



A Year-Round Guide to Yard Care

Tips for healthy lawns and gardens



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The Health of Minnesota's Lakes and Rivers Begins in Your Backyard

Forests, prairies and the land of 10,000 lakes—Minnesotans love the outdoors, even when it's just the backyard. The way you maintain your yard, however, can have surprising impacts on the natural world.

You probably know that pesticides and fertilizers are powerful chemicals that can injure wildlife if overused. But, did you know that yard waste and erosion are major threats to Minnesota waterways and wildlife?

Rain and melting snow wash dirt, leaves, fertilizer and yard waste into streets, which lead to nearby lakes and streams. This debris contains high levels of phosphorus and nitrogen, which in turn allow smelly green algae to grow and grow. In addition to clogging boat propellers and being downright gross, excess algae can be toxic to swim in and lowers oxygen levels in the water, making it hard for fish to survive.

Sediment from erosion clouds waterways, preventing the growth of aquatic grasses—the base of the food chain for many fish and waterfowl.

The good news is that you can help protect Minnesota's waterways and wildlife and still enjoy a vibrant, healthy yard. This guide will help. Arranged in a convenient seasonal format, it will help you decide what to plant and when to fertilize; it will help you restore ailing plants and enrich your soil. Many of the steps outlined in the guide will save you both time and money, making it even easier to enjoy your lawn or garden.



Photo by Gary Hong



Photo by Valley Branch watershed District

Fertilizers are not plant food! This is a misnomer. Plants produce their own food using water, carbon dioxide and energy from the sun.

The Six Macronutrients

Plants need 17 nutrients for health but these six are the most important.

Nitrogen (N): Building block for proteins, enzymes, chlorophyll and growth regulators; excess produces excess leaf growth with little fruit

Phosphorus (P): Used in metabolism, respiration and photosynthesis; usually plentiful in Minnesota soils

Potassium (K): Aids in starch formation, water regulation, disease resistance, chlorophyll development and tuber formation; found in potash

Magnesium (Mg): Building block for chlorophyll, an enzyme activator; excess interferes with calcium

Calcium (Ca): Needed for cell wall structure and cell division, an enzyme activator; excess blocks micronutrient absorption

Sulfur (S): Component of proteins and amino acids, important in respiration; generally present in Minnesota soil

Fertilizer Analysis

All fertilizers are labeled with three numbers. These three numbers give the percentage by weight of nitrogen (N), phosphorus (P₂O₅) and potassium (K₂O). Examples of commonly used fertilizers are 23-3-7 and 28-0-12. Minnesota law prohibits the use of phosphorus fertilizer on lawns, except when establishing a new lawn or if a soil test indicates that phosphorus is deficient.

Cottonseed meal, blood meal, bone meal, hoof and horn meal, fish emulsion and manures are examples of organic fertilizers. Organic fertilizers may contain lower concentrations of nutrients, but they perform important functions that synthetic formulas do not, improving the physical structure of the soil and promoting beneficial bacterial and fungal activity.

Effects of Over-Fertilizing

Not only is over-fertilizing a waste of time and money, it can do serious harm to the plants you intend to help. Fertilizers are salts, much like table salt. If tender plant roots are close to fertilizer granules, water is drawn away from these roots and they dehydrate. Over-fertilizing trees or shrubs, particularly with slow release fertilizer, can also cause them to keep growing into the fall when they should be hardening off for winter.



Winter

Photo by Washington Conservation District

TIP:

Organic fertilizers are a source of slowly available, water-insoluble nitrogen (WIN). These slow-release fertilizers require fewer applications.



Fertilizer poses a serious threat to water quality. Rainwater runoff carries it into streams and lakes, where it promotes the growth of harmful algae. Excess nitrogen in fertilizer can also leach into groundwater supplies. Save time and money by using plants native to Minnesota that do not require fertilizers or pesticides.

Never spread fertilizer on sidewalks, driveways or paved surfaces. It is illegal in Minnesota and the fertilizer can be washed into streets that flow into streams. To minimize runoff, planting groundcover plants in bare spots.

Nutrient Troubleshooting for the Garden

Here are some common symptoms of nitrogen, phosphorus and potassium deficiencies. It is recommended that you test your soil and consult a professional before beginning fertilizer treatments.

