Invasives of Concern – Chrysanthemum White Rust

Lin Schmale, SAF

Cristi Palmer, IR-4

RUSTS are COMPLICATED!!!

microcyclic

diaecious

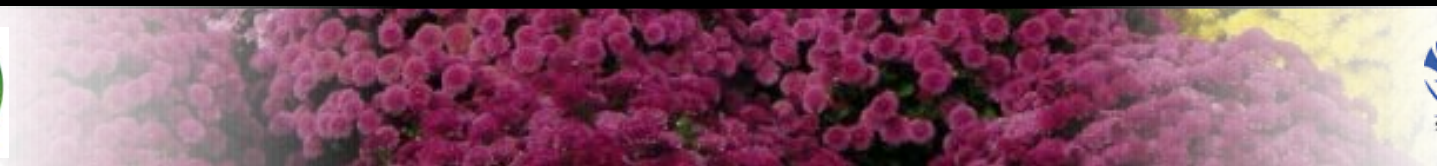
teliospore

macrocyclic

urediniospore

autoaecious

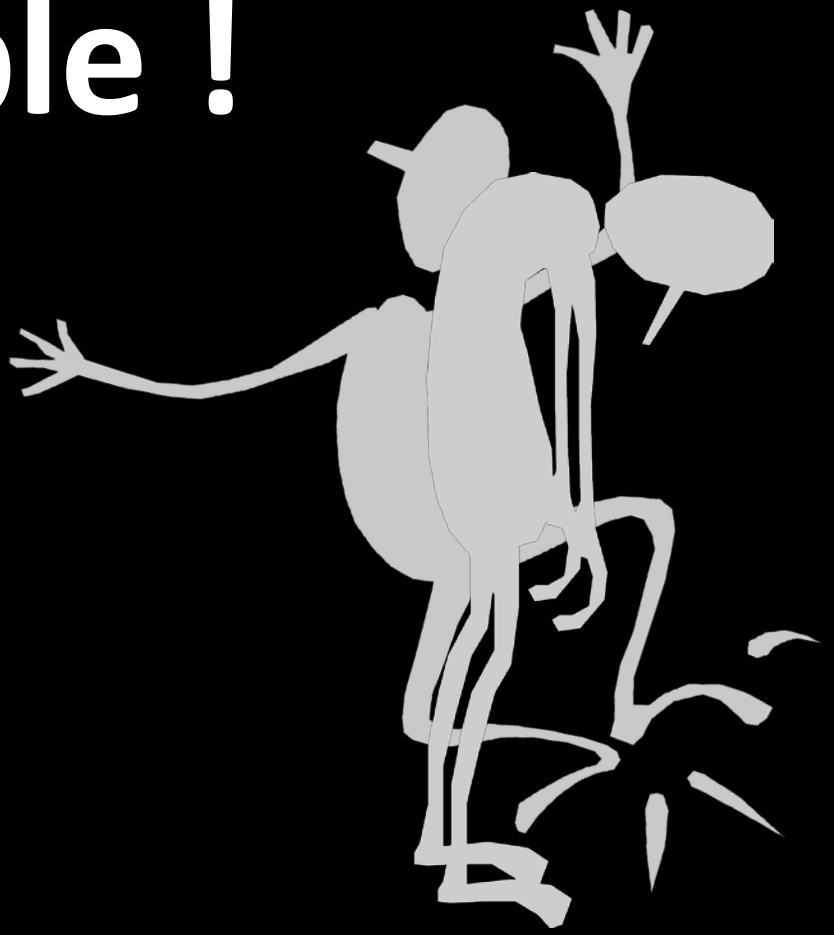
basidiospore



Chrysanthemum White Rust

- CWR is caused by a fungus called *Puccinia horiana*
- Monoecious – completes its life cycle on ONE host
- Microcyclic – doesn't have all 5 life stages
  - Has 2 spore types:
  - Teliospores
  - Basidiospore

CWR is simple !



