

Small Farm Soils and Plant Nutrition

UC Cooperative Extension
Richard Molinar and Michael Yang



~ ~ S o i l s ~ ~

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 _____ (*deflocculator*)

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

~ ~ N u t r i t i o n ~ ~

1. Plants Require. _____ different nutrients to grow

NITROGEN

N

most often fertilized for, 150-200 lbs/A

overall yellowing

PHOSPHOROUS POTASSIUM	P K	part of a complete fertilizer also part of complete fertilizer	purpling leaves, stems leaf edges look burned
CALCIUM MAGNESIUM SULFUR	Ca Mg S	blossom end rot of tomatoes, squash yellowing leaves with green christmas tree in the middle similar to nitrogen deficiency	
IRON BORON	Fe B	older leaves turn yellow, green veins. skeleton. affected by pH 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)

N P K

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

Small Farm Soils and Plant Nutrition

UC Cooperative Extension
Richard Molinar and Michael Yang



~ ~ Av (Soils) ~ ~

Siv sijhawm li 500 xyoo los ua li 1” cov npoo av ua noj txheej sab sauv

1. Texture (cov av txuam dab tsi): Percent sand (av xuab zeb), silt (av ua xua), thiab clay (av nplaum)!

“Av nplaum muaj lino” – nplaum ua thooj yog thaum ntub dej
tuav dej, muaj gases
nyob siab saum npoo av
nws sov qeeb dua lwm yam
tuav dej ntau tshaj
CEC siab heev

cov hmoov av me heev
ua tej daim phaj
nws tuav chiv ntau
nws su thiab saus
dej nqes qeeb heev
tuav dej, thiab pa gases

“_____” yog ntais tawm ntawm pob zeb los ua hmoov me me.

2. Cov Structure: Tej yam uas nws nyob khov ua ntu zus los xws li cov av saum toj hais nod.
3. Cov Chemical – Ph – acidity/alkalinity cov av qab los tsuag...(optimum) yuav tsum txij 6.0 -

Ua rau tej chiv muaj nyob rau los pab
Ua rau muaj tej kab zoo los pab
Tej qoob nyiam thiab muaj tej chiv los pab

- Salt (Ntsev) – (total soluble and Sodium salts) Tej ntsev yaj nyob rau yuav tsum tsawg dua li (< 4 mhos/cm preferred)
Tsob qoob thiab cov noob, nyias kuj nyiam nyias hais txog tej av qab ntsev
Ntsev yeej tsis zoo rau tej av ua noj ntau hom av _____
(defolocculator)

4. Organic Matter (Tej nrog tsuag tha maj xaj) – Txhua yam muaj sia los yog yav tag los muaj sia
 - a. 1 gram of fertile soil (av zoo ua noj) = 4 billion bacteria, 1 million fungi, 20 million actinomycetes, 300,000 algae.
 - b. advantages tuav dej thiab nqus dej ua rau cov av npaum tawg
ua kom cov av zoo ua noj ua rau muaj tej kab zoo coob tuaj
pab cov av nyob ua ke tau tej thooj los thaiv tau tej txheej
 - c. Composting (Ncu ua ib pawg) – 14 days, 6 months, 1 + years
-----30:1 C/N ratio.....160-180°.....needs: O.M., water, bacteria, _____, nitrogen

~ ~ N u t r i t i o n ~ ~
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)

N P K

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 hnub 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