European Chafer Research: Water and Turf Resistance to Grubs

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The European chafer looks like a small June beetle and has the same type of larval stage; a C-shaped white grub that feeds on plant roots. It was discovered in the United States in Newark, New York in 1940. It has now spread throughout the states of Connecticut, New York, Pennsylvania, Ohio and Michigan, where it is a devastating pest of home lawns, municipal turf, and sometimes nursery crops, wheat, alfalfa and pastures. European chafer has rapidly expanded its range across Michigan over the last five years, destroying most of the turf in some subdivisions in the greater Detroit area, Ann Arbor, Jackson, Lansing, and Grand Rapids. However, last year (fall of 2000 and spring of 2001) we saw very little damage to turf from European chafer grubs. Thanks to the Michigan Turfgrass Foundation and Project GREEEN, we now know why European chafer damage to turf is much worse some years than others.

Objective 1: **Evaluate irrigation as an alternative to Diazinon.**

Treatments:

1) rain only;
2) daily irrigation, 0.1 inch at 2:00 pm;
3) weekly irrigation, 0.7 inch on Thursday at 6:00 am.

Homeowners may be able to minimize grub damage to their lawns with consistent irrigation. In our experiment at the Hancock Turf Research Center, 239 European chafer larvae were introduced in August and September to each of 18 plots maintained under three different irrigation practices. In November plots were sampled to determine grub survival. A mean of 22.1 grubs per ft^2 were found in the non-irrigated plots, 17.0 grubs per ft^2 in the plots irrigated once per week, and 8.2 grubs per ft^2 in the daily irrigated plots. Daily irrigation reduced the survival of European chafer by 63%, a level of control comparable to that obtained by applying Diazinon.

Table 1. Survival of European chafer grubs in turf plots that are not irrigated, irrigated once per week, or irrigated daily.

Irrigations treatment	Grubs/ft^2	Statistics
None	22.1	df = 2,15
Weekly	17.0	F = 3.7
Daily	8.2	P = 0.004

Objective 2: **Develop a method for screening turf for resistance to European chafer and begin testing of turf and ground covers for resistance.**

New methods were devised for the testing of 18 cultivars of turfgrass in the greenhouse [3 cultivars each of: Kentucky bluegrass, perennial ryegrass, fine fescue, tall fescue, warm-season (C-4) turfgrasses, and commercially available native grass species]. European chafer consumed between 5 and 95% of the grass roots over an 8-week test period. Six of the nine most susceptible turf cultivars were either Kentucky bluegrass or fine fescue, the type of turf grown in 90% of all Michigan lawns. Tall fescue and perennial ryegrass cultivars were more resistant to European chafer. In the initial run of this experiment in 2000, strong differences were observed among turf types, suggesting that there may be much more benefit from planting resistant turf types than previously believed. In 2001 we are repeating this experiment and initiating a field test to validate the results.