INSECT PESTS OF LAWNS

By
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UNIVERSITY OF KENTUCKY
COOPERATIVE EXTENSION SERVICE
AGRICULTURE AND HOME ECONOMICS

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Much time and money are spent each year trying to establish and maintain attractive lawns. It is indeed discouraging to see such well intended efforts hindered by insect pests. Fortunately, many pests can be satisfactorily controlled if correct identification is made and then proper control methods used. In the following presentation, descriptions and controls will be given for some of the more important and common lawn pests of the state.

TYPES OF INSECTICIDES

Insecticides (insect killers) are sold commercially under various trade names in several package sizes. Usually, the trade name is not as important as obtaining the proper pesticide. Large packages of the material often are much more economical than similar concentrations sold in smaller containers. The user must, however, consider his needs and the convenience of the small package. Most formulations of pesticides offered for sale are stable and will not noticeably deteriorate if stored properly for a year. Even so, it is not recommended that the home user keep pesticides from one year to the next.

Insecticides are commercially available as liquids and as powders which can be added to water and applied as a spray. If wettable powders are used in water, frequent agitation is needed to keep the chemical distributed in the water. The label on the pesticide container will specify the amount of a formulation to be mixed in a certain amount of water.

Oil solutions of pesticides which are not mixable with water should not be used on lawns. Grass and other desirable plants are likely to be injured by the oil base, especially if the solution is applied during high temperatures.

Insecticides as dusts are not recommended for lawn insect pests, because they are likely to drift and are difficult to apply to turf.

In addition to liquids and wettable powders, granulated formulations of many insecticides are now available to the public. These ready-to-use dry preparations have a low concentration of pesticide applied to a pellet with a consistency near that of quartz sand. Mixing granulated insecticides with sand will increase the bulk so that the proper dosage can more easily be applied.

PRECAUTIONS

1. No pesticide should be stored near food products. Pesticides should be kept away from children, incompetent people, and pets.

2. Be sure that the pesticides are properly labeled. Follow carefully the directions on the label as to the necessary precautions. Never reuse pesticide containers. Instead, safely discard containers as soon as they are emptied.

3. Avoid unnecessary inhalation of pesticides and contact with the skin. If a toxicant is accidentally spilled on the skin, wash the area thoroughly with soap and water.

4. Let the grass dry thoroughly if a spray is used before permitting children to play on the lawn.

5. Do not allow pesticides to contaminate fish ponds or the eating utensils of pets. Empty unused spray mixes in areas where there is no danger of animal contact.

6. In case of accidental poisoning, call a physician at once. Inform him of the chemical name (printed on label) of the pesticide involved.

7. Use only the recommended dosage of a pesticide. Too little material will probably not give adequate control, whereas too much material may be wasteful and injure desirable lawn plants.

EQUIPMENT

Commercial Applicators

The type of equipment is not as important as even distribution of the correct dosage on the area to be treated. Chemical control of some insects can most easily be obtained by adding the pesticide to water and applying this mixture with a sprinkling can, but better results are usually obtained when a sprayer is used.

Many commercial sprayers are available for applying pesticides. Most of these sprayers when properly used will perform satisfactorily. All such equipment has its limitation, and usually effectiveness and durability will vary with the initial cost. Perhaps the best sprayers for home use are hand-operated, compressed-air sprayers with a capacity of 1 to 4 gallons.

Hand-pushed fertilizer spreaders can be satisfactorily used for applying granulated pesticides. However, an equally effective method of application is to broadcast granules evenly by hand (be sure to wear rubber gloves).

Calibration of Equipment

The simplest method of applying the desired amount of pesticide as a spray is to add the required amount of chemical to a relatively large amount of water and then repeatedly go over the lawn until all the water is used. After the first coverage it is best to go crosswise to the preceding spray pattern each successive time.

This procedure can be too much work for a large lawn, so a calibration of the water may be desirable. Use the following steps to calibrate a sprayer:

1. Measure water (example: 3 gallons into sprayer).
2. Measure an area of 1,000 square feet in size (example: 25 ft. x 40 ft.).
3. Spray evenly with the water until the area has been covered once.
4. Measure the amount of water that is left and subtract this amount from the original amount. (Example: 3 gallons–1 gallon = 2 gallons, the amount of water needed for treating 1,000 square feet.)
5. Put the necessary quantity of water in the sprayer, add the recommended amount of pesticide necessary for treating 1,000 square feet, and spray the lawn in 1,000 square-foot-areas at as nearly as possible the same speed as originally used for calibrating the sprayer.

