



Diaprepes Root Weevil

Impacts and management

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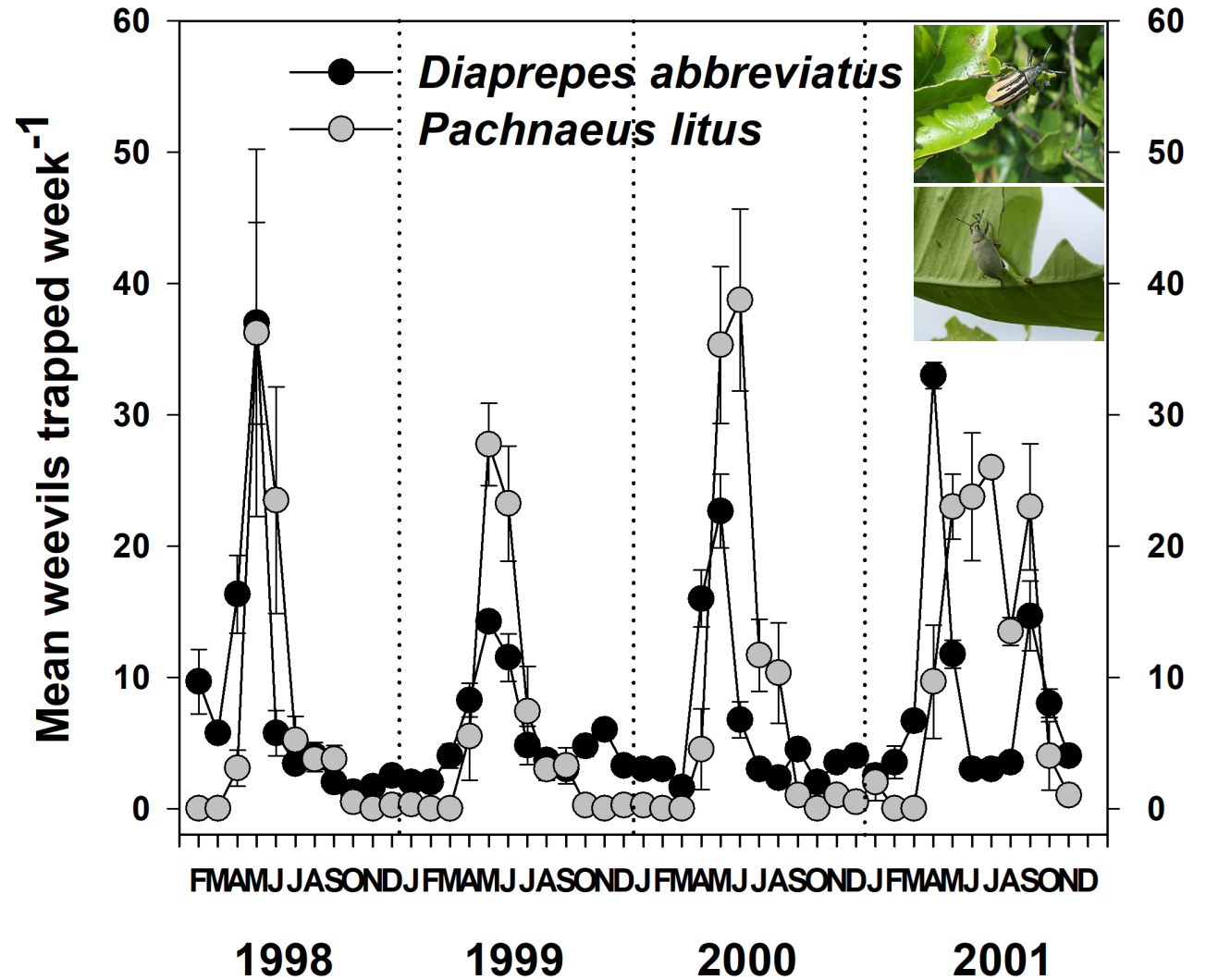
Diaprepes root weevil

- Caribbean pest introduced to Florida in 1960s
- Adults feed and lay eggs in canopy
- Larvae feed on roots, develop in soil
- Adults emerge most of the year with peaks in Spring and sometimes Fall
- Pest-disease complex with *Phytophthora* spp.
- Damage increased by HLB



