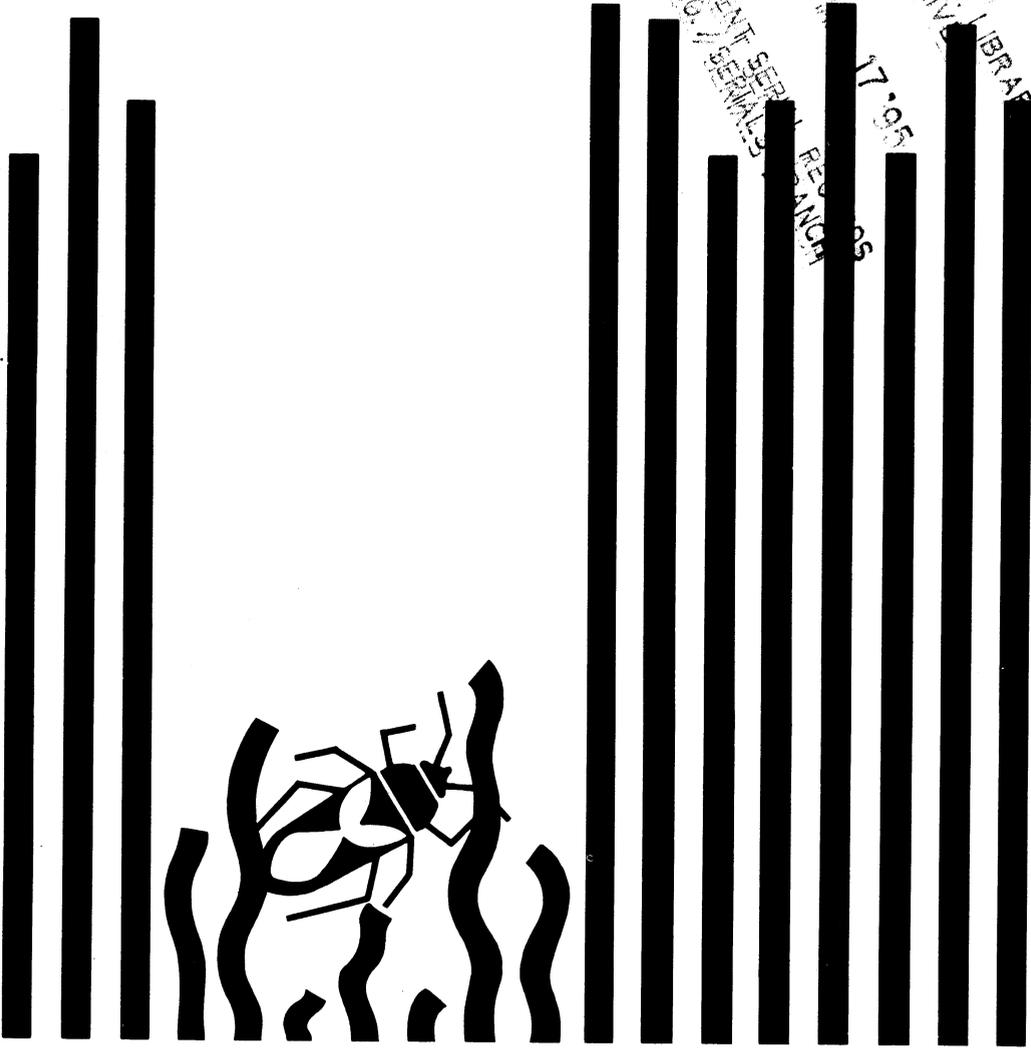


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# LAWN INSECTS: How to Control Them

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UNITED STATES  
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NUMBER 53

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ADMINISTRATION

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Many insects and insectlike pests damage lawns and other turf. They cause the grass to turn brown and die, or they build unsightly mounds that may smother the grass.

Some of the pests infest the soil and attack the plant roots; some feed on the plants' leaves and stems; others suck juice from the plants.

Other insects and insectlike pests inhabit lawns but do not damage them. The pests are annoying, and some of them attack people.

These pests can be controlled with insecticides. The recommendations in this bulletin are applicable not only to lawns but also to such places as parks, roadsides, golf courses, athletic fields, and cemeteries, and to the areas around airport landing strips. However, they are not intended for the control of insects on turf areas that might be grazed by livestock.

On January 24, 1978, four USDA agencies—Agricultural Research Service (ARS), Cooperative State Research Service (CSRS), Extension Service (ES), and the National Agricultural Library (NAL)—merged to become a new organization, the Science and Education Administration (SEA), U.S. Department of Agriculture.

This publication was prepared by the Science and Education Administration's Federal Research staff, which was formerly the Agricultural Research Service.

# LAWN INSECTS:

## How to Control Them

Prepared by A.M. Vance (retired) and B.A. App (retired)

### THE PESTS: DESCRIPTION . . . damage

#### Those That Infect Soil and Roots

##### Grubs

Grubs are the larvae of several species of beetles. They are whitish or grayish, have brownish heads and brownish or blackish hind parts, and usually are found in a curled position when disturbed. They hatch from eggs laid in the ground by the female beetles. Most of them spend about 10 months of the year in the ground; some remain in the soil 2 or 3 years. In mild weather they live 1 to 3 inches below the surface of the lawn; in winter they go deeper into the soil.

They burrow around the roots of the grass and feed on them about an inch below the surface of the soil. Moles, skunks, and birds feed on the grubs, and may tear up the sod in searching for them.

