

PPO inhibitors as new herbicides in lentil production



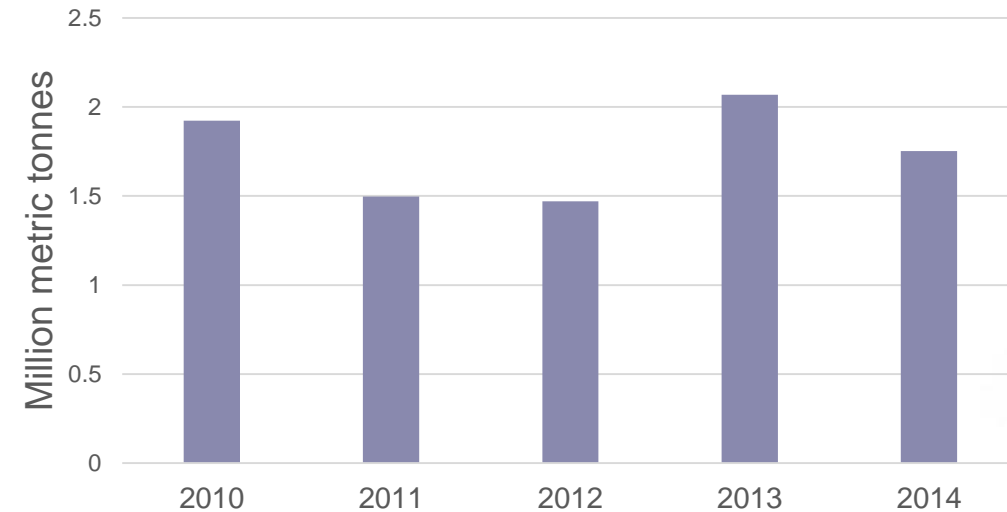
Vladimir Pajic

Lentils in Saskatchewan

- 95% of Canadian lentil production
- World leading exporter since 1995
- Lentil very poor competitor
- Weeds cause up to 17% yield losses



Lentil production in Saskatchewan (2010-2014)



PPO inhibitors

- Group 14 herbicides
- Protoporphyrinogen IX oxidase (PPOX)
- “Light requirement”
- Low number of resistant weeds
- Focus on sulfentrazone (Authority[®]) and Fluthiacet-methyl (Cadet[®])



