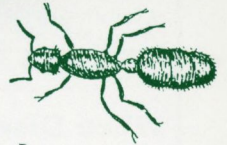
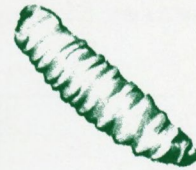




LAWN & LANDSCAPE Digest



Grass Attacks!



"Grass Attacks" was suggested as a title for an article I wrote for the latest edition of *EASY LAWN & GARDEN* magazine. I liked it and hope that the editor, Ed Montague, doesn't mind me using it for *LAWN & LANDSCAPE DIGEST*. Be on the lookout this summer for Grass Attacks—the many "critters" that can cause lawn problems: diseases and insects that plague lawns during the late spring and summer months.

—James R. Brooks, Editor

Stay Alert For Signs of Turfgrass Disease



A healthy lawn is generally a disease free lawn. In fact, lawn diseases rank a distant third in terms of lawn spoilers. Weeds are first and insects second (see the box on this page). But disease is responsible for the destruction of many a lawn, and once a disease takes hold it can be tough to get rid of. Early detection is the best remedy.

Several fungus diseases are common on lawns. Symptoms of different diseases may at times be quite distinct and at other times quite similar, but diseased grass is always conspicuously inferior in appearance when compared with healthy turf.

Is My Lawn Diseased?

Even a well-maintained lawn can have some disease activity, but it often goes unnoticed as healthy lawngresses overcome and out-grow the problem.

Poor cultural practices, however, often weaken

Continued next page

BUGS, BUGS, BUGS

Can Insects Be Kept Out Of Lawns?

Lawn insects are here to stay. Many insects live out their often complex life cycles within the lawn, and at some stage in their development some insects feed on grass plants and may cause damage. That's where a homeowner can have a problem. Whether or not insects damage a lawn often depends on the insect population.

There are always some within the turf canopy, within the thatch and within the root zone. Healthy, vigorous lawns can withstand a few insects chewing on leaves, stems or roots or sucking on leaf sheaths and still have sufficient vigor to grow new leaves and roots. But when a lawn is overrun with hordes of hungry "critters", the damage done can so weaken growth centers and crowns that plants eventually die. Unfortunately, weeds are seldom bothered by either diseases or insects and often gain entrance to a lawn as grasses weaken or die out as a result of a slow developing insect infestation.

Some Like It Hot

Insects thrive in hot summer weather. It helps to think ahead and to stop the problem before it starts by seeding your lawn with new improved varieties that are more insect resistant than the common varieties. Use mixtures or blends of quality lawnseed (which usually have greater resistance than a single variety alone). It also helps to follow proper maintenance practices with mowing, fertilizing, watering, soil cultivation and thatch removal. When these are all done in concert, increased vigor of the lawn leads to greater insect resistance.



See "Getting Rid Of Lawn Insects, page 5

When Diseases Strike Warm-Season Turfgrasses

	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
BROWN PATCH												
PYTHIUM BLIGHT												
SPRING DEAD SPOT												
GRAY LEAF SPOT												
RUSTS												
TAKE ALL PATCH*												
DOLLAR SPOT												
HELMINTHOSPORIUM DISEASES												

*The timing of Take all patch varies by climate. The fungus is active during the rainy seasons and symptoms become visible when the dry (and/or hot) season gets started.

When Diseases Strike Cool-Season Turfgrasses

	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
DOLLAR SPOT												
BROWN PATCH												
PYTHIUM												
HELMINTHOSPORIUM DISEASES												
ANTHRACNOSE												
NECROTIC RING SPOT												
SUMMER PATCH												
RED THREAD												
SNOW MOLDS												

■ FUNGUS MOST ACTIVE

■ PERSISTANT SYMPTOMS OFTEN STILL VISIBLE

LAWN & LANDSCAPE Digest

Editor James R. Brooks

Graphic Design Raymond Gibson

Circulation Melissa Marlin

Editorial Committee

Dr. Doug Brede
Scott Harer
Nancy Junk
Dr. Jerry Peppin
Kevin Smith
Victoria Wallace

Proprietary Members

Advanta West, Inc.
Cenex Supply & Marketing Co.
Jacklin Seed Co.
Lofts Seed, Inc.
Medalist America
Pennington Seed Co.
Peterson Seed Co.
Pickseed Wes, Inc.
Research Seeds, Inc.
Turf Cultivars Associate Growers
Turf Merchants, Inc.
Turf-Seed, Inc.
Zajac Performance Seeds

Be On The Alert For Grass Attacks

Continued from first page

lawngrasses. Too much water, not enough water, too much fertilizer, not enough fertilizer, inadequate use of lime, soil compaction, and over use of pesticides can make a lawn susceptible to diseases.

So how do you tell if your lawn is diseased? A good way is to inspect the lawn in early morning, when grass blades are wet with dew, for signs of fungus growth. Look for web-like formations within the leaf canopy. Some fungi that produce these webs do not infect the grass, so look closer for evidence that active fungus growth is causing a spot or lesion or injury to leaf blades, stems, or crowns of the grasses. Early identification of fungus activity is essential if fungicides are going to be effective in stopping the spread of the disease.

Prevention Tips For Common Lawn Diseases

BROWNPATCH- All grass species are susceptible. It is a common, summertime

disease of cool season grasses. In warm season grasses, it is more severe in the fall and can cause extensive damage during cool, wet periods prior to entering winter dormancy. Symptoms vary according to the species of grass.

On closely mowed grass, patches are roughly circular and a dark "smoke ring" of fungus spores show around the edge of the pattern. Cultural practices that reduce Brown Patch include: avoiding fertilizer applications when the disease is active, increasing mowing height, watering early in the morning, improving drainage, aerating to improve root development, and creating better air circulation by thinning out some trees or shrubs by selective pruning of branches to give more air to the lawn.

DOLLAR SPOT - Susceptible grasses include bentgrass, bluegrass, centipede, fescues, perennial ryegrass, St. Augustine, and zoysia. Symptoms again vary by species. On fine-textured grasses maintained at a low mowing height, it appears as small, circular, straw-colored spots about the size of a silver dollar.

On coarser textured grasses at higher mowing heights, patches are larger and irregularly shaped. Grass blades die back from the tip and have straw-colored spots

shaped like an hourglass. The spots are highlighted on the healthy part of the grass by a distinctive narrow brown, purple, or black band. Dollar Spot is prevalent in late spring -early summer and again in the fall. It is more damaging in poorly nourished grass, especially if soils are dry and high humidity or heavy dew are present.

