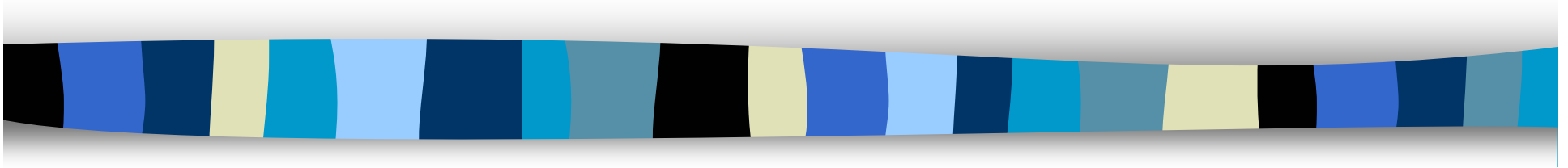


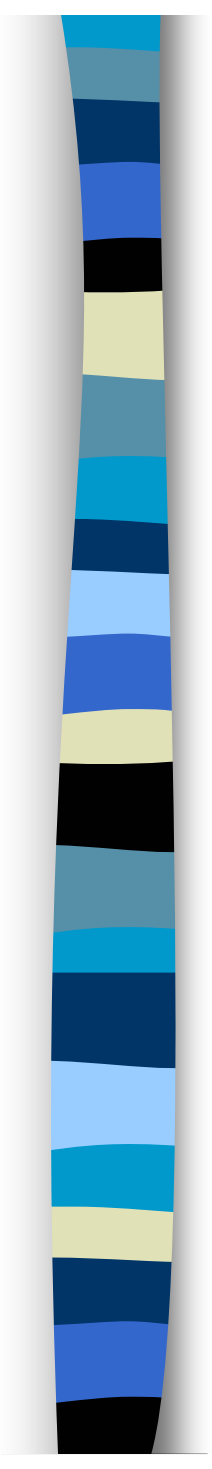
Does Soil Organic Matter Matter?



Donald Genrich

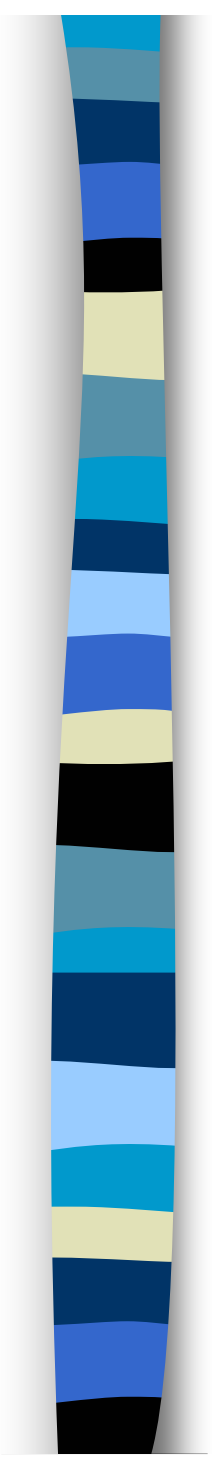
Agriculture and Natural Resources Agent for
Adams County

January 18, 2005



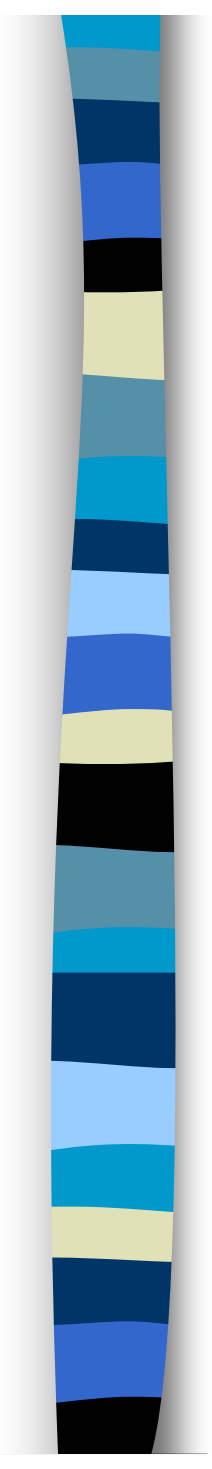
Soil is Alive

- Soil is a living entity: the crucible of life, a seething foundry in which matter and energy are in constant flux and life is continually created and destroyed.
- Daniel Hillel, “Out of the Earth”



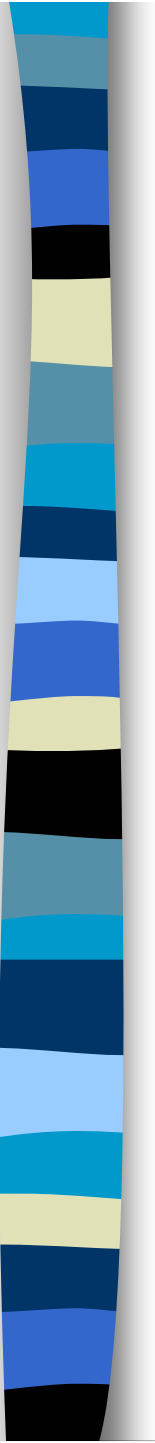
More Nutrients Not the Answer to Increased Yields

