## WHITE GRUB CONTROL ON ATHLETIC FIELDS IN MICHIGAN Terry Davis Department of Entomology Michigan State University

Prior to 1980, insect damage was rarely reported on athletic fields. Two exotic insects, European chafer and Japanese beetle are now important pests in southern Michigan. Japanese beetle and European chafer rides on ships to the United States from their native locations. As a result, they did not bring the complex of natural enemies with them that normally keeps their populations in check. Diseases, predators and parasites have been introduced to help reduce the populations of these pests, but it takes many years after the pest arrives in an area for the natural enemies to catch-up. The larval stage of both of these insects is a white grub that when full grown can be an inch in length.

The Japanese beetle requires moisture for its development and in a normal year will generally be found on irrigated turf. In 1999, rain fell during the last week of June and the first week of July, which has allowed Japanese beetle to survive in non-irrigated situations. The adult emerges in late June or early July and lays egg throughout July and August. The adults are voracious feeders and can denude preferred hosts. They will feed on many different species of deciduous trees especially lindens, apples and roses. The larvae are small until after Labor Day at which time damage will become apparent where populations are high. The larvae feed until late October and spend the winter as a grub. They begin feeding again in April and can cause more damage until they pupate in early June.

European chafer has a similar one-year life cycle except the adults emerge 2-3 weeks earlier and therefore egg laying and the potential for damage occurs earlier. The larvae feed later in the fall - often until Christmas and begin feeding earlier in the spring. They like dry conditions and the larvae usually feed on grass. However, if grass is not available or if populations are high enough, they will also attack tree and shrub roots. The adults do not feed and usually are not noticed. They can be seen just after sundown in late June as they congregate in trees to mate.

As a manager of an athletic field, whether irrigated or unirrigated, it is important to assess the population of grubs every spring and fall. Grub populations are never homogenous over a field. They tend to be very clumped so it is critical to look in many areas. Be especially vigilant where grass is discolored or where it seems to pull up easily due to possible root pruning. The thresholds for chemical control for home lawns are 5 per square foot for non-irrigated turf and up to 15 per square foot for irrigated turf. This is too high for athletic fields that are being heavily used. The most critical time to sample (by digging) for grubs is right around Labor Day. If grubs are found and a fall treatment is applied, a follow-up sample when the grass greens up and starts growing in the spring would be a good idea. Some of the population dies during the winter due to the cold conditions. They are easier to find in the fall than in the spring.

It is not recommended that insecticides be unless damage is observed. Insecticides should only be used when necessary because of the undesirable effects on beneficial arthropods, birds and the clients using the athletic fields. Cost is also a major consideration. Insecticide use can cause thatch buildup and may lead to other insect problems in the future. However, insecticides are the most effective tools for grub control that we have available.

Insecticides can be used before grubs cause damage (preventively) or after damage is observed (curatively). Turcam, Sevin, Mocap, Dylox, Oftanol and Diazinon are compounds that can be used as a curative treatment if it is determined that grubs are present in above-threshold numbers. They should be watered-in or applied in anticipation of rain to avoid problems with toxicity to the people using the field and to get the compound through the thatch. It will require 10-14 days to see the results of a grub treatment. These compounds, under ideal conditions will eliminate 80% of the grubs. Just because you find a grub or two several weeks after treating does not mean the application did not work.

Mach 2 and Merit are compounds that must be applied preventively for best results. They should be used where adults have been readily found, where turf was damaged during the previous fall or spring or in an area where surrounding homeowners have had problems. They should be applied in July for best results. Any application of Merit after early August or Mach 2 after mid August will have the effectiveness greatly reduced. These compounds should also be watered-in for the same reasons as the curative treatments. Sampling is the tool to use to control grub problems. In order to effectively manage grub problems and minimize pesticide use requires time. It is critical to know what is there in order to effectively deal with it. Low populations of potential pests can be tolerated when cultural practices such as irrigation, mowing and fertilization are maximized. Since root damage is often masked by these practices, it is critical to sample for insect damage since a field absorbing heavy use can tolerate less turf damage than a home lawn or a golf course rough.