Usually calibration directions are furnished when fertilizer spreaders are purchased. The setting with the smallest openings is often required for applying granulated insecticides.

Care of Equipment

After each use spray equipment and measuring utensils should be rinsed with clear water and dried before storing, as some pesticide formulations contain corrosive materials. Light oiling of movable parts is advisable. Do not use measuring utensils for other purposes.

2,4-D Contaminated Sprayers

Sprayers contaminated with 2,4-D may be used for all pesticides applied to the lawn. However, since it is very difficult to remove 2,4-D completely from equipment, *do not use sprayers contaminated with this herbicide for treating fruits, vegetables, or ornamental plants.*

HOW LONG DO INSECTICIDES LAST

The common soil insecticides have been shown to prevent the re-invasion of subterranean insect pests for several years. Foliage treatments are less enduring as the treated grass is removed by mowing, and the insecticide is subjected to weathering. Certain insecticides normally have a longer toxic effect than others against insects. Malathion and lindane in comparison with most other recommended insecticides break down more rapidly, but in general are quicker acting. All modern insecticides eventually lose their insecticidal properties, and insects and related pests may then re-enter a lawn.

INSECT AND OTHER ANIMAL PESTS

Lawns having high fertility may unfortunately have insect pests, because many insects thrive best on vigorously growing plants. Also, a weedy lawn does not necessarily attract more lawn pests than a

weed-free lawn, since bluegrass is one of the preferred food plants of some insects. Good lawn management can, however, encourage a vigorous growth of grass that has a better chance of overcoming insect injury.

How Insects Get in the Lawn

Many adult insects can readily fly short distances. They lay eggs, and the offspring infest new areas. Some adult wingless insects, such as fleas, depend on man or other animal hosts for transportation.

Immature insects in lawns do not have wings, and most do not crawl far from the place where they hatched unless there is a shortage of food or some disturbance.

Some insects have several generations or broods in a year and can become more numerous as the growing season progresses. Others have one generation per year. A few require more than one year to pass from the egg to the adult stage.

Grubs

Grubs are the immature or larval stage of a group of beetles (*Scarabaeidae*). They are usually about ½ to 2 inches in length when fully grown, depending on types, and are white or gray in color. Many will curl into the form of a "C" when taken from the ground. Grubs can seriously damage lawns by feeding on the roots of grass within about 1 to 2 inches of the soil surface. Sometimes grubs in a lawn are indicated by areas of grass which brown and die until the turf can be rolled up like a carpet, especially during hot dry weather. Mole burrows can also mean a grub infestation, as the mammals which make these tunnels feed largely on insects such as grubs in the soil.

Some grubs feed about 10 months before entering a non-feeding resting stage (pupal) in the soil, whereas other types may be active for 2 or 3 years before pupation. The adult beetles, which emerge from the pupal or resting stage, mate, and the females lay eggs which hatch into another generation of grubs.

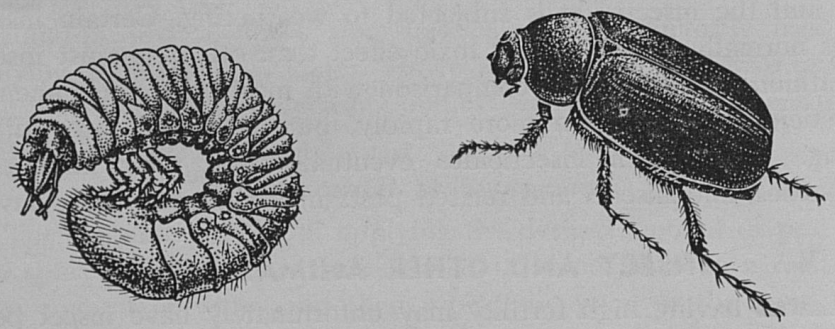

Fig. 1.—*White Grub.* (left) Larva or grub which is a notorious underground pest of grasses. (right) Adult or May beetle which can also injure plants.

The adult stage is the only one found above ground. Some common names for the various adults are May beetles, June "bugs," green June beetles, Japanese beetles, and others. Many beetles feed on above-ground portions of the plants, but the damage caused by the common types in Kentucky is usually not as important as that caused by the grubs.

Wireworms

Wireworms (*Elateridae*) measure about ½ to 1½ inches in length when fully grown and range in color from yellow to reddish brown. They are probably called wireworms because of their hard, slender, smooth bodies which somewhat resemble small pieces of wire. Wireworms live in the soil where they may damage grass and other plants by tunneling into the roots and underground portions of the stems during their feeding activities. Seedlings may be attacked in preference to older plants. Although wireworms can cause grass to wither and die, their presence in a lawn is seldom noticed unless plants more susceptible to their attack are introduced into the lawn.

