



# **Canola Disease Management Research (An Update)**

**Venkat Chapara, PhD  
Plant Pathologist**

**Langdon Research Extension Center, ND – 58249**

**2024 Crop Outlook & International Durum Forum + Canola Expo –'24**

**November 6<sup>th</sup>, Minot, ND**

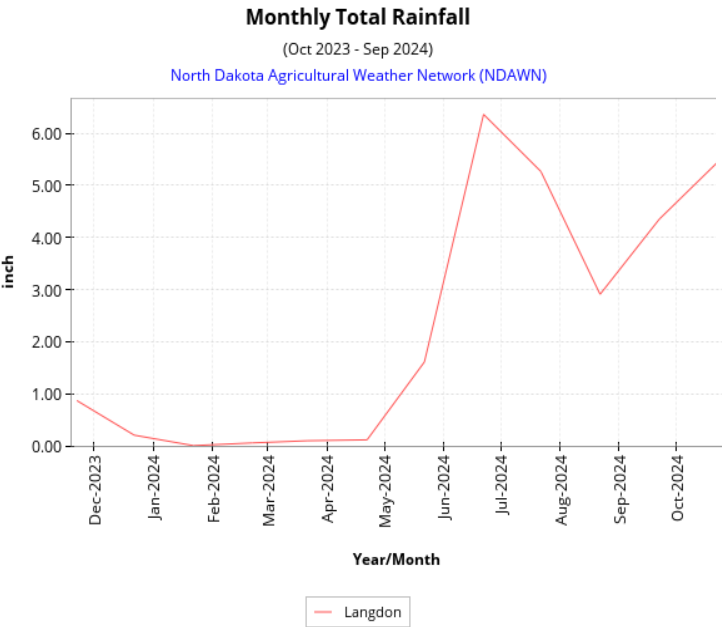
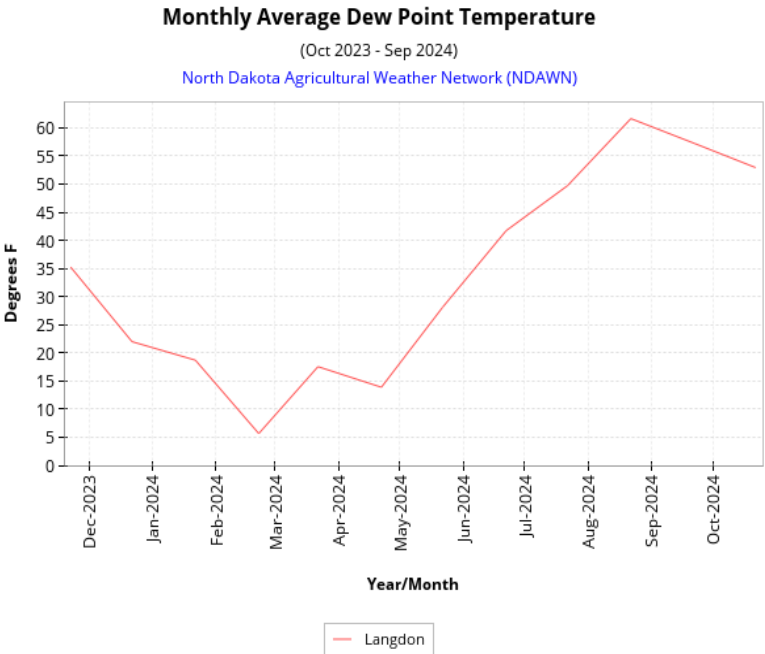
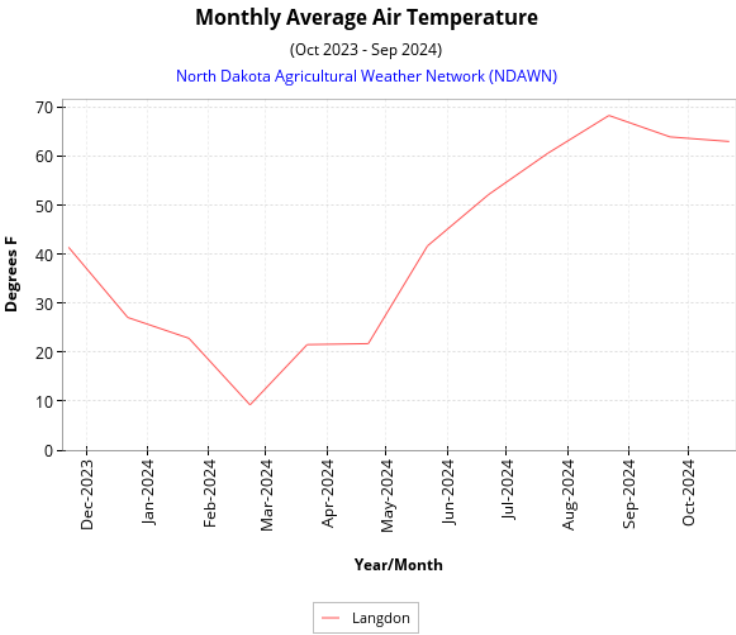
# Outline

- Introduction
- Disease that infect canola in ND
- Disease Surveys
- Research Done at LREC
- Results
- Summary

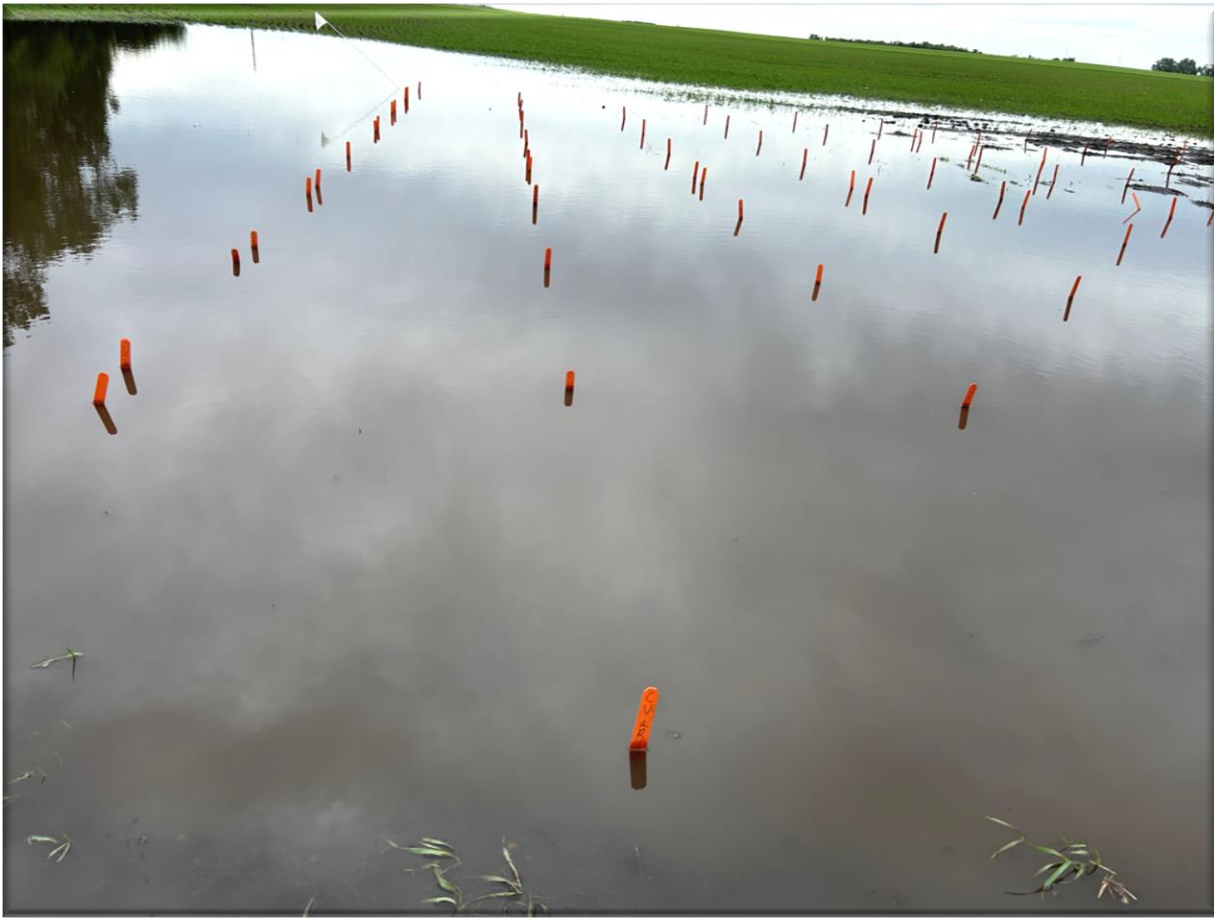


# Weather

Weather			
Monthly Averages			
	Temperature	Rainfall	Dew point
	F	Inches	F
May	52	6.36	42
June	61	5.27	50
July	68	2.91	62
August	64	4.35	57
Sept.	63	5.42	53



