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K. S. Erusha

R. C. Sherman

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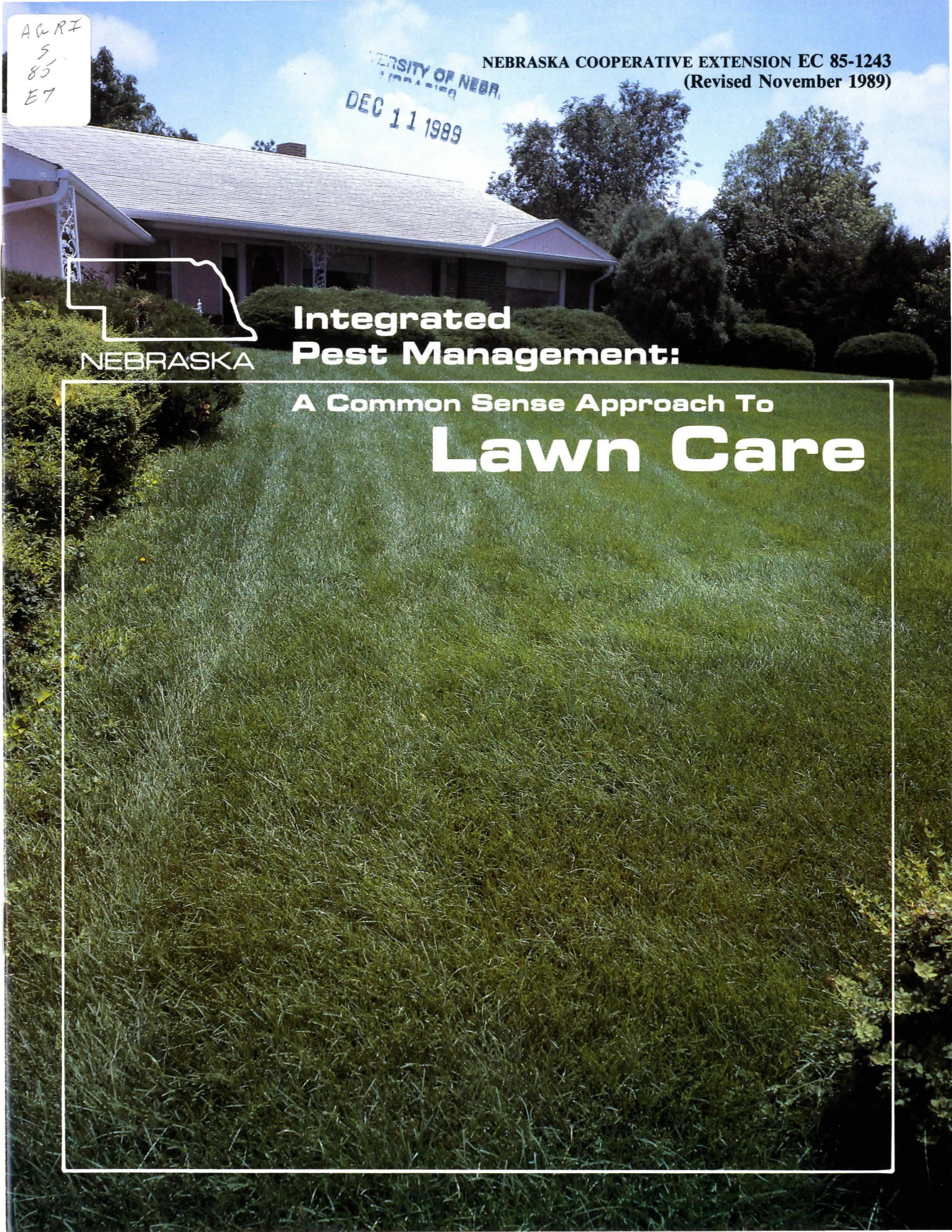
NEBRASKA

Integrated Pest Management:

A Common Sense Approach To

Lawn Care



NEBRASKA

Integrated Pest Management: A Common Sense Approach to Lawn Care

K.S. Erusha, Graduate Research Associate
R.C. Shearman, Extension Turfgrass Specialist

The lawn is an important component of the landscape and contributes significantly to a home's economic value and environment. Turfgrasses prevent soil erosion and reduce heat, noise, and glare. Several cultural practices are needed to maintain a healthy lawn. The level at which these practices are implemented increases the lawn's vigor and appearance.

