Canola Insect Pests: Review 2024 & Forecast 2025

NDSU Fargo: Janet Knodel and Patrick Beauzay,
NDSU LREC: Anitha Chirumamilla and Bryan Hanson
UMN: Dave Grafstrom and Donn Vellekson

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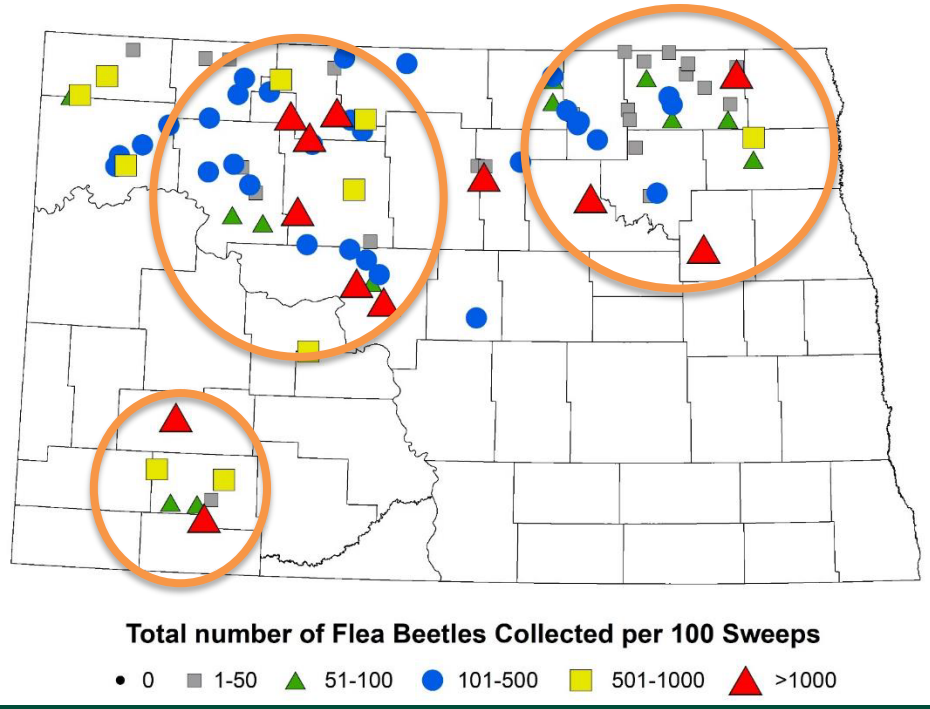
Minnesota Canola Council
Canola Symposium
December 5, 2024

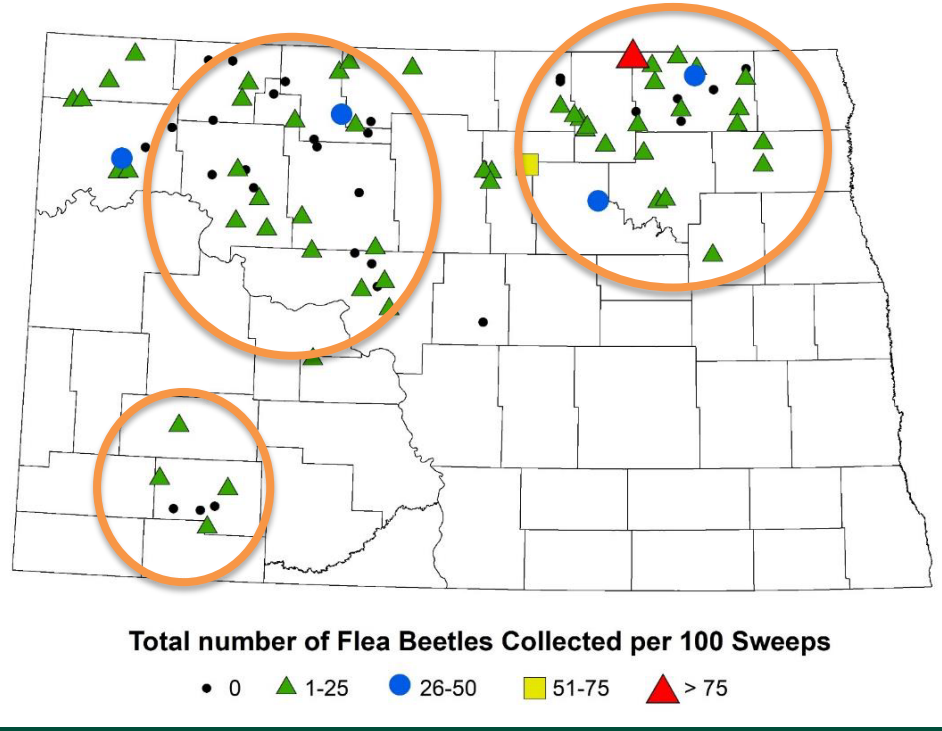
Striped flea beetle
Phyllotreta striolata

Crucifer flea beetle
Phyllotreta cruciferae

2018 Canola Flea Beetle Survey
Crucifer Flea Beetle (*Phyllotreta cruciferae*)



2018 Canola Flea Beetle Survey
Striped Flea Beetle (*Phyllotreta striolata*)



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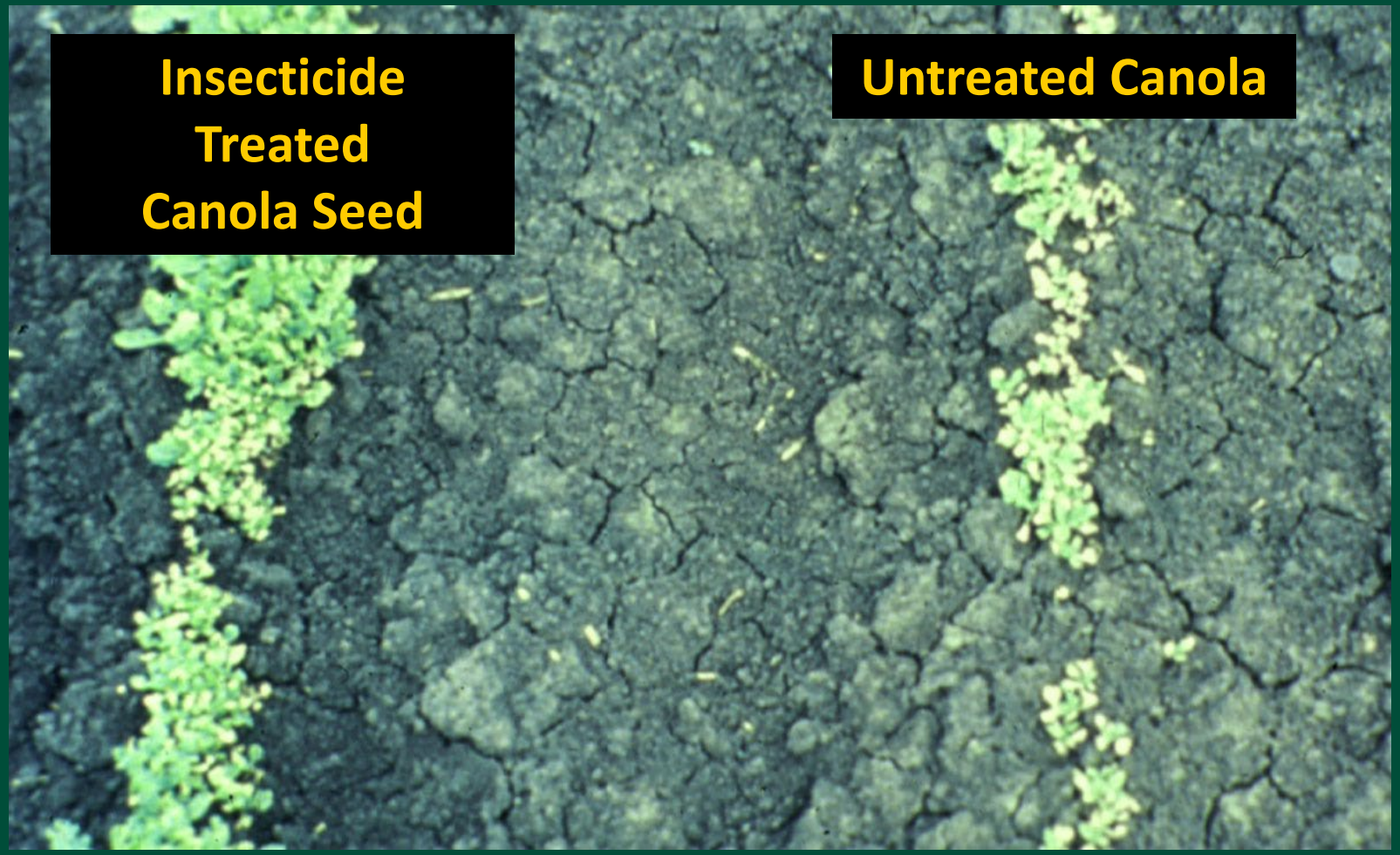
Crop Damage

- Reduced crop stand
- Reduced plant growth
- Delayed maturity
- Yield loss

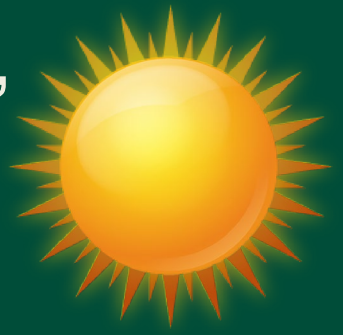


Putnam 1977, Lamb and Turnock 1982, Lamb 1984

Impact of Weather on Flea Beetle Feeding Injury

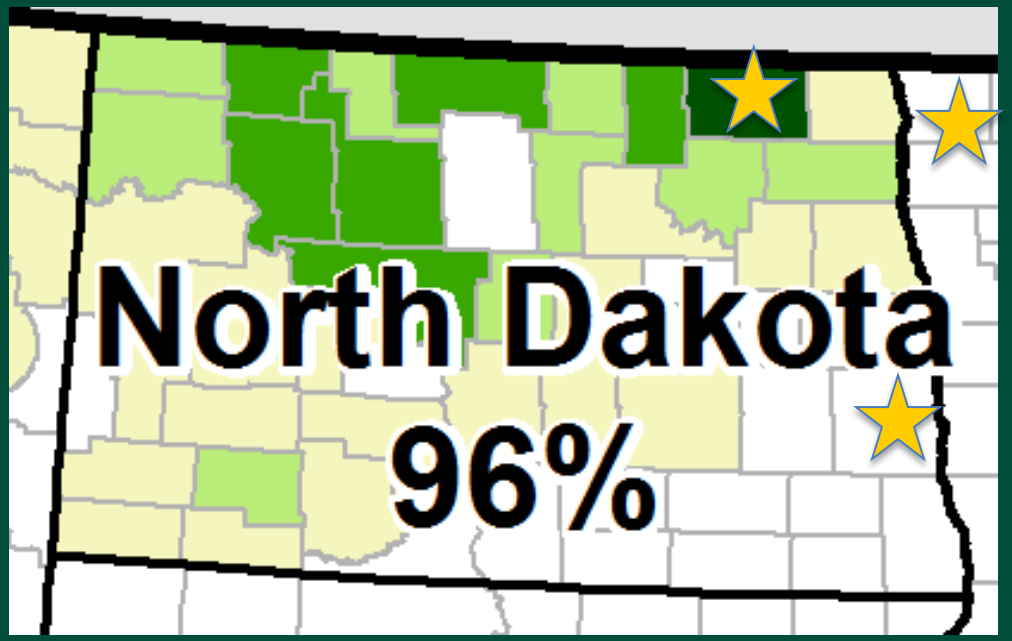
- Less a concern with cooler moderate temperatures, adequate soil moisture, good plant stand