Source : <http://grist.org/>



Sulfentrazone



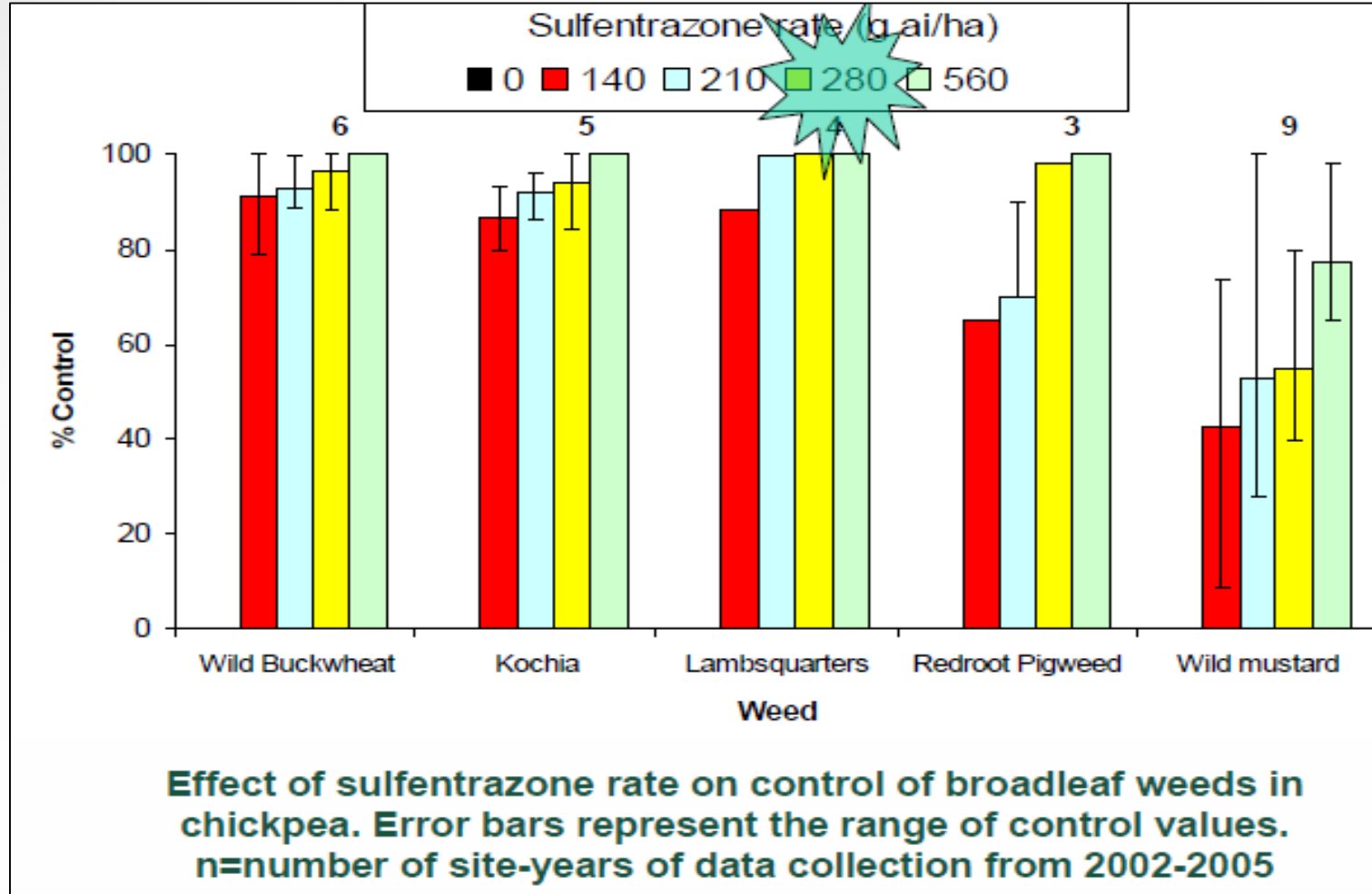
- Soil applied, pre-emergent herbicide
- Activity depends on soil pH and organic matter
- Registered crops

Chickpeas; Garbanzo Beans; Field Pea; Soybeans; Sunflowers; Flax

- **Recroping restriction for lentil - 24 months (revised 2014)**
- Controls: *Kochia, Lamb's quarters, Wild buckwheat and Redroot Pigweed*