Problem	Missing Nutrient
Yellowing, especially of older leaves	N
Yellowing between veins	K
Leaves turn lighter green	N
Leaves turn brown or purple	P
Brown leaf tips	P
Brown leaf edges	K
Tendency to wilt	K
Reduced flowering	P



Photo by Washington Conservation District

It is important to apply the optimum amounts of fertilizer, lime and other soil amendments and to do so at the proper time of year. A soil test supplies valuable guidance for improving your soil. Perform a soil test every 3 to 4 years. If possible, test around Labor Day so that there is ample time to add nutrients and other soil amendments before the winter.

Types of tests

The University of Minnesota provides soil testing services (<http://soiltest.cfans.umn.edu/>). Follow the instructions when collecting a sample and then mail the sample and information sheet to the Soil Testing Laboratory. Your results will arrive by mail, along with recommendations on what fertilizer or other soil amendments to use for specific plants. The regular test costs \$15 and determines pH, phosphorus, potassium, estimated texture and total organic matter.

Some nurseries also sell soil test kits for at-home use. Private testing companies can provide detailed reports but may be expensive.

The accuracy of any soil test is a reflection of the soil sample. Be sure your sample is representative of the area to be treated. Using a stainless steel or chrome plated shovel or spade, sample the soil from five (5) scattered spots within the chosen area. Mix soil well to make a composite sample and send about a pint of the sample to the lab. Sample bags are free on request, but any clean container may be used.

How deep should I dig for a soil sample?

Established lawns	4-6 inches
New or compacted lawns	0-3 inches
Vegetable and flower gardens	0-6 inches
Trees and shrubs	0-12 inches

Common Soil Types in Minnesota

- Sandy soil is coarse and grainy. Sandy soil drains well but dries out rapidly.
- Clay soil is very thick, like putty. It holds water like a sponge, but when it does dry out becomes hard and very solid.
- Silty soil is between sandy and clay soil. It holds water but does not dry into a hard, solid mass.
- Loam is the ideal mixture of sand, clay and silt. Through the addition of organic amendments, loam can become the perfect soil for your vegetable garden.



Winter

TIP:

Do not use brass, bronze or galvanized tools to collect soil samples because they will contaminate samples with copper and/or zinc.



Photo by Valley Branch Watershed District

Soil erosion begins when rainfall detaches soil particles. Runoff then carries the particles away.

Erosion robs your lawn or garden of the nutrients and organic material your plants need. It also contributes to water pollution. Soil is the largest volume pollutant in Minnesota waterways, and most of the phosphate and pesticides in our waters arrive attached to soil particles.

Signs of Erosion

- Exposed tree roots or stones
- Small rills or gullies
- Silt accumulation in low areas
- Soil splashed on windows and outside walls
- Widening or deepening of stream channels

The destructive process of erosion can be controlled. Reducing the quantity and velocity of runoff will abate erosion. This may require regrading steep slopes, building terraces or installing drainage pipes. Groundcovers are a more cost-effective way to slow erosion. These plants cover the ground surface so that rain does not directly strike the soil. Their roots hold the soil in place and absorb water and nutrients.

Turf grass is one important type of groundcover, but newly cut banks and slopes greater than 12 percent are best treated with groundcovers other than sod. Around buildings, groundcovers are superior to paving or structural controls for reducing heat, glare, noise and dust.

Native plants are the best way to protect shorelines by decreasing erosion. Plants slow down incoming waves and anchor soil on shore.

Native plants can:

- Conserve soil moisture and lower soil temperatures during periods of extreme heat.
- Reduce lawn maintenance and fill narrow, odd-shaped areas where mowing and edging might be difficult.
- Obstruct foot traffic without impeding view.
- Produce interesting patterns with variation in height, texture and color.

Significant maintenance is necessary for the first one to three years after planting until groundcovers become established. Use organic mulch, such as wood chips, to control weeds in your groundcover plantings. When dealing with steep slopes, you may need to use erosion control blankets until the plants are established. Contact your local Soil and Water Conservation District for erosion control assistance.

TIP:

Excessive spring fertilizer application leads to leaf growth at the expense of food reserves and root growth, increasing injury to lawns from summer disease and drought.

