What Species? What Makes the Difference?

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Accurate identification can make the difference between success and failure of an insecticide treatment! The more you know and understand about the biology of a pest, the greater the probability of a desirable outcome. This is especially true for the numerous white grub species that invade turf.

There are over ten species of white grubs that attack turfgrass. Fortunately (or unfortunately) there are only three "known" (two Northern masked chafer adults have been collected in Madison, Wisconsin in the summer of 2003) species in Wisconsin: 1) Black turfgrass ataenius (BTA); 2) Japanese beetle; and 3) May/June beetle. While there are some similarities in the biology (life cycle, behavior, and ecology) of these white grubs, there are also some vast differences as well. For example, the life cycle of the aforementioned three white grubs is quite different. BTA typically has two generations per year; however in Wisconsin, one generation seems to be the standard. Japanese beetle has only one generation per year. And, May/June beetles that occur in Wisconsin (*Phyllophaga* spp.) typically have a three-year life cycle.

Control strategies for these grub species varies. That is not to say that the insecticides to be used for their control should be different, but the timing of insecticide treatment varies based on the target grub species. For example, because May/June beetles have a three-year life cycle, they spend much of their life (approximately 75%) in the larval stage. May/June beetle adult females lay their eggs beginning in May soon after adult

emergence and continue through June and even into July. After an approximate gestation period of four weeks, the eggs hatch, and the relatively small (1st instar larvae) grubs begin feeding on and destroying the roots of the turf. Within several weeks (approximately 5-8 weeks) the young larvae develop into increasing larger 2nd instar grub. The grubs typically remain in the 2nd instar larval stage through the winter. The following spring as temperatures become conducive (i.e., > 50°F), larvae resume feeding and grubs develop into 3rd instar larvae by late-June. Thereafter, 3rd instar larvae continue to feed and destroy the roots of turfgrass until the first measurable frost whereby they prepare to overwinter in the soil. The subsequent spring, the 3rd instar larvae resume feeding as temperatures again become conducive. By early-July the grubs reach larval maturity, soon thereafter they pupate (transform into an adult) within 4-6 weeks. Although fully developed, the adults do not emerge from the soil; they remain in the soil until the following spring whereby they emerge in May and June (hence the name; May/June beetle).

Regardless of the white grub species, larger, more physiologically developed grubs (i.e., 2nd and 3rd instar larvae) are considerably more difficult to control than smaller (i.e., 1st instar larvae) grubs. Subsequently, accurate timing of preventative white grub insecticides such as imidacloprid (Merit®) or halofenozide (Mach 2®) are more effective than curative or corrective insecticides such as carbaryl or trichlorofon (Dylox®). For this reason, understanding the biology of a pest is the key to effective and successful management.

Identification of the different white grubs is possible by examining the arrangement of hairs and spines on the **raster** area on the underside of the terminal (end) abdominal segment of the grub. These **rastral patterns** can be easily distinguished using a small 10X hand lens. The arrangement of hairs on May/June beetle grubs are arranged in two distinct parallel lines (Figure 1). Japanese beetle grubs are characterized by a pattern of rastral hairs arranged in a "V" shape, whereas the BTA is distinguished by its small size and "pad-like" structures on the end of the abdomen (Figure 1).

The bottom line is that you must accurately identify the pest species in order to implement appropriate control strategy(s) that will maximum effective control of the target pest.

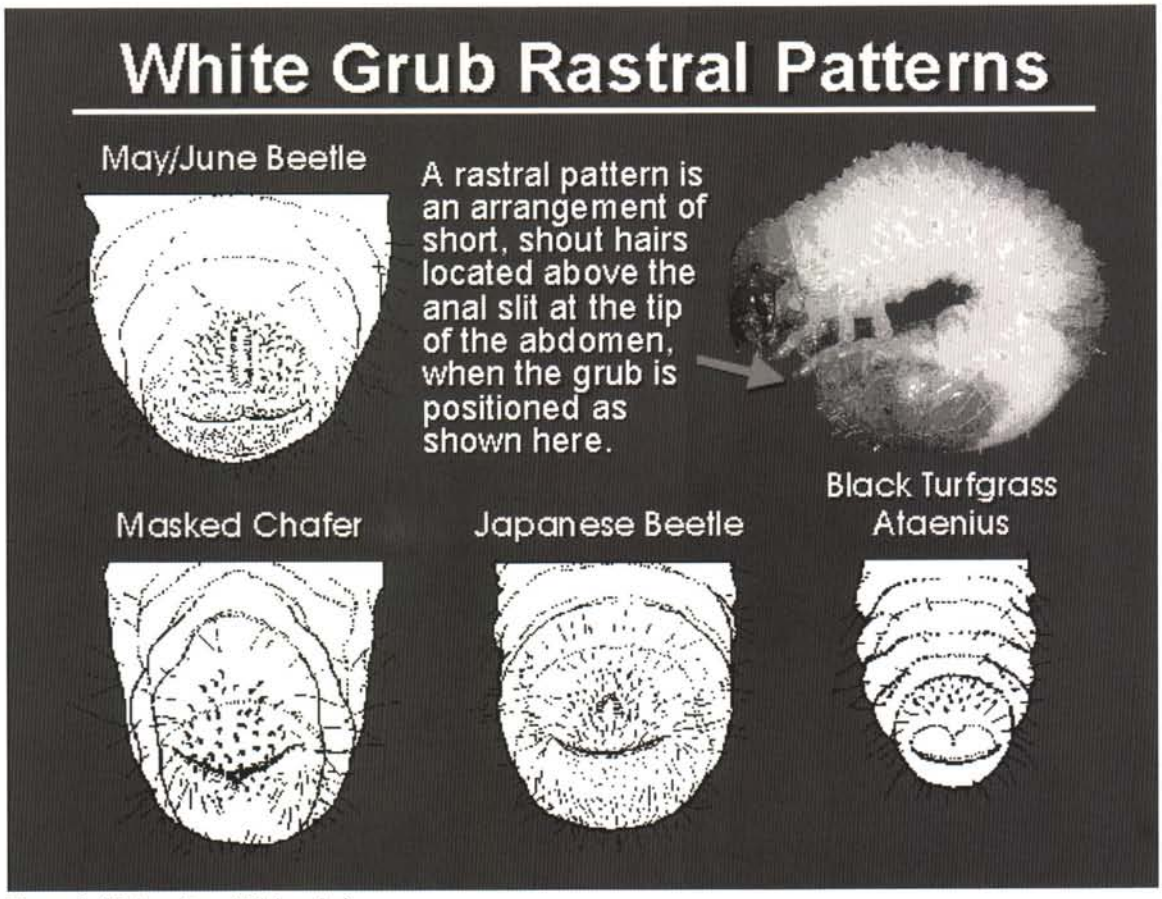

Figure 1 (University of Nebraska)