



**Biology and Management of  
Sunflower Seed Maggot in the  
Northern Great Plains**

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# Sunflower Seed Maggot – *Neotephritis finalis*

- A head feeding insect
- Diptera: Tephritidae
- An emerging pest in North Dakota
- A serious pest in some parts of US and Canada
- In 1970s- Most destructive pest in north Georgia



# Damage

- Caused by larvae (maggots)
- Newly hatched larvae tunnel through the young ovarian walls and destroy seeds
- Mature larvae feed on older heads





# Objectives

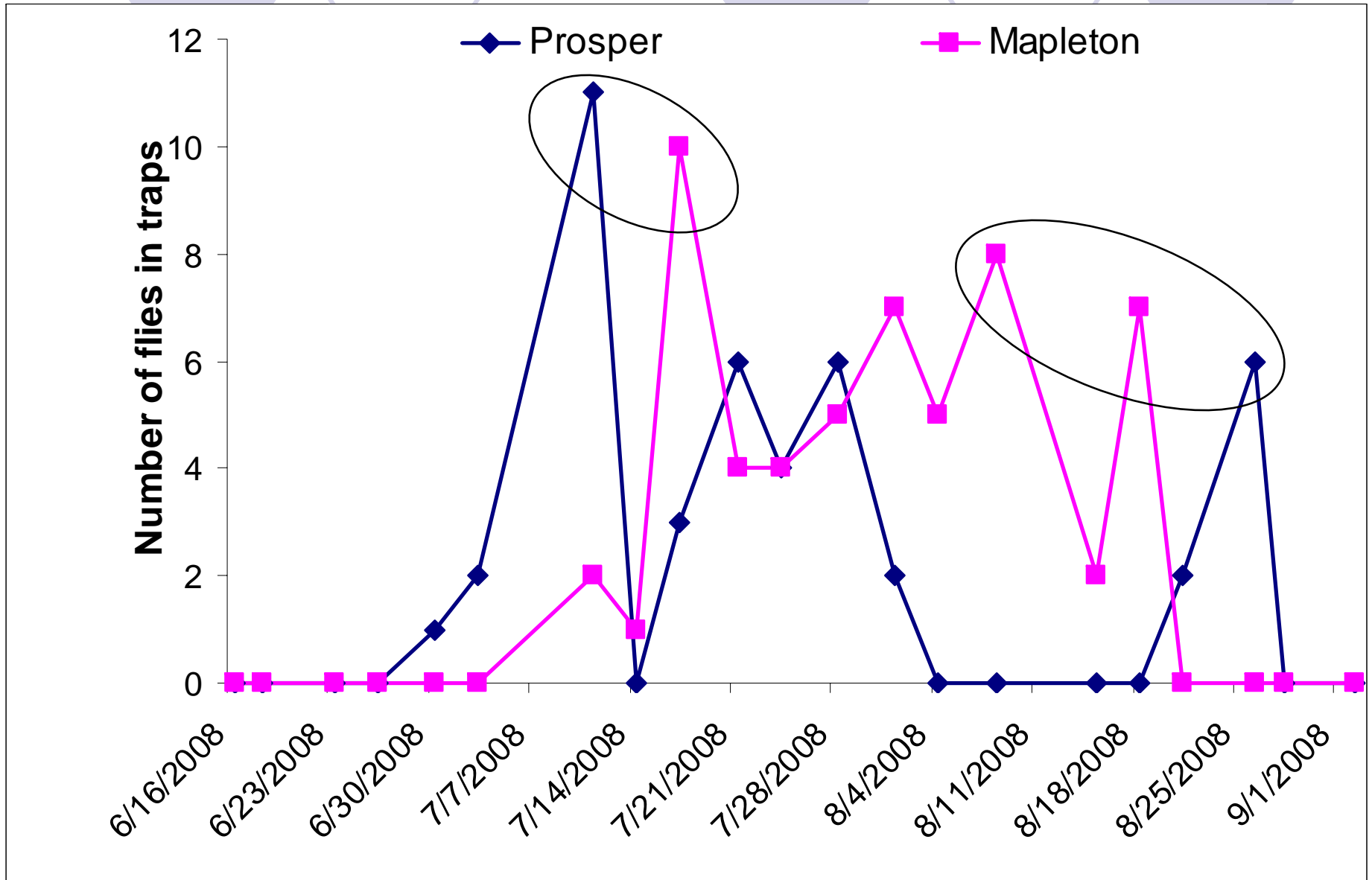
1. Determine the seasonal abundance of sunflower seed maggot
2. Elucidate the biology and behavior of sunflower seed maggot
3. Determine the impact of sunflower seed maggot
4. Evaluate planting date as a pest management strategy
5. Evaluate the efficacy and application timing of insecticides

