Indoor Gardening: Houseplants Galore

Presented by:

Smithsonian Gardens

February 25 & 27, 2025

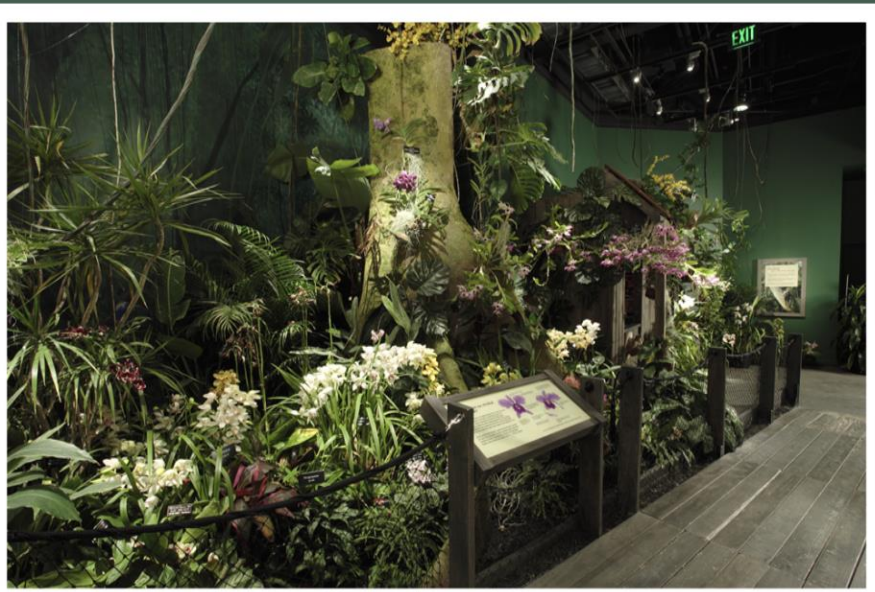
SMITHSONIAN GARDENS INTERIORS SECTION

What we do

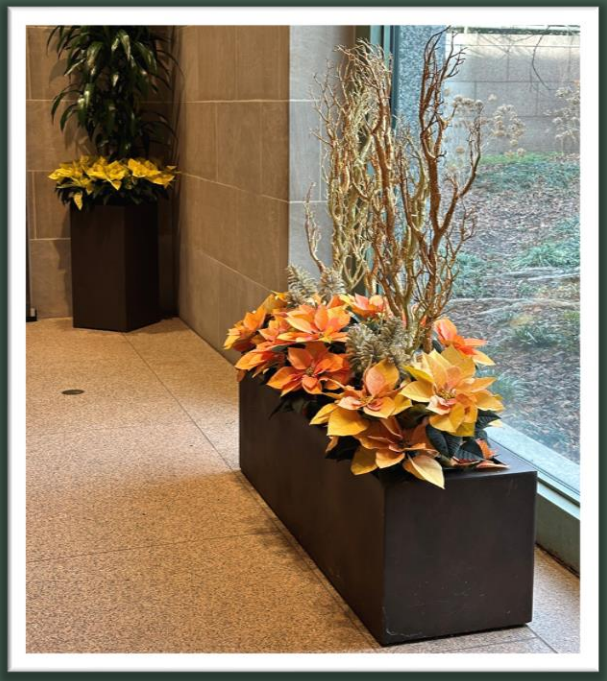
Museum Displays

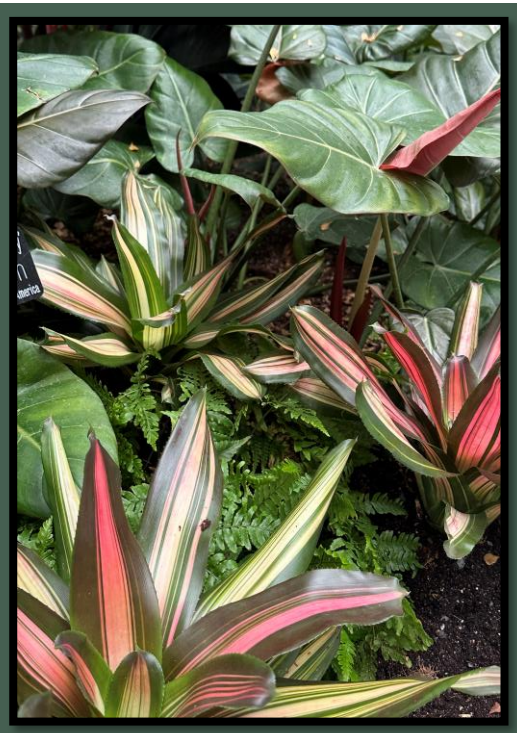
Urns and Dish Gardens

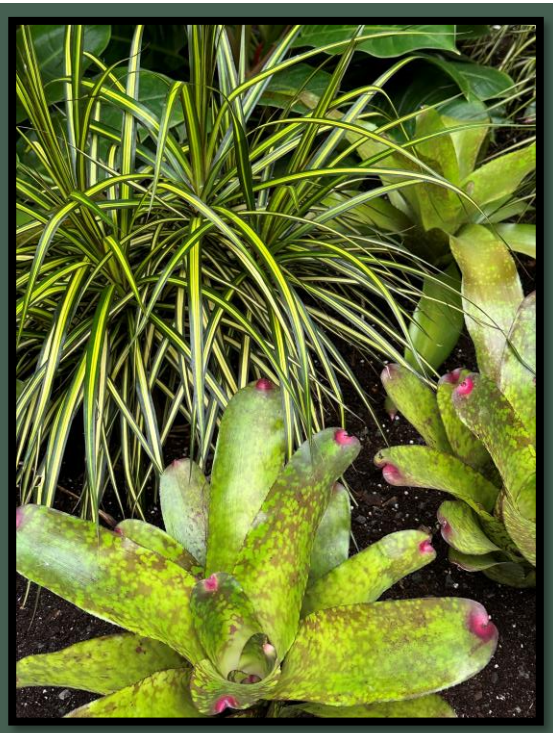
Exhibits



Holiday







Understanding What Plants Need

Virginia V. Thaxton

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Outline

- Growing factors
  - What do plants need
- Stress Symptoms
  - What to look for

- Plant selection based on environmental needs

Plants are living systems

Light

Air / Temperature

Water

Substrate/Nutrients

Growing Factors

Water, Temperature, Light, Nutrients

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Stress Symptoms

Diagnostics of plant stress symptoms can take some detective work plus careful observing of your plants !!!

