

# Performance and Effects of Sustane and Other Lawn Amendments on Turfgrass

## PROGRESS REPORT FOR 1995

by T. Hsiang and L. Yang  
Guelph Turfgrass Institute  
University of Guelph

### OBJECTIVES

This is a 3-year study, which started in June 1994. The major objectives are to evaluate some turfgrass amendments or conditioners and compare them against a traditional synthetic treatment on turfgrass plots.

Specific effects being examined include:

- 1) Effects on turf quality and esthetics in terms of functional features (colour, density, and general appearance) 1994-1996
- 2) Effects on turfgrass disease control such as dollarspot and snow mould: 1995-1996.
- 3) Effects on thatch development and thatch pH: 1994-1996.
- 4) Effects on the development of a newly built and newly seeded bentgrass green over the first several years of establishment: 1994-1996.

### METHODS

Organic amendments are being evaluated on a sward of creeping bentgrass (*Agrostis palustris*) at the Guelph Turfgrass Institute Research site. Regular turfgrass maintenance is similar to that used for golf course putting greens in Ontario. The experimental design consists of a randomized complete block design with 4 replications. Each treatment plot is 1m x 2m. The compounds being tested are shown in Table 1. Two separate experiments are being conducted, one with all 8 treatments for non-disease features, the other with 6 treatments for evaluations of disease (dollarspot and snow mould).

Because we found last year that monthly applications of Sustane 5-2-4 at 20kg/100m<sup>2</sup> yielded very lush and esthetically acceptable turf by the end of the growing season and because this rate is not practical for turf maintenance, in 1995 this rate of nitrogen was applied only every two months (June 6, Aug 4, and Oct 6). The other treatments were applied monthly to 1 m x 2m plots laid out in a randomized complete block design (4 replications). The first treatments were applied on June 6 followed by applications on July 6, August 4, September 6, October 6 and a dormant application in late November.

Evaluations were made at various intervals to evaluate the following effects. Except for the varying rates of Sustane 5-2-4 and the inorganic check, all fertilizers were applied at a rate equivalent to 1 pound nitrogen per 1000 ft<sup>2</sup> (0.49 kg/100m<sup>2</sup>). The Milorganite treatment was amended with sulfate of potash to provide a 6-2-6 mix. A base rate of 2 lb phosphate per 1000 ft<sup>2</sup> was applied at seeding (June 7, 1994)

Table 1. Fertilizer, distributor, application rate, and inclusion in experiments.

Fertilizer	Rate	Kg/100 m <sup>2</sup>	Lb/1000 ft <sup>2</sup>
Sustane 5-2-4+Fe	0.5 x	5	10.2
Sustane 5-2-4+Fe	1 x	10	20.5
Sustane 5-2-4+Fe	2 x	20	41

Sustane 10-2-10 + Polyon	1 x	4.9	10
Ringer 10-2-6	1 x	4.5	9.2
Milorganite 6-2-0+ sulfate of potash	1 x	8.1	16.6
Pursell 18-2-8 Greenskote	1 x	2.7	5.5
Check: Agromart 25-4-10 (inorganic)	1 x	1.5	3.1

### Functional features

The effects of the treatments were evaluated biweekly from March through September. Turf esthetics (colour, density, general appearance) were assessed by using a 0-9 rating system, where 0 = poor and 9 = best. After September, the grass was becoming dormant and the appearance did not change up to snowfall.

### Effects on turfgrass disease

The ability of the amendments to affect disease development was examined on a separate set of plots. In early spring 1995, pink snow mould was evaluated on the disease plots. Wet cool conditions persisted into summer, which allowed development of Fusarium patch. Disease severity was assessed biweekly from April 5 through June 14 by estimating percent affected area in each plot. (Note that these plots had not been inoculated the previous fall because of our fears that the young turf would be killed off.)

