Home and Horticultural

PESTS

K-STATE Research and Extension

Annual White Grubs in Turf

Dead spots in an otherwise healthy lawn may be a sign of white grubs. Grub damage varies from year to year and may be severe. The annual white grub is the most common grub pest of turfgrass in Kansas. It is the larval stage of the masked chafer beetle, *Cyclocephala* spp., which completes its life cycle in a single year. Six masked chafer species have been recorded in Kansas, all with similar developmental cycles: *Cyclocephala lurida* (southern masked chafer), *C. borealis* (northern masked chafer), *C. pasadenae* (southwestern masked chafer), *C. hirta* (western masked chafer), and *Cyclocephala longula* and *C. melanocephala*, which do not have common names.

Life Cycle

Masked chafer beetles (Figure 1) begin emerging from the soil in mid June. After mating, the female burrows back into the ground and deposits eggs. Small, first-instar grubs emerge in two to three weeks. Larvae develop rapidly, maturing by mid to late September. Cooler weather and soil temperatures in late fall cause larvae to burrow deeper into the soil, where they remain dormant during the winter. When warmer weather returns and soil temperatures rise in the spring, grubs move up to grass root zones. Most grubs will have reached full size the previous fall and do not feed much in the spring. They pupate in late May. Within two to three weeks, beetles emerge to repeat the cycle.

Figure 1. Masked chafer beetle

Feeding Damage

Figure 2. Grubs

Root feeding by first- and second-instar grubs (Figure 2) may not cause serious problems until September or October (Figure 3) when larger, more ravenous third-instar grubs consume larger amounts of grass roots (Figure 4). Damage may be more severe when turf is dry or insufficiently fertilized, or in lawns where grass must compete with weeds.

Control Methods

Annual white grubs in turf can be managed using either preventive or rescue treatments. If perfect turf is the goal, preventive treatments are applied automatically. Applying systemic insecticides to an entire site may be an unnecessary expense when pest populations are low. It may be more cost effective to apply short-acting contact insecticides when grubs are most susceptible, ideally when 90 percent are in the first and second developmental stages. This occurs 30 to 40 days after peak flight of masked chafer beetles — typically between July 1 and 10 in Kansas, although it varies by year and location. Thus, August 10 through August 20 is the target date for treating annual white grubs in Kansas. Products containing active ingredients carbaryl and trichlorfon are recommended.

For more lasting effects and greater flexibility in timing, consider products containing the systemic active ingredients imidacloprid, chlorantraniliprole, clothianidin, thiamethoxam, and halofenozide. Although labeled for late April through August application, to ensure adequate protection systemics should be applied during mating and egg-laying, typically between mid June and late July. Table 1 lists insecticides recommended for grub control in turfgrass. Given the number of products on the market, homeowners should check local retail outlets to determine availability. Study the product label to ensure safe, proper, and effective use.

Figure 3. Turf damage associated with white grubs

Figure 4. Grass roots infested with white grubs

Table 1. Insecticides for Grub Control

Active Ingredient	Trade Name *	Residual Activity
carbaryl	Sevin	short/contact
chlorantraniliprole	Acelepryn	extended/systemic
clothianidin	Arena	extended/systemic
clothianidin + bifenthrin	Aloft	extended/systemic
halofenozide	MACH 2	extended/systemic
imidacloprid	Merit	extended/systemic
imidacloprid + bifenthrin	Allectus	extended/systemic
thiamethoxam	Meridian	extended/systemic
trichlorfon	Dylox, 24-Hour Grub Control	short/contact

*Many companies use the same active ingredients to formulate products. Check the label to determine which active ingredient it contains.

Rescue treatments are recommended when a wait-and-see approach is acceptable. Inspect turf frequently, noting areas that appear abnormal. Off-colored turf near dark, healthy grass; a dry or wilted appearance; and gradual thinning may be signs of damage. Where roots have been destroyed by grub feeding, turfgrass can be easily rolled back to reveal white grubs on the surface of exposed soil (Figure 5). Apply rescue treatments only to areas showing these symptoms.

Figure 5. Turf rolled back to reveal grubs

Grubs are often detected after turf has been disturbed by foraging skunks and racoons (Figure 6). In such cases, spot insecticide treatments can be applied to prevent further turf decline.

Figure 6. Foraging damage

Other Considerations

In addition to application timing, these factors influence treatment effectiveness.

Thatch. Contact insecticides applied to the soil surface may not reach grubs, which are located underground. To come in contact with grubs, insecticides must move into the soil. Thatch, an accumulation of organic material, may interfere with insecticide movement and reduce the amount of toxicant that enters the soil. Before applying treatment, use a hand rake, power rake, vertislicer, or core/plug aerator to pierce the thatch layer and facilitate insecticide movement into the grub zone.

Application rate. Apply the amount of insecticide indicated on the label. Cutting back to save money or expanding the treatment area beyond specifications may result in an application that is insufficient to kill pests.

Equipment calibration. Equipment should be calibrated to ensure accurate delivery of insecticide at labeled rates. Even new equipment with predetermined settings requires calibration because of manufacturing irregularities. Rate settings vary from brand to brand. Calibrate when switching to a different formulation of the same active ingredient or to a different product. Older spray equipment may need to be recalibrated as nozzles wear. Repeated grinding action of granular insecticides used in rotary or broadcast spreaders changes flow rates, and they also require recalibration.

Water. Watering before and after treatment improves product performance. Watering beforehand encourages grubs to move up in the soil, bringing them closer to insecticides. Premoistened soils facilitate the movement of water and insecticide into the soil. Irrigating immediately after treatment removes insecticide residues from grass and the soil surface where they tend to degrade rapidly.

Speed of kill. Contact insecticides need time to move from the soil surface into the area where grubs are active. After making contact, more time is needed for insecticides to kill pests. Wait seven to 10 days to assess treatment effectiveness.

Label specifications. Study product labels to achieve maximum grub control. The pH of the water carrier, freshness of the product or tank mix, and agitation requirements vary by product. Weather conditions at treatment also play a role in distribution and coverage. Consider granular applications when excessive winds prohibit use of liquid sprays.

Robert J. Bauernfeind, Entomologist

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