

Let's get
Down & Dirty

TEST & AMEND OUR SOIL

**with our own two hands
and our own common sense!**

**Presented by Hendrikus & Nirav
Hendrikus Organics**

Presented by

- **Hendrikus Schraven**
the mastermind
it all starts with the soil!
- **Nirav Peterson**
mentor of inspirations
earth-body-mind-spirit wellness

Common Soil Problems

- Poor drainage
- Hardpan
- Poor water retention
- Poor or undeveloped root growth
- Poor or diseased plant growth

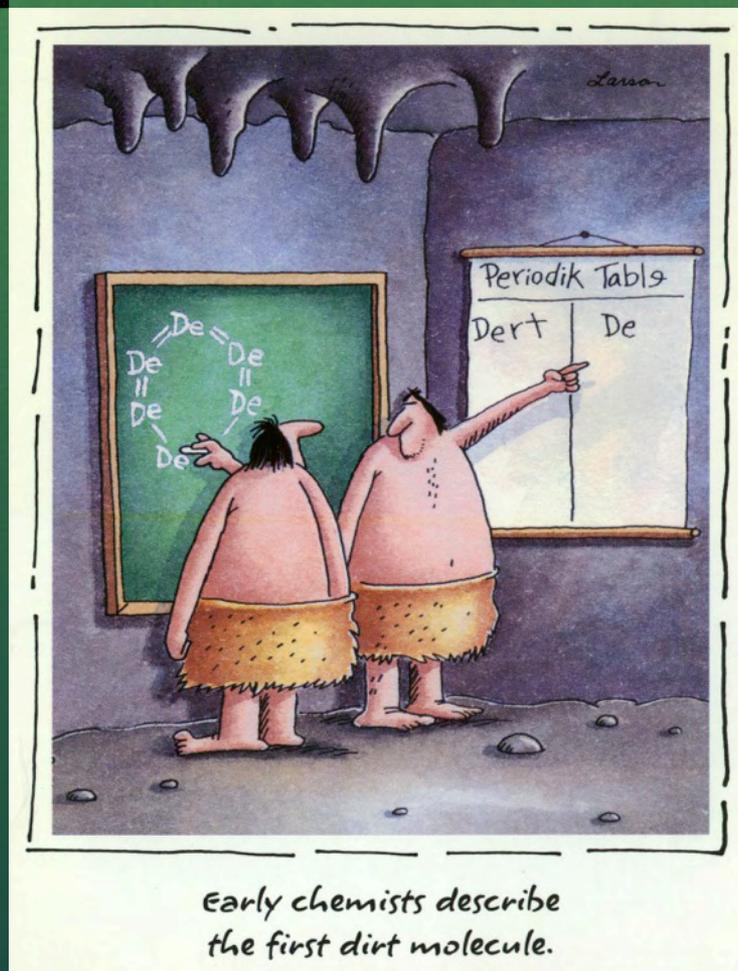
Common Reasons

- pH – soil is too acidic or too alkaline
- Too much clay
- Too sandy
- Tired/wornout – neglected/lifeless
- Poisoned – overuse of chemicals



Let's listen
to the earth

Early chemists describe the first dirt molecule



Early chemists describe
the first dirt molecule.

Desired Soil Characteristics

- Balanced Texture
- Rich Organic Matter
- Diverse Base of Nutrients & Minerals
- Humus & Humic Acids
- Soil Micro-Biology

Observation Test

What weeds are growing?
How healthy are the plants
that ARE growing:

- Scraggly & struggling?
- Dense & lush?
- Pale or color rich?
- Diseased?
- Weeds prolific but the plants are struggling?

Observe the ENERGY of your plants and soil! Everything in nature has an energy vibration!

One of the earliest indicators of a soil problem.

Nature wants to be in balance.
Weeds are nature's way of correcting soil imbalances.

For example:

That clover in your lawn?
= nitrogen poor soil

What Common Weeds Tell Us

Morning Glory (Bindweed)

Poor drainage, hardpan, neglected soil

Adds minerals to the soil

Buttercup

*Poorly drained, cultivated soil,
deficient in potassium*

Adds potassium to the soil

Chickweed

*Cool, moist soil, deficient in potassium,
phosphorus and/or manganese*

Adds potassium, phosphorus
and/or manganese to the soil

Clover

Low fertility, low nitrogen

Adds nitrogen to the soil

Dandelion

*Heavy, clay, compact acidic soil, as well
as fertile well-drained soil. Calcium,
iron, humus and mineral deficiency.*

Adds numerous minerals and
humus.