# Seasonal abundance

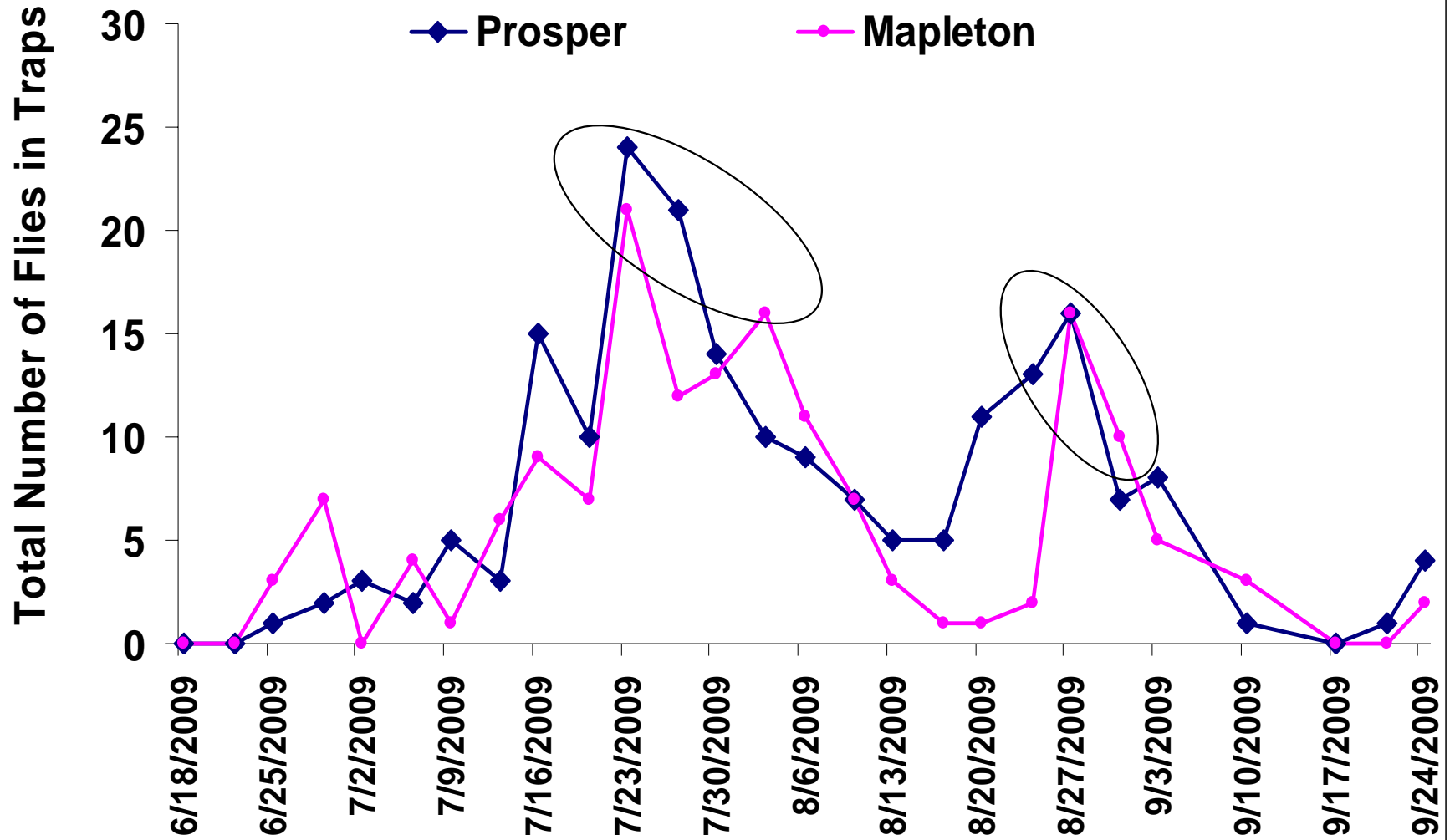
- 2008 and 2009
- Prosper, Mapleton, and Carrington
- 18 Yellow sticky traps
- Set up in 3 x 3 grid
- VE to R7