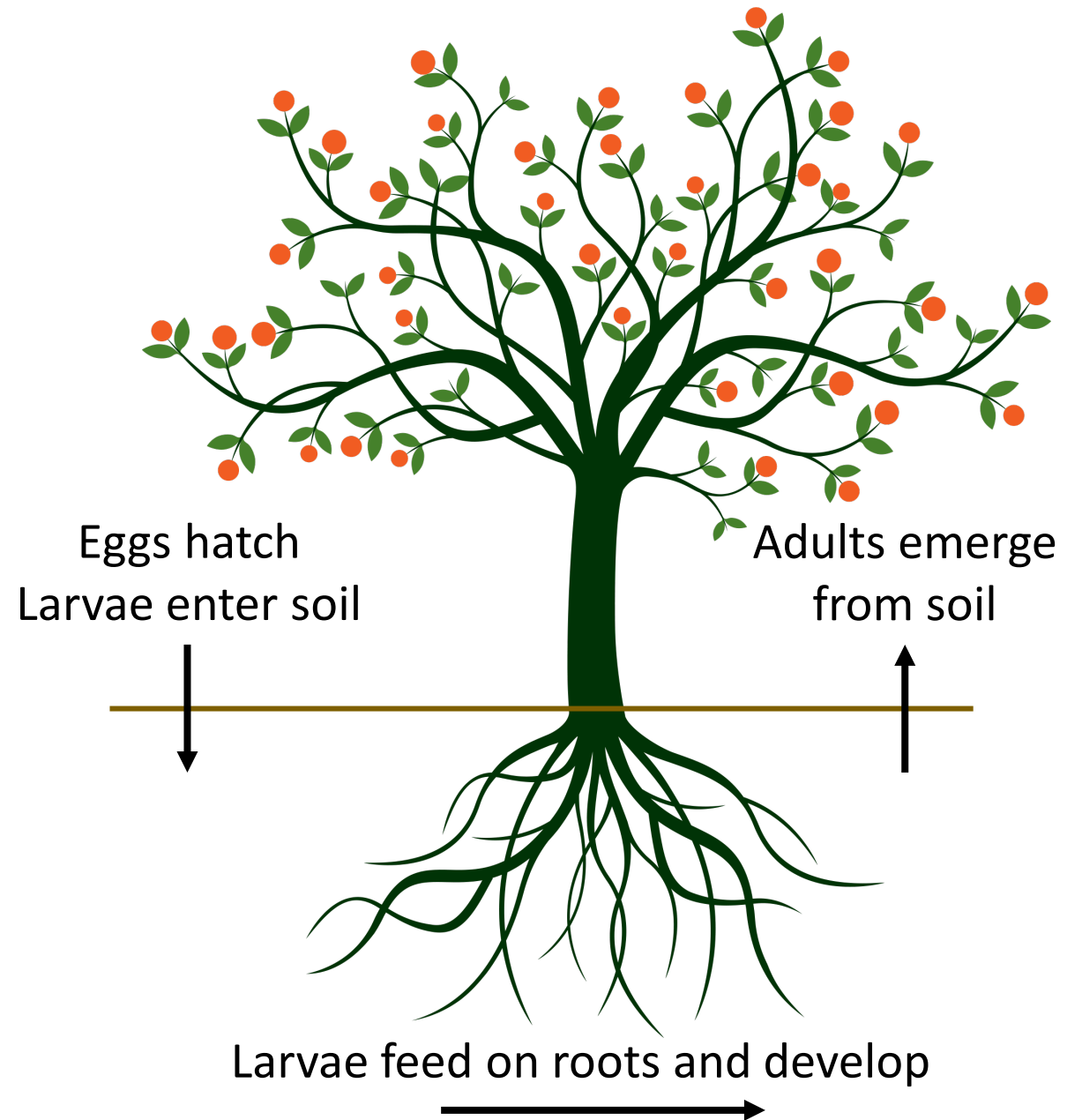
- Plant appropriate rootstock depending on *Phytophthora* species
- Improve drainage when necessary
- Monitor adult emergence to time treatment with adulticide and ovicide
- Chemical barriers on soil surface and entomopathogenic nematodes can reduce larvae in soil and adult emergence

