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## Plant bugs in seed alfalfa

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# Objectives of this talk

- Refresh your memory on how to recognize plant bug pests, monitor them and decide **if** management is necessary
- Research update:
  - alfalfa insect diversity and seasonal activity
- Think about conservation of natural enemies to enhance biological control in the long term

# Plant bug comparison

## Alfalfa plant bug



- Exotic
- Overwinter as egg
- On alfalfa stems
- One generation
- Early, bud damage

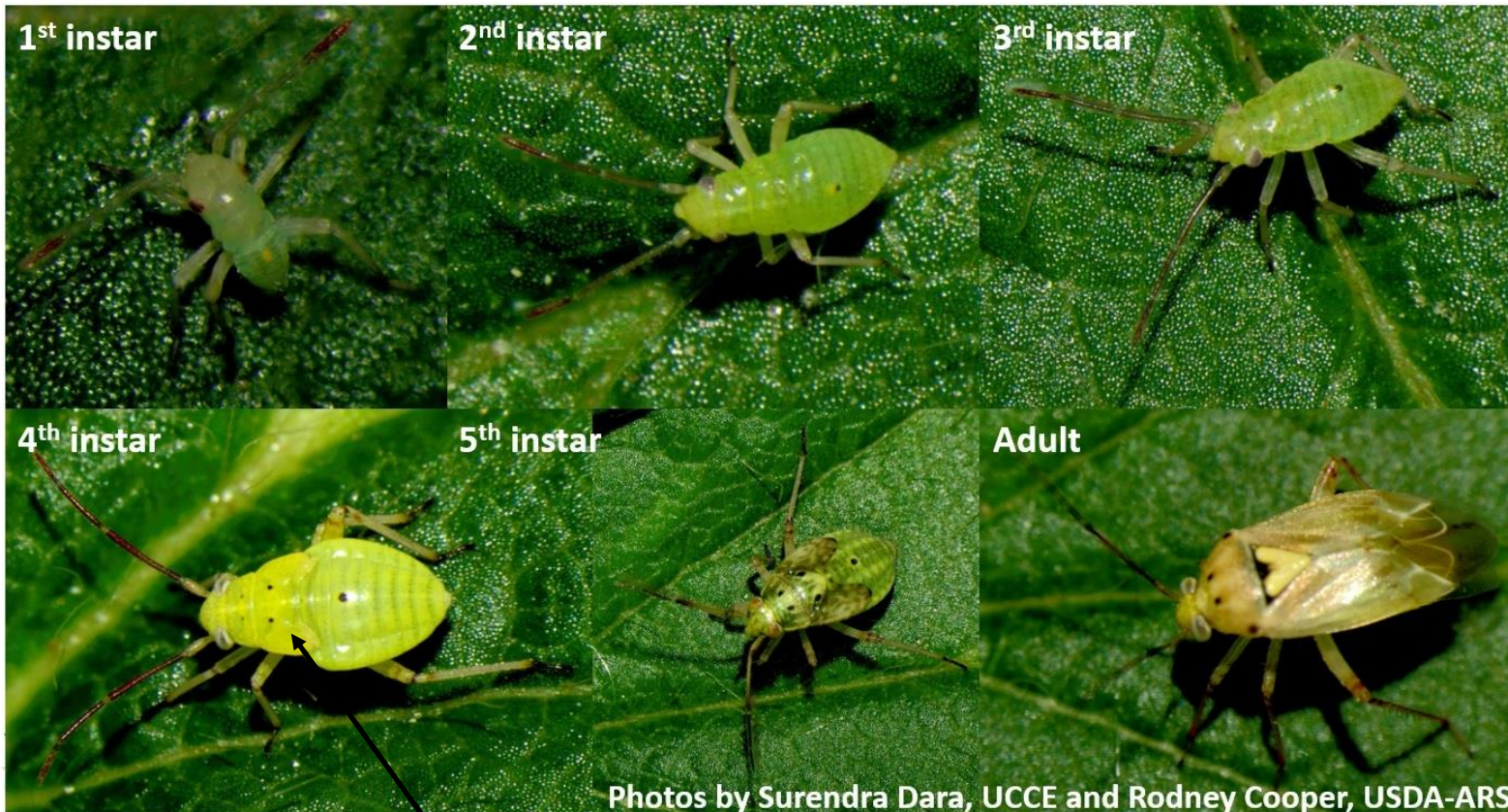
## Lygus bugs



- Native
- Overwinter as adult
- Out or inside the field, on litter
- One or more generations
- Later, seed damage