Integrated pest management (IPM) promotes the use of more than one approach to keep pest populations at acceptable levels. The lawn care IPM approach uses adapted grasses and cultural practices to prevent or reduce pest problems. The ultimate goal is to reduce pesticide use and dependency on pesticides. An IPM approach does not mean total elimination of pesticides. There may be cases when pesticide use is warranted. When pesticides are needed, select the safest, most effective chemical available, and follow its specific label directions.

This circular covers basic cultural practices of turfgrass management. Each cultural practice should be considered an interactive component of the total management system. Interactions of these components determine the level of success.

Turfgrasses

Turfgrass species can be divided into two major groupings: cool season and warm season grasses. Grasses vary depending on their soil temperature growth range.

Cool season turfgrasses are the most widely used in Nebraska. They include Kentucky bluegrass, tall fescue, perennial ryegrass, fine fescue, and bentgrass. Cool season grasses grow best when soil temperatures are between 60-70 °F. They grow most actively in the spring and fall, with growth slowing during the summer. Cool season turfgrass species vary in adaptation, texture, color, and maintenance requirements. Most cool season grasses are established by seed or sod. Proper species and cultivar selection before establishment is key to improved turf performance.

Warm season turfgrasses, like zoysiagrass, bermudagrass, and buffalograss, grow best when soil temperatures are between 80-90 °F. Warm season grasses are more heat and drought tolerant and more wear resistant than cool season grasses, but are generally less low temperature tolerant. Warm season grasses remain dormant late in the spring, grow most actively during the warm summer, and become dormant with the first fall frost. Most warm season turfgrasses are established by sod plugs, or sprigs (stolons). Buffalograss and blue grama are exceptions, being established commonly from seed. Specific information on warm and cool season turfgrass adaptation and recommended cultivars can be found in NebGuides available from the Cooperative Extension Service.

Mowing

Mowing is the fundamental cultural practice on turfs. Improper mowing contributes to a thin, weak lawn that is more susceptible to stress and injury.

Mowing Height

Cutting height will vary according to turfgrass species, intended use, intensity of culture, season, environment, and lawn quality desired (Table 1).

Table 1. Recommended mowing heights for turfgrass grown in Nebraska.

	Seasonal mowing heights (inches)[a]		
Turfgrass	Spring	Summer[b]	Fall
Cool Season Grasses:			
Kentucky bluegrass	1.5 - 2.0	3.0 - 3.5	2.0
Perennial ryegrass	1.5 - 2.0	2.0 - 3.5	2.0
Tall fescue	2.0 - 3.0	3.0 - 3.5	2.0 - 3.0
Creeping red fescue	2.0	3.0	2.0
Chewings fescue	2.0	3.0	2.0
Hard fescue	2.0	3.0	2.0
Sheep fescue	2.0	3.0	2.0
Warm Season Grasses:			
Zoysiagrass	1.0 - 2.0	1.0 - 2.0	1.5 - 2.0
Buffalograss	1.0 - 2.0	1.0 - 2.0	1.5 - 2.0
Blue grama	2.0	2.0	2.0

[a]Mowing heights are indicated as a range based on climatic factors, intensity of culture, intended use, and quality of turf desired.

[b]Use summer mowing heights when turfgrasses are grown in shaded conditions. Buffalograss, blue grama, and zoysiagrass are not recommended for shaded areas.

Adjust the mowing height during the growing season to take advantage of variation in seasonal turfgrass growth habit and to modify the turf's growing environment. For example, mow Kentucky bluegrass lawns at 2.0 inches in spring (mid-April to mid-June), 3.0 to 3.5 inches during summer (mid-June to late-August), and 2.0 inches in fall (early September until the last mowing).

In spring, maintain cool season species at the low end of their mowing range to take advantage of incoming radiation and soil warming for growth. Raise the cutting height during summer to increase the vegetation. This increase aids in insulating the crown (growing point) from high temperature stress and reduces weed competition. Gradually lower the mowing height in the fall, back to the low end of the mowing range. Lowering the height of cut promotes lateral turfgrass growth, stand thickening, and reduces overwintering debris.

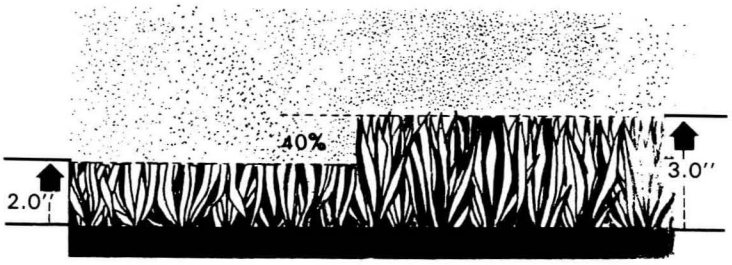


Figure 1. Do not remove more than 30-40% of the leaf with any mowing.

