

Interactions of cover crop-irrigation on the growth & borer attacks of red maples in nursery systems



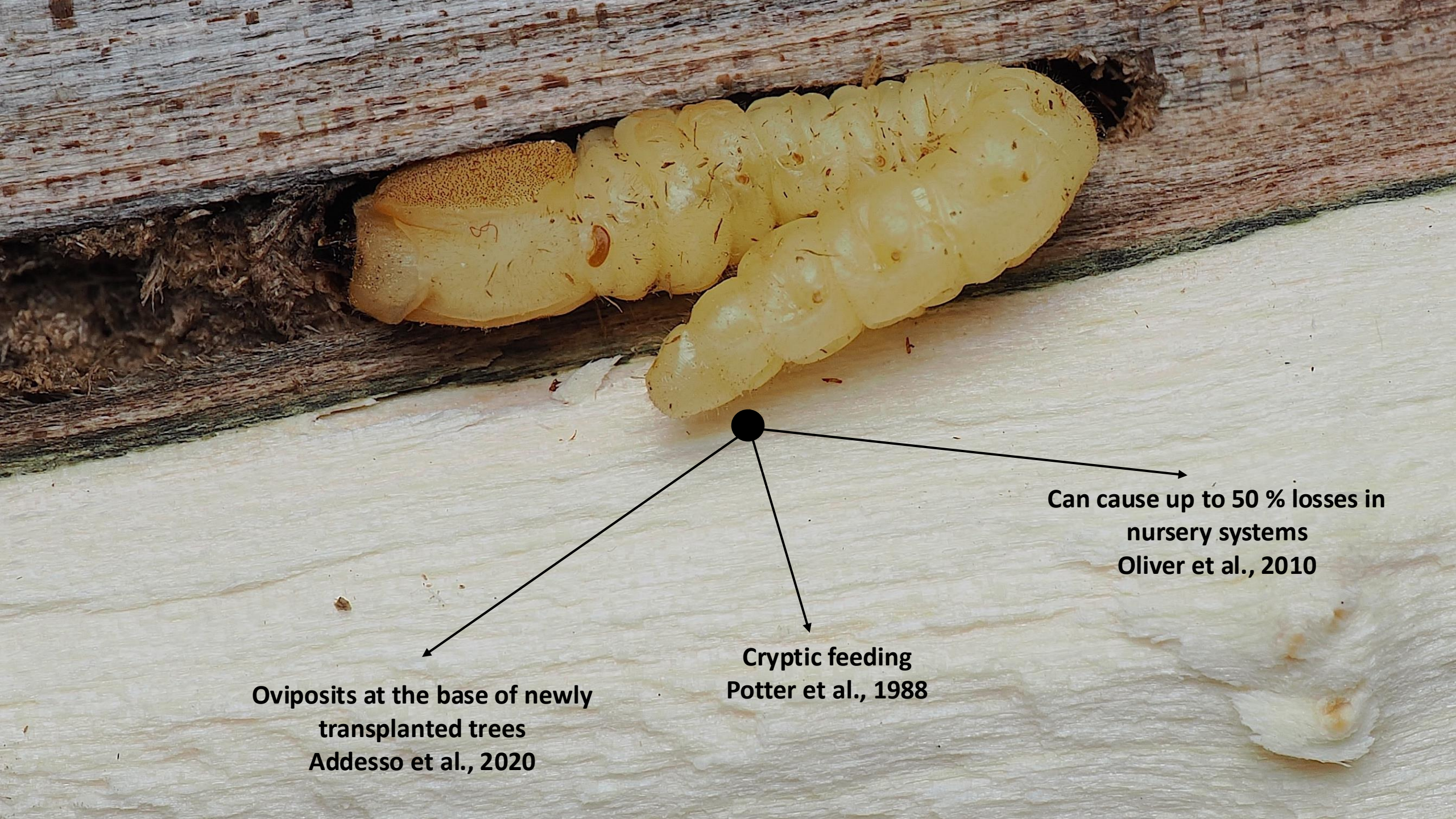
Alfred Johnson, Karla Adesso
Anthony Witcher & Jason Oliver



TENNESSEE
STATE UNIVERSITY



Importance of red maples in United States (Frank et al., 2013)



