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# Lawn and Garden



TEXAS AGRICULTURAL EXTENSION SERVICE  
THE TEXAS A&M UNIVERSITY SYSTEM

# Update

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## June Plant of the Month

# Giant Rose Mallow

*Hibiscus moscheutos*

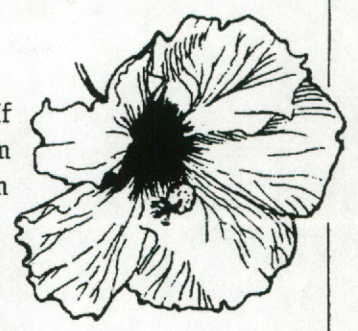
By Dr. William C. Welch, Landscape Horticulturist

The giant rose mallow has the largest flowers of any hardy perennial. Some of the hybrids may be one foot in diameter. Rich, moist soil and full sun bring the most vigorous growth, but mallows are very accommodating, and will tolerate light shade and less desirable soils. Giant rose mallows will flower from seed the first year if started very early in spring. Favorite cultivars may be rooted from cuttings during the growing season. Colors range from crimson, white, pink, rose, and in-between.

Giant rose mallows are relatives of the native hibiscus found in Louisiana, East and Central Texas, and other Gulf South states. They are among the most spectacular and easily grown plants for use in the border. Following the spring and summer growing season, the plants freeze back to the ground each fall. Old stems should be cut back to a height several inches above the ground. New shoots emerge by mid-spring, and the plants quickly develop handsome mounds of foliage and flowers by early summer. Individual flowers last only a day, but each plant may flaunt several flowers at once. Numerous seedling selections, such as 'Southern Belle' and 'Frisbee' are offered in good seed catalogs. Few garden plants provide so much enjoyment for so little care.

Seeds of giant rose mallows are available from catalogs, while container-grown plants are usually in stock at Texas garden centers and nurseries. Color selection is possible when you

purchase blooming-size plants. If growing giant rose mallows from seed, it is important to start them early in the season so that they will have adequate time to develop before freezing weather sets in.



*Hibiscus mutabilis* is an old-fashioned perennial or shrub hibiscus better known as the Confederate rose. It tends to be shrubby or treelike in Zones 9 and 10, though it behaves more like a perennial further north. Flowers are double and are 4 to 6 inches in diameter; they open white or pink, and change to deep red by evening. The 'Rubra' variety has red flowers. Bloom season usually lasts from summer through fall. Propagation by cuttings root easiest in early spring, but cuttings can be taken at almost any time. When it does not freeze, the Confederate rose can reach heights of 12 to 15 feet with a woody trunk; however, a multi-trunk bush 6 to 8 feet tall is more typical. Once a very common plant throughout the South, Confederate rose is an interesting and attractive plant that grows in full sun or partial shade, and prefers rich, well-drained soil.

Several years ago, Dr. Jerry Parsons, Extension Horticulturist in San Antonio, released a new giant rose mallow named 'Moy Grande' from the San Antonio Botanical Garden. 'Moy Grande' has huge flowers of dark rosy pink. Best availability is in the San Antonio area.

# Chinese Hibiscus *Hibiscus rosa sinensis*



By Dr. William C. Welch, Landscape Horticulturist

**C**hinese hibiscus offer an excellent source of summer color in the landscape, and are among our most popular tropical and subtropical flowering plants. Popularity in Texas appears to be increasing in recent years, although insects, diseases, and winter injury limit their use. Even the southernmost extremes of Texas occasionally experience sufficient cold to kill this plant. With this in mind, *hibiscus rosa sinensis* should be grown as an annual or container specimen in most of the state. In areas where winter does not cause damage, hibiscus is a perennial, and may be used as a more permanent landscape plant.

The glossy green foliage varies considerably in size and texture among the many varieties. Flowers range from 4 to 8 inches in diameter, and may be double or single. Hibiscus belong to the mallow family and are closely related to cotton, hollyhock, Turks cap, the mallows, shrub althaea, Confederate rose, and okra. Colors vary from

white through pink, red, yellow, apricot, and orange. Generally, the single-flower hibiscus bloom more, and, therefore, offer a bigger show in the landscape, but doubles are sometimes preferred for their spectacular individual flowers.

Hibiscus flowers are popular for decoration. They need not be placed in water to prevent wilting, which adds flexibility to their use. An objection is that the flowers of most varieties last only one day, especially during hot weather. To keep flowers open until evening, pull blooms as soon as they are fully open in the morning, and keep in the refrigerator until just before using. If no leaves are pulled with the blossoms, picking does not damage the plant or reduce the total amount of flowering.

Hibiscus prefer a sunny location and well drained soil containing plenty of organic matter and nutrients. From April through September, small monthly applications of a complete fertilizer are beneficial. Container-grown plants will require more frequent applications. To bloom and grow profusely, hibiscus must have sufficient water. As with most other plants, watering should be done thoroughly and not too frequently. Some protection from strong winds is necessary, since the flowers are easily damaged.

