SCSC-PU-155
July 2015

WHITE GRUB IDENTIFICATION AND CONTROL

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White grubs (Fig. 1) are the larval stage of scarab beetles, also known as May/June beetles or chafers. There are over 100 species of May/June beetles in Texas, but only a few species cause damage to turfgrass. Those species include May/June beetles, *Phyllophaga crinita* and *Phyllophaga congrua*, as well as the southern masked chafer, *Cyclocephala lurida* (Figs. 2 and 3). White grubs feed on the roots and other belowground portions of warm-season turfgrasses, such as bermudagrass, zoysiagrass, buffalograss, and St. Augustinegrass. They also feed on cool-season turfgrasses such as fescues, bluegrasses, and ryegrasses. Visible damage includes irregularly shaped patches of dead turfgrass that may resemble symptoms of drought stress. In severe cases, damaged turfgrass can often be rolled up like a carpet (Fig. 4). Secondary damage may also occur when skunks, raccoons, and armadillos dig through the turfgrass in search of grubs to eat. Such damage may be particularly severe on golf courses, home lawns, or athletic facilities adjacent to wooded areas. As with many insect pests, prevention is a critical component of effective white grub management.

Figure 1. May/June beetle 3rd instar white grub.

Figure 2. *Phyllophaga crinita* adult beetle.

Figure 3. Southern masked chafer (*Cyclocephala lurida*) adult beetle.

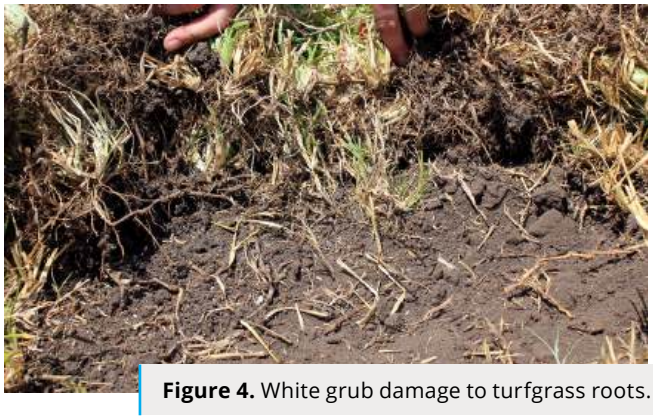

Figure 4. White grub damage to turfgrass roots.

WHITE GRUB LIFE CYCLE

White grubs go through complete metamorphosis, which is a four-part life cycle. The phases are egg, larva (grub stage), pupa, and adult. The June beetle and southern masked chafer, which emerge from late May in south Texas to early July in north Texas, are the principal species of white grubs that damage turfgrass in Texas. The mating flights of these beetles take place at night, and male beetles especially are attracted to windows and outdoor lights. During this time, males fly above the turf searching for females who use a chemical pheromone to lure a mate. After mating, the females burrow into the soil to lay a clutch of eggs (Fig. 5) which hatch and become grubs. The grub stage sheds its old exoskeleton (molts) three times. Each stage between molts is called an instar. As the larva progresses through the three instars, its size and appetite grow exponentially. The third instar does most of the visible damage to turfgrass, so it is best to take action before the insect reaches this stage.

Figure 5. May/June beetle eggs.

White grubs generally stop feeding in the fall and are mostly dormant throughout the winter and into the spring months. In the spring, they

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move closer to the soil surface and begin feeding for a short time. However, damage at this time is not significant, and control is not recommended. In April and May the larvae pupate in preparation for becoming an adult.

It's important to note that between March and June several other species of scarab beetles may also emerge in large numbers and be attracted to windows and lights. Although related to the June beetle, these early emerging beetles do not damage turfgrass, though a few may temporarily defoliate trees and other plants. No treatments should be needed for these beetles.

After about two weeks, the first instar grubs (Fig. 6) emerge and begin to feed on turfgrass roots. The ideal treatment time for white grubs is when the grubs hatch or during the first few weeks of development. Later stages can be more difficult to control and significant turf damage may have already occurred. June is generally the ideal time to treat for white grubs in South Texas while early July is more appropriate for North Texas. If left uncontrolled, white grubs will feed throughout the summer months and kill or thin turfgrass stands.

Figure 6. May/June beetle 1st instar white grub.

