

## Turfgrass Pest Management

The management of turfgrass insect pests and diseases is most effective when an integrative approach is taken. Oftentimes, cultural practices will help grasses to resist and recover from pest damage. Resistant turfgrass varieties may also be available.

### News/What to Watch For

In the northern region of the state, much of the turf is either under snow or dormant now. In the southern region, however, grasses are still actively growing and one of the major insect pests is the white grub. This issue is devoted entirely to white grubs and their control. Cultural practices are also addressed.

## White Grubs (*multiple species*)

One of the most widespread and destructive insect pests of turfgrasses in Utah are white grubs. White grubs are the immature, or larval form, of scarab beetles including the May/June beetle, the masked chafer, the Japanese beetle, and the black turfgrass Ataenius. Grubs feed on turfgrass roots and are capable of causing a significant amount of damage to grasses very quickly, particularly if those grasses are already under some other form of environmental stress.

### Damage

White grubs chew off the turfgrass roots near the soil surface or just below the thatch layer. Early signs of damage include wilting or yellowing/browning and can strongly resemble drought. Early damage can go largely unnoticed until brown patches of turf start to develop. If the population of grubs is high, these small patches can quickly coalesce into large areas. The damaged turf becomes detached from the soil and may feel spongy or pull away from the soil surface easily. Secondary pests such as birds, skunks, and raccoons may prey on white grubs in turf areas.



## Life Histories

### *May/June Beetle*

The May/June beetles require 3 years to complete one generation. The adults feed on a wide range of plants, but rarely cause significant damage. Adults start emerging from turfgrass in late spring and are strongly attracted to lights. During the first summer, mated females will deposit eggs in turfgrass. The eggs hatch into small grubs that feed on turf roots until the temperature cools. These small grubs are the overwintering stage until the next spring when they become active again. During the second summer, grubs continue to grow while feeding on larger turf roots until they are almost fully-developed. The large grubs are the overwintering life stage. Grubs pupate in the soil and emerge as adults in late spring during the third summer of their life cycle.



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### *Masked Chafer*

The masked chafer is an annual white grub. The adults rarely cause plant damage and are present during the summer months. They are highly attracted to lights at night like the May/June beetles. Females deposit eggs in the soil by making small cavities. The eggs hatch into small white grubs that feed on small turf roots. Damage from masked chafers typically occurs in late summer or early fall when the grubs are fully grown and are feeding on larger turfgrass roots. Grubs overwinter well below the soil surface until temperatures begin to warm up in the spring. Third-instar grubs pupate in the soil and adults emerge in early summer.



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### *Japanese Beetle*

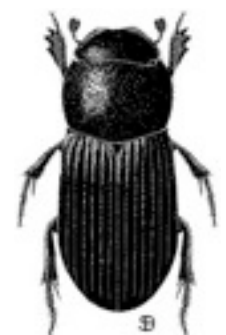
The Japanese beetle is also an annual grub. Adults will emerge from turf in early summer and begin to feed and mate on ornamental plants, sometimes causing significant damage. Mated females move back into turfgrass to lay small egg masses in soil cavities. Most eggs are laid between mid-July and early September. The eggs hatch into small grubs that feed on roots until late September when the temperature cools. The nearly full-grown grubs burrow 4-8" down in the soil and remain active all winter. In the early spring, grubs continue to feed until turning into resting pupae. The pupae hatch into adults in mid-summer and emerge from the soil.



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### *Black Turfgrass Ataenius*

The black turfgrass Ataenius beetle can have up to two generations per year. They are black in color and relatively small (1/4") compared to other common white grub adults. Adults overwinter in leaf litter and loose soil and begin depositing eggs in turfgrass in the spring. Grubs feed for about 3-5 weeks before pupating and starting the second generation in July. As temperatures cool, adults move back to over-wintering habitat by fall.