You can estimate the grub population of your lawn. Do this in the fall before cold weather sets in or in the spring after the soil warms up and the grubs are near the surface. With a spade, cut 3 sides of a strip 1 foot square by 2 or 3 inches deep. Force the spade under the sod and lay it back, using the uncut side as a hinge. Use a

trowel to dislodge soil on the overturned roots that might contain grubs. Count the grubs in the exposed soil. Replace the strip of sod. In the same way, cut strips of sod in several other parts of the lawn, and count the grubs under each strip. To calculate the average number of grubs per square foot of lawn, divide the total number of grubs counted by the number of strips. If the average number is 3 or more, apply an insecticide.

The parent beetles differ in appearance, distribution, and habits. The following are important in lawns:

*May Beetles.*—These beetles are brown or blackish brown. More than 200 kinds are found in the United States. Sometimes they are called June beetles.

In Indiana and southern Wisconsin the beetles are found from the first of May to mid-July; they are most abundant during the last 2 weeks of May. South of this area the beetles appear in early April; north of it they appear in late May and are most numerous in June. In Arizona most kinds are found during July and August.

The young are called white grubs. Some of them remain in the soil 2 or 3

years and may feed on the grass roots during several seasons.

*Japanese Beetle.*—The beetle is about 1/2 inch long and has a shiny metallic-green body; it has coppery-brown wings and six small patches of white hairs along each side and the back of the body, just under the edges of the wings. The adult insect feeds on many different plants.

The insects are found mostly in the Eastern States. The beetles appear about May 15 in eastern North Carolina, June 15 in eastern Pennsylvania, and July 1 or later in New England. They are active 4 to 6 weeks. In North Carolina most of them die early in August; in New England some are present until frost.

*Asiatic Garden Beetle.*—The beetle is about 1/4 inch long, is chestnut brown, and has a velvety appearance. The underside of the body is covered with short yellow hairs. The insect flies only at night and feeds on various kinds of foliage.



Japanese beetle.

BN-5089

These beetles are found in widely scattered places along the Atlantic seaboard from Massachusetts and eastern New York to South Carolina. They are most abundant from mid-July to mid-August.

*Oriental Beetle.*—The beetle is about 5/8 inch long, is straw colored, and has some dark markings on the body.

The beetles occur in Connecticut, Massachusetts, southeastern New York, and northern New Jersey. They appear in late June, July, and August. The grubs prefer unshaded lawn and short grass.

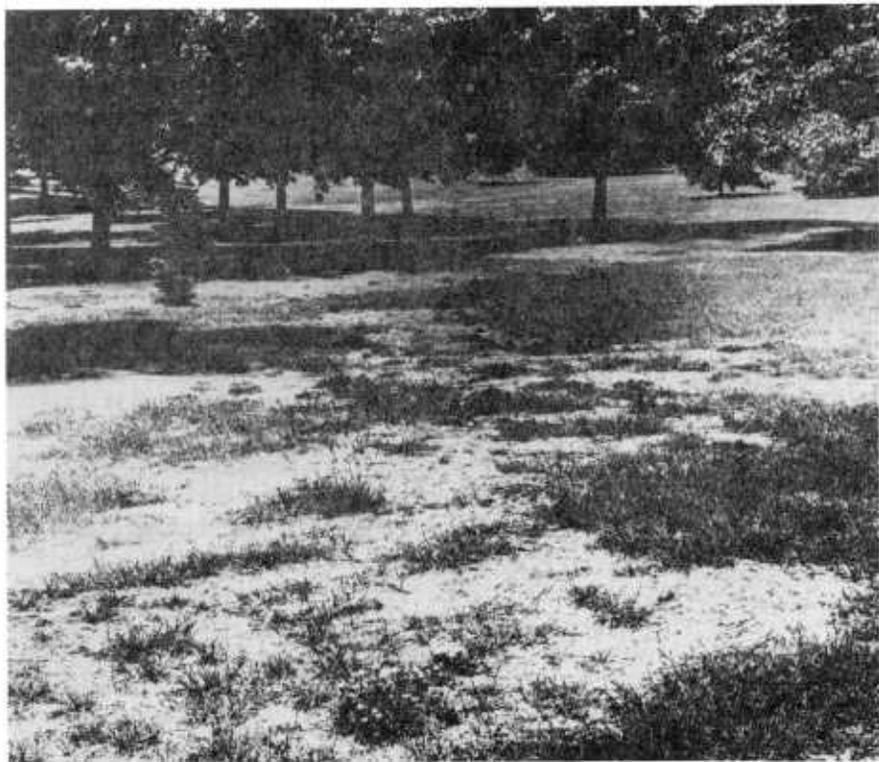
*European Chafer.*—The beetle is about 1/2 inch long and is light chocolate brown or tan. The insects emerge from the soil at dusk, swarm into the trees and shrubs, and make a buzzing sound.

European chafers occur mostly in New York; isolated infestations have been found in Connecticut and West Virginia. The beetles appear in June and July and are most abundant in early July.

*Masked Chafers.*—These beetles are 1/2 inch long and brown. They live in the soil during the day and emerge at night; they are especially active on warm humid evenings.

The northern masked chafer is found from Connecticut south to Alabama and west to California. The southern masked chafer is common in the Southeastern States; it is found throughout the South and in Texas, Oklahoma, Iowa, and Illinois. Masked chafers appear in late June and July and are active 1 or 2 months.

The young are sometimes called annual white grubs because the life cycle of the insect is completed in 1 year. The grubs have irregularly



EPQ-2022

Damage to grass by Japanese beetle grubs.

arranged spines on the underside of the last body segment.

