

Pest Management Update on Sunflower Midge



Janet Knodel¹, Patrick Beauzay¹, Anitha Chirumamilla¹,
Larry Charlet (Retired)² and Theresa Gross²

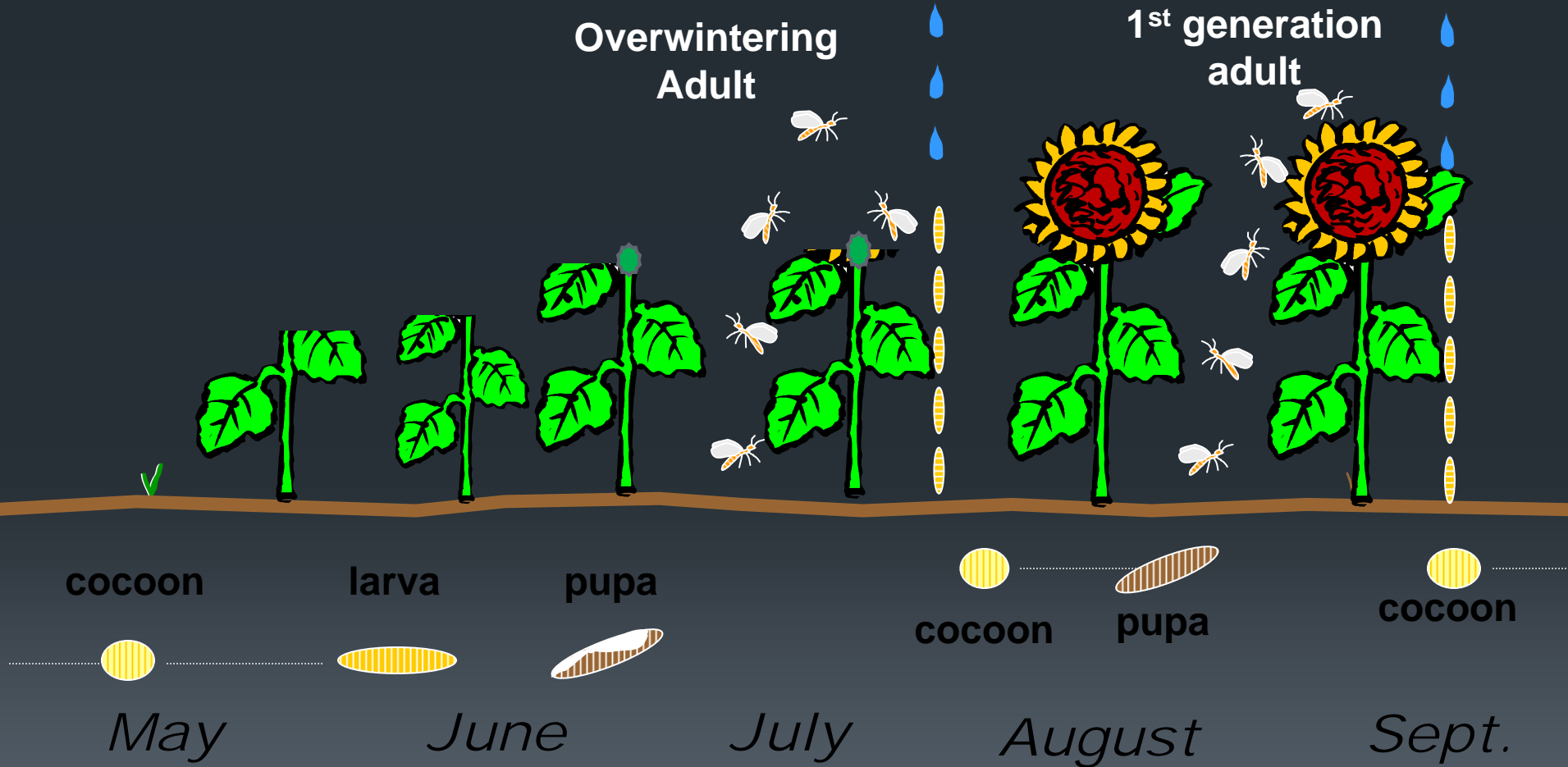
¹NDSU, Dept. of Entomology, Fargo, ND

²USDA-ARS, Sunflower Unit, Fargo, ND



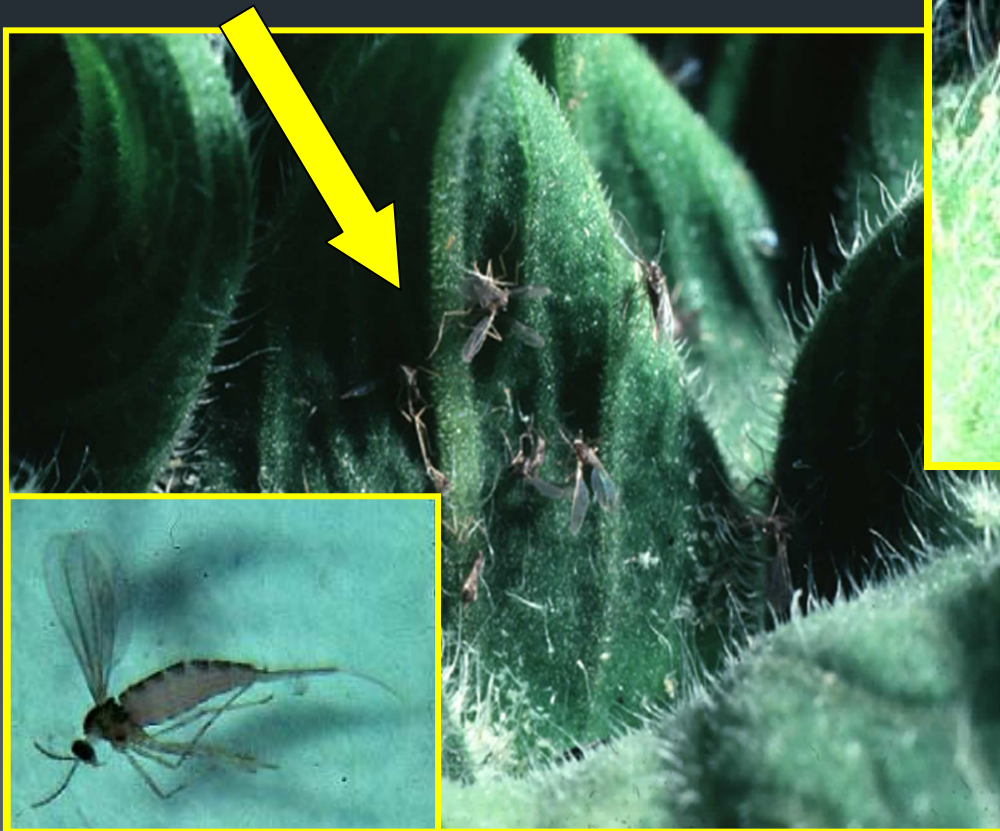
Sunflower Midge – Life Cycle

Contarinia schulzi



Sunflower Midge - Description

Adults



Eggs



Sunflower Midge larval feeding injury to developing bud



Midge Bracken Scale – 0 to 5

- 0 – No damage
- 1 – Bract damage evident



Bracken, G.K. 1991. A damage index for estimating yield loss in sunflowers caused by sunflower midge. Can. J. Plant Sci. 71:81-85.

