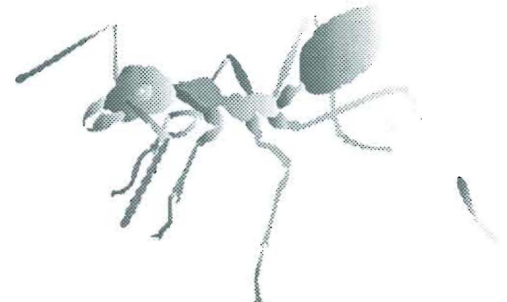
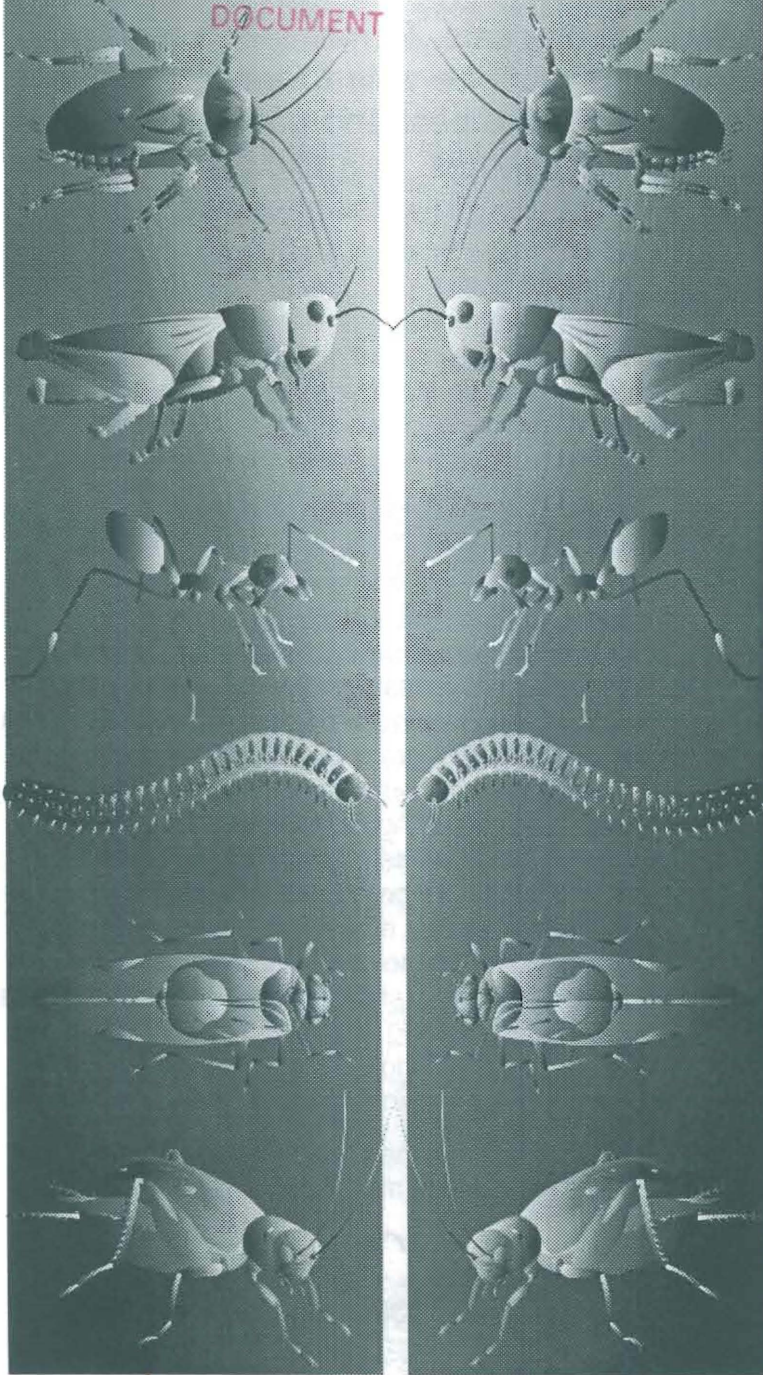


E-904 (Revised)



NORTH DAKOTA  
STATE DEPOSITORY  
DOCUMENT



# Lawn Pests in North Dakota

**Phillip Glogoza**  
Extension Entomologist

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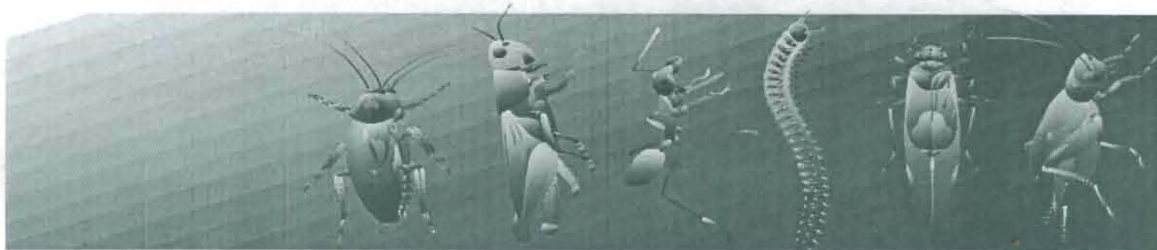


