



Water Quality & Home Lawn Care

Lawns and Water Quality

North Carolinians care for about one million acres of home lawns. These lawns receive large quantities of fertilizer and pesticide. When a lawn gets more fertilizer than it can use or when fertilizers and pesticides accidentally get onto paved surfaces, the excess is likely to run off into the nearest stream or seep through the soil into the groundwater. Contamination from fertilizer, pesticides, or sediments can pollute drinking water, kill fish, and obstruct waterways.

The information in this publication will help you care for your lawn in ways that prevent and reduce contamination of our water resources by sediment, fertilizers, and pesticides. If you hire a commercial lawn care company or employ anyone to take care of your lawn, insist that they follow these practices, and, if anyone is applying pesticides to your lawn for you, ask to see their N. C. Pesticide Applicators License.

New Lawns and Water Quality

The *Carolina Lawns* publication, available from your county Cooperative Extension Center (or on the Web www.turffiles.ncsu.edu), contains information on grass varieties for various uses and locations, site preparation, lawn care, and renovation.

If you are establishing a new lawn, plant at the right time for the grass you select so that the lawn starts out under the best of conditions. Use mulch so that you don't leave soil exposed to

erode and wash away from the site. Be especially careful when the lawn is next to a paved surface or where the ground is compacted or sloped. The loss of good topsoil deprives the grass of needed nutrients and contributes to pollution in the form of sediment as well as chemical contamination. Drainage ditches, waterways, and culverts can fill with sediment. When soils erode unevenly, the lawn will be difficult to mow.

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College of Agriculture and Life Sciences, NC State University
School of Agriculture and Environmental Sciences,
NC A&T State University

Tips for Establishing a Healthy Lawn and Protecting Water Quality

- ✓ **Test the soil** before you plant to find out the right amount of lime and fertilizer for your particular conditions. Obtain an NCDA & CS soil test kit and instructions from the Cooperative Extension Center in your county.
- ✓ **Establish a good seedbed** to help root growth and eliminate competition from weeds.
- ✓ **Cover seeded areas with mulch** to aid establishment and reduce runoff and erosion. Mulch reduces evaporation, enriches the soil, and moderates temperature. Use 1 to 2 bales of straw per 1,000 square feet or, as an alternative, use commercially available covers or mats. Too much mulch smothers the seeds, inhibits germination, and encourages diseases.
- ✓ **Do not try to seed a lawn on a steep slope** or in an area that does not drain well. If your site is very steep, consider sodding your lawn to protect the soil from erosion and runoff.
- ✓ **Water newly seeded areas lightly** and frequently while the lawn is getting established. Do not water so much that runoff occurs.
- ✓ **Choose a grass that will perform well** in your soil and environment. *Carolina Lawns* lists grasses for various conditions and rates their performance and appearance. Plant cool season grasses in the fall and warm season grasses in the spring.
- ✓ **Coring** from time to time will reduce compaction and lessen runoff.

Maintaining an Established Lawn

Watering and Water Quality

In general, water only enough to moisten the soil to a depth of 4 to 6 inches. This will take about ½ inch of water for a coarse, sandy soil and 1 inch on heavy or fine-textured soil. You can check the amount of water applied by placing several shallow cans around the lawn while sprinklers are running. Water clay and compacted soils until runoff is about to occur. When the water has been absorbed, water again until the desired moisture depth is reached. Do not water again until you see signs of moisture stress—dark blue-gray color, footprints that remain after walking, or wilted, folded, or curled leaves.

Unless you plan to continue watering all summer, water dormant cool season (fescue, bluegrass, or perennial ryegrass) lawns only every three weeks in the absence of rainfall. Brown, withered leaves are normal signs of dormancy on cool season grasses.

Mowing and Water Quality

For a healthy lawn, use the correct mowing height, keep the blade sharp, and follow a regular mowing schedule. Maintaining the appropriate grass height will encourage deeper rooting and reduce problems with crabgrass and other weeds that need high light intensity for germination.

Table 1 shows the right height for different grasses.

Mow the lawn when the grass is dry to allow for better distribution of the clippings and help prevent the spread of diseases. If it is not too thick, the thatch layer of plant material between the soil and the green vegetation helps capture and break down pesticides.

Tips for Watering to Protect Water Quality

- ✓ **Water the grass**—not the pavement or the driveway. Position sprinklers and automatic irrigation systems so that the water falls only on the lawn and not on paved surfaces.
- ✓ **Water in the early morning** for best results. Watering in midafternoon will increase losses to evaporation. If you must water in the evening, allow time for the leaves to dry before nightfall. Disease is most likely to appear when leaves are left wet overnight.
- ✓ **Do not water too much.** When lawns are overwatered, fertilizers and pesticides can run off into surface waters or seep below the root zone where they may pollute groundwater. Turn off set timers on automatic irrigation systems to avoid improper watering and to conserve water.

