

Red Sunflower Seed Weevil: Results of the Insecticide Field Studies in ND and SD

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2024 NSA Research Forum

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EXTENSION



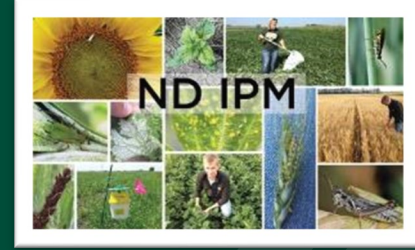
Red Sunflower Seed Weevil

Smicronyx fulvus LeConte

- Annual economic insect pest of sunflower grown in SD and ND
- Crop Damage: Larvae feed on developing seed and consume about $\frac{1}{3}$ of kernel
 - Severe infestations result in 50 - 80% of seeds infested
 - Reduce seed weight and yield
- Primarily managed using foliar insecticides



Red Sunflower Seed Weevil – 2022 IPM Survey in ND



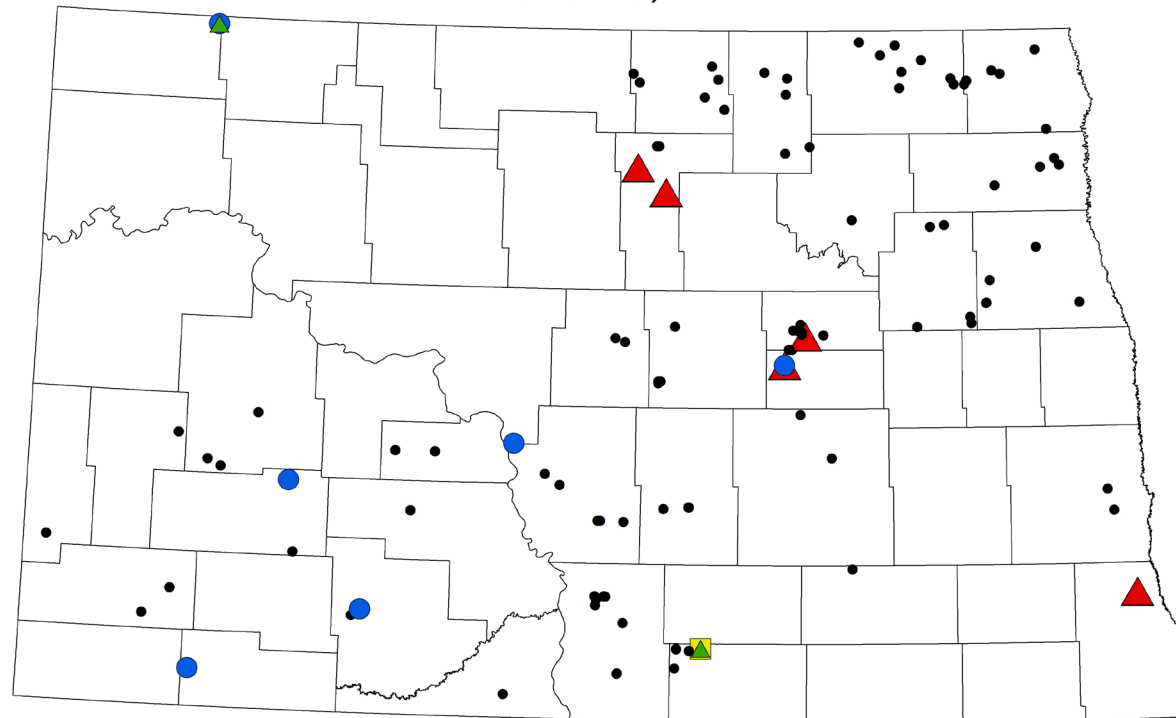
**Average weevils
per head = 1 to 12**

**16% of the fields
surveyed were
above the E.T.**



Red Sunflower Seed Weevils in Sunflower

Season Final, 2023



Average number of weevils per head

• 0 ▲ 0.1-1 ● 1.1-3 ■ 3.1-4 ▲ >4

**2023:
169 fields
scouted in
35 counties**

Sunflower

Foliar Insecticides

Registered Insecticides – 2023-2024

Red sunflower seed weevil

** Restricted Use Pesticide*



Always Read and Follow Labels.

Pyrethroids (Group 3A)

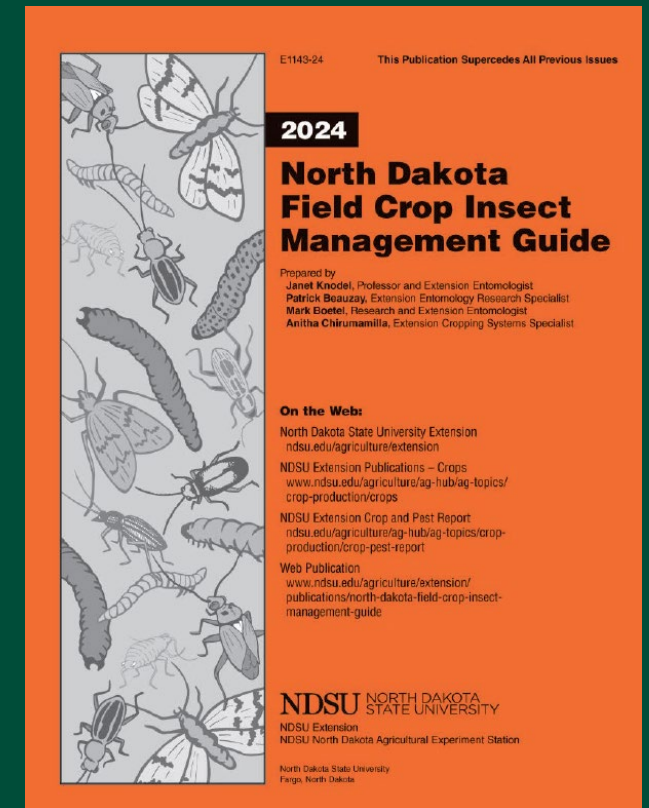
Asana*, Baythroid XL*, Tombstone*, Delta Gold*, Asana XL*, Lambda-Cy*, Warrior*, Mustang Maxx*

Carbamates (Group 1A)

Sevin 4F, Sevin XLR Plus

Premixes:

Besiege*
(Coragen 28 + Warrior 3A)



2023 NSA RSSW Insecticide Study – ND & SD

State	Site	Planting time	Plant Date	Spray Date	Harvest Date
ND	Casselton Agronomy Seed Farm	Early	23-May	2-Aug	9-Oct
ND	Casselton Agronomy Seed Farm	Late	6-Jun	12-Aug	23-Oct
ND	NCREC, Minot	Early	22-May	3-Aug	10-Oct
ND	NCREC, Minot	Late	7-Jun	15-Aug	22-Oct
SD	Dakota Lakes Research Farm, Pierre	Early	8-May	X	X
SD	Dakota Lakes Research Farm, Pierre	Late	14-Jun	17-Aug	24-Oct

