

Basic Skills and Techniques in Vegetable Production



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Let's start with Prozac!

- FLUOXETINE belongs to a class of drugs known as selective serotonin reuptake inhibitors (SSRIs).
- It helps to treat mood problems such as depression, obsessive compulsive disorder, and panic attacks.
- It can also treat certain eating disorders.

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London's Times



IT WAS BOUND TO HAPPEN

Urban Existence



Is Dirt the New Prozac?

From the Journal of *Neuro-science*:

Injections of soil bacteria produce serotonin—and happiness—in mice.

Recent studies indicate that treatment with a specific soil bacterium, *Mycobacterium vaccae*, may be able to alleviate depression.

Lung cancer patients who were injected with killed *M. vaccae* reported better quality of life and less nausea and pain.

The bacteria, when injected into mice, activate a set of serotonin-releasing neurons in the brain—the same nerves targeted by Prozac.

The Case for Gardening

Getting your hands dirty is goof for you!

- Routine exposure to harmless microorganisms in the environment—soil bacteria, for instance—trains our immune systems to ignore benign molecules like pollen or the dandruff on a neighbor's dog.
- Some researchers have proposed that the sharp rise in asthma and allergy cases over the past century stems, unexpectedly, from living too clean.

Basic skills set for a vegetable/herb farmer

- Soils (type, pH)
- Crop knowledge
- Field preparation
- Planting seeds, transplants
- Vertical growing, trellis (peas), cages (tomatoes)
- Raised bed growing
- Flat-field growing
- Mulching
- Harvesting (hand, mechanical)
- Weather/season
- Use of season extenders
- Pest/weed control
- Fertilization
- Irrigation
- Adding value
- Marketing

Planning the Garden

- Prepare a plot plan on paper
- Do soil and water testing to determine nutrient levels, salt levels and pH
- Follow planting dates recommendations
- Purchase seeds that are packaged for the desired planting period
- Prepare seedling boxes
- Prepare the soil

Site Selection

- **Location** - A sunny, easily watered spot, ideally located
- **Sunshine** - Vegetables do best with 5-6 hrs of full sunlight (Esp. corn, peppers, tomatoes, cucumbers and melons). Leafy crops can withstand more shade.
- **Root Competition** – Trees and desirable shrubs compete for nutrients and moisture. Dig a ditch 1-2 ft deep and place roofing paper or tin in it as root barriers
- **Soil** – Vegetables can grow wherever weeds grow. Add topsoil or organic matter, or produce veggies in raised or box beds, or adopt soil-less culture techniques

Soil type

- The degree of sand, loam and clay determines the soil type
- The degree of sand in the soil determines the ability to percolate water
- The greater the percolation the better the chance of nutrients being leached from the root zone



Florida Soil Profile

Why is pH Important

- The pH of the soil has a direct influence on what nutrients are available to plants.
- If pH is above or below the recommended range for that plant, then nutrients may not be soluble (absorbable by plants) or they may be so soluble that they leach or become phytotoxic.
- pH also influences the activity of soil microorganisms.

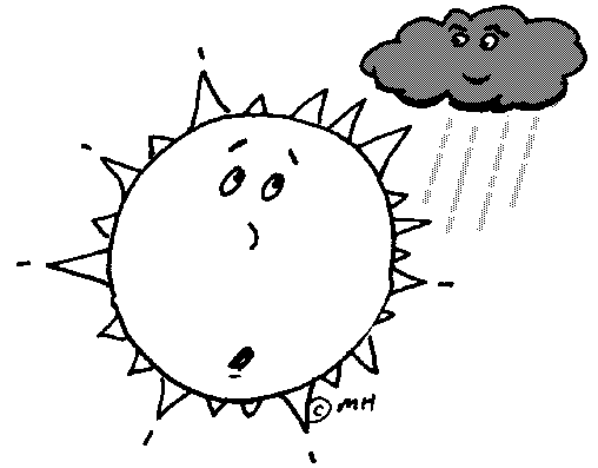
Nutrients - NPK

- Nitrogen
- Phosphorus
- Potassium



Factors Affecting Crop Establishment

- Soil temperature
- Soil moisture
- Planting window for flower and fruit formation, and maturation of harvested portions



