Impact of insecticides on wireworms in sunflower

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What early season pests are problems?

- Wireworms

- Plant stand loss

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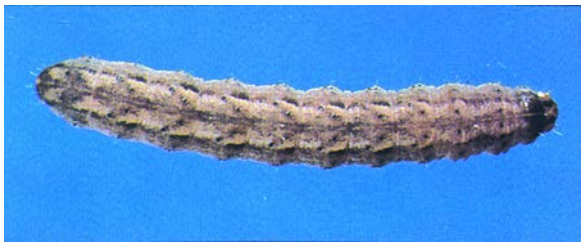
- Wireworms
- Seed corn maggots
- White grubs
- Palestriped flea beetle
- Cutworms



Current Solution to the Wireworms?

- Planting Date
  - Early is ideal
- Seeding Rate
  - If low wireworm populations are present, consider increasing seeding rate by 10%
- Insecticides
  - In-furrow or T-band insecticides
  - Insecticide seed treatments

The seed treatment problem

- Neonicotinoids
  - Systemic (imidacloprid, thiamethoxam)
  - May affect pollinators?
  - Soil insects are difficult to control!
    - Behavioral effect causing wireworms to be ‘repelled’ by neonicotinoid insecticide seed treatments

Sunflower Wireworm Question

Are insecticides in sunflower effective against wireworms for farmers in South Dakota, North Dakota and Kansas?

Experimental design

- Multi-state study with two locations in:
  - ND, KS, SD
- But, South Dakota not included in 2015
- And…Kansas not included in 2016

Experimental design: finding fields

- Searched or fields with wireworm history
- Sampled numerous fields

Experimental design

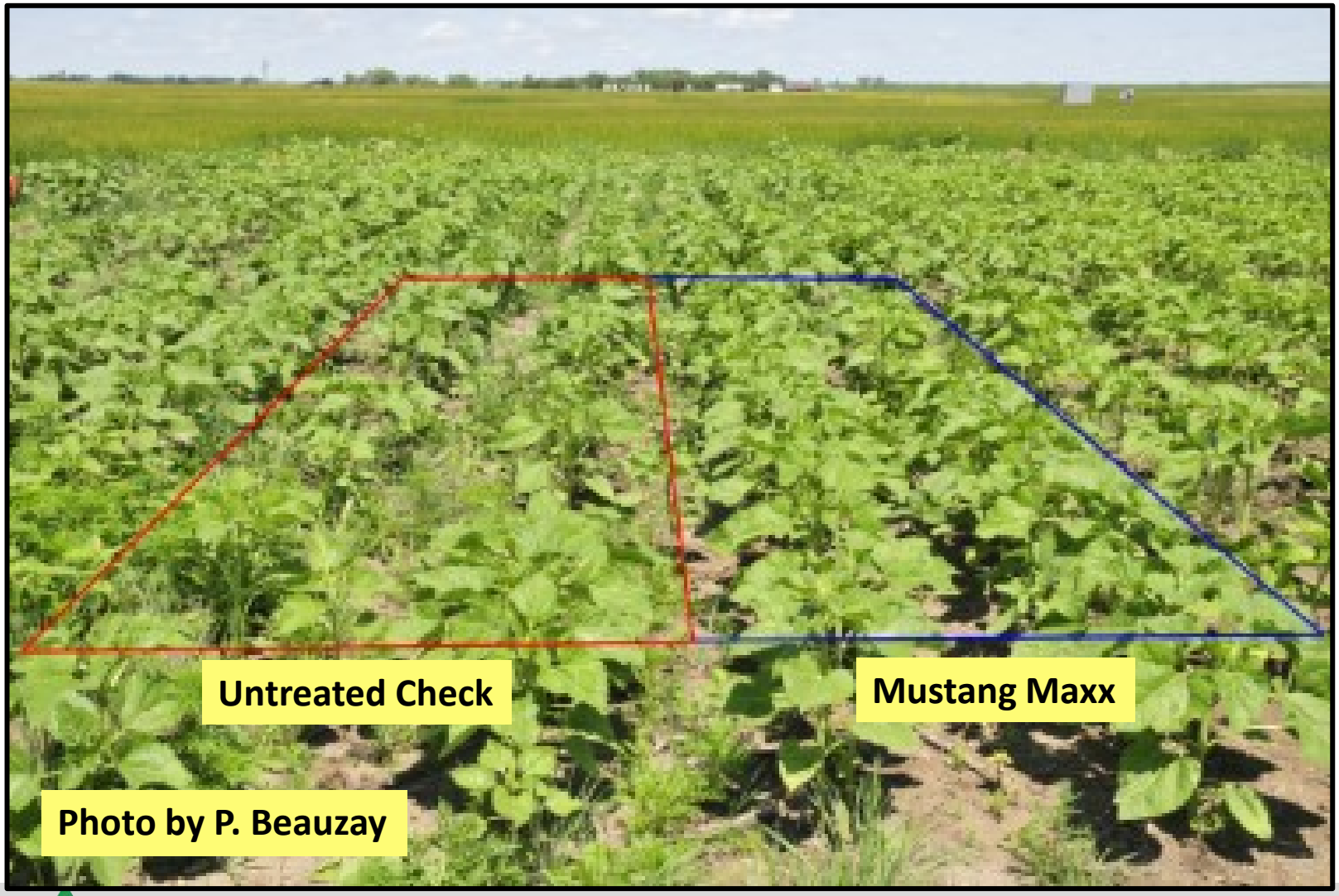
- Fields planted on mid-May to mid-June 2016
- Stand counts taken on 7, 14, 21 and 28 d
  - Counted plants in 10 feet of the middle two rows
- Root ratings at 28 d after planting
  - Dug five roots for the outer two rows
  - 0-10 (10 the worst) injury scale
- Harvested middle two rows for yield