# What we saw in 2024



Flooded Research Trials

# What we saw in 2024 (Canola Diseases)



**Root rot complex**

**Verticillium Stripe**



**White Mold**



**Blackleg**



**Clubroot**

# Severe Root rot infections



# Symptoms of root rot complex



Pythium infections (damping off) on seedlings



Stem girdling on seedling



Crown rot at flowering

# Severe White Mold Infections



# Severe Lodging, and Pod shatter



Severe Lodging due to late season rains and winds



Severe pod shatter due to late season rains and winds



Pod shatter

# Root Rot Complex



- Pythium, Rhizoctonia, and Fusarium
- Root rot include poor germination and reduced emergence
- Crown rot is an aboveground symptom along with leaf yellowing, wilting, and stunting
- Plants typically can not recover once these aboveground symptoms appear
- The severity of root rot is exacerbated under wet conditions
- Yield losses of up to 35%

# Management of root rot complex

- Very challenging
- Only partial resistance
- Cultural practices
- Fungicidal seed treatments can improve canola emergence and yield
- Diverse crop rotations
- An integrated approach is required

# Blackleg in Canola

- A stubble-borne fungus
- Yield loss is greatest when blackleg infects in the early growing stages prior to the six-leaf stage
- If severe infection occurs, yield loss can be up to 50%



Blackleg

Sam Markell, NDSU



# Management of Blackleg in Canola

- Longer crop rotations
- Rotate Resistant Cultivars
- Seed treatments
- Foliar spray at 2- 4 leaf stage (Quadris etc)

# Selection of Resistant Cultivars

In Canada

## BASF blackleg solutions.

All InVigor hybrids are rated 'R' for resistant to blackleg. This resistance rating is given to a hybrid by comparing their blackleg sensitivity to a susceptible variety. Relative ratings are based on the information provided in this table—with Westar being the susceptible check variety.

FIELD RESISTANCE RATING	% DISEASE SEVERITY OF WESTAR
<b>R</b> (Resistant)	0-29
<b>MR</b> (Moderately Resistant)	30-49
<b>MS</b> (Moderately Susceptible)	50-69
<b>S</b> (Susceptible)	70-100



Resistance Group	Major Resistance Gene*
A	Rlm1 or LepR3
B	Rlm2
C	Rlm3
D	LepR1
E <sub>1</sub>	Rlm4
E <sub>2</sub>	Rlm7
F	Rlm9
G	RlmS
H	LepR2
X	unknown

Table 2. Major gene resistance groups for blackleg attacking canola. Courtesy of the Canola Council of Canada.

\*Remember to rotate the cultivars

\*Future research to identify the Pathogenicity Group present in the growers Fields

# Blackleg Seed treatment Results-2023

		Blackleg on Canola		Yield	Test Weight
Seed Treatments	Plant Stand	% Incidence	% Severity	(lbs/a)	(lbs/bu)
Experimental	18	36	29	3485	51.7
Saltro	18	45	45	2795	52.3
Evergol Energy	17	41	42	2898	52.4
Intego Solo	16	31	33	2579	52.6
Rancona Summit	19	35	42	2722	52.3
Trilex	24	38	28	2669	52.4
Non-Treated	18	53	50	2790	52.3
<b>Mean</b>	<b>18</b>	<b>40</b>	<b>39</b>	<b>2848</b>	<b>52.3</b>
<b>CV%</b>	<b>22.0</b>	<b>21</b>	<b>39</b>	<b>9</b>	<b>0.5</b>
<b>LSD</b>	<b>6</b>	<b>13</b>	<b>NS</b>	<b>365</b>	<b>0.4</b>
<b>P-Value (0.05)</b>	<b>0.0041*</b>	<b>0.0321*</b>	<b>NS</b>	<b>00.15*</b>	<b>0.0094*</b>

Non-irrigated Trial  
Cultivar: InVigor L233P  
RCBD Replicated 4 times



# Blackleg Seed Treatment Results-2024

Treatments	Plant Stand	Phytotoxicity	Vigor	Blackleg		Yield	Test Wt.
	3ft/row	(0-9)	(1-5)	% Incidence	% Severity	(lbs/A)	(lbs/bu)
Experimental	24	0.3	2	46	26	2642	51
Saltro	20	0.0	2	41	20	2066	51
Evergol Energy	16	0.5	2	57	34	1874	52
Intego Solo	17	0.0	2	51	24	2077	52
Rancona Summit	15	0.3	2	42	23	1873	52
Trilex	19	0.0	2	61	37	1894	52
Non-Treated	16	0.0	3	71	43	1563	52
Mean	18	0.14	2.04	53	29	1998	51.5
CV%	30	211	14.84	17	24	11	0.4
LSD	8	0.45	0.45	14	11	314	0.3
P-Value (0.05)	NS	NS	NS	0.0018*	0.0024*	0.0001*	0.0034*

Non-irrigated Trial  
Cultivar: InVigor L233P  
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# White Mold on Canola



- A destructive disease that can significantly reduce canola yields
- White mold can reduce canola yields by 7-15%
- Sclerotia an important stage of the pathogen are long-lived in the soil
- When surface soil moisture is high for prolonged periods sclerotia germinate to produce golf tee-shaped apothecia
- Apothecia release air-borne spores which land on petals and infect plants when the petals fall



S Kolke

# Management of White Mold

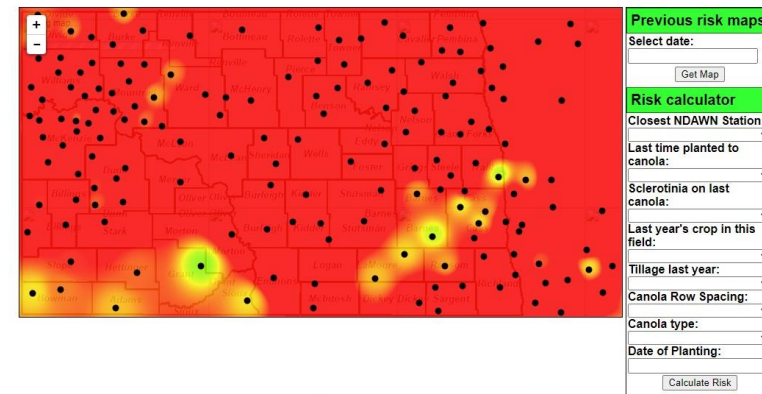
- **Cultural practices:** Maintaining thinner canopies with good air movement
- **Chemical fungicides:** Using nozzles that deliver medium spray droplets and operating pressures of 30–40 PSI,
- Fungicides sprays at 20-30% flowering were found effective
- **Biological control:** Using integrated disease management practices
- Use of protective fungicide sprays

\*Do follow the risk map generated by NDSU, NDWAN and NCGA to make a decision of spray

