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Background

Six athletic fields at five Iowa high schools were selected for the School IPM Program. Over the last five years each field has experienced grub injury and the grounds manager has been faced with the decision of treating the field with an insecticide. With the advent of longer residual insecticides, such as Merit and Mach II, it has been popular to make an insecticide application in June. Such an application is well in advance of first instar grubs that occur during the first week of August. This early and preventative application of a longer residual insecticide precludes the scouting period of early August and does not consider an important IPM strategy of treating the pest only when threshold population levels are reached. A grub scouting program was implemented in early August to assist grounds managers with threshold populations that could be used to make sound insecticide application decisions. Table 1 shows the parameters used to determine the need for pesticide application. Nine grubs per square foot is generally accepted at the threshold for lawn areas. Athletic fields are highly visible areas that require a smooth playing surface with good traction. Intense traffic, high visibility, and the potential for player injury are factors that may require a grub threshold level lower than 9 grubs/sqft. Threshold grub levels are presented as an average and therefore this single parameter may not be the best indicator of potential problems with the field. The percent of samples with grubs was used to indicate grub distribution. The maximum number of grubs per sample was reported to show the greatest potential for injury on at least some part of the field. Each field was also visually evaluated by walking the entire field and hand inspecting the turf in 20 additional locations. A rating scale of 1-9 was used where, 1-3 equals no treatment necessary (low potential for turf loss that influences playing field performance), 4-6 equals threshold level (grubs are causing turf injury and the playing field may or may not be compromised), and 7-9 treatment is advised (turf loss from grub injury will have a negative influence on playing field performance).

Knoxville High School - The field at Knoxville high school was treated every year since its reconstruction in 2000 because grubs were a problem with the old field and they did not want to lose the field again. No grubs were found on the field and treatment was not applied in 2004 or 2005 as a result of the grub scouting and education program.

Mt. Ayr High School - Prior to 2003 Mt. Ayr's football field had declined from traffic and grub injury. In 2003 the center of the field was renovated and reseeded with tall fescue. Tall fescue was used as an IPM strategy because it is less susceptible to white grub injury than Kentucky bluegrass. By 2004 turf cover had greatly improved. Grub populations were below the general threshold level of 9 per sq.ft., however 21% of the samples had grubs and the maximum sample density was 34 grubs/sqft. The field was visually evaluated by inspecting 20 additional locations where the grass looked to be wilting and nearly all of these areas had 2-4 grubs per square foot. It was given a potential injury assessment of 8 indicating a high level of anticipated injury that would justify insecticide treatment. The field was curatively treated in August 2004 with Dylox grub insecticide.

In 2005 grub scouting revealed only one sample with grubs and a low potential for field injury. No insecticide was applied.

North Scott High School - The North Scott baseball field had grub evaluation values that were similar to Mt. Ayr. Even though the average grub counts were below the accepted level of 9 grubs/sqft there was a very high maximum density value of 57 grubs per sqft with 17% of the samples having at least some grubs. The visual assessment further indicated that additional areas were noted to have grub decline and that treatment was justified. In 2004 the baseball field was curatively treated in September with Dylox for grubs.

In 2005 only six percent of the samples showed grubs with a maximum grub density of 18 grubs/sq.ft. Even though the average grub density of 0.8 grubs/sq.ft was very low there was visible damage on parts of the field as evident from the maximum grub density of 18/sq.ft. The decision was made to curatively treat the field in September with Dylox for grubs. The decision was also influence by the early spring baseball season that would not allow for any time to recover the field if turf damage occurred in the fall.

Ames High School - Ames football field has a history of grub injury problems and there was little acceptance for having turf loss during the football season. The grub count was low at 1.9 grubs/sqft and only 12% of the samples had grubs. The visual assessment placed the Ames field within the threshold value base on visual observation of additional areas. Under these circumstances the decision was made to treat the field curatively with Dylox in August 2004.

Because of the previous history with grub problems and because of the field tearing up during the fall 2004 playing season, it was decided to treat preventatively with Merit in June 2005. Even with this preventative treatment the 12% of the samples had grubs and the population density was 4 grubs/sq.ft. This resulted in additional curative treatment with Dylox in August 2005.

Denison High School - The Denison baseball field has seldom been treated in the past even though some grubs have been found each year. Grub counts were low (0-1.4 grubs/sqft) and the visual assessment indicated a low potential for injury (1-2). No treatment was applied in 2004 or 2005.

The Denison football field has experienced grub injury over the last 5 years and the field manager is sensitive to having the field “come apart” during the playing season because of a grub damaged root system. Therefore, Denison High School has treated preventatively with Merit every year since 2003. The grub scouting data shows that there are few grubs in the field, however, because of the preventative treatment it could not be determined if they were never present or if they were present and were killed by the preventative insecticide.

Conclusions

Grub counts are an important part of a scouting program, however, it is necessary to take into consideration the potential field injury and how that relates to playing season and player safety. The IPM grub scouting program was an important factor when deciding the need for grub control on 5 of the 6 fields sampled in the study. Over the 2-year program 5 insecticide applications were determined to be not necessary, 5 curative applications were determined to be justified, and 3 preventative treatments were made. Two of the three preventative treatments (Denison High School) were based on prior experience rather than grub scouting data. One of the three preventative treatments (Ames High School) was based on prior grub scouting data.

Table 1. 2004-05 grub evaluation data for six athletic fields in the Iowa State University Integrated Pest Management Program.

High School	2004				2005			
	Avg. Grubs per sqft	Samples with grubs %	Maximum grub density Grubs/sqft	Visual Turf Injury *	Avg. Grubs per sqft	Samples with grubs %	Maximum grub density Grubs/sqft	Visual Turf Injury Assessment*
Knoxville Football	0	0	0	1	0.3	1	9	1
Mt. Ayr Football	4.8	21	34	8	0.3	1	9	1
Ames Football	1.9	12	23	6	4.0	12	18	6
Denison Baseball	1.4	12	11	2	0	0	0	1
Denison Football	0	0	0	3	0	0	0	1
N. Scott Baseball	4.9	17	57	7	0.8	6	18	4

* Rated on a scale of 1-9 where 1-3 = low injury, 4-6 = threshold level, 7-9 = high injury

Table 2. 2004-05 grub evaluation data for six athletic fields in the Iowa State University Integrated Pest Management Program.

Table 2. White grub control strategies on athletic fields before and after IPM scouting at five Iowa Schools.

High School	Before IPM education 2003	After IPM education 2004	After IPM education 2005
Knoxville Football	Treated	Non-treated	Non-treated
Mt. Ayr Football	Non-treated	Curative (Dylox)	Non-treated
Ames Football	Curative (Dylox)	Curative (Dylox)	Preventative (Merit) Curative (Dylox)
Denison Football	Preventative (Merit)	Preventative (Merit)	Preventative (Merit)
Denison Baseball	Non-treated	Non-treated	Non-treated
N. Scott Baseball	Curative (Dylox)	Curative (Dylox)	Curative (Dylox)

* Rated on a scale of 1-9 where 1-3 = low injury, 4-6 = threshold level, 7-9 = high injury