# Older lygus are more damaging



Watch for spots on thorax





# Lygus bugs



alfalfa



canola



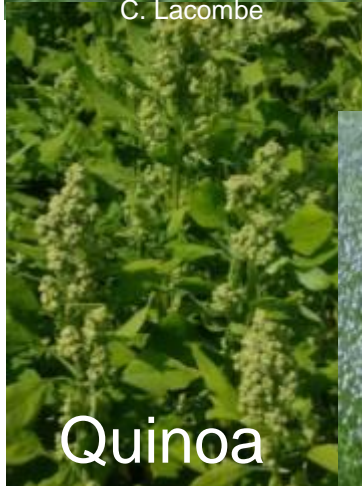
Hemp

C. Lacombe



Sunflowers

S. Daniels



Quinoa

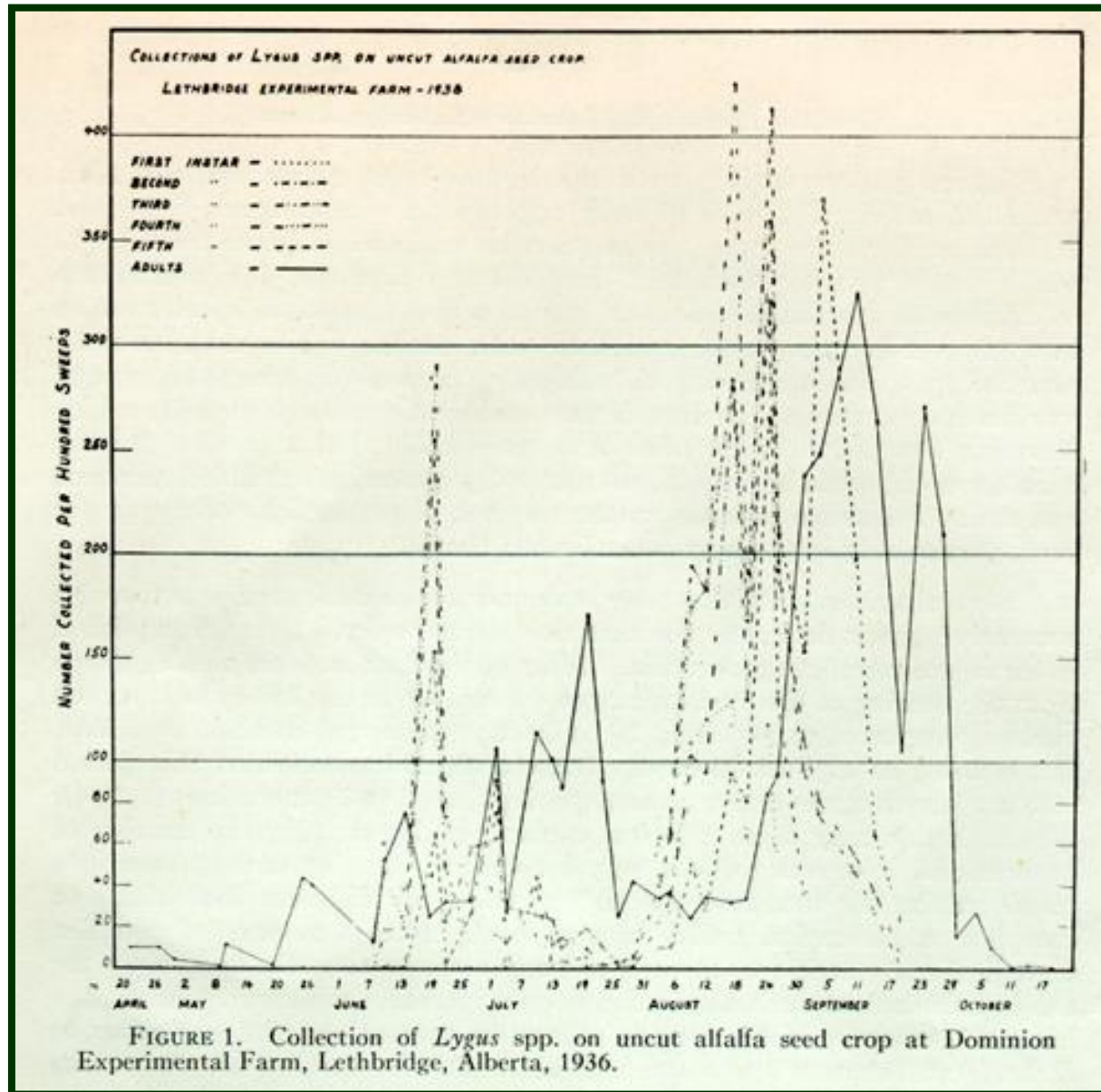


Flax

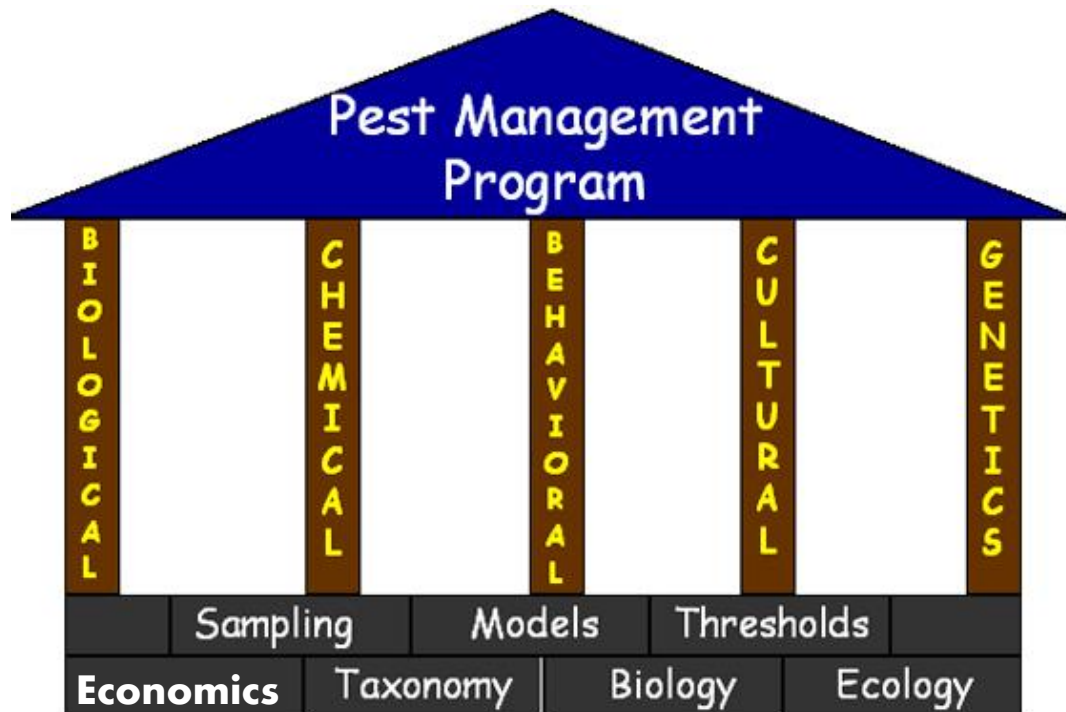


- Native to N. America
- Family: Miridae (plant bugs)
- Highly polyphagous
- Pests of many crops
- Insecticide only management tool
- Flexible life cycle
- Multiple generations