The wireworms transform into pupae, which in turn change into the adults or click beetles, so-named because they are capable of

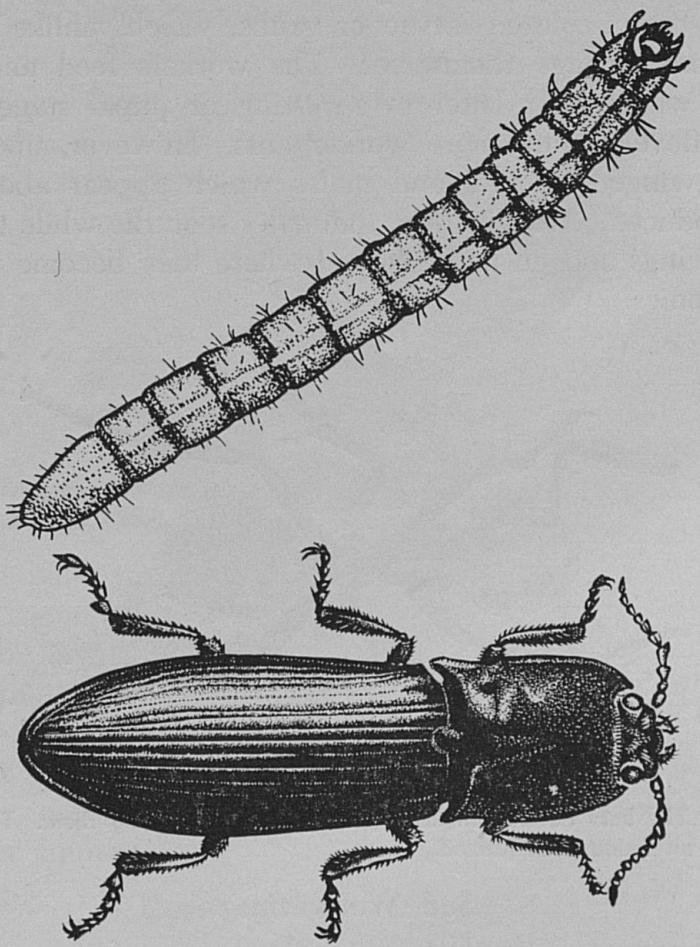

Fig. 2.—*Wireworm.* (top) Larva which is the most injurious stage to plants. (bottom) Adult which is called a click beetle and does no noticeable damage.

making a clicking noise when trying to upright themselves after being placed on their backs. The adults are not important as pests, as their feeding is difficult to detect. Some wireworms in Kentucky complete their life cycle in 1 year, while others require as long as 5 years, depending upon the kinds.

Ants

Ants (*Formicidae*) are considered social insects, and some live in colonies under the surface of the ground. Most do not eat grass leaves but may disfigure and destroy large areas of turf by loosening the soil surrounding the grass roots and by covering the foliage of grass with mounds of dirt around the entrance holes to the colonies. Grass seed may be prevented from germinating because ants have stored it in the underground chambers of their colonies. Some ants nesting in the lawn enter houses in search of food such as sweets and fats, and thus become household nuisances. Some ants are capable of inflicting very painful stings to people who disturb them.

The ant workers are responsible for obtaining food and caring for the colony. These wingless forms are the only members of the colony seen above ground during most of the year. Under the ground surface will be found wingless queen ants which lay eggs. The eggs hatch into cream-colored larvae or grubs, which, unlike the beetle grubs, do no damage themselves. The workers feed and care for the larvae which later enter in a resting or pupal stage. Most of the grubs develop into more worker ants. However, under certain conditions winged females and males which appear above ground may be produced. After mating, the males soon die while the females lose their wings and go underground where they become the queens of new colonies.

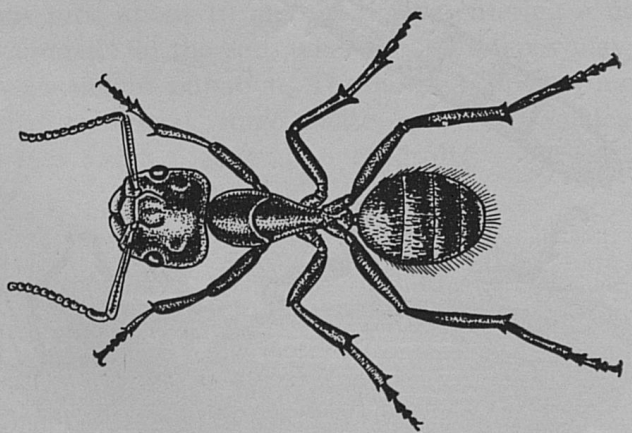

Fig. 3.— *Ant.* The busy adults can keep people busy combatting them. The egg, larva and pupa are all found underground.