- Target stand = 20,000 plants per acre
- ND - Plots 10 x 25 feet, 4 rows, 30-inch row spacing
- SD – long strip of 8 rows, close to edge
- Not show Casselton data today



2023 NSA RSSW Insecticide Study – ND & SD

- **Spraying**
 - Tractor mounted CO₂ boom sprayer, 40 PSI, 20 GPA (ND)
 - High-boy push sprayer, 3 mph (SD)
 - Spray timing – R5.2-5.3
- **Yield – 10 heads per plot**
 - Hand-threshed heads
 - 1,000 seeds per plot



2023 NSA RSSW Insecticide Study – ND & SD

Treatment	Rate (fl oz/acre)	Group	IRAC MOA
Untreated check			
Asana XL	9.6	Pyrethroid	3A
Warrior II	1.92	Pyrethroid	3A
Baythroid XL	2.8	Pyrethroid	3A
Delta Gold	1.5	Pyrethroid	3A
Asana XL + Exponent	9.6 + 8	Pyrethroid + EXP	3A
Warrior II + Exponent	1.92 + 5	Pyrethroid + EXP	3A
Baythroid XL + Exponent	2.8+ 3.5	Pyrethroid + EXP	3A
Delta Gold + Exponent	1.5 + 2.8	Pyrethroid + EXP	3A
Entrust	12	Spinosyns	5
Malathion	32	Organophosphate	1B
Plinazolin Mid	1.03	Isoxazolines	30
Plinazolin High	1.54	Isoxazolines	30

New Insecticide - Plinazolin



- Syngenta Crop Protection
 - Plinazolin technology; active ingredient Isocycloseram
 - Group 30 Isoxazolines
 - GABA receptor antagonist
 - GABA = Gamma-AminoButyric Acid is a neurotransmitter
- Novel mode of action for IRM
- Cotton, soybean, corn, wheat



Photo by A. Hargens, SDSU

Adult RSSW Percent Mortality at 24 hours for Four Rates of Plinazolin in Glass Vial Bioassay, 2022

■ Cass County, ND ■ Hughes County, SD

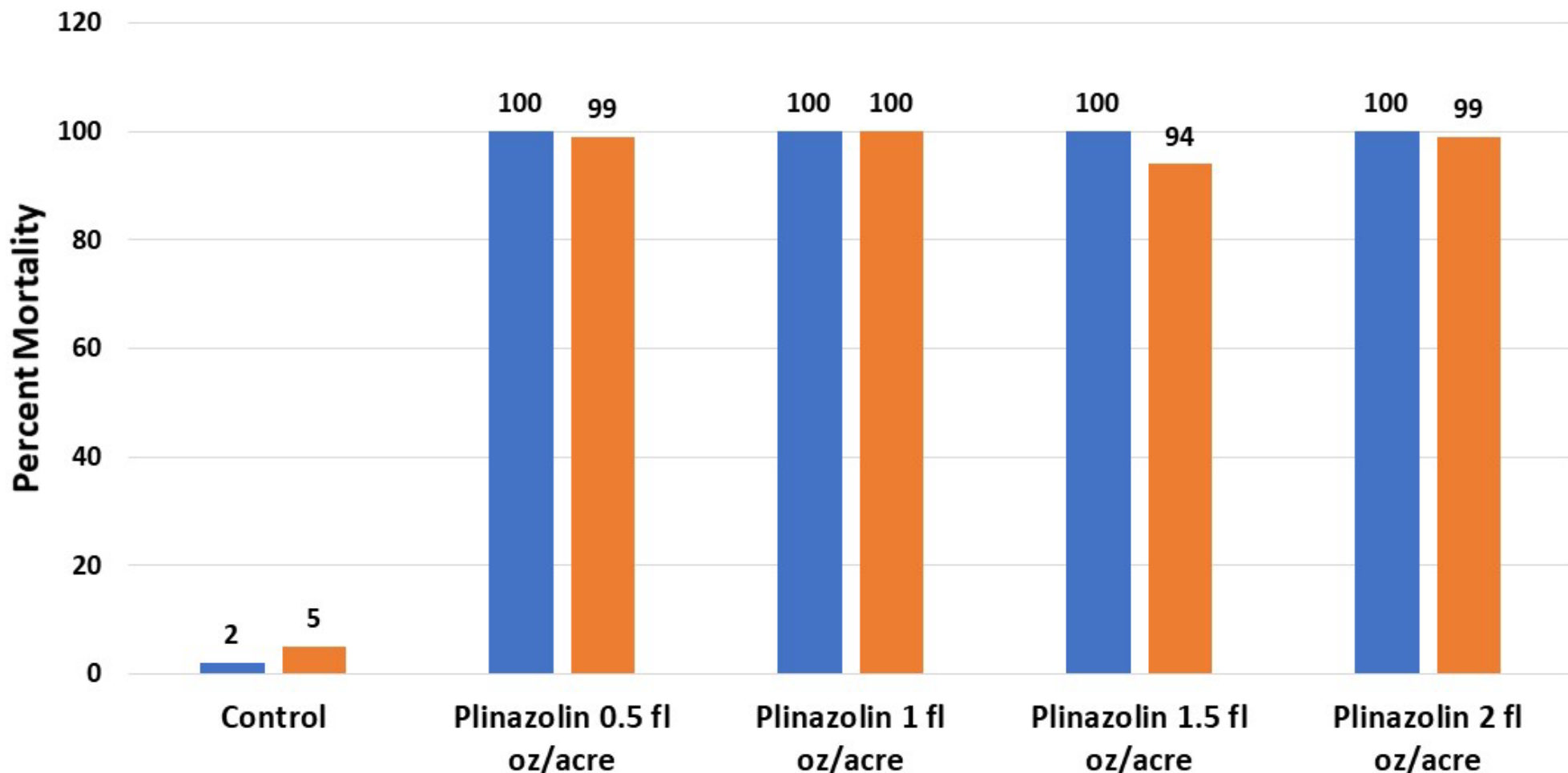
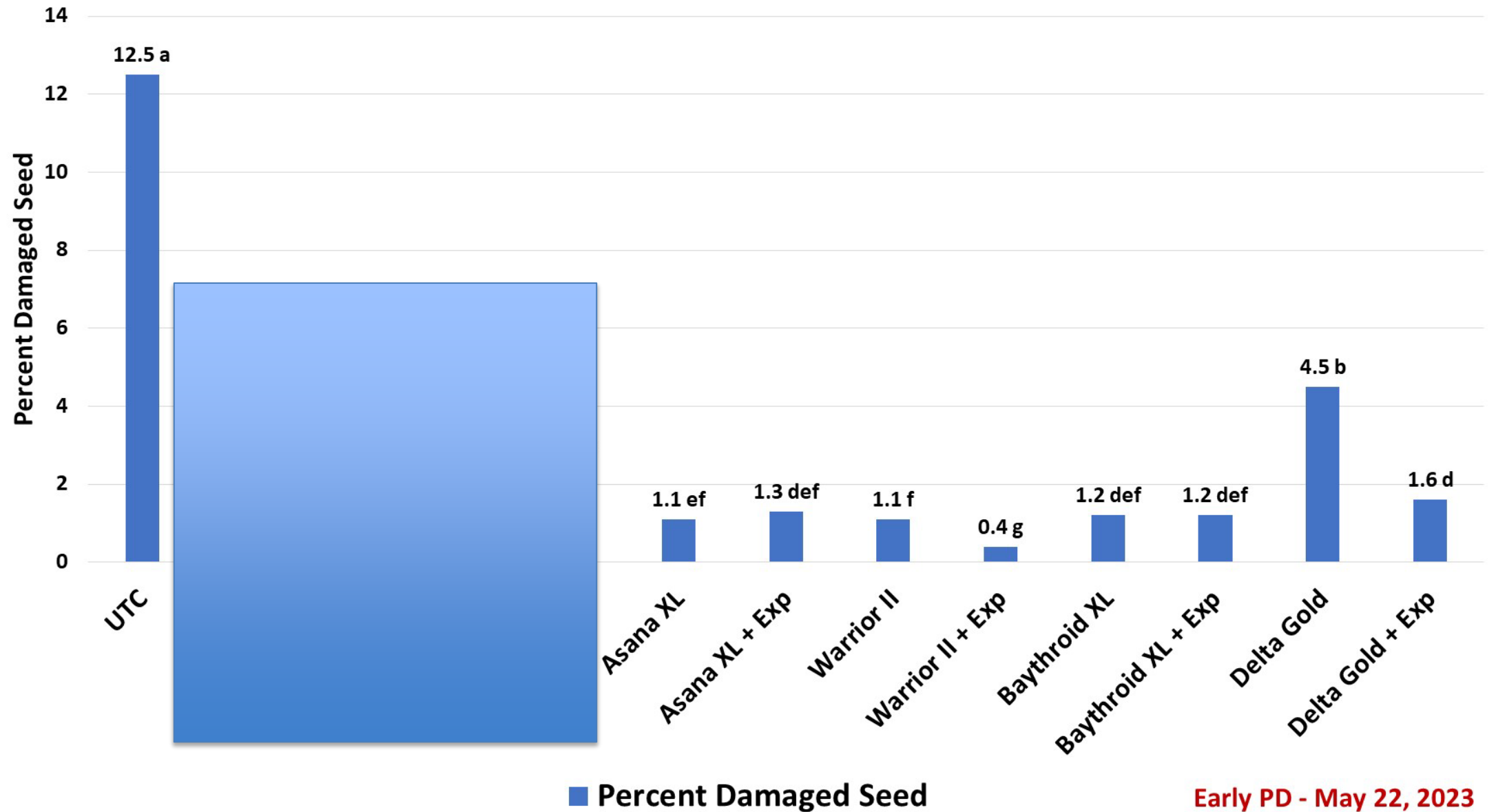


