

## COST ANALYSIS OF NITROGEN FERTILIZATION OF BENTGRASS

By Patrick Keller

Data collected in 1987 from research plots maintained at the Maple Bluff Country Club provide the agronomic basis for this cost analysis. In this experiment, 4 nitrogen fertilizers, each at three N rates, are being applied to Penncross creeping bentgrass established in 1986 on a well drained silt loam soil.

Weekly color ratings of the research plots were averaged for the 1987 season and plotted against the N rate of each fertilizer. From these relationships, the N rate of each fertilizer required to achieve a preselected average annual color rating was derived.

For the purposes of this cost analysis, fertilizer rates were selected that provided a season average color rating of 7.5. A color rating of 7.5 is 0.5 unit above what many turf managers consider to be the minimally acceptable color for bentgrass and is associated with turf with good density, low tendency for weed infestation and rapid recovery from physical or disease damage.

The fertilizers being compared in this cost analysis, their modes of application and the N rates associated with season average color ratings of 7.5 are shown in Table 1. In actual practice the urea and fine grade Milorganite were applied only in the dry form. Both may be applied as solution or a suspension. Thus, there is interest in comparing the costs of sprayer versus spreader application of these two materials. This has been done here with the assumption that turfgrass color responses to urea and fine grade Milorganite over an entire season do not differ significantly whether they are applied dry or as a solution or suspension.

Application costs of the various nitrogen fertilizers were derived from:

1. Actual dealer quotes for the fertilizers and application equipment required.
2. Discussion with Madison area golf course superintendents regarding equipment lifetimes, hours used per season, hours required to apply dry and liquid fertilizers on putting greens and tees and hourly labor costs.

From all this information, annual costs of applying each fertilizer were computed.

As shown in Table 2, annual costs of maintaining the bentgrass at a season average color rating of 7.5 ranged from \$4.17 to \$51.45 per 1000 sq. ft. The inordinately high cost for fine grade Milorganite applied as a suspension is largely the result of the necessity of using a wetting agent. Aqua Gro has proven to be more effective in this regard than several other commercial wetting agents and was used in this cost analysis. Even at the low rate of 8 oz. per 100 gal. water, Aqua Gro accounts for 50 percent of the annual application cost of fine grade Milorganite as a suspension.

When cost is a concern in selecting or modifying a nitrogen fertilization program for turfgrass, total cost is but one factor that should be considered. The various components of the total cost also require attention. A good case to consider is that of urea. As shown in Table 2, material is a relatively small

portion of total application cost for urea. Therefore, a change in rate of application has little influence on total cost. Just the opposite would be true if the rate of application of IBDU used here (1.8 lb N) was found to be inadequate and was increased to 3 to 4 lb N per season.

Equipment and labor costs for spray application of nitrogen fertilizers were found to be considerably greater than for application of dry fertilizers (Table 2). At least in the case of urea, these costs are erroneous if, as is so often done, pesticides are added to the spray tank. Under this circumstance, a significant portion of the equipment and labor costs needs to be allocated to pesticide rather than fertilizer application cost.

Because the basis for this cost analysis is a single year of field research, the results need to be interpreted cautiously. However, they do convey a general sense of the relative costs of different approaches for fertilizing bentgrass.

**Table 1. Nitrogen fertilizers considered and their model and rate of application for a season average color rating of 7.5.**

Fertilizer	Mode of Application	Application Rate	
		Nitrogen	Material
		lb/1,000 ft <sup>2</sup>	
Fine grade Milorganite	a) Dry, bi-weekly, hand operated drop spreader	7.2	120
	b) Suspension, bi-weekly, tractor drawn 300-gal. sprayer with hand boom	7.2	120
Regular grade Milorganite	Dry, monthly, hand operated rotary spreader	4.0	67
IBDU	Dry, bi-monthly, hand operated rotary spreader	1.8	5.8
Urea	a) Dry, bi-weekly, hand operated rotary spreader	4.5	10
	b) Solution, bi-weekly, tractor drawn 300-gal. sprayer with hand boom.	4.5	10



**Table 2. Component and total costs for annual applications of different fertilizers on bentgrass.**

Fertilizer	Form Applied	Component Costs			Total Cost
		Material	Equipment	Labor	
-----cost/1000 ft <sup>2</sup> -----					
Fine grade Milorganite	a) Dry	\$12.24	\$0.52	\$2.66	\$15.42
	b) Suspension	\$39.24 <sup>1</sup>	\$3.66	\$8.55	\$51.45
Regular grade Milorganite	Dry	\$ 6.81	\$0.52	\$1.33	\$ 8.66
IBDU	Dry	\$ 3.59	\$0.52	\$0.89	\$ 5.00
Urea	a) Dry	\$ 0.99	\$0.52	\$2.66	\$ 4.17
	b) Solution	\$ 0.99	\$3.66	\$8.55	\$13.20

<sup>1</sup>Milorganite = \$12.24; Suspending agent (attapulgitic clay) = \$1.05; Wetting agent (Aqua Gro) = \$25.95.

*Editor's Note: Pat is a UW-Madison senior from Mount Horeb, WI. Although he is an Agricultural Business major, he elected to take an internship under Dr. Wayne Kussow this past summer. This paper is one of the activities Pat carried out during his internship.*

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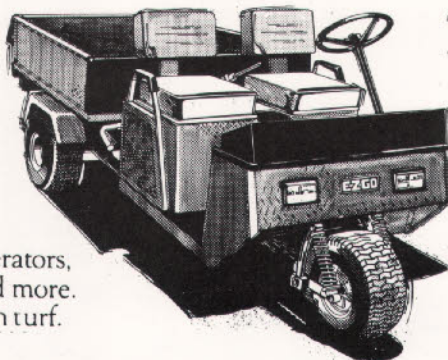
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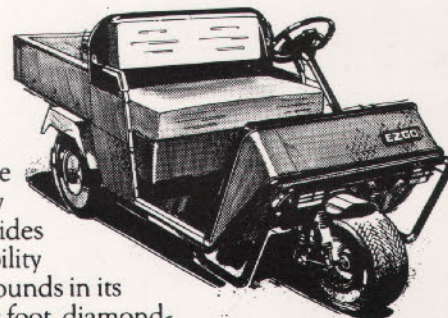
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