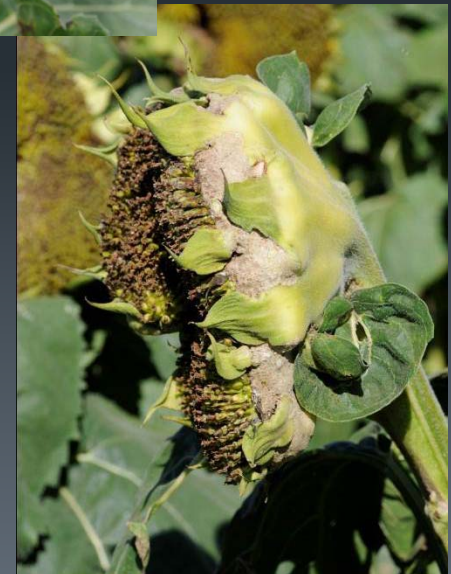
Midge Bracken Scale

- 0 – No damage
- 1 – Bract damage evident
- 2 – Light cupping, receptacle thickening



Midge Bracken Scale

- 0 – No damage
- 1 – Bract damage evident
- 2 – Light cupping, receptacle thickening
- 3 – Moderate cupping, receptacle thickening $\frac{1}{2}$ head diameter



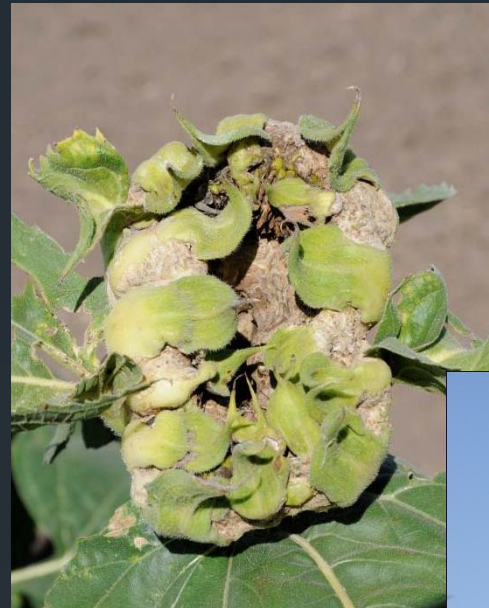
Midge Bracken Scale

- 0 – No damage
- 1 – Bract damage evident
- 2 – Light cupping, receptacle thickening
- 3 – Moderate cupping, receptacle thickening $\frac{1}{2}$ head diameter
- 4 – Extreme cupping to central hole, receptacle thickening $> \frac{1}{2}$ head diameter



