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

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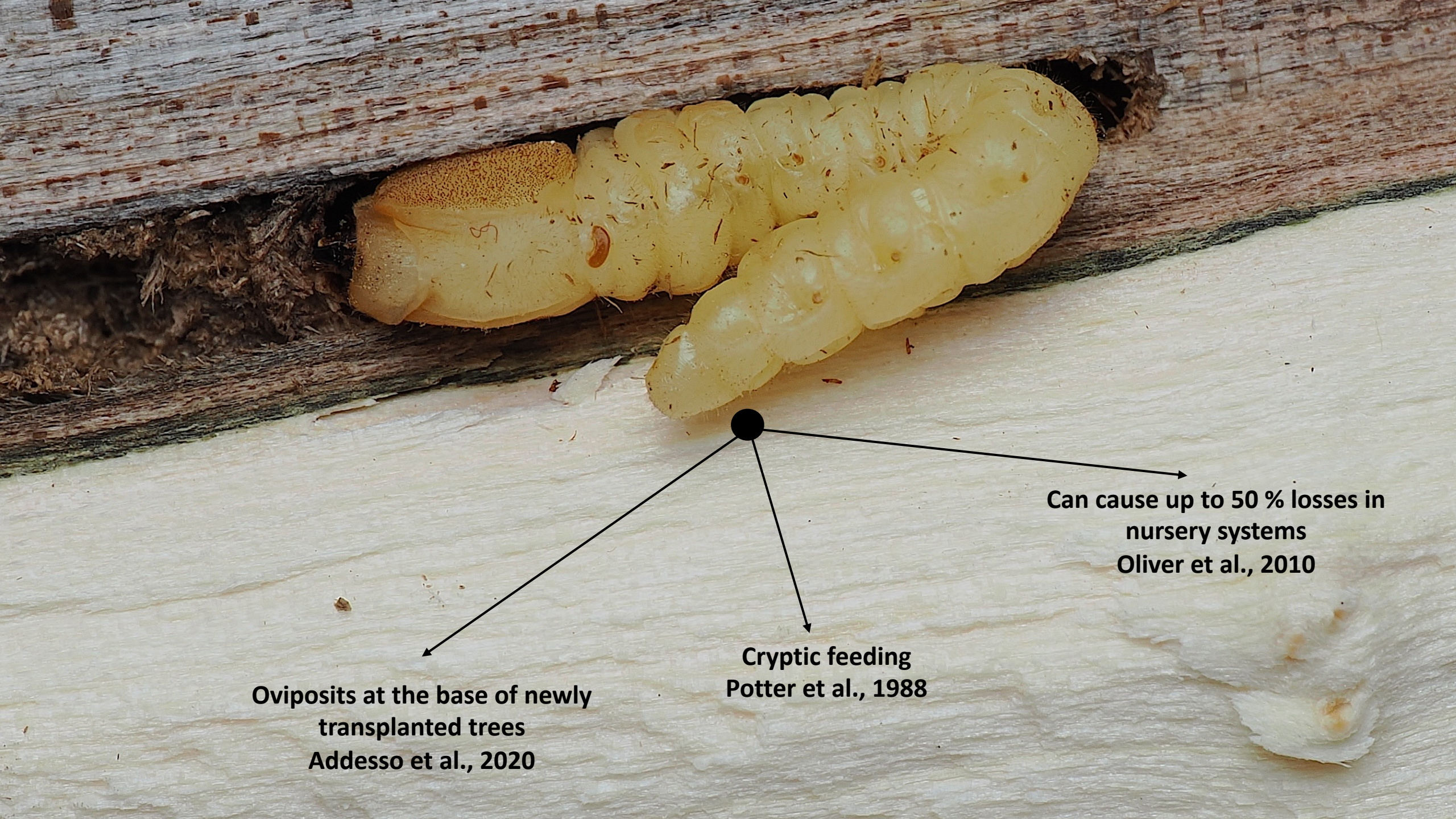
Importance of red maples in United States (Frank et al., 2013)


Can cause up to 50 % losses in nursery systems
Oliver et al., 2010
Cryptic feeding
Potter et al., 1988
Oviposits at the base of newly transplanted trees
Addesso et al., 2020

