

Evaluate Commercial Cultivars of Canola to Monitor the Breakdown of Resistance to Clubroot

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Objective: To monitor the resistance potential of commercial canola cultivars against the mutant clubroot pathotype in field conditions.

Canola cultivars/varieties: Seven commercial canola cultivars having resistance to the clubroot pathogen were planted to monitor the level of resistance against the known mutant pathotype in the research ground (Table 1). The field had a natural soil population of *P. brassicae* of 140,625 resting spores/g of soil. The clubroot susceptible canola cultivars, InVigor L233P and CP9978TF were planted as the checks.

Planted: First week of June (hand planted after thorough tillage with a rototiller).

Field design: Randomized complete block design (RCBD) with four replications.

Plot size: 10 ft. x 5 ft.

Table 1: Commonly cultivated canola cultivars/varieties in North Dakota.

Cultivar	Description
CP9978TF	Croplan Genetics
CP7130LL	Croplan Genetics
CP7144LL	Croplan Genetics
InVigor LR344PC	BASF
InVigor L340PC	BASF
EXPERIMENTAL#1	BASF
InVigor L345PC	BASF
InVigor L343PC	BASF
InVigor L233PC	BASF

Clubroot Evaluated: Early August (60 days after planting).

Clubroot Disease Index (DSI):

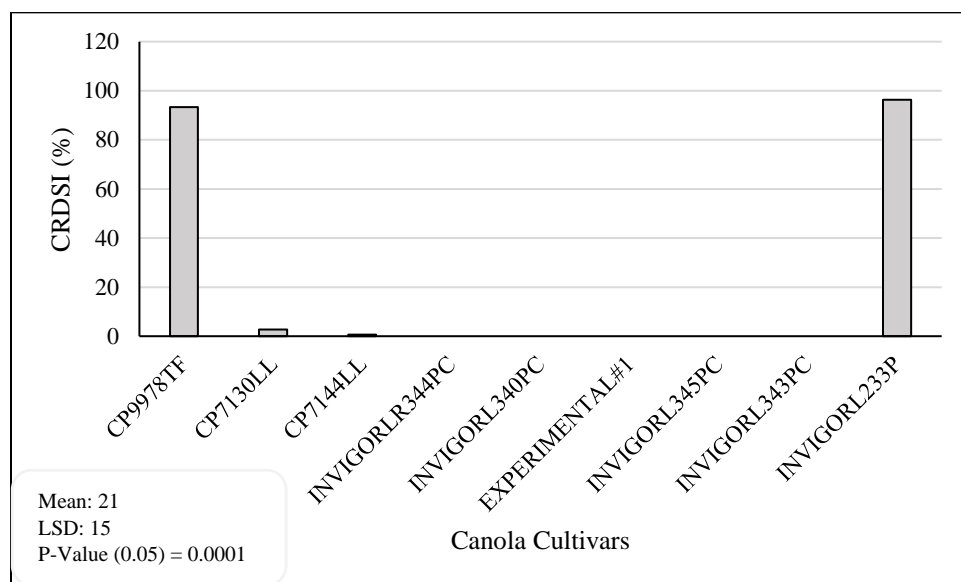
CRDI: <30% of Susceptible Check = Resistant (R)

CRDI: 30-69% = Intermediate (I)

CRDI: \geq 70% = Susceptible (S)

Note: To validate a clubroot research trial, the susceptible check should have > 60% disease index.

Figure 1: Mean clubroot disease index (%) recorded on various commercial cultivars of canola tested in 2022.



Results: Clubroot susceptible cultivars CP9978TF and InVigor L233P were used as reference checks to compare resistance levels. They showed 93 and 96 percent of DSI, respectively, indicating the validity of the trial. Canola cultivars CP7130LL, CP7144LL, InVigor LR344PC, InVigor L340PC, EXPERIMENTAL#1, InVigor L345PC, and InVigor L343PC showed resistance to clubroot and were significantly different from the susceptible cultivars tested.

Future research: Screening large numbers of commercial cultivars of canola will be helpful to growers. Monitoring clubroot resistance breakdown in commercially available resistant cultivars each year will be a crucial survey objective.

Canola Council of Canada’s Monitoring Clubroot in Resistant Varieties

“Growers using clubroot-resistant cultivars in clubroot-infested fields may experience some infected plants, which can be attributed to susceptible volunteers and off-types. Volunteer canola seed can germinate many years after it was last grown, and if this comes from a susceptible canola crop, then the volunteers will be susceptible. Off-types are a normal part of hybrid canola production – no canola hybrid is 100% pure, so there may be a small proportion (1 to 4%) of the seed that is susceptible.

When scouting, if more than 10% of seeded plants (do not count volunteers) are infected, that may indicate that the clubroot resistance is no longer functional against the pathogen population in the field. These infected plants may be restricted to a small patch which indicates a recent pathogen change.”

Ideal Recommendation: Practice longer crop rotations in clubroot endemic areas and use a clubroot resistant variety every three years minimum.

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