

Diseases of Roses - Case Study

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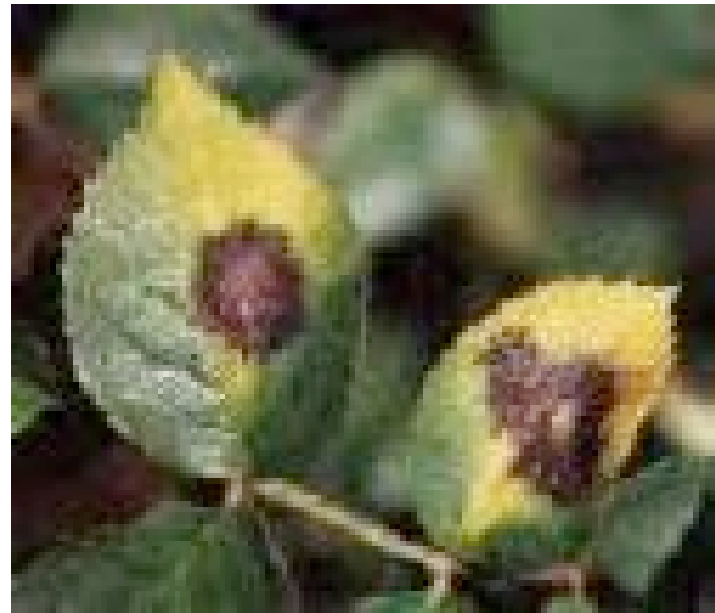
Fall 2006

Common Rose Diseases

- Caused by Fungi
 - Powdery Mildew
 - **Black Spot** (foliar)
 - Rust
 - Verticillium Wilt
 - Downy Mildew
- Caused by Bacteria
 - **Crown Gall** (meristematic tissues of the crown)
 - Harry Root
- Caused by Virus
 - Rose Mosaic

Black Spot of Roses

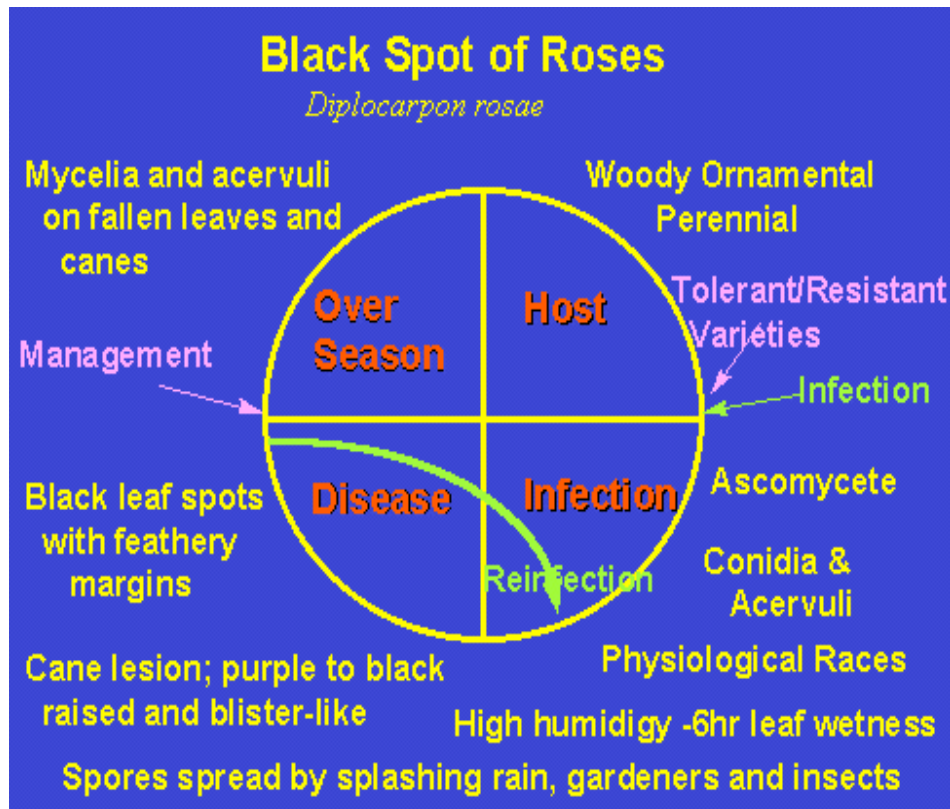
“Nebraska’s most troublesome rose disease, can be controlled through selection of a resistant cultivar, spaced plantings and an active fungicide spray program.”



