

# Plant problems

Pathways to Farming  
Emma Maxwell  
*of*  
*Ash & Elm Horticulture*



# Recap/ Any questions?

## **Business plans**

- Sowing & Planting timetable
- Markets
  - Confirm outlets
  - Start building your customers on social networks
- Financial forecast

# Financial forecast

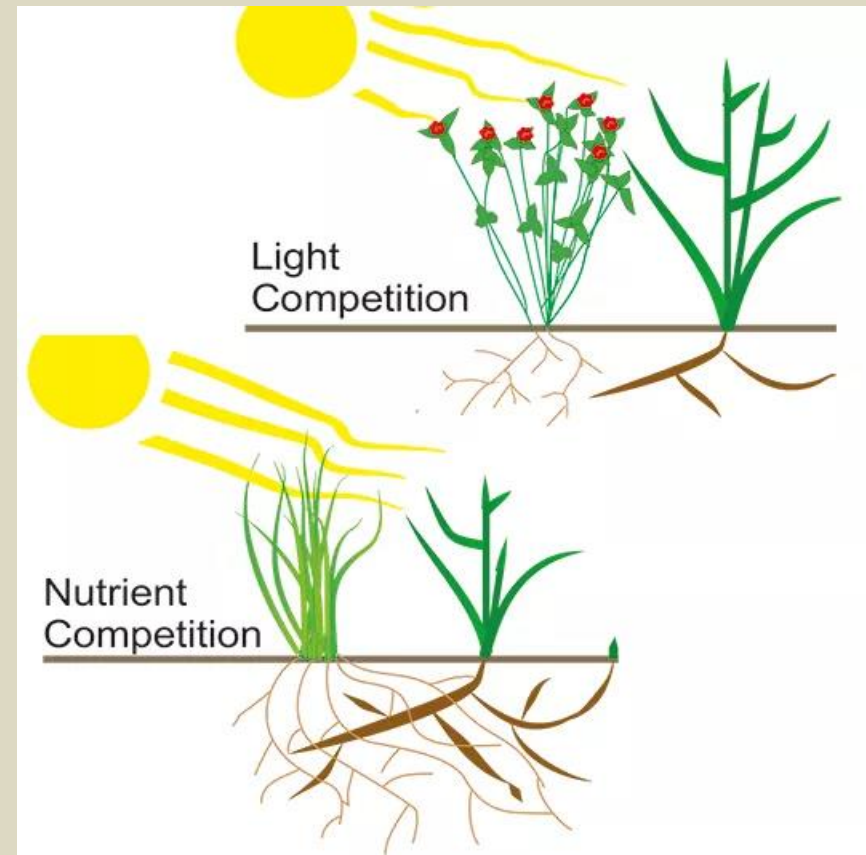
- You need info from your...
  - Cropping plan
    - including planting quantities
    - Predicted harvest
  - Your market- wholesale, retail
    - Sales price
  - Expenses/ overheads

# Today

- Competition & weeds
- Plant disorders
- IPM
- Plant diseases
- Plant pests
- Plant problems - Identification

# Plant competition

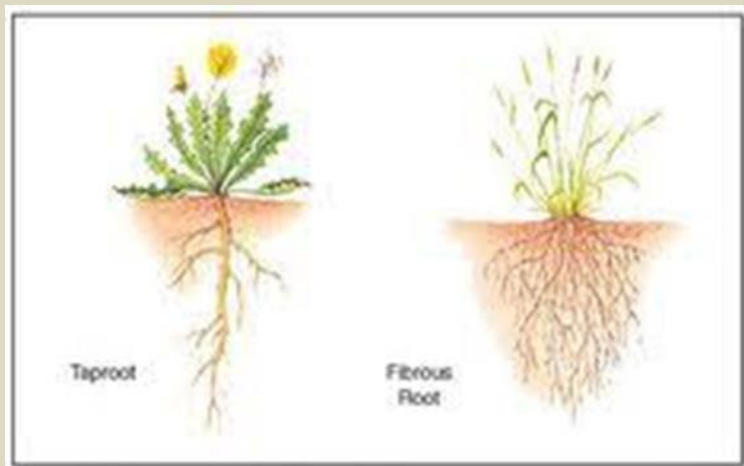
- Reducing the availability of resources
  - Water, nutrients, sun light



# Understanding weeds

## Annuals

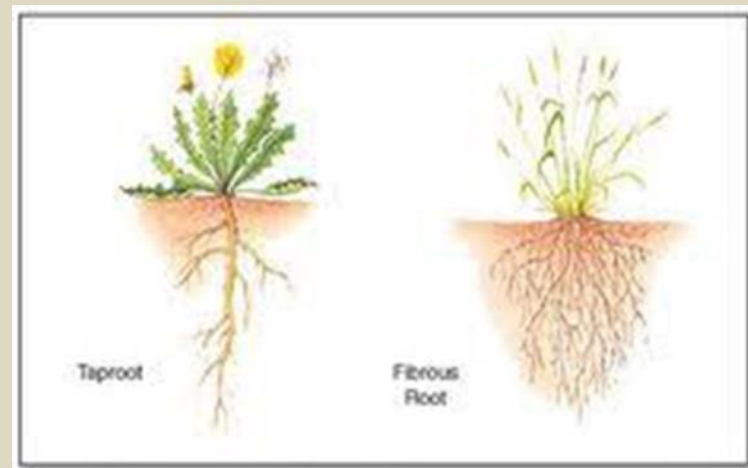
- Generally small root system
  - often fibrous
- Short lived
- Easy to get rid of
- Remove before they seed