Sod Webworms

Sod webworms (*Crambus spp.*), the larvae of some moths, are light brown in color with fine hairs distributed over the body. When

full grown they are about ½ to ¾ inch in length. Sod webworms are most likely to be pests of newly established lawns, but old lawns are by no means immune from attacks. Bluegrass is probably the preferred food plant of most kinds in Kentucky.

The pest is likely to be worse during dry years, especially if the lawn is regularly sprinkled. The webworms feed mainly at night and may cause irregular growth patches on the lawn where the grass is shortened at uneven heights. The pests do not molest the grass roots but instead feed on the tender green portions near the ground. During the day they may remain secluded in shelters constructed of grass clippings held together by silken webs (hence the name webworm) and located at the base of the plant. As the larvae become older they can rapidly crawl backward as well as forward and will often thrash wildly about if touched.

After gorging themselves on grass, the larvae go into the non-feeding, resting stage in the soil. Later, from the resting stage

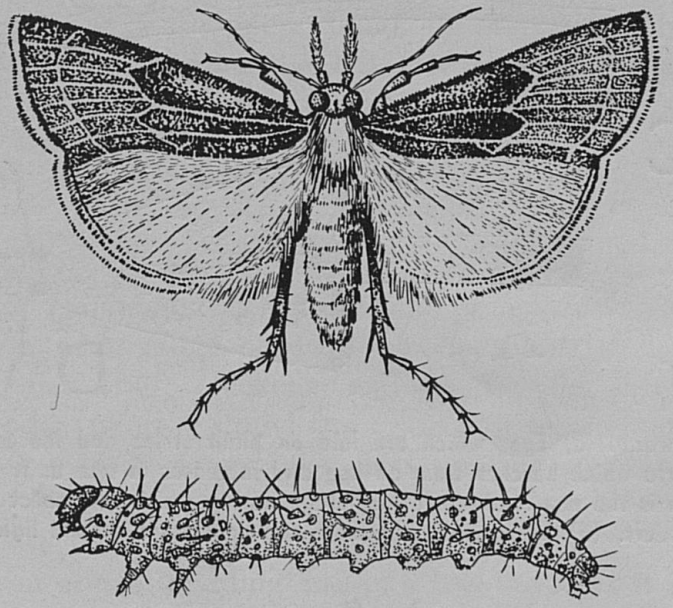

Fig. 4.— *Webworm.* (top) Adult which is a common moth seen erratically flitting about lawns. (bottom) Larva which damages the leaves and stems of grasses.

emerge the pale, brown adult moths, popularly called lawn moths, millers, or snout moths, which do no damage to the grass except indirectly by laying the eggs which produce the larvae. The moths may be numerous during the summer around lawns and shrubbery where, upon being disturbed, they will fly for a short distance in a rapid zig-zag pattern. Most sod webworms have at least two broods a year. The insects go through the winter as larvae which hibernate in the silken tunnels.

Cutworms and Armyworms

Cutworms and armyworms (*Noctuidae*) are larvae, or caterpillars, of various moths. The larvae range in length from about 1 to 2

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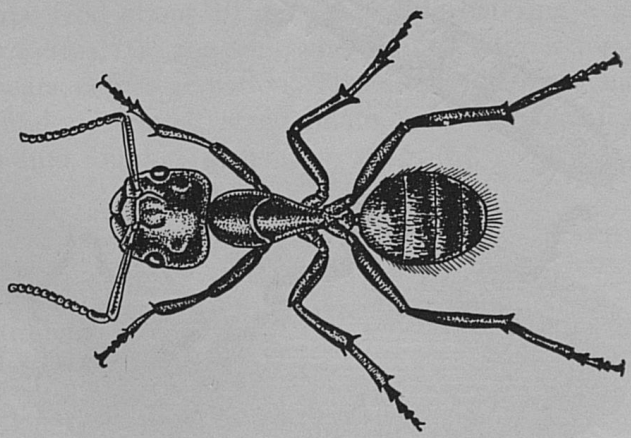

