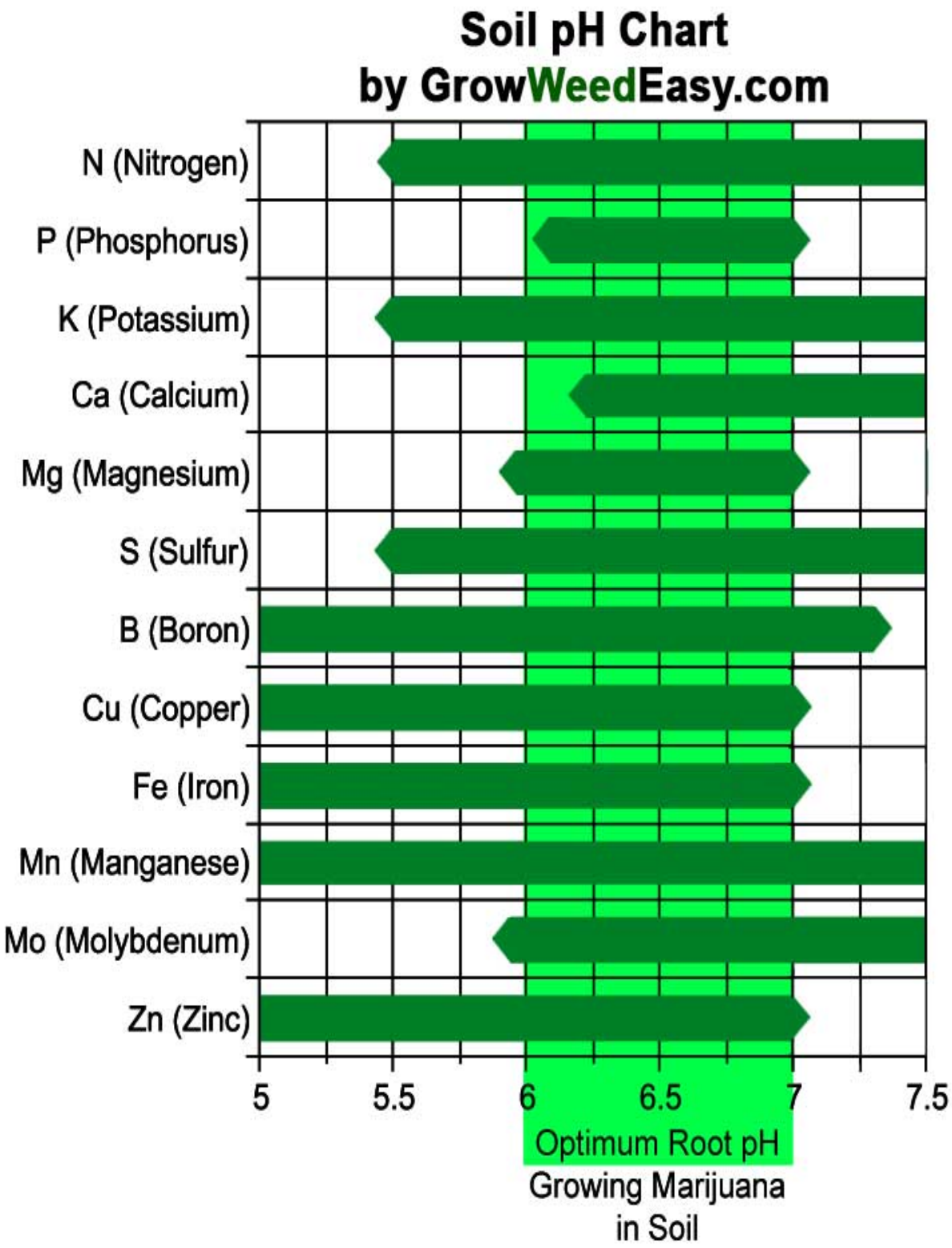
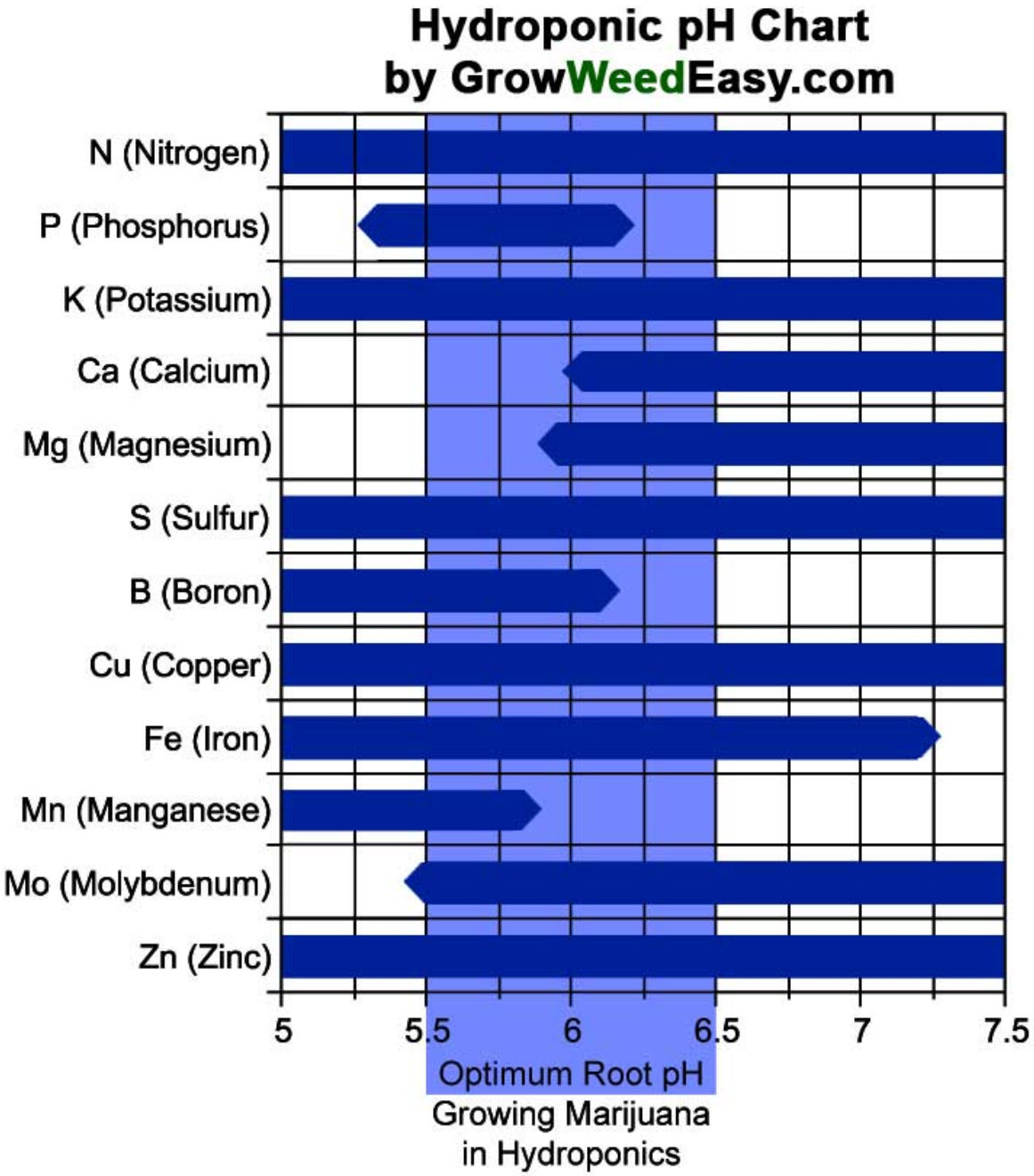
#


Soil pH Chart
by GrowWeedEasy.com
N (Nitrogen)
P (Phosphorus)
K (Potassium)
Ca (Calcium)
Mg (Magnesium)
S (Sulfur)
B (Boron)
Cu (Copper)
Fe (Iron)
Mn (Manganese)
Mo (Molybdenum)
Zn (Zinc)
5
5.5
6
6.5
7
7.5
Optimum Root pH
Growing Marijuana
in Soil

#


Hydroponic pH Chart
by GrowWeedEasy.com
N (Nitrogen)
P (Phosphorus)
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5
5.5
6
6.5
7
7.5
Optimum Root pH
Growing Marijuana
in Hydroponics

#

GUIDE TO TERPENES

	Aroma	Vaporizes at	Found in	Strains
PNE α-PINENE	Pine	311°F (155°C)	Pine Needles, Rosemary, Basil, Parsley, Dill	Indica: Pk (Purple Kush) · Sativa: Bay (Bay Dream) · Hybrid: Ak (AK-47)
MYR MYRCENE	Cloves, Earthy, Herbal	332°F (167°C)	Mango, Lemongrass, Thyme, Hops	Indica: Gdp (Granddaddy Purple) · Sativa: Am (Amnesia) · Hybrid: Tw (Trainwreck)
LME LIMONENE	Citrus	348°F (176°C)	Fruit Rinds, Rosemary, Juniper, Peppermint	Indica: Hk (Hindu Kush) · Sativa: Lmg (Lemon G) · Hybrid: Stb (Strawberry Banana)
CYE CARYOPHYLLENE	Pepper, Spicy, Woody, Cloves	266°F (130°C)	Black Pepper, Cloves, Cinnamon	Hybrid: Fog (Fire OG) · Hybrid: Gg4 (GG4) · Hybrid: Gsc (GSC)
LNL LINALOOL	Floral	388°F (198°C)	Lavender	Indica: Kos (Kosher Kush) · Indica: Rom (Romulan) · Hybrid: Sk (Sour Kush)
HUM HUMULENE	Woody, Earthy	222°F (106°C)	Hops, Coriander, Cloves, Basil	Indica: Bcg (Black Cherry OG) · Indica: Ds (Death Star) · Hybrid: Gsc (GSC)
OCM OCIMENE	Sweet, Herbal, Woody	122°F (50°C)	Mint, Parsley, Pepper, Basil, Mangoes, Orchids, Kumquats	Indica: Sen (Sensi Star) · Sativa: Dp (Durban Poison) · Hybrid: Svb (Silver Bubble)
TPE TERPINOLENE	Pine, Floral, Herbal	366°F (186°C)	Nutmeg, Tea Tree, Conifers, Apples, Cumin, Lilacs	Hybrid: Dt (Dutch Treat) · Sativa: Gth (Ghost Train Haze) · Hybrid: Ago (Agent Orange)

Leafly

#

Mobile Nutrients

symptoms start at the bottom with older fan leaves and progress up the plant

Nitrogen deficiency, (N) early stage

Nitrogen deficiency, (N) progression

Nitrogen abundance (N), early stage

Phosphorus deficiency (P), early stage

Phosphorus deficiency (P), progression

Phosphorus abundance (P), early stage

Potassium deficiency (K), early stage

Potassium deficiency (K), progression

Potassium abundance (K), early stage

Calcium deficiency (Ca), early stage

Calcium deficiency (Ca), progression

Calcium deficiency (Ca), late stage

Magnesium deficiency (Mg), early stage

Magnesium deficiency (Mg), progression

Magnesium deficiency (Mg), late stage

Immobile Nutrients

symptoms start at the top of plants with new growth

Zinc deficiency (Zn), early stage

Zinc deficiency (Zn), progression

Zinc deficiency (Zn), late stage

Manganese deficiency (Mn), early stage

Manganese deficiency (Mn), progression

Manganese deficiency (Mn), late stage

Iron deficiency (Fe), early stage

Iron deficiency (Fe), progression

Iron deficiency (Fe), late stage

Sulfur deficiency (S), early stage

Sulfur deficiency (S), progression

Sulfur deficiency (S), late stage

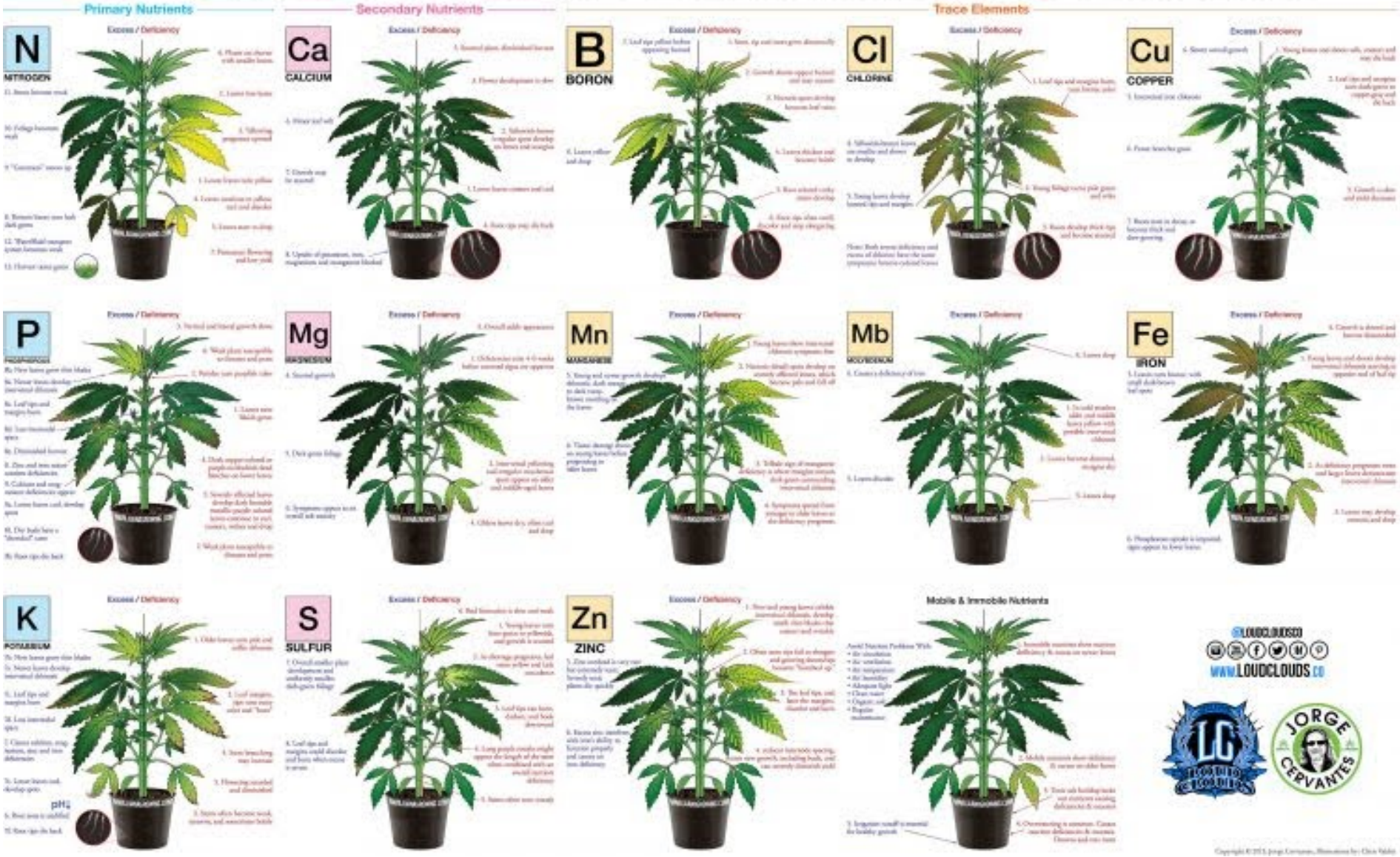
Healthy Leaf

even shade of green, no blueish tint, no yellowing, no burned leaf tips, no spots, etc