Disease Cycle

Black Spot of Roses

Rosa spp :: *Diplocarpon rosae*



- **Host**

- Roses
- Resistant varieties
- Architecture - open, ground leaves

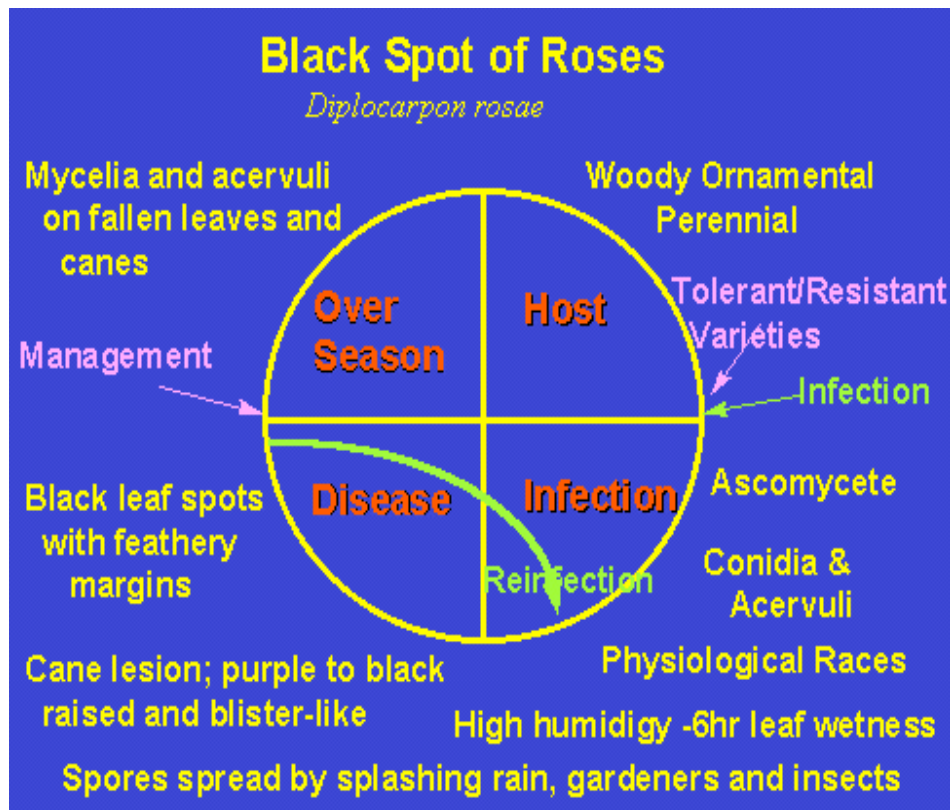
- **Infection**

- Fungus is quite host-specific and approaches obligate parasitism.
- Infects directly through cuticle on both sides of leaf
- High humidity needed for infection to occur, but not free moisture to infect
- Infection > leaves wet for 6+ hours
- Spores dispersed in rain or dew by splashing water
- Infected fallen leaves blown by wind