# Understanding weeds

## Perennials

- Extensive root system
  - often large tap root
- Grow back year after year
- Can be difficult to remove
  - Will grow back from a small amount of root left behind



# Weed removal

## Perennials

- Cultivation/ digging
- Mowing/ cutting
- Fabric Mulch
- Flame gun



## Annuals

- Hoeing
- Hand pull
- Organic Mulch
- Flame gun

# Mechanical weed control



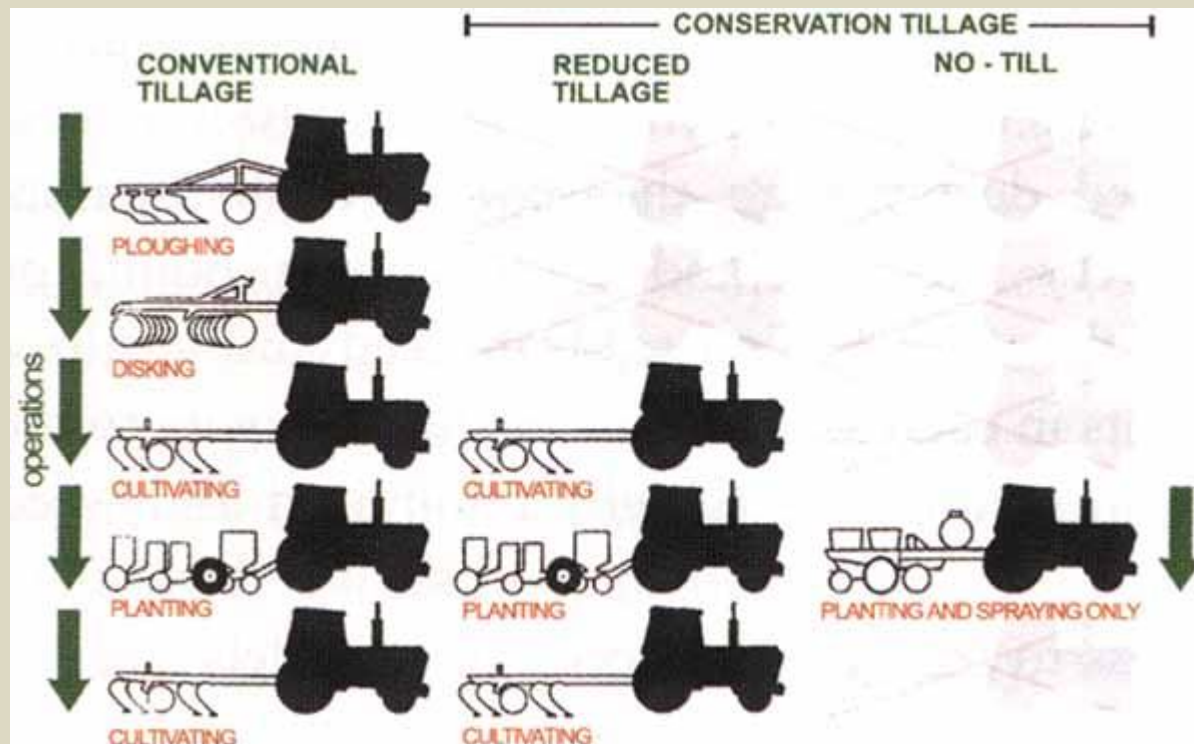
# Cultivation

- Plough
  - Inverts turf
  - Correct depth to bury turf, but not go into subsoil
- Harrow (Disc, tine, chain, power)
  - 2-week intervals
  - Smashes up clods
  - Rakes soil
  - Prepares tilth
- Bastard fallow
  - 5 to 6 cultivations to make a clean seed bed
    - Needs a dry Spring to allow cultivations every 2 weeks
    - Each time destroying weed seeds as they germinate



# Minimum till agriculture

- How to remove weeds
- Difficult organically



# Herbicides

- Often used in conventional no till systems
- Not only used for weed removal
  - Used to kill off crop residue pre harvest
    - Potatoes and grains

Understanding conventional practices helps  
you to educate consumers

# Conventional growers traditionally had a whole arsenal of herbicide to use

- Selective – kills broad leaved plants, often used on lawns (2,4-D)
- Non-selective – Kills everything (Paraquat)
- Systemic – works through the transport system of a plant
  - Roundup (Glyphosate)
  - Deep root ( Ammonium Sulphamate)
- Residual/Pre emergent – Path killers – Simazine, Dichlobenil (these are mainly band now)
- Contact – for annuals, chemical hoe (Paraquat or diquat)

Thankfully more and more herbicides are being band

## Organic growers rely on good land management to reduce the weed burden

# Cover it up



# Rotation

Different crops reduce the weed burden

- Potatoes good to break weed cycle
  - Hoe/ earth up once or twice at 4-7 weeks after planting
  - Canopy cover from 8 weeks after planting
    - = no light for weeds to germinate
- Onions hate competition
  - Need to be in weed free ground
- Deep rooted crops cope with weed burden better

# Weed identification

Are these:

- Annual
- Biennial
- Perennial

What is the most problematic weed on your land?

