INDOOR FLOWERING AND FOLIAGE PLANTS

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Healthy living plants make an attractive and welcome setting for a home and business. The wide variety of available foliage indoor plants provides many choices for every situation. There are plants which thrive in low light as well as those that flourish in bright sunny spaces. Some foliage plants also tolerate dry atmospheres. Many different sizes are available, from small plants for a terrarium or dish garden to large specimen trees for interior landscapes.

Foliage plants enhance all types of decor by accenting the attractive colors and textures in the client's home or business and by breaking up the cool and clinical lines prevalent in many offices. Leaf form and plant habit can be used with imagination; there are infinite possibilities for individual expression. Feathery palms and ferns will lighten massive, solid color settings; while the large leaved philodendrons can be used to add strong focal points in rooms with continuous color or with small and varied patterns.

Foliage indoor plants are easy to grow and care for. Their light and temperature needs cover a range of conditions without being exacting. Since one can choose plants most suited to a location, this makes care very simple. Once a plant has made the adjustment to a room's light, temperature, and humidity, it should be watered and fertilized whenever necessary.

The move from greenhouse or florist's shop into a home usually means the plant is moved to a dryer atmosphere. In greenhouses the relative humidity (RH) is 70-90%, while most homes have an average RH of 35-50% for much of the year. This change means that water will be lost rapidly from the plant's leaves, and initially it may not have enough roots to replace the lost water.

For the first week or two, the plant will probably need water frequently; if possible, keep the plants out of direct sunlight even if the new plant grows best in the sun. A cool position such as 55 to 60°F, will also help the plant adjust to its new environment. Some lower mature leaves may turn yellow and drop off, but this is normal while the plant adjusts. However, if leaves continue to fall, the plant may either be over watered or not getting enough light.

Foliage plants can be grouped according to their light requirement (Table 1). One indication is based on leaf color: the darker green the leaf, the darker the location the plant will tolerate. Variegated plants generally display their best leaf coloration in bright locations away from direct sun.

Foliage plants are generally very adaptable and will adjust to home temperatures provided temperatures do not fluctuate significantly. Most foliage plants require temperatures greater than 65°F during the day for new growth. However, night temperatures can drop to 55 to 60°F. Different rooms in a home offer a variety of climates, some with lots of sun and extra warmth, and some that are cooler than others. Make use of these differences in plant selection for each room.

Some foliage plants prefer a relatively high humidity, but this doesn't make them especially hard to grow. Kitchens and bathrooms are the most humid rooms of the house. For other rooms, raise the humidity around the plants by placing them on wet gravel or sand, but do not allow the plant to stand in water.

Growing Media

Since plants obtain water, nutrients, and air from the soil, the proper growing medium is very important. Most indoor flowering and foliage plants thrive well in the following mixture:

1 part vermiculite
2 parts sphagnum peat
1 part sand or perlite

Foliage plants usually grow best in a growing medium containing 50 percent organic matter. At least half of the organic matter used for foliage plants should be peat. Acid peat should be used as a source of organic matter for acid-loving plants such as azaleas, camellias, and gardenias. A higher proportion of sand is advisable for cacti and succulents which are plants with thick leaves or stems. Peat alone can be used as

Table 1. Light requirements for indoor flowering and foliage plants.

A. **Full sun** loving plants are good in or near sunlit windows, or in places where there is strong reflected light. These plants prefer fresh air, but not cold or hot drafts.

1. Full sun or bright indirect light.

Copperleaf	English Ivy	Panama Orange	Schefflera
Croton	Gardenia Jade Plant	Pineapple	True Aloe
Crown of Thorns	Natal Plum	Pony Tail Palm	Velvet Plant

2. Bright indirect light, but not full noon-day sun.

Aralia	Episcia	Large Lady Palm
Cardboard Palm	Fish Tail Palm	Wax Plant

B. **Diffused light** prevails in an average well-lighted position out of direct sunshine, or with a sheer curtain between the plant and sunlight. Plants in this group are best placed inside the room, 4 to 8 feet from the window, or at a north-facing window.

