

# Novel Organic Approaches to the Management of Wireworms (*Agriotes spp.*)



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# European *Agriotes* spp. wireworms



- **Introduced from Europe (ballast theory)**
- **Damage caused by larval stages**
- **Feed on a wide range of crops**
- **Cause reductions in crop yield and/or quality**
- **In North America, potato crop losses due to wireworms range from 5-25%**

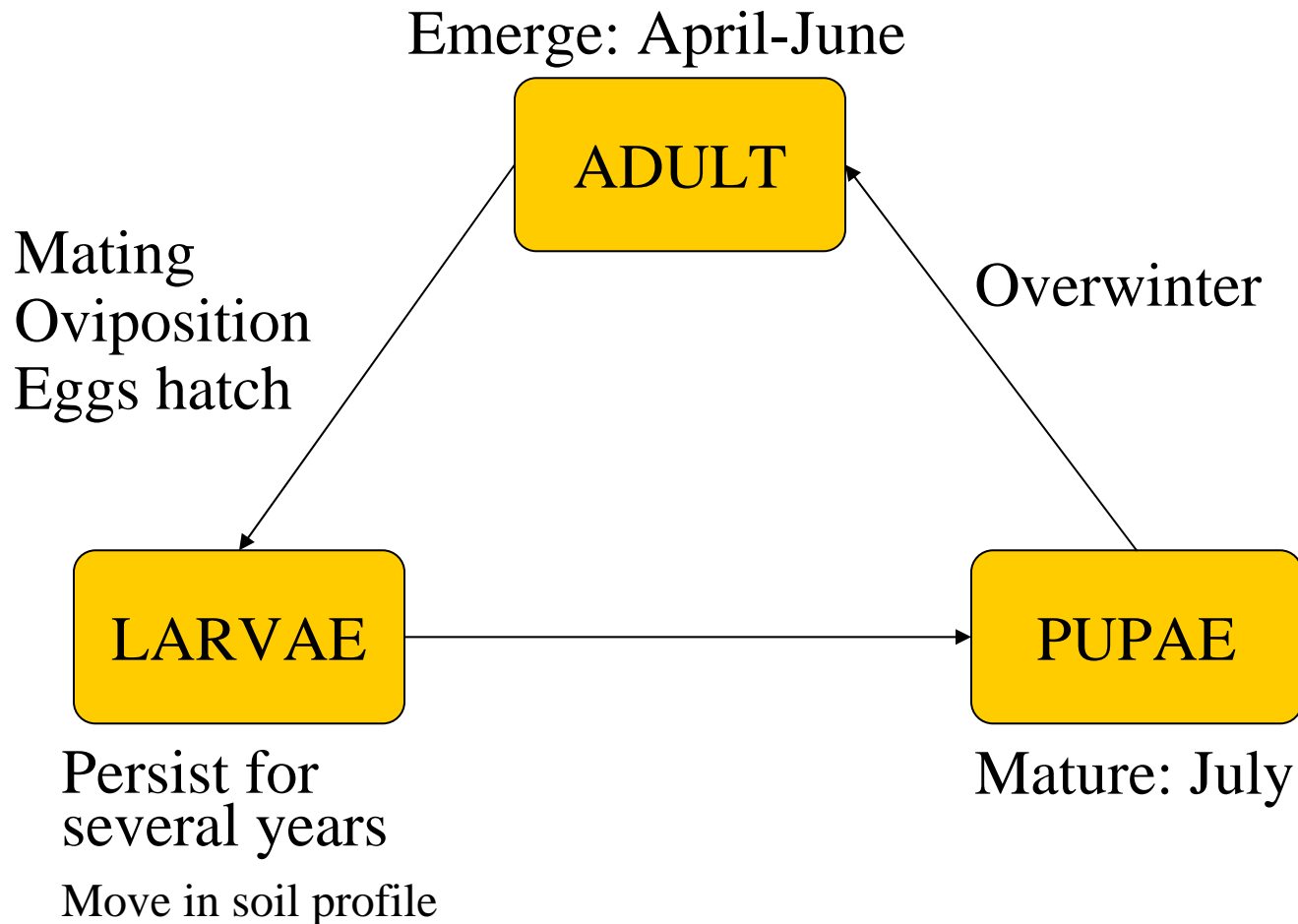
# European Wireworm Species



*Agriotes sputator*



# Life Cycle



# Wireworm Control



- Insecticides
- Timing of planting & harvest
- Tillage
- Trap Crops
- Flooding
- Biological Control
- **Crop Rotation!**