It should be remembered that hibiscus are not cold hardy. If your area is subject to freezing temperatures, your Chinese hibiscus must either be treated as annuals and allowed to freeze or be protected during cold weather. During mild winters, plants may freeze to the ground and then sprout from the base the following spring. Applying a loose mulch, such as pine straw or oak leaves, around the base of the plant before cold weather sometimes prevents severe winter injury. Certain varieties are more susceptible to cold damage than others. If greenhouse space is available, plants may be dug, placed in containers, and replanted in the landscape after the danger of frost has passed.

In recent years, there has been an increase in use of hibiscus as container plants. Small plants may be purchased early in spring or summer, placed in large pots (at least 12 inches in diameter) and enjoyed until frost.

## Summer Tolerant Annuals

By Dr. William C. Welch, Landscape Horticulturist

*Texans are fortunate to have a number of flowering annuals available that will withstand our hot, dry summers. Marigolds, zinnias, periwinkles, cleome, portulaca, gloriosa daisies, and globe amaranth are all extremely heat-tolerant, and well adapted to our environment. Castor beans will provide huge masses of tropical foliage in green, bronze, or purple, with minimum effort. For shaded areas, chose from impatiens, begonias, caladiums, or coleus. All these are available in a variety of foliage or flower colors to suit most any scheme. Moonflowers and morning glory vines may be planted from seed now, and when grown in arbors, provide shade and flowers later in the summer.*

*Summer is a time for enjoying the landscape. By carefully selecting and placing colorful, easy-to-grow annual flowers, you can make our outdoor areas more attractive, and still have plenty of time to relax.*

# Pre-Vacation Planning Pays

By Ted Fisher, Cherokee County Extension Horticulturist, Rusk

Landscape preparation for a summer vacation may sound like a lot of extra work, but it is really not much more than the normal weekend routine of maintaining a healthy, well-groomed landscape. Just a little extra effort on your part before leaving can make a big difference in the health and well-being of your plants. Here are some practical tips that should help ensure that your home landscape will not suffer the post-vacation blues. And don't forget to visit some gardens while you are away. There are many spectacular gardens to enjoy in just about any part of the country where you may be headed.

**WATER.** Water the home grounds well prior to leaving. Soak your lawn, gardens, and all landscape plants deeply. Our shallow soils can dry out rapidly even after heavy watering, so if you will be gone over a week, plan to have a neighbor hook up your hose and do a little supplemental watering.

**CUT.** Mow your lawn a day or two before your leave. Use the same cutting height that you normally do. Don't lower the mower blade for a 'closer shave'. Doing so could easily cause sun scald and damage. If you plan to be gone more than a week, it would be a good idea to arrange to have a friend or neighbor mow the lawn for you. Prune hedges and other plants likely to get gangly by the time you return. Be sure that walks and flower beds are neatly edged before your departure. A buildup of growth while you are away will be difficult to manage on your return.

**MULCH.** Mulching helps conserve valuable moisture needed for plant growth while you are at home or away. Choose a clean mulch, free of weed seed, and one which will remain loose and well aerated. Consider grass clippings, pine bark, compost, or a variety of other organic materials. Mulching will also reduce or eliminate the weeding problem (see chart).

**CHECK FOR INSECTS AND DISEASES.** Spray, if necessary, for insects and diseases, to prevent a buildup of pests during your absence. Summer insects and diseases do not take a vacation, and will work overtime on your healthy plants. This goes particularly for chinch bugs. Make sure you have applied chinch bug control to your St. Augustine lawn, or you just might find it severely damaged by this little critter when you return.

**HARVEST.** Pick all ripe or nearly ripe fruit and vegetables. If you will be gone over a week, arrange for a friend to pull and use produce. Vegetables left unpicked will frequently cease to bear.

**MAINTAIN EQUIPMENT.** Take lawn and garden equipment by the repair shop if needed. They will have it ready by the time you return.

**PROTECT PROPERTY.** Arrange for a neighbor to pick up newspapers, or ask the paper delivery service to hold them until you return. Newspapers scattered over the front lawn are a dead giveaway that no one is home. Lights on a timer are a good idea, and can provide an impression that someone is home.

## MUCH TO DO WITH MULCH

**Ground Bark.** Inexpensive, attractive, long lasting. Available in chip size or finely ground.

**Peat Moss.** Expensive and somewhat difficult to prepare. Initially attractive, but it can dry out, lose aesthetic appeal, and shed water.

**Pine Needles.** Durable, resist wind disturbance, locally abundant. Potential fire hazard when dry.

**Grass Clippings.** Available to most gardeners. Mat quickly, generating heat; disagreeable results if initial application is too thick. Spread thinly, allow to dry before applying to the garden. Do not use fresh clippings in your garden.

**Straw.** One of the best choices. Long lasting, can reduce moisture evaporation by as much as 70 percent. Will deplete soil nitrogen, which should be replaced by adding nitrogen fertilizer or blood meal.

