

The Role of the Environment

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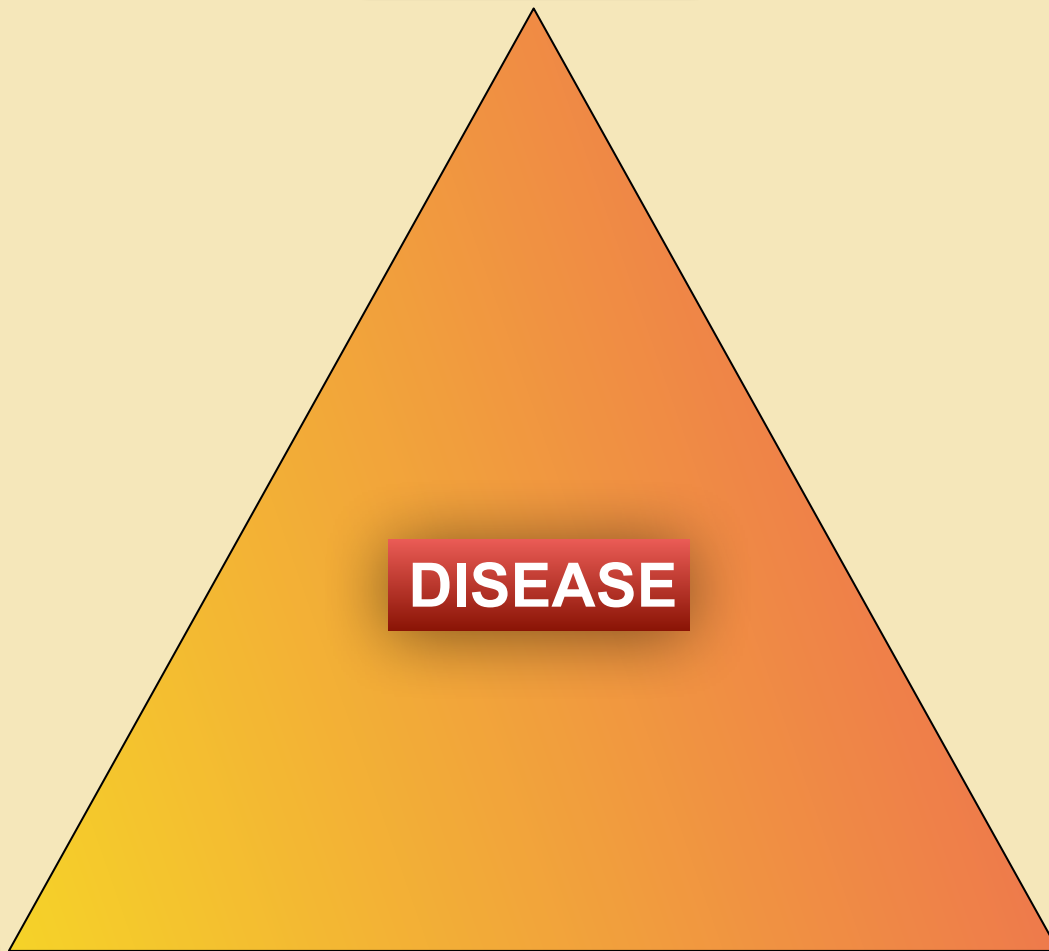
Chase Agricultural Consulting, LLC

PLANT HOST

DISEASE

ENVIRONMENT

PATHOGEN



What can you do?
shadehouse
greenhouse
raised benches
flood floors
ebb and flood benches
drip tape or drip tubes

Open to the environment - no protection





Water on leaves=disease



Light control for flowering



Protected from rain/snow

Protection from wind and rain



and snow





Too much snow



Avoid fog

Creating fog to promote disease



Fans reduce leaf wetness and RH



Overhead irrigation best way to create foliar diseases





Sprinkler irrigation



Drip irrigation on steep slopes



**Raising pots off ground
pack stop disease spread**

Raising pots off floor and using drip tape to manage water





**Drip tubes reduce
disease spread**

**Ebb and flood
benches keep
leaves dry**





**Benches promote air movement
and drip tape keeps leaves dry**



The image shows a long, straight concrete aisle in a greenhouse. On either side of the aisle are raised benches. The benches on the right are filled with a layer of brown, granular material, likely perlite or vermiculite, used for growing plants. The benches on the left are partially visible, showing a green surface. A blue coiled hose lies on the concrete floor near the left benches. The concrete floor has some dark, irregular stains, possibly from water or fertilizer. The overall scene is a typical greenhouse environment for commercial plant production.