#

#

CANNABIS NUTRIENT DEFICIENCIES & EXCESSES



N

NITROGEN

Excess / Deficiency

6. Plants are shorter with smaller leaves

11. Stems become weak

2. Leaves lose luster

10. Foliage becomes weak

3. Yellowing progresses upward

9. "Greenness" moves up

1. Lower leaves turn yellow

4. Leaves continue to yellow, curl and discolor

8. Bottom leaves turn lush dark green

5. Leaves start to drop

12. Water/fluid transport system becomes weak

7. Premature flowering and low yield

13. Harvest tastes green

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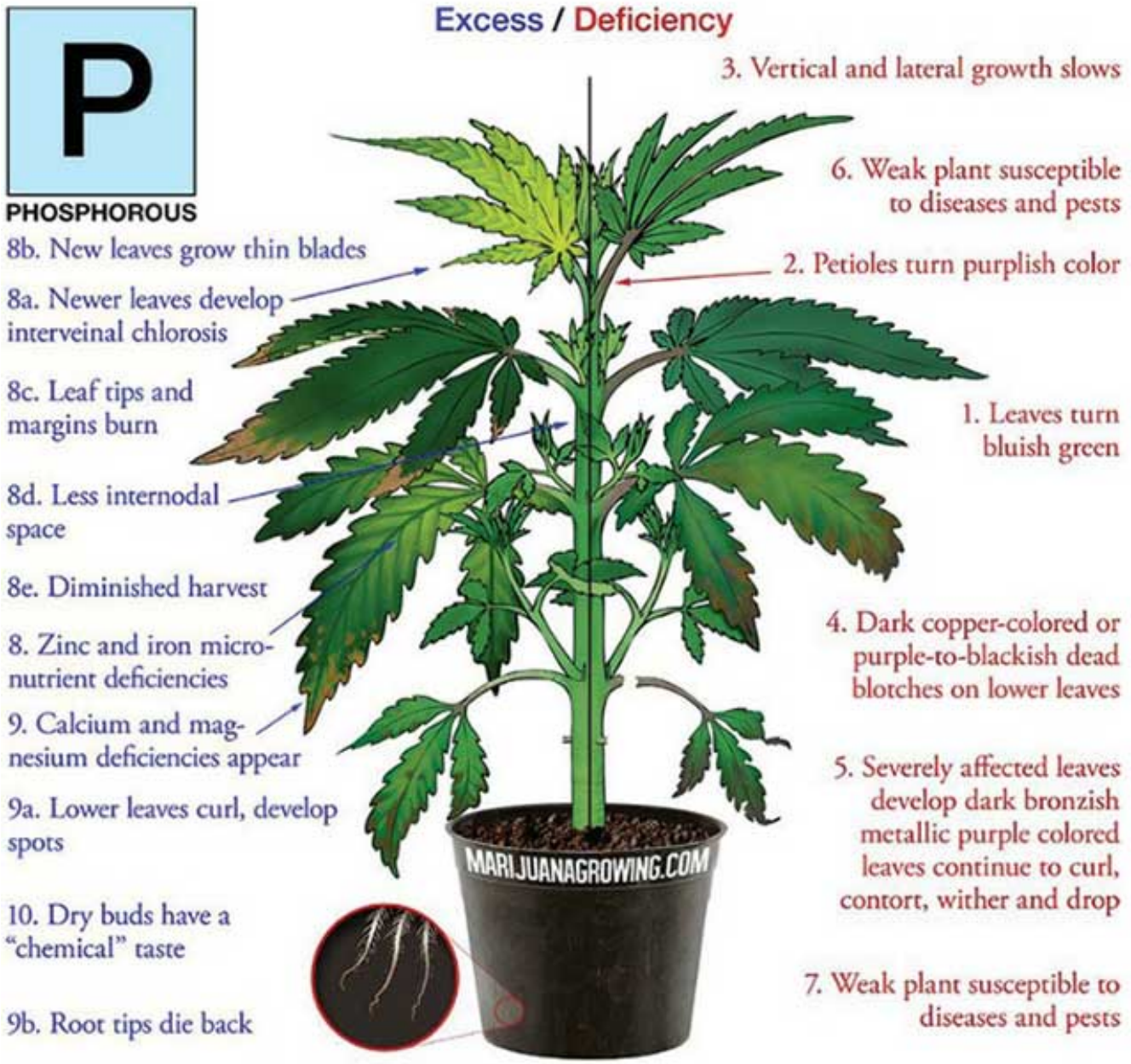
P
PHOSPHOROUS
Excess / Deficiency
3. Vertical and lateral growth slows
6. Weak plant susceptible to diseases and pests
2. Petioles turn purplish color
1. Leaves turn bluish green
4. Dark copper-colored or purple-to-blackish dead blotches on lower leaves
5. Severely affected leaves develop dark bronzish metallic purple colored leaves continue to curl, contort, wither and drop
7. Weak plant susceptible to diseases and pests
8b. New leaves grow thin blades
8a. Newer leaves develop interveinal chlorosis
8c. Leaf tips and margins burn
8d. Less internodal space
8e. Diminished harvest
8. Zinc and iron micro-nutrient deficiencies
9. Calcium and mag-nesium deficiencies appear
9a. Lower leaves curl, develop spots
10. Dry buds have a "chemical" taste
9b. Root tips die back
MARIJUANAGROWING.COM

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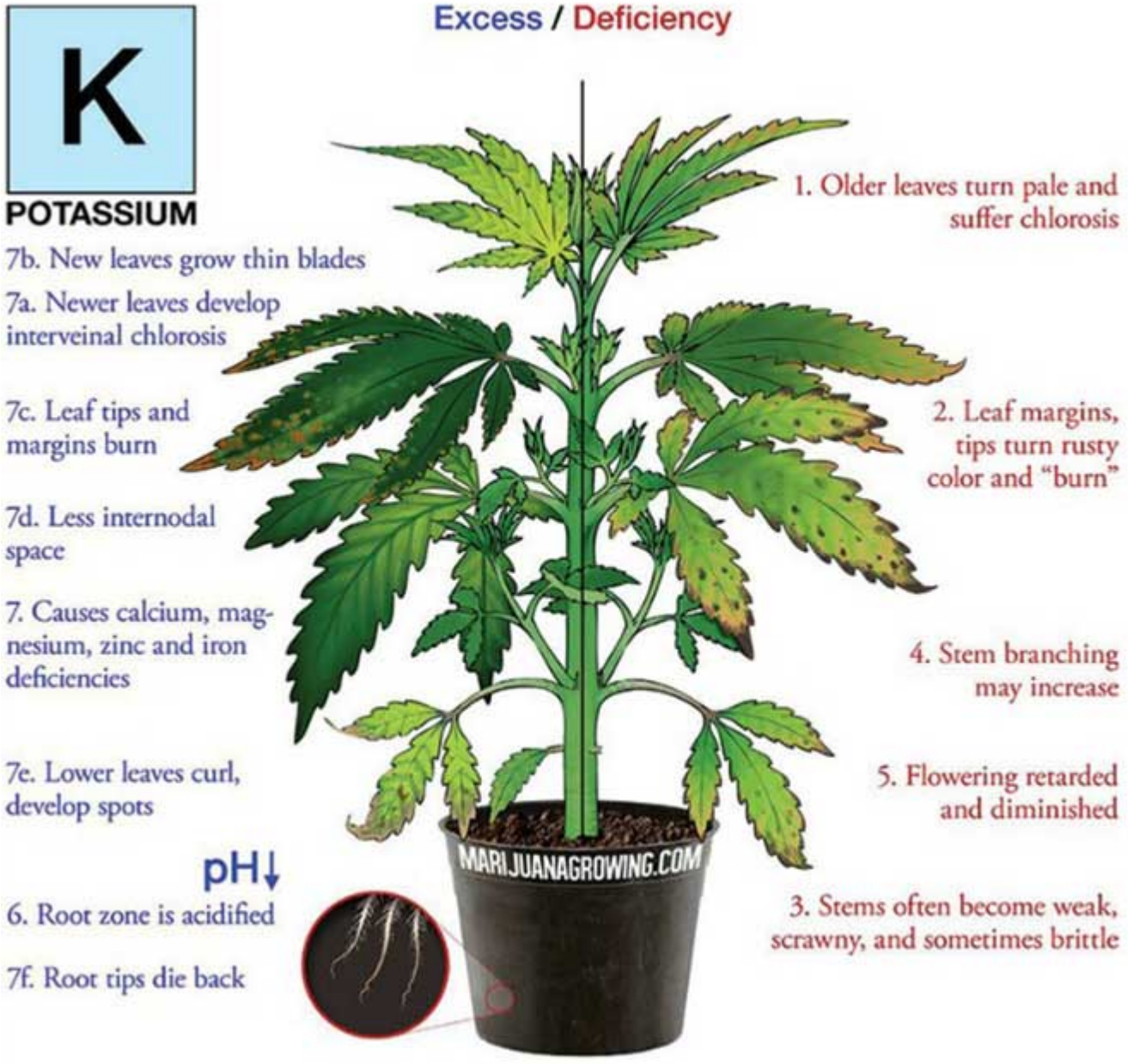
K
POTASSIUM
Excess / Deficiency
1. Older leaves turn pale and suffer chlorosis
2. Leaf margins, tips turn rusty color and "burn"
3. Stems often become weak, scrawny, and sometimes brittle
4. Stem branching may increase
5. Flowering retarded and diminished
7. Causes calcium, magnesium, zinc and iron deficiencies
7a. Newer leaves develop interveinal chlorosis
7b. New leaves grow thin blades
7c. Leaf tips and margins burn
7d. Less internodal space
7e. Lower leaves curl, develop spots
7f. Root tips die back
pH↓
6. Root zone is acidified
MARIJUANAGROWING.COM

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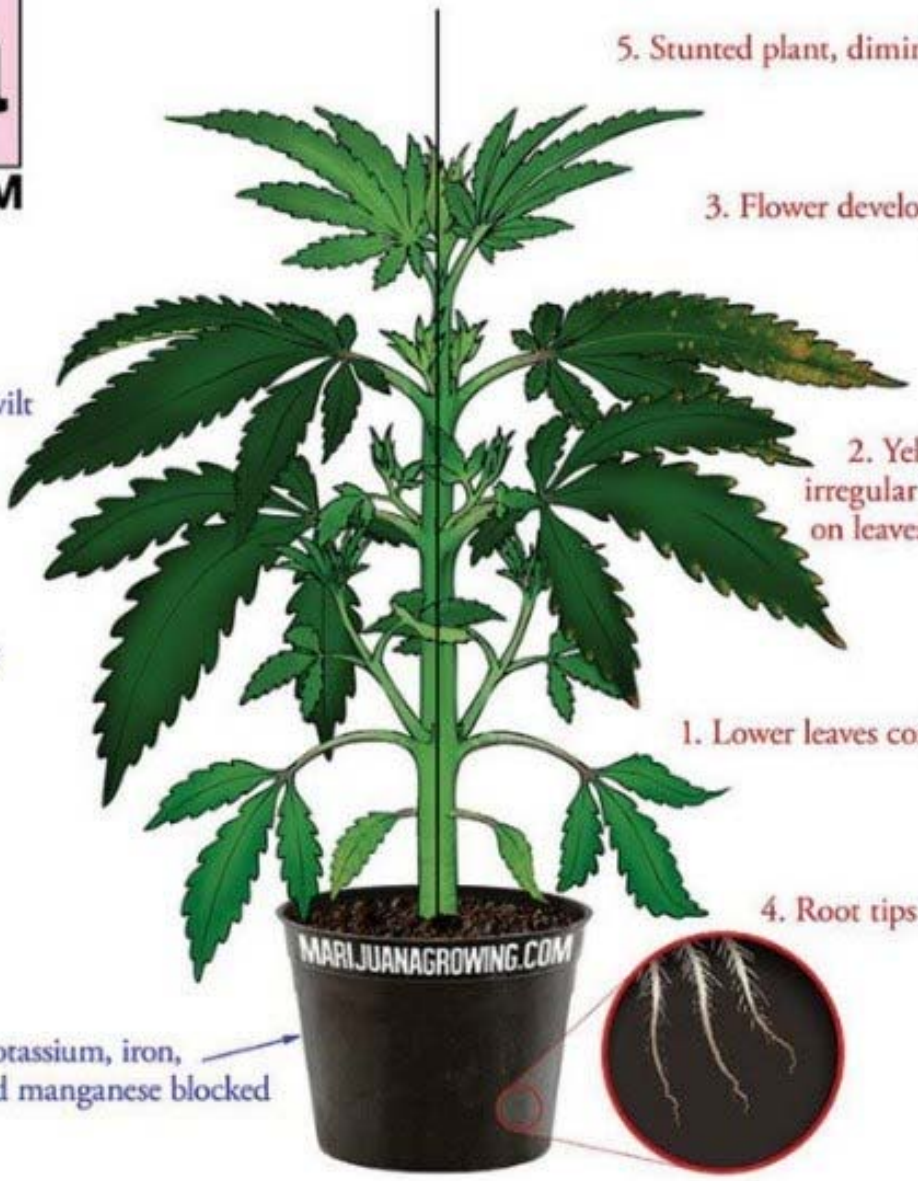
#