*Rose Chafer.*—The beetle is 1/2 inch long and is yellowish brown; it has long spiny legs. Rose chafers feed on almost any vegetation and are very destructive to roses in bloom. They prefer areas in which the soil is light and sandy.

The insects are found in eastern United States and west to Colorado and Texas. They are abundant in June and early July.

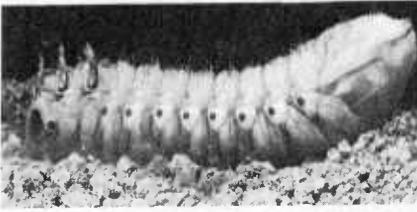
The grubs are not so harmful to lawns as some of those mentioned above.

*Green June Beetle.*—The beetle is nearly 1 inch long. The body is some-

what flattened; it is velvety green and has bronze to yellow edges. The insects feed on the foliage of many trees and plants. The females often lay eggs in piles of grass clippings, as well as in the soil.

Green June beetles are found mostly in the southern part of the United States but frequently as far north as Long Island and southern Illinois. They are active in June, July, and August. They produce one generation a year.

The grubs feed mainly on decaying vegetable matter. Their burrowing mounds the soil and smothers the grass. The grubs also uproot seedlings in newly sown lawns. Damage is most



TC-3878

Green June beetle grub.

severe in dry seasons and is most apparent in the fall.

Sometimes after a heavy rain the grubs come out of the soil and crawl on the surface of the ground. They have the unusual habit of crawling on their backs.

### Ants

Ants build nests in the ground. Some ants form hills around the openings of their nests; fire ants build large mounds. The anthills and mounds often smother the surrounding grass. If the ants nest about the roots of the grass, they may destroy them. Ants also destroy grass seeds in the ground and prevent good stands.

Some ants bite people and animals; fire and harvester ants are especially vicious. In the West, winged harvester ants when swarming in mid-summer often damage newly planted lawns.

### Mole Crickets

Mole crickets are light brown; their lower surface is lighter than the upper and is often tinged with green. They are about 1-1/2 inches long and have short, stout forelegs, shovellike feet, and large, beady eyes.

Mole crickets feed on the roots of the grass. In addition, their burrowing uproots seedlings and causes the soil to

dry out quickly. One mole cricket can damage several yards of a newly seeded lawn in a single night.

These insects are most numerous in the South Atlantic and Gulf Coast States from North Carolina to Texas.

### Wireworms

Wireworms, which are the larvae of click beetles, are 1/2 to 1-1/2 inches long and are usually hard, dark brown, smooth, and slender. Some wireworms are soft and white or yellowish. Wireworms bore into the underground part of the stems and feed on the roots of the grass. The boring causes the plant to wither and die.

The adults are about 1/2 inch long, and brownish, grayish, or nearly black. They are hard shelled and their bodies taper somewhat at each end. When they fall on their backs, the beetles flip the middle part of the body against the ground, throw themselves several inches into the air, and make a clicking sound.

### Cicada-Killer Wasp

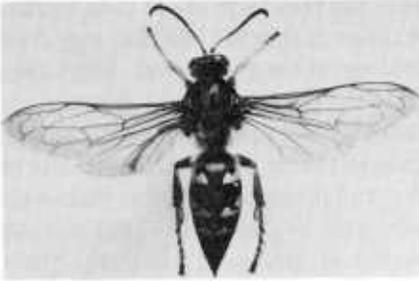
This insect is about 1-1/2 inches long and has yellow and black markings on its body. The wasps dig deep nests or burrows in the ground and mound the soil at the entrance to the nests. The female paralyzes a cicada by stinging it, then places it in the nest and lays an egg on it. When the egg hatches, the larva feeds on the cicada.

These wasps, which appear in late



TC-3788

Wireworm.



Cicada-killer wasp.

TAX-261

July and August, damage lawns in the eastern United States. They may sting people if molested.

### Wild Bees

Some kinds of wild bees occasionally damage lawns by digging up the soil, making holes, and forming mounds that interfere with the growth of grass.

### Periodical Cicada

The young, or nymphs, leave many small holes in lawns, especially under trees, when they emerge to become adults.

If you hear the day-long song of the cicada in the spring of a year in which a brood is scheduled to appear in your region, the holes in your lawn were probably made by the emerging nymphs.

If a large brood is emerging, control of adults or protection of ornamental trees and shrubs in the lawn is recommended.

### Billbugs

The young, or grubs, are small and white, and have hard brown or yellow

heads. They feed on the roots of the grass.

Adult billbugs are beetles 1/5 to 3/4 inch long. They have long snouts, or bills, that carry at the tip a pair of strong jaws with which the beetles chew their food. Their color is clay yellow to reddish brown to jet black. The beetles burrow in the grass stems near the surface of the soil and also feed on the leaves.

Several species of billbugs damage lawns. One species, *Sphenophorus phoeniciensis*, attacks bermudagrass in Arizona, California and New Mexico. Another species, *S. cica-tristriatus*, has damaged lawns in eastern Washington. The hunting bullbug has caused extensive damage to zoysia grass from Maryland to Florida, and in California and Hawaii.

### Earthworms

When earthworms are numerous, they sometimes become pests in lawns.



Billbug.

C&F-3180

They make small mounds of castings that ruin the appearance of the grass.

An imported species, the oriental earthworm, is found in some of the eastern States. It is 6 to 8 inches long and about 1/5 inch in diameter. It is light green on the upper surface and has a purplish-green line down the center of the back. It throws up abundant castings of soil.

