IPM, Pests & Diseases of Roses

Dave Ingram

Rocky Mountain District

Integrated Pest Management

A System Of Checks & Balances

- Observe your garden
- Correctly identify the problem
- Decide whether treatment is necessary
- Start with least toxic treatment
- Evaluate the results

Integrated Pest Management (IPM)

Integrated Pest Management is a program of monitoring, coupled with use of a combination of control methods as needed that are least disruptive to the environment.

IPM Control Methods

- Cultural
- Mechanical & Physical
- Biological
- Chemical

Cultural Control

Joan Franson

- <u>Grow healthy plants</u>
- Buy pest-free plant materials
- Choose resistant varieties
- Choose & prepare a healthy planting site
- Sanitation – remove infected plant materials
- Water properly
- Fertilizer – follow label instructions

Mechanical & Physical

- Mulch - for weed control & water conservation
- Solarize - for control of weeds and diseases
- Hose & Syringe - for control of aphids, mites, & powdery mildew
- Barriers - e.g., copper banding for snails/slugs
- Handpick & Crush - for many large insects and beetles

Biological Control

- Predators - e.g., lady beetles & lacewings
- Parasites (Parasitoids) - e.g., parasitic wasps & flies
- Diseases - e.g., BTG for Japanese Beetle, beneficial nematodes, etc.

Pemphredon wasp, Whitney Cranshaw

Pesticides – Correct Use

- Always use the pesticide according to its label
- Read and understand the label thoroughly
- Never recommend the use of restricted chemicals!
- Always abide by the pesticide regulations in YOUR STATE

Only use an insecticide when damage becomes intolerable and use the least toxic, effective insecticide

Peggy Williams

Monitoring

- There are many different types of organisms (insects, mites, microorganisms) in your garden
- Most are neutral or beneficial
- Very few are pests!
- Correct identification of the pest is essential for proper control

Identifying Good Insects in the Garden

Lady Beetles

Learn To Recognize The Good Bugs Of The Garden

Leatherwinged Beetle

Lady Beetle Larva

Parasitized Aphid – A “Mummy”

Lady Beetle Pupae

Ground Beetle

Scale Feeding Lady Beetle Larvae, Pupae & Adult

Mealybug Destroyer Lady Beetle Larvae

Aphids

Signs/Symptoms:

- Deformed, stunted, damaged new growth & blooms
- Weakened plant, curling leaves, sticky honeydew on foliage
- Presence of ants

Control:

- Inspect plants frequently, catch early
- Dislodge by hand or with strong water spray
- Encourage beneficial insects
- Insecticidal soaps, Neem oil

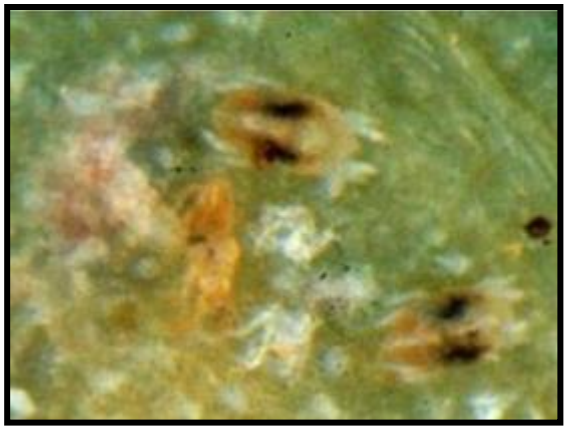
Spider Mites

Signs/Symptoms

- Very tiny; attack undersides of leaves
- Leaves appear speckled, or flecked
- Webs may appear on underside of leaf
- Lower leaves infested first
- They love hot, dry weather

Control

- Water sprays to underside of leaves
- Rain helps control
- Natural predators
- Miticide sprays – not insecticides



Spider Mites – suck individual leaf cells dry

Spider Mites suck juices from underneath rose leaves and can defoliate a rose plant in a matter of days

Rose Curculio

Feeds on early flower buds

Rose Curculio

One generation, usually in May and June

Control:

1. Drop adults into soapy water
2. Early deadheading of blooms, before larvae drop to soil

Pith Nesting Insects

Bees nest in canes, provide pollen and nectar to young

Remedy - Seal the ends of cuts with waterproof wood glue, or colored finger nail polish

