

NCGA 15th Annual Canola
Research Conference

Canola Pathology Program

Research update 2021

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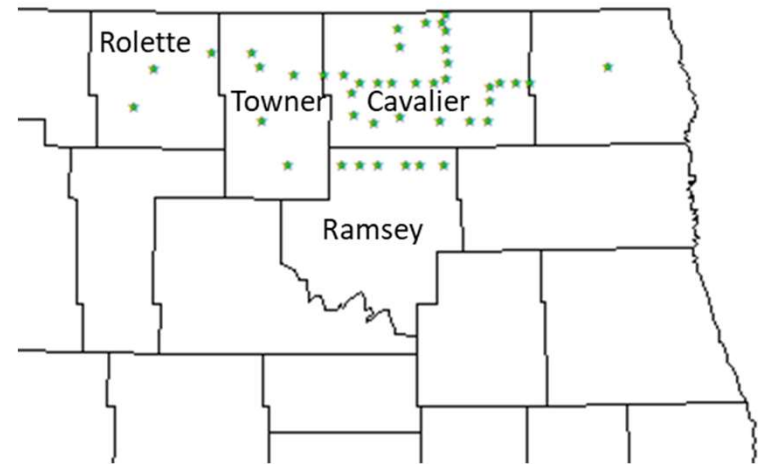
- ❑ Canola blackleg survey
- ❑ Resistance to SSR and to blackleg
- ❑ Resistance to clubroot



Blackleg survey

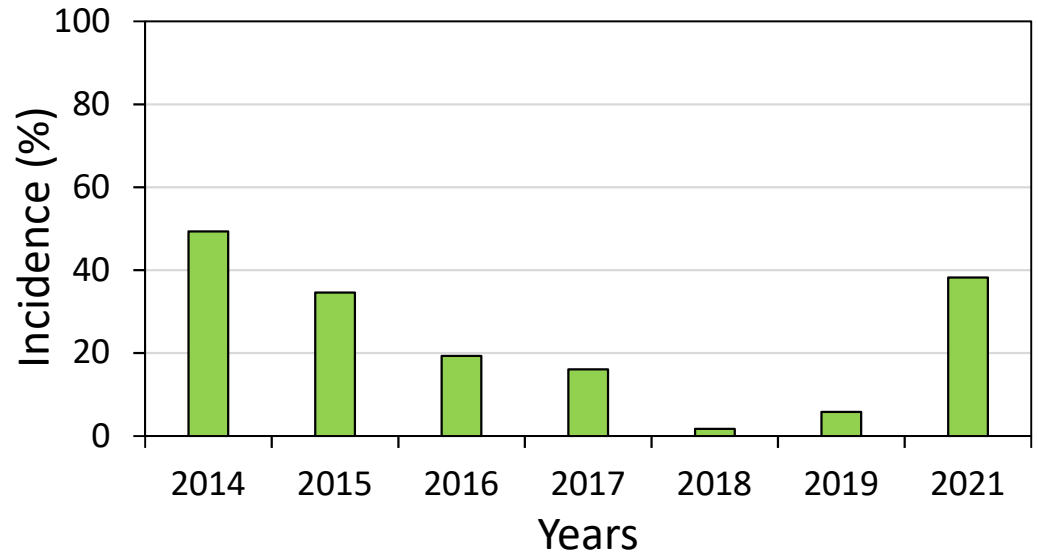
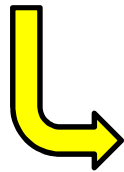
Objectives: Characterize prevalence of blackleg and of blackleg races

- End of season survey
- 47 fields
- Cavalier, Rolette, Towner, and Ramsey counties
- 50 plants per field (10 sites)
- Visual disease identification
- Avirulence gene prevalence

