Improving Canola Yields and Quality Through Best Management Practices for Diseases

Dr. Madeleine Smith

UNIVERSITY OF MINNESOTA
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Talk Outline

- Results of 2014 Disease Survey In Minnesota
- Important Diseases in MN
- Canola Disease Nursery

Results of 2014 Canola Disease Survey

- Small Initial Survey of Canola Fields in MN based on the proportion of acres
- one field for every 5,000 acres

Photo: NDSU

Survey Methods

- Sample 5 stems at random at 10 locations in a field (at least 30 paces apart)
- Stem will be collected by carefully pulling them from the ground and then visually examined for presence of symptoms/signs of blackleg
- Stems were examined for signs of Sclerotinia stem rot, clubroot and aster yellows
- 10 pods sampled at each location within a field. Pods rated for severity of Alternaria black spot

2014 Survey Results

- blackleg was present in all fields scouted
- Incidence was low with all fields having incidences <11% (80% of fields had incidences below 5%)
- Sclerotinia stem rot had 10% incidence or less in fields scouted
- No aster yellows was detected

Conclusions From Survey

- Both blackleg and white mold are widespread
- Both have potential to be serious problems to canola production in MN

Blackleg

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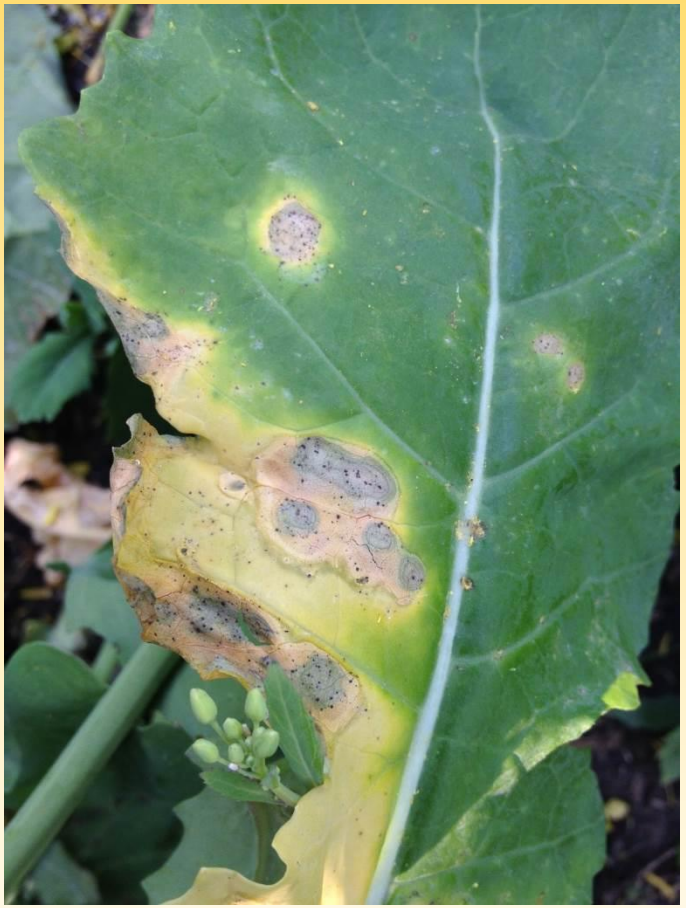
What is Blackleg?

- **A fungus called Leptosphearia maculans**
  - **complex with *Leptosphearia biglobosa (causes less disease)***
- There are different races of the *L. maculans* - this impacts selection of varieties and resistance
- These races are classed as pathogenicity groups (PG) and are based on the ability of the fungal isolate to cause diseases on a core set of varieties

Symptoms of Blackleg

- The first symptoms of blackleg will appear as grey lesions on leaves
- Sometimes you can see small black dots in the lesions -pycnidiospores
- These symptoms can occur as early as the two to four leaf stage



Symptoms of Blackleg

- As the growing season progresses, the fungus grows from the leaf lesions through the vasculature of the plant in to the stem base.

- Once the fungus reaches the stem base, it can cause stem lesions which weaken the stem and cause it to lodging