- More of a concern with HOT temperatures, dry droughty conditions, poor plant stand



Objectives

- ✓Determine field efficacy of current insecticide seed treatments for optimal control of spring populations of *Phyllotreta spp.* in different canola producing areas:
  - ✓Fargo, ND
  - ✓Langdon, ND
  - ✓Roseau, MN



Canola growing regions (USDA NASS)

Canola

Insecticide Recommendations

Registered Insecticides – 2024-2025

Seed Treatment Insecticides

Neonicotinoid (Group 4A):

- **thiamethoxam** - Helix Vibrance
- **clothianidin** - NipsIt INSIDE, Prosper EverGol, Poncho 600
- **imidacloprid** - Dyna-Shield Imidacloprid 5, Gaucho 600, Senator 600 FS

Diamides (Group 28):

- **cyantraniliprole** - Fortenza, Lumiderm

Butenolides (Group 4D):

- **Flupyradifurone** – Buteo Start

Always Read and Follow Labels.

Insecticide Seed Treatments

Trt No.	Canola Hybrid	Treatment + Rate fl oz/cwt	IRAC # & Chemical Class	
1	DK400TL	Fungicide Check		
2	DK400TL	Helix Vibrance @ 23	4A	Neonicotinoid
3	DK400TL	Helix Vibrance @ 23 + Fortenza @ 10.2	4A + 28	Neonicotinoid + Diamide
4	DK400TL	Prosper Evergol @ 21.5	4A	Neonicotinoid
5	DK400TL	Prosper Evergol @ 21.5 + Lumiderm @ 9.8	4A + 28	Neonicotinoid + Diamide
6	DK400TL	Prosper Evergol @ 21.5 + Buteo Start @ 9.6	4A + 4D	Neonicotinoid + Butenolide
7	DK400TL	Prosper Evergol @ 21.5 + Buteo Start @ 16	4A + 4D	Neonicotinoid + Butenolide
8	DK400TL	Prosper Evergol @ 21.5 + Buteo Start @ 9.6 + Lumiderm	4A + 4D +28	Neonicotinoid + Butenolide + Diamide
9	L350	Helix Vibrance @ 23 + Lumiderm @ 9.8	4A + 28	Neonicotinoid + Diamide

DK400TL – Bayer DEKALB® TruFlex® Liberty Link® canola hybrid
L350 – BASF InVigor® canola hybrid

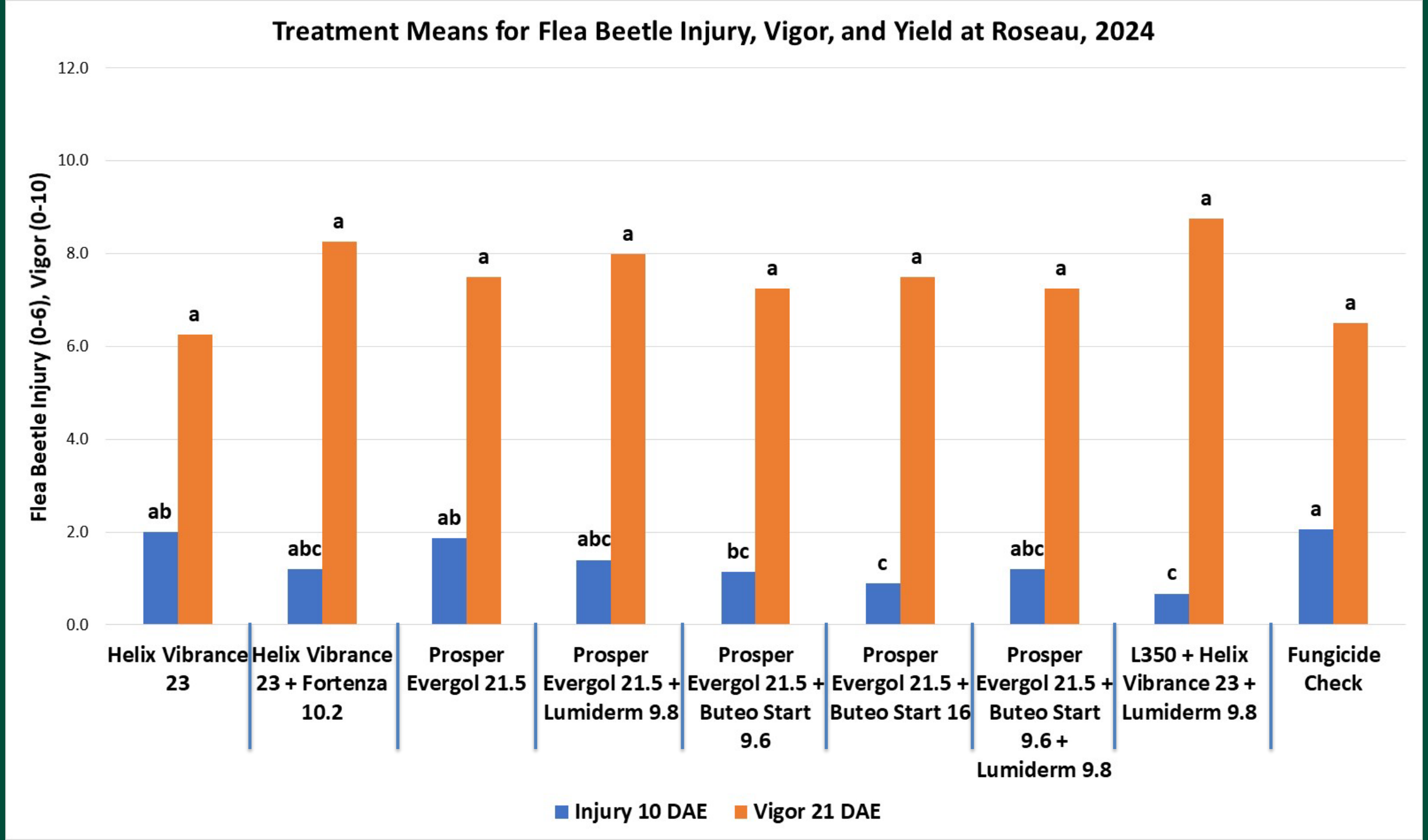
Insecticide Active Ingredients

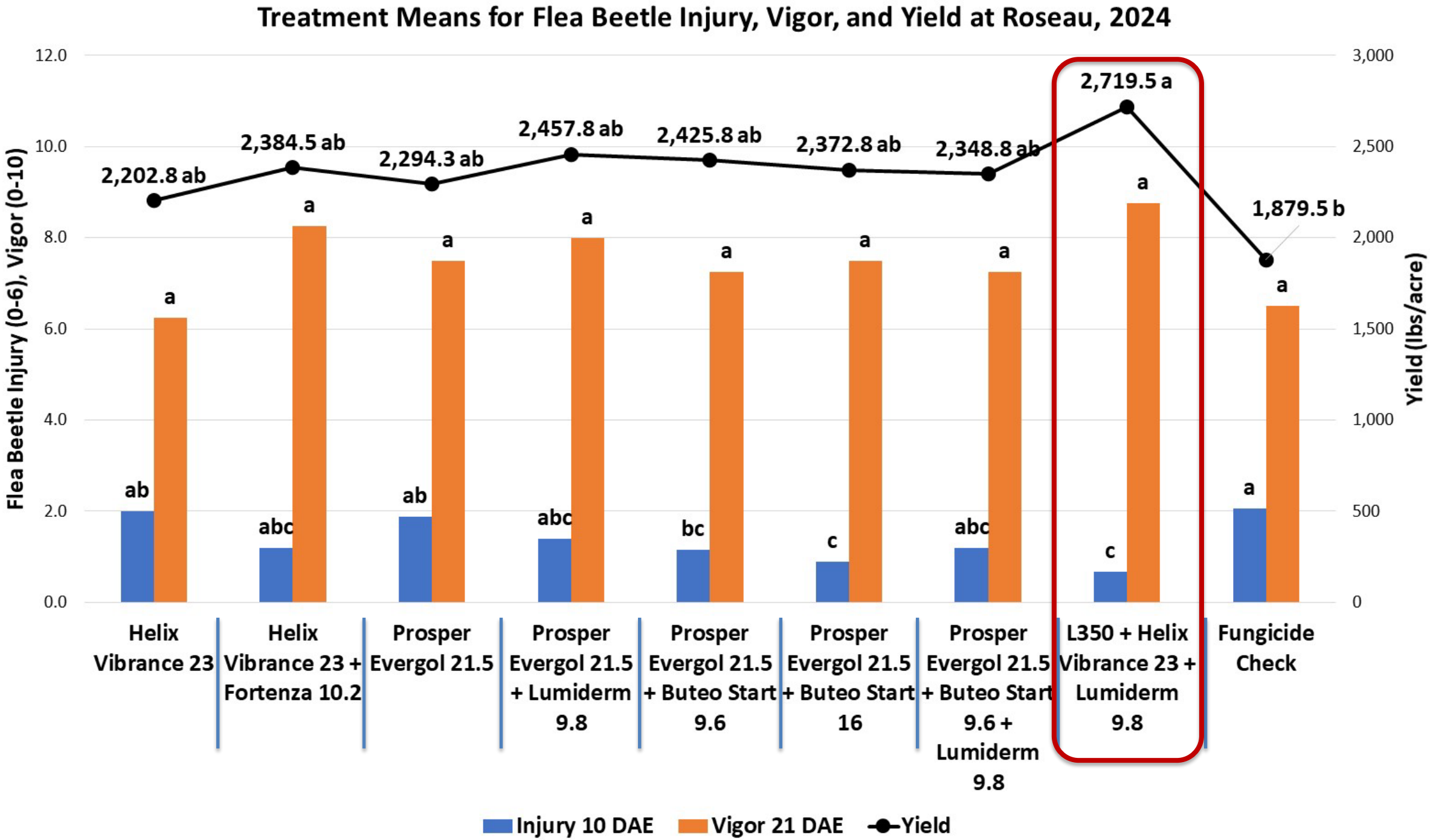
Product	Chemical Class (IRAC)	Active Ingredient	Commercial Rate	AI Rate (metric)
Helix Vibrance	Neonicotinoid (4A)	Thiamethoxam	23 fl oz per cwt	404 g ai per 100 kg
Prosper Evergol	Neonicotinoid (4A)	Clothianidin	21.5 fl oz per cwt	406 g ai per 100 kg
Lumiderm	Diamide (28)	Cyantraniliprole	9.8 fl oz per cwt	400 g ai per 100 kg
Fortenza	Diamide (28)	Cyantraniliprole	10.2 fl oz per cwt*	400 g ai per 100 kg
Buteo Start	Butenolide (4D)	Flupyradifurone	9.6 fl oz per cwt	300 g ai per 100 kg