What Common Weeds Tell Us

Dock

Waterlogged, poorly drained acidic soil, deficient in calcium, potassium, phosphorus, iron

Adds nutrients & minerals to the soil

Horsetail

Low lime, sandy, light, acidic soil, poor fertility

Adds minerals to the soil

Plantain

Heavy, compacted, acidic, low-fertile soil.

Adds calcium, magnesium & others, helps de-acidify soil

Quack Grass

Poorly drained, heavy clay soil, crusty surface

Adds nitrogen to the soil

Thistle

Heavy, compacted soil.

Adds iron, and its deep roots break up the subsoil

Smell Test



Take a clump in our hands - what does it smell like?

- Sweet?
- Earthy - like a forest?
- Sour or putrid?
- Does it have barely any smell?

Lawns should have soil that smells sweet - bacteria dominated

Native plants, vegetables should have soil that smells earthy, humus-rich - fungal dominated

Anaerobic soils, poor drainage, no air, or poisoned soils smells sour, pungent.

Neglected, dead soil will have barely any smell.

pH Test



Use a pH tester

Test various areas of your garden, lawn and landscape.

What is your pH?

- Is it below 6.0?
- Is it above 7.0?

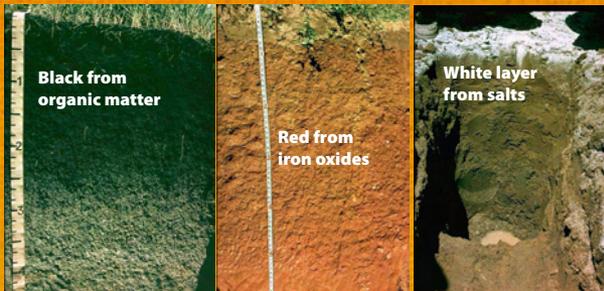
pH is critical for nutrient availability to your plants.

In our climate, 6.5 to 6.9 is a good base, however, it is common for our soils to be lower, and many plants can handle it as low as 4.5.

KNOW YOUR PLANTS.

Nutrients need a particular pH to be plant available, so an unfavorable pH will greatly affect whether your plants are receiving the nutrients they need.

Color Test



What are the colors of your soil?

What colors are they as you dig down deeper?

- Red
- Yellow
- Gray
- Light brown
- Dark brown
- Black

Although soil color comes from a multitude of things, here are some basics.

Reds, Oranges & Yellows

From various types of iron oxides – rich in iron

Grays are the background color of soil without any oxidized matter.

Browns & overall Blacks

Organic carbon / humus – the darker, the more organic carbon & fertile.

Some Black color may be from Manganese-oxides or charcoal.

Root Hair Test

What is the condition of your plant's roots



- Large or small compared to the plant size
- Lots of hair roots?
- Only main roots?
- Complex & dense or limited and thin?
- Areas of rot on roots

Root hairs are increase the absorption area of the roots and penetrate finer pores in the soil ... very important for water and nutrient uptake.

- Lack of root hairs, lack of overall root density and limited size indicate impenetrable poor soil.
- Rotting root areas indicate soggy, airless soils and poor drainage.

Ribbon Test

Wet an egg sized lump of your soil until it is like putty. Roll or squeeze it into a ribbon as long and thin as possible between thumb and forefingers and let it extend over your fingers.

- Does it stick together?
- How long of a ribbon can you make before it breaks?
- Can you bend the ribbon all the way into a circle?

The longer the ribbon, the thinner the ribbon, and the longer it sticks together, the higher the clay content of your soil.

Soils with high silt content will flake rather than make a ribbon.

Soils with high sand content will not make a ribbon and will break apart quickly.

Wet Ball Test

Wet your soil, squeeze it as tight as you can 10 times into a ball. Watch and feel your squeezing:

1. How quickly did the ball consolidate or stick together?

On the first squeeze?

The tenth squeeze?

2. Did it ever stick together?
3. Take a finger and begin to apply pressure to the top of your wet ball. Notice:

Does the wet ball stay together but get squished?

Or...

When does it break apart?

Is it in only a few pieces?

Or does it quickly crumble into many pieces?

It is not just sandy soils that do not make a ribbon.

Highly friable soils also will not create a ribbon.

The ball test will tell you about its potential for compaction, root growth, erosion and drainage.

