mn	25 - 200	(< 20) 25 - 200	35 - 100	50 - 80	(< 20) 25 - 200 (> 450)	above 15
Fe	50 - 400	(< 25) 50 - 400		150 - 250	(< 40) 50 - 400 (> 500)	above 100
Cu	(< 3) 5 - 20	(< 3) 5 - 20	5 - 12	10 - 20	( 1) 4 - 50 (>100)	above 8
Al		0 - 200				
Mo			0.10 - 0.30			
				**http://www.msue.msu.edu/vanburen/e-852.htm		

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Crop: Apricot		<i>(Deficient) Adequate Range (Excessive)</i>			
Macronutrient \ Source	A & L (& CSU - Past reports)	Bergmann	Mich. St. U. **		
N (%)	2.00 - 3.00	2.20 - 3.20	3.3 - 4.5		
S (%)	(< 0.15) 0.20 - 0.30				
P (%)	0.13 - 0.35	0.18 - 0.35	0.15 - 0.25		
K (%)	2.50 - 3.00	2.00 - 3.20	1.4 - 2.0		
Mg (%)	0.30 - 1.20	0.30 - 0.60	0.30 - 0.50		
Ca (%)	1.60 - 2.50	1.20 - 2.50	0.15 - 0.25		
Na (%)	0.00 - 0.10				
Cl (%)					
Micronutrient (ppm)					
B	20 - 70	20 - 60	30 - 50		
Zn	(< 15) 20 - 60	(< 16) 20 - 50	20 - 50		
Mn	25 - 100	30 - 100	50 - 100		
Fe	70 - 150		75 - 150		
Cu	5 - 25	5 - 12	10 - 20		
Al	0 - 251				
Mo		0.10 - 0.30			
			** <a href="http://www.msue.msu.edu/vanburen/e-852.htm">http://www.msue.msu.edu/vanburen/e-852.htm</a>		
Crop: Cherry, Sweet		<i>(Deficient) Adequate Range (Excessive)</i>			
Macronutrient \ Source	A & L (& CSU - Past reports)	Bergmann	Mich. St. U. **	Westwood, 1978	
N (%)	(1.95) 2.30 - 3.29	2.60 - 2.80	2.5 - 3.5	(< 1.7) 2.3 - 2.6 (> 4.0)	
S (%)	(0.10) 0.15 - 0.49				
P (%)	(0.20) 0.23 - 0.37	0.18 - 0.30	0.15 - 0.30	(< 0.08) 0.12 - 0.30 (> 0.70)	
K (%)	1.00 - 1.89	1.60 - 2.00	1.4 - 2.0	(< 1.0) 1.2 - 3.0 (> 4.0)	
Mg (%)	0.40 - 0.64	0.30 - 0.50	0.40 - 0.80	(< 0.18) 0.24 - 1.0 (> 2.0)	
Ca (%)	1.60 - 8.99	1.60 - 2.00	1.2 - 2.0	(< 0.20) 1.0 - 2.5 (> 3.0)	
Na (%)	0.00 - 0.19				
Cl (%)					
Micronutrient (ppm)					
B	30 - 81	30 - 60	30 - 50	(< 30 ) 35 - 80 (> 100)	
Zn	20 - 200	(< 16) 20 - 50	15 - 40	(<10) 18 - 100 (> 200)	
Mn	18 - 150	35 - 100	35 - 60	(< 20) 25 - 200 (> 450)	
Fe	40 - 150	42 - 120 *	75 - 150	(< 40) 50 - 400 (> 500)	
Cu	6 - 26	5 - 12	15 - 30	(1) 4 - 50 (> 100)	
Al	0 - 300				
Mo		0.10 - 0.30			
		* Christensen & Walker, 1964			
			** <a href="http://www.msue.msu.edu/vanburen/e-852.htm">http://www.msue.msu.edu/vanburen/e-852.htm</a>		

Leaf Analyses Nutrient Levels, By Crop (from various sources)

