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Overwintering Tropical Plants

Container gardening has gained in popularity in recent years and tropical plants are well-suited for containers. Their lush growth and colorful flowers make them a welcome addition to the home landscape. Additionally, tropical plants seem to thrive in the heat and humidity of a typical Missouri summer. Many of these plants are woody species in nature that can grow quite large in a single summer and gardeners often are faced with the problem of what to do with them as the end of the growing season approaches.

The answer to this problem in certain cases is very simple. If the plants have become quite large and indoor space is limited or available light is poor, the easiest solution would be to allow the plants to freeze and start over with younger, smaller plants purchased from a local nursery or garden center the following spring. Young plants which are growing actively at the time of their purchase will most likely make more of an immediate impact in the landscape when compared with older plants that have been overwintered in less-than-ideal conditions. Since many gardeners become somewhat attached to their plants, allowing them to freeze is a difficult decision to make. Additionally, certain species of tropical patio plants can be a bit “pricey” and the prospect of replacing them each spring is unattractive.

For gardeners who have time and indoor space with reasonably adequate light and temperature conditions, it is possible to keep tropical patio plants for another summer of enjoyment. Plants fitting into this category include hibiscus, bougainvillea, mandevilla, banana, palm and citrus (orange, lemon or grapefruit). Since many tropical plants can suffer from chill injury, it is wise to move them inside for the winter when night temperatures start to consistently fall below 45 degree F.

Hibiscus are fairly content indoors and do not require a lot of space. It is wise to cut them back before bringing them indoors, but this will eliminate the flower buds that

had developed on the growth removed. Smaller plants may be placed in a sunny window where they should bloom periodically throughout the winter. If a sunny location is not available, hibiscus can be placed in a cool location and allowed to drop their leaves and go dormant during the winter. The roots should not be allowed to dry out and, since the plant has no leaves, it will not require much water. A “rule-of-thumb” is to keep the root system “barely moist”.

Bougainvillea is fairly ranked in growth habit and can take up a lot of space to overwinter. If the plant was in a hanging basket or small container, it can be cut back and placed in a sunny indoor location in a manner similar to hibiscus. Because many bougainvillea patio plants tend to be large containers, a more common overwintering method is to place it in a cool location that does not freeze and allow it to go dormant for the winter. Although its leaves will drop, bougainvillea is a woody plant that will initiate new leaves and growth when placed outdoors the following spring. As with hibiscus, the root system should not be allowed to dry out but do not over-water the plant.

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Mandevilla is a very vigorous vine that will need to be severely pruned before moving it indoors. It, too, can survive in a sunny location in the home and might require additional pruning during the winter if growing conditions are good. Mandevilla also can be allowed to go dormant and placed in a cool location that does not freeze during the winter. Additionally, it can be overwintered by harvesting its thick, fleshy storage roots and protecting them from desiccation while keeping them cool. While requiring less space, this latter method usually requires more time the following spring before a blooming plant is established.

Bananas are probably the most difficult container plant to overwinter because of their size and high light requirement. Dwarf bananas are more likely to fit indoors and find a suitable home in a sunny window than are large bananas. If large bananas have produced side shoots, these shoots can be removed, potted and maintained as small plants throughout the winter. The shoots must have some roots present on the stem when cut since bananas do not root from the stem. An alternative storage method for large bananas is to cut the plant off and hold it in cool temperatures (45 to 50 degrees F). The cut stump will gradually die back to the soil and should be removed the following spring. When placed outdoors the following spring a new shoot may develop (in time) if the root system has been protected and not allowed to dry out.

Palms make useful houseplants as well as attractive patio or deck plants during the summer. They acclimatize rapidly to the lower light conditions found in the average home although some of the older leaves might yellow and

drop. Watch for insects and mites that might have gained access to the plant while growing out-of-doors.

The various species of citrus all require about the same conditions for overwintering. If large, they can be pruned to accommodate an indoor setting. They require a sunny location, uniform moisture and a monthly feeding with a fertilizer that is acidifying in nature, such as those developed for azaleas. While they might flower given adequate light indoor, they seldom set fruit.

Regardless of the species, tropical patio plants moved indoors for the winter should be thoroughly inspected for pests. Mites are a very common pest of plants outdoors and are difficult to detect because of their small size. While they might not have developed into a major problem on the plant during the summer, the warm, dry conditions of the average home encourage their proliferation during the winter. Watch for leaves that are pale or look stippled and inspect with a hand lens. If present, mites can be eliminated by washing thoroughly with a mild detergent or spraying the plant with an appropriate pesticide labeled for use on mites indoors.

