

Sustainable Soil-Borne Disease Management



Soil-Borne Disease Overview

- Pathogens are present in soil
- Outbreaks of disease occur when: *susceptible hosts meet disease-causing pathogens in a favorable environment.*



Historical Look at SBDM

- Until 1930's, animal/green manures, composts, and crop rotation were principle methods of soil-borne disease control.
- Since then, methods have been largely replaced by synthetic pesticides along with synthetic fertilizers.
- Non-specific pesticides decrease natural fertility; strong fertilizers feed pathogens and compromise plant defense mechanisms. Use of one increases need of the other.
- This “pesticide treadmill” and its associated problems are leading us to develop alternative, sustainable production systems.

Methods of Disease Suppression

■ Control of Pathogen

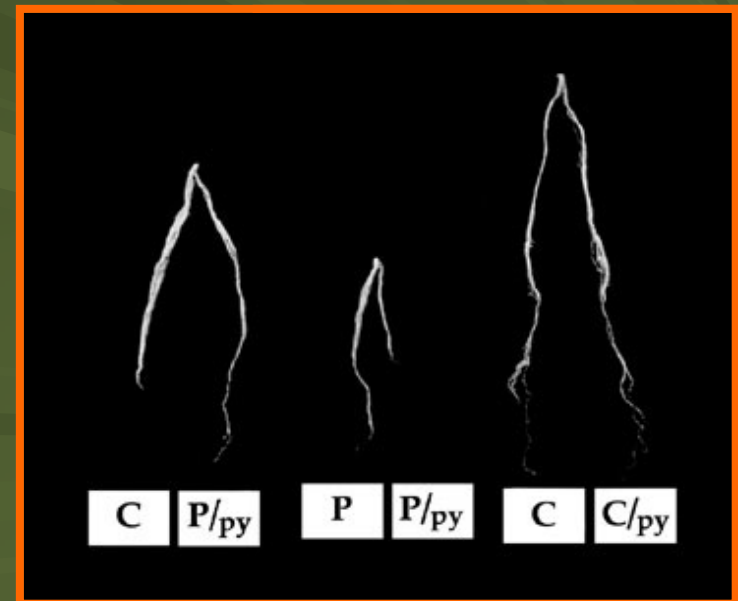
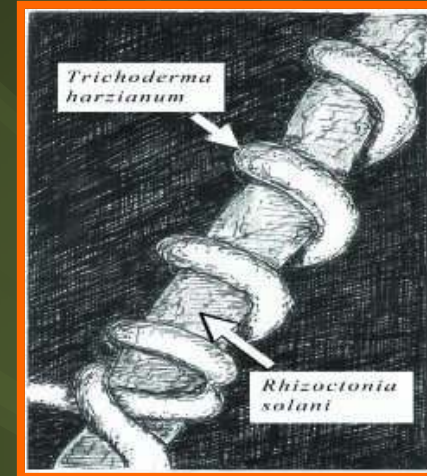
-fumigants, fungicides, solarization, competitive organisms, natural enemies

■ Decrease Host Susceptibility

-resistant varieties, crop rotation, inter-planting, induced resistance

■ Environmental Conditions

-early/late plantings, proper irrigation



A Closer Look at Kentucky



We are evaluating management tactics for two *broad-spectrum*, soil-borne diseases affecting two production systems of KY.

- *Sclerotinia sclerotium*

- cool season high tunnel systems (Au Naturel Farm)

- *Phytophthora capsici*

- warm season field vegetable systems (Bray's Orchard)



A Preliminary Look

Sclerotinia sclerotium survival was monitored after different soil treatments at Au Naturel Farm:

- Soil Solarization
- Contains WG (natural enemy)
- Combination
- Control



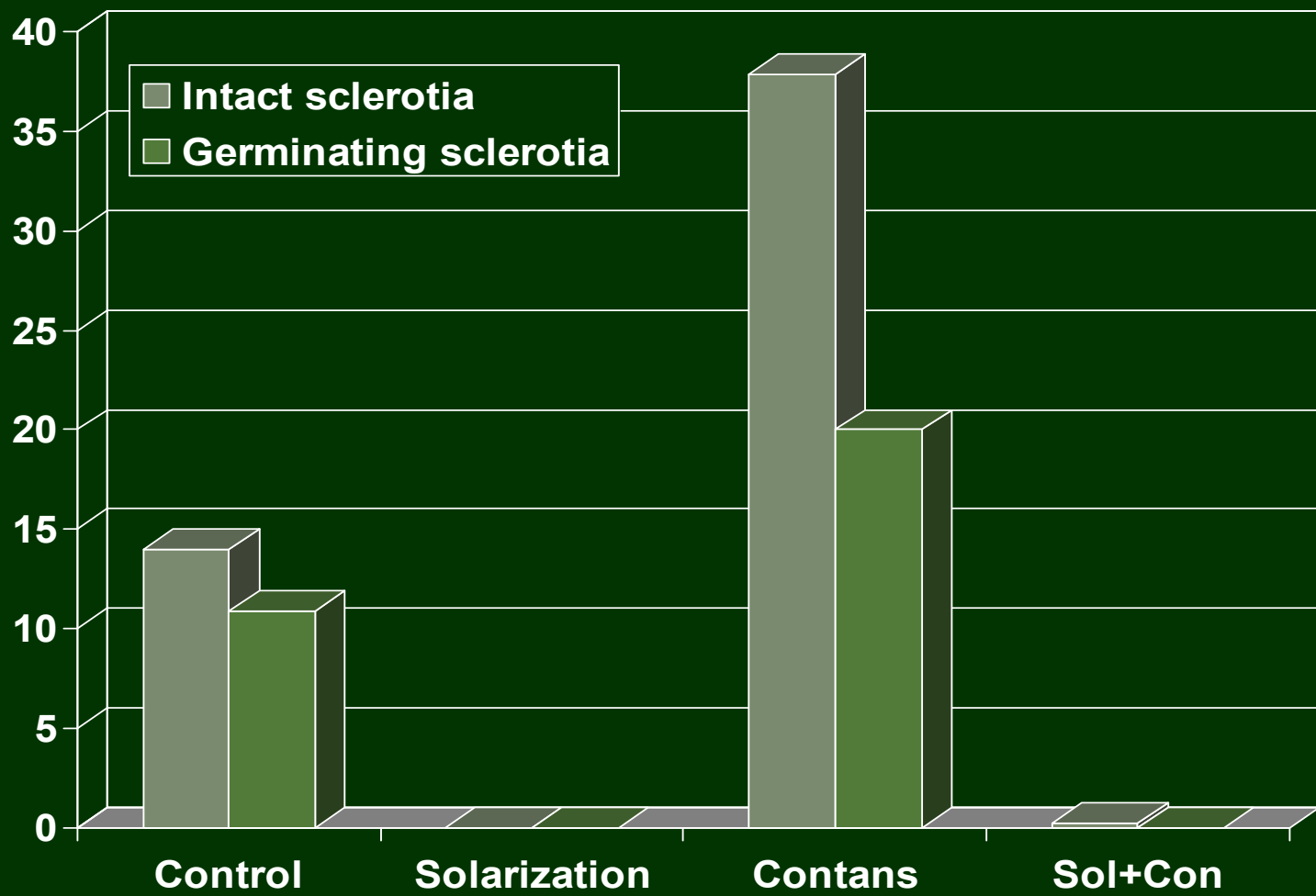












BIOFUMIGATION

- Use of chemicals that naturally occur in the Brassica family of plants to suppress soil-borne disease.
- Chemicals: glucosinolates (GSL's)
 - part of the plants' natural defense systems
 - when tissue is damaged, GSL's are converted to isothiocyanates (ITC's), which are toxic to many pathogenic fungi.
- Brassicas are grown, then incorporated into soil to release toxicity, and suppress disease pathogens.

Our Study

- 40 varieties of Brassicas are being grown and evaluated for their GSL content.
- Promising varieties will then be tested in the lab for their toxicity to *sclerotinia* and *phytophthora*.
- Effective varieties will be tested in on-farm field trials.
- Solarization will be incorporated alone and in combination with biofumigation.

Goal:

To evaluate potential sustainable soil-borne management tactics for use in both conventional and organic vegetable production systems of Kentucky.

QUESTIONS?