Cultural practices that reduce disease pressure include avoiding drought stress, watering deeply once a week or so during the early morning hours so foliage dries quickly, maintaining a balanced fertilization program, and controlling thatch and compaction. Fungicides labeled for Dollar Spot generally provide effective control when applied properly at the right time.

PYTHIUM-COTTONY BLIGHT - Susceptible grasses include creeping bentgrass, annual bluegrass and perennial ryegrass. Circular reddish-brown spots appear in affected areas. When the grass is wet, infected leaf blades appear water-soaked and dark, and may feel slimy.

As they dry, the blades shrivel and turn reddish brown. A purplish-gray or white and cottony fungal growth may be visible on the outer margins of the spot. Root-infecting *Pythium* species may cause damage in irregularly shaped areas.

The grass turns yellow or reddish-brown and symptoms may mimic Melting Out or Anthracnose. Warm season *Pythium* attack the foliage and are active during periods of high humidity, night temperatures above 70 degrees, and abundant surface moisture. The disease is generally more severe in shaded areas, low spots, or near water where circulation is poor.

Water management is a key to minimizing disease severity. If you need to water, do it early in the day to avoid moist foliage at night. Improve drainage in low areas and increase air circulation to the lawn by selective pruning of trees and shrubs.

HELMINTHOSPORIUM DISEASES AND MELTING OUT - Susceptible grasses include bentgrass, buffalograss, bermuda, bluegrass, fescues and perennial ryegrass. Symptoms range from leaf spots and blotches to crown and stolon rots. During the leaf spot phase, distinctive purplish-brown spots with tan centers are found in older leaves.

During favorable conditions of cool, wet weather, the spots may increase in size to encompass the entire width of the grass blade, causing a dieback from the tip. If the disease remains active, successive layers of leaf sheaths are penetrated and the

Using Lawn Fungicides

In spite of preventive cultural practices, plant disease sometimes still occurs. Fungicides are the most commonly used pesticide for disease control. There are many different formulations designed to control specific diseases listed on the label. Therefore, proper identification of the disease problem is critical for effective control.

As you can tell by the descriptions of the most common fungus diseases, it is often difficult to make sure which problem you have. If in doubt, we suggest you contact a professional lawn care or pest control company for assistance and proper selection of chemical control. Timing of fungicide applications is also critical. Applying the chemical after symptoms are seen may be too late to provide adequate control.

If you're certain of the disease diagnosis, make sure you purchase a fungicide that specifically lists it on the label. For instance, a fungicide that controls *Pythium-Cottony Blight* will **not** control Brown Patch. There are two basic types of fungicides available. Contact types form a protective shield on the surface of the plant that prevents or halts infection. Applied before a fungus attacks the plant, contact fungicides have the disadvantage of being exposed to weathering and mowing. In addition, new plant growth is not protected.

The other type, systemic fungicides, are absorbed by the plant and protect new growth. Systemic fungicides persist longer, often times up to 3 to 4 weeks. Timing of the application is critical for control...otherwise you're probably wasting your money.

There are a number of fungicides on the market to control different lawngrass diseases, though not all are sold in any one location. For the control of many of the common lawn diseases mentioned, look for products containing the active ingredients listed. These active ingredients are listed on the pesticide label. If you have difficulty finding brand name products having these active ingredients, consult with your local lawn & garden center, nursery, or local county extension office...the phone number is generally found under county or state offices.



DISEASE	EFFECTIVE FUNGICIDE
Brown Patch	Benomyl, captan, chlorothalonil, cycloheximide, fenarimol, iprodione, mancozeb, maneb
Dollar Spot	Thiram, benomyl, chlorothalonil, cadium compounds
Pythium-Cottony Blight	Chloroneb, ethazole, propamocarb
Melting Out	Mancozeb, chlorothalonil, anilazine, cycloheximide, iprodione
Gray Leaf Spot	Chlorothalonil
Anthracnose	Chlorothalonil, propiconazole, thiophanates, triadimefon
Rust	Anilazine, chlorothalonil, mancozeb, maneb, propiconazole, thiophanate-methyl, triadimefon, zineb
Red Thread	Anilazine, chlorothalonil, fenarimol, iprodione, triadimefon, vinclozolin
Necrotic Ring Spot	Benomyl, fenarimol, iprodione, thiophanates
Summer Patch	Same as Necrotic Ring Spot
Take-all Patch	Sulfur containing fertilizer, sulfur at 2lbs/1000 sq. ft.

Chemicals listed must be applied in accordance with the manufacturer's directions on the label...The use of certain pesticides may be restricted in some states and may not be available. This listing is not all inclusive and there may also be other products that are suitable.

Be On The Alert For Grass Attacks

Continued from page 3

crown is invaded. Once this happens, the disease enters the melting out phase showing spots with purplish margins.

The use of resistant lawnseed varieties has shown to reduce the damage caused by Helminthosporium-type diseases. Cultural practices that reduce injury include raising the mowing height at least 1/2", watering deeply but infrequently, and reducing the thatch layer. Avoid spring applications of fast release fertilizers.

GRAY LEAF SPOT - Susceptible grasses are St. Augustine and perennial ryegrass. The entire lawn may have a scorched appearance as if suffering from prolonged drought. Leaf spots first appear as tiny brown to ash-colored spots, with purple to brown margins, that enlarge and become diamond-shaped.

Spots usually have a depressed gray center and may have a velvet appearance. This is a summer disease associated with high humidity and high temperatures. If watering is needed, do so early in the morning to allow the foliage to dry quickly. Avoid fertilizer applications during the hot, humid weather. Rapidly growing grass is more susceptible, thus the reason for avoiding fertilization.

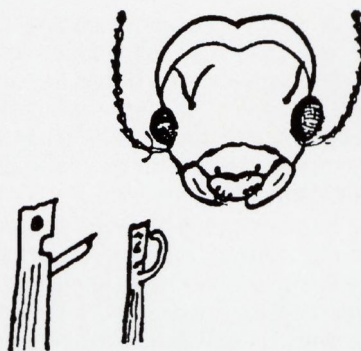
ANTHRACNOSE - Susceptible grasses are the cool-season species and centipede. The grass is affected in irregularly shaped patches and has a yellow-bronze appearance. Initially, elongated reddish-brown spots appear on the leaves. As the disease progresses, these spots enlarge and cover the entire leaf blade. You normally can see numerous black fruiting bodies, with protruding black spines on the foliage and stems. This disease is normally found where there is prolonged moist weather. Generally it is only a problem if the grass is weakened by some stress factor such as heat or low fertility.

