Fertilizers
– Case Study 1: Your grandmother wants to build a small garden in her backyard. She lives near a city and does not have a large budget for this. Should she use an organic or inorganic fertilizer?

– Case Study 2: In order for the horticulture department to have its vegetable garden it needs to increase its field’s phosphorus levels. Although the nitrogen level does not need to change. We will buy a bag of N-P-K fertilizer. Do we need a complete or incomplete fertilizer?

– Case Study 3: There is a new producer down the street. He has built a new greenhouse and for his first year he does not want to have to put together any equipment to fertilize. His plants also need something that will slowly release overtime. Does he need soluble or insoluble fertilizer?
Types of Fertilizers

- Complete
- Incomplete
- Organic
- Inorganic
- Soluble
- Insoluble
Complete vs. Incomplete

- Complete has all three primary nutrients—nitrogen, phosphorus, and potassium.
  - Examples: 10-10-10, 15-30-15, 20-5-20

- Incomplete DOES NOT have all three primary nutrients.
  - Examples: 20-0-0, 0-20-0, 12-0-44
Organic Fertilizers

- Comes from plant or animal matter and contains carbon compounds
- Examples: urea, sludge and animal tankage
Advantages of Organic

• Slow release of nutrients
• Not easily leached from the soil
• Add organic components to growing media
Disadvantages of Organic

- Hard to get
- Not sterile
- Low nutrient content
- Expensive
Inorganic Fertilizers

• Comes from sources other than animals or plants
• Chemical products
Advantages of Inorganic

- Can make the desired ratio of nutrients
- Easy to get
- Lower cost
Disadvantages of Inorganic

• No organic material
• possible chemical building up in growing media
Soluble Fertilizer

- Dissolve in water and are applied as a liquid solution
- Fertigation
  - fertilizing through irrigation water
  - big advantage
Insoluble Fertilizer

- Includes granular and slow release applied to the growing media
Granular vs. Slow Release

- **Granular**
  - relatively inexpensive
  - easy to find

- **Slow Release**
  - more expensive because it is coated
  - more uniform release of nutrients over time period
Fertilizer analysis expresses weight as a percent of nitrogen, phosphorus and potassium
Fertilizer Analysis

- For Example
  - A 100 pound bag of fertilizer has an analysis of 15-5-15. How many pounds of nitrogen, phosphorus and potassium are in the bag?
    - Nitrogen: 100lbs X 15% = 15lbs
    - Phosphorus: 100lbs X 5% = 5lbs
    - Potassium: 100lbs X 15% = 15lbs
• A fertilizer with a 10-10-10 analysis would have a 1:1:1 ratio
• A fertilizer with a 24-8-16 analysis would have a 3:1:2 ratio
• What would be the ratio for a fertilizer with an analysis of 36-18-27?

4:2:3
What's In The Bag

200 LBS NET

4-10-6

GENERAL CROP

GUARANTEED ANALYSIS

Total Nitrogen 4%
Water Insoluble Nitrogen 25% of Total
(Optional On general Crop Fertilizer)

Available Phosphorus 10%
Available Potash 6%

Total Calcium Oxide 14%
Total Sulphur 5%
Total Magnesium Oxide 5%

Nonacid Forming Basic 5%

Manufactured By
JOHN DOE COMPANY
WILMINGTON, NC
Application Procedures

• Banding
• Sidedressing
• Topdressing
• Perforating
• Broadcasting
• Foliar spraying
• Fertigation
Banding

• Placing a band of fertilizer about two inches to the sides and about two inches below seed depth.

• DO NOT place below the seeds because fertilizer will burn the roots.
• Placing a band of fertilizer near the soil surface and to the sides after seedlings emerge from the soil.
Topdressing

• Mixing fertilizer uniformly into the top one to two inches of growing media around the plant.
• Placing fertilizer in 12”-18” holes drilled 18” to 24” around the canopy drip line of fruit trees. Cover the holes and fertilizer slowly dissolves.
Broadcasting

- Spreading fertilizer to cover the entire production area
Foliar Spraying

- Spraying micronutrients in a solution directly on plant leaves.
- Quickly corrects nutrient deficiencies
- Fertilizer concentration should not be too high or leaf burning will occur.
• Incorporating water-soluble fertilizer into the irrigation system of greenhouse and nursery crops.

• Concentrated solutions usually pass through proportioners or injectors to dilute to the correct ratio.
  – Venturi-type
  – Positive-displacement
Venturi-type

- Simple and inexpensive
- less accurate
- depends on water pressure in the hose and in the smaller tube to proportion
- Example: Hozon
Positive-displacement

- More expensive
- very accurate
- physically inject and mix specific amounts of concentrated solution and water
- Examples: commander proportioners, and Smith injectors
Rules for applying fertilizers

• Method used should be practical, effective and cost efficient
• Method used affects nutrient availability for plant use
• Fertilizer must be dissolved and reach plant roots