**Sawdust.** Easily obtainable in many areas. Easy to handle, but can severely deplete nitrogen if not well rotted and aged. Supplemental nitrogen fertilizing may be necessary.

**Plastic Film.** Black polyethylene film is an excellent mulch, but unattractive where aesthetics are a consideration (it can be covered with decorative bark). Keeps soil temperatures even, eliminates weeds entirely. Punch holes in it for water penetration.

**Newspaper.** Readily available, builds humus. Can be used shredded or in sheets to desired thickness. Can be held in place by rocks, bricks, soil, etc., and covered for better appearance. The ink actually contains trace minerals beneficial to plant growth.

*From an article by Wayne R. Pianta,  
Former County Extension Agent, Texas  
Agricultural Extension Service*

# DRIP IRRIGATION: *Salvation for the Gardener*

*By Dr. Larry A. Stein, Extension Horticulturist, Uvalde*

I am always amazed at the number of folks who have never used drip irrigation, much less know what it is! In working with drip irrigation on day-to-day applications on fruits, pecans, and vegetables, I have come to take it for granted. However, its use is not nearly as widespread as I once thought. In this day and age, when water is in the spotlight as a critical resource, there is a great potential for water conservation using drip irrigation.

Drip irrigation, also commonly known as trickle- or micro-irrigation, is merely the precise application of water where and when plants need it. The concept is not new, as the Germans and Italians worked out the basics in the 1930s, and, according to Dr. Jody Worthington, former TAES Research Horticulturist who did extensive research on drip irrigation, Texas Extension specialists in the 1940s were showing growers how to make concrete lines to sub-irrigate gardens from windmills. However, it took the development of UV-light resistant plastic pipes and fittings to make drip irrigation practical for home gardeners.

The greatest selling point for drip irrigation in its earliest applications was that great savings in water could be realized. Some sources claimed plants under drip required only a third as much as water as usual. These erroneous assumptions have caused tremendous headaches in the industry. A plant's water requirements are the same *regardless* of how the water is applied. Initially, water savings are realized when plants are small, and only a small volume of soil must be wet. However, as plants grow, more and more soil volume must be wet for drip to be effective. The real conservation features of drip irrigation come from the precise application of water and minimal runoff, less evaporation from an essentially closed system, and less water lost to weeds and undesirable plants, since the system is placed exactly where the desirable plants need it.

The basic component parts of a drip irrigation system are as follows: (1) water source (well or city), (2) filter, (3) delivery lines, and (4) emitters. The water source used will dictate the amount of filtration needed. If the water is sandy or dirty or from an open pond, there is a greater need for

filtration as opposed to using city water. Although it is best to filter city water, it can often be used unfiltered without too much problem. However, the life of the lines and emitters can be prolonged using filtration.

Basically there are two types of drip emitters. In one, the water path is very long thus reducing the amount of water which comes out of the emitter. The other type utilizes a very tortuous or crooked path. Emitters are also designed to be either low- or high-pressure. Low-pressure emitters usually apply one to two gallons per hour at operating pressures of 2 to 5 psi, whereas high pressure emitters typically apply one gallon per hour at 15 psi. Such devices can be purchased or made. Considering the low cost of emitters, it is best to purchase them. They can be placed at the desired spacing along a poly hose, or hose can be purchased which already have holes or emitters within. Three common types are Bi-wall, At@ tape, and Ram tubing. The hose with preformed holes works extremely well for garden applications. Spacing between holes varies with the product; 12-, 18-, and 24-inch spacing is common. There are many drip irrigation products on the market. All are basically good, and there is no great advantage of one over another, but regardless of how good the products are, they all eventually stop up. Drip systems must be maintained and cared for, as with other water systems; hence, it is best to leave the emitter and loops on top of the ground so they can be checked regularly.

The most practical applications for drip irrigation in the home landscape are in gardens, hedge rows, shrub or flower beds, and combinations of these along with trees. The key to making drip irrigation work in home landscapes is in scheduling -- knowing when and how long to water. The best absorptive roots for most plants are in the top 6 to 12 inches of the soil, since this upper soil area contains a lot of oxygen. The deeper one goes into the soil, the less oxygen is present, and root growth is less. In order for water to be absorbed by the plant, oxygen must be present. If oxygen

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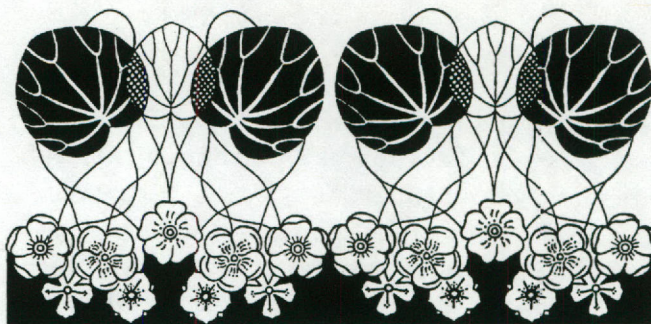
is not present, plants cannot take up water, and the roots will drown if the saturated conditions continue. An irrigation system should never be operated for longer than 8 to 12 hours a day. In no case should the system be turned on and forgotten. Some turn the system on for 24 hours, or until the water reaches the surface (buried systems), and then leave the system off for several days. Such operations present extreme wet and dry periods which are deleterious to plant growth. An ideal situation is to maintain uniform moisture and oxygen in the soil.