Midge Bracken Scale

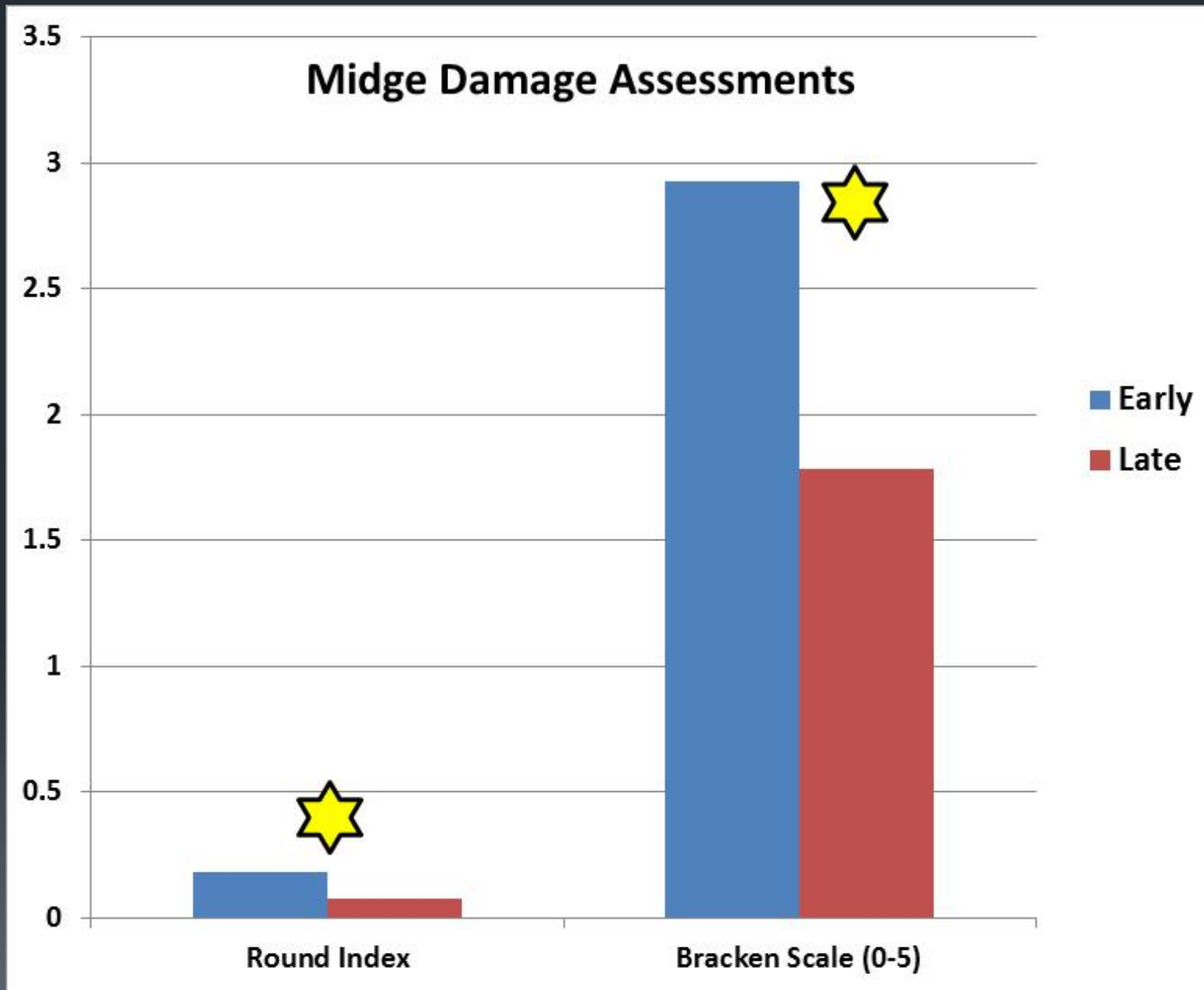
- 0 – No damage
- 1 – Bract damage evident
- 2 – Light cupping, receptacle thickening
- 3 – Moderate cupping, receptacle thickening $\frac{1}{2}$ head diameter
- 4 – Extreme cupping to central hole, receptacle thickening $> \frac{1}{2}$ head diameter
- 5 – Head closed & no seeds



