Should apple viruses be of concern to the New York apple industry?

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Outline

- What is the current status of virus infections in New York apple orchards?
- Why should apple viruses be of concern?
- What management strategies are available for apple viruses?

Viruses aren’t usually a major focus of apple disease management.

Fire blight (*Erwinia amyolvora*)

Photo: David Rosenberger, Cornell University

Apple scab (*Venturia inaequalis*)

Photo: Awais Khan, Cornell University

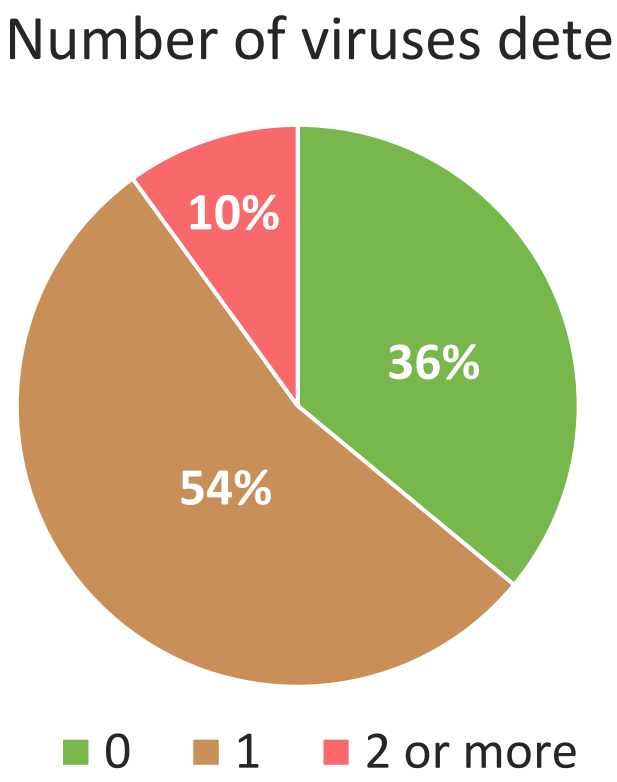
Summer fungal diseases: rots, sooty blotch, flyspeck

Photo: Srđan G. Aćimović, Cornell University

Virus diseases?

But apple viruses are widespread in NY orchards.

Viruses were detected in the majority (64%) of 2,620 samples tested in a 2017 survey of NY orchards.



Virus	Percent of samples
1. Apple stem pitting virus (ASPV)	42.9
2. Apple chlorotic leaf spot virus (ACLSV)	20.9
3. Apple stem grooving virus (ASGV)	7.1
4. Tomato ringspot virus (ToRSV)	2.4
5. Apple mosaic virus (ApMV)	1.3

Distribution of Viruses in New York Apple Orchards

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Apple viruses are primarily transmitted through apple propagation.

Virus	Percent of samples	Transmission methods
1. Apple stem pitting virus (ASPV)	42.9	**Vegetative propagation (grafting, budding)**
2. Apple chlorotic leaf spot virus (ACLSV)	20.9	**Vegetative propagation (grafting, budding)**
3. Apple stem grooving virus (ASGV)	7.1	**Vegetative propagation (grafting, budding)**
4. Tomato ringspot virus (ToRSV)	2.4	Nematode vectors
5. Apple mosaic virus (ApMV)	1.3	**Vegetative propagation (grafting, budding)**

The top three viruses in NY apple orchards cause asymptomatic (latent) infections.

ASPV, ACLSV, and ASGV cause no noticeable symptoms in most commercial cultivars.