## Those That Feed on Leaves and Stems

### Sod Webworms

Sod webworms are about 3/4 inch long and light brown. Their bodies are covered with fine hairs.

Sod webworms are the larvae of lawn moths. The adults are small, whitish or gray moths (or millers). They fold their wings closely about their bodies when at rest. They hide in the shrubbery or other sheltered spots during the day. In the early evening, they fly over the grass, and the females scatter eggs over the lawns.

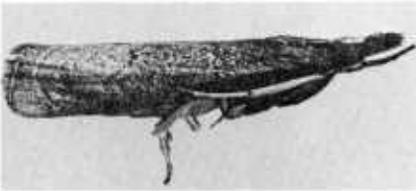
The worms work only at night, and they live in protecting silken webs or

nets that they form about their bodies. As soon as they are hatched, they start feeding on the grass leaves. When they grow larger, they build burrows or tunnels close to the surface of the soil; they reinforce the tunnels with bits of dirt and pieces of grass, line them with silk, and live in them. They cut off blades of grass and eat them. Some species feed on the grass crowns at ground level and on the roots. As partly grown larvae, they overwinter in their silken webs.

Sod webworms prefer new lawns. They attack bentgrass, bluegrass, fescue, and other grasses. Irregular brown spots are the first signs of damage. If the infestation is heavy, large areas of grass may be damaged severely or destroyed in only a few days.

Several species infest lawns. The tropical sod webworm is the most important one in Florida. A burrowing sod webworm sometimes infests lawn grasses from Kansas south to Louisiana and east to Maryland. The dirty white larvae live in silk-lined tubes about 3/8 inch in diameter that extend 2 to 3 inches into the soil.

You can find the worms by breaking apart some of the drying sod. If there are 3 or 4 of them within a 6-inch-square section, apply an insecticide.



C&F-1419  
Sod webworm adult.



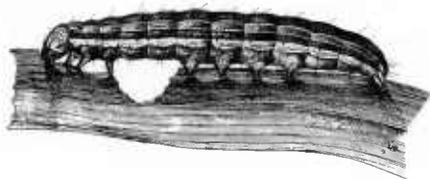
C&F-1414  
Sod webworm.

### Armyworms

Armyworms are the larvae of moths. They are 1-1/2 inches long; they are greenish and have blackish stripes along each side and down the center of the back.

The adults are brownish gray; their wings measure about 1-1/2 inches across when expanded.

The armyworm and the fall army-



Armyworm.

C&F-3929

worm are common species. When they are numerous, they may devour the grass down to the ground. Their feeding causes circular bare areas in lawns. The lawn armyworm sometimes damages lawns in Hawaii.

### **Cutworms**

Cutworms are dull-brown, gray, or nearly black caterpillars and are 1-1/2 to 2 inches long. Some cutworms are spotted, others striped. Usually they hide in the soil during the day and feed at night. They are the larvae of night-flying brown or grayish moths.

Cutworms infest lawns occasionally. They feed on the leaves or cut off the grass near the soil, and may do severe damage to seedlings of bermudagrass, bentgrass, and ryegrass.

### **Billbugs**

Billbugs feed on stems and grass leaves. For a description of the insects, see p. 7.

### **Fiery Skipper**

The larvae of the fiery skipper feed on the leaves of common lawn grasses but attack bentgrass most severely. Early infestation is indicated by isolated, round bare spots, 1 to 2 inches in diameter. The spots may

become numerous enough to destroy most of the grass on the lawn.

The adults are small, yellowish-brown butterflies.

The fiery skipper is occasionally a pest of lawns in California.

### **Lucerne Moth**

The larvae of this insect prefer clover and other legumes, but they also infest grass.

The adult is a grayish-brown moth; it has two pairs of dark spots on each forewing.

The lucerne moth sometimes attacks lawns throughout California. It has been recorded from 20 other States across the country.

### **Grasshoppers**

Grasshoppers do not feed on the grasses of a well-kept lawn except when they are very numerous and forage is scarce. They usually migrate to lawns from croplands or wastelands.

Control measures in lawns are seldom necessary.

### **Leaf Bug**

A leaf bug feeds on lawn grass and causes it to die out in spots. This insect is gray and white. It attacks bluegrass, bermudagrass, and bentgrass in California, and is distributed throughout the United States.

### **Frit Fly**

This insect is present in a number of States across the country. It occasionally attacks lawns in Connecticut and Rhode Island. The adult fly is

black and about 1/16 inch long. The female lays eggs on the grass and the hatching maggots bore into the stems.

