



INTERIOR FOLIAGE PLANTS

Master Gardener Volunteer Training

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INTERIOR FOLIAGE PLANTS



- Things to know
 - Plants are not like people!
 - Growth requirements
 - Potted plants have been popular indoors for centuries
 - 1970's, widespread use
- Human need for plants
 - Psychological reduction in physical and mental excitement, cause us to relax
 - People desire to care for living creatures
 - Architectural functional function
 - Enhancing our Environment
 - Interior plants are a satisfying hobby

History of Plants Indoors

- 19th century
 - Foliage plants in the home (1816 paintings)
 - Victorian homes, extensive use
 - Agave, Aspidistra, Dieffenbachia, Dracaena, Philodendron
 - End of the 19th century
 - Keeping plants and knowledge of plant culture = sign of culture, good taste, and proper upbringing
- Interest in foliage plants 1930s
 - Introduction of dish gardens
- 1960s Architecture
 - atrium in building design, especially hotels



Aspidistra

History/Origins

- 1970-80s Green Revolution
 - awareness of preserving the environment
- Collected over past 200 years, peak period 1927-1974
 - Botanists (plant hunters) financed by botanical gardens, USDA, private nurseries, etc
 - Tropical America, Amazon basin
 - Tropical Africa, mainly Congo
 - Tropical Asia, SE Asia, Philippines
 - Subtropical Asia, China & Japan
- Native climate – tropical, humid, little or no winter

Principles of Light

- Importance in Plant Growth
 - Light drives or regulates 3 major processes:
 - Photosynthesis
 - Phototropism
 - Rotate plants a quarter turn every 2-3 days
 - Photoperiodism
 - Few effects in tropical foliage plants
 - Properties of light
 - Light quality
 - Light intensity
 - Light duration

Light Quality

- Colors in sun-light spectrum
 - Human eye uses small portion
 - Plants utilize light over a wider range than the human eye
- Passage of sunlight through-
 - Glass, plastic, or curtains
 - reduce light intensity
 - modifies light quality
 - Avoid colored materials



Light Intensity

- Factors affecting light intensity
 - Seasonal change
 - Time of day
 - Interior furnishing
 - Plant spacing



Changing Light Intensity

- Lowering light intensity
 - usually not difficult
 - Add curtains or blinds
- Increasing light intensity
 - more difficult
 - Trim tree limbs
 - Lighter color materials reflect
 - Hang thinner/lighter colored drapes
 - Artificial lighting – variable results
- Choose plants according to existing conditions

Light categories

- Using a light meter (foot-candles)
 - Not necessary
- Categories
 - Low light (50-100 fc)- N window, few plants for here
 - Medium light (125-200 fc)- indirect light, 5-8' from E or W window
 - High light (250-450 fc)- great deal of light, no direct sun, 3-5 feet from window receiving direct sun for part of day

Light categories

- Very high light (500-1000 fc)- less than 5 hours of direct sun per day, unobstructed E or W window
- Full sun (>1000 fc)- receive more than 5 hours of direct sun per day, usually south facing window



Haworthia and other cactus-type plants need high light

Functions of Water

- Water – essential for growth & development of plants
- Adequate supply must be available at all times for normal plant functioning
- Plant functions (ch 3)
 - Solvent for cell functions
 - Photosynthesis
 - Transports
 - Maintains turgor
 - Cooling



Watering task

- Mis-watering (typically over-watering) is probably the second major cause of plant death, after incorrect light.
- Critical issue: how often to water & how much to apply
 - Saturate entire soil volume
 - Enough for several ounces to run out of the drainage hole
 - 10-15% rule - flush



How often to water?

- Methods of determining when to water
 - Media surface (wet media = darker than dry)
 - Visual appearance of plant - no wilting
 - Finger-feel media a couple of inches deep
 - Probe - moist media adheres to probe
 - moisture may change color of probe
 - Weight or heaviness of plant
 - Appearance - drop plant out of pot, examine soil and roots
 - Moisture meters – beware salt build-up
- Practice and observe*



Watering Methods

- Overhead watering
- Sub-irrigation - capillary action of water
 - Wick watering
 - Automatic watering containers
- Double potting
 - clay pot inside watertight container
- Hydroculture
 - plant in coarse aggregate, constantly supplied water



Water well



Wick watering

Self Watering Containers

- Type of sub-irrigation (bottom watering)
 - 2 to 6 week water reservoir
 - Should reduce water stress and longer quality
 - Good for inaccessible areas
 - ledges, high areas
 - Good for high water use plants
 - Soil ball kept constantly moist
 - but air pores remain open
 - Less chance of spilling water
 - floor or furniture
 - Can go on vacation without worry!
 - Method using towel!



