

Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>



Photo credits: Anette Phibbs and Susan Lueloff
DATCP Plant Industry Laboratory
unless otherwise noted.

We hope this gallery of symptoms will be helpful to nursery professionals and plant enthusiasts in recognizing annuals and perennials that may be infected with plant viruses. Viruses can cause plant diseases that affect the quality and viability of plants. The plant materials shown in these photographs were collected from 2007 to 2014, as part of a collaborative survey by DATCP's Plant Industry Laboratory, the University of Minnesota, Plant Disease Clinic, Michigan, Minnesota and Ohio Departments of Agriculture. The material is sorted alphabetically by host genus. High resolution images are also available on [bugwood.com](http://www.ipmimages.org/) under <http://www.ipmimages.org/> There are of course many more plant virus diseases than are depicted here.

DISCLAIMER: Final diagnosis should include appropriate test methods and should not be based on visual symptoms alone.

Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>



'Azure' Monkshood (*Aconitum fischeri*) infected with aconitum latent virus (AcLV), cucumber mosaic virus (CMV), and a potexvirus.

Detection methods:

Electron microscopy, University of Minnesota, Plant Disease Clinic.

Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

'Azure' Monkshood (*Aconitum fischeri*) infected with cucumber mosaic virus (CMV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Monkshood (*Aconitum*) infected with filamentous virus particles.



Detection method: Electron microscopy, University of Minnesota, Plant Disease Clinic.

Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Black Cohosh, (*Actaea racemosa*) infected with an undetermined potyvirus.



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Mexican giant hyssop 'Acapulco Orange' (*Agastache*)
infected with impatiens necrotic spot virus (INSV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Bugleweed 'Gaiety' (*Ajuga*) infected with cucumber mosaic virus (CMV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Hollyhock 'Chaters Double Mix' (*Alcea rosea*) infected with TRV.



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Peruvian lily (*Alstroemeria*) infected with tomato spotted wilt virus (TSWV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Grape-leaf anemone 'Robustissima' (*Anemone tomentosa*)
infected with tobacco rattle virus (TRV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Grape-leaf anemone 'Robustissima' (*Anemone tomentosa*) infected with TRV.



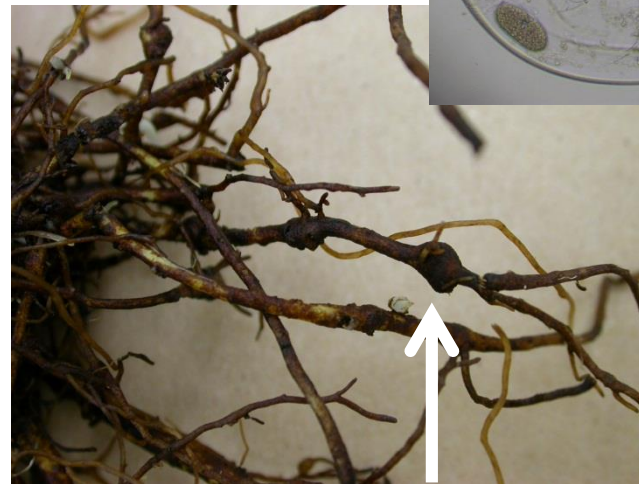
Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms



Anemone 'Serenade' infected with TRV and root knot nematode.

Female root knot nematode
(*Meloidogyne hapla*)



Root knot

Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Horseradish (*Armoracia rusticana*)
infected with tobacco rattle virus (TRV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Astilbe arendsii 'Fanal' infected with cucumber mosaic virus (CMV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Astilbe arendsii 'Fanal' infected with CMV and TRV.



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

Astilbe infected with tobacco rattle virus (TRV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Begonia x hiemalis 'Cindy Fringed' infected with impatiens necrotic spot virus (INSV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Begonia x hiemalis 'Dark Britt' infected with impatiens necrotic spot virus (INSV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Tuberous begonia
(*Begonia x hiemalis*)
infected with CMV.
'Non-Stop Rose Petticoat' and
'Go-Go Rose Bicolor'
on the left,
healthy 'Non-Stop Apricot'
on the right.



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Tuberous begonia infected with CMV.