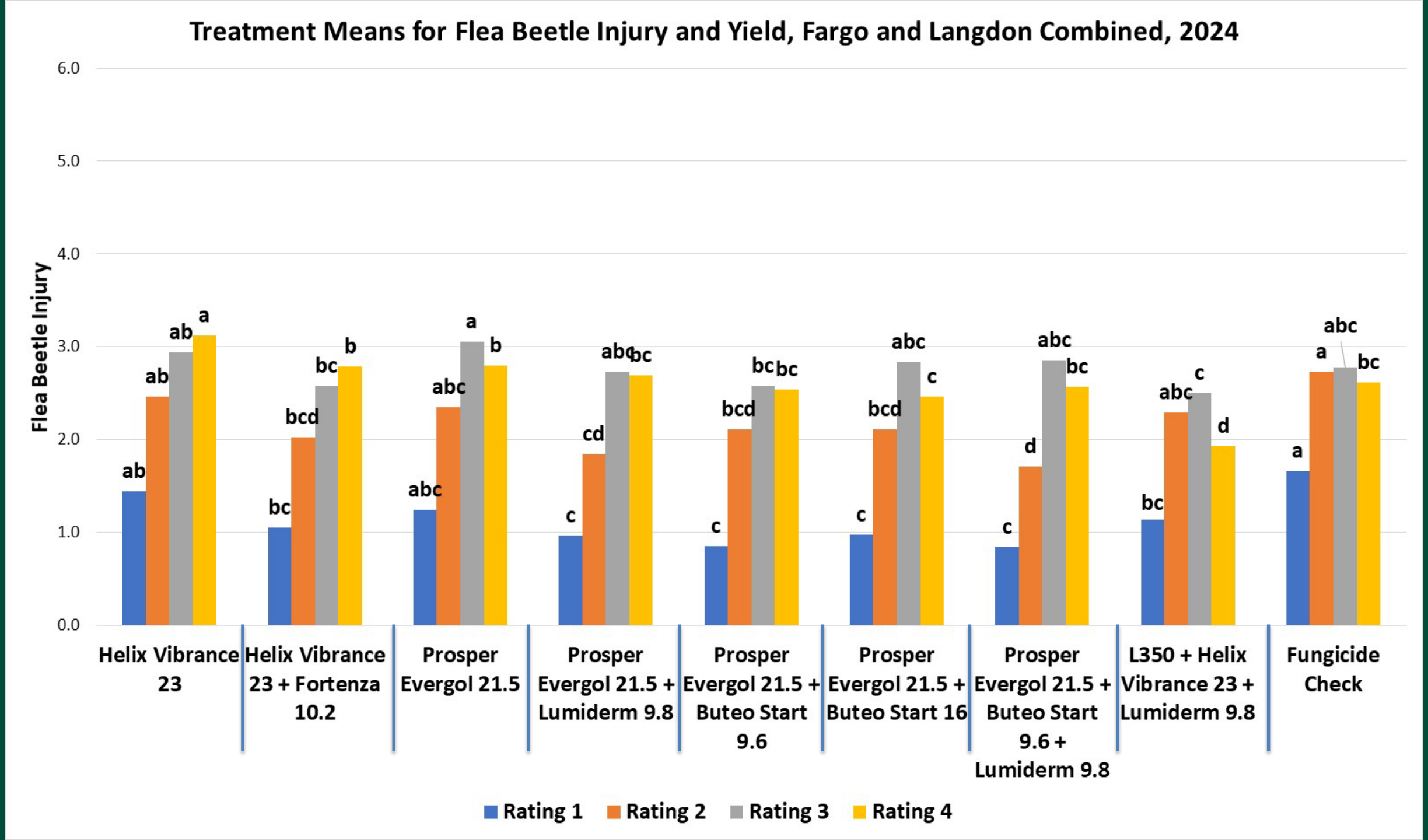
Flea Beetle Population & Injury Rating

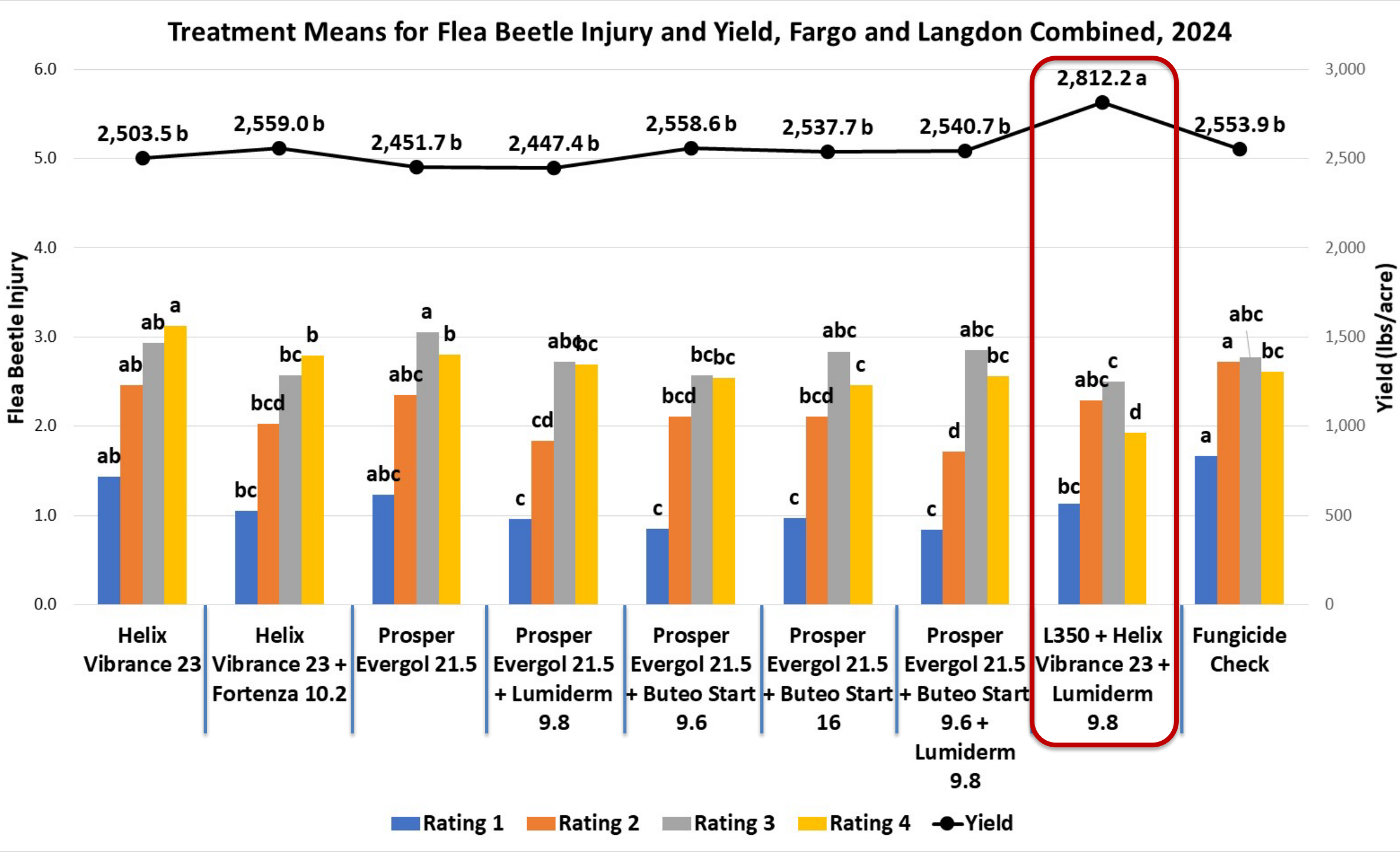
- Feeding injury rating assessed at 3, 7, 10 and 14 DAE
- 0-6 scale based on cotyledon pitting feeding injury (Knodel et al. 2008)
- Vigor rating at 21 DAE (at Roseau only)

0 = 0 pits
1 = 1-3 pits
2 = 4-9 pits
3 = 10-15 pits
4 = 16-25 pits
5 = >25 pits
6 = Plant death

