Super Soil for Organic Gardening

George Bushell
“Feed your soil, not your plants”
(Thomas Jefferson)

What Makes A Healthy Soil

- Soil Type
- Correct pH Range
- Proper Nutrients
- Good Drainage
- Lots of Organic Matter
- Appropriate Moisture Levels
- Sufficient Sunlight
Basic Soil Structure And Types

3 Basic Types

- **Silty Soil**
  - Squeezed wet soil forms partial ball

- **Sandy Soil**
  - Squeezed wet soil forms no ball

- **Clayey Soil**
  - Squeezed wet soil sticks together while dry soil cracks

Structure

- **Top Soil**
- **Sub Soil**
- **Base**
Analyzing Soil Composition

1 - Place a couple of handfuls of test soil in a glass jar

2 - Fill jar with water

3 – Shake soil / water mixture and let sit for 12 hours

4 - Observe soil composition

No raw organic matter on surface

Typical Soil Sold in Ottawa

80% sand
18% silt
2% clay
**Soil Type**

**Best Soil** – Silt: 50%
Sand 25%
Clay: 25

Add Compost to All Soil Types – improves organic matter, drainage, nutrients, workability

- **Sandy Soil**
  - Dries out quickly
  - Low nutrient levels
  - Drains well (if not underlain by clay)
  - 0 to 10% Clay +
  - 0 to 10% Silt +
  - 80 to 100% Sand +++

- **Clay Soil**
  - Sticky when wet
  - Hard when dry
  - Difficult to work
  - High mineral content
  - Drains poorly
  - 50-100% Clay +++
  - 0 to 49% Silt +
  - 0 to 49% Sand +

- **Silty/Loam Soil**
  - Good when wet
  - Good when dry
  - Easy to work
  - High nutrient content
  - Drains well
  - 10 to 30% Clay +
  - 30 to 50% Silt ++
  - 25 to 50% Sand +++

Add Compost to All Soil Types – improves organic matter, drainage, nutrients, workability
Soil pH (measure of acidity/alkalinity)

- 7.0 indicates a neutral soil
- A change of one (e.g. 7.0 to 6.0) indicates a 10 fold increase in acidity
- >7.0 indicates an alkaline soil
- <7.0 indicates an acidic soil
- The majority of plants prefer a reading of 6.0 to 6.5
- Potatoes & strawberries prefer a more acidic soil (5.5 – 6.0)
- Brassicas prefer less acidity (alkaline soil) (near 7.0)
- Wood ashes & limestone decrease acidity - increase alkalinity
- Sulphur powder decreases alkalinity - increases acidity
### pH Preference
(7.0 is neutral)

<table>
<thead>
<tr>
<th>Vegetable</th>
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<tbody>
<tr>
<td>Cabbage</td>
<td>~7.0</td>
<td>Beans</td>
<td>6.0-6.5</td>
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<tr>
<td>Broccoli</td>
<td>~7.0</td>
<td>Carrots</td>
<td>6.0-6.5</td>
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<tr>
<td>Cauliflower</td>
<td>~7.0</td>
<td>Eggplant</td>
<td>6.0-6.5</td>
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<tr>
<td>Beets</td>
<td>~7.0</td>
<td>Parsnips</td>
<td>6.0-6.5</td>
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<tr>
<td>Turnip</td>
<td>~7.0</td>
<td>Peas</td>
<td>6.0-6.5</td>
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<tr>
<td>Cucumber</td>
<td>6.5-7.0</td>
<td>Peppers</td>
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<tr>
<td>Lettuce</td>
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<td>Pumpkin</td>
<td>6.0-6.5</td>
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<td>Melons</td>
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<td>Squash</td>
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<td>Onions</td>
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<td>Tomatoes</td>
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<td>Spinach</td>
<td>6.5-7.0</td>
<td>Potatoes</td>
<td>4.5-6.0</td>
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<td>Celery</td>
<td>6.5-7.0</td>
<td>Radish</td>
<td>4.5-6.0</td>
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<tr>
<td>Corn</td>
<td>6.5-7.0</td>
<td>Watermelon</td>
<td>4.5-6.0</td>
</tr>
</tbody>
</table>

- Sulphur powder increases acidity – decreases alkalinity
Three Main Vegetable Nutrients