Oviposits at the base of newly
transplanted trees
Addesso et al., 2020

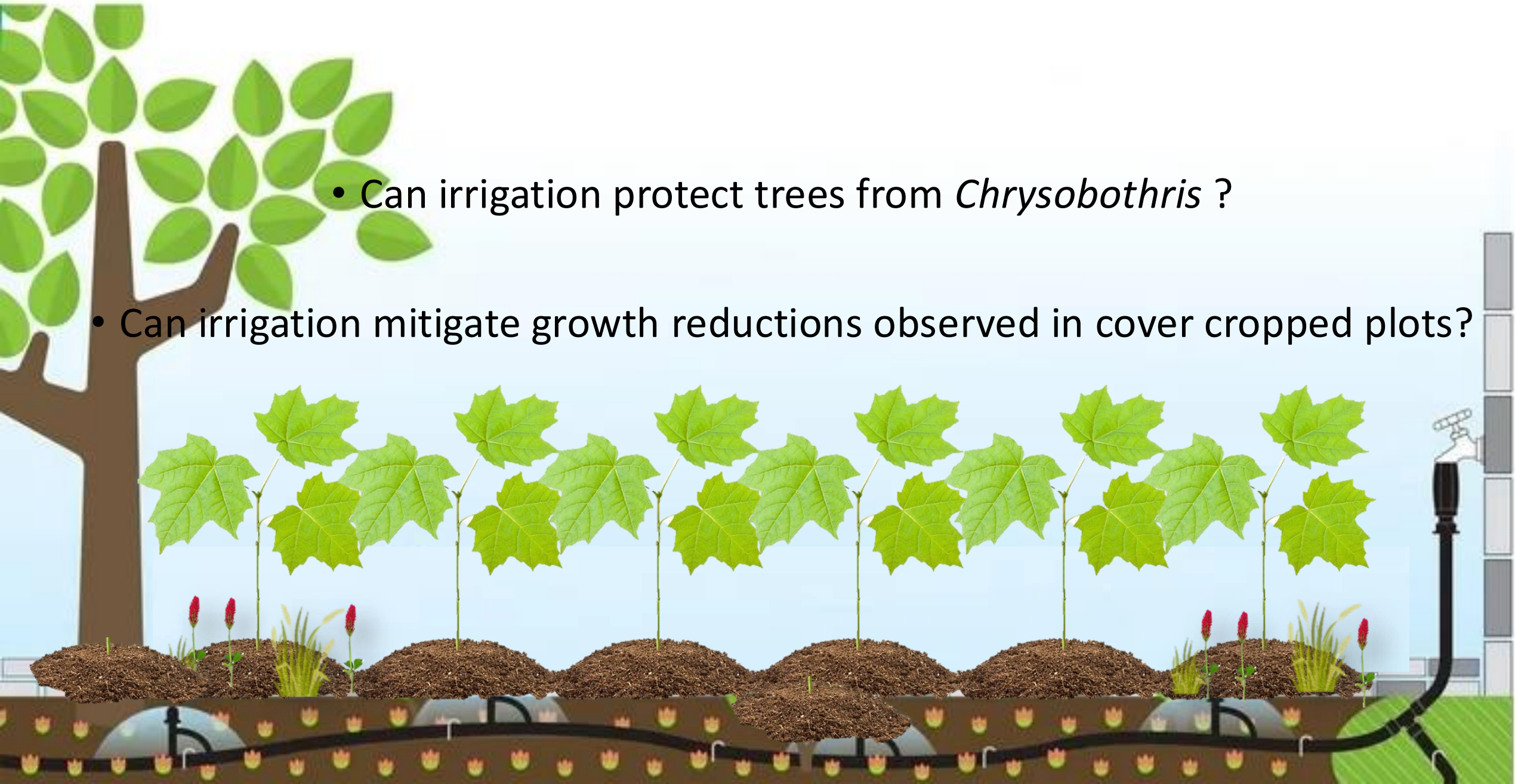
Cryptic feeding
Potter et al., 1988

Can cause up to 50 % losses in
nursery systems
Oliver et al., 2010

Using Winter Cover Crops to Reduce *Chrysobothris* Incidence (Dawadi et al., 2019; Gonzalez et al., 2023)

Questions to be answered ..

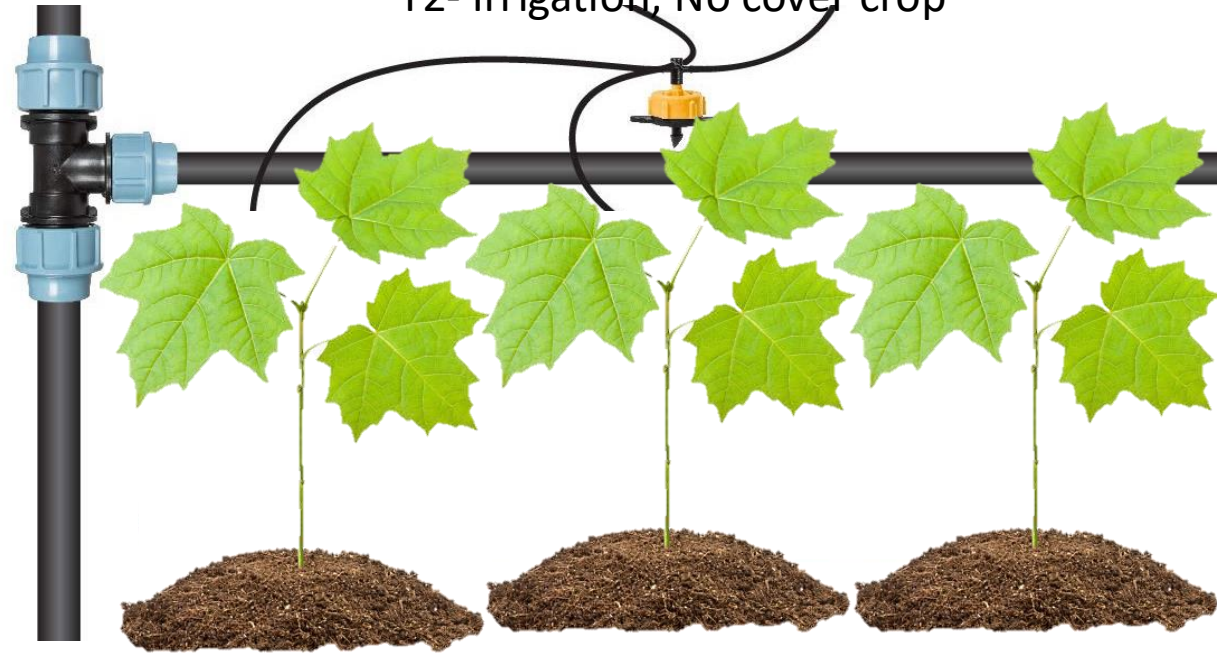
- Can irrigation protect trees from *Chrysobothris* ?
- Can irrigation mitigate growth reductions observed in cover cropped plots?