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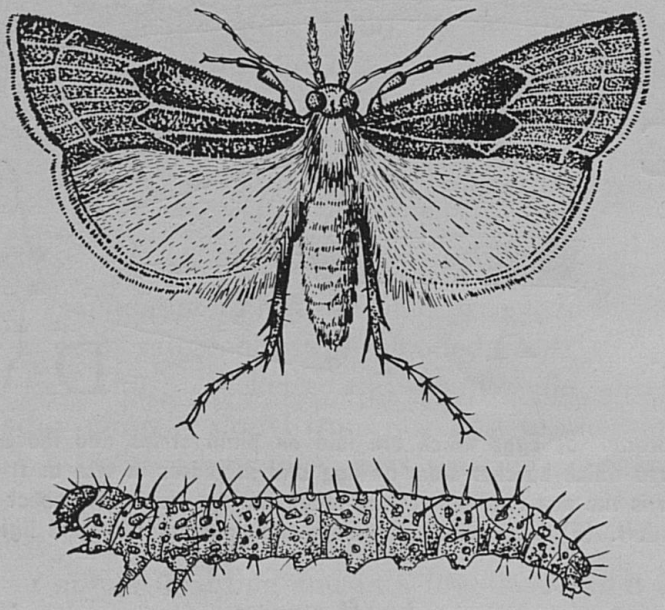

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inches when fully grown, and in color from green to nearly black. Some have stripes extending almost the length of the body. When numerous, certain types can devour the leaves and stems of grasses down to the ground. Other types clip the grass while feeding near the ground surface and the damaged leaves fall over.

Armyworms characteristically crawl en masse to new feeding locations, hence the common name. Most cutworms and armyworms feed mainly at night and stay hidden near the base of the plants during the day. Thus, their presence may go unnoticed until feeding damage has become extensive.

The adults, or moths, which do no direct plant damage are common summer visitors around lights at night. With most of the common kinds there is but one generation a year.

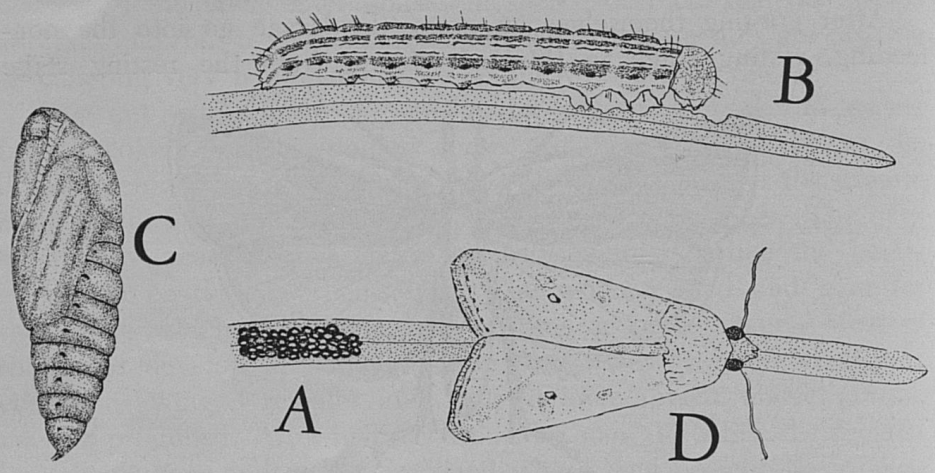

Fig. 5.— *Armyworm.* (a) Eggs which are laid on plant stems and leaves by the female moths. (b) Larva which hatches from an egg and increases in size as it feeds on plants. (c) Pupa which is the non-feeding, resting stage during which the insect transforms from a larva to an adult. (d) Adult which is a moth commonly seen around lights at night.

Leafhoppers

Leafhoppers (*Cicadellidae*) are tiny wedge-shaped insects ranging in color from yellow to dark gray. Most species in lawns are not over 1/5 inch in length. The young (nymphs) and adults are very similar in external appearance differing mainly in size and the presence of wings on the adults. As the common name implies, leafhoppers are capable of hopping for short distances on the foliage of plants. In addition to hopping, the adults of many species readily fly when disturbed.

Because of their small size and agility, leafhoppers are often not associated with the plant damage which they cause. Both the immature and adult leafhoppers can, however, seriously retard the growth of grass by sucking the sap from the stems and leaves. New seedings may actually be killed because of leafhopper feeding.

