Canola Breeding and Variety Testing

- **PNWCA Workshop**
- **January 25, 2024**

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The UI Canola breeding program

- Our program is recognized as the “**Brassica Breeding and Research Program**”.

- The goal of the program is to develop genetically superior canola cultivars for a wide range of environments in the Pacific Northwest and other regions in the United States.

Outcomes of the UI canola breeding program…

Spring canola cultivars

1. Sunrise
2. Premier
3. Clearwater* - available for non-exclusive license
4. Empire - available for license
5. Cara* - available for license
6. Monarch (low linolenic variety) - available for license

Industrial rapeseed cultivars

1. Garnet
2. Sterling
3. Gem* - Available for non-exclusive license (**Tolerant to Group 2 herbicide residues and drift)*
4. Industrious - Available for license

Outcomes of the UI canola breeding program

Winter canola cultivars

1. Ericka
2. Selkirk
3. Athena
4. Amanda - available for non-exclusive license
5. CP1022WC* (Chinook, licensed to Winfield)

Industrial rapeseed cultivars

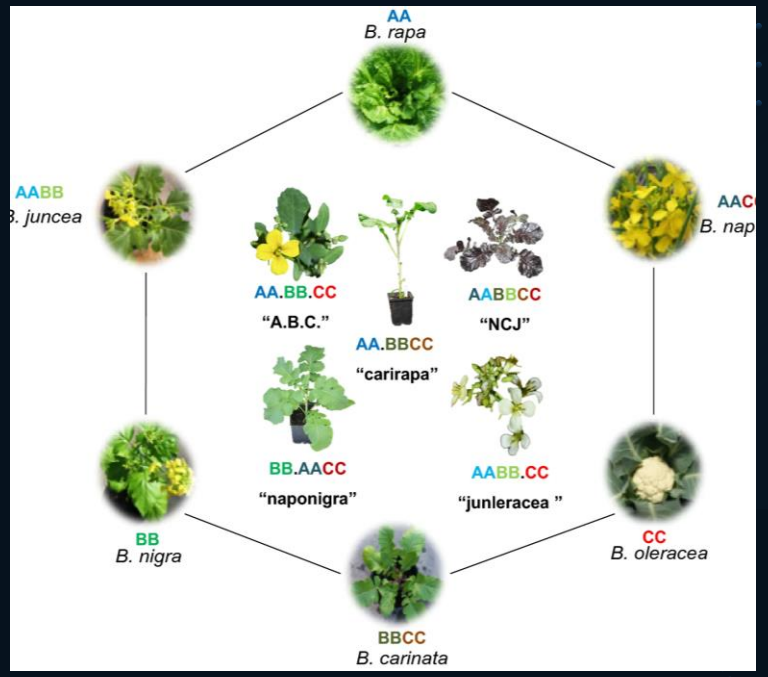
1. Durola
2. Impress* - available for licence

These two gentlemen deserve sincere appreciation for their great contribution to canola research and development

Research focus

1. Variety/cultivar development

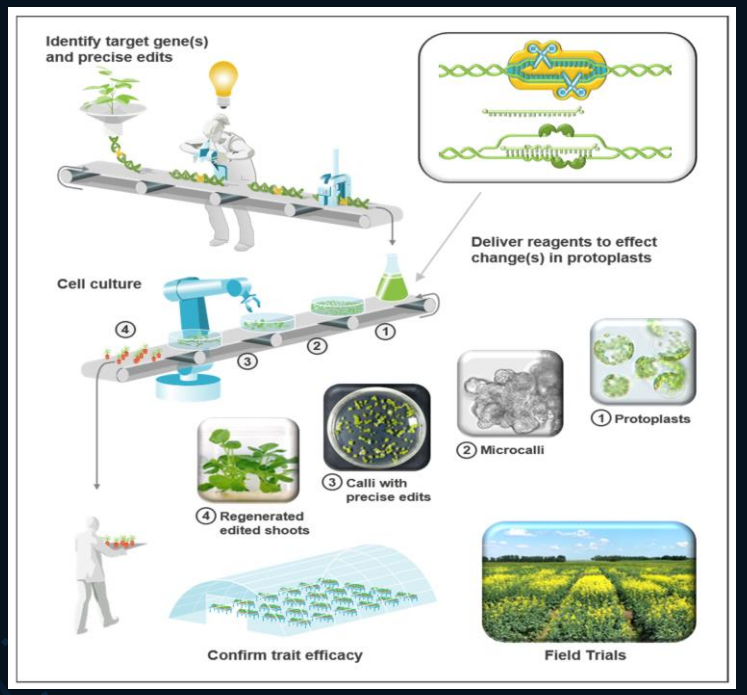
- High yielding
- Biotic stress tolerant (diseases, insects)
- Abiotic stress tolerant (cold, drought, low-pH)