Ca

CALCIUM

Excess / Deficiency



5. Stunted plant, diminished harvest

3. Flower development is slow

6. Minor leaf wilt

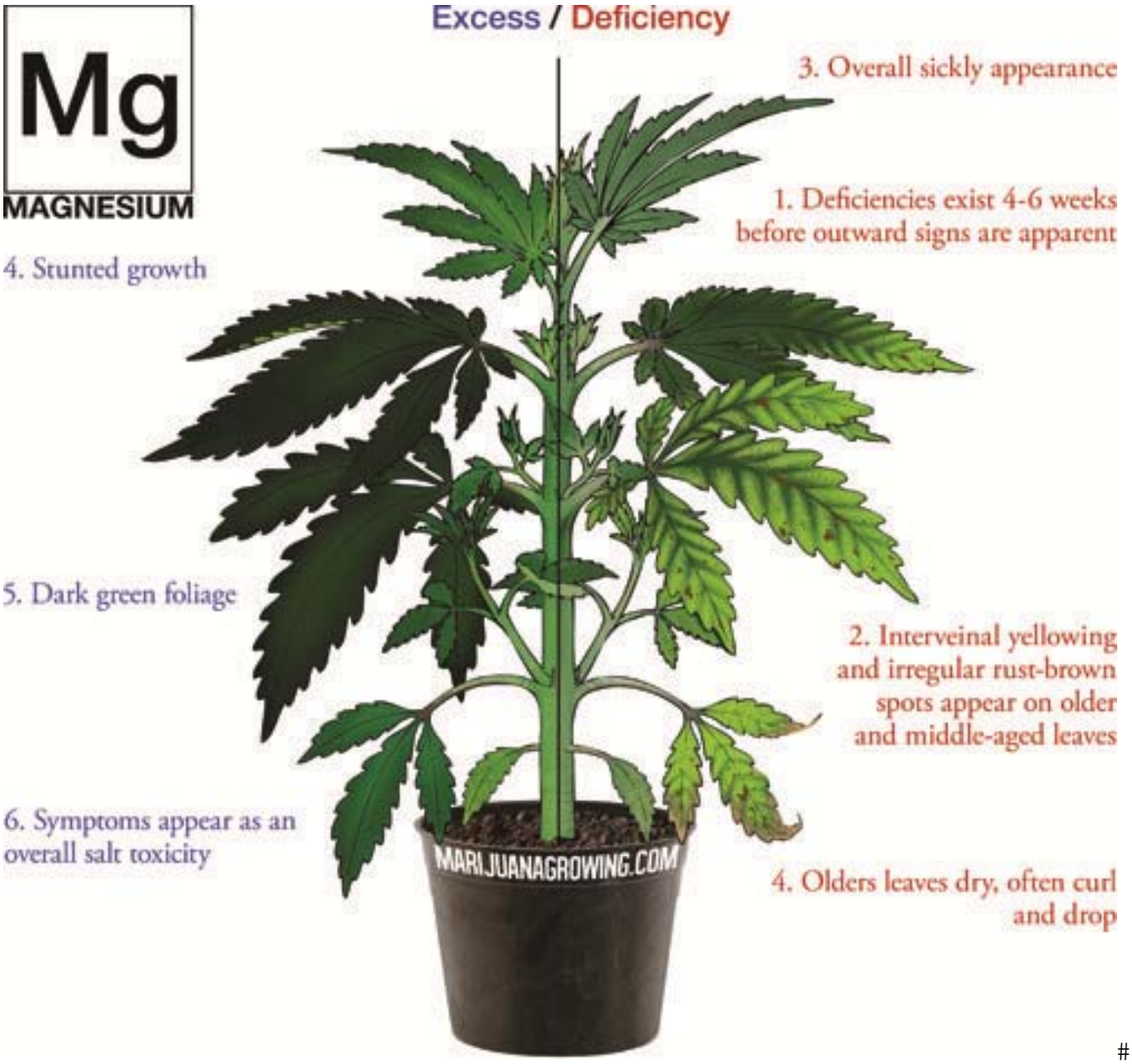
2. Yellowish-brown irregular spots develop on leaves and margins

7. Growth may be stunted

1. Lower leaves contort and curl

4. Root tips may die back

8. Uptake of potassium, iron, magnesium and manganese blocked


Mg
MAGNESIUM
Excess / Deficiency
3. Overall sickly appearance
1. Deficiencies exist 4-6 weeks before outward signs are apparent
4. Stunted growth
5. Dark green foliage
2. Interveinal yellowing and irregular rust-brown spots appear on older and middle-aged leaves
6. Symptoms appear as an overall salt toxicity
4. Olders leaves dry, often curl and drop
MARIJUANAGROWING.COM

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	TDS KCI		TDS 640	442™			
EC	Low KCI	High KCI	Eutech TDS 640	HANNA 98300 Low 442	Most common 442	High 442	**CF**
mS/cm	0.5 (x500)	0.57 (x 570)	0.64 (x 640)	0.65 (x 650)	0.70 (x 700)	0.85 (x 850)	x10
0.1	50 ppm	57 ppm	64 ppm	65 ppm	70 ppm	85 ppm	1
0.2	100 ppm	114 ppm	128 ppm	130 ppm	140 ppm	170 ppm	2
0.3	150 ppm	171 ppm	192 ppm	195 ppm	210 ppm	255 ppm	3
0.4	200 ppm	228 ppm	256 ppm	260 ppm	280 ppm	340 ppm	4
0.5	250 ppm	285 ppm	320 ppm	325 ppm	350 ppm	425 ppm	5
0.6	300 ppm	342 ppm	384 ppm	390 ppm	420 ppm	510 ppm	6
0.7	350 ppm	399 ppm	448 ppm	455 ppm	490 ppm	595 ppm	7
0.8	400 ppm	456 ppm	512 ppm	520 ppm	560 ppm	680 ppm	8
0.9	450 ppm	513 ppm	576 ppm	585 ppm	630 ppm	765 ppm	9
1.0	500 ppm	570 ppm	640 ppm	650 ppm	700 ppm	850 ppm	10
1.1	550 ppm	627 ppm	704 ppm	715 ppm	770 ppm	935 ppm	11
1.2	600 ppm	684 ppm	768 ppm	780 ppm	840 ppm	1020 ppm	12
1.3	650 ppm	741 ppm	832 ppm	845 ppm	910 ppm	1105 ppm	13
1.4	700 ppm	798 ppm	896 ppm	910 ppm	980 ppm	1190 ppm	14
1.5	750 ppm	855 ppm	960 ppm	975 ppm	1050 ppm	1275 ppm	15
1.6	800 ppm	912 ppm	1024 ppm	1040 ppm	1120 ppm	1360 ppm	16
1.7	850 ppm	969 ppm	1088 ppm	1105 ppm	1190 ppm	1445 ppm	17
1.8	900 ppm	1026 ppm	1152 ppm	1170 ppm	1260 ppm	1530 ppm	18
1.9	950 ppm	1083 ppm	1216 ppm	1235 ppm	1330 ppm	1615 ppm	19
2.0	1000 ppm	1140 ppm	1280 ppm	1300 ppm	1400 ppm	1700 ppm	20
2.1	1050 ppm	1197 ppm	1334 ppm	1365 ppm	1470 ppm	1785 ppm	21
2.2	1100 ppm	1254 ppm	1408 ppm	1430 ppm	1540 ppm	1870 ppm	22
2.3	1150 ppm	1311 ppm	1472 ppm	1495 ppm	1610 ppm	1955 ppm	23
2.4	1200 ppm	1368 ppm	1536 ppm	1560 ppm	1680 ppm	2040 ppm	24
2.5	1250 ppm	1425 ppm	1600 ppm	1625 ppm	1750 ppm	2125 ppm	25
2.6	1300 ppm	1482 ppm	1664 ppm	1690 ppm	1820 ppm	2210 ppm	26
2.7	1350 ppm	1539 ppm	1728 ppm	1755 ppm	1890 ppm	2295 ppm	27
2.8	1400 ppm	1596 ppm	1792 ppm	1820 ppm	1960 ppm	2380 ppm	28
2.9	1450 ppm	1653 ppm	1856 ppm	1885 ppm	2030 ppm	2465 ppm	29
3.0	1500 ppm	1710 ppm	1920 ppm	1950 ppm	2100 ppm	2550 ppm	30
3.1	1550 ppm	1767 ppm	1984 ppm	2015 ppm	2170 ppm	2635 ppm	31
3.2	1600 ppm	1824 ppm	2048 ppm	2080 ppm	2240 ppm	2720 ppm	32

#

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Week	ppm range	EC Range	Life cycle stage
Week 1	400–600	.8-1.2	Early vegetative
Week 2	600–1000	1.2-2	Late vegetative
Week 3	800–1200	1.6-2.4	Transition
Week 4	800–1200	1.6-2.4	Early flowering
Week 5	800–1200	1.6-2.4	Early flowering
Week 6	1000–1300	2-2.6	Mid flowering
Week 7	1000–1300	2-2.6	Mid flowering
Week 8	1000–1300	2-2.6	Late flowering
Week 9	1000–1300	2-2.6	Late flowering
Week 10	1000–1300	2-2.6	Ripening
	0–400	0-.8	Flush

RELATIVE HUMIDITY VS. TEMPERATURE AND VAPOR PRESSURE DIFFERENCE (VPD) CHART

VAPOR PRESSURE DIFFERENCE IN KILOPASCAL (kPa) UNITS

(For Millibar Units (mbar), Multiply Values Below by 10)

°F	0.75	0.80	0.85	0.90	0.95	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	°F
	WEEKS 1 to 2							WEEKS 3 to 4					Weeks 5 to 9						
	RELATIVE HUMIDITY																		
86	83%	82%	80%	79%	78%	77%	75%	74%	73%	72%	72%	69%	68%	67%	66%	65%	63%	62%	86
85	82%	81%	79%	78%	77%	76%	74%	73%	72%	71%	70%	68%	67%	66%	65%	64%	62%	61%	85
84	81%	80%	79%	77%	76%	75%	74%	72%	71%	70%	69%	67%	66%	65%	64%	62%	61%	60%	84
83	81%	79%	78%	77%	75%	74%	73%	71%	70%	69%	68%	66%	65%	64%	62%	61%	60%	59%	83
82	80%	79%	77%	76%	75%	73%	72%	71%	69%	68%	67%	65%	64%	63%	61%	60%	58%	57%	82
81	79%	78%	76%	75%	74%	72%	71%	70%	68%	67%	65%	64%	63%	61%	60%	58%	57%	56%	81
80	79%	77%	76%	74%	73%	71%	70%	69%	67%	66%	64%	63%	61%	60%	59%	57%	56%	54%	80
79	78%	76%	75%	73%	72%	70%	69%	68%	66%	65%	63%	62%	60%	59%	57%	56%	54%	53%	79
78	77%	76%	74%	73%	71%	69%	68%	66%	65%	63%	62%	60%	59%	57%	56%	54%	53%	51%	78
77	76%	75%	73%	72%	70%	68%	67%	65%	64%	62%	61%	59%	57%	56%	54%	53%	51%	50%	77
76	76%	74%	72%	71%	69%	67%	66%	64%	62%	61%	59%	58%	56%	54%	53%	51%	49%	48%	76
75	75%	73%	71%	70%	68%	66%	65%	63%	61%	60%	58%	56%	54%	53%	51%	49%	48%	46%	75
74	74%	72%	70%	69%	67%	65%	63%	62%	60%	58%	56%	55%	53%	51%	49%	48%	46%	44%	74
73	73%	71%	69%	68%	66%	64%	62%	60%	59%	57%	55%	53%	51%	50%	48%	46%	44%	42%	73
72	72%	70%	68%	66%	65%	63%	61%	59%	57%	55%	53%	52%	50%	48%	46%	44%	42%	40%	72
71	71%	69%	67%	65%	63%	61%	59%	58%	56%	54%	52%	50%	48%	46%	44%	42%	40%	38%	71
70	70%	68%	66%	64%	62%	60%	58%	56%	54%	52%	50%	48%	46%	44%	42%	40%	38%	36%	70
69	69%	67%	65%	63%	61%	59%	57%	55%	52%	50%	48%	46%	44%	42%	40%	38%	36%	34%	69
68	68%	66%	64%	62%	59%	57%	55%	53%	51%	49%	47%	44%	42%	40%	38%	36%	34%	32%	68
67	67%	65%	62%	60%	58%	56%	54%	51%	49%	47%	45%	42%	40%	38%	36%	34%	31%	29%	67
66	66%	63%	61%	59%	56%	54%	52%	50%	47%	45%	43%	40%	38%	36%	34%	31%	29%	27%	66
65	64%	62%	60%	57%	55%	53%	50%	48%	45%	43%	41%	38%	36%	34%	31%	29%	26%	24%	65
64						51%	48%	46%	44%	41%	39%	36%	34%	31%	29%	26%	24%	21%	64
63						49%	47%	44%	41%	39%	36%	34%	31%	29%	26%	24%	21%	19%	63
62						47%	45%	42%	39%	37%	34%	31%	29%	26%	24%	21%	18%	16%	62
61						45%	43%	40%	37%	34%	32%	29%	26%	24%	21%	18%	15%	13%	61
60						43%	41%	38%	35%	32%	29%	26%	24%	21%	18%	15%	12%	9%	60

MSP® TECHNOLOGY
Indoor Agricultural Division

Growth stage values complements of HIGHTIMES Magazine, Skye Hanke and Harry Resin, March 09, 2017.