How would you deal with weeds in your system?



Creeping Cinquefoil



Speedwell



Chickweed



Creeping Buttercup



Ribwort Plantain



Clover



Field Woodrush



Ragwort



Yarrow



Thistle



Selfheal



Lesser Trefoil



Celandine



Daisy



Greater Plantain



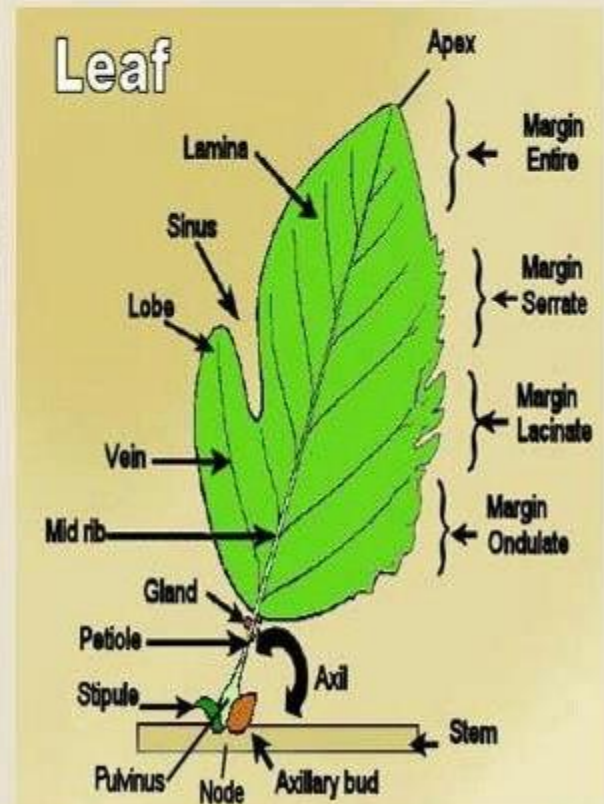