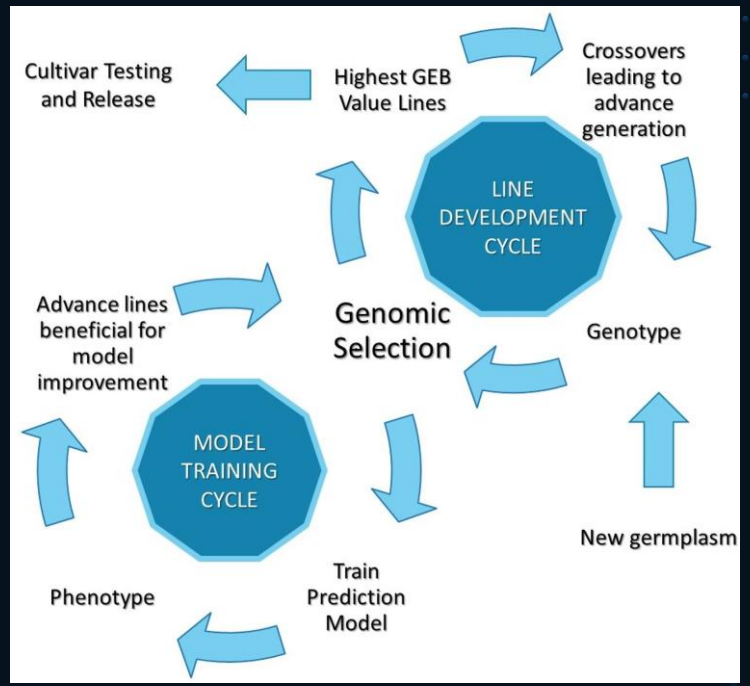


Research focus

2. Exploitation of genetic diversity

- Broaden genetic diversity/base
- Genetic studies -e.g. physiological traits contributing to stress tolerance





Research focus

3. Research on methods/approaches

- Investigate breeding methods
- Develop methods to increase breeding efficiency

When I started…

- Should I continue with both winter and spring canola
- Or focus on only winter canola breeding
- Decided to continue ~ the performance of a few new breeding lines
- Option for non-GMO conventional cultivars

Which factors determine the breeding objectives?

Environments

- Soil e.g. Palouse has low-pH soil
- Rainfall pattern

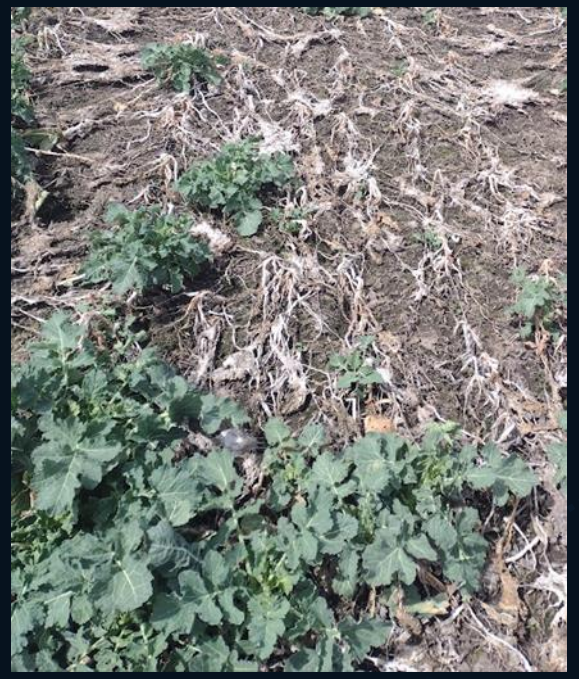
Growers need (people)