Mowing Frequency

Mowing frequency is dictated by turfgrass growth rate. Remove no more than 30 to 40% of the leaf blade with any mowing (Figure 1). For example, mow a Kentucky bluegrass lawn maintained at 2.0 inches before it exceeds 3.0 to 3.5 inches. A mowing that removes an excessive amount of topgrowth is called scalping. Scalping reduces turf quality and restricts root growth. Severe defoliation that removes more than 50% of the topgrowth causes existing roots and rhizomes to stop growth. Tiller, rhizome, and root initiation cease and shoot regrowth occurs at the expense of the roots, during the period following severe defoliation.

Lower the mowing height gradually if growth becomes excessive between mowings or when lowering the mowing height in the fall. Reduce the height in 0.5 to 1.0 inch increments, using a two to three day period between mowings, until lawn is at the desired height.

Clipping Removal

Clippings do not need to be removed if proper mowing frequency is maintained. Clippings recycle nitrogen, phosphorus, and potassium to the turf. Clippings do not contribute significantly to thatch build-up. Recycled clippings reduce the turfgrass nitrogen requirement for the growing season by as much as one third. Remove clippings if they accumulate during mowing. Grass clippings on the lawn surface decompose slowly, may smother the grass, enhance disease development, and increase thatch build-up. Use excess clippings for compost or air-dry clippings for use as a mulch in gardens and flower beds.

Mowing Equipment

Keep mower blades sharp and mowers properly adjusted and tuned. Improperly adjusted mowers give reduced mowing quality and are less fuel efficient. Mowers with dull blades mutilate the turfgrass leaf resulting in a browned appearance that reduces turfgrass quality, provides a favorable site for disease penetration, and results in a weakened, more stress susceptible turf.

Fertilization

A fertilization program is important in a lawn care program. You must consider several factors before the fertilizer program is developed:

1. Soil test.
2. Soil type.
3. Turfgrass species and cultivar.
4. Intensity of culture.
5. Irrigation practices.
6. Clipping removal and return.
7. Type and cost of fertilizer.
8. Convenience of fertilizer application.

Soil Tests

Turfgrasses depend on soils for their nutritional needs. It is important to test the soil to determine available nutrients. Make soil tests on lawns every three to five years. More frequent testing is required when dealing with a problem soil, nutrient deficiency, or pH modification. Most soil tests analyze pH, potassium, and phosphorus levels. Turfgrass nitrogen requirements are usually based on turfgrass evaluations rather than soil test results.

Randomly collect 15 to 20 soil samples from the lawn, using a clean, narrow garden tool or soil probe. Sample the upper three inches of soil. Discard the turf and thatch. Combine the samples in a plastic container, allow to air dry, and mix thoroughly. Send a pint of soil to a reputable soil testing lab, specifying whether the sample is from a new or established lawn. Cooperative Extension Service offices can supply information on sampling procedures and a soil sample container to mail samples to the University Soil Testing Laboratory.

Turfgrasses require 16 essential nutrients for their growth and development:

Macronutrients

Carbon	Calcium
Hydrogen	Magnesium
Oxygen	Sulfur
Nitrogen	Potassium
Phosphorus	

Micronutrients

Iron	Molybdenum
Manganese	Boron
Zinc	Chlorine
Copper	

These elements are required in varying amounts by the turfgrass plant. Regardless of the amount required, the plant will suffer if any of these elements are not present in adequate amounts.

Carbon, hydrogen, and oxygen are supplied to the plant from the atmosphere and water. The remaining essential nutrients must be supplied by the soil. When adequate levels are not found in the soil, the essential elements must be supplied from fertilizers.

The fertilizer label contains information concerning what the product contains. The label indicates the percentage of nitrogen (N), available phosphoric acid (P_2O_5), and water soluble potash (K_2O) (Figure 2).

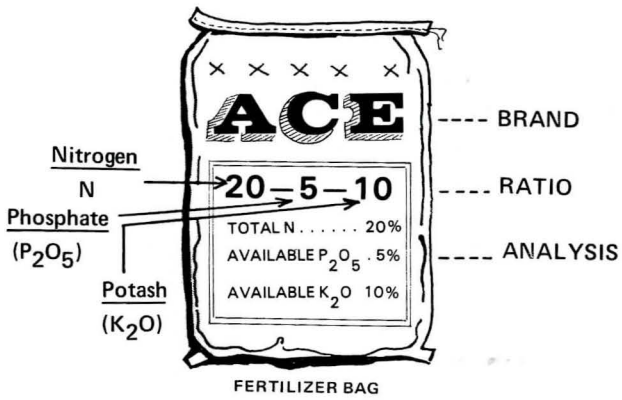


Figure 2. Reading the fertilizer label.