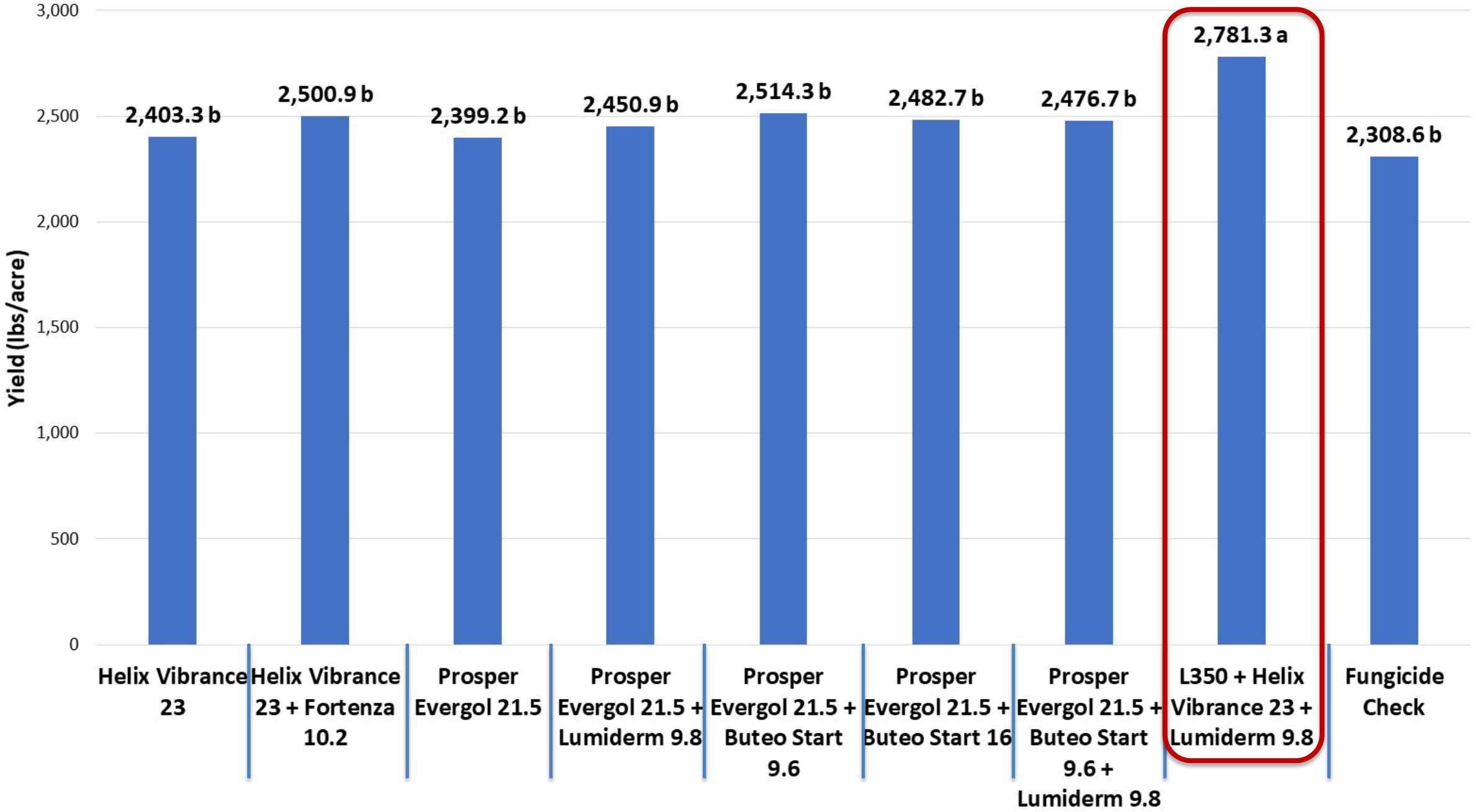

Treatment Means for Flea Beetle Injury, Vigor, and Yield at Roseau, 2024
Flea Beetle Injury (0-6), Vigor (0-10)
12.0
10.0
8.0
6.0
4.0
2.0
0.0
ab
a
abc
a
ab
a
abc
a
bc
a
c
a
abc
a
c
a
a
a
Helix Vibrance 23
Helix Vibrance 23 + Fortenza 10.2
Prosper Evergol 21.5
Prosper Evergol 21.5 + Lumiderm 9.8
Prosper Evergol 21.5 + Buteo Start 9.6
Prosper Evergol 21.5 + Buteo Start 16
Prosper Evergol 21.5 + Buteo Start 9.6 + Lumiderm 9.8
L350 + Helix Vibrance 23 + Lumiderm 9.8
Fungicide Check
Injury 10 DAE
Vigor 21 DAE


Treatment Means for Flea Beetle Injury, Vigor, and Yield at Roseau, 2024
Flea Beetle Injury (0-6), Vigor (0-10)
Yield (lbs/acre)
12.0
10.0
8.0
6.0
4.0
2.0
0.0
3,000
2,500
2,000
1,500
1,000
500
0
2,202.8 ab
2,384.5 ab
2,294.3 ab
2,457.8 ab
2,425.8 ab
2,372.8 ab
2,348.8 ab
2,719.5 a
1,879.5 b
ab
a
abc
a
ab
a
abc
a
bc
a
c
a
abc
a
c
a
a
a
Helix Vibrance 23
Helix Vibrance 23 + Fortenza 10.2
Prosper Evergol 21.5
Prosper Evergol 21.5 + Lumiderm 9.8
Prosper Evergol 21.5 + Buteo Start 9.6
Prosper Evergol 21.5 + Buteo Start 16
Prosper Evergol 21.5 + Buteo Start 9.6 + Lumiderm 9.8
L350 + Helix Vibrance 23 + Lumiderm 9.8
Fungicide Check
Injury 10 DAE
Vigor 21 DAE
Yield


Treatment Means for Flea Beetle Injury and Yield, Fargo and Langdon Combined, 2024
Flea Beetle Injury
6.0
5.0
4.0
3.0
2.0
1.0
0.0
ab ab ab a
bc bcd bc b
abc abc a b
c cd abc bc
c bcd bc bc
c bcd abc c
c d abc bc
bc abc c d
a a abc bc
Helix Vibrance 23
Helix Vibrance 23 + Fortenza 10.2
Prosper Evergol 21.5
Prosper Evergol 21.5 + Lumiderm 9.8
Prosper Evergol 21.5 + Buteo Start 9.6
Prosper Evergol 21.5 + Buteo Start 16
Prosper Evergol 21.5 + Buteo Start 9.6 + Lumiderm 9.8
L350 + Helix Vibrance 23 + Lumiderm 9.8
Fungicide Check
Rating 1
Rating 2
Rating 3
Rating 4


Treatment Means for Flea Beetle Injury and Yield, Fargo and Langdon Combined, 2024
Flea Beetle Injury
Yield (lbs/acre)
6.0
5.0
4.0
3.0
2.0
1.0
0.0
3,000
2,500
2,000
1,500
1,000
500
0
2,503.5 b
2,559.0 b
2,451.7 b
2,447.4 b
2,558.6 b
2,537.7 b
2,540.7 b
2,812.2 a
2,553.9 b
Helix Vibrance 23
Helix Vibrance 23 + Fortenza 10.2
Prosper Evergol 21.5
Prosper Evergol 21.5 + Lumiderm 9.8
Prosper Evergol 21.5 + Buteo Start 9.6
Prosper Evergol 21.5 + Buteo Start 16
Prosper Evergol 21.5 + Buteo Start 9.6 + Lumiderm 9.8
L350 + Helix Vibrance 23 + Lumiderm 9.8
Fungicide Check
Rating 1
Rating 2
Rating 3
Rating 4
Yield

Treatment Means for Yield Combined Across All Locations, 2024



$ Economics 2024 $

Trt #	Treatment	Market Value (USD/cwt)	Yield (lbs/acre)	Crop Value (USD/acre)
1	Fungicide Check	$18.73	2,308.6	$ 432.40
2	Helix Vibrance 23	$18.73	2,403.3	$ 450.14
3	Helix Vibrance 23 + Fortenza 10.2	$18.73	2,500.9	$ 468.42
4	Prosper Evergol 21.5	$18.73	2,399.2	$ 449.37
5	Prosper Evergol 21.5 + Lumiderm 9.8	$18.73	2,450.9	$ 459.05
6	Prosper Evergol 21.5 + Buteo Start 9.6	$18.73	2,514.3	$ 470.93
7	Prosper Evergol 21.5 + Buteo Start 16	$18.73	2,482.7	$ 465.01
8	Prosper Evergol 21.5 + Buteo Start 9.6 + Lumiderm 9.8	$18.73	2,476.7	$ 463.89
9	L350 + Helix Vibrance 23 + Lumiderm 9.8	$18.73	2,781.3	$ 520.94

Yield combined across all locations.
January futures price of $18.73 USD/cwt as of 12/02 ($581.60 CAD/tonne)