Virus	Percent of samples
1. Apple stem pitting virus (ASPV)	42.9
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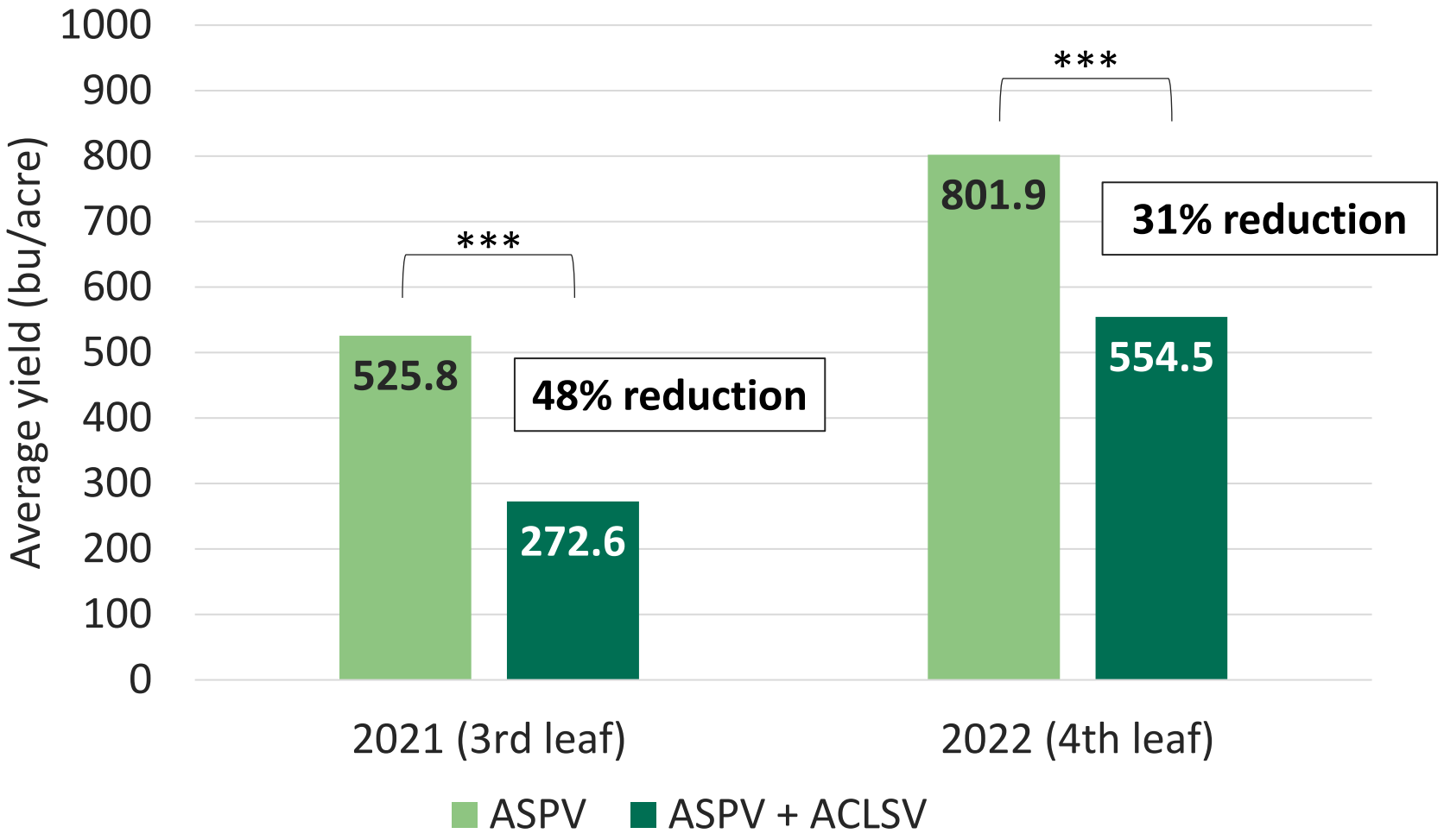
Which of these trees are infected with latent viruses?