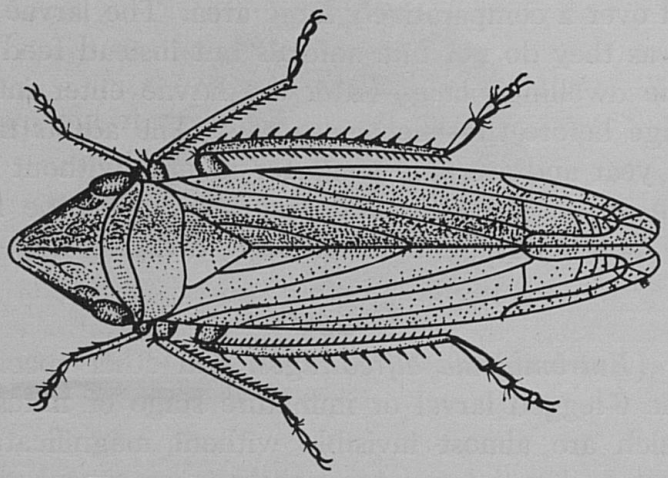

Fig. 6.— *Leafhopper.* This small pest is usually wedge-shaped and varies in color from pale green to dark brown. The young look very similar to the adults but do not have wings.

The pale areas in lawns caused by leafhoppers are often mistaken for drought damage.

Most species of leafhoppers build up to their largest, most damaging populations during the hot, dry months of summer and fall. Even if leafhoppers cause no plant damage, their presence on lawns would still be of concern because they annoy human beings when they are attracted to light in and around the home.

Fleas

Adult fleas (*Siphonaptera*) are small, wingless insects feeding externally on a wide range of warm-blooded hosts such as human beings, dogs, cats, rats, chickens, and many wild animals. Most adults will readily jump or crawl from one host to another. In addition to causing extreme annoyance, fleas may be carriers of certain germs causing diseases.

On the host the females usually lay eggs which drop to the ground, floor, or animal bedding and in a few days hatch into larvae. The scattering of the eggs in this way may cause a flea infestation

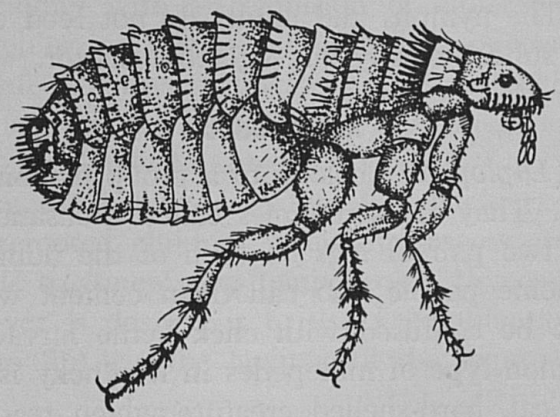

Fig. 7.— *Flea.* This is the adult stage which does the biting. The larvae or young do not feed on animals and are seldom seen.

to be spread over a comparatively large area. The larvae are usually not noticed, as they do not bite animals but instead feed on organic matter in the dwelling place. Later the larvae enter into a resting or pupal stage before they become adults. The adults may live for as long as a year and are able to go for months without food. Thus, when people go on vacations and take their pets, the fleas left at home await their return with increasingly ravaging appetites.

Chiggers

Chiggers (*Eutrombicula alfreddugesi* and other species), or red bugs, are the 6-legged larval or immature stage of mites. The tiny chiggers which are almost invisible without magnification can be very prevalent during the summer months in grass and weeds. They do not noticeably damage the grass but are important because of their annoyance to man. They readily get on humans and other animals when the opportunity affords and attach to the skin, often where clothing comes in contact with the body. When they feed on people, they inject a fluid which can cause extreme itching and produce inflamed reddish welts. Continual scratching may incite secondary infection.

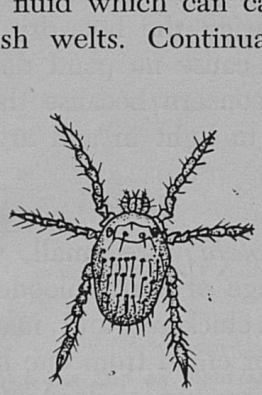

Fig. 8.— *Chigger Mite.* Shown is the tiny larval or six-legged stage which is more often felt than seen. The adult has eight legs and is not believed to bite people.

Many animals other than man serve as a host for chiggers. After the mite has become engorged on its host, it drops to the ground where it transforms into an 8-legged nymph and eventually into an adult mite. The nymphs and adults do not feed on man but instead probably subsist mostly on vegetable matter.