Sulfentrazone

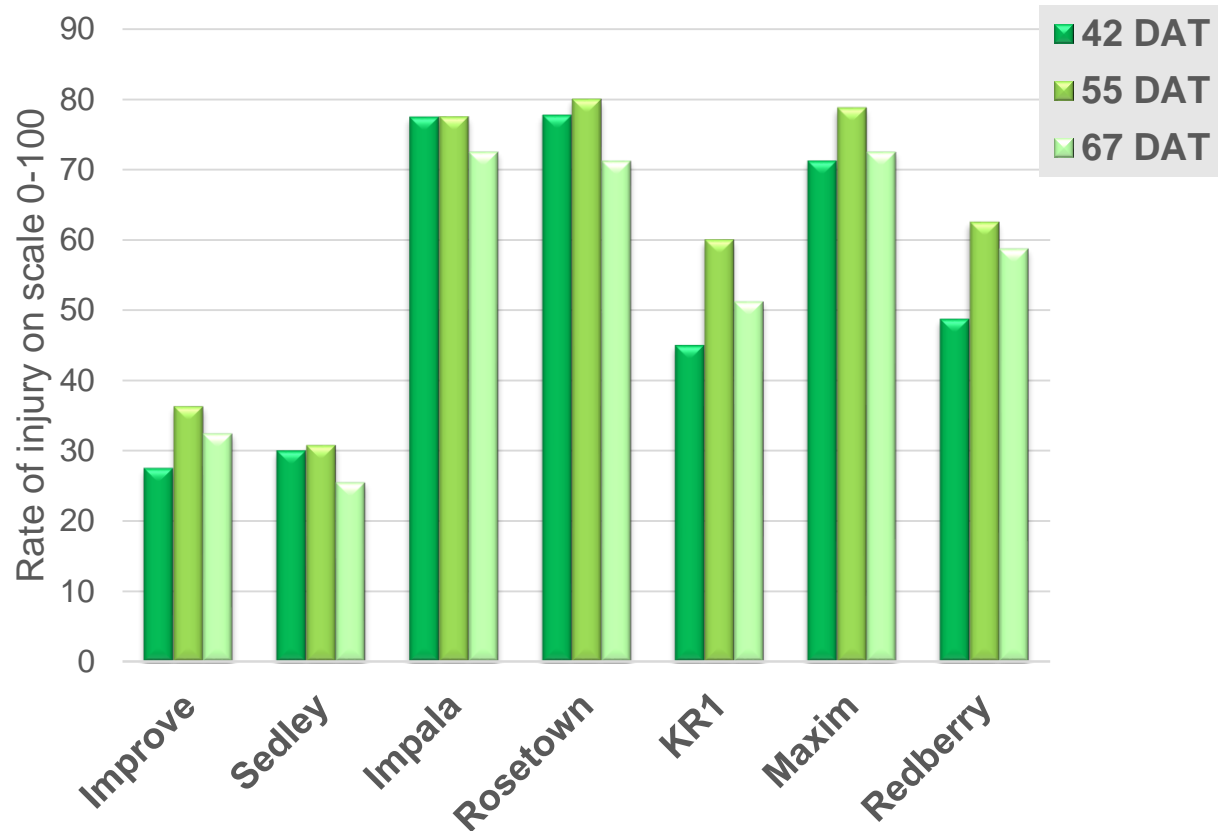


Courtesy of Eric Johnson

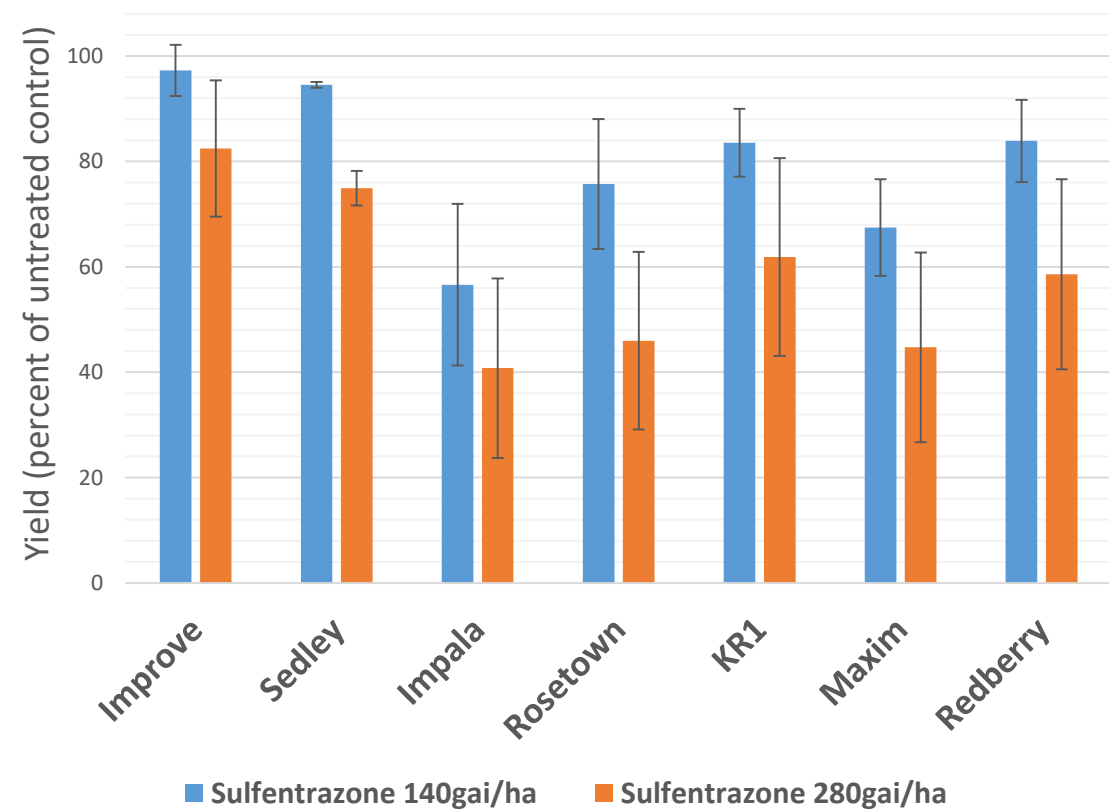
Effects of sulfentrazone on lentil

Two year study (2011, 2012) in two