

Trunk Problems in Vermont Apple Orchards

Voles, borers, and canker, oh my!

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UVM APPLE PROGRAM ANNUAL MEETING
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The problem:

Increased vulnerable trunk tissue per acre

	Trees/ acre	In-row (ft)	Alley width (ft)	Tree TCSA (cm ²)	Tree Circ (cm)	Trunk area / tree (30cm)	Trunk area/acre (m ²)	% Vuln tissue (CL std)
Central leader (MM.111)	145	15	20	250	17.8	535	78	100%
Vertical axe (M.26)	484	6	15	80	10.1	303	147	189%
Tall spindle (M.9)	1210	3	12	40	7.1	214	259	333%



Borers

The usual: Round headed apple borer

- *Saperda candida*
- Relatively large beetle larvae
- Two years in tree- larvae, pupa, adult Y2
- Large piles of frass outside hole
- Common in organic / low-spray orchards
- Can screen but labor & cost may be prohibitive
- Hollowed trunks break off after trees decline for 2-3 years



Roundheaded apple-tree borer exit hole

The usual: Flat headed apple borer

- *Chrysobothris femorata*
- Relatively large beetle larvae
- Two years in tree- larvae, pupa, adult Y2
- Attracted to brush piles in / near orchard
- Common in organic / low-spray orchards
- Can screen but labor & cost may be prohibitive
- General tree decline for 2-3 years



Adult flat headed apple-tree borer

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Flat headed apple-tree borer larva

The known: Dogwood borer

- Present throughout VT
- Lay eggs in burr knots:
 - M.9, M.26 especially susceptible
- Shallow feeders:
 - Don't carve out trees
 - Cause general decline
- Susceptible to mating disruption



Adult dogwood borer

Managing common borers

- Cultural:
 - Weed management: no tall weeds that form habitat for borers and protect from predators.
 - Reduce shading (weed management, pruning)
 - Paint trunks white
 - 50:50 white latex: water
- Physical
 - Screening on trunks
 - Tight spacing- think window screening
- Trunk sprays...



Trunk sprays for borer management



- First option: make sure your sprayer is covering the trunk
 - Borer management typically late June-early July
 - If applying a broad-spectrum material then, will likely manage for many borers
 - Need to get coverage before they 'go deep'
- Directed, coarse trunk sprays
 - Lorsban is the gold standard, penetrates and gives full-season protection
 - Not ideal material, hot stuff
 - Assail has good efficacy as well

The new: black stem borer

- *Xylosandrus germanus*
- Many hosts- known nursery pest early 1900s
- Does not feed on tissue:
 - Forms galleries in trunk, cultivates various fungi for food
 - Weakening from 2° infection
 - May (?) spreads fire blight or increase its virulence



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Biology

- Adults overwinter in galleries at the base of infested trees
- Females emerge from overwintering sites to infest new sites after 2-3 days with temps $\geq 68^{\circ}\text{F}$
- Female cultures a symbiotic fungus, *Ambrosiella grosmanniae*
- Food for larvae and adults
- Opportunistic colonizers of weakened or physiologically stressed trees (which produce ethanol) flooding, drought stress, cold injury
- “apparently healthy” trees also attacked



Liz Tee 2013

Damage

Discoloration and blistering of bark; compressed sawdust toothpicks from adult tunneling.
Tree's vascular system is shut down: wilting, dieback, death.



BSB: Management

- Trunk sprays not entirely effective
 - Can help on trees you're treating anyway but not typically recommended unless you have a history
- Still relatively sporadic
- General best management practices reduce ethanol production that brings adults in:
 - Proper watering (not too wet or too dry)
 - Reasonable crop load
 - Good disease management
 - Good nutrition