## Those That Suck Plant Juice

### Chinch Bugs

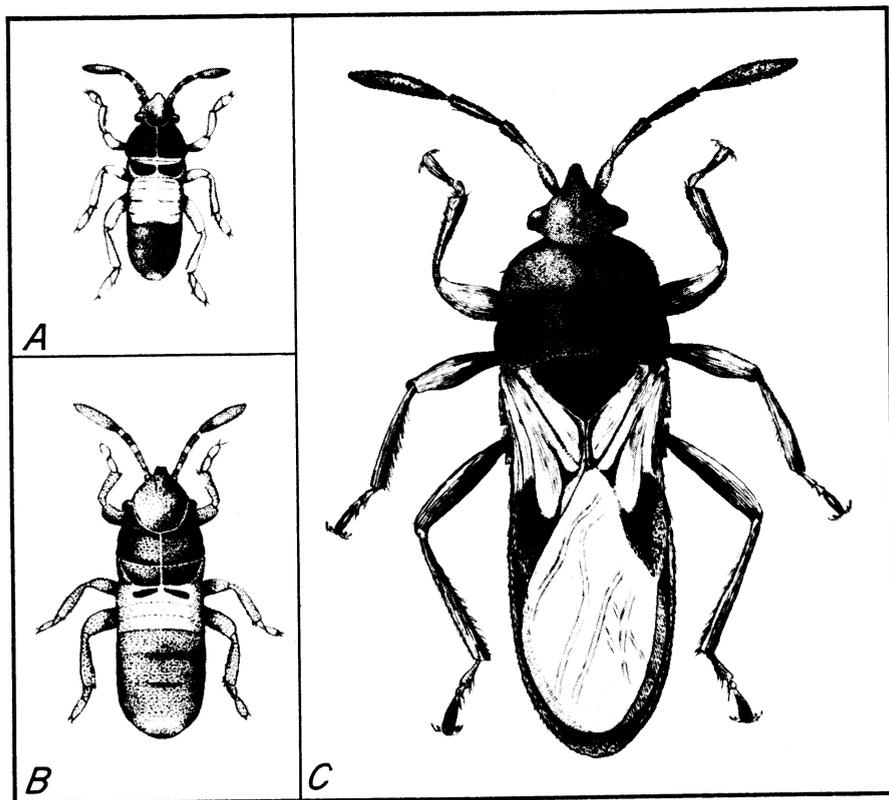
Most chinch bug damage is caused by the young bugs, or nymphs. Yellowish spots appear in the infested lawn; they turn rapidly into brown, dead areas.

Nymphs hatch from eggs laid by the female adults. At first a nymph is about half the size of a pinhead; it is bright red and has a white band across the back. As it grows, it sheds its skin

four times. The full-grown nymph is black and has a white spot on the back between the wing pads.

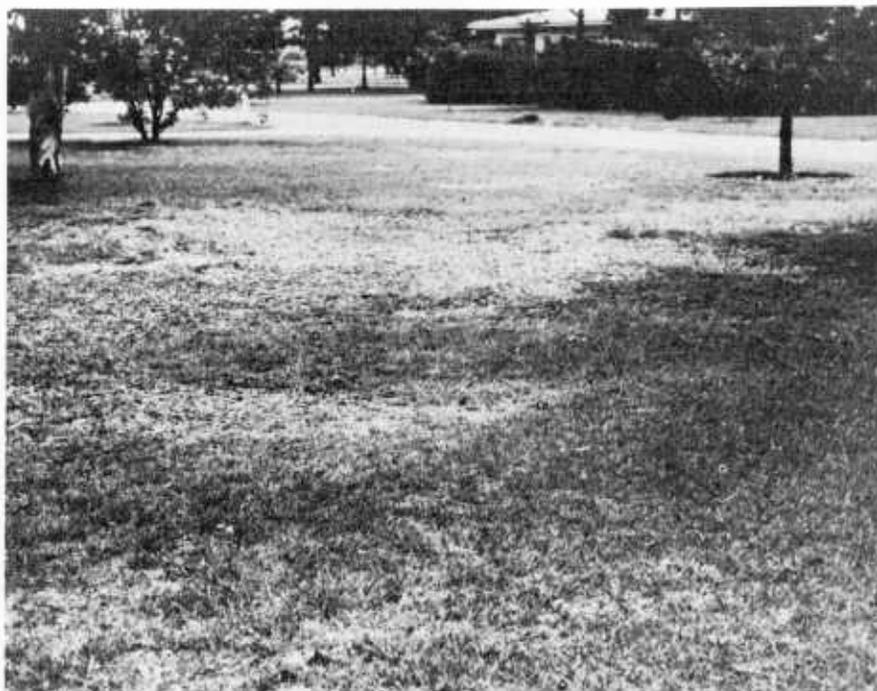
The adults are about 1/6 inch long; they are black and have white markings.

The species *Blissus leucopterus hirtus*, the hairy chinch bug, infests lawns in the eastern part of the United States. The species *B. leucopterus leucopterus* is a pest of bermudagrass in Oklahoma. *B. insularis*, the southern chinch bug, severely damages St. Augustinegrass in Florida and other Gulf States. It also attacks other grasses in these States and is a serious lawn pest in Georgia, North Carolina, and South Carolina.



C&F-5661

Chinch bug: A, First stage or red nymph; B, second-stage nymph; C, winged adult.



Chinch bug damage to St. Augustinegrass lawn (light spots).

BN-20000

In the East and as far south as northern Florida, the eggs hatch in the spring and nymphs infest lawns until late fall. The adults hibernate during the winter. In southern Florida they are active during the winter, except on the coldest days.

### **False Chinch Bug**

The false chinch bug is frequently mistaken for a chinch bug. It feeds on grasses in the same way as the chinch bug but rarely is a lawn pest.

The nymphs are greenish gray, the adults are gray.

### **Scale Insects**

Scale insects suck the juice from grasses; some feed on the crown of the

plants and aboveground parts; others feed on the roots. The grass becomes yellow and then brown, and finally dies. Damage is usually more severe in dry periods than in wet.

Several kinds of scales damage lawns in the southern part of the United States, from South Carolina south and west to California. No satisfactory way has been found to control scales on lawns. Consult your county agricultural agent or State agricultural experiment station for current recommendations.

