



HOUSE PLANTS

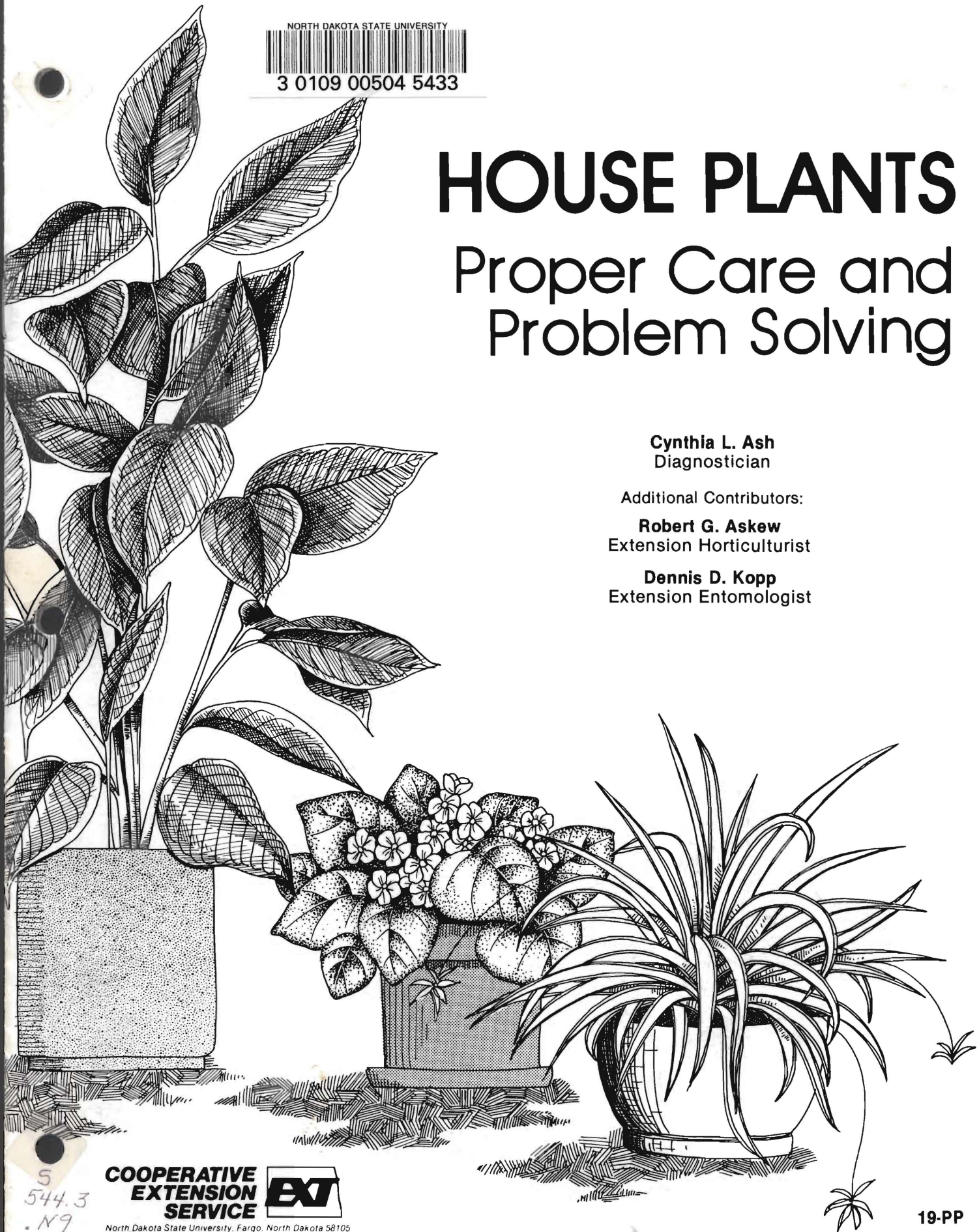
Proper Care and Problem Solving

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Growing house plants is a challenging and rewarding hobby that can be enjoyed by everyone and need not be difficult. Give plants what they need and they'll do well for you. Give them just about what they need and they hold their own. Deny too many of their needs and plants fail.

Take time to learn the cultural needs of a particular plant when you purchase it and keep a watchful eye out for possible disease and insect problems. If a plant has poor color, or distorted leaves or flowers, or if the plant tends to droop, something is wrong. These distress signals tell you the plant is having problems and corrective steps should be taken.