Proper fertilization, alleviating soil compaction, traffic, and deep watering (1" per week) in the morning hours can minimize the occurrence of this disease.

RUST - Susceptible grasses are bluegrass, perennial ryegrass, and zoysia. Rust-affected grass has a yellowish to reddish-brown appearance from a distance. Closer examination of the diseased leaves reveals the presence of red, black, orange, or yellow pustules. They are most damaging to

Blades of Grass

by BC Roberts



"That's a face only a mother could love!"

poorly nourished lawns and those mowed too short.

Prolonged periods of overcast weather or shaded environments favor disease development. A balanced fertility program, deep watering, and increased mowing height are the best cultural practices for the prevention or minimizing of rust problems.

RED THREAD - Susceptible grasses are bentgrass, bermuda, bluegrass, fescues, and ryegrass. Symptoms are concentrated in circular or irregularly shaped patches from 2 inches to 3 feet in diameter. From a distance, the grass seems to be suffering from a lack of water. When there is morning dew or rain, a reddish layer of jelly-like substance can be seen on the leaves and sheaths. Infected leaves often appear water soaked.

During the final stages of the disease, bright red, hard and brittle strands are visible from the leaf tips. Red Thread is a disease of slow-growing grass, whether from a lack of fertilizer or cold temperatures. Timely application of fertilizer is the best defense to reduce damage.

NECROTIC RING SPOT - Susceptible grasses are Kentucky and annual bluegrasses, and red fescue. Affected areas have 6 to 12 inches circular to irregularly shaped patches of light tan, matted grass. On older patches, the grass at the center will often look healthy giving a "frog-eye" appearance. Because the fungus attacks the roots, plants first wilt and eventually turn straw colored. Necrotic Ring Spot occurs when wet weather is followed by warm, dry periods. The fungus is active during the spring and fall, though symptoms may not appear until summer.

Because it is a root disease, proper watering is required during the summer months when heat and drought stress the lawn. Use of slow-release and bio-organic fertilizers help to reduce disease severity.

SUMMER PATCH - Susceptible grasses are Kentucky and annual bluegrasses and red fescue. Symptoms are similar to Necrotic Ring Spot but typically appear in the warm weather of summer as yellow to bronze-colored, irregularly shaped patches. The diseased areas may take on a crescent shape or become elongated streaks over time.

Healthy grass may persist at the center of the patches, giving a "frog-eye" appearance. Leaves generally die back from the tips. To minimize summer patch, increase mowing height, apply water deeply and only when the lawn begins to show signs of wilt. Use slow-release fertilizers.

TAKE-ALL PATCH - Susceptible grasses are bermuda and St. Augustine. The diseased areas are irregularly shaped patches and the grass plants have root systems that are short and rotted. These grass areas are easily pulled or lifted from the ground. The nodes and stolens may become infected and show a brownish discoloration and rotting.

This disease is generally active during rainy periods. However, symptoms often don't appear until the lawn experiences stress from high temperatures and dry weather. Low or poorly drained areas suffer the most damage. Excessive thatch buildup and over watering contribute to disease development.

Cultural practices that improve the root system, such as improving surface and subsurface drainage, not over watering, controlling thatch buildup and a balanced fertility program reduce the probability and damage of Take-all Patch.

SNOW MOLDS - All grass species are susceptible. There are two basic types of snow molds, pink and gray. While called snow molds, snow is not necessary for disease to develop. Patches may be from a few inches to a few feet in size. The mycelium mats the leaves and the grass plants eventually collapse and die. Snow molds are active at temperatures slightly above freezing, so there's no worry about such disease now. However, abundant surface moisture allows the fungus to infect the grass when it's dormant or when growth is slow because of low temperatures. Over fertilizing in the fall can make these fungi more damaging.

BUGS, BUGS, BUGS



Getting Rid Of Lawn Insects

Early detection and identification of the insects, followed by the proper use of the right insecticide, will generally stop damage to your lawn before it becomes severe. Chemical control of insects won't in itself repair damage already done to the lawn, but the grass will often times "grow out" of the damage.

One tip: as you can imagine, many are not easy to see, so besides looking for problem insects, also be on the lookout for a larger than normal amount of birds, skunks, moles, and other small animals hanging around your lawn. This is often a sign of increased insect populations.

Insect Scouting - One way to look for certain insects is to use the pyrethrum test. This involves mixing 1 TBS. of a commercial pyrethrum preparation (containing 1 to 2% pyrethrins) in 1 gal. of water and applying it to 1 sq. yd. (3'x3') of lawn where you suspect insect activity. Or, use 1-2 TBS. of liquid dishwashing detergent in place of the pyrethrum. This brings pests like sod webworms, cutworms, and other caterpillars to the surface generally within 10 minutes. However, it does not indicate whether white grubs or billbugs are present.

Chinchbugs are difficult to spot. The best method for spotting these critters, because of their small size and tendency to hide, involves floating them on water. Take a metal coffee can, removing both ends, and press the can into the lawn to form a tight seal at the bottom. Fill with water and count chinchbugs floating after a few minutes.

A rate of twenty bugs per square foot indicates a sufficiently large population to merit use of an appropriate insecticide. Examine the soil around the roots of the grass for the white, legless larvae of billbugs or the C-shaped, legged larvae of white grubs.

Insects That Feed On Lawngrasses

The following are the most common lawn insects. Fortunately, only a few of these normally cause major damage.

ANTS - Ants are social nest-building insects. They don't directly feed on lawngrasses, but they do form mounds that may smother the grass or form tunnels that dry out root zones and otherwise disrupt the uniformity of the lawn.



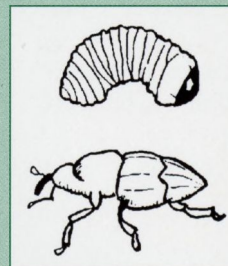
ARMYWORMS -



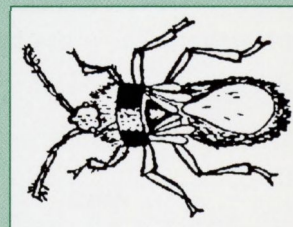
These are caterpillars about 1-1/2 in. long, having distinctive blackish stripes along the sides of a greenish body. They have a distinct inverted yellow Y on the head area. They feed on grass leaf blades, and when numerous, can eat the grass down to the ground. In many areas,

armyworms are more of a problem following a cool, wet spring...which is being experienced over much of the northern part of the country this year. Feeding occurs both day and night, but activity is greatest early in the morning or late in the evening. Treatment thresholds vary for lawns, but as few as 2 per sq. ft. should prompt consideration of insecticide control.