Pith Nesters

Cane Borers: Small, wasp-like insects that burrow into the cut tip of a rose cane

Seal low pruning cuts – the center of this rose has died

Leafcutter Bees

Circles cut from leaves are used for lining nests

These are beneficial insects – their damage is tolerated

Thrips

Thrips Damage

Browned edges on inside petals of lighter colored roses

Western Flower Thrips

Frankliniella occidentalis

Thrips
Control Issues

- Overwinter under leaves
- New thrips travel on winds
- Tiny adult enters under sepals, lays eggs
- Adult and larvae use rasping mouth parts

- Larvae:
  - 2 instars in bloom
  - 2 instars in soil
- Generations time varies with temperature
  - Normal – 3 weeks
  - 85F – under 10 days
- Difficult to reach

Thrips – Control Options

- Remove & destroy spent blooms
- Insects – minute pirate bugs, green lacewing larvae
- Insecticidal soap & neem oil on outside

- Systemics
  - Limited control
  - Spray only buds & blooms
- Systemics:
  - Imidacloprid
  - Bifenthrin
  - Orthene
- Also: Spinosad

Rose Midge

Dasineura rhodophaga Coquillett (Diptera: Cecidomylidae)

- Adult fly is minute
- Adult lays eggs on new growth
- Tiny white larvae feed (5 days) on apical rose growth
- Drop to soil to pupate.
- 2 week life cycles

Rose Midge Damage

Bud Damage

Tip Damage

Rose midge photos
by Robin Rosetta

Larval feeding

Rose midge damage may prevent any flowers in your garden!

W. Cranshaw

Rose Midge

Organic Control

- Attempt to interrupt breeding cycle
- Plastic or wet newsprint on soil
- Insecticidal soaps
- Prune & destroy “burnt” foliage & buds.
- Exclude suspect plants

Chemical Control

- A recent test shows:
  - Acetamiprid
  - Spinosad

Properly applied, can control 70% or more of midge larvae on stems and foliage

Japanese Beetle

Popillia japonica

Average size: 1/2” x 1/3”

Japanese Beetle Life Cycle

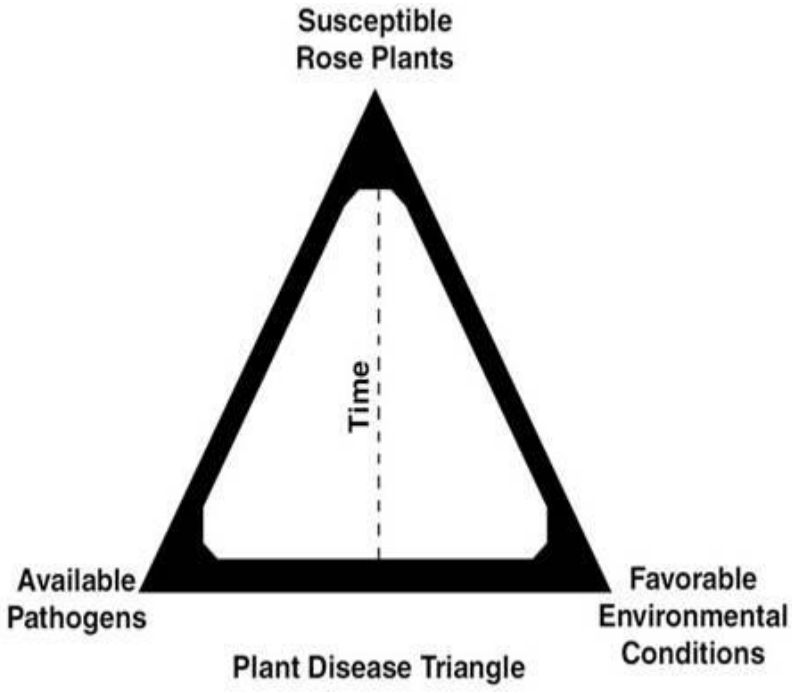
- Adults emerge from turf in summer to feed and breed
- Females lay eggs in turf grass
- Eggs hatch into larva, which feed on grass roots
- Larva overwinter in turf

