

# Small Farm Soils and Plant Nutrition

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## ~ ~ Soils ~ ~

*Takes about 500 years to make 1" of top soil*

1. Texture: Percent sand, silt, and clay!  
“clay characteristics” – plastic and sticky when wet  
absorbs water, gases  
high surface area  
usually warms up slower  
holds more water  
higher CEC  

very small particles
plate shaped
very fertile
swells/shrinks
slow water infiltration
adsorbs water, gases
  
- “\_\_\_\_\_” is simply broken down pieces of rocks
  
2. Structure: Physical arrangement of the above particles
3. Chemical – Ph – acidity/alkalinity of the soil.....optimum is 6.0 - \_\_\_\_\_  
Affects availability of nutrients  
Affects organism activity  
Plant preference  
  - Salt – total soluble and Sodium salts (< 4 mhos/cm preferred)  
Plants and seeds differ in their sensitivity  
Sodium is very bad for soil structure \_\_\_\_\_ (*defolocculator*)
  
4. Organic Matter – anything that is or once was living
  - a. 1 gram of fertile soil = 4 billion bacteria, 1 million fungi, 20 million actinomycetes, 300,000 algae.
  - b. advantages. Absorbs and adsorbs  
makes soil more fertile  
helps cement together soil  

breaks up a heavy clay soil
increases organism activity
insulates soil
  - c. Composting – 14 days, 6 months, 1 + years  
----30:1 C/N ratio.....160-180° .....needs: O.M., water, bacteria, \_\_\_\_\_, nitrogen

## ~ ~ Nutrition ~ ~

### 1. Plants Require. \_\_\_\_\_ different nutrients to grow

NITROGEN	N	most often fertilized for, 150-200 lbs/A	overall yellowing
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PHOSPHOROUS	P	part of a complete fertilizer	purpling leaves, stems
POTASSIUM	K	also part of complete fertilizer	leaf edges look burned
CALCIUM	Ca	blossom end rot of tomatoes, squash	
MAGNESIUM	Mg	yellowing leaves with green christmas tree in the middle	
SULFUR	S	similar to nitrogen deficiency	
IRON	Fe	older leaves turn yellow, green veins. skeleton. affected by pH	
BORON	B	new buds die, can also be toxic if too high	
MANGANESE	Mn	young leaves show network of green veins	
ZINC	Zn	similar to iron, new leaves turn yellow and look smaller and clustered	
COPPER	Cu	similar to boron	
CHLORINE	Cl	wilting and stubby roots. not usually a problem	
MOLYBDENUM	Mo	yellow spots on leaves, similar to nitrogen. only need 2 ounces/acre	

CARBON (C), HYDROGEN (H), & OXYGEN (O) FROM THE WATER AND AIR. Symptoms would be wilting/poor growth, or death from too much or too little water/air.

## 2. Fertilizer Analysis. (percent in the bag/bucket)

	<u>N</u>	<u>P</u>	<u>K</u>
Compost	1.3-1.7	.65	
Sheep manure	1.4	.48	1.2
Bone meal	1	14	0
Cottonseed meal	6.5	3	1.5
Ammonium Sulfate	21	0	0
Urea	45	0	0
CAN 17	17	0	0 plus Calcium
UN32	32	0	0
triple 15	15	15	15

nitrogen = ammonium or nitrate -----lasts 30-45 days only (longer in organic sources)  
 nitrate...plant can get easier but leaches out of soil quicker  
 ammonium..plant has to work a little harder but it stays in the soil a little longer



~~ Nutrition ~~  
Tej Chiv

**1. Plants Require (Tej qoob siv chiv los pab).** \_\_\_\_\_ Muaj ntau yam los pab tej qoob khoom loj hlob taus

NITROGEN	N	ntau zaus tsuas siv txij li, 150-200 lbs/A	thaum tej nplooj daj daj
PHOSPHOROUS	P	yog ib hom chiv siv pab tej qoob	thaum tej nplooj xiav, thiab tej kav
POTASSIUM	K	yog ib hom chiv siv pab tej qoob	thaum tej ntug ntsis nplooj qhuav
CALCIUM	Ca	siv pab rau yog tias cov paj lwj nyob rau cov txiv lws suav, tej taub	
MAGNESIUM	Mg	cov nplooj daj, hos ntsuab tej kab nyob ntawm daim nplooj	
SULFUR	S	similar to nitrogen deficiency (zoo xws li tej chiv tsis txaus)	
IRON	Fe	cov nplooj laus daj daj tuaj, ntsuab tus kav. Pom tej kav tawm tuaj pH	
BORON	B	tus kaws tuag, thaum muaj cov chiv no ntau nws kuj lom tsob qoob thiab	
MANGANESE	Mn	cov nplooj mos nws tus kav ntsuab ntsuab heev cab zom zaws	
ZINC	Zn	sib xws cov iron, tej nplooj mos nws daj daj ua tej ntsaus me me heev	
COPPER	Cu	sib xws li cov boron thiab	
CHLORINE	Cl	tsob qoob ntsws tuaj, cag hlav tsis taus. Tsis tshua muaj teeb meem cov no	
MOLYBDENUM	Mo	muaj tej tee daj daj ntawm cov nplooj, sib xws cov nitrogen. Siv li 2 ounces/ac	

CARBON (C), HYDROGEN (H), & OXYGEN (O) FROM THE WATER AND AIR. Symptoms would be wilting/poor growth, or death from too much or too little water/air.

**2. Fertilizer Analysis (Ntsuas Chiv Siab Pestsawg). (percent in the bag/bucket)**

	<u>N P K</u>
Compost	1.3-1.7-.65
Sheep manure	1.4-.48-1.2
Bone meal	1-14-0
Cottonseed meal	6.5-3-1.5
Ammonium Sulfate	21-0-0
Urea	46-0-0
CAN 17	17-0-0 plus Calcium
UN32	32-0-0
triple 15	15-15-15

nitrogen = ammonium or nitrate -----nyob ntev li 30-45 hnuv xwb (Cov chiv los ntawm tej yam muaj sia organic los nyob ntev tshaj)

nitrate...cov chiv yaj tej qoob mam nqus los siv, tab sis nws tog mus rau hauv av sai heev li  
ammonium..cov chiv no tsob qoob yuav tau ua hauj lwm hnyav, cov chiv tsis tog sai nyob ntev