Diaprepes root weevil



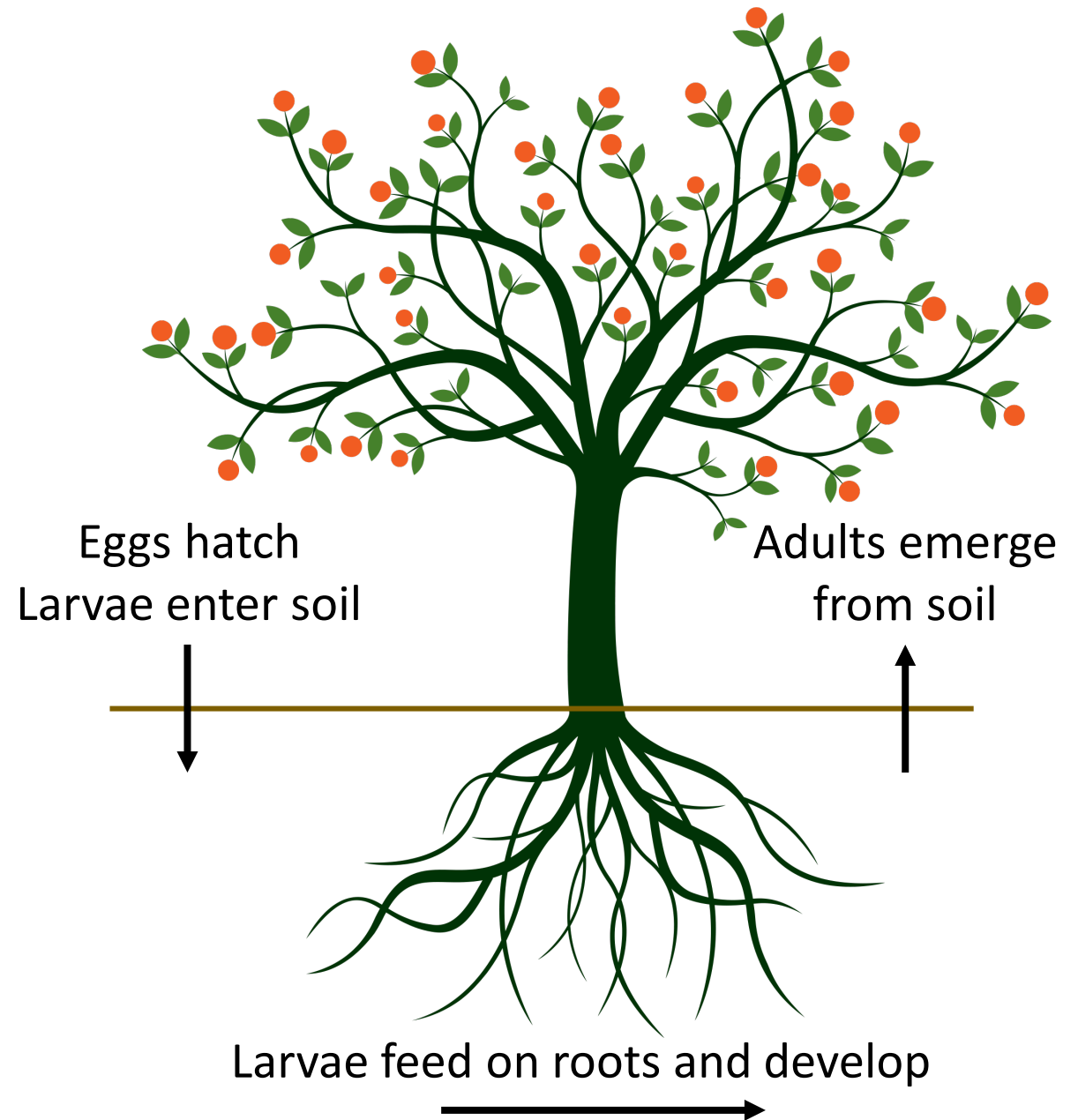
Diaprepes root weevil

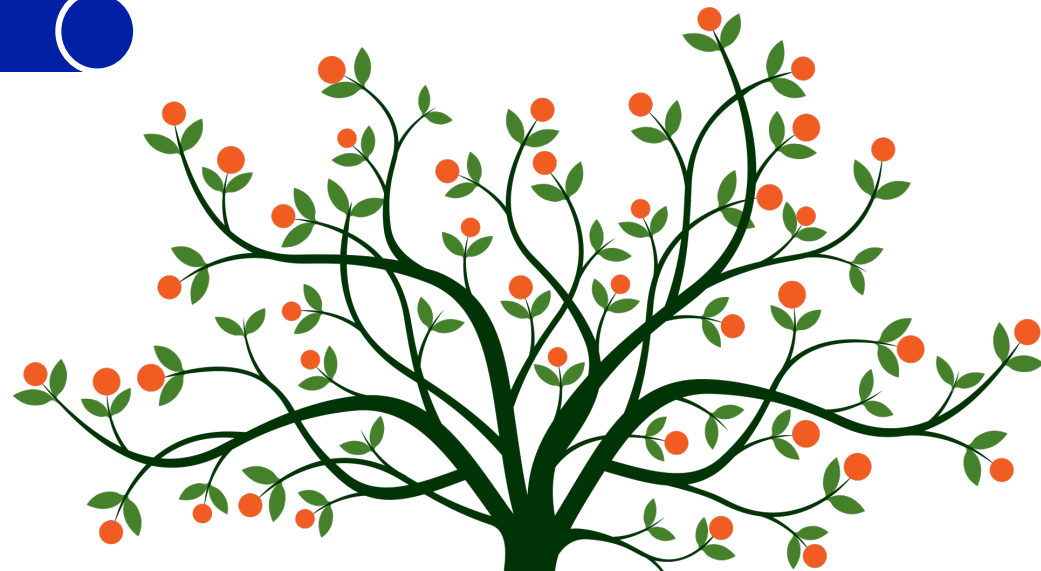
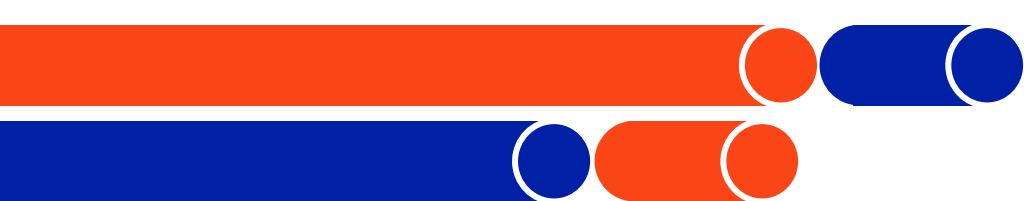
- Weevils have multiple generations with continuous development above- and below-ground during all but the coldest months.



Diaprepes root weevil

- Weevils have multiple generations with continuous development above- and below-ground during all but the coldest months.
- This 'partitioned' life history impairs effectiveness of IPM recommendations.





