

# Home Selection and Care of Interior Foliage Plants

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Interior foliage plants seem to fill a primeval psychological need in humans to live in close association with plants. Unlike previous generations who lived an agrarian lifestyle, people in developed countries today live indoors about 90 percent of the time. Studies show that in our modern world in which we are bombarded by noise, rapid movement, and visual complexity, foliage plants reduce physical and mental excitement, cause us to relax, and improve our general health. Health improvements occur because interior foliage plants clean the air of pollutants such as benzene, trichloroethylene, and formaldehyde found in virtually all indoor environments. Plants reduce noise, trap dust from the air, remove carbon dioxide from the air, release oxygen, and raise relative humidity, thereby reducing the incidence of colds. Foliage plants can also have functional uses in the home. They reduce large areas to human scale by softening harsh architectural surfaces, such as solid walls and lengthy corridors. Plants can also reduce light glare or may be placed to control and direct traffic.

Growing interior foliage plants is a popular indoor pastime. However, there is no such thing as a house plant. Plants grown indoors actually come from tropical or arid regions of the world and must adapt to less than ideal conditions inside the home. Foliage plants require certain environmental conditions, such as high relative humidity and correct light level, which are not always present inside homes. Therefore, a gardener's challenge is knowing the plant's environmental requirements and meeting them. The interaction of environmental factors and maintenance practices contribute to the health or decline of plants. Several factors determine the success of indoor plants: potting mix, watering, container, fertilizer, and interior conditions such as relative humidity, temperature, and light level.



## Plant Selection

Too often, consumers purchase foliage plants on impulse, without giving consideration to the environmental needs of the plants they buy and what function they will serve in the home. A far better approach is choosing locations within the home where foliage plants will contribute to the interior decor and purchasing plants suited to the environmental conditions present in those locations. In the plant selection process, begin by considering the location's environment.

Determine whether a particular plant will survive, and preferably thrive, in the environment. Then check Tables 1, 2, and 3 in this publication or consult interior foliage plant reference books for the specific requirements and care of plants being considered for the indoor environment.

Whether in permanently installed planters or in individual moveable containers, plants should be attractive and decorative and should create moods and organize the space in a way that is compatible with the surrounding decor. Be aware of the relative size of foliage plants and their scale in relationship to humans and furnishings. If a plant is too large, it can overpower a setting.

**Table 1. Interior Foliage Plants for Low Light**

Botanical Name	Common Name
<i>Aglaonema spp.</i>	Chinese evergreen
<i>Andiantum spp.</i>	Maidenhair fern
<i>Aspidistra eliator</i>	Cast iron plant
<i>Asplenium bulbiferum</i>	Mother fern
<i>Chamaedorea elegans</i>	Parlor palm
<i>Davallia spp.</i>	Deer & rabbit's foot fern
<i>Epipremnum aureum</i>	Pothos ivy
<i>Hedera helix</i>	English ivy
<i>Howeia forsteriana</i>	Kentia palm
<i>Nepbrolepis exaltata</i> ' <i>Bostoniensis</i> '	Boston fern
<i>Philodendron spp.</i>	Philodendron
<i>Pteris spp.</i>	Table fern
<i>Rhapis excelsa</i>	Lady palm
<i>Rumohra adiantiformis</i>	Leather fern
<i>Sansevieria trifasciata</i>	Snake plant
<i>Spathiphyllum spp.</i>	Peace lily
<i>Syngonium</i> <i>podophyllum</i>	Arrowhead plant

**Table 2. Interior Foliage Plants for Medium Light**

Botanical Name	Common Name
<i>Aucuba japonica</i>	Aucuba
<i>Anthurium spp.</i>	Anthurium
<i>Asparagus densiflorus</i>	Plume and sprengeri asparagus
<i>Caryota spp.</i>	Fishtail palm
<i>Chamaedorea erumpens</i>	Bamboo palm
<i>Chlorophytum comosum</i>	Spider plant
<i>Cissus rhombifolia</i>	Grape ivy
<i>Codiaeum variegatum</i>	Croton
<i>Dieffenbachia amoena</i>	Giant dumbcane
<i>Dieffenbachia maculata</i>	Spotted dumbcane
<i>Dizgotheca elegantissima</i>	False aralia
<i>Dracaena spp.</i>	Dracaena
<i>Ficus spp.</i>	Fig
<i>Gynura aurantiaca</i>	Velvet plant
<i>Maranta leuconeura</i> <i>erythronera</i>	Prayer plant
<i>Livistonia chinensis</i>	Chinese fan palm
<i>Pilea cadierei</i>	Aluminum plant
<i>Pilea involucrata</i>	Friendship plant
<i>Plectranthus australis</i>	Swedish ivy
<i>Polyscias balfouriana</i>	Balfour aralia