In garden applications, the hose with holes is laid down the plant row. One hose will work for two rows of vegetables, or emitters can be placed at each transplant. Either way, the plants or seeds are well watered at planting, and then left alone until regular growth begins, unless it is very dry. The system should maintain uniform moisture down the plant row. If saturated conditions occur, the time interval between watering will need to be increased. Generally speaking, when using drip around hedges, one emitter per plant is sufficient. The hose and emitters are placed around the shrubs at planting, and are used to maintain uniform moisture as needed. The hose can be tied into lawn sprinkler systems or operated manually. Hose with holes, hose with emitters, or micro-sprinklers can be used for flower beds. Basically, the size and shape of the bed will dictate the system employed. Remember to water early in the morning to avoid excess humidity and disease pressure. Tree applications begin with emitters but are usually best served later with micro-sprinklers. As the best absorbing roots are at the dripline of the trees, the emitters need to move out as trees grow. This requires hose loops with emitters, which can cause problems with maintenance operations. Hence after 5 years, micro-sprinklers which wet the area covered by the canopy of the tree work best. Micro-sprinkler heads can be changed as the tree grows, to provide greater water coverage. The key with trees is to wet as much of the tree root system as possible, but maintain water in the top 18 to 24 inches of the soil.

Drip irrigation is a wonderful, labor-saving and water-conservation device for the home owner. For some, such devices have been the salvation for their gardening efforts. Many wish they had discovered it years ago, and wonder how they made it before. Most large nurseries and seedsmen carry drip irrigation kits, which can be purchased to get a feel for how the system works. These same folks carry supplies to upgrade and increase the range of your drip irrigation system.

# LANDSCAPE DESIGN Study Course II

*September 27-29, 1999*



The Landscape Design Study Courses are a series of four courses offered approximately six months apart in the Bryan-College Station area. They are accredited by the National Council of State Garden Clubs, and cosponsored in Texas by the Texas Agricultural Extension Service. Although the courses are a four-part series, participants may begin with any of the four. Master Gardeners are finding the courses a logical extension of their training and a good opportunity to receive in-depth information in the field of landscape design.

Course II is being offered September 27-29, 1999 at the Brazos Center in Bryan. Subjects to be addressed at Course II include: History of Landscape Architecture, The Private Garden, Landscape Architecture Design Process, Plants in Composition, Site Design and Ground Forms, Art and Nature Appreciation, Introduction to Urban Design, and a special-interest lecture on Making Organic Gardening Work for You. Faculty are selected from the Department of Landscape Architecture at Texas A&M University, horticulturists, planners, and professional landscape architects. Of special interest for Course II will be two lectures by Dr. Neil Odenwald, Professor Emeritus and former head of the Department of Landscape Architecture at Louisiana State University.

Registration information for the course may be obtained from Lenora Sebesta [(409) 845-7341 in the Extension Horticulture office] or Jacque Hand [(409) 845-7692 or (409) 845-8904 in the office of Conferences and Short Courses at Texas A&M University]. Rooms are being reserved at several local motels for participants.

# BT FOR WORM CONTROL

This article appeared in "Texas EARTH-KIND™ Landscape and Gardening Guidelines," published by the Texas Agricultural Extension Service, The Texas A&M University System, College Station.

