Starting A Garden

Site Selection
Soil Preparation
Raised Beds
Mulch

Starting A Garden
Site Selection

- At least 6 to 8 hours of direct sun
  - 10 or more hours is ideal
- Convenient to kitchen
- Near a supply of water
- Buildings or fences may shade too much
  - Observe shade patterns through the year
  - Watch for reflected glare off buildings
- Avoid planting near trees and shrubs
  - They vie for nutrients and water and can add shade
- Avoid a low spot or at the foot of a slope
- Converting turf requires a great deal of work
  - Eliminate grass, weeds, and soil insects
Here is my yard
😊 “Warts and All”😊
John Worley

A friend’s garden
😊 “Warts and All”😊

Water
Kitchen

4’ x 8’ Raised Beds
Blackberries
Cherry Trees
Chain Link Fence

Tomatoes
Peppers

Starting A Garden
Starting A Garden

Site Limitations

Too shady
Good location
Shade from fence?
Reflected heat
Reflected heat or shade from neighbor’s house
Starting A Garden

Soil Improvement

- Vegetables grow best in a level area with loose, well-drained soil

Benefits of Improving Soil
- Easier to Work
- Reduces Pest Problems and Need for Pesticide
- Saves Water
- Ensures a Healthy Soil Community

“Oops” Onions

“Oops” Wheat
• **Mineral Matter** – 45% of soil’s content
  – Weathered rock that has eroded in place or was deposited by wind, water or ice

• **Open Pore Space** - 50% of soil’s content
  – Half air and half water

• **Organic Material**
  – Decaying plants and animals
  – Organisms such as earthworms, fungi, and bacteria

Amendments mostly broken down

3 Different Soil Mixes

Larger amendments – shredded bark

**Ideal Soil Components**

- Mineral Material: 45%
- Open Pore Space: 50%
- Organic Material: 5%
Types of Soil

• Sand
  – Loose, single grained particles
  – Low in ability to retain water and nutrients – lacks fertility

• Silt
  – Very small particles, mostly undetectable
  – Greater ability to retain water and nutrients - more fertile

• Clay
  – Microscopic particles
  – Excessively holds on to water (drains poorly) and only reluctantly releases
Our Soil – Houston Black Clay

SOIL ASSOCIATIONS

1. Houston Black-Austin association: Gently sloping to sloping, clayey soils that are deep over mantle and shallow on uplands
2. Houston Black-Houston association: Gently sloping to sloping, clayey soils that are deep over compact clays on uplands
3. Trinity-Friole association: Deep, nearly level, clayey and heavy soils on flood plains
4. Houston Black-Burleson association: Nearly level to gently sloping, deep, clayey soils on stream terraces
5. Harris-Houston association: Sloping to strength
   Sloping, eroded, deep, clayey soils on uplands
6. Wilson-Burleson association: Nearly level to gently sloping, deep, clayey and clayey soils on uplands

July 1988
Our Soil – Houston Black Clay

- Surface soil is black due to organic matter
  - Subsoil is yellow below where organic matter gets
- Shrinks and forms hard clods when dry
- Expands and gets sticky when wet
- Drains and dries very slowly
  - Cracks form and close up, but don’t fully “heal”. This low spot is call a *gilgai*
• Quite Alkaline (pH > 7.5)
  – Iron (and other minor nutrient) availability issues
• Most plants like soil that can breathe and drain well, with adequate levels of nutrients and a pH balance that is neutral to slightly acidic

Soil pH and Nutrient Availability

Iron Deficiency
chlorosis on the youngest leaves

Nitrogen Deficiency
chlorosis on the oldest leaves

Iron Deficient Rose
Photo courtesy of Ray Well
University of Maryland

Nitrogen Deficient Tobacco
Photo courtesy of Ray Well
University of Maryland

Soil pH and Nutrient Availability
It is important to read and follow instructions on the back of the form.

