SOIL- Too Little Water

IRRIGATION
Adds W_____ to the pores which allows nutrients to D_____ in the water. Plant R_____ take up water and nutrients and I_____ plant growth
Also provides soil organisms M_____ so they can survive and decompose

Sprinkler system

Gun Irrigator

K-Line

Improving Soil Organisms

SOIL ORGANISMS
Nitrogen fixers- add N_____ to the soil
Decomposers like W____, F____ and B_____ break down organic matter into H_____ and N_____, improving soil structure and soil nutrients. They like air, moist, pH6.5 soils

Add Organic Matter
Organic matter provides material to D_____ so improves the soil condition improving soil o_____

Increase pH to 6.5
By improving the pH, the organisms can decompose and R_____ more improving decomposition and N_____

Add water
By improving soil moisture the organisms can decompose and reproduce more because they wont D_____.

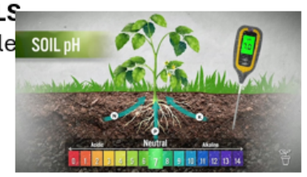
Improving Soil pH

SOIL pH
Want soil pH _____
Nutrients are unlocked and _____ for the plants to use at pH 6.5
Soil microbes and worm activity _____
Plant growth _____

LIME
C_____ C_____
White powder

ADDED TO SOIL
Added to soil using T_____ and S_____
Normally added in A_____ or S_____
BEFORE planting. Must be _____ in.

LIME IN CLAY SOILS
Causes clay particles to F_____
Improves soil structure and P_____



Primary Production System

_____

MARKET GARDEN

What is grown/produced?

_____

_____

_____

Soil Types

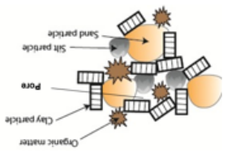
Sandy Soils Particle size _____
Pore size _____
Air _____
Water _____
* Poor W_____ holding ability
* Leeches N_____
* Change T_____ easily

Clay Soils Particle size _____
Pore size _____
Air _____
Water _____
* Good W_____ holding ability
* Holds onto N_____
* Cold, hard to H_____ up

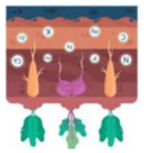
Silty soils- hold onto W_____ and N_____
Loam soil – mixture of S____, S____ & C_____ so has a mixture of P_____ sizes.
Soil texture – amount of S____, S____ & C_____
Optimal soil = ___% air, ___% water, __% organic matter, living organisms, ___% Inorganic matter

Soil Properties

PHYSICAL PROPERTIES
POREs – A_____
W_____
T_____



CHEMICAL PROPERTIES
N_____
pH
Nutrient retention- how well the soil H_____ onto nutrients
Nutrients Status- use a S____ T____ to find out the L_____ of each nutrient



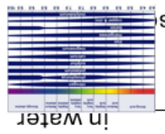
BIOLOGICAL PROPERTIES
Nitrogen-F_____
W_____, F_____ and B_____
Decomposition – H_____
P_____ and Diseases

SOIL- No nutrients

Fertiliser
Do a soil test and add fertiliser that has required nutrients
N = N_____ for _____
P= P_____ for _____
K= P_____ for _____
Q_____ release and known A_____ of NPK

Organic Matter
Eg _____
Can be D____ in, before crop is planted or placed on top of soil
S_____ release but also improves P_____, W_____ retention and conditions for decomposers. Unknown amounts of N_____.

pH – Add Lime
Raises pH so nutrients can D_____ in water and are A_____ for plant
Too high or too low pH, even if N_____ present, plants cant us



SOIL- Too Much Water

Drainage
Removes W_____ from the pores which allows A_____ and oxygen for plant R_____ and soil O_____ to respire. Improves plant G_____
Also allows soil to W_____ up faster so plant grows faster