**NDSU EXTENSION SERVICE**

North Dakota State University, Fargo, ND 58105

APRIL 1997

## Lawn Pests in North Dakota



Even the most beautiful lawns can be troubled by pests. To maintain a healthy lawn, homeowners and lawn care professionals must be able to recognize the symptoms of pest damage and be able to identify the pest and understand its life cycle in order to apply appropriate and effective controls. This circular discusses the life histories and control strategies of the common invertebrate lawn pests of North Dakota.

### SOD WEBWORMS

Sod webworms are a complex of several species of moths in the family Crambidae with similar biologies and appearance. Damage to lawns is caused by the larval or caterpillar stage.

**Damage Symptoms:** Sod webworm lawn damage is caused by the larvae feeding at night on the leaves, crown and roots of grass and is usually first noticed during periods of hot dry weather as grasses become dormant. Prior to the appearance of browning, homeowners may notice large numbers of robins, blackbirds, grackles or flickers feeding in concentrated areas. Brown irregular spots and later ragged uneven patches of grass are the first indications of lawn damage. The grass on the edge of dead patches is short or uneven from the feeding activities of the larvae. A search for the larvae should concentrate in the thatch of the margins of dead patches since this is where active feeding occurs. If the infestation is heavy, large areas of grass may be damaged severely or destroyed in only a few days. Sod webworm moths do not feed on lawns but are frequently observed flying over the lawn on calm evenings as they move about to lay eggs.

Sod webworms have a preference for newly seeded, thick lawns. They prefer bentgrass, bluegrass, fescue and timothy, as well as pasture and field grasses.

**Biology and life cycle:** Sod webworm moths (Figure 1) first appear in late May to early June and range from 1/2 to 3/4 inch long and are whitish-gray or brown. They fold their wings tightly over their bodies at rest and have a prominent projection on the front of the head that forms a distinctive snout. At rest on the grass, they resemble pieces of a wooden match stick attached to a grass blade. The front wings are triangular, narrow and have a distinctive wing scale pattern. The front wing scale pattern may have a distinctive silver, white or black longitudinal streak. The hind wings are broad and lack distinctive markings. During the day, moths hide in shrubbery and dense turf near the soil and seldom move until disturbed, moving a short distance from their original roost. Toward evening, mated females fly about the lawn and lay their eggs in the grass crowns. Each female may lay several hundred eggs over a period of one to 10 days.

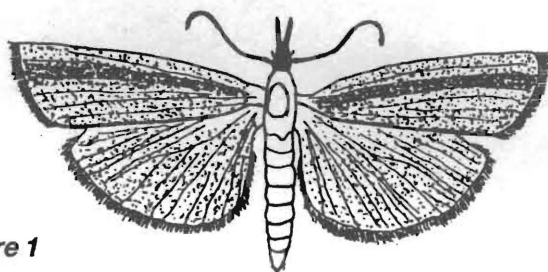
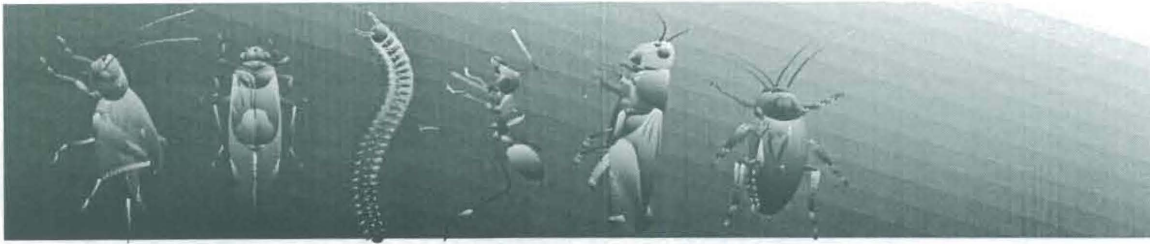


Figure 1





## Lawn Pests in North Dakota

Eggs are small, oval and white when first laid but turn pale yellow to bright scarlet before they hatch. In one to two weeks, the eggs hatch and the first stage larvae begin to feed on grass. The larvae (Figure 2) are active, thick bodied and 1/4 to 1 inch long. The head is dark brown and the body is grayish to milky white, often with dark spots. Each larva constructs a loose silken web, containing bits of debris, on the surface of the ground, which leads to a silk-lined tunnel at the base of the plant where the larva lives (Figure 3). Larvae emerge from their tunnels at night to collect blades of grass which they pull into their tunnels and feed upon. Some feeding may occur on the roots and crowns of the grass and noticeable thinning of the lawn will be apparent. After the larvae have reached maturity, they burrow into the soil and spin a silken cocoon where pupation occurs.