Cranesbill

# Disorders

## Nutrient deficiencies

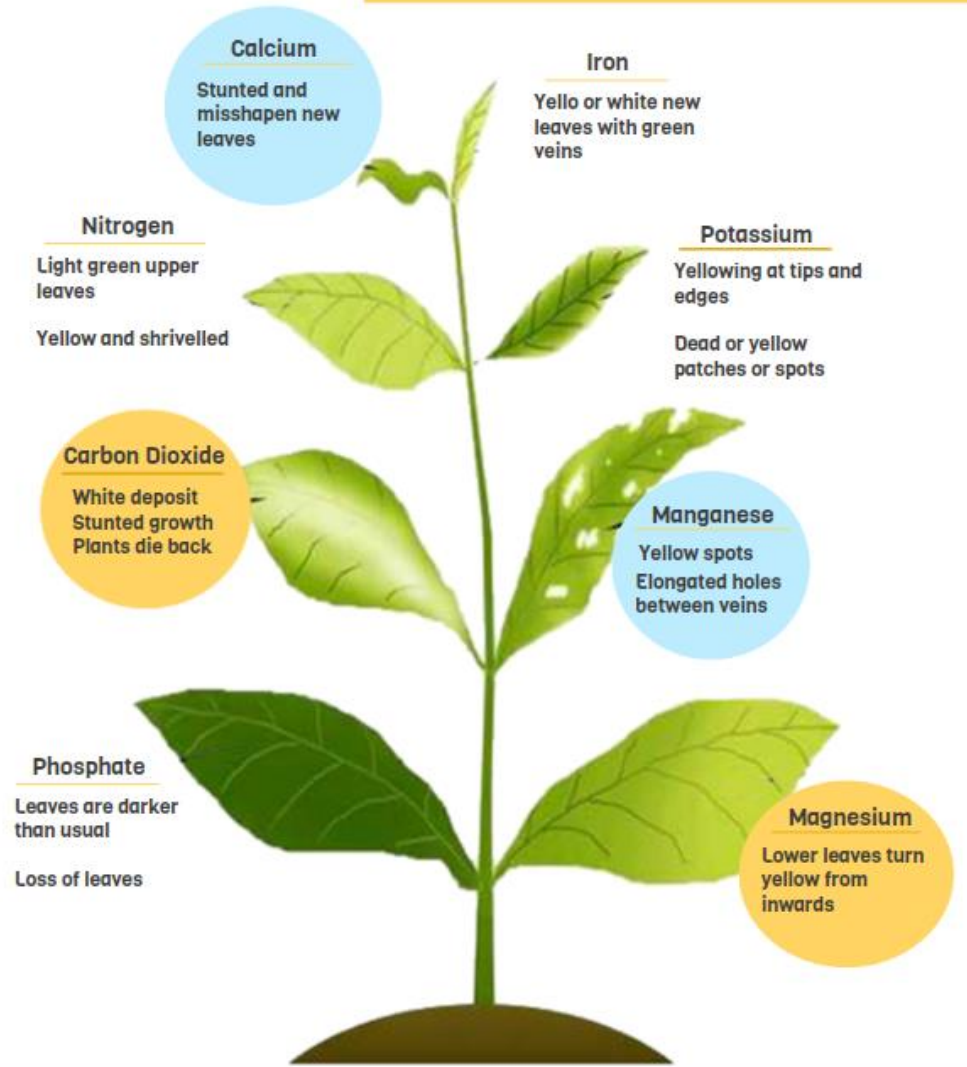
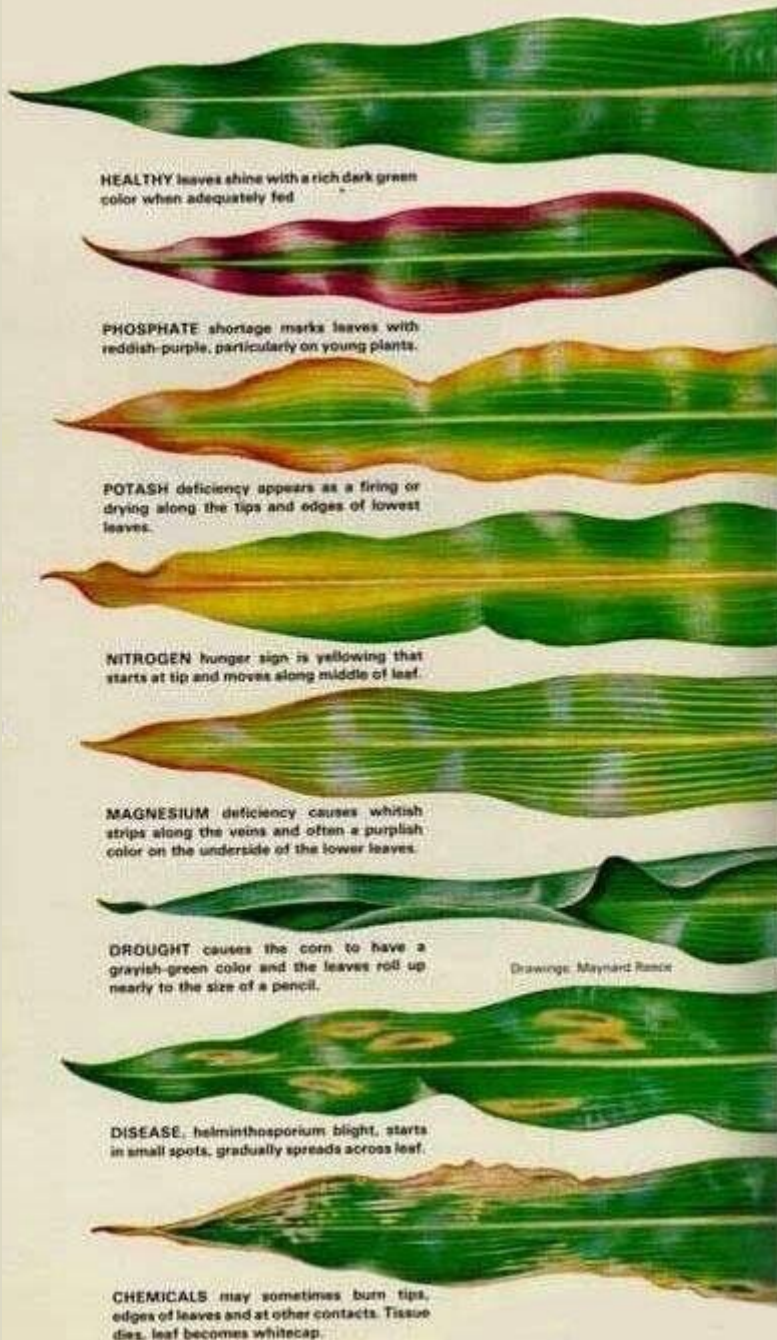
- Healthy organic soils shouldn't be deficient
- Deficiencies can occur
  - If lacking organic matter
  - In pot plants
  - Small modules
  - Extreme pH
  - Hydroponics

