

An Evaluation of Turf Quality and Home Owner Satisfaction Resulting From Five Turf Management Programs

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There are approximately 49.8 million owner-occupied, single family homes in the U. S. (Watson et. al., 1992) and more than twenty million acres of lawns in the United States (Roberts and Roberts). Lawn care, whether commercial or do-it-yourself, represents a large industry. In 1986, the lawn care industry in the United States was responsible for more than one and one-half billion dollars in business volume (Daniel and Freeborg, 1987). Lawn care sales to do-it-yourself consumers in 1985 totalled more than six hundred and fifty million dollars (Watson et. al., 1992). It is estimated that there are more than fifty six million Americans involved with caring for their own lawns (National Gardening Association 1987-88).

It is assumed that consumers demand lawns completely free of weeds, insects and diseases. A considerable portion of the service the lawn care industry provides involves fertilizing, and applying herbicides and insecticides to residential and commercial lawns (Watson et. al., 1992). Fertilizer and pesticide applications most often occur at scheduled intervals primarily for business, rather than agronomic reasons. A predetermined schedule allows the most efficient access to the greatest number of lawns. In addition to using a predetermined schedule, lawn care companies apply pesticides to entire turf areas, regardless of pest presence or absence, because this method requires less employee training and time.

Pesticide applications to home lawns are also made by home owners. Like lawn care companies, home owners often apply pesticides at scheduled calendar intervals to entire lawns rather than on a as needed basis. Extension service representatives and fertilizer and pesticide manufacturers frequently encourage this type of pesticide application program since it aids untrained individuals in managing a completely pest free lawn.

Both home owners and lawn care companies often apply pesticides when no pests are present. In 1989, the United States Environmental Protection Agency (EPA) estimated that there were about six million pounds of diazinon applied to home and commercial turf (USGAO, 1990). In addition, the EPA also estimated that nearly four million pounds of 2,4-D were applied annually to residential turf (USGAO, 1990). It is possible, that if pesticides were applied only when pests are present, that these numbers could be significantly reduced.

An alternative to the application of lawn care products on a predetermined schedule is to apply many of these same products on an "as needed" basis. Using an Integrated Pest Management (IPM) program on residential lawns is one method that should be explored. The overall goal of an IPM program is to produce the healthiest lawn possible by combining all available turf and pest management alternatives (Voigt and Fermanian, 1991). In this plan, pest tolerance levels are established, lawns are regularly monitored (scouted) for the presence of pests, an appropriate maintenance program is implemented, and controls (cultural, biological, or chemical) are used when necessary (Daar, 1986).

Research Protocol:	An Evaluation of Turf Quality and Home Owner Satisfaction Resulting From Five Turf Management Programs
Location:	Ornamental Horticulture Research Center, Urbana, IL.
Seeding/ Establishment:	establishment date - September 1992; turf - mature Kentucky bluegrass blend ; plot size - 9 ft x 11 ft;
Professional Lawn Care Treatment:	fertilizer - Lebanon 18-5-9 @ 4 lbs N/M/yr, (0.75 lb N/M in Apr. & early July, 0.5 lb N/M in May, 1.0 lb N/M in Sept. & Nov.); herbicides - preemergence control in April, postemergence broadleaf weed control in May; insecticides - grub control in August.
Organic Treatment:	fertilizer - milorganite @ 4 lbs N/M/yr (1 lb N/M each application early May, mid to late June, early Sept., and mid Nov.); herbicides & insecticides - none are used.
IPM 1 Treatment:	fertilizer - Lebanon 18-5-9 @ 4 lbs N/M/yr, (1.0 lb N/M in May, June, Sept., & Nov.); herbicides - when present all weeds controlled with postemergence herbicides; insecticides - grub control @ 4-6 grubs/sq ft, webworm control @ 2 worms/sq ft.
IPM 2 Treatment:	fertilizer - Lebanon 18-5-9 @ 4 lbs N/M/yr, (1.0 lb N/M in May, June, Sept., & Nov.); herbicides - controlled with postemergence herbicides when weeds are present @ 100 sq in of weeds/sq yd turf; insecticides - grub control @ 8-12 grubs/sq ft, webworm control @ 2 worms/sq ft.
Untreated:	no fertilization, weed or insect pest control.
Management:	mowing - all treatments mowed with mulching mower' irrigation - as needed to prevent stress.
Experimental Design:	RCB; 3 replications.

There has been little research comparing consumer preferences for lawns maintained with standard practices compared to an IPM approach. There are trade-offs associated with each approach. IPM methods can use less pesticides (measured in pounds per year) when compared with lawn care practices that apply pesticides at regularly scheduled intervals regardless of need (Short et. al., 1982). However, lawns managed using IPM methods may contain a few weeds, insects or diseases.