Blackleg symptoms on mature canola stems. Photo Courtesy of Don Hershman

Life Cycle

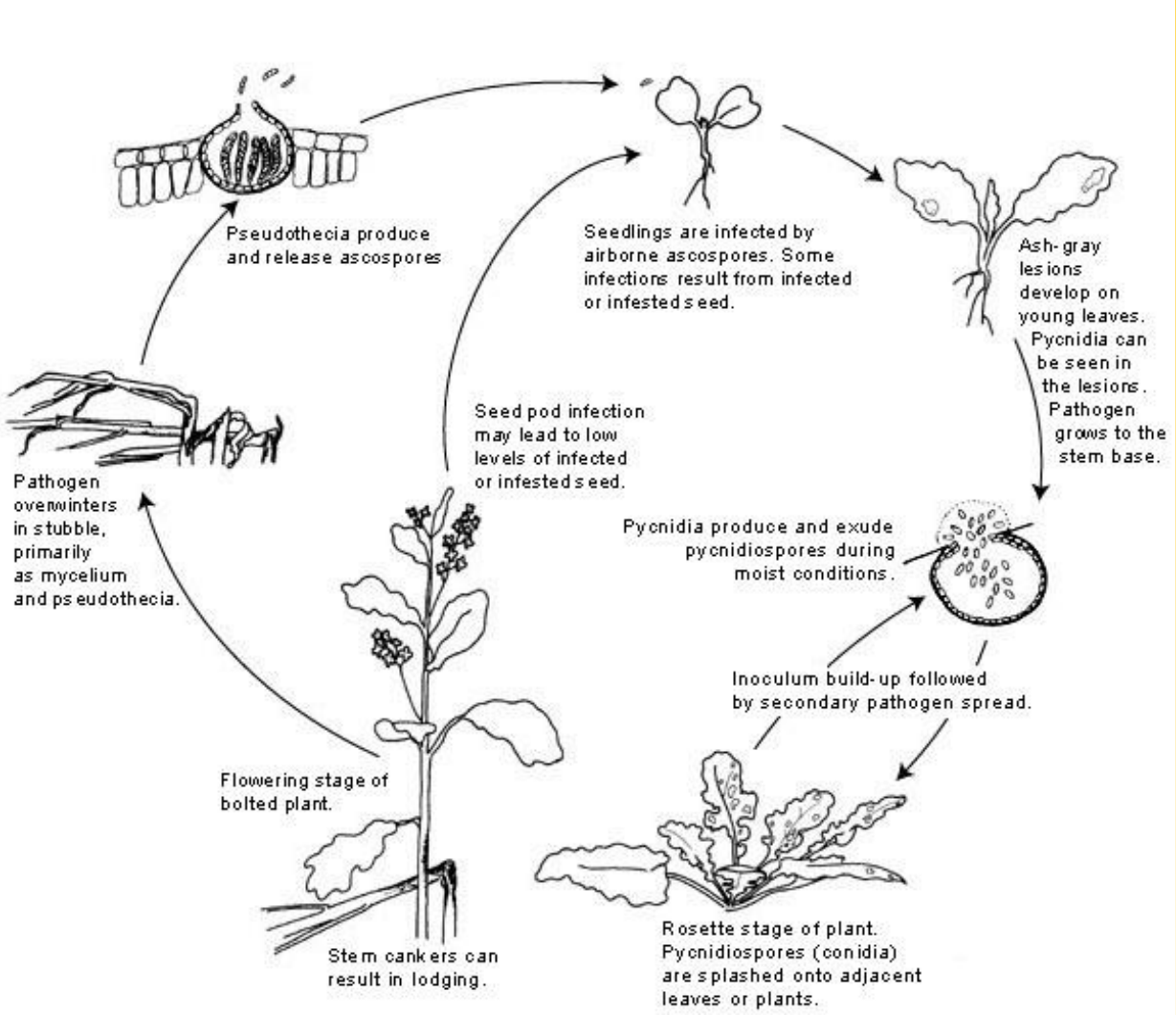


Figure.http://www.apsnet.org/edcenter/intropp/lessons/fungi/ascomycetes/Pages/Blackleg.aspx

When Are You at Risk from Blackleg?

- Weather- warm and humid, frequent rains
- Spore production from residue within field/ neighbouring fields
- Longer range spore production
- Susceptible varieties

Management Strategies

- Rotation- length depends on varietal resistance
- Scouting early- look for leaf lesions
- Fungicide applications

White Mold

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What is White Mold?

- Fungus caused by the fungus *Sclerotinia sclerotiorum*
- Fungus has a wide host range
- Persists in the soil for several years