The disease dollarspot, caused by *Sclerotinia homoeocarpa* (syn.: *Lanzia* or *Mollerodiscus* sp.) was evaluated from July through September. Inoculum was prepared by growing the fungus on autoclaved cereal grains (chicken scratch) for two weeks, then air dried and ground down. Inocula from 5 strains of the fungi were mixed together and 2 grains of this mixture were re-mixed with 18g of whole wheat flour and evenly applied to each 1m x 2m plot. Plots were inoculated twice, on June 23 and then on July 24. Disease assessment was started 3 weeks after first inoculation, and repeated every week for 4 months. Percent area affected in each plot was estimated. In August, dollarspot also found on the turf quality plots and was evaluated there too.

For this coming Winter, the snow mould diseases, caused by *Typhula* spp. (grey snow mould), and *Fusarium nivale* (pink snow mould), will be inoculated onto the disease plots. Inoculum will be prepared using the dollarspot protocol. Plots of 1 m x 2m will be split into two, and each inoculated in late November with the mixture of 1 g of grey snow mould or pink snow mould inoculum and 9 g of whole wheat flour. Disease severity will be evaluated next Spring after snow melt.

### Effects on thatch

Thatch degradation over the period of the study is being examined. Thatch depth and change in depth are being measured over time. In 1995, thatch and soil pH were measured in 0.01 M CaCl<sub>2</sub> at the beginning and the end of season using 4 replicates from each plot (Methods of Soil Analysis, Part 2, p. 923, 1965).

### Analysis

All data from the 1995 experiments were analyzed for variance with PROC ANOVA in PC SAS® ver 6.04. When a significant treatment effect was observed, mean separation was done with the Protected L.S.D. (least significant difference, p = 0.05).

## RESULTS AND DISCUSSION

The results from the 1995 field season are shown in the following tables.

Table 2. Fertilizer effects on *Fusarium nivale* diseases observed after snow melt.

TREATMENTS	PINK SNOW MOULD RATING (% Affected area)					
	Apr 5	19-Apr	3-May	17-May	31-May	14-Jun
5-2-4 20kg	6	7	11	14	19	3
5-2-4 10kg	9	9	11	20	26	4
10-2-10 5kg	8	9	10	15	19	2
GREENKOTE	3	5	7	13	18	3
MILORGANITE	7	7	9	16	20	5
CHECK 25-4-10	4	5	7	11	15	3
LSD (P=0.05)	8	9.7	10.3	15.2	15.2	4.4

--- There were no significant differences in severity of pink snow mould or *Fusarium* patch among the treatments.

Table 3. Effects on functional features of fertilizers applied throughout the growing season. First application was on June 6 and monthly thereafter until November except for 5-2-4 at 20 kg, which was applied every 2 months

TREATMENT	QUALITY RATING (0 = poor, 9 = best)													
	20-Mar	5-Apr	19-Apr	3-May	17-May	31-May	14-Jun	21-Jun	5-Jul	19-Jul	2-Aug	16-Aug	30-Aug	13-Sep
5-2-4 20kg	5	6	7	7	6	5.8	6	7	7	5.8	6.3	8	7.8	6.5
5-2-4 10kg	3.5	3.5	3.8	3.8	4.8	4.5	4.8	5	5.8	7	7.5	7	6	6
5-2-4 5kg	2.8	3.3	2.5	2.3	3.3	3.5	3.3	3	3.3	3.5	4.5	5	4.3	3.8
10-2-10 5kg	4.5	4.5	4.5	5.3	5	4.8	4.8	5.3	5.3	6	6.8	6.3	5.3	5.3
GREENSKOTE	4.3	4.3	4.3	5	5.3	5	5.3	4.8	5	6.0	6.3	6	5.3	6
MILORGANITE	3	3.3	4	4.3	4.3	4.5	3.8	3.3	4	4.3	5	4.3	4.3	4
RINGER	3	3.3	3.3	3.8	4.5	4.8	3.8	3.3	4.3	4.3	4.8	5.3	5	4.3
CHECK 25-4-10	2.5	2.8	2.5	2.5	3.3	3.3	4.3	4	3.5	3.3	4	5.5	4.8	5
LSD (P=0.05)	1.4	0.8	1.0	1.2	0.8	0.7	1	0.9	0.8	0.9	0.8	0.9	1.2	1

--- The effects of Sustane 5-2-4 at 20kg/100m<sup>2</sup> applied the previous year were evident very soon after snow melt. Even though the first applications were not made until June 6, these plots achieved a greenness in early Spring that was not matched by any of the other treatments until mid-Summer. These results show that high rates of Sustane 5-2-4 in the previous season can provide a big boost to green-up in the following season.