# Nutrient Deficiency Problems

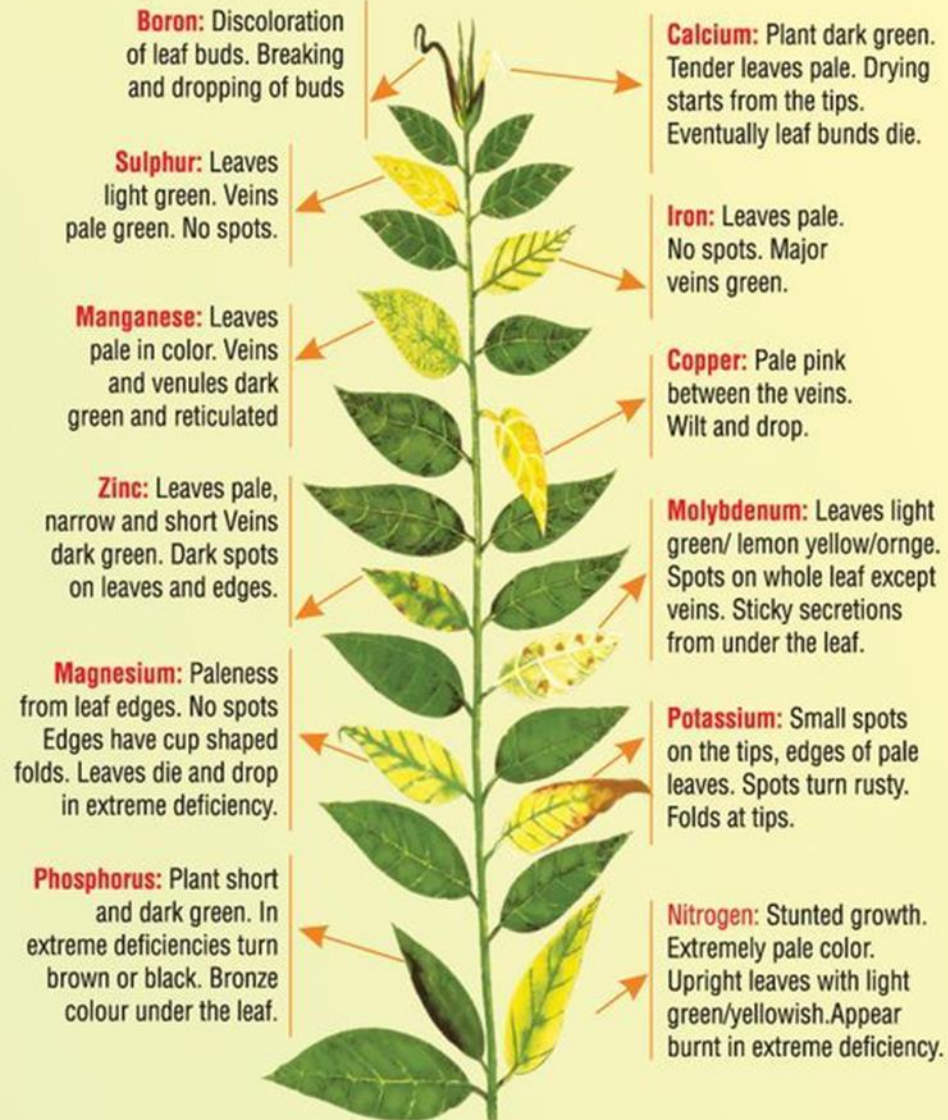


# Signs of Nutrient Deficiency

Plants can suffer from malnutrition if not taken care of properly. Here are some common signs of nutrient deficiency:



## Deficiency Chart of Micronutrients



THE COLOUR REPRESENTED ARE INDICATIVE.  
THEY MAY VARY FROM PLANT TO PLANT

# Pests

- What pests are your biggest problem?
- Discuss
  - Large pest
    - Deer, rabbits, pheasants, pigeons
  - Small pests
    - Aphids, caterpillars, mites, nematodes, slugs



# Integrated Pest Management (IPM)

- Prevention is better than cure
- Plant bio-service areas/ shelter belts
- Companion planting to attract predators
  - Ladybirds, Lacewings, Hoverflies, & wasp larva
- Chose resistant varieties
- Hose or pick off (works on a small scale)
- Biological controls Natural micro-organisms
- Pheromone traps & Fruit tree grease
- Soil Health
- Pesticides only as a last resort

# Balance of nature

## Attracting predators

- Buckwheat
  - Attract aphid predators
- Marigold, nasturtium
  - Attract whitefly & Aphids that feed predators
- Flowering brassicas
- Open flowers (*apiacea*)
  - Attracts hoverflies
- Hibernation homes
  - Hollow stems
- Nettles
  - Food & over wintering homes