Not exactly

TODAY, DOMESTIC PRODUCTION OF GARDEN MUMS DOMINATES IN US – MUMS ARE ONE OF THE MOST IMPORTANT GARDEN CROPS

- Mums as cut flowers: about 90% from Colombia; also Costa Rica, Ecuador, Mexico
- US cut production: small % - mostly California
- Hardy garden mums: $109 million wholesale value of sales 2009 (15 NASS survey states).
- Florist mums: $25 million wholesale (15 NASS survey states)
- Mums dominate ALL total garden plants sold (15-20%)

Chrysanthemum Growing and CWR: Then & Now

TTThen (1940-80)

- Cut mums dominated
- MANY small growers across country
- Greenhouse production
- Self propagation
- Limited control options

Now

- Garden and pot mums dominate
- MANY small/large growers across country
- Outdoor production for garden mums
- LESS self-propagation
- Good fungicides available
- Growers more aware

After several years of expensive quarantine/eradication efforts…

In 2011, resolutions were passed by

The Eastern Plant Board

The Western Plant Board

The National Plant Board

URGING APHIS TO MOVE TO A DIFFERENT REGULATORY STATUS FOR CHRYSANTHEMUM WHITE RUST

APHIS CONVENED A MEETING

January 31 - February 1, 2012

USDA, Riverdale, MD

ATTENDEES:

Society of American Florists, and state organizations

Breeder/propagator companies, both U.S. and international

U.S. and Canadian commercial mum growers

National Plant Board, States

USDA-APHIS

Scientists

Canadian government representatives

Mexico also interested, will be involved

APHIS PUBLISHED ADVANCE NOTICE OF PROPOSED RULEMAKING FOR PUBLIC COMMENT

OUTLINED FOUR POTENTIAL OPTIONS, RECEIVED COMMENTS::

--No Change

--Deregulate completely

--Move to “Regulated Non-Quarantine Pest”

--Move to “FRSMP” (state-by-state regulatory action)

APHIS DID NOT PROPOSE, BUT IS LIKELY CONSIDERING IN ADDITION, "NAPPRA"

"NOT AUTHORIZED PENDING PEST RISK ASSESSMENT"

Before mums (could include cut flowers too) could be imported, APHIS would have to do a "Pest Risk Assessment" for the exporting country

Important because other pests than CWR are known on mums

APHIS DID NOT PROPOSE, BUT IS LIKELY CONSIDERING IN ADDITION, "NAPPRA"

THIS MAY BE THE MOST VIABLE OPTION.

APHIS could move quickly to do the assessment just for the most likely exporting countries

Likely some kind of certification program would be established ("systems approach" type)

Cut flowers might continue under a separate certification approach, as at present.

SAF-ANLA-OFA COMMENTED, AND SAID:

CHANGES MUST BE BASED ON SOUND SCIENCE

PROTECTION FOR CUT FLOWER IMPORTS SHOULD CONTINUE AS WELL UNDER ANY CHANGED PROGRAM

APHIS SHOULD CONSIDER “NAPPRA” AS PART OF THE SOLUTION

Questions

- Does *P. horiana* overwinter?
- If so, how? Does it go systemic? Do spores survive?
- Do different isolates sporulate differently?
- Are there additional fungicide options?

Collaborative Research Effort

- USDA-ARS Team at Fort Detrick
  - Doug Luster, Mo Bonde, Susan Nester, Jason Revell
    - Overwintering
    - Biology/Systemicity
    - Fungicide Baseline Data for US Isolates
- Belgium Group
  - Kurt Heungens
    - Whole Plant Fungicide Efficacy in the Greenhouse