Home About us Risk map Gallery Contacts

CANOLA PATHOLOGY

Estimated risk of Sclerotinia stem rot development for 7/2/2024

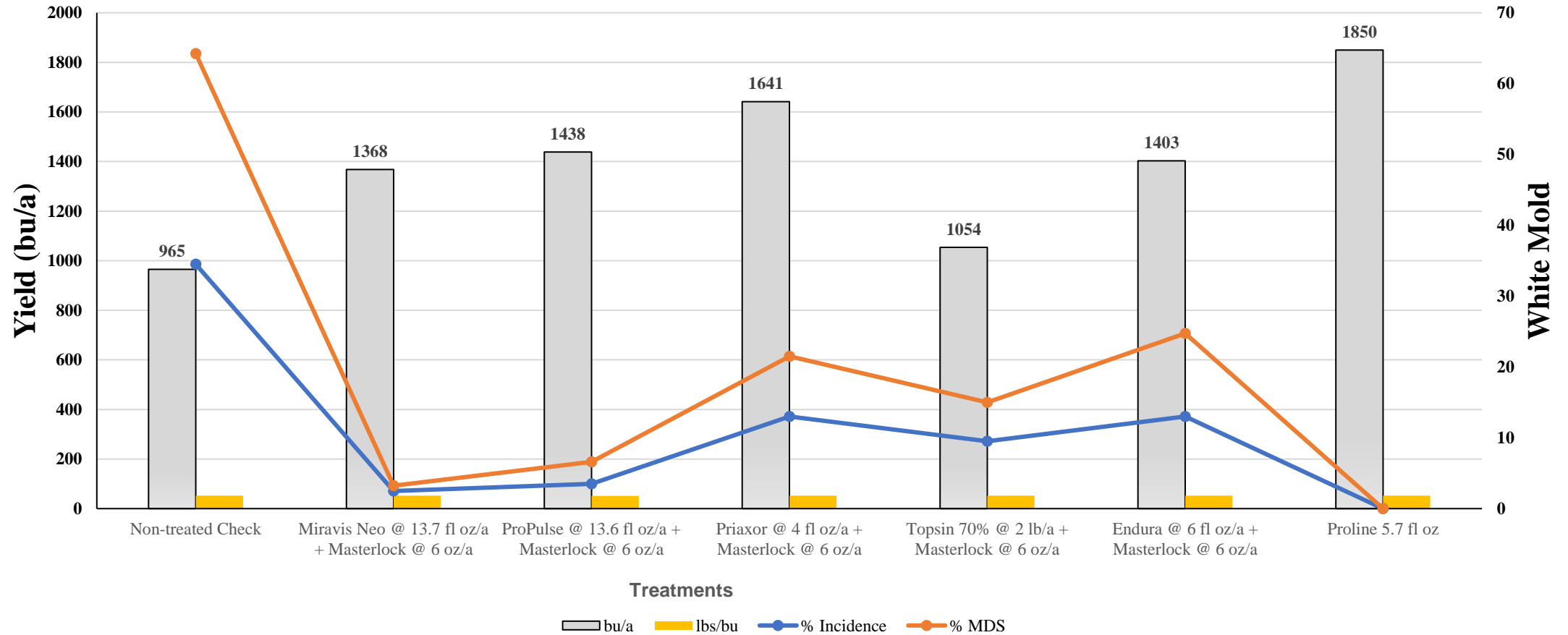


• NDAWN Station  
■ Low Risk  
■ Intermediate Risk  
■ High Risk

Estimation of the risk of sclerotinia stem rot development is based on temperature and precipitation patterns prevalent in the region as recorded by NDAWN stations. Areas where conditions are favorable for infection are presented in red; if apothecia are present in these fields fungicide applications may be warranted. Fields in yellow areas should be scouted for apothecia and changing weather conditions. Fields in green areas have low risk of disease development. The estimation of risk applies to canola fields that are in the flowering period only.

<https://www.ag.ndsu.edu/sclerotinia/riskmap.html>

# White Mold Fungicide Field Trial Results



Cultivar: DKL DKTFL21SC

# Clubroot Research

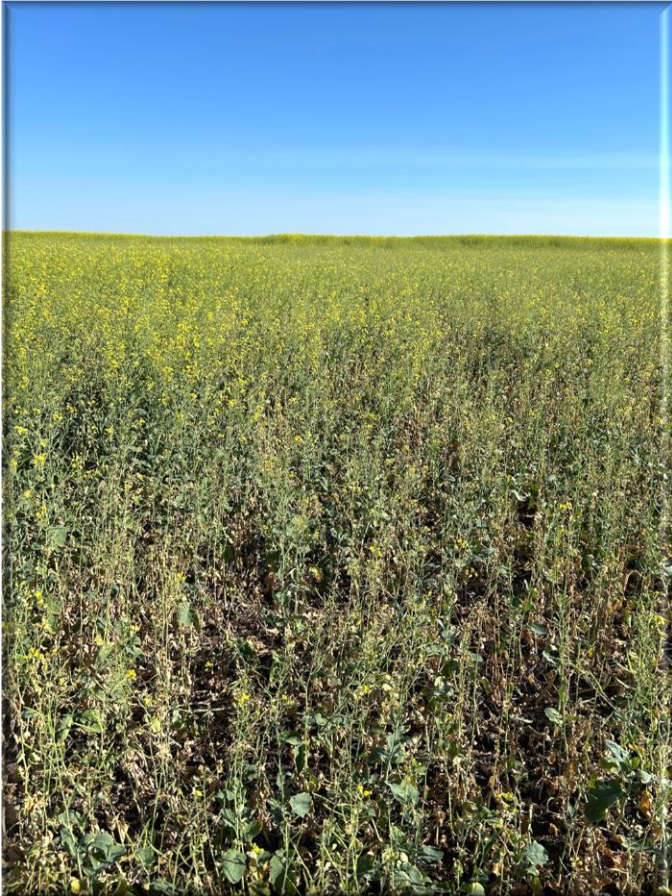
- Clubroot is a soil-borne disease that affects canola and other cruciferous crops, causing the roots to swell into galls



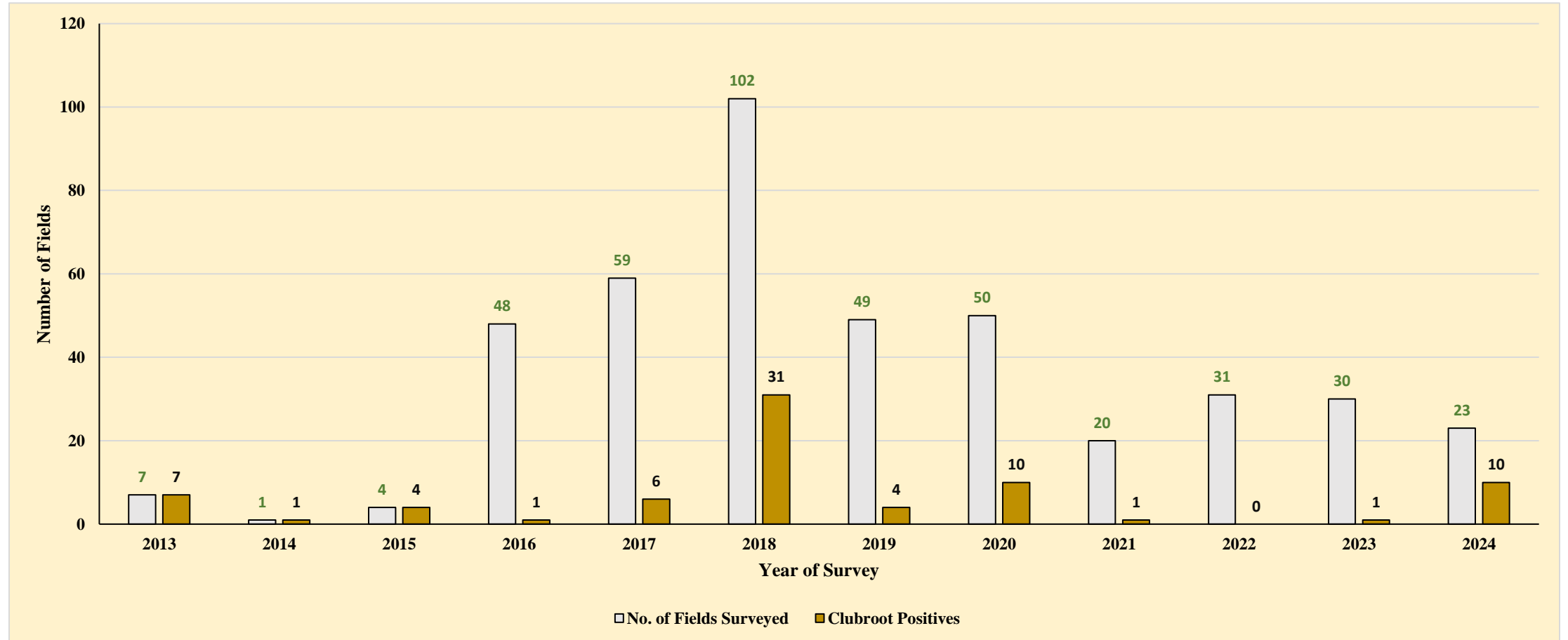
- Caused by a protist, is an organism that has plant, animal, and fungal characteristics.
- *Plamodiophora brassicae*
- A 100 percent yield loss is possible
- Research at LREC
  - Survey
  - Varietal resistance
  - Soil Amendments