#

Clear
Not enough potency, do not harvest yet

Half Clear / Half Cloudy
Harvesting when you have a 50/50 clear-cloudy mix will produce a more energetic or "heady" high

Cloudy - Highest THC levels
Harvesting when most trichomes are cloudy or milky will produce the greatest levels of THC and a euphoric high

Half Amber / Half Cloudy
Harvesting when you have a 50/50 ambercloudy mix will give you a combination of head & body high

Amber
Harvesting when most trichomes are amber will produce a more body, cough-lock high

#

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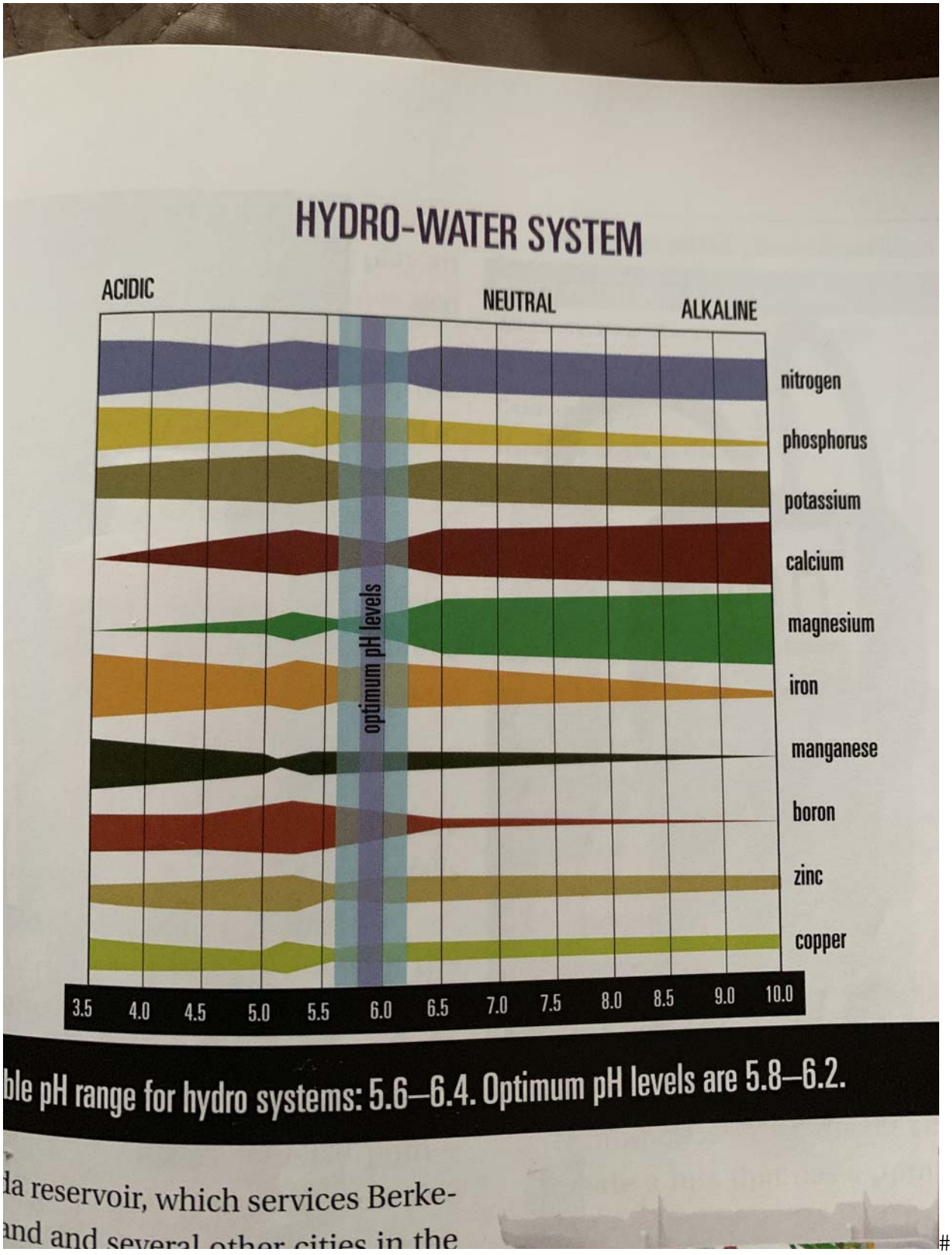

ble pH range for hydro systems: 5.6–6.4. Optimum pH levels are 5.8–6.2.

da reservoir, which services Berke-
and and several other cities in the

WATER LEVEL	EC	PH	SOLUTION
STATIC	STATIC	STATIC	Plant not feeding/drinking, change EC, check meters. Usually, lowering the EC a little should get the plant feeding again
STATIC	STATIC	RISING	Ph buffers probably raising ph. This is usual. Having a static water level is not though, so again, a slight reduction in EC or a res change should resolve this.
STATIC	STATIC	FALLING	Usual cause of this is when media has been rinsed at a lower ph than you require. The other possibility is that too much CO2 has been pumped into the water. See Note 1. Change your res and look at the volume of air pumped plus look at your air source.
STATIC	RISING	STATIC	Plant is leeching nutrition, raise EC. Note 2
STATIC	RISING	RISING	Plant leeching nutrition, Raise EC. An unusual state. The rising ph is probably caused by what nutrient leeching back. If these are alkaline, it will lead to the rise in ph. Could also be ph buffers.
STATIC	RISING	FALLING	As above but be aware of the acid rain effect mentioned in note 1. Res change, plus increase in EC
STATIC	FALLING	STATIC	Plant eating but not drinking. Not ideal. Lower EC or res change
STATIC	FALLING	RISING	As above but rising ph is a better sign. Lower EC slightly or res change.
STATIC	FALLING	FALLING	Falling ph along with falling EC but no drop in water level suggests a res change. Could also be an acid rain effect as per note 1. Depending on other symptoms, lowering EC after res change.
FALLING	STATIC	STATIC	Perfect conditions. EC and ph are at the correct level.
FALLING	STATIC	RISING	Normal state most people encounter. Nothing to worry about, carry on doing what you are doing unless other plant symptoms.
FALLING	STATIC	FALLING	Res change plus a change of EC. Lower EC if over 1.4, raise EC if lower than 1.0
FALLING	RISING	STATIC	Plant is drinking more than eating, lower EC.
FALLING	RISING	RISING	Plant is drinking more than eating, lower EC
FALLING	RISING	FALLING	Plant is drinking more than eating, lower EC. Also, res change due to possible acid rain problem.
FALLING	FALLING	STATIC	Hungry plant, raise EC. Very good situation to be in. Nute buffers are working and plant is taking a balance of nutrients.
FALLING	FALLING	RISING	Almost as above, usually considered almost perfect, raise EC slightly.
FALLING	FALLING	FALLING	Res change. Potential acid rain issue but plant is still eating & drinking. Raise EC on new res.

#

Lux to PPFD (μmol m^{-2} s^{-1})

Light Source	Calibration Factor
Sunlight	0.0185
Cool White Fluorescent Lamps	0.0135
Mogul Base High Pressure Sodium Lamps	0.0122
Dual-Ended High Pressure Sodium (DEHPS): ePapillion 1000 W	0.0130
Metal Halide	0.0141
Ceramic Metal Halide (CMH942): standard 4200 K color temperature	0.0154

Lux to PPFD (µmol m^{-2} s^{-1})

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Mogul Base High Pressure Sodium Lamps	0.0122
Dual-Ended High Pressure Sodium (DEHPS): ePapillion 1000 W	0.0130
Metal Halide	0.0141
Ceramic Metal Halide (CMH942): standard 4200 K color temperature	0.0154
Ceramic Metal Halide (CMH930-Agro): 3100 K color temperature, spectrum shifted to red wavelengths	0.0170

Multiply the Lux by the conversion factor to get PPFD. For example, full sunlight is 108,000 Lux or 2000 µmol m^{-2} s^{-1} (108,000 $*$ 0.0185).

#

Cool White Fluorescent Lamps	0.0135
Mogul Base High Pressure Sodium Lamps	0.0122
Dual-Ended High Pressure Sodium (DEHPS): ePapillion 1000 W	0.0130
Metal Halide	0.0141
Ceramic Metal Halide (CMH942): standard 4200 K color temperature	0.0154
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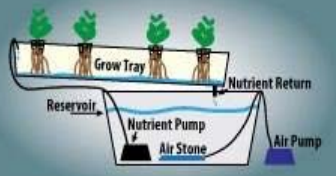
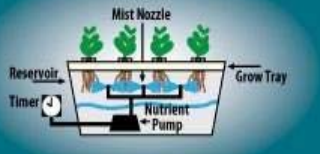
Multiply the Lux by the conversion factor to get PPFD. For example, full sunlight is 108,000 Lux or 2000 µmol m^{-2} s^{-1} (108,000 ∗ 0.0185).	

Simple

Hydroponic Systems	Pros	Cons
Wick Systems: 	• Affordable • Low maintenance • No nutrient pump	• Limited oxygen access • Slower growth rate • No nutrient recirculation • Prone to algae growth
Deep Water Culture: 	• Cheapest of the active systems • Simple set up • No nutrient pump • Reliable	• Risk of root rot if not cleaned regularly • Slower growth rate • Must top water until roots are long enough to fall into the nutrition solution • Must frequently refill reservoir
Ebb & Flow: 	• Affordable • Low maintenance • Excess nutrient solution recirculates	• Prone to algae growth • Technical malfunctions could result in crop loss
Drip Method: 	• Excess nutrient solution recirculates • Sufficient oxygen flow	• Prone to clogging • Prone to algae growth • Requires regular cleaning
Nutrient-Film Technique: 	• Excess nutrient solution recirculates • Plentiful oxygen flow • Space efficient	• Prone to clogging • Technical malfunctions could result in crop loss
Aeroponics: 	• Maximum nutrient absorption • Excess nutrient solution recirculates • Plentiful oxygen flow • Space efficient	• Prone to clogging • Technical malfunctions could result in crop loss • High-tech • Time intensive • Poorly suited to thick organic-based nutrients & additives

Advanced

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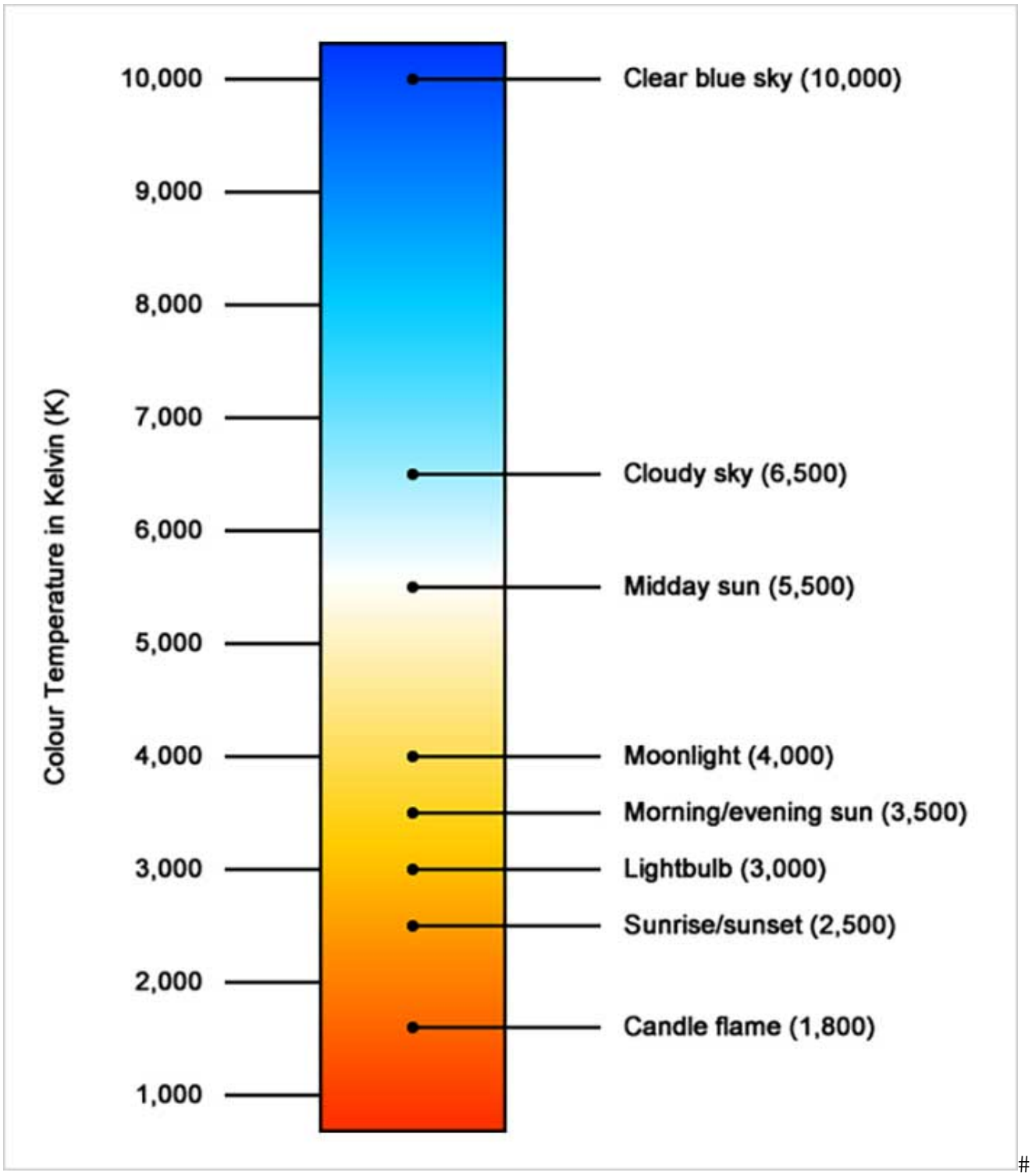
Colour Temperature in Kelvin (K)
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
Clear blue sky (10,000)
Cloudy sky (6,500)
Midday sun (5,500)
Moonlight (4,000)
Morning/evening sun (3,500)
Lightbulb (3,000)
Sunrise/sunset (2,500)
Candle flame (1,800)
#