locations (Saskatoon and Scott)

Injury rating after 280gai/ha of Sulfentrazone at Saskatoon (2011)

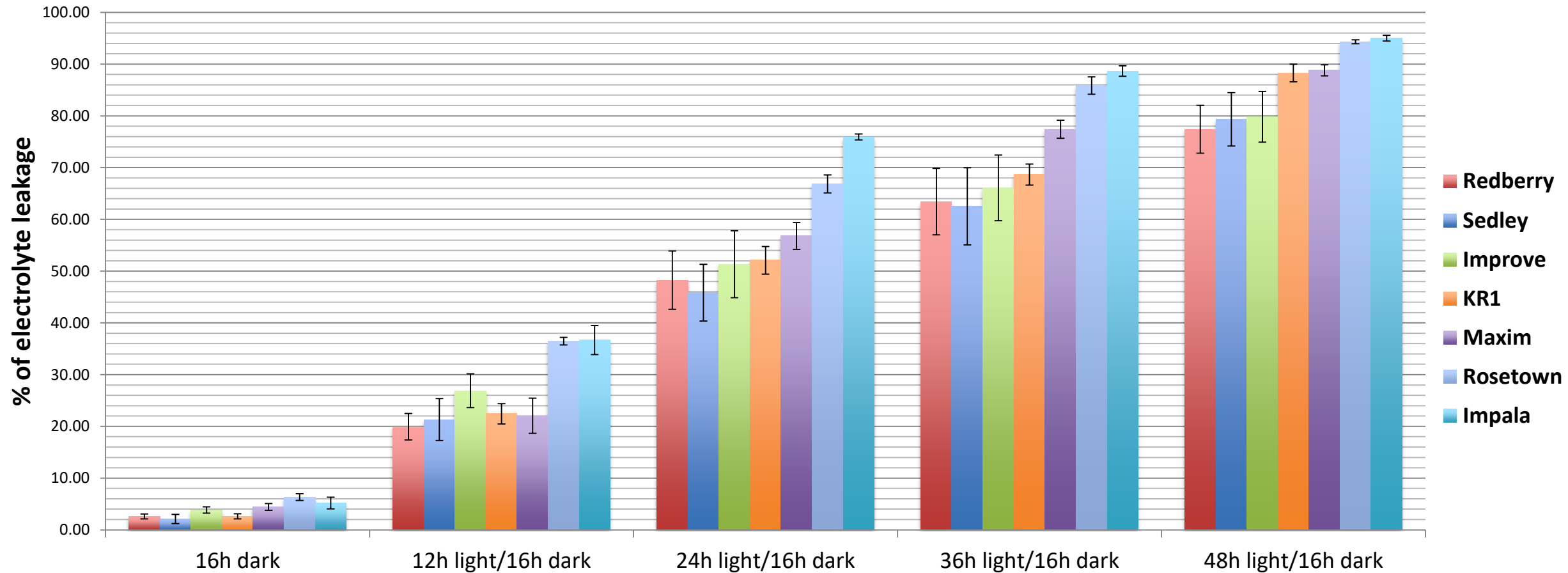


Yield data for Saskatoon and Scott (2011-2012)



