HEALTHY SOILS FOR HEALTHY BLUEBERRIES

Dr. Ben Fuqua
Emeritus Professor
College of Agriculture
Missouri State University

HEALTHY SOILS FOR HEALTHY BLUEBERRIES

SOIL HEALTH (QUALITY) – **Capacity of a soil to function within natural or managed ecosystems to sustain plant and animal productivity, maintain or enhance water and air quality, and support human habitation**

DETERMINING SOIL HEALTH

- **PHYSICAL INDICATORS**
  - **Soil texture**
  - **Soil depth - depth of root penetration**
  - **Bulk Density of soil**
  - **Infiltration capacity of surface**
  - **Water-holding capacity**

DETERMINING SOIL HEALTH

- **CHEMICAL INDICATORS**
  - **Soil acidity (pH)**
  - **% Organic Matter**
  - **Cation Exchange Capacity (CEC)**
  - **Extractable Plant Nutrients**
  - **Electrical Conductivity**

DETERMINING SOIL HEALTH

- **BIOLOGICAL INDICATORS**
  - **Microbial numbers**
  - **Microbial respiration**
  - **Microbial activity**
  - **OM content and OM form**

"IDEAL" SOIL FOR BLUEBERRIES

1. coarse (sandy-type) soil texture
2. high organic matter (4+ %)
3. well-drained
4. good water holding capacity
5. low pH

pHs vs pH

- Soil pH is the most critical chemical property for successful blueberry growth and production.
- pH measures the acidity in the soil solution.
- pH can be expressed as pHs or pH(water)
- pH = pHs + (0-0.5)
  - pHs of 5.3 = pH of 5.3-5.8

LOWERING SOIL pH

- Granulated sulfur
  - Sandy loams and loamy sands 0.5 -0.75 # per 100 ft^2
  - Loams and silt loams 1-1.5 # per 100 ft^2
  - Clay loams 1.5-2.0 # per 100 ft^2
- Aluminum Sulfate and Iron Sulfate can also be used but are generally more expensive

BENEFITS OF ORGANIC MATTER ADDITIONS

- Add organic matter to improve water/air relationships
- Prior to planting – grow cover crops and incorporate
- Add peat moss when planting blueberry plants
- Use organic mulches to conserve soil moisture and help control weeds
- Organic matter decomposition provides some N to plants

BENEFITS OF MICRO/MACRO ORGANISMS

- Most microbes work best at pH 6.0 - 8.0
- Fungi, bacteria, actinomycetes act as decomposers of organic matter, releasing nutrients for plant uptake
- Some bacteria and fungi function in acid soil conditions (help control soil pH)
- Earthworms work best at pH 6.0-6.5, however some earthworm species have been found to work well in acid soils

MYCORRHIZAL FUNGI

- Mycorrhizal fungi form a symbotic relationship with plant roots thereby extending the root system and enhancing water and plant nutrient absorption.
- Mycorrhiza have been studied extensively on trees and have been shown to benefit overall plant growth
- The affect of several species of mycorrhiza are currently being evaluated on blueberry plants
- Research results on blueberry plants have been inconsistent

Missouri Challenges

- Soils – soil pH, low organic matter, poor drainage
- Water – irrigation, mulches, berms
- Pests – diseases, insects, birds, birds,and more birds
- Promoting Missouri grown blueberries
- Educating consumers on the multiple uses of blueberries
- Marketing - “No Problem”

BLUEBERRIES: FACT OR FICTION

- 1. Missouri soils are ideally suited for blueberry production
- 2. Blueberries should be grown on the less productive soils in Missouri.
- 3. Majority of blueberry plantings in Missouri are less than 10 acres.
- 4. Blueberry yields of 10+ pounds per plant are possible in Missouri.
- 5. Most blueberries in Missouri are harvested by Upick.

BLUEBERRIES: FACT OR FICTION

- 6. Disease, insect, and other pests problems will increase as the acreage of blueberries increase
- 7. Blueberries are an excellent crop for "week-end" farmers, because they require little care
- 8. Health benefits from eating blueberries continue to be discovered
- 9. Consumption of blueberries continues to increase in Missouri
- 10. Demand for fresh blueberries in Missouri exceeds supply