<i>Polyscias fruticosa</i>	Ming aralia
<i>Polyscias guilfoylei</i>	Spinach aralia
<i>Schefflera actinophylla</i>	Umbrella tree
<i>Schefflera arboricola</i>	Dwarf schefflera
<i>Strelitzia nicolai</i>	Bird of paradise
<i>Tradescantia fluminensis</i>	Inch plant
<i>Zebrina pendula</i>	Wandering jew

**Table 3. Interior Foliage Plants for High Light**

Botanical Name	Common Name
<i>Aloe barbadensis</i>	Aloe vera
<i>Alternanthera ficoidea</i>	Joseph's coat
<i>Araucaria heterophylla</i>	Norfolk Island pine
<i>Arecastrum</i> <i>romanzoffianum</i>	Queen palm
<i>Beaucarnea recurvata</i>	Ponytail palm
<i>Bucida buceras</i>	Black olive tree
<i>Cissus antarctica</i>	Kangaroo ivy
<i>Clivia miniata</i>	Kafir lily
<i>Chamaerops humilis</i>	European fan palm
<i>Chrysalidocarpus</i> <i>lutescens</i>	Areca palm
<i>Codiaeum variegatum</i>	Croton
<i>Crassula argentea</i>	Jade plant
<i>Cycas spp.</i>	Sago
<i>Eucharis grandiflora</i>	Amazon lily
<i>Fatsia japonica</i>	Japanese aralia
<i>Hoya carnosa</i>	Wax plant
<i>Iresine lindenii</i>	Blood leaf
<i>Pandanus spp.</i>	Screw pine
<i>Peperomia spp.</i>	Peperomia
<i>Phoenix roebelenii</i>	Pygmy date palm
<i>Phyllostachys</i> <i>aureosulcata</i>	Yellow-groove bamboo
<i>Pittosporum tobira</i>	Pittosporum
<i>Podocarpus gracilior</i>	Weeping podocarpus
<i>Podocarpus</i> <i>macrophyllus</i>	Buddhist pine
<i>Ptychosperma elegans</i>	Queensland palm
<i>Rhoeo spathacea</i>	Moses-in-the-cradle
<i>Sedum morganianum</i>	Burro's tail
<i>Veitchia merrillii</i>	Adonidia palm
<i>Yucca elephantipes</i>	Spineless yucca

If the plant is too small, it will be ineffectual. When placing containers in an interior setting, avoid sharp or sudden height or texture changes. Strive for interesting and appealing placement of the same or similar objects and plants. Repetition of the same kind of plant will be monotonous. Use massing and clustering of containers to frame an area or route traffic flow through or around an area. Avoid straight-line container placement. Frequently, all that is needed to complete the decor of a room in the home is one plant of the correct size, shape, texture, and color.

Lastly, it is important to begin with good quality, healthy, pest-free plants. Check that leaves have good color for the species, with no brown leaf tips or margins. Look for insects, mites, and signs of disease before purchasing.

## The Root Environment

Healthy roots are vital to the growth and quality of interior foliage plants. The container, growing mix, and watering and fertilizing practices affect the root system and, therefore, overall plant health. Roots serve to anchor a plant in the container and to absorb water and nutrients. A plant's root system must have oxygen in order to function properly.



A vast assortment of containers varying in size, proportion, color, and texture are available for growing foliage plants. It is important to consider both the practical and aesthetic qualities of the choices when selecting planters for interior use. A container should be in proportion to the height and width of the plant, and blend well with the interior decor. In general, tall plants look and perform better in a tall container, while broad, shrub-like plants look better when potted in a lower, wider container. Shallow containers reduce the planting proportion, de-emphasize height, and are ideal for low, massed groupings and containers placed on furniture. A container should not be so ornate as to visually overwhelm the plant growing in it.

The weight of the container may be another consideration if the plant will be moved often. Large containers can be placed on a low cart with coasters. Any container for growing plants must have at least one drainage hole and provision must be made to capture drainage water so that interior furnishings are not damaged. Lastly, the container must be strong enough to hold the weight of the plant and wet potting soil and be durable enough to last the amount of time the plant is expected to remain in the container.