Pupation lasts about 14 days, with the pupae ranging from 5/16 to 1/2 inch long. Initially they are light yellow but, as they mature, they become dark brown.



Figure 2

The moths then emerge and start a new generation. In North Dakota, sod webworms have one to two generations per season. Webworms overwinter in the egg stage or as larvae within special chambers in the soil known as hibernacula. Larvae emerge from these chambers or hatch from eggs in the spring to continue the life cycle.

**Natural enemies:** Natural enemies of sod webworms, such as disease, parasites and predators, keep most populations below damaging levels, but if notable damage develops, chemical control measures may be necessary.

**Sampling methods:** The presence of adult sod webworms may be determined during walks through the lawn or while mowing the lawn. The moths emerge from the grass and fly about 2 to 4 yards with a quick, jerky, zigzag flight before again landing. Adult moths do not damage the lawn, so sampling for larvae is recommended.

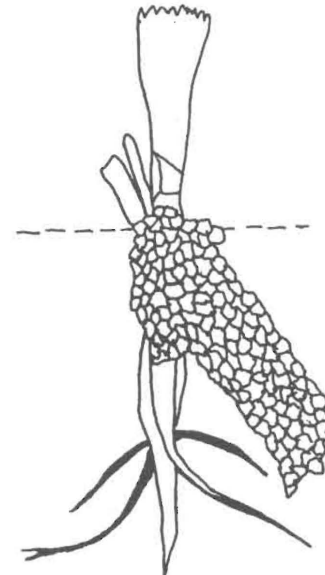
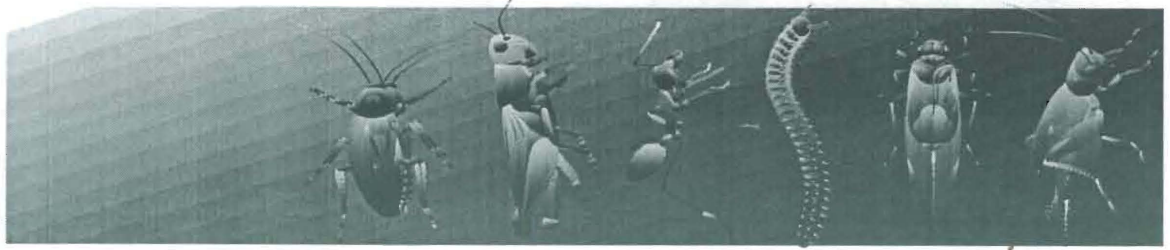


Figure 3

Webworm infestations may also be determined by breaking apart 6-inch square sections at the edge of dying sod. Control of larvae is recommended if an average of three to four larvae are found per 6-inch square section of sod. See control table for chemicals registered for sod webworm control.

**Cultural practices:** Cultural practices will not control webworms in lawns. Sod webworm problems in lawns are most apparent from July to September as larval populations increase and the growth of grass slows down. Routine lawn care will aid the lawn in withstanding damage and will aid recovery from damage but will not stop the feeding activity of the larvae. The development of resistant strains of grass may provide a future means of reducing or stopping larval damage.



## WHITE GRUBS

White grubs are the larval stage of June beetles (*Scarabaeidae: Phyllophaga spp.*). The different species of white grubs that infest lawns cause similar turf damage and are similar in appearance.

**Damage symptoms:** Grub damage in lawns occurs when larvae feed on the roots of grass causing the grass plant to turn brown and die. The size of the brown patches varies depending on the number of larvae feeding in a particular area. Dead patches become more noticeable as the summer growing season progresses. Feeding damage of grubs separates the turf from the roots so effectively that the turf and thatch can be rolled or pulled up like carpeting, often exposing the larvae below. The larvae also damage the roots of pasture grasses, corn, small grains, strawberries, potatoes and other garden vegetables.

In areas with large June beetle populations, adult feeding may cause minimal defoliation in flower beds, shrubs (e.g. dogwood and honeysuckle) and trees (e.g. bur oak, birch, hackberry, willow, elm, ash, poplar and cottonwood).

