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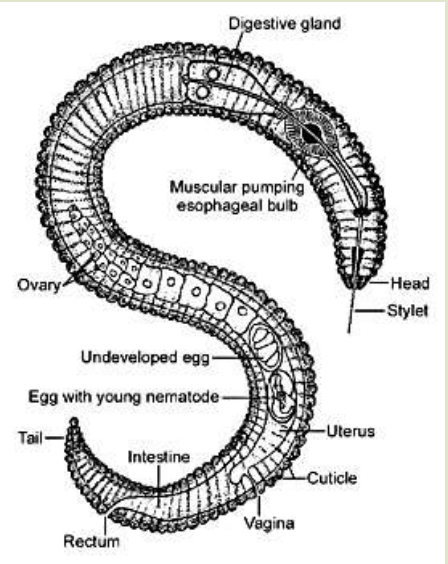
Metabolomic Analysis of Sting Nematode Tolerance in Bermudagrass



Credit: R.P. Esser, Florida Department of Agriculture and Consumer

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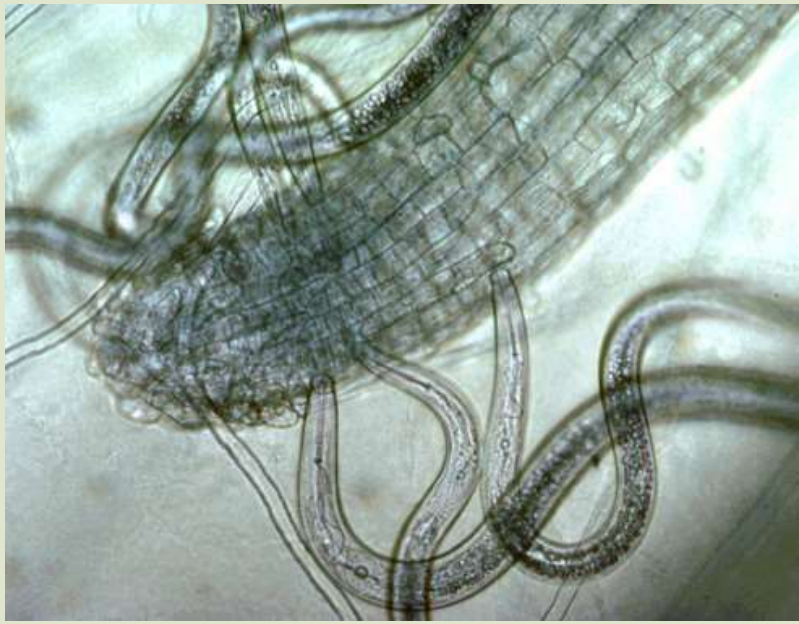


Credit: J. O. Becker, University of California, Riverside.

