Seed-borne Cucurbit Viruses

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**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
**Potyviridae: 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
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
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)
**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

Importance of seed-borne cucurbit viruses shown by availability of Immunostrips

**Cucurbitaceae**

- Cucumber mosaic virus
- Cucumber green ring mottle virus
- Melon necrotic spot virus
- Squash mosaic virus
- Zucchini yellow mosaic virus
- Melon severe mosaic virus

- Cucumovirus
- Tobamovirus
- Carmovirus
- Comovirus
- Potyvirus
- Tospovirus
THANK YOU