**Biology and life cycle:** The life cycle of June beetles varies from two to four years depending on the latitude and the particular species. The majority of species inhabiting North Dakota have a three-year life cycle (Figure 6). The cycle begins when adults emerge in late May or early June. Adult beetles (Figure 4) are oval and robust, tan to dark brown and 1/2 to 1 inch long. The wing covers are hard and may be smooth and shiny or covered with short hairs. Newly emerged adults mate and the females burrow 3 to 7 inches into the soil to lay eggs. Each egg is placed in a cavity in the center of a ball of soil. A single adult female will lay about 50 eggs during her life. The eggs are pearl white, oblong and approximately 1/10 inch long. Eggs hatch in three to four weeks into milky white first stage "C-shaped" larvae (white grubs) which will grow to about 1 inch long by maturity (Figure 5). The larvae have a hard brown

head capsule with a soft, shiny, creamy-white transparent body which is dark gray to blackish at the rear portion. Six prominent brownish legs are present right behind the head. The newly emerged larvae move upward in the soil to the root zone of the grass to begin feeding. The larvae feed on the roots throughout the summer. In the fall, they burrow deeper into the soil to hibernate during the winter. The larvae move upward and resume feeding on grass roots the following spring (Figure 6).

The larvae feed throughout the second summer, burrowing deep into the soil in the fall to hibernate. During the following spring, the larvae feed for a short period, burrow back into the soil and form earthen cells for pupation. During this nonfeeding stage, the pupae (Figure 7) transform into adults. Pupation will be completed during the third summer but the adults do not emerge until the following spring. The three-year cycle is repeated when the adults emerge.

**Natural enemies:** There are several natural controls that may effectively reduce the grub populations to levels where chemical control is not required. White grubs are susceptible to infections by viruses, bacteria, fungi, parasitic nematodes, parasitic mites, parasitic wasps and parasitic flies. Vertebrate predators such as crows, woodpeckers, grackles, gulls and skunks will rout for grubs in infested lawns.

**Sampling methods:** In areas where June beetles are a problem, light traps (or porch lights) may be used to monitor adult emergence. The adult beetles are nocturnal and males are attracted to light. Insecticides applied to the lawn at the time of beetle emergence will kill the females as they burrow back into the ground to lay their eggs.

Sample for larvae by removing strips of sod 1 square foot by 3 to 4 inches deep and counting the number of larvae. Samples should be taken from several areas of the lawn representing both healthy and affected areas. Control should be initiated when there are an average of three to four white grubs per square foot.



# Lawn Pests in North Dakota

**Cultural practices:** Regularly scheduled lawn maintenance is a good means of deterring the activities of the larvae. Adult egg-laying females are attracted to bare patches or thinned out areas on the

lawn. Maintaining a healthy lawn by proper cutting, fertilization and dethatching makes the lawn less attractive to the egg-laying females. If the lawn again becomes infested, it is better able to withstand damage and recover.