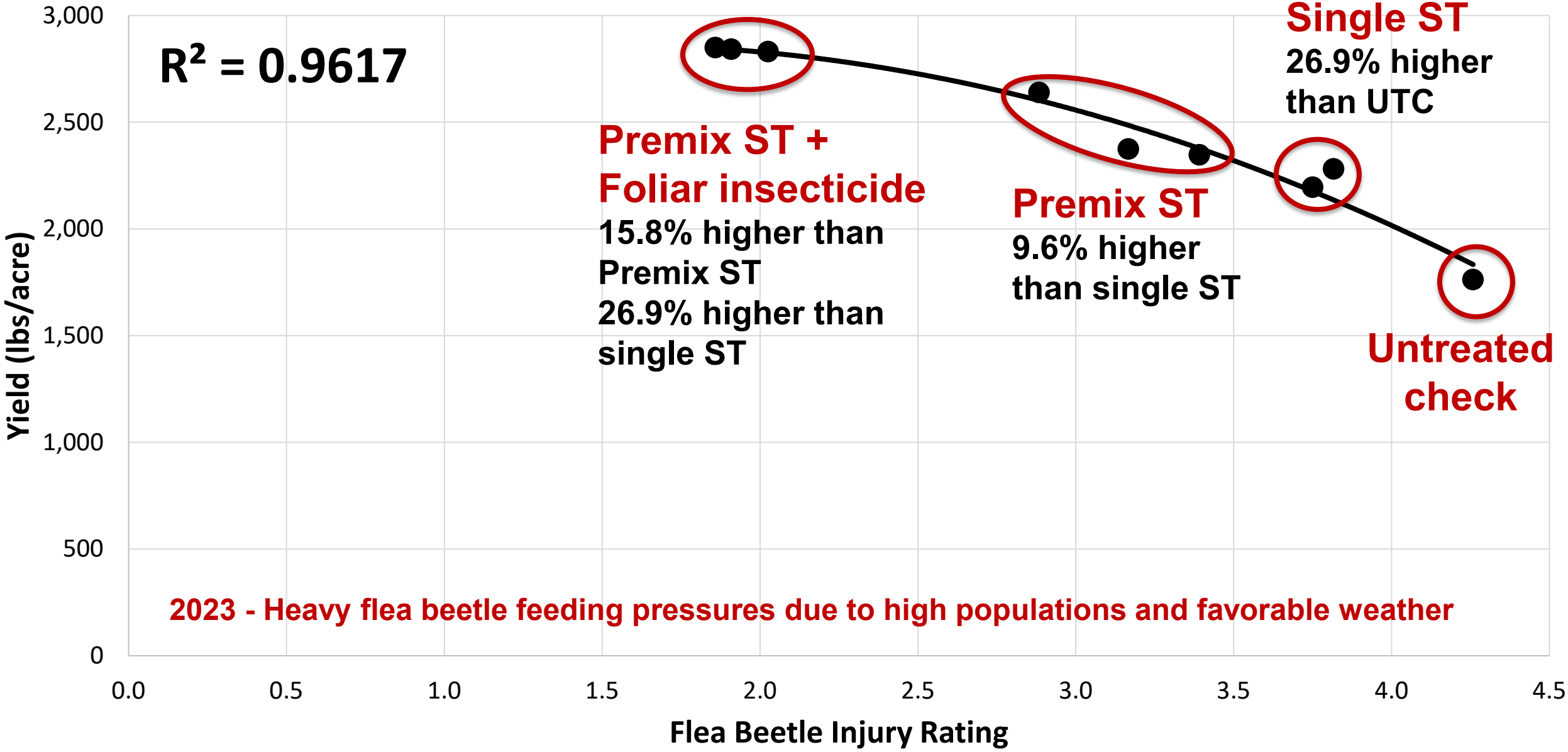
$ Economics 2024 $

Trt #	Treatment	Market Value (USD/cwt)	Yield (lbs/acre)	Crop Value (USD/acre)	ST Cost (USD/acre)	Net (USD/acre)
1	Fungicide Check	$18.73	2,308.6	$ 432.40	$ 4.00	$ 428.40
2	Helix Vibrance 23	$18.73	2,403.3	$ 450.14	$ 8.00	$ 442.14
3	Helix Vibrance 23 + Fortenza 10.2	$18.73	2,500.9	$ 468.42	$ 16.00	$ 452.42
4	Prosper Evergol 21.5	$18.73	2,399.2	$ 449.37	$ 8.00	$ 441.37
5	Prosper Evergol 21.5 + Lumiderm 9.8	$18.73	2,450.9	$ 459.05	$ 16.00	$ 443.05
6	Prosper Evergol 21.5 + Buteo Start 9.6	$18.73	2,514.3	$ 470.93	$ 16.00	$ 454.93
7	Prosper Evergol 21.5 + Buteo Start 16	$18.73	2,482.7	$ 465.01	$ 16.00	$ 449.01
8	Prosper Evergol 21.5 + Buteo Start 9.6 + Lumiderm 9.8	$18.73	2,476.7	$ 463.89	$ 24.00	$ 439.89
9	L350 + Helix Vibrance 23 + Lumiderm 9.8	$18.73	2,781.3	$ 520.94	$ 16.00	$ 504.94

Yield combined across all locations.

January futures price of $18.73 USD/cwt as of 12/02 ($581.60 CAD/tonne)

Correlation Between Flea Beetle Injury and Yield at 10 Days After Emergence - 2023



$ Economics 2023 $

Treatment	Net (USD/acre)	Net Increase
Check	$ 495.37	
Helix Vibrance	$ 608.82	$ 113.45
Helix Vibrance + Fortenza	$ 651.26	$ 155.89
Helix Vibrance + Fortenza + Bifenthrin	$ 771.31	$ 275.94
Prosper Evergol	$ 633.07	$ 137.70
Prosper Evergol + Lumiderm	$ 643.51	$ 148.14
Prosper Evergol + Lumiderm + Bifenthrin	$ 768.25	$ 272.88
Prosper Evergol + Buteo Start	$ 725.53	$ 230.16
Prosper Evergol + Buteo Start + Bifenthrin	$ 773.51	$ 278.14
Bifenthrin Only	$ 680.45	$ 185.08
Bifenthrin Only x 2	$ 718.62	$ 223.25

Take Home Message for Canola Growers

- **Premix ST with 2 or more Active Ingredients > Single ST > Untreated check**
- **Optimal yield and control of flea beetles:**
  - Premix of neonics with 2 Active Ingredients or Modes of Action (Diamides, Group 28 OR Butenolides, Group 4D)

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BAYER

BUTEO start

FLUPYRADIFURONE | GROUP 4D | INSECTICIDE

Lumiderm™

INSECTICIDE SEED TREATMENT

Take Home Message for Canola Growers

- **Additional foliar spray on top of ST** may be necessary to protect canola crop
  - –Economic populations of mixed species of flea beetles
  - –Repeated field infestations due to extended feeding period

Midges in Canola

- Family Cecidomyiidae, Order Diptera (flies)
  - Swede midge, *Contarinia nasturtii* (Kieffer)
    - Introduced into Ontario, Canada in 2000
    - United States in 2004 in Niagara County, New York
  - Canola flower midge, *Contarinia brassicola* Sinclair
    - Identified in 2017; it was first discovered in 2012
- Crop damage by larval stage of midge:

2019 Mori et al. Can. Entomol. 151:131-148

Identification Features of Adult Midges

Canola flower midge	Swede midge
Light brown fly, small <2mm long (see imag	Brown fly, small 1.5-2mm long
Female wings mottled with dense macrotrichia (see image B)	Clear wings

Use molecular techniques to identify species

2019 Mori et al. Can. Entomol. 151:131-148

Canola Flower Pod Damage by Midge Larvae

Canola flower midge	Swede midge
No feeding injury on leaves or shoots	Feeding injury on leaves and shoots (scarring of tissue)
Shape of flower gall - elongated, bottle-shaped, closed flower galls (see image A)	Shape of flower gall - caper shaped, closed flower galls (see image B)

A. Canola flower midge

B. Swede midge

Larva

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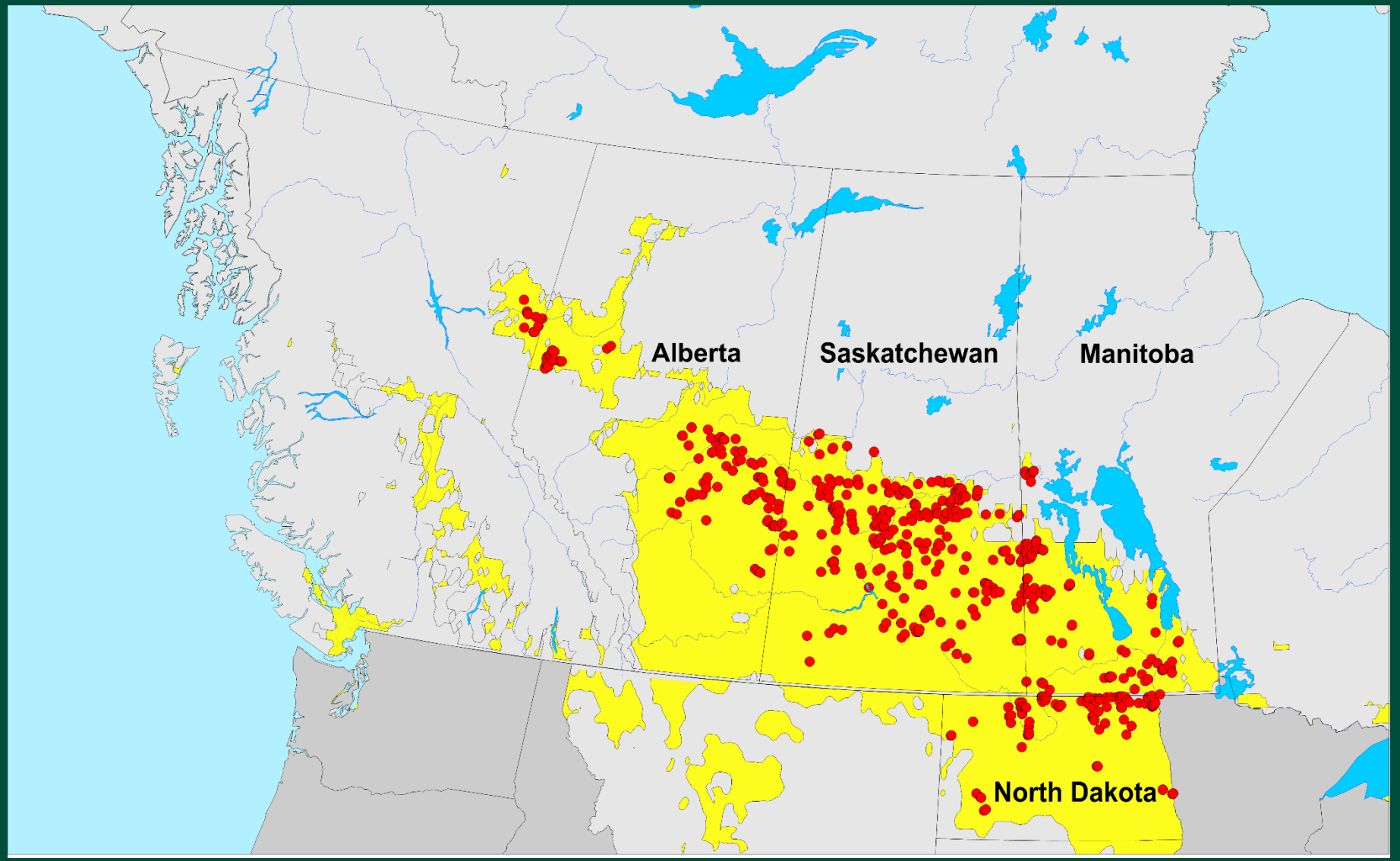
2019 Mori et al. Can. Entomol. 151:131-148

Midge Pheromone Trap Surveys in Canola

- *PI: Janet Knodel*
- Identifier: *Patrick Beauzay*
- *2024 ND-MN Trappers:*
  - *ND:*
    - *NE: Anitha Chirumamilla, Natalie Eversvik*
    - *NC: Chris Asmundson*
    - *SW: Victor Gomes, Frederick Eddy Nortje*
    - *EC: Greg Endres retired, Shelby Dietz*
    - *SE: Patrick Beauzay, Tommy Crompton*
  - *NW MN: Dave Grafstrom*

Trap Bottom of Canola Flower Midge from Langdon REC

2006 - 2021
No Swede Midge found in pheromone traps across the canola growing region of the Northern Great Plains



Citation: Vankosky et al. 2022. Pheromone trap monitoring reveals the continued absence of swede midge in the Northern Great Plains. The Canadian Entomologist.

