



Best Practices for Cucumber Green Mottle Mosaic Virus (CGMMV)

March, 2018

Initial Detection

July 2013 - First Detection of Cucumber Green Mottle Mosaic Virus, (CGMMV) and Bacterial Fruit Blotch, (BFB) in a melon seed production field in Yolo County during a PQ walk by County Inspectors.



How have things changed from 2013?

- CGMMV outbreaks in other areas have led to new research
 - Weeds and other non-cucurbit plants can be a host to the virus
 - Insects may also play a role in transmitting the disease
 - Research/Industry is continuing to work towards better understanding CGMMV and its transmission



Growing Season Activities

- CGMMV can be manually and/or mechanically transmitted.
- People - Transplanting and nursery crews, tractor drivers, irrigators, weeding crews, pruning and hybridization crews (pollinating, tipping, marking, etc.), separating and harvest crews, Field Reps., growers, PCA's and scouts, researchers, county inspectors, visitors...
- Equipment - Nurseries, tractors, planters/transplanters, sprinkler pipe, cultivators, rollers, incorporators, sprayers, crowders, male line destruction equipment, harvesters, bins, washers and driers...
 - Crew tools (hoes, knives) as well as shade structures, portable bathrooms, water containers, etc.
- Ask what crop your bees are coming from and avoid hives previously in other cucurbit crops

Why the Concern?

- ✓ Effects the quality and yield of seed and subsequent crops
- ✓ Potential effects on fruit



Where do we go from here?

- Partnership between all players is needed
 - Seed Companies, Growers, FLC's, PCA's...
- Tackling this problem as an industry is why we are here today
- Implications of not doing anything can potentially cause the disease to spread in the Valley
 - Can lead to greater regulatory oversight
 - Trade restrictions
 - Shifts in future cucurbit seed production volumes

Reinforcing Best Management Practices

- Identify Field locations prior to planting
 - Maintain a three year crop rotation or greater
 - Select fields with low weed pressure, keep the field and the surrounding area around the field free of weeds
 - Consider ditch banks, pumps, electrical poles/towers, roads...
- **Look out for and remove cucurbit volunteers in adjacent areas from previous crops**
- Timely pollen parent removal
- With this issue it strengthens the need maintain isolation distances at/or greater than a mile from other cucurbit fields
- Ask your seed provider for a CGMMV disease testing certificate



Seed Assay Summary Certificate

Seminis Vegetable Seeds, Inc.
Woodland QC Lab
37437 State Hwy 16
Woodland, CA, 95695
(530)666-0931

Certificate Date: 1/23/2018

Analysis: Cucumber green mottle mosaic virus

Statement: The sample of each lot referenced below has been tested for Cucumber green mottle mosaic virus and no Cucumber green mottle mosaic virus has been detected in the sample.

Botanical Name:	Variety Name:	Lot:	Batch:	Number of Seeds/Seedlings:	Test Date:
<i>Citrullus lanatus</i>	TCS-EJ09137	103050659	0173634554	1000	5/30/2017

The information provided in this certificate reflects Seminis Vegetable Seeds, Inc.'s ("Seminis") internal testing based on tests and analysis of the referenced samples of the material. This certificate shall not be construed to conflict with, supersede or modify in any way any warranties, disclaimers, limitations and other terms and conditions contained in a formal written agreement between the parties, or in Seminis' standard terms and conditions of sale and use of this seed, including any information printed on a label, product packaging or otherwise published by Seminis.

Certified By: 
Quality Representative



- 1 - Testing Laboratory
- 2 - Pathogen tested for
- 3 - Test result
- 4 - Seed lot/batch information, seeds and date tested
- 5 - Certified / Signed document

APHIS Accredited Labs for CGMMV

- California Seed and Plant Laboratory - Pleasant Grove, CA.
- Eurofins/STA Laboratories, Inc. - Longmont, CO.
- HM CLAUSE - Modesto, CA.
- Iowa State University Seed Science Center - Ames, IA.
- Monsanto Company - Woodland, CA.
- Oregon State University Seed Laboratories - Corvallis, OR.
- Sakata Seed America, Inc. - Salinas, CA.
- Summit Plant Laboratories, Inc. - Fort Collins, CO.
- Sunburst Plant Disease Clinic - Turlock, CA.
- Syngenta Seeds - Nampa, ID.