# Clubroot Survey

- Visual (If galls found, it's a +ve)
- Soil sampling (Molecular assays done to find DNA)

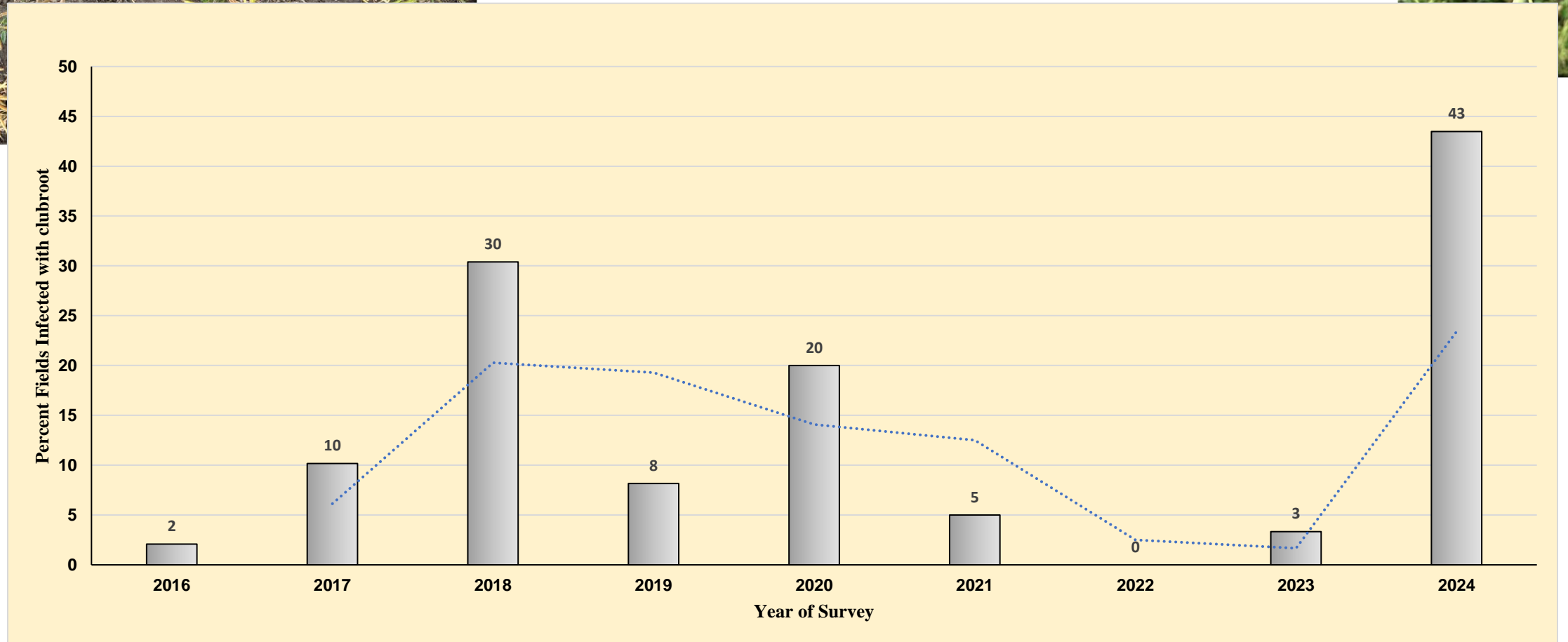


# Clubroot Survey Results (2013-2024)





# Clubroot Survey Results-2024



# Clubroot Survey Results-2024

## (First Report of Break Down of Clubroot Resistance in North Dakota)

A breakdown occurs when a variety rated “R” has unexpectedly high levels of infection.

Clubroot Resistance Breakdown-2024		
Cultivar Characteristics (Clubroot Resistant Types)	Herbicide Trait	Level of Clubroot Damage
First Generation	LibertyLink +RoundUp Ready	Severe (100% DSI) /Heavy Losses
CR4	LibertyLink	Severe (100% DSI) in Patches
Resistant to Currently Predominant Pathotypes	LibertyLink + RoundUp Ready	Severe (100% DSI) in Patches
Next-generation	LibertyLink	Found galls in low levels (5% DSI)

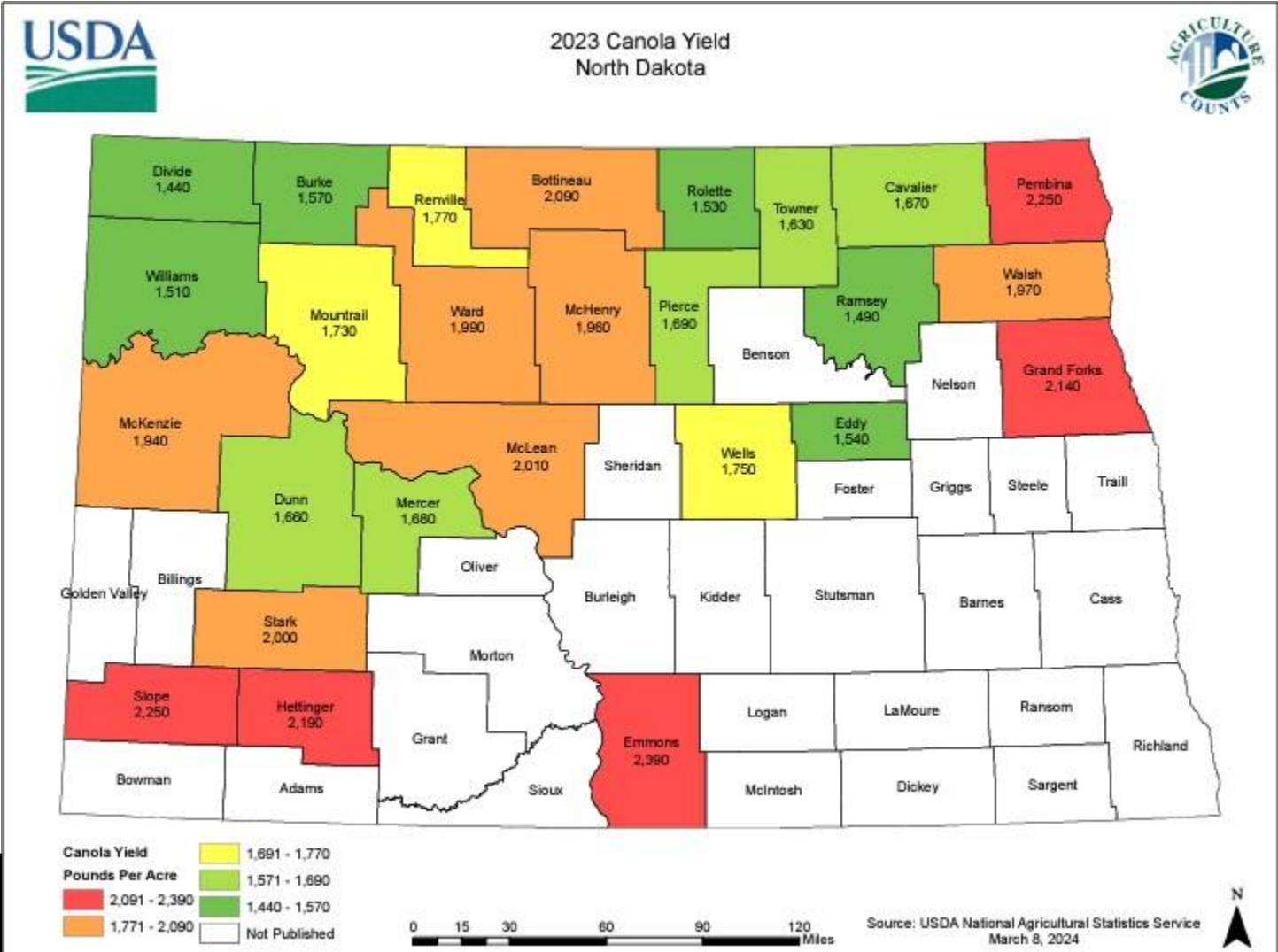
# Large Patches of Infections in Clubroot Resistant Varieties



