

# Plant Diseases



**Fungal Damage: Botrytis**



**Fungal Damage: Powdery Mildew**



**Viral Damage: Cucumber Mosaic**

What causes diseases in plants?

Many times they are caused by microscopic organisms such as:

## Fungi



**Fungal Damage**

*Fungi cause soil-borne diseases such as:*

- Damping off
- Root rots

*They cause diseases above ground on the plant such as:*

- Powdery Mildew—squash and cucumbers
- Downy Mildew—lettuce and spinach
- Botrytis—strawberries and grapes

## Bacteria



**Black rot on cabbage**

## Bacterial wilt transmitted by



**the cucumber beetle**



**Bacterial damage on cucumber**

- Resistant varieties
- Crop rotation
- Nutrient management

## Prevention of bacterial diseases

- Sanitation; removal of prunings

- Some copper fungicides
- Irrigation management
- Spacing, air circulation.

## Virus



**Viral symptoms on lettuce**

## Virus examples

- Tobacco mosaic virus
- Cucumber mosaic virus
- Lettuce Big Vein virus



**Viral damage on beans**

## Nematodes



**Root nodules caused by nematodes**

Worm-like microscopic animals that live in soil and water. Some are parasites to animals and plants but most are beneficial.

**Nematodes are only visible by microscope.**



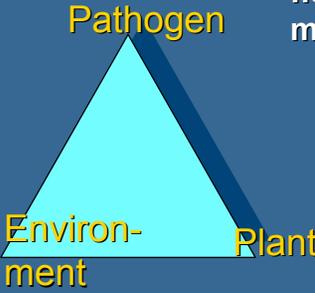
# An ounce of prevention is better than a pound of cure. How to prevent plant diseases.

## CULTURAL PRACTICES THAT STRENGTHEN YOUR CROPS



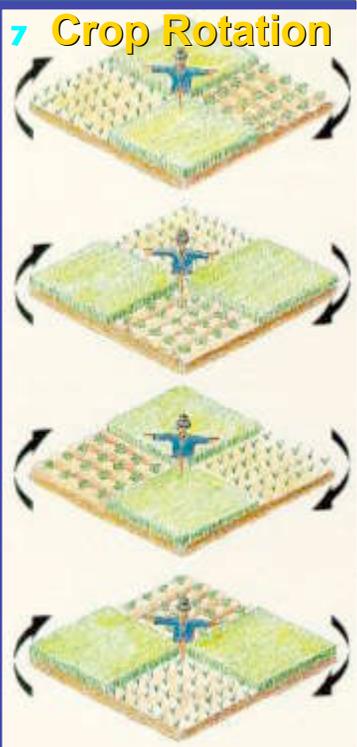
- Sanitary practices that exclude or remove pests (or residues that may contain pests) from the field or orchard.
- Selection of well-adapted varieties that are resistant to pests.

When pathogens are present in the field, damage can be reduced by manipulating one of these three points:



1. Strengthen the plant: use resistant cultivars, manage for healthy soil
2. Make environment friendlier to plant or less friendly to pathogen
3. Reduce pathogen load (crop rotation & sanitation)

## SOIL MANAGEMENT: CROP ROTATION AND GOOD NUTRIENT MANAGEMENT



## 12 Sclerotinia or White Mold

This disease is caused by a soil fungus and its symptoms are a moist rot covered by white cottony mycelium.



### Controls for Sclerotinia

- Resistant varieties
- Drip irrigation
- Rotate with grains and other grasses
- Control weeds and increase air circulation
- Solarization with clear plastic (warm inland areas)
- Biological control options:
  - Serenade®
  - Intercept®



## Powdery Mildew

- Caused by one or two fungi: *Erysiphe* sp. and/or *Sphaerotheca* sp.
- These fungi primarily infect leaves & stems of cucumber, squash, melon & watermelon plants .
- Damage consists of weakening & killing the plants.