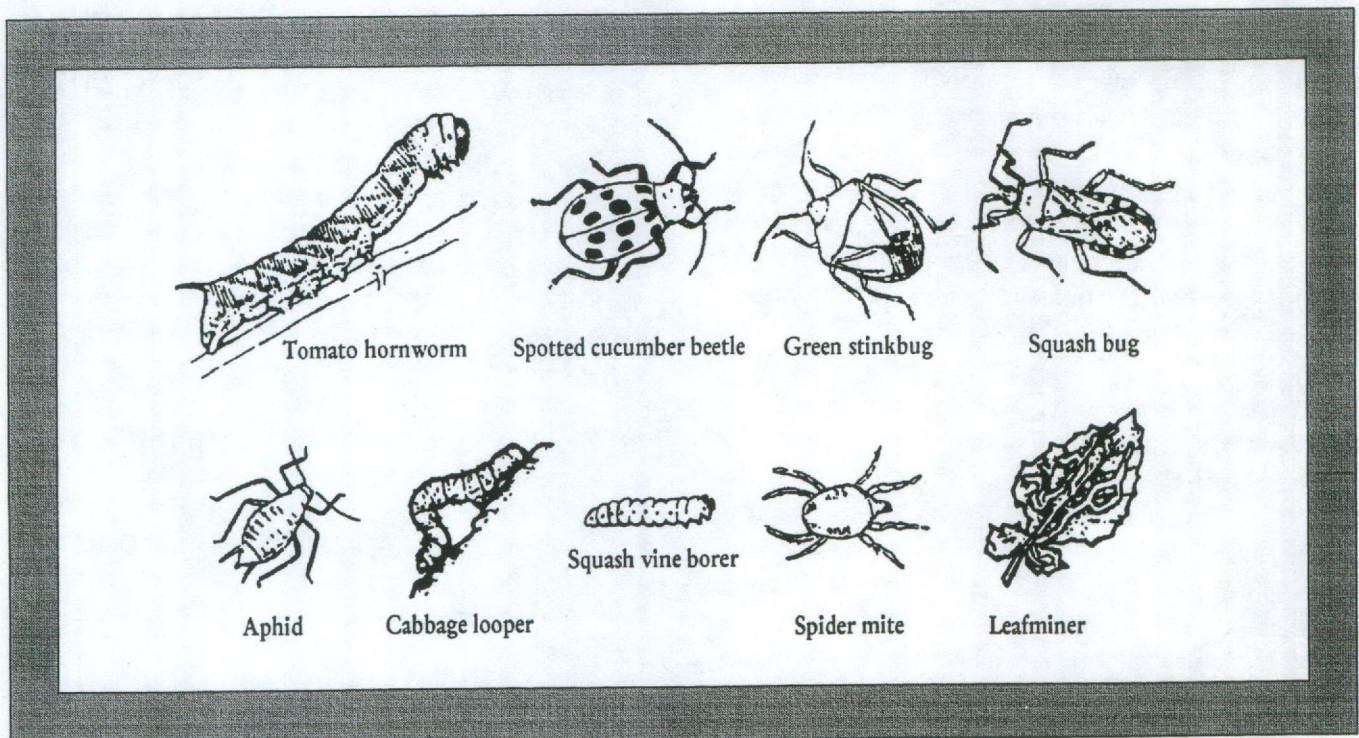
People are afraid of pesticides! We **should** respect pesticides because **they are poisonous**; if they weren't, they would not kill bugs! Still, people want to rid their plants of those creeping, crawling critters called worms (which are actually insect larvae) that devour plants day and night. Good news! There is a pesticide available which kills worms but is not poisonous to man or beast. The worm killer is the bacteria *Bacillus thuringiensis*, or BT for short.

When ingested, BT produces within the cells of its victims a toxic substance. Only certain species of caterpillars are affected by BT, and the infection only occurs when the caterpillars feed on desirable plant foliage protected by BT. Adult insects which feed mainly on plant nectar are not affected. So, only the bad, destructive caterpillars are killed; the good bugs are spared.

is gut paralysis. Of course, this means an immediate cessation of foliage eating, which is a desirable result for the preservation of plants. But BT does not stop there. Eventually, it causes a breakdown in the gut wall and leakage of contamination into the body cavity of the larvae (caterpillar victim). The body cavity tissues of a caterpillar are bathed by blood in an open circulatory system, and the larval blood offers an ideal growing medium for BT. This BT contamination produces spores which divide rapidly. In fact, new generations of spores are produced every 20 minutes; after just 12 hours, one spore can produce over 6 billion new BTs. Obviously, this many new BTs needing nourishment from the innards of a caterpillar soon has a devastating effect.

BT is not a merciful killer. Death is slow and painful. The first symptom experienced by a BT victim

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A BT ingestion is deadly. All larvae infected either become sick and die or are permanently incapacitated. This is because insects do not have effective immune systems such as those present in humans and other mammals. In theory, the lack of an effective immune system dictates that the susceptible species will not develop resistance to BT.

Outward manifestations of BT infection in caterpillars are changes in behavior, color, and morphology. As soon as they are infected, the larvae quit feeding. They usually move from their normal feeding sites to exposed leaf surfaces. Before dying, they become sluggish and discolored, and usually exhibit regurgitation and diarrhea. The cadavers of large larvae become limp, but they do not 'liquefy' as do viral-infected larvae. Cadavers of small larvae are often difficult to find because they turn black and become shriveled.

Usually one taste of BT is enough to destroy susceptible larvae. However, in some instances, larvae may not die from BT, but suffer a fate worse than death, such as:

- A predisposition to other naturally occurring pathogens, such as other bacteria, fungi, and viruses.
- Starvation due to digestive track disruption.
- Failure to pupate due to physiological malfunctions.
- Enhanced susceptibility to predators and parasites as a result of sluggish movement and migration to exposed leaf surfaces.
- Increased sensitivity to harsh climatic factors, such as high or low temperatures.
- Reduced reproductive potential. Infected larvae that do successfully mature into adults are abnormally small and weak. They are significantly less fertile than normal adults, and incapable of successful mating. That alone could be considered a fate worse than death!