Under bench heating



**Boom irrigation
with fine mist**

Flood floors - check for puddles





Flooding

What is covered in the “environment”?

Light

Temperature

Water

Structures

RH

Leaf wetness

Pathogen spread

Key Factors in Disease

Disease	Wet leaves	High humidity	Temperature	Wind
Botrytis	+++	++	+	+
Downy mildew		+++	+	+
Powdery mildew	--	++	+	++
Rust	++	+	+	++
Bacterial leaf spots	+++	++	+	
Fungal leaf spots	+++	+	+	+
Phytophthora aerial	+++	+	+	
Rhizoctonia blight	+++	+	++	
Root rot				
Crown rot				



Gray mold

(Botrytis blight – gray to brown spores)



Botrytis Characteristics

Spores form on all parts of the plant.

Botrytis spores spread by fans or wind and infect new leaves.



Overnight moisture on leaves is especially favorable for *Botrytis* sporulation.

Botrytis Characteristics

- Botrytis conidia are released when there is a rapid change in relative humidity.
- They require air currents or splashing water for dispersal within the greenhouse.
- In geranium stock-plant production areas, peak concentrations of conidia:
 - harvesting cuttings
 - spraying pesticides
 - cleaning plants
 - drip-tube watering.
- Optimal growth temperature is reported to be 75–82°F, but some growth occurs from 32 to 95°F.

Cultural Control Strategies

- Heat and vent at disk to reduce humidity.
- Space plants to reduce humidity.
- All handling can spread Botrytis spores including irrigation and fungicide spraying.
- Never water at night.
- Do not place crops in hanging baskets with petals that shed easily over crops that are very susceptible to Botrytis.

Powdery mildew (white spots or all over leaves, flowers and stems)



Powdery Mildew





Downy Mildew





When the sun comes up, leaves start to dry and spores are released.

Most spores spread by fans or wind and infect new leaves before noon.