- Any specific traits e.g. shattering tolerance, oil/protein quality

Economy

- Trait demand in the market
- Quality



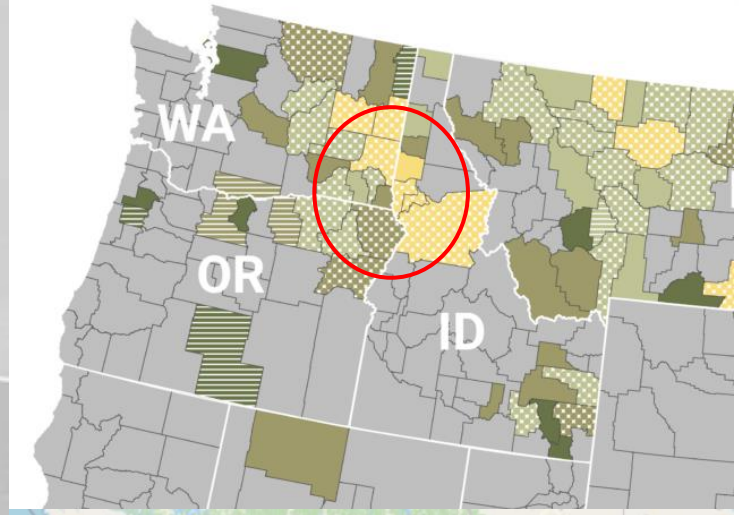


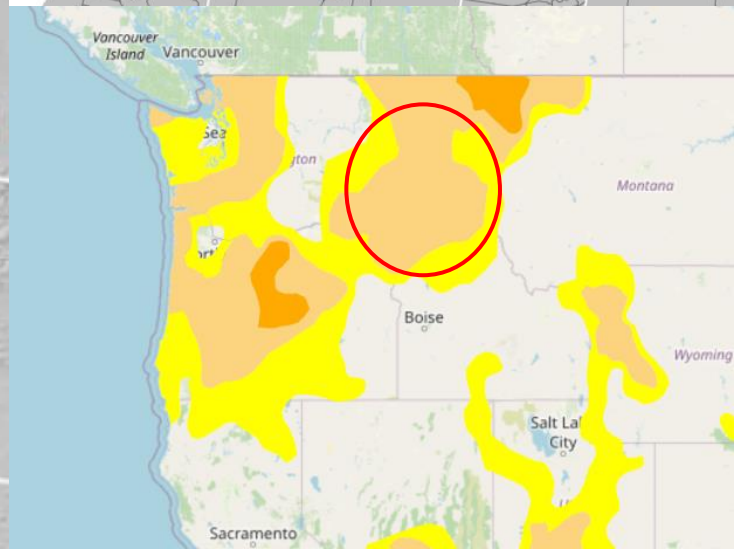

Key research areas/topics/traits that I will consider in my breeding program

Breeding winter hardy canola cultivars

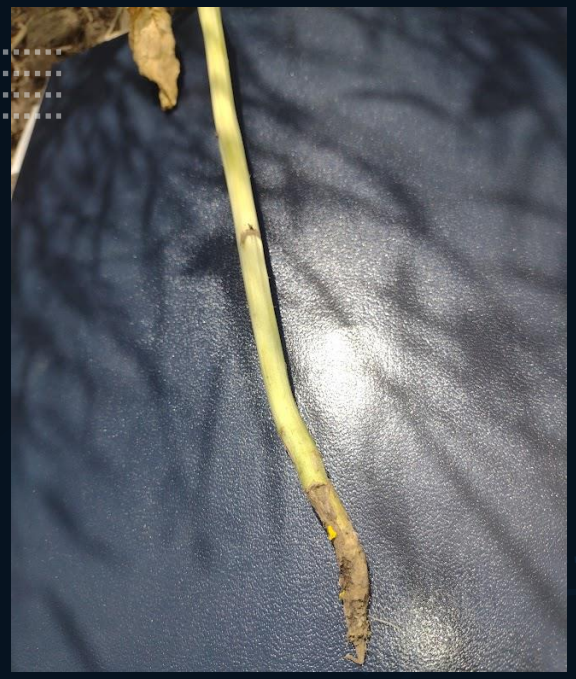
- Winter 2023, bad winter for canola!!
- Exposure of crown root region due to freezing and thawing
- Morphological and physiological traits contributing winter hardiness

Breeding drought tolerant cultivars





- 2022 winter canola at Genesee as an example ~ no germination
- Drought if coupled with heat for spring canola
- Physio-morphological traits contributing to drought tolerance
- Promoting canola in the East or North of Palouse???