Credit: W.T. Crow. UF/IFAS Entomology and Nematology Department

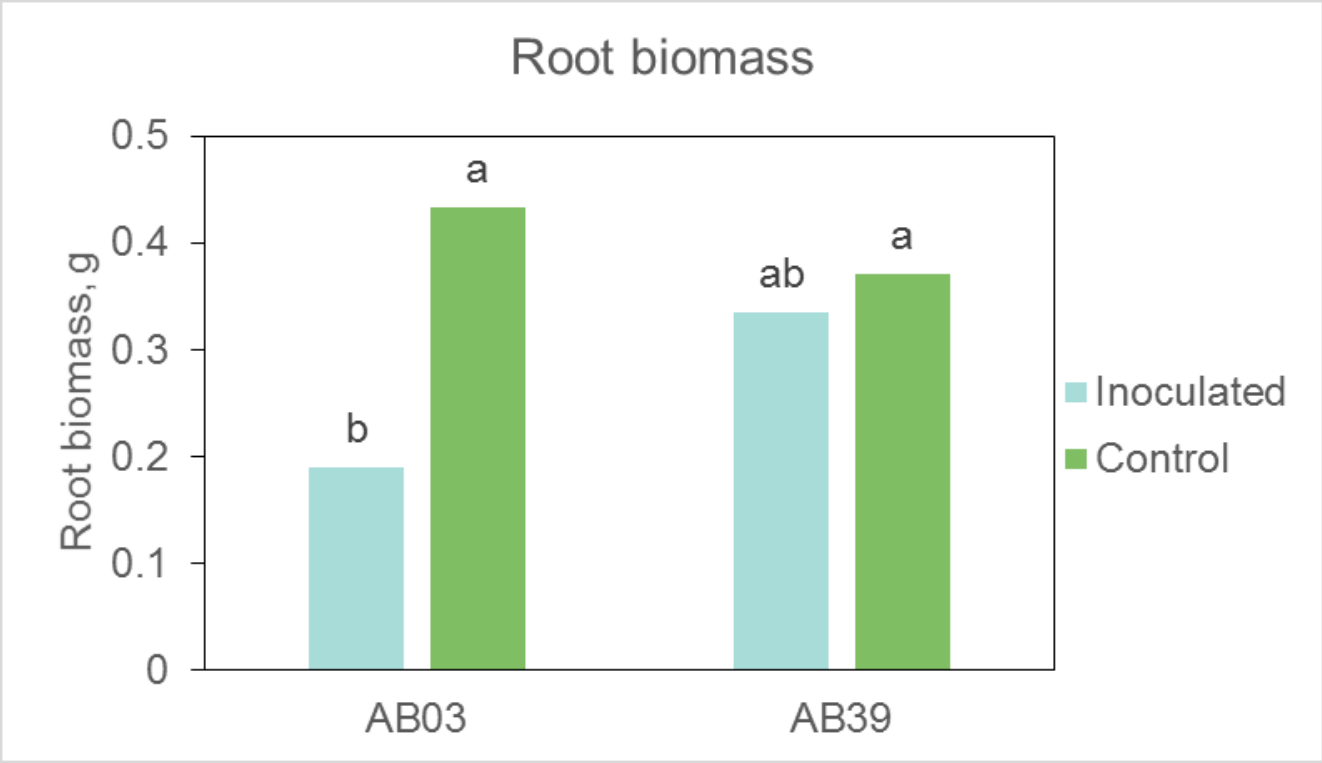
Metabolomics

- Metabolites (small molecules)
- Fuel and sustain life (chemical signaling, converting food into energy, starting materials)
- Metabolomics analysis
  - Difference in metabolomes between susceptible and tolerant lines
  - Metabolites that are associated with nematode tolerance
  - Marker in screening process