For ease of replacement, it is generally better to keep the plant in its original growing container and place it inside a decorative container or planter rather than repotting to a new container. Decorative containers, called *jardinieres*, and planters without drainage holes can be purchased at many retail outlets. Place the growing container inside the decorative one filled with a few inches of small pea gravel to prevent the pot from sitting in pooled water. After placement in the decorative container, an organic mulch, moss, or bark-chip cover can be placed over the planting medium to cover the plastic pot lip and help retain moisture.

Containers are classified in two categories: porous and nonporous. The most widely available porous containers are terra-cotta (clay). Terra-cotta allows water to evaporate through the container material. It generally blends well with most interior settings, improves aeration of the potting mix, reduces the chance of over watering, and comes in a wide variety of sizes and styles. However, as the plant grows larger, plants in terra-cotta containers require more frequent watering. Terra-cotta is also heavy and breakable and can become stained on the outside by algae and fertilizer salt accumulation over time. Terra-cotta containers are often displayed with terra-cotta saucers in retail outlets, and it seems reasonable to purchase both. However, unglazed terra-cotta saucers are not water proof and, while OK for outdoor use, can mar the surfaces of interior furnishings. For interior use, purchase a waterproof saucer (glazed terra-cotta or plastic).

The most widely used type of nonporous containers are made of plastic. Plastic containers are light-weight, water-tight, easier to clean, less breakable, and less expensive than terra-cotta. Because water cannot evaporate through the container material, plants in plastic containers need less frequent watering. Plastic containers come in a wide variety of colors, textures, sizes, and shapes but can become brittle and crack with time due to the effects of ultraviolet light and high temperature. Avoid clear or white plastic containers because light shining through the plastic encourages algae growth on the inside and reduces root growth in some plants.

Ceramic and glazed terra-cotta containers have properties similar to terra-cotta except they are nonporous. Containers made from these materials come in a wide variety of colors, textures, sizes, and shapes. Though less often used, containers made from wood, stone, marble, or concrete are available. These are usually large containers for large applications.

Hanging baskets also come in a variety of sizes and colors and may be made of plastic, fiberglass, terra-cotta, ceramic, or wire. Plastic hanging baskets are by far the most widely available. They usually have a wire hanger and either an internal or external saucer to capture drainage water. When shopping for hanging baskets, keep in mind that a saturated peat-based potting mix can weight 90 pounds per cubic foot. Be sure the hooks or brackets supporting the basket and the basket hanger are strong enough to support the weight. Hooks or brackets should be screwed into a ceiling or wall joist. Wall or ceiling covering materials are not strong enough to support the weight of a hanging basket.

## Potting Mix

The quality and properties of potting mixes for foliage plants are critical to their growth and maintenance in an interior setting. A desirable mix will not break down or degrade quickly over time and will include a mixture of particle sizes to provide pore space for good drainage and aeration. If compacted or saturated with water, oxygen in the soil is reduced and roots suffer. A good quality potting mix should have several properties. When watered, the mix should hold sufficient water to constantly supply the plant's roots until the next irrigation. It should also be able to hold and constantly supply the roots with fertilizer nutrients until the next application.

Because the uptake of water and fertilizer nutrients is an active process requiring respiration, a potting mix should have sufficient air channels for exchange of oxygen and carbon dioxide and to allow irrigation water to move quickly through the mix. Suffocation in a poorly drained mix results in wilting and symptoms of nutrient deficiencies. The potting mix should have sufficient substance to provide anchorage to maintain the shoot in an upright position.

Soil from the ground used in a potting mix does not meet many of the requirements outlined above. The preferred potting mix for foliage plants is called a soilless mix. Soilless mixes have an organic component, usually sphagnum peat moss or pine bark, for holding water and fertilizer nutrients and a drainage component, usually perlite or vermiculite, for improving aeration and drainage. Many brands of commercial soilless potting mixes are available in the retail market. Unfortunately, the quality varies tremendously. When shopping for a potting mix, look for those labeled professional potting mix. Then, check for a list of ingredients. If they are not listed, find another brand. Look for ingredients like peat moss, bark, perlite, or vermiculite. If the mix is composed of unusual ingredients like composted municipal waste or muck peat, choose another brand. Better success is usually achieved with some fertilizer included in the mix. This will be listed on the label. If the brand does not list fertilizer, it probably has little or none added, and liquid fertilization should begin within days of potting a plant in the mix. Another desirable ingredient in a good quality potting mix is a wetting agent. Wetting agents are chemicals that help the mix absorb water when it becomes too dry.