Check plants over carefully before purchasing. Pick one which has a healthy green color and shows signs of new growth. Make sure that the pot has good drainage and the plant is not root bound. Avoid plants with abnormal white or brown lumps on the leaves or stems. Webbing or a speckled leaf appearance could indicate an insect or related pest problem. A new plant should be isolated from other plants in the home for two to three weeks to avoid exposing other plants to problems which may develop. If a problem does develop, you have not exposed your other house plants.

CULTURAL CONSIDERATIONS

Soil

Plant roots must have air, food and water. Potting soil must be porous enough to allow drainage of excess water and to admit oxygen (soil aeration) needed by the roots.

Garden soil may appear ideal for potting indoor plants but actually causes problems. This soil may be wonderful for outdoor gardening under natural conditions, but after a few months the garden soil becomes hard and almost rock-like in a plant pot. Plants in garden soil grow satisfactorily for a month or two, but soon the lower leaves turn yellow and the plants become unthrifty. This problem is the result of poor drainage and the lack of soil aeration due to improper soil structure. Most garden soils become compacted with time and house plants grow poorly in compacted soil.

A proper soil mixture is of utmost importance to a house plant because the roots are restricted by the pot. A good potting soil should have the capacity to retain some air and moisture and yet drain well and hold nutrients. Sand or perlite added to the soil will improve aeration and drainage. Clay or organic matter will help retain water. Organic matter, plus commercial fertilizers, will maintain adequate nutrient levels. Modern "soilless" potting medias do not contain soil so the addition of fertilizer is required to provide all essential plant nutrients.

For general use, a good soil mix includes approximately equal parts of good garden loam, organic matter (preferably peat moss, although well-rotted manure or leaf mold will do) and sharp sand or perlite (Fig. 1). When sandy soil is used in the mixture, reduce the amount of sand or perlite.

Always use pasteurized soil when repotting at home. This can be purchased at a local store, or soil can be pasteurized at home.

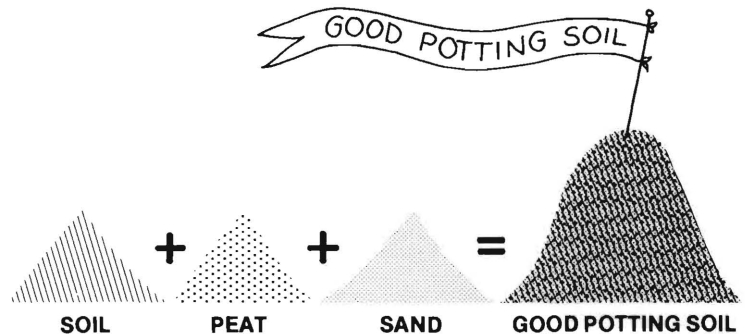


Figure 1.

Methods for Pasteurizing Small Amounts of Soil with Heat

Conventional Oven

Place moist soil in a deep baking pan or roaster (aluminum, glass or iron). The soil should be level and not over 4 inches deep. Bury a small potato (1½ inches in diameter) in the center. Then tightly cover the container with aluminum foil. Punch a small hole in the center of the soil but away from the potato and insert the bulb end of a meat or candy thermometer into the soil. Place in an oven on low heat (180 to 200 degrees Fahrenheit). Keep the soil in the oven for 30 minutes after the soil temperature has reached 180 F. Remove and cool the soil. The potato should be well cooked, indicating sufficient heat penetration throughout the soil. Do not overcook the soil.

Microwave Oven

Place approximately 2 pounds of moist soil in a polypropylene bag. Leave the top open and place in the center of a microwave oven. Treat for 2½ minutes on full power about 650 watts. After treatment close the top of the bag and allow the soil to cool before removing.

Potting

Always use thoroughly cleaned potting containers with proper drainage holes. Before reusing any pots, they should be scrubbed clean and thoroughly rinsed in a solution of one part household bleach to nine parts water to kill disease organisms present.

Cover the drainage holds in the pot with pieces of broken clay pots or coarse gravel. Next add enough potting soil to bring the soil level of the finished planting to about one-half inch below the rim of the pot. This top space serves as a reservoir for watering.

When repotting, cover the old soil level with about one-half inch of new soil. Firm the new soil around the root ball and water well to eliminate air pockets. Keep transplants away from drafts and provide extra humidity to reduce transplanting shock. You can provide extra humidity by covering plants with plastic for a day or two. Water when the soil feels dry but avoid fertilizing the plants for a few weeks until new shoot growth is evident. Excess fertilizer can damage the newly developing root hairs and delay plant growth.

Watering

Close observation and good judgment are essential for proper house plant watering. Growing conditions vary from home to home and room to room due to variations in light, temperature (day and night) and humidity. Plants with roots in shallow containers may need daily watering, while plants in large tubs may go several weeks between waterings. Succulents and other dry-soil plants require less watering than moist-soil plants such as ferns and African violets.

