MORRIS WHOLESALE
NURSERY
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SOIL BALANCE AND PREPARATION

A balanced soil involves:
1. Chemical properties – fertility, pesticides, CEC (Cation Exchange Capacity)
2. Physical properties – texture, structure, porosity
3. Biological properties – organic matter, organisms

Limiting factors to plant success:
1. Air – soil oxygen
2. Water – quality, quantity (sodium buildup—test water)
3. Fertility – available plant nutrients

PHYSICAL PROPERTIES OF SOIL:

Mineral – 45% Water – 25% Air – 25% Organic – 5%

Texture = Water Movement = Air Movement — **Primary need for new forming roots is oxygen**.

CHEMICAL PROPERTIES OF SOIL:

Calcium – 68%, Magnesium – 11%, Potassium – 5%, Sodium – 1%, Hydrogen – 10%, Other – 5% = **6.3 pH ALWAYS**

Formula has been around since 1930; developed by University of Missouri

- Gypsum added to soils will lower pH irrelevant of elemental Sulfur in soil.
- Magnesium raises pH 1.4-1.6 times faster than Calcium.
- PH becomes a balance of Base Exchange (CEC); remove Magnesium by adding Calcium.

Analogy: Soil chemistry is like making chili. Chili is made up of hot and mild pepper. Add more hot (Mg) pepper, the hotter the chili (the higher the pH). Vice-versa.

BIOLOGICAL PROPERTIES OF SOIL:

Organic matter addition based on coarse or fine soil type and **only no more than 5%**

- Multiple bed preparation a must as no one type of organic matter will do the job.
- Organic matter increases water holding capacity, porosity, nutrition, CEC, AEC, and food source for organisms.
- How to figure organic matter %: Weight (x) Amount of soil, bake at 580° for 3 minutes.
  Weight again (y), mineral matter remaining
  Difference (z), organic matter burnt away
  Organic matter = z / x

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Choosing which type of organic matter to incorporate in bed preparation involves matching soil type to organic matter kind. Fine (clay) soils need coarse organic matter, while coarse (sand) soils need fine organic matter.

DIFFERENTIATING BETWEEN ORGANIC MATTERS

Fine Organic Matter (Composted)	Coarse Organic Matter (Aged, Processed, Blended)
• High in Sodium and Phosphorus (causes chlorosis)	• Low nutrition
• High pH	• Low pH
• Highly concentrated chemical properties	• Not concentrated chemical properties
• Possibly anaerobic	• Opens heavy soils
	• Uses nitrogen—promotes biological activity

BEFORE YOU AMEND A SOIL, YOU MUST KNOW:

1. Which kind of organic matter is needed?
2. What are the physical properties of the soil?
3. What is the organic content of the soil? (Remember, no more than 5%)
4. What are the chemical properties of the soil?

DON'T USE ORGANIC MATTER TO SOLVE CHEMICAL PROPERTIES OF SOIL. Fine organic matters tend to conflict due to high concentration of chemical properties in composting process.

KNOW THE CHEMISTRY OF THE SOIL BEFORE APPLYING ORGANIC MATTER. Pretest soil and make sure it falls within parameters of chemical formula for all soils. Add drainage if needed.

WHICH TEST TO USE?

SATURATE PASTE – Water base extract lets you know nutrition in solution now.
ACID EXTRACT – Lets you know available nutrition to plant in future.

Two important terms related to soils:

1. Floculate – opens soil, improves water and air movement, colloidal (forms aggregates)
   - Flocculating chemicals in mineral soils: Calcium, Magnesium, Potassium
   - Flocculating chemical in organic soils: Calcium

2. Peptizing – disassociates, runs together, slimes
   - Peptizing chemicals in mineral soils: Sodium (needed only in small quantity (1%))
   - Peptizing chemical in organic soils: Sodium, Magnesium, Potassium