Crop: Cherry, Tart		<i>(Deficient) Adequate Range (Excessive)</i>			
Macronutrient \ Source	A & L (& CSU - Past reports)	Bergmann	Mich. St. U. **	Westwood, 1978	
N (%)	2.00 - 3.00	2.80 - 3.20	2.5 - 3.5	(< 1.7) 2.3 - 2.6 (> 4.0)	
S (%)	0.16 - 0.45				
P (%)	0.21 - 0.50	0.20 - 0.35	0.15 - 0.30	(< 0.08) 0.12 - 0.30 (> 0.70)	
K (%)	(0.80) 1.51 - 2.50	1.60 - 2.00	1.4 - 2.0	(< 1.0) 1.2 - 3.0 (> 4.0)	
Mg (%)	0.31 - 0.80	0.30 - 0.50	0.40 - 0.80	(< 0.18) 0.24 - 1.0 (> 2.0)	
Ca (%)	1.26 - 2.50	1.60 - 2.50	1.2 - 2.0	(< 0.20) 1.0 - 2.5 (> 3.0)	
Na (%)	0.01 - 0.10				
Cl (%)					
Micronutrient (ppm)					
B	31 - 80	30 - 60	30 - 50	(< 30) 35 - 80 (> 100)	
Zn	21 - 70	(< 16) 20 - 50	15 - 40	(< 10) 18 - 100 (> 200)	
Mn	(20) 51 - 250	35 - 100	35 - 60	(< 20) 25 - 200 (> 450)	
Fe	31 - 250	19 - 74 *	75 - 150	(< 40) 50 - 400 (> 500)	
Cu	11 - 40	5 - 12	15 - 30	(1) 4 - 50 (> 100)	
Al	1 - 250				
Mo		0.10 - 0.30			
		* Kenworthy, 1950			
			** <a href="http://www.msue.msu.edu/vanburen/e-852.htm">http://www.msue.msu.edu/vanburen/e-852.htm</a>		
Crop: Peach / Nectarine		<i>(Deficient) Adequate Range (Excessive)</i>			
Macronutrient \ Source	A & L (& CSU - Past reports)	Bergmann	Mich. St. U. *	Westwood, 1978	CSU (Godin)
N (%)	(< 2.40) 2.75 - 3.50	2.2 - 3.2	3.3 - 4.5	(< 2.0) 2.8 - 3.8 (> 4.5)	2.5 - 3.0
S (%)	(< 0.07) 0.12 - 0.3 <sup>9</sup>				above 0.3
P (%)	(< 0.10) 0.12 - 0.29	0.18 - 0.35	0.15 - 0.25	(< 0.08) 0.12 - 0.30 (> 0.70)	0.20 - 0.35
K (%)	(< 1.20) 1.30 - 3.20	1.5 - 3.0	1.4 - 2.0	(< 1.0) 1.5 - 3.0 (> 4.0)	1.5 - 2.5
Mg (%)	(< 0.20) 0.25 - 0.49	0.30 - 0.60	0.30 - 0.50	(< 0.18) 0.24 - 1.0 (> 2.0)	above 0.30
Ca (%)	(< 1.0) 1.50 - 2.50	1.5 - 2.5	1.5 - 2.5 **	(< 0.20) 1.0 - 2.5 (> 3.0)	above 2.0
Na (%)	0.00 - 0.20				below 0.3
Cl (%)					below 0.3
Micronutrient (ppm)					
B	(< 20) 20 - 80	20 - 60	30 - 50	(< 30) 35 - 80 (> 100)	above 45
Zn	(< 15) 20 - 50	(< 16) 25 - 50	20 - 50	(< 10) 18 - 100 (> 200)	above 25
Mn	(< 15) 20 - 201	35 - 100	50 - 100	(< 20) 25 - 200 (> 450)	above 50
Fe	(< 50) 60 - 250		75 - 150	(< 40) 50 - 400 (> 500)	above 100
Cu	(< 4) 5 - 20	7 - 15	10 - 20	(1) 4 - 50 (> 100)	above 4
Al	0 - 250				
Mo		0.10 - 0.30			