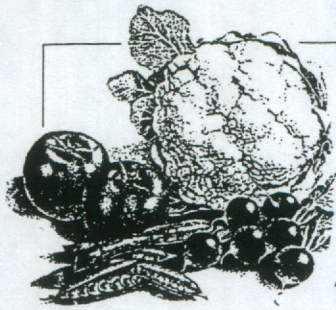
Anything which causes as many horrible symptoms as BT does should certainly be feared. It is feared by susceptible caterpillars, but only susceptible caterpillars have the necessary combination of pH, salts, and enzymes in their digestive system needed to activate BT. The alkaline pH (greater than 7.0) gut of susceptible caterpillars activates BT. Acid gutted (stomached) creatures, such as humans and other mammals, cannot be affected in any way.

BT was discovered in 1915 by a German named Berliner. He isolated this unique pathogen, which he named *Bacillus thuringiensis* after the German region Thuringia. BT is a naturally occurring bacterium that causes a deadly disease specific to certain lepidopterous (caterpillar) insects.

BT products do not have any of the hazards sometimes associated with chemical insecticides. As a naturally occurring pathogen, BT is biodegradable in the environment. It is rapidly inactivated in soil below a pH of 5.1. Rainfall, exposure to sunlight, and, in some cases, the type of foliage on which it is sprayed may cause BT spores and crystals to lose their viability over time. The bacteria may remain effective for as long as 22 days, or may become ineffective after 24 hours, depending on conditions. Under normal conditions, BT products are active for 3 to 7 days after spraying. In comprehensive spray programs on some crops, repeated application is recommended at regular intervals.

BT is available in local nurseries under the brand names of Thuricide, Dipel, Bactus, Biological Worm Control, Leptox, SOK, Novabac, and Tribacture. Since BT is such an effective plant-damage deterrent, it should be spread around -- especially on the surface of leaves -- using a mix of one teaspoon of liquid soap per gallon of spray mix. The soap breaks the surface tension on the leaf's surface and allows the BT product to spread evenly. This allows more leaf area to have BT's protection.

So, now you can rid plants of those devastating worms without endangering yourself or your environment, a truly EARTH-KIND™ practice.



# Harvest for Highest Quality

*This article appeared in "Growing Fall Vegetables and Annuals in Texas," produced by the Texas Agricultural Extension Service, College Station.*

*Many gardeners do not know when to harvest homegrown vegetables. Proper harvesting at the right stage of growth is essential for good yields of high quality vegetables from the fall garden.*

**Bean, snap** - when pods are nearly full size but before seeds begin to show appreciable enlargement.

## **Beets**

**greens** - when leaves are 4 to 6 inches long.

**tops and small beets** - when beets are 1 to 1-1/2 inches in diameter.

**beet roots only** - when roots are 1-1/2 to 3 inches in diameter.

**Broccoli** - when flower heads are firm and fully developed, but before individual flowers start opening; cut 6 to 7 inches below flower head.

**Brussels sprouts** - when buds along the stem become solid, and thereafter as higher buds become firm. Remove leaves along stem to hasten maturity.

**Cabbage** - when heads become solid; to prevent splitting of mature heads, twist plants enough to break several roots, and thus reduce water uptake from the soil; excessive water uptake causes splitting.

**Carrots** - when roots are 3/4 to 1 inch or more in diameter; during cool, dry periods, leave carrots in the ground for later harvests.

**Cauliflower** - when curds (heads) are 4 to 8 inches in diameter but still compact, white, and smooth; exclude sunlight when curds are 2 to 3 inches across by covering them with an inverted cabbage leaf (this may need replacing once or twice), or by loosely tying the outer cauliflower leaves together above the curd; curds exposed to sunlight rapidly become discolored, rough in appearance, and coarse in texture.

**Chard** - thin and use small plants when they become 6 to 8 inches tall; thereafter remove only outer, older leaves when 8 to 10 inches long; new leaves continue to grow for a continuous harvest of young, tender chards.

**Collard** - break off older, lower leaves when they are 8 to 12 inches long; new leaves continue to grow for a continuous harvest.

**Kohlrabi** - when bulbs (thickened stems) reach 2 to 3 inches in diameter.

## **Lettuce**

**leaf forms** - when older, outer leaves are 4 to 6 inches long.

**heading forms** - when heads are moderately firm, and before seed stalks start; take older, outer leaves from either leaf or head lettuce as soon as these leaves are 4 to 6 inches long; new leaves provide a continuous harvest of tender, tasty leaves until excessive cold weather.

**Mustard** - when older, outer leaves are 6 to 8 inches long; new leaves provide continuous harvest until leaves are strong in flavor and tough in texture from hot weather.

**Parsley** - when older leaves are 3 to 5 inches long; continue to take older, outer leaves for fresh, tender parsley until heavy frosts in early winter.

## **Peas**

**regular varieties** - when pods are fully developed but still bright green.

**edible-podded varieties** - when pods are fully developed but before seeds are more than one-half full size, if pods are to be eaten; harvest when seeds are fully developed but still fresh and green, if pods are to be discarded.