# 2008 Results

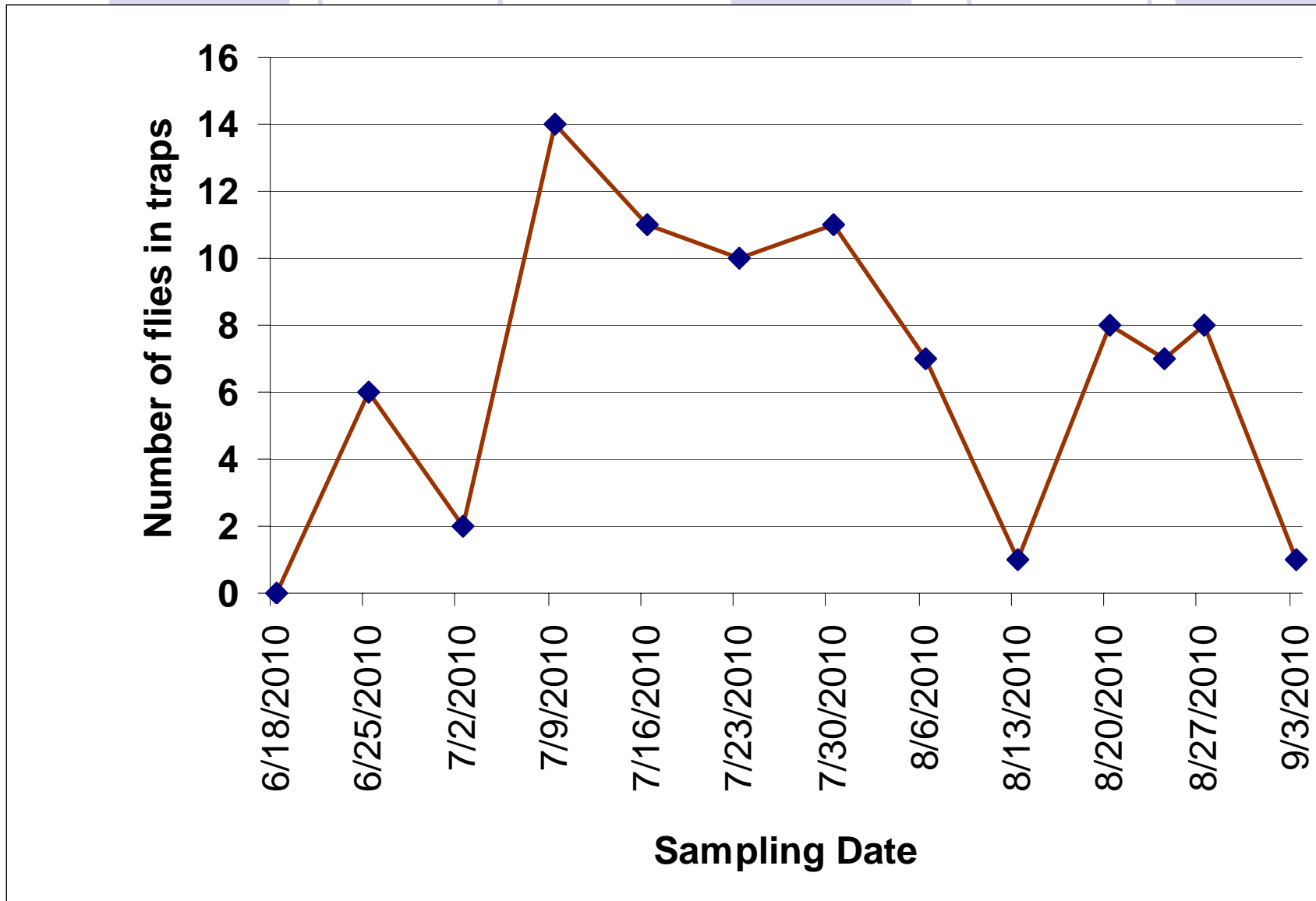


# 2009 Results





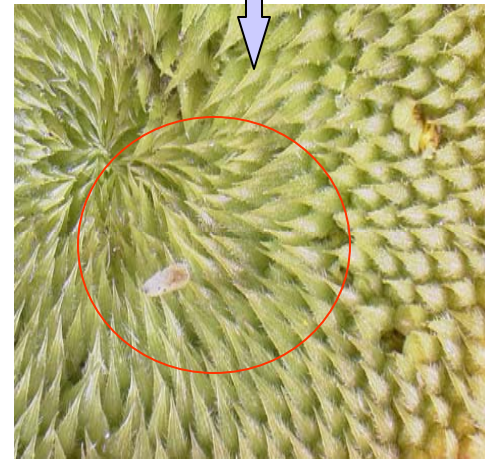
# 2009 Carrington



# Life History of Seed Maggot

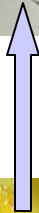
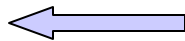
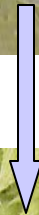
(64-87 days)