# Biological controls

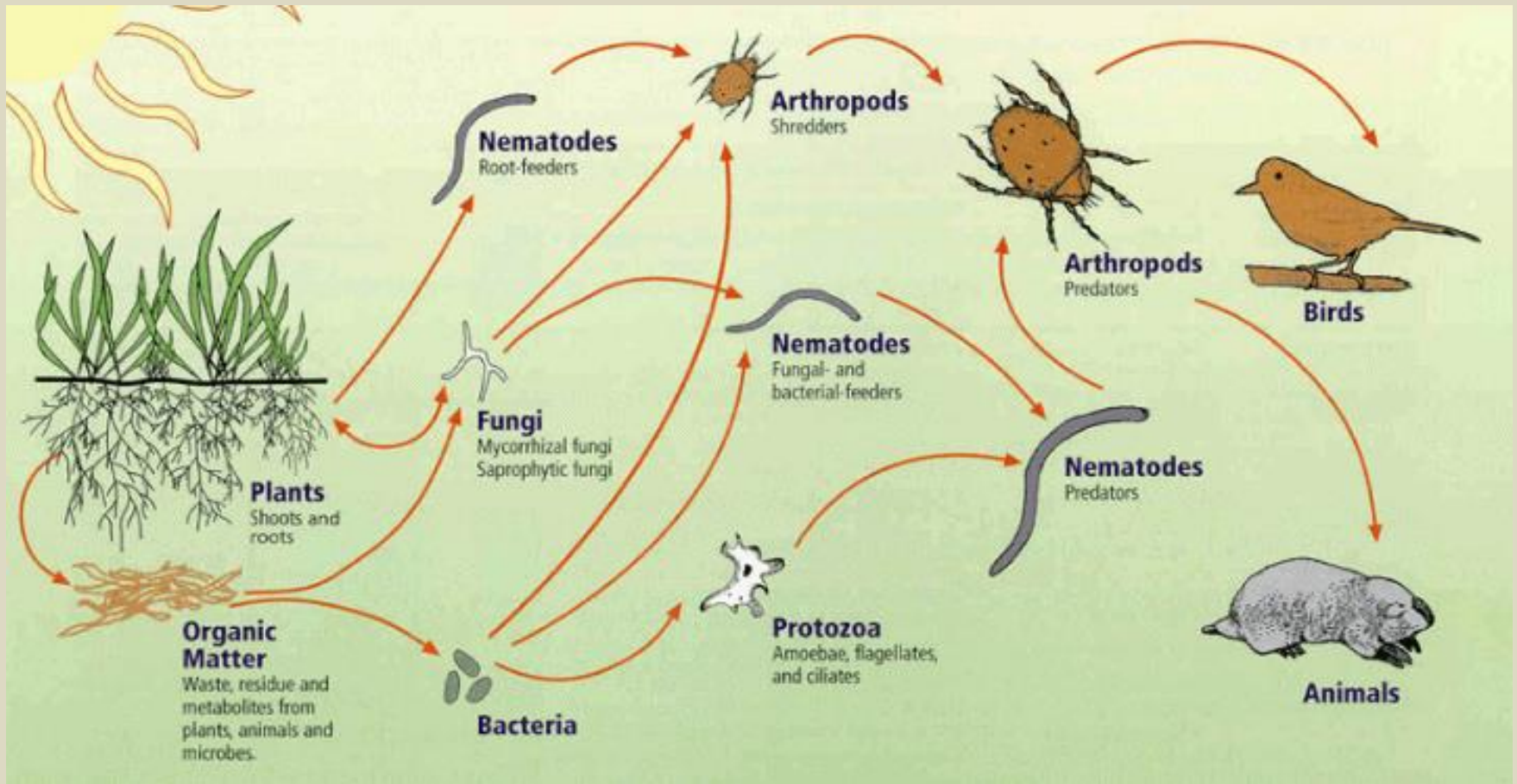
## Natural micro-organisms

- Bacillus thuringiensis (Bt)
  - Against caterpillars
- Nematodes
  - *Heterorhabditis megidis* & *Steinernema carpocapae*,
    - Against insects, soil pests e.g. Vine weevil larva
  - Nemaslug - *Phasmarhabditis Californica*
    - For slugs, use in spring or Autumn