The end of the growing season does not have to signal the end of tropical patio plants that have brought months of enjoyment. With a bit of care they can be carried through the winter as "house guests" and put to work the following spring as outdoor patio plants.

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The Blast Furnace Summer of 2011 turned some Evergreens to Everbrowns



Drought-injured yew

Since the high temperature episode in July and August of 2011, I have observed extensive browning of certain evergreens. Some 8-foot-tall Green Giant arborvitae trees on campus are completely dead. Others show complete browning of individual branches or groups of branches. I have observed similar damage on other types of arborvitae and on yews. It seems likely that this damage is due to a combination

of cool wet spring with little transition to the blast furnace conditions in mid-summer. In Columbia, we had 16 inches of rainfall between March 1 and July 1. This caused trees and shrubs to have shallow root systems and soft, drought-susceptible foliage. The blast furnace cranked up between July 19 and August 8. Table 1 shows weather data for this period at Sanborn Field in Columbia. The numbers are startling. The relative humidity on the hottest days was 50-60%, with maximum wind speeds greater than 20 MPH on two of the three hottest days. We only had 1.1 inches of rain in the month of July, only 0.2 inches in the 2 weeks prior to the major heat and only 0.22 inches during the hot spell itself. The temperature of bare soil at

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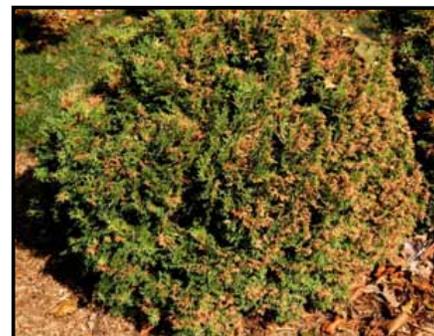
Green Giant arborvitae

4 inches got up to 95 degrees. Night temperatures in the 80s didn't help either.

I think that we did not realize how high the evaporative demand was and how low the soil moisture reserves were. As shown in the table, total estimated E.T. (Evapotranspiration from short crops) during the episode was 4.3 inches. Thus, over this 19 day period, we lost about 4 more inches of soil mois-

ture than we regained from precipitation. Even if one realized that this was occurring, it would have been hard to keep up with irrigation.

Since the weather has cooled and we have gotten some rainfall, some of the affected plants appear to be recovering somewhat. However, it is likely that some branches have been completely killed, disfiguring the damaged plants beyond repair. It is also likely that the severe stress caused by the blast furnace summer of 2011 will make many plants susceptible to attack by diseases and insects that may affect them for several years.



Hetz Midget arborvitae

Table 1. Weather data from Sanborn Field in Columbia MO during the high temperature episode from July 16 to August 3.

Month	Day	Precip	Max Temp	Max Wind Speed	E.T.*
7	16	0	93.2	12.9	0.21
7	17	0	94.8	11.1	0.22
7	18	0	94.7	11.7	0.23
7	19	0	97.9	12.9	0.24
7	20	0	98.7	14.7	0.25
7	21	0	100.1	12.9	0.25
7	22	0	99.5	11.7	0.25
7	23	0	101.9	20.7	0.25
7	24	0	93.4	17.1	0.19
7	25	0	95	12.3	0.23
7	26	0	98.3	14.1	0.23
7	27	0	101.7	23.7	0.27
7	28	0.09	102.1	21.9	0.24
7	29	0	94.2	12.3	0.20
7	30	0.13	85.8	13.5	0.09
7	31	0	96.6	9.4	0.20
8	1	0	103.2	14.7	0.26
8	2	0	106.3	15.9	0.26
8	3	0	96.3	13.5	0.24
total		0.22			4.30

*Estimated evaporative total evaporation from short crops like soybean

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What a Season for Moles and Voles!

MOLES:

Moles have been very active over the past several years. Activity in the late fall and early winter months is not uncommon as moles prepare for winter hibernation. Many lawns are heaved with feeding runways and mounds to the point that it is difficult to walk. Excess rainfall in the spring and fall will trigger mole activity since their primary food source (earthworms) generally retreats to the surface escaping saturated soils.