Source: No Till Growers

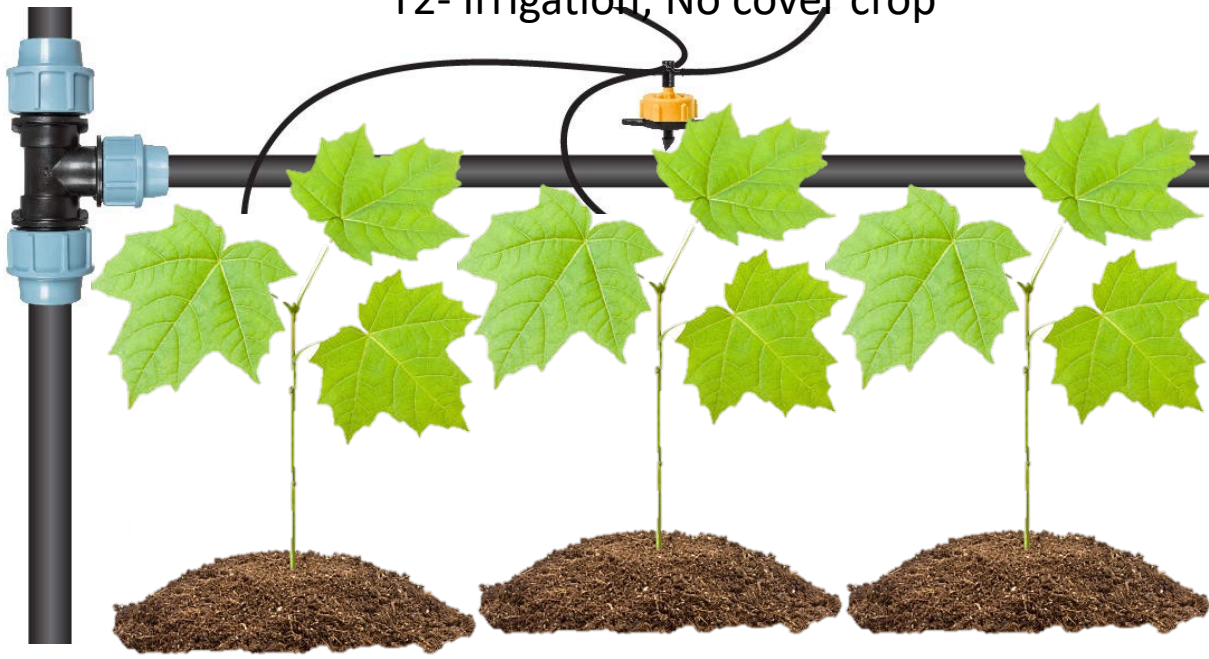
Using Winter Cover Crops to Reduce *Chrysobothris* Incidence (Dawadi et al., 2019; Gonzalez et al.,2023)

Questions to be answered ..