BILLBUGS - These are weevils (beetles) that have a snout. They can be found in nearly all parts of the country and are particularly troublesome in the north-east and midwest. Generally around late May, females lay eggs in grass stems above the crown. Larvae are small legless white grublike creatures with a yellow-brown head. They look much like a grain of puffed rice. The larvae feeds on stem tissue causing infested shoots to turn brown and die. In June, larvae move into the soil and feed on roots. They remain near the soil surface when moist. As soils dry, they go deeper. Most damage is usually noted from mid-June through July. Spring treatment of adults and early summer treatment when billbug grubs are in the soil may be required. As little as one adult per sq. ft. of lawn can make insecticide treatment desirable.



CHINCH BUGS - These insects are particularly fond of bluegrass, fine fescue, St. Augustine and bentgrass. They are small sucking insects that damage lawngrasses in all stages of development from nymph to adult. The chinch bug has a salivary fluid that is injected into the grass plant that disrupts water conduction. This causes wilt or death. Damage is heaviest in sunny locations during hot dry periods. Often this condition is thought to be the result of drought stress. Patchy bleached areas of grass are evident. In early stages chinch bugs are red with a white band on the abdomen; later in maturity, they turn orange-brown to black with white wings. They are seldom seen flying. Females start laying eggs generally in May. These develop in about two weeks.. Nymphs emerge in May and June and can grow through five growth stages in about 30 days. A second generation comes along in September with adults ready to over-winter around October.



A rate of 20 cinch bugs per sq. ft. indicates a population large enough to merit use of an insecticide. In some cases, insecticides will need to be watered in to be most effective, although the practice is not recommended in all regions of the country. Read the label carefully and follow the manufacturer's directions.

Continued next page

Insects That Feed On Lawngrasses

Continued from page 5

GRUBS - These are the immature forms of several species of beetles. Grub species that damage lawns include Japanese beetle, European chafer, northern masked chafer, southern masked chafer, Oriental beetle, Green June beetle, and Ataenius beetle. They can be found in any soil about anytime of the year. Those that feed on grass plants are usually not a problem until mid-to-late summer. Generally it takes a high grub population to cause significant damage. Fewer than 4 to 5 grubs per sq. ft. usually will not present a problem if the lawn is basically healthy.

Grubs feed on roots, so the visual damage looks like grass that needs to be watered. These infested areas do not readily respond to water because much of the root system is gone. When this type of damage is observed, digging may reveal grubs and treatment with a recommended insecticide may be necessary. To be effective, the insecticide must contact the grubs. If the soil is poorly drained or there is an excessive thatch layer, getting the control to the insect won't be easy. Pre-treatment watering helps move the grubs up nearer the surface and will enhance control. Time applications when the grubs are actively feeding in the top one-inch of the soil in the root zone.

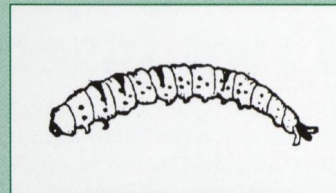
MOLE CRICKETS - These rather large insects, which can be up to 1 1/2 in. in length, are a warm-season southern pest. They have a preference for sandier soils because of easier burrowing. Their burrows look like very small mole tunnels. These burrows can uproot grass seedlings and cause soils to dry out quickly. Mole crickets are active nocturnally during warm, humid weather. As roots are consumed, grass dies out. Like grubs, a few won't do a



great deal of damage on a healthy lawn, but when several tunnels are seen in a small area, it's time to treat. Both contact insecticides and baits can provide control.

On established lawns, spray or granular applications can be used as long as they are thoroughly watered into the grass, although nighttime temperatures should be at least 60 degrees F. Baits are effective when young nymphs are actively feeding.

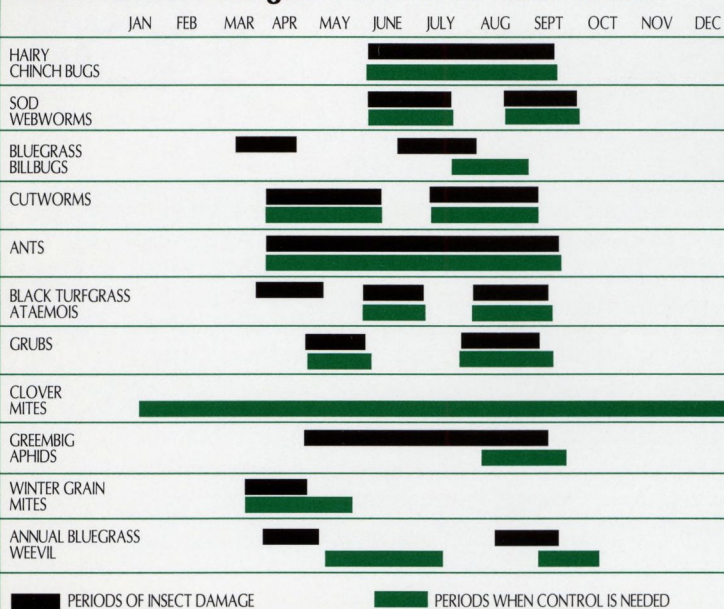
SOD WEBWORMS - These insects are particularly fond of bluegrass, bentgrass, tall and fine fescues, hybrid bermuda, and zoysia. They are the larvae of a buff-colored moth which is from 1/2 to 3/4 in. long. Wings on the moth fold close to the body at rest. A pair of snout-like projections are conspicuous on the head. Moths hide during the day and fly at dusk in zig-zag patterns. Females drop eggs randomly as they fly. The larvae develop dark brown heads, are hairy, and have dark spots on each body segment.



