



EB1354

HOUSEPLANTS

COOPERATIVE EXTENSION
COLLEGE OF AGRICULTURE & HOME ECONOMICS

Basic Houseplant Culture

Cultivating plants inside the home is both a popular hobby and an interior decorating technique. Over 75% of all American families use living plants as part of their home decor or cultural expression.

To maintain these living plants in good health and an attractive condition requires that each be provided a suitable environment in which to grow. To accomplish this the homeowner must control a number of environmental factors, such as light, temperature, humidity, water, and plant nutrients. The right combination results in healthy plants. Too much or too little of any one factor results in poor plant health or loss of the plant.

A houseplant is simply an outdoor plant which has been planted in a pot and cultivated indoors. Not all plants are suitable for indoor culture. Some require environmental conditions that are impossible to duplicate indoors. Others are adaptable to indoor culture where their minimum growth needs can be provided for. The key to successful indoor plant culture is to select plants which are adaptable to the conditions of your home.

The normal home provides a number of different environments. Light varies from sunny windows to dim corners. Humidity is usually much higher in kitchens and bathrooms than in living rooms. Temperatures vary widely at different places in the home. Plants in living areas receive long hours of light (either natural or artificial) the year around, but plants in bedrooms normally receive only minimal supplemental light. The overall climate in the home may vary from subtropical to arid desert conditions in various locations.

The environmental factors of light, temperature and humidity are to a large extent predetermined by managing the conditions of the home for the comfort of the family. Other environmental factors, such as water and available nutrients, can be managed solely for the sake of the plants. By selecting the best site for specific plants and managing the amount of water and nutrient supplies, it is possible to grow most of the common "houseplants" in any home.

Specific Plant Needs

Each of the numerous varieties of plants commonly cultivated as houseplants has its own set of desired environmental conditions. There are

many sources of information for the specific cultural requirements of each kind or type. Check with the florist or garden store that supplied the plant, local garden club members or neighbors, houseplant books (there are hundreds on the market, many available at your local library), garden encyclopedias (also available at libraries), and garden news columns written by houseplant enthusiasts.

In general the environmental needs of any particular plant will be those which most closely approximate the environmental conditions where the plant grew native. Understory plants (those which evolved on the forest floor) can grow in diffuse light. Plants from deserts or other open environments require strong light. Tropical and subtropical species generally do best in humid conditions, and desert species require arid conditions. Cool-climate species prefer cool nights and warm days, while tropical species prefer warm temperatures at all times. Learn about the specific plants you are growing (or plan to acquire) and place them in a portion of your home which provides the best combination of environmental factors for their needs.

Managing Light

Perhaps the major environmental factor limiting the growth of plants indoors is the lack of adequate light. As natural light enters homes it decreases very quickly. For example, a plant receiving 100 foot candles of light at a distance 1 foot away from a window, will receive 25 foot candles of light if it is moved 2 feet away from the same light source, and only 11 foot candles if it is moved 3 feet away. Very few, if any houseplants will do well at these last two light intensities.

The most expedient method of adjusting light intensity is to move the plant closer to or farther from the light source. This may place the plant in the wrong spot for your convenience. Other alternatives to increase light intensity include:

- Moving the plant to a lighter room (south versus north exposure).
- Moving the plant closer to a window.
- Placing the plant near an electric light.
- Providing separate artificial light for the plant.
- Providing reflected light with a light-colored wall or mirror.
- Keeping leaves free of dust and grime.

To reduce light intensity you can:

- Place a lace curtain between the plant and window.
- Use venetian blinds to intercept and divert direct sunlight.
- Reduce reflected light with a dark backdrop
- Shade the plant with another plant.

- Move the plant back from strong light source (south window).

Managing Temperatures

Home temperatures are adjusted for the comfort of people but temperatures vary considerably in most homes. Bedrooms are usually cooler than bathrooms or living areas. South-exposure rooms are usually warmer during the day than north-exposure rooms. Fortunately most plants can tolerate a fairly broad range of temperatures and will thrive at normal home temperatures if other environmental factors are satisfactory.