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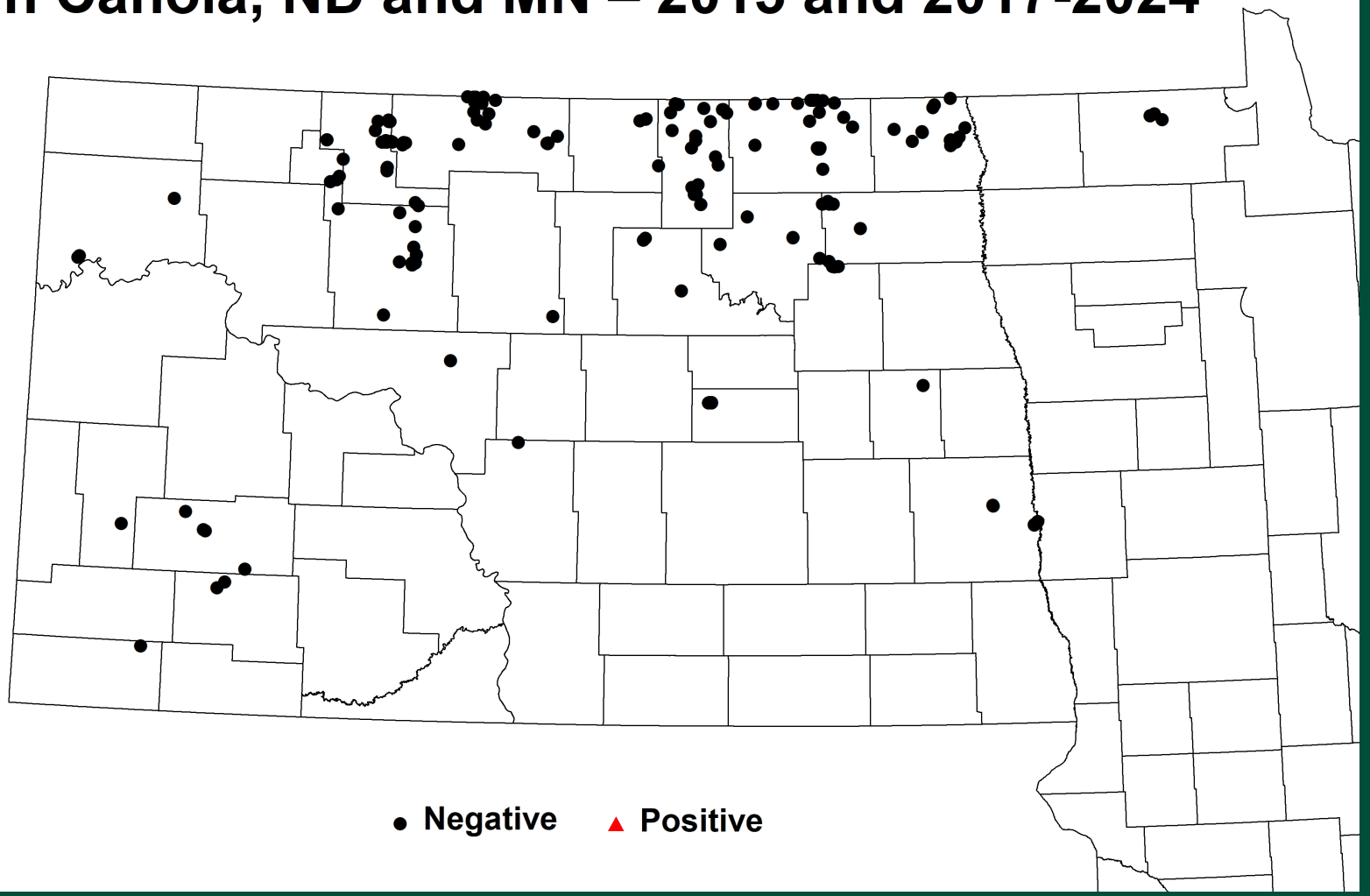
Swede Midge (*Contarinia nasturtii*) Trap Surveys in Canola, ND and MN – 2015 and 2017-2024



- ✓ A total of 163 trap sites in 19 counties in ND and 1 county in MN
- ✓ 9 years of trapping
- ✓ 87% of sites in northern tier of ND

Photo: Susan Ellis, www.forestryimages.org

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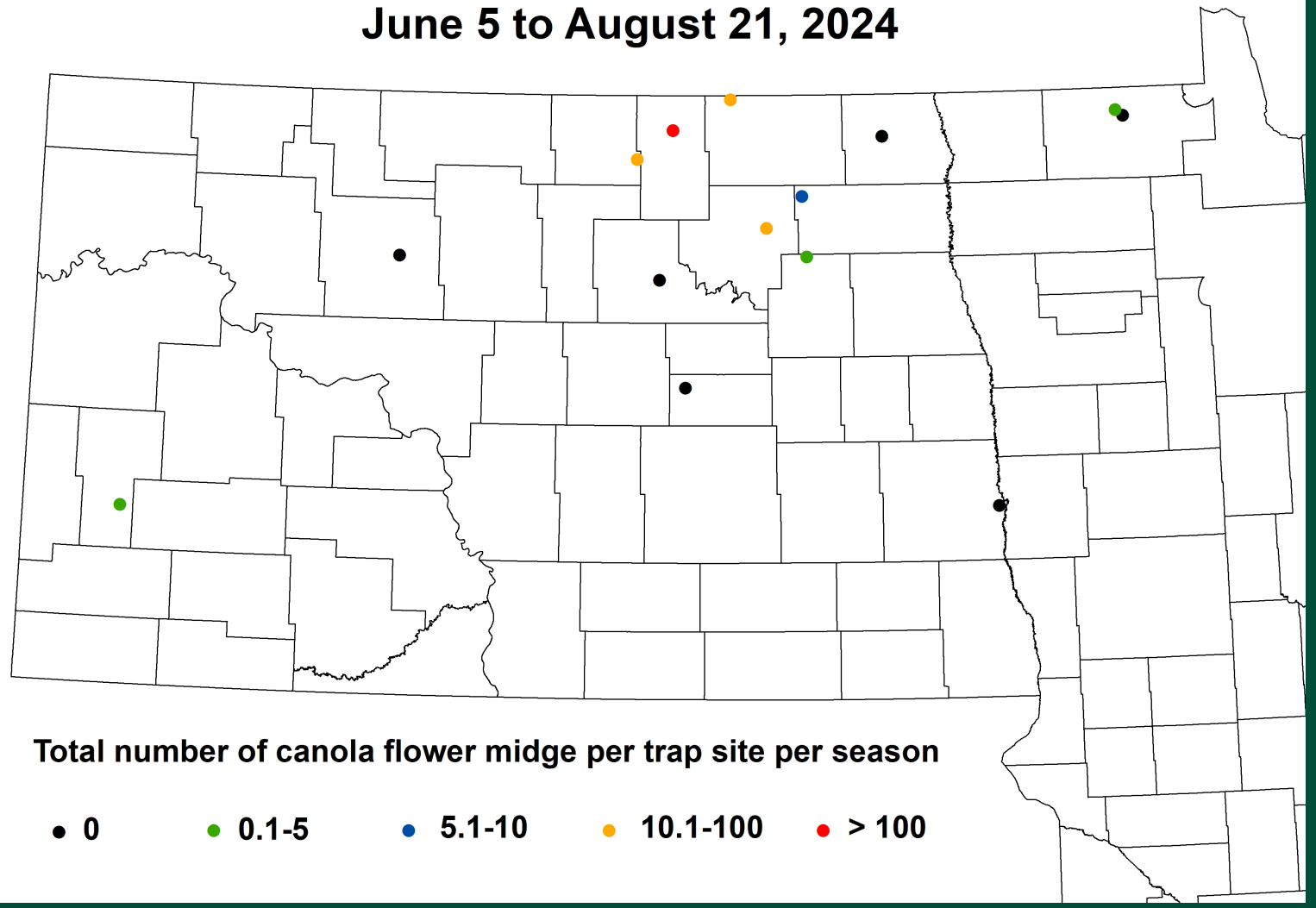
Canola Flower Midge (*Contarinia brassicola*) Trap Survey in Canola, ND and MN – 2024

June 5 to August 21, 2024



- ✓ A total of 14 trap sites in 13 counties
- ✓ 8 of 14 trap sites were positive in 8 counties
- ✓ Total of 254 canola flower midge captured
- ✓ One positive trap in MN

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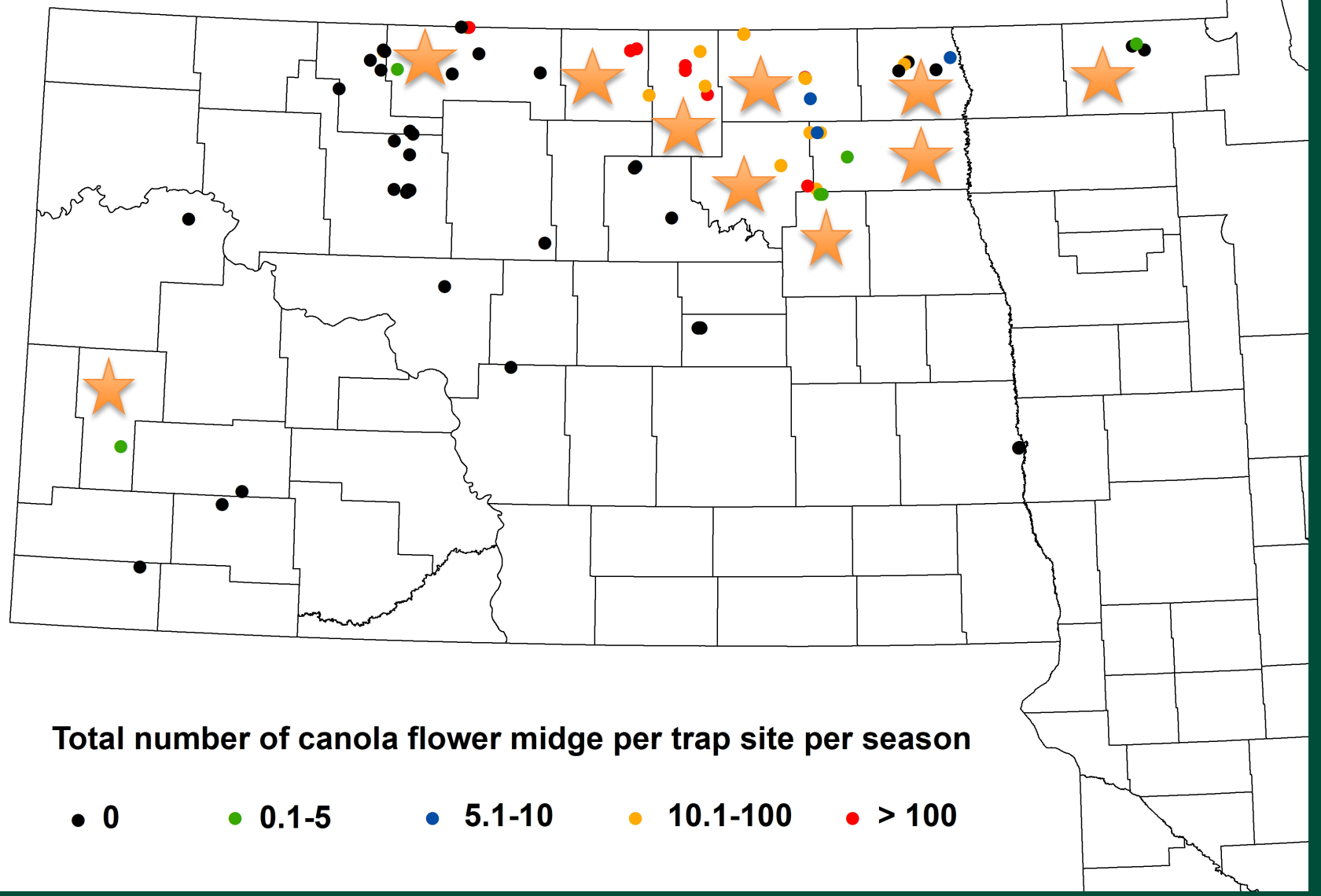
Canola Flower Midge (*Contarinia brassicola*) Trap Survey in Canola, ND and MN – 2020-2024