Consult website for instructions and download form:

• soiltesting.tamu.edu

<table>
<thead>
<tr>
<th>SAMPLE INFORMATION (Required)</th>
<th>(see options listed below)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory #</td>
<td>My Sample</td>
</tr>
<tr>
<td>For Lab Use</td>
<td>ID</td>
</tr>
<tr>
<td>Example</td>
<td>Front Yard</td>
</tr>
</tbody>
</table>

### Annual, Flowers and Gardens
- A. Azaleas and Camellias
- B. Azaleas
- C. Cannas
- D. Vegetable Garden
- E. Other

### Turfgrass
- F. Common Bermudagrass
- G. Hybrid Bermuda grass
- H. St. Augustine grass
- I. Centipedegrass
- J. Buffalo grass
- K. Tall Fescue
- L. Kentucky Bluegrass

### Trees and Woody Ornamentals
- M. Pecan trees
- N. Fruit trees
- O. Shrub and Ornamentals
- P. Shade trees
- Q. Other trees

Describe any problems you have observed and want to correct:

1. Routine Analysis (R): $10 per sample
   - (pH, NO₃, N, P, K, Ca, Mg, Na, S and Conductivity)
   - (This test is a basic test for basic fertilizer recommendations.)
2. R + Micronutrients (Micro):
   - (Includes Test 2 plus boron)
3. R + Micro + Boron (B):
   - (Recommended for individuals applying compost and manures)
4. R + Detailed Salinity:
   - (Includes Test 1 plus detailed salinity analysis)
   - (Recommended for individuals using lower quality irrigation water)
5. R + Micro + Detailed Salinity:
   - (Includes Test 2 plus detailed salinity analysis)
6. Routine Analysis + Organic Matter:
   - (Includes Test 1 plus organic matter analysis)
7. R + Micro + Organic Matter:
   - (Includes Test 2 plus organic matter analysis)
8. R + Micro + B + Organic Matter:
   - (Includes Test 3 plus organic matter analysis)
9. R + Texture (determines % sand, silt, and clay):
   - (Includes Test 1 plus texture analysis)
10. R + Micro + Texture:
    - (Includes Test 2 plus texture analysis)
11. R + Micro + B + Organic Matter + Detailed Salinity:
    - (Includes Test 3 plus detailed salinity analysis)
    - (Includes Test 6 plus detailed analysis and detailed salinity and provides the most comprehensive data needed for troubleshooting most plant/soil growing issues (does not address pathogen, pesticide or herbicide issues)).

Pricing valid until 12-31-2013.

The latest form can be downloaded at the laboratory's website: soiltesting.tamu.edu
### Soil Testing

**Collin County**
- **Laboratory Number:** 245353
- **Customer Sample ID:** 2
- **Crop Grown:** FLOWERS

<table>
<thead>
<tr>
<th>Analysis</th>
<th>Results</th>
<th>CL*</th>
<th>Units</th>
<th>ExLow</th>
<th>VLow</th>
<th>Low</th>
<th>Mod</th>
<th>High</th>
<th>VHigh</th>
<th>Excess</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>pH</strong></td>
<td>8.0</td>
<td>(6.2)</td>
<td>-</td>
<td>Mod. Alkaline</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Conductivity</strong></td>
<td>245</td>
<td>(-)</td>
<td>umho/cm</td>
<td>None</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Nitrate-N</strong></td>
<td>1</td>
<td>(-)</td>
<td>ppm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Phosphorus</strong></td>
<td>4</td>
<td>(50)</td>
<td>ppm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Potassium</strong></td>
<td>173</td>
<td>(175)</td>
<td>ppm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Calcium</strong></td>
<td>6.408</td>
<td>(180)</td>
<td>ppm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Magnesium</strong></td>
<td>273</td>
<td>(65)</td>
<td>ppm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sulfur</strong></td>
<td>47</td>
<td>(13)</td>
<td>ppm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sodium</strong></td>
<td>249</td>
<td>(-)</td>
<td>ppm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Iron</strong></td>
<td>10.00</td>
<td>(2.25)</td>
<td>ppm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Zinc</strong></td>
<td>1.44</td>
<td>(0.27)</td>
<td>ppm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Manganese</strong></td>
<td>3.12</td>
<td>(1.00)</td>
<td>ppm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Copper</strong></td>
<td>0.67</td>
<td>(0.16)</td>
<td>ppm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Boron</strong></td>
<td>0.00</td>
<td></td>
<td>ppm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Limestone Required</strong></td>
<td>0.00 lbs/1000sq ft</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Textural Analysis Test (hydrometer):**
- **Sand:** 35%
- **Silt:** 43%
- **Clay:** 22%