Water quality

- Toxic substances
 - Fluoride toxicity prevention
 - avoid using perlite and superphosphate
 - soil pH 6.0-6.5, fluoride insoluble
 - Hard water
 - high in carbonates and bicarbonates will raise pH
 - not easily corrected, buy bottled water
 - or use rain water
 - Chlorine
 - not usually a problem except on some monocots
 - let water stand over night to evaporate



Growing Media

- Functions
 - Constant supply of water between irrigations
 - Constant supply on nutrients between fertilizations
 - Gas exchange-O₂ & CO₂ exchange
 - Support-maintain shoot in upright position
- Characteristics of growing medium
 - Well-drained for adequate air exchange
 - Sufficient water and nutrient holding
 - Low in soluble salts
 - Standardized and uniform
 - Free of diseases and insects

Potting Media Components

- Field soil
 - poor drainage, inconsistent, diseases, insects & weeds
- Organic components
 - Sphagnum moss peat*
 - Composted bark (pine)*
 - Muck peat (Michigan)
 - Composted byproducts
- Coarse Aggregate Components
 - Sand (washed river)*
 - Polystyrene beads
 - Perlite & Vermiculite*



Soil-less Mixes

- Advantages
 - standardization (consistent from batch to batch)
 - inexpensive and easy (<5¢ per 6-inch pot), sterile
- Peat-lite
 - Sphagnum moss peat + perlite and/or vermiculite
 - High water holding capacity (easily over watered initially)
 - Low density (tall plants may fall over)
 - Examples of commercial products:
 - Jiffy-mix, Scotts, Pro- mix, Sunshine, Verilite



Soil-less Mixes - Chemical Characteristics

- Potting Media pH
 - major impact on root's ability to acquire nutrient
 - Soil-less - pH 5.5 to 6.5 (slightly acidic)
- Soluble Salts
 - Fertilizer, poor water quality, media components ???
 - Excess soluble salts
 - Root damage, wilting of plants during middle of the day
 - Stunted growth, leaf margins and tips burn
 - Soil test
 - Send sample to lab

Soluble Fertilizers

- Liquid fertilizers
 - Peter 20-20-20, Miracle Grow 15-30-15
 - Mix with water and drench medium thoroughly
 - Apply dilute solution, higher degree of control
 - Follow label directions for mixing
 - Use warm water (completely dissolve)
 - Apply when plants are not dry and un-stressed
 - Saturate soil volume + 10-15% leachate
 - Discard excess from saucer



Fertilization Amount/Frequency

- Dependent on:
 - light intensity, temperature, time of year, and species
 - objective in interior is to maintain plants not have them grow rapidly
- Concentration
 - ½ to 1 tablespoons / gallon for a 15-15-15
 - 1 to 2 teaspoons / gallon for a 20-20-20
- Frequency
 - 1 or 2 times a year in low light
 - 3 or 4 times a year in moderate light
 - 4 to 6 times in high light
 - apply during warmer month when growth is actively occurring



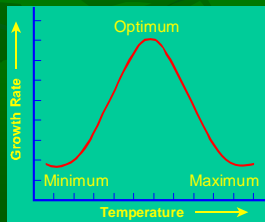
Slow-release fertilizer

- Complete fertilizers coated in plastic pellets
 - Fertilizer released over a period of 3 to 9 months – temperature dependent
- Usage
 - Do not apply late fall, early winter
 - Amount per container depends on container size
 - Follow manufacturers directions (Table provided on fertilizer bag)
 - Commercial: Osmocote, Nutricote
 - Reduce liquid fertilizer rate by half



Temperature

- Effects on growth
 - Minimum temperature below which no growth occurs
 - Optimum temperature at which the greatest growth occurs
 - Maximum temperature above which no growth occurs



Temperature

- No one temperature where plants grow best
 - Tropical plants
 - 62-68F night, 72-80 daytime
 - Conditions that most people find comfortable
 - Be aware
 - Heating & cooling systems may be turned down or off at night and/or on holidays
 - Cold next to glass windows
 - Cold drafts from windows/doors and air conditioning vents
 - Extreme heat next to window on hot days
 - Heater sources (radiators & vents)
 - Placed next to the plants, but out of direct sun
 - Maximum-minimum thermometer