- ✓ A total of 80 trap sites in 22 counties
- ✓ 42.5% of trap sites were positive in 11 counties
- ✓ Total of 2,842 canola flower midge captured

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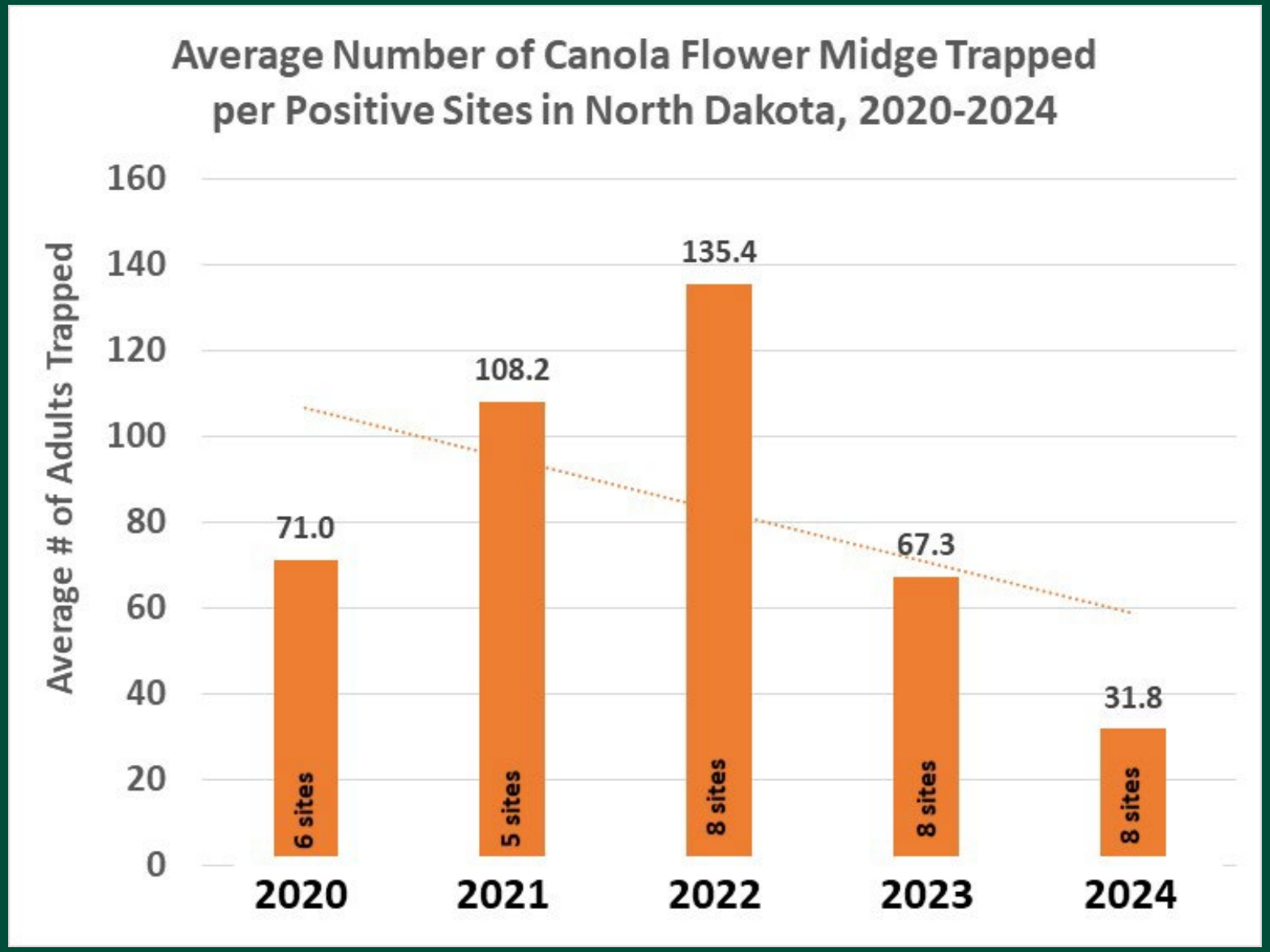
Canola Flower Midge Trap Summary

- ✓ Canola flower midge populations increasing from 2020 to 2022
- ✓ 2022 to 2024 decreased by 50%
- ✓ No pod damage or yield losses recorded by trappers or canola growers



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Trap Monitoring for Adult Diamondback Moths

- Put traps in field in early-mid June
- Monitor weekly until August

Aborted flowers

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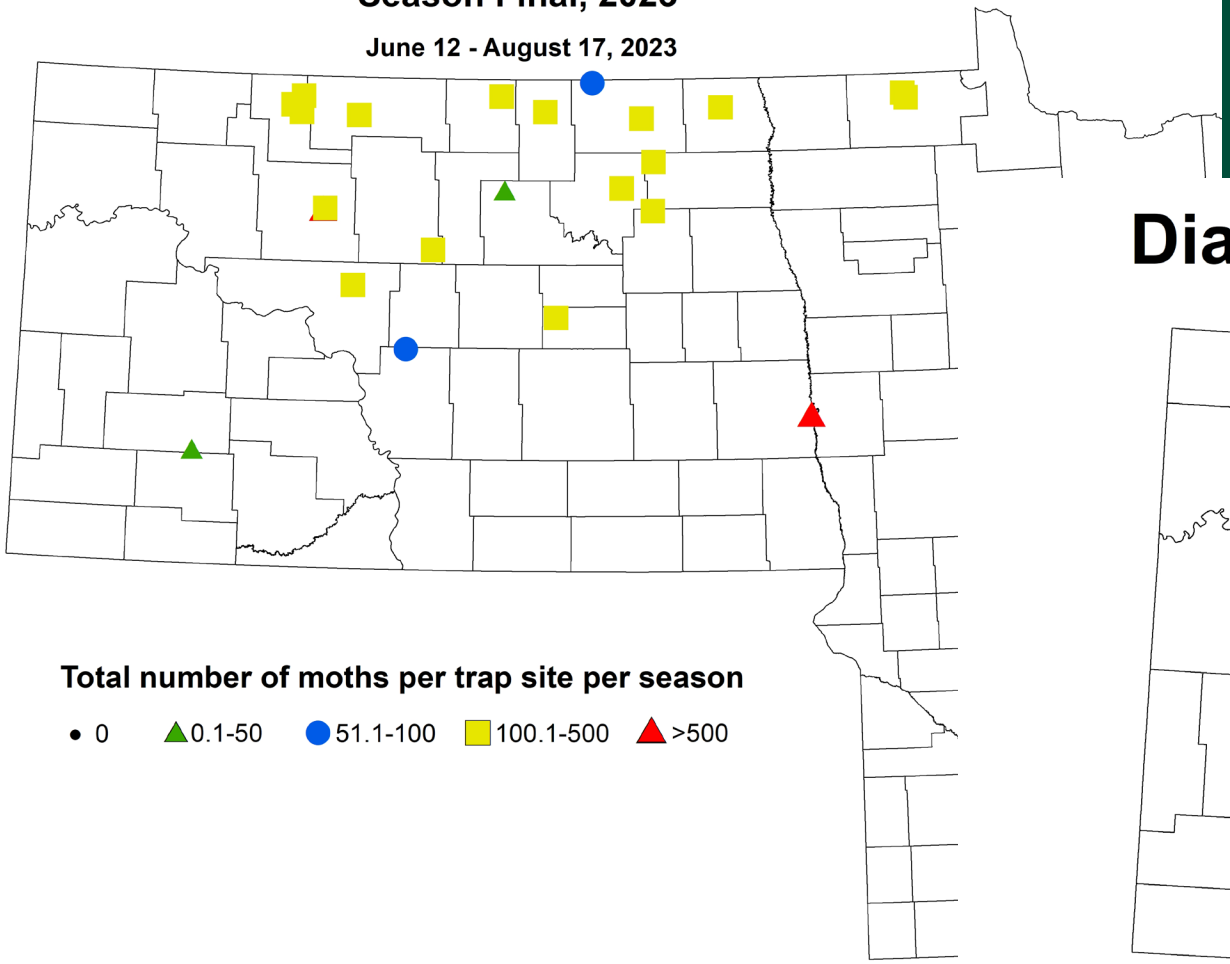
Diamondback Moth Trapping Network