The pH of the potting mix for foliage plants is a very important factor because it affects the absorption of fertilizer elements required by the plant. The pH level is a measure of the acidity or alkalinity of the potting mix and ranges from 1.0, which is extremely acid, to 14.0, which is alkaline. A pH of 7.0 is neutral. Interior foliage plants generally prefer a slightly acidic mix with a 6.0 to 6.5 pH. Many homeowners find that their foliage plants do well with good care for several years and then growth slows and fertilizer deficiencies begin to appear. Often this occurs because the pH of the potting mix gradually changes over time as fertilizers are used and residues from water accumulate. The best way to determine if the potting mix pH is incorrect is to contact your county Extension agent and request a soil test. Then correct the potting mix pH according to the soil test recommendations.

## Repotting Foliage Plants

Repotting should be done only as needed, during spring or summer when the plant is actively growing. Do not repot ailing or dormant plants. A plant needs repotting if roots grow out of the drainage hole, are surfacing in the pot, or if it requires frequent watering. Take the plant out of the pot and examine the roots. If the roots are thick and circling around the bottom, it is time to repot. Choose a pot one or two inches larger in diameter than the current one. With each one inch increase in pot diameter, the volume of soil nearly doubles. For example, a 4-inch diameter pot holds 2½ cups, while a 5-inch pot holds 4½ cups. If a plant is repotted into too large a pot, the potting mix becomes excessively wet leading to root rot.

New, dry, terra-cotta pots absorb a considerable amount of water from the potting mix when a plant is first potted. Soak the new container in a bucket of water for several hours before potting a plant in it. Used pots (plastic or terra-cotta) can be reused if cleaned thoroughly. Scrub dirty pots with a wire brush to remove all surface dirt, then soak the pots in a 10 percent chlorine bleach solution (1 part bleach to 9 parts water) for about 10 minutes. Rinse pots several times in clear water to remove the bleach. Pots can also be washed in a dishwasher.

Make sure the plant to be repotted is watered and the new potting mix is slightly moist. Remove the plant from its original pot and gently disturb the root system with your fingers so that roots are headed outward from the root ball. If the roots are very tight and compact in the pot, score the roots with a knife to loosen them. Potting mix can be kept from falling through the drainage holes by placing a piece of coffee filter paper or broken pottery over the hole. Do not put a layer of gravel in the bottom of the pot.



Place some potting mix in the new pot and position the plant at the same depth as in the old pot. Fill in around the sides of the roots with new potting mix, pressing the potting mix down enough to remove any air pockets but not packing it too tightly. Do not fill the pot completely. Leave about a ¼- to 1-inch space at the top, depending on pot size, to hold water. Then apply enough water so that excess drains out of the drainage hole. Water again about an hour later to ensure all the new potting mix is watered. For plants in large containers that are impossible to repot, carefully remove the top 2 or 3 inches of potting mix and replace with fresh mix every two years. This process is known as top-dressing.

## Watering

Adequate water is essential for growth and development of plants. Therefore, an adequate supply must be available to the roots at all times for normal plant functioning. At one extreme, foliage plants should never wilt. This causes a chain of events that continues to be detrimental long after the plant is watered and recovers. Underwatering (allowing the potting mix to become too dry) causes shorter stems, smaller leaves, hardened, brittle stems, and loss of leaves. In extreme cases, leaves burn around the margins and roots curl and die. At the other extreme, overwatering can cause sudden loss of leaves, wilting, nutrient deficiencies, stunting, death of roots, and death of the plant. Miswatering (typically overwatering) is probably the leading cause of failure with interior plants. Proper watering of indoor plants includes knowing when to water, how much water to apply at one time, and what temperature the water should be.

Foliage plants cannot be watered correctly based on a time schedule. Watering frequency is determined by many factors such as light intensity, temperature, relative humidity, potting mix type, stage of plant growth, container type, and plant type and size. For example, a plant using abundant water when the weather is hot, dry and sunny will use less water when conditions are cloudy and cool. Plant growth may decline after a period of heavy bloom, after a flush of new growth, or during a prolonged period of dark or cloudy weather. Be especially careful not to overwater such plants.

Most foliage plants prefer to dry a little between waterings, the degree of which depends on the plant species. Successful gardeners check their plants daily and water only when necessary. Sometimes one can judge when to water based on the lightness or darkness of a potting mix. The potting mix looks lighter colored when it is dry, but some dark or black potting mixes are deceptive. To be sure of the moisture content, it is best to stick your finger about a half-inch into the soil. Water when this depth feels dry. A person knowledgeable about foliage plants knows when plants need watering by noticing their freshness, firmness, and general appearance. Another way to determine when a plant needs watering is by weight. After watering the container, lift it daily. At some point, the weight will change from heavy to noticeably light—water at this time. This technique is especially useful for hanging baskets because you can't see the potting mix without taking the plant down.