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

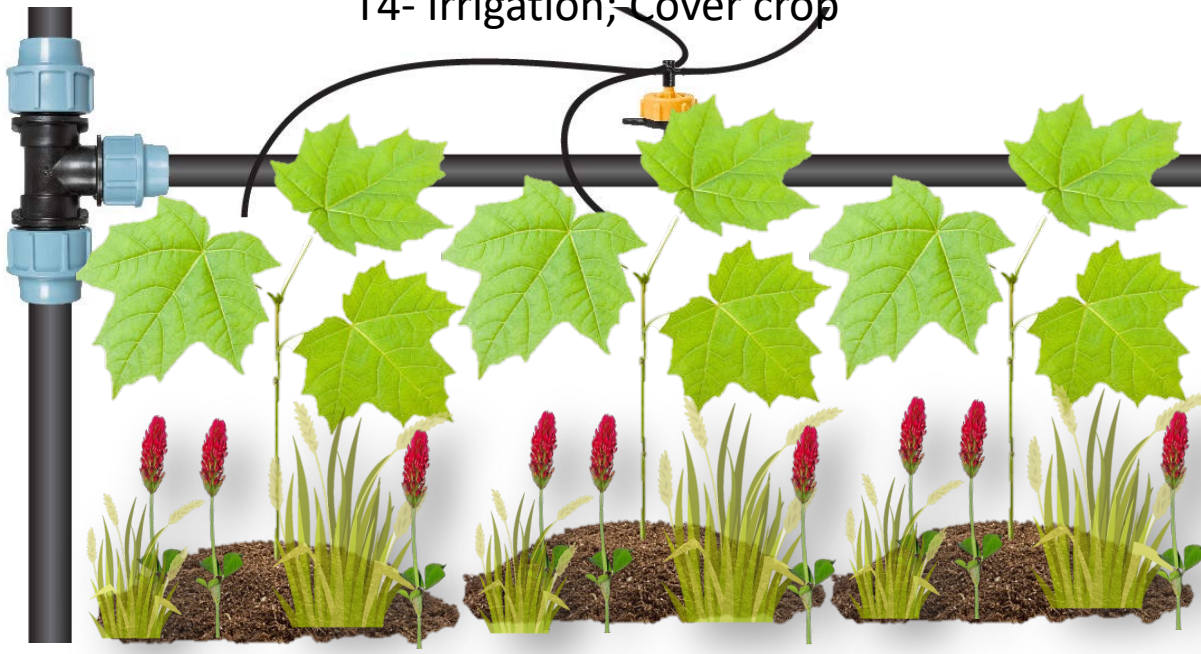
T1- No irrigation; No cover crop

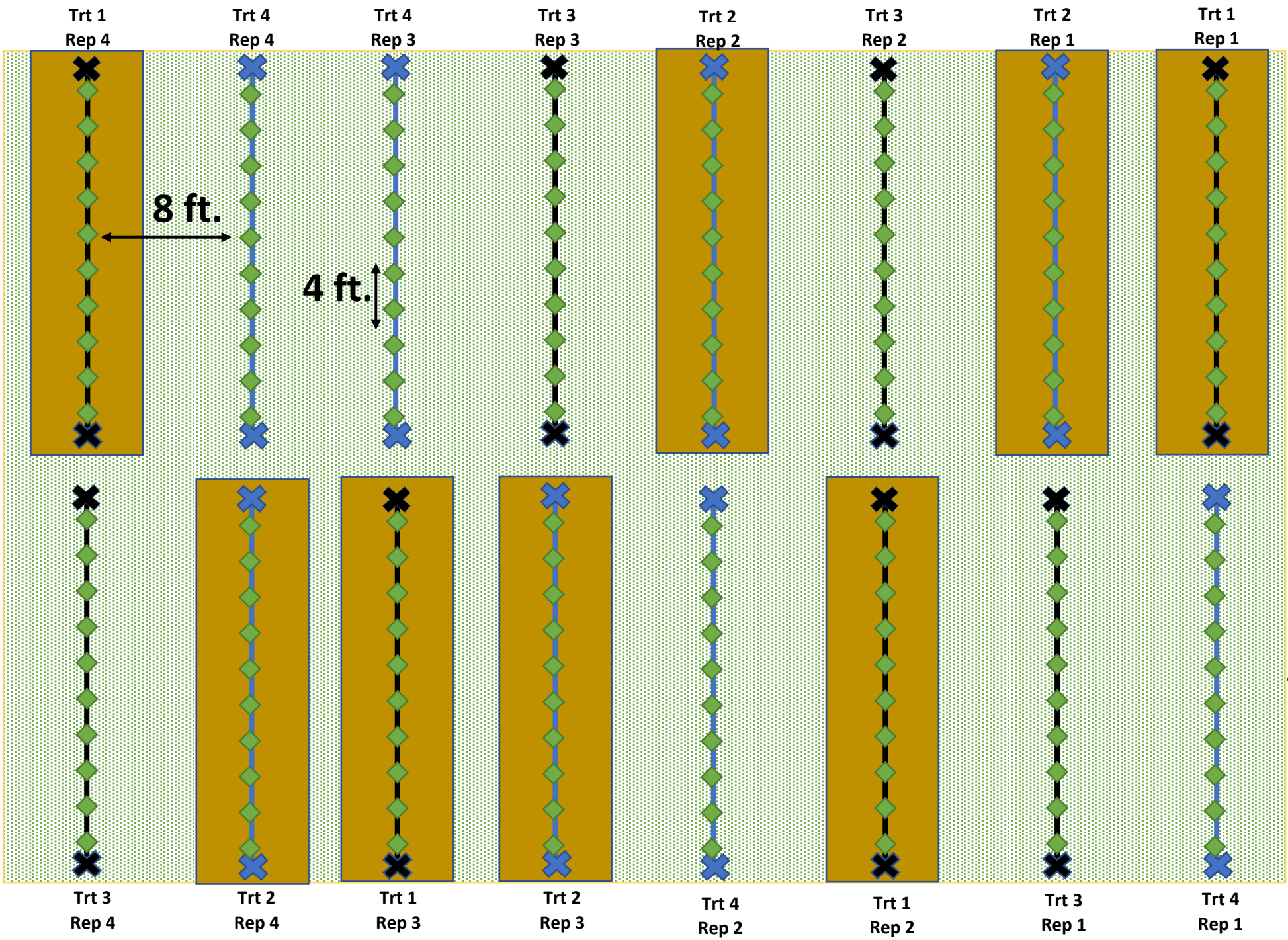
T2- Irrigation; No cover crop



T3- No irrigation: cover crop

T4- Irrigation; Cover crop





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

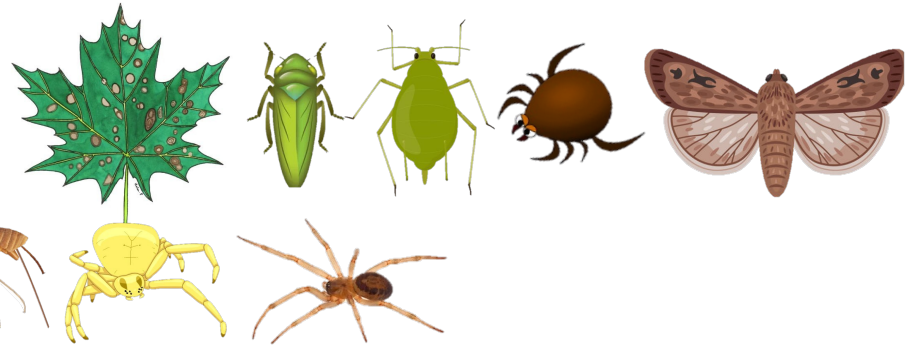
Cover and No Cover Blocks

No Irrigation blocks

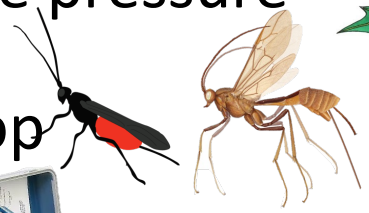
Irrigation blocks

What have we collected ?