WATER

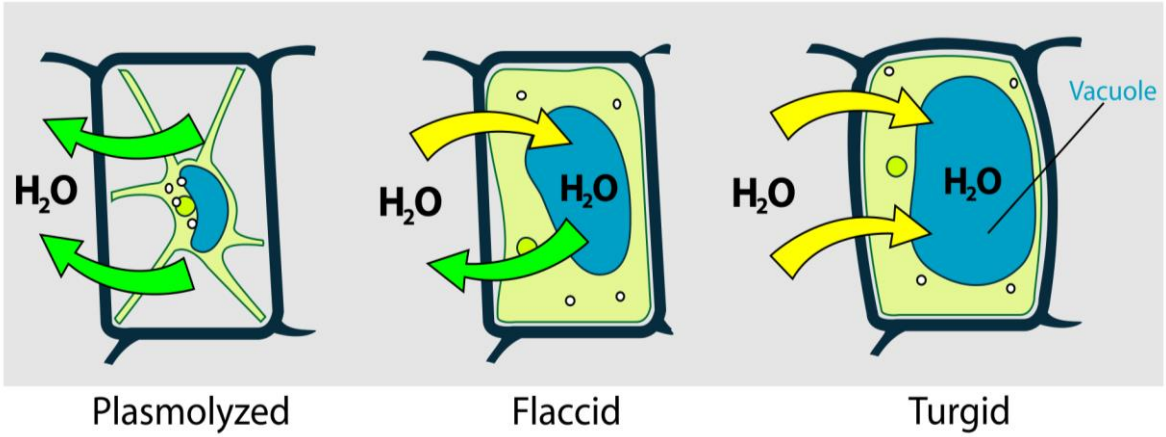
- Essential element in fundamental processes.
  - Photosynthesis, growth and most all metabolism.
- Stress symptoms come from:
  - Lack of water (drought)
  - Root impairment (due to lack of oxygen from too much water)
- Both **drought stress** (underwatering) and **waterlogging** (overwatering) are common causes of plant loss.

WATER

- Signals from over- and underwatered plants are similar.

- Wilting for example is a sign of both too much or too little water.
  - It may also be caused by too much sun, being root bound, too much fertilizer, and some diseases.

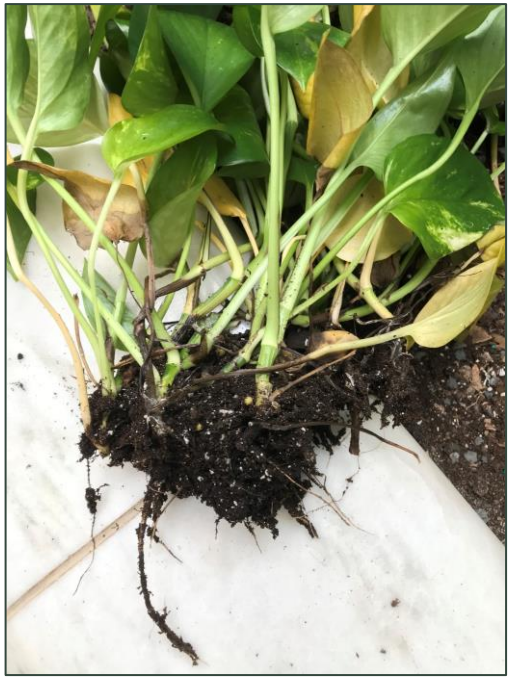
Wilting: Loss of ***turgor pressure =*** cells deflate and die.



OVERWATERING

Golden Pothos – *Epipremnum aureum*

Healthy roots and leaves



Root rot and yellow leaves

- **Leaves:**

  Limp, soft, yellow

- **Roots:**

  Soft, rotten, grey, slimy

- **Substrate:**

  Mildew, mold and other fungal growth

Flowerpot Parasol – *Leucoprinus* fungus

- Leaves becoming yellowed, curled and crispy, floppy
  - Dry brown leaf edges; dropped leaves or flowers
    - Full wilting and drying up of leaves and roots

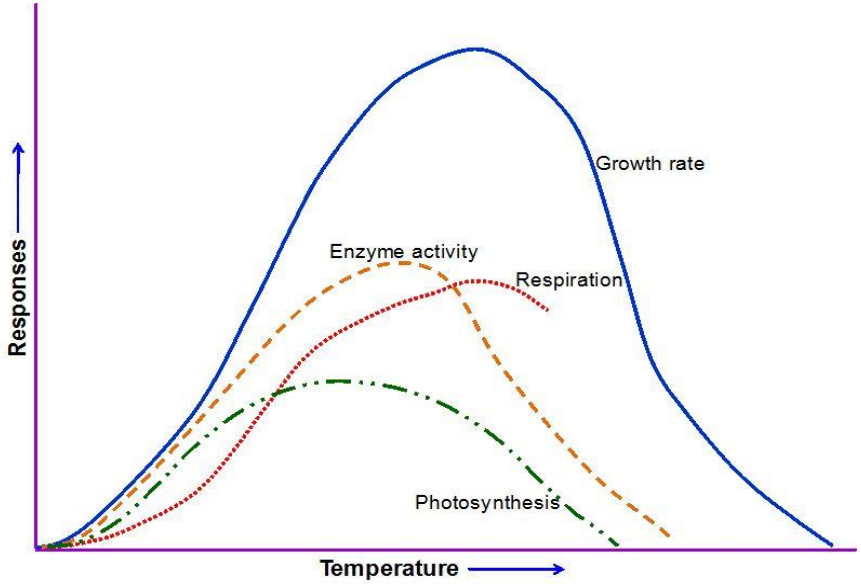
Hemigraphis

Well-watered

Wilting

TEMPERATURE

- Temperature stress has devastating effects on plant growth and metabolism.
- These processes have optimum temperature limits.



Mirza Hasanuzzaman, Kamrun Nahar and Masayuki Fujita (March 2013)

TEMPERATURE

- Heat stress can occur:
  - high daytime temperatures
  - high nighttime temperatures
  - high soil temperatures
  - proximity to indoor heat sources.

- **Chilling injury** = cold damage at non-freezing temperatures 32 to 55°F (0 to 10°C).
  - Plants from tropical origins are chilling-sensitive.

HEAT

Dracaena

- Hot air injury: drying and browning at the tips and edges of older leaves. Followed by wilting and dieback of tender new growth.

Tradescantia

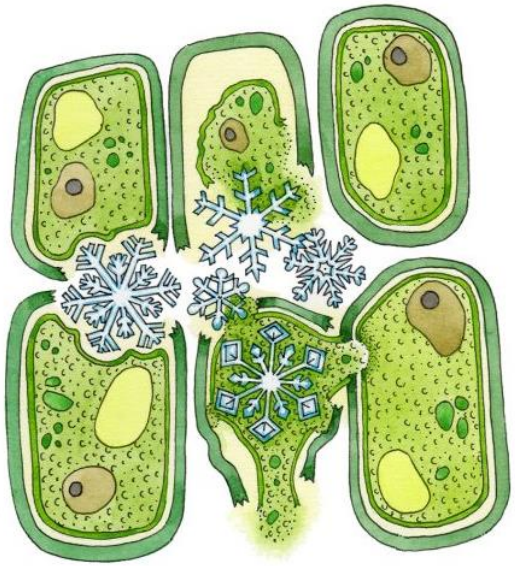
- Long exposure: stunted growth, leaf drop, leaf scald, failure to flower, or failure to produce seeds.