Experimental design

- Six treatments:
  - Untreated control
  - Cruiser 5FS (0.25 mg/seed) seed treatment
  - Cruiser 5FS (0.375 mg/seed) seed treatment*
  - Mustang Maxx in-furrow (4 fl oz/acre)
  - Capture LFR in-furrow (8 fl oz/acre)*
  - Ethos XB in-furrow (8 fl oz/acre)*

** Not registered in sunflowers*

Treatments affected stand counts



Treatments affected stand counts

South Dakota Field 1

Treatment	Stand Counts
Untreated Check	23,813 ± 1,047
Cruiser 5FS @ 0.25mg/seed	25,555 ± 832
Cruiser 5FS @ 0.375mg/seed	24,394 ± 2,012
Mustang Maxx @ 4 fl oz/acre	25,555 ± 2,070
Capture LFR @ 8 fl oz/acre	25,555 ± 2,356
Ethos XB @ 8 fl oz/acre	27,007 ± 1,102

Treatments affected stand counts

South Dakota Field 2

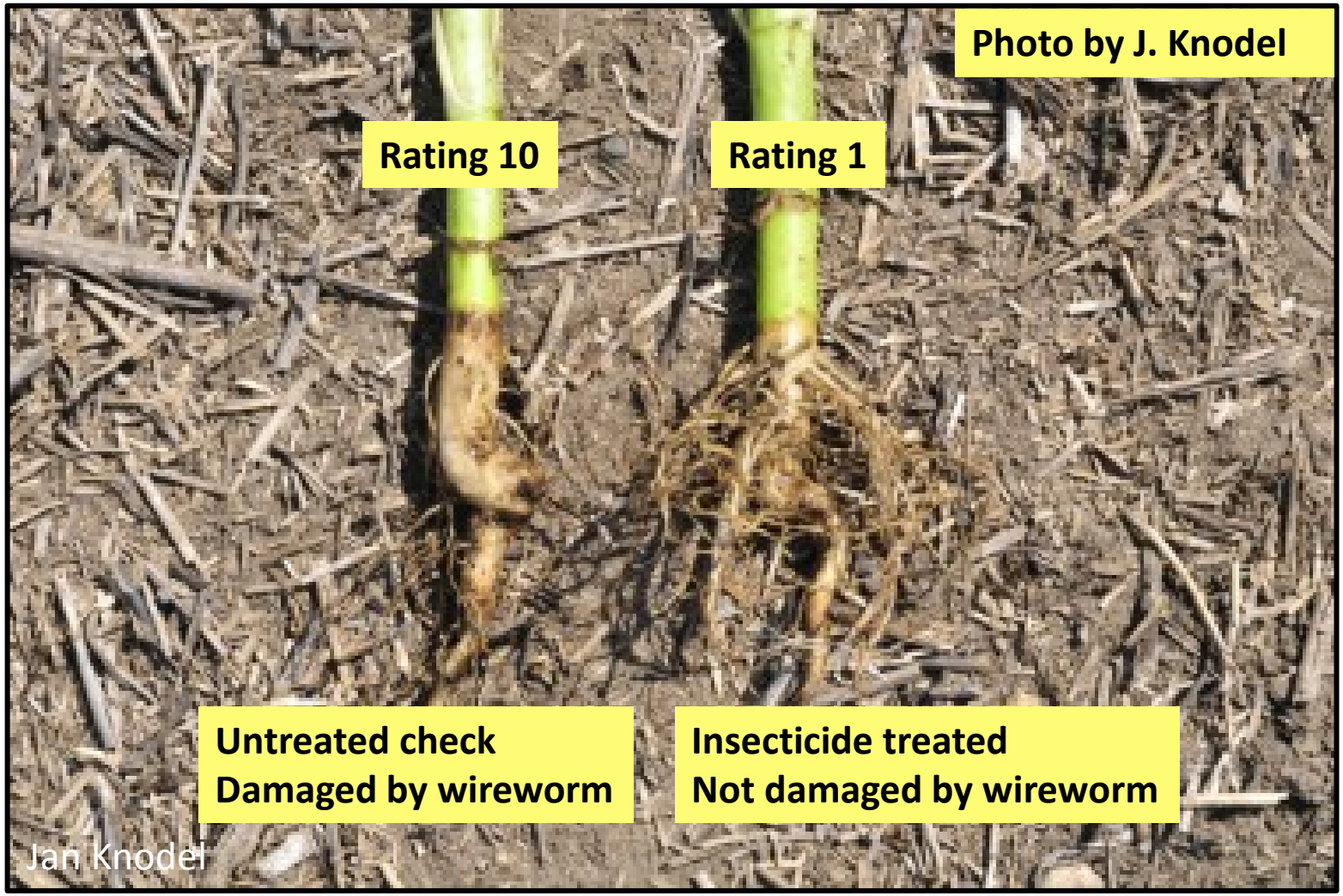
Treatment	Stand Counts
Untreated Check	23,813 ± 1,047
Cruiser 5FS @ 0.25mg/seed	25,555 ± 832
Cruiser 5FS @ 0.375mg/seed	24,394 ± 2,012
Mustang Maxx @ 4 fl oz/acre	25,555 ± 2,070
Capture LFR @ 8 fl oz/acre	25,555 ± 2,356
Ethos XB @ 8 fl oz/acre	27,007 ± 1,102

Treatments affected stand counts

North Dakota

Treatment	Stand Counts
Untreated Check	14,288 ± 1,025b
Cruiser 5FS @ 0.25mg/seed	16,466 ± 864ab
Cruiser 5FS @ 0.375mg/seed	16,727 ± 910ab
Mustang Maxx @ 4 fl oz/acre	18,731 ± 729a
Capture LFR @ 8 fl oz/acre	17,163 ± 749a
Ethos XB @ 8 fl oz/acre	18,469 ± 762a