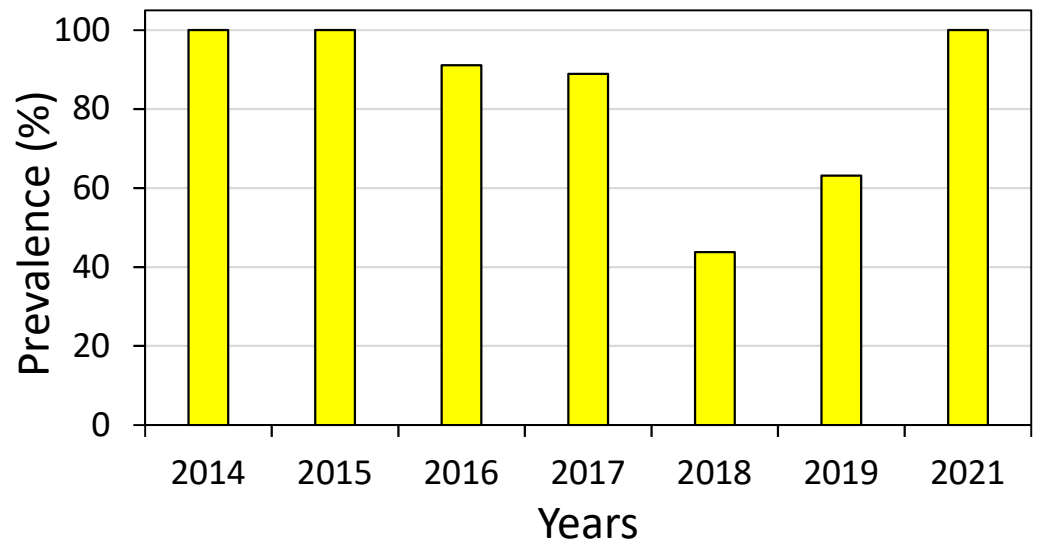
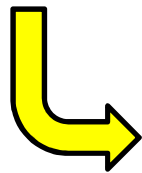


Blackleg survey

Mean blackleg incidence (%) in Cavalier County