Rapid moisture loss in extreme heat can cause tender leaves to turn black.

COLD

- Drooping and discoloration of leaves:

✓ water freezing
✓ ice crystal formation
✓ membrane breakage
✓ fluid leaking
✓ cell damage.



Neon Pothos

- Cold air injury: Wilting, reduced leaf expansion, surface lesions, chlorosis, necrosis, tissue break down and water-soaked appearance.

Tradescantia

Water-soaked tissue

Dracaena

Necrotic lessions

LIGHT

- Critical function in plant development and metabolism.
  - Different plant types may require different light intensities.
- **Too much** sunlight:
  - UV damage to their leaves and dehydration (from rapid evapotranspiration).
- **Too little** light:
  - Inhibition of metabolic processes (i.e. photosynthesis, gas exchange, water transport, pigment synthesis).

HIGH RADIATION

- A yellow-white or tan "burn" on the upper surface of leaves

The epidermis, outer tissue layer (like our skin), gets sunburned !!!

Croton

Clivia miniata

- Wilting due to rapid water loss from exposure to high intensity of light.

LOW RADIATION

- Slow plant growth, decrease in plant biomass (weight of material) and flowering performance.
- Spacing between leaves increase … longer internodes

Tradescantia

More compact in high light

Streched in low light

- Reduction chlorophyll
- Lighter green leaves
- leaves yellow and fall off
- Red or oranges hues get lost when moved away from sunlight.

Croton

New leaves formed in low light lack the red colors of the older leaves formed in sun

NUTRIENTS

- Nutrients are essential for growth, development, and reproduction.
  - Photosynthesis, tissue building, energy storage, disease resistance.

- Balanced source of nutrients is needed to thrive.