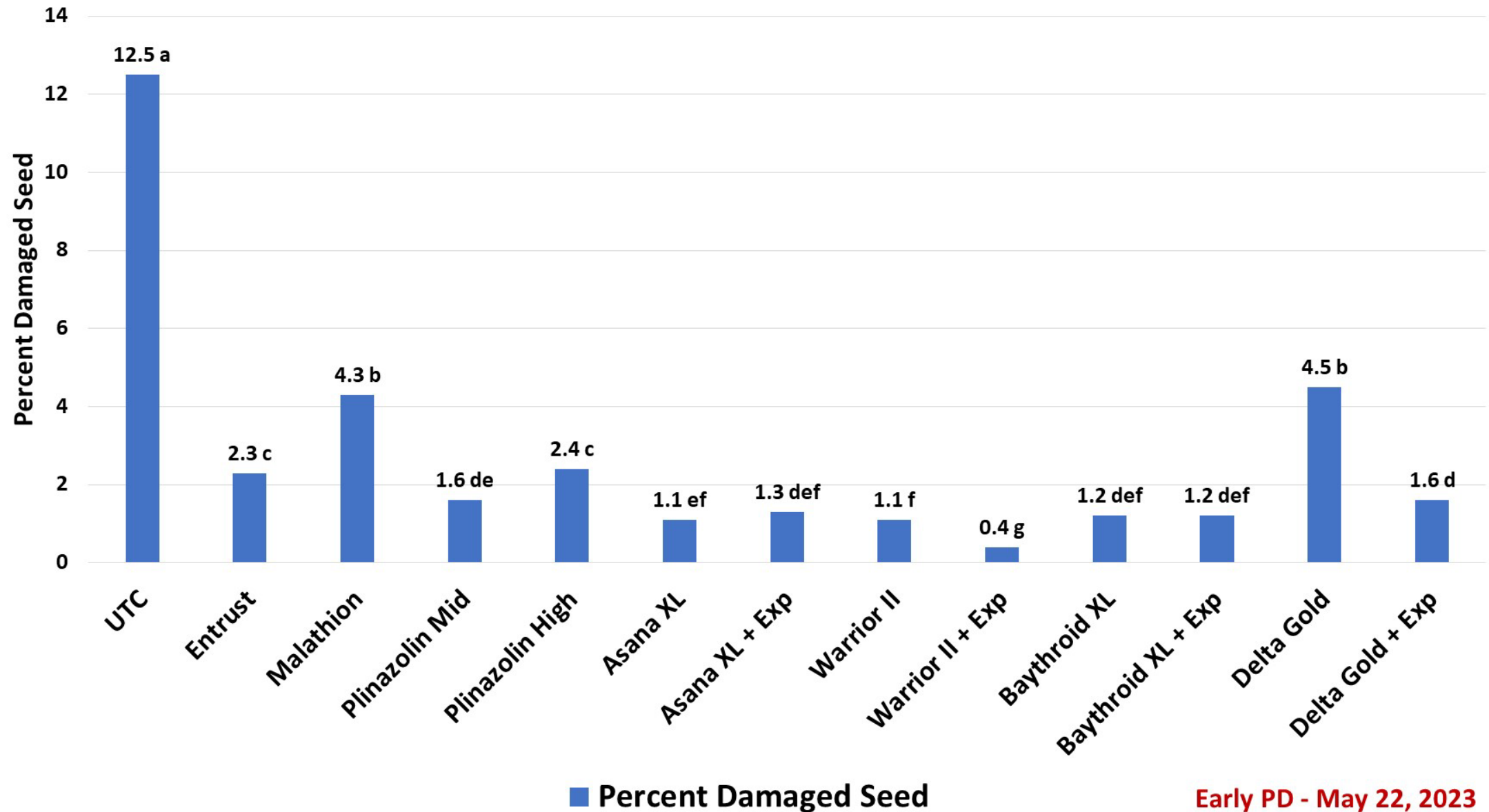
Photo by A. Hargens, SDSU

2023 NSA Insecticide Trial - Treatment Means for RSSW Percent Damaged Seed and Yield, Early Planting Date at Minot, ND