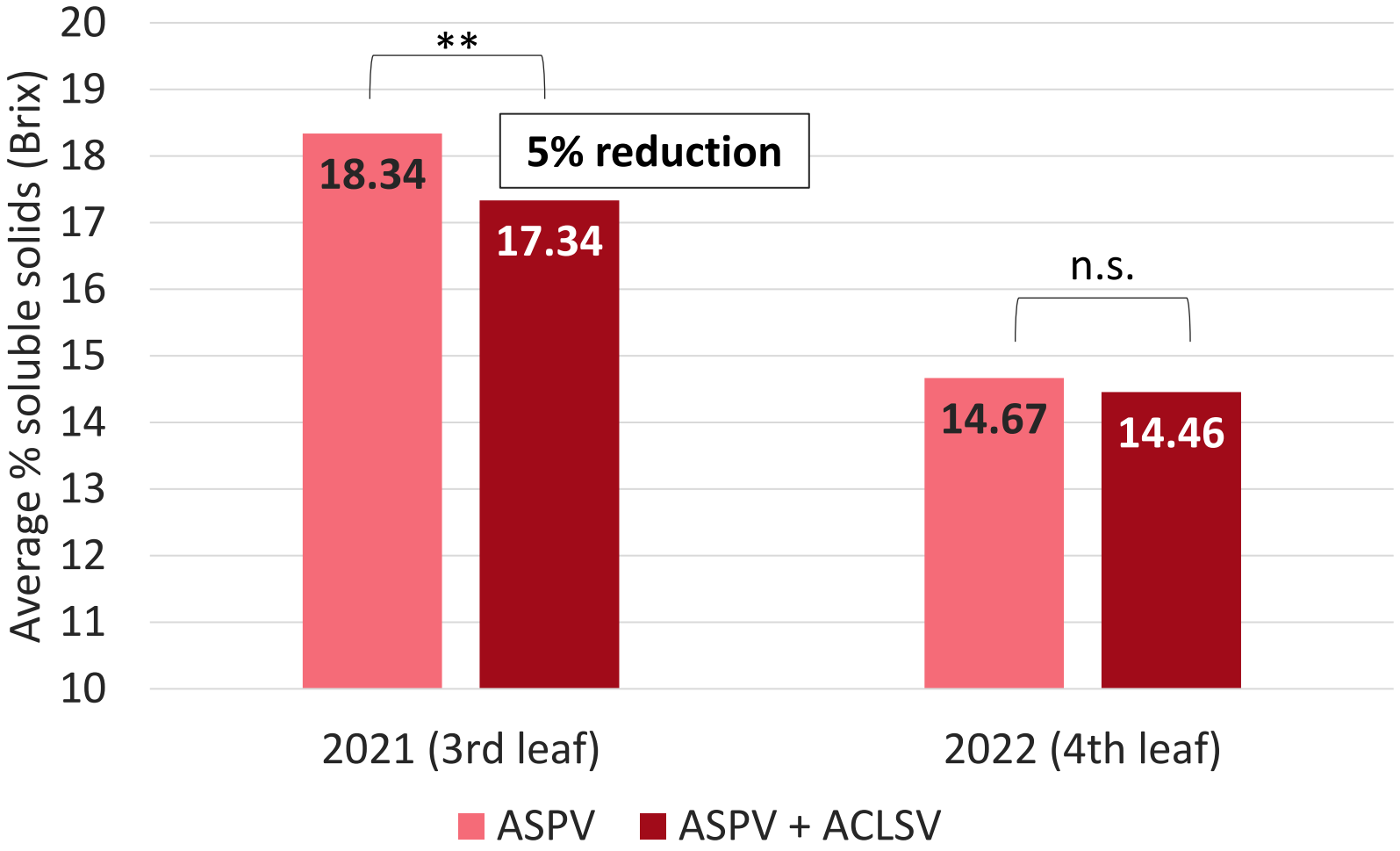
Why should these latent viruses be of concern if they don’t cause noticeable symptoms?

Coinfection with ASPV and ACLSV reduced yield.