Turfgrass fertilizers vary based on the analysis. Most turfgrass specialists recommend fertilizers with ratios (i.e. $N:P_2O_5:K_2O$) of 4:1:2, 3:1:2 or similar for maintaining established turfs. Higher ratios of phosphoric acid and potash are recommended on newly seeded or sodded turfs.

In most cases, slow-release nitrogen fertilizer sources or a combination of slow and fast-release, are preferred over fast-release fertilizers alone (Table 2). If a fast-release nitrogen source must be used, it is best to use light, frequent applications rather than heavy, infrequent ones. Fertilizer programs emphasizing slow-release sources result in uniform turfgrass shoot and root growth over a longer time than those using fast-release sources.

Table 2. Nitrogen carriers for turfgrass fertilization in Nebraska.

Carrier[a]	N	Percent P_2O_5	K_2O	Amount (lb) needed to apply 1 lb N per 1000 sq. ft.
Fast Release:				
Ammonium nitrate	33.0	—	—	3.0
Ammonium sulfate	20.5	—	—	4.9
Urea	45.0	—	—	2.2
Slow Release:				
Activated sewage sludge (eg. Milorganite)	4-7	4-6	0.4-0.7	16.7
Sulfur-Coated Urea	36.0	—	—	2.7
IBDU	31.0	—	—	3.2
Processed tankage	7-10	2.6	0.4-0.7	12.5
Ureaformaldehyde	38.0	—	—	2.6

[a] This list is not all inclusive.

Nitrogen

Turfgrasses respond most readily to nitrogen if other nutrients are present in adequate amounts. Nitrogen influences shoot and root growth, color, density, recuperative rate, and stress hardiness, such as heat, cold, and drought hardiness. It is important to maintain a controlled level of nitrogen nutrition and not fertilize above recommended levels (Table 3). Too much nitrogen results in succulent growth susceptible to heat and drought stress injury, and prone to insect and disease problems.

Several types of nitrogen carriers are available (Table 2). Fast-release sources make nitrogen available to the plant quickly, resulting in a rapid, short-lived response. They have a high potential for burning the grass and promoting succulent growth. As a result they cannot be applied at rates higher than one pound of actual nitrogen per 1000 square feet. Slow-release sources make nitrogen available to the turfgrass plant over a longer time

Table 3. Annual nitrogen requirements for turfgrass species used in Nebraska lawns.

Turfgrass species	Amount of N required each growing season (lb/1000 ft^2)[a]
Improved Kentucky bluegrass (i.e. Baron, Glade, Midnight, etc.)	3 to 6
Common Kentucky bluegrass (i.e. Park, Newport, Delta Cougar, Kenblue, etc.)	2 to 4
Perennial ryegrass	3 to 6
Tall fescue	1 to 4
Fine-leaf fescues (i.e. Creeping red, Chewings, Hard, and Sheep fescue)	1 to 4
Zoysiagrass	1 to 3
Buffalograss	0 to 2
Blue grama	0 to 2

[a] Nitrogen recommendations are based on a six month growing season. A range for nitrogen is given because of variations in soil, climate, cultural practices, and clipping return or removal.

period. Turfgrass response to slow-release nitrogen sources is not as rapid and potential for foliar burn is lower than for rapid-release sources. For best results, use a combination of fast and slow-release nitrogen.

Potassium and Phosphorus

Use soil test results to determine the need for additional phosphorus and potassium. Higher rates of phosphorus are recommended on newly seeded areas. Phosphorus affects establishment and root development. Potassium influences turfgrass wear, heat, cold, and drought tolerance.

Fertilizer Timing

Timing of fertilizer applications depends upon turfgrass species, lawn quality desired, cultural intensity, turfgrass use, and soil nutrient retention.

All lawns need to be fertilized at least once a year. Warm season turfgrasses require a different fertilization schedule than cool season turfgrasses. Fertilize cool season turfgrasses in late fall (mid October to mid November). Warm season turfgrasses should be fertilized before August 15. Applications on warm season turfs made after this date encourage weed competition and winter injury.