All stages (R1-R6) 4 days



8-9 days

14-16 days



# Other life history parameters

- Pre-oviposition period - 19 days
- Oviposition period - 20 days
- Post oviposition period - 27 days
- Fecundity - 27 eggs
- Longevity - 78 days
- Natural enemies – *Pteromalus*
- % Parasitism - 50-90%
- Resting, mating, and oviposition
- (Oviposition = egg laying)

# Overwintering stage





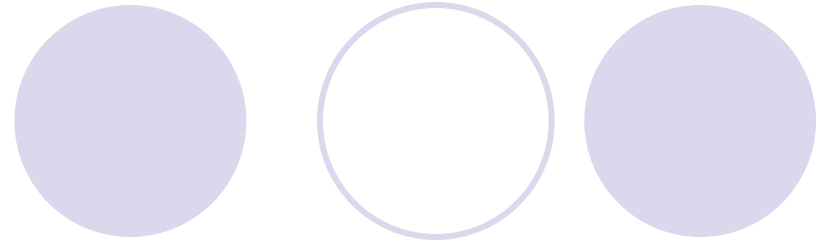
# Impact of seed maggot injury

- Harvested four types of heads
- Heads – No damage (n=25)
- Heads – Low damage (n=37)
- Heads – Mid damage (n=28)
- Heads – High damage (n=22)