Managing Humidity

Many plants require a more humid climate than is offered by the average home. Ferns, ivies, and other humid-climate plants may grow best in bathrooms or kitchens where the air is usually more humid. The relative humidity around any plant can be increased by placing the pot on a bed of moist gravel. Shallow trays of wet gravel evaporate water into the air around the plants. Damp sphagnum moss packed between the pots in planters will also evaporate water into the air. This has the added advantage of acting like a wick to draw up and dispose of excess water in the bottom of the planter box.

Grouping plants together in the same room will raise the relative humidity for all. Plants transpire water continuously. The more plants you are growing, the more water they are transpiring into the air.

You could use a humidifier in your home. The higher relative humidity preferred by plants is also healthier for people.

Misting plants does not significantly increase the humidity for them. It may, however, help to keep leaves clean, which is obviously desirable.

Managing Water

Watering is the most important (and most often abused) cultural practice. Plants must have a continuous and adequate supply of water, but they can only absorb water from the soil under certain conditions. First, there must be a supply of water in the soil. The soil particles hold a certain amount of water too firmly for the plants to take. The water supply available to plants is water in excess of that required to satisfy the soil itself.

Second, some air must be in the soil for the plant roots to function and absorb water. Therefore, the soil must not contain so much water that no room is left for air. A good potting soil will not hold too much water if a hole in the bottom of the container allows excess water to drain away.

The difference between these two extremes is called the available water supply. Proper water management is a watering program that avoids both extremes and maintains a supply of available water at all times. The following guidelines may help you establish a satisfactory watering schedule.

- Use a well-prepared potting soil for planting. This assures a good water-retention capacity in the soil as well as space for oxygen that plant roots must have.

- Always have a drainage hole in containers so excess water can drain away. This will prevent overwatering.
- When watering, use enough water to run out the drainage hole. This usually assures you that you have "replenished" the available supply and reduces salt buildup. Do not allow pot to sit in excess water. Pour it away or raise the pot on shims so it is always above the level of drained-out water in the saucer.
- Do not water on a time schedule.
- Allow the soil in the pots to become dry on the surface before you water again. This maintains a good balance of air and water.
- If some plants require frequent watering, move them into slightly larger pots (with correspondingly larger water-holding capacities).
- Some plants like desert cacti and succulents should be watered very cautiously during the short days of the year. With the exception of seedlings and very young plants, no water is necessary from about mid-November to mid-March.
- Highly organic soils are difficult to re-wet once they dry out. They also tend to shrink away from container sides, allowing water to run down and out the drainage holes without actually moistening the soil. In this case submerge the entire pot in water until the medium is fully moistened.
- Flush soluble salts from pots on a regular basis, say every 6 months.
- (See "*Houseplant Problems*" chart.)
- Chlorine in tap water will not harm plants.
- Fluoride in tap water can damage sensitive plants. (See "*Houseplant Problems*" chart.)
- Room temperature water is best. Plants like African violets and their relatives may require even warmer water.

Managing Nutrients

Plants growing in containers have a limited volume of soil from which to extract the mineral nutrients (fertilizer) needed for growth. The supply of nutrients in the containers becomes exhausted rapidly if the plant is actively growing. Replenish nutrients regularly. The easiest way is to water the plants with a solution of soluble fertilizer.

Many totally soluble fertilizers are available in most garden stores. Since they vary in strength (percent of fertilizer nutrients), dilute or dissolve them in your watering can according to the label directions. Mix only enough of this fertilizer solution to water your container plants once each time you fertilize. Fertilize your houseplants regularly with a soluble fertilizer. During

the long days of the year (Easter to Thanksgiving) when they are actively growing, fertilize about every other week. During the short days of the year (Thanksgiving to Easter) fertilize only every 4 to 6 weeks. If the plants are totally dormant, do not fertilize until new growth starts.

- Slow or timed release fertilizers are an acceptable and desirable way to fertilize houseplants. Follow label directions.
- Plants grow best with small amounts of nutrients available to them constantly.
- Do not apply fertilizers to dry soil.
- Do not overfertilize. More is not better. Plants can be killed. It's better to underdo than overdo.
- Both organic and synthetic fertilizers are acceptable sources of plant nutrients.