T1- No irrigation; No cover crop



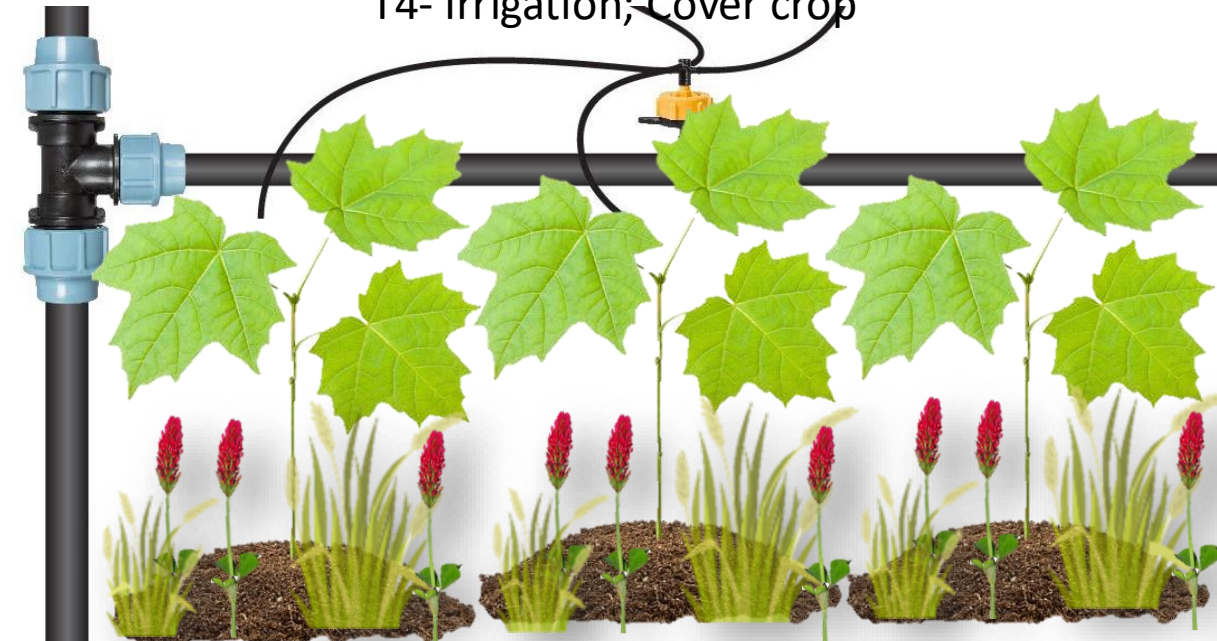
T2- Irrigation; No cover crop

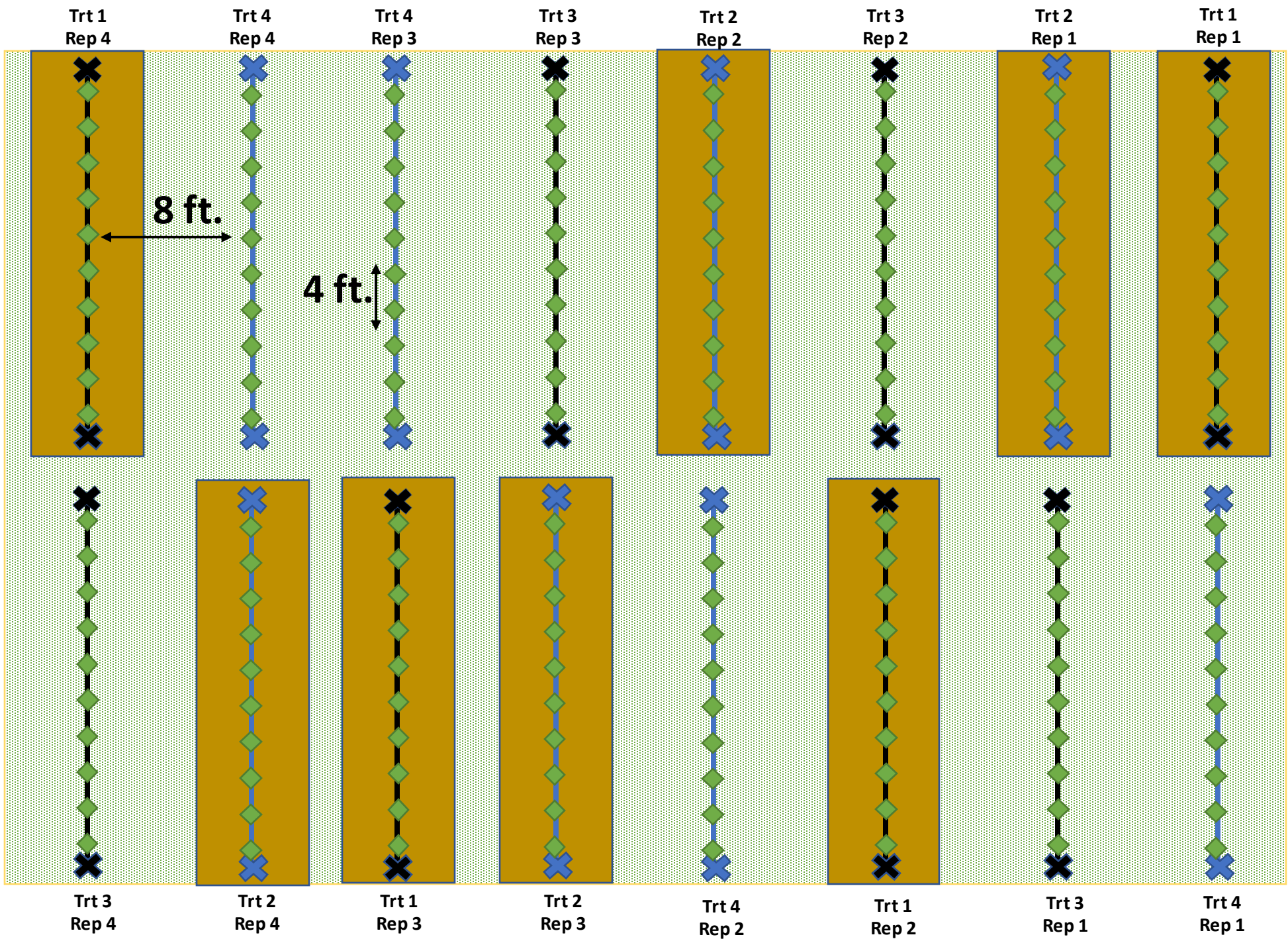


T3- No irrigation; cover crop



T4- Irrigation; Cover crop





- October Glory
- 160 trees in total
- RCBD
- 4 treatments
- 4 replications
- 10 trees per replication



Pic: Prof. Adesso

Cover and No Cover Blocks

No Irrigation blocks



Irrigation blocks



What have we collected ?