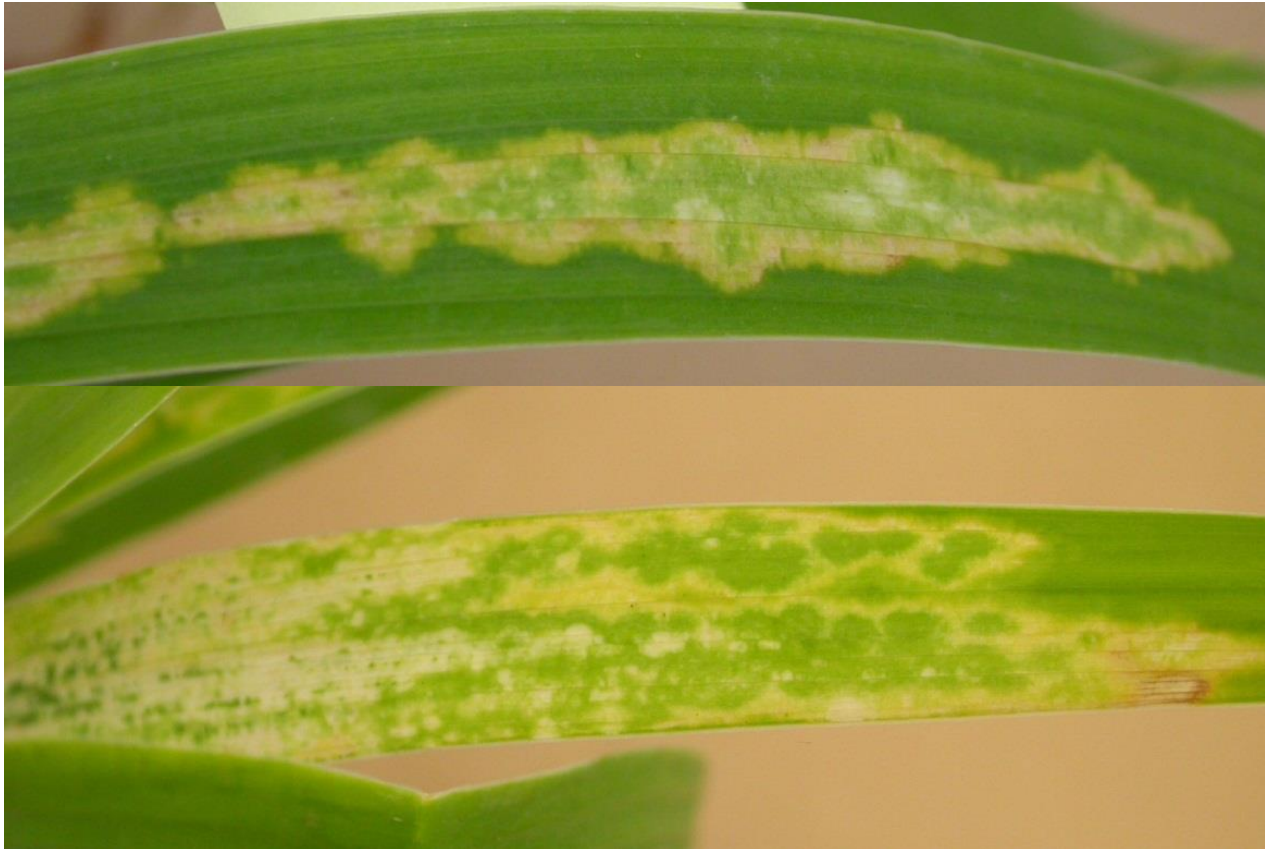


Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Blackberry lily (*Belamcanda chinensis*)
infected with tomato spotted wilt virus (TSWV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

Bergenia infected with tobacco rattle virus (TRV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>



Bellflower (*Campanula*)
infected with
cucumber mosaic virus (CMV).

Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Canna 'Crimson Beauty' infected with canna yellow streak potyvirus (CaYSV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Canna 'Banana Punch' infected with canna yellow streak potyvirus (CaYSV).

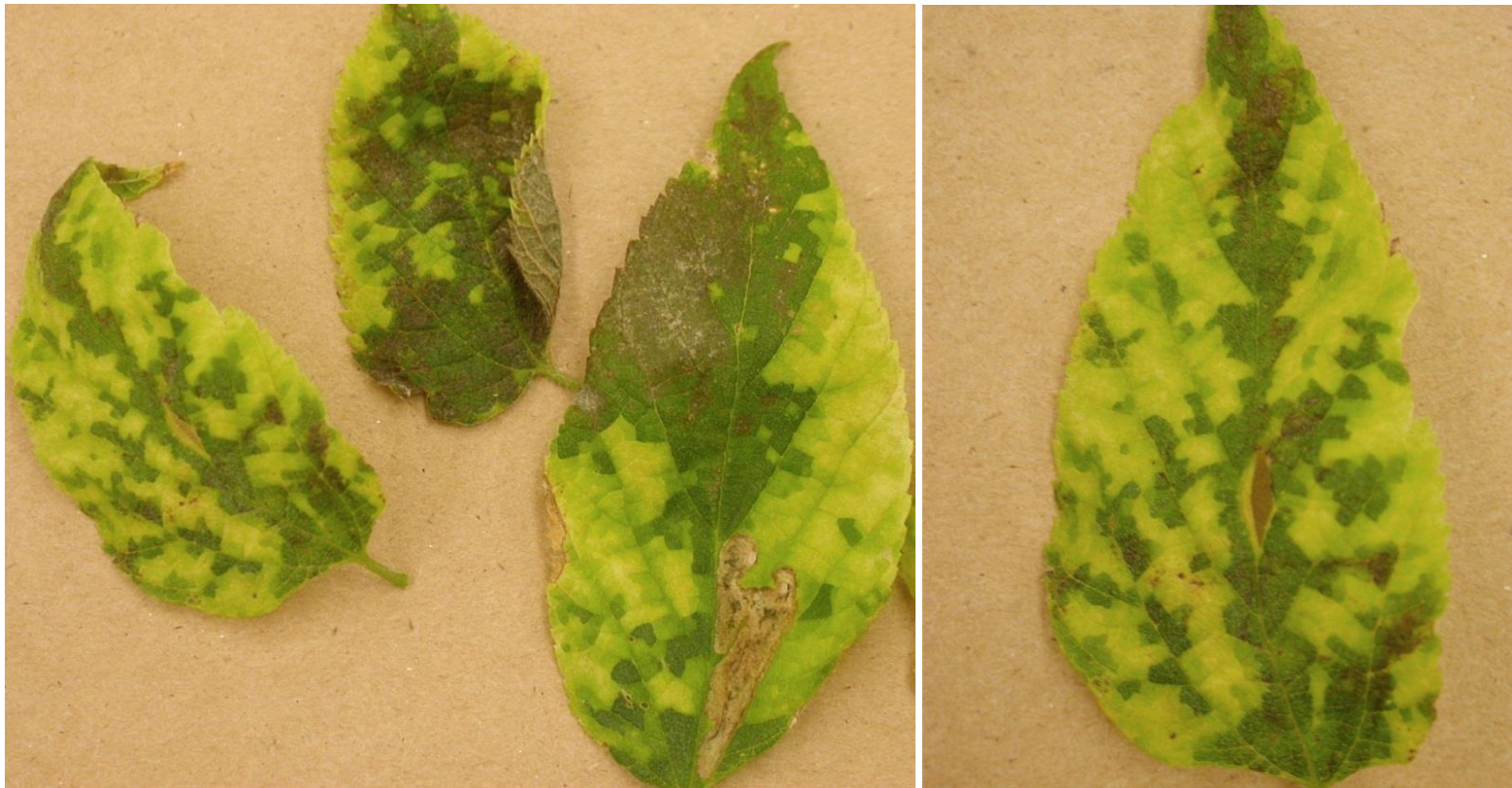


Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Hackberry (*Celtis occidentalis*) with “hackberry island chlorosis”, believed to be associated with virus, and seed transmitted.



Detection: University of Minnesota, Plant Disease Clinic.

Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Clematis 'Dancing Queen' (left) and 'Dancing Dorian' (right) infected with clematis chlorotic mottle tomosvirus (CICMoV).



Detection method: Electron microscopy, RT-PCR University of Minnesota, Plant Disease Clinic.

Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Clematis 'Dancing Smile' (left) and 'Natascha' (right) infected with clematis chlorotic mottle tombusvirus (CICMoV).



University MN,
Plant Disease Clinic.

Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Clematis 'Multi Blue' infected with clematis chlorotic mottle virus (ClCMoV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>



Dahlia infected with dahlia common mosaic virus (DCMV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Bleeding heart (*Dicentra spectabilis*, new name: *Lamprocapnos spectabilis*)
infected with tobacco rattle virus (TRV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Bleeding heart (*Dicentra spectabilis*) infected with TRV.



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Bleeding heart (*Dicentra spectabilis*) infected with TRV.



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Bleeding heart (*Dicentra spectabilis*) infected with TRV.

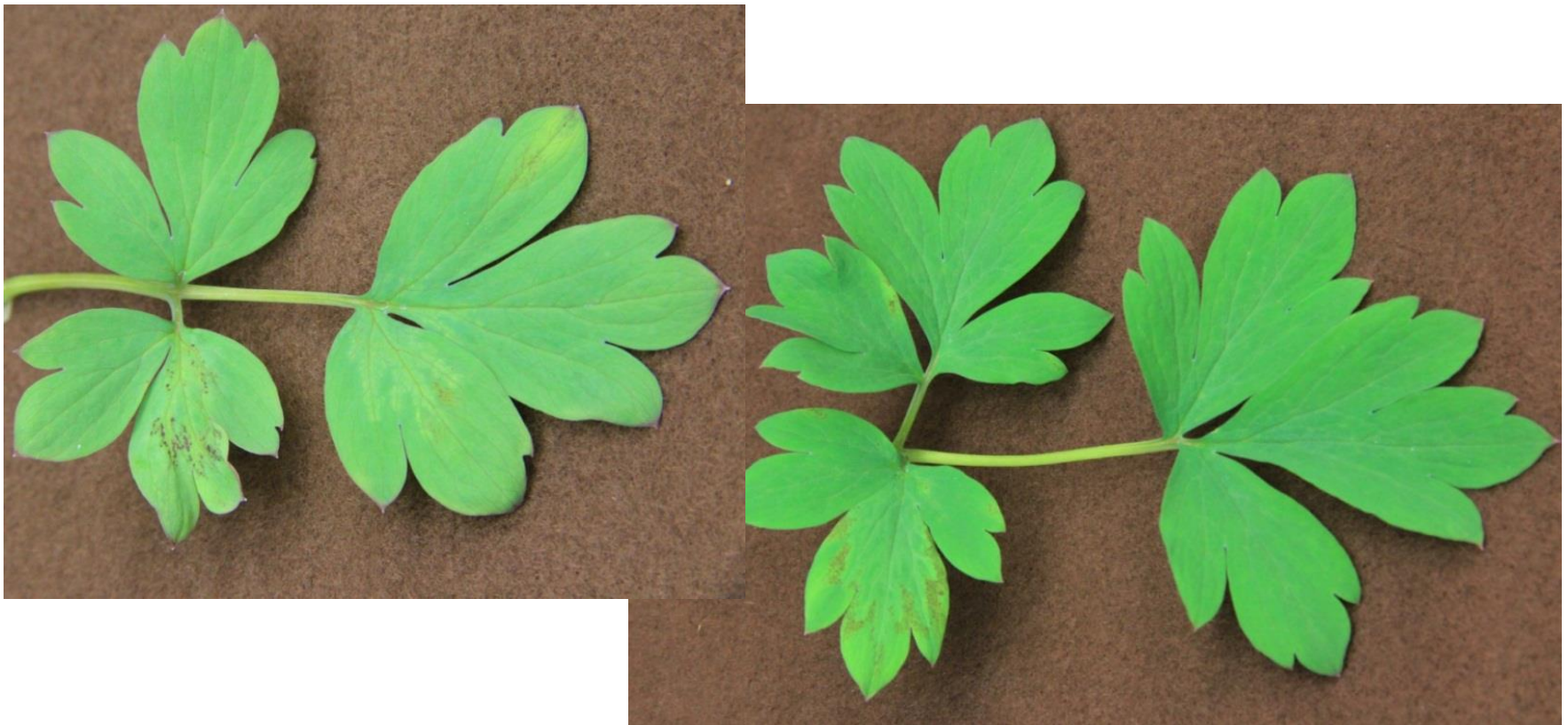


Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Bleeding heart 'Pink' (*Dicentra*) infected with CMV and TRV.



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

Bleeding heart (*Dicentra*) infected with CMV and TRV.



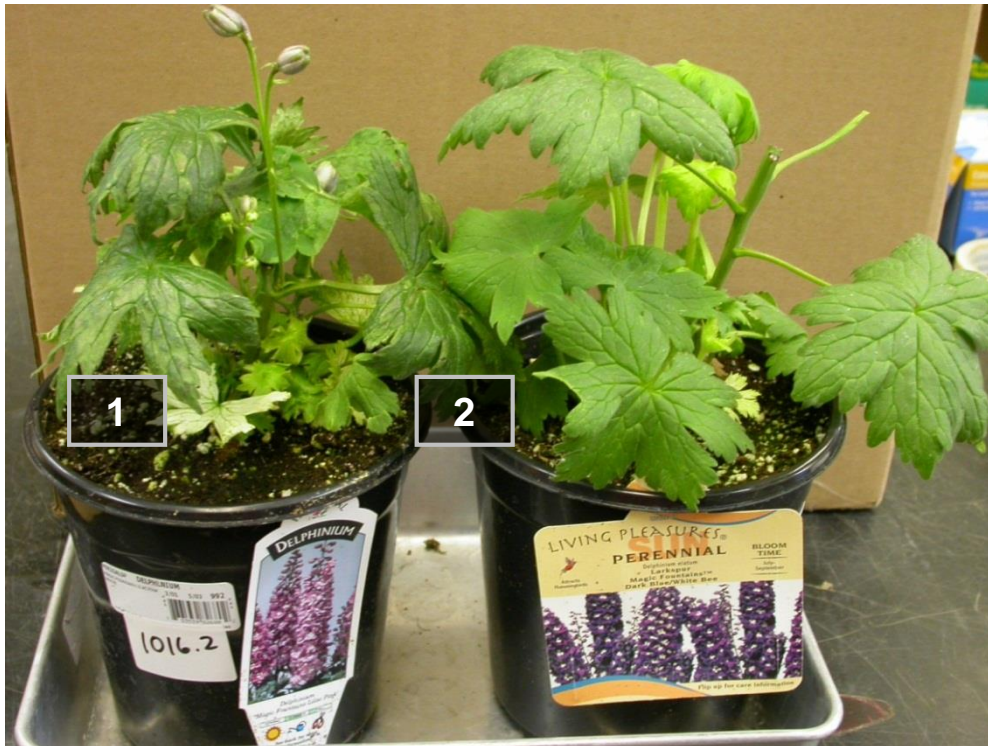
Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Larkspur (*Delphinium elatum*) infected with TRV.