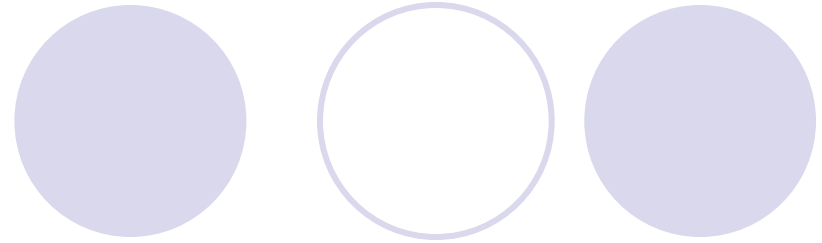
# Low injury



# Mid injury

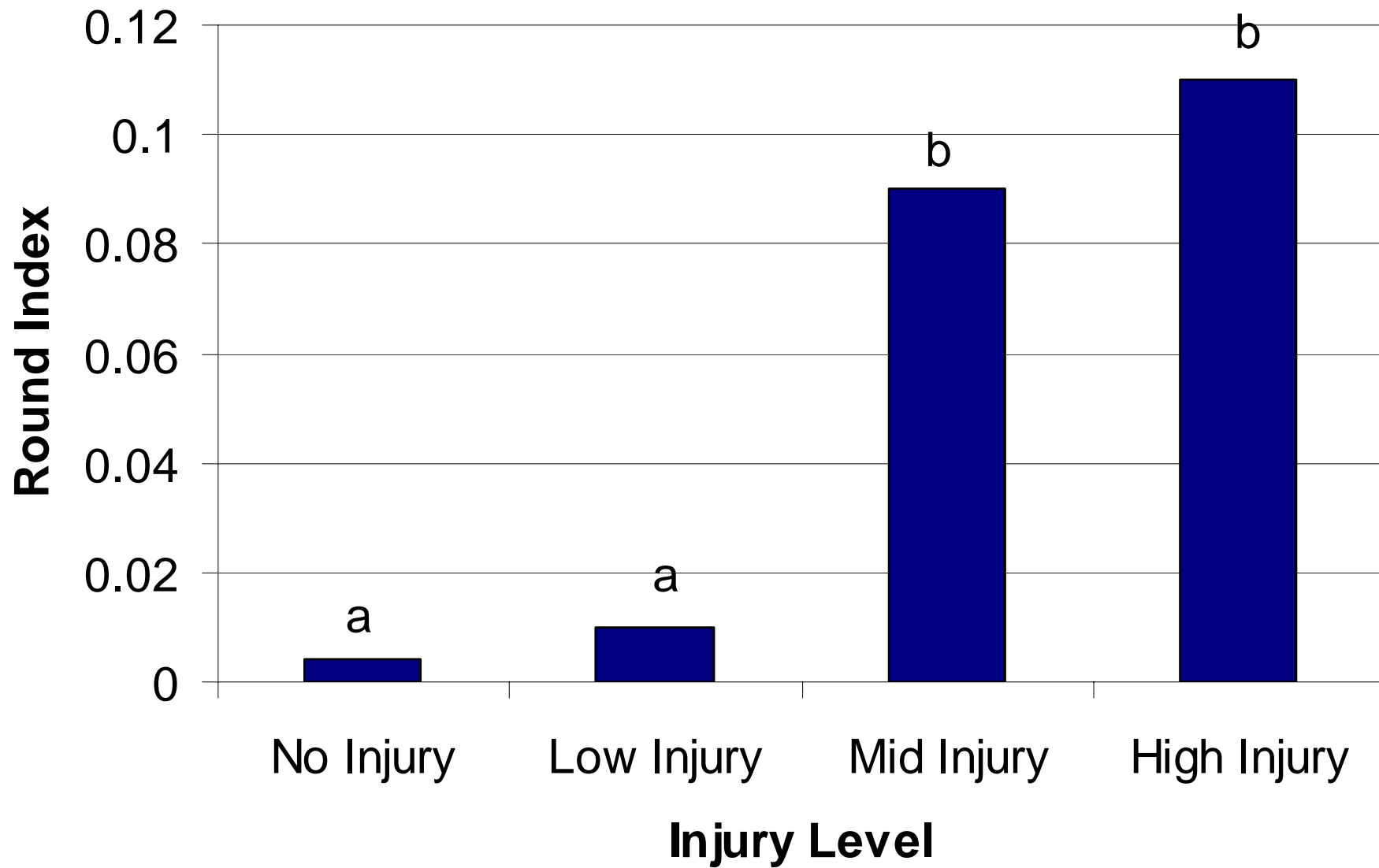


# High injury

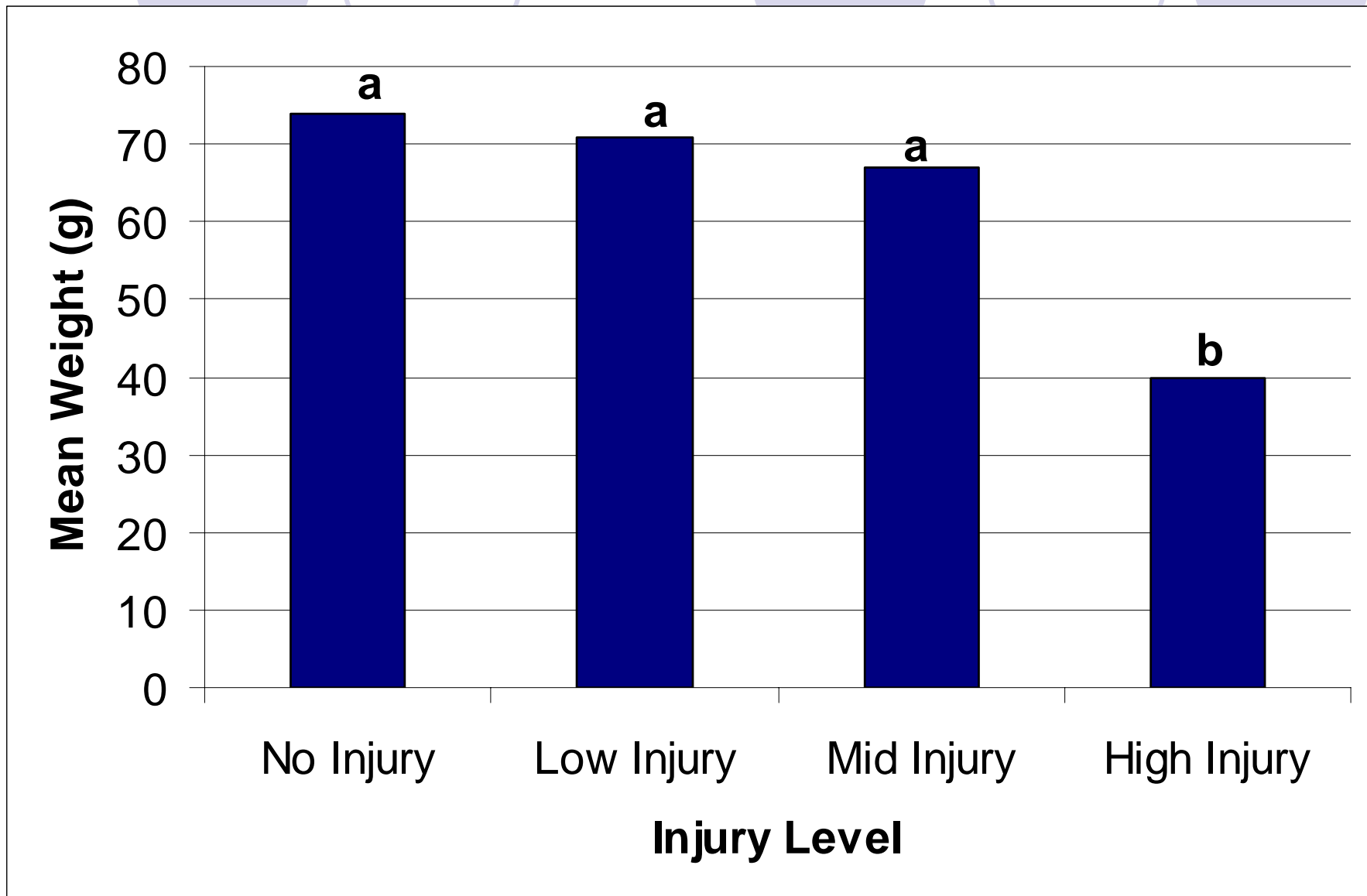




# Damage level vs. Round Index



# Damage Level Vs. Mean Weight



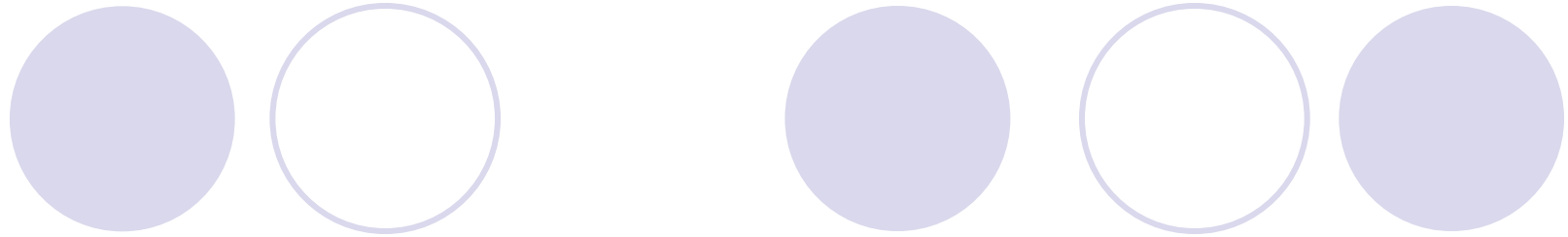
# Effect of planting dates

- 5 Locations – Prosper, Mapleton, Carrington, Minot, Langdon

Location	Early	Late
Prosper	30 May 2009	15 June 2009
Mapleton	02 June 2009	15 June 2009
Carrington	29 May 2009	17 June 2009
Minot	28 May 2009	16 June 2009
Langdon	21 May 2009	04 June 2009

- Randomized complete block design
- Six replicates
- Plot – 8 row wide 25 m long





