Thousand Cankers Disease of Black Walnut

- Observed in Boulder, Arvada, Colorado Springs since 2003
  - Over 250 trees killed so far in Boulder
- Branch dieback followed by rapid mortality
  - Trees may go from 25-30% crown damage to dead during summer
Distribution

- Twig beetle- New Mexico late 90’s
- Oregon – walnut mortality last 10 years – cause unknown
- Samples from *J. nigra* and *J. regia* – Utah
- Decline noted in Idaho?
Walnut Twig Beetle

- *Pityophthorus juglandis*
  - First report of insect in Colorado around 2003
  - *Juglans nigra* not a natural host?

- Purportedly only attacks small, weak twigs on *Juglans* species native to Southwest
Walnut twig beetle

*(Pityophthorus juglandis)*

Adults trapped throughout summer on yellow sticky cards
Beetles may attack branches >3 inches in diameter.
Fusarium solani

- Vertical branch and trunk cankers (>10 feet in length)
Fusarium Trunk and Branch Cankers
Fusarium Canker of Walnut

- Reported in 80’s in Minnesota, Kansas following harsh winter conditions
Extensive discoloration associated with galleries

*F. solani* not isolated from diffuse twig/branch cankers or from beetles
Geosmithia sp. Isolated from Branch Cankers/Galleries/Beetles

- Fungus associated with bark beetles of hardwoods and some conifers
  - Not previously reported as plant pathogen

Image: Geosmithia fruiting in gallery
Geosmithia
Inoculations

- *Fusarium solani* (top) 8 weeks after inoculation
- *Geosmithia* sp. (bottom) 8 weeks after inoculation
  - Much more aggressive than *F. solani*
  - Note streaking going up the stem
Original Hypothesis

- Drought conditions and poor walnut sites
- Geographic expansion of twig beetle
- Beetle attacks stressed trees
- Damage causes carbohydrate depletion/weaken defense responses
- Opportunistic *F. solani* causes branch and trunk cankers – tree dies
New Hypothesis

- Beetle has expanded in geographic range and attacks new host
  - Why?
- Beetle vectors aggressive canker pathogen
  - Is pathogen native?
- Fusarium canker develops during late stage of decline
  - Where does it come from?
- Drought stress likely not the primary factor