# Canola Acreage and the Average Yields in lbs/a

#	County	Acreage
1	Benson	No Data
2	<b>Bottineau</b>	<b>145,000</b>
3	Burke	86,800
4	<b>Cavalier</b>	<b>246,500</b>
5	GrandForks	10,500
6	McHenry	61,900
7	<b>McLean</b>	<b>111,000</b>
8	<b>Mountrail</b>	<b>129,000</b>
9	Nelson	No Data
10	Pembina	42,000
11	Pierce	34,500
12	Ramsey	81,700
13	Renville	87,900
14	Rollette	62,200
15	Towner	74,100
16	Walsh	46,500
17	<b>Ward</b>	<b>158,000</b>
18	Wells	6,200

26 Counties



# Molecular Assay Results: DNA of the Resting spore population found in soil samples collected in 2023 survey

		% Fields with CR
County	CR Resting spore Range	Positives
Cavalier	22/30 (17,000 – 807,000)	73
Rolette	2/5 (11,000 – 37,000)	16
Towner	4/6 (11,000 – 62,000)	67
Nelson	1/4 (35,000)	25
Walsh	3/4 (18,000 - 65,000)	75
Pembina	3/6 (62,000 – 546,000)	50
Bottineau	3/5 (546,000 -1,500,000)	60
Ramsey	2/5 (306,000 – 318,000)	40
McLean	2/5 (550,000 -1,450,000)	40
Renville	2/4 (141,000 – 197,000)	50
Ward	2/4 (110,000 – 173,000)	50
Grand Forks	2/5 (60,000- 154,000)	40

# pH of the soils collected in 2023 survey

Basic ( $\geq 7$ ): 55/84 (65%)  
 Neutral (6.6 - 7) = 4/84 (5%)  
 Acidic ( $< 6.6$ ) = 25/84 (30%)

	#	Sample ID	N	W	PH
1					
2	Rolette Cty.	1 RLCT 23	48.80529	-99.6245	7.5
3	"	2 RLCT 23	48.81952	-99.4501	7.5
4	"	3 RLC 23	48.97915	-99.6398	7.7
5	"	4 RLC 23	48.76789	-99.7447	6.8
6	"	5 RLC 23	48.62462	-99.6233	7.2
7	Towner Cty.	1 TWC 23	48.4102	-99.2539	7.6
8	"	2 TWC 23	48.5736	-99.3796	7.4
9	"	3 TWC 23	48.70391	-99.2997	7.2
10	"	4 TWC 23	48.67462	-99.0194	7.9
11	"	5 TWC 23	48.84865	-99.2923	7.8
12	"	6 TWC 23	48.67515	-99.39509	5.2
13	Ramsy Cty.	1 Ramsy 23	48.50048	-98.84099	7.1
14	"	2 Ramsy 23	48.38449	-98.7425	6.3
15	"	3 Ramsy 23	48.3252	-98.6693	7.4
16	"	4 Ramsy 23	48.36979	-98.3728	7.5
17	"	5 Ramsy 23	48.20915	-98.435	7.5
18	Pembina Cty.	Pcty cntr. 2	48.81191	-97.5569	6.2
19	"	Pcty NE 2	48.9341	-97.392	7.2
20	"	3 Pcty N 23	48.96345	-97.5529	7.2
21	"	Pcty NW 2	48.94897	-97.8182	6.4
22	"	5 Pcty W 23	48.84771	-97.9317	5.6
23	"	Pcty SW 2	48.65152	-97.8618	8.2
24	Walsh Cty.	1 Wcty N 23	48.47078	-97.8511	7.7
25	10/2/2023	Wcty SW 2	48.28564	-98.0116	7.4
26	"	Wcty W 2	48.41271	-98.081	7.7
27	"	Wcty NW 2	48.48541	-98.1836	8.1
28	Nelson Cty.	Ncty NW 2	48.15188	-98.2937	7.8
29	10/4/2023	2 Ncty W 23	47.99089	-98.2902	7.7
30	"	3 Ncty E 23	47.94751	-98.0048	7.9
31	"	Ncty NE 2	48.12241	-97.9574	8.1

32	Cavalier Cty.	1 Ccty NW 23	48.81923	-98.7504	7.8
33	"	2 Ccty NW 23	48.84839	-99.1104	7.7
34	"	3 Ccty W 23	48.71795	-98.8008	7.8
35	"	4 Ccty W 23	48.71792	-98.7355	7.6
36	"	5 Ccty W 23	48.68839	-98.5382	7.7
37	"	6 Ccty 23	48.54397	-98.8031	7.7
38	"	7 Ccty SW 23	48.71784	-98.4478	7.4
39	"	8 Ccty SW 23	48.67425	-98.7224	7.5
40	"	9 Ccty SW 23	48.66743	-98.892	7.7
41	"	10 Ccty C 23	48.75394	-98.3389	5.4
42	"	11 Ccty C 23	48.76325	-98.3214	6.4
43	"	12 Ccty C 23	48.78301	-98.1905	4.9
44	"	13 Ccty C 23	48.78302	-98.1903	7.4
45	"	14 Ccty C 23	48.93533	-98.3431	5.2
46	"	15 Ccty C 23	48.98594	-98.2555	5.7
47	"	16 Ccty NE 23	48.90946	-98.2401	5.7
48	"	17 Ccty NE 23	48.92408	-98.0372	5.3
49	"	18 Ccty cntr. 23	48.83364	-98.4746	7.8
50	"	19 Ccty NW 23	48.86281	-98.8628	7.8
51	"	20 Ccty NW 23	48.84848	-98.9168	7.8
52	"	21 Ccty NW 23	48.95026	-98.9789	7.4
53	"	22 Ccty NW 23	48.97871	-98.7622	7.9
54	"	23 Ccty NW 23	48.97858	-98.5322	7.9
55	"	24 Ccty 23	48.75553	-98.3864	6.5
56	"	25 Ccty SE 23	48.63356	-98.2461	6.5
57	"	26 Ccty SE 23	48.61252	-98.1491	7.6
58	"	27 Ccty SE 23	48.60108	-98.1095	6.1
59	"	28 Ccty SE 23	48.57222	-98.0193	5.5
60	"	29 Ccty SE 23	48.72467	-98.0586	7.4
61	"	30 Ccty SE 23	48.75751	-98.23383	7.5

pH range in soil samples across 12 counties  
 collected from Canola grown fields: 5.2-8.2

62	GrandForks Cty.	1GFC23	47.74469	-97.4039	7.9
63	10/9/2023	2GFC23	47.89343	-97.1534	7.8
64	"	3GFC23	47.97624	-97.5942	8.2
65	"	4GFC23	48.00877	-97.8181	6.9
66	"	5GFC23	48.13694	-97.86730	7.3
67	Bottineau Cty.	1 BTNC 23	48.80622	-100.145	7.1
68	10/11/2023	2 BTNC 23	48.6682	-100.386	5.6
69	"	3 BTNC 23	48.73284	-100.53	7.5
70	"	4 BTNC 23	48.86417	-100.523	7.4
71	"	5 BTNC 23	48.67627	-100.76	5.4
72	Renville Cty.	1 RENV 23	48.83129	-101.387	5.7
73	10/11/2023	2 RENV 23	48.83578	-101.591	8.1
74		3 RENV 23	48.69092	-101.682	7.8
75		4 RENV 23	48.61817	-101.473	6.7
76	Ward Cty.	1 WARD 23	48.26901	-101.218	6.1
77	10/12/2023	2 WARD 23	48.4011	-101.544	5
78	"	3 WARD 23	48.32736	-101.62	5.1
79	"	4 WARD 23	48.11828	-101.339	4.9
80	McLean Cty.	1 Mclcty 23	47.82645	-101.4	7.6
81	10/12/2023	2 Mclcty 23	47.76887	-101.433	5.1
82	"	3 Mclcty 23	47.64686	-101.234	7.5
83	"	4 Mclcty 23	47.72804	-101.079	7.8
84	"	5 Mclcty 23	47.81913	-100.991	6.9

