DEVELOPING A TURFGRASS NITROGEN FERTILITY PROGRAM

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Turfgrass fertility programs in large part determine the pace and requirements for other management practices. Differences in geographic location, soils, climate, species and maintenance level strongly influence application timing. These general recommendations for timing and rates should only be used as a guideline. Adjustments for individual site and programs should be made as necessary.

TIMING

Application timing is strongly influenced by turfgrass species. Warm-season turfs, like buffalograss and zoysiagrass, are fertilized at a different time of year than cool-season turfs, like tall fescue and Kentucky bluegrass. This timing difference is closely related to when these turfs are actively growing. Warm-season turfs go off color in the fall and, depending upon location, will not green-up in the spring until as late as April or May. Cool-season turfs, on the other hand, grow actively in the spring and fall, but growth is minimal during the late summer months. In general, fertilizer is applied to an actively growing turf. There are, however, exceptions to this guideline.

COOL SEASON TURFGRASS

Cool season turfgrasses should receive the majority of their annual application in the fall. University research and practical experience have shown that turf that is fertilized in the late fall has better root growth, less weeds, disease and thatch, longer fall color, and earlier spring green-up than cool season turf that is fertilized heavy in the spring. A demonstrated disadvantage of heavy spring fertilization is the promotion of a top-growth flush, at the expense of root growth, prior to the summer stress period. In general, cool season turfs should receive two-thirds of their total annual N application in the fall and one-third in the spring. For example: if the desired annual N application was 3 lbs/N/1000ft^2, 1 pound should be applied in the spring and 2 pounds in the fall. How these applications are applied (i.e. single or split application) will depend on fertilizer carrier (slow or quick release) and length of growing season.

WARM-SEASON TURFGRASS

Warm-season grass fertility programs should begin in the early spring, as the turf becomes active, and continue through the active growing season. Over stimulation of warm-season grasses in late fall should be avoided. Succulent growth will be more susceptible to frost damage or winterkill.

RATES

Application rates of nitrogen fertilizers depend on species, as well as the level of maintenance desired. Turf that is abundantly fertilized will require more frequent mowing and irrigation, but the turf will be of higher quality. Other management practices will also influence fertility rate. For example, if clippings are removed,

higher rates of fertilizer need to be applied to compensate for the nutrients lost in the removed clippings. Additionally, if the turf is irrigated frequently or grown on sandy soils or in a high rainfall region, higher nitrogen levels should be used. See Table 1 for monthly nitrogen requirements for many turfgrass species.

TABLE 1. The monthly nitrogen requirements for different turfgrass species at three different maintenance levels.

Turfgrass Species and Fertility Requirements	Pounds of Nitrogen Per Growing Month Per 1000 sq. ft.[a]		
	Low Maintenance Level Desired	Medium-High Maintenance Level Desired	Very High Maintenance Level Desired[b]
COOL SEASON GRASSES			
Chewings fescue	0.2-0.3	0.4-0.6	not adapted
Red fescue	0.2-0.3	0.4-0.6	not adapted
Italian ryegrass	0.3-0.4	0.5-0.6	0.7-0.8
Kentucky bluegrass-- common types, or cultivars selected for low N	0.3-0.4	0.5-0.6	0.7-0.8
Perennial ryegrass	0.3-0.4	0.5-0.6	0.7-0.8
Tall fescue	0.3-0.4	0.5-0.6	0.7-0.8
Colonial bentgrass	0.4-0.5	0.6-0.7	0.8-1.0
Annual bluegrass	0.4-0.5	0.6-0.7	0.8-1.0
Kentucky bluegrass-- cultivars developed for higher maintenance	0.4-0.5	0.6-0.7	0.8-1.0
WARM SEASON GRASSES			
Buffalograss	0.0-0.1	0.2-0.4	not adapted
Zoysiagrass	0.3-0.4	0.5-0.7	0.8-1.0

[a] Within each range the higher nitrogen level should be used if the turf is irrigated frequently, if you are in a high rainfall region, if the soil is sandy, and/or if clippings are removed.
[b] These rates should not be applied on home lawns but only to highly maintained recreational turf.

CARRIERS AND SOURCES

There are numerous fertilizer products currently on the market. Characteristics of the different nutrient sources are summarized in Table 2.

TABLE 2. Characteristics of primary nutrient sources in turf fertilizers[a]

	Approx. Nutrient Percentage			Salt Index[b]	Acidifying[c]	Cold-Water Solubility,[d]
Source	N	P_2O_5	K_2O	Per Unit	Effect	g/l
Ammonium nitrate	33	0	0	3.2	62	1810
Ammonium sulfate	21	0	0	3.3	110	710
Urea	45	0	0	1.7	71	780
UF (ureaformaldehyde or methylene urea)	38	0	0	0.3	--	SS
IBDU (isobutylidene diurea)	31	0	0	0.2	--	SS
SCU (sulfur-coated urea)	32	0	0	0.7	--	SR
Milorganite	6	4	0	0.7	--	SS
Monoammonium phosphate	11	48	0	2.7	58	230
Diammonium phosphate	20	50	0	1.7	75	430
Superphosphate	0	20	0	0.4	0	20
Treble superphosphate	0	45	0	0.2	0	40
Muriate of potash	0	0	60	1.9	0	350
Sulfate of potash	0	0	50	0.9	0	120
Potassium nitrate	13	0	44	5.3	(-23)	130

[a]Adapted from Turgeon, A.J. 1991. Turfgrass Management. Prentice-Hall. Englewood Cliffs, NJ 07632.
[b]Relative salinity of salts per unit of nutrient compared to sodium nitrate (6.3):>2.5 = high, 2.5 to 1.0 = moderate, <1.0 = low.
[c]Units of $CaCO_3$ required to neutralize 100 units of fertilizer (by weight).
[d]SS = slowly soluble, SR = slow release.

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