ORGANIC FERTILIZER

Fertiliser: materials occurring naturally or commercially produced for application to soil

add deficient nutrients

costs 20% of all crop productions

increases yield by 50%

Profitable when:

based on soil test

added in efficient manner

soil is managed

Unprofitable when:

soil moisture limited

pest and adverse temps are problem

increased yield has less market value than cost of fertilizer

Principles of Organic Gardening:

soil food web - microorganisms provide nutrients to plants and soil

Soil Organism

Photosynthesizer: plants, algae&bacteria

capture energy, fix CO_2

Decomposers: bacteria & fungi

break down residue

retain nutrients in biomass

Mutualist: bacteria & fungi

enhance plant growth

fix nitrogen

deliver nutrients

Earthworms

break down residue

enhance soil structure

Requirements of living system:

- food
- air
- water
- shelter
- living organism

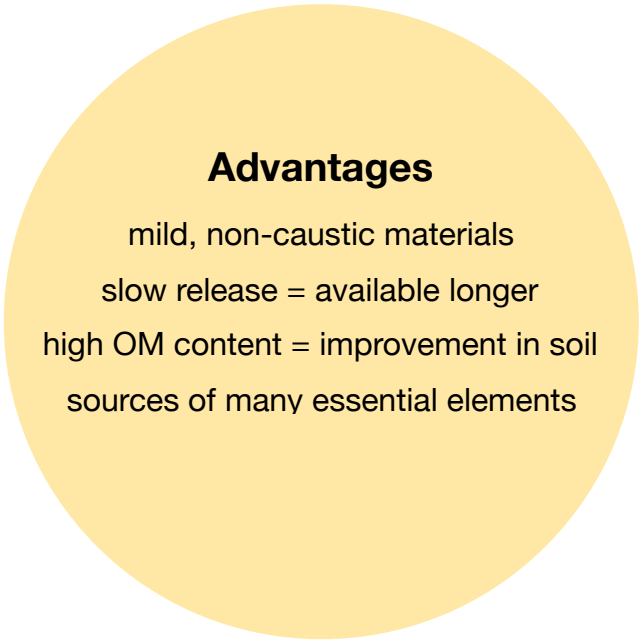
Feeding soil a balanced diet:

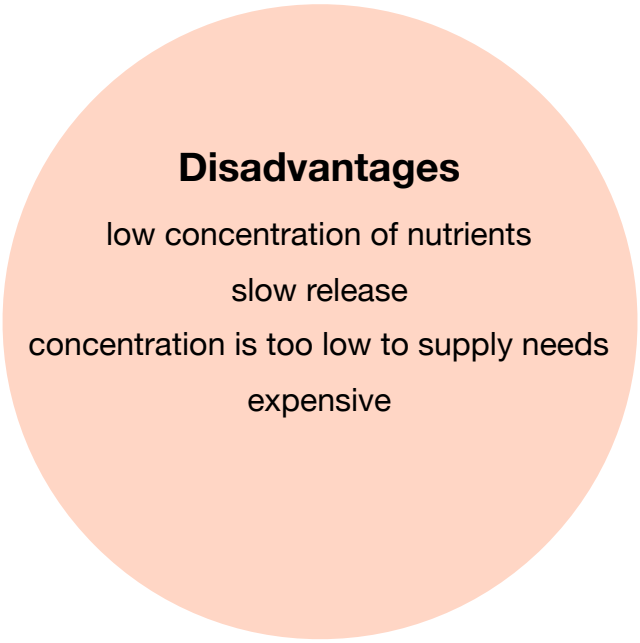
- compost
- cover crops
- organic mulches
- organic residues
- other organic nutrients

Organic VS. Chemical Fertilizers

Organic slower the rate of release in response to environmental factors: soil moisture and temperature

Chemicals are bad for environment





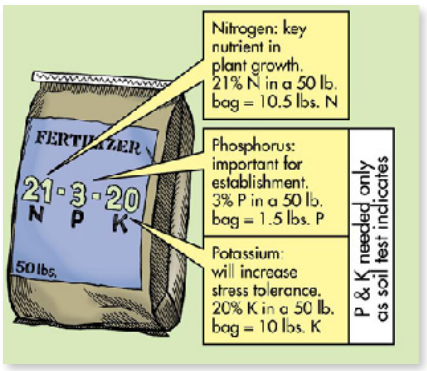
Organic amendments

- increase OM content in soil
- increase nutrient storage capabilities
- supplies plant nutrients
- stabilizes pH
- promotes beneficial microbial populations

Pre-plant preparation

- soil analysis
- adjust pH
- adding soil amendments prior to planting

Fertilizers: ratio on the bag

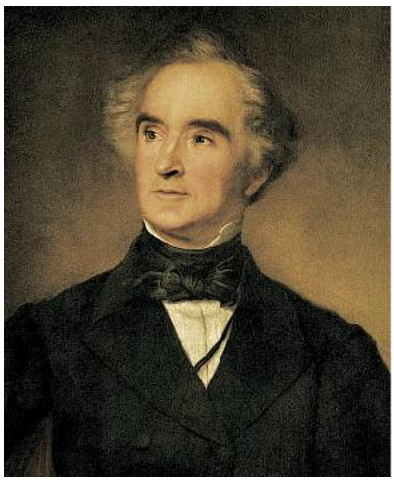


total N

available P2O5

Soluble K2O

Law of minimum



Justus vol Liebig

Role of Mineral Nutrients

affect crop quality and yield

direct

indirect

N excess make cell swollen

Manure

low nutrition per volume

rapidly decay

heat generating

unpleasant odor

Cover Crops

green manure

grasses/legumes

planted after harvest of primary crop

benefits:

- reduced soil erosion
- improve soil structure
- suppress weeds, insects, diseases
- enhance soil fertility

Compost

- organic fertilizer produced by composing organic materials
- organic waste -> biological reduction -> compost
- greens(N-rich material) and browns(C-rich material)
- composting methods:

without aeration

- slow, smelly

with aeration

- rapid, not smelly

conventional composting

- layer organic materials (30cm)
- overlay with animal manure (5cm)
- repeat 4-5 times
- water
- cover on top with soil to keep humid

To make quicker compost, make a good mixture, control temperature, aerate compost heap, optimize humidity and add effective microorganisms.

composting requires heating and covering with white fiber.

why compost?

- cheap
- simple
- no chemicals which kill soil organisms
- better plant and water quality

why compost is better than manure?

- clean (heating kills pathogenic disease)
- no smell

what should not be used as organic fertilizers?

- heavy metal/toxin contaminated materials
- strong acid/base
- wood - hard to decompose
- diseased manure
- green manure with risk of weed

Crop Residue

portion of plant remaining in soil after harvest

maintains OM

can harbor disease and insect pests: avoided by crop rotation

benefits:

- increased OM content
- increased soil aggregation
- prevents soil crusting, erosion
- improves water infiltration rates
- provides nutrients

Mulches

keep soil cool in summer

retain soil moisture

adds organic matter, helps in nutrition

improves soil structure

reduce weed pressure

increase soil water holding capacity

Ground vs. Foliar

Ground: most efficient way to apply nitrogen, phosphorus, potassium, magnesium

Foliar: boron, zinc, copper, manganese