- Nitrogen (N)
- Phosphorus (P)
- Potassium (K)

Plus Many Minor Nutrients
Nitrogen (N) - enhances green, leafy growth

Preferred by: leafy green vegetables, such as lettuce, spinach, chard, cabbages, broccoli, cauliflower, corn

Source: compost, plowed down green plants (e.g. rye, oats, buckwheat), fish emulsion
Phosphorous (P) - hastens ripening & improves flavour

Preferred by: **Fruiting vegetables such as tomatoes, peppers, eggplant, beans, melons, squash**

Source: bone meal, rock phosphate
Potassium (K) – encourages root growth

Preferred by: carrots, radish, parsnips, turnips, rutabagas, potatoes

Source: wood ashes, sea weed

Beets
Carrots
Parsnips
Rhutabagas
Radishes
Liquefied Sea Weed
Wood Ashes
Plants Need Good Drainage

- Raised beds improve drainage where needed
- Soil warms faster in spring
- Should provide raised edge to prevent water run-off when watering
Building Wooden-Sided Raised Beds

Use metal rebar or any old metal stake – wooden stakes rot

Eastern white cedar slabs and poor quality planks are sometimes free or cheap at local area saw mills

Angle sides inward slightly to prevent winter collapse
Building Wooden-Sided Raised Beds

Connect side slabs with metal strips and short screw nails

Connect end slabs to sides with metal strips & short screw nails

Plank Side Raised Beds

Connect side planks with metal strips and short screw nails

Connect end planks to sides with long screw nails or nails
Other Types Of Raised Beds

- **Cold Frame / Raised Bed**
- **Cement Block Raised Bed**
- **Untreated Cedar Planks**
- **Up-scale Raised Beds**
- **Stone Sided Raised Bed**
Building Grass-Sided Raised Beds - #1

1 - Laying out the beds (about 5’ wide)

2 - Cutting the sod into 1 foot strips

3 - Rolling up the sod

4 - Excess sods placed upside-down in bottom of bed

5 - Starting to place topsoil in bed
Building Grass-Sided Raised Beds - #2

6 – Propping up sod sides with soil (place at an angle)

7 – Completely fill the raised bed with topsoil

8 – Smooth the top of the bed (leave an edge for efficient watering)

9 – The finished product
Good Drainage (Cont’d)

Raised Beds Improve Drainage

But Hilled Beds:
- difficult to water efficiently
- must use considerable compost to prevent run-off
Compost Adds Organic Matter (N), Conserves Moisture, Improves Drainage & Adds Fibre (easier to work)

Add compost as mulch in June and dig into the soil in the fall

Add as much compost as possible
Make Your Compost

Save:
- fruit & vegetable scraps
- all yard trimmings, etc
- eggshells & hair
- tea bags, coffee grounds

Do Not Compost:
- meat or dairy products
- pet waste

Add to the composter in winter too

Most commonly available composter

Three composters are better than one

Keep a container handy under the sink

Best Mix for Quick Composting

50% brown (carbon)  50% green (nitrogen)

Year 1

Year 2

Year 3

Add to the composter in winter too
Turn Over Your Compost Once Per Year

- Keep 3 bins
- Each spring, remove bins from compost
- Turn over compost
- Place back in bins
- Use compost in 3rd year
7: Hide Your Composters

Build a Divider to hide Composters in the back corner of your yard

Or hide a single composter behind a rose / clematis / etc trellis
8: Other Composters

- Experimental Farm Wire Mesh Composter
- Rodale Farm (PA) Row Composter with Aerator
- Rotating Quick Composter
- Two Bin Composter
- Wood Chipper
- Worm Composting
Providing The Right Amount of Moisture

- If using a sprinkler, water in the morning or evening to minimize evaporation & conserve water – a soaker hose & mulch saves water

- Established plants need about one inch of water each week - mulch & only water if not enough rain

- Create soil ridges around hills and beds to reduce runoff & increase seepage to root areas

- If warm, transplants require daily watering during 1st week
Install A Rain Barrel

- Rain water filter
- Converted whiskey barrel
- Fancier Rain Barrel
- Simpler Rain Barrel
- Most vegetables need a minimum of six hours of sunlight each day

- Some leafy green veggies can survive in partial shade
Start With Good Soil - Finish With Great Veggies