Feel Test

Wet some soil and rub it between your fingers. Is it...

- Gritty
- Smooth
- Powdery
- Sticky

Gritty = more sand

Smooth = more silt

Powdery = more silt

Sticky = more clay

Rigid Probe Test

Take a stiff probe (with a point) and push it into your soil, feeling the resistance or ease as you push it deeper.

- How easy does it push through and how deep?
- Does it completely stop and can go no further?
- At what depth does it give complete resistance, if at all?
- What is the “feel” and “texture” while its being pushed down?

How much organic matter do you have?

Is your hardpan hidden underneath just a few inches of workable soil.

Gritty but firm = sand based soils

Slick and sticky = clay and silty soils.

Bumpy = stones

Stopping point = hard pan

Glass Jar Test

Take a soil sample from 6" down after scraping away top 2" of soil.

Dry it out, sieve it to remove stones, roots, lumps, etc.

Fill a straight sided or mason jar $\frac{1}{2}$ full with soil, add 1 tbsp of dishwashing liquid as a dispersent, fill with water almost to the top. Shake well for five minutes to mix thoroughly.

Then let it settle out. This can take several days.

Loam is considered the ideal soil and contains:

Equal amounts of sand and silt with a lesser amount of clay (40%-40%-20%).

Sand = volume & porosity

Silt = resilience

Clay = nutrients, strength and water retention

Glass Jar Test

Sand will settle first.

Silt will settle next.

Clay is the last and takes the longest to settle out.

Measure the amount of each layer and determine its % by dividing it by the total amount of all 3 layers.

Use the Soil Texture Pyramid Chart to determine what type of soil you have.



Dig a Hole Drainage Test

Dig a 12" x 12" flat sided hole that is a few inches deeper than the root ball of the plant(s) in question.

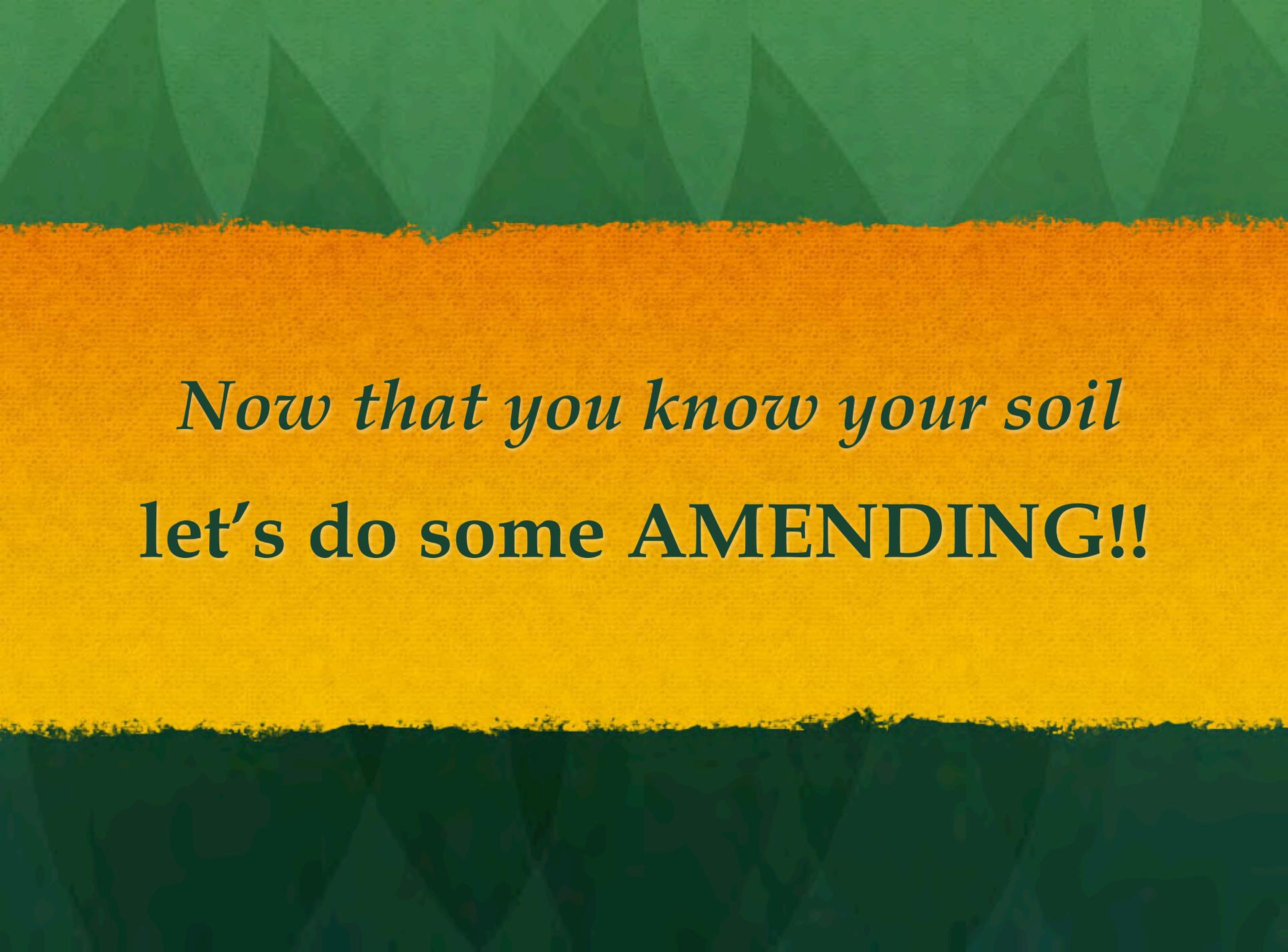
Fill it with water and let it drain through (overnight).