Electrolyte leakage assay (ELA)

ELA of seven lentil varieties with 100 μ M concentration of Sulfentrazone



Fluthiacet-methyl

- Not registered in Canada
- Foliar applied, post-emergence herbicide
- In USA registered crops:

Corn and soybean

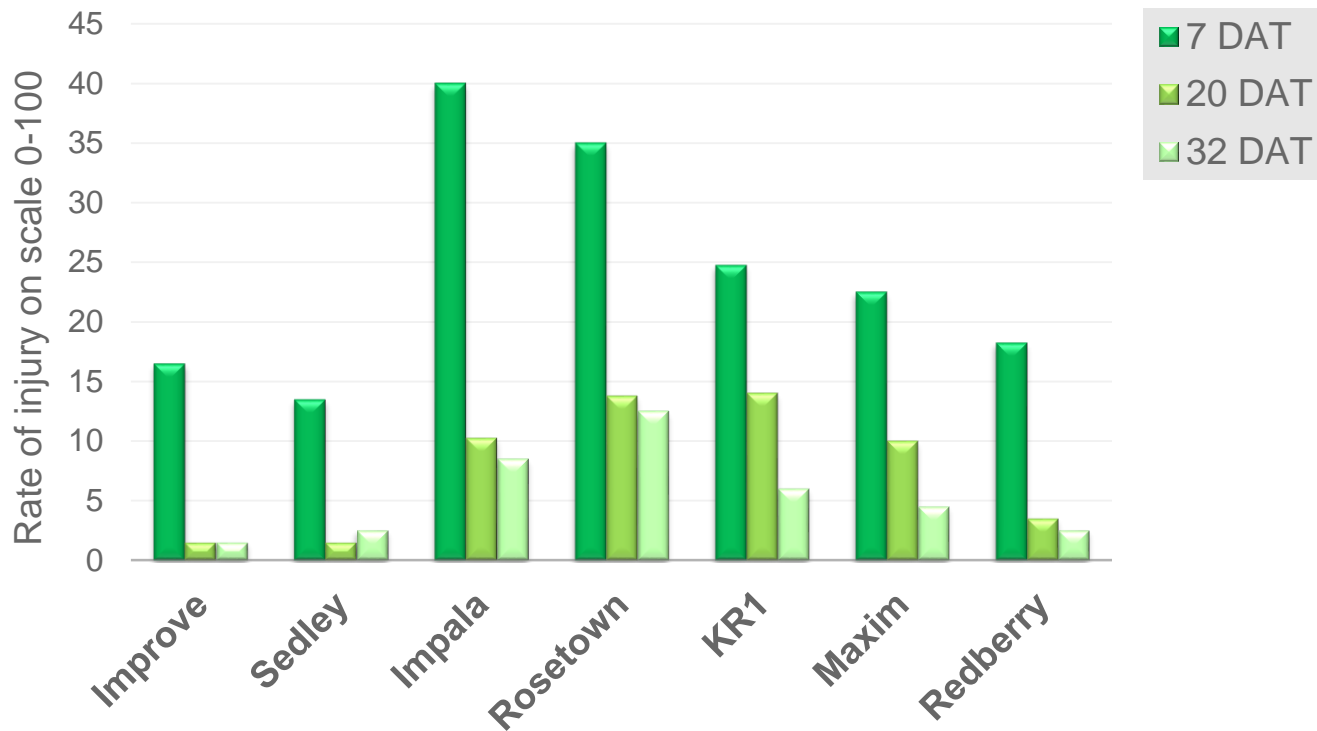
Controls : *Kochia, Waterhemp, Lamb's quarters, Wild buckwheat, Velvetleaf, Pigweed, etc.*