Types of Nutrients

Macronutrients

- Nitrogen
- Phosphorus
- Potassium
- Magnesium
- Calcium
- Sulfur

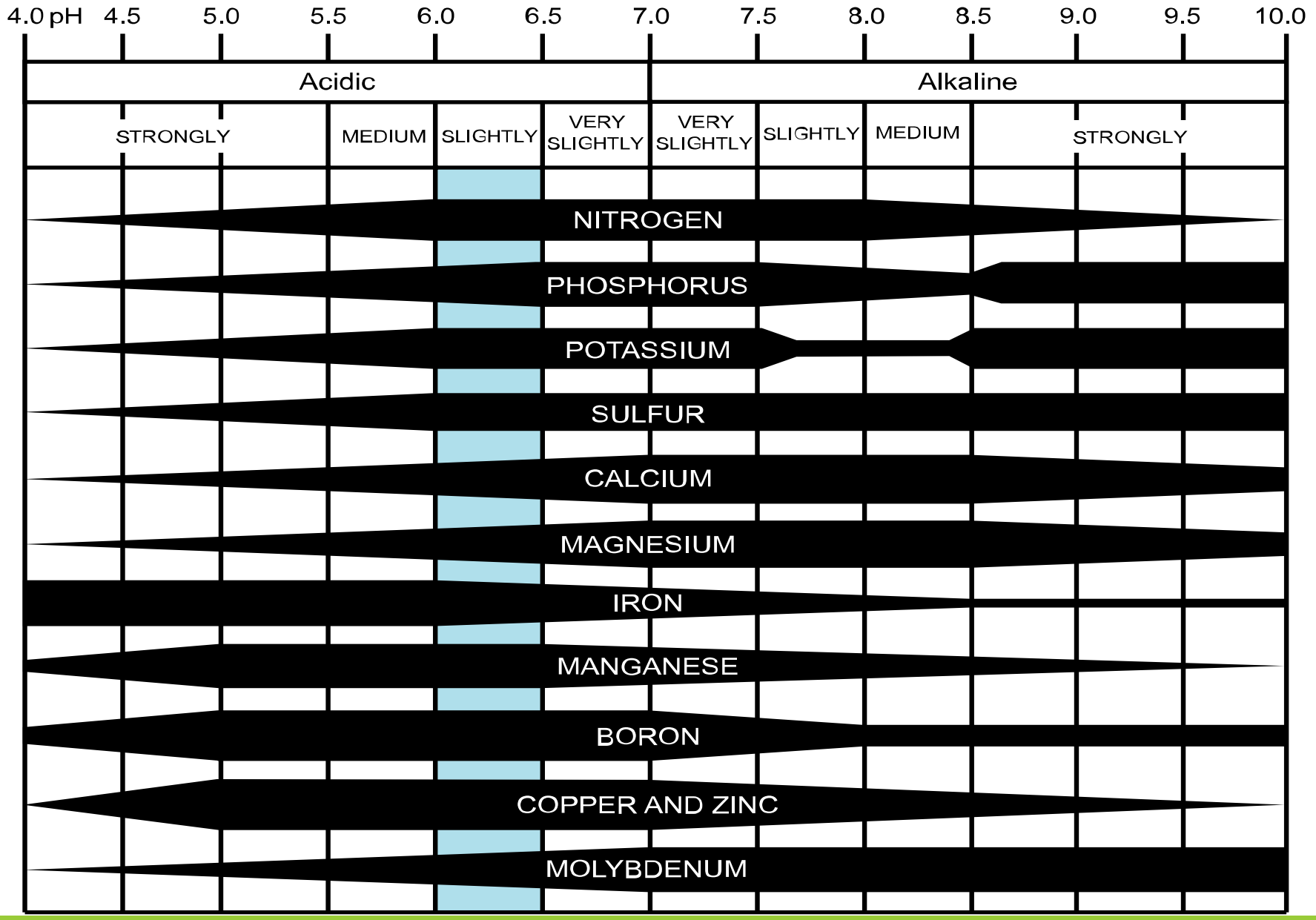
Micronutrients

- Boron
- Iron
- Manganese
- Molybdenum
- Copper
- Chlorine
- Zinc

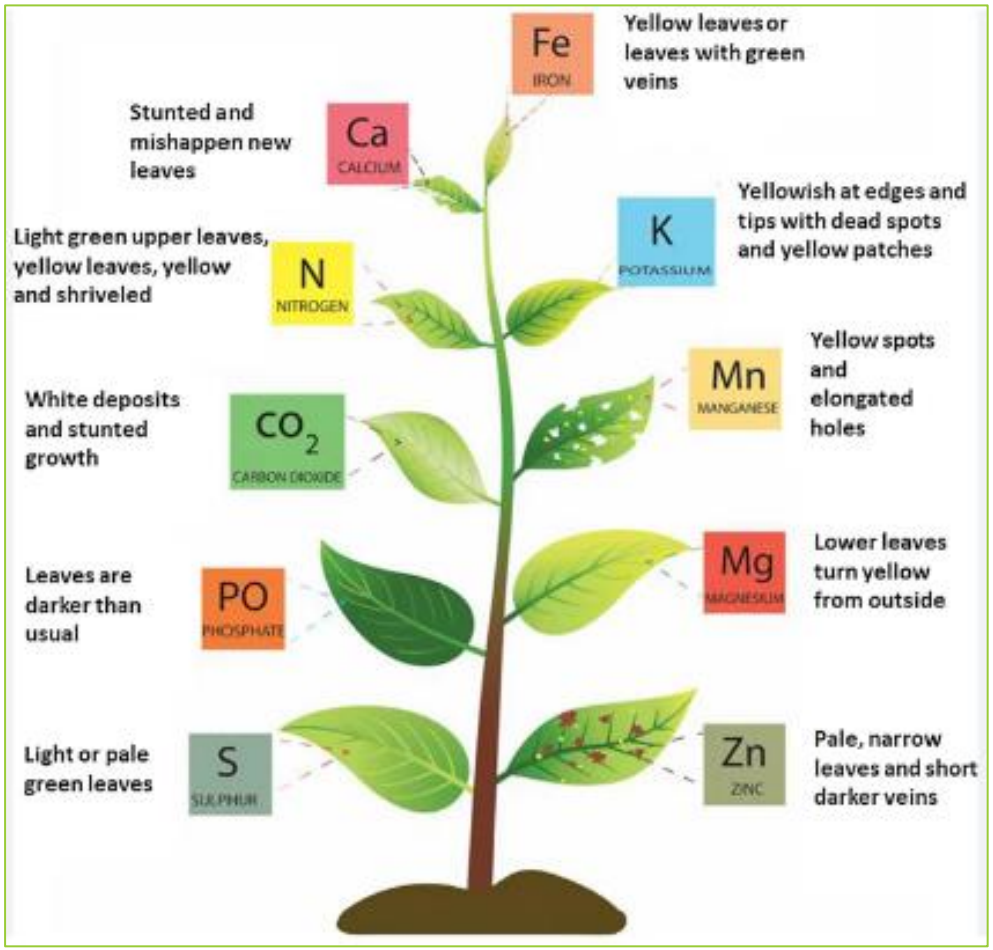
Nutrients and the environment

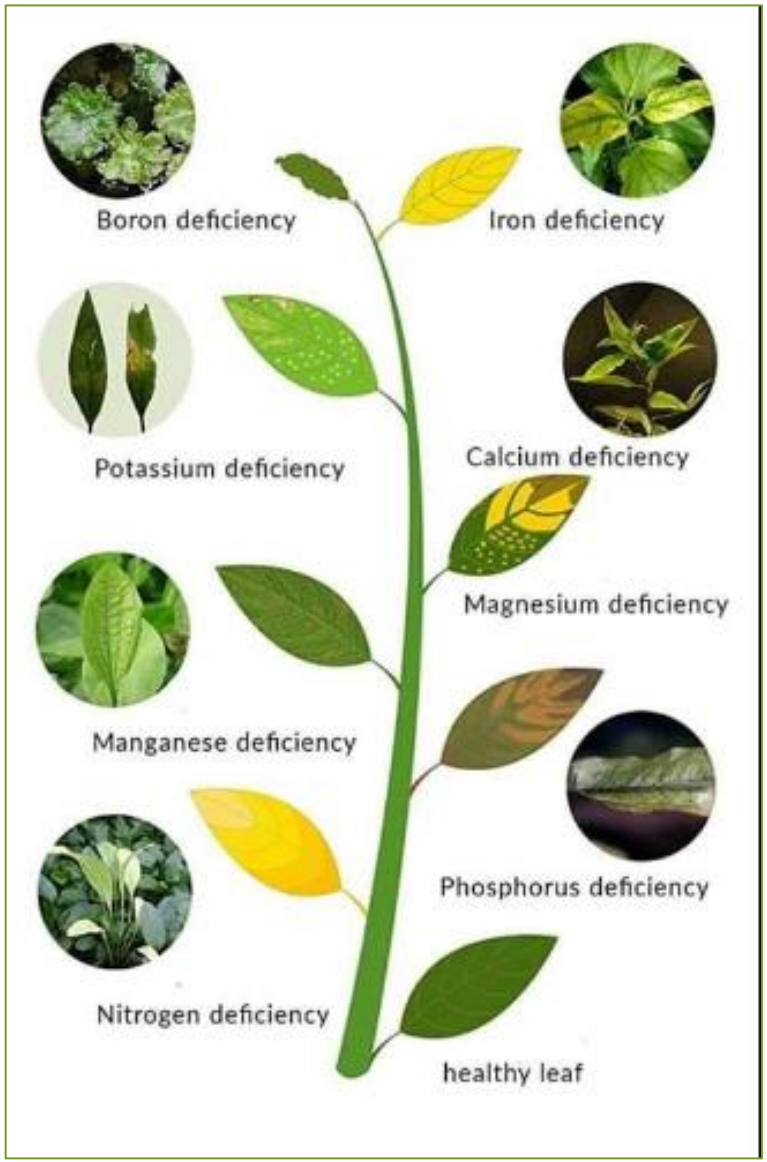
- Water is required to transfer the nutrients from the soil to the plant roots. Drought and flooding can hinder uptake.
- Soil temperature and weather can affect nutrient uptake.
- Soil pH must be in the proper range to allow nutrient availability.