1. 'Lilac Pink',
2. 'Magic Fountain' dark blue/white bee,
3. 'Magic Fountain' pure white.



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Larkspur (*Delphinium elatum*) infected with TRV.



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Larkspur (*Delphinium*) 'Magic Fountain' infected with tobacco mosaic virus (TMV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Purple Coneflower (*Echinacea purpurea*) 'Magnus' infected with CMV.



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Barrenwort `Rubrum' (*Epimedium alpinum*) infected with TRV.



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Barrenwort 'Creeping yellow' (*Epimedium*) infected with TRV.



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Barrenwort (*Epimedium pubigerum*) infected with TRV.



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Barrenwort (*Epimedium x rubrum*) infected with TRV.



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Barrenwort 'Sulphureum' (*Epimedium x versicolor*) infected with TRV.



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Barrenwort infected with tobacco rattle virus (TRV).



- 1) *Epimedium pubigerum* 'Orange Queen'
- 2) *Epimedium pinnata elegans*
- 3) *Epimedium youngianum* 'Niveum'

Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

'Black Jack' fig (*Ficus carica*) infected with fig mosaic virus (FMV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>



Gladiolus infected with bean yellow mosaic virus (BYMV) on left and cucumber mosaic virus (CMV) on right.

Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Sneezeweed (*Helenium*) 'Chelsey' infected with CMV.

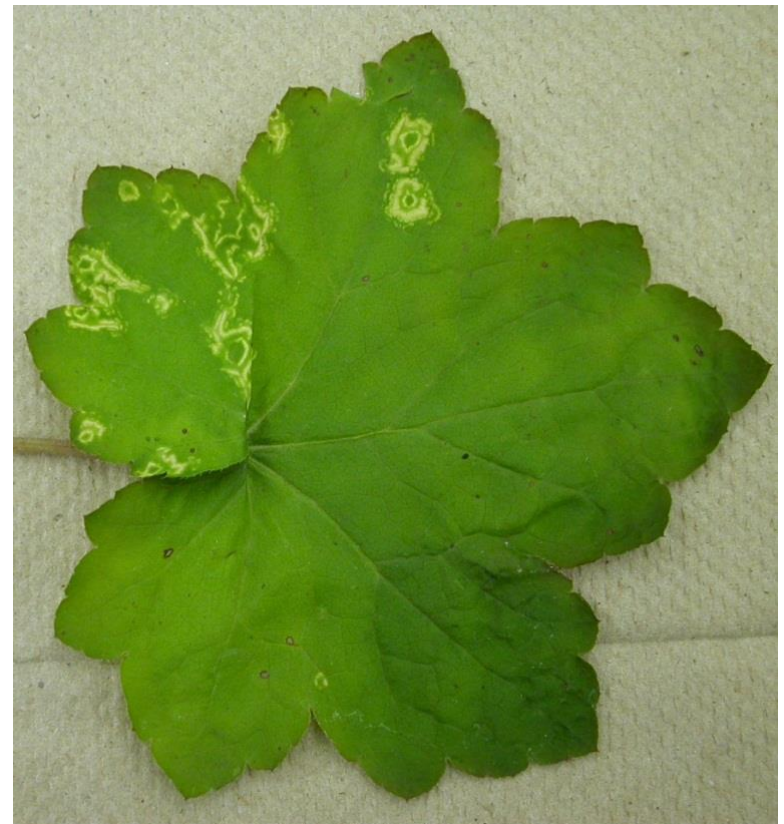


Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Coral bells (*Heuchera*) infected with tobacco rattle virus (TRV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Hosta or plantain lily 'Albo-Marginata' infected with arabis mosaic virus (ArMV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

Hosta 'Albo-Marginata' infected with HVX.



Hosta 'Daybreak' infected with HVX.



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>



Hosta 'Blue Angel'
infected with TRV.



Hosta 'Honeybells'
infected with TRV.

Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>



Hosta
'Magic Fire'



Hosta funkia
'Regal Splendor'



Hosta funkia 'Krossa Regal'

Hosta varieties
infected with
tobacco rattle virus
(TRV).

Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Hosta 'Golden Tiara' infected with hosta virus X (HVX).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Hosta 'Paul's Glory' infected with hosta virus X (HVX) and arabis mosaic virus (ArMV).



Hosta varieties infected with tobacco rattle virus (TRV).



Hosta 'So Sweet'
ringspot pattern symptom.



Hosta 'Christmas Tree'
color bleeding symptom.

Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Hosta 'Sum & Substance' infected with hosta virus X (HVX).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Hosta 'Undulata' infected with hosta virus X (HVX) and tobacco rattle virus (TRV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Wax plant (*Hoya carnosa*)
infected with
impatiens necrotic spot virus
(INSV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Bearded iris 'Avalon Sunset' infected with tobacco rattle virus (TRV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Dwarf German iris (*Iris*) infected with iris severe mosaic potyvirus (ISMV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Leopard plant (*Ligularia*) infected with tomato spotted wilt virus (TSWV).