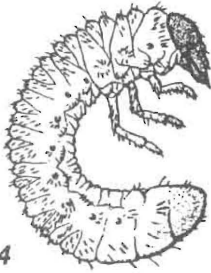


Figure 4

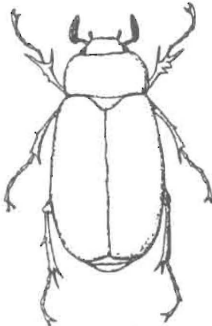


Figure 5

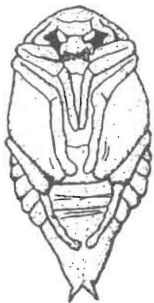


Figure 7

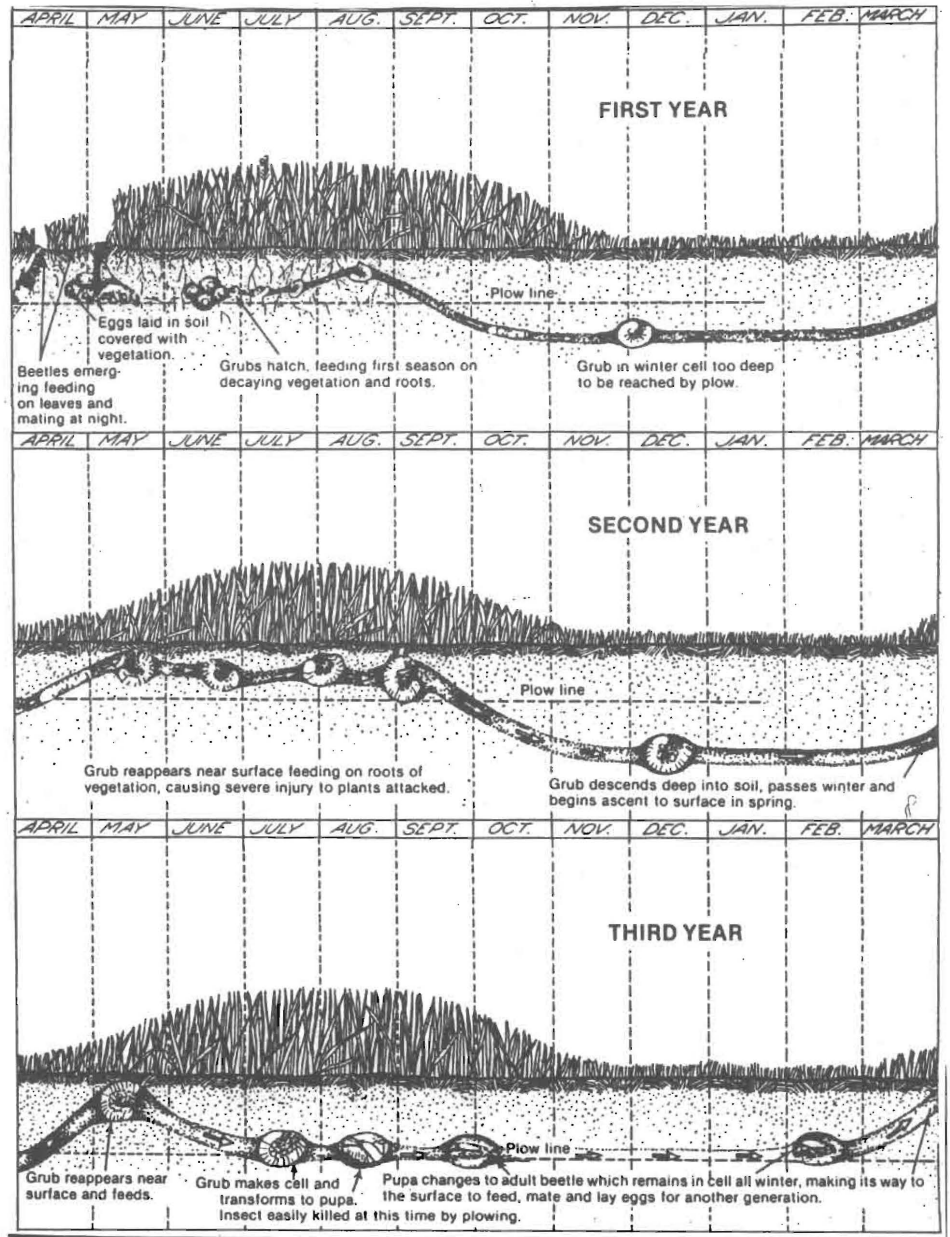


Figure 6

# Lawn Pests in North Dakota



## ANTS

Ant species discussed in this report are attracted to lawns because this habitat provides sites for their nesting activities. There are about 10 species of ants that can establish nests in or around lawns and houses. None feed directly on grasses but can utilize seeds, secretions and other insects that are attracted to the lawn habitat. Most ant activity is beneficial, but nesting activity at times becomes unsightly and may annoy homeowners.

**Damage symptoms:** Any damage associated with ants is due to the activities of the worker or foraging caste of ants. Harvester ants may remove the grass from around their nests. This produces large bare patches. Ants which culture aphids on grass roots can cause indirect damage due to aphids feeding on the grass. In addition, ants may damage the grass roots around the colony while excavating galleries. Large mounds produced by certain species may detract from the appearance of the lawn as well as make mowing difficult. Some common lawn inhabiting ants are very aggressive and can attack when their colonies are disturbed, inflicting a painful sting. Ants may invade homes during foraging activities causing distress to homeowners.

**Biology and life cycle:** Ants can sometimes be identified by their nest building habits or food preferences. The western harvester ant is a seed gatherer. It produces large pebble-covered mounds and frequently clears the vegetation from large patches of lawn. The silky ant produces low, medium sized earthen mounds, tends aphids on plants and scavenges dead insects for food. The other species found in lawns produce small inconspicuous mounds or no mounds at all. The activities of ants are most obvious following rains when they reexcavate their collapsed galleries and deposit soil particles on the surface. Most lawn ants collect honeydew and scavenge for dead insects and seeds as food.