Is turf quality reduced using IPM programs? Will home owners accept reduced turf quality if they know that less pesticides are used? How do consumers respond to these potential trade-offs? Do turf-care specialists' perceptions of turf quality differ from home owners' preferences? This study will investigate these questions by conducting a two- to three-year study at the Horticulture Research Field Laboratory in Urbana, Illinois. Two hundred forty local home owners without particular expertise in turf grass and 25 turf-care specialists will participate in this study.

Five management treatments are included in this study: 1) a management program as practiced by lawn care companies; 2) a management program where no fertilizer or pesticides are applied; 3) a management program using only organic fertilizers; and 4) two management programs using IPM programs.

The objectives of this study are to:

- A. determine the performance levels of each management regime by rating weed, insect, and disease levels and measuring quantities of applied pesticides;

B. determine preference for turf associated with each treatment, by three distinct groups; and

C. determine the influence of receiving management information on turf quality evaluations.

Evaluations will be made by three groups: 1) turf-care specialists; 2) local home owners who are unaware of the treatments; and 3) local home owners who have knowledge of each plot treatment.

Treatments

1. Untreated, ie. no fertilizer or pesticides are applied.
2. Organic fertilizers are applied at 4 lbs N/M/yr (1 lb N/M each application early May, mid to late June, early Sept., and mid Nov.) and no pesticides are used.
3. A calendar-based program modelled on a schedule used by a local lawn care business. Fertilizers and pesticides are applied as follows:
 - *Early Spring Application (April)* - fertilize with 0.75 lb N/M with preemergence control herbicide;
 - *Late Spring Application (May)* - fertilize with 0.5 lb N/M with postemergence broadleaf control herbicide;
 - *Summer Application (late June through late July)* - fertilize with 0.75 lb N/M;
 - *Early August* - grub control;
 - *Fall (September)* - fertilize with 1 lb N/M; and
 - *Late Fall (November)* - fertilize with 1 lb N/M.
4. IPM-1 program is followed. The turf is fertilized with a complete fertilizer at 4 lbs N/M/yr (1 lb N/M each application early May, mid to late June, early Sept. and mid Nov.). Insecticides are applied when thresholds reach 4 -6 grubs/square foot or 2 sod webworms per square foot. Weeds when present are controlled regardless of numbers. Spot treating is desirable when possible. Weed canopy cover will be recorded as square inches per square yard.
5. IPM-2 program is followed. The turf is fertilized with a complete fertilizer at 4 lbs N/M/yr (1 lb N/M early May, mid to late June, early Sept. and mid Nov.). Insecticides are applied when thresholds reach 8 -12 grubs/square foot or 2 sod webworms per square foot. Weeds are controlled when the weed canopy reaches 100 square inches per square yard turf (approximately 8%) for broadleaf and annual grass weeds combined.

During the 1993 growing season the plots were evaluated only by a U. of I. turf researcher. Other evaluations were delayed to allow a full year of treatments to be applied to each plot. It was necessary to apply postemergence broadleaf weed control herbicide to the plots maintained under IPM1 management. Broadleaf weeds in these plots were spot treated in the spring at the same time that Professional Lawn Care (PLC) treatment was made. Turf quality appeared to be most effected by fertilizer source and applications. No significant difference was observed between the PLC treatment and the IPM 1 treatment on any of the evaluation dates (Table). April through June no significant differences were observed between the IPM 2 program and IPM1 or PLC program. Lower quality of the IPM 2 plots July through October was a result of increasing weed populations. The organic program produced turf quality rated only as fair. This is probably due to the slower nitrogen release properties of the organic fertilizer. Turf density in these plots was poor and weed populations were able to grow.

Table 16. The evaluation of 5 home lawn management programs.¹

Management Program	Quality ²						
	4/23	5/14	6/17	7/22	8/23	9/16	10/15
Professional Lawn Care	7.0c	7.0c	7.0c	7.0c	7.0c	7.0c	8.0d
Organic	4.7b	4.7b	5.0b	4.0a	4.3a	4.0a	4.3b
IPM 1	6.7c	6.7c	7.0c	7.0c	7.0c	6.7c	7.7d
IPM 2	6.7c	6.7c	7.0c	6.0b	5.7b	5.3b	6.3c
untreated	3.7a	3.7a	3.0a	3.0a	3.7a	3.0a	3.0a

¹All values represent the mean of 3 replications. Means in the same column with the same letter are not significantly different at the 0.05 level as determined by Fisher's Protected Least Significant Difference test.

²Quality evaluations are made on a 1-9 scale where 9 = excellent turfgrass quality and 1 = very poor turfgrass quality.