Symptoms of White Mold

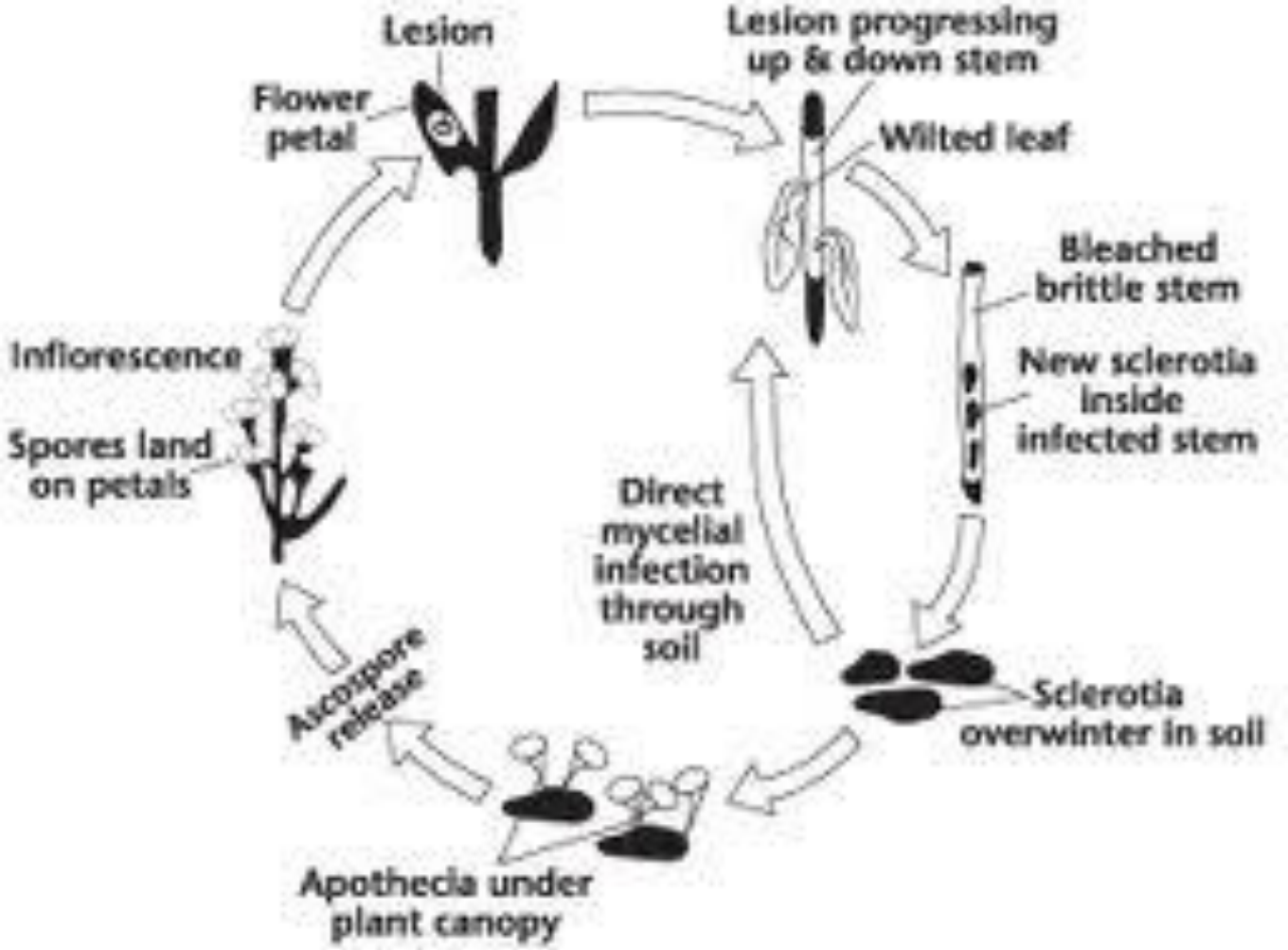
Photo: J. Venette, North Dakota State University

Photo: XB Yang, Iowa state University

Symptoms of white Mold

Photo: Beth Hoar

Life Cycle of White Mold



When are you Most at Risk From White Mold?

- Apothecia observed in field
- Periods of cool, wet weather
- Dense and/or lodged canopies which create a moist microclimate optimal for disease development
- Spore release at flowering

Can Assess Risk

- **http://www.ag.ndsu.edu/sclerotinia/**

- Sclorotinia risk cards: http://www.saskcanola.com/quadrant/media/canola/pdfs/canola_disease_scouting.pdf

Management of White Mold

- Varietal selection
- Crop rotation-non hosts-cereals
- Seeding –rate and row spacing
- Disease scouting
- Fungicide applications

Canola Disease Nursery

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Why Do We Use Inoculated Nurseries?

- To evaluate disease control measures, we need good disease pressure
  - Natural infection does not always occur depending on environmental conditions
  - Natural infection may not occur uniformly over the whole trial

Inoculated Nurseries

- These are important factors whether we are evaluating:
  - Varietal resistance
  - Cultural control
  - Chemical control

Inoculated Nurseries

- Requires inoculum production
  - White mold – seeding ground with sclerotia, spore spraying
  - Blackleg-spraying of spores at seedling stage

Inoculated Nurseries

- Requires susceptible varieties
- Whitemold- varieties with increased lodging potential
- Blackleg- Weststar

Inoculated Nurseries

- Must provide the right conditions for disease development
  - irrigation

Nursery Crookston 2015

- Approx. 1 acre
- Misted using overhead misting system
- Plots 15 x 5 ft with 3 ft gaps between plots

Objectives

- Determine best inoculation methods for our environment
- Utilize plots to evaluate chemical and biocontrol agents
- How these work with cultural control methods

Results

- Irrigation system was successfully set up
- Disease was successfully introduced to plots
- Although all inoculated plots had disease, it did not spread evenly

Conclusions

- Due to timing of the grant award, we were not able to prepare enough inoculum for the best application methods in 2015
- Optimal methods will produce more even disease spread

Acknowledgements

- Survey work
  - Luis Del Rio (NDSU)
  - Sam Markell (NDSU)
- Canola Disease Nursery
  - MDA for funding
  - Mala Ganiger

Questions?

Please contact me at:

smit7273@umn.edu