When watering, be sure to thoroughly saturate the entire potting mix volume using enough additional water so that some runs out the drainage hole in the bottom of the pot. Empty the excess drainage water from the pot saucer after watering. A good method for wetting the potting mix thoroughly is to submerge the bottom inch or two of the container in a pan of water so water is absorbed through the drainage holes. However, it is very important not to let the pot stand in water once the potting mix is wet. Do not allow the soil mix to dry excessively. If fertilizer levels are high in the potting mix, root damage can occur. If a plant becomes excessively dry and hard to rewet, try double watering. Water once and then again half an hour later, or submerge the pot in a sink or bucket filled with water. Remove it from the sink or bucket when the potting mix stops bubbling. Allow the pot to drain after using one of these methods.

When watering tropical foliage plants, water temperature is important. Ice cold water should not be used. A water temperature between 62 and 72 degrees F is safe. Whenever possible, watering should be done in the morning using water at room temperature. Do not water plants with softened water, which adds sodium and chloride to the potting mix and could cause root damage.

Self-watering containers are useful for those who must be away from home for periods of a week or more. These containers may be purchased at many retail garden centers and mass market outlets. They consist of a nylon wick or potting mix column that extends from a water

reservoir in the bottom of the container into the potting mix above where the roots are growing. Plants in these containers are kept adequately watered by keeping the reservoir filled. Plants with high water requirements such as ferns and peace lilies grow especially well in these containers.

## Fertilization

Foliage plants grown in containers must be supplied fertilizer frequently enough to remain healthy and long-lived. Most interior foliage plants are fertilized with water soluble fertilizers. These are dry, powder formulations designed to be mixed with water and applied to the potting mix. When shopping for a soluble fertilizer, look for a complete fertilizer containing nitrogen (N), phosphorus (P), and potassium (K). The percentage of these three nutrients will be indicated on the front of the fertilizer container by three numbers, such as 20-20-20. It is also beneficial if the soluble fertilizer also contains micronutrients. This is indicated on the back of the container as iron (Fe), zinc (Zn), manganese (Mn), boron (B), copper (Cu), and molybdenum (Mo). When mixing the soluble fertilizer, follow the manufacturer's recommended rate. Often there is a rate for outdoor plants and indoor plants. Follow the one for indoor plants. Mix the fertilizer in the required volume of water and stir the solution until all is dissolved. Then apply enough solution to saturate all the potting mix volume and create some drainage. Be sure to discard the drainage from the saucer. Apply soluble fertilizer only when plants are well-watered and not stressed by diseases, insects, or adverse growing conditions. Applying fertilizer will not cure these ills and may make the problem worse!

How often to apply soluble fertilizer depends on light intensity, temperature, potting mix type, and plant type and size. Fertilizer containers often indicate how frequently to apply their product, but consideration should be given to the factors listed above to modify how often to fertilize. Generally, the light intensity the plant is growing under, the time of the year, and whether the plant is actively growing are good indicators. A plant growing under low light can be fertilized 1 to 2 times a year, a plant under moderate light can be fertilized 3 to 4 times a year, and a plant under high light can be fertilized 4 to 6 times a year. It is best to fertilize during the warmer months or when growth is actively occurring. Most foliage plants grow very little during the winter months and therefore do not need fertilizer. Be careful not to exceed the fertilizer

manufacturer's recommended rate or application frequency. An excessive buildup of fertilizer in the potting mix can have disastrous results. High levels of fertilizer will restrict water uptake and damage roots. This can cause wilting, stunted growth, leaf margins and tips to turn brown, and plant death.

A variety of fertilizer stakes and slow-release fertilizer prills are available on the market for interior plants. These provide continuous fertilization because some fertilizer dissolves with each watering over a period of 3 to 12 months, depending on the product. However, use these products with some caution because it is not easy to correct an overfertilization problem should it occur. If the plant goes into a dormant phase or if dark and cloudy weather occurs, these fertilizers can't be leached quickly from the potting mix. Therefore, apply them just before active growth begins in the spring and according to the manufacturer's recommendation.