--- There were no significant differences in functional features between Sustane applied at 5kg/100m<sup>2</sup> and the check 25-4-10, but they were significantly lower than other treatments. This was not unexpected since their rates of actual N were lower than the other treatments.

--- No significant differences in functional features were observed between Ringer and Milorganite, and between Sustane 10-2-10 at 5kg/100m<sup>2</sup> and Greenskote, and in general these performed less well than Sustane 5-2-4 at 10kg/100m<sup>2</sup>.

**Table 4. Effects on thatch depth and thatch root pH**

TREATMENT	Thatch depth (mm)		Thatch root pH	
	9-May	6-Nov	9-May	6-Nov
5-2-4 20kg	8.41	8.69	7.33	7.42
5-2-4 10kg	8	8.13	7.38	7.42
5-2-4 5kg	8	7.69	7.36	7.42
10-2-10 5kg	8.41	7.75	7.41	7.45
GREENSKOTE	8.41	7.84	7.29	7.38
MILORGANITE	8.44	7.38	7.33	7.36
RINGER	8.03	7.69	7.41	7.42
CHECK 25-4-10	7.44	6.88	7.39	7.53
LSD (P=0.05)	0.76	0.81	0.06	0.07

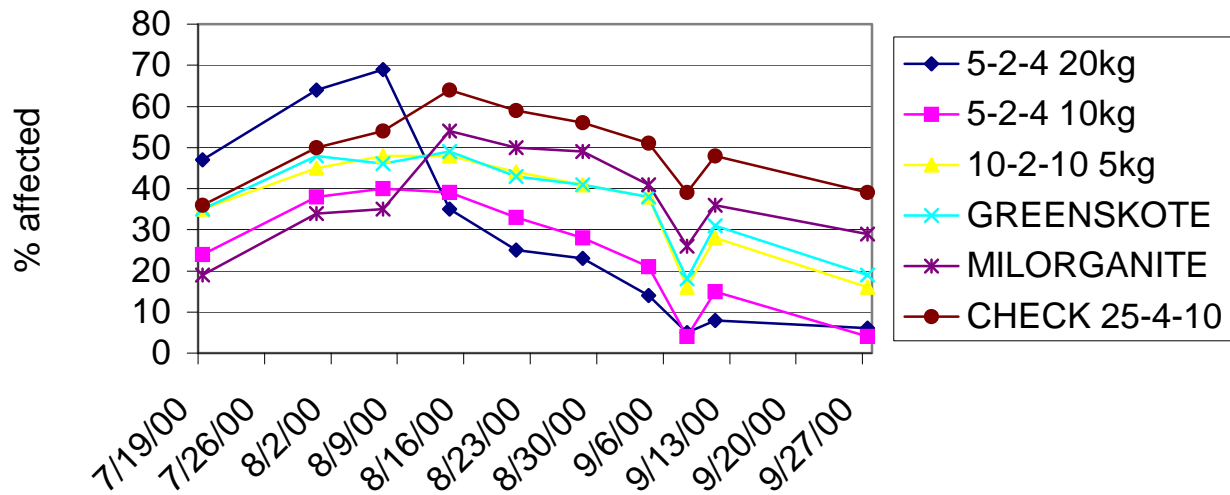
--- The thatch pH value at the end of the season was significantly higher in the plots treated with check 25-4-10.

