

2 Causes of Disease:

BIOTIC

- Means “living”
(these are the contagious diseases)

ABIOTIC

- Means “non-living”
(such as stress factors:
Temperature
Nutrition
pH
Air pollution
(these aren't contagious!)
(and are far more common)

Abiotic or Biotic?

For example, what if a plant is *wilting*?



Abiotic disease or Biotic disease – symptoms may be very similar



Not irrigated
in far too long?
(Abiotic)



Fusarium wilt?
(Biotic)

A. R. Chase image

Abiotic Disease = an interaction of 2 factors

PLANT ← ENVIRONMENT

Abiotic diseases typically have cultural solutions . . .

They don't spread

They often affect plants of many species in one area
(but sometimes one cultivar is more prone to a stress)

Look at the overall pattern in the greenhouse

Does it fit with an abiotic disease?

Is there an environment-related pattern? One location affected?

Are plants of multiple species affected?

Or are symptoms random & scattered within
one plant species (thus more likely a contagious disease)?



Common Abiotic Problems – Nutrient Deficiencies

Mobile Nutrients:

Symptoms appear on lower leaves FIRST

Nitrogen

Phosphorus

Potassium

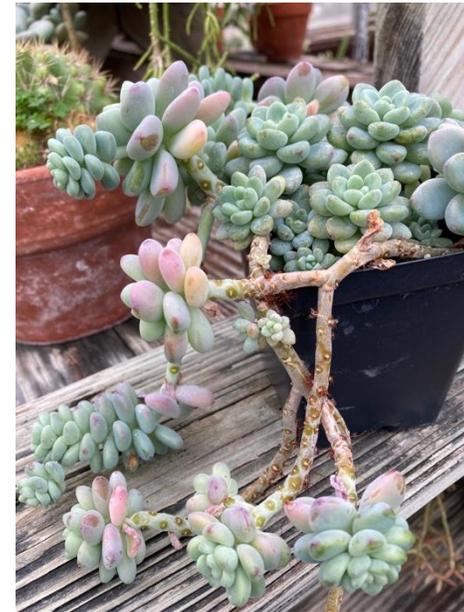
Magnesium



Nitrogen Deficiency - Mobile

Chlorosis or Yellowing on
Lower Leaves

Plant drops lower leaves



Phosphorus Deficiency - Mobile

Purple leaves

Smaller overall size

Similar to Cold Damage



Photo compliments of Nora Caitlin

Potassium Deficiency - Mobile

Necrotic (black) spots on leaves

Edges of leaves are necrotic



Photo compliments of Neil Mattson and Tanya Merrill, Cornell University

Magnesium Deficiency - Mobile

Interveinal Chlorosis – leaf margins

Red/Purple Leaves (Rare)



Nutrient Deficiencies

Immobile Nutrients:

Symptoms appear on upper leaves FIRST

Calcium (only macronutrient)

Boron

Iron

Manganese

Copper

Zinc

Molybdenum



Photo compliments of Margery Daughtrey

Calcium Deficiency - Immobile

Necrotic leaf edges

Chlorotic leaves (newest growth)

Tulips – Calcium Topple



Photo compliments of Penn State Department of Plant Pathology and Environmental Microbiology

Boron Deficiency - Immobile

Leaf distortion

Loss of apical meristem



Photos compliments of Margery Daughtrey

Iron and Manganese Deficiency

Interveinal Chlorosis

Iron – leaves can turn white



Photo compliments of Kathleen Holman



Photo compliments of Paul Bachi, University of Kentucky

Iron and Manganese Toxicity

Starts as Interveinal Chlorosis

Necrosis on new leaves



Photos compliments of Margery Daughtrey

Low pH

Toxic: Iron, Manganese, Zinc,
Copper

Deficient: Calcium, Magnesium



Photo compliments of Margery Daughtrey

High pH

Deficient: Iron, Manganese, Zinc,
Copper, Boron



Photo compliments of Margery Daughtrey

Sulfur – young and old leaves

Chlorosis or leaf yellowing

Symptoms impact both old and young leaves



Photo compliments of Neil Mattson and Tanya Merrill, Cornell University

How to know if fertilizer is the culprit?

Fertilizer problems often look like other issues (and vice versa)