# Lygus life cycle in southern Alberta in seed alfalfa



# IPM and Threshold context



[http://www.bestapples.com/varieties/varieties\\_ipm.aspx](http://www.bestapples.com/varieties/varieties_ipm.aspx)

# Economic threshold

- The density of a pest (or level of injury) at which control measures should be initiated to prevent an increasing pest population from reaching the EIL.

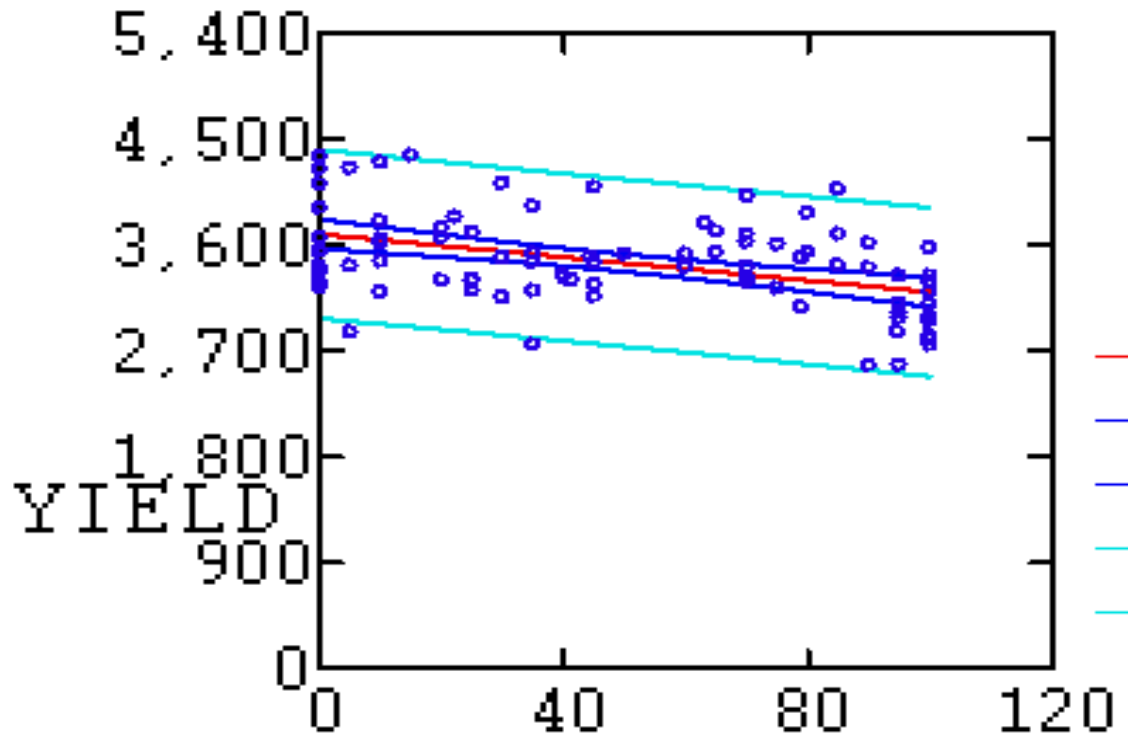




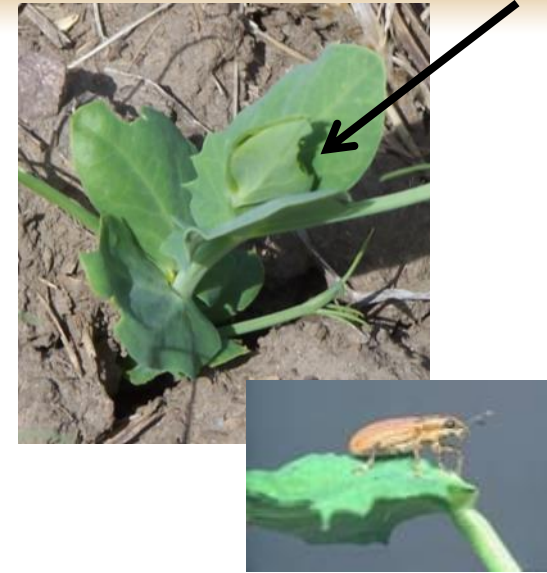
Asha Wijerathna

# Economic Injury Level = $g/b$

Yield regression on % of seedlings with clam leaf damage (the biology)