Proper watering keeps the soil moist enough to supply the plants' needs without drowning the roots. Saturated soil drives out air, and roots can die from lack of oxygen. Proper pot drainage is critical. All the soil in a pot should be thoroughly wetted each time the plant is watered. Always empty the drainage water from the catch basin beneath your plant container after each watering. This will reduce the possibility of water-logged soil and prevent the dissolved salts in the water from being drawn back into the soil. Soil should dry to the point that the plant approaches moisture stress between watering intervals.

Do not use water that is unusually high in salts or that has been run through a water softener to water plants. Rain or melted snow are good alternate sources of water for house plants. Some plants are sensitive to the chlorine gas in city water systems. Letting a container of tap water sit overnight before use will allow most of the gas to escape.

Feeding

Many brands of fertilizers are designed for house plants. Follow the manufacturer's directions and do not assume that twice the recommended amount is better than the recommended amount; overfeeding may damage your plants.

Plant injury can be reduced by leaching or rinsing out part of the dissolved fertilizer with clear water if overfertilization occurs. Use a container with holes in the bottom to allow thorough drainage. Place the pot in a sink and water liberally three to four times at half-hour intervals, allowing the water to flush out the dissolved fertilizer and other accumulated salts.

A white, flaky material on the soil surface of potted plants is often observed one to several months after potting. These are mineral salts that accumulate in the soil. Well water in North Dakota contains varying amounts of dissolved salts, as does the fertilizer you apply. With continuous watering, these dissolved salts accumulate in the soil and appear on the soil surface. The salts can be flushed out of the soil from time to time to prevent salt injury to your plants. Leaching (rinsing) the soil of most house plants every three to six months is a good cultural practice and will reduce the accumulation of salts in the soil. Clay pots which have accumulated salts should be soaked in hot water for 24 hours before reuse.

Fertilizer will not cure all ills. Fertilizer will not help a plant that is suffering from poor drainage, insect infestation, disease or over-watering.

Interstate Transport of Plants

If plants are to be transported across state lines, determine the regulations of the states en route to avoid possible transport of harmful plant pests to areas not previously infested. For more information on interstate transportation of plants, contact the North Dakota State Entomologist, North Dakota Department of Agriculture, Bismarck, ND 58501, or the Department of Entomology, North Dakota State University, Fargo, ND 58105.

HOUSE PLANT TROUBLE SIGNS

Wilting or partial wilting will often be the result of improper water relations in the plant. If sudden wilting is diagnosed, check the roots, pot or soil for the trouble. Some common causes are a lack of water, excess water, root rot, too much fertilizer and/or a salt buildup. Check the cause by pressing your finger, up to the first knuckle, into the soil. If the soil is dry to this depth, the plant needs water. If the soil is wet, too much water in the root area may be the problem. The roots may be saturated or rotting and incapable of absorbing water from the soil and supplying it to the leaves. Overwatered plants should be repotted into fresh soil. (Refer to the section on yellowing and death of all leaves and poor growth for more information on root rot.)

Plants which are pot bound may wilt because the roots are strangling each other. Don't be afraid to remove the plant from the pot and examine the roots to see if they are too dry, too wet or diseased. To remove, merely invert the plant and lightly tap the edge of the container on a solid object while holding the plant and soil ball (figure 2). You may find the soil mass is completely enveloped in roots and the plant needs repotting.

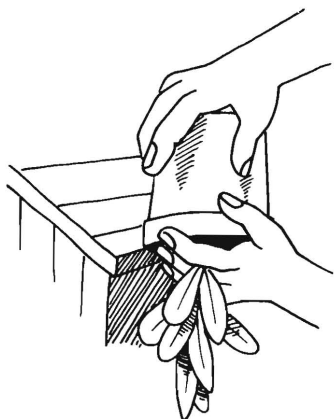


Figure 2. Removing plant from container.

Sudden loss of leaves is frequently caused by a rapid temperature change. It may also be caused by such factors as prolonged hot or cold drafts, dry air, exposure to gas or furnace fumes or by changing the location of the plant from a sunny to a dark location. *Ficus benjamina*, commonly called weeping fig, frequently has sudden leaf drop when moved to a location with lower light intensity.

Yellowing or death of leaves may indicate a nutrient deficiency, usually nitrogen or iron. First apply a nitrogen fertilizer. If the foliage does not appear greener after three to four days, do not add additional nitrogen. Instead apply a chelated iron product. Iron is essential to healthy green leaves and may be present in the soil but in a form which the plant cannot use. Chelated iron is in a form which is readily available to the plant roots.