Non-turf Groundcovers Native to Minnesota

Barrenstrawberry, *Waldsteinia fragarioides*
Wineleaf Cinquefoil, *Potentilla tridentata*
Strawberry, *Fragaria virginiana*
Violets, *Viola* spp.
Bush-honeysuckle, *Diervilla lonicera*.
Chokeberry, *Aronia melanocarpa*
Creepers, Virginia & Thicket, *Parthenocissus quinquefolia* & *P. inserta*
Sumacs, *Rhus glabra* & *R. typhina*
Sweetfern, *Comptonia peregrina*

Raingardens

Raingardens are simply gardens with depressions that are designed to catch rainwater runoff in your yard, growing plants that tolerate getting partially flooded on occasion. They provide beautiful landscaping and wildlife habitat. And, by soaking up rain where it falls, they slow stormwater runoff, help prevent erosion, and remove pollutants in the process.

Most raingardens feature plants native to Minnesota, which are well adapted to our seasonal changes. Some people use cultivated varieties of Minnesota natives in their raingardens, and these plants usually survive the winter as well. In the summer, these gardens bloom vibrantly, attracting birds, bees and other pollinators.

For more information about raingardens visit www.BlueThumb.org.



Winter

Photo by Valley Branch Watershed District



Discover the secret to leisurely landscaping at www.BlueThumb.org.



Photo by Valley Branch Watershed District



Photo by Gregg Thompson

Tilling or plowing your garden correctly preserves the soil and its fertility, enhancing the absorption of rainfall and protecting local streams from sediment runoff.

When to Till

Tilling the soil in late fall facilitates earlier spring planting:

- Turning under organic matter in the fall results in better decomposition because there are more warm days in early spring for the process to take place.
- Incorporating limestone or rock fertilizers in the fall gives them time to interact chemically with the soil.
- Insects and perennial weeds are reduced by exposing soil and roots to harsh winter weather.
- Finally, tilled soil retains more moisture by trapping snow between its furrows.

Steep Slopes

Fall plowing alone is not recommended for hillside garden plots. Sloped soil left exposed all winter is subject to erosion. Till sloped areas, then plant a winter cover crop of rye and hairy vetch. Turn the green cover crop under in the spring.

For steep slopes, consider replacing your vegetable or annual flower garden with native Minnesota plants to reduce erosion and eliminate the need for tilling.

Minimum-till Gardening

Vegetable gardeners: consider a move to minimum-till gardening, also known as conservation tillage. This method is ideal for transplants, and you can start on a test plot within your garden.

1. In the fall, till under summer crop wastes. Remove tomato vines and corn stalks to make tilling easier.
2. Plant a combination cover crop such as rye and hairy vetch. Use 2 pounds of winter rye grain and 0.75 pounds of hairy vetch seed (coated with a Rhizobium inoculant) per 1000 square feet.
3. In the spring, cut the cover crop to a manageable level with a scythe or string-line trimmer. Rake the clippings aside and save them. Use a lawn mower to completely trim the cover crop to the ground.
4. A week later, mow the area again. Now your area is ready for planting. Dig a hole for each plant, pulling out the surrounding vegetation. Mulch the area between plants with the clippings reserved from the week before.
5. As the plants grow, add mulch or weed as needed.



Spring

Photo by Washington Conservation District



Photo by Dakota County

Fertilizers are designed to supplement the nutrients already present in your soil. Too much fertilizer can damage roots, and the excess can pollute groundwater or local waterways.

Different Plants, Different Needs

Proper use of nutrients, particularly nitrogen, can control the rate and character of a plant's growth, but certain crops require more of some nutrients than others. If tomatoes are fertilized heavily with nitrogen into the summer, the plants may be all vine and no fruit. This is also the case with potatoes, which will produce vines instead of tubers. Corn, however, may require nitrogen fertilization every month.

Remember that a nitrogen application will have its greatest effect three to four weeks after application. Slow-release fertilizers or heavy amounts of manure will keep plants producing leaves or vines, with fruit or vegetables developing very late in the season.

Application Methods

Broadcasting. Fertilizer is spread over the growing area then left to filter into the soil or incorporated into the soil with a tiller or spade.