--- No significant difference was found in thatch depth between treatments of 20kg/100m<sup>2</sup> and 10kg/100m<sup>2</sup> of Sustane 5-2-4, but they were significantly higher than the check 25-4-10

**Table 5. Effects of fertilizers on dollarspot disease in inoculated disease plots**

TREATMENTS	DOLLARSPOT RATING (% Affected area)									
	19-Jul	31-Jul	7-Aug	14-Aug	21-Aug	28-Aug	4-Sep	11-Sep	8-Sep	27-Sep
5-2-4 20kg	47	64	69	35	25	23	14	8	5	6
5-2-4 10kg	24	38	40	39	33	28	21	15	4	4
10-2-10 5kg	35	45	48	48	44	41	38	28	16	16
GREENSKOTE	35	48	46	49	43	41	38	31	18	19
MILORGANITE	19	34	35	54	50	49	41	36	26	29
CHECK 25-4-10	36	50	54	64	59	56	51	48	39	39
LSD (P=0.05)	13.7	10.4	10.7	8.2	7.3	8.4	9.1	13.6	10.2	12.7

*Effects Effects of fertilizers on dollarspot disease in inoculated disease plots*



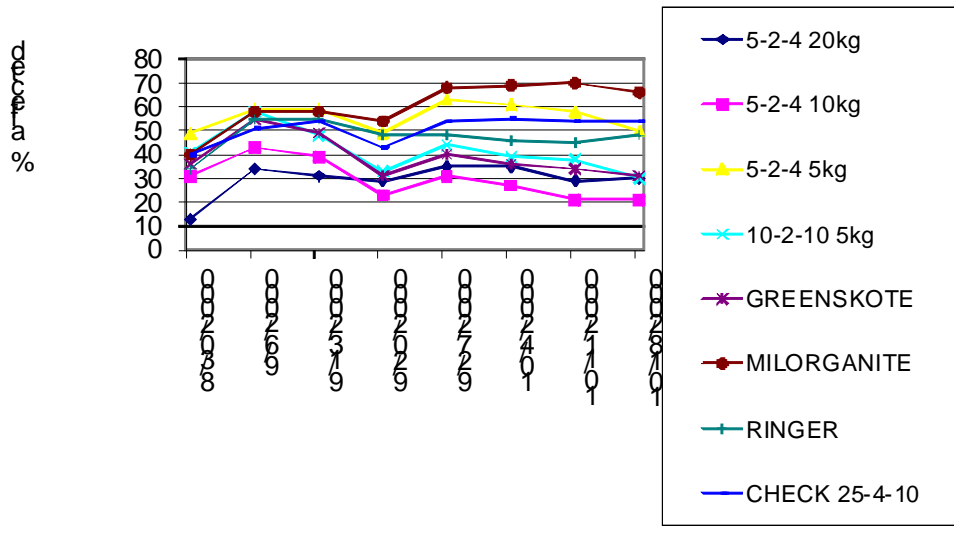
--- In the first 3 ratings, the greatest amount of dollarspot was found in the plots with Sustane at 20kg/100m<sup>2</sup>. From mid-August on, greater amounts of dollarspot were found in the check plots treated with Agromart inorganic 25-4-10.

--- Sustane 5-2-4 at 10kg/100m<sup>2</sup> (monthly applications) performed as well or better than the 20kg/100m<sup>2</sup> rate (bimonthly applications)

Table 6. Effects of fertilizer on dollarspot disease in non-inoculated turf quality plots.

TREATMENTS	DOLLARSPOT RATING (% Affected area)							
	30-Aug	6-Sep	13-Sep	20-Sep	27-Sep	4-Oct	11-Oct	18-Oct
5-2-4 20kg	13	34	31	29	35	35	29	30
5-2-4 10kg	31	43	39	23	31	27	21	21
5-2-4 5kg	49	59	59	49	63	61	58	50
10-2-10 5kg	41	58	48	33	44	39	38	30
GREENSKOTE	36	55	49	31	40	36	34	31
MILORGANITE	40	58	58	54	68	69	70	66
RINGER	34	55	55	48	48	46	45	48
CHECK 25-4-10	40	51	54	43	54	55	54	54
LSD (P=0.05)	12	15.9	16.7	12.7	13.3	14	14.1	14

Effects of fertilizer on dollarspot disease in non-inoculated turf quality plots.



--- Similar results were found in the turf quality plots as those in the disease plots. Sustane 5-2-4 at 10kg/100m<sup>2</sup> applied monthly showed the best performance.