Disease Cycle

Black Spot of Roses

Rosa spp :: *Diplocarpon rosae*



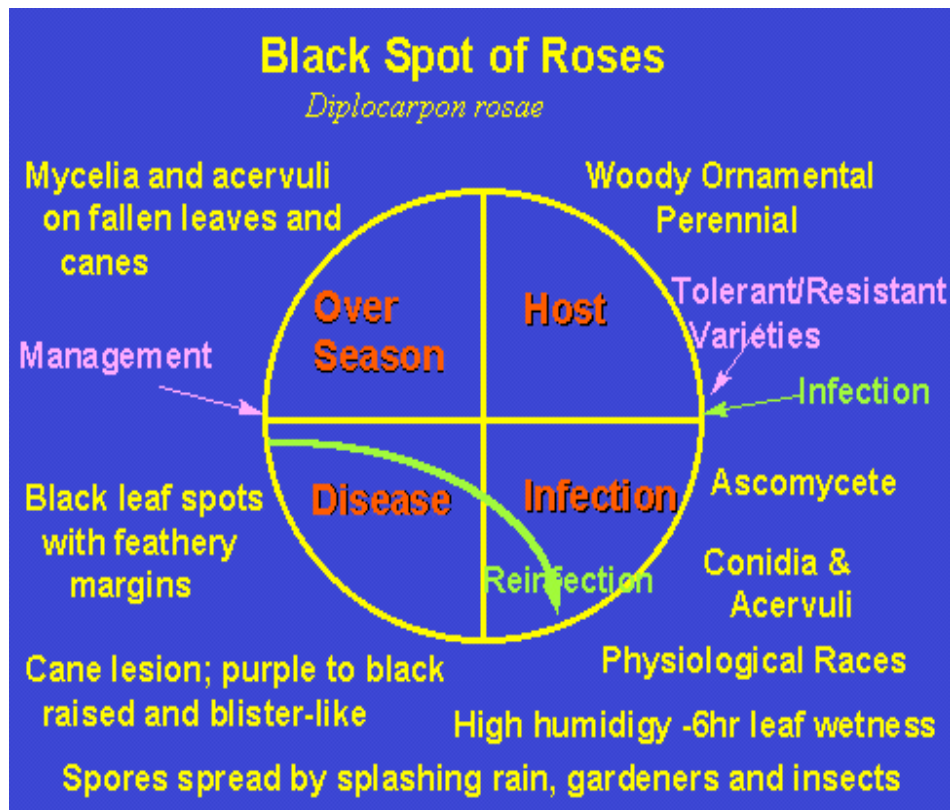
- **Disease**

- Circular black leaf spots with fringed margins
- Leaves turn yellow and drop (lower leaves drop 1st)
- -> reduced stem size, # and quality of leaves and blossoms
- -> increased risk of injury from cold
- Raised purple blotches on immature wood

Disease Cycle

Black Spot of Roses

Rosa spp :: *Diplocarpon rosae*



- **Over Season**
 - Mycelia in fallen leaves or infected canes
- **Plant Health Management**
 - Resistant Cultivars
 - Fungicide spray programs (May-Sept in Nebraska) (weekly application to protect newly emerging foliage) (apply in evening when less wind and lower temp) (cover both sides of leaves)
 - Sunny location, proper spacing for air circulation, drip water, remove leaf debris, mulch to reduce splashing of spores from fallen leaves

Fungicides to control Black Spot of Roses

- Captan
- Chlorothalonil, Daconil 2787
- Funginex, Triforine
- Mancozeb, Fore, Dithan M-45, Dithane F-45, Dithane DF, Manzate 200 DF
- Maneb
- Sulfer
- Ziram

Use a different fungicide each season or alternate during the growing season.

Traditional Black Spot Fungicides

Black Spot of Rose

<http://pmo.umext.maine.edu/factsht/Spotrose.htm>

Traditional Fungicides for Black Spot Control		
Fungicide	Apply when first observed	Examples of Trade Names
trifloxystrobin	7-14 day schedule	Compass
chlorothalonil	7-14 day schedule	Daconil, Bravo, Echo, Fungonil and others
myclobutanil	7-10 day schedule	Eagle
maneb	7-10 day schedule	Maneb
mancozeb	7-10 day schedule	Mancozeb, Stature, Dithane M45, and others
Thiophanate-methyl	10-14 day schedule	Fungo Flo, Quali-Pro TM, Systec, Cleary's 3336
Ziram	7-10 day schedule	Ziram
captan	7-10 day schedule	Captan
Triforine	7-10 day schedule	Funginex
Propiconazole	14-21 day schedule	Banner Maxx

Alternative Black Spot Fungicides

Black Spot of Rose

<http://pmo.umext.maine.edu/factsht/Spotrose.htm>

Alternative Fungicides for Black Spot Control		
Fungicide	Apply when first observed	Examples of Trade Names
copper products	Coverage critical. 5-7 day schedule.	Kocide, Tenn-Cop, Basicop, and others
Lime Sulfur	Apply when dormant	Lime Sulfur
Neem oil	Preventative 7-14 day schedule.	70% Neem Oil
Potassium bicarbonate	10-14 day intervals	Remedy Fungicide, Armicarb 100
sulfur	Coverage critical. 5-10 day schedule.	Sulfur Dust, Wettable Sulfur, and others
Hydrogen dioxide	Commercial only. See label	ZeroTol