Plant Systems

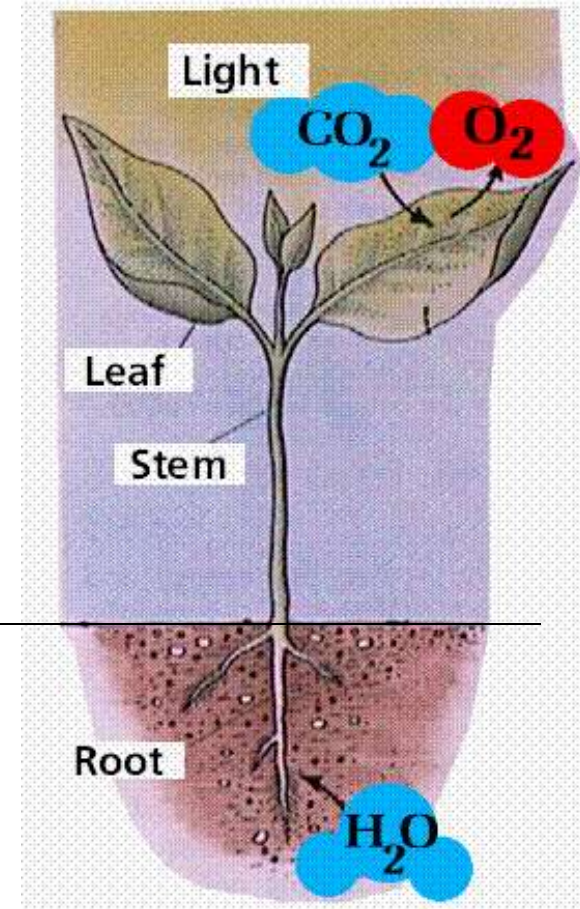
A plant has two organ systems:

1) the shoot system

2) the root system.

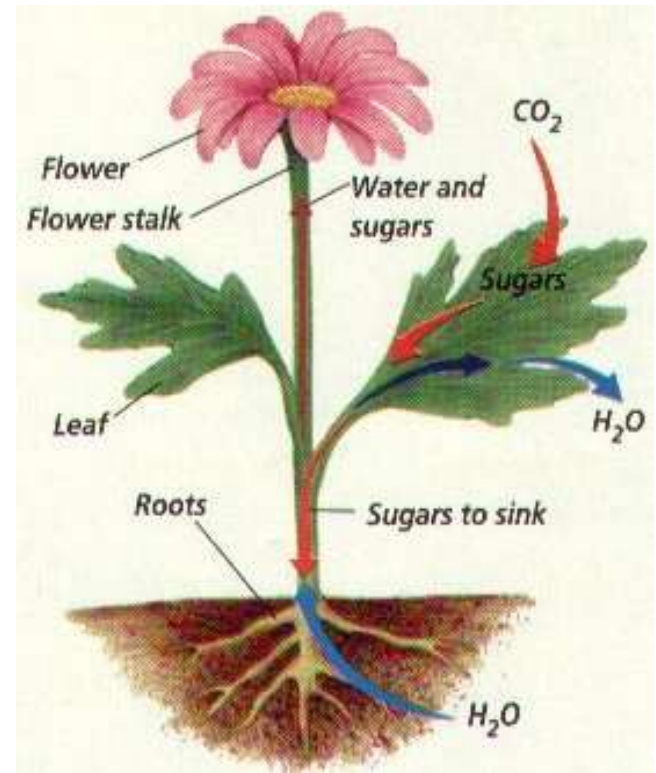
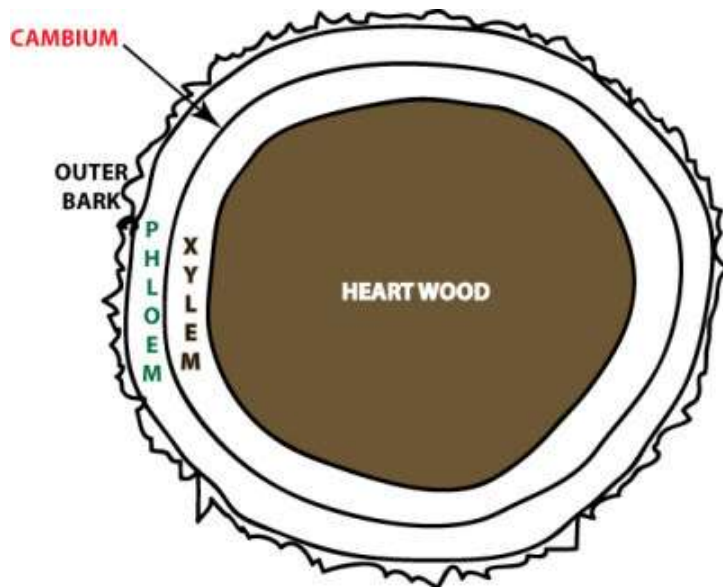
- The shoot system is above ground and includes the organs such as leaves, buds, stems, flowers (if the plant has any), and fruits (if the plant has any).