African Violet	Caladium	False Aralia	Norfolk Island Pine	Philodendron
Aglaonema	Coffee	Fancy-leaved Begonia	Peperomia	Snake Plant
Aluminum Plant	Coral Berry	Ficus	Pertusum	Spider Plant
Aralia	Cryptanthus	Fittonia	Pilea	Swedish Ivy
Areca Palm	Devil's Ivy	German Ivy	Pleomele	Tradescantia
Arrowhead Vines	Dieffenbachia	Grape Ivy	Prayer Plant	Wandering Jew
Asparagus Ferns	Dracaena	Hawaiian Ti	Polka Dot Plant	Wax Plant
Baby Tears	Dumb Cane	India Rubber Plant	Polypody Fern	Zebra Plant
Boston Ferns	English Ivy	Moses-in-the-Cradle	Pothos	

C. **Shade loving** plants grow best with indirect light, in low light areas, or more than 8 feet from a window.

Aglaonema	Chinese Evergreen	English Ivy	Philodendron	Snake Plant
Birdsnest Fern	Dieffenbachia	Parlor Palm	Satin Pellionia	Waffle Plant
Cast Iron Plant	Dumb Cane	Peace Lily	Silver Lace Fern	

the growing medium for some plants if a complete, preferably slow release fertilizer is applied at regular intervals.

Fertilization

If a commercial greenhouse growing medium is used, most indoor plants will not need additional fertilizer for three to four months since most commercial media contain fertilizer. Check the label on soil-less media to determine if fertilizer has been added. A slow release fertilizer should be incorporated at the time of initial planting and upon transplanting. Well established plants may need fertilizer every five to six weeks when actively growing. Quiescent or dormant plants should not be fertilized.

One way to apply fertilizer to indoor plants is to use a liquid form. To use this soluble fertilizer, follow the manufacturer's directions. When applying fertilizers in liquid form, use enough of the solution to wet the entire soil mass. The use of slow release dry fertilizers incorporated into the growing medium or applied to the medium surface is also an excellent means to provide a continuous supply of nutrients to the plant. They provide a steady flow of nutrients for an extended time with a high degree of safety. Never

apply fertilizer, in either a dry or liquid form, to a dry soil, as root injury may result.

Many foliage plants are injured more from an excess of fertilizer than from a lack of it. Symptoms of over fertilization may include a slowdown of growth, stunted plants, burned or dried leaf margins, and wilted or even dead plants, depending on the degree of over fertilization. Symptoms of a lack of fertilizer may include chlorotic foliage, leaf loss, sporadic flowering, stunted plants, and stressed plants.

When fertilizing regularly, it is beneficial to leach the media periodically. Every four months, run clear water through the media to leach out any excess fertilizer or salts that may have accumulated.

Irrigation

There is no time schedule to follow for watering plants, since the watering frequency varies with many factors such as weather, type and size of plant, type and size of container, and stage of plant growth. Most successful growers check the plants daily and water them only when necessary. A plant usually requires water when the soil surface appears dry. Generally, growing media look lighter when dry, but some dark or black media are deceptive. If in doubt, check the medium two to three inches deep with fingers to determine its moisture content. A person familiar with different kinds of plants can detect when a plant will need water by noticing its freshness, firmness, and general appearance. Do not let plants wilt.

Irrigate growing medium thoroughly, but don't water more often than necessary; over watering causes rotting of the roots. Rotting often is indicated by a change in foliage color from green to yellow, and in extreme cases, by foliage spotting or drying, lower leaf loss and even death of the plant. Lack of water can result in dwarfing, foliage spotting, leaf dropping, and eventual plant death. The finger test is important as over watering and under watering symptoms may appear similar.

Some plants that should not be allowed to dry out such as most ferns; they should be watered when the growing medium starts to dry. Most foliage plants need to be kept uniformly moist, but not wet. No harm will be done to certain plants if they dry out entirely for brief periods; cacti and succulents grow best when they dry out completely between waterings. No matter how often the plants are watered, be sure each time that the whole root ball is thoroughly moistened; excess water must drain out of the container. A thorough watering followed by enough time to allow the soil to start drying, permits air to be drawn into the soil. Plant roots need oxygen for life and growth, and if they are constantly saturated by being watered too frequently, they will soon die.