# Objectives

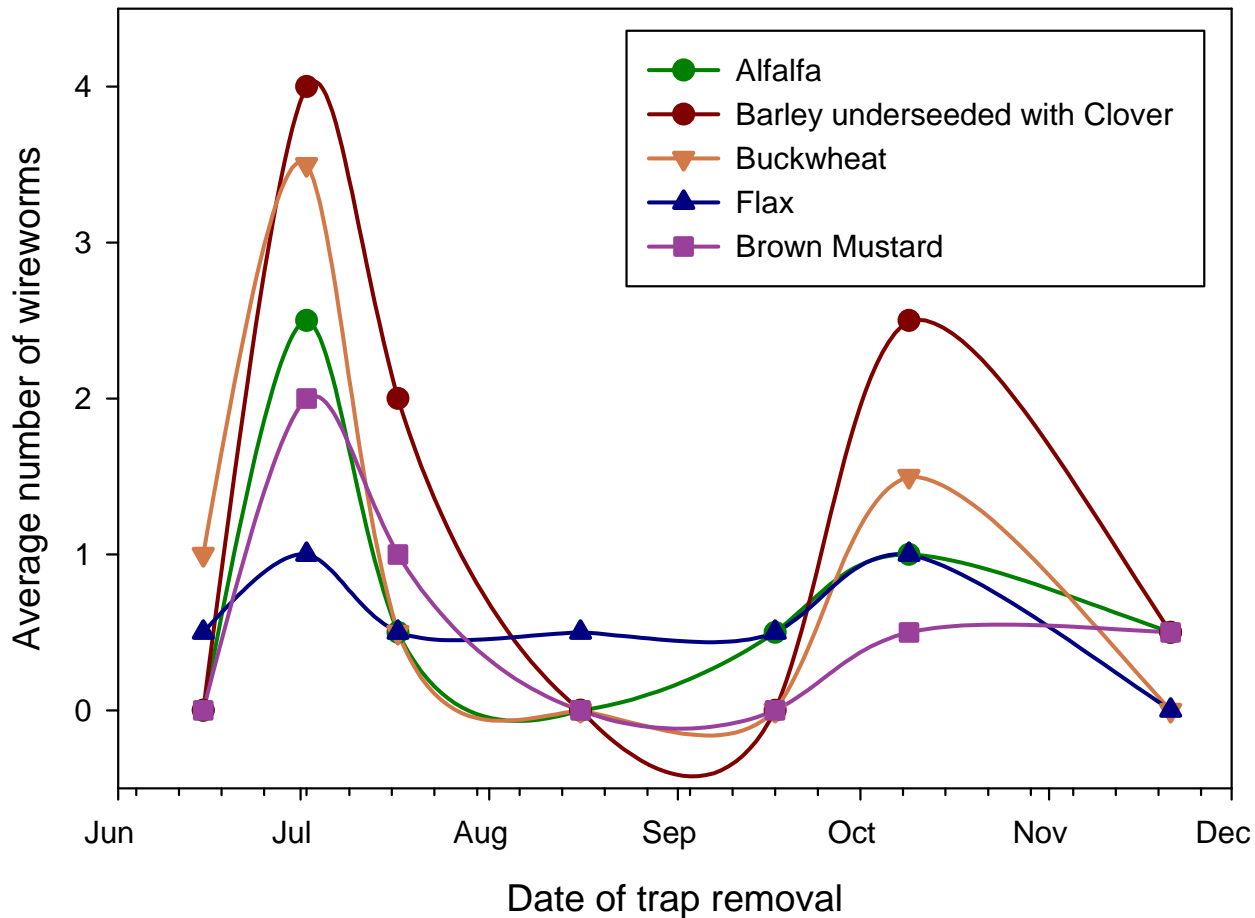
- **Larval control**
  - Push – Pull – Immobilize
  - Crop rotation
- Survey click beetle populations
- Adult crop preference