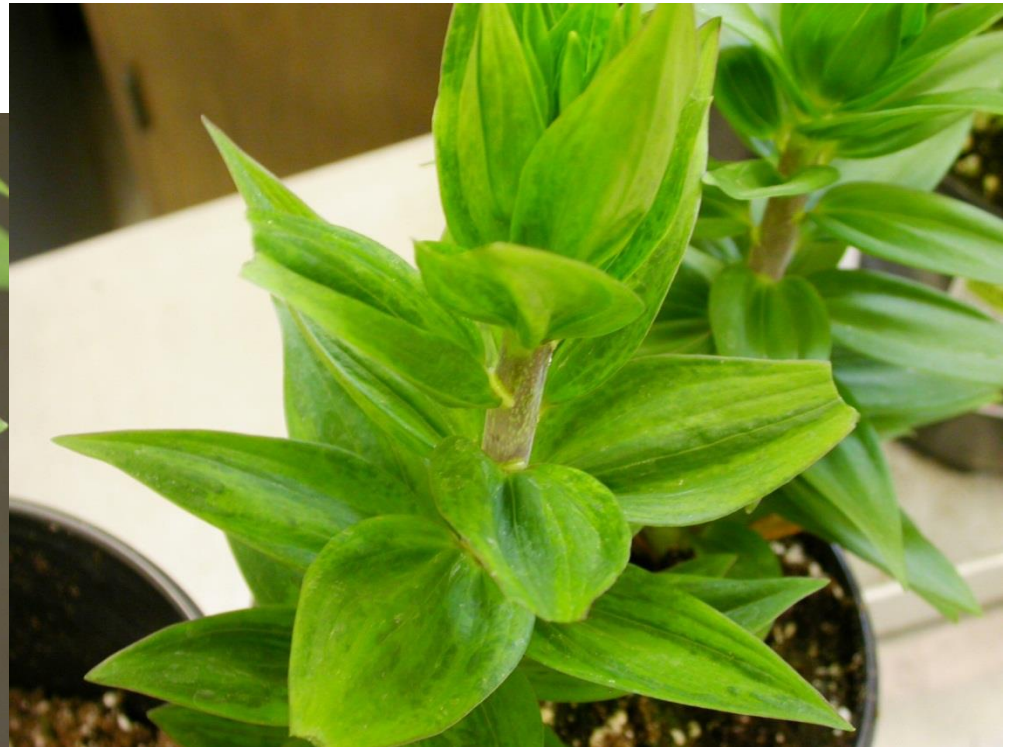


Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Oriental lily 'Angelique' (*Lilium oriental*) infected with tobacco rattle virus (TRV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Oriental lily 'Casablanca' (*Lilium*) infected with lily symptomless virus (LYLSV).



Detection Method: ELISA, Ohio Department of Agriculture.

Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Lily 'Scarlet Delight' (*Lilium*) infected with lily mottle potyvirus (LMoV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Cardinalflower (*Lobelia*) infected with cucumber mosaic virus (CMV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Cardinalflower (*Lobelia*) infected with spherical virus particles.



Detection method: Electron microscopy, University of Minnesota, Plant Disease Clinic.

Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Cardinalflower 'Ruby Slippers' (*Lobelia*) infected with cucumber mosaic (CMV), tobacco rattle (TRV) and turnip mosaic potyvirus (TuMV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Lupine 'Minarette' (*Lupinus*) infected with tomato spotted wilt virus (TSWV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Maltese cross 'Vesuvius' (*Lychnis x arkwrightii*)
infected with impatiens necrotic spot virus (INSV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Creeping Jenny (*Lysimachia*) infected with impatiens necrotic spot virus (INSV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Mandevilla sp. 'Fury Fancy Pink' and 'Teepee Mini Pink' infected with cucumber mosaic virus (CMV).

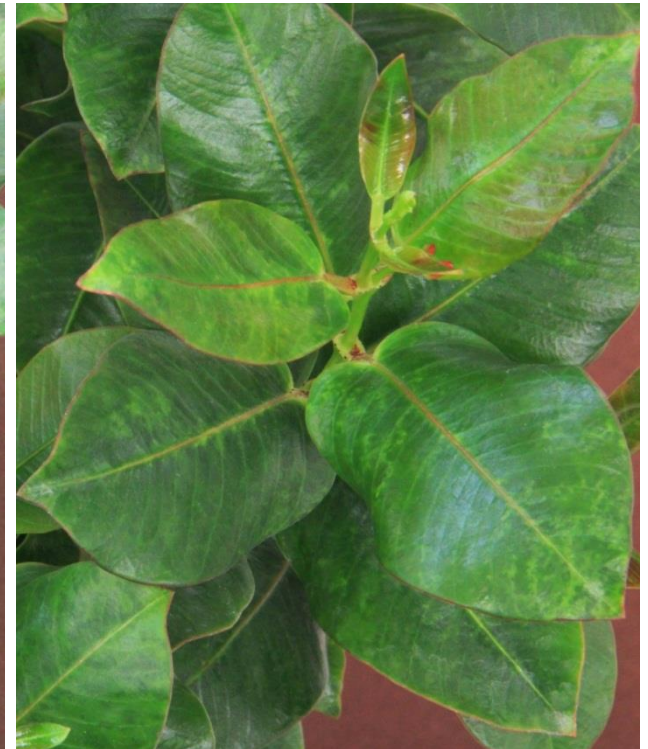


Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Mandevilla 'Red Riding Hood' (*Mandevilla sanderi*)
infected with cucumber mosaic virus (CMV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Virginia bluebells (*Mertensia virginica*) infected with tobacco rattle virus (TRV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Shamrock (*Oxalis*) infected with filamentous & spherical virus particles.



Detection method: Electron microscopy,
University of Minnesota, Plant Disease Clinic.

Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Japanese pachysandra 'Green Carpet' (*Pachysandra terminalis*) with alfalfa mosaic virus (AMV) and an unknown filamentous virus.



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Peony 'Sarah Bernhardt' (*Paeonia*) infected with tobacco rattle virus (TRV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

Peony (*Paeonia*) infected with tobacco rattle virus (TRV).



Peony 'Yellow Crown'



Peony 'Edens Perfume'

Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Peony (*Paeonia*) infected with tobacco rattle virus (TRV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Peony 'Momoyama' (*Paenia suffruticosa*) infected with unknown virus.