- Foliar pests and disease pressure



- Beneficials in cover crop



- Leaf vapor pressure

- SPAD readings

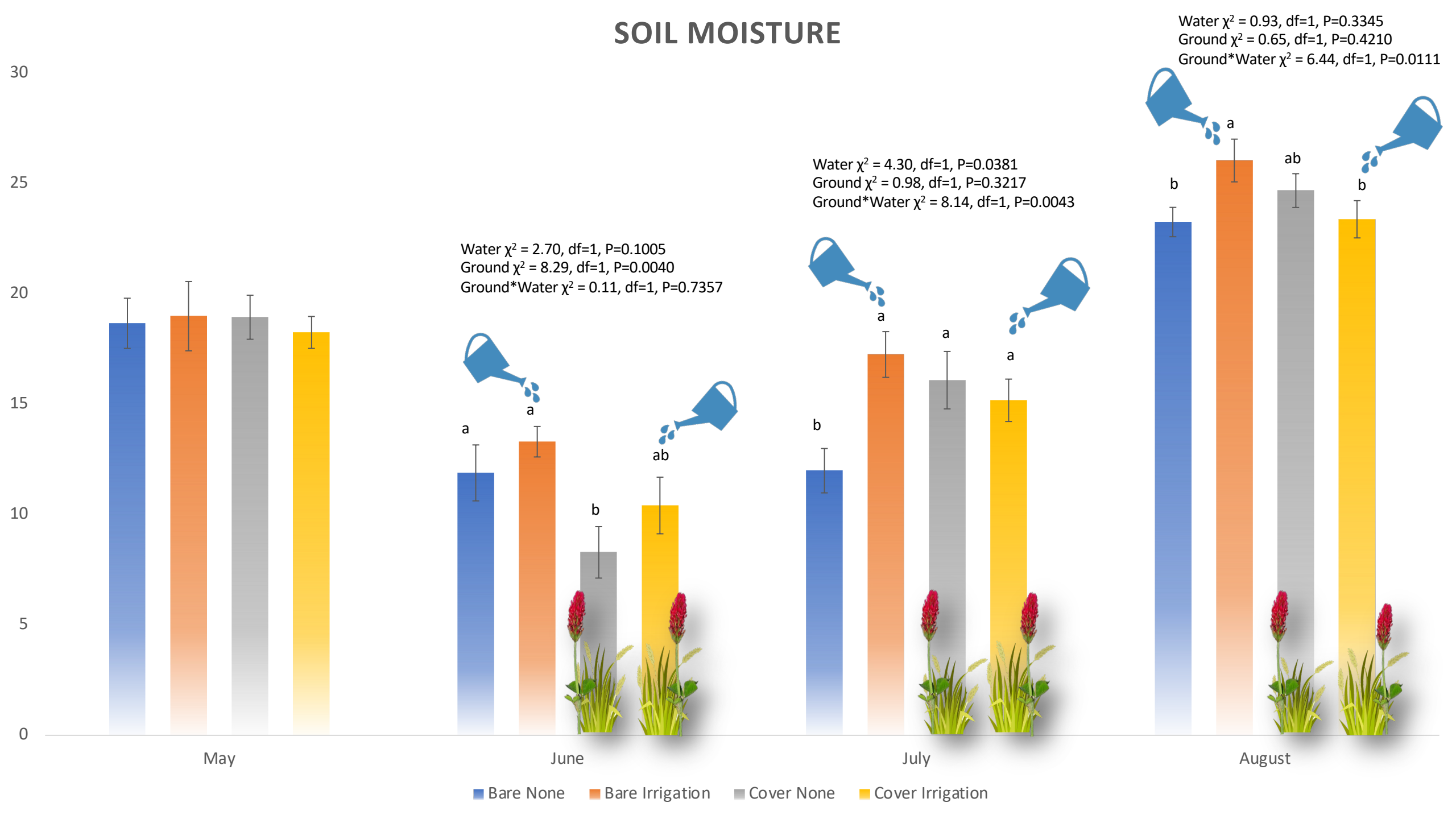
- Trunk Temperature

- Soil moisture

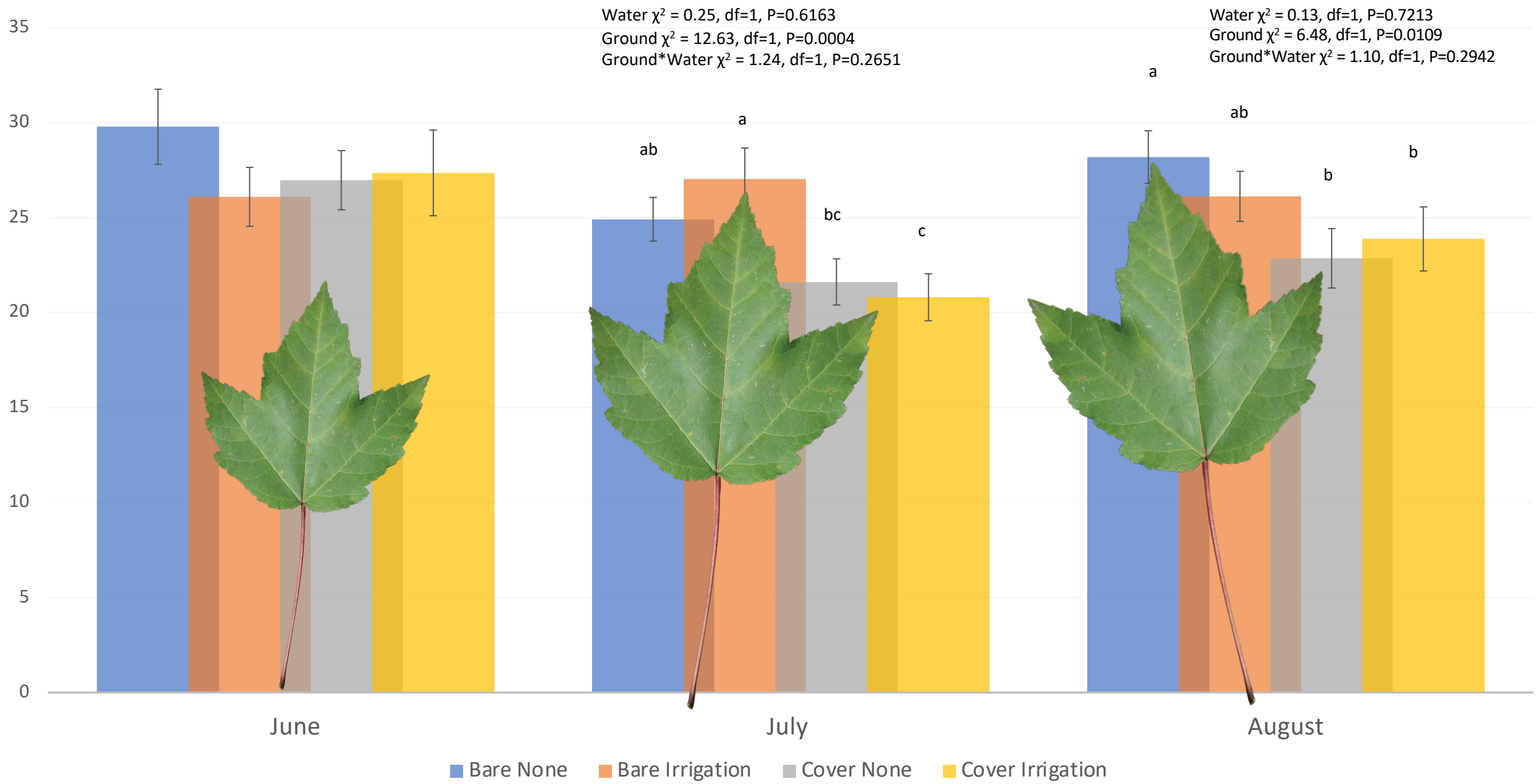
- Leaf area

- Tree growth

- Flatheaded borer attacks


SOIL MOISTURE
Water χ^2 = 0.93, df=1, P=0.3345
Ground χ^2 = 0.65, df=1, P=0.4210
Ground*Water χ^2 = 6.44, df=1, P=0.0111
Water χ^2 = 4.30, df=1, P=0.0381
Ground χ^2 = 0.98, df=1, P=0.3217
Ground*Water χ^2 = 8.14, df=1, P=0.0043
Water χ^2 = 2.70, df=1, P=0.1005
Ground χ^2 = 8.29, df=1, P=0.0040
Ground*Water χ^2 = 0.11, df=1, P=0.7357
30
25
20
15
10
5
0
a
a
b
ab
b
a
a
a
b
a
ab
b
May
June
July
August
Bare None
Bare Irrigation
Cover None
Cover Irrigation