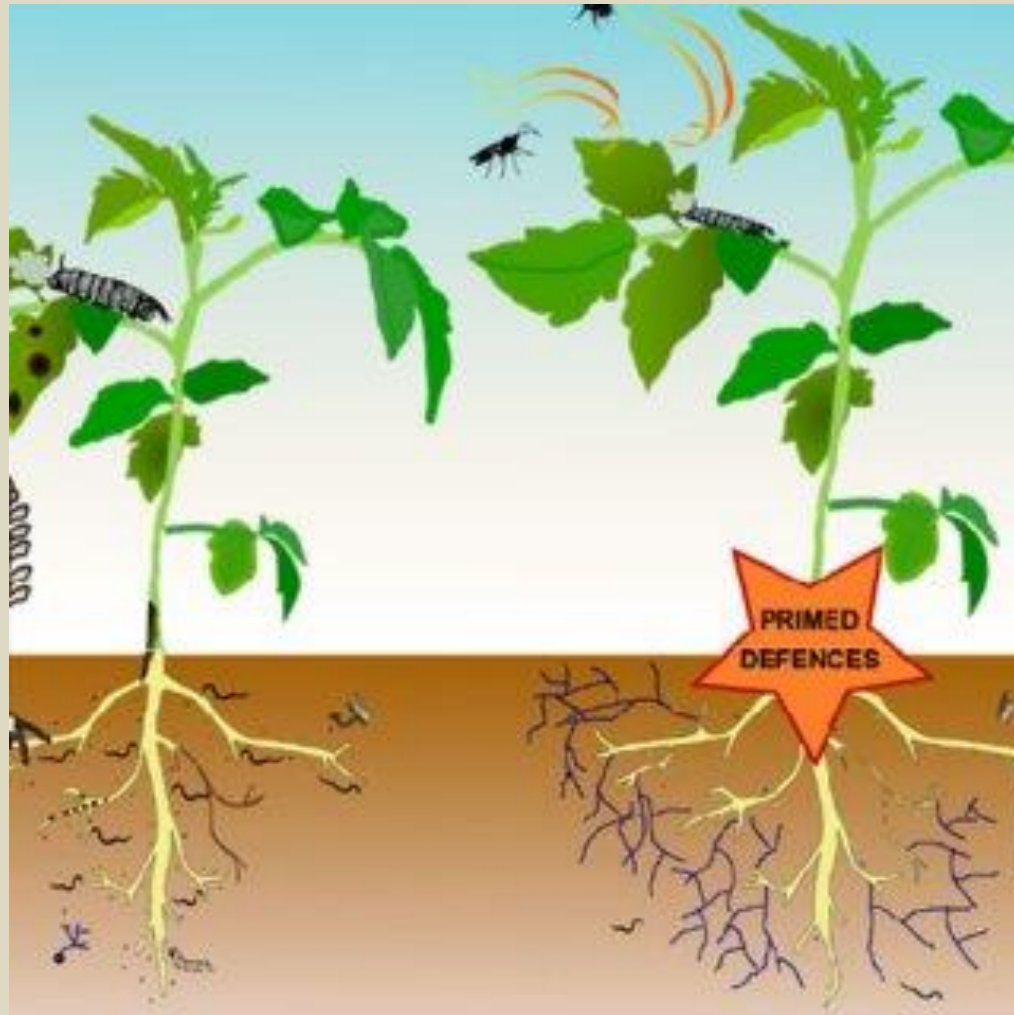
# Soil Health

- What do we know already
  - PH
  - Texture
  - Nutrients
- How to improve soil health?
- Organic matter inoculates the soil with good fungi and bacteria which in turn feeds the whole food web