Millepedes

Millepedes (*Diplopoda*) belong to a group of animals closely related to insects. They are sometimes called thousand-legged worms because of the two pair of legs on each of the numerous segments of the body. Some people also call them cement worms or "wireworms" (not to be confused with click bettle larvae). When fully grown the common type of millepedes in Kentucky is a dark brown, slender, cylindrical, hard-shelled creature which reaches the length of about 1 inch. A young millepede is very similar in appearance

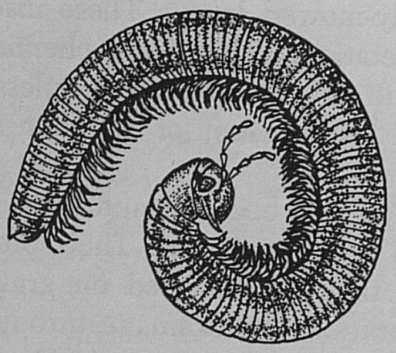

Fig. 9.— *Millepede.* Note the many pairs of legs. The pest often curls up when disturbed. Immature millepedes look similar to the adults.

to the adult except it is smaller and has fewer body segments and legs. It probably takes a year to complete a generation.

Millepedes ordinarily stay hidden in moist places where they are thought to feed mainly on decaying vegetation. As they do not noticeably damage the lawn, millepedes would not be of importance; however, in the fall of the year they tend to migrate into the house, especially when the house has recently been built. Millepedes are less likely to invade homes after freezing weather arrives. They seemingly can enter the house through a minute opening and will congregate on porches and in window wells, apparently because they are attracted to lights. Millepedes do not bite people or damage household furnishings but are objectionable in the home because of their appearance and offensive odor. They also will stain fabric if crushed upon it.

Other Animal Pests

Some types of bees and wasps construct nests in lawns, particularly if the location has a terrace or sloping bank. These insects may form mounds of dirt which interfere with the growth of grass; but the main reason for objecting to their presence is that some of them, for example the cicada killer, may inflict painful stings to human beings, especially if the nest is disturbed. For control, spray the nesting sites thoroughly with an emulsion of either aldrin, chlordane, dieldrin, heptachlor, or lindane. Use 2 fluid ounces of the emulsifiable concentrate per quart of water. Treat at night or if possible when the temperature is below 50°, as the wasps and bees will be less active and less likely to sting.

Bees visiting the blooms of white Dutch clover in lawns sometimes sting barefooted children when the insects are stepped upon. Since insecticide treatments are temporary in this case, the best solution unless clover is desired is to use a combination of 2,4-D and 2, 4, 5-T, and to fertilize the lawn until the legume is replaced by grass.

Grasshoppers are notorious pests of grasses but are seldom a

problem in frequently-mowed lawns. These insects prefer to inhabit somewhat rank vegetation. Therefore, chemical control of grasshoppers in lawns will not be necessary unless food plants in surrounding areas have been eaten or are not attractive because of drought.

Earthworms sometimes become numerous in lawns, especially if the soil is high in organic matter. Their presence is usually considered desirable as they do not feed on grass to any extent, and they may aid soil aeration and drainage through their tunneling activities. Seldom will chemical control be necessary. Most of the insecticides applied at dosages sufficient to control insects will not kill earthworms.

Cluster fly maggots are parasitic in earthworms. The adults do no damage but can become extremely annoying because of their seemingly constant buzzing when they enter houses in large numbers in the fall. No effective control has been found.

Moles commonly burrow in lawns and obtain various insects, earthworms, and related animals for food. They do not ordinarily feed on plants but may loosen the soil around the roots and cause grass to die when the soil moisture is low. Also, the mounds of dirt are unsightly and may cause difficulty in mowing the lawn. Treating the lawn for soil insects will often discourage mole activities for long periods of time, but the results are slow.

With proper skill moles can be caught in traps such as the choker-loop or diamond-jaw trap placed in active runways. Moth balls or crystals will act as repellents to moles when inserted at about 10-foot intervals into the main burrows. Carefully close the openings through which the material has been placed. Cyanide dust is effective in the runways but should be used with *extreme caution*. Poisoned grain baits are commonly used but usually give poor results.