Cankers

Cankers

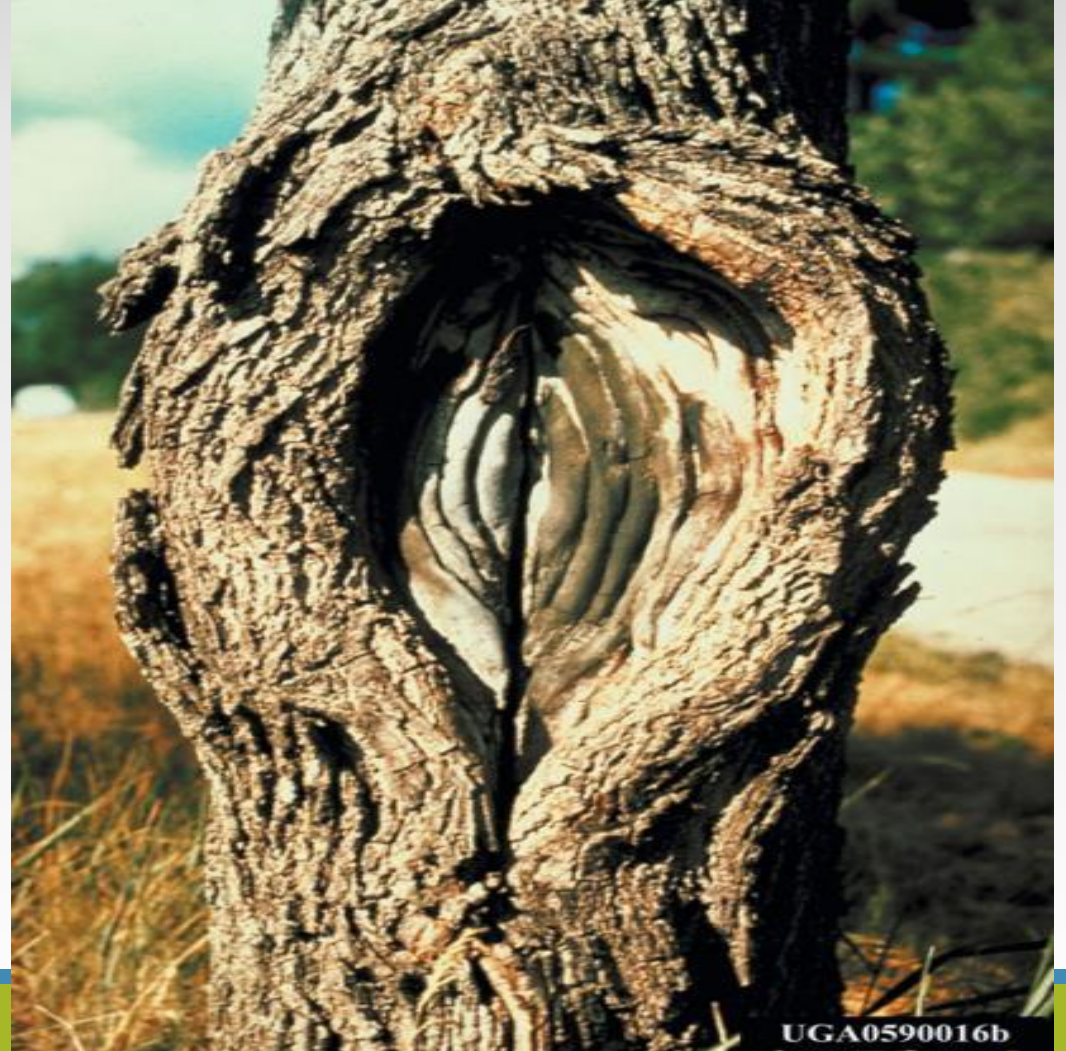
Numerous opportunistic fungi (and some bacteria) may infest trunk tissue

Infestations can become necrotic & eventually kill the tree

Almost always a result of other poor tree health or damage



Nectria Canker-honey locust and maple but also apple, aspen, basswood, birch, elm, oak, walnut, and other hardwood trees. Attacks weakened trees-wet years/ low temperature damage.



Black rot- *Botryosphaeria obtusa*

weak pathogen





Prior injury

Potential trunk killers:

- Mechanical tillage



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- Herbicide damage
 - Esp. glyphosate, glufosinate



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Cornell University

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Potential trunk killers:

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 - Esp. glyphosate, glufosinate
- Winter damage
- Vole damage



Prescription for better trunk health

Don't hide your trunks!

- Vegetation against them will greatly increase borer and vole problems



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Get back to trunk painting

- Something is better than nothing, use a backpack sprayer if needed



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Manage your voles

- Clean groundcover
- Bait stations
- Trunk guards



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Manage your voles

Keep an eye on borers

- DWB Mating disruption
- Thorough spray coverage
- Specific trunk sprays late June - early July
- Exposed trunks



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Manage your voles

Keep an eye on Borers

Maintain good tree health

- Appropriate site
- Right water
- Nutrition
- Pest management
- Weed management



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Manage your voles

Keep an eye on Borers

Maintain good tree health

(Re) consider the system?



Thank you

- UVM Apple Program
- Crop Production Services, Addison, VT
- Vermont Agriculture Experiment Station
- USDA NIFA CPPM #VTN29202
- UVM Agricultural Risk Management and Crop Insurance Education Program
RM17RMETS524005

