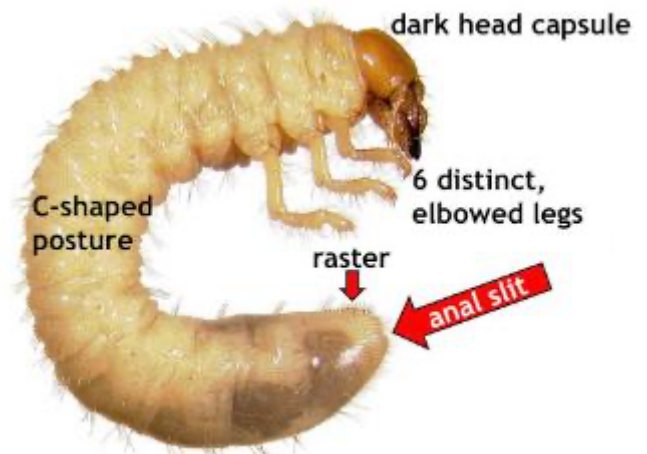


LAWN INSECTS

TITLE:	TYPES OF GRUBS
ORDER:	<i>Coleoptera</i>
FAMILY:	<i>Scarabaeidae</i>
LATIN NAME:	<i>Phyllophaga</i>
OVERALL DESCRIPTION (Lifecycle):	
White grubs are the larval stage of several species of beetles and chafers. The most notorious of these in Virginia is the Japanese beetle, but others include the Green June Beetle and the Masked Chafer. Larvae are usually C-shaped, 1/2 to 1 1/2 inches long, and cream colored with a brown head. They also have a dark area at the posterior end (aka raster) White grubs feed on grass roots and roots of various other plants.	



Source: Cornell University

STAGES OF DEVELOPMENT

EGG: Extremely tiny and found encased in soil aggregates. They are spherical, pearly white and darken before hatching.



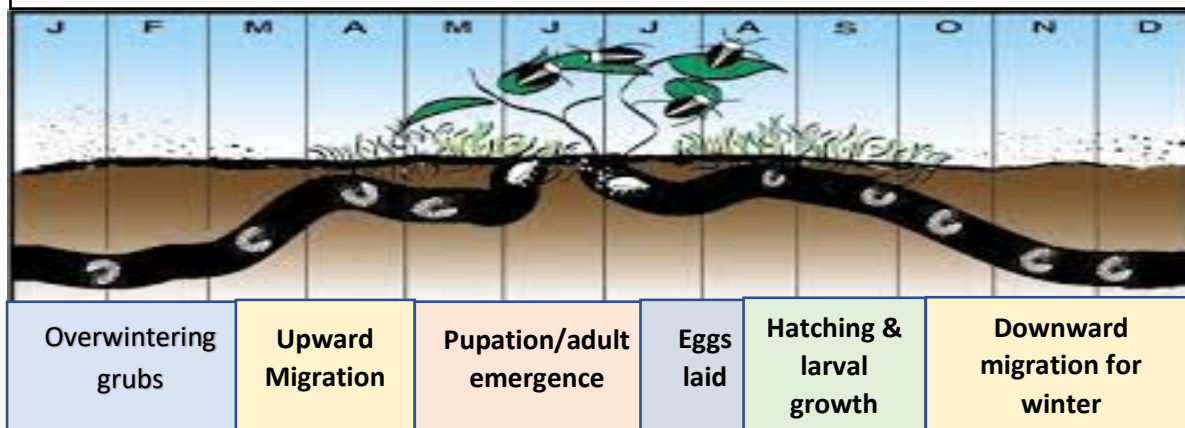
Source: Ohio State

LARVAE: length varies from 1/2 - 1 1/4 inch. Larvae are white with a c-shaped body, brown head, and three pairs of legs. The hind portion of the abdomen is slightly enlarged and appears darker due to the soil particles through the body wall. Two parallel rows of spines on the underside of the last abdominal segment distinguish true white grubs from similar-looking larvae.

PUPA: Length varies but is less than 1/2 inch long and is usually white, faint yellow, or dark brown in color.

ADULT BEETLE End of life cycle (Shown: Japanese Beetle)

STAGES OF DEVELOPMENT - ONE YEAR LIFE CYCLE



TYPES OF DAMAGE	Grubs feed on the fine root hairs of plants. and potentially field crops. They chew grass roots just below the soil surface. Root injury reduces the turf's ability to take up water and nutrients and withstand the stress of hot, dry, weather conditions.
WHAT THE HOMEOWNER NEEDS TO KNOW	White grub damage is usually most evident in August and September. Turf may feel spongy when walking on the infested area. Sod that is heavily grub-damaged can be pulled up from the soil as if lifting a carpet. Serious grub problems mean that they will return and reinfest the area. In addition, the lawn might show holes caused by moles, skunks or other animals. Another check: cut a 1 ft by 1 ft area 6 inches deep. If there are 6 or more grubs in this area, consider treatment.



Source: University of Minnesota



Source:
Cornell
University

CULTURAL CONTROL	Maintain a healthy stand of grass. Monitor for changes in turf as described and look for features as described, especially during May through August.
BIOLOGICAL CONTROL	Milky spore is a proven biological control. The plant-produced milky spore which is a soil inhibiting bacterium eaten by the grub. When the grub ingests the bacterium, it will be spread by the further release of bacterial spores into the soil.
CHEMICAL CONTROL	Use products with any of the following active ingredients: Azadirachtine; Bifenthrin; Carbaryl; Halofenozide; Imidacloprid; Permethrin; Trichlorfon. Apply at the labeled rate and water in with 1/2 inch of water. Timing is important, but make certain grubs are present. Treatment is most effective against young grubs. Generally, preventative control can be applied from April to mid-July and curative controls from late July through August. Water in measured controls according to label instructions.

REFERENCES

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<https://extension.psu.edu/white-grubs-in-home-lawns>

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SPECIAL PROJECT RESEARCH BY

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SUPPLEMENTAL INFORMATION

While adult beetles generally have distinctive characteristics, identification of the specific beetle during the grub (larva) stage is not so easy. The major way to identify the grub is through the raster, or rear part of the grub. The raster is found at the end of the grub opposite the legs and mouthpart. The raster pattern is the arrangement of bristles and hairs on the underside of the abdomen. A 10x hand lens is needed to see this pattern on most mature white grubs.

ADULT GRUBS



Japanese Beetle
Popillia japonica



May/June Beetle
Phyllophaga sp



Masked Chafer
Cyclocephala sp.



Green June
Beetle, *Cotinus nitida*,

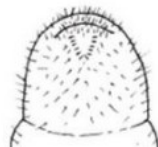


Asiatic Garden
Beetle, *Maladera castanea*,

LARVAE



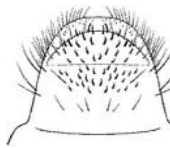
RASTERS



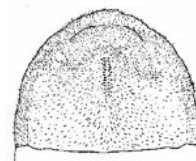
Japanese Beetle Raster (~9X)



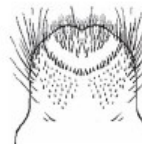
May/June Beetle Raster (~6X)



Masked Chafer Raster (~8X)



Green June Beetle Raster (~5X)



Asiatic Garden Beetle Raster (~8X)

Image Acknowledgement:

Ohio State University
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Rutgers University