

UV Crop Treatment



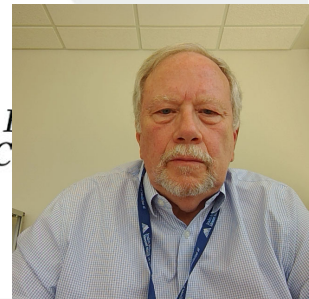
The Dragon

Mark Rea, PhD

Professor, Light and Health Research Center
Department of Population Health Science and Policy
Icahn School of Medicine at Mount Sinai
mark.rea@mountsinai.org



*Light and Health
Research Center*

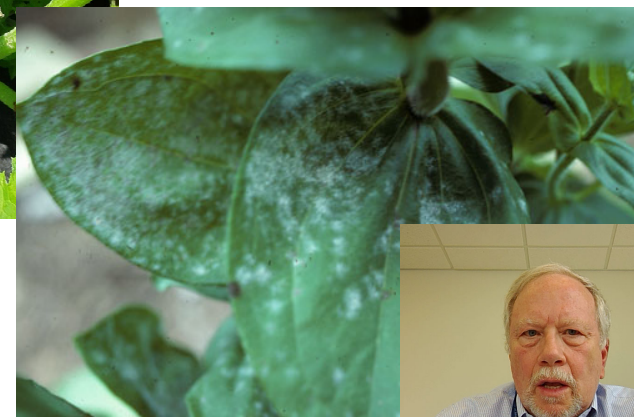


Why UV-C [254 nm]?

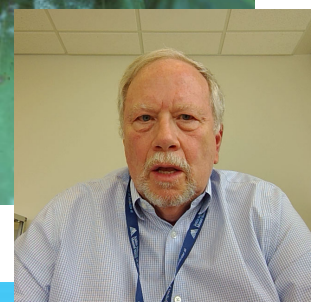
- ▶ Pathogen DNA absorbs and is damaged by UV-C, preventing replication
- ▶ UV-C treatment has shown efficacy in various crops
 - Strawberries (PM)
 - Grapes (PM)
 - Squash/Cucurbits (PM, ALS)
 - Zinnias (PM)
 - Beets (CLS) – ongoing trials
- ▶ No residue
- ▶ Zero re-entry interval
- ▶ Zero preharvest interval
- ▶ No induced resistance



PM on Squash



PM on Zinnias



Configuration is variable to suit different farms/crops

Summer Squash



Cucumber



Cucumber
(side-row)



Strawberries



Unit construction

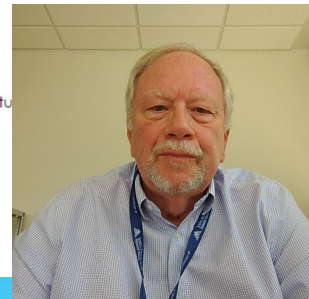
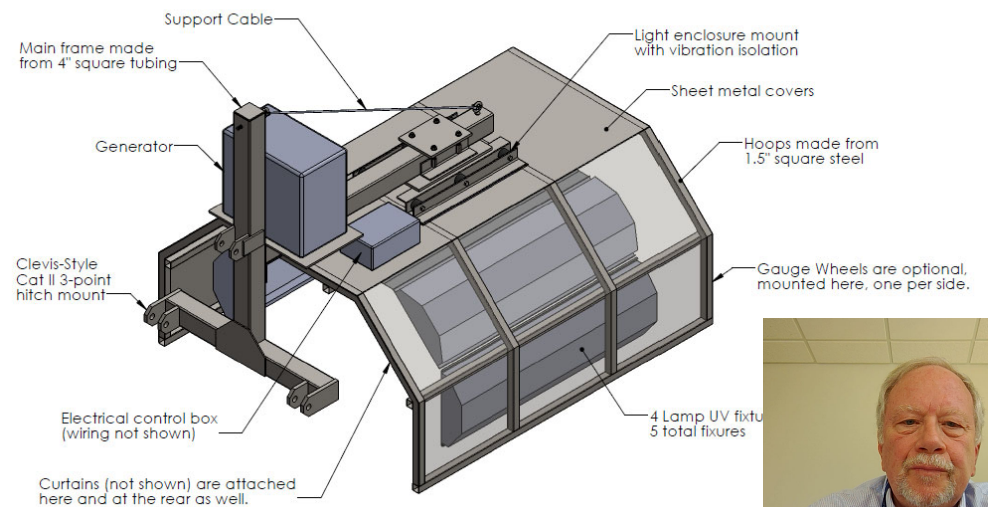