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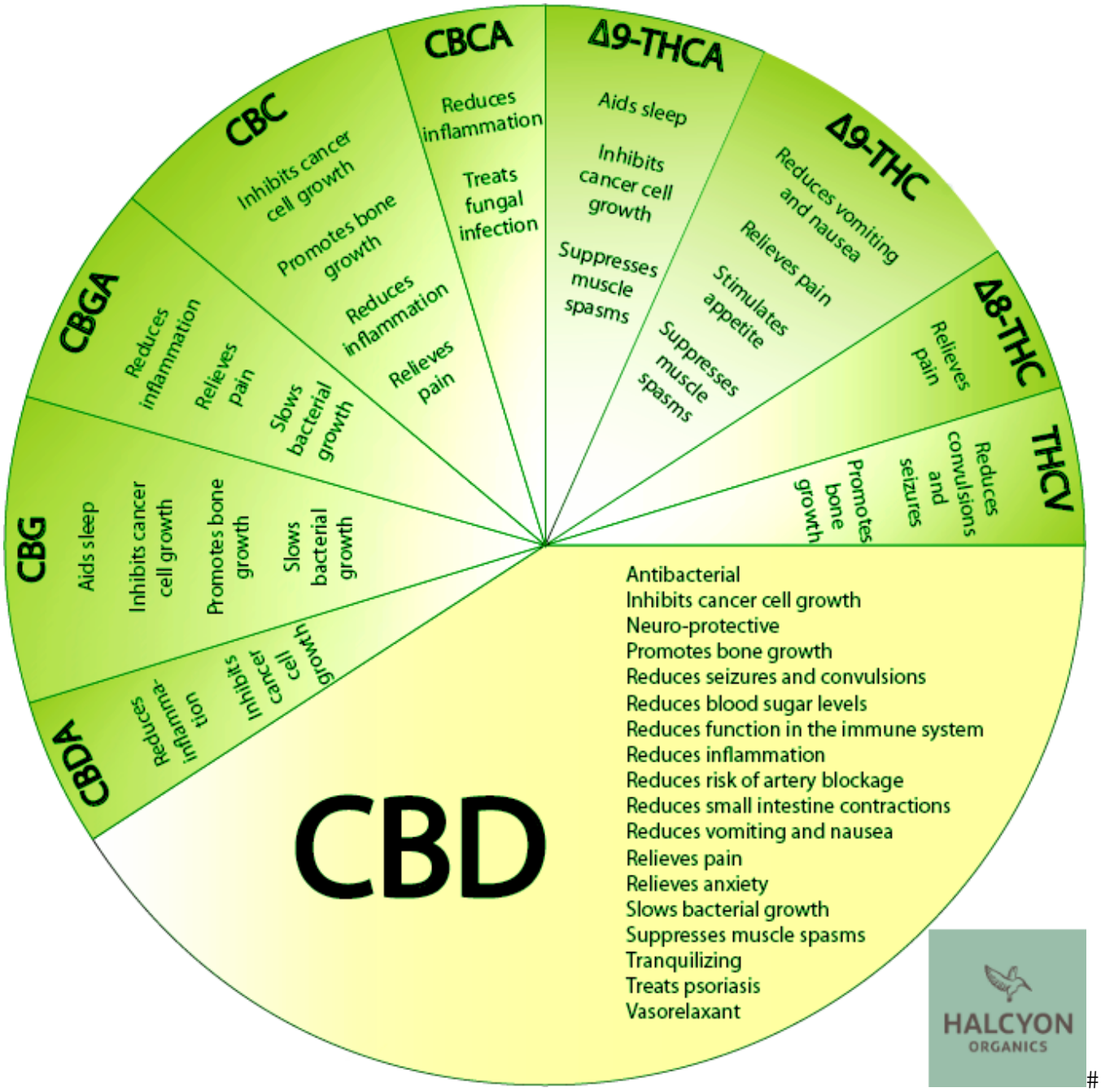
CBCA
Reduces inflammation
Treats fungal infection
Δ9-THCA
Aids sleep
Inhibits cancer cell growth
Suppresses muscle spasms
Δ9-THC
Reduces vomiting and nausea
Relieves pain
Stimulates appetite
Suppresses muscle spasms
Δ8-THC
Relieves pain
THCV
Reduces convulsions and seizures
Promotes bone growth
CBC
Inhibits cancer cell growth
Promotes bone growth
Reduces inflammation
Relieves pain
CBGA
Reduces inflammation
Relieves pain
Slows bacterial growth
CBG
Aids sleep
Inhibits cancer cell growth
Promotes bone growth
Slows bacterial growth
CBDA
Reduces inflamma-tion
Inhibits cancer cell growth
CBD
Antibacterial
Inhibits cancer cell growth
Neuro-protective
Promotes bone growth
Reduces seizures and convulsions
Reduces blood sugar levels
Reduces function in the immune system
Reduces inflammation
Reduces risk of artery blockage
Reduces small intestine contractions
Reduces vomiting and nausea
Relieves pain
Relieves anxiety
Slows bacterial growth
Suppresses muscle spasms
Tranquilizing
Treats psoriasis
Vasorelaxant
HALCYON
ORGANICS
#

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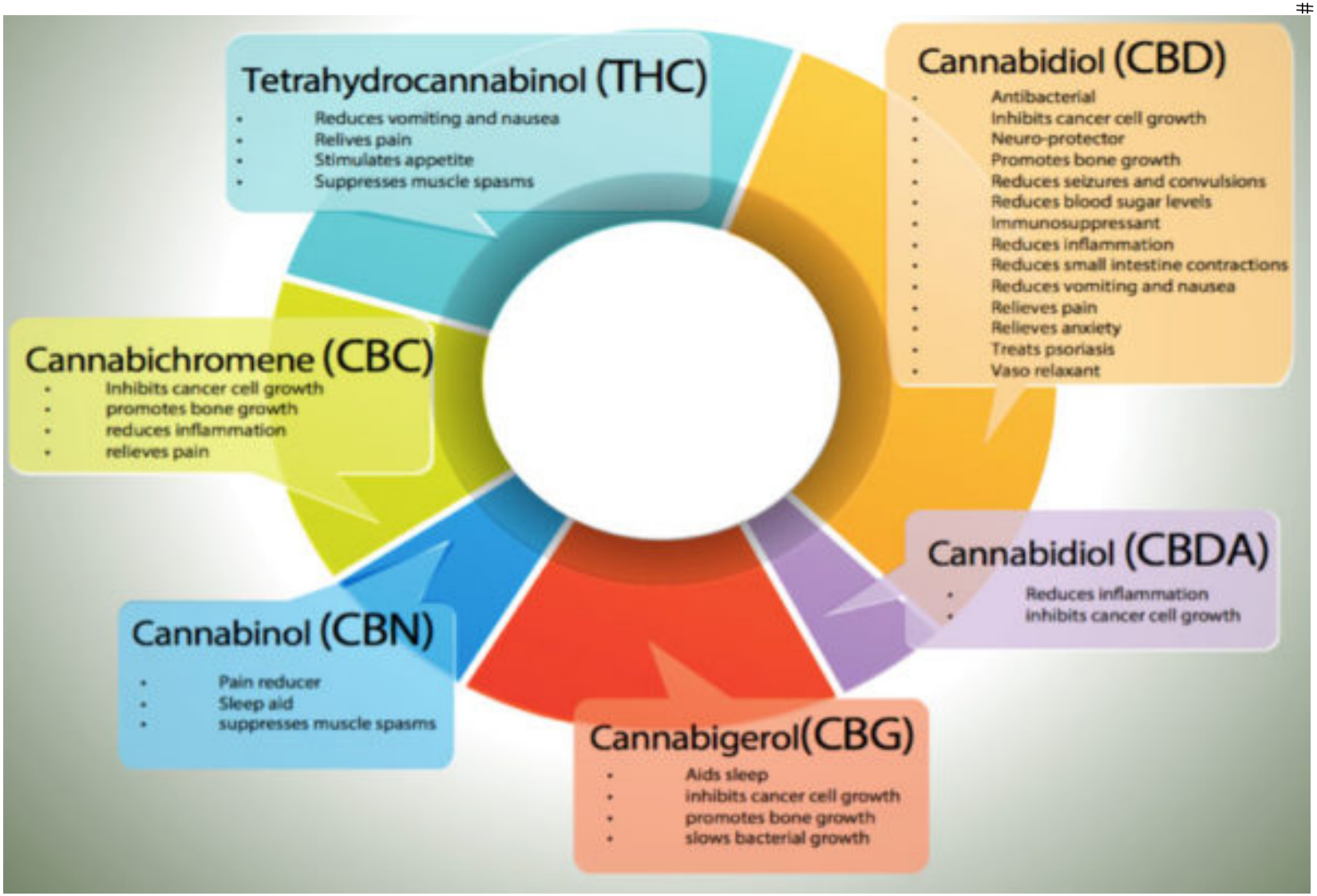
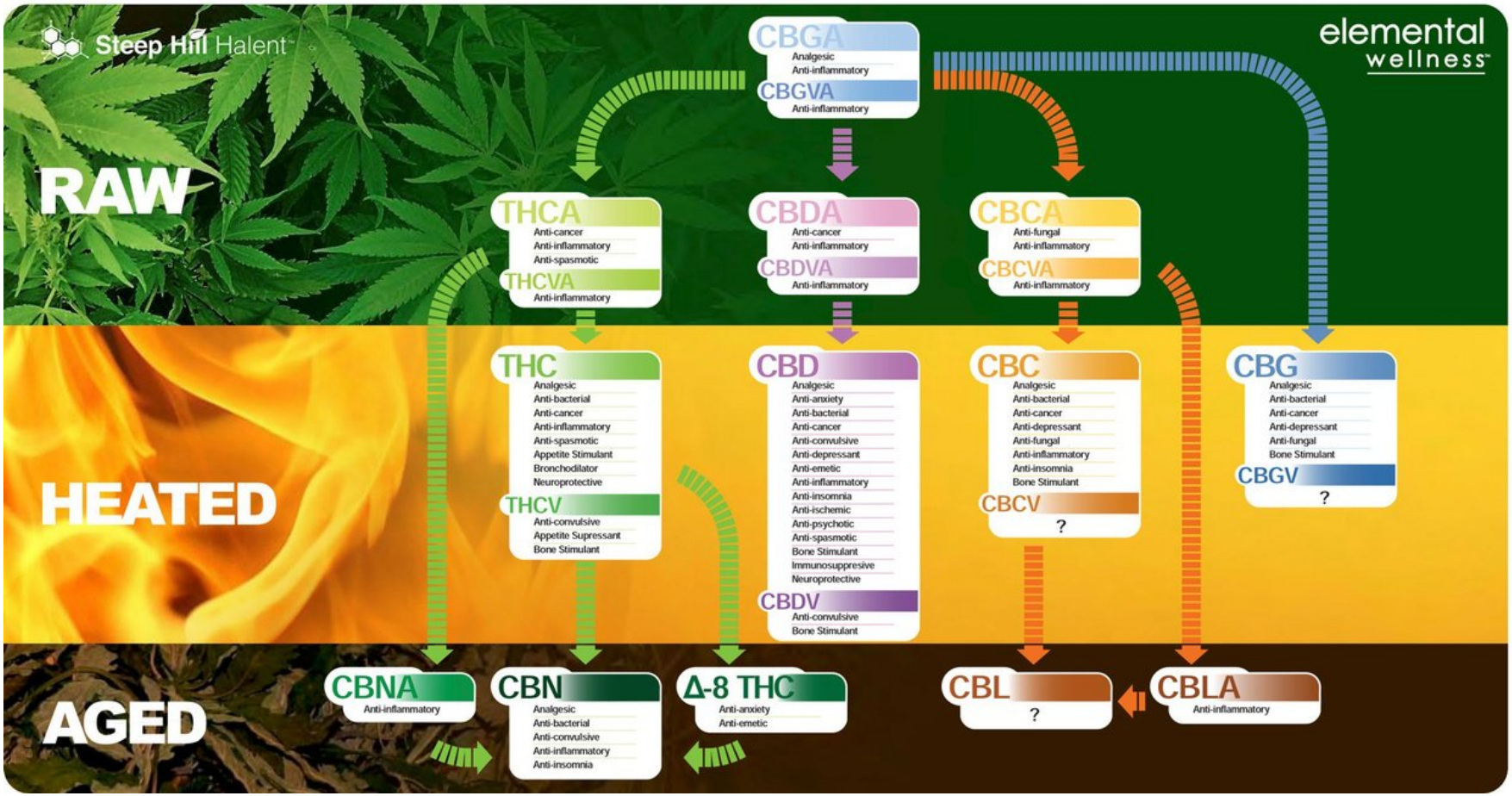
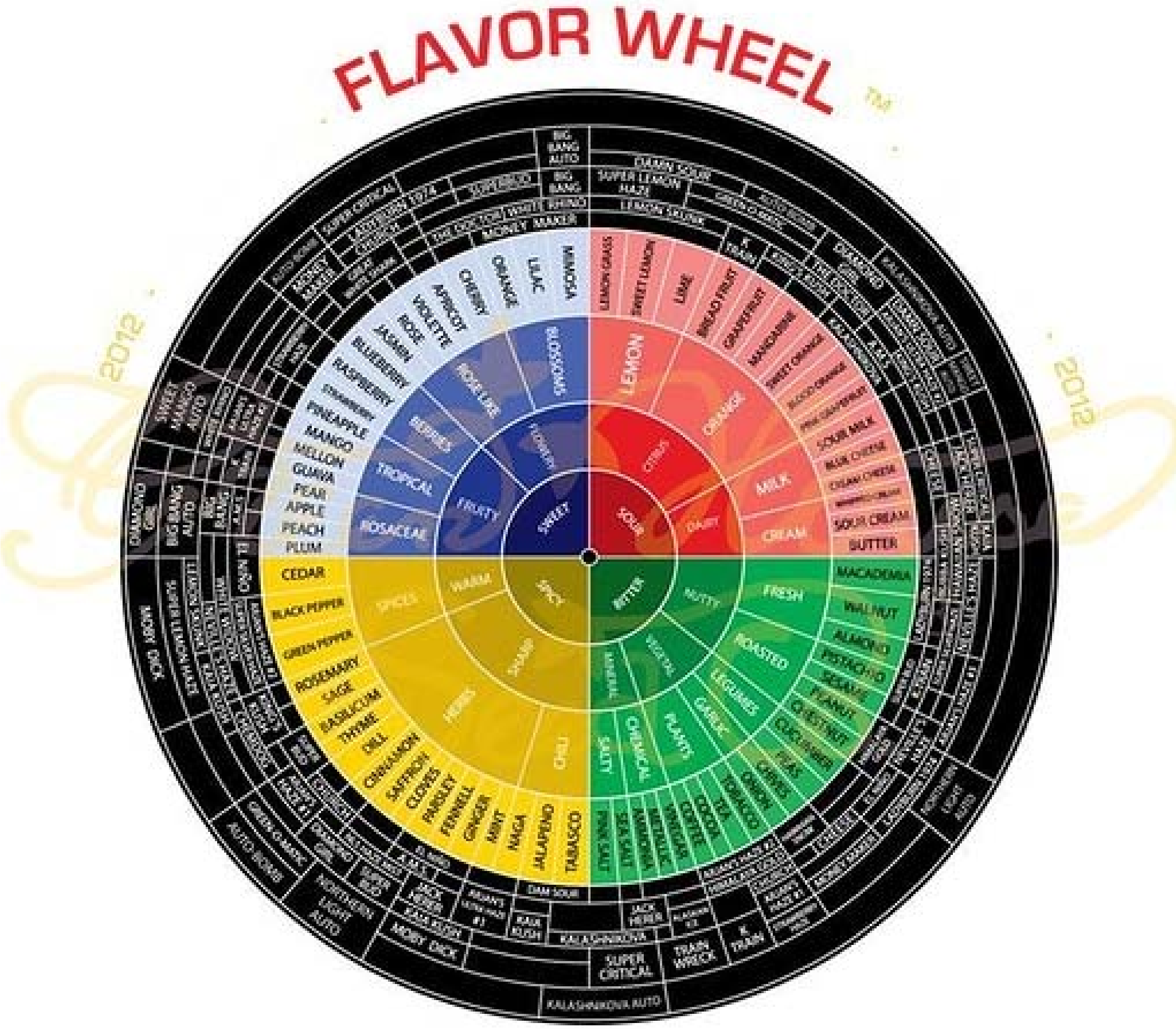