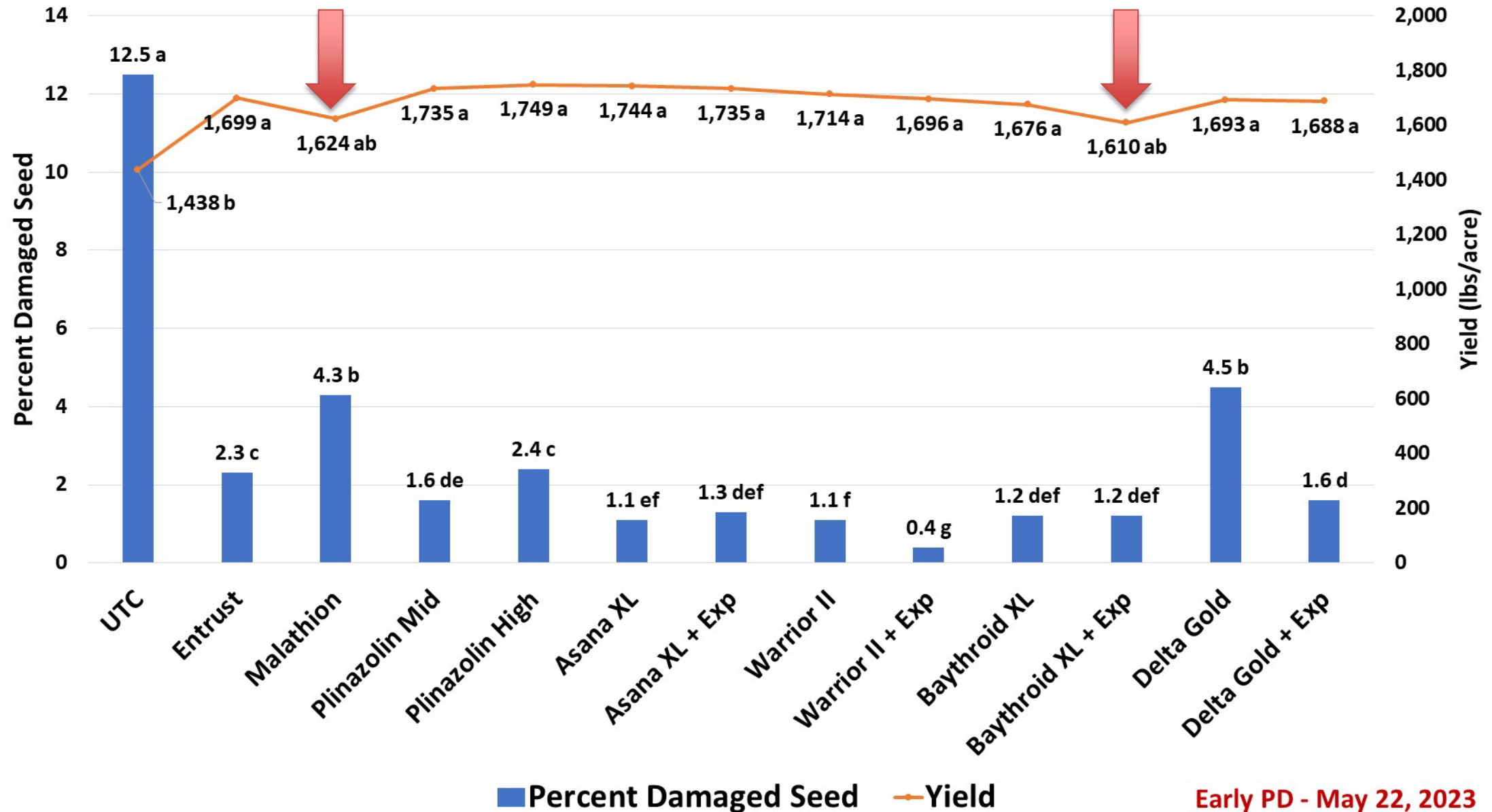
Early PD - May 22, 2023

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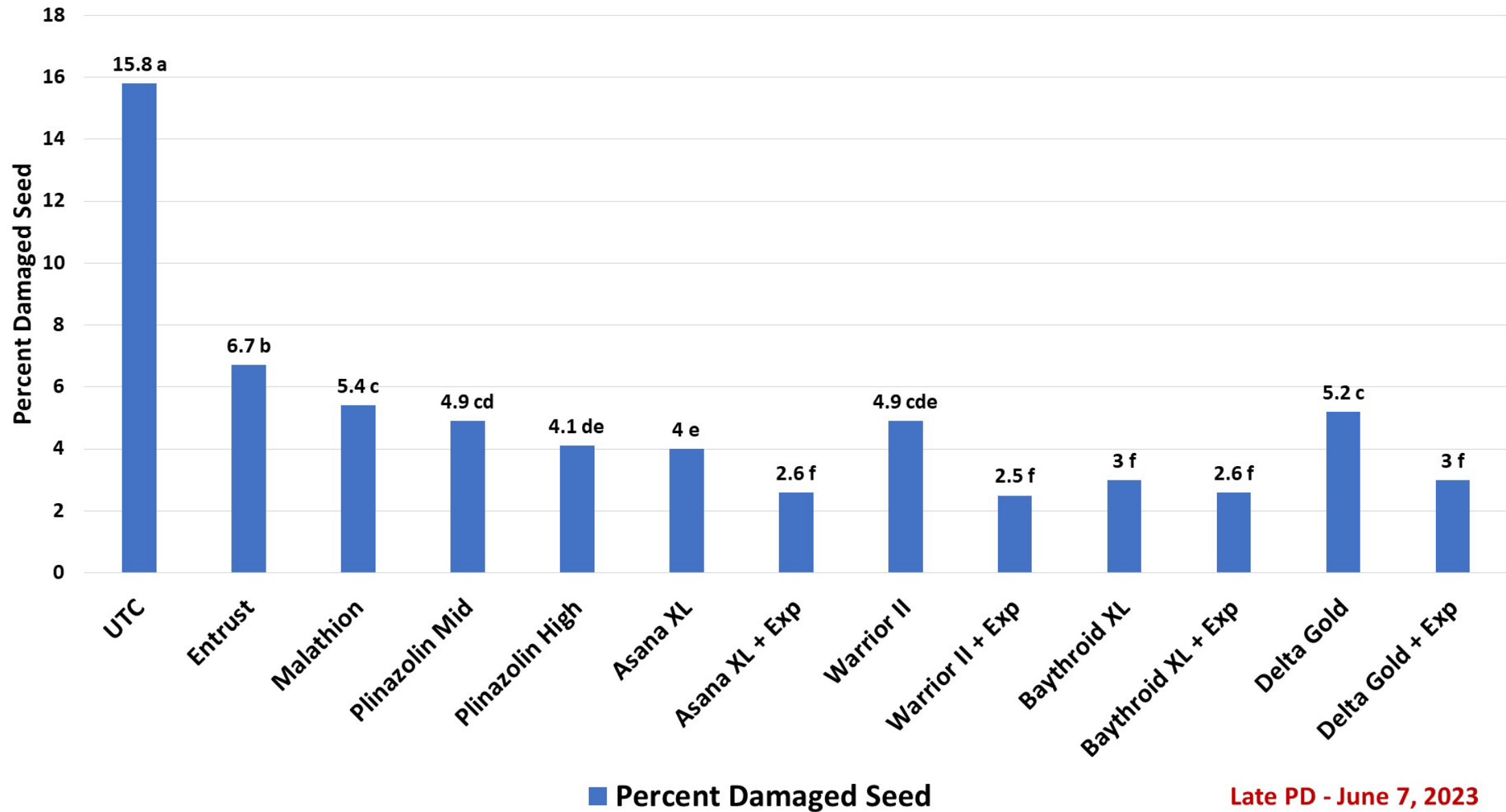