Organic Controls

- Hand-picking, early a.m. or late p.m.
  - Toss into soapy water and destroy
- Shake plant over sheet
  - Dump into soapy water and destroy
- Vacuum cleaners
- Important to keep plants damage-free
- Okay to squish
  - Only virgin females emit pheromones as they emerge from the soil
- *Bacillus thuringiensis (Btg)*

Plant Disease Triangle

- Susceptible Host
- Available Pathogen
- Right environmental conditions
- All three factors must be present



Types Of Disease Organisms

- Fungi
- Bacteria
- Viruses

- Abiotic Factors

Rose Diseases - Infectious

- Powdery Mildew
- Black Spot
- Rust
- Verticillium Wilt
- Downy Mildew
- Cankers
- Botrytis
- Anthracnose
- Crown Gall
- Rose Mosaic
- Rose Rosette
- Rose Wilt
- Root Nematodes

Rose Diseases – Non-Infectious

(Abiotic)

- Genetic Disorders
- Environmental Imbalances
- Salinity
- Air Pollution
- Nutritional Deficiencies
- Nutritional Toxicities
- Oxygen Deficiency
- Heat & Moisture Stress
- Pesticide Toxicity

Diseases Caused By Fungi
General Control Considerations

- Acquire resistant varieties of roses, if available
- Remove infected plant material as soon as it is noticed and get rid of plant materials after pruning
- Avoid overcrowding and choose open beds away from fences and wind obstructions
- Open the center of the plants when you prune to provide air circulation through the leaf canopy

Diseases Caused By Fungi
General Control Considerations

- Water early in day to allow leaves to dry
- Avoid overhead irrigation/sprinklers
- Sterilize tools between pruning, especially if you've cut through a diseased cane
- Avoid injury to rose canes; use sharp tools to obtain clean cuts
- Most home compost piles do not destroy fungal spores

Types of Fungicides

Based On Mode Of Action

- **PROTECTANT -** Applied before infection
- **SYSTEMIC -** Translocated by leaves and roots and distributed in the plant to prevent infection
- **ERADICANT -** Applied after infections appear and kills on contact
- Fungicides work best to prevent infections
- Always read and follow label instructions for any fungicide

Powdery Mildew

Sphaerotheca pannosa

Photo by Jack Kelly Clark

- Very common – some roses more susceptible than others!
- Starts on leaves, but spreads to buds and young shoots
- Common where air circulation is poor
- Optimum conditions are 71°F and 98 percent relative humidity

Warm days and cool nights makes any climate just right for this!

Needs high relative humidity for spores to germinate!

Powdery Mildew Control

- Overwinters on infected canes
- Fungicides work best at onset of disease, not after massive infection
- Potassium Bicarbonate has shown fungicidal activity
- Some antitranspirants have shown fungicidal activity by acting as a barrier to invading spores

Fungicides work best when applied early!

Black Spot

Note Fringed Borders of Spots

Black Spot

Diplocarpon rosae **Wolf**

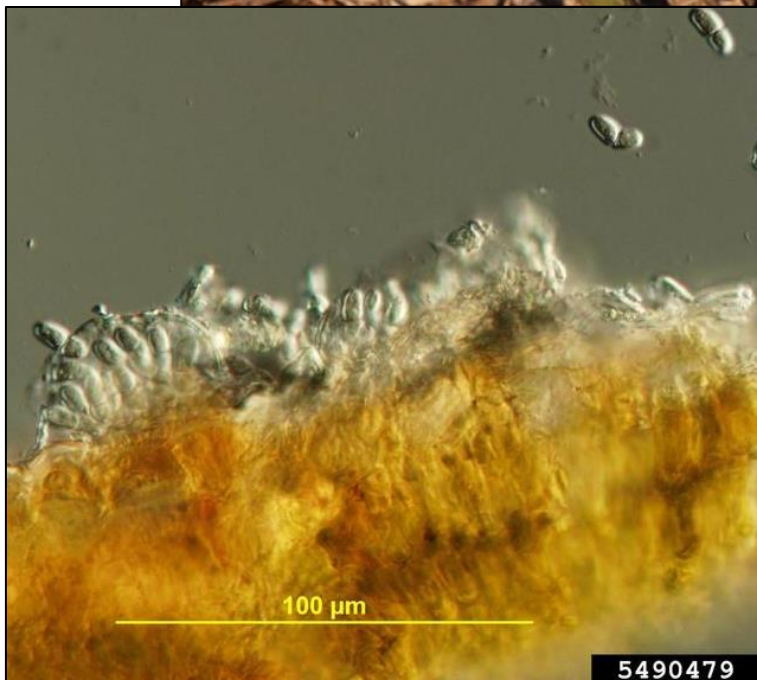
- SYMPTOMS: Characteristic black spots develop on the upper leaf surfaces. Leaf spots are usually circular with characteristic fringed borders. Raised purple-red, irregular blotches may develop on young canes of susceptible varieties.