## Light Levels

Light intensity refers to the brightness or level of light. In many instances, it is the limiting factor in growing and maintaining foliage plants. Indoor light intensity varies depending upon the source of light, obstructions, and reflections. Natural sunlight may provide most, some, or none of the light for a home interior. Light is a necessary component for plant growth because it is the energy source for photosynthesis. Light intensity often determines whether the plant will actively grow or simply survive. Placing plants in an interior environment requires an understanding of the light requirements of foliage plants and what factors affect light availability. The light intensity received by foliage plants growing in a window varies depending on the season of the year, the region of the country, the area and exposure of the glass surface, the presence of outdoor trees and shrubs, roof overhangs, window screens and awnings, color and cleanliness of the glass, and inside window treatments used.

Generally, light intensity is higher in the summer and lower in the winter, but this may not always be true. For example, if a window has a deciduous tree growing close by, light intensity in the window may be higher in the winter when leaves are not present on the tree and lower in the summer when leaves are present. As winter approaches, light intensity diminishes. A plant that grew well in an eastern exposure in the summer may require a southern exposure in the winter. Move plants to other locations seasonally if

needed. A southern exposure indoors typically provides the greatest light intensity, followed by western, eastern, and northern exposure, respectively.

Interior furnishing can also affect the amount of light plants receive. The amount of natural or artificial light available for the plants will be affected by curtains and blinds, surface textures, and reflectance from wall coverings, draperies, and furniture. Dark colors and coarse textures tend to reduce the amount of light reflected back to plants, while light colors and smooth textures increase reflected light. For example, white surfaces reflect about 90 percent; mirrors, 80 to 90 percent; gray or beige paint, 50 percent; and draperies, 35 percent. It is easier to decrease light intensity in a window that is too bright than to increase it in a window that is too dark. Light intensity can be lowered by drawing a sheer curtain or installing and adjusting venetian blinds. One way to deal with a low-light window is to periodically rotate plants from the low-light window to a higher light location in the home. A fatal condition can occur when low light intensity and excessively high temperatures are combined. A plant can stand higher temperatures if it is growing in higher light than if it is growing in low light.

Increasing light intensity in a window may involve removing trees, trimming lower limbs, or installing artificial lighting. When properly designed, an artificial supplemental lighting system can provide the most uniform and desirable lighting.

Interior foliage plants can be classified into light requirement categories for the purpose of correctly locating them in an interior environment.

**Low Light:** Light through a north facing window. Several foliage plants can be maintained at these light levels but little growth occurs.

**Moderate Light:** Five to 8 feet from a window receiving direct sun for part of the day. Some foliage plants can adapt to this level, but growth will be slow.

**High Light:** Plants receive a great deal of indirect light but no direct sun. Many foliage plants prefer this level.

**Very High Light:** Plants receive 5 or more hours of direct sun per day. Several foliage plants can adapt to this much light.

Light intensity can be measured precisely where a plant is placed in the interior, but few homeowners need to purchase a light meter. With careful observation of the plants, you can learn to identify the symptoms of sufficient, too much, or too little light. Generally speaking, if a plant is maintaining leaves and appears healthy, the light level is adequate. At light intensities above this minimum, plants produce new leaves and grow faster. Plants receiving too little light have new growth that is spindly with weak, elongated stems and wide internodes, new leaves that are smaller and paler in color than normal, or lower leaves that prematurely turn yellow then fall off. Plants with variegated foliage have less chlorophyll and therefore require more light to achieve the same photosynthesis as a plant with green foliage. If light is insufficient, variegation may be lost. Plants receiving too much light have new leaves that are smaller and thicker than normal, leaves with a washed-out appearance, leaves with brown or gray scorched patches, or leaves that shrivel and die. If the plant receives light from only one side, such as in a window, it will bend toward that side. The plant should be turned one-quarter turn once a week to facilitate straight growth.

## Temperature

Most foliage plants grow best at temperatures that people find comfortable. This makes them well suited to home environments. If you feel hot or cold, very likely your plants do, too.

There is no one temperature at which foliage plants grow best, rather an optimum range for each plant species. Most tropical foliage plants grow best if the day temperature is 70 to 80 degrees F and the night temperature is 60 to 70 degrees F. However, some foliage plants from subtropical regions, such as cast iron plant, can withstand lower but non-freezing temperatures. At the other extreme, chilling injury can occur below 40 to 45 degrees F in some tropicals such as peace lily.



Air temperature can be quite variable, changing daily or seasonally within a home. Overall, interior temperatures are lower in the winter than the summer. Low temperature combined with low light and short days during the winter often results in little or no growth. Therefore, it is important to make seasonal changes in plant care such as watering less often and applying little or no fertilizer. Some homeowners turn heating and cooling systems down or off to conserve energy at night and on weekends and holidays when they are away from home. This practice can result in plants being exposed to excessive cold in winter or excessive heat in the summer, injuring them or rapidly reducing their quality. In addition, be careful not to expose foliage plants to excessive cold, heat, wind, or high light intensity while in transit to the home from the garden center.