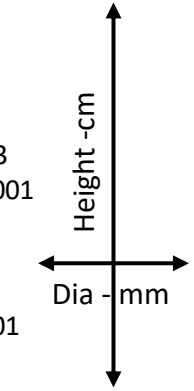
Leaf Area

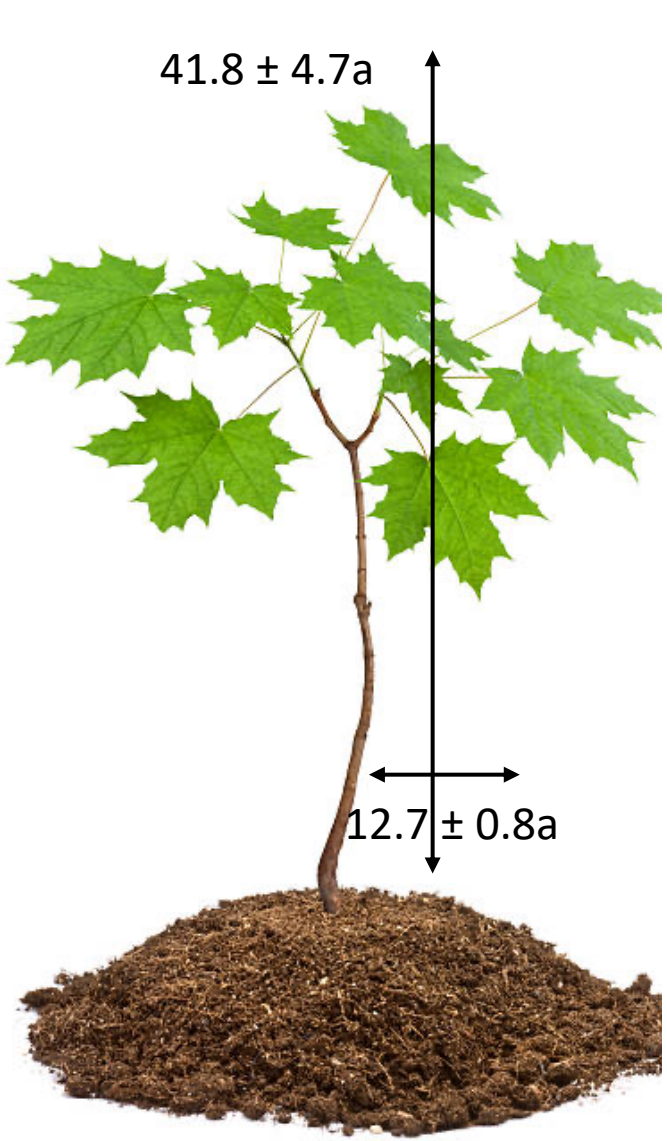

Water χ^2 = 0.25, df=1, P=0.6163
Ground χ^2 = 12.63, df=1, P=0.0004
Ground*Water χ^2 = 1.24, df=1, P=0.2651
Water χ^2 = 0.13, df=1, P=0.7213
Ground χ^2 = 6.48, df=1, P=0.0109
Ground*Water χ^2 = 1.10, df=1, P=0.2942
35
30
25
20
15
10
5
0
a
ab
ab
a
bc
c
b
b
June
July
August
Bare None
Bare Irrigation
Cover None
Cover Irrigation

Tree Growth

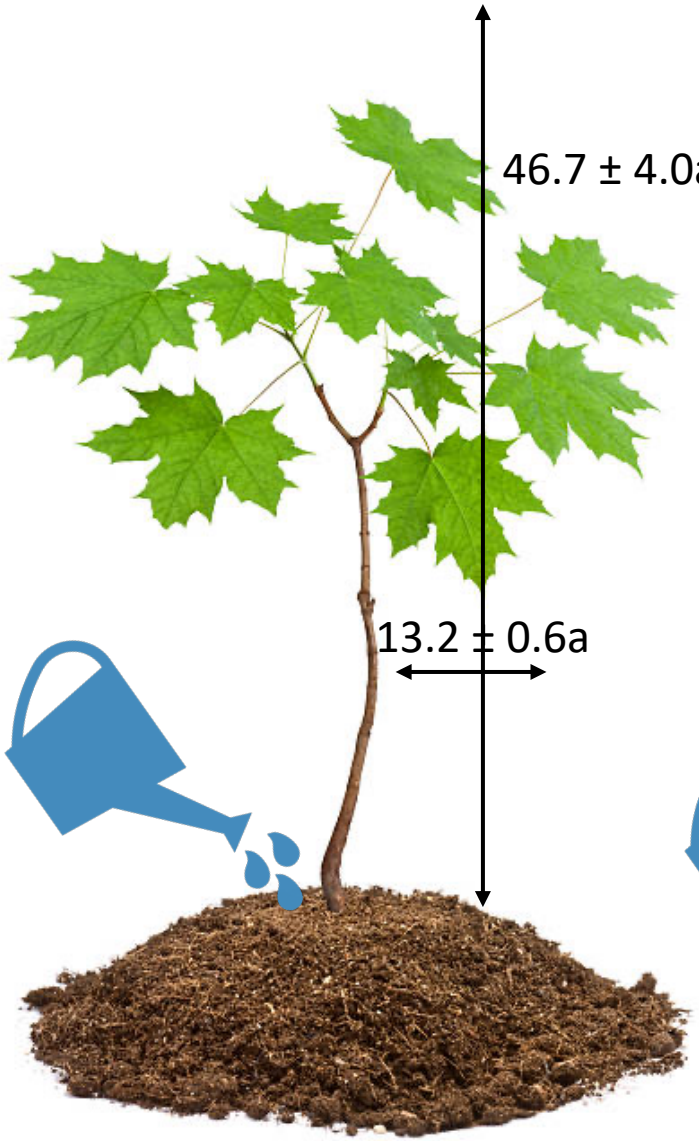
Diameter
Water F = 6.13, df= 1, 110, P = 0.03
Ground F= 119.0, df=1,110, P<0.0001