Nutrient Availability by pH



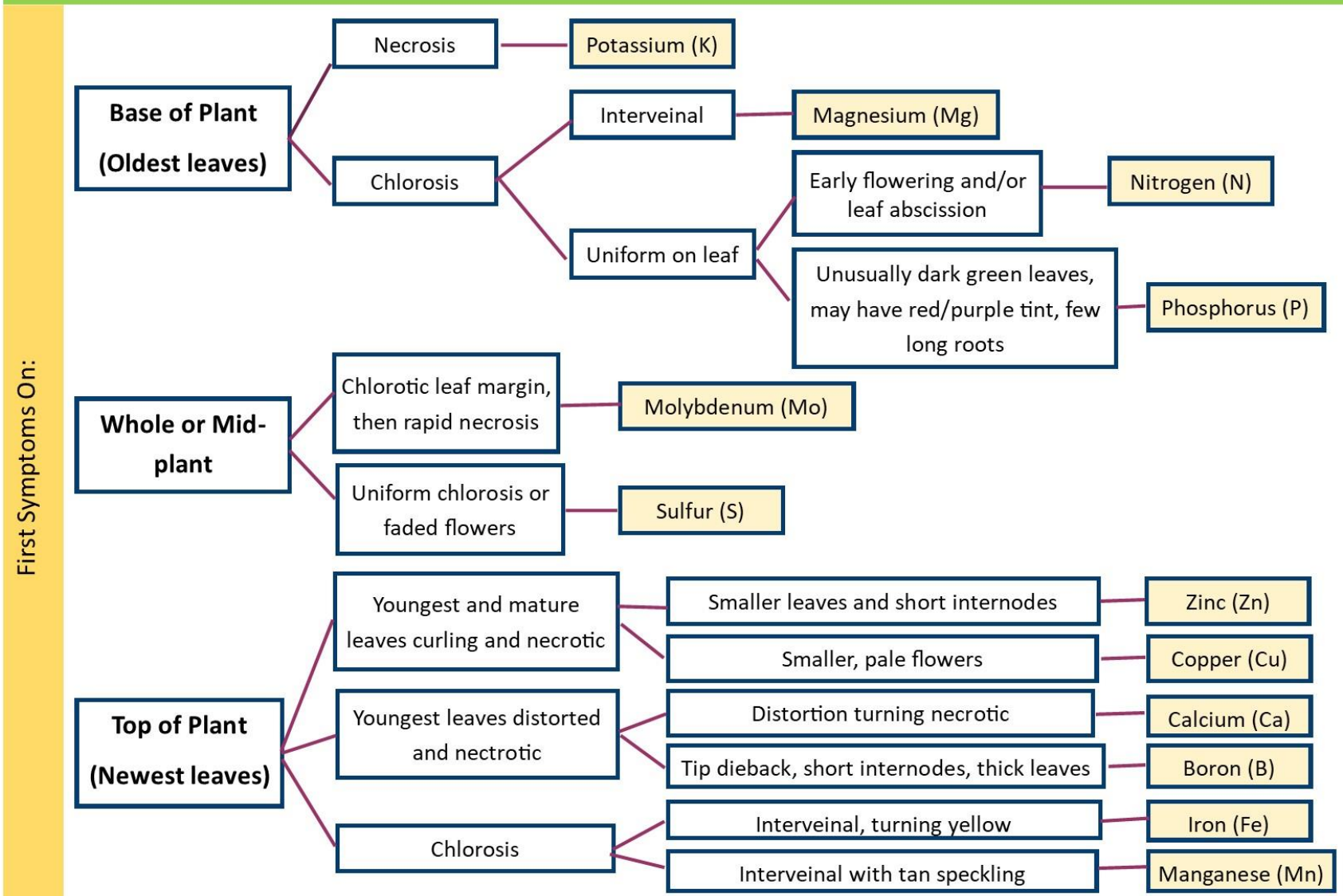
Nutrient deficiency graphics





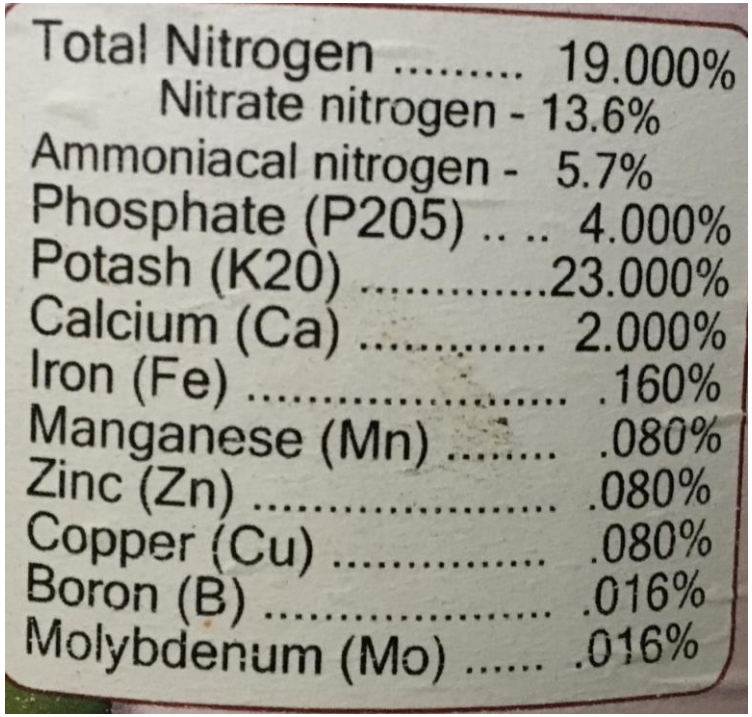
- Nutrient mobility affects where symptoms will appear first.

Plant Nutrient Deficiency Key



Fertilizers

❖ N-P-K



- Applied to soil or plant tissues to supply nutrients.
- Natural or synthetic
- Granular, powder or liquid

Toxicity

- Too much fertilizer.
  - level of nutrients far exceeds the need… can become toxic.
- High levels of soluble salts – electrical conductivity (EC).

- <u>Signs of Fertilizer Toxicity</u>:
  - Necrosis on leaf tips
  - Reduced root growth
  - Slow to mature
  - Chlorosis
  - Lesions to roots/stems
  - Premature leaf fall

Toxicity

Soluble Salt Injury on Geranium, University of Massachusetts Extension

- **High EC** due to salts of sodium, calcium or magnesium – Tip/edge burning.

Aglaonema

- **Fluoride:** Marginal chlorosis and necrosis, sometimes spotting.

About factors and needs

- Diagnosing is not easy!
- Same symptoms for many different problems
- Get to know your plants – what is typical?

- Be a detective – What has changed?
- Ask for help – Garden Centers, Master Gardeners, extension service offices

Choosing the best plant for you

- Importance of Taxonomy
- General suggestions

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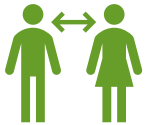
Taxonomy Basics

- The Plant Kingdom has about 400,000 different species of plants
- A classification system was developed back in the 1700s by **Carl Linnaeus**
- The plant's name consists of 2 parts, a Genus and a species, and that is why it is known as **Binomial Nomenclature.**
  - The name is *italicized*
  - *Genus* capitalized but not the *species*
- The science that manages this classification system and studies the naming of plants is called TAXONOMY =
  - "Method of Arrangement"
  - Taxis + Nomia

Having this system in place allows us to get to know plants on a first-name basis!

Taxonomy Importance

Having a unique and accurate name for a plant allows us to more easily communicate information about it



Common names are not unique, can be subjective, and can vary geographically

Identifying properly the plant we have allows us to get the right information about the care it needs

Better information =
Less miscommunication =
Happier plants!

General suggestions when choosing plants

- Beware of Oversimplification of lists
  - Overlap of growing factors.
  - Performance depends on all growing conditions and plant quality.
  - Observation!!!