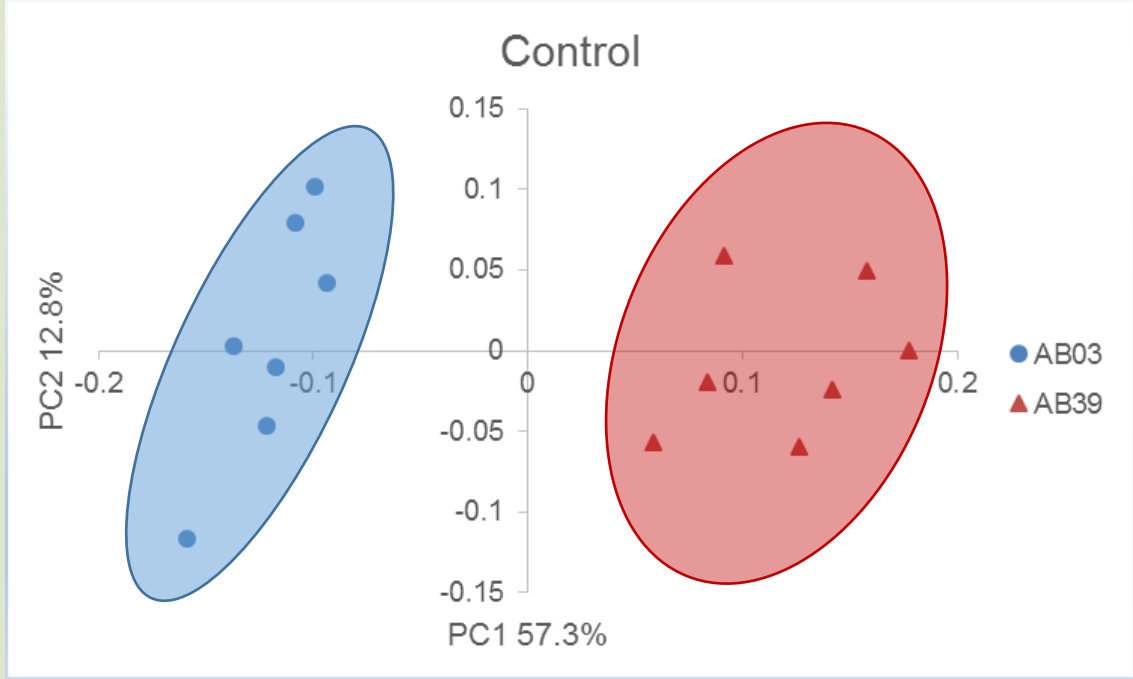
Materials and Methods

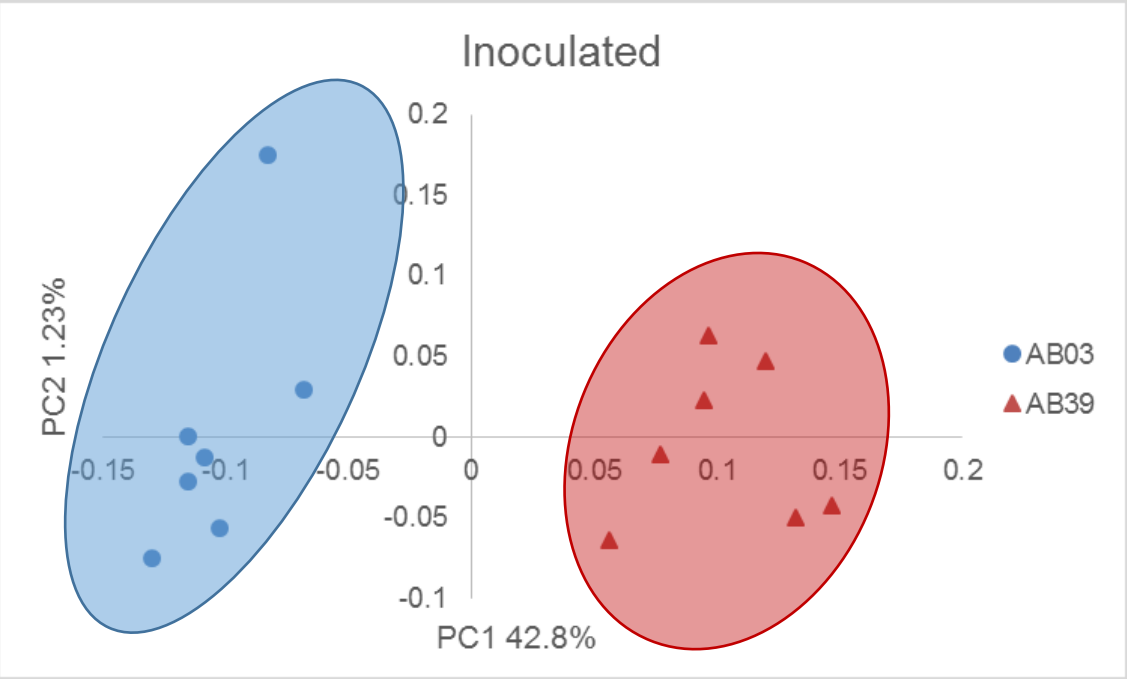
- African bermudagrass (*Cynodon transvaalensis* Burtt-Davy)
- One susceptible line (AB03) and one tolerant line (AB39) were grown a greenhouse.
- Treatment: Inoculation of 50 nematodes and the control with no nematodes
- Roots were harvested 90 days after nematode infection
- Data
  - Root biomass
  - Nematode counts in the soil
  - Global metabolomics profiling