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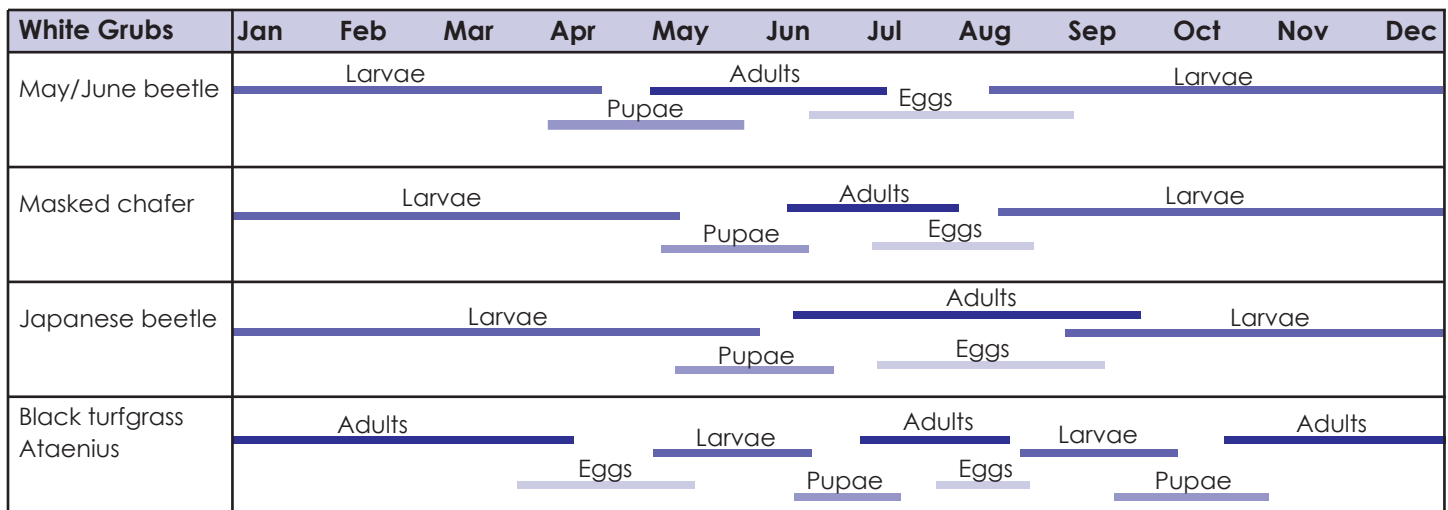


Figure 1. Life histories of white grub species in Utah. Colored bars indicate the approximate timing and length of activity of the life stages.

## Cultural Practices

Appropriate cultural practices will help to maintain the health and competitiveness of turfgrass areas. If insecticidal treatment is required, reduce the thatch layer to no more than 1/2 in. deep. Aeration will also help to enhance the movement of insecticidal treatments into the soil. Apply 1/2 to 3/4 in. of irrigation water after application to move treatments downward. Repeat irrigation every 4-5 days to continue insecticide movement into the soil. Regarding seeding/overseeding and **resistant varieties**, the tall and fine fescues are more resistant to white grub damage than the bluegrasses. Refer to Figure 2 for a list of best cultural practices and their timing.