Banding. Narrow bands of fertilizer are applied in furrows 2 to 3 inches from the seeds or plants and 1 to 2 inches deeper. If the fertilizer band is placed too close to the seeds, it will burn the roots of the seedlings. For plants widely spaced, such as tomatoes, fertilizers can be placed in a circle 4 inches from the plant base. Banding is a good way to satisfy the needs of plants like tomatoes for phosphorus as the first roots develop.

Side Dressing. Dry fertilizer is applied as a side dressing after plants are up and growing. Scatter fertilizer on both sides of the row, 6 to 8 inches from the plants. Rake it into the soil and water thoroughly.

Foliar Feeding. Nutrients applied to foliage are absorbed and used by the plant quite rapidly. Absorption begins within minutes and is complete within two days. Foliar feeding is best when your soil is too cold for plants to extract dry fertilizer. Foliar nutrition can be a supplement at a critical time, but cannot replace soil fertilization.

TIP:

Plant crops with similar fertilizer needs close together to avoid improper application rates as nitrogen enters the soil.

Adequate soil moisture is essential for good crop growth. A healthy plant is 75 to 90 percent water; water is necessary for photosynthesis, provides rigidity to plant tissues and transports nutrients and sugars to various parts of the plant.

There are several options for watering plants: a watering can, a garden hose with a spray attachment or portable lawn sprinkler, a perforated soaker hose, or an irrigation system.

Careful irrigation helps lakes, rivers, streams and groundwater aquifers by reducing fertilizer and pesticide runoff and conserving water.

When to Water your Lawn

In Minnesota most lawns can survive without watering, although they may enter a dormant “brown” stage during the summer. If you wish to keep your lawn green during dry, hot weather, add 1 - 1.5 inches of water per week. The best time to water is between 4 and 8am.

Basic Principles for Watering Lawns and Gardens

- Morning watering is preferred. Do not sprinkle foliage in the evening. Wet foliage overnight may encourage disease. Avoid watering during the heat of the day, as too much water will be lost to evaporation.
- Apply water at a rate of half an inch per hour. Faster application will cause runoff, wasting water and money. Test the application rate for a sprinkler by placing small cans at within the sprinkler’s reach, and checking the level of water in them at 15-minute intervals.

TIP:

Drip irrigation systems and soaker hoses are the most efficient ways to water your plants; a timer even allows your system to water in the morning, while you’re getting ready for work.



Spring



- When using an oscillating lawn sprinkler, place the sprinkler on a platform higher than your garden plants to prevent water from being diverted by their leaves. Water evenly by moving the sprinkler often and overlapping about half of each spray pattern.
- Perforated soaker hoses should be placed with holes down along one side of the row of plants. Semi-permanent soaker hoses can be placed underneath mulch.
- Frequent, light waterings encourage shallow rooting, which causes plants to suffer more during drought. On the other hand, too much water can be as damaging to plants as too little.

Spring



When to Water Vegetables

Be sure to water the following vegetables at these critical phases of development.

Asparagus	Spear production, fern development
Broccoli, cabbage, cauliflower	Head development
Beans, peas	Pod filling
Carrots	Seed emergence, root development
Corn	Silking, tasseling, ear development
Eggplant, tomatoes cucumber, melons	Flowering, fruiting
Lettuce	Throughout head development



Photo by Scarsdale Organic Vegetable Garden

Selecting Turf grass

The first step toward a beautiful, healthy lawn is to select the right turf grass variety—one that is adapted to your climate and maintenance preferences. In Minnesota, Kentucky bluegrass, fine fescue, and some of the perennial ryegrass cultivars are recommended.

In order to flourish, turf grass requires a soil depth of six to eight inches for good root growth, a soil pH between 6 and 8, about an inch of water weekly during the summer, and adequate sunshine. If your yard doesn't meet these criteria, consider an alternative groundcover (see page 7).

“Lo-mow” Lawns

For people who would prefer to have more free time and spend less time mowing, fertilizing and watering their lawns, a lo-mow lawn mix may be the perfect solution. These mixes are composed primarily of fescue grasses, sometimes with clover or other flowers, that grow slowly and require less moisture and nutrients and only occasional mowing.

These mixes grow best in full sunlight or very light shade and are not well suited for clay or poorly drained soils. To replace your existing lawn, use an herbicide or sod cutter to remove all grass and weeds and then plant the new fescue mix between mid-August and mid-September along with one pound of 10-10-10 fertilizer per thousand square feet you'll be seeding.