# Rotate Crops to Manage Clubroot

- Canadian-based research has found that switching from a one-in-two to a one-in-three-year rotation can drop spore loads by 90 per cent.
- Current Rotation:  
Canola- Wheat-Field Pea/Soybean/Sunflower/Dry bean -Wheat-Canola
- Use of Resistant cultivars highly recommended with cultivar rotation

# New Canola Disease-Verticillium Stripe (Symptomology)



Half leaf yellowing



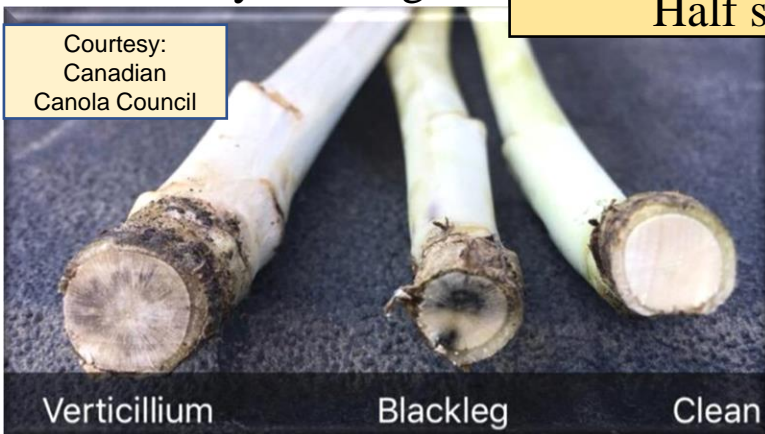
Half stem browning



Outer layer peels off in strings  
Micro sclerotia underneath

- Caused by a fungal pathogen *Verticillium longisporum*
- Infects brassica crops mostly
- Yield losses associated with Verticillium stripe were between 10 to 50%

Lodging



Verticillium

Blackleg

Clean

- Verticillium and Blackleg symptoms can be seen on the same plant
- Interaction between *L. maculans*/*V. longisporum* may cause more severe losses in canola

Courtesy:  
Canadian  
Canola Council

# Verticillium Stripe Management

- Longer Crop Rotations
- No resistant Varieties available
- No fungicides available
- **Research Done at LREC**
  - Survey
  - Seed treatment evaluations
  - Varietal Screening
  - **Do neutral to high pH favors Verticillium Stripe? (Canadian Research Says ‘Yes’)**
  - Correlation study needed in ND

# Prevalence of Verticillium Stripe in ND

## 2022 Verticillium Stripe Survey

Verticillium Stripe Prevalence		
County	Total Surveyed	Fields Positive (Incidence)
Cavalier	31	5 (25%)
Rollette	7	2 (20%)
Towner	10	2 (5%)
Pembina	13	4 (25%)
Ramsey	7	2 (5%)
Nelson	8	1 (5%)
Walsh	8	1 (5%)
Bottineau	5	1 (5%)
GrandForks	8	0
Benson	1	1 (5%)
Pierce	4	2 (5%)
<b>Total</b>	<b>102</b>	<b>21 (20.6%)</b>
20.6% of the fields were infected with V. stripe		

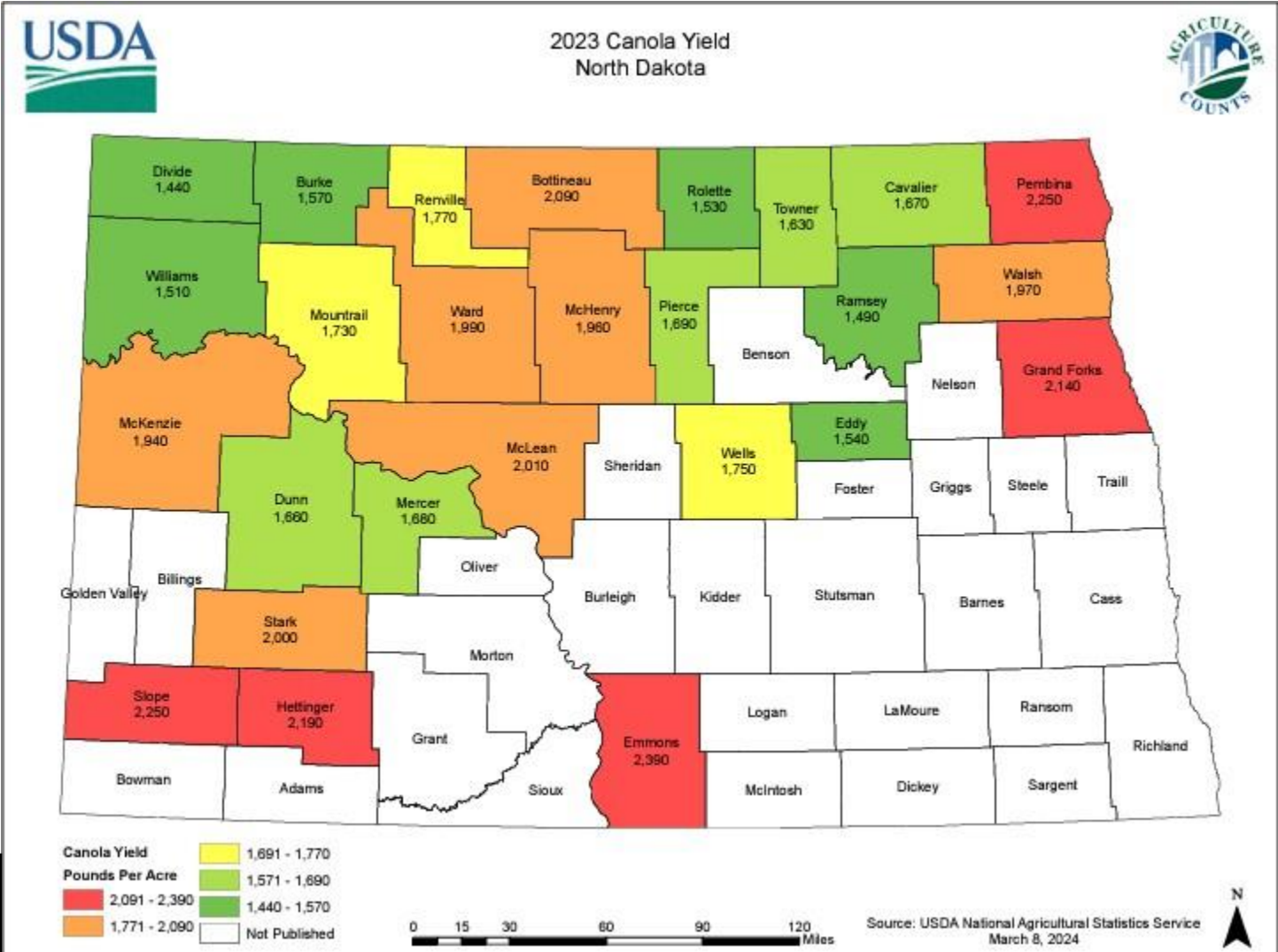
## 2023 Verticillium Stripe Survey

County	% Incidence
Bottineau	2
Cavalier	3
Grand Forks	0.4
McLean	2
Nelson	2
Pembina	5
Ramsey	0
Renville	3
Rolette	4
Towner	4
Walsh	1
Ward	2