- Average soil test P = 52 ppm
- Average soil test K = 130 ppm
- Wisconsin farmers apply 142 million lbs of nitrogen in excess of crop needs



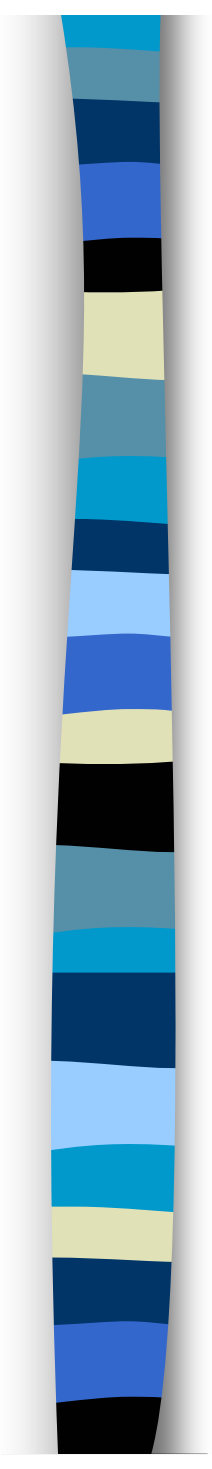
Inputs Substituted for Organic Matter

- Fertilizer
- Machinery
- Pesticides
- Irrigation



Problems as Soil Organic Matter Decreases

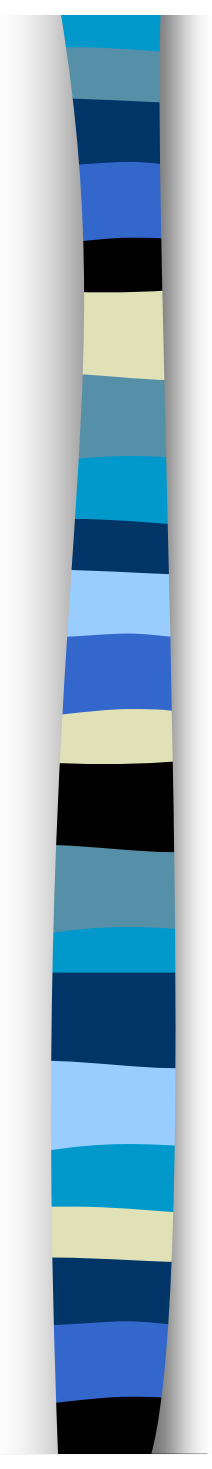
- Fertility
- Water availability
- Compaction
- Erosion
- Disease
- Insects



Yield Improvement Practices

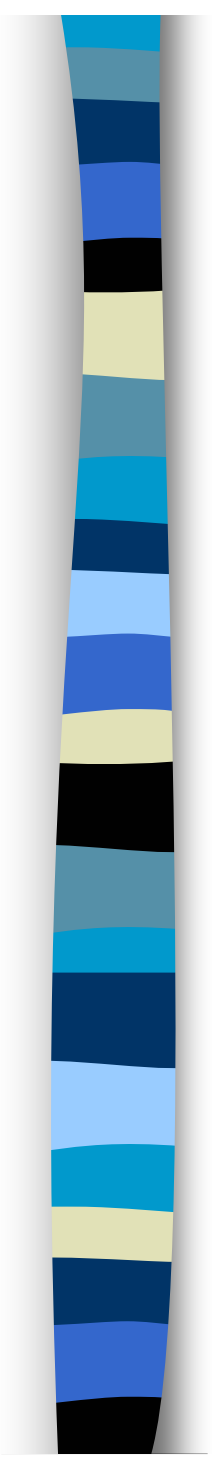
- Implement standard best management practices
- Optimize sets of agronomic management factors
- Evaluate system level changes
- Long-term soil quality improvement

adapted from Better Crops article
by Paul Fixen



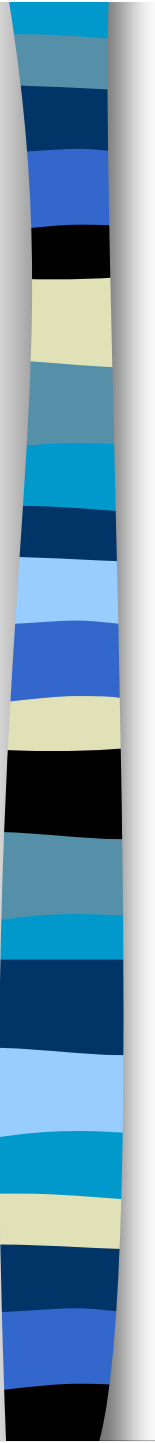
To Increase Soil Quality

- Organic matter is the foundation for high quality, healthy soils
- Build and maintain soil organic matter
 - Add organic material
 - Reduce tillage
 - Increase ground cover
 - Increase plant diversity