# Crop Rotation Trial



# Rotation Trial Preliminary Results

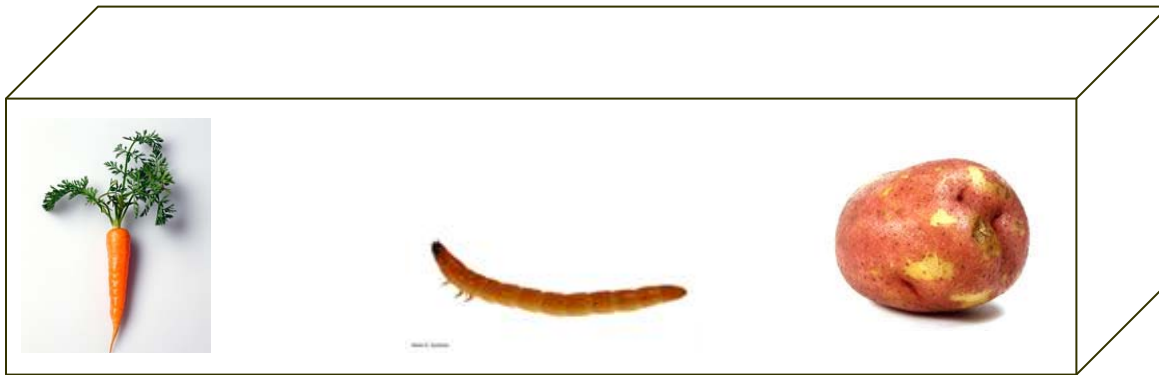


# Push-Pull-Immobilize

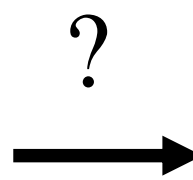
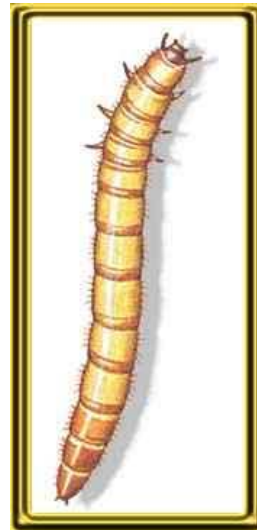
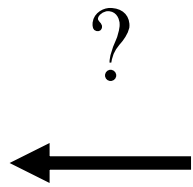
- **Push** wireworms away from the cash crop (deterrents)
- **Pull** wireworms away from the cash crop (attractive trap crop)
- **Immobilize** wireworms (control)