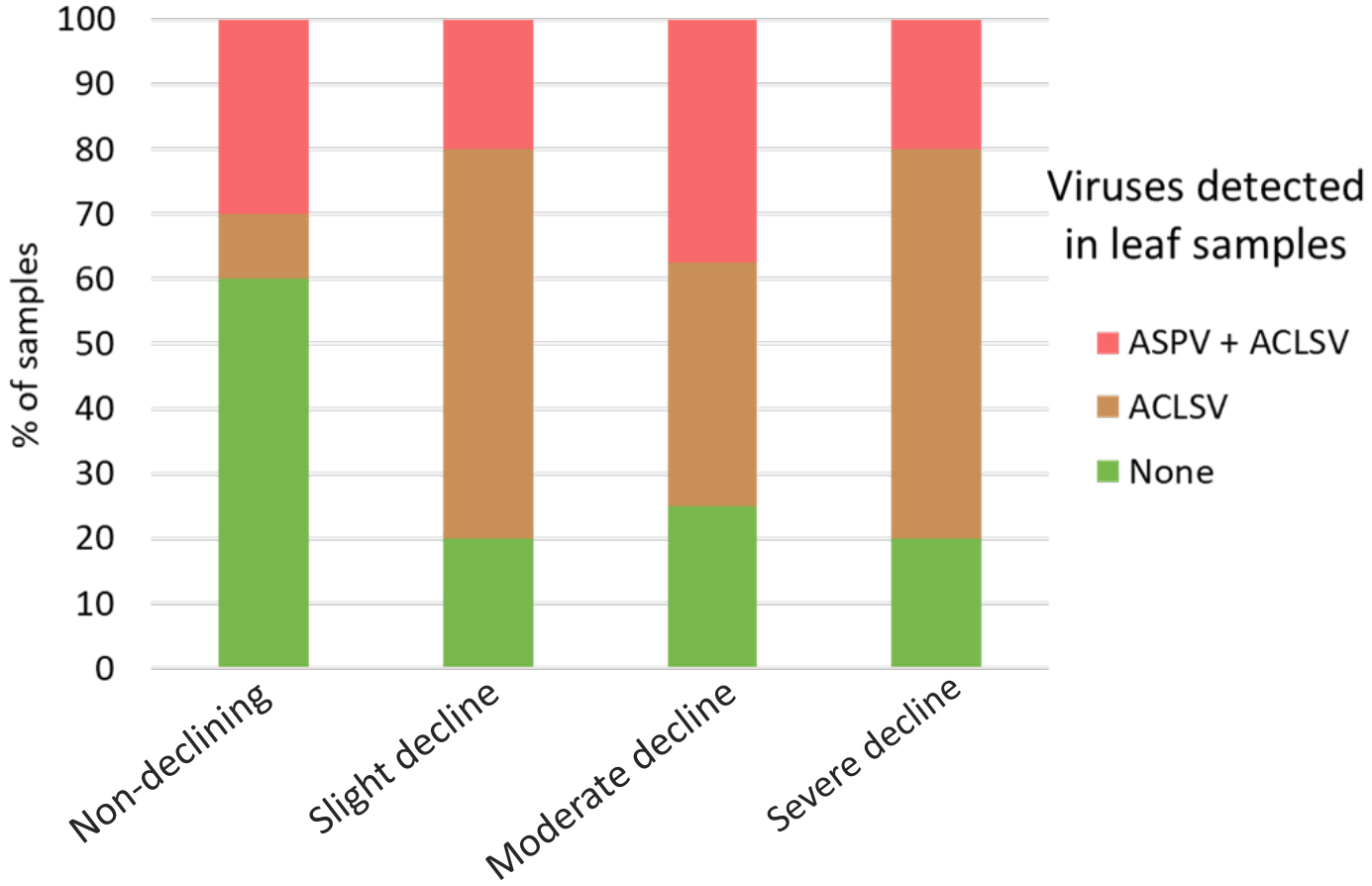
- Gala, Honeycrisp, Royal Red Honeycrisp
- M.26 and G.935
- Est. 2018
- Geneva, NY
- 3’ x 11’
- 3-wire trellis
- Drip irrigation

Coinfection with ASPV and ACLSV may reduce fruit quality.



Do latent virus infections predispose trees to decline?

ASPV and ACLSV incidence were higher in declining vs. non-declining trees in a Honeycrisp block on M.9-Nic29.



Honeycrisp on M.9-Nic29

Rapid apple decline was demonstrated in an experimental setting for the first time in 2022.