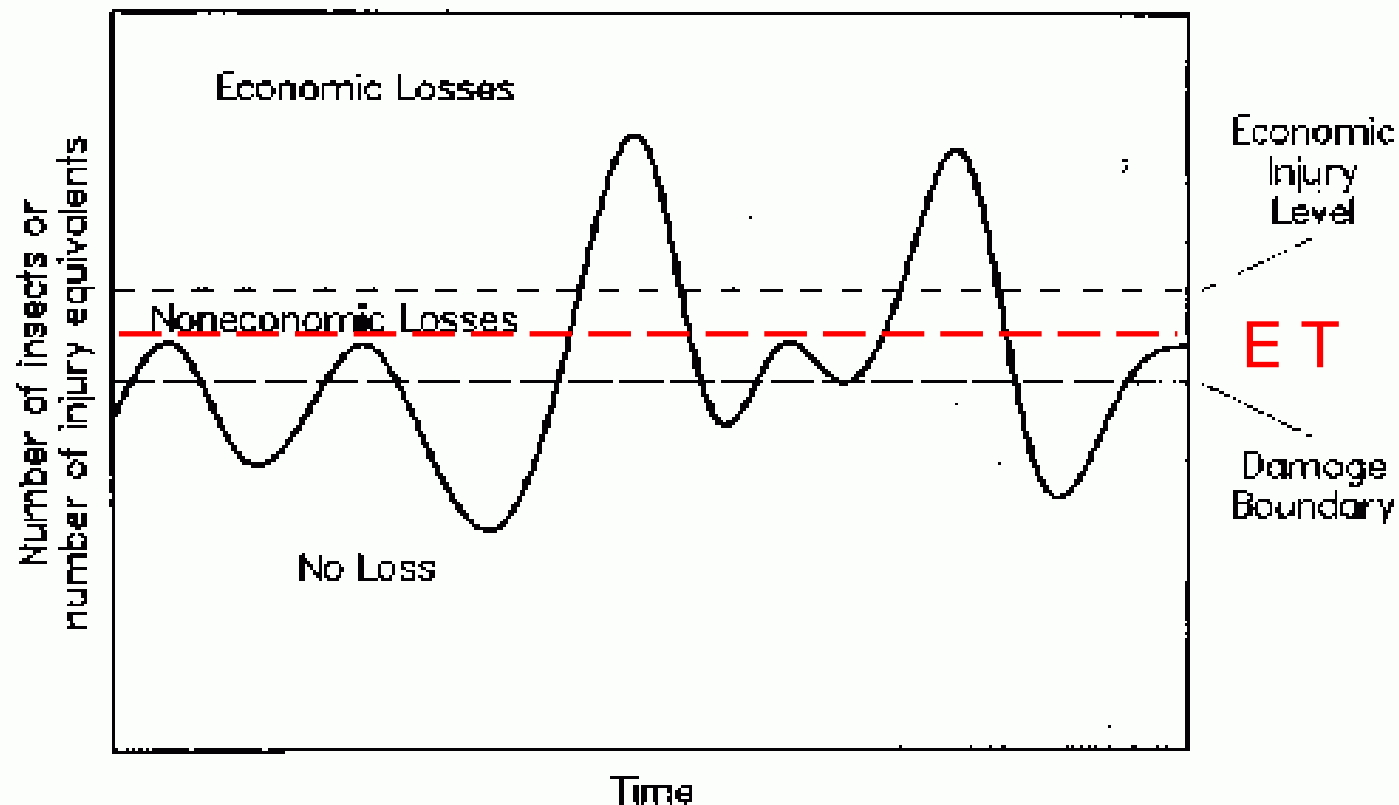


$Y = 3,692.49 - 4.91X$ ;  $R^2 = 0.20$  (N=90),  $p = 0.00$ ;  
b is the regression coefficient (slope) of -4.91



Pea leaf weevil

# Relationship of the Economic Injury Level and the Economic (Action) Threshold



# Plant bug thresholds?

- Ideal thresholds
  - Crop stage, insect stage, and region specific
  - Not available for most pests
- Nominal threshold: 5 plant bugs per sweep at late bud or early flower; seed stage? Same used for now
  - Include all life stages of the two plant bugs
  - Wait until the lygus nymphs (young) have black spots and wing pads



