



# Seed-borne Cucurbit Viruses

Sue Tolin  
Virginia Tech

IPM-IL Workshop 2014



## e: *Cucumovirus*

### *Cucumber mosaic virus*

- ” ssRNA, icosahedral, 3-segment genome
- ” Occurs globally, in many crops
- ” Broad host range ->1200 species, including many crop plants and weeds
- ” Mechanically transmitted, but only moderately stable
- ” Seed-to-seedling transmitted, and also by **aphids** non-persistently, in many economically important hosts (spinach, bean, lupine, pepper reported 2009).
- ” Management in cucurbit through resistance in many cultivars has reduced incidence of CMV where used
  - ” Found in association with potyviruses

## ae: Potyvirus

*Watermelon mosaic virus*

*Papaya ringspot virus (strain W)*

*Zucchini yellow mosaic virus*

- “ ssRNA, flexuous rod
- “ Occur globally, in many cucurbit crops, often in mixed infections with each other, with CMV, and other viruses
- “ Each has rather narrow host range, WMV wider
- “ Mechanically by touch; also on field equipment
- “ **Aphid** transmitted non-persistently
- “ Seed-to-seedling transmission at low rates
  - “ ZYMV first Italy 1989, then detected worldwide likely from spread of seed. Seed transmissibility low (1-2%), and questioned



## Comovirinae: Comovirus

### *Squash mosaic virus*

- “ ssRNA, icosahedral, 2-segment genome
- “ Occurs globally, mainly in cucurbits
  - “ Called a major killer of heirloom varieties
- “ Narrow host range
  - “ *Lagineria* spp. in Indonesia
- “ Mechanically transmitted, but only moderately stable and also by **leaf beetles** semi-persistently
  - “ First virus shown to be beetle-transmitted
- “ Seed-to-seedling transmitted
  - “ Symptoms obvious early in grow-out tests
  - “ Easily graft-transmitted



## ae: Carmovirus

### *Melon necrotic spot virus*

- “ First report in Japan 1959. Economically important worldwide, USA, UK, Greece, Spain, Korea, China
- “ ssRNA, icosahedral particles
- “ Especially important in greenhouse grown crops – *Cucumis melo*, *C. sativum*
- “ Mechanically transmitted
  - “ Remains viable in soil for years
  - “ Viable in irrigation water and streams
- “ Seed-to-seedling transmitted, and also by **fungus** *Olpidium bornavanus*
  - “ Both outside and inside the seed
- “ Effective melon seed-disinfection treatment was 144 hr at 70°C in Spain
  - “ Plant Pathology 58,436 (2009)



## *Tobamovirus*

### *Cucumber green mottle mosaic virus*

- “ ssRNA, rod-shaped, stable like TMV
- “ In Europe, Asia – recently in US, US
  - “ Considered a high risk pathogen
  - “ Causes losses of 25% or more
  - “ Dutch call for needed revision in sanitation practices in greenhouses, and vigilant seed test programs
- “ Melon, cucumber, watermelon, bottle gourd
- “ Mechanically transmitted, no vector species
- “ Transmitted horizontally by **pollen** to fruits of the pollinated flower.
- “ Seed > Seedling by virus on seed surface.
- “ Disinfection of seed surface possible
- “ Emergence associated with growing grafted watermelon and other cucurbits



# Prevalence of seed-borne cucurbit viruses shown by availability of Immunostrips

## “ Cucurbitaceae

“ Cucumber mosaic virus	Cucumovirus
“ Cucumber green ring mottle virus	Tobamovirus
“ Melon necrotic spot virus	Carmovirus
“ Squash mosaic virus	Comovirus
“ Zucchini yellow mosaic virus	Potyvirus
“ Melon severe mosaic virus	Tospovirus



*Your complimentary  
use period has ended.  
Thank you for using  
PDF Complete.*

[Click Here to upgrade to  
Unlimited Pages and Expanded Features](#)

A photograph of several large, green, lobed leaves of a pumpkin plant growing in sandy soil. The leaves are vibrant green with prominent veins. The soil is light brown and appears dry with some cracks. The text 'THANK YOU' is overlaid in the center of the image.

**THANK YOU**