Weekly pH/EC testing is recommended

Foliar testing is critical to determine what fertility problem may be present

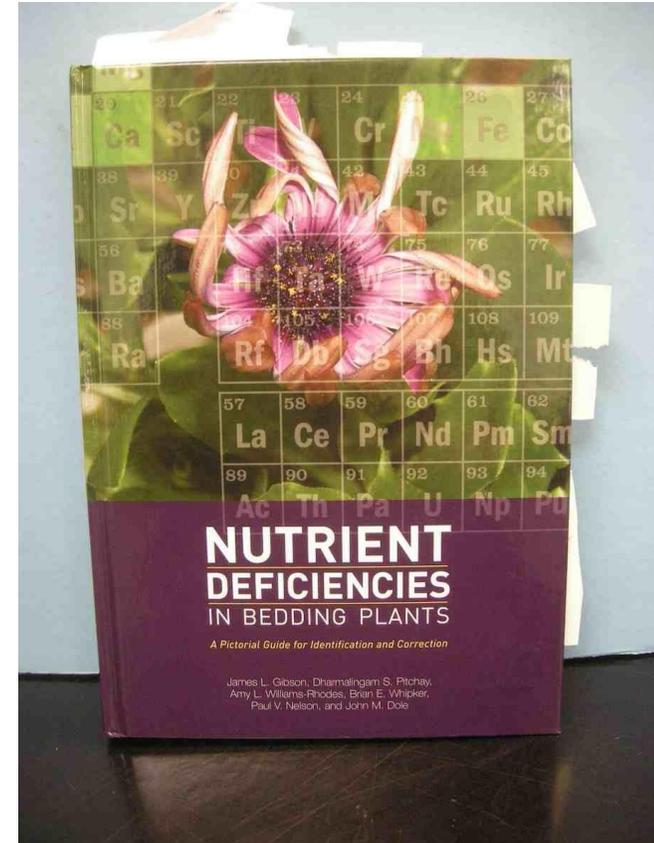


Photo compliments of Margery Daughtrey

Common Abiotic Problems – Spray Damage

Timing is critical – usually shows up FAST!

Read labels before applying

Take care when spraying hanging baskets

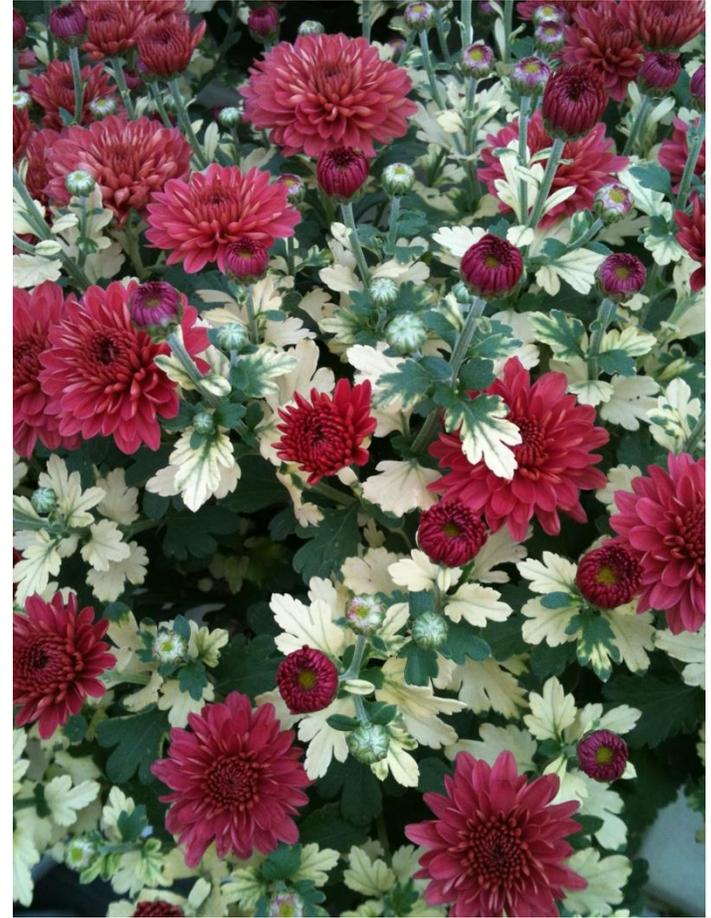


Photo compliments of Cheryl Sullivan

Cold Temperature Stress



Photo compliments of Elizabeth Bush



Photo compliments of John Ruter

Low Light

Plant drops lower leaves

Larger than normal internodes

Consider spacing!

Common on:

Succulents

Poinsettia

Other sun-loving plants



High Light

Scorching on leaf margins

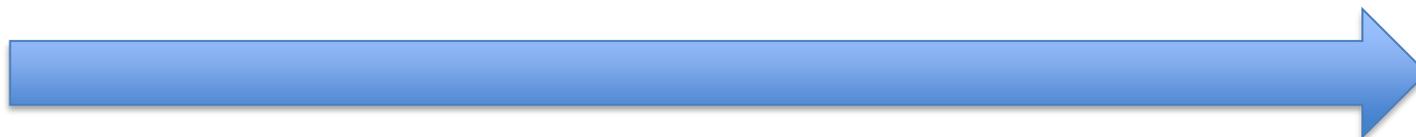
Common on:

House plants

Any shade loving plant



Low Water Stress



Less Water

More Water

Other Abiotic Problems - Ethylene



Leaf drop or
Flower drop

Seen here on a
Euphorbia

Ethylene may result
from incomplete
combustion

Other Abiotic Problems - Edema

Water uptake faster
than transpiration

Cells burst

Lower leaf

Ex: Ivy geranium,
tomato



Photo compliments of Sandra Jensen