**Textural Class:** Loam

**Organic Matter:** 1.10%

*CL* = Critical level is the point which no additional nutrient (excluding nitrate-N, sodium and conductivity) is recommended.

---

**Fertilizer Recommended:**
- 1.4 lbs N/1000sq ft
- 2.7 lbs P2O5/1000sq ft
- 0 lbs K2O/1000sq ft
- 0 lbs Ca/1000sq ft
- 0 lbs Mg/1000sq ft
- 0 lbs S/1000sq ft

---

**Starting A Garden**
How do you turn your soil into that nice, loose, aggregate mixture that simultaneously holds water and drains well?

- Add organic matter
- Add expanded shale

“Expanded shale, a gravel-size rock that is pumped full of air, aerates clay soil, makes it easy to work, and helps it drain better.”

- Dr Steve George, a Texas A&M Extension Horticulturist in Dallas
What is Organic Matter?

- Decomposing once living matter such as: vegetables, fruits, grass clippings, wood, and leaves
- Composted organic matter looks like dark, rich garden soil
- Organic matter is dark and crumbly with small sized particles
- It looks and smells like the forest floor!
Benefits of Compost

- Humus rich product that is packed with beneficial nutrients necessary for healthy plant development
- Builds soil health through attraction of beneficial organisms
- Aids in breaking up clay soil.
- Retains moisture, requiring less water
• For new raised bed gardens in sticky / gumbo-type clay soil
  – Remove the top 2 inches of soil, particularly sod
    • This also removes lots and lots of weed seeds
  – Add 3 inches of expanded shale on top
  – Till or spade it in 6 to 8 inches deep
  – Add 3 inches of finished, plant-based compost
  – Till or spade again
  – Results in a 6-inch raised bed.
    • Crown the bed to further improve water drainage
Successful Raised Bed Gardens

Starting A Garden
12” deep boxes from 2”x6” untreated pine

1 coat Latex Primer

2 coats Exterior Latex

Now for the hard part!!!

Plan the layout of your garden

These beds will sit on top of the ground.
The grass is removed, but the native soil is not improved.

Starting A Garden
Starting A Garden

Sod removed and drip lines connected

$\frac{1}{2}$” Funny pipe to all boxes

$\frac{1}{4}$” hose to drip outlets

For root vegetable beds use sprayer heads

The finished product!!!

Starting A Garden
Success!!

Starting A Garden
Place frames. Add leftover soil and organic matter to fill.

Layout beds, remove sod, set some soil aside. Add organic matter.

8” deep boxes – 3’x5’ and 4’x4’ from 2”x8”x8’ and 2”x2” Cedar

Add supports and 2”x6” Cedar tops

Plastic edging to block roots
Utility Raised Beds

- **4’x8’ wooden beds**
  - Inexpensive metal straps around the corners helps stabilize them

- **Concrete block beds**
  - Marigolds planted in the block voids

Starting A Garden
Ornamental Raised Beds

- Stone or Retaining Wall Block edges
Advantages of Mulch

• Conserves water
• Reduces weeds
• Prevents soil compaction
• Moderates soil temperature
• Prevents soil erosion in heavy rain
• Reduces diseases
• Slow decomposition of mulch encourages soil health
  – Rapid decomposition can rob Nitrogen from the soil

Starting A Garden
Types of Mulch

• Straw (usually wheat)
  – Hay is full of weed seeds
• Pine needles
• Chipped or Shredded Bark
• Composted materials
• Peat Moss