The most important species of scales are the following:

*Rhodesgrass Scale*.—The adult is about 1/8 inch in diameter, globular, dark purplish brown, and covered with a white cottony secretion. The tiny

nymphs, or crawlers, move about at first and then settle down to feed. They secrete a wax that covers them. The Rhodesgrass scale may produce five generations a year.

The adults and nymphs cause lawn damage. They attack chiefly the plant crowns and cause infested plants to turn brown and die.

The Rhodesgrass scale is found in Arizona, California, Hawaii, New Mexico, and the Gulf States. It attacks bermudagrass and St. Augustinegrass.

*Bermudagrass Scale.*—The adults are about 1/16 inch long, oval, and covered with a white, hard secretion.

This insect infests bermudagrass and is especially active in shady areas. It kills the grass and leaves bare brown patches.

*Ground Pearls.*—The female adult secretes a white wavy sac, in which it places about a hundred pinkish-white eggs. Slender nymphs hatch and feed on the fine grass rootlets. The nymphs cover themselves with hard globular shells that look like tiny pearls. These are called ground pearls. They are about 1/8 inch in diameter.

Ground pearls cause serious damage to bermudagrass in the South and Southwest and to centipedegrass in the South. The grass that they attack turns brown in the summer; it dies in the fall and leaves irregular dead spots.

## Leafhoppers

Leafhoppers are tiny triangular or wedge-shaped insects that fly or hop short distances. They are less than 1/5 inch long, and green, yellow, or brownish gray.

Many species of leafhoppers infest lawns. They suck the sap from the

leaves and stems of the grass. New lawns may be damaged so extensively that reseedling is necessary. Damage to established lawns is evident in whitened patches. It is often mistaken for damage due to dry weather or disease.

## Mites

Several species of mites attack grasses. They suck the sap and cause the leaves to be blotched and stippled. Severe infestations can kill the plants.

The Banks grass mite occurs throughout most of the United States and occasionally attacks lawns. It is not ordinarily a pest in well-managed lawns.

The Bermudagrass mite damages bermudagrass throughout the extreme southern United States. It is very tiny and light beige. It causes shortened stems and rosetted growth.

Another mite, *Oligonychus stickneyi*, damages bermudagrass in New Mexico, Arizona, and California. In Florida it damages other grasses as well.

Clover mites feed on clover and other lawn plants. They are very tiny and red. Although they feed only on plants, they are a nuisance when they enter homes. This usually occurs in spring and fall.

## Spittlebugs

Spittlebugs seldom damage well-managed lawns. The nymphs live inside masses of spittle and suck the juices from the plants. The adults resemble leafhoppers in appearance and habits, but they are more robust. Two species are sometimes found in lawns.

The meadow spittlebug is found in

the Northeastern and Midwestern States. The nymphs are yellowish green. The adults are about 1/4 inch long, are gray or brown, and have dark-brown markings. They usually feed on clover or weeds.

The two-lined spittlebug occasionally infests lawns in the Southeastern States. The nymph is ivory and its head and thorax are brownish. The adult is about 3/8 inch long, is dark brown or black, and has two orange stripes on its wings. These insects feed on bermudagrass, St. Augustinegrass, centipede grass, and several other plants.

Control measures in lawns are seldom necessary.

## **Those That Inhabit but Do Not Damage Lawns**

### **Earwigs**

Earwigs are beetlelike insects. They are about 3/4 inch long and are reddish brown. The insect has a prominent pair of forceps at the rear of the body; the forceps of the male are curved. Earwigs hide during the day and forage at night.

These insects are found occasionally in lawns. Sometimes they breed in enormous numbers in piles of lawn clippings. They feed on all kinds of food.

One species known as the European earwig occurs in the Northeast and in the West.

### **Ticks**

Several kinds of ticks infest lawns. They drop on the grass from dogs and rodents. Most of them attack man. Pain may result from their bites. Some

ticks transmit diseases, including Rocky Mountain spotted fever and tularemia.

### **Chiggers**

Chiggers, or "red bugs," invade lawns from surrounding grassy or woody areas. These mites are annoying to people; they attach themselves temporarily to the skin and release a poison that causes severe irritation and intense itching. They are very tiny and are seldom seen.

Chiggers are most numerous east of the Rocky Mountains. They often are found in large numbers in Pennsylvania, Ohio, Indiana, Illinois, Iowa, and the area south of these States.

### **Thrips**

Thrips are found in lawns and sometimes in homes. They come from nearby grass or flowers. These tiny black or brown insects may inflict painful bites on people working about the lawn.

Control measures in lawns are seldom practical.

### **Slugs and Snails**

Slugs and snails may often move about on the lawn and may injure adjacent plants. They are night feeders and leave mucous trails on plants and sidewalks.

### **Millipedes and Centipedes**

Millipedes (thousand-legged worms) and centipedes (hundred-legged worms) are dark brown and have many segments. Most of them coil up when disturbed.

Millipedes and centipedes do not

usually damage lawns. Occasionally, millipedes congregate in yards after heavy rains. Their food is chiefly decaying vegetable matter. In Florida the tropical millipede is a common species.

Some of the larger centipedes may bite people. Most species are not dangerous.

Control of centipedes in lawns is seldom necessary.

### **Sowbugs and Pillbugs**

Sowbugs and pillbugs are light gray to slate colored; they are 1/2 inch long; they have segmented bodies and seven pairs of legs. When disturbed, pillbugs roll up into tiny balls.

Sowbugs and pillbugs are usually found on damp ground under stones, boards, or dead leaves, or in damp basements. They feed on organic matter in the soil and sometimes on grass and other plants.