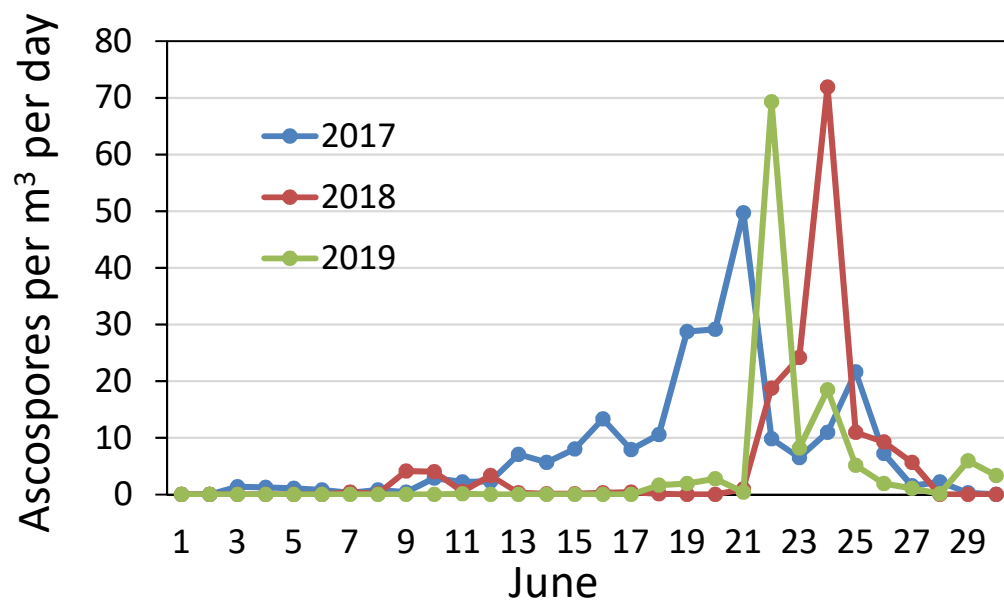
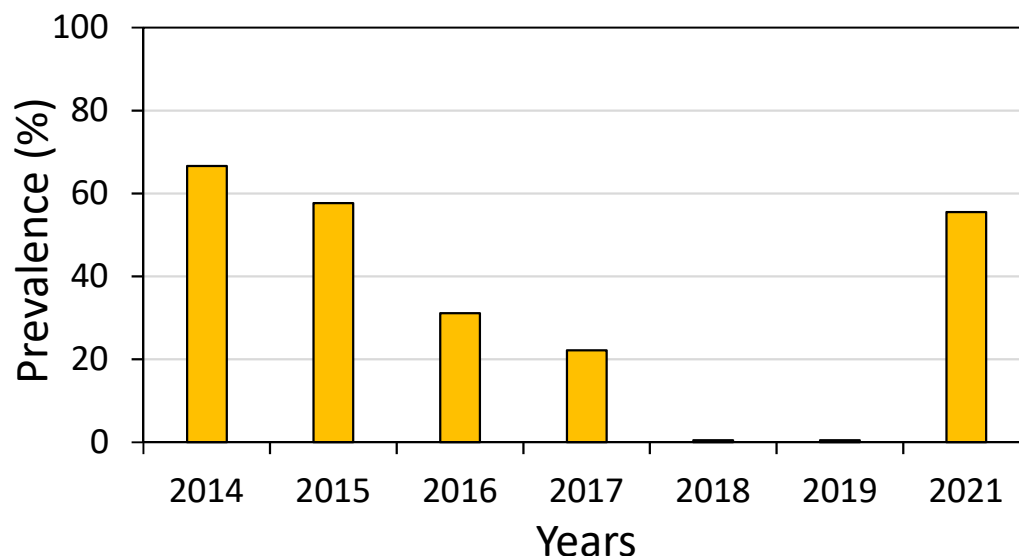
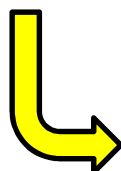