**Potato** - when tubers are full size and have a firm skin; new potato tubers may be dug at any size, but generally are not harvested before the tubers are 1-1/4 to 1-1/2 inches in diameter.

**Radish** - when roots are 3/4 to 1-1/2 inches in diameter, thin radishes to 1 inch between plants, to insure rapid, uniform growth and crisp roots.

*(Continued on Page 9)*



# MANURE

## *Is it Safe for your Garden?*

*This article by Van Bobbit and Dr. Val Hillers appeared in "Down the Garden Path Newsletter," published by Purdue University.*

Pathogens (microorganisms which cause disease) can be transferred from animal manures to humans. The pathogens *Salmonella*, *Listeria*, and *E. coli*, as well as parasites such as roundworms and tapeworms, have been linked to applications of manure to gardens. Publicity about illnesses due to *E. coli* 0157:H7 has made people more aware of the potential risk of foodborne illness from manure contamination. As a result, many are now asking whether it is safe to use manure on their gardens.

In August 1993, *The Lancet* medical journal reported on a small *E. coli* 0157:H7 outbreak that appeared to be the result of manure applications to a garden. The gardener ate eggs and milk products, but no meat, and her diet relied heavily on vegetables from her garden. She fertilized the garden all summer with manure from her cow and calf. No *E. coli* 0157:H7 bacteria were isolated from fecal samples taken from the cow and calf; however, the animals did have antibody counts for the pathogen, suggesting they had been previously infected. *E. coli* 0157:H7 was isolated from the manured garden soil.

So, how risky is the use of manure in gardens and compost piles? If you use fresh manure in the garden, there is a risk that pathogens which cause disease may contaminate garden vegetables. The risk is greatest for root

crops, such as radishes and carrots, and leafy vegetables, such as lettuce, where the edible part touches the soil. Careful washing and/or peeling will reduce some of the pathogens responsible for the disease. Thorough cooking is most effective.

To reduce the risk of disease, we suggest these precautions:

- Use only aged or composted manure in the garden.
- Never apply fresh manure after the garden is planted.
- Thoroughly wash raw vegetables before eating.
- Do not use cat, dog, or pig manure in gardens or compost piles, because some of the parasites which can be found in these manures may survive, and remain infectious to people.
- People who are especially susceptible to foodborne illnesses [pregnant women, very young children, and persons with chronic diseases, such as cancer, kidney failure, liver disease, diabetes, or AIDS] should avoid eating uncooked vegetables from manured gardens.

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### *Harvest for Highest Quality (Continued from Page 8)*

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**Spinach** - when larger leaves are 4 to 6 inches long; pull larger whole plants or harvest older leaves, and allow new growth to develop.

**Squash, winter types** - when fruits are full size, the rind is firm and glossy, and the bottom of the fruit (portion touching the soil) is cream to orange colored; light frost will not damage mature fruits.

**Sweet potato** - late in the fall, but before the first early frost; lift to avoid cuts, bruises, and broken roots; cure in a warm, well-ventilated place for 2 to 3 weeks, and store in a cool, dry place.

**Turnip** - when roots are 1-1/2 to 3 inches in diameter, but before heavy frosts in the fall.

# TEXAS MASTER GARDENERS™

Over the past decade, Texas Master Gardeners have established themselves as a premier corps of volunteers serving Texas citizens. A love of gardening and search for knowledge are the catalysts by which Texans from every walk of life enter the Master Gardener program.

Master Gardener "Interns" complete at least 50 hours of training, and have one year to complete a minimum of 50 hours of volunteer service to become a certified Master Gardener. They may be recertified every two years by fulfilling 12 hours of training and 12 hours of volunteer service.

Master Gardeners now respond to the vast majority of telephone calls to Extension offices in urban areas of Texas. They also have a Master Gardener web page, and assist in answering tens of thousands of home gardening questions each year. Speakers' bureaus are provided by many Master Gardener programs; these public presentations deliver research-based information to garden clubs, civic clubs, and other community organizations.

Master Gardeners provide leadership and support to educational programs targeted at critical issues, including youth development, environmental stewardship, solid waste management, and water conservation. Master Gardeners have successfully plowed new ground in preparing youth for the future by teaching academic and life skills via gardening. Master Gardeners provided coordination and expertise to over 500 School Gardens in 1998. Our Lady of the Lakes University submitted their research findings on the impact of the Bexar County Master Gardener Classroom Garden Project on youth participants. All youth from every economic and cultural background showed advanced life, leadership, and academic skills, increasing their knowledge and awareness from exposure to this project.

## JUNIOR MASTER GARDENERS™



Stemming from Extension's tradition of youth-development excellence and the commitment and zeal of Master Gardeners to share their knowledge and love for gardening with youth, a new and ambitious youth-gardening program is underway: the Junior Master Gardener™ program (JMG™). This program will mirror its senior counterpart by providing in-depth horticultural and leadership training to youth gardeners, who then return volunteer service to the community.