Tetrahydrocannabinol (THC)
Reduces vomiting and nausea
Relives pain
Stimulates appetite
Suppresses muscle spasms
Cannabidiol (CBD)
Antibacterial
Inhibits cancer cell growth
Neuro-protector
Promotes bone growth
Reduces seizures and convulsions
Reduces blood sugar levels
Immunosuppressant
Reduces inflammation
Reduces small intestine contractions
Reduces vomiting and nausea
Relieves pain
Relieves anxiety
Treats psoriasis
Vaso relaxant
Cannabichromene (CBC)
Inhibits cancer cell growth
promotes bone growth
reduces inflammation
relieves pain
Cannabidiol (CBDA)
Reduces inflammation
inhibits cancer cell growth
Cannabinol (CBN)
Pain reducer
Sleep aid
suppresses muscle spasms
Cannabigerol(CBG)
Aids sleep
inhibits cancer cell growth
promotes bone growth
slows bacterial growth

UNDERSTANDING MEDICAL CANNABIS

Cannabinoids and Their Therapeutic Effects




THE PCC 7
GROUP
EFFECTS
MENTAL
PHYSICAL
TOP STRAINS
ACTIVE TERPENES
FLAVOR
ENERGY
MEDICAL USES*
7
Clear Sativas
sociable clear
energetic uplifting
Durban Lambsbread Jack Herer
Terpinoline dominant, rich in Ocimene and Myrcene
Spicy
Transcendence
Anti-proliferative, antioxidant, analgesic, anti-emetic
6
Heavy Sativas
psychoactive euphoric
active energetic
Cherry AK Sour Diesel Trainwreck
Myrcene dominant, rich in Beta-Caryophyllene and Ocimene
Sweet
Insight Wisdom
Analgesic, appetite stimulant, anti-inflammatory, anti-spasmodic
5
Clear Hybrids
alert clear
awake active
White Widow Blue Dream Super Silver Haze
Myrcene dominant, rich in Pinene and Beta-Caryophyllene
Pine
Communication Creation
Analgesic, anti-inflammatory, anti-proliferative, bronchodilator
4
Even Hybrids
creative sociable
calm active
S.A.G.E. Blue Bubble XJ-13
A balance of Limonene, Beta-Caryophyllene and Pinene
Floral
Compassion Love
Antidepressant, analgesic, anxiolytic, anti-inflammatory
3
Heavy Hybrids
psychoactive creative
calm sedative
OG Kush Gorilla Glue #4 Girl Scout Cookies
Limonene dominant, rich in Beta-Caryophyllene and Myrcene
Skunk
Power
Antidepressant, anxiolytic, gastro-oesophageal reflux, appetite stimulant
2
Clear Indicas
awake clear
relaxing calm
Bubba Kush Northern Lights Master Kush
Beta-Caryophyllene dominant, rich in Limonene and Myrcene
Earthy
Life Energy
Anti-inflammatory, anti-proliferative, neuroprotective, anxiolytic
1
Heavy Indicas
heavy psychoactive
sedative relaxing
Midnight Grand Daddy Purple Afghani Goo
Myrcene dominant, rich in Beta-Caryophyllene and Linalool
Fruity
Grounding
Analgesic, anti-inflammatory, anti-insomnia, antispasmodic
PCC PATIENT'S CARE COLLECTIVE
510-540-7878 • 2590 Telegraph Ave, Berkeley, CA 94704 • PatientsCareCollective.com
*These statements have not been evaluated by the Food and Drug Administration. This information is not intended to diagnose, treat, cure or prevent any disease. Consult your physician before using cannabis.


FLAVOR WHEEL
TM
2012
2012
SWEET
SOUR
SPICY
BITTER
FRUITY
FLORAL
CITRUS
DAIRY
WARM
SHARP
NUTTY
VEGETAL
MINERAL
BLOSSOMS
ROSE LIKE
BERRIES
TROPICAL
ROSACEAE
LEMON
ORANGE
MILK
CREAM
SPICES
HERBS
CHILI
FRESH
ROASTED
LEGUMES
GARLIC
PLANTS
CHEMICAL
SALTY
MIMOSA
LILAC
ORANGE
CHERRY
APRICOT
VIOLETTE
ROSE
JASMIN
BLUEBERRY
RASPBERRY
STRAWBERRY
PINEAPPLE
MANGO
MELLON
GUAVA
PEAR
APPLE
PEACH
PLUM
LEMON GRASS
SWEET LEMON
LIME
BREAD FRUIT
GRAPEFRUIT
MANDARINE
SWEET ORANGE
BLOOD ORANGE
PINK GRAPEFRUIT
SOUR MILK
BLUE CHEESE
CREAM CHEESE
SOUR CREAM
BUTTER
CEDAR
BLACK PEPPER
GREEN PEPPER
ROSEMARY
SAGE
BASILICUM
THYME
DILL
CINNAMON
SAFFRON
CLOVES
PARSLEY
FENNELL
GINGER
MINT
NAGA
JALAPENO
TABASCO
MACADEMIA
WALNUT
ALMOND
PISTACHIO
SESAME
PEANUT
CHESTNUT
CUCUMBER
PEAS
CHIVES
ONION
TOBACCO
TEA
COCOA
COFFEE
WHISKEY
METALLIC
AMMONIA
SEA SALT
PINK SALT
BIG BANG AUTO
BIG BANG
DAMN SOUR
SUPER LEMON HAZE
LEMON SKUNK
SUPERBUD
SUPER CRITICAL
WHITE RHINO
MONEY MAKER
SWEET MANGO AUTO
DIAMOND GIRL
BIG BANG AUTO
MOBY DICK
AUTO BOMB
NORTHERN LIGHT AUTO
MOBY DICK
JACK HERER
KALA KUSH
KALASHNIKOVA
DAM SOUR
SUPER CRITICAL
TRAIN WRECK
K TRAIN
JACK HERER
KALASHNIKOVA AUTO

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#


Terpenoid Education
How do Terpenoids affect the body?
Medicinal efects one can expect to see from medicine high in these terpenoids.
α-Pinene
• Sleep aid
• Anti-anxiety
• Sedative
• Bronchodilator
• Pine aroma
• Anticonvulsant
• Stress reliever
• Anti-epileptic
• Anti-convulsant
• Anti-inflammatory
Linalool
• Sleep aid
• Anti-anxiety
• Sedative
• Anti-bacterial
• Pain reliever
• Floral aroma
• Anticonvulsant
• Stress reliever
• Anti-epileptic
• Anti-convulsant
• Analgesic
Myrcene
• Anti-tumor
• Anti-fungal
• Anti-cancer
• Anti-spasm
• Sedative
• Aids insomnia
• Anti-inflammatory
• Anti-bacterial
• Muscle relaxant
• Allows THC to takes effect quickly
• Levels > 5% result in "couch lock effect"
• Musky aroma
β-Caryophyllene
• Anti-tumor
• Anti-fungal
• Anti-septic
• Anti-inflammatory
• Anti-bacterial
• Muscle relaxant
• Rich spicy aroma
Carophyllene Oxide
• Anti-fungal
• Pain Reliever
• Spicy aroma
• Anti-ischemic
• Anti-inflammatory
α-Humulene
• Anti-tumor
• Anti-bacterial
• Hoppy aroma
• Anti-inflammatory
• Suppresses appetite
Limonene
• Anti-anxiety
• Anti-depression
• Anti-tumor
• Antiseptic
• Anti-stress
• Immunostimulant
• Orange aroma
• Produces apoptosis of breast cancer cells
• Antimicrobial
• Used clinically to dissolve gallstones
• Relieves heartburn and gastrointestinal reflux
• Increases blood flow from the heart
Terpinolene
• Anti-bacterial
• Anti-fungal
• Smokey woody aroma
• Anti-insomnia
• Antiseptic
az med
t·e·s·t·i·n·g
azmedtest.com
#

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CANNABIS CANNABINOID & TERPENE DISEASE TARGETS

ANALGESIC	D9-THC CBD CBC CBGA D8-THC THCA-C4 THCVA CBLA CBNA LINALOOL MYRCENE	Pain
ANORETIC	THCV	Weight Loss
ANTIBACTERIAL	CBD CBGA CBG	Inhibits Bacteria
ANTI-DIABETIC	CBD	Lowers Blood Sugar
ANTIDEPRESSANT	LIMONENE	Reduces Depression
ANTI-EMETIC	D9-THC CBD	Reduces Nausea/Vomiting
ANTI-EPILEPTIC	CBD LINALOOL THCV	Inhibits Seizures
ANITFUNGAL	LIMONENE CBCA CARYOPHYLLENE OXIDE	Inhibits Fungal Growth
ANTI-INFLAMMATORY	CBD CBC CBGA CBCA CBDA MYRCENE ALPHA-PINENE TRANS-CARYOPHYLLENE	Reduces Inflammation
ANTI-INSOMNIA	CBG THCA	Aids Sleep
ANTI-ISCHEMIC	CBD	Reduces Artery Risk Blockage
ANTIPROLIFERATIVE	CBD CBC LIMONENE CBG CBDA THCA	Inhibits Cancer Growth
ANTIPSIORATIC	CBD	Inhibits Psoriasis
ANTIPSYCHOTIC	CBD LINALOOL MYRCENE	Tranquilizing
ANTISPASMODIC	D9-THC CBD MYRCENE THCA	Suppresses Muscle Spasms
ANXIOLITIC	CBD LIMONENE LINALOOL	Relieves Anxiety
APPETITE STIMULANT	D9-THC	Increases Appetite
BONE STIMULANT	CBC THCV CBG CBD	Stimulates Bone Growth
GASTRO-OESOPHAGEAL REFLUX	LIMONENE	Reduces Acid Reflux
IMMUNOSTIMULANT	LIMONENE	Immune Response Stimulant
IMMUNOSUPPRESSIVE	CBD	Immune Response Reduction
INTESTINAL ANTI-PROKINETIC	CBD	Reduces Small Intestine Contractions
NEUROPROTECTANT	CBD	Slows Nervous System Degeneration
VASORELAXANT	CBD	Reduces Vascular Tension

This is provided for informational purposes only and is not to be considered medical advice. Please consult your health care provider for medical advice.