2010 Planting Date Study

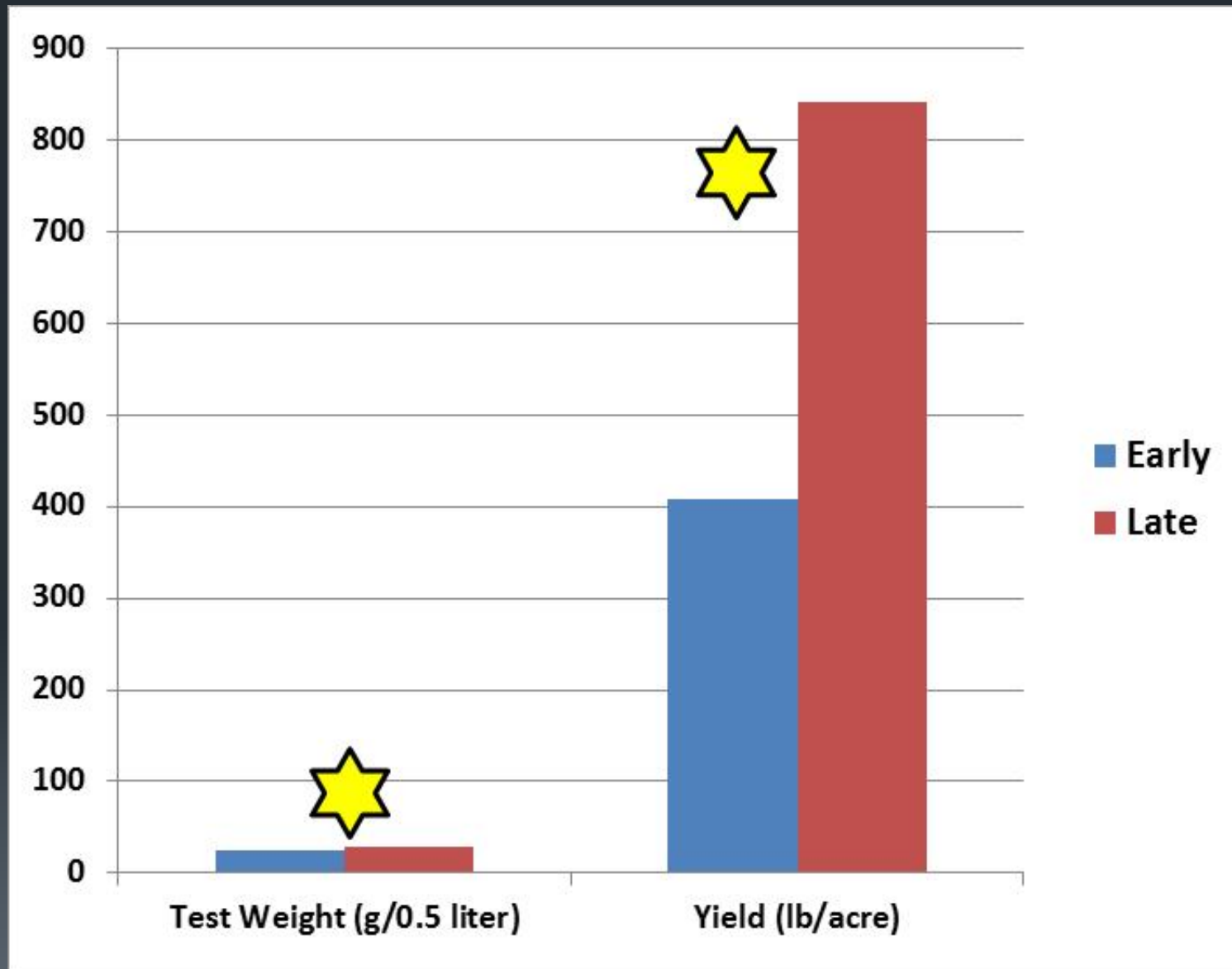
- Carrington REC – Blaine Schatz
- Early planting date – May 26
- Late planting date - June 8
- Cultivar NK 2930 NS-DM (Syngenta Crop Protection)
- RCB design, 6 reps
- Plots – 20 ft wide by 30 ft long
- 8 rows with 30-inch row spacing
- 20,000 live seeds per acre
- Rated using Bracken Scale and Round Index
- Assessed test weight and yield