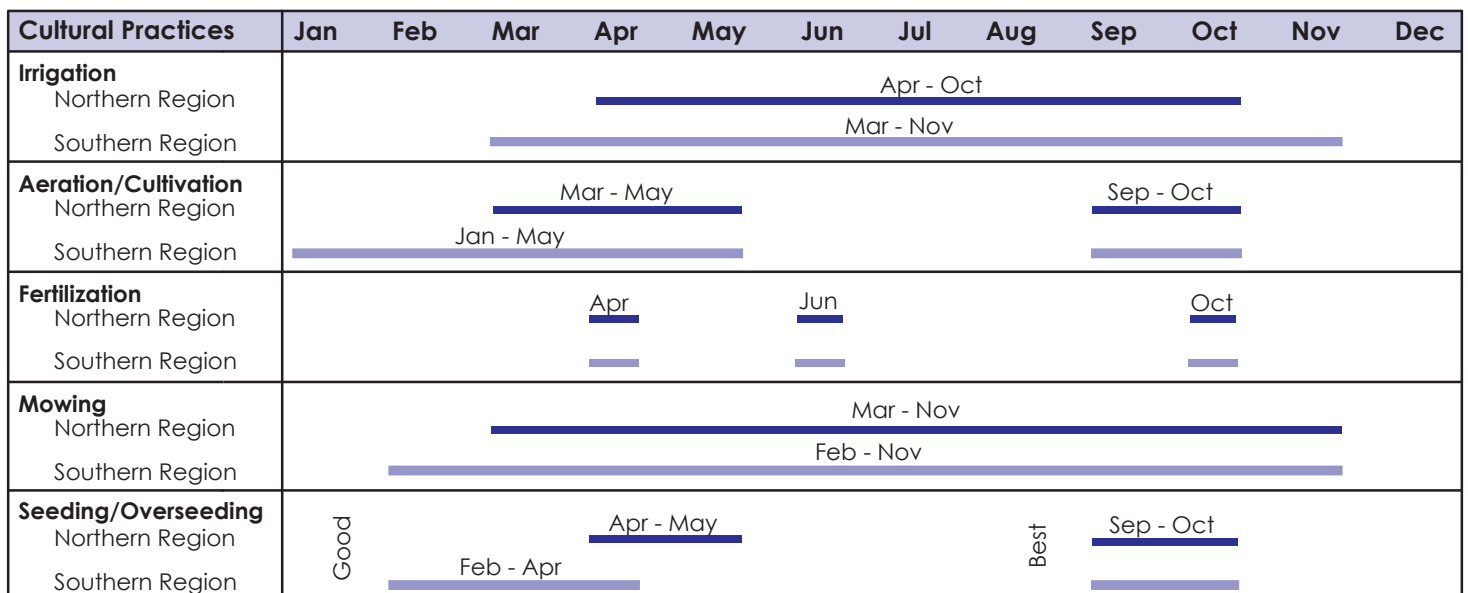


Figure 2. Optimal timing of cultural practices in Utah. Colored bars indicate appropriate timing for practices.

## Insecticidal Products

### Treatment Thresholds

The treatment threshold for masked chafer and Japanese beetle is 8-10 per square foot. The threshold for May/June beetle grubs is 3-5 per square foot. The threshold for black turfgrass Ataenius is 30-50 per square foot.

### Products

The systemic insecticides Acelepryn®, Arena®, and Merit® may be applied in late spring or early summer to target eggs before hatch. The contact insecticides Dylox®, Malathion®, Sevin®, Mach2®, Concern®, Pyganic®, and Surround® may be applied in late summer or early fall to target larvae before they move deeper into the soil (Fig. 1).

Entomopathogenic products such as nematodes (*Steinernema carpocapsae* and *Heterorhabditis bacteriophora*) and fungi (*Beauveria*, *Metarhizium*) may also be applied in late summer or early fall to target larvae before they move deeper into the soil (Fig. 1). Also note that irrigation before and after applications of entomopathogens is essential to ensure their survival and movement into the root zone and soil.

## Acknowledgments

Drs. Diane Alston and Erin Hodgson authored two USU Extension Fact Sheets that provided the basis for this advisory.

1, 2 Images courtesy of Erin Hodgson, Department of Entomology, Iowa State University.

3 Image courtesy of Paul Johnson, Department of Plants, Soils & Climate, Utah State University.

4 Image courtesy of Matthew Roth (<http://bugguide.net/node/view/40314/bgimage>).

5 Image courtesy of Daves Automontage (<http://microimaging.com/images/index.htm>).

6 Image courtesy of Laura C. Jesse, Iowa State University Extension (<http://www.extension.iastate.edu/yardgarden/>).

## Relevant USU Extension Fact Sheets

### Insect Pests

<http://extension.usu.edu/files/publications/factsheet/white-grub07.pdf>

<http://extension.usu.edu/files/publications/factsheet/turf10.pdf>

### Turfgrass Management

<http://extension.usu.edu/files/gardpubs/hg517.html>

<http://extension.usu.edu/files/publications/Turfgrass.html>

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**\*Precautionary Statement:** All pesticides have benefits and risks, however, following the label instructions will minimize the risk and maximize the benefit. Pay attention to the directions for use and follow precautionary statements. Pesticide labels are considered legal documents containing instructions and limitations. Inconsistent use of the product or disregarding the label is a violation of both federal and state laws. **The pesticide applicator is legally responsible for proper use.**

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