Temperature extremes can occur in various locations in the home. Typically, southern and western window exposures are warmer because of high light intensity, while eastern and northern are more moderate or cooler. Plants are exposed to excessive cold in the winter near glass windows and doors that are poorly sealed, if they are next to an outside door that is opened frequently, or if they are in direct line with an air conditioner vent. Cold drafts from poorly sealed windows and doors can be corrected by installing storm doors, caulking, or weatherstripping. On extremely cold nights, draw a curtain between the window glass and the plants or cover them with a sheet. Plants can also be exposed to excessive heat next to a window on hot days or if they are in direct line with a heater vent. Draw a sheer curtain between the plants and the window on hot days. Symptoms of cold damage to plants include defoliation, leaf spots or blotches, downward curled foliage, slowed growth, root rot, or plant death. Excessively high temperatures, above 90 degrees F, cause yellowish green foliage that may have brown, dry edges or tips, spindly growth, and wilting and death of tissues. Insect, mite, and disease problems may develop quickly in some foliage plant species under warm conditions. One way to determine if plants are being exposed to improper temperatures is to place a maximum-minimum thermometer next to the plant but out of direct light. The maximum-minimum temperature can be noted each day and the thermometer reset.

## Relative Humidity

The relative humidity is often quite low in homes, on average 40 percent. In some homes, the relative humidity may be as low as 15 percent in the winter when the heat is running frequently. Yet most tropical foliage plants receive 60 to 90 percent relative humidity in nature. Foliage plants under low humidity conditions often stop producing new leaves or produce new leaves that are smaller than normal. Leaves may also become brittle and turn brown around the edges. Therefore, increasing humidity will aid plant growth and quality.

Spray or mist bottles are of little use because they do not increase the humidity for very long. A better solution is to place the pots on a waterproof tray that contains moist sand, crushed rocks, or colored pebbles. Make sure the pots are not sitting in water. Grouping plants together, watering properly, and avoiding drafts and high temperatures also helps. Double potting may work also. Sink pots in a larger container, then fill in between the pots with moistened sphagnum moss. Unit humidifiers can be used to raise the relative humidity in a room, or a humidifier can be installed on the central heating and air conditioning system. Any plants requiring very moist air, such as delicate ferns, should be planted in a terrarium.

## Pruning

Pruning is done to remove a portion of the plant to control overall size; to remove dead or injured leaves, branches, or shoots; or to assist in developing and maintaining the desired plant shape. Foliage plants grown indoors are under conditions where they may not be as dense and full as similar plants grown outdoors. Thus, maintaining a tight, full crown or a desired shape may be difficult. Periodic light pruning and shoot removal is better than infrequent, severe pruning. When a portion of a leaf is dead, remove the entire leaf rather than just the injured portion.



When removing small branches or shoots, the cut should be made close to the main branch.

Pinching refers to removing the growing tip of a stem to stimulate new growth from lower buds. Vining plants, such as grape ivy, Swedish ivy and wandering jew, are commonly pinched. Do not pinch non-branching plants, such as Norfolk Island pine. Typically, the growing stem tip is removed just above a node. Pinch with your thumb and forefinger, or use sharp scissors to make the cut. Mature plants can be pinched to produce dense, bushy growth, especially on fast growing, soft-stemmed plants with long, lanky stems. Once side shoots form, they, too, can be pinched to promote even more new growth.

## Cleaning Foliage

One week's accumulation of dust can reduce the amount of light available to plants to carry out photosynthesis by 20 percent. While dusting your furniture, dust your plants. Though there are many cleaning and leaf shine products on the market, the best way to clean leaves on foliage plants is to carefully wipe each leaf with a very mild solution of liquid soap in room temperature water. Alternatively, plants can be placed in a shower or hosed off outdoors in warm weather. Plants with hairy foliage should be dusted rather than washed. A periodic spray of insecticidal soap will help prevent insect problems.