Results

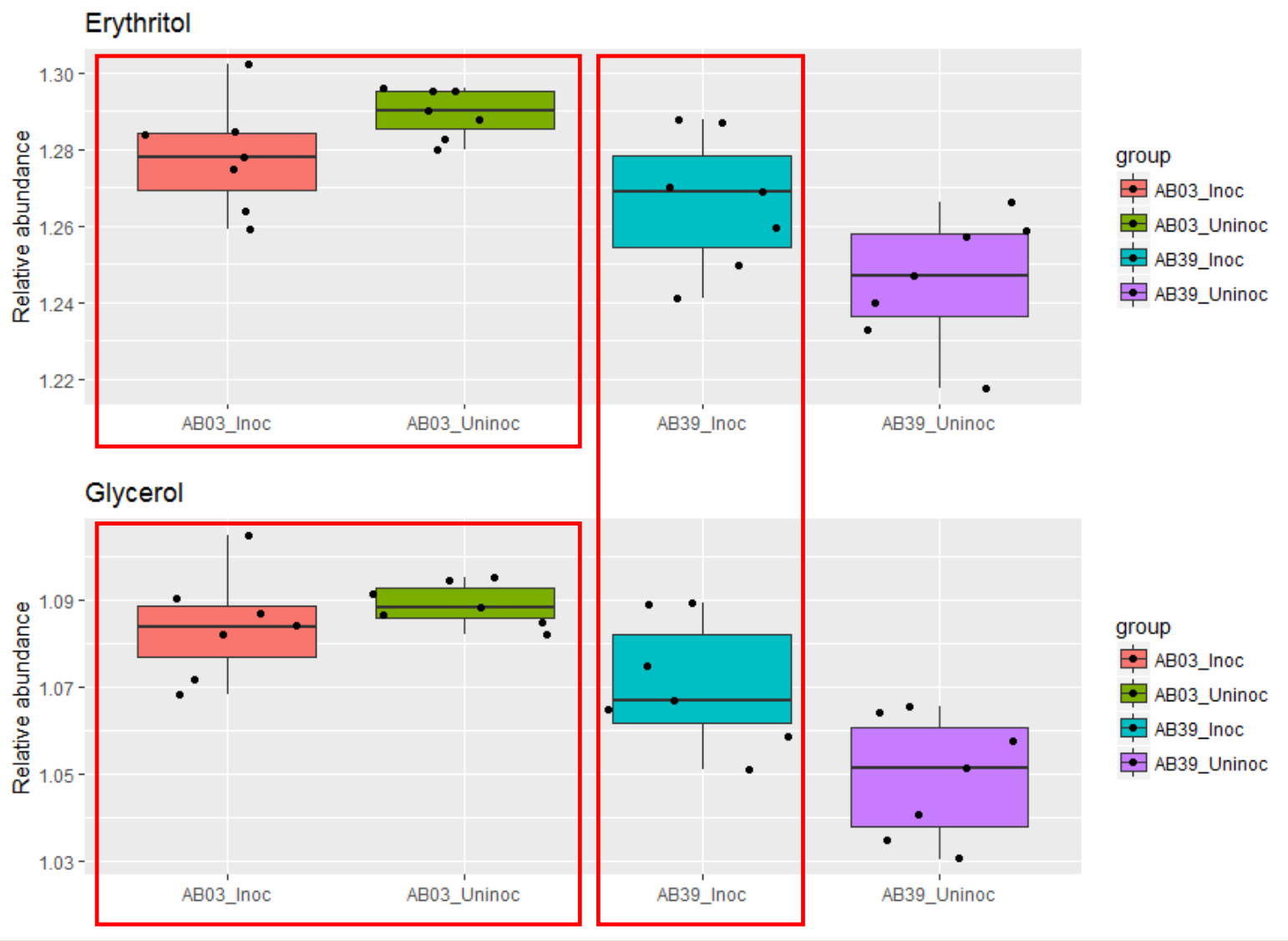

Root biomass
Root biomass, g
0.5
0.4
0.3
0.2
0.1
0
a
b
ab
a
AB03
AB39
Inoculated
Control