Many individuals think moles feed primarily on the roots of plants causing them to die. The truth is, moles' feeding on plant material is very limited. It's the air pockets they create around roots of flowers and other ornamental plants that cause them to dry out and die. Others say that mole activity is strictly tied to the existence of white grubs and will purchase grub insecticides not realizing that these products will reduce earthworm populations up to 70 percent. Mole activity decreases simply because you eliminated their primary food source. Therefore, we do not recommend the use of grub insecticides for the control of moles. Many individuals have their own home remedies to control or repel moles. Several of these include such things as human hair, Juicy Fruit gum, poison peanuts, mothballs, flooding tunnels with a garden hose and water, a hose connected to a cars exhaust and finally, pets (some dogs and/or cats can be effective). Just keep in mind that moles are carnivores and that is why several baits are ineffective.

Moles construct networks of tunnels in the soil surface. Many of these are built after rains when the mole is in search of new sources of food and are usually not re-used day to day. Digging of surface tunnels normally proceeds at a rate of 1 foot per minute. They tend to feed and rest on two-hour cycles, 24 hours a day. Living foods (earthworms and other insects) constitute about 85 percent of their diet; however millipedes, centipedes, spiders, sow bugs, snails and slugs are taken in considerable amounts. Moles are insatiable eaters and can consume 70 to 80 percent of their body weight daily. Moles generally move up or down within the soil profile following their food sources such as earthworms, which moves with soil moisture.

Moles also create mounds (called molehills) of soil in the lawn by pushing up soil developing deeper, permanent tunnels for nesting and hibernating cavities. Mating occurs in the spring with a single annual litter of 2 to 5 young being produced in March, April or the first week of May.

Management or Control:

There are products on the market that are available to homeowners at local nurseries or garden centers.

Many repellent-type products are based on castor bean oil. Many have been tested on the Eastern mole and appear effective on that species, which is our predominant species. These products need to be sprayed (garden hose-end applicator) or granule applied (through a spreader) at regular intervals to maintain a barrier that repels these small mammals to your neighbor. The repellent type products are marketed as natural and safe, but information about effectiveness is mixed. Chase, Scoot Mole, Shotgun Mole & Gopher Repellent, Mole Max, Mole-Out, Whole Control, and Schultz Garden Safe Mole Repellent are just a few presently available. These products will generally treat 5,000 to 10,000 square feet and last one to three months.

More recent products include several baits that seem to be very effective if applied properly to active feeding runways. See below on how to locate active feeding runways. Wear rubber gloves whenever handling and placing baits in tunnels. This will prevent placing human scent on the bait.

Two products called "Kapot Mole Control" (Lesco) and "Moletox Baited Gel" (Bonide) are water-based gels containing warfarin (0.025%) as the active ingredient and flavored like their primary food, earthworms. It is best to locate the active runways as you would for trapping before placement of the bait. They are both packaged in syringe-type applicators with which the bait is injected into the tunnels.

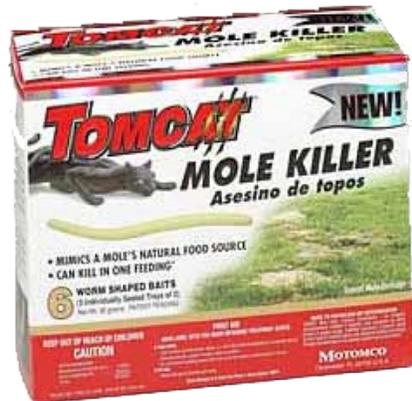
The latest mole baits registered are worm-shaped baits (Talpirid, MOTOMCO Mole Killer, and Tomcat Mole Killer) containing a bromethalin-based active ingredient that actually looks, feels and tastes like earthworms. Each worm contains a lethal dose of bromethalin. It is the only mole bait that has submitted efficacy studies to EPA.



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M O T O M C O Mole Killer and Tomcat Mole Killer are similar baits to Talpirid, but in a more affordable package of six or eight worms. Gemplers, QC Supply and MFA carry this product.

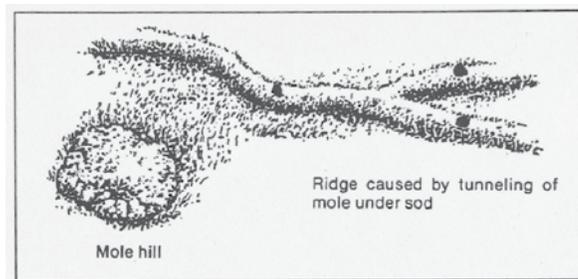
We can also find some poisonous granular baits of a different class as compared to the previous baits mentioned. These include “Moletox II” and “Mole-Nots”, both of which are cracked corn baits laced with 2% zinc phosphide. One teaspoon of material will treat an active tunnel. While some results indicate excellent control with these products, keep in mind that moles do not prefer grains in their diet.