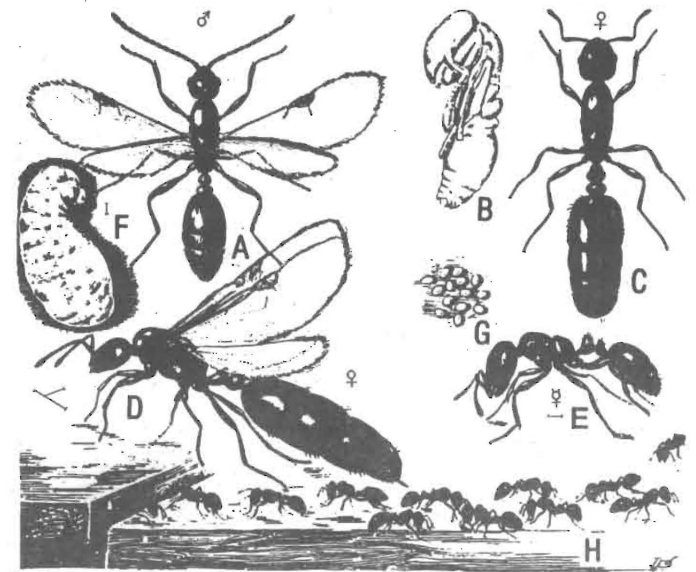


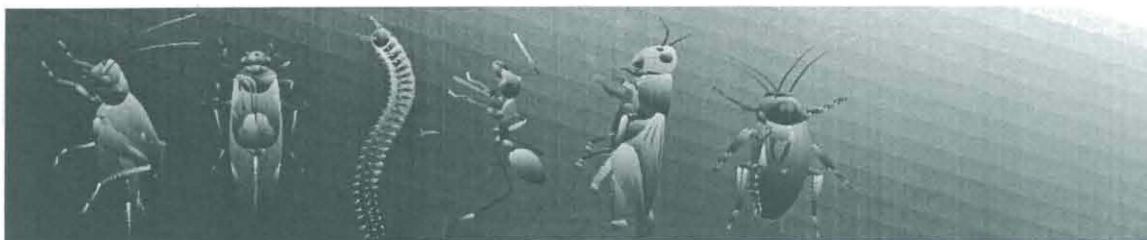
Figure 8

Adult ants in a colony include a fertile female queen (Figure 8c), sterile female, workers (Figure 8e), winged males (Figure 8a) and virgin queens (Figure 8d). Virgin queens and males have two pairs of wings. The queen is the largest ant in the nest, often being twice the size of the workers. Males may be almost as large as the queen and the workers are the smallest individuals in the colony.

When temperatures drop in the fall, ants become less active and congregate in the deeper chambers of the nest where they pass the winter. In the spring, ant activity resumes and they move to the upper chambers of the nest to reproduce and collect food. Within the colony, the queen lays eggs (Figure 8g) and workers tend to the queen. Worker ants maintain the colony by foraging for food and tending the young (Figures 8b and f). Several generations of young are reared each summer.

Queens and males are produced once during the season by each colony. Winged males and winged virgin females leave the colony to mate and form a new colony. Timing of the emergence of reproductives varies from species to species. After mating, the males die. Fertilized queens search for a nest site, strip their wings and excavate a brood chamber.





Within this brood chamber, the queen lays and rears the first brood of workers. As the first brood of workers become adults, they take over the colony maintenance, foraging and brood care. The queen's role in the colony is solely egg laying once the nest is established. A queen may live for many years. The actual life span of a queen is species dependent and in some colonies she may be replaced several times during the life of a colony.

**Natural enemies:** Ants are parasitized by a number of species of parasitic wasps and are preyed upon by birds, reptiles, amphibians and predaceous insects. Most parasitism and predation is directed at the worker caste and has little impact on a healthy colony.

**Sampling methods:** There are no established methods to sample quantitatively for ants in lawns. Treatment is only warranted if ant activity in the lawn produces unsightly mounds or bare patches.

**Cultural practices:** Cultural practices have little impact on ant activity, but proper lawn maintenance will enhance a lawn's ability to withstand and recover. The activity of most ant species are beneficial to lawns since they aid in soil aeration and feed on harmful insects.

## EARTHWORM

This category is a complex of species that includes night crawlers, garden earthworms and red worms (*Anellida: Lumbricus spp.*). These animals are segmented terrestrial worms that normally inhabit healthy lawns with their presence seldom causing alarm. Earthworms are found in almost any soil which has adequate moisture and nutrients.

**Damage symptoms:** Very high earthworm populations may disrupt the roots of grass and plants in the lawn. The main concern to homeowners is the castings left on the soil surface that make the ground uneven and the lawn unsightly. The castings are evidence of worm digging activity because worms must eat their way through the soil and excrete the ingested soil on the surface. As these castings dry, they become hard and unpleasant to walk over.

**Biology and life cycle:** Earthworms are most abundant in moist heavy soil situations. Earthworms will migrate deep in the soil during the fall and return toward the soil surface in the spring. During the summer months, the proximity of earthworms to the surface depends upon the availability of soil moisture. Earthworms (Figure 9) are long and tubular. They have approximately 150 segments with the skin being covered with a secreted lubricating mucus. Each body segment possesses bristles that can be felt if the finger is rubbed against the underside of the worm. The worms also possess a distinctive raised smooth structure, the clitellum, about a third of the distance from the anterior end.