### Control Options for Powdery Mildew

- Resistant varieties
- Plant in full sun with good drainage
- Don't crowd plants (this reduces air circulation)
- Don't over fertilize
- Cull infected plants or prune infected plant parts
- Irrigate in the morning
- Sulfur (garlic)
- Vegetable oil
- Bicarbonate of soda recipe:
  - 4 Tbls/ gallon of water
  - 8 drops of liquid soap per gallon
  - 4 Tbls hydrogen peroxide per gallon
- Compost teas
- Yeast & sugar solutions
- Milk (10% milk/water mix or more by volume)
- Biological Controls:
  - Amelomyces quisqualis*
  - Serenade®

## Diseases: Mosaic Virus



### Prevention

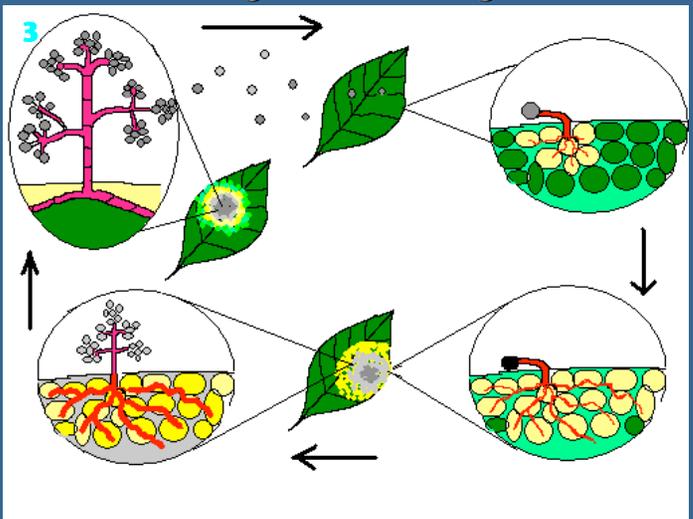
- Control insects that vector the virus (aphids)
  - Harvest by hand (without a knife that transmits the virus from plant to plant )
  - Wash hands
- Do not smoke

**There are no controls**

## Botrytis or Gray Mold

## Botrytis Life Cycle

## Botrytis Management Options:



Botrytis is a fungus that rots stems, buds, leaves, flowers and fruit.

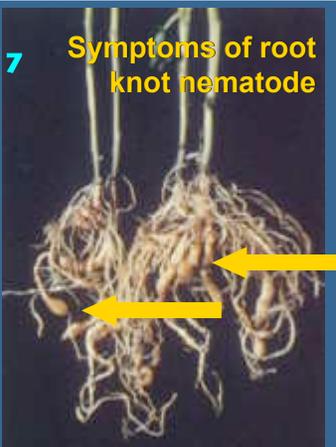
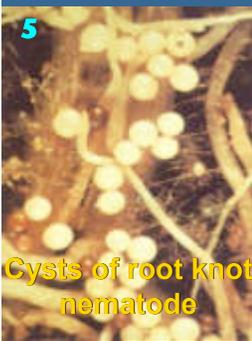
Botrytis attacks numerous crops: flowers, strawberries, raspberries, grapes, apples, cherries, kiwis, pears, lettuce, asparagus, onions and many others.

Botrytis infects through wounds, preferring new tender succulent growth of stems and leaves.

- Avoid wounding plants
- Good water, drainage & fertilization management
- Good ventilation (plant spacing & leaf thinning in vineyards)
- Crop rotation
- Cull infected plants & prune plant parts
- Bicarbonate of soda
- Compost tea
- Nettle tea
- Vegetable oil
- Biological controls

## Root Nematodes

## Nematode Controls



- Resistant Varieties
- Cover Crops:
  - Castor bean
  - Chrysanthemum
  - Sesame and marigolds
- Red plastic mulch
- Solarization

- Botanical Controls:
  - Caraway oil & seed fennel
  - mint or oregano
- Biological Controls:
  - Ditera®
  - Prospernema®
  - Deny®
  - Beneficial Nematode: *Steinernema* sp.

Root nematodes are miniscule eel-like animals less than 1 mm long in the adult stage, only visible with a microscope. They possess a stylet that penetrates cell walls in order to absorb their content. The plant's roots form tiny nodules or cysts that are visible to the naked eye.

For more information call the ATTRA project toll free at 1-800-346-9140