- Two separate measurements
  1. injury ratings
  2. Incidence of damage

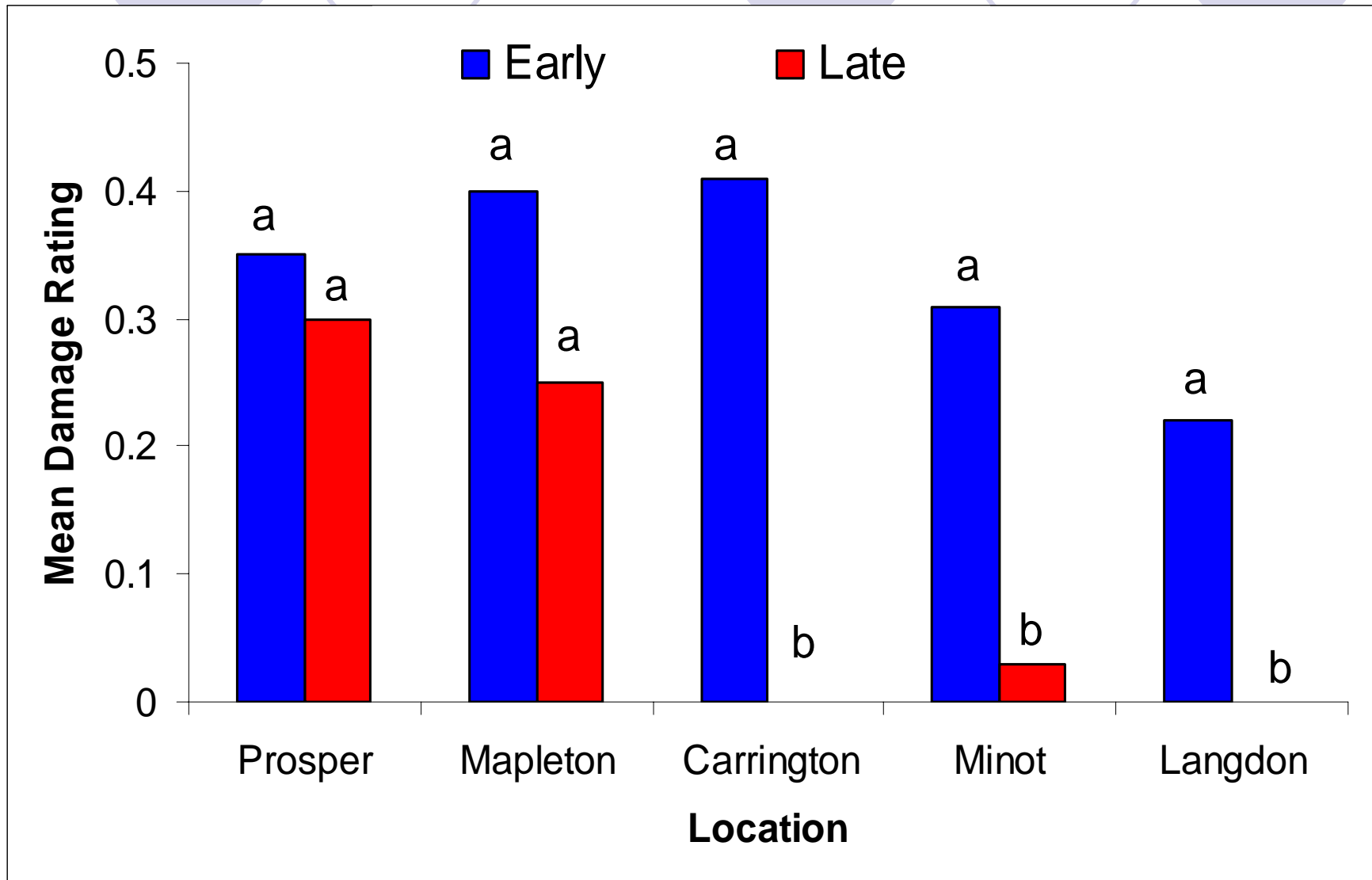
# Damage ratings (0-8)