Blackleg prevalence (%) in Cavalier County



Blackleg survey

Percentage of fields with
blackleg incidence > 30%
in Cavalier County

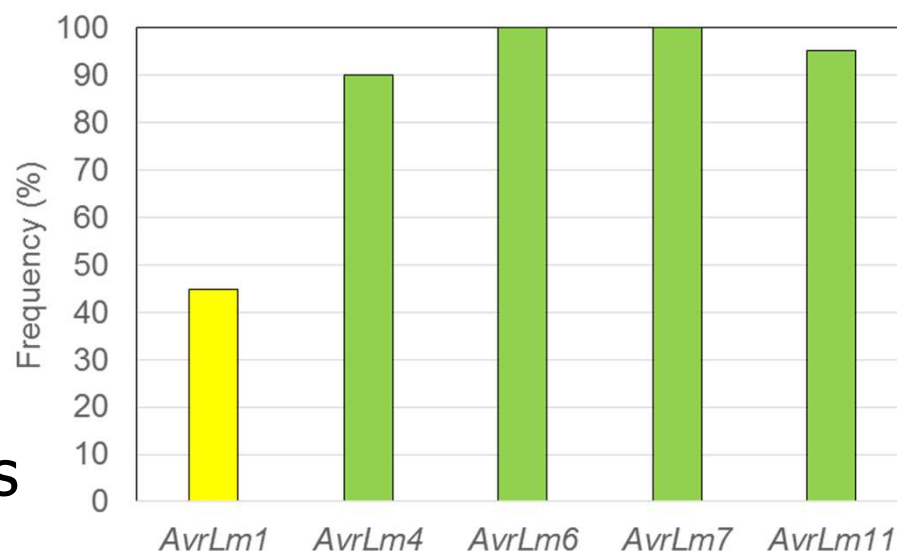


Airborne blackleg
ascospore concentrations
in Cavalier County

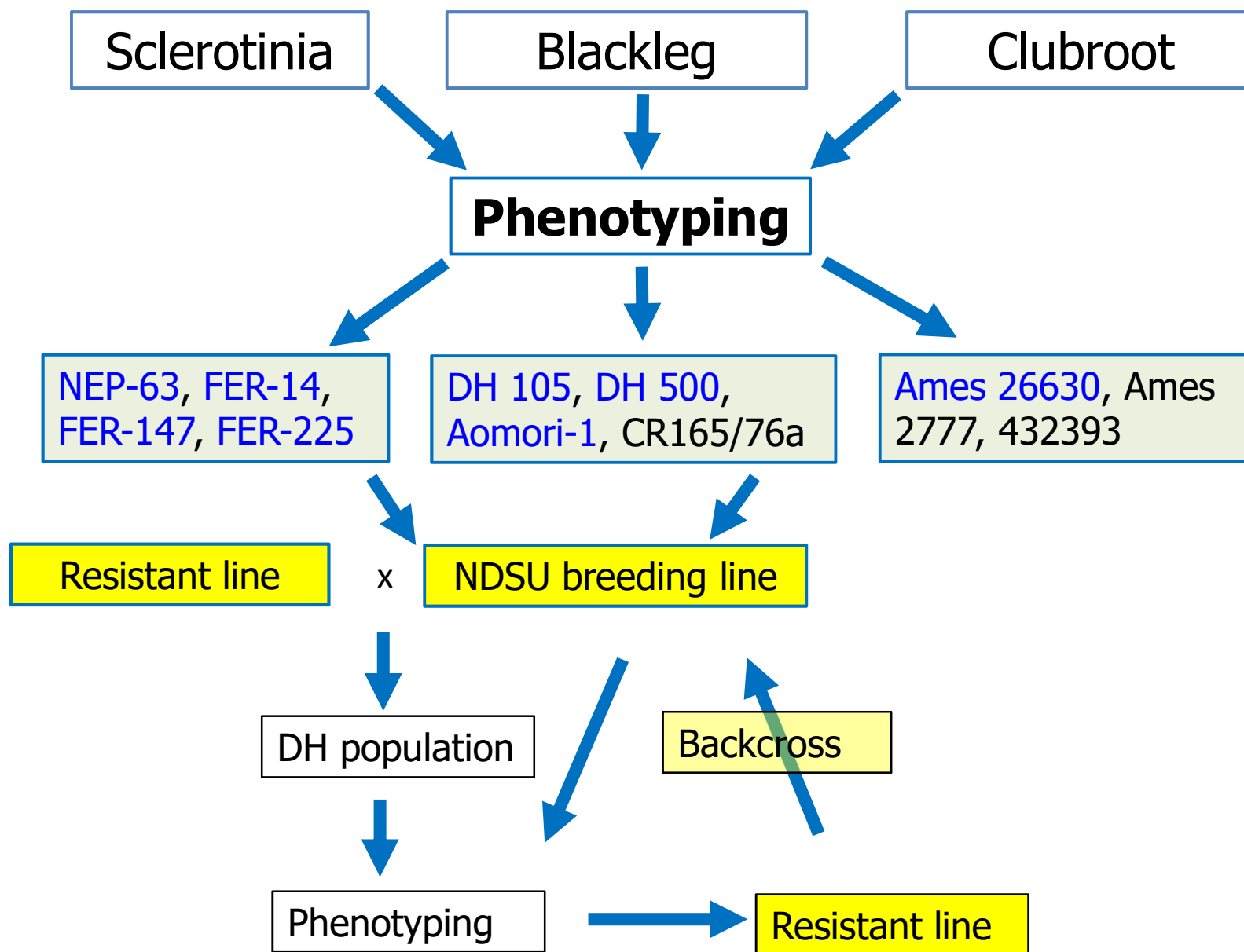


Conclusions – Blackleg survey

- Blackleg continues to be a threat
- Race identification is needed to improve cultivar rotations
- Resistance genes *Rlm6*, *Rlm7* or *Rlm11* could be effective against current blackleg isolates
- Additional race phenotyping is in progress



