

# **Recognizing Virus Symptoms In Vegetable Crops**

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# Snap Bean Viruses – A Recurring Problem Since 2000

- 2000 - Fields near Oostburg, Belgium and Cambria
  - High incidence of plants with virus-like symptoms
  - Many fields exhibiting these symptoms were destroyed prior to harvest – losses represented several hundred acres

# Snap Bean Viruses – A Recurring Problem Since 2000

- 2001 – Primary incidence along Lake Michigan near Manitowoc; scattered incidence elsewhere; losses less than 2000
- 2002 - Disease most visible on late plantings in eastern WI along Lake MI
  - Outbreaks of soybean aphids delayed
  - Virus outbreaks on snap beans observed only on late planted snap bean fields

# Snap Bean Viruses – A Recurring Problem Since 2000

- 2003 – Wide distribution along Lake Michigan, Cambria, central and southern WI
  - Aphid pressure early and heavy
  - 100% virus infection in many fields
  - Losses due to reduced yields and pod quality

# Virus Symptoms on Snap Beans

## Overall Key Points

- Pathogen: Several viruses detected
  - Involve CMV (Cucumber mosaic virus), AMV (alfalfa mosaic virus) and other viruses
  - All are stylet borne aphid transmitted
- Key Symptoms :
  - Leaf and pod mosaic
  - Plant stunting, pod blemishes, internal pod discoloration
  - Blossom abortion, pod drop, low yields, low quality
  - Yield loss not evident until harvest
- Timing of symptoms consistent with soybean aphid buildup





Leaf Curl and  
Plant Stunting





Mosaic and Leaf Blisters





Yellow Flecking





Plant Stunting





Tall plant – Short plant





Pod Necrosis –  
Internal and External





Pod Necrosis –  
Internal and External



Necrosis of stems  
and pedicels

# Symptoms of CMV on Pepper

- **Key Symptoms :**

- **Early infection**

- ✓ mosaic
    - ✓ necrosis
    - ✓ tiny deformed leaves
    - ✓ severe plant stunting

- **Late infection**

- mild symptoms
    - blossom drop
    - low yields
    - symptoms on fruit are variable



# CMV - Pepper



Note: Leaf  
mosaic,  
rosette

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# CMV - Pepper



Note: Fruit  
scarring, Leaf  
Pattern

# Symptoms of CMV on Tomato

## Key Symptoms :

- Early infection
  - ✓ yellow foliage
  - ✓ bushy appearance
  - ✓ stunted plants
  - ✓ shoestring leaf blades
- Later infection
  - ✓ few fruit
  - ✓ smaller fruit
  - ✓ delayed maturity



# CMV - Tomato



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# CMV – Tomato Shoe-string Leaf Symptom



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# Symptoms of CMV on Cucurbits

## Key Symptoms :

- Early infection
  - ✓ plant stunting
  - ✓ leaf curl and crinkling
  - ✓ mosaic patterns
- Later infection
  - ✓ symptoms on young leaves
  - ✓ fruit symptoms
    - low yield
    - bitter fruit
    - mosaic
    - bumpy and deformed fruit