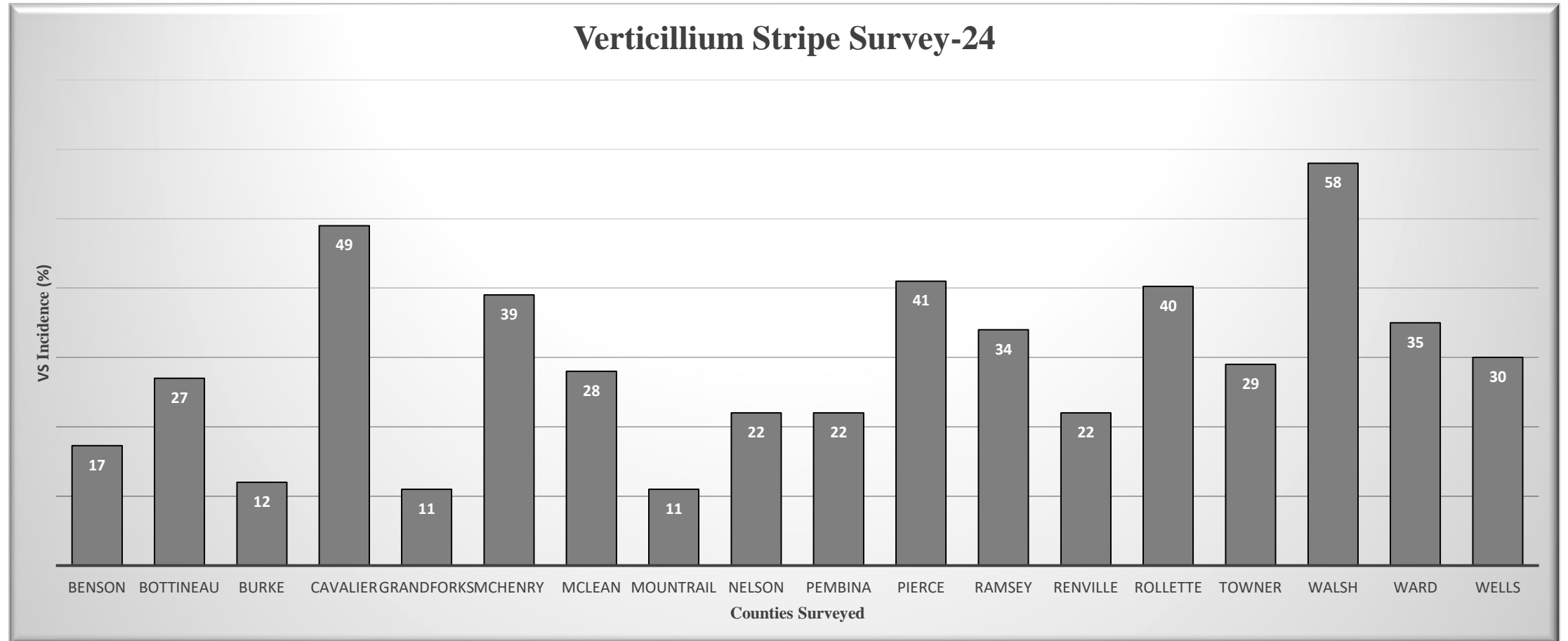
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19	"	1 Pcty NE 2	48.9341	-97.392	7.2
20	"	3 Pcty N 23	48.96345	-97.5529	7.2
21	"	Pcty NW 2	48.94897	-97.8182	6.4
22	"	5 Pcty W 23	48.84771	-97.9317	5.6
23	"	Pcty SW 2	48.65152	-97.8618	8.2
24	Walsh Cty.	1 Wcty N 23	48.47078	-97.8511	7.7
25	10/2/2023	Wcty SW 2	48.28564	-98.0116	7.4
26	"	Wcty W 2	48.41271	-98.081	7.7
27	"	Wcty NW 2	48.48541	-98.1836	8.1
28	Nelson Cty.	Ncty NW 2	48.15188	-98.2937	7.8
29	10/4/2023	2 Ncty W 23	47.99089	-98.2902	7.7
30	"	3 Ncty E 23	47.94751	-98.0048	7.9
31	"	Ncty NE 2	48.12241	-97.9574	8.1

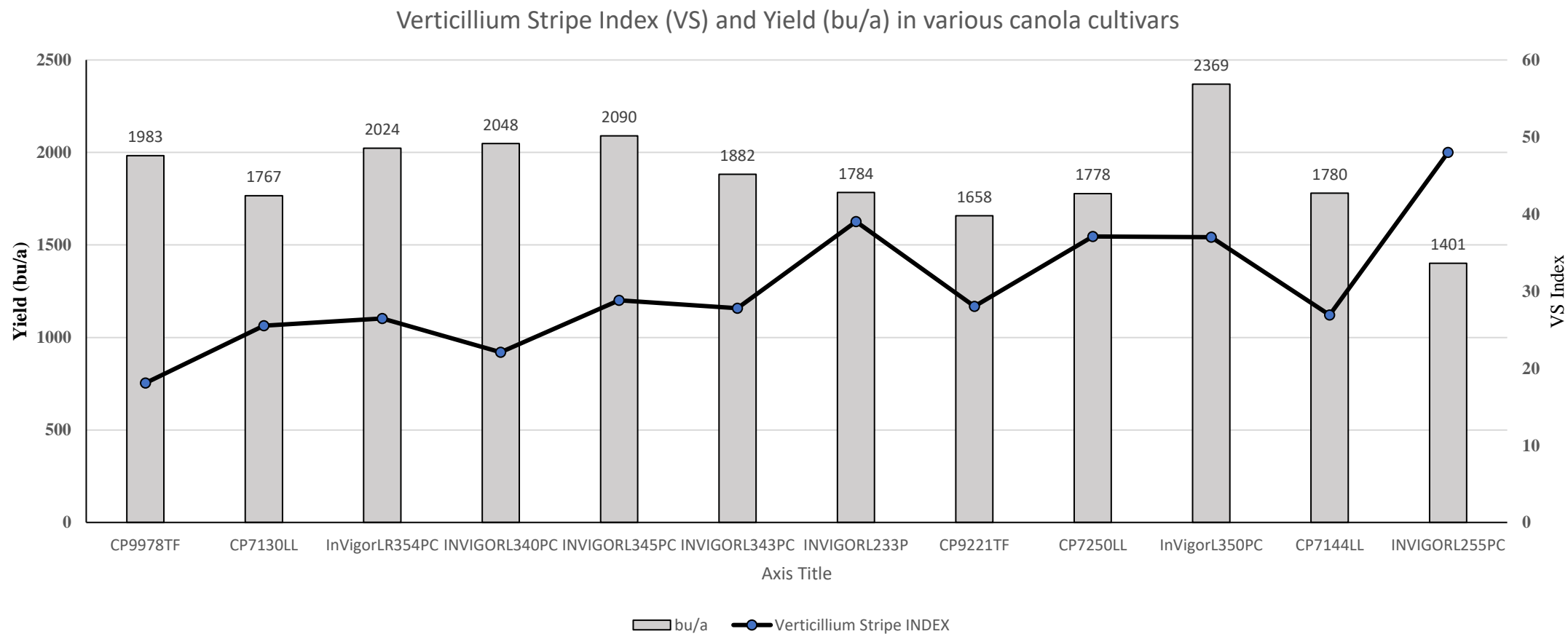
32	Cavalier Cty.	1 Ccty NW 23	48.81923	-98.7504	7.8
33	"	2 Ccty NW 23	48.84839	-99.1104	7.7
34	"	3 Ccty W 23	48.71795	-98.8008	7.8
35	"	4 Ccty W 23	48.71792	-98.7355	7.6
36	"	5 Ccty W 23	48.68839	-98.5382	7.7
37	"	6 Ccty 23	48.54397	-98.8031	7.7
38	"	7 Ccty SW 23	48.71784	-98.4478	7.4
39	"	8 Ccty SW 23	48.67425	-98.7224	7.5
40	"	9 Ccty SW 23	48.66743	-98.892	7.7
41	"	10 Ccty C 23	48.75394	-98.3389	5.4
42	"	11 Ccty C 23	48.76325	-98.3214	6.4
43	"	12 Ccty C 23	48.78301	-98.1905	4.9
44	"	13 Ccty C 23	48.78302	-98.1903	7.4
45	"	14 Ccty C 23	48.93533	-98.3431	5.2
46	"	15 Ccty C 23	48.98594	-98.2555	5.7
47	"	16 Ccty NE 23	48.90946	-98.2401	5.7
48	"	17 Ccty NE 23	48.92408	-98.0372	5.3
49	"	18 Ccty cntr. 23	48.83364	-98.4746	7.8
50	"	19 Ccty NW 23	48.86281	-98.8628	7.8
51	"	20 Ccty NW 23	48.84848	-98.9168	7.8
52	"	21 Ccty NW 23	48.95026	-98.9789	7.4
53	"	22 Ccty NW 23	48.97871	-98.7622	7.9
54	"	23 Ccty NW 23	48.97858	-98.5322	7.9
55	"	24 Ccty 23	48.75553	-98.3864	6.5
56	"	25 Ccty SE 23	48.63356	-98.2461	6.5
57	"	26 Ccty SE 23	48.61252	-98.1491	7.6
58	"	27 Ccty SE 23	48.60108	-98.1095	6.1
59	"	28 Ccty SE 23	48.57222	-98.0193	5.5
60	"	29 Ccty SE 23	48.72467	-98.0586	7.4
61	"	30 Ccty SE 23	48.75751	-98.23383	7.5

pH range in soil samples across 12 counties collected from Canola grown fields: 5.2-8.2