Leafly

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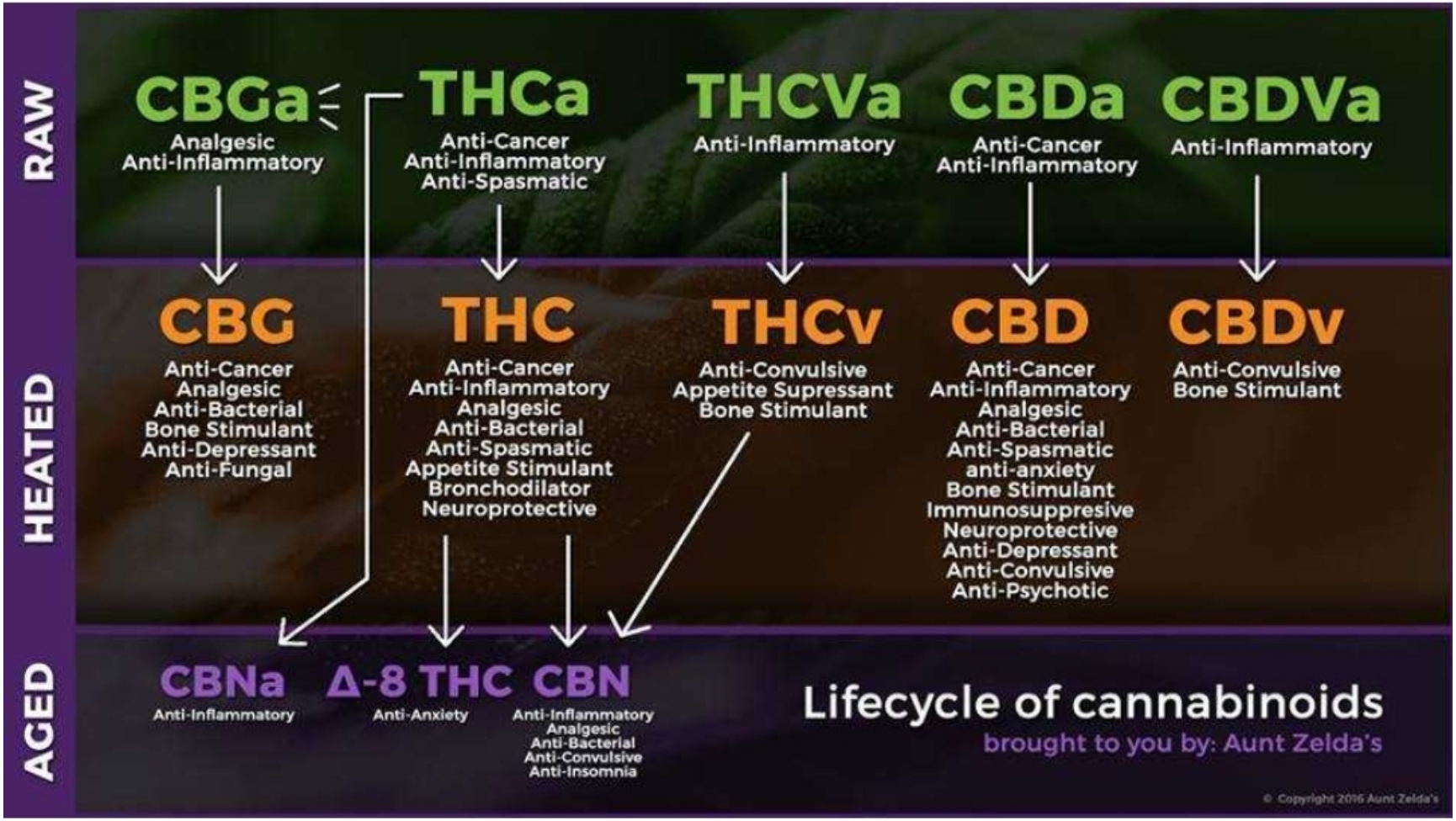
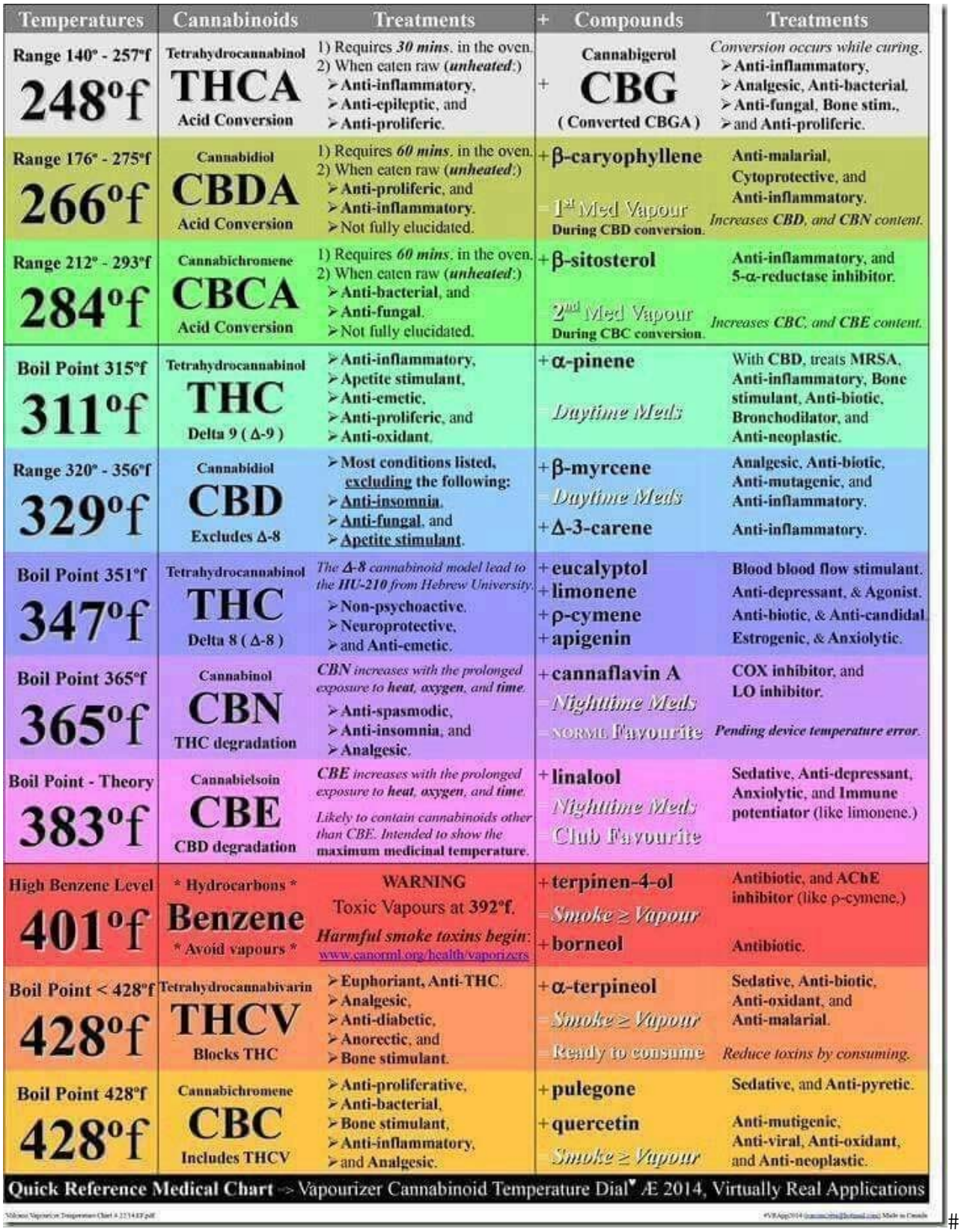

RAW
HEATED
AGED
CBGa
Analgesic
Anti-Inflammatory
THCa
Anti-Cancer
Anti-Inflammatory
Anti-Spasmatic
THCVa
Anti-Inflammatory
CBDa
Anti-Cancer
Anti-Inflammatory
CBDVa
Anti-Inflammatory
CBG
Anti-Cancer
Analgesic
Anti-Bacterial
Bone Stimulant
Anti-Depressant
Anti-Fungal
THC
Anti-Cancer
Anti-Inflammatory
Analgesic
Anti-Bacterial
Anti-Spasmatic
Appetite Stimulant
Bronchodilator
Neuroprotective
THCv
Anti-Convulsive
Appetite Supressant
Bone Stimulant
CBD
Anti-Cancer
Anti-Inflammatory
Analgesic
Anti-Bacterial
Anti-Spasmatic
anti-anxiety
Bone Stimulant
Immunosuppresive
Neuroprotective
Anti-Depressant
Anti-Convulsive
Anti-Psychotic
CBDv
Anti-Convulsive
Bone Stimulant
CBNa
Anti-Inflammatory
Δ-8 THC
Anti-Anxiety
CBN
Anti-Inflammatory
Analgesic
Anti-Bacterial
Anti-Convulsive
Anti-Insomnia
Lifecycle of cannabinoids
brought to you by: Aunt Zelda's
© Copyright 2016 Aunt Zelda's


Temperatures
Cannabinoids
Treatments
+ Compounds
Treatments
Range 140° - 257°f
248°f
Tetrahydrocannabinol
THCA
Acid Conversion
1) Requires 30 mins. in the oven.
2) When eaten raw (unheated:)
➢Anti-inflammatory,
➢Anti-epileptic, and
➢Anti-proliferic.
Cannabigerol
+ CBG
(Converted CBGA)
Conversion occurs while curing.
➢Anti-inflammatory,
➢Analgesic, Anti-bacterial,
➢Anti-fungal, Bone stim.,
➢and Anti-proliferic.
Range 176° - 275°f
266°f
Cannabidiol
CBDA
Acid Conversion
1) Requires 60 mins. in the oven.
2) When eaten raw (unheated:)
➢Anti-proliferic, and
➢Anti-inflammatory.
➢Not fully elucidated.
+β-caryophyllene
Anti-malarial, Cytoprotective, and Anti-inflammatory.
1st Med Vapour
During CBD conversion.
Increases CBD, and CBN content.
Range 212° - 293°f
284°f
Cannabichromene
CBCA
Acid Conversion
1) Requires 60 mins. in the oven.
2) When eaten raw (unheated:)
➢Anti-bacterial, and
➢Anti-fungal.
➢Not fully elucidated.
+β-sitosterol
Anti-inflammatory, and 5-α-reductase inhibitor.
2nd Med Vapour
During CBC conversion.
Increases CBC, and CBE content.
Boil Point 315°f
311°f
Tetrahydrocannabinol
THC
Delta 9 (Δ-9)
➢Anti-inflammatory,
➢Apetite stimulant,
➢Anti-emetic,
➢Anti-proliferic, and
➢Anti-oxidant.
+α-pinene
With CBD, treats MRSA, Anti-inflammatory, Bone stimulant, Anti-biotic, Bronchodilator, and Anti-neoplastic.
Daytime Meds
Range 320° - 356°f
329°f
Cannabidiol
CBD
Excludes Δ-8
➢Most conditions listed, excluding the following:
➢Anti-insomnia,
➢Anti-fungal, and
➢Apetite stimulant.
+β-myrcene
Analgesic, Anti-biotic, Anti-mutagenic, and Anti-inflammatory.
Daytime Meds
+Δ-3-carene
Anti-inflammatory.
Boil Point 351°f
347°f
Tetrahydrocannabinol
THC
Delta 8 (Δ-8)
The Δ-8 cannabinoid model lead to the HU-210 from Hebrew University.
➢Non-psychoactive,
➢Neuroprotective,
➢and Anti-emetic.
+eucalyptol
Blood blood flow stimulant.
+limonene
Anti-depressant, & Agonist.
+ρ-cymene
Anti-biotic, & Anti-candidal.
+apigenin
Estrogenic, & Anxiolytic.
Boil Point 365°f
365°f
Cannabinol
CBN
THC degradation
CBN increases with the prolonged exposure to heat, oxygen, and time.
➢Anti-spasmodic,
➢Anti-insomnia, and
➢Analgesic.
+cannaflavin A
COX inhibitor, and LO inhibitor.
Nighttime Meds
NORML Favourite
Pending device temperature error.
Boil Point - Theory
383°f
Cannabielsoin
CBE
CBD degradation
CBE increases with the prolonged exposure to heat, oxygen, and time.
Likely to contain cannabinoids other than CBE. Intended to show the maximum medicinal temperature.
+linalool
Sedative, Anti-depressant, Anxiolytic, and Immune potentiator (like limonene.)
Nighttime Meds
Club Favourite
High Benzene Level
401°f
* Hydrocarbons *
Benzene
* Avoid vapours *
WARNING
Toxic Vapours at 392°f.
Harmful smoke toxins begin:
www.canorml.org/health/vaporizers
+terpinen-4-ol
Antibiotic, and AChE inhibitor (like ρ-cymene.)
Smoke ≥ Vapour
+borneol
Antibiotic.
Boil Point < 428°f
428°f
Tetrahydrocannabivarin
THCV
Blocks THC
➢Euphoriant, Anti-THC.
➢Analgesic,
➢Anti-diabetic,
➢Anorectic, and
➢Bone stimulant.
+α-terpineol
Sedative, Anti-biotic, Anti-oxidant, and Anti-malarial.
Smoke ≥ Vapour
Ready to consume
Reduce toxins by consuming.
Boil Point 428°f
428°f
Cannabichromene
CBC
Includes THCV
➢Anti-proliferative,
➢Anti-bacterial,
➢Bone stimulant,
➢Anti-inflammatory,
➢and Analgesic.
+pulegone
Sedative, and Anti-pyretic.
+quercetin
Anti-mutigenic, Anti-viral, Anti-oxidant, and Anti-neoplastic.
Smoke ≥ Vapour
Quick Reference Medical Chart -> Vapourizer Cannabinoid Temperature Dial Æ 2014, Virtually Real Applications