Crown Gall of Roses

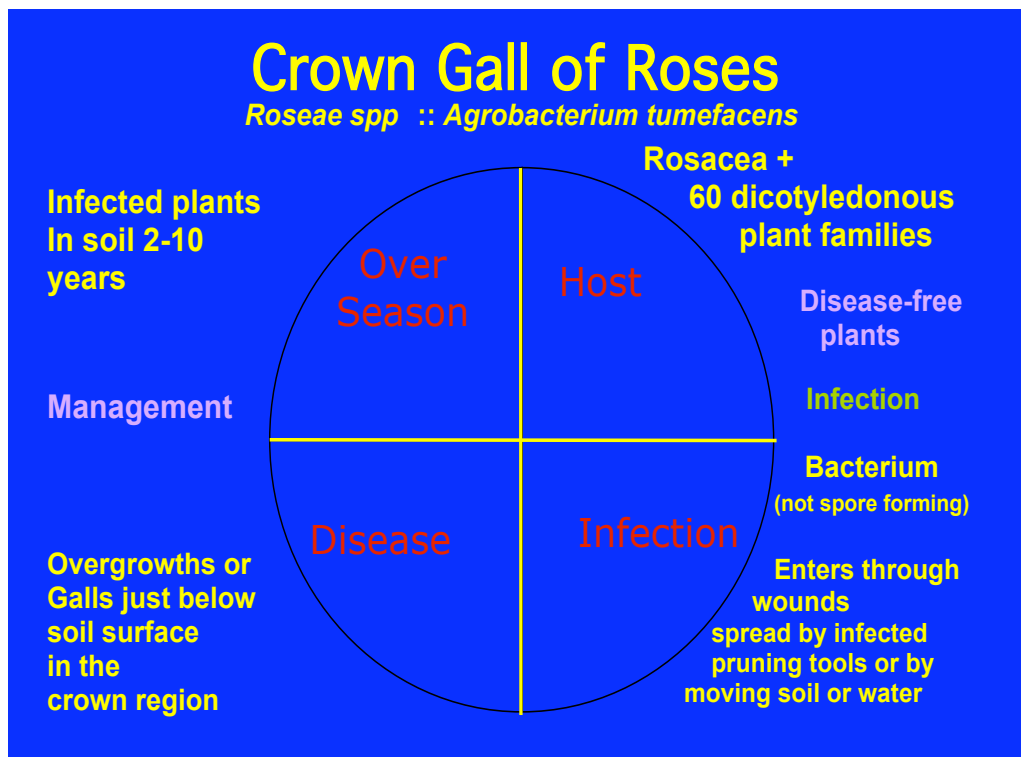
- This disease caused by bacteria “has been reported in all parts of the world on various plants. This disease occurs worldwide on roses and is commonly observed on roses in the United States.”