View of Tubular Lamp UV-C Sources

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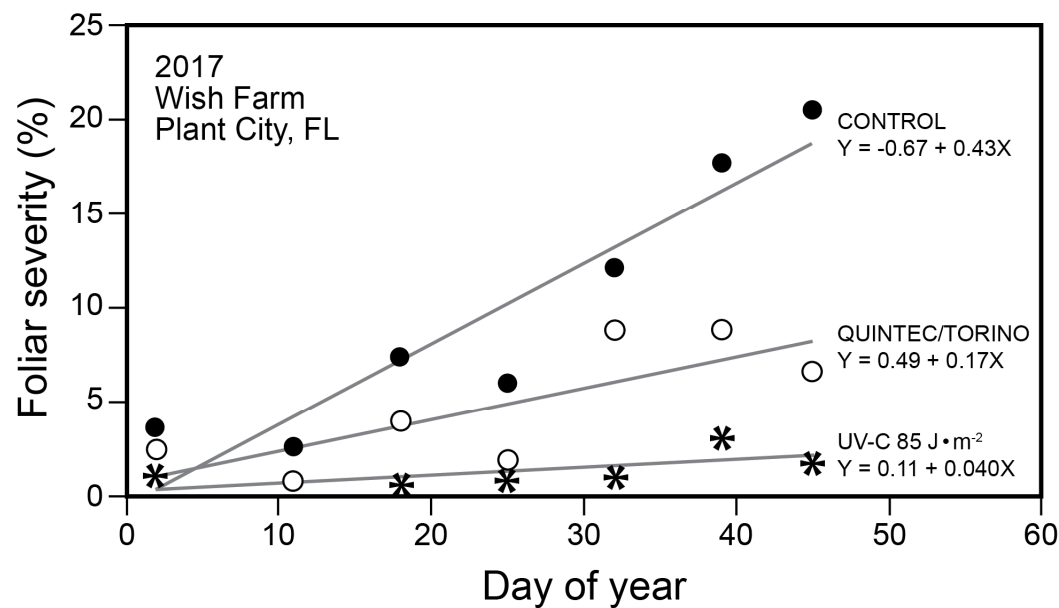
- Current units are farm built
- DIY plans available
<https://tinyurl.com/make-a-dragon>

UV-C Strawberry Treatment Attachment Key Features

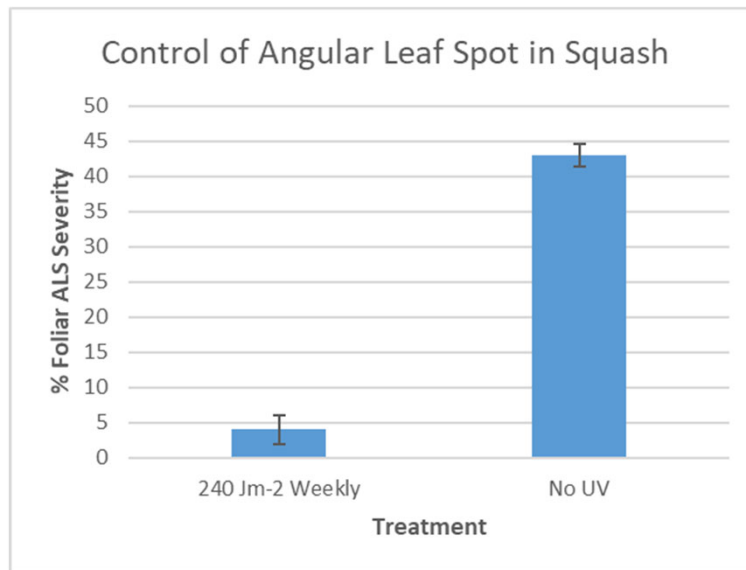


Crop example: Strawberry powdery mildew (PM)

- ▶ Weekly UV-C (85 J·m⁻²) produced better control than conventional fungicide
- ▶ Highly cost-effective management approach