At night during spring and early summer, earthworms will mate and deposit fertilized eggs within a cocoon on or near the soil surface. Each cocoon will contain from two to 20 eggs with an average of four. The cocoons are oval and approximately 1/8 inch long,

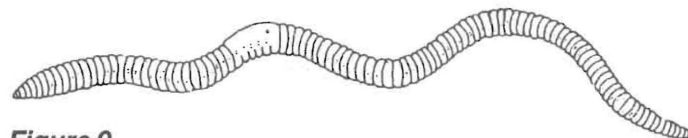
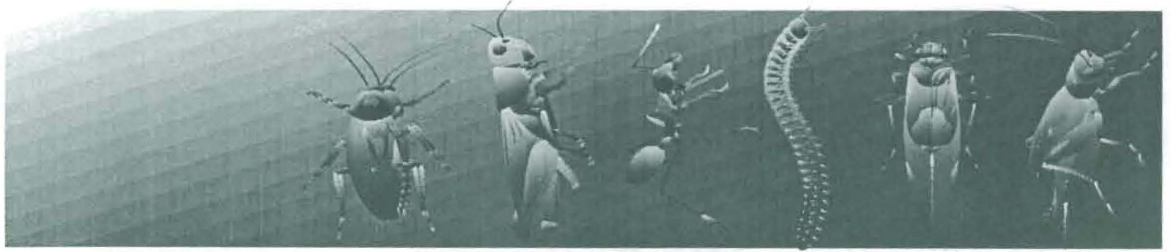


Figure 9



with the eggs hatching in two to three weeks. Once hatched, the young worms begin tunneling and feeding in the soil.

**Natural enemies:** Earthworms are preyed upon by ants, centipedes, birds, snakes, beetle larvae and toads. They are also parasitized by species of protozoa, nematodes, fly larvae and mites.

**Sampling methods:** There are no established methods of sampling for earthworms in lawns. The presence of earthworms can be determined by finding castings in the lawn or earthworms on the surface of the soil or sidewalk following a rain. Control is necessary only when the earthworm population develops to levels that damage the lawn or when castings severely roughen the surface of the lawn.

**Cultural practices:** Routine lawn maintenance schedules indirectly benefit worms. The healthier the lawn, the more attractive it is to earthworms. Worms, for the most part, benefit the lawn by recycling nutrients and aerating the soil. Excessive castings left by worms may be flattened with either a power rake or a weighted lawn roller when the surface of the soil is damp. Annual power raking each spring is often sufficient to destroy castings from season to season.

## ADDITIONAL READINGS

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### EARTHWORMS


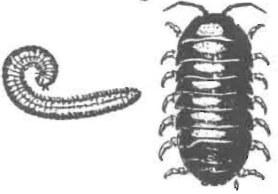


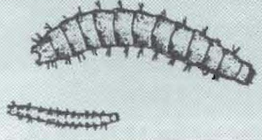
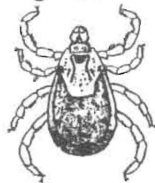
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## Other Pests Associated With Lawns

| Overwintering Insect or Other Arthropod Pest   | Stage and Location                          | Generations /Year                               | Host Attacked   | Part(s) of Plant Attacked and Symptoms                                    |
|--|---|---|---|---|
| Leafhoppers<br>(Several spp.)<br>   | Eggs in stem and adults in protected areas. | several   | Grass   | Leaves spotted at feeding site. Tiny wedge-shaped insects fly from grass. |
| Millipedes and Sowbugs<br>          | Adults and eggs in and on soil.             | 1   | Feed on decaying organic matter. Hide and migrate in grass. | Eat roots of plants. Heavy populations are themselves annoying.           |
| Grasshoppers<br>(Several sp.)<br> | Eggs in pods in the soil.                   | 1   | Grass   | Eat foliage.  |
| Crickets<br>                      | Eggs in the soil.                           | 1   | Grass   | Eat foliage. Enter homes in fall.   |
| Wireworms<br>                     | Larval and adult stages in soil.            | Up to 7 years development. Generations overlap. | Wild and cultivated grasses.                                | Wilting and dying areas. Roots eaten and tunneled by larvae.              |
| American Dog Tick<br>             | Adults and nymphs in the thatch.            | 1   | Man and pets.   | Ticks attach to man and pets. Possible vector of human and pet diseases.  |