Pest	Insecticide and Dosage of Formulation per 1,000 Square Feet[2]	Comments

CONTROL RECOMMENDATIONS FOR LAWN INSECTS AND RELATED PESTS[1]

Pest	Insecticide and Dosage of Formulation per 1,000 Square Feet[2]		Comments
Grubs Wireworms Ants	Aldrin	1⅓ lb of 5% Gran 4½ oz of 25% W P 4½ fl oz of 2 lb/gal E C	Apply the insecticide when the soil is reasonably dry, and then thoroughly water the chemical into the turf to obtain the quickest results. Even so, it may take several weeks before the insecticide has sufficiently penetrated the soil to kill the pests. One application can prevent damage from grubs and wireworms for more than one year.
	Chlordane	2⅔ lb of 5% Gran 5½ oz of 40% W P 2 fl oz of 8 lb/gal E C	
	Dieldrin	1⅓ lb of 5% Gran 4½ oz of 25% W P 6 fl oz of 1.5 lb/gal E C	Commercial dust preparations containing bacterial spores are available for the control of Japanese beetle grubs. These spores are not effective against most other species of grubs.
	Heptachlor	Same dosages and formulations as given for aldrin	If only a few scattered ant mounds are present, do not treat the entire lawn; instead, treat an area 6 to 12 inches in diameter around the opening of each nest. Granulated insecticides are convenient for this use. Repeat the process if new mounds appear.
Cutworms Armyworms	Use W P or E C formulations listed for grubs, wireworms, and ants but use half the dosage. Or apply:		Do not water the insecticide into the soil as armyworms and most cutworms, unlike soil insects, feed on the portions of the plant above ground. Seldom will more than one insecticide application per year be necessary.
	DDT	4 oz of 25% W P 4 fl oz of 2 lb/gal E C	
	Toxaphene	2 oz of 40% W P 1 fl oz of 6 lb/gal E C	
Leafhoppers	DDT	3 oz of 25% W P 3 fl oz of 2 lb/gal E C	Leafhoppers can rapidly move back into a lawn from untreated areas, so it may be necessary to treat about every 4 weeks during summer and fall if leafhoppers are numerous.
	Malathion	3 oz of 25% W P 1⅓ fl oz of 5 lb/gal E C	

CONTROL RECOMMENDATIONS FOR LAWN INSECTS AND RELATED PESTS[1]

Pest	Insecticide	Dosage of Formulation per 1,000 Square Feet[2]	Comments
Sod Webworms	Toxaphene	4 oz of 40% W P 2 fl oz of 6 lb/gal E C	Cut the grass before applying the insecticide and then do not mow for about one week after application. When sod webworms are numerous, more than one application will probably be necessary. Granulated insecticides have not proven very effective.
	Diazinon	2 oz of 25% W P 2 fl oz of 2 lb/gal E C	
Fleas	Lindane	1½ oz of 25% W P 2 fl oz of 1.65 lb/gal E C	Successful control of fleas may involve bathing and treating pets and getting rid of fleas on the inside of buildings as well as on the lawn. Two or more insecticide applications may be necessary to control these pests on a lawn, especially if lindane or malathion is used as there is a relatively short residual effect.
	Malathion	3 oz of 25% W P 1⅓ fl oz of 5 lb/gal E C	
	Diazinon	1 oz of 25% W P 1 fl oz of 2 lb/gal E C	
Chiggers	Dieldrin	2 oz of 25% W P 3 fl oz of 1.5 lb/gal E C	Prolonged control of chiggers can be obtained by treating the lawn, but more than one chemical application may be necessary.
	Heptachlor	2 oz of 25% W P 2 fl oz of 2 lb/gal E C	Commercial repellents containing diethyl toluamide, ethyl hexanediol, dimethyl carbate, or Indalone will satisfactorily prevent chiggers, fleas, and some other pests from biting when properly applied to the skin or clothing.
	Lindane	½ oz of 25% W P ½ fl oz of 1.65 lb/gal E C	
	Toxaphene	2 oz of 40% W P 1 fl oz of 6 lb/gal E C	
Millepedes	Heptachlor	10 lb of 5% Gran (about 20 lb for the average size home)	The insecticide should be applied in a band at least 10 feet wide surrounding the house. Keeping porch lights off will help prevent entrance of millepedes into the home.
	Diazinon	1 pt of 2 lb/gal E C	

1 Modified from USDA Home and Garden Bul. 53, 1956.

2 If a formulation has a different amount of active ingredients from that listed above, then use proportionally more or less. For example, half as much of 10% granulated heptachlor would be used. When measuring liquids, 3 teaspoons = 1 tablespoon, 2 tablespoons = 1 ounce, and 16 ounces = 1 pint. Wettable powders and granules vary in density and thus need to be weighed instead of measured.

Abbreviations: Gran = granules; W P = wettable powder; E C = emulsifiable concentrate; lb = pound; oz = ounce; lb/gal = pounds per gallon; and pt = pint.

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