Filamentous virus particles of 500-600nm length observed with electron microscope (TEM) at University of Minnesota.

Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Beardtongue (*Penstemon*) infected with impatiens necrotic spot virus (INSV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Petunia 'Portunia Plus Papaya' (left) and 'Sweetunia Orange Flash' (right)
infected with tobacco mosaic virus (TMV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

Petunia 'Sunflower Ray' infected with tobacco mosaic virus (TMV).

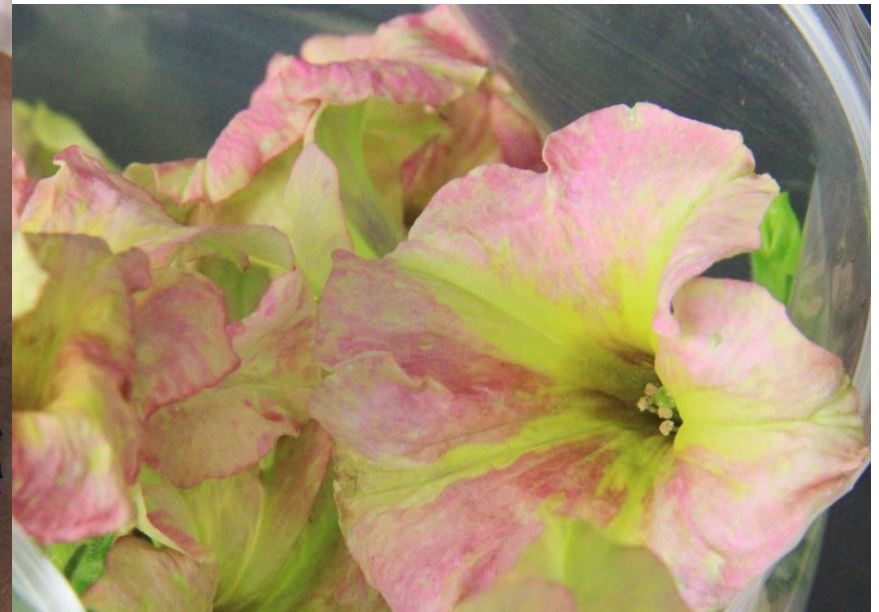


Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Petunia 'Cobalt Blue' (left) and 'Pink Lemonade' (right) infected with TMV.



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Phlox 'Orange-Red' infected with a potyvirus.



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

Phlox 'Peppermint Twist' infected with TRV.



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Phlox 'Pink Lady' infected with
CMV and TRV.



Phlox infected with a
potyvirus and TRV.



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Jacob's ladder (*Polemonium caeruleum*) infected with impatiens necrotic spot virus (INSV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Jacob's ladder (*Polemonium caeruleum*) infected with INSV.



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Yellow moss rose (*Portulaca oleracea*) infected with papaya mosaic virus (PapMV).



Detection method: ELISA (Agdia, Inc.).

Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>



'Black Satin' Blackberry
(*Rubus subgenus Watson*)
with virus symptoms.
Note: *Rubus* is host to over 40 viruses.

Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Britton's wild petunia (*Ruellia simplex*) 'Purple Showers'
infected with tobacco rattle virus (TRV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>



Elderberry with undetermined virus causing ringspot symptoms.



Elderberry 'Yellow Leaf' (*Sambucus*) infected with filamentous & spherical virus particles (University of MN).

Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Pincushion flower (*Scabiosa*) infected with tobacco rattle virus (TRV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Stonecrop (*Sedum*) infected with cucumber mosaic virus (CMV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Stonecrop 'Strawberries and Cream' (*Sedum*) infected with undetermined potyvirus.



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>



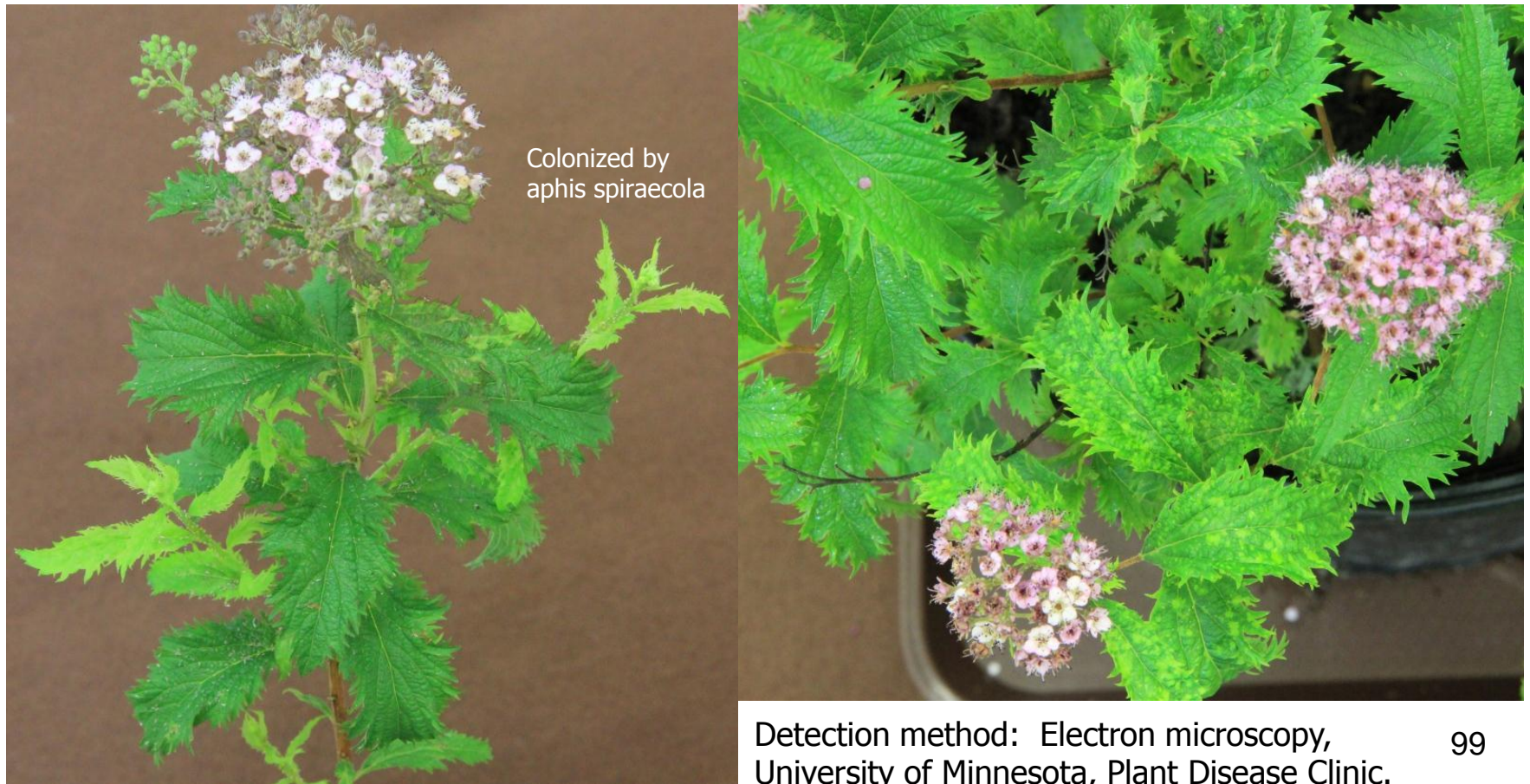
Stonecrop 'Matrona' (*Sedum*) also on 'Maestro' infected with undetermined potyvirus.

Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Spirea (*Spiraea japonica*) infected with spiraea yellow leafspot virus (SYLSV) and spiraea leafspot spherical virus (SLSSV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Celandine poppy (*Stylophorum diphyllum*) infected with tobacco rattle virus (TRV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Lilac (*Syringae*) foliar symptoms commonly observed but no virus has been detected.



Detection method: Electron microscopy, University of Minnesota, Plant Disease Clinic.

Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Wisteria infected with wisteria vein mosaic potyvirus (WVMV).

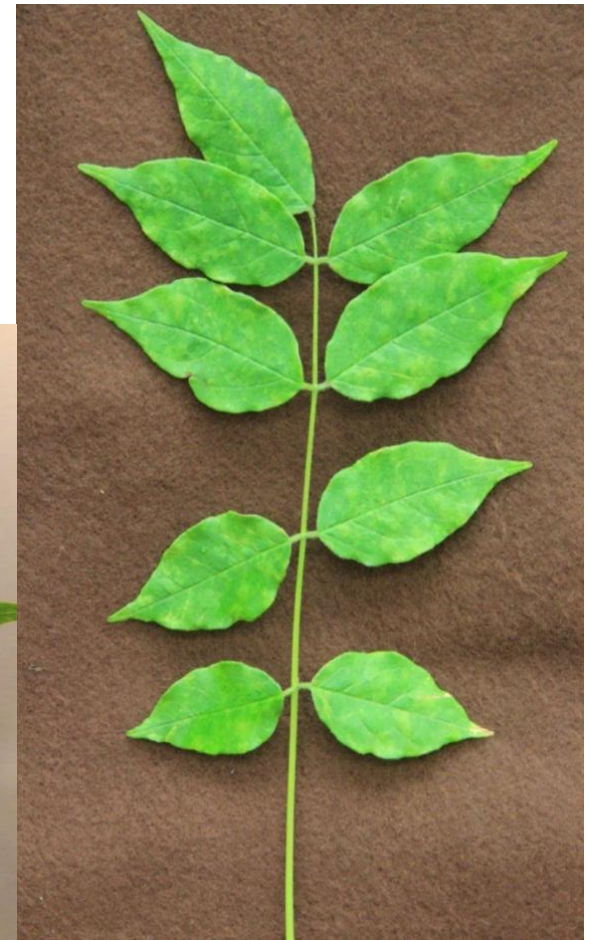


Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Wisteria 'Aunt Dee' (*Wisteria macrostachya*)
infected with wisteria vein mosaic virus (WVMV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Zinnia 'Uptown Sunstruck' infected with tomato spotted wilt virus (TSWV).



Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Virus diagnosis performed at Plant Industry Laboratory unless otherwise noted.

Detection methods for each virus are listed below:

1. Alfalfa mosaic virus – RT-PCR (Martinez et al. Plant Disease (2004) 88:908, 2004).
2. Arabis mosaic virus (ArMV) – Immunostrip (Agdia, Inc.).
3. Cucumber mosaic virus (CMV) - Immunostrip (Agdia, Inc.).
4. Cucumber mosaic virus (CMV) - RT-PCR (Blas et. al. Journal of Phytopathology, 141 (1994) 323-329).
5. Dahlia mosaic virus – PCR detection (M. Nicolaisen, Plant Disease (2003) 87, 945-948).
6. Fig mosaic virus (FMV)-RT-PCR (Elbeaino et al. Journal of General Virology (2009) 90, 1281-1288).
7. Hosta virus X (HVX) - Immunostrip (Agdia, Inc.).
8. Impatiens necrotic spot virus (INSV) - Immunostrip (Agdia, Inc.).
9. Tomato spotted wilt virus (TSWV) - Immunostrip (Agdia, Inc.).
10. Tobacco mosaic virus (TMV) - Immunostrip (Agdia, Inc.).
11. Potyvirus group – RT-PCR and sequencing (Zheng et. al. Plant Pathology (2010) 59, 211–220).
12. Tobacco rattle virus (TRV) – Endpoint and real time RT-PCR (D.J. Robinson (1992) Journal of Virological Methods, 40 (1992) 57-66).

Wisconsin Department of Agriculture, Trade and Consumer Protection

Wisconsin Pest Survey Report

Gallery of Plant Virus Symptoms

<http://pestsurvey.wi.gov>

Comments welcome!

anette.phibbs@wisconsin.gov

Department of Agriculture, Trade & Consumer Protection
Plant Industry Laboratory
2601 Agriculture Dr., Suite 150
Madison WI 53708-7883

ACKNOWLEDGEMENTS:

We wish to thank USDA APHIS for providing funding through the 2008 Farm Bill Section 10201. Dr. Benjamin Lockhart, University of Minnesota, 495 Borlaug Hall, 1991 Upper Buford Circle, St. Paul, MN 55108 and Dr. Dimitre Mollov, USDA ARS, National Germplasm Resources Laboratory, Building 004, Room 022, 10300 Baltimore Avenue, Beltsville, MD 20705.