- Foliar pests and disease pressure

- Beneficials in cover crop

- Leaf vapor pressure

- SPAD readings

- Trunk Temperature

- Soil moisture

- Leaf area



WinFOLIA™
Leaf Area and Morphology

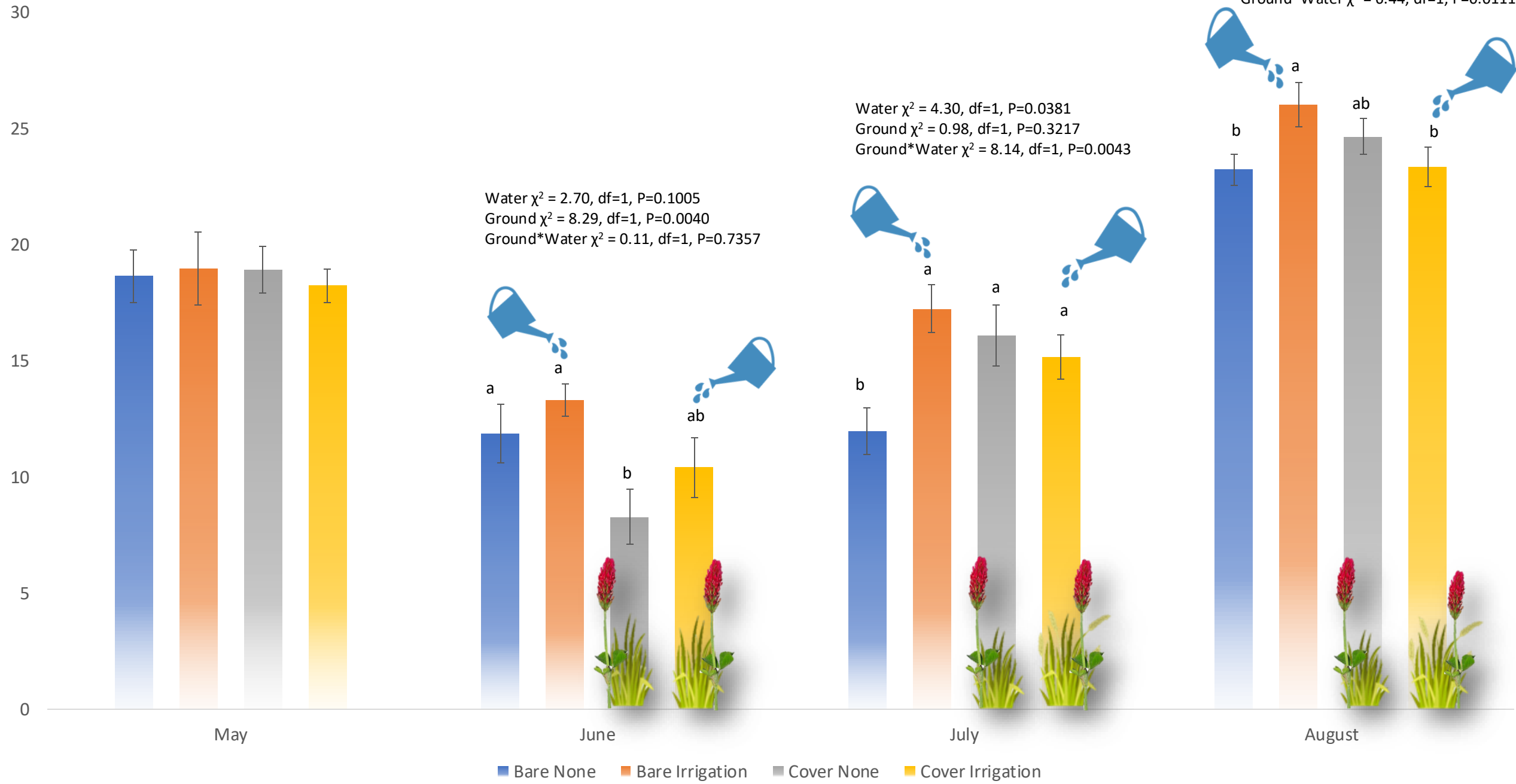
- Tree growth



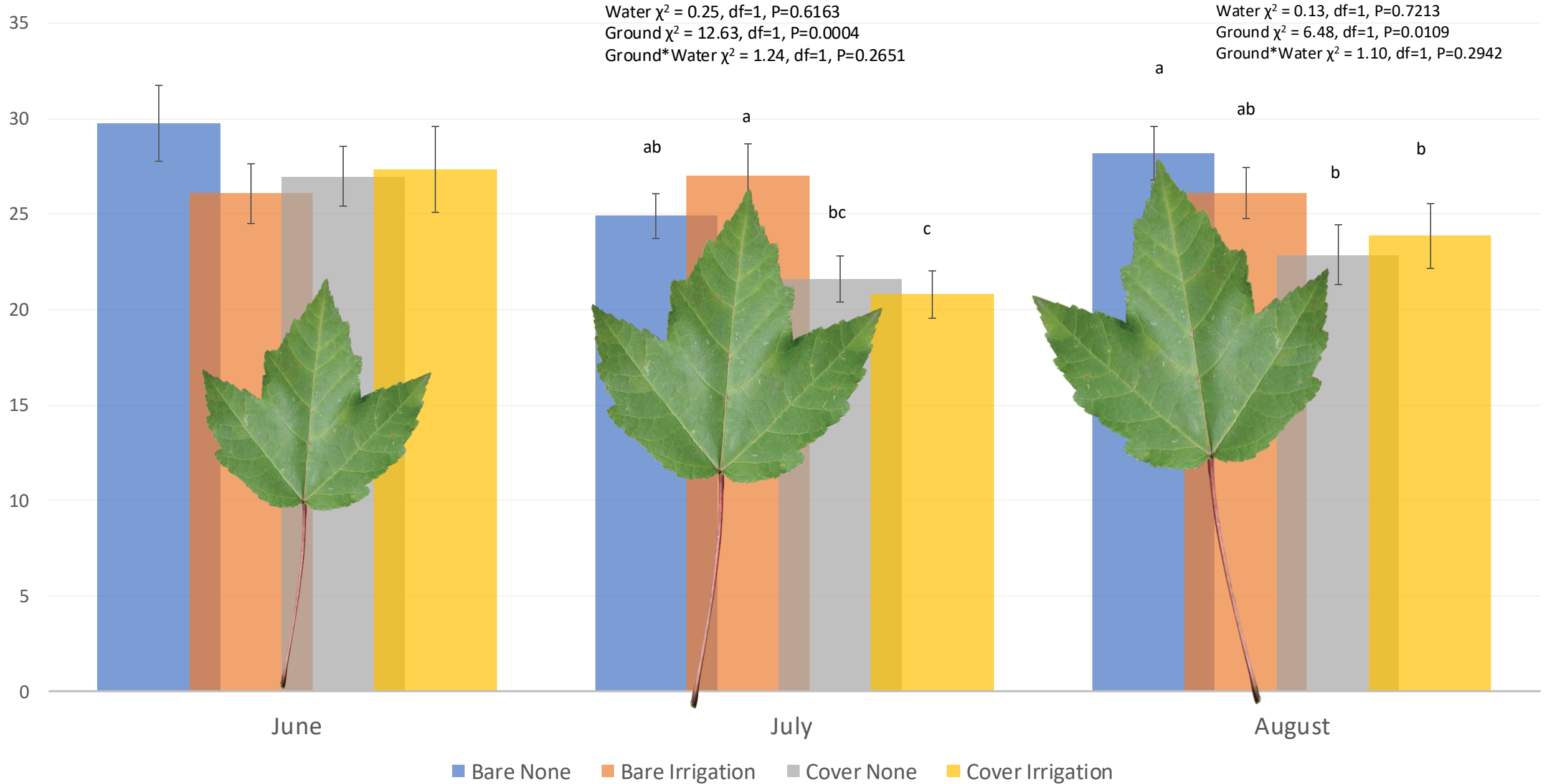
- Flatheaded borer attacks



SOIL MOISTURE



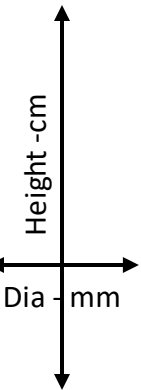
Leaf Area



Tree Growth

Diameter
Water F = 6.13, df= 1, 110, P = 0.03
Ground F= 119.0, df=1,110, P<0.0001