- The root system includes those parts of the plant below ground, such as the roots, tubers, and rhizomes.



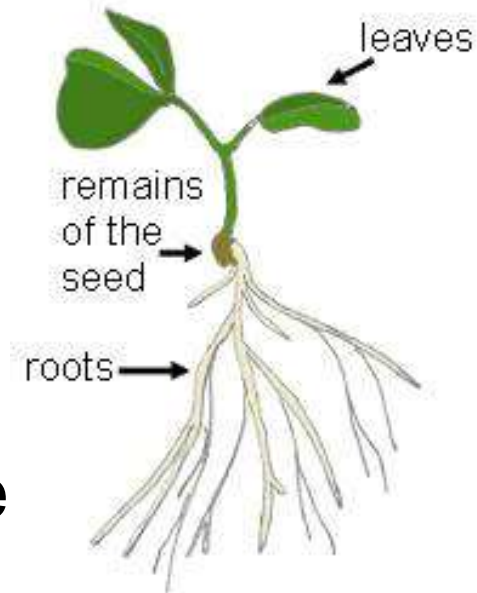
Xylem and Phloem Vessels

- The Xylem carries water (with nutrients) UP from the **root system** into the **shoot system**
- The Phloem carries foods manufactured in the leaves from the **shoot system** DOWN to the **root system**



Soil - Where Control Begins

- Transplants are often an ideal method for establishing production fields of vegetables
- During the production of transplants, certain soil borne plant diseases can occur.
- “Soil borne disease” relates to a disease that affect roots (root rot), lower stems (stem rot), or other plant parts in contact with the soil (tubers, bulbs, fruits, etc).



Clean Soil, Clean Vessels

- **A thorough disease control program for root and stem rot diseases will assist in control of certain other types of plant diseases .**



Composting for 'cleaner soil'

Types of composting techniques include:

- Cold Composting
- Hot Composting
- Worm Composting or Vermiculture



Cold Composting (Slow Composting)

- All organic matter eventually decomposes.
- Composting speeds the process by providing an ideal environment for bacteria and other decomposing microorganisms.
- The final product, humus or compost, looks and feels like fertile garden soil.



Pile of leaves left to compost or break down

Hot Composting – *the steps*

- Gather 50% carbon-rich (brown materials) and 50% nitrogen-rich (green materials)
- Shred materials to increase the surface area.
- Build the pile with a 4" to 6" base of brown material, which will allow air into the pile at the bottom. Moisten these materials.
- Alternate layers of green and brown materials, adding water and a scoop or two of soil until the pile is three to four feet high (or the bin is full).
- Cover the pile with a lid, tarp, plastic bags or other material.
- Monitor the heat in the center of the pile. It should peak 170 degrees F about four to seven days later.
- Every time the temperature peaks, turn the pile.
- Continue this turning process until compost is finished in about four weeks.