Fisher's LSD; $P \leq 0.05$

Carrington REC 2010



Fisher's LSD; $P \leq 0.05$

Carrington REC 2010

Early

Late



2010 Insecticide Timing & Mode of Action Study



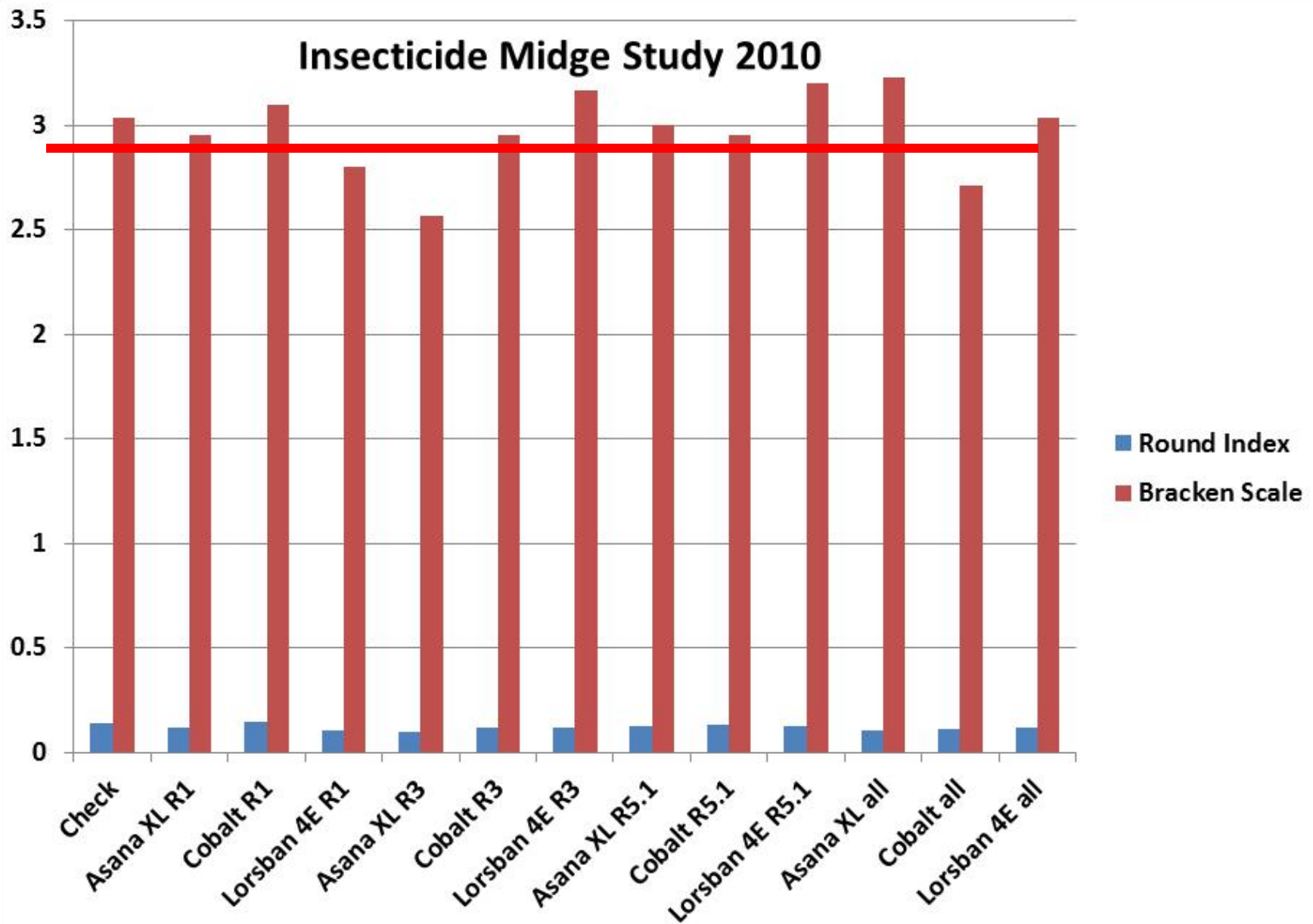
- Carrington REC – Blaine Schatz
- Planting date – May 26
- Cultivar NK 2930 NS-DM (Syngenta Crop Protection)
- RCB design, 4 reps
- Plots – 10 ft wide by 30 ft long
- 8 rows with 30-inch row spacing
- 20,000 live seeds per acre
- Rated for Midge Bracken Scale and Round Index
- Yield

Treatments



- Insecticide timing:
 - R1 (bud)
 - R3 (bud elongates >2 cm above nearest leaf)
 - R5.1 (10% of disk flowers open)
 - R1, R3, R5.1
- Modes of Actions:
 - Pyrethroid – esfenvalerate
 - Asana XL at 5.8 fl oz per acre
 - Organophosphate – chlorpyrifos
 - Lorsban 4E at 16 fl oz per acre
 - OP & Pyrethroid – chlorpyrifos + gamma-cyhalothrin
 - Cobalt at 19 fl oz per acre