Disease Cycle

Crown Gall of Roses

Rosa spp :: *Agrobacterium tumefaciens*



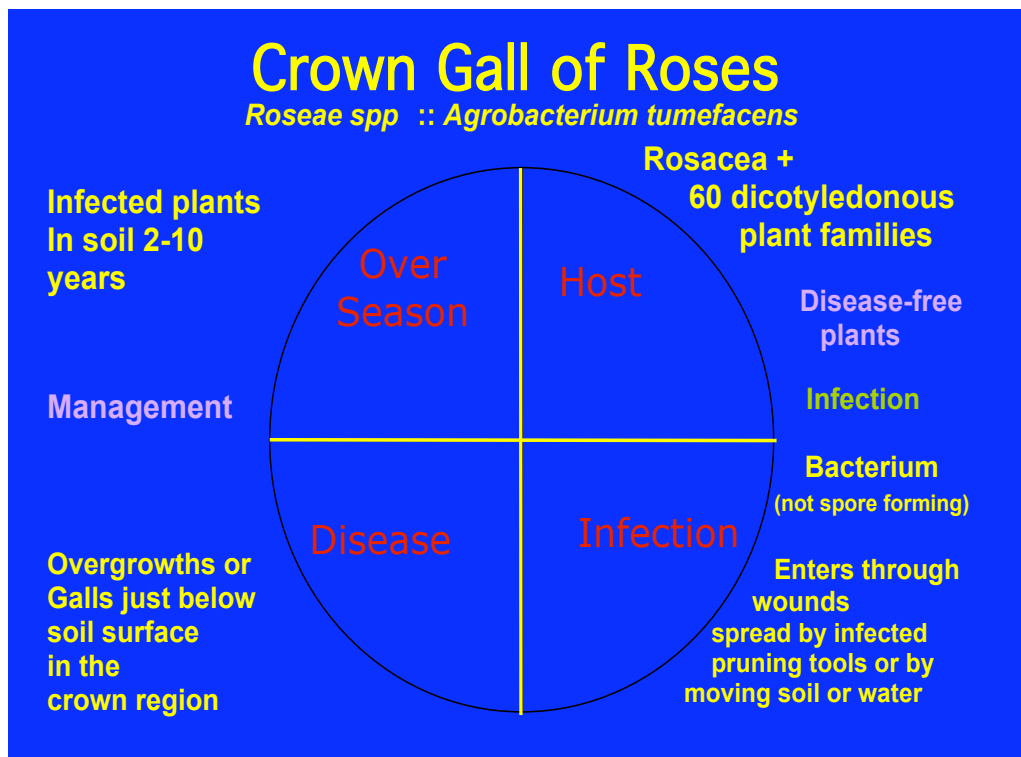
- **Host**

- >60 dicots including Rosaceae
- Almond, apple, apricot, aster, beet, blackberry, cherry, daisy, grape, raspberry, walnut, pecan, tomato, sunflower, etc.
- Resistant rootstock, none immune

Disease Cycle

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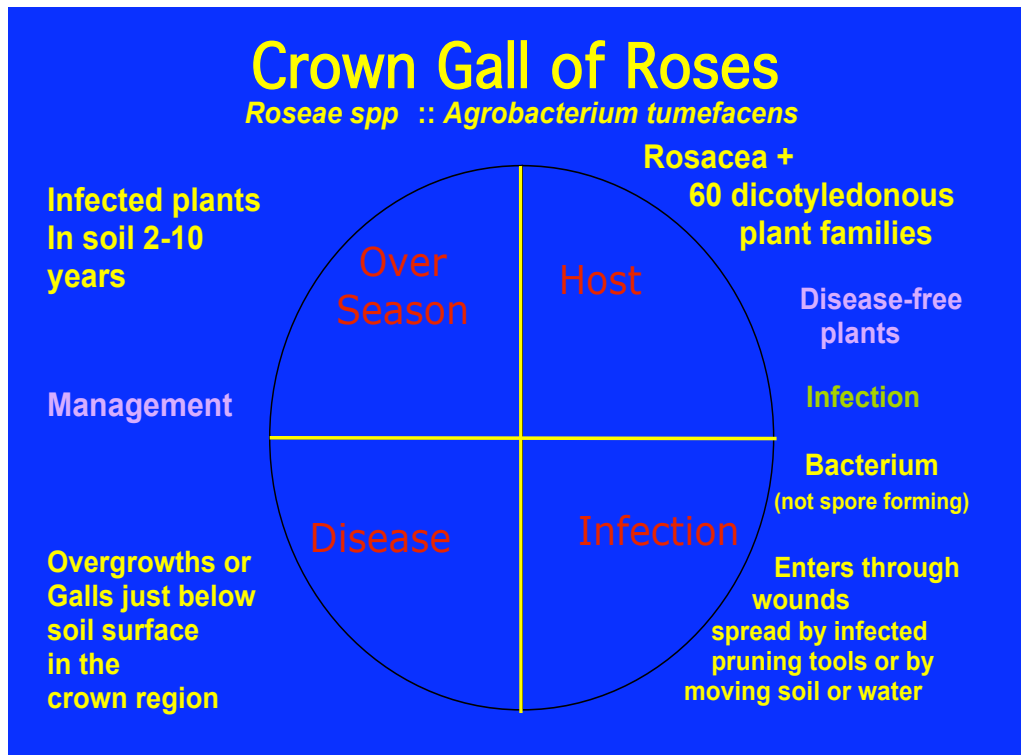
- **Infection**

- Bacteria enters through natural wounds or wounds caused by pruning, grafts, mechanical injury from cultivation, “heaving” of frozen soils, chewing insects, or the emergence of lateral roots.
- Plasmid DNA transferred from the bacterium into the nuclear genome of the plant cells transforms normal cells into tumor cells.