**Do neutral to high pH favors Verticillium Stripe? (Canadian Research Says 'Yes')**

62	GrandForks Cty.	1GFC23	47.74469	-97.4039	7.9
63	10/9/2023	2GFC23	47.89343	-97.1534	7.8
64	"	3GFC23	47.97624	-97.5942	8.2
65	"	4GFC23	48.00877	-97.8181	6.9
66	"	5GFC23	48.13694	-97.86730	7.3
67	Bottineau Cty.	1 BTNC 23	48.80622	-100.145	7.1
68	10/11/2023	2 BTNC 23	48.6682	-100.386	5.6
69	"	3 BTNC 23	48.73284	-100.53	7.5
70	"	4 BTNC 23	48.86417	-100.523	7.4
71	"	5 BTNC 23	48.67627	-100.76	5.4
72	Renville Cty.	1 RENV 23	48.83129	-101.387	5.7
73	10/11/2023	2 RENV 23	48.83578	-101.591	8.1
74		3 RENV 23	48.69092	-101.682	7.8
75		4 RENV 23	48.61817	-101.473	6.7
76	Ward Cty.	1 WARD 23	48.26901	-101.218	6.1
77	10/12/2023	2 WARD 23	48.4011	-101.544	5
78	"	3 WARD 23	48.32736	-101.62	5.1
79	"	4 WARD 23	48.11828	-101.339	4.9
80	McLean Cty.	1 Mclcty 23	47.82645	-101.4	7.6
81	10/12/2023	2 Mclcty 23	47.76887	-101.433	5.1
82	"	3 Mclcty 23	47.64686	-101.234	7.5
83	"	4 Mclcty 23	47.72804	-101.079	7.8
84	"	5 Mclcty 23	47.81913	-100.991	6.9

# Varietal Resistance to Verticillium Stripe on Canola-2024



# Verticillium Seed treatment Trial-2023

## Symptoms

1. Half stem yellowing/senescence
2. Shredding of the stem tissue
3. Greyish hue at the base of the stem on cross section
4. Microsclerotia underneath the epidermis when its peeled

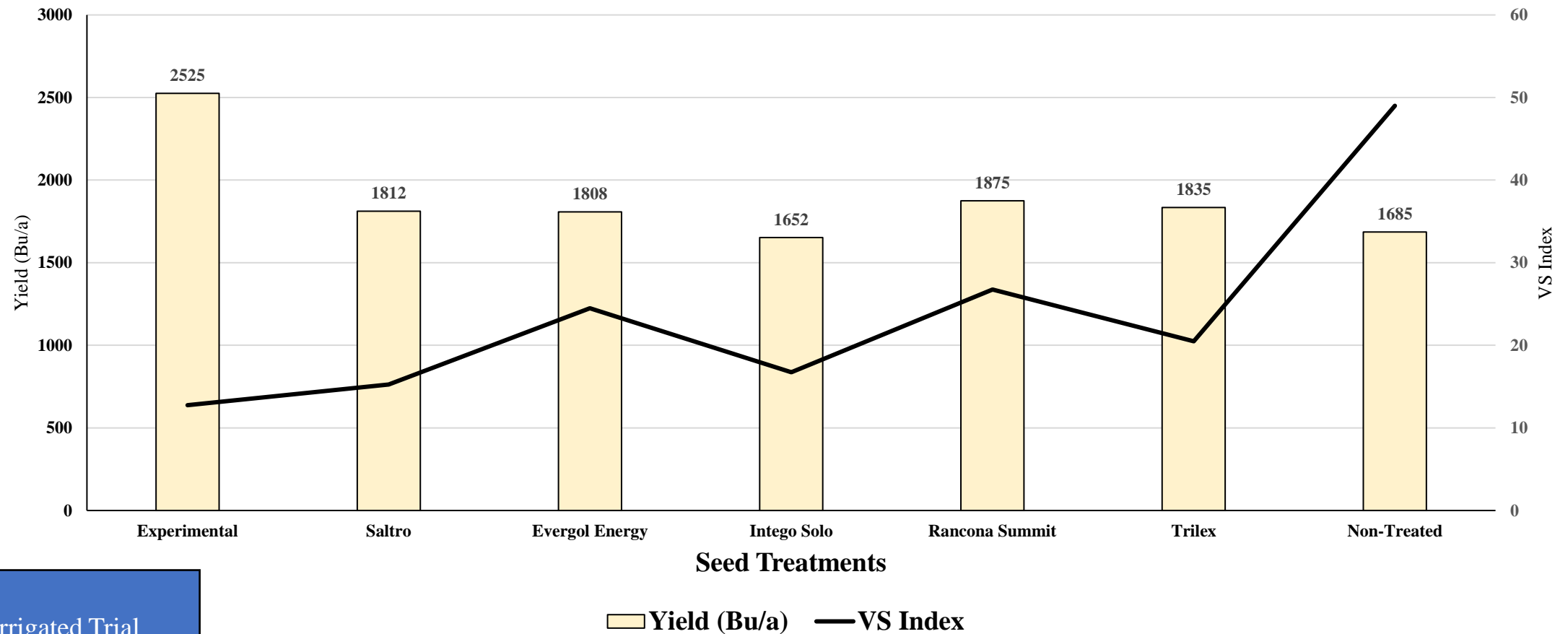


	Plant Stand	Verticillium Stripe		Yield	Test Weight
Treatment	3ft	% Incidence	% Severity	lbs/a	lbs/bu
Vercoras	12	60	26	3873	51.7
Saltro	17	58	23	2960	52.4
Prosper Evergol	17	61	25	3058	52.5
Intego Solo	14	71	32	2698	52.6
Rancona					
Summit	19	65	29	2985	52.6
Trilex	17	65	30	3082	52.4
Non-Treated	19	62	28	2842	52.5
Mean	16	63	28	3071	52.4
CV%	23	17	21	10	0.6
LSD	5.6	16	9	464	0.4
P-Value (0.05)	NS	NS	NS	0.0016*	0.0057*

Non-irrigated Trial  
Cultivar: In Vigor L233P  
RCBD Replicated 4 times



# Seed treatment Trial to Manage Verticillium Stripe on Canola-2024



Non-irrigated Trial  
Cultivar: InVigor L233P  
RCBD Replicated 4 times

# Summary

- Accurate Diagnosis is essential
- Rotation of varieties and longer rotation works in ND to manage blackleg
- White Mold Management: A single spray of fungicide at 20-50% flowering is crucial
- Clubroot first-generation resistant varieties are no longer effective
- Clubroot has to be currently managed with longer rotations and with rotation of multi-gene resistant varieties with different pathotype designations
- Pathotype study is currently ongoing
- Verticillium stripe, a prevalent issue in the surveyed Counties of ND, demands our immediate attention and preparedness
- 1 canola in 4-year rotation helps in ND
- Growing multiple canola varieties can spread out the risk and provide some insurance



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# Thank you & Questions



**Venkat Chapara, PhD**  
**Plant Pathologist**

**Langdon Research Extension Center, ND –**  
**58249**  
**7015663685**