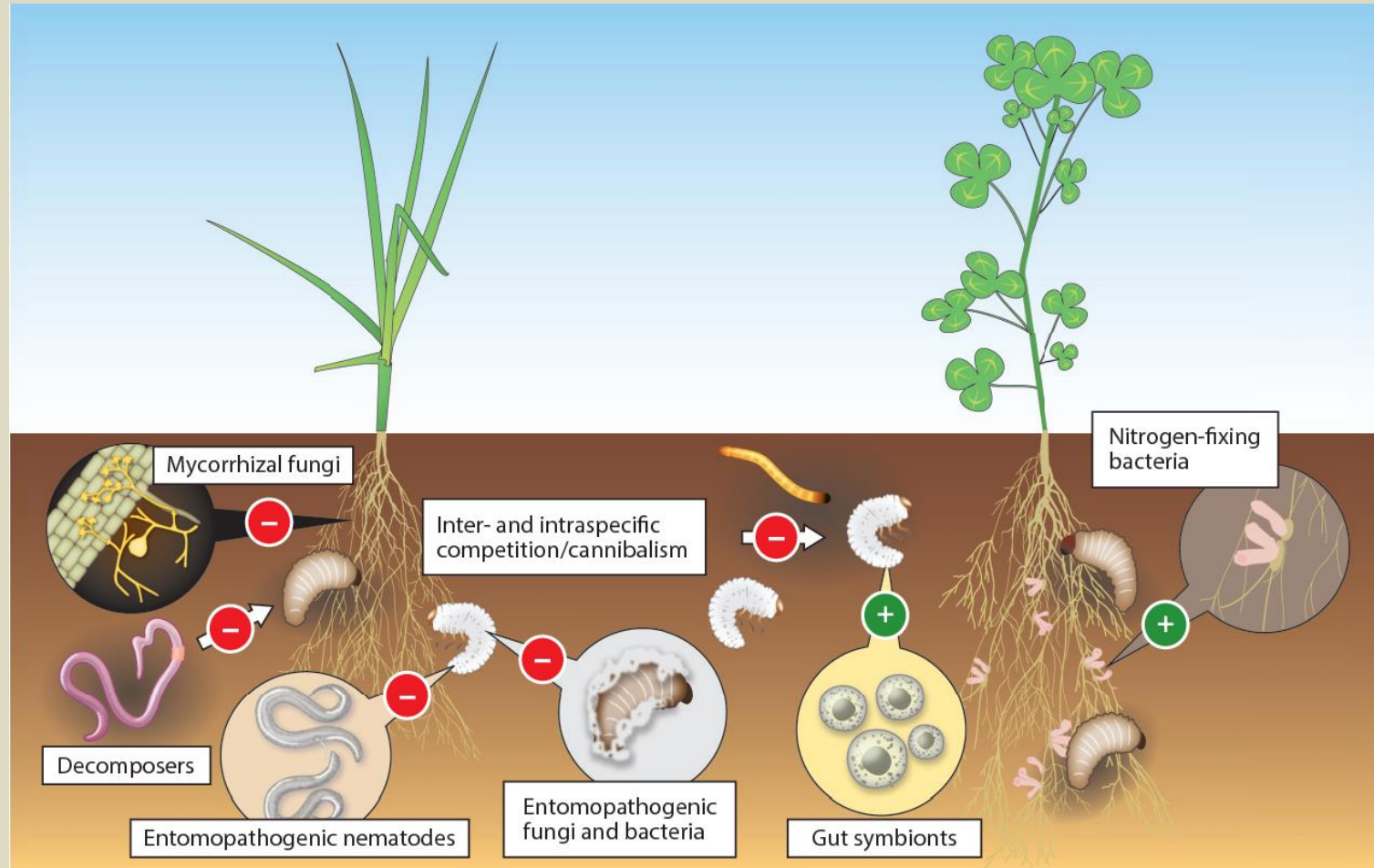
# Soil Food web



# Mycorrhizal protection



# Beneficial interactions



<https://www.floraldaily.com/article/9227666/friendly-fungi-benefits-80-of-all-plant-species/>

# The EU -pesticide approvals database

- Currently **490** substances approved for use as pesticides
- of these only **28** are approved for use in organic agriculture.
  
- Any chemicals will disrupt natural interactions

<http://ec.europa.eu/food/plant/pesticides/eu-pesticides-database/public/?event=activesubstance.selection&language=EN>



# Chemical Insecticides

- Strict laws on use
  - Need a licence
  - PPE – coveralls, face mask
- Many are being withdrawn

No one should want these on their food?

**Start a conversation with conventional farmers...  
Only use chemical sprays at dusk once bees have gone to bed**

- Bifenthrin –kills Caterpillars, Vine weevil
- Permethrin
- Malathion – so deadly, not to be used in the house
- Primicarb – reported to be safe to beneficial insects

Often manmade chemicals are specific rather than generalist...

# Organic chemicals

- Pyrethrum daisy (*Chrysanthemum cinerariifolium*)
  - Spray paralyzes insects that come into contact with it
  - It is the strongest insecticide allowed
- Horticultural soap
  - potassium fatty acids used to control many plant pests
  - direct contact with the pest
- Thyme oil & Lavender oil
- Neem oil- seeds from the neem tree

## Banned organic products

- Tobacco
- Derris (legume)



# Make your own horticultural soap

- 1 cup of vegetable oil (any)
- 1 tablespoon of bio dishwashing liquid
  - (no bleach)

Mix 2 teaspoons of this mixture into a cup of warm water and put into a sprayer bottle for use

- For chewing insects
  - Add 1 teaspoon of ground garlic
- Powdery mildew
  - Add 1 teaspoon of cider vinegar

# Neem Oil

- *Azadirachta indica*, a South Asian and Indian plant
  - Extracted from all parts but mainly seed
- Safe, non-toxic pesticide
- Use against
  - whitefly, aphids, moth larvae, scale & spider mites
- Effects
  - insects reduce or cease feeding
  - can prevent larvae from maturing
  - reduces or interrupts mating behavior
  - oil coats the breathing holes of insects and kills them
  - Also prevents powdery mildew
- It is reported to be nearly non-toxic to birds, fish, bees, and wildlife, and studies have shown no cancer or other disease-causing results from its use

## Mix

- 1 to 2 tablespoons neem oil, pure or raw form, cold-pressed (warm)
- 1 gallon water
- 1 to 2 teaspoons mild dish detergent

# Diseases – what to do

## Organic solutions

- Prevention
  - Resistant varieties
  - Soil health
- Cultural
  - Cleanliness
  - Plant health
  - Good air flow
  - Remove & burn before spread
- Fungicides – need to use repeatedly

# Fungicides

- Fungicides coats plant & kills spores
- Need to continue to use repeatedly all season
- Organic fungicides are naturally derived substances
- Allowed as a last resort, with permitted derogation
  - copper sulfate, sulfur, potassium bicarbonate, lime sulfur (calcium polysulfide), and certain plant extracts (like neem oil)

## Non-organic

- Systemic
- Often also contain insecticides
  - E.g. Rose clear

# Organic solutions for diseases

- Neem oil (*Azadirachta indica*)
  - Vegetable oil pressed from fruit & seed
  - Anti fungal, anti bacterial, insecticide
- Biodynamic preparations
  - sprays contain substances including cytokinins
    - stimulate plant growth
- Organic Milk
- Baking soda (Sodium bicarbonate)
  - powdery mildew

# Make your own solution

- 1 tbs (15ml) Neem oil
- 1 tsp (5ml) washing liquid
- 2 litres Water

Mix washing liquid and Neem oil with warm water.  
Then add the rest of the water.

Plant Problems

Identification