The yellowing and death of lower leaves may occur if plants become pot bound because of extensive root development. Rubber plant, *Dracena*, *Diffenbachia* and other woody plants are especially prone to this problem. When the lower leaves first start to yellow, apply extra nitrogen fertilizer or consider repotting. Occasional lower leaf drop may be normal. The length of time a plant will hold its leaves varies from species to species.

Yellowing of all leaves and poor growth may be due to excessive soil moisture and/or to root rot. If the drainage hole in the pot or plant box is plugged

or if the plants constantly stand in water, the soil will be waterlogged and lack sufficient oxygen.

If a root rot problem is suspected, remove the root-ball and check the roots. Healthy roots and root tips will be white or cream-colored. Rotted roots are a brown-black color and may appear slimy. Severely rotted roots may be hollow and easily broken between the thumb and index fingers.

Destruction of the roots by soil-borne fungi and nematodes may cause a yellowing of the entire plant. Severe infestations of mites, aphids and scale insects, fertilizer burn, improper light and temperature, or improper pH all may cause plant yellowing. Soil pH prefers to the acidity or alkalinity of a soil measured on a scale of one to 14 with seven being neutral. Anything below seven is acid and anything above seven is alkaline.

Some plants such as the Norfolk island pine and Boston fern require an acid soil medium. This can be achieved by using a potting mixture high in peat and by using an acid fertilizer. Acid fertilizers help to reduce the pH of the soil. Most North Dakota well and river water is alkaline, so regular use of an acidifying fertilizer would be advantageous to plant growth.

Finely specked leaves with a faint mottled, lighter color may be infested with spider mites. When the mites are plentiful, the upper and sometimes the lower surface of the leaves may appear dusty due to their webbing. To check plants for spider mites, shake several suspect leaves or branches over a sheet of white paper. Look closely at the specks which have fallen on the paper. If they are moving, they are spider mites. More information on mites and their control is give in the chart on page 6.

Bronzed or abnormally reddened leaves indicate cold temperature damage or a deficiency of phosphorus or potassium. Check the recommended temperature range for the plant. If a nutrient deficiency is suspected, fertilize with a complete fertilizer or repot in new soil.

Unnaturally small pale leaves and spindly plants are most generally the result of insufficient light. This is especially common during the winter or when outdoor or greenhouse grown plants are brought into the home. Small leaves might also indicate a need for fertilizer.

Brown leaf tips and margins can be caused by exposure to hot dry air, improper watering, insect feeding, salt accumulations (fig. 3) or objects rubbing against the leaves. Water which is chlorinated or contains added or natural amounts of fluoride can harm sensitive plants. Perlite (the white material in many potting mixes) and fertilizer products containing fluoride may release enough fluoride to harm sensitive plants. Spider plants, especially the variegated variety, are very sensitive to fluoride and



Figure 3. Soluble salt injury on fern. Courtesy of R.W. Stack.



Figure 5. Citrus mealybug. Courtesy of D.D. Kopp.



Figure 4. Oedema on geranium leaf. Courtesy of H.A. Lamey.



Figure 6. Scale insects on foliage plant. Courtesy of D.D. Kopp.

toothpick or tweezers or by thoroughly washing the leaves with a mild detergent solution (two teaspoons solution per gallon of water). If the last method is used, care should be taken to avoid wetting the soil. This method should be repeated several times.

- 6) Avoid misting plants as this can contribute to and spread infectious diseases.

Control Measures With Chemicals

To insure the safest and most effective results from a pesticide, READ THE ENTIRE LABEL on the container.

Some plant species may be injured by certain chemicals (phytotoxic reaction), so read the precaution section on the pesticide label before applying. If in doubt about the reaction of a certain pesticide on a specific plant, treat a small portion of the plant at the recommended rate to determine if there is a phytotoxic reaction. If there is a reaction, use another pesticide.

Treat the underside of leaves too, since this is frequently where infestations of mites, aphids and whiteflies are heavily concentrated.

Control of mites, mealybugs, whiteflies, scales and aphids can be a problem indoors because of the difficulty in applying insecticides to the target area. For treating smaller plants, place them in a 20 to 30 gallon tightly closed plastic bag for 12 to 24 hours with a no-pest-strip insecticide. Repeat at weekly intervals for about three treatments and then repeat at intervals of a month or two. The active ingredient in the no-pest-strip, vapon, can be quite toxic, so be sure to read all label precautions before using. It is difficult to attain a complete eradication. Do not treat velvet plants (*Gynura*), Boston ferns and their varieties, zebra plants (*Aphelandra*) and *Peperomias* because of possible injury.