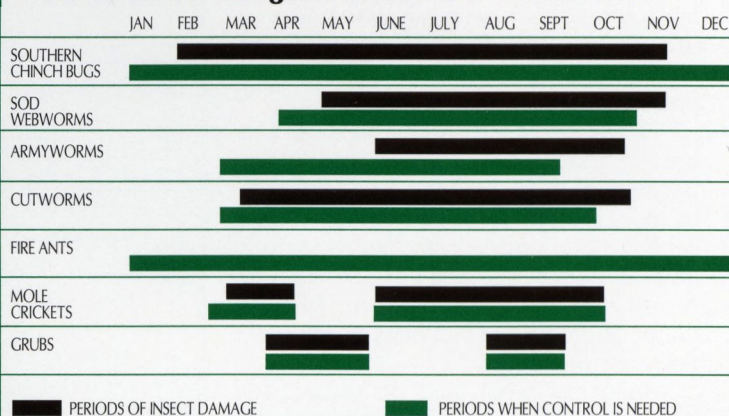
Webworms construct silk-lined burrows through the thatch and into the soil. Larval activity increases as temperatures warm in the spring. They mature from mid-May to mid-June and moths emerge during late May to late June. First generation larvae feed from late June to the end of July when a new brood of moths emerge.

There may be as many as three generations, May, July, and September. Sod webworms feed at night on grass leaves and stems. Irregular brown spots of thinned grass develop. When as many as 15 of the larvae are noted per sq. yd., use of an insecticide is generally advised. The lawn should be mowed first and the clipping removed. Water before the application of the insecticide in the late afternoon or early evening. The lawn should not be mowed for two days following treatment.

When Northern Turfgrass Insects Are Most Active



When Southern Turfgrass Insects Are Most Active



What Insecticide Will Meet Your Needs?

On a regular basis, research is conducted to determine the most effective insecticides for control of lawn insects. This research also identifies the most effective methods of application and information on timing to achieve the maximum results with maximum safety to the user and the environment. This information is printed on the container or in leaflets attached to the package. Generally, six insecticides are included among those found to give the best control of lawn insects. The active ingredients of these are:

Bendiocarb	Chlorpyrifos
Diazinon	Ethoprop
Sofenphos	Diazinon + methoxychlor

Not all insecticides are equally effective on all insects. Active ingredients found to provide best control for specific pests are:

Billbugs	Chlorpyrifos, diazinon, isofenphos
Chinch Bugs & Sod Webworms	Bendiocarb, chlorpyrifos, diazinon, Ethoprop, isofenphos
Grubs	Diazinon, isofenphos

Chemicals listed here must be applied in accordance with the manufacturer's directions on the label. The use of certain pesticides may be restricted in some states and not available. This list does not imply approval of these active ingredients to the exclusion of other products that may also be suitable.

Tips On Using Insecticides

When insect population increases are detected, treatment with the proper insecticide is often the best means of maintaining a quality lawn. Failure to reduce populations can lead to spread of the pest throughout the neighborhood. This spread will continue until natural adjustments in environmental conditions occur.

There's real no way to determine how long this will take. Insecticides must only be used with care. Maximum insect control must be obtained in order to reduce the likelihood of repeat treatments. This requires a positive I.D. of the insect pest. It also requires a knowledge of the insect's life cycles so that the insecticide is applied at the right time when the insect is most susceptible. In addition, the treatment must be made in the proper manner so that the chemical reaches the insect wherever it is...on leaves, in the thatch or in the soil.

Sometimes it is necessary to water the grass prior to treatment. At other times, the insecticide must be watered in after application, or left to dry as a coating on the foliage. Never make applications of pesticides on the spur of the moment. If you're not certain of the pest or proper treatment, contact a licensed professional lawn care or pest control company, local extension office, or landscape horticulturist.

How Much Should I Use?

Determining how much of a chemical to use for a particular target area is often a difficult question for the homeowner. Many products can be bought in a convenient ready-to-use form, such as in spray cans or spray bottles that won't require any mixing. These are generally not the problem, unless you follow the "1 oz. needed, 2 oz. will get them better" theory. However, if you buy a product that has to be measured out or mixed with water, we often times are uncertain of the proper amount needed for the area to be treated.

The label on a pesticide product contains much useful information, but there isn't always room to include examples of different dilutions or measurements for every situation. For example: The product label says, "For the control of aphids on tomatoes, mix 8 fluid oz. of pesticide with 1 gal. of water and spray until the foliage is wet." You have only 6 tomato plants, and from experience you know that a gallon is too much for 6 plants.

How much do you need to mix? You probably need only 1 qt. of water to wet the leaves of 6 plants. A qt. is only 1/4th of a gal. Because you want to use less water than the label says, you need less pesticide. You need only 1/4th of the

pesticide recommended on the label...only 2 fluid oz. This makes the same strength spray recommended by the label, and is an appropriate amount for the 6 tomato plants. In short, all you need to do is figure the amount of pesticide you need for the size of your target area, using good measurements and careful arithmetic.

For most pesticide uses in and around the home, you need to remember some common ways to measure volume and some common abbreviations.

1 gallon (gal.)	=	16 cups (C.)
	=	8 pints (pt.)
	=	4 quarts (qt.)
	=	128 fluid ounces (fl. oz.)
1 quart (qt.)	=	4 cups
	=	2 pt.
	=	32 fl. oz.
1 pint	=	2 cups
	=	16 fl. oz.
1 cup	=	8 fl. oz.
1 tablespoon (TBS.)	=	3 teaspoons (tsp.)
	=	1/2 fl. oz.
1 teaspoon	=	1/6 fl. oz.
1 sq. yard	=	9 sq. ft. = 3 ft. x 3 ft.

For More Information - Contact EPA's Public Information Center (PIC), 401 M Street SW, Washington, DC 20460 (202) 260-2080; or the National Center for Environmental Publications and Information (NCEPI), P.O. Box 42419, Cincinnati, OH 45242-2419 (513) 489-8190 or Fax: (513) 489-8695 for a listing of free information available, including *Citizen's Guide to Pest Control and Pesticide Safety* (EPA 730-K-95-001) and *Healthy Lawn, Healthy Environment* (EPA 700-K-92-005).

Reading the Pesticide Label

The pesticide label is your best guide to using pesticides safely and effectively. The directions on the label are there primarily to help you achieve "maximum" benefits—the pest control that you desire—with minimum risk. Both depend on following label directions and correctly using the pesticide.