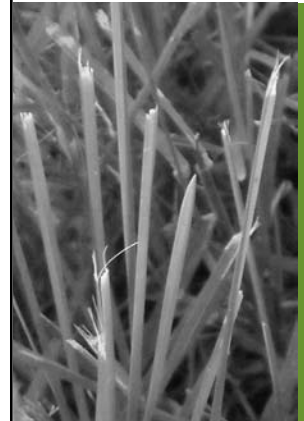
Mow Regularly

Regular mowing with a sharp mower blade at the proper height will help keep grass growing vigorously and maintain adequate density to completely cover the soil surface. Mow often enough so that no more than 1/3 of the leaf surface of the grass plants is removed at one time. For most lawn areas, mowing at a height of two to three inches will provide a good quality turf. Increase mowing height during the summer to reduce stress on the turf.

Bagging grass clippings robs your lawn of valuable nutrients. Clippings left on a properly mowed lawn act as fertilizer. During peak growing periods, in the spring and fall, it may be necessary to collect grass clippings. In this case, add them to your compost pile to produce mulch.

TIP:

To determine the pH of your soil, send a sample to the University of Minnesota for testing. The soil report will also tell you what kind of fertilizer to use and how much.



Summer

Seeding or Sodding New Lawns

Seeding is generally less expensive than sodding and allows a wider variety of grasses to choose from. However, a seeded lawn may take longer to establish and should be planted between mid-August and mid-September to succeed.

Sod establishes rapidly and is generally weed-free in the beginning. It can also be laid any time during the growing season, but is more expensive than seed.

Whether seeding or sodding your new lawn it is important to prepare the soil adequately. Conduct a soil test to determine what nutrients are present in the soil and amend clay soil with sand and organic matter to reduce compaction and allow water to soak in better. After amendments are added, apply a phosphorus and potassium fertilizer as prescribed by your soil test before seeding or sodding.

Fertilize in the Fall

Late summer and fall are the best times to apply fertilizer to your lawn in Minnesota. Fertilizing in the spring may make the lawn look nice, but it can deplete the plants' energy reserves. Choose a cool day to fertilize and water immediately afterwards if rain is not forecasted. By leaving grass clippings on the lawn all summer, you can reduce the need for artificial nitrogen 20 to 30 percent after the first year and 35 to 45 percent after the second year.

Save Time and Money

By leaving their grass clippings on the lawn rather than bagging them as trash, homeowners in Minnesota save more than time. Annual homeowner savings for a typical quarter-acre lot amount to \$25 to \$50 in fertilizer costs and \$25 to \$45 for plastic bags. In addition, you will help your local government keep a lid on refuse disposal costs. A typical quarter-acre lot generates 3,500 to 4,000 pounds of grass clippings a year. Disposing of them costs the homeowner \$50 to \$90 a year in public service charges, private collector fees or taxes.

Water if Needed

Except during the most severe drought, grasses common to Minnesota will survive without watering. If you wish to maintain a green yard in dry weather, add about 1 inch of water a week, preferably in the early morning and only as much as will soak into the ground. Water that is allowed to run off carries with it nutrients that are valuable to the lawn but harmful to streams and reservoirs.



Photo by Capitol Region Watershed District

Saving your Soil

What happens to soil nutrients during a drought? Nothing. The good news about drought is that it does not rob your soil of nutrients.

But, heavy rainfall after a dry period can wash away clay, and with it valuable nutrients and topsoil. To hold on to your soil:

- Incorporate organic matter into clays and other soil types to improve soil structure.
- Mulch your plants to conserve moisture and control erosion.
- Use trickle irrigation near the base of plants to reduce runoff.

Watering during a Drought

There is no substitute for water during a dry spell. However, you should adhere to local water restrictions, if applicable. Your water conservation ensures safe drinking water for your community.

Avoid afternoon watering, which results in a 20 to 25 percent loss of water through heat and evaporation. The best time to water is early morning, when humidity is high and moisture loss is minimal.

Watering in the evening prevents evaporation, but it increases the risk of fungal disease and damage from nocturnal insects searching for water.

Dormancy or Death?