Ingredients for a hot compost



Carbon Rich Material



Shovel full of soil



Water



Nitrogen Rich Material

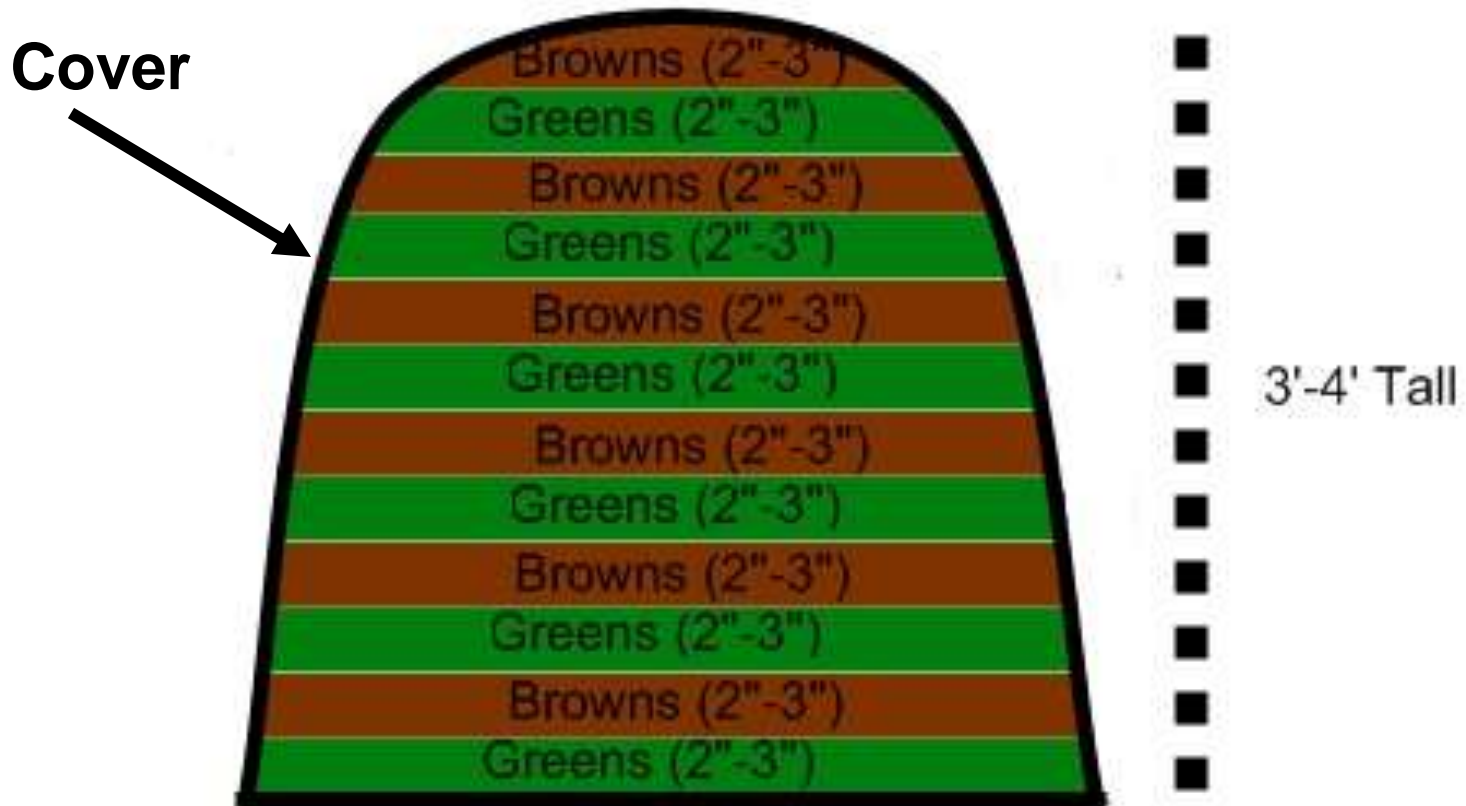


Thermometer



Black Tarp

Hot Compost - Layers



Starting Seedlings (Transplants)