High maintenance lawns require nutrients throughout the growing season. A general fertilization schedule for a high maintenance, cool season lawn would include four applications of fertilizer per growing season. A typical schedule for a Kentucky bluegrass lawn:

Application	Timing	Nitrogen/1000 sq. ft.
1	April 20 to May 10	0.5 to 1 pound
2	June 5 to June 15	0.75 to 1 pound
3	September 1 to Sept. 15	0.75 to 1 pound
4	October 15 to Nov. 15	1 to 1.5 pounds

Avoid heavy fertilizer applications in early spring (March and early April). Early spring applications increase disease susceptibility, high temperature stress, and drought injury. Lawns that are frequently watered, have clippings removed, or grow on coarse, sandy soils require more fertilizer applied, more frequently, than lawns which are watered less frequently and have their clippings returned.

Do not fertilize during high temperature stress conditions on cool season turfgrasses. Light applications of 0.5 lb of nitrogen per 1,000 square feet or less can be used to enhance turfgrass color and recovery from insect or disease damage.

Late Season Fertilization

Nitrogen recommendations have changed for cool season grasses, placing emphasis on late season rather than spring fertilizer applications. As temperatures cool, rainfall increases, and turfgrasses come out of summer dormancy, fertilizer plays an important role in root growth and carbohydrate storage within the plant. Nitrogen applied in late fall stimulates some topgrowth, but not to the extent that occurs during spring. As topgrowth slows, carbohydrates produced are stored or used in the growth of underground structures such as roots and rhizomes. The greatest rhizome growth occurs in the fall. This growth increases the density of a Kentucky bluegrass lawn. Late season fertilizer programs do not eliminate the need for spring fertilization, but allow the turfgrass manager to use lighter rates that give uniform shoot and root growth. The late season application improves fall and winter color retention, stress tolerance, root growth, and spring green-up.

Apply fertilizer about the time of the last mowing of the season. This usually takes place in late October or early November. Apply fertilizer at a rate of 1 to 1.5 pounds of nitrogen per 1,000 square feet. Do not apply fertilizer after the turf has become brown or the soil is frozen. Under these conditions significant amounts of nutrients can be lost due to surface runoff, leaching, or both.

How to Fertilize

Fertilizers are available in dry and liquid form. Dry forms are most commonly used by homeowners. With either formulation it is important to apply fertilizers uniformly and with care to avoid missed areas and uneven color.

Dry fertilizer can be applied using centrifugal (broadcast) or gravity (drop) spreaders (Figure 3). When used properly, broadcast spreaders distribute material more rapidly with minimum overlap problem than drop-types. Drop spreaders apply herbicide-fertilizer mixtures with greater safety around plant material.

Use recommendations on the fertilizer bag or the chart supplied with the spreader as a starting point to determine proper spreader setting. Spreaders vary in delivery rate and must be calibrated to insure proper application. Improper application reduces effectiveness, increases costs, produces an uneven color, and has a negative effect on the environment.

To calibrate the spreader, weigh the material placed in the spreader. Using the recommended spreader setting, apply the fertilizer to an area of known size. Weigh the fertilizer remaining in the spreader and determine the amount used. Adjust the spreader setting and repeat the process until the desired rate is obtained (Table 4).

To ensure uniform distribution, divide the application into two equal parts. Apply half over the lawn. Apply the other half over the same area at right angles to the first pattern (Figure 4). Water the lawn imme-

Figure 3. Types of fertilizer spreaders commonly used in lawn fertilization: (top) centrifugal type and (bottom) gravity type.

Table 4. Example of spreader calibration.

Starter fertilizer
20 pounds/bag
Covers 5000 sq. ft. Recommended spreader setting 6.5

A. Material placed in spreader = 5 pounds

B. Apply material to 1000 sq. ft.

C. Calculate the material used.

= starting material - final material in spreader
= 5 pounds - 2 pounds
= 3 pounds of material used on 1000 sq. ft.

D. Calculate the amount of material that should have been used.

$$\frac{20 \text{ pounds}}{5000 \text{ sq. ft.}} = 4 \text{ pounds per } 1000 \text{ sq. ft.}$$