			* <a href="http://www.msue.msu.edu/vanburen/e-852.htm">http://www.msue.msu.edu/vanburen/e-852.htm</a>		
			**corrected value (web page value x 10)		

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Crop: Pear		<i>(Deficient) Adequate Range (Excessive)</i>			
Macronutrient \ Source	A & L (& CSU - Past reports)	Bergmann	Mich. St. U. **	Westwood, 1978	
N (%)	2.30 - 3.00	2.80 - 3.20	1.9 - 2.6	(< 1.9) 2.2 - 2.4 (> 3.5)	
S (%)	0.14 - 0.50				
P (%)	0.14 - 0.50	0.20 - 0.35	0.16 - 0.30	(< 0.08) 0.12 - 0.30 (> 0.70)	
K (%)	1.25 - 2.25	1.60 - 2.00	1.3 - 1.5	(< 0.4) 0.7 - 3.0 (> 4.0)	
Mg (%)	0.30 - 0.75	0.30 - 0.50	0.30 - 0.50	(< 0.18) 0.24 - 1.0 (> 2.0)	
Ca (%)	1.50 - 2.50	1.60 - 2.50	1.1 - 1.6	(< 0.20) 1.0 - 2.5 (> 3.0)	
Na (%)	0.00 - 0.20				
Cl (%)					
Micronutrient (ppm)					
B	20 - 75	30 - 60	25 - 50	(<30) 35 - 80 (> 100)	
Zn	25 - 100	(< 16) 20 - 50	20 - 40	(< 10) 18 - 100 (> 200)	
Mn	(< 40) 60 - 200	35 - 100	50 - 80	(< 20) 25 - 200 (> 450)	
Fe	60 - 200		150 - 250	(< 40) 50 - 400 (> 500)	
Cu	(< 4) 9 - 100	5 - 12	10 - 20	( 1 ) 4 - 50 (> 100)	
Al					
Mo	0.1 - 0.7 *	0.10 - 0.30			
	*Woodbirdge & Lasheen, 1960		** <a href="http://www.msue.msu.edu/vanburen/e-852.htm">http://www.msue.msu.edu/vanburen/e-852.htm</a>		
Crop: Plum		<i>(Deficient) Adequate Range (Excessive)</i>			
Macronutrient \ Source	A & L (& CSU - Past reports)	Mich. St. U. *	Bergmann	Westwood, 1978	
N (%)	(< 1.70) 1.80 - 2.60	3.3 - 4.5	2.2 - 3.2	(< 1.7) 2.2 - 2.5 (> 3.5)	
S (%)	0.15 - 0.49	0.22 - 0.47 **			
P (%)	0.09 - 0.29	0.15 - 0.25	0.18 - 0.35	(< 0.08) 0.12 - 0.30 (> 0.70)	
K (%)	1.10 - 2.90	1.4 - 2.0	1.5 - 3.0	(< 1.0) 1.4 - 3.0 (> 4.0)	
Mg (%)	0.20 - 0.45	0.30 - 0.50	0.30 - 0.60	(< 0.18) 0.24 - 1.0 (> 2.0)	
Ca (%)	1.00 - 4.99	0.15 - 0.25	1.5 - 2.5	(< 0.20) 1.0 - 2.5 (> 3.0)	
Na (%)	0.00 - 0.20				
Cl (%)					
Micronutrient (ppm)					
B	31 - 81	30 - 50	20 - 60	(< 30) 35 - 80 (> 100)	
Zn	20 - 200	20 - 50	(< 16) 25 - 50	(< 10) 18 - 100 (> 200)	
Mn	17 - 200	50 - 100	25 - 100	(< 20) 25 - 200 (> 450)	
Fe	50 - 400	75 - 150		(< 40) 50 - 400 (> 500)	
Cu	6 - 26	10 - 20	5 - 12	( 1 ) 4 - 50 (> 100)	
Al	0 - 251				
Mo			0.10 - 0.30		
		* <a href="http://www.msue.msu.edu/vanburen/e-852.htm">http://www.msue.msu.edu/vanburen/e-852.htm</a>			
		** Brown, et al., 1953			