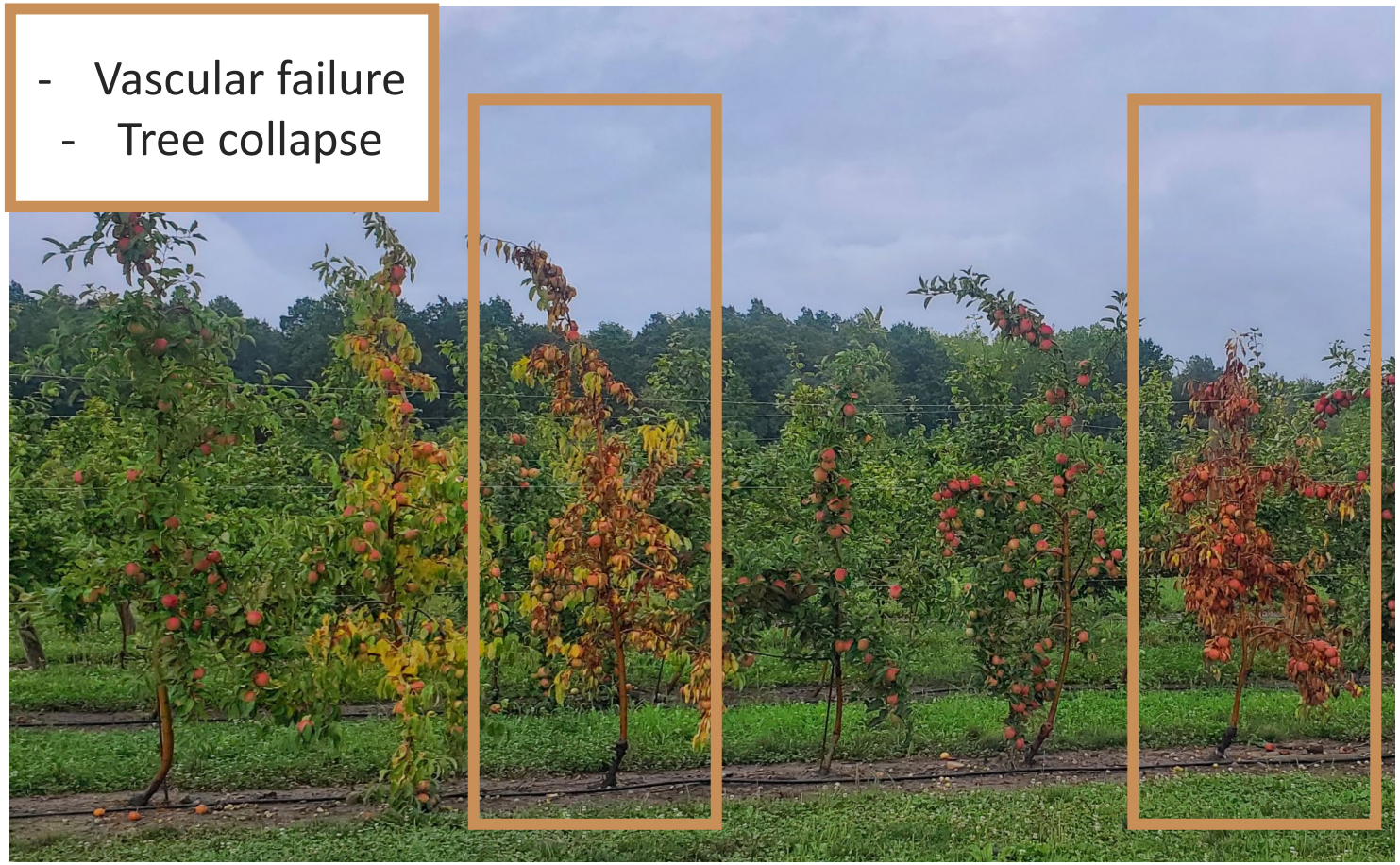
Four of the 30 trees that collapsed during the 2022 growing season.

Rapid apple decline was demonstrated in an experimental setting for the first time in 2022!

Gala on M.26

Rapid apple decline was demonstrated in an experimental setting for the first time in 2022!