# Laboratory Trials

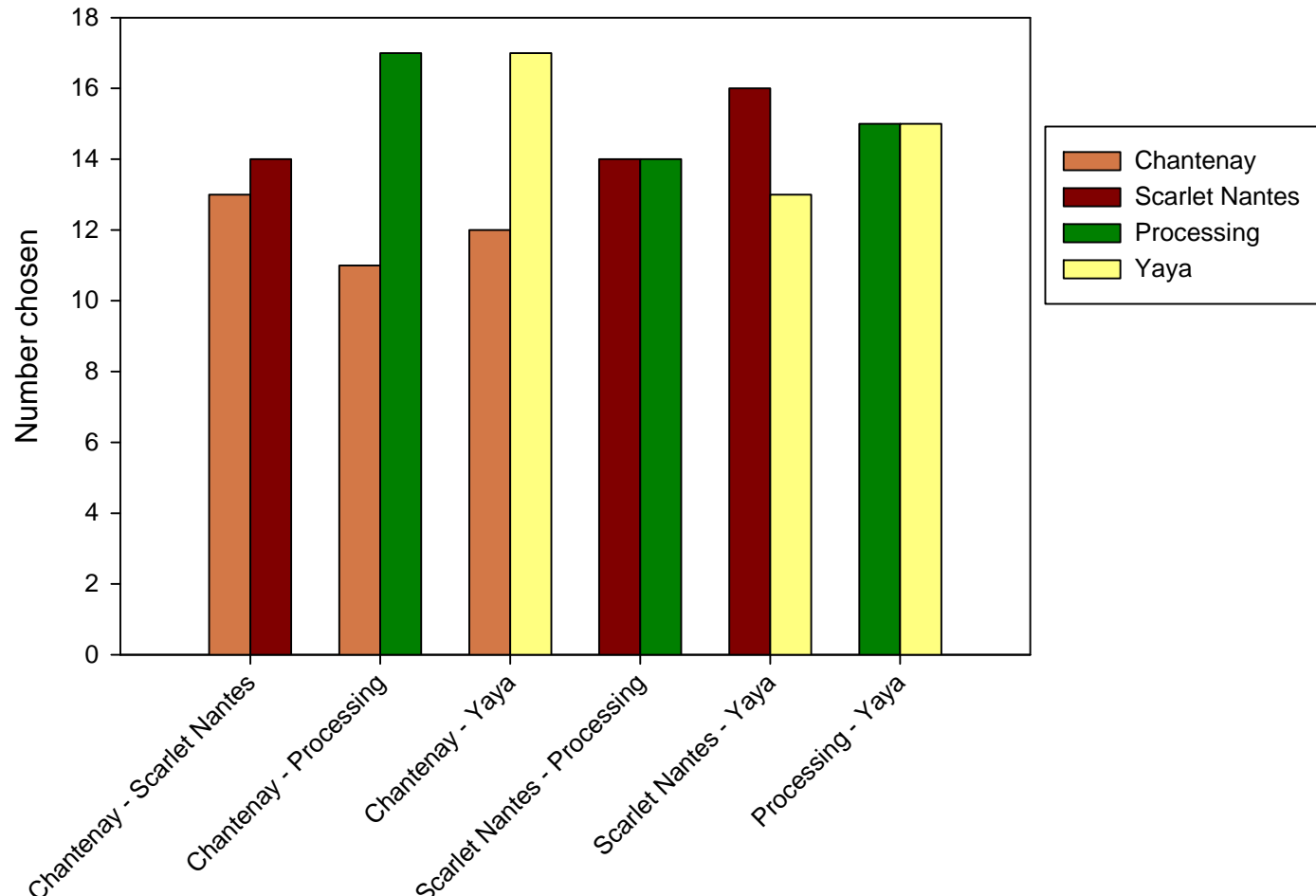
- Wireworms stored in moist soil for 4 months...hungry wireworms!
- Plexiglass chambers filled with loamy sand soil



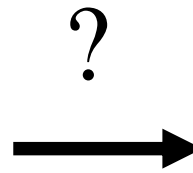
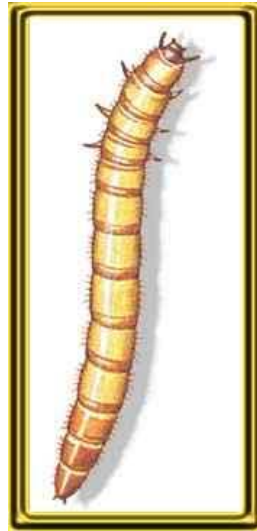
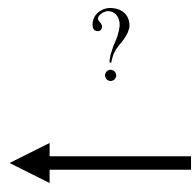
# “Push”