When rainfall is sparse, Mother Nature has provided your lawn with a built-in protection plan: dormancy. Grass turns brown as moisture reserves dry up, but it is far from dead. By going into a dormant state, grass halts the process of photosynthesis. This is why grass grows at a slower pace in hot, dry periods. When rains do come, your grass will green up.

Never apply fertilizer or herbicide to a dormant lawn, because it could kill your grass.

Replacing Lawn with Native Plants

Natives are hardy, easily surviving harsh winters, summer heat, and even drought. Once established, native gardens and prairie plantings need very little weeding, watering, mulching or mowing and so, are virtually maintenance-free.

Native plants also help to clean water. They generally have deep root systems, acting as filters, collecting dirty runoff from streets and rooftops and separating out pollutants while absorbing water and decreasing flooding.

Use the plant selector at www.BlueThumb.org to find native plants for your yard.

TIP:

Restrict the use of herbicides during periods of drought to reduce stress on your lawn. Grass uses water to detoxify these chemicals, so avoid them during hot summer months.



Summer

Photo by Virginia Cooperative Extension

TIP:

Enlist the aid of wild birds in your garden. They feed on pest insects. Consider planting shrubs and trees with fruits that attract them—and distract them from your fruits and vegetables. You can protect ripening fruits and vegetables with bird netting.

Summer



Photo by Washington Conservation District

The best way to control insects and disease is to prevent them before they get a foothold in your yard. A few important things to remember:

- Use native plants when possible, as these are most resistant to indigenous pests.
- Buy plants from a reputable grower who can assure you that they are pest free; use disease-free, certified seed.
- Water in the morning. This allows plants to dry before the cool evening, making them less susceptible to disease. It also discourages the presence of many insects that feed at night.
- Avoid overcrowding in your garden beds. This will slow the spread of diseases and insects, giving you more time to deal with them.
- Weed your garden beds. Weeds and grasses often harbor pests. Organic mulches and fabric covers are extremely effective for weed control and also reduce soil splash, which can bring soil-borne diseases into contact with lower leaves.
- Avoid injury to plants. Broken limbs, cuts, bruises, cracks and insect damage are often sites of infection. Remove and dispose of diseased or infested leaves from as soon as you observe them. Remove severely damaged plants before they contaminate others.
- Inspect plants for egg clusters, beetles, caterpillars and other insects as often as possible. Hand-pick as many pests as you can. Avoid sprays until the population has reached a critical level.
- If slugs are a problem, try to create drier conditions. Placing diatomaceous earth, crushed eggshells and hydrated lime near plants may deter slug activity.

Using Pesticide and Herbicide










Before applying a pesticide, be certain to identify the target pest accurately. Also, make sure it is causing harm to your plants. Poor growing conditions (moisture or nutrient levels, severe weather) cause most plant problems, not pests.

Always read the label before applying chemicals in your yard. Select products targeted to the pest or weeds in your yard to avoid damaging beneficial insects or even your own flowers and vegetables.

Never spray chemicals near water, polluted runoff is a threat to your local water supply and to wildlife. Also avoid spraying on windy days and near paved surfaces.

Beneficial Bugs

Many insects prey on pest insects. Here are a few bugs you want to see in the yard and the pests they feed on.

	Assassin bug, <i>Reduviidae</i>	Aphids, caterpillars, leafhoppers
	Ground beetles, <i>Carabidae</i>	Insects, earthworms, gypsy moths
	Big-eyed bug, <i>Lygaeidae</i>	Aphids, caterpillar eggs and larvae, immature bugs, leafhoppers, spider mites
	Predacious stink bug, <i>Pentatomidae</i>	Potato beetles, caterpillar larvae, Mexican bean beetles
	Syrphid fly larvae, <i>Syrphidae</i>	Aphids, mealybugs
	Lady beetle, <i>Hippodamia convergens</i>	Aphids, mealybugs, spider mites
	Green lacewing larvae, <i>Chrysopa carnea</i>	Insect eggs, aphids, spider mites, thrips, leafhopper nymphs, caterpillar larvae
	Trichogramma wasp, <i>Trichogrammatidae</i>	200 pest insect eggs including cutworms, corn borers, corn earworms, armyworms, codling moths, cabbage moths
	Encarsia wasp, <i>Encyrtidae</i>	Greenhouse whiteflies

TIP:

Purchase only the pesticide and fertilizer you need for one season to avoid the storage and disposal problems associated with strong chemicals. Never pour pesticide down a sink, toilet or storm drain.