Relative Humidity

- Average 40% found in homes, some homes in winter 15% R.H.
 - Sahara desert 25% - Death Valley 23%
 - Most foliage plants are grown at 85-90%
- Effects of low R.H.
 - stops producing new leaves or only small leaves
 - leaves become brittle, often with brown edges



Increasing Relative Humidity

- Humidifiers in central heating / air conditioning
- Unit humidifier for single room
- Grouping plants together
- Place plants on water-filled container (pebble tray)
- Mist foliage (short term)
- Fountains or pools
- Terrariums



Acclimatization

- Adaptation from one environment to another
- Many foliage plants selected for capacity to adapt to interior environment
- Sudden environmental change - symptoms
 - leaf loss, reduced growth, even plant death
- Make environmental change gradually
 - High to lower light
 - Gradually, in stages over several weeks
 - Reduce watering frequency
 - Reduce fertilization frequency

Choosing Containers

- Factors to consider
 - Cost and availability
 - Weight-large, heavy, difficult to move
 - Appearance-blend with plant and environment?
 - Plant-shallow or deep, porous or non-porous
 - Drainage-drainage hole, provision for excess
- Two Types
 - Porous
 - Wood (short life), clays (terra-cotta)
 - Non-porous
 - Plastic, fiberglass, glazed clay, ceramic, stone, marble
 - Jardiniere - "Ornamental receptacle for holding plants"



Potted Cyclamen in jardiniere

Anatomy of a Pot

- Drainage holes
 - at least one
 - more than one
 - side or bottom
- Feet, or rim, on bottom
 - prevent drainage holes from sealing
- Tapered shape
 - ease removal from plant stand or double pot
- Top rim for grasping



Maintenance

- Once a week
 - Examine plants top to bottom
 - water, remove drainage
 - fertilize (scheduled)
 - media pests (fungus gnats)
 - foliar pests or other foliar problem diagnostic
 - remove dead or yellow leaves
 - clean leaves of dust
 - insecticide if needed
 - clean debris from container
 - clean container
 - rotate plants
 - pinch to improve canopy - baskets



Chinese evergreen

Plant Problems: Diagnosis

- Problem-solving exercise
 - Requires a common-sense approach
 - Part skill
 - systematic examination of facts, “detective work”
 - Part knowledge
 - plant and environment knowledge
 - Part science
 - laboratories and diagnosis clinics
 - Recognition that a problem exists



“The Symptom Circus”

- Direct cause: “classic symptom”, aphids
- Indirect cause: high Ca causes Mg deficiency
- May have several causes: tip burn
- Examine all the facts, don’t rush a diagnosis
 - When did the problem start?
 - Is the problem progressing rapidly or slowly?
 - Are nearby plants affected?
 - Is only one type of plant affected?
 - Gather data
- Consult Extension agent



Plant Problems: Diseases

- “Disease Triangle” (ch 5)
 - Many diseases present in environment
 - potting medium, on leaves & stems
 - even within the tissues of healthy plants
 - Why then are most plants disease-free?
 - disease development requires interaction between disease organism and host
 - Three requirements:
 - Plant susceptible to infection and development of organism
 - Pathogen-one capable of infecting host
 - Environmental conditions-favorable to infection and development of organism



Bacterial wilt

Common Disease Pests

- Powdery mildew
 - white, fuzzy mildew growth on leaves
- Anthracnose leaf blight
 - brown spots on leaves with concentric rings
- Fungal leaf spots
 - red, brown or black spots
- Root or crown rots
 - crown and roots turn brown to black, mushy
- Canker or dieback
 - localized dead areas, often swelling
- Bacterial diseases
 - water-soaked spots on stem with yellow “halo”



Root rot

Common Insect Pests

- Scales
 - Immobile raised oval, dark, shiny-looking lumps
- Spider Mites
 - tiny, 8-legged spiders, yellow-orange, green or red
- Mealy bugs
 - scale insect with soft white or pink fuzzy body
- Aphids
 - Soft bodied insect, feed by sucking plant juices
- Whitefly
 - Tiny white-winged fly like a small moth
- Fungus gnats
 - Slender, clear-winged fly found running along or flying around potting medium



Spider mites magnified



Mealy bugs



Any Questions?