Above ground
Hump and hollow

Ditch

Under ground
Novo flow pipe

Mole plough

Soil Types

Sandy Soils

Particle size _____
Pore size _____
Air _____
Water _____

* Poor water holding ability
* Leeches nutrients
* Change temperature easily

Clay Soils

Particle size _____
Pore size _____
Air _____
Water _____

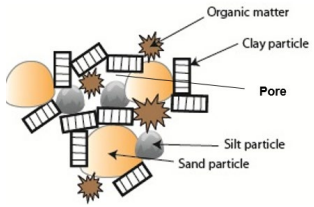
* Good water holding ability
* Holds onto nutrients
* Cold, hard to heat up

Silty soils- hold onto water and nutrients
Loam soil – mixture of sand, silt and clay so has a mixture of pore sizes.
Soil texture – amount of sand, silt and clay
Optimal soil = 25% air, 25% water, 5% organic matter, living organisms, 45% Inorganic matter

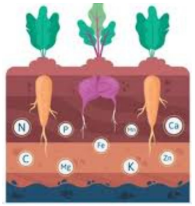
Soil Properties

PHYSICAL PROPERTIES

PORES – Air
Water
Temperature

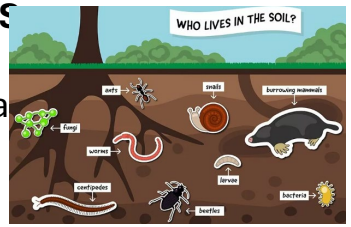


CHEMICAL PROPERTiES



Nutrients
pH
Nutrient retention- how well the soil holds onto nutrients
Nutrients Status- use a soil test to find out levels nutrients

BIOLOGICAL PROPERTIES



Nitrogen-fixers
Worms, fungi and bacteria
Decomposition – humus
Pests and Diseases

SOIL- No nutrients

Fertiliser

Do a soil test and add fertiliser that has required nutrients

N = Nitrogen – green/leafy crop

P= Phosphorous- roots and health

K= Potassium –fruits and flower

Quick release and known amounts of NPK

Organic Matter

Eg Mulch, compost, pea straw

Can be dug in Before crop is planted or placed on top of soil

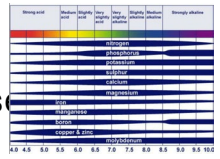
Slow release but also improves pores, water retention and conditions for decomposers.

Unknown amounts of nutrients.

pH – Add Lime

Raises pH so nutrients can dissolve in water and are accessible for plant

Too high ot too low pH, even if nutrients present, plants cant us



SOIL- Too Much Water

Drainage
Removes water from the pores which allows air and oxygen for plant roots and soil organisms to respire. Improves plant growth
Also allows soil to warm up faster so plant grows faster

Above ground
Hump and hollow

Ditch

Under ground
Novo flo pipe

Mole plough

SOIL- Too Little Water

IRRIGATION
Adds water to the pores which allows nutrients to dissolve in the water. Plant roots take up water and nutrients and improves plant growth
Also provides soil organisms moisture so they can survive

Sprinkler system

Gun Irrigator

K-Line

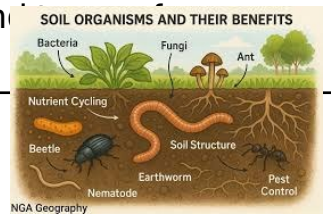
Improving Soil Organisms

SOIL ORGANISMS

Nitrogen fixers- add nitrogen to the soil
Decomposers like worms fungi and bacteria break down organic matter into humus and nutrients, improving soil structure and soil nutrients. They like air, moist, pH6.5 soils

Add Organic Matter

Organic matter provides material to decompose so improves the soil condition improving numbers an
organisms



Increase pH to 6.5

By improving the pH, the organisms can decompose and reproduce more improving numbers and types of organisms

Add water

By improving soil moisture the organisms can decompose and reproduce more because they wont dry out.

Improving Soil pH

SOIL pH
Want soil pH 6.5
Nutrients are unlocked and available for the plants to use at pH 6.5
Soil microbes and worm activity improved
Plant growth improves

LIME
Calcium Carbonate
White powder

ADDED TO SOIL
Use tractor and spreader
Normally added in AUTUMN or SPRING BEFORE planting. Must be dug in.

LIME IN CLAY SOILS
Causes clay particle to FLOCCUATE
Improves soil structure
and Pores