Control measures in lawns are seldom necessary; if they should be needed, apply one of the insecticides recommended for control of grubs.

### **Spiders and Scorpions**

Spiders are found about the lawn, on flowers, plants, and shrubbery. Most spiders are harmless to man and are even beneficial because they capture and devour large numbers of harmful insects. They do not damage the grass or other vegetation.

Scorpions appear occasionally on lawns and about the yard. They occur in the warm parts of the United States.

The black widow spider may bite people and household pets, and scorpions may sting them. These insect-like pests are poisonous. If a person is bitten by a black widow spider or stung by a scorpion, he should see a physician at once.

Control measures in lawns are seldom necessary.

### **Fleas**

Fleas occasionally spread to lawns from infested dogs, cats, or nearby animal quarters. They may attack human beings or pets.

## **CONTROL**

The pesticides mentioned in this publication are available in several different formulations that contain varying amounts of the active ingredient. Because of differences in active ingredient, dosage rates are not indicated in this publication.

The user is cautioned to read and follow all directions and precautions given on the label of the pesticide formulation that will be used.

Insecticides are sold under various trade names by garden supply houses, and hardware, seed, and drug stores.

Granules are readymade formulations that are used dry. Apply them with a lawn fertilizer spreader.

Wettable powders and other formulations are used in sprays. Mix the purchased product with water, and apply with a garden type compressed-air sprayer, or a knapsack sprayer. The quantity of water to use depends on the type of sprayer you have. If a wettable powder is used, frequent agitation of the mixture is necessary.

A quart jar attachment for a garden hose will provide good distribution of



C&F-5970

Applying insecticide to lawn with a fertilizer spreader.

an insecticide on a lawn. Use an attachment that delivers a coarse spray and large volume of water. Usually a quart jar full of an insecticide mixture will cover about 500 square feet of lawn.

Baits are usually purchased ready mixed, but a bait for controlling slugs and snails may be prepared.

Control of soil insects is sometimes difficult. Therefore, it is important to apply the pesticide at the time of the year when the insect is most susceptible to control. This information will be on the pesticide label.

To control underground lawn pests, apply an insecticide and, immediately afterward, sprinkle the lawn thoroughly. One application may control the pests for several years. Control of soil

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## Milky Disease

Grubs of the Japanese beetle can be controlled by applying a dust containing spores of milky disease. However, the disease may require several years to spread and reduce beetle populations appreciably.

In general the spore dust should not be applied to soil that has been treated with an insecticide. Although the insecticide does not harm the disease spores, it reduces the grub population and thereby greatly lowers the chance of establishment and spread of the disease.

Spore dust powder can be purchased. Apply it when the ground is not frozen. Follow directions on the label.

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insects is slow, and it may be a month or more before the insecticide becomes fully effective.

To control aboveground lawn pests, apply an insecticide to the grass. Sprinkle lightly with water to wash the insecticide down around the crowns of the plants. Do not water again for a few days; then sprinkle the grass thoroughly to wash off the insecticide. One application may control the pests for several weeks. Repeat the application if they become numerous.

The table at the end of this publication gives insecticides recommended for most lawn pests.

## USE OF PESTICIDES

This publication is intended for nationwide distribution. Pesticides are registered by the Environmental Protection Agency (EPA) for country-wide use unless otherwise indicated on the label.

This use of pesticides is governed by the provisions of the Federal Insecticide, Fungicide, and Rodenticide Act, as amended. This act is administered by EPA. According to the provisions of the act, "It shall be unlawful for any person to use any registered pesticide in a manner inconsistent with its labeling." (Section 12(a) (2) (G))

EPA has interpreted this section of the act to require that the intended use of the pesticide must be on the label of the pesticide being used or covered by a Pesticide Enforcement Policy Statement (PEPS) issued by EPA.

The optimum use of pesticides, both as to rate and frequency, may vary in different sections of the country. Users of this publication may also wish to consult their Cooperative Extension Service, State agricultural experiment stations, or county extension agents for information applicable to their localities.

The pesticides mentioned in this publication are available in several different formulations that contain

varying amounts of active ingredient. Because of these differences, the rates given in this publication refer to the amount of active ingredient, unless otherwise indicated. Users are reminded to convert the rate in the publication to the strength of the pesticide actually being used. For example, 1 pound of active ingredient equals 2 pounds of a 50-percent formulation.

The user is cautioned to read and follow all directions and precautions given on the label of the pesticide formulation being used.

Federal and State regulations require registration numbers. Use only pesticides that carry one of these registration numbers.

USDA publications that contain suggestions for the use of pesticides are normally revised at 2-year intervals. If your copy is more than 2 years old, contact your Cooperative Extension Service to determine the latest pesticide recommendations.

The pesticides mentioned in this publication were federally registered for the use indicated as of the issue of this publication. The user is cautioned to determine the directions on the label or labeling prior to use of the pesticide.

## SPECIAL PRECAUTIONS

Store pesticides in original containers—out of reach of children and pets—and away from foodstuff.

Apply pesticides selectively and carefully. Do not apply a pesticide when there is danger of drift to other areas. Avoid prolonged inhalation of a

pesticide spray or dust. When applying a pesticide, it is advisable that you be fully clothed.

Do not apply insecticides to a lawn when people or animals are on it, and do not permit children and pets on the lawn until the insecticide has been

washed off by sprinkling, and the grass has dried completely.