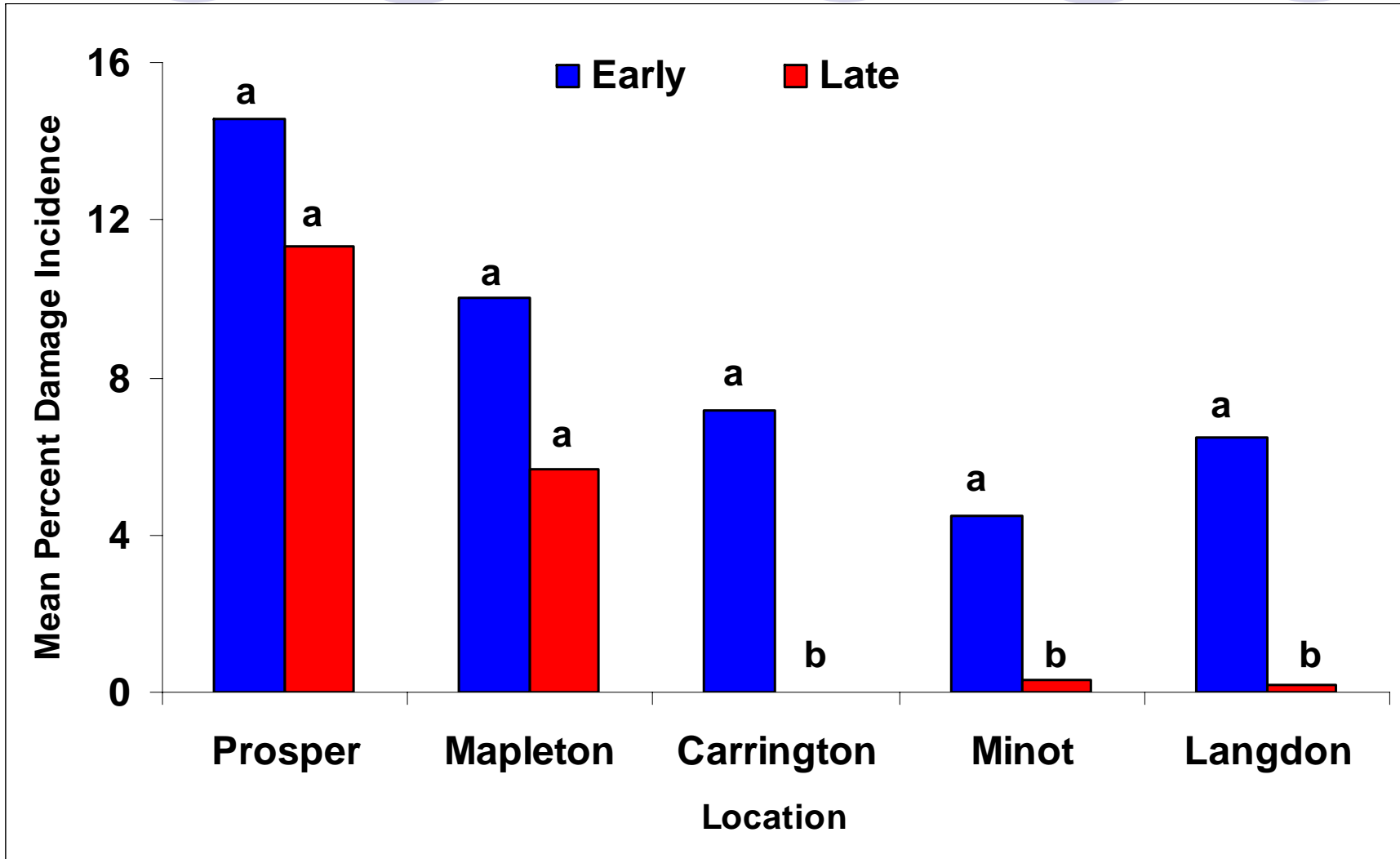
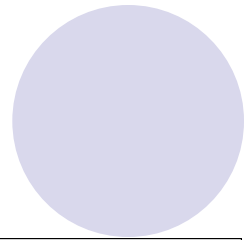
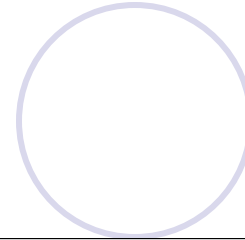
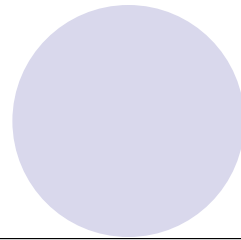
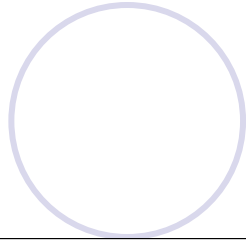
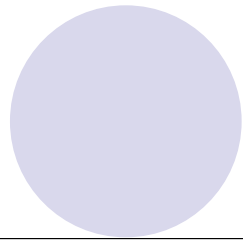
# Incidence of damage



# Results – Damage Ratings





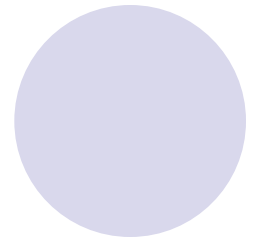
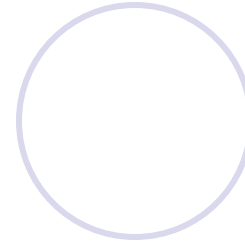
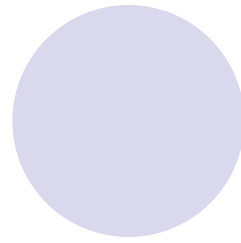
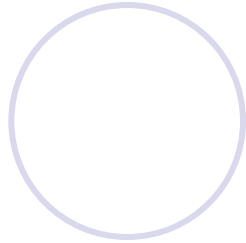
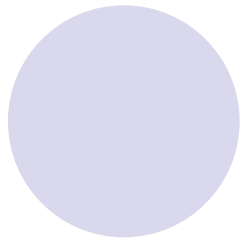


# Insecticides and timing

- Seven treatments

- Untreated check      Asana XL (5.8fl oz/a) at R3 and R5
- Lorsban (16 fl oz/a) at R3 and R5      Cobalt (19fl oz/a) at R3 and R5

Location	R3	R5
Prosper	29 July 2009	10 August 2009
Mapleton	29 July 2009	10 August 2009
Carrington	04 Aug. 2009	12 August 2009
Minot	01 Aug. 2009	12 August 2009



Location	Damage ratings	Incidence
Prosper	0.33	0.74
Mapleton	0.81	0.95
Carrington	0.69	0.28
Minot	0.77	0.25



# Conclusions

- Significant head injury was observed at mid to high injury level
- Late planting effective in mitigating head damage from seed maggot
- Insecticide efficacy and timing was inconclusive due to low population density and other insect pests (e.g: Banded sunflower moth)



# Acknowledgements

- National Sunflower Association - Funding
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