Generally, tap water can be used to water plants, however, this is dependent on the presence and type of water softener being utilized. Also, water from the cold tap may be too cold for the plants. It is best to use water at room temperature; or at 60 to 75^{o}F. Either add a little warm water or let it stand overnight so that it warms to room temperature.

Light

Light conditions in the average home are poor; light may come from one side only and often in only small quantities. A plant growing in a sunny window or strong light can stand higher temperatures than the same kind of plant growing in poor light. Excessively high temperatures and low light intensity form a fatal combination.

Some plants require more light than others. Flowering plants usually require sunlight or bright light most of the day. Although foliage plants will thrive in less light, their location should be in a spot bright enough to permit reading most of the day. Low light symptoms are usually accentuated under shorter day conditions during the winter.

Symptoms of insufficient light include: small leaves, long thin stems, poor color, weak growth in general, and failure to flower. If plants are desired in relatively dark locations and artificial light cannot be used, increase their attractiveness and life span by rotating them with plants grown in lighter parts of the home. Reduce fertilization application rate when light levels are low.

Transplanting

Indoor flowering and foliage plants can be left in the original growing container as long as possible. However, this restriction of the root system will also result in continued restriction of the growth of the top of the plant. Transplant plants when the top has outgrown the root ball or when the plant is rootbound. Remove the plant from the old container, clip off all dead roots. If the plant is root bound or if no growing medium is visible, cut the root ball longitudinally, ½ to one inch deep. This will cause the roots to redevelop into the fresh growing medium. Select the new

container with a diameter of at least two inches wider and deeper than the old one. All containers must have drainage holes. Fill the container with growing medium to the top of the root ball, but keep the planting depth the same as the original planting. Compress the growing medium to remove air pockets and to support the root ball. Water thoroughly until excess water drains out of the bottom of the container.

Training and Pruning

To maintain a desired form, some indoor flowering and foliage plants will need staking and pruning. Install stakes soon after transplanting, and prior to development of the new root system. Early placement avoids damaging the root system and provides immediate support for the stems. Estimate the final height of the plant or cut off the stake to a desired height. Stain stakes green or use specially prepared ones made out of plastic, root fiber, or metal. When tying stems to stakes, first tie a loose loop around the stem and then a tight loop around the stake. This will provide for the expansion of the diameter of the stem as the plants grow.

Pruning and selective removal of growing tips or side branches will help retain desired form. Use sharp pruning shears or a knife to remove only the tips of the shoots. Cuts should be smooth and at a slight angle to the main stem. The cut surfaces will heal over quickly when kept dry. Do not be concerned when sap oozes from the cut surfaces; continue to wipe clean until the flow ceases. Avoid skin contact with the sap.

Insect and Disease Control

Read the label on registered insecticides and fungicides, and follow all the directions on the label. Ensure that the pesticides are registered in Minnesota and consult with a specialist for correct recommendations.

Isolate any plant suspected of carrying insects or diseases. Discard plants if severe infestation is suspected. Clean all foliage and stems with warm, soapy water. Using bath temperature water, dip only the top of the plant, encasing its root system in a poly bag to keep dry. Use a soft cloth to wipe all surfaces clean. Rinse all surfaces with tap water, shake the plant, and place in a well-aerated spot for the plant to dry. Repeat at frequent intervals, at least every seven days, until under control.

The following insects will cause the most problems:

Aphids – Aphids are sucking insects, either green or black, on the surface of plant. The foliage becomes malformed and discolored.

White Flies – White flies are white miniature insects, 1/20 inch long, usually found on the underside of leaf, or they are flying around the plant.

Red Spiders – Red spiders are extremely small and they form webs over the plants. Leaves become finely speckled with yellow spots. Firmly tap the leaves over a white paper and look for red spots on the paper. If webbing is visible, the population is established and the plant should be discarded.

Soft Brown Scale – Soft Brown Scale appears as small discolored blisters on stem or leaf.

Mealy Bugs – Mealy bugs are pale pink or yellow insects covered with a white mealy or fluffy substance. They live in sheltered corners of leaves and stems.

Control leaf diseases by keeping excess water off of all plant surfaces. Control root diseases by not over watering. Corrective procedures are difficult to achieve in the limited space in a home or business. Therefore, it is best to discard severely affected plants.