E. Adjust spreader setting to apply more fertilizer.

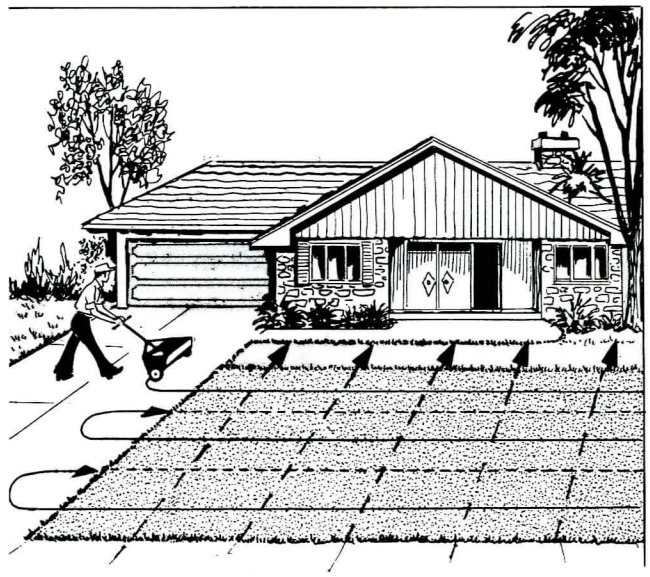


Figure 4. Apply half of the fertilizer over the lawn. Apply the other half at right angles to the first pattern.

diately after applying the fertilizer to minimize foliar burn, especially when fast release nitrogen sources are used.

Fertilize to meet the nutritional needs of the turf. An inadequately fertilized lawn is more susceptible to weeds, diseases, and insects. Too much fertilizer increases susceptibility to disease and environmental stress. Follow label directions carefully for rate, timing, method of application, and recommended use.

Irrigation

Irrigation is necessary in Nebraska to maintain a healthy, vigorous lawn. The turf plant consists of 75-80% water by weight. A small reduction in water content can be lethal to the plant. The need for supplemental irrigation varies among turfgrass species (Table 5). If the drought period is extended, even the most drought tolerant grasses will need supplemental watering.

Watering Frequency

Base watering frequency on the turfgrass plant's need. Look for signs of wilting before applying water and avoid regular scheduled watering with automatic systems. A dark, blue-green color and footprints remaining after walking on the turf are signs that the lawn needs water. When these conditions occur, irrigate the lawn as thoroughly as possible without causing runoff or puddling. Repeat this process several times until the soil is well-moistened. Amount and frequency of watering depends on (a) turfgrass species and cultivar, (b) soil texture and structure, (c) ground slope, (d) exposure, (e) climate, (f) intensity of culture and use, and (g) length of growing season.

Table 5. Characteristics and adaptation of principle turfgrasses used in Nebraska lawns.

Turfgrass species	State wide	Soil	ADAPTATION High temperature tolerance	Cold temperature tolerance	Drought tolerance	Shade tolerance	Wear tolerance
Kentucky bluegrass	yes	well-drained soil, pH from 6.0 to 7.0	fair	good	medium	poor	medium
Tall fescue	yes	wide range of soil, pH from 4.7 to 8.5	good	poor	excellent	good	good
Perennial ryegrass	yes	medium to high fer-fertility soil, pH from 6.5 to to 7.0	poor	very poor	fair	fair	good
Creeping red fescue	yes	dry-sandy, infertile soil, pH from 5.5 to 6.5	fair	medium	good	excellent	poor
Chewings fescue	yes	sandy, infertile soil, pH from 5.5 to 6.5	fair	medium	good	excellent	poor
Hard fescue	yes	sandy, infertile soil, pH from 5.5 to 6.5	fair	medium	good	good	poor
Zoysiagrass	yes	well-drained, fertile soil, pH from 6.0 to 7.0	excellent	medium	excellent	good	excellent
Buffalograss	yes	fine-texture soil, tolerates alkaline conditions	excellent	medium	excellent	very poor	fair
Blue grama	yes	wide range, sandy soil, tolerates alkaline conditions	excellent	good	excellent	poor	fair

When to Water

Early morning (4 a.m. to 8 a.m.) is the best time to water. The least demand for water is placed on municipal systems at this time, wind and evaporative losses are low, application efficiency is high, and distribution is best. Midday watering is not hazardous to the lawn but is inefficient and should be avoided. Evaporative losses are greatest at midday and wind makes it difficult to apply water uniformly.

A form of midday watering, called **syringing,** is beneficial for lawns to minimize disease, insect, and high temperature stress. This light application of water evaporates rapidly from leaf blade surfaces. The evaporation process cools the turf and reduces heat stress. Syringing is also beneficial for lawns with active Summer Patch disease.

Avoid watering in the early evening or at night. Evening and night watering increase disease problems. Evaporative water loss is low and relative humidity is high at night. Night watering favors dew formation and its duration. Water remains on the leaf surface and enhances turfgrass disease growth and development. Night watering may be necessary in some cases but it should be used only when early morning watering cannot be practiced.

How to Water

Water lawns thoroughly, infrequently, and uniformly to develop a deep, extensive root system. Infrequent (i.e. 5 to 7 days), but thorough watering encourages the plant to develop a deep root system. Frequent (i.e. daily), light watering results in a shallow root system. Plants with shallow root systems are prone to heat and drought stress and damage from disease and insects.