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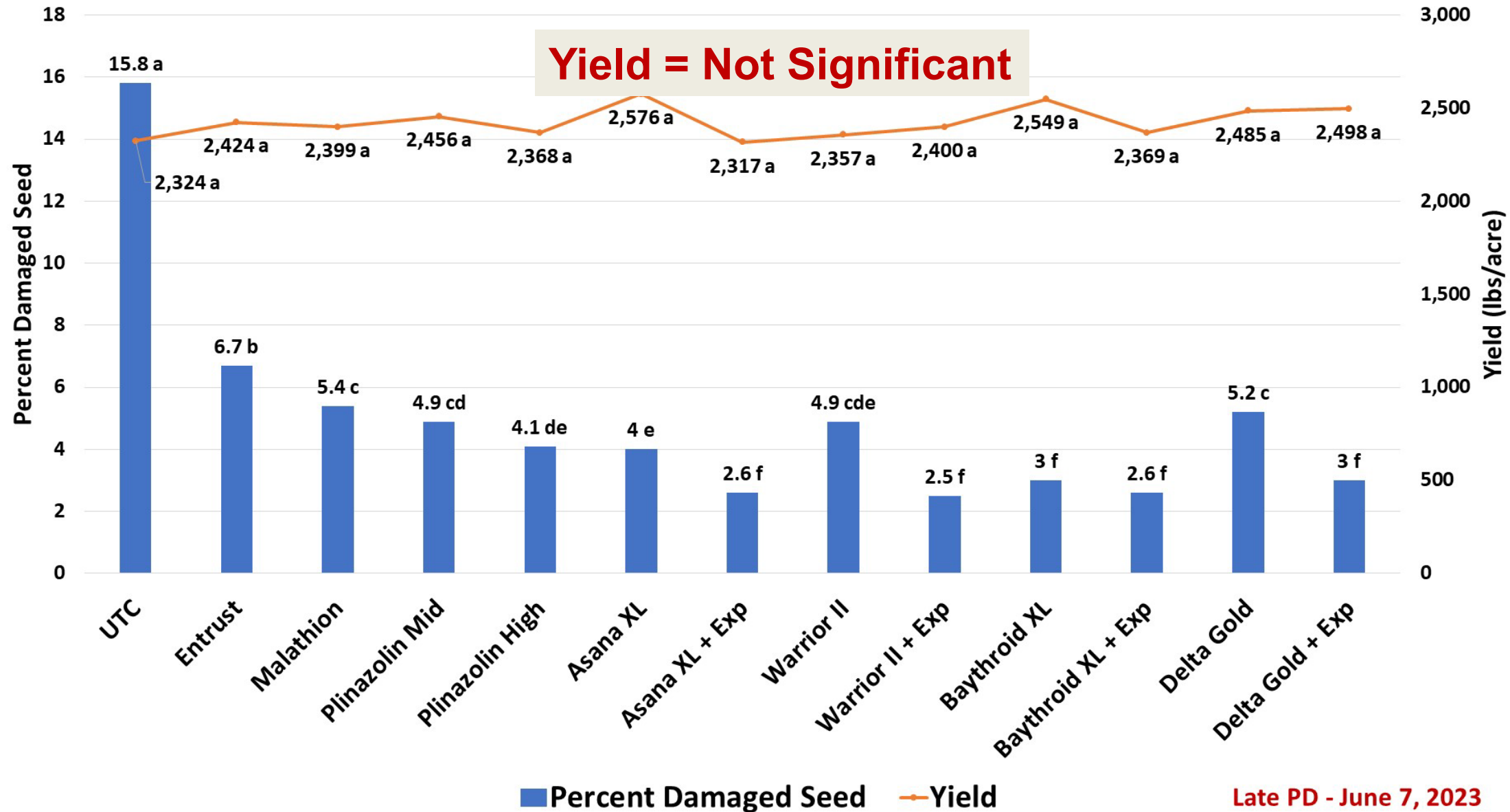