- CONDITIONS: The fungal spores (conidia) must be immersed in water and must be continuously wet for at least seven hours for any infection to occur.

- Needs free moisture.

Black Spot

- Lower areas are infected as spores are splashed up on foliage during rains or irrigation
- As disease spreads, leaves go from green to yellow and then drop
- Becomes very active in wet environments with temps around 70°F



Black Spot Control

- Preventative spraying
- Prune to allow air circulation
- Early water so foliage can dry
- Snip off diseased leaves
  - But don’t spread the infection!
- Good garden sanitation all year
- Spores can over winter on canes
- Buy disease resistant varieties of roses

Rust

Phragmidium spp

- Appears on the underside of the foliage as red-orange pustules
- Spores are wind borne
- Can defoliate the plant
- Needs 2 – 4 hours of water contact for spores to germinate

D. Ingram

Rust Control

- Good sanitation helps prevent infections
- Remove infected leaves and dispose in trash
- Don’t water in the evening so that the leaf surface is wet over night
- Preventative fungicides for powdery mildew or black spot are usually effective

D. Ingram

Spot Anthracnose

Sphaceloma rosarum (Pass.) Jenkins

- Initially spots are small and black - easily confused with blackspot
- Spores believed to be carried by water or rain to new leaves and stems
- The light-colored center best defines the difference with blackspot
- Can be severe under cool, moist spring conditions

Sphaceloma rosarum Baldo Villegas

Anthracnose

- Tissue may drop out of the center of the spots, giving infected leaves its other name of “Shot Hole Fungus”
- Sanitation is best means of control – remove diseased leaves, and dispose in trash

Gail Trimble

Bacterial Crown Gall - Diagnosis

Caused by a Bacterium, not a Fungus!

Agrobacterium tumefaciens

Bacterial Crown Gall

- Bacterial disease usually seen on bud union, or on the trunk
- Thrives in warm, sunny weather; not active in cold weather
- Plants will usually be stunted in their growth habits
- <u>Disease is un-treatable</u>

John Moe

Bacterial Crown Gall

- Can stay dormant in the soil for years
- The growth can be removed, however, chances are it will eventually return
- Destroy the galls; disinfect cutting tools with Lysol® after each cut
- <u>Best: Destroy the plant</u>
- Try to replace soil where rose was growing, or saturate the soil well with a 10% bleach solution before replanting

John Moe

This cut was most likely made with infected pruners!

Rose Mosaic Virus Complex

- Probably the most commonly found virus in roses
- Primarily transmitted by propagation
- No cure – buy quality plants showing no symptoms of the disease
- Overall damage from the disease may be mostly cosmetic with some reduction of plant vigor

Prunus Necrotic Ringspot Virus

All viral diseases are incurable, and have no chemical remedy

Rose Rosette Disease - Diagnosis

Note weird, “witch’s broom” foliage

Rose Rosette Disease (RRD)

- Has not been officially diagnosed in Colorado – yet!
- Caused by a virus
- Transmitted by a tiny eriophyid mite
- The distinctive red stems, distorted and wrinkled leaves are symptoms
- New growth appears unusually soft and pliable

James W. Amrine Jr.,
West Virginia University, Bugwood.org

Rose Rosette Disease

- Once diagnosed, you need to act fast!
- Very serious disease – no cure, fatal to plant!
- Remove the diseased plant as soon as possible (including the entire root system) and destroy it!
- Considered to be one of the most damaging problems of roses!

Herbicide Drift On Roses

Herbicide Damage

Common in Colorado

May look like Rose Rosette

Rose Rosette

Questions?

Chihuly sculpture in the rose garden at Denver Botanic Gardens