Results – metabolomes based on identified compounds



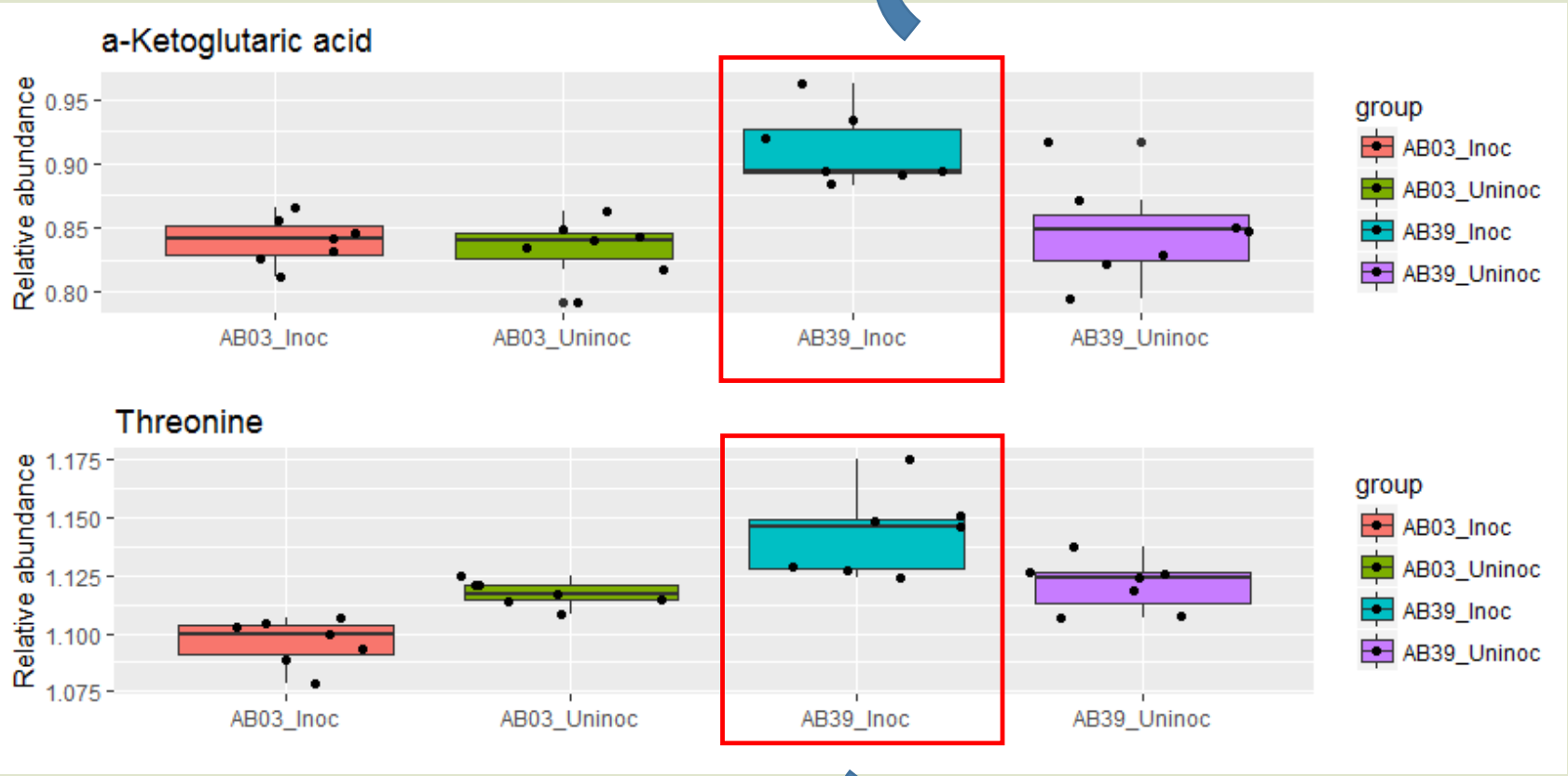


Results – sugar alcohols



Results

TCA intermediate → Root respiration



Amino acid in Serine/Threonine protein kinase → Receptor in signaling and plant defense mechanism

Summary

- Further study is needed to determine the effect of erythritol and glycerol on sting nematodes.
- Which processes are responsible for the increased respiratory activity? Does it indicate nematode damage or a defense mechanism?

Acknowledgement

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