2023 NSA Insecticide Trial - Treatment Means for RSSW Percent Damaged Seed and Yield, Late Planting Date at Minot, ND



Late PD - June 7, 2023

2023 NSA Insecticide Trial - Treatment Means for RSSW Percent Damaged Seed and Yield, Late Planting Date at Minot, ND

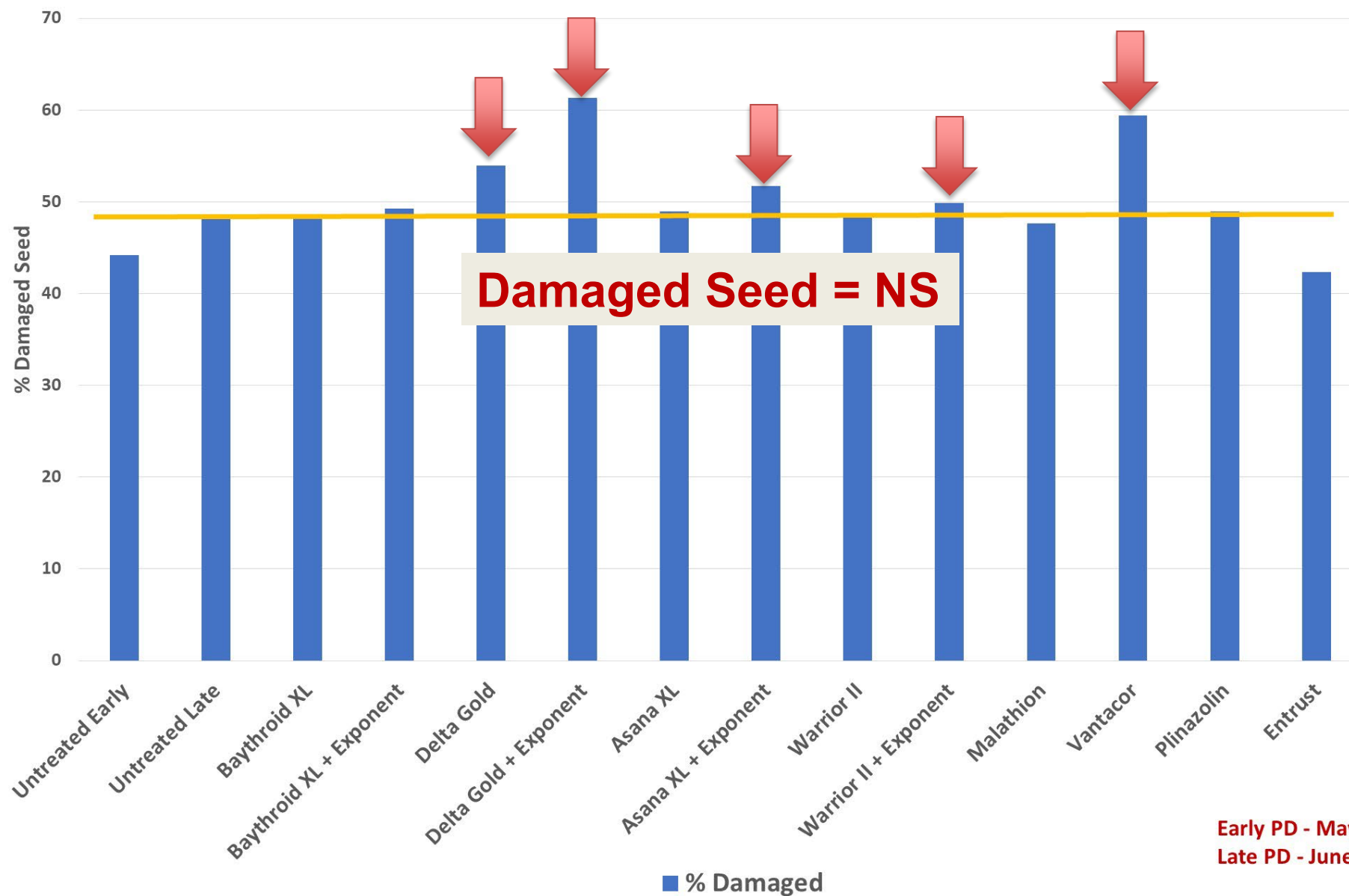


Late PD - June 7, 2023

North Dakota - RSSW (pyrethroid susceptible) Damaged Seed

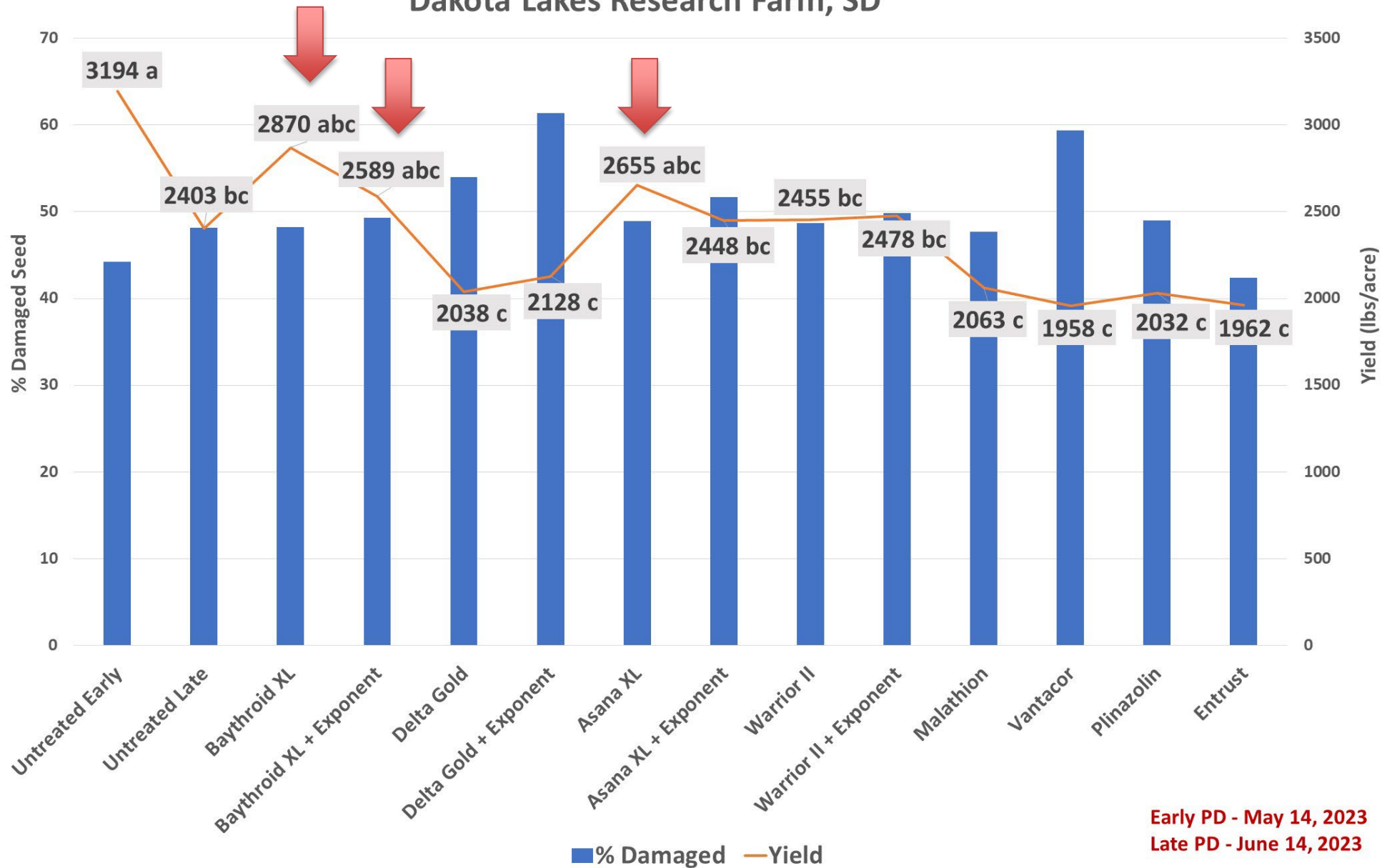


2023 NSA Insecticide Trial - Treatment Means for RSSW
Percent Damaged Seed and Yield, Late Planting Date at
Dakota Lakes Research Farm, SD



Early PD - May 14, 2023
Late PD - June 14, 2023

2023 NSA Insecticide Trial - Treatment Means for RSSW Percent Damaged Seed and Yield, Late Planting Date at Dakota Lakes Research Farm, SD