Lygus bug, 3<sup>rd</sup> instar nymph  
R. Butts



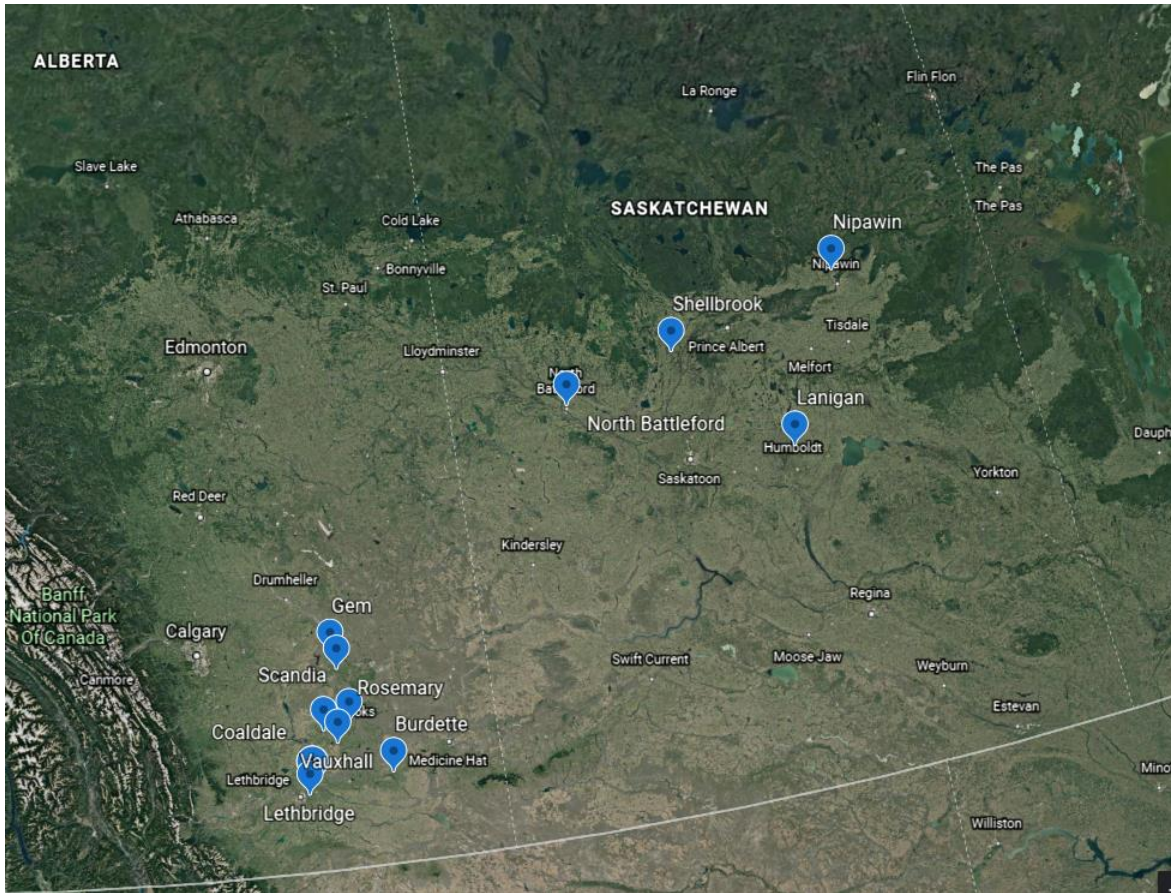
Alfalfa plant bug, old nymph  
S. Bauer

# Research update

- Objective
  - to update current status of insect pests and beneficial arthropods in seed alfalfa
  - 3 ecoregions
    - Peace Region, Parkland in Saskatchewan, southern Alberta
    - Otani, Mori, Carcamo



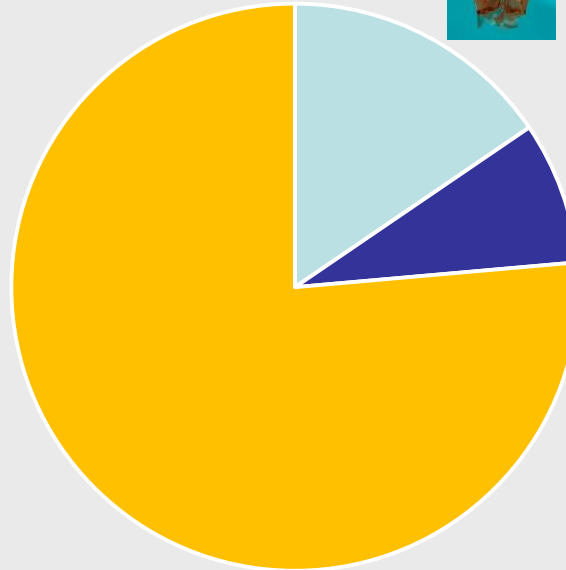
# Field survey regions in Saskatchewan and Alberta