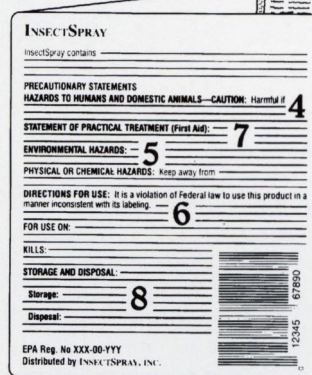
Read the label. Read the label before buying the pesticide. Read the label before mixing or using the pesticide each time, and read the label before storing or disposing of the pesticide. Do not trust your memory. You may have forgotten part of the label instructions or they may have changed. Use of any pesticide in any way that is not consistent with label directions and precautions is illegal. It may also be ineffective and, even worse, dangerous. The main sections of a pesticide label are as follows:

1. EPA Registration Number. This number tells you that EPA has reviewed the product and determined that it can be used with minimal or low risk if you follow the directions on the label properly. The number is not a stamp of approval or guarantee of effectiveness.

2. Ingredients Statement or Active Ingredients. Active ingredients are the chemicals in the pesticide that kill or control the target pests.

3. Signal Words. The signal words—Caution, Warning, or Danger—indicate the pesticide's potential for making you sick. The word CAUTION appears on pesticides that are the least harmful to you. A pesticide with the word WARNING is more poisonous than those with a Caution label. Pesticides with the word DANGER on the label are very poisonous or irritating. They should be used with extreme care because they can severely burn your skin and eyes.

4. Precautionary Statements. This part describes the protective clothing, such as gloves or goggles, that you should wear when using the pesticide. The section also tells you how to protect children or pets by keeping them away from areas treated with pesticides.



5. Environmental Hazards. This section tells you if the product can cause environmental damage—if it's harmful to wildlife, fish, endangered plants or animals, wetlands, or water.

6. Directions for Use. Make sure that the product is labeled for use against the pest(s) that you are trying to control. (For example, products labeled only for termites should not be used to control fleas.) Use only the amounts recommended, and follow the directions exactly.

7. First Aid Instructions.

The label tells you what to do if someone is accidentally poisoned by the pesticide. Look for this information in the Statement of Practical Treatment section. The instructions are only first aid. ALWAYS call a doctor or your local poison control center. You may have to take the person to a hospital right away after giving first aid. Remember to take the pesticide label or container with you.

8. Storage and Disposal.

Read carefully and follow all directions for safe storage and disposal of pesticide products. Always keep products in the original container and out of reach of children, in a locked cabinet or locked garden shed.

Table 1. Diluting Pesticides with Water

Unit stands for any measure of pesticide quantity listed on the label.

LABEL SAYS: MIX "X" UNITS OF PESTICIDE	YOU MIX
8 units per gal. of water	2 units per 1 qt. water or 1 unit per pt. water
16 units per gal. water	4 units per qt. water or 2 units per pt. water
32 units per gal. water	8 units per qt. water or 4 units per pt. water
128 units per gal. water	32 units per qt. water or 16 units per pt. water

Table 2. Measuring Pesticides for a Surface Application

Unit stands for any measure of pesticide quantity listed on the label.

LABEL SAYS: APPLY "X" UNITS OF PESTICIDE	YOUR SURFACE AREA MEASURES		
	20,000 sq. ft.	10,000 sq. ft.	500 sq. ft.
1 unit per 1,000 sq. ft.	20 units	10 units	1/2 unit
2 units per 1,000 sq. ft.	40 units	20 units	1 unit
5 units per 1,000 sq. ft.	100 units	50 units	2 1/2 units
10 units per 1,000 sq. ft.	200 units	100 units	5 units

Everywhere you look today there are sunflowers: Sunflower perfume, sunflower shirts, sunflower doormats, sunflower decorations of all kinds. They are big, beautiful, trendy, and belong in almost every landscape and garden. Sunflowers are native to North America, and they are useful as food (check out the baseball players), in food products (sunflower oil), and are highly decorative.

If you haven't paid a lot of attention to sunflowers for your garden lately, you may think only of the gigantic ones that reach for their namesake in the "Kansas" sky and tower to heights of 8 ft. or more. And you may think they only come in yellow. But today, we have a lot of choices when selecting sunflowers for color, height, decoration, and cutting.

While children still get a big thrill out of growing giant sunflowers, adults often find them a bit overwhelming for their gardens. Thankfully, breeders have developed a wide range of sunflower heights, and you can find varieties that grow anywhere from about 1 ft. tall to 8 ft. or more. Sunflowers grow so easily that, depending on your weather and region of the country, even with minimal care, they can grow to their full potential.

Depending on the variety, sunflowers will bloom anywhere from 55 to 75 days after planting the seeds. In addition to the wide range of heights, sunflowers also come in a wide range of colors. While brilliant yellow is still popular, you now have choices ranging from creamy white to bronze, mahogany, and even purple and orange shades, with some varieties offering bicolors.

Growing Sunflowers - Sunflowers are among the easiest flowers to grow. As one gardener put it, "It can't be too tough if squirrels can do it." You can start sunflowers indoors in any small container, and then transplant them outdoors when they have several true leaves on them. You can also sow seeds directly into the soil. Whether transplanting or planting directly, wait until warm weather has stabilized and the days and nights are relatively warm.

Plant sunflowers where they will receive plenty of sun and practically no shade. While they will grow most anywhere, sun-



The Versatile Sunflower

flowers do best in a well-drained loose soil. Water the seeds and plants regularly to get them started and keep them growing. If transplanting seedlings to the garden, you may want to put some screening around them until they are several inches tall as this will help protect them from rabbits and other small animals that like to nibble on tender young plants.

The Kindest Cuts - If you're growing sunflowers to use as cut flowers, there are new varieties you should consider. Introduced recently are "pollenless" sunflowers that are sterile and do not set seed. Their central seed disks remain a dark color all season.

Regular sunflowers can be a real mess to deal with if you bring them inside as cuts. The pollen can bother some people, and it can also permanently stain clothing, tablecloths and unfinished furniture. The new hybrid pollenless varieties also offer shorter heights (3 to 5 ft.) and a smaller head size for attractive cuts. When growing sunflowers for cutting, avoid using too much fertilizer or the plants may produce foliage instead of flowers.

Cutting stems under water avoids the development of an air pocket in the stem that can block water uptake. Next, immediately place them in a vase of warm water with cut flower food and arrange them, or put them in a bucket of warm water with cut flower food in it. Then, cover the flowers with a black plastic bag and place them in a dark corner in a cool location. Leave them this way for a few hours. This will "condition" garden flowers, and give them a chance to "recover" from the shock of cutting and the move indoors. Remove the cover and make your arrangement.