Early PD - May 14, 2023
Late PD - June 14, 2023

2023 NSA RSSW Insecticide Study



Insecticide	Rate (fl oz/acre)	Cost per fl oz	Cost/acre
Untreated check	-	\$ -	\$ -
Asana XL	9.6	\$ 0.60	\$ 5.76
Warrior II	1.92	\$ 3.08	\$ 5.91
Baythroid XL	2.8	\$ 3.17	\$ 8.88
Delta Gold	1.5	\$ 2.00	\$ 3.00
Asana XL + Exponent	9.6 + 8	\$5.76 + \$12.00	\$ 17.76
Warrior II + Exponent	1.92 + 5	\$5.91 + \$7.20	\$ 13.11
Baythroid XL + Exponent	2.8 + 3.5	\$8.88 + \$5.25	\$ 13.65
Delta Gold + Exponent	1.5 + 2.8	\$3.00 + \$4.20	\$ 7.20
Entrust	12	\$ 3.17	\$ 38.04
Malathion	32	\$ 0.59	\$ 18.88
Plinazolin Mid	1.03	UNK	
Plinazolin High	1.54	UNK	

2023 FMC RSSW Insecticide Study

- NDAES Agronomy Seed Farm, Casselton, ND
- NCREC, Minot, ND
- Dakota Lakes Research Farm, south of Pierre, SD
- Planting date – May 22 (ND); June 14 (SD)
- Yield – 10 heads per plot
 - Hand-threshed heads
 - 1,000 seeds per plot

2023 FMC RSSW Insecticide Study

Treatment	Rate	Group	IRAC MOA
Untreated Check			
Mustang Maxx	4 fl oz/a	Pyrethroid	3A
Vantacor	1.7 fl oz/a	Diamides	28
Steward EC	11.3 fl oz/a (2x)	Oxadiazine	22A
Steward EC	11.3 fl oz/a	Oxadiazine	22A
Steward EC	9.2 fl oz/a	Oxadiazine	22A

FMC – Steward EC



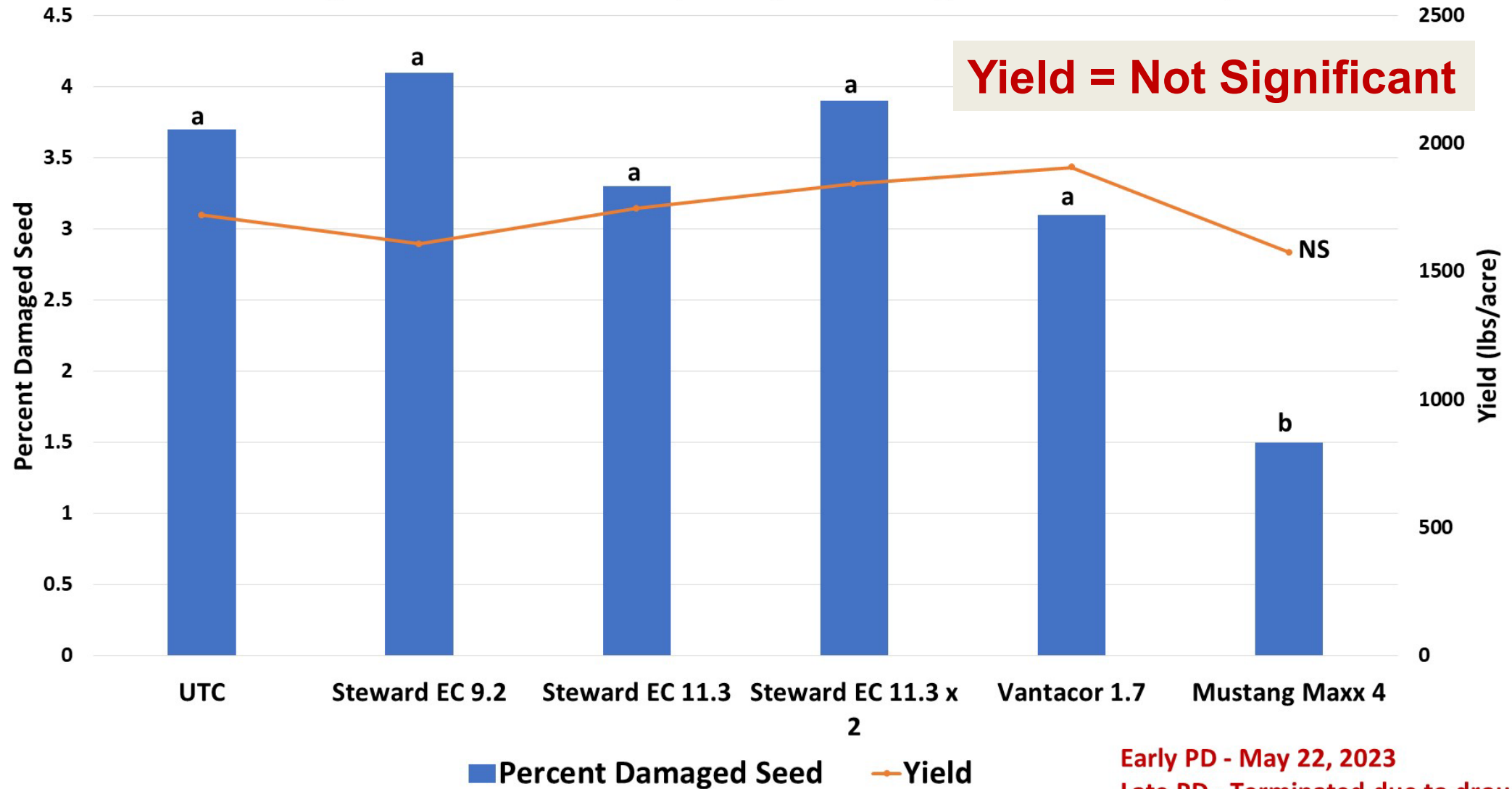
- FMC Corporate
- Active ingredient - Indoxacarb (22A)
- Controls Lepidopteran, beetles and weevils
 - Alfalfa weevil, corn rootworm beetles, numerous caterpillars
- Fast acting and long lasting (14 days of residual control)
- Rainfast within 2 hours
- Excellent fit in IPM and insect resistance management (IRM) programs