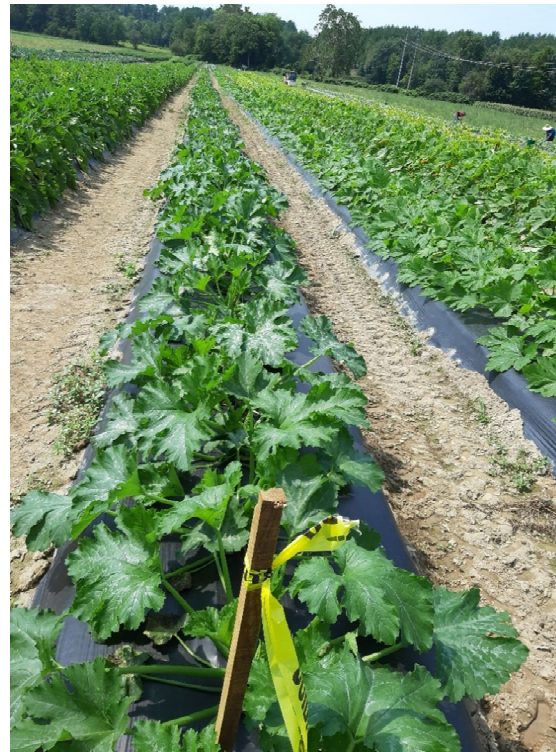


Crop Example: Angular leaf spot (ALS) on zucchini



- ▶ UV-C treated plants had lower disease severity ($p < 0.05$) and were noticeably more advanced and vigorous

240 J·m⁻² UV-C weekly



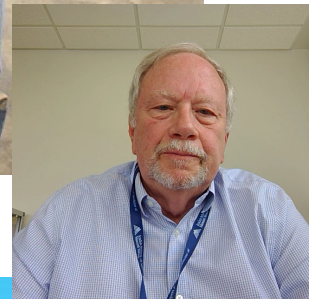
No UV-C treatment



UV-C safety

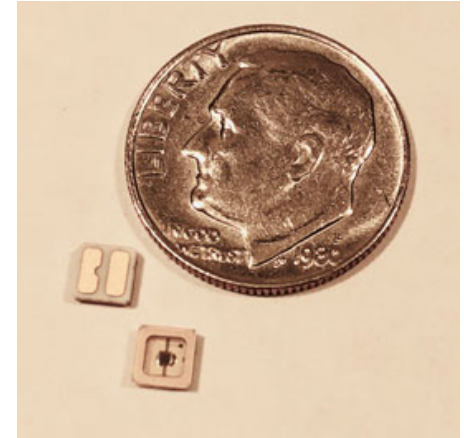
- ▶ Similar to chemical pesticide safety
- ▶ Tractor cab glass blocks UV-C
 - No extra PPE required
- ▶ Cover exposed skin (pants and long sleeve shirt)
- ▶ Protect eyes with
 - face shield – or –
 - safety glasses

<https://www.deere.com/en/tractors/row-crop-tractors/row-crop-7-family/comfort-visibility/>

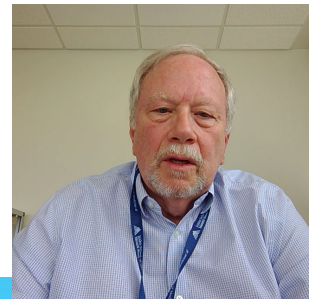
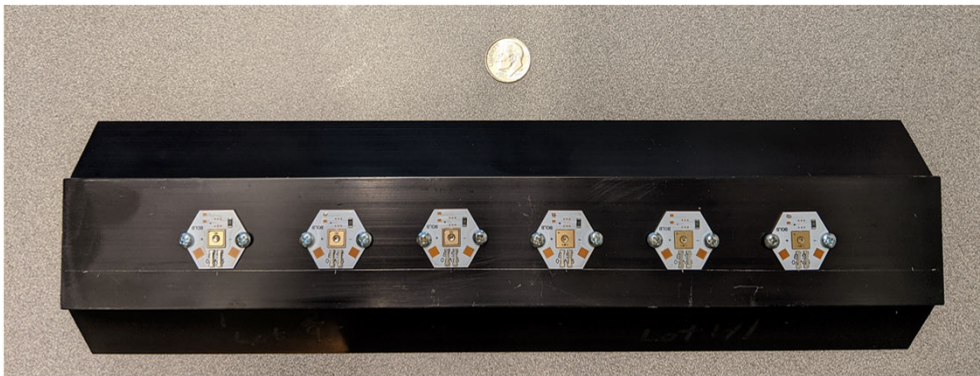


UV-C technology advancements

- ▶ UV-C LED sources are rapidly evolving
 - No hazardous glass or Hg
 - Integration into other equipment
 - Speed of dosing improvements — more economical
 - \$ / watt is expected to be equivalent to current sources by 2025



Electronics Weekly, 26 March 2019



Thank You

<https://icahn.mssm.edu/research/light-health>