After handling a pesticide, do not eat, drink, or smoke until you have washed. If a pesticide is swallowed or gets in the eyes, follow the first aid treatment given on the label, and get prompt medical attention. If a pesticide is spilled on your skin or clothing, remove clothing immediately and wash skin thoroughly.

Dispose of empty pesticide containers by wrapping them in several layers of newspaper and placing them in your trash can.

It is difficult to remove all traces of a herbicide (weed killer) from equipment. Therefore, to prevent injury to desirable plants, do not use the same equipment for insecticides and fungicides that you use for a herbicide.

*Lawn pests and insecticides to use in their control<sup>1</sup>*

Lawn pest	Diazinon (Spectracide)	Carbaryl (Sevin)	Chloro- pyrifos (Dursban)	Trichlo- rofon (Dylox)
Ants	X	X	X	X
Armyworms	X	X	X	X
Billbugs	X	X		
Chiggers	X		X	
Chinch bugs <sup>3</sup>	X	X	X	
Cicada killer wasps	X			
Cutworms	X	X	X	X
Earwigs	X	X	X	
Fleas	X	X	X	
Frit fly	X			
Grasshopper			X	
Grubs <sup>4</sup>	X	X	X	X
Leafhopper	X	X		
Millipeds	X	X		
Mites, clover	X		X	
Sod Webworm	X	X	X	X
Ticks	X		X	

<sup>1</sup>Several insects are not listed either because no control measures are necessary or chemicals for their control are not registered at this time.

<sup>2</sup>If only a few ant nests are present, treat them individually. Wash the insecticide into the nests or drench the mounds with it. Special treatment is required to control fire and harvester ants; consult your State Agricultural Experiment Station for latest recommendations.

<sup>3</sup>To control cutworms, apply the insecticide in late afternoon.

<sup>4</sup>In hot dry areas, lower dosages may be necessary to prevent burning the grass; consult your State Agricultural Experiment Station.

## Common and Scientific Names

<i>Common name</i>	<i>Scientific name</i>
Ants .....	Formicidae (many species).
Armyworms .....	Noctuidae (several species).
Asiatic garden beetle .....	<i>Maladera castanea</i> .
Banks grass mite .....	<i>Oligonychus pratensis</i> .
Bees .....	Hymenoptera (several species).
Bermudagrass mite .....	<i>Aceria cynodontiensis</i> .
Bermudagrass scale .....	<i>Odonaspis ruthae</i> .
Billbugs .....	<i>Sphenophorus</i> spp.
Burrowing sod webworm .....	<i>Acrolophus popeanellus</i> .
Centipedes .....	Chilopoda.
Chiggers .....	<i>Trombicula</i> spp.
Chinch bug .....	<i>Blissus leucopterus leucopterus</i> .
Cicada-killer wasp .....	<i>Sphecius speciosus</i> .
Clover mite .....	<i>Bryobia praetiosa</i> .
Cutworms .....	Noctuidae (several species).
Earthworms .....	Annelida.
Earwigs .....	Dermaptera.
European chafer .....	<i>Amphimallon majalis</i> .
European earwig .....	<i>Forficula auricularia</i> .
False chinch bug .....	<i>Nysius ericae</i> .
Fiery skipper .....	<i>Hylephila phylaeus</i> .
Fleas .....	Siphonaptera (several species).
Frit fly .....	<i>Oscinella frit</i> .
Grasshoppers .....	Orthoptera (many species).
Green June beetle .....	<i>Cotinis nitida</i> .
Ground pearls .....	<i>Margarodes meridionalis</i> .
Hairy chinch bug .....	<i>Blissus leucopterus hirtus</i> .
Hunting billbug .....	<i>Sphenophorus venatus vestitus</i> .
Japanese beetle .....	<i>Popillia japonica</i> .
Lawn armyworm .....	<i>Spodoptera mauritia</i> .
Leaf bug .....	<i>Spanogonicus albofasciatus</i> .
Leafhoppers .....	Cicadellidae (several species).
Lucerne moth .....	<i>Nomophila noctuella</i> .
May beetles .....	<i>Phyllophaga</i> spp.
Meadow spittlebug .....	<i>Philaenus spumarius</i> .
Millipedes .....	Diplopoda.
Mole crickets .....	Gryllidae (several species).
Northern masked chafer .....	<i>Cyclocephala borealis</i> .
Oriental beetle .....	<i>Anomala orientalis</i> .
Periodical cicada .....	<i>Magicicada septendecim</i> .
Rhodesgrass scale .....	<i>Antonina graminis</i> .
Rose chafer .....	<i>Macrodactylus subspinosus</i> .

<i>Common name</i>	<i>Scientific name</i>
Scorpions .....	Scorpionida.
Slugs and snails.....	Gastropoda.
Sod webworms .....	<i>Crambus</i> spp.
Southern chinch bug .....	<i>Blissus insularis</i> .
Southern masked chafer .....	<i>Cyclocephala immaculata</i> .
Sowbugs and pillbugs .....	Crustacea.
Spiders .....	Araneida.
Thrips .....	Thysanoptera (several species).
Ticks .....	Acarina.
Tropical millipede.....	<i>Orthomorpha corarctata</i> .
Tropical sod webworm .....	<i>Herpetogramma phaeopterails</i> .
Twolined spittlebug .....	<i>Prosapia bicincta</i> .
Wireworms.....	Elateridae (several species).



*Use Pesticides Safely*  
**FOLLOW THE LABEL**  
U.S. DEPARTMENT OF AGRICULTURE

This edition incorporates changes in insecticide recommendations that make all previous editions obsolete. For this reason, all earlier copies should be destroyed.

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