# Commercial Lawn Pest Control

| PEST        | INSECTICIDE                             | RATE                                     | REMARKS  |
|-------------|---|--|--|
| WHITE GRUBS | carbaryl (several formulations) (Sevin) | Follow label rates for white grubs.      | Water into sod after application.  |
|             | chlorpyrifos (2E & 4E) (Dursban)        | Follow label rates.                      | Water thoroughly, immediately after application.   |
|             | chlorpyrifos 2.3 (Dursban)              | 1 lb./1000 sq. ft.                       | Water lawn immediately after application with 30 gal. of water/1000 sq. ft.  |
|             | diazinon 25% EC                         | 4 fl. oz. in 12 gal./500sq. ft.          | Water immediately into soil after application. Do not use on golf courses or sod farms.  |
|             | diazinon 5 G                            | 2.5 lbs./1000 sq. ft.                    | Apply when grass is dry and water after application. Do not use on golf courses or sod farms.  |
|             | isazophos 4E (Triumph)                  | 1.5 fl. oz./1000 sq. ft.                 | Apply in sufficient water to ensure uniform coverage. As soon as application is complete, apply ½ inch of water but stop watering before puddling or runoff occurs. Do not treat golf course fairways. |
|             | isofenphos 22% EC (Oftanol 2)           | 3.0 fl. oz./1000 sq. ft. or 1 gal./acre  | Water lawn thoroughly within 12 hours of the application, using sufficient water to wet the soil to a depth of 1 to 1½ inches.   |
|             | isofenphos 5 G (Oftanol)                | 0.9 lb./1000 sq. ft.                     | White grub control will occur only after rain or watering moves the insecticide into the top 1 to 1½ inches of soil.   |
| SOD WEBWORM | bendiocarb 76% EC (Turcam)              | ½ to 1 fl. oz./1000 sq. ft.              | Apply when pest is evident. Use adequate quantity of water to thoroughly moisten grass and thatch.   |
|             | carbaryl (several formulations) (Sevin) | Follow label rate for sod webworm.       | Insure good penetration of turf. For best results mow lawn and apply after a rain or watering. Repeat at 2 to 3 week intervals if needed.  |
|             | chlorpyrifos (2E & 4E) (Dursban)        | Follow label rates                       | Delay watering for 12 to 24 hours after application.   |
|             | chlorpyrifos 2.3 G                      | 1 lb./1000 sq. ft.                       | Water lawn immediately after application with 30 gal. of water per 1000 sq. ft.  |
|             | diazinon 25% EC                         | 8 fl. oz. in 24 gal. water/1000 sq. ft.  | Thoroughly wet down grass a few hours before applying. Do not use on golf courses or sod farms.  |
|             | diazinon 5 G                            | 2 lb./1000 sq. ft.                       | Apply when grass is dry and water after application. Do not use on golf courses or sod farms.  |
|             | isazophos 4E (Triumph)                  | 0.75 fl. oz./1000 sq. ft.                | Apply in sufficient water to ensure uniform coverage. As soon as application is complete, apply ½ inch of water but stop watering before puddling or runoff occurs. Do not treat golf course fairways. |
|             | isofenphos 22% EC (Oftanol 2)           | 1.5 to 3 fl. oz./1000 sq. ft. treatment. | Apply ¼ to ½ inch of water within 12 hours of application.   |
|             | isofenphos 5 G (Oftanol)                | 0.9 lbs./1000 sq. ft.                    | Apply ½ to 1 inch of water within 24 hours of application.   |



## Commercial Lawn Pest Control (Continued)

| PEST | INSECTICIDE                             | RATE                         | REMARKS  |
|------|---|------------------------------|--|
| ANTS | bendiocarb 76% EC (Turcam)              | 0.5 to 1.0 oz./1000 sq. ft.  | Apply to hills and surrounding areas. Use adequate quantities of water to thoroughly moisten grass and thatch.   |
|      | carbaryl (several formulations) (Sevin) | Follow label rates for ants. | Same as above.   |
|      | chlorpyrifos (2E & 4E) (Dursban)        | Consult label for rates.     | Same as above.   |
|      | chlorpyrifos 5.3 G (Dursban)            | 1 lb./1000 sq. ft.           | Spot treat areas where ant hills are abundant. Water with ¼ to ½ inch to activate the insecticide.   |
|      | diazinon 25% EC                         | 2 tsp./gal.                  | Spot treat ant hills and surrounding areas. Thoroughly moisten the grass and thatch. Do not use on golf courses or sod farms.  |
|      | diazinon 5 G                            | 2 lbs./1000 sq. ft.          | Spot treat ant hills and surrounding areas. Water with ¼ to ½ inch to activate the insecticide granules. Do not use on golf courses or sod farms.  |
|      | isazophos 4E (Triumph)                  | 0.75 fl. oz. /1000 sq. ft.   | Apply in sufficient water to ensure uniform coverage. As soon as application is complete, apply ½ inch of water but stop watering before puddling or runoff occurs. Do not treat golf course fairways. |

- EARTHWORMS** There are no lawn insecticides that list earthworms on the label of pests controlled. Publications from Ohio State University have listed the toxicity of the common lawn insecticides to earthworms. The only lawn insecticide that is listed as highly toxic to earthworms is carbaryl (Sevin). From this information the following control procedure is suggested:
1. In early spring, lightly roll or power rake the lawn to remove old worm castings.
  2. Thoroughly water the lawn several hours before the application is to be applied.
  3. Apply liquid carbaryl (Sevin) insecticide at the label rate recommended for sod webworms. Evening applications are most effective. Do not water the lawn for several days after application.
  4. Repeat if castings continue to appear.

This circular is an updated version of the publication prepared in 1990 by W. Micheal Stoy of Bismarck State College and former extension entomologists Dennis Kopp and Dean McBride.



E-904

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