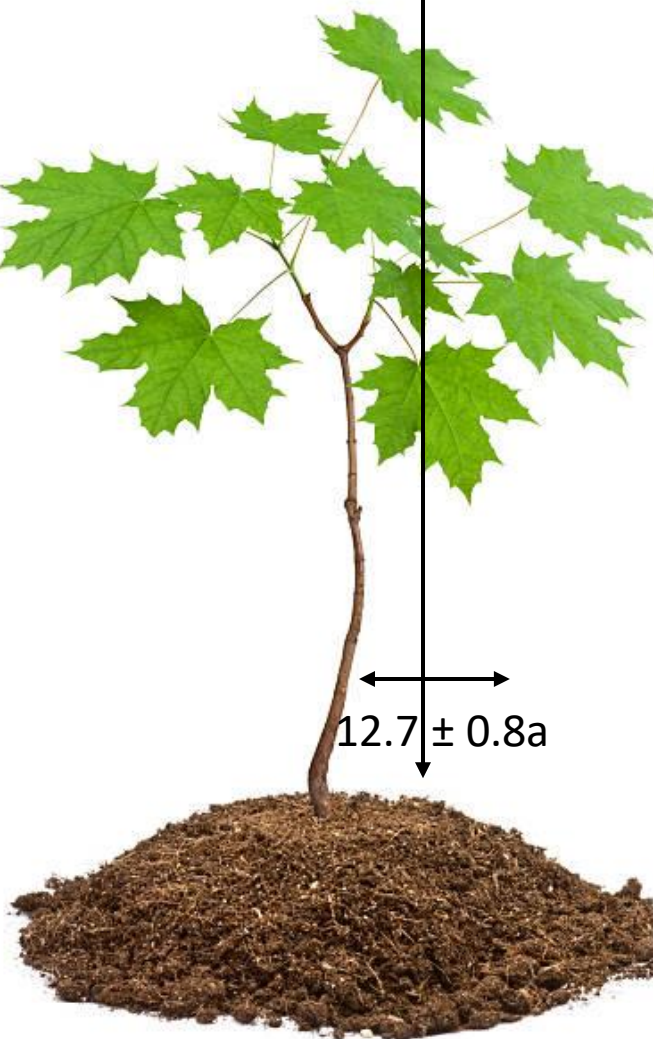
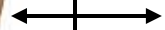
Height
Water F = 4.4, df= 1, 110, P = 0.03
Ground F= 39.2, df=1,110, P<0.0001