▶ Link to Accredited Entities:

https://www.aphis.usda.gov/plant_health/acns/downloads/SeedHealthProgram/Entities/EntitiesAccredited.pdf

▶ Testing method: <http://seedhealth.org/cb3-1/>

Disinfectants

Many disinfectant materials are available on the market

Work have been done using TMV to measure and confirm the material efficacy. Some widely used are:

KleenGrow

Simple Green d Pro 5

Virkon S

Virocid

Always follow the material label recommendations and consult with your Pest Control Advisor

Test strip are available to quickly measure the correct solution concentration

Disinfectant Efficacy

Summary

Disinfectant	Bacteria									Virus
	Bacterial Canker (Cmm)	Bacterial fruit Blotch (Aac)	Carrot Leaf Blight (Xhc)	Black Rot (Xcc)	Bacterial Spot (Xcv)	Common Blight (Xap)	Halo Blight (Psp)	Bacterial Speck (Pst)	Bacterial Wilt (Rs)	Tobacco Mosaic (TMV)
KleenGrow (0.3%)	+++	+++	+++	+++	+++	+++	+++	+++	+++	2%
Simple Green d Pro 5 (0.5%)	+++	+++	+++	+++	+++	+++	+++	+++	+++	2%
Phyosan 20 (syn. Maril 100 (India)(0.13%)	+++	+++	+++	+++	+++	+++	+++	+++	0.5%	2%
Lysol (25%)	+++	+++	50%	50%	50%	50%	-	-	+++	50%
Ethyl Alcohol* (70%, 75%)	+++	+++	+++	+++	+++	+++	+++	+++	+++	-
Isopropyl Alcohol** (70%, 75%)	+++	+++	+++	+++	+++	+++	+++	+++	+++	-
Virocid (0.25%)	+++	+++	+++	+++	+++	+++	+++	+++	+++	1%
Virkon S (0.5%)	1%	+++	+++	+++	+++	+++	+++	+++	+++	2%
Des-O-Germ SP VEG (0.2%)	+++	+++	0.5%	0.5%	0.5%	0.5%	+++	+++	0.5%	2%
Green Shield (0.25%)	+++	+++	+++	+++	+++	+++	+++	+++	+++	2%
Menno Ter Forte (0.5%)	+++	+++	+++	+++	+++	+++	+++	+++	+++	2%
Menno Florades (1%)	+++	+++	+++	+++	+++	+++	+++	+++	+++	2%
SaniDate (0.4%)	2%	+++	+++	+++	+++	0.8%	0.8%	0.8%	+++	2%
Virex II 256 (0.4%)	+++	+++	+++	+++	+++	+++	+++	+++	+++	2%

+++ denotes efficacy against listed pathogen

- denotes INEFFECTIVE against listed pathogen

*Although 75% ethanol and 75% isopropanol controlled pathogens in the lab, they may not be effective in fields or greenhouses due to quick evaporation and the presence of organic matter

**Laboratory and store-bought products both tested. yielding comparable results

Symptoms

- Light mottling and mosaic
- Uneven fruit ripening, necrotic flesh
- Lesions on peduncle





Cucumber



Melon



Watermelon





Watermelons (Sugar Baby) from Yolo, 2013 and
CGMMV ELISA O.D. Data and images by Dr.
Tongyan Tian, CDFA

Source: Tera Pitman, UC Davis



2014

- Dr. Brenna Aegerter examined seedless watermelon fields in San Joaquin County
- Samples arrived in August, tested positive for CGMMV
- More samples arrived other counties, positive samples found from Fresno and Kern counties



Source: Tera Pitman, UC Davis

Symptoms observed in California

- Symptoms in the field can differ from pictures in text books or disease guides
 - Our environment and our farming practices are unique to this area
- Look for atypical / subtle symptoms (anything suspicious or out of the norm)
 - Mottling or mosaic patterns on the plant leaves
 - Weak areas of the field or area where plants are dying
 - Necrotic lesions on the pedicles and/or fruit rind
 - Deformed fruit
 - Discolored and/or necrotic lesions of the fruit flesh
 - Collapsed/broken down flesh of the fruit

The goal here is to submit samples into a lab for diagnosis of any suspicious plant symptoms observed in the field.