Commercial seedling nursery



The Home Depot System



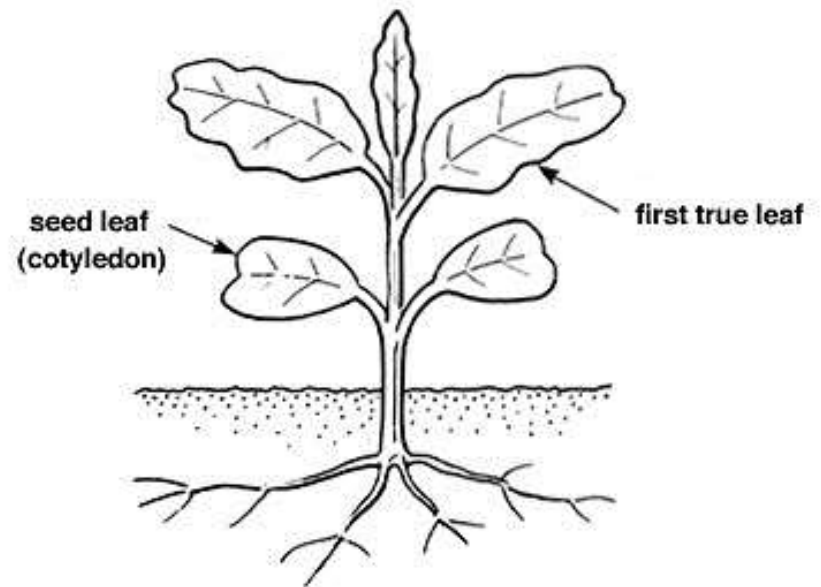
Seedling trays



Transplanting Depth

Research findings

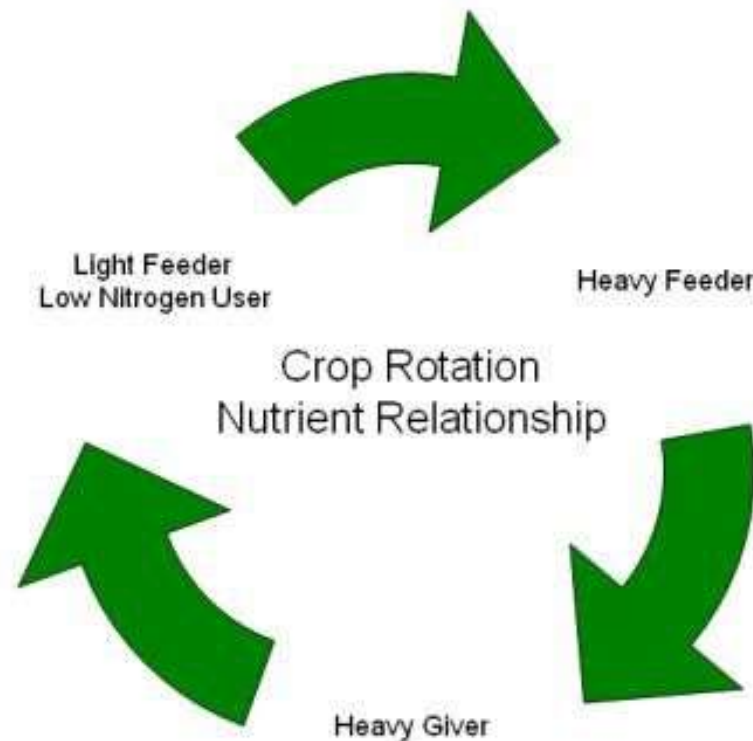
- Set tomato, pepper, and watermelon transplants to the depth of the first true leaf
- Earlier yields and larger fruit size results



Clean Soil, Clean Vessels

- The most common fungi that cause soil borne diseases on transplants are *Fusarium* spp., *Pythium* spp., and *Rhizoctonia* spp.
- Some fungi and bacteria that cause disease on other plant parts (leaves, flowers, fruits, etc.) may be considered to be soil borne as they may have originated in the soil on undecomposed plant material from previous plant growth (weeds or crops).
- **A thorough disease control program for root and stem rot diseases will assist in control of certain other types of plant diseases .**

Crop Rotation as a Management Strategy



Crop Rotation Models



These groups should be rotated together as they use soil in similar ways and share similar pests.

- **Alliums**
Onions, Garlic, Scallions, Shallots, and Leeks.
- **Brassicas**
Broccoli, Cauliflower, Cabbage, Brussels Sprouts, and Kale.
- **Crucifers**
Turnips, Radishes, Rutabaga, and Collards.
- **Cucurbits**
Cucumbers, Squashes (from zucchini to pumpkin), and Melons.
- **Legumes**
Peas and Beans.
- **Mescluns**
Arugula, Swiss Chard, Chicory, Endive, Escarole, and Radicchio.
- **Solanaceae**
Tomatoes, Peppers, and Eggplant.

Classifying Disease Pathogens

- A pathogen is a biological agent that causes a disease to occur
- The main plant pathogens can be classified into four main categories
- (a) Fungi (85% of plants diseases)
- (b) Bacteria
- (c) Virus
- (d) Nematodes



Disease 'Conditions'

- Nutrient imbalance
- Chemical damage
- Mechanical damage
- Environmental damage
- Genetic imperfections



Climatic and Weather Effects on Vegetables

| Cold/Frost | Heat | Flooding |
|-------------------------|---------------------------------|----------------------|
| Slow seed Germination | Loose cabbage and lettuce heads | Fungal problems |
| Leaf discoloration | Bolting | Poor nutrient uptake |
| Flower dropping | Poor root enlargement | Root death |
| Pod/fruit discoloration | Undesired flavor | Plant death |

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