

Apple Viruses

Written by Dr. Alicyn Smart

Top 3 Most Common Apple Viruses in the US

- Apple chlorotic leaf spot virus (ACLSV)
- Apple stem grooving virus (ASGV)
- Apple stem pitting virus (ASPV)

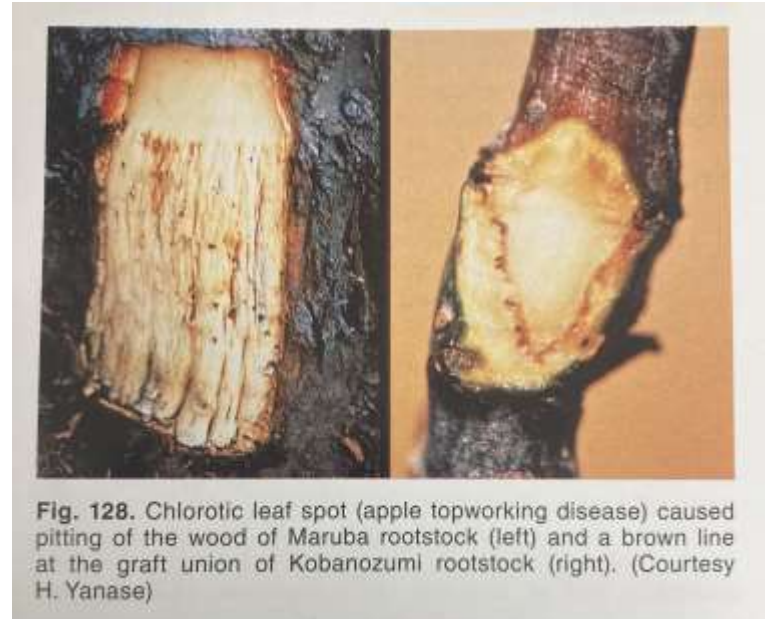
Less Common Viruses

- Apple mosaic – ApMV and TAMV
- Flat apple – cherry rasp leaf virus
- Apple union necrosis – tomato ringspot virus
- Apple scar skin viroid – ASSVd

Apple chlorotic leaf spot virus (ACLSV)

Most widely distributed virus of fruit trees

- Latent – does not cause readily observable symptoms in most cultivars
- No natural vector of virus is known
- Virus moves by use of infected scion buds for propagation or topworking infected trees
- Very hard to tell if trees are infected due to not having observable symptoms so virus certification programs are effective for management



Apple stem grooving virus (ASGV)

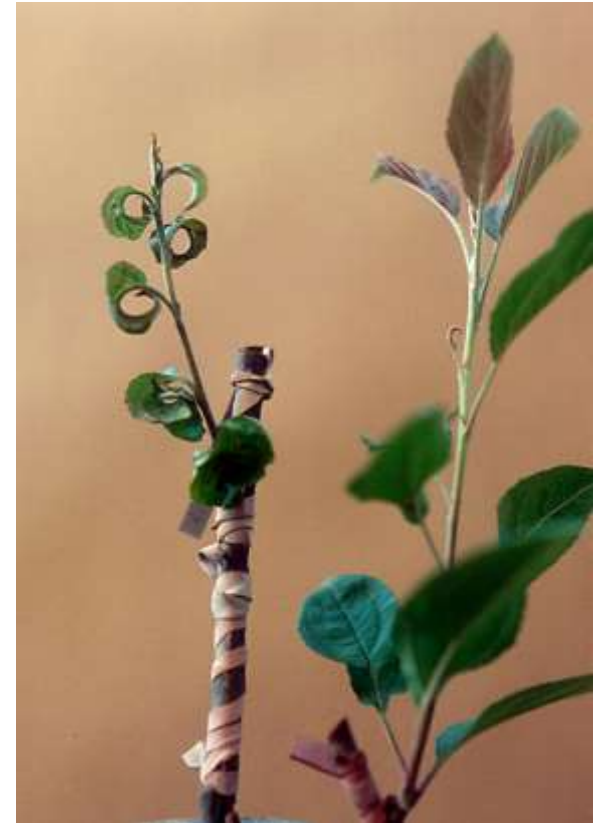
- Latent – does not cause readily observable symptoms in most cultivars
- Causes stem grooving, swollen graft union, poor scion growth and premature leaf drop
- Similar spread as ACLSV and has similar management



Union necrosis and swelling above the graft union. William Howell, Washington St. Univ.

Apple stem pitting virus (ASPV)

- Latent – does not cause readily observable symptoms in most cultivars
- Causes stem pitting, reduced yield, distorted leaves and mishappen fruit in some strains of the virus
- Similar spread as previous latent viruses and similar management



Downward curving of leaves. Wayne Wilcox, Cornell Univ.