Cultivating houseplants is an enjoyable and rewarding experience. The basic culture is not difficult and most plants require only a few minutes of attention each week once the basic environmental requirements are satisfied. They do, however, require this minimal care on a regular basis. Plants are living things and must be managed so that their life-support systems are continuous.

Potting Soil Mixtures

Plants growing in containers require specially prepared soils or growth media to thrive. A container-grown plant cannot extend its root system to gather the water and nutrients it requires but is limited to the small volume of soil in the container. Potted plants "use" the soil in their pots much more intensively than the same plants growing unrestrained out of doors. Even the most fertile garden soil will not sustain this intensive use for more than a short time.

Ready-to-use potting soil mixes are available in garden stores. Some of these commercially prepared potting soils are excellent but expensive. If you are cultivating only a few houseplants, the prepared soil mixes are convenient and probably the most practical to use. However, if you are growing numerous houseplants it may be more economical to prepare your own potting soils.

Good potting soils differ from garden soils. They should contain a much higher proportion of coarse mineral particles to assure and maintain sufficient pore spaces in the soil for air, water and root growth. They must have enough organic matter to hold water and condition the soil (keep it from compacting). They also contain sufficient mineral nutrients to supply a large part of the plants' needs. (Supplemental fertilizer applications are needed on a regular basis for all houseplants.)

Good potting soils can be prepared by mixing "garden" soil, coarse sand, pumice or perlite, and peat moss. Most potted plants will grow quite well in a mix containing equal parts of these ingredients, especially if you adjust management techniques (watering, fertilizing) to suit their different needs.

The general potting mixture also can be modified with additional coarse mineral material or peat moss to satisfy specific plant requirements.

General Potting Mixture

- 1 part garden soil (not clay)
- 1 part washed builder's sand, perlite, or pumice
- 1 part horticultural peat moss
- 1 quart steamed bonemeal per bushel (8 gallons) of mixture
- 1 pint dolomite lime per bushel of soil mix

Mix all ingredients thoroughly by shoveling them from one pile to another at least three times. Pulverize any large lumps or clods as you mix. When thoroughly mixed add sufficient water to moisten the mixture and store in a sheltered spot until you are ready to use it. A garbage can, wastebasket, or large bucket makes a handy storage container.

This general potting mixture provides a suitable growth medium for most container plants, including vegetables, bedding plants, geraniums, begonias, fuchsias, and ivies.

High-Organic Soil Mix

- 1 part general potting mixture
- 1 part horticultural peat moss

Many houseplants, such as African violets, gloxinias, philodendrons, rubber plants, and most other tropical foliage plants may do better in a mix containing a higher proportion of organic matter. Addition of extra peat moss to the general potting mixture adjusts the mixture to their needs.

Desert Plant Soil Mix

- 1 part general potting mixture
- 1 part sand

Cacti and other succulents grow best in a low-organic soil mixture that dries rapidly and, therefore, does not retain large quantities of water. By mixing the general soil mix with equal volumes of sand you will have an appropriate potting mixture for these types of plants.

Using Your Potting Soil Mixes

By mixing a quantity of general potting soil mixture and retaining a small quantity of additional peat moss and sand you can adjust your mixture for any type of plant. This arrangement will require only a minimum amount of storage space and your potting soil is ready to use at any time. Before using your mix to repot plants, be sure it is damp. Totally dry soil mixture is difficult to handle and may damage tender roots before the plant is watered.

Sterilizing Soil

It is normally unnecessary or even undesirable to sterilize potting soils. Garden soils contain millions of living organisms beneficial to the soil. They only rarely contain disease organisms that might damage your houseplants. Young seedlings during the first 2 to 4 weeks of growth are the most susceptible to attack by soil-borne disease organisms. To prevent damping off disease on seedlings, it may help to heat treat the soil used for seedling

production.

The easiest method of home soil treatment is with oven heat. Place the container of soil in the oven and bake until the center of the mix is 140°F for 30 minutes. Use thermometer to check. A microwave oven also may be used.

Potting and Repotting Houseplants

Cultivating plants in containers requires occasional replanting from one container to another. Handle plants carefully in potting and repotting operations to avoid injury and to provide optimum growth conditions in the new container. When transplanting plants in containers, consider such factors as size and condition of the plant, size and type of container, type and amount of soil mixture, and prevention of mechanical damage to the plant.