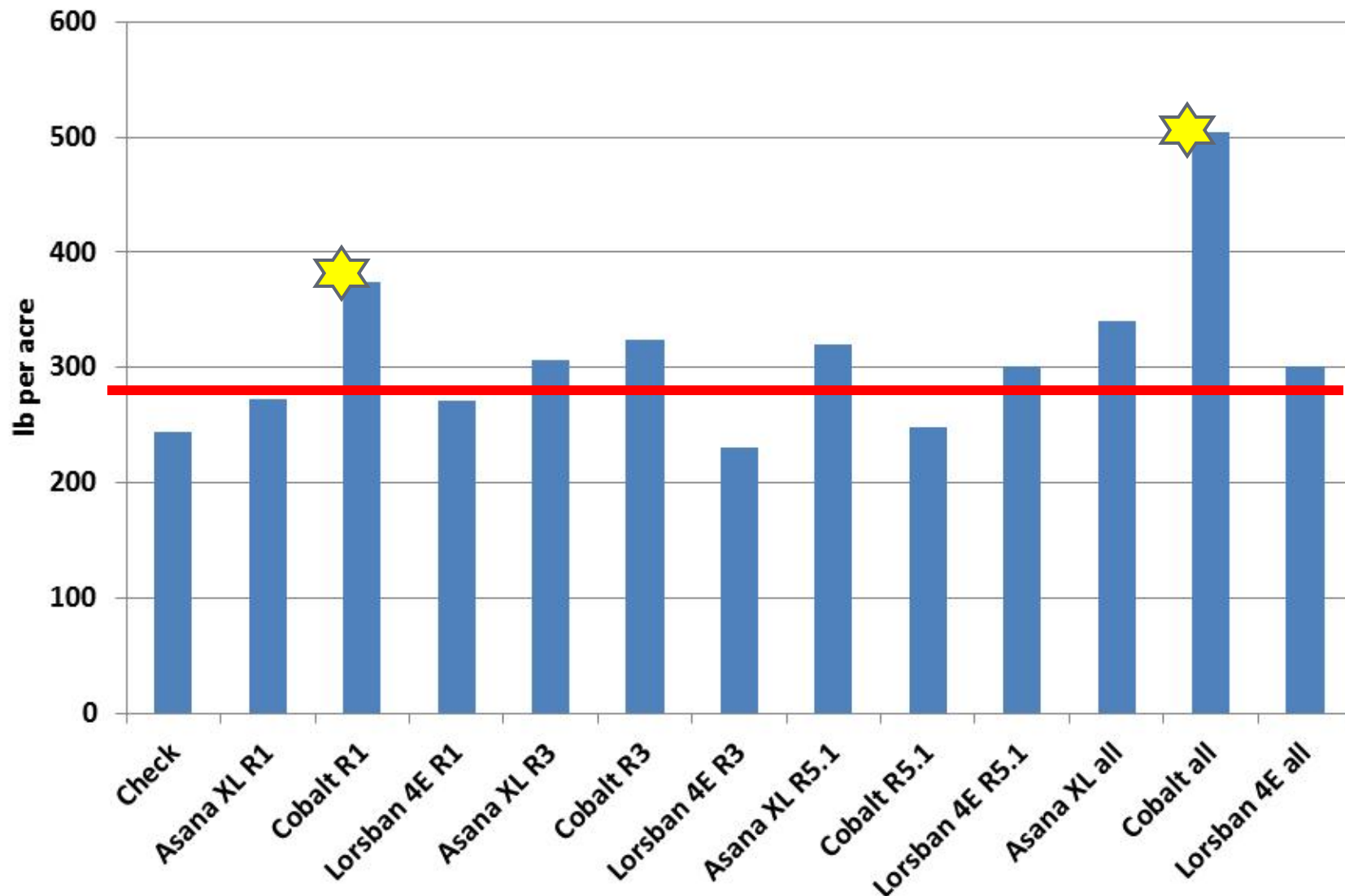
Insecticide Midge Study 2010



Fisher's LSD; $P \leq 0.05$

Carrington REC 2010

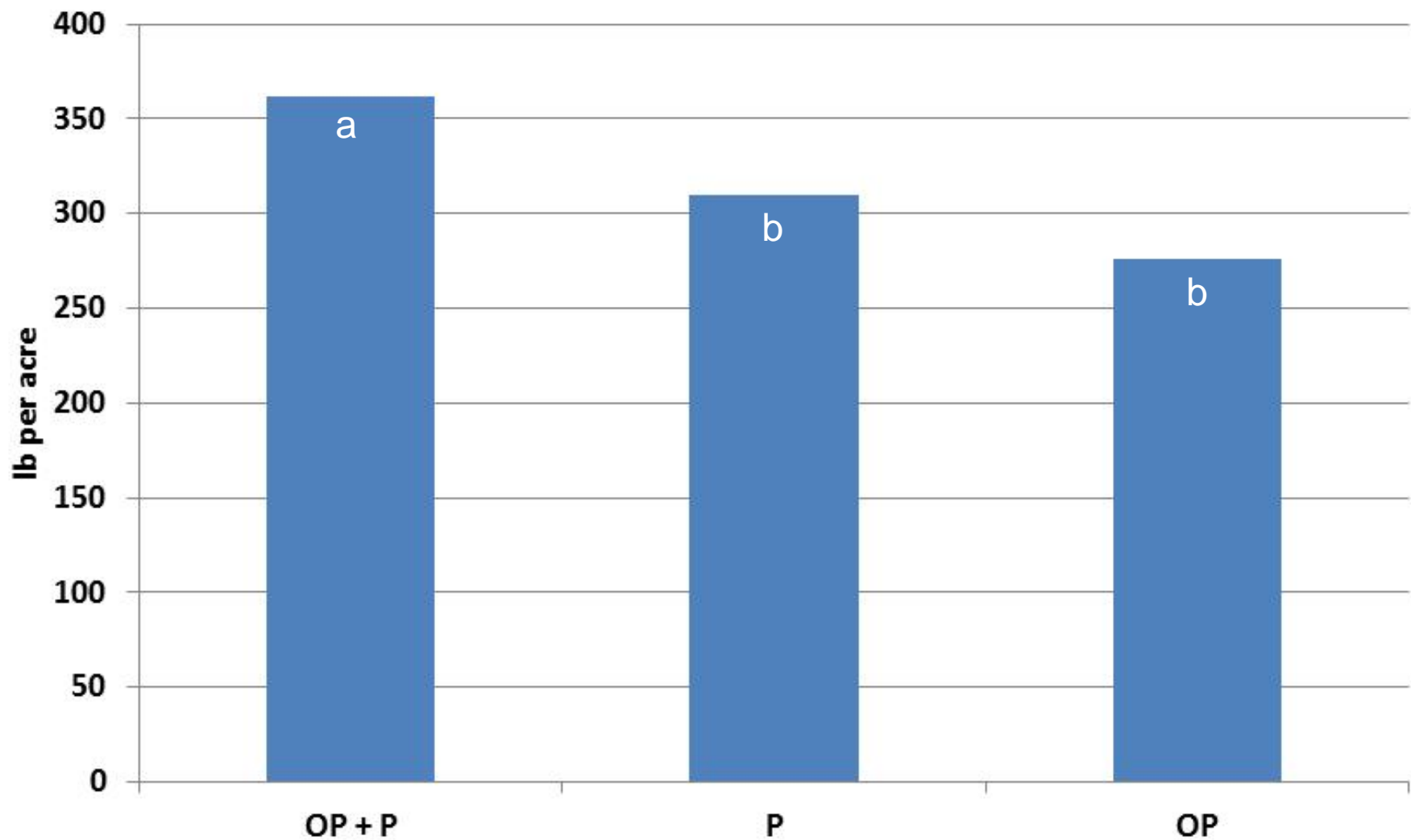
Sunflower Midge Insecticide Study Yield (lb/acre)