Treatments affected Root Ratings



Treatments affected Root Ratings

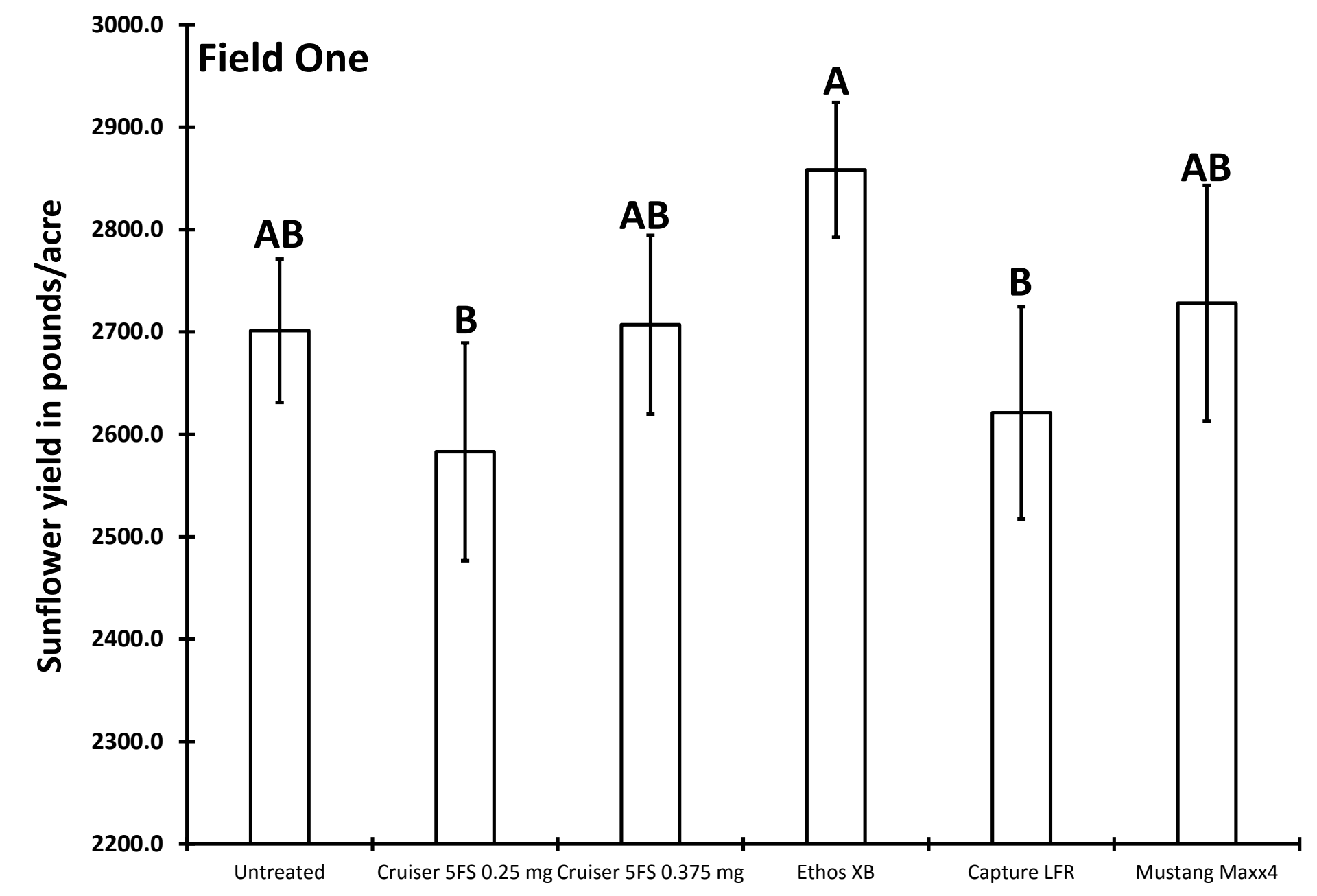
South Dakota

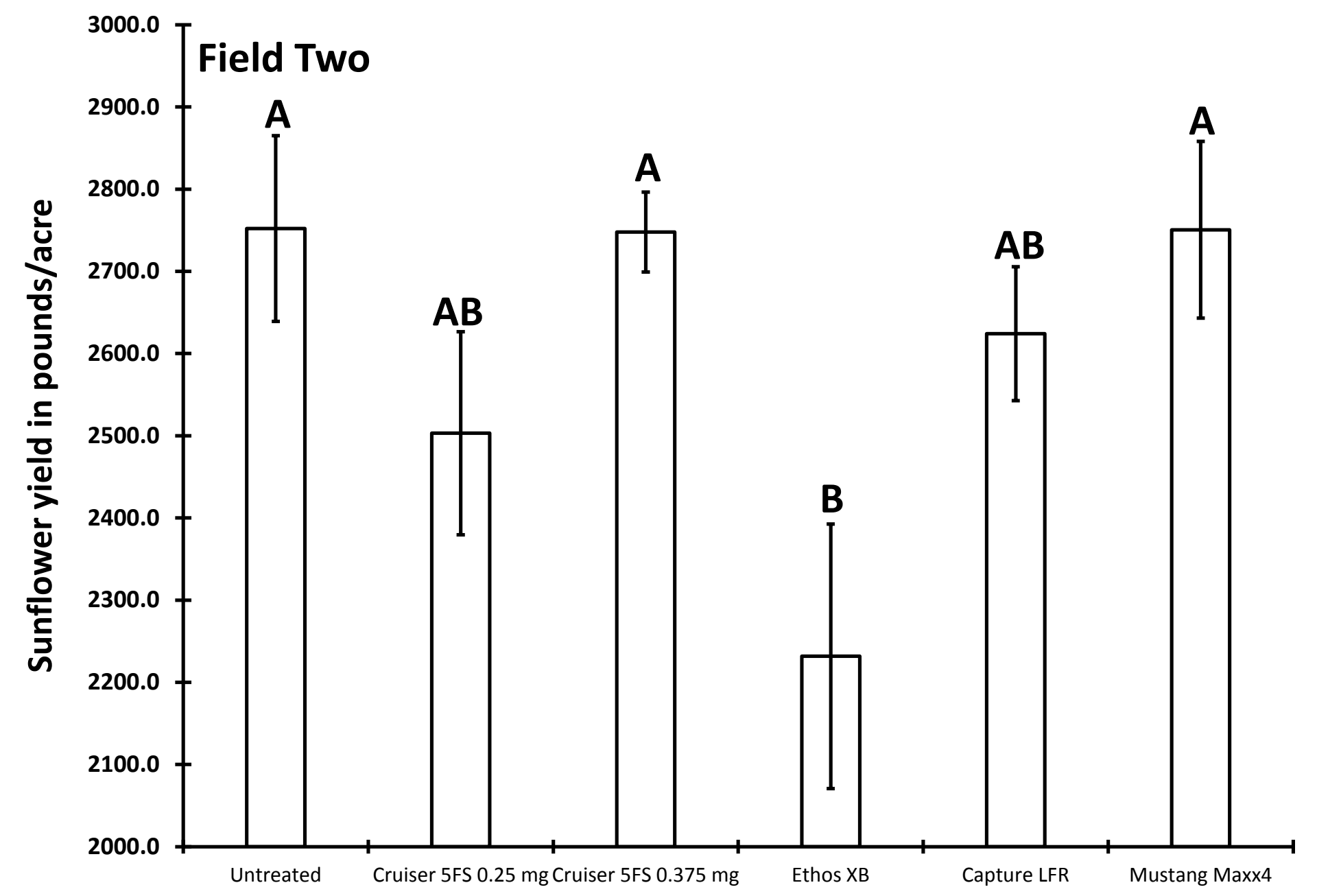
Treatment	Root Injury Rating (0-10)
Untreated Check	5.1 ± 0.21a
Cruiser 5FS @ 0.25mg/seed	4.75 ± 0.13ab
Cruiser 5FS @ 0.375mg/seed	4.55 ± 0.08b
Mustang Maxx @ 4 fl oz/acre	4.38 ± 0.07b
Capture LFR @ 8 fl oz/acre	4.55 ± 0.23b
Ethos XB @ 8 fl oz/acre	4.5 ± 0.15b

Treatments affected Root Ratings

North Dakota

Treatment	Root Injury Rating (0-10)
Untreated Check	2.38 ± 0.11a
Cruiser 5FS @ 0.25mg/seed	1.48 ± 0.1bc
Cruiser 5FS @ 0.375mg/seed	1.36 ± 0.07c
Mustang Maxx @ 4 fl oz/acre	1.54 ± 0.09bc
Capture LFR @ 8 fl oz/acre	1.6 ± 0.03b
Ethos XB @ 8 fl oz/acre	1.64 ± 0.07b





Conclusions

- In-furrow insecticides and insecticide seed treatments tested reduced wireworm damage and improved stand counts.
- Future Direction – test ‘new’ active ingredients for efficacy against wireworms in sunflower.

SDSU Extension

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Thank you NSA!