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

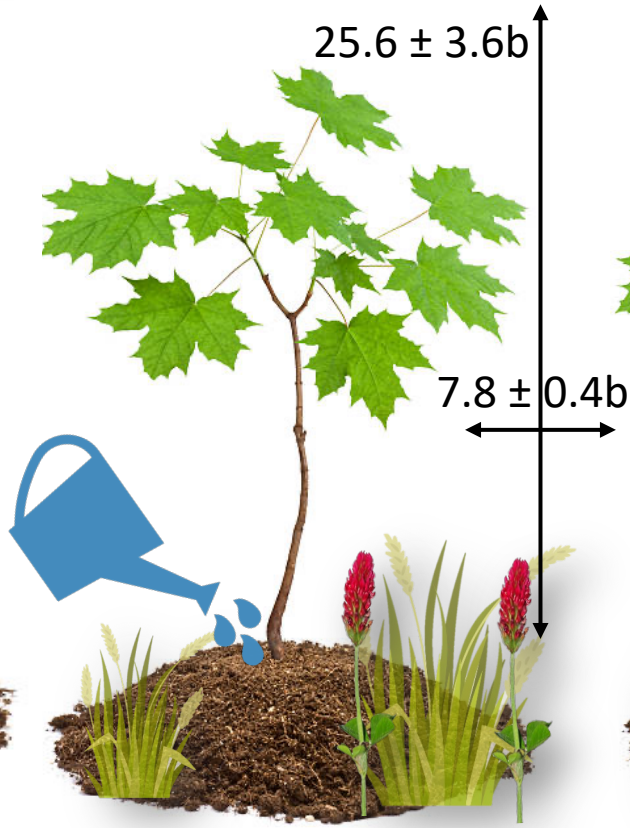




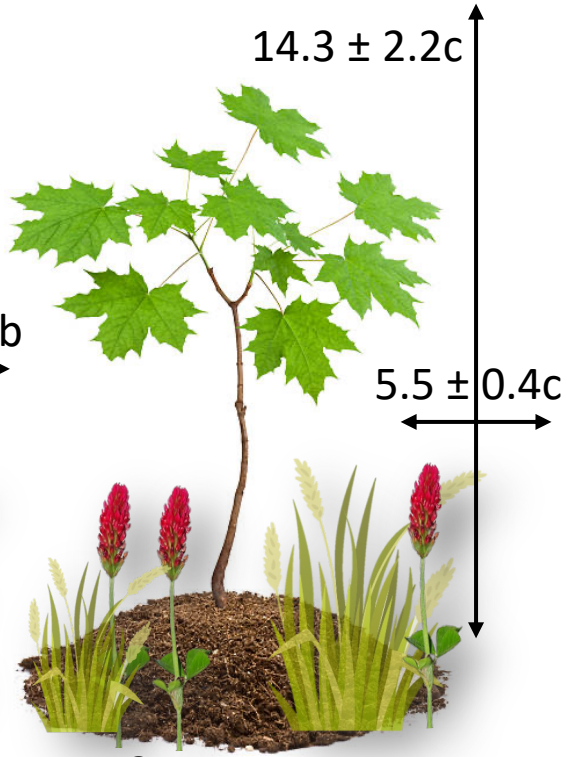
Bare None



Bare Irrigation



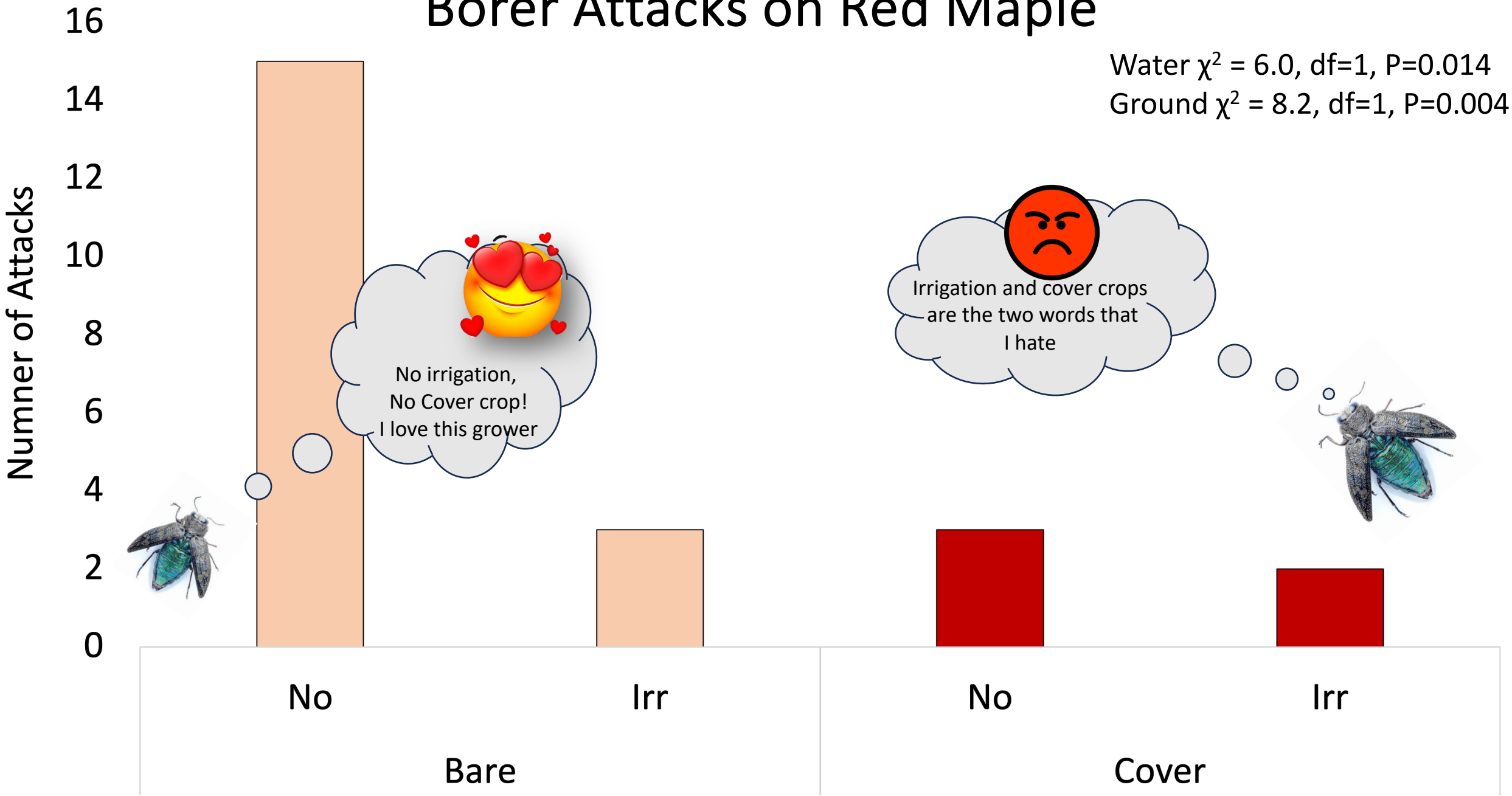
Cover Irrigation



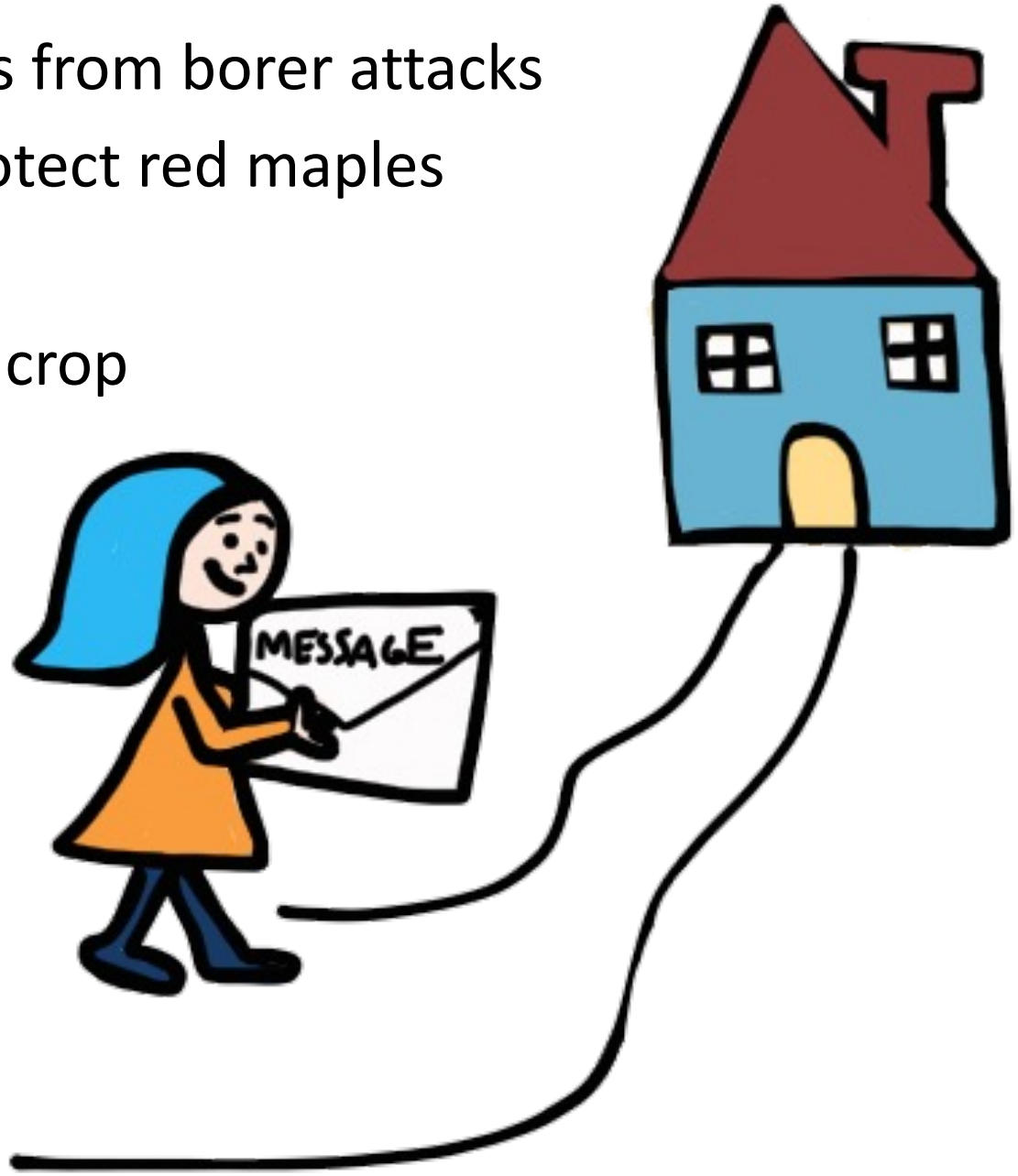
Cover None

Borer Attacks on Red Maple

Water χ^2 = 6.0, df=1, P=0.014
Ground χ^2 = 8.2, df=1, P=0.004



- 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



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Questions?

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