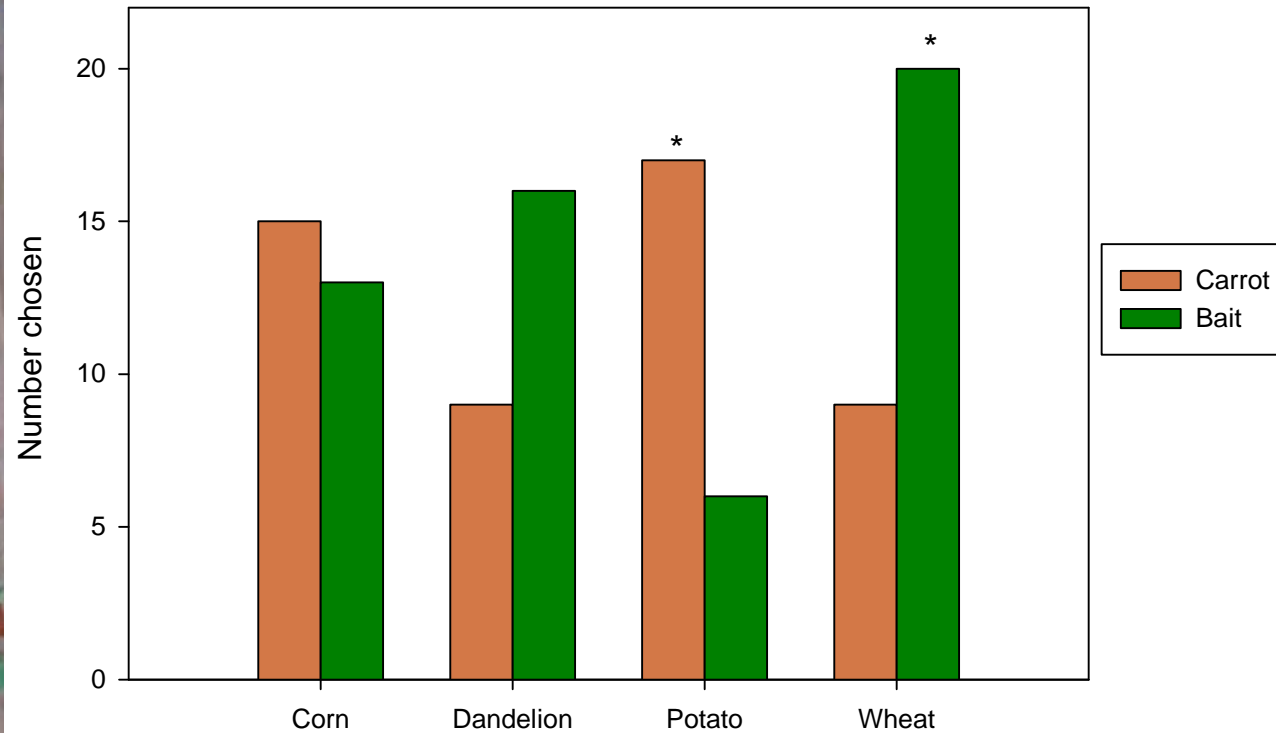
# Do Carrot Varieties Differ in Attractiveness?



# “Pull”



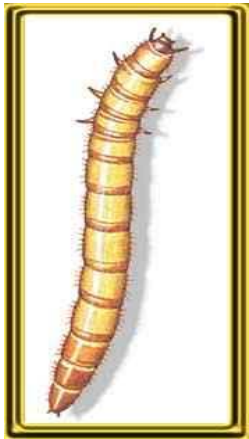
# Wheat May Serve as a Trap Crop



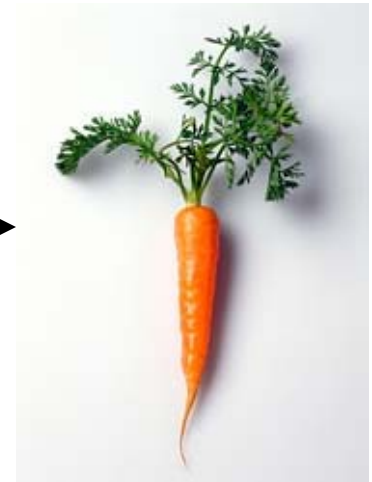
Bait Preference Rating: -4                      +8                      -18                      +17

\* Significantly more chosen than expected by chance,  $p < 0.05$

# “Immobilize”



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Diatomaceous Earth

# Acknowledgments

- Dr Andrew Hammermeister - Organic Agriculture Centre of Canada, NSAC
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# Questions?