Never remove more than a third of the leaf at one time. When prolonged rains make it impossible to mow regularly, raise the mower for the initial cutting and gradually lower the mower to the proper height.

Leave grass clippings on the lawn for “grasscycling.” Grass clippings are 75 to 85 percent water. When you mow regularly, clippings quickly decompose and release nutrients that fertilize the lawn. Grasscycling can supply about a quarter of the fertilizer needed each season.

If you cannot leave clippings on your lawn, compost them with other yard waste for use as a mulch or soil conditioner. See *Composting: A Guide to Managing Organic Yard Wastes* (Cooperative Extension publication AG-467) for useful information about composting yard materials.

Fertilizer and Water Quality

Grass can use only a limited amount of fertilizer at each application. When more fertilizer is applied than plants can use, the excess is wasted and may eventually end up in groundwater or runoff. Follow the schedule in Table 2 so that you apply fertilizer only when your grass variety is actively growing and able to make use of it.

When nitrogen and phosphorus from fertilizer get into rivers and streams, they can stimulate undesirable algae blooms. This can use up the oxygen in the water and cause fish kills and poor water quality. Applying too much fertilizer may also cause plants to become very lush so that they require more frequent mowing and become more susceptible to disease.

The label on the fertilizer bag (Figure 1) can be a guide to understanding the types and forms of

Lawnglass	Height after Mowing (inches)*
Bahiagrass	2 to 3
Bermudagrass	3/4 to 1 1/2
Centipedegrass	1 to 1 1/2
Fescue (fine)	1 1/2 to 2 1/2
Fescue (tall)	2 1/2 to 3 1/2
Kentucky Bluegrass	1 1/2 to 2 1/2
Perennial Ryegrass	1 1/2 to 2 1/2
St. Augustinegrass	2 to 3
Zoysiagrass	3/4 to 1 1/2

*The higher mowing heights are preferred going into the hot summer months.



Figure 1. Sample of a fertilizer label. The fertilizer grade or analysis describes the relative proportion of nutrients in percentage by weight. The grade in this example is 20-5-10. Soil test reports will often recommend a particular grade or analysis.

nutrients contained in fertilizers. Nitrogen may be found as quick-release forms which will be called “ammonium,” “nitrate,” or “urea.” These forms are highly water soluble and readily available for plant use. On sandy soils, it is advisable to use slow-release or controlled-release sources of nitrogen which will be called “water-insoluble nitrogen,” “slowly water-soluble nitrogen,” “sulfur-coated urea,” “polymer-coated urea,” “urea formaldehyde,” or “IBDU”. As an alternative, quick-release forms of nitrogen can be used by splitting the total application into

two equal applications spaced 2 to 3 weeks apart.

Phosphorus rates should be based on soil test results. Phosphorus fertilizers move very little in most soils, but may leach into groundwater through very sandy and organic soils. Because phosphorus is generally attached to soil particles, most phosphorus movement comes from sediment eroding from disturbed soils. Water-soluble forms of phosphorus can also be lost in surface runoff.

Tips for Fertilizing to Protect Water Quality

- ✓ **Apply the right amount** of fertilizer at the right time to maintain a healthy lawn and reduce water pollution.
- ✓ **Choose a slow-release form of nitrogen** to reduce the potential for leaching of this nutrient into groundwater—especially on sandy soils.
- ✓ **Test the soil** every two or three years to see whether you need to add lime to improve the root environment and increase the availability of nutrients already in the soil. The soil test will also tell you how much phosphorus and potassium the soil needs.
- ✓ **Calibrate your spreader** whenever you use it to make sure that you get a good pattern of coverage and apply the fertilizer or lime at the right rate.
- ✓ **Fill the spreader with granular material on a paved surface** that will make it easy to sweep up any spills and apply them to the lawn. Don't leave fertilizer on paved surfaces where it will wash off in the next rain. Shut off the spreader when you cross paved surfaces or bare ground.
- ✓ **Use a drop spreader** near water or hard surfaces like sidewalks or driveways to give you more control of the distribution pattern. If particles get on the hard surface, blow or sweep them back onto the lawn.
- ✓ **Leave clippings on the lawn to decompose and return their nutrients to the soil.** This “grasscycling” can provide about 25 percent of the nutrients recommended for the lawn.