Fill again, measure the depth.

Measure again every hour until it is empty.

Ideally your square hole should drain anywhere between 1" to 3" per hour, with 2" being ideal.





Now that you know your soil
let's do some AMENDING!!

Your soil pH is not right ...

pH too low, too acidic

Solution

Add **LIME** to raise pH

Rule of Thumb – it takes at least 50# per 1000 sq. ft. to raise pH ½ point, 6" deep.

Increase **SOIL MICROBIOLOGY**

to help your plant's pH tolerance.

Add compost teas, mature composts and living humate regularly.

pH too high, too sweet

Solution

Add **SULFUR** to lower pH

Rule of Thumb – it takes at least 12# per 1000 sq. ft. to lower pH ½ point, 6" deep.

OR: **Acidic amendments** such as pine needles, peat moss, or tree leaves.

Increase **SOIL MICROBIOLOGY**

to help your plant's pH tolerance.

Add compost teas, mature composts and living humate regularly.

Your soil drainage is poor ...

The most common conditions for poor drainage is too much clay and/or heavy compaction, overwatering, disturbing soils in rains or wet conditions.

Solution

Add **GREEN SAND, LIVING HUMATES, MATURE COMPOST & WORMS**

Change the texture, continue to test.

Increase **SOIL MICROBIOLOGY** to help improve your soil texture.

Add compost teas, mature composts and living humate regularly.

Your soil has too much clay ...

The most common characteristic of too much clay is **HARDPAN!** Whether at the surface, or at the subsurface, hardpan contributes to poor drainage and poor plant health and production.

Solution

Add **GREEN SAND & MATURE COMPOST**

Till in these products as deeply as possible into the hardpan itself.

NOTE: do not use sand in heavy clay soils, only green sand.

Sand mixed with clay will give you concrete!

Increase **SOIL MICROBIOLOGY & WORMS** to help improve your soil texture.

Add compost teas, mature composts and living humate regularly.

Your soil has too much sand...

The most common characteristic of too much sand is its inability to hold water and nutrients, which contributes to poor plant health and production.