$41.8 \pm 4.7a$



$12.7 \pm 0.8a$

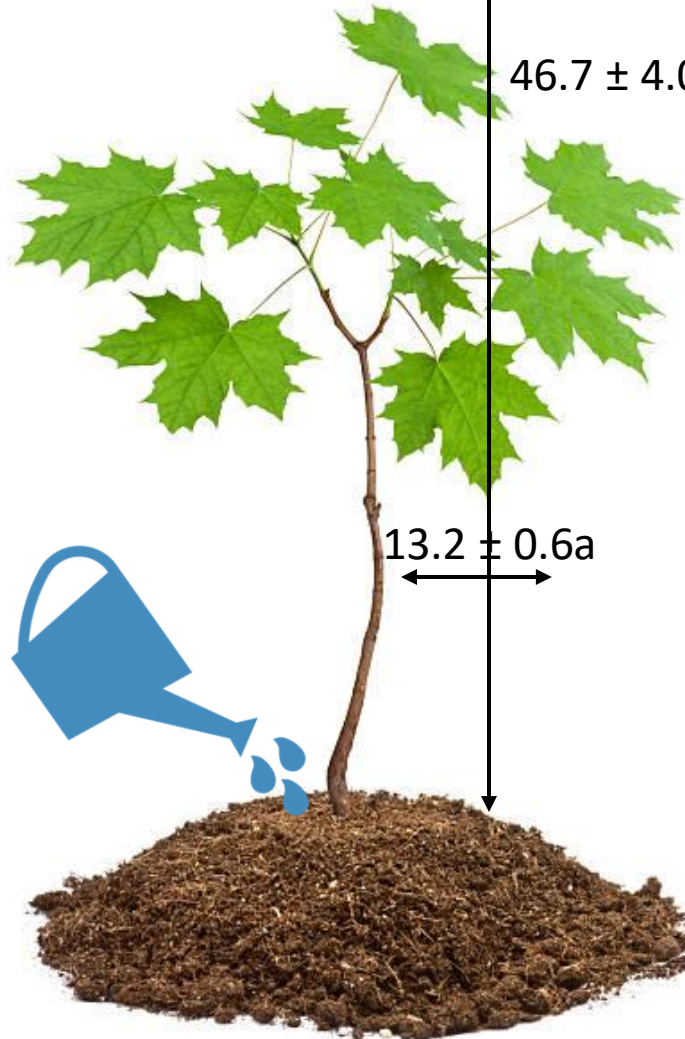


Bare None

$46.7 \pm 4.0a$



$13.2 \pm 0.6a$

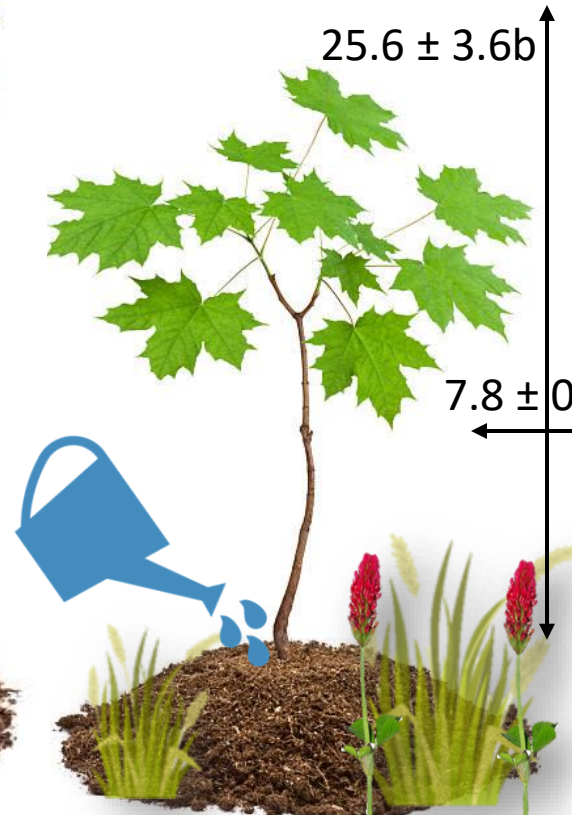


Bare Irrigation

$25.6 \pm 3.6b$



$7.8 \pm 0.4b$

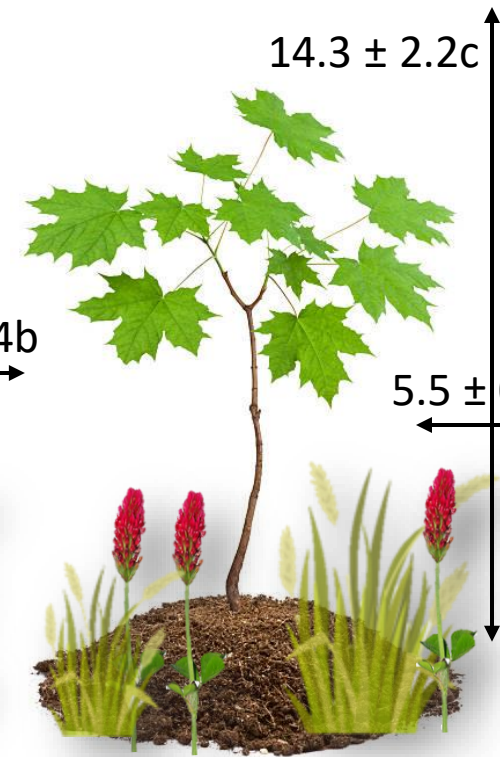


Cover Irrigation

$14.3 \pm 2.2c$



$5.5 \pm 0.4c$



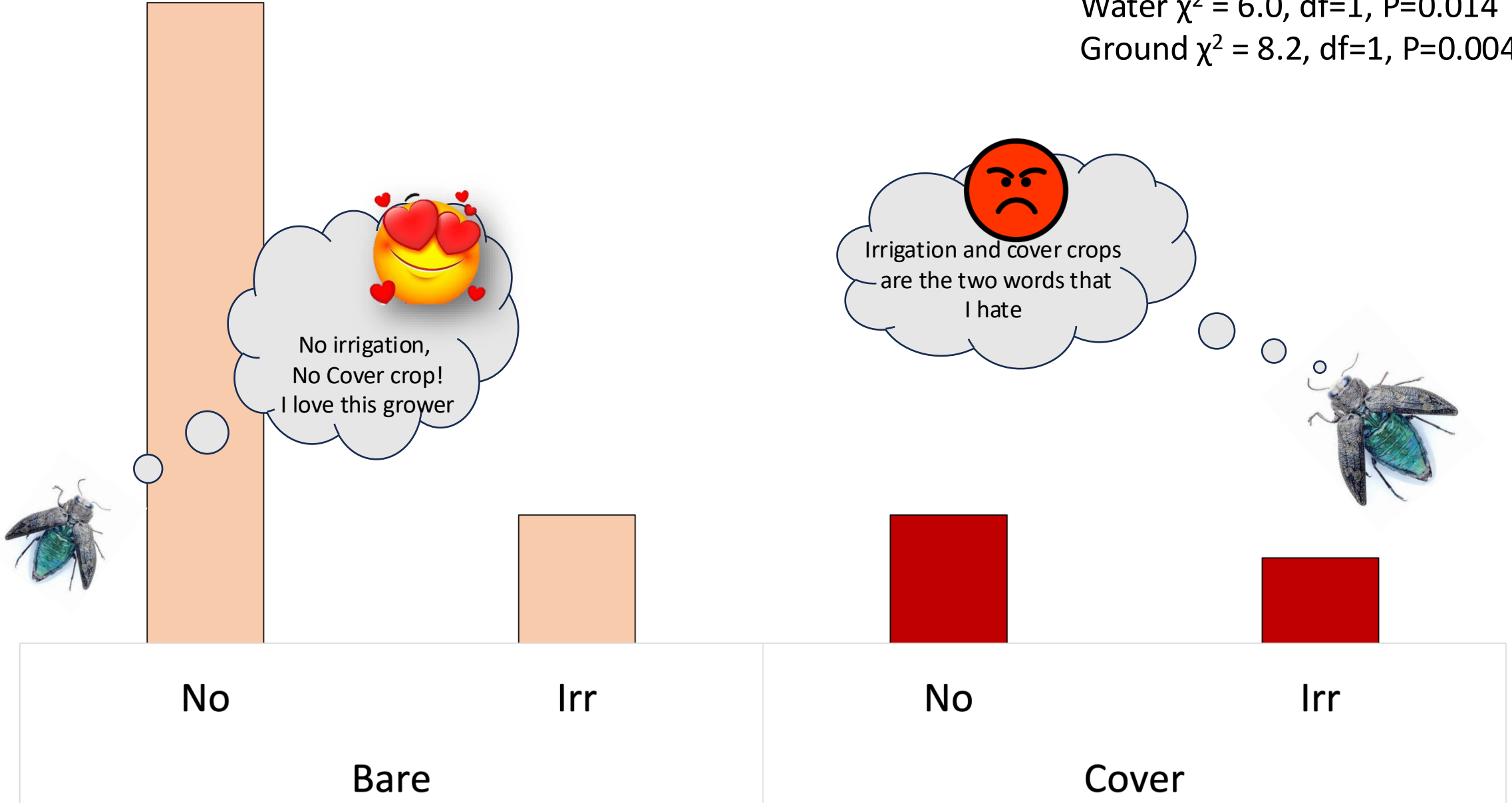
Cover None

Borer Attacks on Red Maple

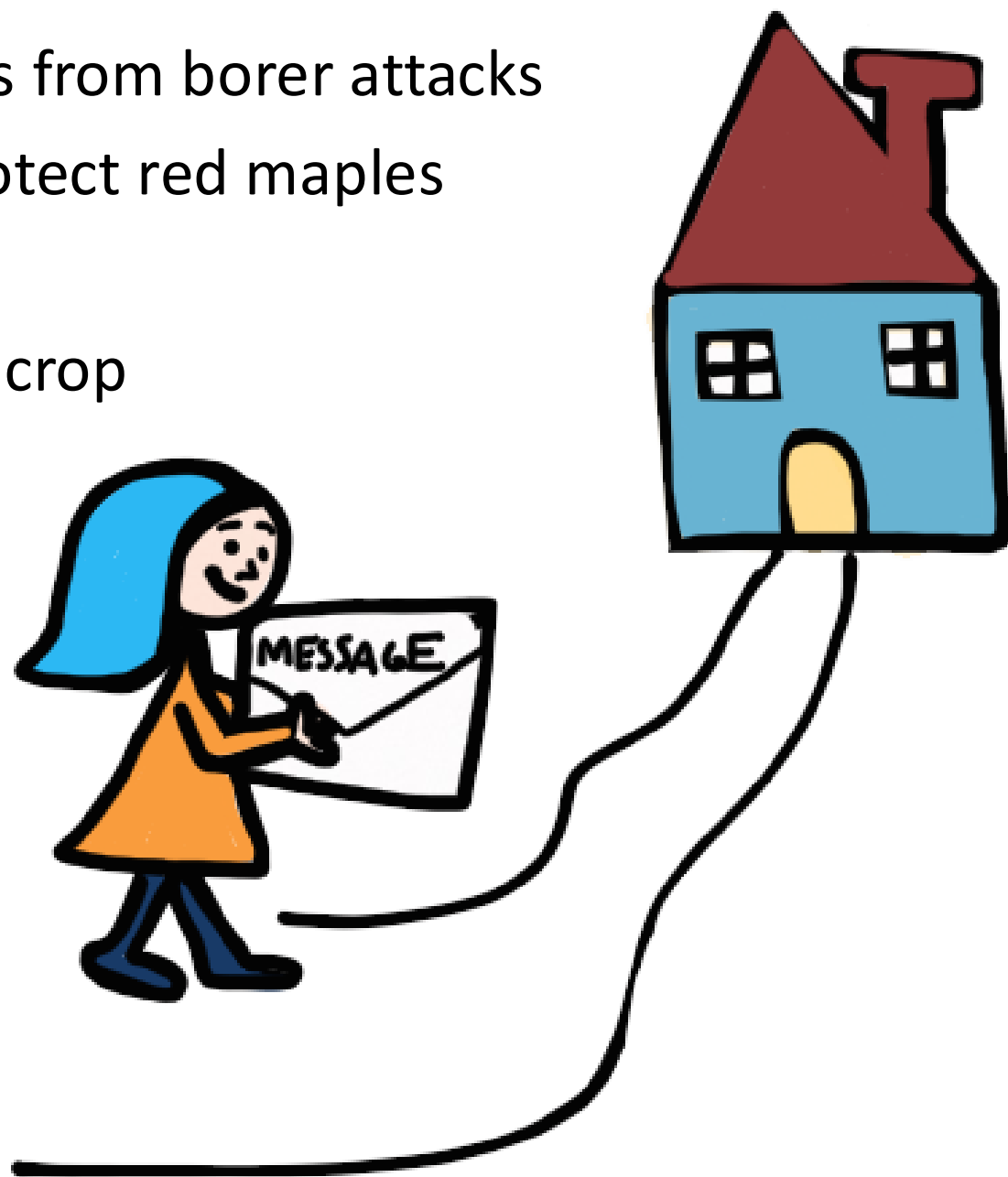