- Monitor emergence
- Adulticide and sterilant/ovicide

Eggs hatch
Larvae enter soil

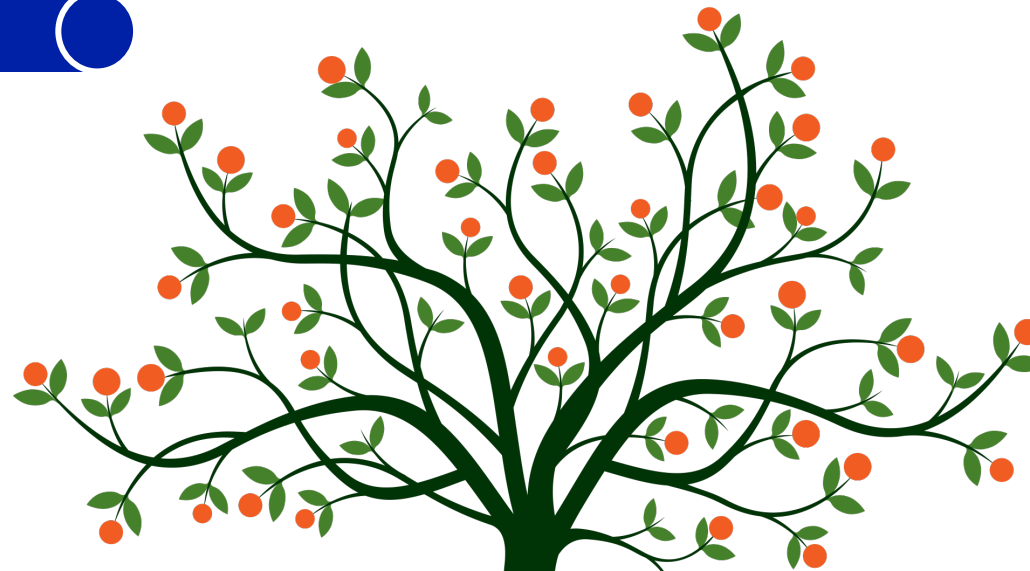
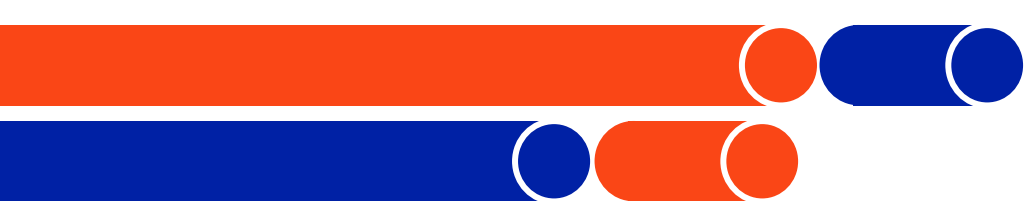
Adults emerge
from soil