## Summering Plants Outdoors

Summering plants outdoors exposes them to conditions of light, temperature, and humidity beneficial for lush growth. Only those plants requiring medium to high light should be summered outside because light intensity in the shade outdoors is higher than light intensity indoors. Plants can be moved outdoors after all danger of frost is past and the night temperatures reach 60 degrees F. Place plants under the shade of trees appropriate to the light requirement of the particular foliage plant. Remember, plants outside grow rapidly and require frequent fertilization and watering if rainfall is not adequate. Move plants back indoors as night temperatures approach 60 degrees F in fall. Realize that some leaf yellowing and drop may occur as the plant readjusts to indoor conditions. Inspect plants carefully for insect or mite pests before bringing them indoors. Control any pests found because indoor conditions may allow populations to increase rapidly. Many gardeners choose not to summer plants outdoors because of the potential pest problems and the stress plants usually undergo once moved back indoors.

## Insect and Disease Problems

Various problems with insects and disease can be encountered when growing foliage plants indoors. Examine plants regularly, and treat immediately should any problem become evident. There are relatively few serious insect and disease problems affecting indoor foliage plants. However, they can do significant damage if undetected. Identify pests accurately, and treat accordingly. Other problems are related to incorrect cultural practices. A symptom key is provided in Table 4 for diagnosing these problems.

### Insects

**Aphids:** Aphids are soft-bodied insects that come in shades of green, brown, or red. Aphids damage plants by sucking plant sap and reducing plant vigor. Control them by spraying insects directly with 1 teaspoon phosphate-free soap in 1 gallon of water weekly.

**Fungus gnats:** Fungus gnats are dark-colored, delicate flies. Adult fungus gnats do not damage the plant, but larvae feed on organic matter (including roots) in the growing media. Diseases may enter damaged root tissue. Symptoms of infestation are overall decline of plant appearance, stunting, yellowing, and defoliation. Control fungus gnats by allowing the growing media to dry out, and move the plant to a brighter location.

**Mealybugs:** Mealybugs are six-legged insects with a flattened, oval body and a white, waxy covering. Mealybugs pierce stems and leaves and feed on the sap. Control them by pruning out infested branches, and spray a 2:1 mixture of rubbing alcohol and water directly onto the insects.

**Scales:** Most female scales have no legs, and many species form a hard shell. The winged males have legs but no mouths and do not feed. Scale insects damage plants by sucking sap from tender growing parts of the plant, reducing plant vigor and appearance. Control them by pruning off infested branches and mist or hose off the plant to remove and dislodge insects. Wipe off or spray insects with a 2:1 rubbing alcohol and water mixture.

**Spider mites:** Mites are eight-legged spiders with oval bodies. Mites damage plants by sucking sap from the leaves, leaving gray or yellow stippling on the upper leaf surfaces and producing a mottled appearance. Control them by removing badly infested leaves and moving the plant from hot, dry areas. Spray at 7 to 10 day intervals with a water and phosphate-free soap mixture.

**Thrips:** Thrips are tiny winged insects that are usually tan, black, or yellow. Thrips scrape plant tissue and suck sap from the wound. Plants lose vigor and appearance suffers with thrip infestation. Control thrips with a spray of phosphate-free soap and water, and increase humidity levels.

**Whiteflies:** Whiteflies are tiny, winged insects covered with a powdery wax. Whiteflies suck plant sap, resulting in plant wilting, yellowing, and loss of vigor. Control them by vacuuming winged adults and spraying with a phosphate-free soap and water mixture.

**Contact your County Extension Office for insecticide recommended on foliage plants in the home.**

### Diseases

A controlled environment and proper maintenance generally keep interior plants healthy and vigorous. Diseases develop because of a disease pathogen—a living agent such as fungi, bacteria, or virus. If you suspect the presence of a disease, contact your County Extension Office for diagnosis and control measures.

**Table 4. Diagnosing Symptoms of Common Foliage Plant Cultural Problems**

Symptom	Excess Light	Insufficient Light	High Temperature	Low Temperature	Lack of Water	Over-watering	Too Much Fertilizer	Not Enough Fertilizer	Low Humidity	Container Too Small
Brown leaf tips/margins					X	X	X	X	X	
Curled/bent leaves				X					X	X
Yellow-green leaves	X	X	X			X	X	X	X	
Oldest leaves drop off		X	X		X	X	X	X	X	
Spotted leaves	X				X		X		X	
Wilted leaves	X		X	X	X	X				
Weak, soft growth		X	X			X	X			X
Small new leaves		X	X		X	X		X		
No new growth				X	X	X	X	X	X	X
Plant dies				X	X	X	X		X	X



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Use pesticides **only** according to the directions on the label. Follow all directions, precautions, and restrictions that are listed. Do not use pesticides on plants that are not listed on the label.

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**For more information**, call your county Extension office. Look in your telephone directory under your county's name to find the number.

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