Season Final, 2023

June 12 - August 17, 2023

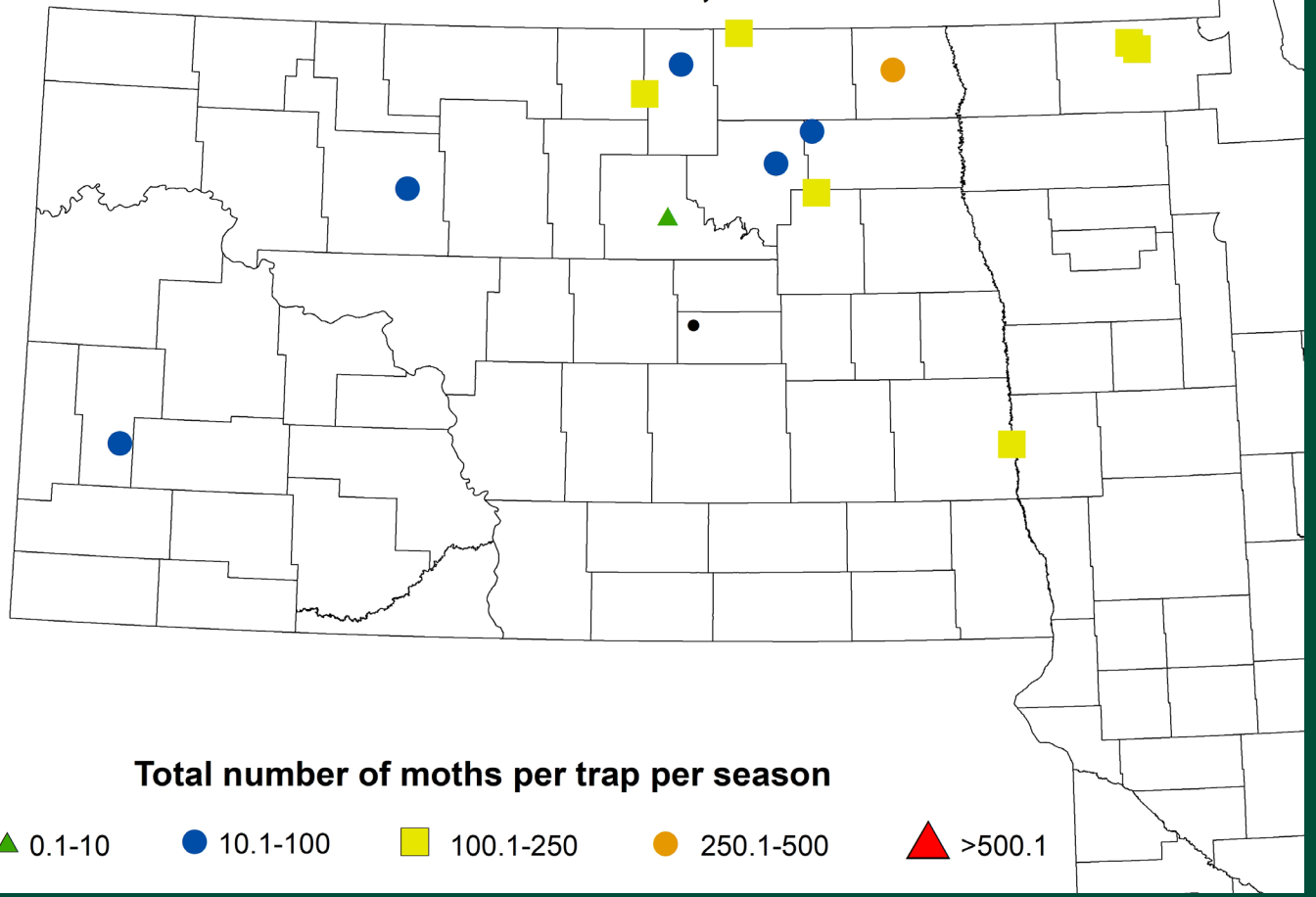


Total number of moths per trap site per season

• 0 ▲0.1-50 ●51.1-100 ■100.1-500 ▲>500

Diamondback Moth Trapping Network

Season Final, 2024



Total number of moths per trap per season

• 0 ▲0.1-10 ●10.1-100 ■100.1-250 ●250.1-500 ▲>500.1

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Bertha armyworm

monitoring can begin with moth activity in mid-June

Pheromone traps can alert crop managers to potential problems

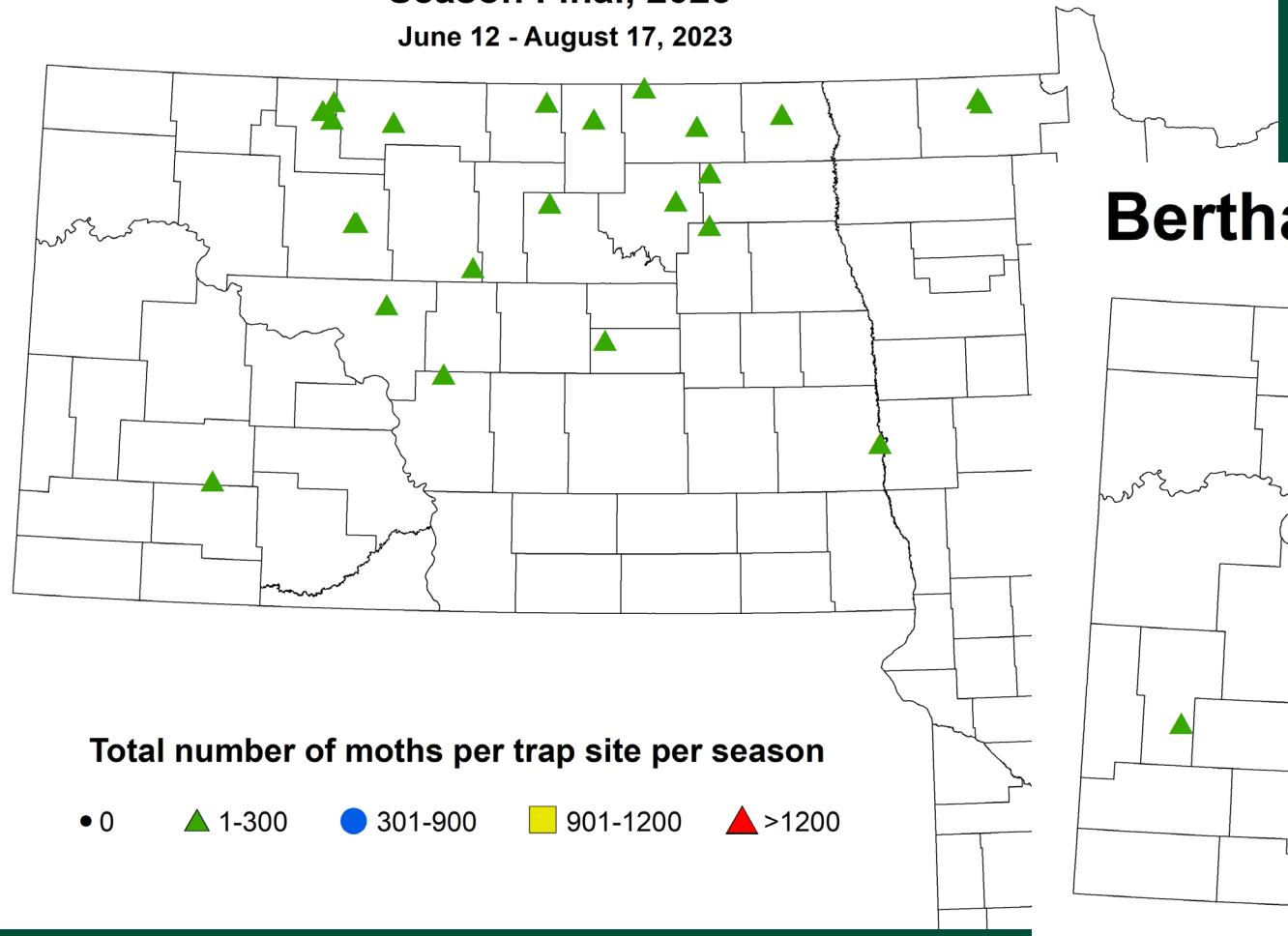
… >900 moths/ six weeks

Pod-feeding

Bertha Armyworm Trapping Network

Season Final, 2023

June 12 - August 17, 2023

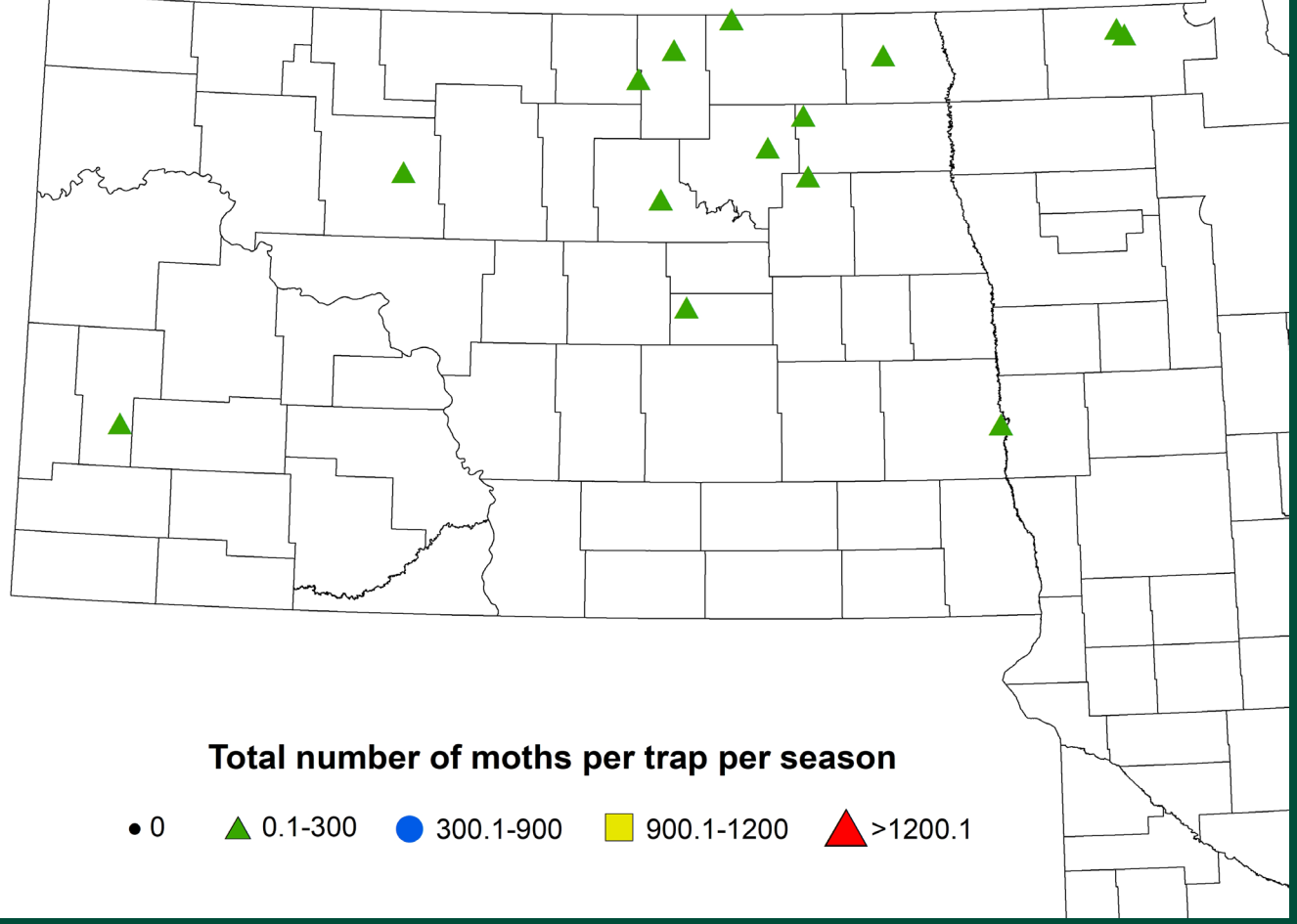


Total number of moths per trap site per season

• 0 ▲ 1-300 ● 301-900 ■ 901-1200 ▲ >1200

Bertha Armyworm Trapping Network

Season Final, 2024



Total number of moths per trap per season

• 0 ▲ 0.1-300 ● 300.1-900 ■ 900.1-1200 ▲ >1200.1

ACKNOWLEDGEMENTS

- Northern Canola Growers Association
- Honggang Bu, IPM mapper

Send any questions to:
janet.knodel@ndsu.edu