- Chemical barrier
- Entomopathogenic nematode



Larvae feed on roots and develop





Chemical
adulticides are
non-persistent

Eggs hatch
Larvae enter soil

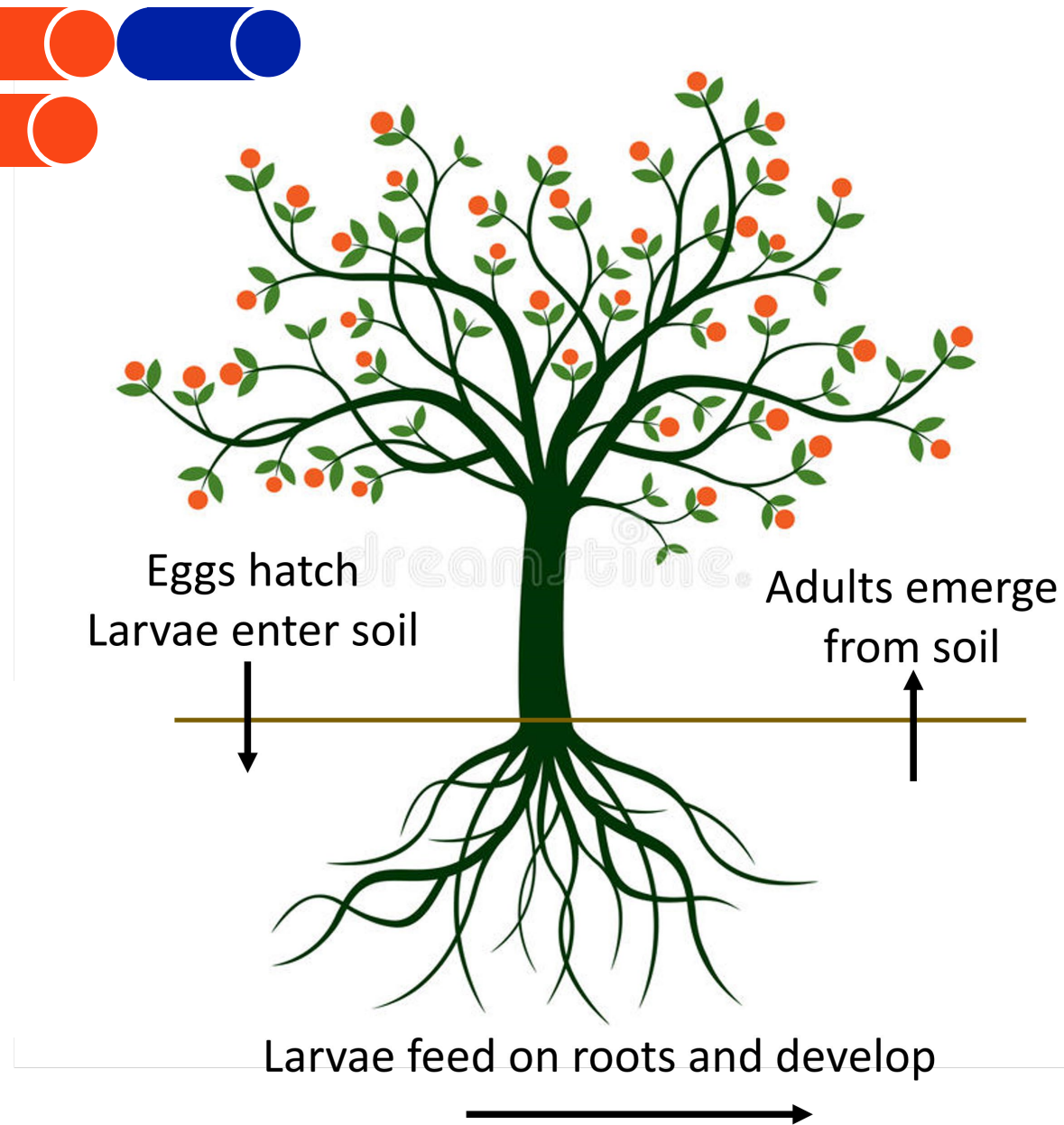
Adults emerge
from soil



Barriers and
entomopathogenic nematodes
are non-persistent

Larvae feed on roots and develop





Chemical
adulticides are
non-persistent

- Avoid over-use*
- *affordability*
 - *resistance*
 - *beneficials*
 - *health and safety*

*New chemistries
being studied*

Physical barriers?