Foliage Plant Toxicity to Humans and Animals

All indoor foliage plants should be treated with special care. They should be kept out of the mouths of children and pets. They have been selected for their form and color and should not be eaten or bruised. All parts of the plants consumed should be immediately expelled from the body, and a physician should be consulted. Anyone handling unfamiliar plants should wear garden gloves to prevent any direct contact with the plants.

Fluoride Damage

Plants in the lily (Dracaena and Chlorophytum) and prayer plant (Maranta) families are sensitive to low concentrations of fluorides. Damage develops over a period of weeks. It first shows up on the margins of the older leaves, which turn yellow and slowly dry to a tan color (Table 2). The damage progresses slowly up to the growing tips. Growers can make changes to growing media to prevent the fluorides from being present, taken up or accumulated at the margins of the leaves. Growers can also grow plants with low fluoride

water, increase pH to 6.0 or 6.5, and avoid the use of super phosphate and perlite. Visible damage can be reduced by maintaining even moisture levels in the root system and by trimming off the dead edges on the leaves.

To overcome or avoid fluoride damage:

1. Avoid the use of super phosphate in the growing medium as this contains a high level of fluoride.

2. Raise the pH of the growing medium to 6.0 or 6.5; within this range the fluorides become relatively unavailable to plants. Transplant in a growing medium that contains dolomitic limestone, replacing as much medium as possible in the root ball.

3. Avoid the use of fluorinated water if possible. This may require using rainwater or buying distilled water.

Chlorine in tap water does not usually harm indoor plants. Leaving the water standing in an open, wide container for 12 to 24 hours will allow most of the chlorine gas to escape.

Plant Shines

All green plants, even the ones with hairy leaves, produce their own shiny wax coating. It is essential that the leaves be cleaned at frequent intervals to keep their glossy appearance. The shine can be increased by applying a gloss product. First clean the plants with warm soapy water, then spray or wipe the absolute minimum amount of product on the leaves. Never apply a spray to plants in a wilted condition as plants must be turgid before they are sprayed. Follow directions on label. Avoid over treating the older leaves and do not apply the gloss products to the young leaves. Plant shines will coat and plug the stomata in the leaves, leaving permanent damage. Do not put plant shines on soft leafed plants such as ferns and purple passion plant; only apply plant shines to plants with hard waxy leaves.

Table 2. Common plant problems, their cause, and potential remedies.

Symptom	Cause	Remedy
Yellowing bottom leaves.	Lack of nitrogen.	Water the plant regularly and include liquid fertilizer.
Soft stems.*	Too much water or plant set too deep in medium.	Let plant dry out, then establish how much water to give it. Transplant to larger container.
Curling leaves.	No drainage hole in pot; too much water in roots.	Transplant to container with drainage hole; establish a regular watering schedule.
Dropping old leaves.*	Sudden decrease in light. Soil too heavy.	Put plant in sunny area. Transplant with lighter growing medium.
Black, misshapen leaves.	Soil too salty.	Remove plant from container and flush salts out of medium and roots. Transplant.
Lackluster leaves during new growth.*	Deficient in fertilizer.	Begin fertilizing plant on a regular basis.
Brown tips on leaves.	Fluoride injury.	Trim off damaged areas; keep medium uniformly moist.
Black spots on leaves.*	Drafts or disease. Treat with fungicide.	Move plant away from sources of drafts such as outside doors, heating or cooling units.
Spots on leaves, stems.	Insect damage.	Regularly wash leaves, stems with warm, soapy water and rinse. Do not do this on hairy-surfaced leaves. Treat with insecticide.
White fuzz on leaves. Flying "dandruff".	Mealy bugs or white flies.	White fuzz: treat plant with insecticide registered for use against mealy bug, and treat with insecticide registered for whiteflies.
Brown scales on stems.	Small, brown insects.	Wash leaves with rubbing alcohol every three to four days. Treat with a systemic insecticide.
Web-like matter on undersides of leaves.	Red spider.	Wash plant. Treat with insecticide registered for use against Red Spider.
Green scum on medium.	Algae and moss.	Remove surface medium and replace with new.
Chlorotic colorless new leaves that quickly turn brown.	Lack of humidity.	If possible, raise humidity in room or place plant on wet gravel or sand.

*Insufficient light may cause these symptoms.