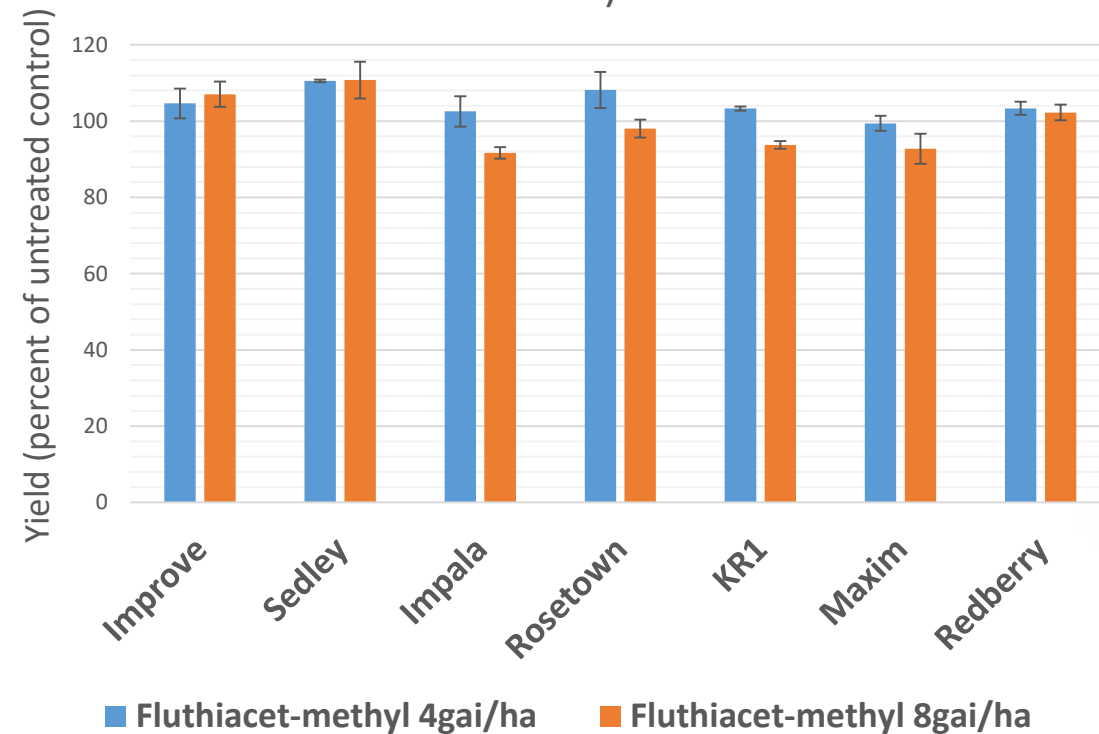
Effects of Fluthiacet-methyl on lentil

Two year study (2011, 2012) in two locations (Saskatoon and Scott)

Injury rating after 8gai/ha of Fluthiacet-methyl at Saskatoon (2011)



Yield data for Saskatoon and Scott (2011-2012)