Check irrigation equipment for rate and uniformity of water application. Set watering equipment to provide complete coverage of the area to be watered. To test water coverage and amount applied arrange cans at intervals no more than five feet apart over the area to be watered. Water for a specific time (i.e. 15 minutes). Measure the amount of water in each can to determine application uniformity and the amount (inches) of water applied per hour (i.e. inches water applied per 15 minutes x 4 = inches applied per hour). Water should be applied at a rate that avoids runoff and puddling. To thoroughly wet a clay soil, it may require several light water applications in succession. After the soil is moist allow 5 to 7 days before rewetting. Syringing can be practiced to minimize stress irrigations.

Soil Cultivation

Many Nebraska soils have high clay and silt content. These soils are prone to compaction when exposed to traffic, irrigation, and rainfall. Soil compaction reduces turfgrass quality, growth, and vigor by decreasing soil aeration, water infiltration, and root growth. Soil cultivation (coring, slicing, and spiking) relieves compaction and enhances turfgrass growth. (Figure 5).

Texture	Color	Nitrogen requirement	Preferred mowing height	Irrigation requirement	Disease problems	Insect problems	COMMENTS
		CULTURAL PRACTICES					
medium	medium to dark green	medium to high	1.5 to 2.5	yes	some	some	Use a blend of three or more improved cultivars.
coarse	light green	low to medium	1.75 to 3.5	seldom	seldom	seldom	Good low maintenance turfgrass. Direct low temperature kill is a problem. Do not plant in mixtures.
medium	medium to dark green	medium to high	1.5 to 2.5	yes	some	some	Some improved cultivars are available with improved mowing quality and improved high and low temperature tolerance.
fine	medium to dark green	low	1.0 to 2.5	yes	some	seldom	Mixes well with Kentucky bluegrass, should be included in mixes where shade is a problem.
fine	medium to dark green	low	1.0 to 2.5	yes	some	seldom	Rapid establishment on sandy areas, bunch-type grass, shade tolerant.
fine	light to dark green	low	1.25 to 2.5	some	some	seldom	Somewhat better disease resistance than creeping red fescue. Mixes well with Kentucky bluegrass.
medium	medium to dark green	low to medium	0.5 to 1.0	seldom	seldom	seldom	Slow to establish but forms a dense, weed resistant turf.
medium	gray-green	low	0.5 to 2.0	no	seldom	seldom	Good low maintenance turfgrass, somewhat susceptible to phenoxy herbicide injury.
medium	gray-green	low	1.5 to 3.0	no	seldom	seldom	Mixes well with buffalograss. Not recommended in monostands.

Aerify sites prone to compaction at least once and preferably twice each year. Aerify when the turfgrass is actively growing to enhance recovery and maximize root growth responses. Control traffic on areas prone to compaction to minimize problems. Lawns established on poor soils or highly disturbed soils associated with new building sites require more frequent aerification. These sites should be aerified twice each year.

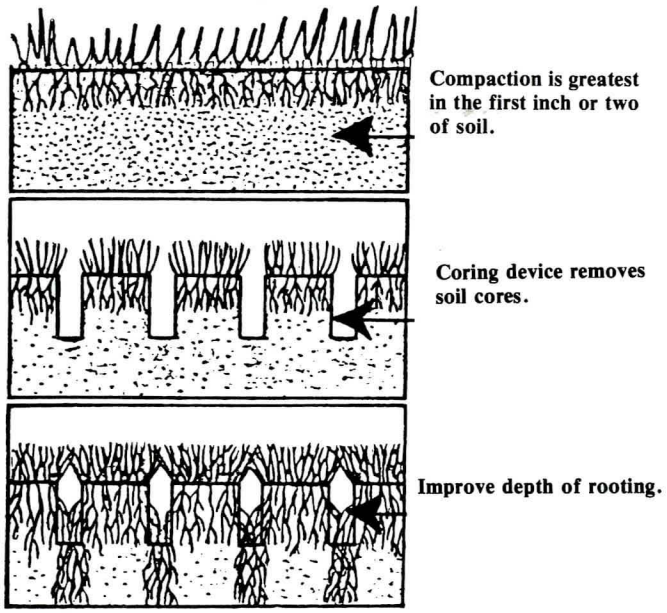


Figure 5. Soil cultivation with a coring device enhances water, air, and nutrient penetration, as well as increases root depth on heavy, clay soils.