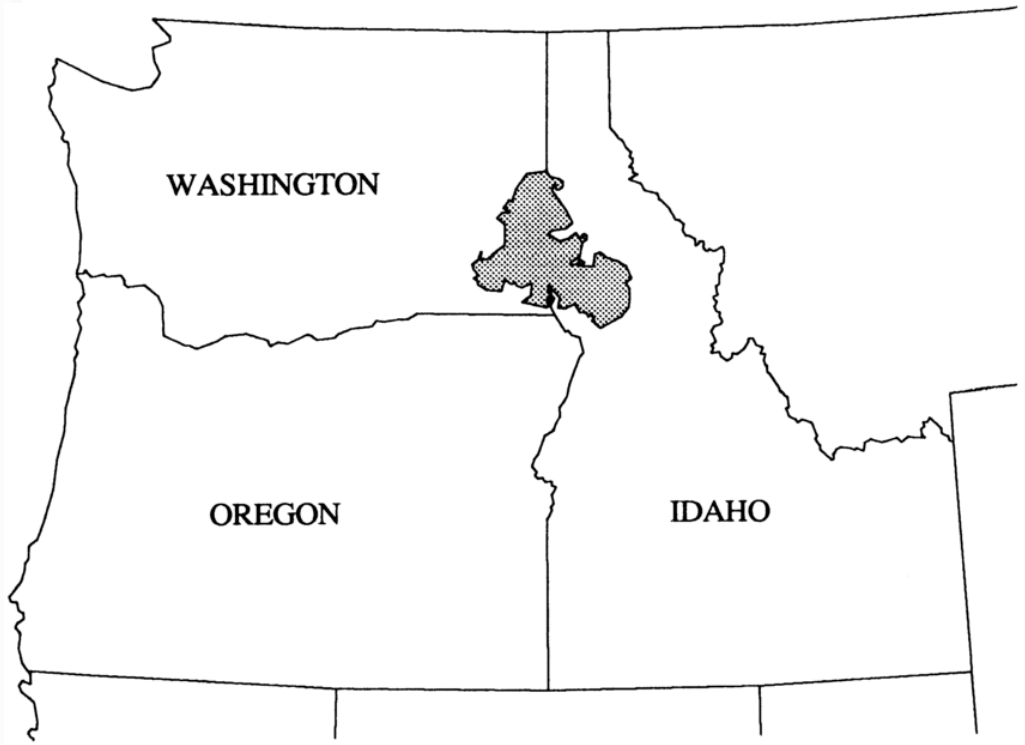



Breeding disease resistant cultivars

- Blackleg, new in PNW
- Verticillium stripe, Stem rot etc.
- Resistance in our germplasm?
- Resistant germplasm available for using them as parents?

Low-pH tolerant canola cultivars

- Low pH is one of the issues in the Palouse region
- Palouse region-key for canola cultivation
- Screening germplasm for low-pH tolerance
- One of the key research areas