# CMV - Cucurbits



Leaf curl, stunted leaves

# CMV - Cucurbits



Mild mosaic on leaves

# CMV - Cucurbits



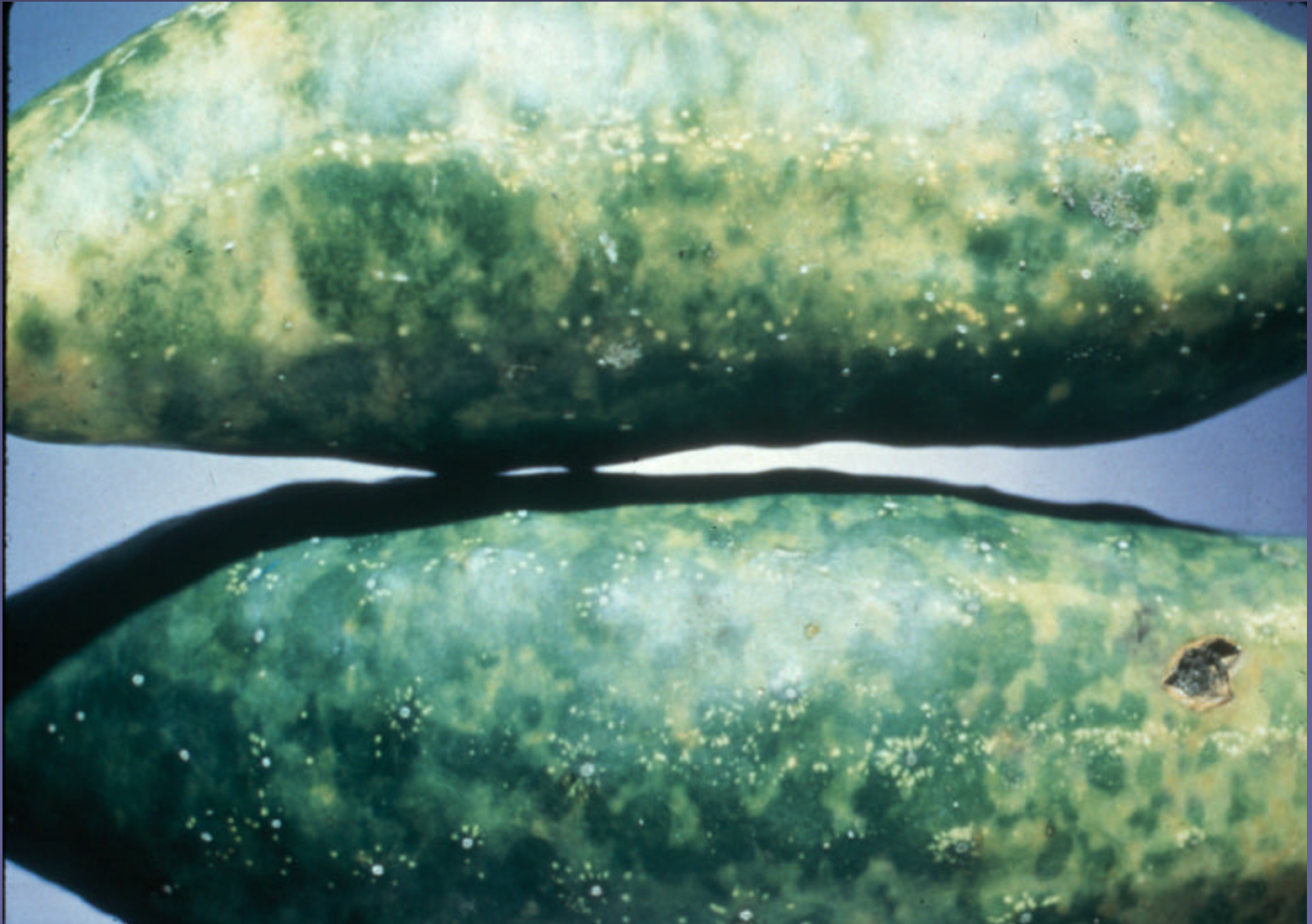


# CMV - Cucurbits



Mosaic, leaf deformation

# Cucumber Mosaic Virus



# Cucumber Mosaic Virus

CMV-NY causing  
color breaking on  
pumpkin (*Cucurbita  
pepo*)



# Summary

- CMV continues to affect many vegetable crops in WI
- CMV can infect 1,200 plant species in 101 families
- With continued presence of the primary vector, the soybean aphid, problems will continue
- Symptoms include:
  - ✓ poor growth
  - ✓ weak foliage
  - ✓ abnormal shape, color, texture of leaves and fruit
  - ✓ blossom drop
  - ✓ low yields
- CMV may well be overlooked problem on many crops