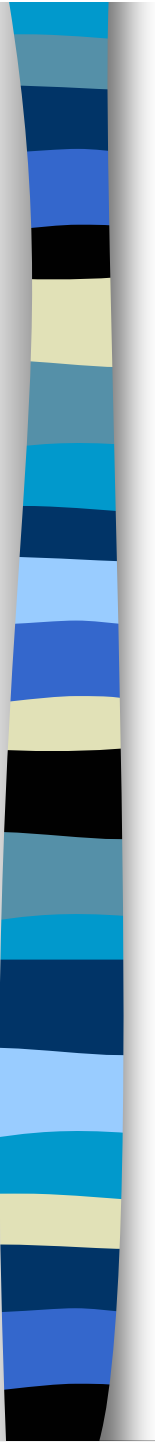
Soil Organic Matter Characterization

- The living
 - Soil biomass
- The recently dead
 - Actively decomposing organic matter
- The long time dead
 - Stabilized organic matter



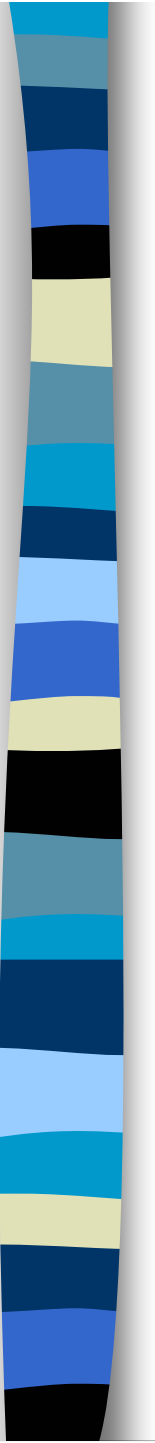
Effects of Organic Matter on Soil Properties

- Biological properties
- Chemical properties
- Physical properties



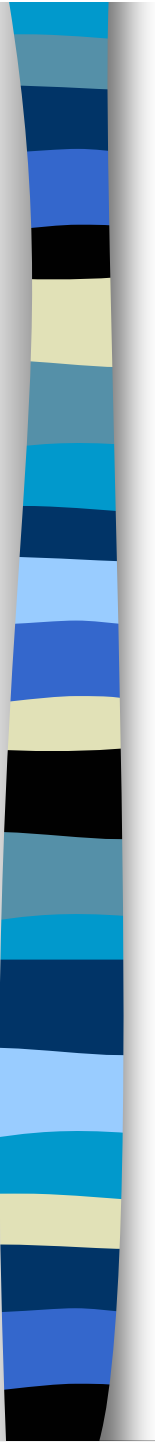
Effects on Biological Properties

- Provides energy source for microbes
- Shifts the soil community to more desirable organisms
- Reduces disease incidence
- Promotes plant growth
- Stores and supplies nutrients



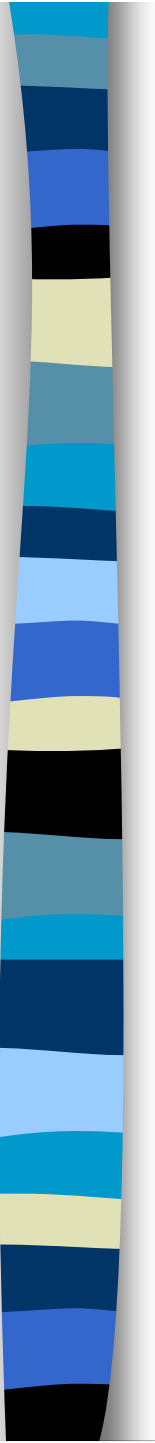
Effects on Chemical Properties

- Increases cation exchange capacity
- Increases buffering capacity
- Chelates micronutrients
- Reduces toxicity of pesticides, contaminants



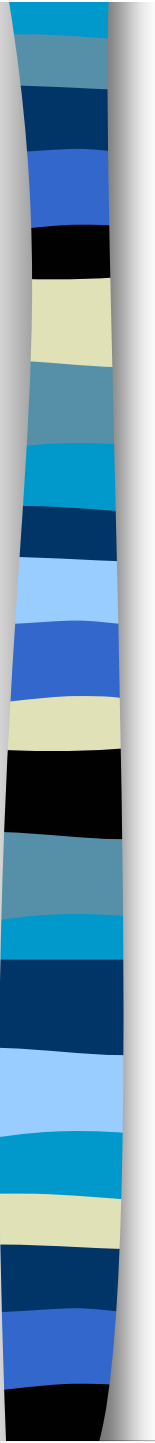
Effects on Physical Properties

- Increases aggregation
- Increases porosity
- Increases water infiltration rate
- Increases water holding capacity
- Lowers bulk density



Practices Increasing Soil Organic Matter

- Add organic materials
 - Manure, compost, organic wastes, mulches
- Decrease decomposition
 - Reduce tillage
 - Keep soil cool
 - No erosion



Practices Increasing Soil Organic Matter

- Increase production of plant materials
 - High biomass producing crops
 - Cover crops
 - Fertilization
 - Irrigation