Plant Size. Small plants transplant more readily than larger plants; however, any size plant which is already established in a container can be repotted readily. When first planting into pots, select small plants from which you do not have to remove many roots to fit the plant into the container. Pot rooted cuttings when the roots are about 1/2 inch long. Seedling plants will transplant most readily as soon as the first true leaves have formed.

Plant Condition. Most plants transplant best when in an active growing state. Dormant plants or those in flower may not produce root growth and establish themselves in the new pot as readily. Plants should not be wilted at time of transplanting. Be sure your plants are well irrigated in advance of repotting. Clean up any insect infestation prior to repotting.

Container Type. Plants can be grown in almost any container, but it is best to use containers with drainage holes. When you want to establish plants in decorative containers without drain holes (cachepots), pot the plants in drained pots which will fit inside the other containers. You can combine several small pots in a larger planter with sphagnum moss packed around the sides of the pots for support and to help evaporate excess water from the planter. Clay pots are no better than plastic ones. Porous and non-porous pots require different management. For example, soil in clay pots dries more rapidly and requires more frequent watering.

Container Size. Normally it is best to keep each potted plant in the smallest size container needed for its current stage of development. This conserves growing space, allows for gradual increases in pot size (and new soil) as the plants develop, generally looks better (small plants in large pots look lost), and allows more versatility in moving plants or arranging plants in groups. Small plants in large volumes of soil tend to suffer from overwatering.

Adjust container size to manage irrigation schedules. Move plants that need more frequent watering to larger pots with more water storage capacity. The quantity and type of soil mix will determine how much water the pot retains for plant use.

The Potting Process. It is not necessary to cover the drainage hole or holes with anything. Any item that might inhibit free drainage of surplus water from the pot is best avoided. Plants will not suffer if a bit of the potting mix

comes out with the first irrigation or two. Do not use a gravel layer or other so-called drainage material at the bottom of the pot. This will not increase drainage. It actually slows it down by shortening the soil column. Different layers of material are also likely to lead to perched water tables (restricted drainage) in the container. Always fill the entire pot with the growing medium right to the bottom.

If you are repotting from another pot, gently crumble some of the old soil ball away. Place the resulting root ball in the center of the new container and fill around it with potting soil while holding the plant in the desired position. Slap the sides of the container as the soil is filtered around the roots of the plant to help settle the medium. Thumping the bottom of the pot on the potting bench also will aid in this process. Avoid pressing or tamping the soil down too hard. This often eliminates air space in the mix and causes drainage problems.

If you are potting a plant the first time, trim the root system (if necessary) to fit the pot. Do not bend or wind roots into the pot. It is better to prune them to fit without bending. Hold the plant in place and fill around the roots. If extensive root pruning is necessary, keep the plant away from strong light or heat till new roots have grown. Increasing the humidity around the plant will help in reestablishment.

Finish filling the pot to approximately 1/2 inch from the top. In standard flower pots, fill to one-half the depth of the rim. This leaves enough space for watering with sufficient water to saturate the soil.

As soon as you finish potting or repotting plants, irrigate by filling the pot to the brim. Add water until it comes out the drain hole. This will assure that you have completely filled the reservoir capacity of the potting soil.

How Often? Small, rapidly growing plants may require repotting into larger containers every 3 to 4 months. You may repot houseplants on an annual basis, or allow them to remain in containers until they have outgrown them or become potbound. Plants not doing well in a container, for which no obvious reason can be found, may benefit from being repotted.

Propagating Houseplants

Many houseplants are easily propagated vegetatively by cuttings. For further information on propagating houseplants, see PNW 0151, Propagating Herbaceous Plants from Cuttings, PNW 0165, Layering To Renew or Multiply Plants, and PNW 0170, Propagating Plants from Seed.

Houseplant Problems

Most houseplant problems are related to cultural or environmental stress. Those which are not are usually insect-caused (Exception: powdery mildew on a very few species of plants such as grape ivy). Pathogen-caused diseases are not normally a problem for plants grown in homes or other typical indoor environments. Plants grown in greenhouses, however, are another matter.