Light

Low

ZZ Plant
Dracaenas (exc. *D.marginata*)
Peace Lily
Pothos
Aglaonemas
Homalomena
Aspidistra
Kentia, Lady & Parlor Palms
Philodendron hederaceum

*50-100 fc

Medium

Philodendrons & Monstera
Prayer plants & Pileas
Spider Plant
Arrowhead Plant
Dumb Cane
Lipstick Plant
Schefflera
Ficus lyrata & F.elastica
Anthuriums
Aralias & China Doll
Peperomias
Ferns & Orchids
Tradescantias

*100-150 fc

High

Succulents/Cacti
Yucca
Bromeliads
Medinillas
Ficus benjamina & F.maclellandii
Ponytail Palm
Phoenix Palm

*250-500 fc

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Water

Low

ZZ Plant
Dracaenas
Ponytail Palm
Yucca
Succulents and Cacti
(Except the Zygocacti - *Schlumbergera* & *Hatiora*)

*Fully dry out between waterings

Medium

Spider Plant
Pothos & Ficus
Arrowhead Plant
Lipstick Plant
Dumb Cane
Aglaonemas
Aspidistra
Schefflera
Philodendrons
Bromelias
Peperomias
Tradescantias
Palms (Kentia, Parlor)

*Top of medium dry out between waterings

High

Peace Lily
Prayer plants
China Doll
Anthuriums
Ferns
Watermelon Vine
Laceflower
Medinillas
Palms (Lady, Pigmy Date)

*Do not let dry out between waterings (but good drainage)

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Maintenance

Low	Medium	High
Dracaenas	Monsteras	Peace Lily
ZZ Plant	Palms	Prayer plants
Aglaonemas	Ficus	Lipstick Plant
Pothos	Anthuriums	Scheffleras
Philodendrons	Aralias	China Doll
Spider Plant	Ferns	Medinillas
Ponytail Palm	Dumb Cane	Orchids
Succulents/Cacti	Money Tree	Nerve Plant
Bromeliad	Arrowhead Plant	Polka Dot Plant
		Watermelon Vine
		Laceflower

Availability

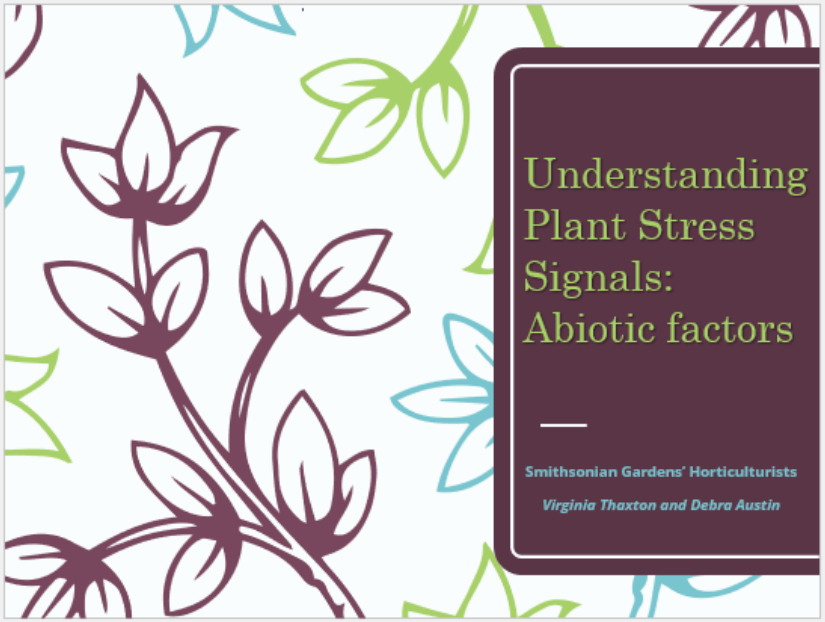
Common/Well known

Dracaenas
Philodendrons
Aglaonemas
ZZ Plant
Peace Lily
Ficus
Prayer plants
Scheffleras
Spider Plant
Arrowhead
Anthuriums
Tradescantias
Aralias
Bromeliads & Orchids
Succulents/Cacti

Less common/Unique/Newer

Alsobia dianthiflora (Lace Flower)
Pellionia pulchra (Watermelon Vine)
Orthophytum gurkenii (Orthophytum)
Ledebouria socialis (Silver Squill)
Dorstenia elata (Congo Fig)
Medinilla spp. (Showy Medinilla)
Oxalis triangularis (False Shamrock)
Homalomena (Emerald Gem)
Gynura (Purple Velvet Plant)
Radermachera (China Doll)
Peperomia orba (Pixie Peperomia)
Pilea libanensis (Silver Sparkles Plant)
Dichorisandra penduliflora (Weeping Blue Ginger)

LET'S TALK GARDENS!



https://gardens.si.edu/learn/lets-talk-gardens-video-library/

Ongoing Plant Care

Shannon Hill

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Your new addition!

- Plant placement
- Tools for success
- Watering/fertilization
- Plant pests/diseases
- Continuing care
- Manage expectations

Bringing your plant home

- To pot or not to repot? That is the question!
- Setting the scene (plant placement, supplemental lighting, to ensure success)