The JMG™ program will use a specially developed curriculum to enhance the academic, life, and leadership skills of youth gardeners, while meeting TEKS and TAAS requirements of the schools. JMG™ Handbooks, Leader's Guides, garden facilities, and youth gardeners will sprout up in after-school child care programs, classrooms, 4-H clubs, and home-school groups. The program is on the fast track to success, fueled by over \$400,000 in grants from private foundations that believe gardening can help prepare Texas children for the future. The JMG™ program will debut in the fall, 1999.

In 1987, Texas had only 6 county Master Gardener programs. The number has grown to 48 local Master Gardener programs, including the only collegiate program in the nation, the Aggie Master Gardeners at Texas A&M University. Through the lasting dedication of Master Gardeners, Extension has multiplied its efforts, continues to expand educational programs to new audiences across the state, and has helped to improve the quality of life for Texans.



### 1998 Texas Master Gardener Activities

Total volunteer hours: 204,666  
 Full-time employee equivalents: 98  
 Economic value to Texas citizens: \$2,865,324  
 School gardens: 536 projects reached 53,669 (49 percent ethnic minorities)  
 Telephone inquiries: 105,317  
 Speaking engagements: 1,271 presentations reached 28,505 citizens  
 Environmental projects: reached 219,087 citizens

| Year | Master Gardeners | Total Volunteer Hours |
|------|------------------|-----------------------|
| 1990 | 730              | 29,836                |
| 1991 | 1,203            | 43,596                |
| 1992 | 1,475            | 36,293                |
| 1993 | 1,617            | 54,349                |
| 1994 | 2,293            | 95,621                |
| 1995 | 2,671            | 117,764               |
| 1996 | 3,500            | 202,179               |
| 1997 | 4,115            | 182,975               |
| 1998 | 4,660            | 204,666               |

# Garden Checklist for June

By Dr. William C. Welch, Landscape Horticulturist

- ✓ Take a critical look at your landscape while at the height of summer development. Make notes of how you think it can be better arranged, plants that need replacement, overgrown plants that need to be removed, and possible activity areas that can be enjoyed by family members.
- ✓ Check for insects and diseases. Destroy badly infested plants. Spider mites can be especially troublesome at this time. Select a chemical or organic control, or use insecticidal soap.
- ✓ Supplemental irrigation is essential for many ornamental plants such as coleus, caladium, geranium, dahlia, azalea, and camellia during the hot dry summer days ahead. Water lawn and garden thoroughly, but not too frequently. As a general rule, soak to a depth of 8 inches. Finish watering by early afternoon, to lessen the chance of disease.
- ✓ During the summer, soil moisture becomes extremely important and essential for good plant production. Because continual watering is oftentimes costly and time consuming, it pays to conserve the moisture around plants. This is best done by mulching. A good mulch will retain valuable moisture needed for plant growth, and improve overall gardening success. Mulches are usually applied 2 to 6 inches deep, depending on the material used. In general, the coarser the material, the deeper the mulch. For example, a 2-inch layer of cottonseed hulls will have about the same mulching effect as 6 inches of oat straw or 4 inches of coastal Bermuda hay.
- ✓ There is still time to plant some of the colorful, heat-tolerant summer annuals. Direct-seed zinnias and portulaca, and purchase plants of periwinkle, salvia, marigold, and purslane. Be sure to water transplants as needed until roots become established.
- ✓ Removing faded flowers from plants before they set seed will keep them growing and producing flowers. A light application of fertilizer every 4 to 6 weeks will also be helpful.
- ✓ House plants can be moved out of doors this month. Sink the pots in a cool, shaded garden bed to prevent them from drying out so quickly; water pots, container plants, and hanging baskets often. Monthly feedings with house plant fertilizer will encourage continued growth.
- ✓ Now is the time to plan for next spring. Consider digging and dividing any crowded spring bulbs. Once the bulbs have matured and the foliage has turned brown, it is time to spade them up and thin out the stand. Crowded bulbs produce fewer and smaller blooms. They usually need thinning every 3 to 4 years.
- ✓ June is the time to select daylily varieties as they reach their peak of bloom.
- ✓ Fertilize roses every 4 to 6 weeks. Apply a high-nitrogen fertilizer immediately after a flush of bloom.
- ✓ Continue to spray susceptible roses with a black-spot control such as Funginex every 7 to 10 days.
- ✓ Re-blooming salvias, such as *Salvia greggii* and *S. Farinacea*, should be pruned back periodically during the summer. To make the job easier, use hedging shears, and remove only the spent flowers and a few inches of stem below. Fall-blooming perennials, such as Mexican marigold mint (*Tagetes lucida*), chrysanthemums, physostegia, and *Salvia leucantha*, should be pruned in the same manner during the summer to keep them compact, reducing the need for staking. This type of pruning should be completed prior to September 1, since flower buds begin forming about that time.

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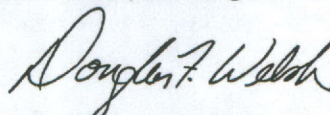
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Douglas F. Welsh, Editor for June 1999