Solution

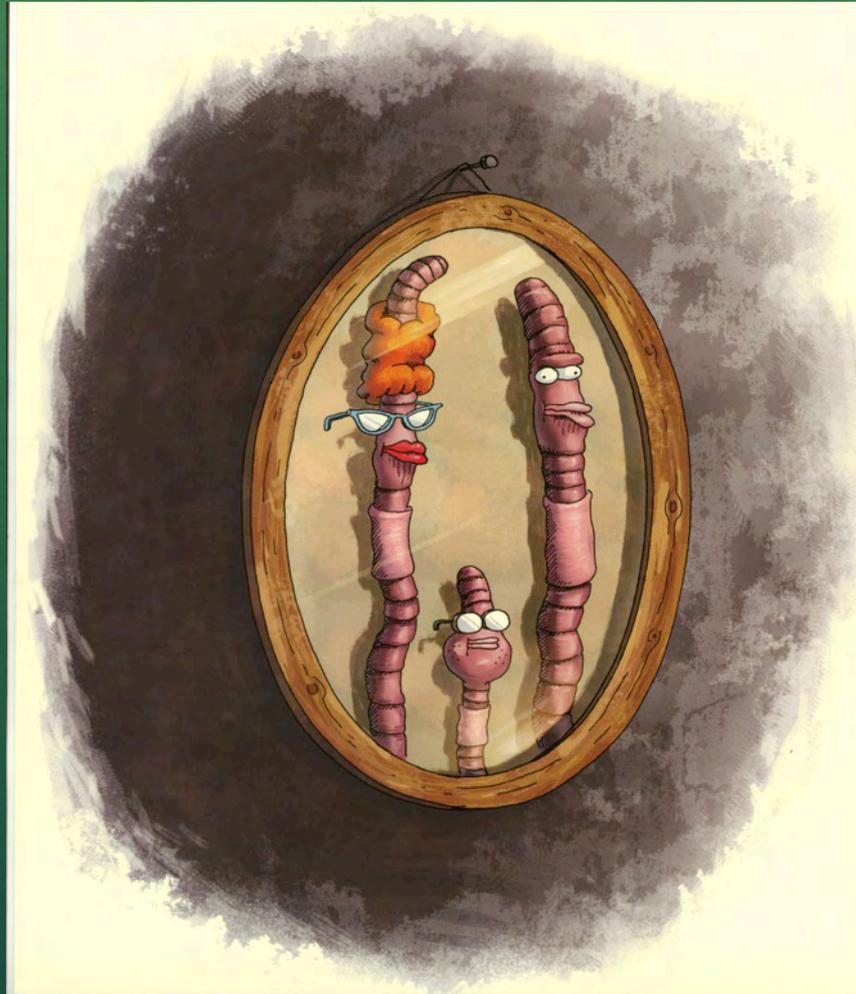
Add **MATURE COMPOST & ZEOLITE**

Till in these products as deeply as possible into the sand itself to help water & nutrient retention and balance soil.

Increase **SOIL MICROBIOLOGY & WORMS** to help improve your soil texture.

Add compost teas, mature composts, living humate regularly. Use mulch on surface, add worms to soil to boost organic matter.

Do we keep mentioning “worms”?



Your soil is neglected/worn out...

The most common characteristic of neglected soil is the poor, often scraggly plants, flowers and root systems, and the propensity for disease and pests.

Solution

Add **SOIL MICROBIOLOGY, HUMIC ACIDS, MACRO & MICRO NUTRIENTS, TRACE MINERALS, MATURE COMPOST**

Till in these products as deeply as possible into the soil. Compare soil texture, color and smell, test for percentages of silt, clay, sand if needed.

Increase **SOIL MICROBIOLOGY & WORMS** to help improve your soil texture.

Add compost teas, mature composts, living humate regularly. Use mulch on surface, add worms to soil to boost organic matter.

Your soil is chemically poisoned...

The most common characteristic of chemically over-treated soil is its compaction, lack of life & soil microbiology, its toxicity to plants, and the resulting poor plant health and disease resistance.

Solution

Add **COMPOST TEA, MATURE COMPOST & LIVING HUMATE**.
Start with MICATROL for heavy poisons.

Soil drench with these products. Micatrol can be used to start, followed by compost tea & living humate.

Increase **SOIL MICROBIOLOGY & WORMS** to help improve your soil texture.

Add compost teas, mature composts, living humate regularly. Use compost as mulch, add worms to boost organic matter.

Amendments

- Greensand • Glaucinite mineral formed in shallow marine waters
- Lime (Calcium Carbonate) • The form of lime most beneficial to raise pH
- Mature Compost • Brings beneficial microbes and fertility to soil, detoxifies
- Worms • Make vermicompost, the best of mature composts, detoxifies.
- Micatrol • Natural bacteria that mitigate poisons in soil
- HuMagic • Living humate rich in humic acids & organic carbons
- Compost Tea/Mycorrhizae • Dense and diversified beneficial microbes
- Zeolite • Honeycomb structured rock dust for water retention and nutrient distribution

Some Helpful Charts ...

Nutrient Deficiencies in the Garden

...and how to fix them

Nitrogen

Signs

The lower leaves on the plant will turn light green or yellow. The plant is stunted and wilts under normal weather conditions.

Cures

Ammend the soil with poultry manure or bone meal. Use a legume cover crop in the winter. Add organic matter & compost before planting.