Water $\chi^2 = 6.0$, $df=1$, $P=0.014$
Ground $\chi^2 = 8.2$, $df=1$, $P=0.004$

Number of Attacks

16
14
12
10
8
6
4
2
0



- Winter cover crops can protect red maples from borer attacks
- Irrigating newly transplanted trees can protect red maples
- If you can, irrigate new transplants
- If you can't irrigate, consider winter cover crop
- Irrigation tests will be repeated in 2024





United States Department of Agriculture
National Institute of Food and Agriculture



Acknowledgements

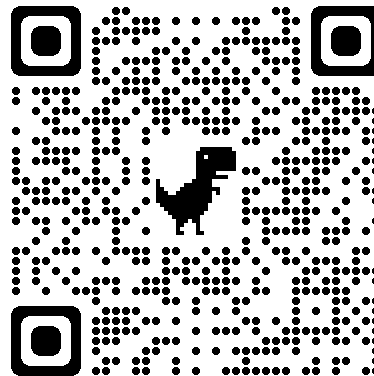
Addesso Lab

Paul O'Neal
Kripa Dhakal
Angelo Wood
Cheyenne Morales

Witcher Lab

Grayson Delay
Terry Kirby

www.stopfhb.com



These projects have been funded by
SSARE (OS14-084, LS18-287) and USDA-
SCRI (2020-51181-32199)

Questions?

Dr. Karla Adesso

kaddesso@tnstate.edu

931-815-5155