- 2018 and 2019
- 5 fields each year

# Key pest abundance 2019

All sites and dates

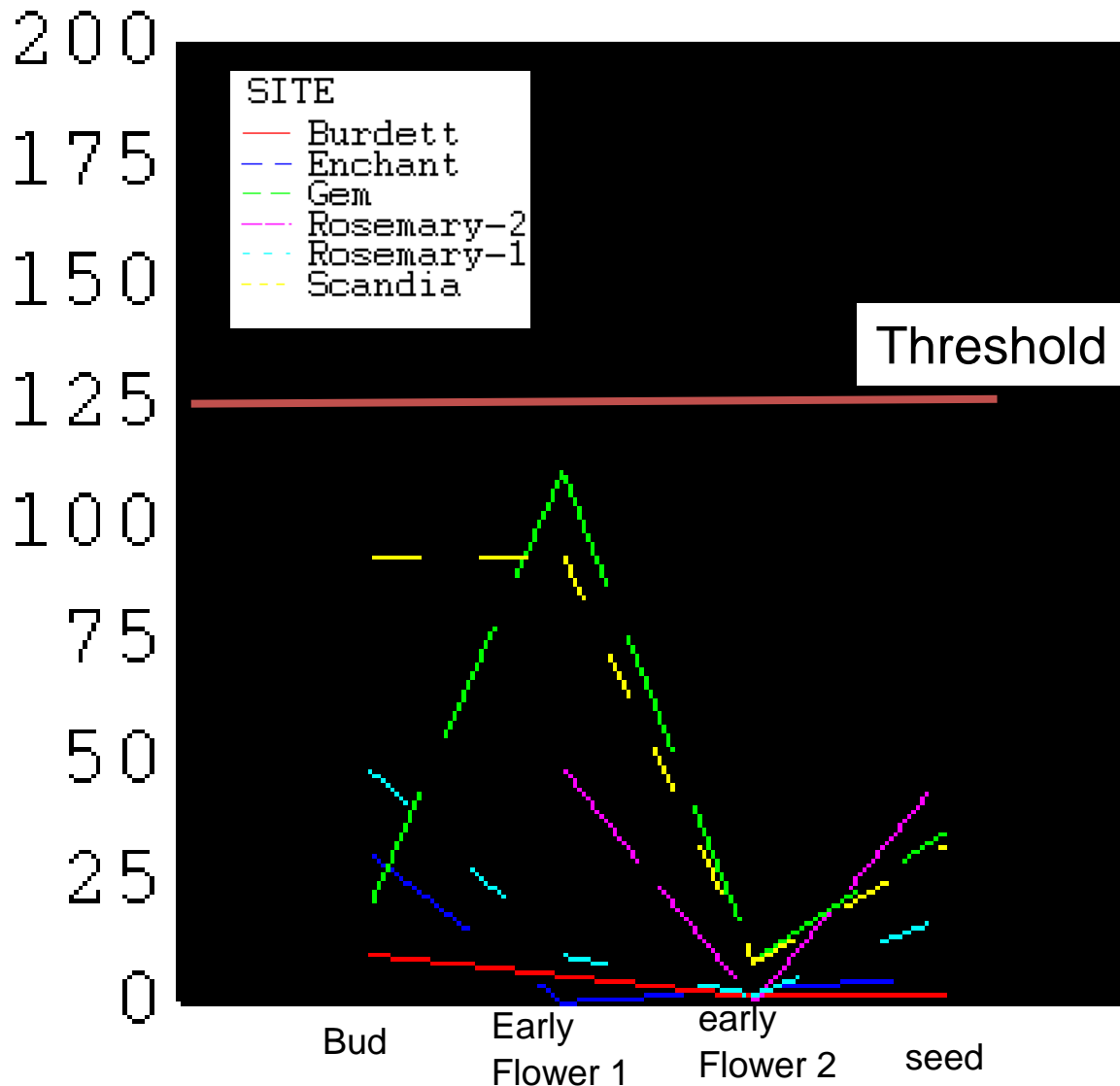


■ Lygus   ■ Alfalfa Plant Bug   ■ Alfalfa weevil

Alfalfa Plant		
Lygus	Bug	Alfalfa weevil
1617	849	7982

# 2019 Lygus and alfalfa plant bug abundance before and after insecticide spray

Lygus+alfalfa plant bugs/25 sweeps

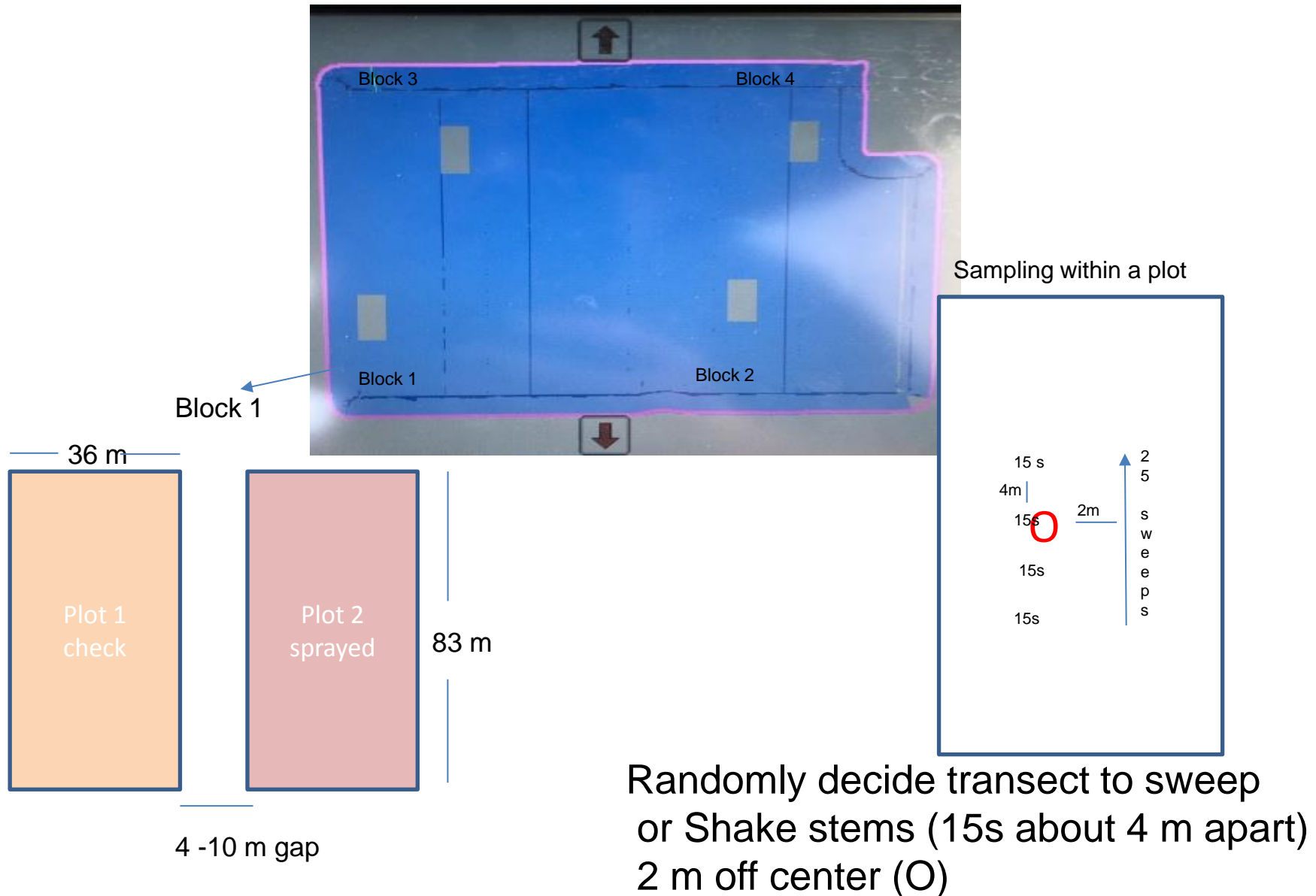


Crop Stage

# Coaldale Seed Alfalfa Insecticide Spray Study 2019

with Ken Coles and Lewis Baarda of Farming Smarter

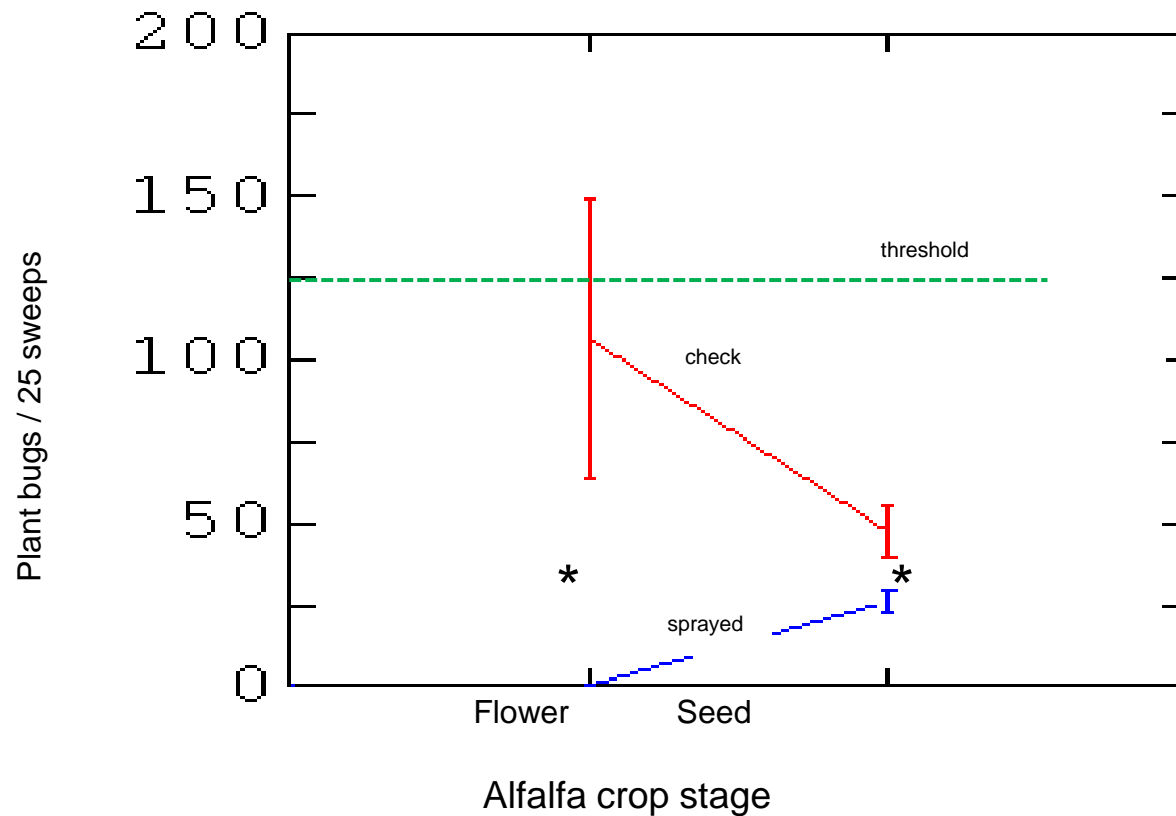
("randomized block design") 4 blocks and 8 plots





# Lygus abundance at a seed alfalfa field in 2019

## Sprayed at early flower



Effect of spraying insecticide at early flower on plant bugs at the seed stage of alfalfa in a farm near Coaldale in 2019. With Ken Coles and Lewis Baarda of Farming Smarter. \* P = 0.02 Mann-Whitney U Test, N=4.

# Peristenus parasitoids effective in NE and SW USA

- *Peristenus digoneutis* (European)
- Introduced to NE USA
- Reduced lygus in alfalfa and other crops
- Established in Ontario and Quebec
  - Impact?
- *P. relictus* in California
- Relocate *P. digoneutis* west?
- Native displacement?