Transferring resistance to canola diseases



Resistance to Sclerotinia

Objective: Transfer of resistance to *S. sclerotiorum*

- Sources NEP-63 and FER-147
- DH lines for phenotyping
- Backcross to NDC12121
- NDOLA-01 x FER-147: 130 DH lines ready for screening to start backcross
- 260 DH lines derived from NEP32 ready for screening



Resistance to Blackleg

Objective: Transfer of resistance to *L. maculans* (PG-4)

- Sources DH-105, DH-500
- DH lines for phenotyping
- Backcross to NDC12121
- NDOLA-01 x DH-105: 250 DH lines ready for screening to start backcross
- Topas x SMA34: 160 DH lines ready for screening to start backcross
- SMA26 x Topas: DH mapping population being prepared



Resistance to multiple diseases

Objective: Transfer resistance to SSR and blackleg

- NDC12121 x (DH-500 x FER-147): 150 DH lines ready for screening to start backcross



Resistance to clubroot

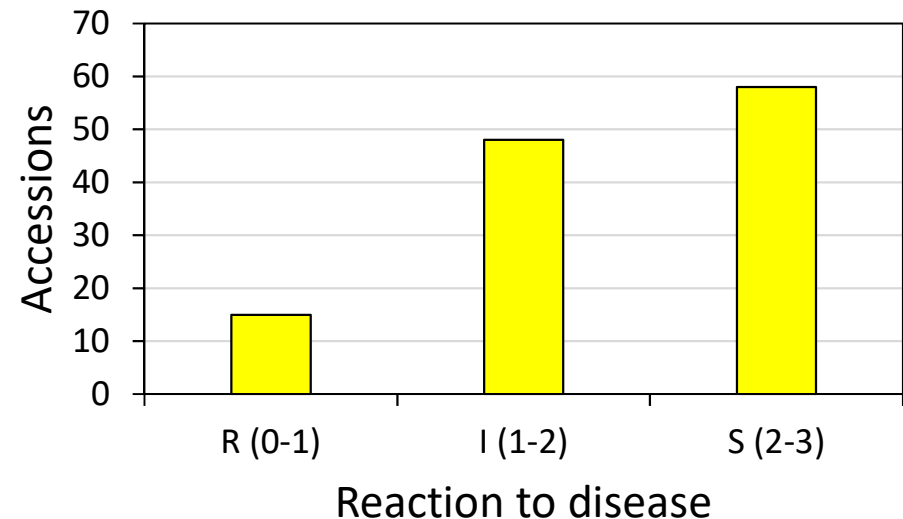
Objective: Identification of sources of resistance and molecular markers associated with resistance to clubroot (D. Marino)

- 200 plant introductions
 - Field/ greenhouse screenings
 - Association mapping analysis
 - Biparental populations
 - Transfer resistance
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- Trials in 2019 and 2021
 - RCBD with three reps
 - Controls (4 hybrids, Westar)



Resistance to clubroot

- Field with 2.8×10^6 spores/g soil
- 15 resistant accessions
- 0-3 severity scale 40 dap



- 7 accessions in three trials
- 8 accessions in two trials
- Crosses with Topas for DH



Resistance to Clubroot

Objective: Transfer of resistance to *P. brassicae*

- Sources: Ames lines, 432393
- DH mapping population with Topas
- Genotyping
- Backcross to NDC12121

- Initial attempt to produce DH lines from Ames 30186 was unsuccessful

- Production of DH lines derived from Topas and 432393 in progress

What is next?

- Characterize blackleg race prevalence
- Start backcross for Sclerotinia resistance
- Characterize resistance from NEP-32 and other sources
- Start backcross for blackleg resistance
- Characterize resistance from SMA26 and other sources
- Characterize resistance to clubroot from Ames lines and other sources
- Start transfer of clubroot resistance

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