Essential Components of a Healthy Productive Soil

Biological & Physical Factors of Soil Health and Soil Quality

Good Quality Organic Content

Build a Healthy Soil using Good Quality Amendments to add Organic Matter

Best -> Cover Crops (Any) - but Legume cover crops supply the most Nitrogen
Good -> Compost - but use in moderation to avoid excess phosphorus
Good -> Leaves - best to till in fall, instead of spring
OK -> Animal Manures - can contain weed seed if uncomposted
Marginal -> Peat Moss, Humates - little useable carbon (food) for microbes
Not -> Sawdust, Shavings, or Straw - will tie up all available Nitrogen

Good Biological Activity

Robust Population of Beneficial Microbes, fed by Good Quality Organic Matter (above)
Cycle and release nutrients from amendments in plant-available form
Promote the formation of Soil Aggregates (see below)
Compete with & Supress Pathogenic disease organisms
Degrade and Neutralize Synthetic Contaminants - Pesticides, Hydrocarbons
Promote Adaptability & Resiliency in the Soil Environment

Good Nitrogen Supplying Potential

Properly Fed microbial population will supply sufficient Nitrogen for Plants

Good -> Legume cover crops - Clovers, Vetch, Field peas
Good -> Plant & Animal Meal Fertilizers - Blood, Soy, Fish, Feather
Marginal -> Compost - releases Nitrogen VERY slowly
Poor -> Wood, Bark, or Straw tie up Nitrogen, robbing it from plants

Timing -> Delay application of fast release fertilizers (if needed) 3-4 weeks after planting for vegetable production

(OVER)

Strong Soil Aggregates (Crumb Structure)

Benefits:

Improved Drainage
Better Aeration
Improves Water Infiltration
Greatly Improves Workability (Tilth)
Prevents Crusting after rainfall
Minimizes Compaction (below)
Better Root Growth & Depth of Penetration

Encouraged by:

Cover Crops or Sod Crops in Rotation
Regular Additions of Good Quality Organic Matter

Preserved by:

Minimal Tillage or No-till

Minimal Soil Compaction

Penetration Resistance measured with Small metal rod, Bamboo stake, or Penetrometer
Push into the soil as far as possible (or 300 psi Penetrometer reading)
Ideal depth to compacted layer 18 + inches
Determines Effective Rooting Depth for access to Water and Nutrients

Compaction causes:

Working wet soil
Tillage - compresses soil layer just beneath
Poor or Weak Aggregation (above)

Prevention/Remediation:

Mechanical ripping - Yoemans plow or other Shank ripper
Deep rooted cover crops - Sweet Clover, Tillage radish, Canola (rape)
Minimal Tillage or No-till

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