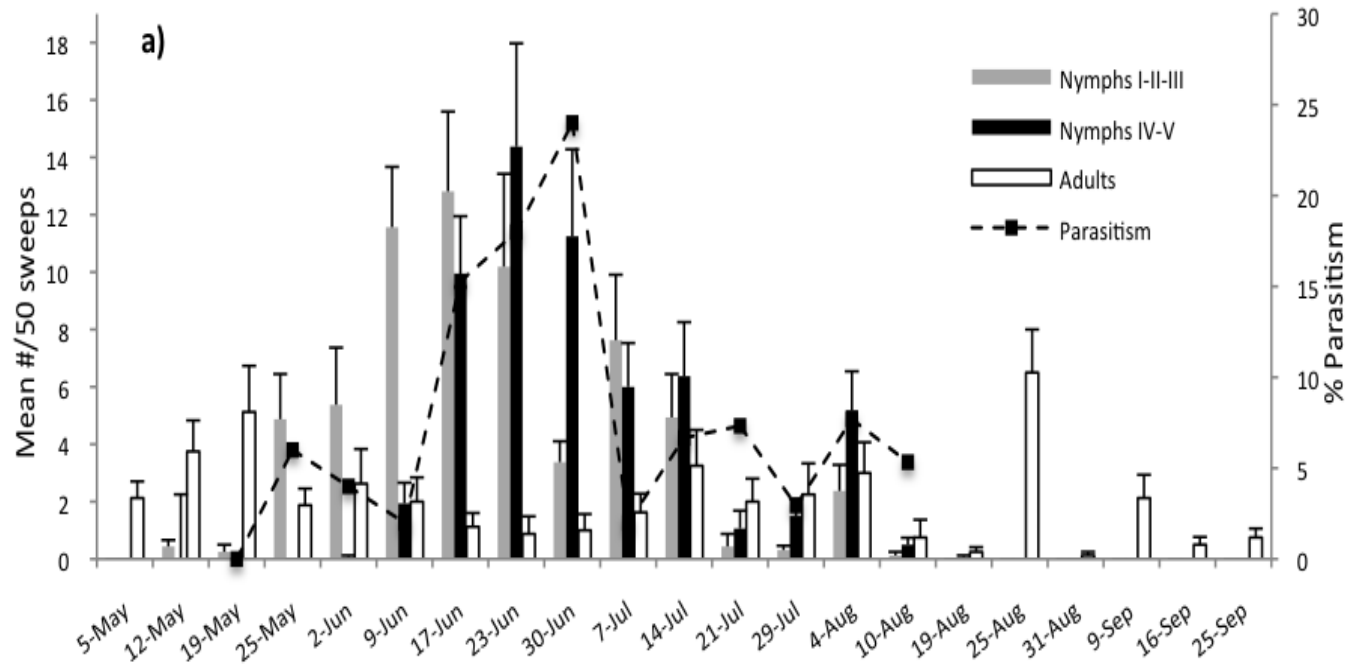
T. Haye



Scott Bauer

# Lygus stages and parasitism

## Research alfalfa site near Lethbridge in 2015



# Diversity very high in alfalfa?

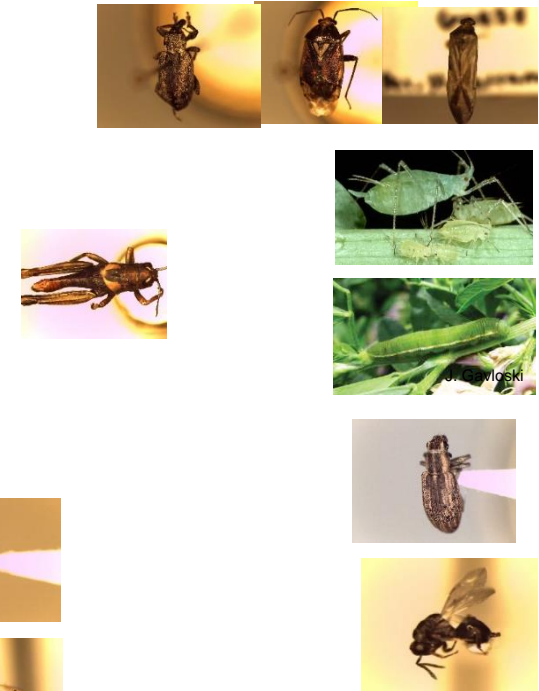
Friends



Neutral



Foes (pests)



= greater stability?



# summary

- ❖ Lygus bug numbers vary a lot
  - ❖ Weather dependent, can increase fast if hot and dry; more in new alfalfa?
- ❖ Most damage occurs later at seed stage
  - ❖ From second generation
- ❖ Thresholds have been developed: 5/sweep
  - ❖ May need validation ?
- ❖ Like most pests, they have natural enemies
  - ❖ Conservation and enhancement of Peristenus parasitoid by timing/reduction of insecticide use?



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# ***THANK YOU !***

- ❖ Alberta Alfalfa Seed Commission, Peace Region Forage Seed Association, Sask Alfalfa Seed Producers Development Commission and AAFC funding through CAP
- ❖ Special big thanks to all the growers that allowed us access to their fields before and after spraying
- ❖ Technical support:
  - ❖ J. Holowachuk, S. Daniels, R. Brandt, B. Roy, B. Bennett, K. Haile.

Canada