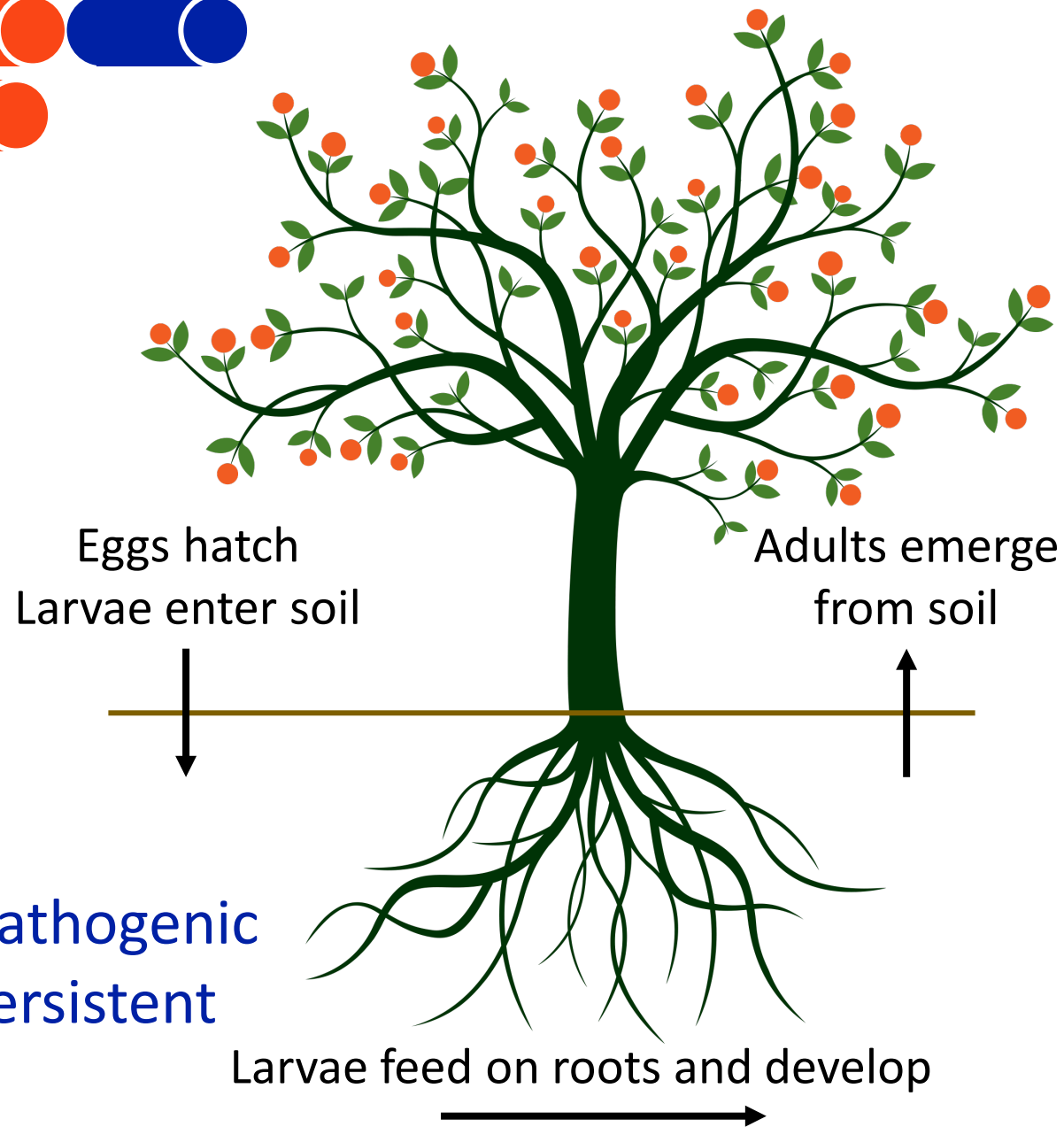
*Repeated use of
nematodes?*

- *safe*
- *but expensive*

*Perhaps modify the
nematode target
area?*

Physical barrier?

Barriers and entomopathogenic
nematodes are non-persistent





What is needed to improve weevil IPM?

- Better detection
- Comprehensive evaluation of:
 - New insecticides
 - Physical barriers
 - EPN utility

Weevil monitoring *belowground*

- Examine roots when pulling and resetting trees. If clipping to replant a block, push a few trees to examine roots.





Weevil monitoring *aboveground*

- Damage to leaves is distinctive, but is easily overlooked if adults are not abundant. Not unusual to detect when tree health declines.

Weevil monitoring *with traps*

- Adult weevils that emerge from soil can be captured in a boll weevil trap attached to a cone-shaped ground trap.
- Tedders traps capture adult weevils that mistake the base for a tree trunk.
- The traps are useful for research, but are inefficient for routine monitoring.



Fabric Soil Barriers

- Reduced soil entry by neonate larvae by >97% in laboratory
- Reduced adult capture by >99% in field when traps placed on fabric.
- No effect on capture in traps adjacent to fabric (i.e., weevils did not migrate to escape at edge of barriers).



0.12 ± 0.13
adults

2.75 ± 1.0
adults

4.38 ± 1.9
adults

32.1 ± 12.0
adults

- Flat bed applicators being used in Florida
- Sloped bed applicators used in Texas



Soil accumulation, weed germination and root penetration of fabric can be a problem

Damage beneath fabric

Source (penetration, edges)?

Frequency?

Fabric profitability?

Requires experimental design
to include non-fabric
comparison.



Foliar barriers (IPCs)

Best of both worlds

- No ACP
- No weevil egg laying
- Faster growth, more efficient water and nutrient use.

However, unique IPM tactics required inside covers.





Not covered



IPC

Foliar barriers (IPCs)

Three months after IPC removal.

- Will the differences between covered and uncovered trees persist as they encounter weevils and HLB while maturing and bearing fruit?
- Will they respond differently to pest management?

Foliar barriers (IPCs)

Responses to Hurricane Ian

- 17% of uncovered trees were tilted $>45^\circ$ compared to 1.5% of the formerly IPC trees
- Caused by damaged, poorly developed root system.



> Entomopathogenic nematode application frequency?



- Surface area at crown <1% that of remaining root system
- Soil surface of 2-foot radius at crown is 9-fold < 6-foot radius under canopy
- Would increase application cost
- Profitability?





Thank you!