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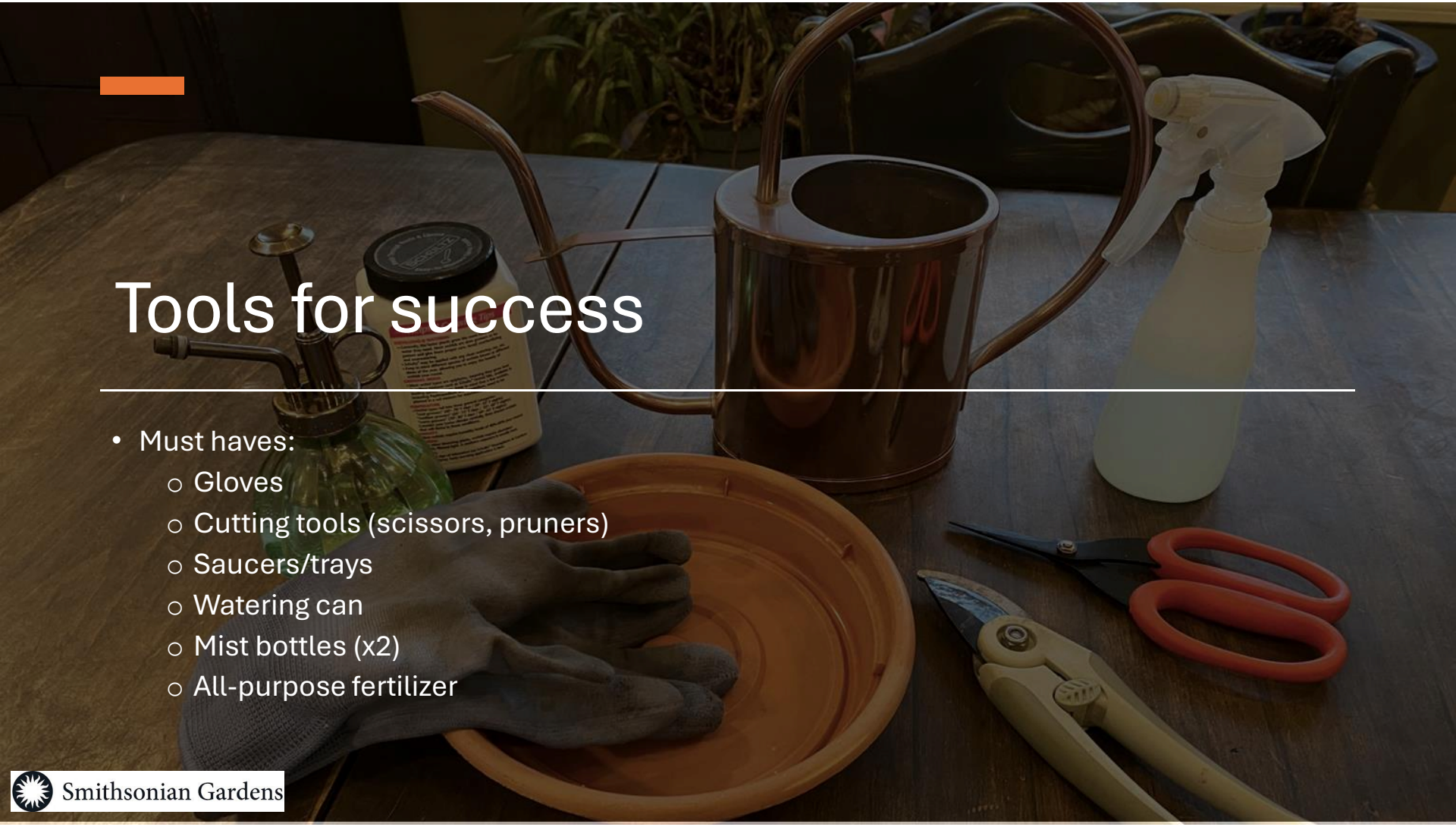

Tools for success

- Must haves:
  - Gloves
  - Cutting tools (scissors, pruners)
  - Saucers/trays
  - Watering can
  - Mist bottles (x2)
  - All-purpose fertilizer

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Tools (continued)

- Additional Tools
  - Magnifying loop
  - Soil moisture meter
  - Light meter
  - Supplemental lighting
  - Humidifier
  - Heat mat
  - Humidity dome
  - Plant stakes/ties

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Watering and Feeding Your Plant

- Some considerations:
  - Type of plant
  - Where it's growing
  - Media/soilless mix
- Finger test
- Soil moisture meter
- When to fertilize
- Type of fertilizer

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Plant Pests

Insect and mite images courtesy of UMD Extension website

- Most common:
  - Mealybug
  - Mites
  - Thrips
  - Aphids
  - Scale
  - Fungus gnats
  - Your pets!
  - Disease issues

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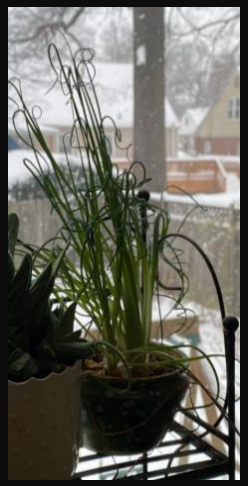
Continuing Care

Rotating your plant



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Continuing Care

Grooming

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Continuing Care

Staking and support

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Continuing Care

Repotting

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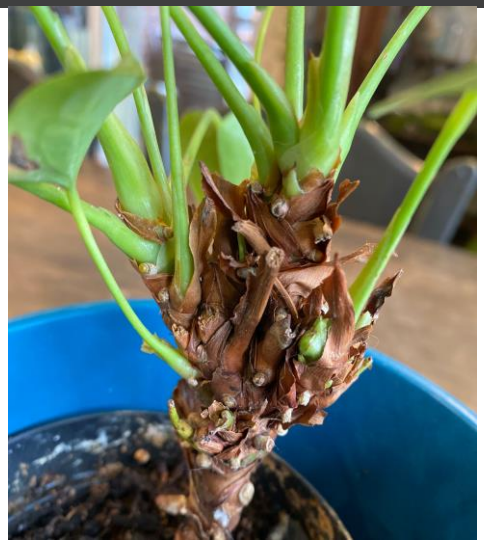
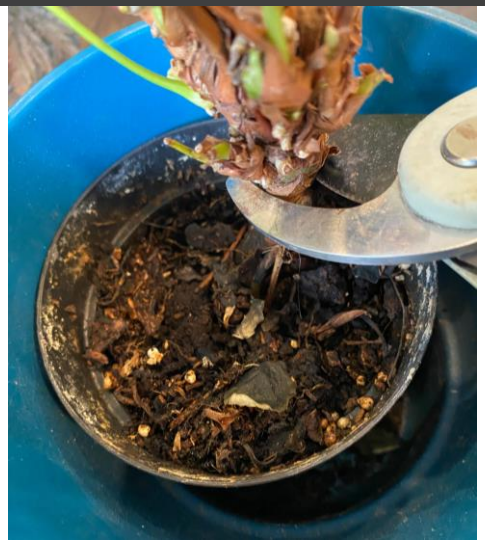
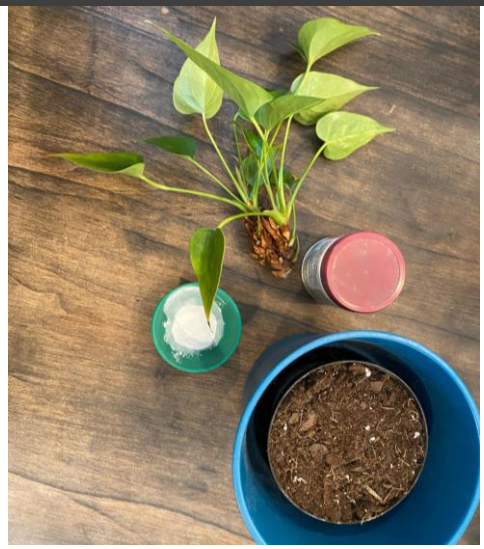


Continuing Care

- Cuttings/propagation

Continuing Care

- Propagation (cuttings)