Fisher's LSD; $P \leq 0.05$

Carrington REC 2010

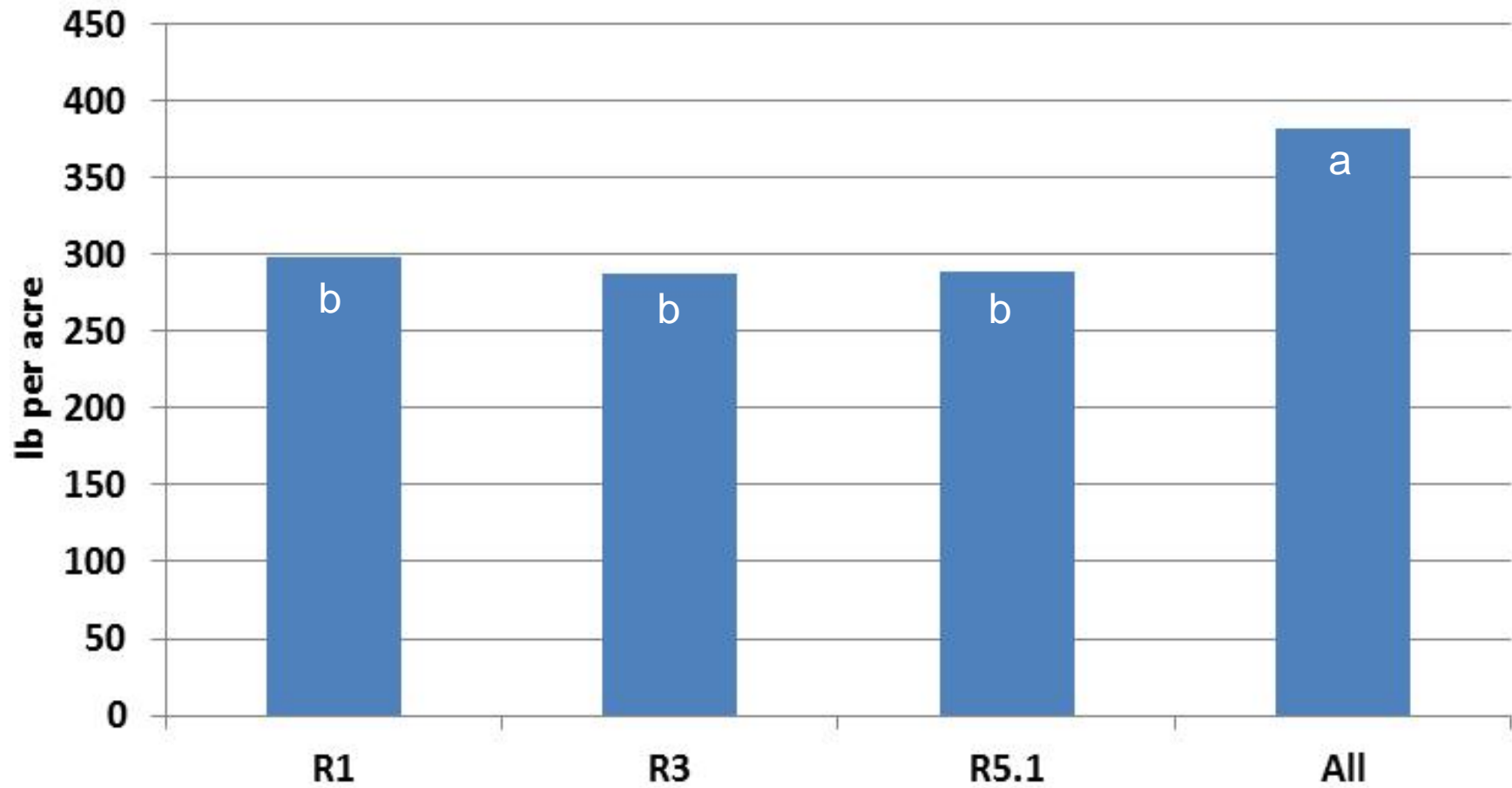
Sunflower Midge Insecticide Mode of Action - Yield