Another granular bait is “Mole Patrol Bait.” Mole Patrol is a ready-to-use, pelletized bait highly palatable with unique attractants. This product contains chlorophacinone, a historically sound anticoagulant of the rodenticide industry. Some studies indicate 100% control of moles.

Trapping is still one of the most efficient means of controlling moles and anyone can be successful by following a few simple steps. If you have a network of shallow runways used for feeding, then you can do some effective trapping. First, you need to locate active feeding runways, and then place one of several types of traps. The Nash trap (wire hoop type) and the Victor “Out O’ Sight” trap (scissors type) do work, but seem to be more difficult to set. The Victor “Harpoon or Gig” and Sweeney’s “Precision Mole Trap” are some of the most successful traps on the market. A newer trap called the “Easy Set” mole eliminator (scissor type) is a very easy trap to set, hence its name. Even individuals who have difficulty setting the heavy spring-type traps mentioned above can set this trap simply by stepping on the trap with a little body weight. All traps can be found at garden centers, hardware stores or found online (Gempler’s, Forestry Suppliers, etc.).

Identifying Active Feeding Runways:

First, with a small stick or broom handle, poke holes in various runways over the entire network. Come back two to three hours later and inspect those holes. Find the tunnels with the holes plugged back up. This will indicate to you which runways are active feeding tunnels at that time. These are the tunnels that you want to set your traps on or place baits.



Controlling and trapping moles requires a little time and patience. Your success with controlling moles is dependent on locating active runways and the proper placement of a trap or bait or both.

VOLES:

Voles are small mammals that occur throughout Missouri. Commonly called meadow mice, they are distinguished from true mice by their short tails (about an inch long), stocky bodies and short legs. Their eyes are small and their ears are partially hidden. They are usually brown or gray but can vary in color. Three species of voles occur in the state, the pine or woodland vole, the meadow vole, and the prairie vole. However, it usually is not necessary to distinguish between the species to control the damage they cause.

Voles are herbivores. They eat a variety of plants, such as forage grasses, flower bulbs and bark of trees and shrubs. Voles live in colonies consisting of several openings (silver dollar size) on the soil surface connecting networks of underground runways. Vole colonies consist of a pair of animals but more than likely will include several generations. A colony can have runways covering an area as large as a quarter acre. Although voles have value in the ecosystem, homeowners and managers of valuable horticultural plantings may need to use control measures to limit vole damage.

Controlling Voles:

The reduction of large vole populations is accomplished most effectively with toxic baits. A good rodenticide program can be both effective and economical for home gardeners as well as commercial producers when vole damage is severe.

Toxicants have been a mainstay in vole damage control. Zinc phosphide has been the toxicant most frequently used. It is a single-dose toxicant available in a pelleted formulation. Zinc phosphide baits generally are placed by hand in runways and burrow openings. Although pre-baiting (application of a non-toxic bait prior to applying toxic bait) is not usually needed to obtain good control, it

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may be required in some situations such as when a population has been baited several times and bait shyness has developed. ZP Gopher Bait is an excellent zinc phosphide bait to kill voles.

Home gardeners and managers of horticultural landscapes can also consider using one of the labeled anticoagulant rodent baits to control voles. Anticoagulants require multiple feedings to kill the animal (over 5 to 15 days). These rodenticides are usually safer around nontarget species, and bait shyness will not develop as the animal never associates a weakened condition with the bait. Currently, warfarin formulated in pellets (sold as Kaput Rat, Mouse and Vole Bait) is recommended for use by homeowners and managers of horticultural landscapes for controlling voles. This product can be found at various garden centers as well as on various web sites. Be sure to read and follow

all label directions when using any rodenticide.

Standard mouse traps with bait, such as peanut butter, can be placed next to colony openings then simply place a large clay pot over the trap and opening – another proven home remedy. Voles are easier to control than moles simply because the placement of bait into their colonies takes little time and is very effective.