WHITE GRUB CONTROL

Not all lawns, athletic fields, or golf courses require regular treatment for white grubs. Infestations of five to 10 grubs per square foot is considered the threshold above which damage occurs, and though it is possible to sample for white grubs to determine whether treatment is needed, few people want to dig up areas to sample for these insects. Consequently, for turf that has high value or has a history of white grub damage, annual treatment may be justified.

Most of today's white grub preventative insecticides have relatively long persistence in the soil; however, applications made too early may break down before white grubs are present. To avoid treating too early, it is usually best to put out an insecticide after the June beetle mating flights have ended. Effective prevention products include the active ingredients chlorantraniliprole, cyantraniliprole, clothianidin, imidacloprid, or thiamethoxam. There are also combination products that contain bifenthrin mixed with clothianidin or imidacloprid. Although these treatments can provide some control after damage appears, they are most effective if applied early.

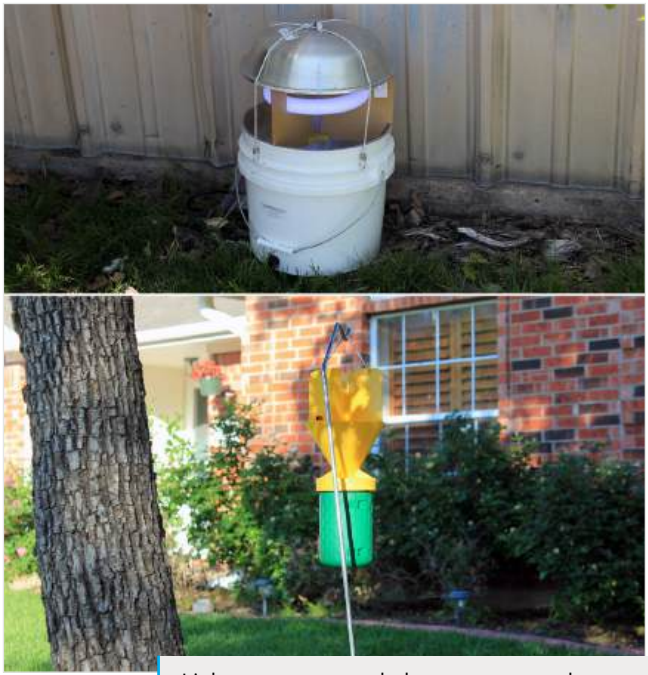
To confirm that white grubs are the reason for yellowing or dying patches of turfgrass, dig up some small

Figure 7. Before treating, search for white grubs in the turfgrass to make sure they are causing the problem.

sections on the edge of dying grass (Fig. 7). If grass pulls up easily and has few roots, and there are five to 10 grubs per square foot, then treatment may be justified. Late season treatment products may include carbaryl, chlorpyrifos, dinotefuron, lambda-cyhalothrin, or trichlorfon. However, unlike the preventative treatments listed above, these products have relatively short residual activity after application.

ORGANIC OPTIONS

Insect-killing nematodes have been effective against white grubs in numerous trials, but they tend to be more difficult and expensive to use. The ground should



Light traps, top, and phermone traps, bottom, are two possible ways to determine when beetles are active in urban landscapes.

be kept moist before applying nematodes, and you should apply at least ½ inch of water immediately after nematodes are sprayed. It is best to buy nematodes directly from online suppliers with a good reputation for quality control and prompt shipment. When buying nematodes in a store it can be difficult to know whether they were shipped and stored properly, and whether they are still viable.

WATERING BEFORE AND AFTER TREATMENT

Irrigation is essential for both chemical and biological treatments. Pretreatment irrigation encourages white grubs to come closer to the surface and helps prepare the soil for improved penetration of insecticides or nematodes. For dry soils, apply ¼ to ½ inch of water one day before application.

Insecticides and nematodes also require water after they are applied, because they require water to move them through the thatch layer and down into the root zone where grubs feed. Apply ½ to 1 inch of irrigation immediately after a nematode or liquid insecticide treatment. Granular insecticides do not require immediate irrigation, but they will not provide control until they are watered in. For specific product recommendations on white grub control, please consult the Texas Turfgrass Pest Control Recommendations guide. As always, be sure to read and follow label directions for recommendations and precautionary statement.

Note: Mention of insecticides is for informational purposes only and does not imply recommendation or endorsement. It is always the applicator's responsibility, by law, to read and follow all current label directions for the specific insecticide being used. The label always take precedence over the recommendations found in this publication.