Disease Cycle

Crown Gall of Roses

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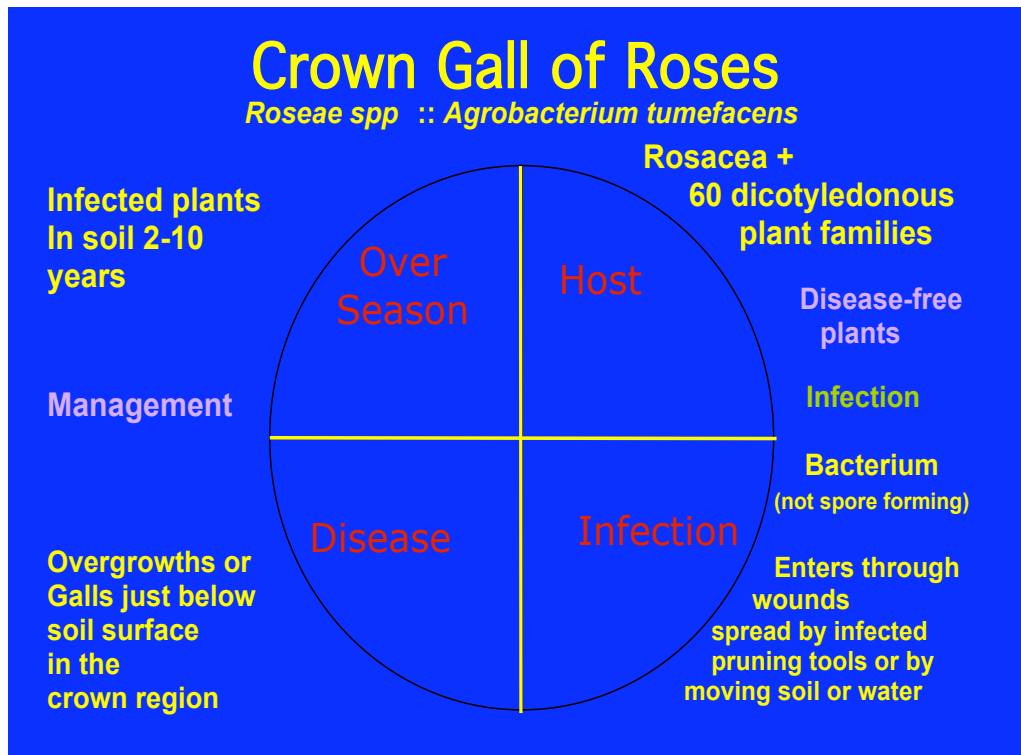
- **Disease**

- Rapid proliferation of meristematic tissue and formation of overgrowths or tumors (galls)
- Rounded, rough galls just above the soil surface in the basal or crown
- May occur on roots and aerial plant parts
- Stunting, poor foliage, fewer blossoms

Disease Cycle

Crown Gall of Roses

Rosa spp :: *Agrobacterium tumefaciens*



Over Season

- Bacteria can remain in soil for up to ten years

Plant Health Management

- Resistant rootstocks; however, none are immune
- Use disease-free plants
- Avoid injury to roots and crown during planting and cultivation
- Plant in properly treated or sterilized soil.
- Remove infected plants as soon as galls are observed
- Disinfect pruning tools
- Rotate crops using monocotyledonous cover crop

Designing a Disease Control Program

- **Prevention**
 - Healthy Plant
 - Good soils mix
 - Plenty of water
 - Balanced fertilizer application - when the plant needs it
 - Granular
 - Foliar spray
- **Weekly or Biweekly Spray Program**
 - Fungicide Protectants
 - Form a barrier between the spore and the leaf (physical or chemical) - that kills the spore when it tries to germinate.
 - Systemic Fungicides
 - Absorbs into leaf and kill germinating spores
 - Contact Fungicides
 - Smother the spore and killing it or reducing spread
 - PDBs
 - Stimulate the plant to kick in its natural defenses

References

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- Nebraska Cooperative Extension Publication EC 79 1206C.
- Black Spot of Roses, NebGuide, 1991
- Rose Ecstasy Newsletter, The Santa Clarita Valley Rose Society, Santa Clarita, CA, March 2004
- Report on Plant Disease, Crown Gall, University of Illinois Extension, RPD No 1006, Nov. 1999
- American Rose Magazine, Publication of the American Rose Society, March 2003