To Share or Not To Share - Sunflowers will grow a mass of seeds in the center of the disk, unless a pollenless variety, and you can make the choice about whether you want the seeds all to yourself or if you're willing to share them with the birds and squirrels. If you don't want to share, you'll have to cover the seedhead with cheesecloth to keep the "seed thieves" at bay. Watch the birds. When they start to visit, it's time to cover the head. Seedheads can be harvested when 2/3 of the seeds are mature.

Covered seedheads are ready to harvest when the back of the head is brown and dry and no traces of green remain. If not already covered, use a bag or cloth to catch any falling seeds during harvest. Leave about one to two feet of stem attached and then hang the seedhead in a warm well-ventilated place such as the garage or attic. When the backs are entirely brown and papery, remove the seeds by brushing them out with your hand or a stiff brush.

Do not wash the seeds before storage as this may promote rot or mold. Store in air-tight containers in your refrigerator to maintain flavor and nutrition. Sunflower seeds make tasty snacks by themselves. They can be roasted, and can be used in salads and other dishes.

The versatility and variety of today's sunflowers offer something for almost every gardener and homeowner no matter how green the thumb. If you haven't tried this native American plant lately, give it another look by visiting your local lawn and garden retailer.

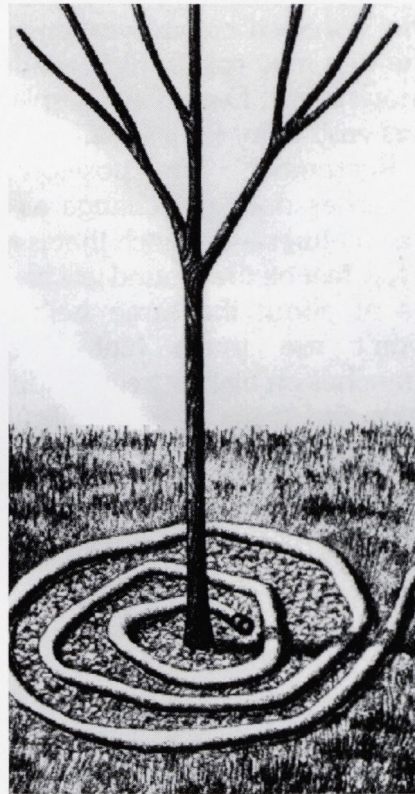
Like People, Trees Suffer in the Summer

Hot summer weather takes its toll on trees just as it does on humans. When the temperature's up for an extended period of time, look for these signs of stress to determine if your trees are suffering:

- wilted leaves
- light-green or yellow leaves
- brown edges around the leaves
- mottled or speckled leaves
- leaves that are smaller than normal
- leaves drop early or take on a fall color prematurely
- limited new grow on stems
- poor flowering
- branch die back

These signs may also indicate insect problems, so consult a professional before treating the tree. Treatment for heat stress generally involves opposite measures than those you'd take to stop insect infestation or a progressive disease.

High temperatures make evaporation occur faster than normal, and that can reduce moisture to the tree's roots causing



Canvas soaker hoses make sure the water gets to the tree with little wastage.

stress. To alleviate stress from lack of moisture, water new plantings heavily once a week.

For established trees, water 6 to 8 in. deep every two weeks. Check the depth of the soaking with a probe around the roots. This is very important because prolonged dry periods may create obstacles to the soil's ability to absorb water. In such situations, water may run off quickly over tightly compacted soil, with little left to moisten the roots. Also, soil that's compacted too tightly won't allow oxygen to diffuse through the soil to the roots. Without oxygen, the roots will eventually die.

In the summer, all living creatures feel the impact of stress more acutely than other times during the year. Too often, our trees are the last ones we think of when trying to keep our landscape green and healthy during the "dog days" of summer. This year, let's put our trees at the top of the watering list!

National Arborist Association

Irrigation Tips for a Water-Wise Landscape

In seeking a lush green landscape and vibrant, healthy flowers, many people over-water their lawns and gardens by 20 to 40%, reports the American Association of Nurserymen (AAN). Follow these water-wise tips to cut back on the amount of water you use in your landscape.

Irrigation Tip # 1 - Install a drip irrigation system made of flexible poly tubing and small emitting devices.

The purpose of a drip irrigation system is to release water in slow, steady drops on a timed schedule; particularly in flower beds and vegetable garden areas.

Drip irrigation systems can be connected to a hose, faucet, or automatic sprinkler valve. They can be set to drip, spray or soak individual plants.

Irrigation Tip # 2 - Consider automating your sprinkler system. You can set the system to water your landscape at a specific time and for designated periods. Early morning is the best time in most cases. You can also program automated

.....

It's always a good idea to group plants in the landscape according to how much water they need.

This way, you won't over water an entire section of the landscape to meet the needs of a few plants.

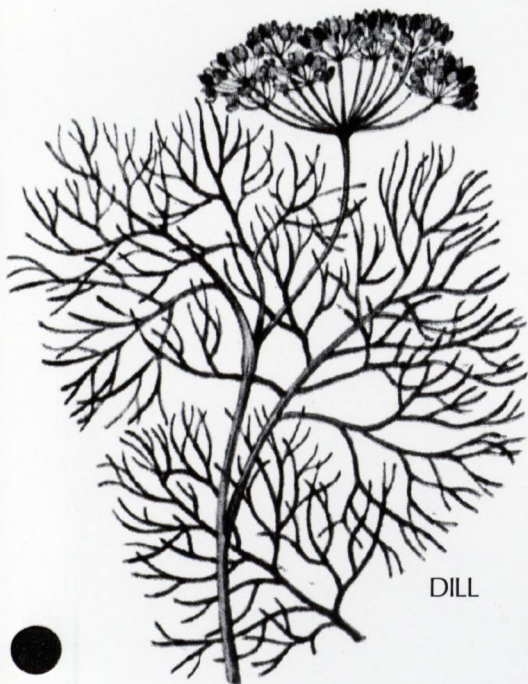
.....

systems to deliver different amounts of water to different zones in your lawn and garden.

It's always a good idea to group plants in the landscape according to how much water they need. This way, you won't over water an entire section of the landscape to meet the needs of a few plants. And remember that less frequent, but deeper watering are both water-wise and better for the plants.

Irrigation Tip # 3 - Periodically check your sprinkler system for leaks. It may not look like much, but leaking sprinklers, faucets, and hoses waste precious water. Your sprinkler may be leaking if there are muddy areas in your soil, if you have a broken or clogged sprinkler head, your water meter is always running, or your valve box is filled with water.