Cures

Amend the soil with bone meal or lime. Dig finely crushed egg shells into the soil. Use a foliar calcium spray.

Signs

Blossom end rot in tomatoes, peppers and squash. Yellow curling leaves, blackened growing tips or overall stunted growth.

Calcium

Magnesium

Signs

Yellowing of leaves on the plant. Dropping of old leaves. Smaller, woodier fruits of poor color.

Cures

Add a few tablespoons of Epsom Salts to the planting hole or mix 2T Epsom salts in a gallon of water to feed plants throughout the season.

Cures

Add wood ash sparingly. Apply greensand. Place a banana peel in the hole at planting time.

Signs

Deformed, stunted leaves. Weak stems. Fruits will drop prematurely. Poorly developed roots.

Potassium

Phosphorus

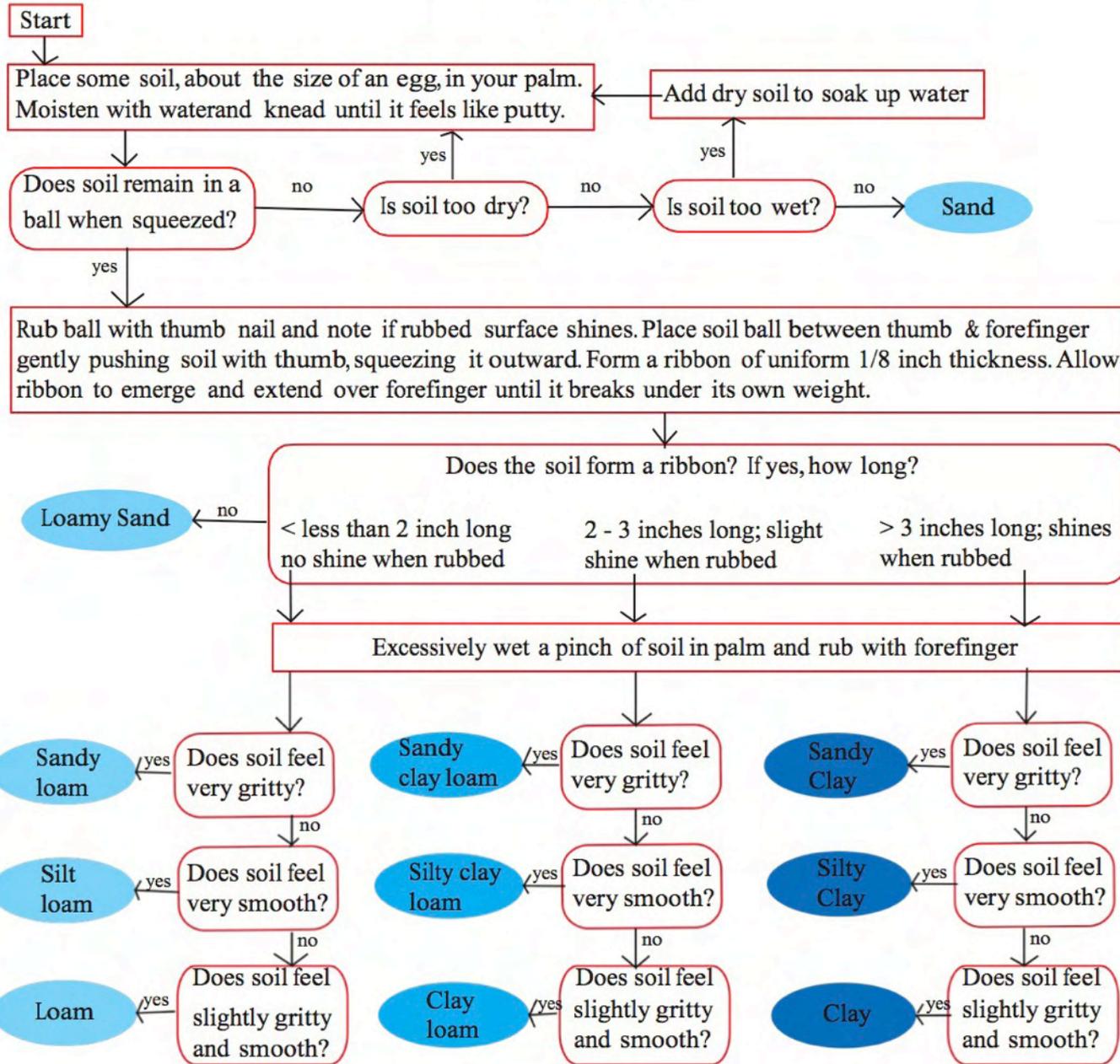
Signs

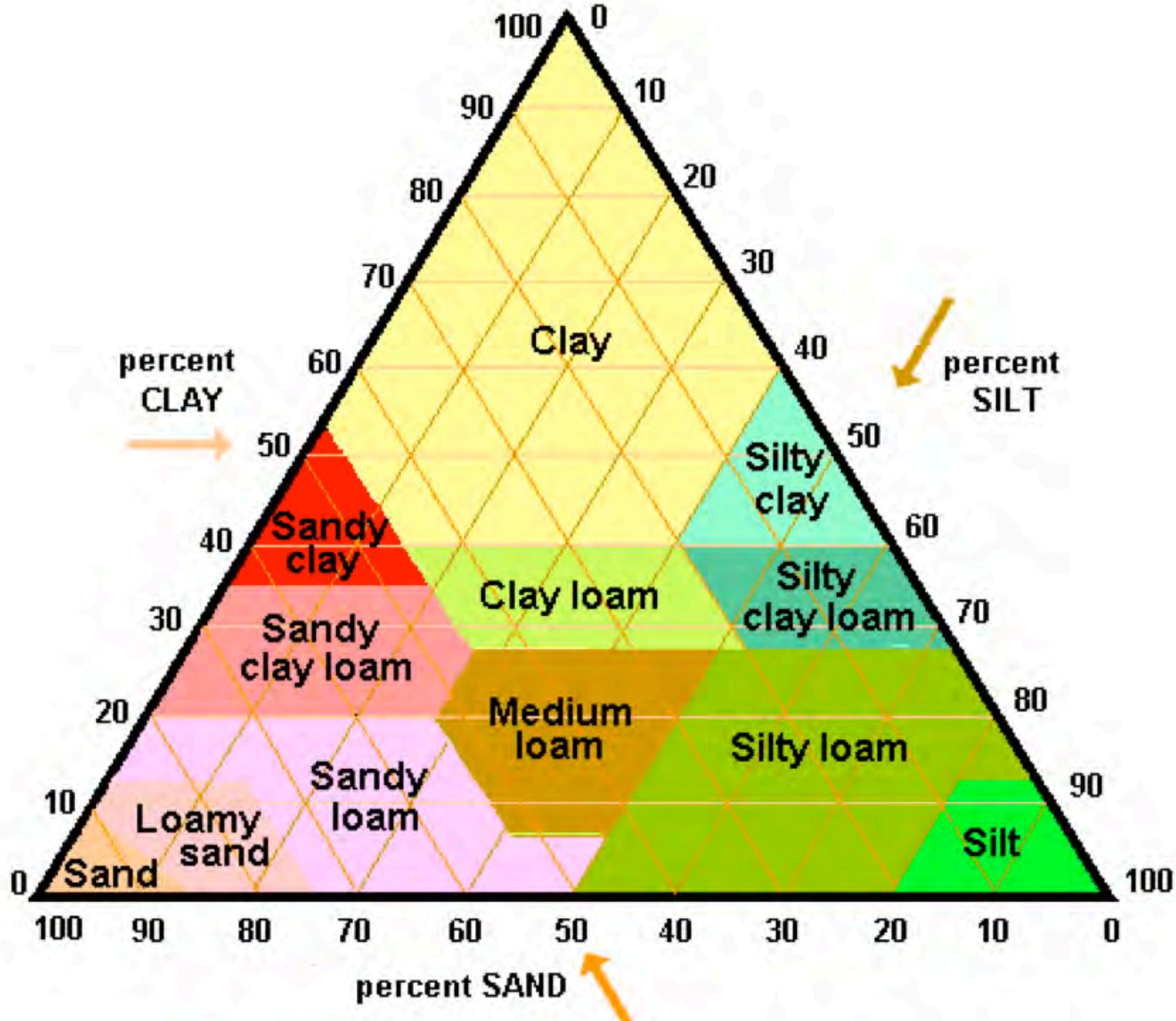
Plants have small, thin stems. Reduced flowers; failure to produce fruits. Leaves have a purple hue.

Cures

Apply rock phosphate. Amend the soil with chicken manure. Spray the leaves with fish emulsion weekly.