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#

• DECARBOXYLATION TEMPERATURES AND TIMES •

Temperature +/-5F	Heating mode	Plant Material Time		Kief/Hash Time		Cannabis Oil Time
		High THC	High CBD	High THC	High CBD	
300 F	Oven	10-18 minutes	15-25 minutes	5-10 minutes	10-15 minutes	
250 F	Hot oil bath					Until bubbles taper off
245 F	Oven	50-60 minutes	60-90 minutes	30-40 minutes	40-50 minutes	
212 F	Boiling water bath	90-120 minutes	2-4 hours	90-120 minutes	2-4 hours	

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Strength of Cannabis (assuming neglible canabidiol)	Daily dosage of cannabis corresponding to 2.5 - 90 mg of THC
10% THC	.15 g . 5.55g
15% THC	.12 g . 3.69g
20% THC	.08 g . 2.79g
25% THC	.04 g . 2.25g
30% THC	.01 g . 1.86g

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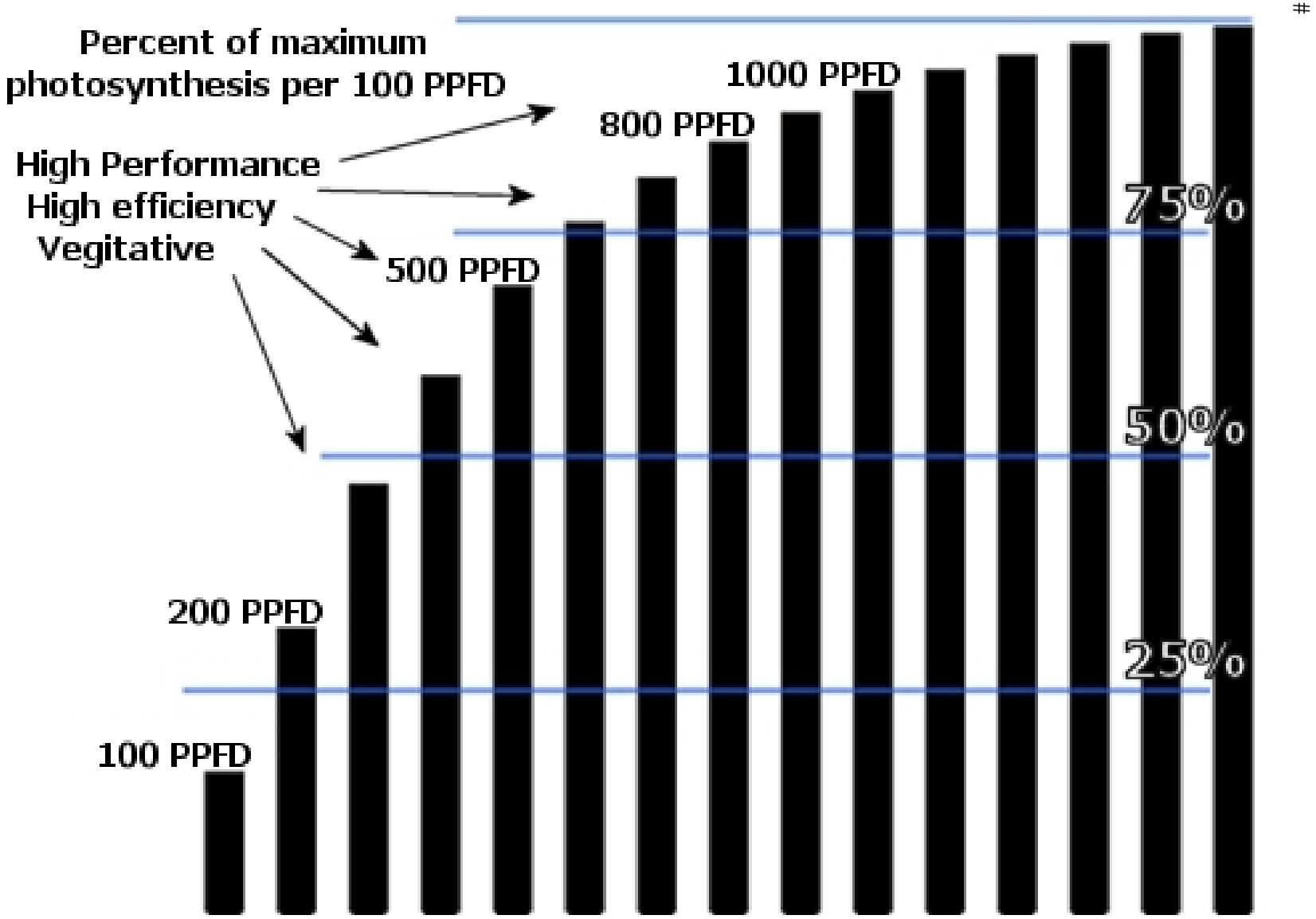
Percent of maximum
photosynthesis per 100 PPFD
High Performance
High efficiency
Vegitative
100 PPFD
200 PPFD
500 PPFD
800 PPFD
1000 PPFD
75%
50%
25%

Species	Establishment		Vegetative	Reproductive
	Seed	Vegetative Cutting		
Cannabis	100-300	75-150	300-600	600+
Tomatoes	150-350	75-150	350-600	600+
Cucumbers	100-300	--	300-600	600+
Peppers	150-350	--	300-600	600+

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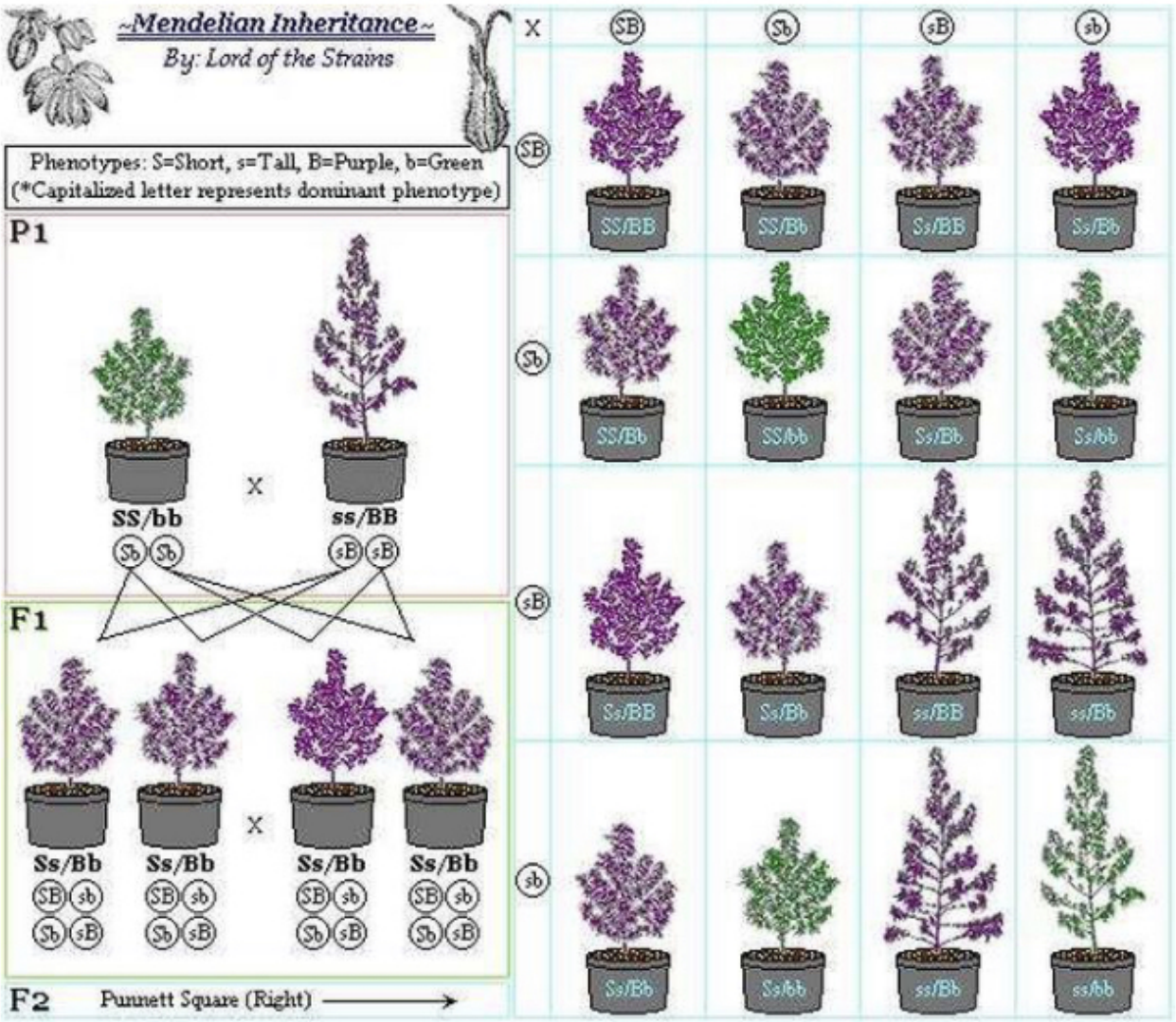

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15.1.

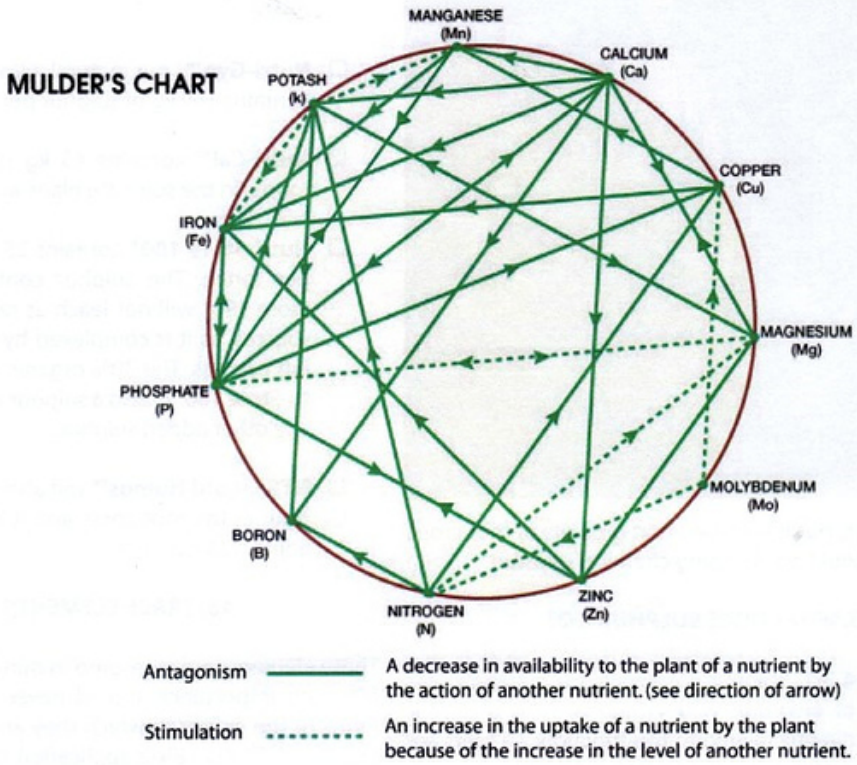

Figure 2: Mulder's Chart

This chart graphically highlights some of the complex inter-relationships between the different elements. It also illustrates the critical importance of **balance**. The simplistic N-P-K concept, involving copious amounts of just three elements piled on indiscriminately, is revealed to be hopelessly inadequate when we consider these complex relationships.

In this context the symptoms of a particular deficiency may not mean that there is a shortage of the element in question. It is more often the case that excesses of other elements have shut down the availability of the element which appears to be deficient.

Iron is a good example. **Chlorosis** is a condition which suggests an iron deficiency, but the soil analysis will invariably suggest otherwise. The fact is that iron deficiency can be induced by too much calcium or too much zinc, copper, manganese or phosphorus (see chart). These elements in excess are **antagonistic** to the uptake of iron. The fascinating thing here is that the problem can be solved without the addition of **iron**. In fact, in this case, the addition of a completely different element **potassium**, which stimulates iron uptake, can solve the iron deficiency problem. Professor Mulder's chart should be kept accessible for easy reference, so you can gain maximum benefits from this enlightening information.

15.2. TRACE ELEMENT SOURCES

NTS trace element sources include the following:

15.2.1. Micro-nutrients in the sulphate form - ie iron sulphate, manganese etc.

15.2.2. **Nutri-Key Shuttle™ Range - Chelated trace elements** using the Shuttle System™ to deliver nutrients directly to the plant. The Shuttle System is a major breakthrough in chelation nutrition. In conventional chela-