If mechanical thatch removal is necessary, do it when the turf is actively growing to aid in recovery. Fall is the preferred time as weed competition is minimal. Spring is an acceptable time, but apply a preemergent herbicide after dethatching to prevent establishment of annual weeds. Power rake lightly, removing no more than 1/2 inch of thatch at one time. If thatch is excessive it may require several spring and fall treatments to reduce the level, or it may be necessary to completely renovate or reestablish the turf.

Thatch

Thatch is a problem on most turfgrass sites. Thatch is located between the green vegetation and the soil surface (Figure 6). It consists of a layer of dead and decaying turfgrass tissues derived from leaves, shoots, and roots.

Thatch accumulates when the rate of turfgrass organic matter production exceeds its rate of decomposition. Small amounts (less than 0.5 inch) can be beneficial. Some thatch increases the lawn's resiliency, improves wear tolerance, and insulates against soil temperature changes. Thatch accumulations more than 0.5 inch reduce heat, cold, and drought hardiness and increase localized dry spots, scalping, disease, and insect problems. As thatch accumulates, there is a tendency for root and rhizome growth to occur in the thatch layer

Figure 6. Thatch is a layer of dead and decaying tissue located between the green vegetation and the soil surface.

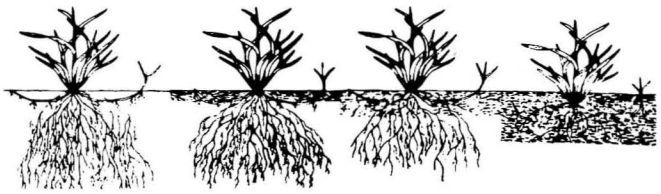


Figure 7. As thatch accumulates, turfgrass roots grow in the thatch rather than in the soil, resulting in a weakened turf prone to stress injury.

rather than the soil (Figure 7). This situation is particularly troublesome since thatch build-up is accelerated by root and rhizome tissue debris. Without proper thatch management, the turf will become poorly rooted and prone to stress injury.

To determine thatch accumulation, cut a pie-shaped wedge of grass and soil, remove it, and measure the organic matter that has accumulated. Measure the accumulation from several areas in the turf, since thatch is not uniformly distributed over the lawn. If the layer exceeds 0.5 inch, the thatch accumulation needs to be reduced.

Thatch can be removed by hand raking or with a power rake. Hand raking is laborious and is only practical for small areas. Power rakes can be rented or the service hired from a professional lawn care service company. Power raking devices use rigid wire tines or steel blades to lift thatch debris and a small amount of soil to the lawn surface. The soil should be moist, not dry, for best results. Power raking during excessive soil moisture conditions tears and pulls the turf from the soil instead of slicing and lifting the thatch debris as desired. Remove thatch during periods of active turfgrass growth. Thatch removal from cool season turfgrasses, like Kentucky bluegrass, is best done in spring before green-up and in the fall after Labor Day. Remove the thatch when at least 30 days of favorable growing conditions are anticipated following the process. Thatch removal in the spring requires an application of preemergent herbicide to prevent establishment of annual weeds.

Core cultivation (aerification) can be used to minimize thatch accumulation, to modify its physical characteristics, and to remove limited amounts of thatch. Core cultivation is not as effective as power raking in removing thatch debris but is more effective in reducing thatch accumulation rate. A combination of soil cultivation and aeration is a preferred program to modify and reduce thatch build-up.

Pesticides

Pesticides are part of integrated pest management (IPM) programs, but they are only a tool to be used as needed in an overall plant management approach. Pesticides for lawns include: fungicides for diseases, insecticides for insects, and herbicides for weed control. These materials should be used as directed by label information and applied only as needed.

Use well-adapted turfgrass species and cultivars to reduce disease and insect problems. Proper mowing, fertilizing, and watering reduce weed problems. These steps reduce the need for pesticides to produce a quality lawn. Considerable information is available from the Cooperative Extension Service that can help homeowners and lawn care enthusiasts make the right decisions on grass selection and management. These decisions will reduce the need of pesticides to produce a quality lawn.

A Common Sense Approach

The integrated pest management (IPM) approach to lawn care is a common sense approach. It might best be described as **"integrated plant management"** since IPM develops lawns that have greater potential to resist pest problems.

A vigorous, well maintained lawn has the potential to withstand higher insect, disease, and weed populations without causing detrimental effects on the turf. Proper cultural practices promote turf growth to aid in resisting these infestations. Pesticides are a tool that can be used in IPM programs. Use them only as needed. IPM approaches reduce the need for pesticides when growing a quality lawn.

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