Mist chamber used for inoculations

The IR-4 Project

SAF Society of American Florists Your Growth is Our Business

Photo by
Jason Revell

Symptoms

Photo by
Jason Revell

Heavily Infested Leaf

Photo by
Jason Revell

Stem with heavy infection

Photo by
Jason Revell

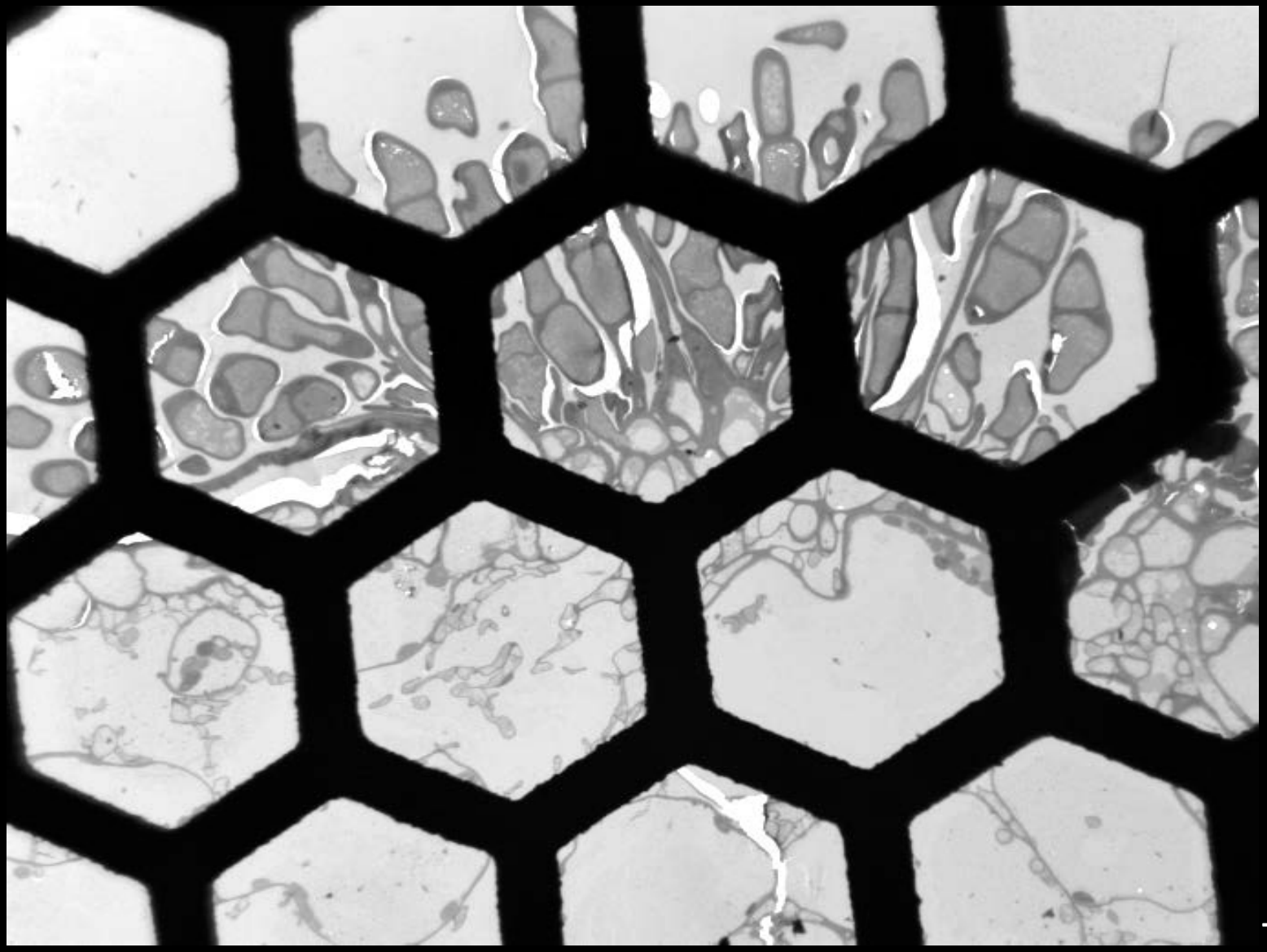
Pustule Before Sporulation

Photo by
Jason Revell

Pustule with Sporulation

Photo by
Jason Revell

Pustule Just Sporulating



TEM by
Gary Bauchan

Pustule Just Sporulating

Teliospores

The IR-4 Project

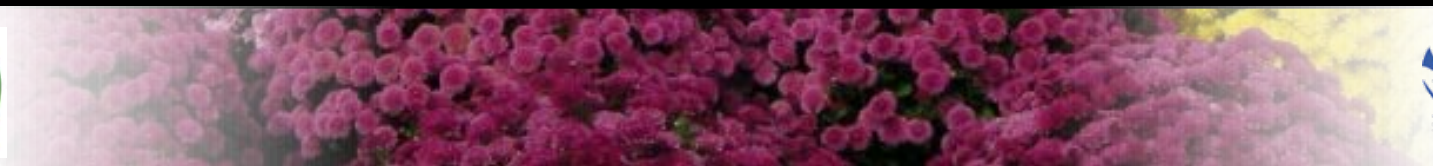
SAF Society of American Florists Your Growth is Our Business