Factorial Model ANOVA, Fisher's LSD; $P \leq 0.05$

Carrington REC 2010

Sunflower Midge Insecticide Timing Yield



Factorial Model ANOVA, Fisher's LSD; $P \leq 0.05$

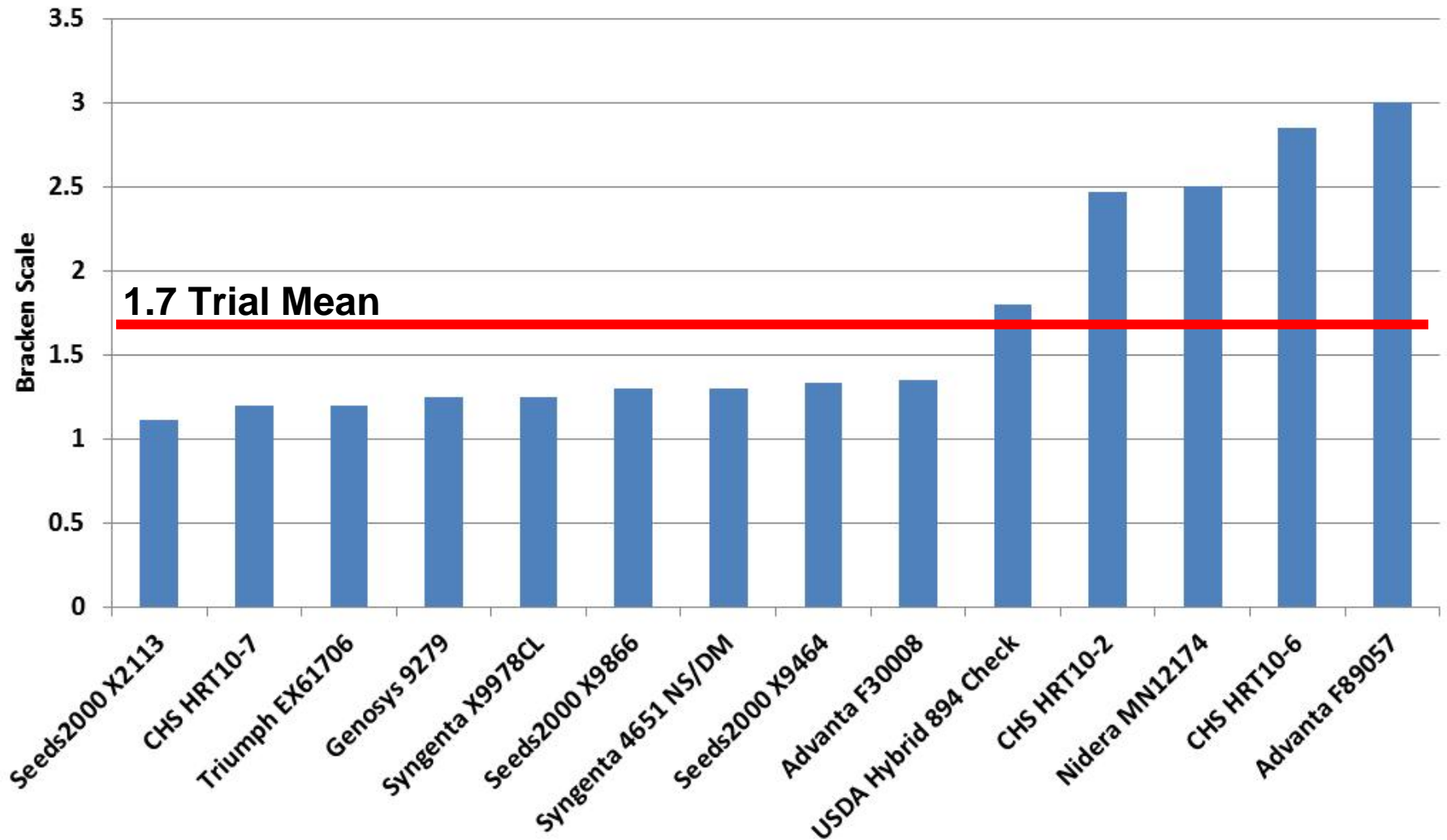
Carrington REC 2010

2010 Sunflower Midge Hybrid Evaluation

- **Mapleton**
 - Nursery located in area that has had midge damage for 20+ years
 - Early planting date to ensure infestation.
 - RCB design, 4 reps, Single row plots
 - 71 hybrids
 - Heads evaluated after flowering for visible damage by midge larval feeding.
 - 30 August
 - 5 plants per row
 - 20 total per hybrid
 - Bracken Scale (0-5)



Sunflower Midge Hybrid Evaluation - Mapleton 2010



Range of 1.11 to 3.00; 48% had score of <1.5

Fisher's LSD; $P \leq 0.05$

Sunflower Midge Management

- Use tolerant hybrids
- Use a late planting date
 - Stagger budding dates
- Insecticides tested are ineffective
 - Long emergence period of adult midge
 - Sunflower buds susceptible for 3 weeks
- Weather – soil moisture
 - Carrington had 1.63 inches of rain on 17 June 2010 (111% of normal rainfall)
- “Midge” area
 - Most midge survive and move to nearby field

Sunflower Midge Art