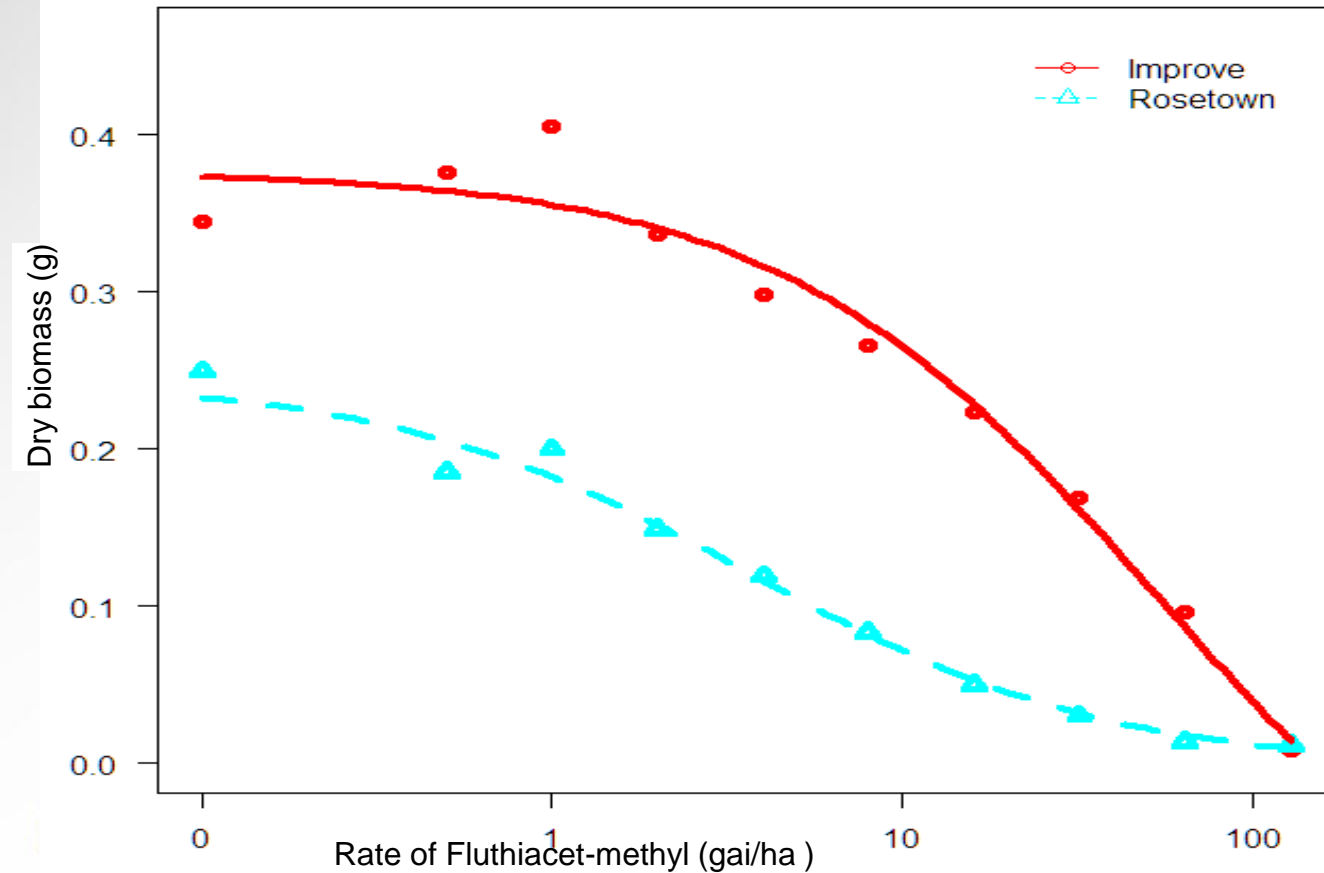


Dose response study

Fluthiacet-methyl rates: 0, 0.5, 1, 2, 4, 8, 16, 32, 64 and 128 gai/ha

Improve: $GR_{50} = 32$ gai/ha

Rosetown: $GR_{50} = 1.7$ gai/ha



Current work

- Screening diverse lentil germplasm and validating selections



Conclusion

- Genetic diversity to the effects of PPO inhibitors exist in lentil germplasm
- The next step is understanding genetics which controls lentils response to PPO inhibitors
- The goal is to provide essential tools and knowledge to the breeders which will lead to development of PPO tolerant lentil varieties
- PPO inhibitors will be part of lentil weed management strategies in near future

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Questions?