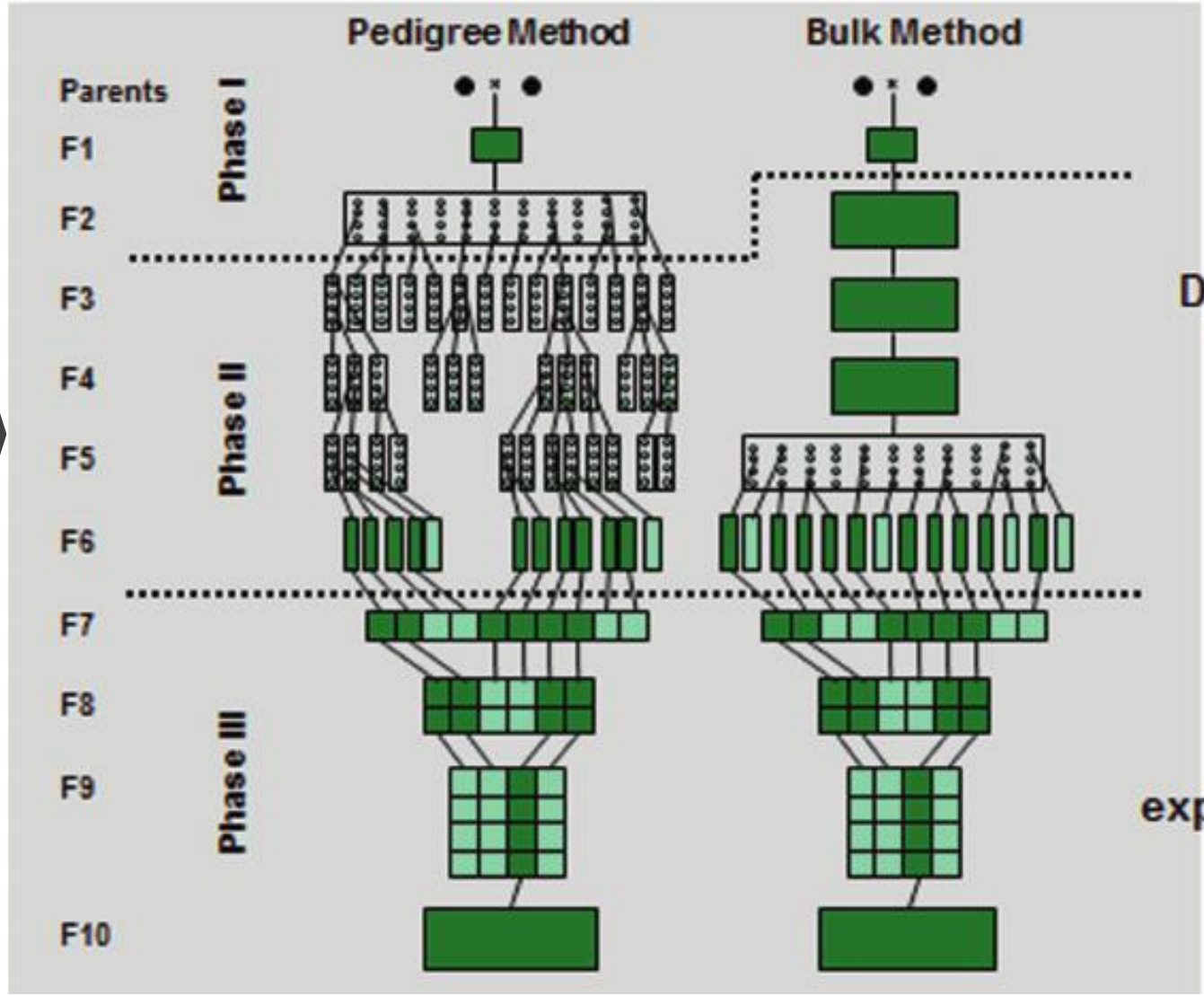


Other key traits…

- Shattering tolerance
- Frost tolerance
- Insect tolerance/resistance (flea beetle)???
- High oil, protein content
- Herbicide tolerance

Current conventional approach

Pedigree Selection vs. Bulk Selection



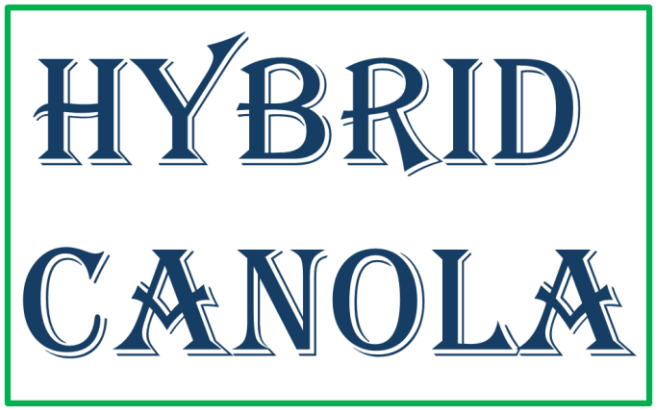
Variety testing

- Preliminary screening trials, the best performers are tested in advanced breeding trials/yield trials
- Best performers are then included in coordinated variety trials (CVTs) or multilocation trials
- **PNW Variety Trials** include industry lines + advanced breeding lines
- Results shared to stakeholders:

https://www.uidaho.edu/cals/brassica/for-growers

Potential for trying out new approaches

- Will continue with the conventional breeding approach and non-GMO open-pollinated varieties (OPVs)



But,

- Breeding hybrid canola cultivars?
- Consider GMO traits?

Thank You