Basidiospores

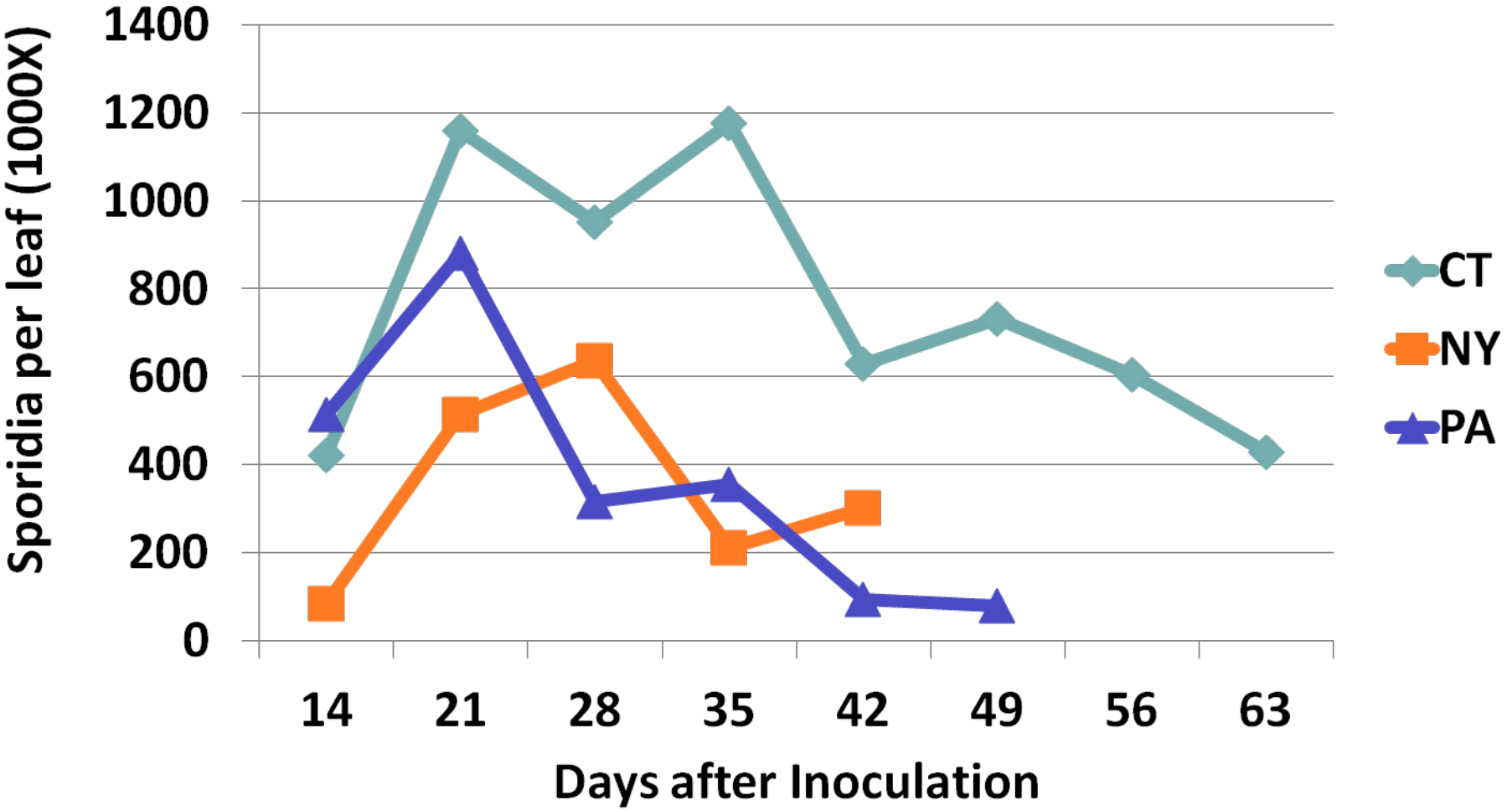
The IR-4 Project

SAF Society of American Florists Your Growth is Our Business

Do isolates have a difference in sporulation?