We also wish to thank the scientists at Functional Biosciences, Inc., <http://functionalbio.com/web/index.php>, for providing excellent sequencing services.

INDEX

Slide	Host	Variety	Virus
1	Introduction		
2	Aconitum fisheri	Azure	AclV, CMV, potexvirus
3	Aconitum fisheri	Azure	CMV
4	Aconitum		undetermined virus
5	Actaea racemosa		potyvirus
6	Agastache	Acapulco Orange	INSV
7	Ajuga	Gaiety	CMV
8	Alcea rosea	Chaters Double Mix	TRV
9	Alstroemeria		TSWV
10	Anemone tomentosa	Robustissima	TRV
11	Anemone tomentosa	Robustissima	TRV
12	Anemone	Serenade	TRV, nematode
13	Armoracia rusticana		TRV
14	Astilbe arendsii	Fanal	CMV
15	Astilbe arendsii	Fanal	CMV, TRV
16	Astilbe		TRV
17	Begonia x hiemalis	Cindy Fringed	INSV
18	Begonia x hiemalis	Dark Britt	INSV
19	Begonia x hiemalis	Non-Stop Rose Petticoat, Go-Go Rose Bicolor	CMV
20	Begonia		CMV
21	Belamcanda chinensis		TSWV
22	Bergenia		TRV
23	Campanula		CMV
24	Canna	Crimson Beauty	CaYSV
25	Canna	Banana Punch	CaYSV
26	Celtis occidentalis		Hackberry island chlorosis
27	Clematis	Dancing Queen, Dancing Dorien	CICMoV
28	Clematis	Dancing Smile, Natascha	CICMoV
29	Clematis	Multi Blue	CICMoV
30	Dahlia		DCMV
31	Dicentra spectabilis		TRV

Slide	Host	Variety	Virus
32	Dicentra spectabilis		TRV
33	Dicentra spectabilis		TRV
34	Dicentra spectabilis		TRV
35	Dicentra spectabilis		CMV, TRV
36	Dicentra spectabilis		CMV, TRV
37	Delphinium elatum	Lilac Pink, Magic Fountain	TRV
38	Delphinium elatum		TRV
39	Delphinium elatum	Magic Fountain	TMV
40	Echinacea purpurea	Magnus	CMV
41	Epimedium alpinum	Rubrum	TRV
42	Epimedium pubigerum	Creeping Yellow	TRV
43	Epimedium pubigerum		TRV
44	Epimedium x rubrum		TRV
45	Epimedium x versicolor	Sulphureum	TRV
46	Epimedium	Orange Queen, Elegans, Niveum	TRV
47	Ficus carica	Black Jack	FMV
48	Gladiolus		BYMV, CMV
49	Helenium	Chelsey	CMV
50	Heuchera		TRV
51	Hosta	Albo-Marginata	ArMV
52	Hosta	Albo-Marginata, Daybreak	HVX
53	Hosta	Blue Angel, Honeybells	TRV
54	Hosta	Magic Fire, Krossa Regal, Regal Splendor	TRV
55	Hosta	Golden Tiara	HVX
56	Hosta	Paul's Glory	ArMV, HVX
57	Hosta	Christmas Tree, So Sweet	TRV
58	Hosta	Sum & Substance	HVX
59	Hosta	Undulata	HVX, TRV
60	Hoya carnosa		INSV
61	Iris	Avalon Sunset	TRV
62	Iris	Dwarf German	ISMV

INDEX

Slide	Host	Variety	Virus
63	Ligularia		TSWV
64	Lilium oriental	Angelique	TRV
65	Lilium	Casablanca	LYLSV
66	Lilium	Scarlet Delight	LMoV
67	Lobelia		CMV
68	Lobelia		undetermined virus
69	Lobelia sp.	Ruby Slippers	CMV, TRV, TuMV
70	Lupinus hybrid	Minarette	TSWV
71	Lychnis x arkwrightii	Vesuvius	INSV
72	Lysimachia		INSV
73	Mandevilla	Fury Fancy Pink, Teepee Mini Pink	CMV
74	Mandevilla sanderi	Red Riding Hood	CMV
75	Mertensia virginica		TRV
76	Oxalis		undetermined virus
77	Pachysandra terminalis	Green Carpet	AMV & undetermined virus
78	Paeonia	Sarah Bernhardt	TRV
79	Paeonia	Yellow Crown, Edens Perfume	TRV
80	Paeonia		TRV
81	Paeonia suffruticosa	Momoyama	undetermined virus
82	Penstemon		INSV
83	Petunia	Portunia Plus Papaya, Sweetunia Orange Flash	TMV
84	Petunia	Sunflower Ray	TMV
85	Petunia	Cobalt Blue, Pink Lemonade	TMV
86	Phlox	Orange-Red	potyvirus
87	Phlox	Peppermint Twist	TRV
88	Phlox	Pink Lady	CMV, TRV, potyvirus
89	Polemonium caeruleum		INSV
90	Polemonium caeruleum		INSV
91	Portulaca oleracea		PapMV
92	Rubus subgenus Watson	Black Satin	virus symptoms
93	Ruella simplex	Purple Showers	TRV
94	Sambucus	Yellow Leaf	undetermined virus

Slide	Host	Variety	Virus
95	Scabiosa		TRV
96	Sedum		CMV
97	Sedum	Strawberries and Cream	potyvirus
98	Sedum	Matrona, Maestro	potyvirus
99	Spiraea japonica		SYLSV, SLSSV
100	Stylophorum diphyllum		TRV
101	Syringae		no virus
102	Wisteria		WVMV
103	Wisteria macrostachya	Aunt Dee	WVMV
104	Zinnia	Uptown Sunstruck	TSWV
105	Detection methods		
106	Acknowledgements		
107	Index		
108	Index		