Soil Texture Key





Helpful Links

The Glass Jar Test - Determining % of Sand, Silt & Clay and using the Soil Clay Chart

<http://www.finegardening.com/how-your-soil-texture>

Colorado Master Gardener - Estimating Soil Texture

<http://www.ext.colostate.edu/mg/gardennotes/214.html>

WikiHow - Testing soil for pH

<http://www.wikihow.com/Test-Soil-pH>

Common Weed Identification Chart

<http://www.portlandoregon.gov/bes/article/471991>

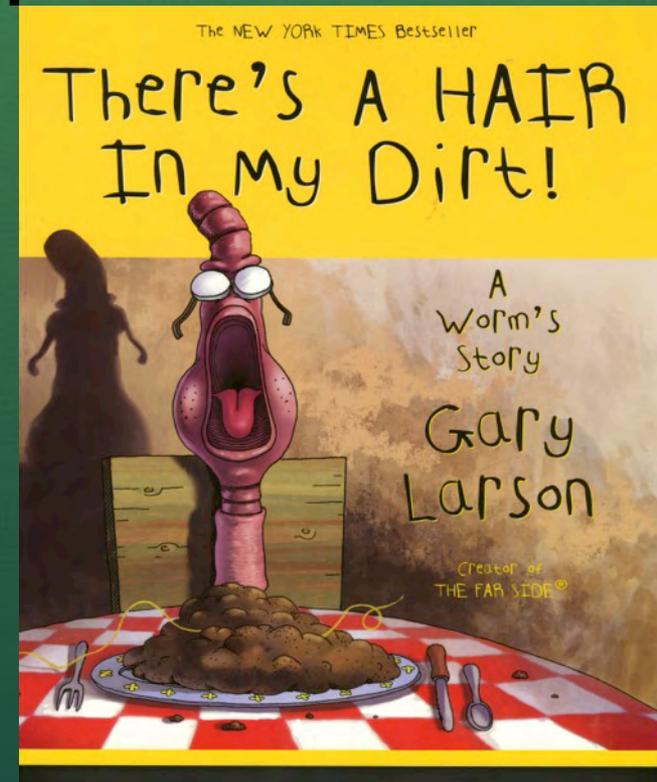
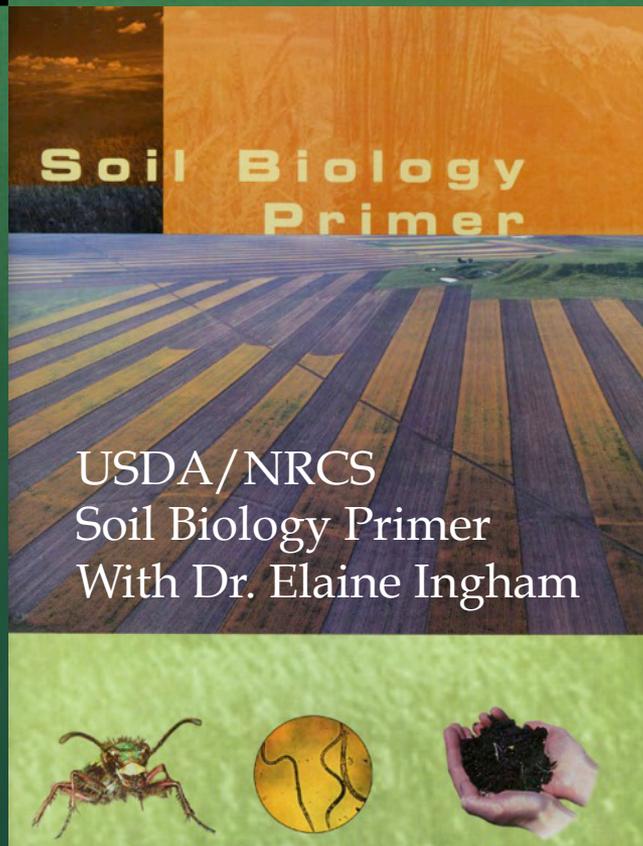
Look to the Weeds - more about what weeds tell us

<http://homestead.org/DianaBarker/LooktotheWeed/SoilIndicators.htm>

Instructional Videos on Numerous Soil and Garden Topics

<http://www.hendrikusorganics.com/video/ciscoe-tv-show/>

Some Good Reads



Thank You!

We appreciate your attending our presentation and hope that we were able to impart some helpful knowledge for your success in working with your soil!

Please leave us your name and email if you would like us to send you a copy of this presentation

www.hendrikusorganics.com