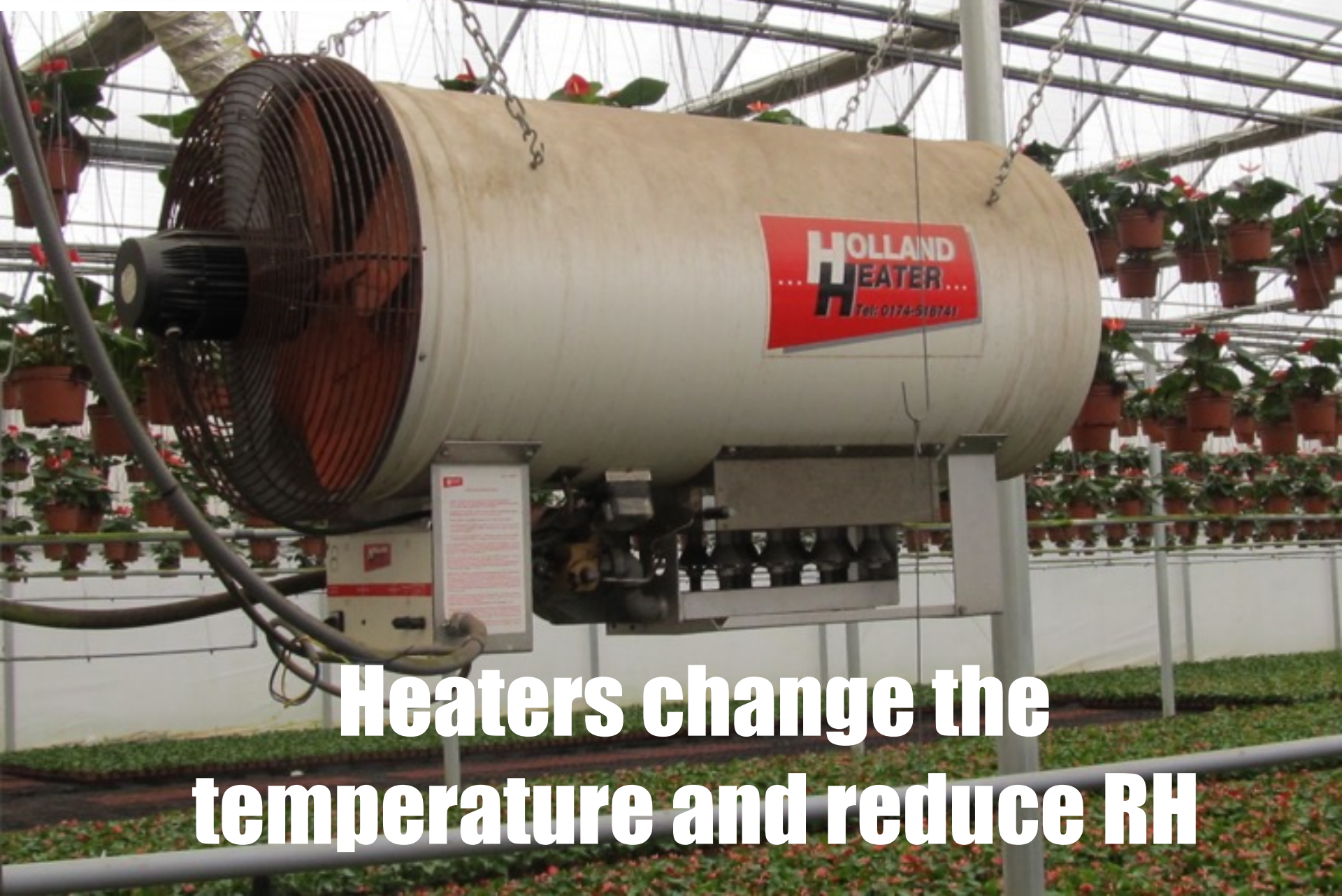
Wet leaves and high humidity make the Downy Mildew fungi sporulate and infect healthy leaves.

Six hours of constant leaf wetness = downy mildew

Use fans and venting to reduce humidity and leaf wetness

Water early in the day to ensure dry foliage at night.





**Heaters change the
temperature and reduce RH**

Optimal temperatures for some diseases

Why do you care?

Plant	Pathogen	Optimal temp F
Philodendron	Dickeya chrysanthemi	82-93
Dianthus	Fusarium wilt	70-75
Chrysanthemum	Fusarium wilt	81-90
Calathea	Helminthosporium leaf spot	59-70
Xmas cactus	Helminthosporium	75-91
Aphelandra	Phytophthora stem rot	81-90
Hibiscus	Pseudomonas cichorii	70-81
Hibiscus	Pseudomonas cichorii	68-82
Bougainvillea	Pseudomonas leaf spot	75-91
Hibiscus	Pseudomonas syringae	59-64
Geranium	Ralstonia wilt	72-95
Nephrolepis	Rhizoctonia aerial blight	air less than 95, soil less than 90
Begonia	Rhizoctonia root rot	70-91
Impatiens	Rhizoctonia stem rot	68-95
Dieffenbachia	Xanthomonas blight	86-91
Hedera	Xanthomonas leaf spot	68-86
Syngonium	Xanthomonas leaf spot	79-86
Hibiscus	Xanthomonas malvacearum	75-91
Geranium	Xanthomonas pelargonii	77-86

- **Tests were all done at constant temperatures**
- **Unlikely that you can change the temperature of the growing range**

BUT

- **Know when to watch for the disease - scouting**
- **Know when to time preventative sprays**
- **Help in diagnosis by narrowing down the likely causes**



**Heated propagation beds
for rooting**



YouTube.com/ChaseAgricultural

Chase Digest

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Chase Archives – open access

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