Fresh Herbs...Bon Appetit!



DILL

Herbs have always been favorites with gardeners. They provide color, form, scent and taste, and have many reputed medicinal values. In Colonial times, and long before that in Europe and other areas, a garden of plants known for their culinary and medicinal qualities was frequently grown just outside the kitchen.

Today's kitchen garden may be some distance from the kitchen door, but if you have an area just outside the kitchen, nothing can match the aroma of fresh-picked herbs, no matter how they're used. Just what is a "herb"? In its broadest definition, a herb is any non-woody plant that is grown for its aroma, taste or reputed medicinal value. Today, we commonly recognize herbs as plants with culinary qualities.

Generally, herbs are relatively easy to grow, and you can start most of them from seed indoors, or direct sowing to the garden. Provided the soil is well drained, most herbs will grow where regular flowering bedding plants won't, although no plant will argue against rich soil.

While there are a few herbs that favor

shade, particularly in the south, you will find that most prefer full sunlight. Water regularly until plants are established, but after that, most herbs are surprisingly tolerant of drier conditions. If you have a vegetable garden, the addition of herbs is a natural. Allow ample space between plants so they can develop to their fullest. One or two plants per herb type will probably be plenty for most families.

If growing herbs is new to you, start with a few of your favorites before launching into a large herb garden. Because you'll be harvesting these plants and not just admiring them, be sure to plan for walkways between rows for easy weeding, watering and harvesting if you're putting them in a garden. Many people plant herbs in containers.

What are the top 10 Herbs?

What are the most popular herbs being grown today by home gardeners? According to Kathy Sabastian of **The International Herb Association**, *chives, basil, rosemary, lemon verbena, sage, oregano, sweet marjoram, parsley, French tarragon, and thyme* make up today's Top 10 Herbs. Kathy noted that there has been a big increase in herb purchases in the mid-'90's. "It's back to the basics, back to natural, and back to gardening," she said. "And if you're only familiar with herbs from a can or jar, it's time to discover what fresh is like. Fresh herbs are tastier because they haven't been processed or dried, so there is no lost flavor."

But of course, one of the great things about herbs is that they can be used fresh in season, and also dried for later use. And growing your own is a lot less expensive than buying them in the produce department of your local supermarket.



CORIANDER

For use in their fresh state, the leaves of herbs can be picked when the plant has reached a relatively mature stage when the harvesting of some leaves won't damage its growth. For most herbs, harvesting should be done before the plants flower. If buds are seen, pinch them back so the plant continues to produce foliage instead of flowers.

Once the plant has flowered, it will be past its peak. However, if it is the seeds that are wanted, such as dill seed that comes from the flower, you should wait until the flower has matured. Herb purists recommend picking in late morning, after the dew has dried but before the hot afternoon sun has dried any of the oils in the leaves. Thoroughly wash and dry the leaves before chopping them for use in recipes. Chopping releases the flavorful oils in the leaves.

It should be remembered that fresh herbs have a lot more flavor than dried, so less is needed in a recipe that calls for dried. A general "rule of thumb" is to use 1/2 the amount called for in a recipe, unless it specifies using a certain amount of a fresh herb.

Herbs can be preserved in several ways from drying by various methods, to chopping and freezing them with water in ice trays. Among the more common methods of drying is to cut the stems close to the ground, loosely tie in bundles, and hang upside down to dry in a warm, dry place that is out of bright light. Some people

Continued next page

Herbs

Continued from first page

prefer covering the bundles with a paper bag before hanging them. The paper bag helps absorb moisture without absorbing the natural oils, and the bag also keeps dust off the stems.

Plants are properly dried when a leaf will crumble in your hand. This may take 2 to 3 weeks. When dried, the leaves can be crumbled (remove the stems) and then stored for later use. Colored jars or tins with tight-fitting lids are preferred to retard loss of oils due to exposure to heat and light.

Many herbs such as parsley and chives can be simply chopped and placed in plastic bags and then put in the freezer. Be sure to label the bags, as many chopped green herbs look alike in the freezer. Herb cubes can be made by blending them with water and then placing them in ice cube trays for freezing.

After cleaning the picked leaves, place them in a blender or food processor with water (about 1 1/2 cups of water to 2 cups of leaves). Once frozen, the cubes can be put in plastic bags in the freezer. Simply thaw a cube or two for almost any fresh herb when cooking. Again, be sure to label the bags. There are also methods for drying herbs in a microwave, found in many cookbooks.

Fresh or dried, there are few delights that offer as much year-round satisfaction as herbs from your own garden. Bon Appetit!

Minimize Vacation's Toll on Plants

How many times over the years have you said, "The flowers and vegetables were in beautiful shape until we returned from vacation." With packing, getting the car tune-up, and the thousand and one other things that need to be done before leaving for that well-deserved vacation, the garden seldom gets on the "pre-vacation" check list of things to do. The Fertilizer Institute suggests a number of measures you can take to limit the effect of lack of garden care during an extended absence...if you'll make time for them.

1. First of all, make sure that needed nutrients are provided early in the season for vigorous growth. Healthy, thriving plants have greater resistance to disease and insects than those that suffer from lack of nutrients. Today's commercial, specially-formulated fertilizers for flowers and vegetables are labeled as to percentage of nutrients in the mixture, as well as, directions for amounts and application procedures. Use them as directed by the manufacturer.
2. Before you leave, get rid of weeds. Weeds not only look unsightly, but compete for nutrients and water.
3. Water soil well. Make sure the soil is moist to root depth. There may be little or no rainfall while you're away. If you've not already done so, apply a mulch around flowers, vegetables and shrubs. Mulch will keep weeds down and better minimize loss of soil moisture.
4. Plan your regular insect and disease spraying program so you can do this just before you leave. Insects and disease **never** take vacations, so take the time to give this added protection to your plants.
5. Pick fruits and vegetables that are ready for harvest and those that will ripen during your vacation. Give them to a neighbor if you can't use them. Clean up old stalks and rotted vegetables or plant parts before you leave. They merely pose an invitation to insects, disease, and other pests during your absence.
6. If you can't get it all done before you depart, offer a neighbor (without a garden) to harvest what they want while you're gone. More times than not, the neighbor will also do a little maintenance, such as, watering and weeding while you're away. It's worked for us!

Have a great vacation!