FMC – Vantacor

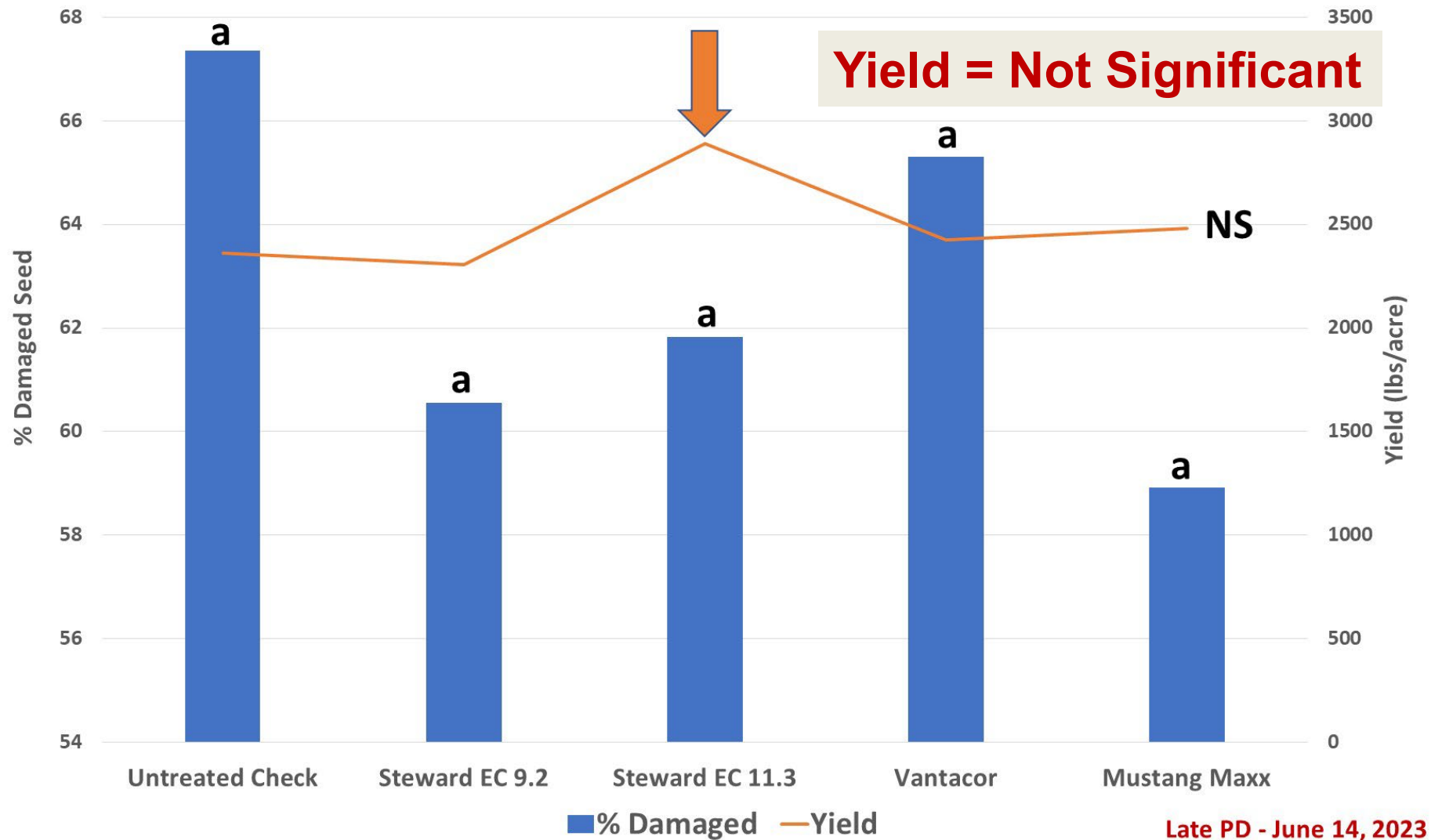


- FMC Corporate
 - A.I. Chlorantraniliprole (Diamides, IRAC group 28)
 - MOA – Muscle poison - *activate muscle ryanodine receptors, leading to contraction and paralysis*
 - Registered for foliar use in sunflower, soybean, corn, wheat and other crops
 - Above ground **lepidopteran caterpillars, and grasshoppers**
 - **Grasshoppers** - use MSO adjuvant at 1% v/v and target 2nd-3rd instars)

2023 FMC Insecticide Trial - Treatment Means for RSSW Percent Damaged Seed and Yield, Early Planting Date at Minot, ND



2023 FMC Insecticide Trial - Treatment Means for RSSW Percent Damaged Seed and Yield, Late Planting Date at Dakota Lakes Research Farm, SD



2023 FMC RSSW Insecticide Study



Insecticide	Rate (fl oz/acre)	Cost per fl oz	Cost/acre
Mustang Maxx	4	\$ 1.71	\$ 6.84
Vantacor	1.7	\$ 17.12	\$ 29.10
Steward EC	9.2	\$ 2.65	\$ 24.38
Steward EC	11.3	\$ 2.65	\$ 29.95
Steward EC	11.3 x2 apps	\$ 2.65	\$ 59.89

Red box indicates that products is NOT registered in sunflowers

Insecticide Summary - % Damaged Seed

Treatment	Rate (fl oz/acre)	Group	IRAC MOA	ND pyrethroid-susceptible RSSWs		SD pyrethroid-resistant RSSWs	
				Early planting	Late planting	Early planting	Late planting
Untreated check				12.5	15.8	44.2	48.1
Asana XL	9.6	Pyrethroid	3A	2.3	6.7		48.3
Warrior II	1.92	Pyrethroid	3A	4.3	5.4		49.3
Baythroid XL	2.8	Pyrethroid	3A	1.6	4.9		54.0
Delta Gold	1.5	Pyrethroid	3A	2.4	4.1		61.4
Asana XL + Exponent	9.6 + 8	Pyrethroid + EXP	3A	1.1	4		49.0
Warrior II + Exponent	1.92 + 5	Pyrethroid + EXP	3A	1.3	2.6		51.7
Baythroid XL + Exponent	2.8+ 3.5	Pyrethroid + EXP	3A	1.1	4.9		48.7
Delta Gold + Exponent	1.5 + 2.8	Pyrethroid + EXP	3A	0.4	2.5		49.9
Entrust	12	Spinosyns	5	1.2	3		47.7
Malathion	32	Organophosphate	1B	1.2	2.6		59.4
Plinazolin Mid	1.03	Isoxazolines	30	4.5	5.2		49.0
Plinazolin High	1.54	Isoxazolines	30	1.6	3		42.4
			<i>Average</i>	1.9	4.1		50.9

Insecticide Summary for RSSW Control



- Continue field efficacy testing in ND and SD in 2024
- Adjuvants to improve coverage and contact
- New Mode of Action
 - Not labeled in sunflower – Plinazolin Group 30, Entrust Group 5, Steward Group 22A
 - Labeled in sunflower (not tested)
 - Exirel Group 28 (cyantraniliprole, Lep caterpillars) Expensive \$29-86/acre
 - Besiege Group 28 (chlorantraniliprole + lambda-cyhalothrin, Lep caterpillars and grasshoppers) Moderately expensive \$13-20/acre



Chlorpyrifos Proposed Interim Decision

December 20, 2023

- 11 uses approved
 - Alfalfa, soybean, sugar beet, wheat (spring + winter)
- Represents about 55% of the total chlorpyrifos usage
- Sunflower NOT included
- Potential to obtain a Section 18 Emergency Exemption for RSSW in SD?
- Unknown product supply of Lorsban & generics?





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

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