Houseplant pests (insects and mites) are pictured and described in EB0695, Houseplant Pests, available from your county Extension office. Numerous insecticides registered for use can be effective in reducing or eliminating arthropod infestations in the home. The key to success against such pests is

to get control of all their life stages. Consistent application of a pesticide every 5 to 7 days for a period of a month or more may be necessary. Nonchemical controls also must be consistent.

The following chart of symptoms, possible causes, and treatments may help you recognize and deal with some of the many problems of houseplants.

When your container plants receive acceptable growing conditions they will return to normal, healthy growth. This recovery may require a few weeks to several months. If you find you cannot achieve the proper conditions for certain types of plants, it may be best to discard them and get varieties which can grow successfully in the conditions you are able to provide.

Symptoms (what you see)	Possible Causes	Treatment (corrective action)
Plants are spindly, stems grow abnormally long, leaves lack color and are undersized, leaves may fall off.	Too little light	Move closer to windows or other light source. Don't fertilize when plants are dormant (winter).
Old leaves curl under; new leaves are smaller than old leaves. Leaves may brown around margins.	Too much light	Move farther from window or light sources or filter light through a curtain.
Yellow, brown, or white (bleached) spots on leaves (particularly on upper leaves).	Sun scorch caused by sudden increase in light intensity	Shade plants. Move from shade to sun gradually so plants can adapt. Some require shade always.
Leaves turn yellow or curl downward or wilt.	Too much heat	Move to cooler spot. Avoid placing near heat registers or hot air outlets.
Plants wilt even if soil is moist. Margins and tips of leaves burn. White crust may appear on leaf edge and on soil surface when dry.	Salt buildup in soil	Leach out excess salts by watering three times at 30-minute intervals to wash the salts out the drainage hole. Do not use softened water.
White crust on rim and sides of porous pots. Leaves touching rim wilt and die.	Salt accumulation on pot	Leach soil as above. Wash excess salts off pot with clear water. Wax rim of pot to prevent future salt deposits which might touch leaves.
White or yellow spots on leaves of African	Cold water on leaves or in soil	Use room-temperature to lukewarm water for

violets, gloxinias, and other hairy-leaved plants.		watering plants.
Dark brown spots around leaf margins of tropical foliage plants (especially philodendron).	Raw natural gas or incompletely burned gas in home	Check gas lines and fittings for gas leaks. Adjust gas burners for blue flame. Have furnace checked for leaks or adjustment.
Plants wilt between waterings, roots fill pot and may grow out drainage hole. Growth slow.	Too much plant for the pot	Repot in a larger container with a good potting soil mixture.
Sudden wilting or shedding of foliage during cold weather.	Chilling	Move away from chilling drafts.
Wilting and loss of foliage after repotting or initial potting.	Transplant shock	Give optimum care until plant adjusts to its new situation.
Tips of leaves turn brown and leaves wilt. Lower leaves turn yellow and fall off.	Not enough water	Water until some water runs out drainage hole in bottom or sub-merge pot in a pail of water for 5 minutes. Drain off excess water. Repeat when soil is dry to touch.
Lower leaves curl and wilt; stems become mush and rot; soil in pot is usually wet.	Too much water	Water less frequently. Use pots with drainage hole in bottom. Do not allow pot to stand in water more than 30 minutes.
Leaf edges are crinkly and brown. Tips of new leaves often dry up.	Lack of humidity	Increase humidity around plants by standing pots on a bed of moist gravel or place in planters with moist sphagnum moss packed around pots. Use a humidifier in home or move plants to a more humid area of the home (bathroom or over kitchen sink).
Plants grow rapidly with lots of foliage but have few if any flowers.	Too much fertilizer	Fertilize less often or at half the suggested rate. Use low nitrogen fertilizer during blooming season. Do not

		fertilize when plants are dormant.
Lower leaves lose color and may drop off. New leaves are progressively smaller than last leaves. Stems are stunted.	Too little fertilizer	Fertilize regularly when plants are growing. Use a soluble fertilizer and apply as per package instructions.
Brown or black spots on leaves. Tip and marginal burning. Spider (Chlorophytum), corn (Dracaena) plants, and palms especially sensitive.	Fluoride in water supply	Use rain or distilled water. Keep pH up to 6.5.

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