Apple scar skin viroid aka Dapple Apple

- Previously documented in ME in 1960.
- Tested with molecular diagnostics
- No cure and predominantly spread by grafting
- 2022 identified as a mycoviroid



Other apple viruses

Apple mosaic virus

- Chlorotic leaf spots, small flecks, irregular blotches mostly on leaves
- Large variation in symptom severity due to cultivar sensitivity (Golden Delicious, Granny Smith, and Jonathan have highest sensitivity)

Flat apple aka Cherry rasp leaf virus

- Infected trees produce squat fruit with absent stem cavities, have reduced productivity and thinning canopies
- Virus is spread by nematodes and by seeds of broadleaf weeds



Top healthy, Bottom infected

Other apple viruses cont.

Apple union necrosis

- Caused by tomato ringspot virus ToRSV
- Almost exclusively associated with trees propagated on Malling-Merton 106 rootstock
- Spreads via nematodes and infected weeds, virus can infect common orchard weeds such as dandelions, sheep sorrel, and chickweed, can be seed borne.



Fig. 130. Line of dead tissue at the union between a 'Delicious' scion and an MM 106 rootstock, a typical symptom of apple union necrosis. (Courtesy K. S. Yoder)

UMaine Plant Disease Diagnostic Lab



- Four undergraduate students
- One Diagnostician
- One Assistant Diagnostician
- About 1,000 samples/year
- Over 100 photos submissions/month
- Covered two states in 2022
- National Plant Diagnostic Network Regional Center Lab



- Apples = 50 total samples, 18 unique diagnoses

Pathogen Common Name	Pathogen Scientific Name	Number Diagnosed
Apple scab	<i>Venturia inaequalis</i>	11
Fire blight	<i>Erwinia amylovora</i>	6
Frogeye leaf spot; Black rot; Apple Black Rot; Apple twig blight; dieback; Canker	<i>Botryosphaeria obtusa</i>	9
No pathogen found	No detection	4

Services at the Lab

Plant Disease Diagnostic Testing



Submit Plant Material
(Submission Form Included)



Plant Disease
Identification Box



Digital Plant Disease
Diagnostic Submission
Form

We offer:

- General disease ID
- Molecular diagnostics
- Online plant disease ID

The Plant Disease Diagnostic Lab now has **three options** for diagnosing plant diseases. The traditional way to test is by submitting plant material to the lab that can be triaged and cultured in the lab to identify if a disease is present. The next option is to purchase the Plant Disease Identification Box and culture the plant material yourself. The Plant Disease Identification Box is designed for those with limited plant material or for plant material that is prohibited by federal law regulations to be received by the lab. The lab's newest option is the Digital Plant Disease Diagnostic Submission Form which accepts samples of plants with symptoms of disease or possible disease (with illustrative photos), digitally.

General Disease Identification



PLANT DISEASE DIAGNOSTIC SUBMISSION FORM

LAB STAFF ONLY
 PDDL#: _____
 Date Rec: _____
 Revised 7/2023

Mail sample to:
 Pest Management Unit
 Plant Disease Diagnostics Lab
 17 Godfrey Drive
 Orono, ME 04473-3692
 207.581.3883
 1.800.287.0279 (within Maine)

- Bloat nematode testing \$20.00 for in-state sample, and \$50.00 out-of-state sample
 - Verticillium wilt testing of soil: \$30 for in-state sample
 - Grain testing for export: \$50 for in-state sample
 - General testing: no charge for in-state | \$20 for out-of-state
- Make check payable to: University of Maine**

Send results to:
 Submitter _____
 Client _____
 If applicable, resubmission # _____

Submitter Information:

Name: _____ Business/Farm Name: _____
 Address: _____ City/State/Zip: _____
 Phone: _____ Email: _____

Check all that apply: commercial (grower, consultant, pest control) gardener UMaine Extension or researcher

Client Information:

Name: _____ Business/Farm Name: _____
 Address: _____ City/State/Zip: _____
 Phone: _____ Email: _____

Check all that apply: commercial (grower, consultant, pest control) gardener UMaine Extension or researcher

Please provide the following information about your plant sample:

Plant common name: _____ Scientific name: _____ Cultivar or variety: _____
 Date planted: _____ Date collected: _____ Date problem appeared: _____
 Sample category (e.g. vegetable, woody, ornamental, turf): _____ Hemp license #: _____
 Material submitted (e.g. leaves): _____
 Number of plants affected: _____
 Percentage (%) of plants affected: _____
 Did it appear suddenly gradually
 Is it getting worse staying the same
 Degree of injury: light moderate severe
 Symptoms: _____

Distribution of Damage:

single plant scattered plants groups of plants entire planting
 Other plant species affected? _____
 Related to weather? _____
 Pesticides used and date used in last 30 days: _____
 Other relevant information: _____

Please fill out form as completely as possible.



Plant Disease Diagnostic Lab

[3D Tour](#)



Questions or comments?

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Pest Management Unit**

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