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November Gardening Calendar

Ornamentals

- **Weeks 1-4:** Continue watering evergreens until the ground freezes. Soils must not be dry when winter arrives.
- **Weeks 1-4:** Now is the ideal time to plant trees and shrubs. Before digging the hole, prepare the site by loosening the soil well beyond the drip line of each plant. Plant trees and shrubs at the depth they grew in the nursery and not deeper. Remove all wires, ropes and non-biodegradable materials from roots before back filling. Apply a 2-3 inch mulch layer, but stay several inches away from the trunk. Keep the soil moist, not wet, to the depth of the roots.
- **Weeks 1-4:** Remove the spent flowers and foliage of perennials after they are damaged by frost.
- **Weeks 1-3:** Newly planted broad-leaf evergreens such as azaleas, boxwood and hollies benefit from a burlap screen for winter wind protection. Set screen stakes in place before the ground freezes.
- **Week 1:** Now is a good time to observe and choose nursery stock based on fall foliage interest.
- **Week 1:** Plant tulips now.
- **Weeks 3-4:** Mums can be cut back to within several inches of the ground once flowering ends. After the ground freezes, apply a 2 to 3 inch layer of loose mulch such as pine needles, straw or leaves.
- **Weeks 3-4:** Mulch flower and bulb beds after the ground freezes, to prevent injury to plants from frost heaving.
- **Weeks 3-4:** Roses should be winterized after a heavy frost. Place a 6 to 10-inch deep layer of mulch over each plant. Top soil works best. Prune sparingly, just enough to shorten overly long canes. Climbers should not be pruned at this time.
- **Weeks 3-4:** Take steps to prevent garden pools from freezing solid in winter. Covering pools with an insulating material, or floating a stock tank water heater in the pond, will lessen the chance of ice damage.
- **Weeks 3-4:** Covering garden pools with bird netting will prevent leaves from fouling the water. Oxygen depletion from rotting organic matter can cause winter kill of pond fish.

Vegetables

- **Weeks 1-4:** Fall tilling the vegetable garden exposes many insect pests to winter cold, reducing their numbers in next years garden.
- **Weeks 1-4:** Any unused, finished compost is best tilled under to improve garden soils.
- **Weeks 1-4:** To prevent insects or diseases from over-wintering in the garden, remove and compost all plant debris.
- **Weeks 1-3:** Overcrowded or unproductive rhubarb plants can be divided now.
- **Weeks 3-4:** Root crops such as carrots, radishes, turnips and Jerusalem artichokes store well outdoors in the ground. Just before the ground freezes, bury these crops under a deep layer of leaves or straw. Harvest as needed during winter by pulling back this protective mulch.
- **Week 4:** Thanksgiving - Weave a holiday wreath of garlic, onions, chili peppers and herbs. It will make a gourmet gift for a lucky friend.

Fruits

- **Weeks 1-4:** Keep mulches pulled back several inches from the base of fruit trees to prevent bark injury from hungry mice and other rodents.
- **Week 1:** Harvest pecans when they start to drop from trees. Shake nuts onto tarps laid on the ground.
- **Week 1:** Fallen, spoiled or mummified fruits should be cleaned up from the garden and destroyed by burying.
- **Weeks 3-4:** A dilute whitewash made from equal parts interior white latex paints and water, applied to the southwest side of young fruit trees will prevent winter sun scald injury.
- **Weeks 3-4:** Commercial tree guards or protective collars made of 18-inch high hardware cloth will prevent trunk injury to fruit trees from gnawing rabbits and rodents.
- **Weeks 3-4:** Mulch strawberries for winter with straw. This should be done after several nights near 20 degrees, but before temperatures drop into the teens. Apply straw loosely, but thick enough to hide plants from view.

Miscellaneous

- **Weeks 1-4:** Now is a good time to collect soil samples to test for pH and nutritional levels.
- **Weeks 1-4:** Roll up and store garden hoses on a warm, sunny day. It's hard to get a cold hose to coil into a tight loop.
- **Weeks 1-4:** To prevent injury to turf grasses, keep leaves raked up off of the lawn.
- **Weeks 1-4:** Continue mowing lawn grasses as long as they keep growing.
- **Weeks 1-4:** A final fall application of fertilizer can be applied to bluegrass and fescue lawns now.
- **Weeks 2-4:** Clean house gutters of leaves and fallen debris before cold wet weather sets in.
- **Weeks 2-4:** Set up bird feeders. Birds appreciate a source of unfrozen drinking water during the winter.
- **Weeks 2-4:** Be sure to shut off and drain any outdoor water pipes or irrigation systems that may freeze during cold weather.
- **Weeks 3-4:** For Cyclamen to bloom well indoors, they need cool temperatures in the 50-60 degree range, bright light, evenly moist soils, and regular fertilization.
- **Weeks 3-4:** Winter house plants basics: - reduce or eliminate fertilizer until spring. - shorter days mean slower growth. - slower growth means less frequent watering. - plants in plastic pots need less water than those in clay pots. - plants in cooler rooms need less water and grow slower than those in warm rooms.

Gardening Calendar supplied by the staff of the William T. Kemper Center for Home Gardening located at the Missouri Botanical Garden in St. Louis, Missouri. (www.GardeningHelp.org)