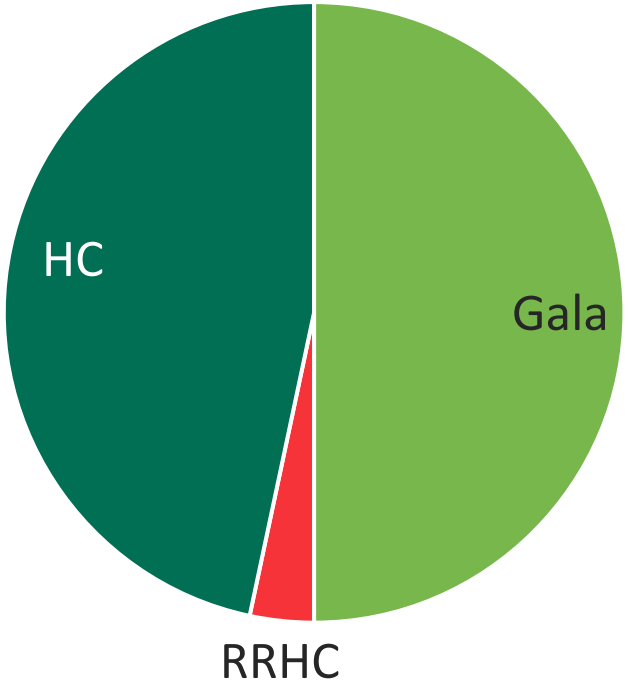
- Vascular failure
- Tree collapse



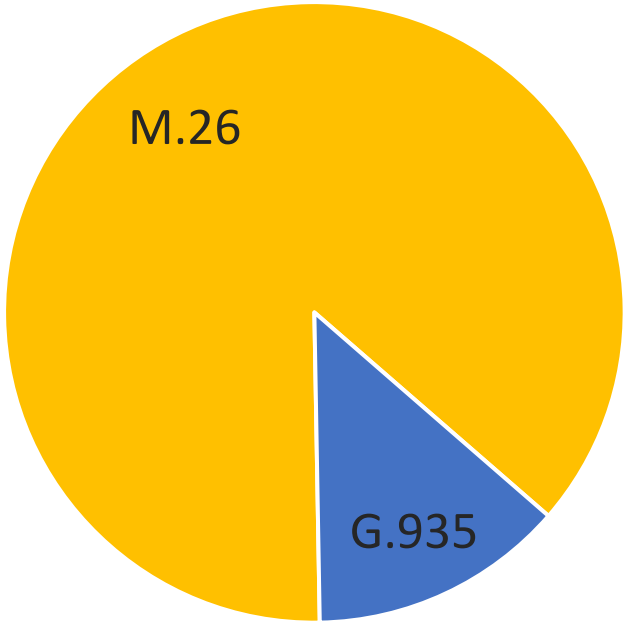
Gala on M.26

Declined trees at a glance

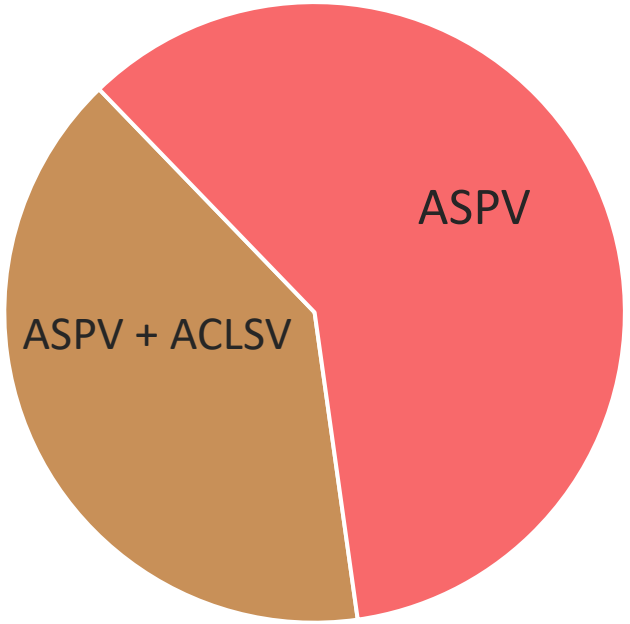
Cultivar



Rootstock



Virus infection status



Management options

New orchards

- Source material from reputable nurseries
- Use certified scion and rootstock material when possible

Established orchards

- Limit topworking
- Limit other tree stressors
  - Drought and water stress

Takeaways

1. What is the current status of virus infections in New York apple orchards?

   Apple viruses are widespread in NY orchards (64% of trees sampled in statewide survey).

Takeaways

2. Why should apple viruses be of concern?

   Coinfection with the two most widespread apple viruses reduced yield in our trial and may be associated with reduced fruit quality.

   Latent virus infections may predispose trees to decline.

Takeaways

3. What management strategies are available for apple viruses?

   Established orchards: Limit topworking and limit stressors to trees.

   New orchards: Be selective when sourcing planting material.

   Industry-wide: Ensure there are many available sources for virus-tested material.

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Thank you!