Table 2. Basic Fertilizing Schedule (Pounds N/1,000 square feet).^a

Warm Season Grasses	Month ^b										Total Annual	
	F	M	A	M	J	J	A	S	O	N		
Bahiagrass				0.5		0.5						1
Bermudagrass (common) ^c				1	1	1	1	0.5				4.5
Bermudagrass (hybrid) ^c			0.5	0.5-1	0.5-1	1	1	0.5				4 - 5
Centipedegrass ^{c d}					0.5							0.5
St. Augustinegrass ^c			0.5	0.5	1	0.5						2.5
Zoysiagrass ^c			0.5		0.5		0.5					1.5
Cool Season Grasses												
Tall Fescue	0.5 to 1								1		1	2.5 - 3
Kentucky bluegrass	0.5 to 1								1		1	2.5 - 3
Ky. bluegrass/ fine fescue	0.5 to 1								1		1	2.5 - 3
Ky. bluegrass/ tall fescue	0.5 to 1								1		1	2.5 - 3
Ky. bluegrass/ perennial ryegrass	0.5 to 1								1		1	2.5 - 3

^a Except on centipedegrass, use a complete (N-P-K) fertilizer that has a 3-1-2 or 4-1-2 analysis.

^b Dates shown are for Central Piedmont counties. Adjust by two weeks for spring and fall seasons in mountain and coastal counties.

^c In the absence of soil test recommendations, in August apply about 1 pound of potassium per 1,000 square feet to Bermudagrass, centipedegrass, St. Augustinegrass, and zoysiagrass.

^d Fertilize established centipedegrass using a low phosphorus, high potassium fertilizer with an analysis approaching 1-1-2 or 1-1-3. Centipedegrass should be fertilized very lightly after establishment. An additional fertilization in August may enhance centipedegrass performance in coastal locations. Do not use any phosphorus on centipedegrass after establishment. Fertilizers without phosphorus are preferred if soils supporting centipedegrass show moderate-to-high levels of phosphorus.

Integrated Pest Management and Water Quality

The balanced use of all the available methods to reduce pest problems is called “integrated pest management” or IPM. IPM begins with taking steps to prevent pest problems in the first place. Choosing a grass variety that is well adapted to your area and then following guidelines for watering, mowing, and fertilizing will go a long way toward

reducing problems with weeds, insects, and diseases. A healthy lawn also provides a good habitat for the beneficial organisms that help to manage pests so that pesticides may not be needed.

Before you use any pesticides on the lawn, be sure that you identify your problem correctly. You can get help on diagnosing diseases and

identifying weeds and insects from the county’s Cooperative Extension Center, from a reputable local garden center, or from North Carolina State University’s Turffiles on the Web at: www.turffiles.ncsu.edu.

If you decide to use a pesticide, read the product label very carefully and follow all the instructions.

Tips for Managing Pests to Protect Water Quality

- ✓ **Identify the true cause of any problems** and decide if you really need to take any action. The damage caused by some diseases looks very much like the damage caused by some insects or environmental stress problems. Treat only those areas that have pest problems. Problems in small areas can be “spot” treated.
- ✓ If you decide to use a pesticide, **make sure that the disease or insect or weed you are trying to control is listed on the product label and that the pesticide is labeled for use on the type of grass in the lawn.**
- ✓ Plan to **treat the pest when it is most susceptible** and the lawn is most tolerant. Follow label directions to apply the pesticide at the correct rate and time.
- ✓ Pay attention to the weather forecast. **Do not apply pesticides when heavy rain is likely.** Pesticides are especially likely to run off lawns that are on slopes or where soil is compacted or crusty. If the water table is shallow, a heavy rainfall soon after application can result in pesticides seeping through sandy soils into the groundwater.
- ✓ **Calibrate your sprayer** to deliver the correct amount of pesticide.
- ✓ **Mix liquid solutions and fill sprayers on grassy surfaces** so no liquid spills on pavements or bare areas.
- ✓ **Mix granular materials and fill applicators on smooth, impenetrable surfaces** so you can clean up any spills.

Prepared by
A. H. Bruneau, Extension Turfgrass Specialist
North Carolina State University

with contributions and assistance from:
Matt Martin, Area Specialized Agent, Turfgrass
Emily Erickson, Department of Crop Science
James Monroe, Agricultural Agent, Mecklenburg County
Fred Yelverton, Extension Crop Science Specialist, Weed Management
C.H. Peacock, Turfgrass Research and Teaching
Daniel C. Bowman, Crop Science Turfgrass Research and Teaching
Mitchell C. Woodward, Assoc. Area Specialized Agent, Wake County



College of Agriculture and Life Sciences, NC State University
School of Agriculture and Environmental Sciences,
NC A&T State University

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