Continuing Care

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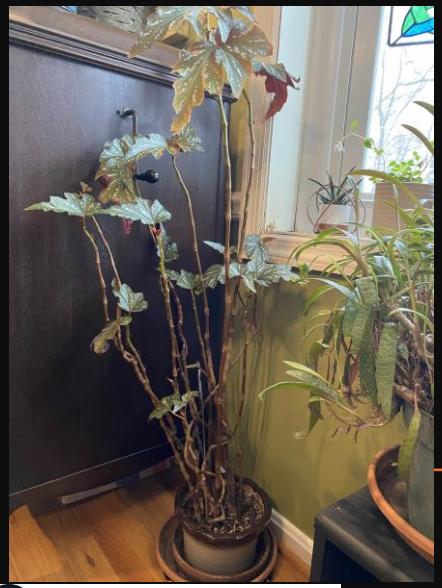
Continuing Care

Rooted Cuttings



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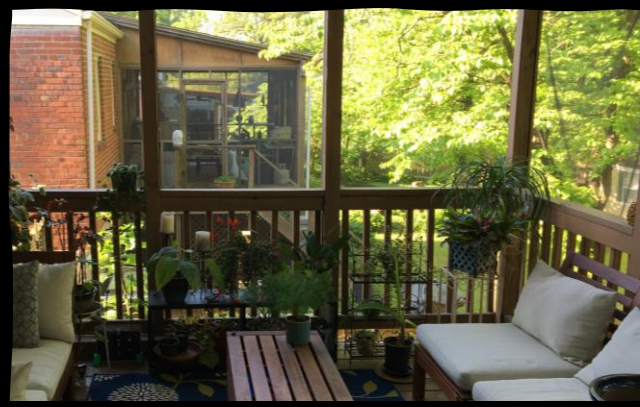
Continuing Care: Summer Vacation!

Bringing your indoor plants outdoors



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Managing Expectations

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Share the joy of houseplants!

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Recommended Plant Varieties

Alexandra Thompson

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'Silver Bay'


'Siam'


'Osaka'


'Sparkling Sarah'


'Golden Madonna'

Aglaonema

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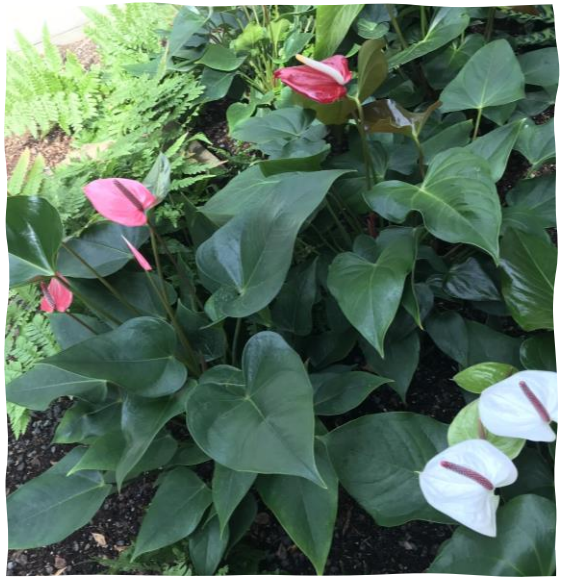
Anthurium

Anthurium plowmanii 'Ruffles'

Anthurium faustomirandae



Anthurium andraeanum

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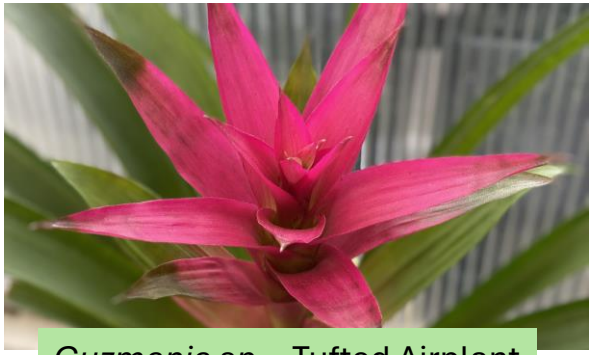
Aechmea sp. - Vase Plant



Guzmania sp. - Tufted Airplant

Bromeliads

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Goeppertia (Calathea)

Goeppertia roseopicta

Goeppertia insignis

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Dracaena marginata 'Colorama'

Dracaena fragrans 'Lisa'

Dracaena fragrans 'Giganta'

Dracaena marginata

Dracaena fragrans 'Jade Jewel'

Dracaena fragrans 'Carmen Art'

Dracaena

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Dracaena (Sansevieria)

Dracaena trifasciata 'Laurentii'

Dracaena trifasciata 'Hahnii'

Dracaena angolensis

Dracaena masoniana

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Cyrtomium falcatum

Platycerium bifurcatum

Asplenium 'Austral Gem'

Asplenium nidus

Nephrolepis cordifolia

Ferns

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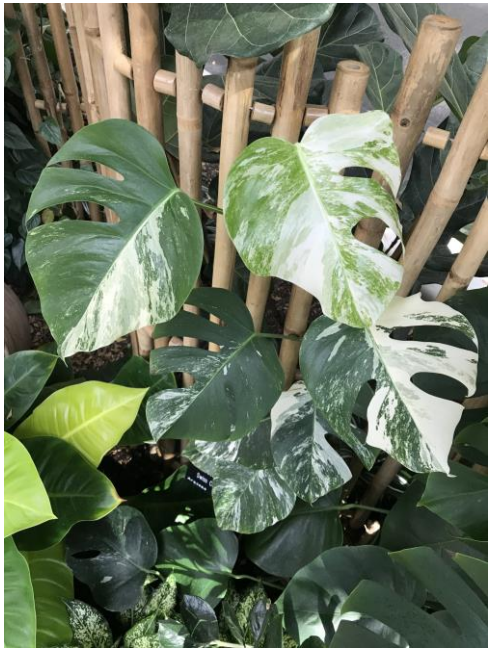
Monstera deliciosa

Monstera deliciosa 'Thai Constellation'



Monstera albo

Monstera

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Philodendron gloriosum

Philodendron burle-marxii

Philodendron 'Rojo Congo'

Philodendron 'Moonlight'

Philodendron giganteum

Philodendron hederaceum

Philodendron 'Autumn'

Philodendron

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Pothos

Epipremnum aureum

Epipremnum aureum 'Neon'

Scindapsus pictus

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Peperomia rotundifolia


Peperomia tetragona


Peperomia prostrata


Peperomia tetraphylla


Peperomia caperata 'Frost'

Peperomia

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Ficus

Ficus lyrata

Ficus benjamina

Ficus elastica

Ficus microcarpa 'Moclame'

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Rhipsalis

Rhipsalis cappillaris

Rhipsalis baccifera

Rhipsalis pilocarpa

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Gasteria

Gasteria sp.

Smithsonian Gardens

Hoya kerrii

Hoya carnosa (green)

Hoya carnosa (variegated)

Hoya

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ZZ Plant

Zamioculcas zamiifolia

Zamioculcas zamiifolia 'Raven'

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