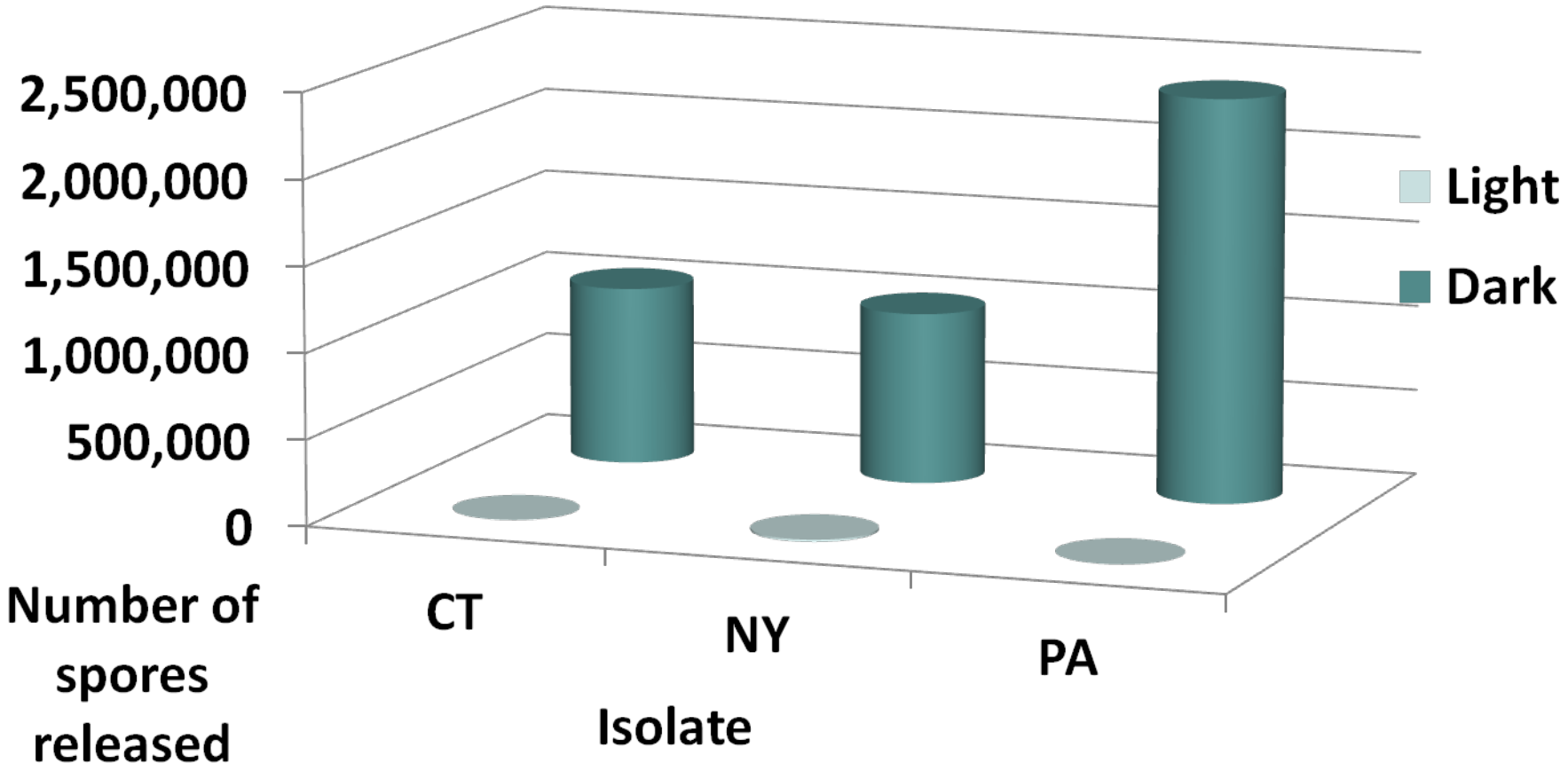
Sporulation from Three *P. horiana* Isolates



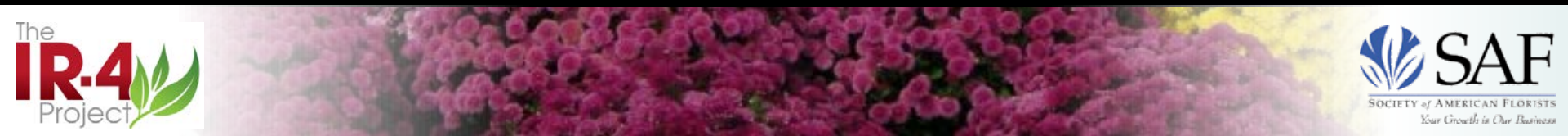
The IR-4 Project

SAF Society of American Florists Your Growth is Our Business

Impact of light on *P. horiana* sporulation



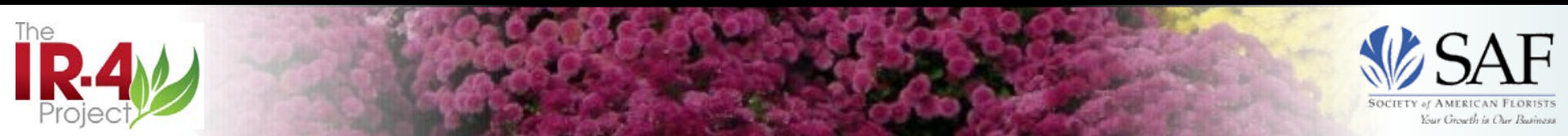
Does CWR Overwinter?



How does CWR overwinter?

Is it systemic?

Do the teliospores survive?




Thank you