Summer

Photo by Washington Conservation District



Photo by Rice Creek watershed District

Pest-Control Plants

Many plants produce natural chemicals that repel insects. When planted among flowers and vegetables, these plants help keep pests away.

Pest

Ant
 Aphids
 Bean leaf beetle
 Codling moth
 Colorado potato bug
 Cucumber beetle
 Flea beetle
 Cabbage worm
 Japanese beetle
 Leaf hopper
 Mexican bean beetle
 Slugs
 Spider mites
 Squash bug
 Stink bug
 Thrips
 Tomato hornworm
 Whitefly

Plant Repellent

Mint, tansy, pennyroyal
 Mint, garlic, chives, coriander, anise
 Potato, onion, turnip
 Common oleander
 Green beans, coriander, nasturtium
 Radish, tansy
 Garlic, onion, mint
 Mint, sage, rosemary, hyssop
 Garlic, larkspur, tansy, rue, geranium
 Geranium, petunia
 Potato, onion, garlic, radish, petunia, marigolds
 Prostrate rosemary, wormwood
 Onion, garlic, cloves, chives
 Radish, marigolds, tansy, nasturtium
 Radish
 Marigolds
 Marigolds, sage, borage
 Marigolds, nasturtium



Photo by CA State Water Resources Control Board

Fertilizing Your Lawn

When the weather warms and spring is on the horizon, many people make plans to fertilize their lawns. However, spring may not be the best time to apply fertilizer. Be sure you apply the right kind of fertilizer, in the right amount, at the right time.

Selecting a Fertilizer

Before beginning a fertilization program, use a soil test to determine the fertility of your soil. The results will indicate the amounts of nutrients already present and the acidity (pH) of your soil. In Minnesota it is illegal to use a phosphorus fertilizer for your lawn unless soil tests indicate that your soil is phosphorus deficient.

Choose a fertilizer with 35 to 50% of the nitrogen in a slow-release form. This provides some nitrogen for immediate use while releasing some more slowly to provide for a longer sustained nutrient supply and hence more uniform growth. Acidic soils may need lime in addition to fertilizer (apply it in the fall so it can break down during the winter). Mature lawns generally require more nitrogen than potassium.

High and Low Maintenance Lawns

High-maintenance lawns are characterized by vigorously growing plants such as improved Kentucky bluegrass and improved turf-type perennial ryegrass varieties. These lawns require 3 to 4 pounds of nitrogen per 1,000 square feet of lawn area each year.

Low-maintenance lawns typically contain plants such as creeping red fescue, chewings fescue, hard fescue, or some of the common types of Kentucky bluegrass which grow and spread more slowly. A low-maintenance lawn will typically require only 1 to 2 pounds of nitrogen per 1000 square feet of lawn area per year.

Maintenance practices	Nitrogen (N) to apply lb. N/1000 ft ²	Timing of applications
	High-maintenance lawn	
(Irrigation, clippings removed)	4	Aug, Sept, mid-Oct, May-June
(Irrigation, clippings not removed)	3	Aug, mid-Oct, May-June
	Low-maintenance lawn	
(No irrigation, clippings removed)	2	Aug, mid-Oct.
(No irrigation, clippings not removed)	1	Sept

TIP:

Choose a fertilizer with 35 to 50% of the nitrogen in a slow-release form; look for the percentage of water insoluble nitrogen (WIN) on the label. Too much quick release nitrogen creates growth too quickly and can weaken the plant going into the summer.



Photo by Dakota County

Fall

TIP:

Excessive spring fertilizer application leads to leaf growth at the expense of food reserves and root growth, increasing injury to lawns from summer disease and drought.

Choosing Application Equipment

It is important to apply lawn fertilizers uniformly for even growth. Proper application by hand is very difficult. Drop-type or rotary fertilizer spreaders are most effective.

Rotary spreaders tend to cover a broader swath, but take care to avoid application of any fertilizer to driveways, roads or bare soil. It is illegal and fertilizer could be washed into the water supply.

Use the following chart to determine the correct amount of fertilizer to apply for a desired amount of nitrogen

Fertilizer analysis	Lbs of fertilizer per 1000 square ft. to achieve 0.5 and 1 lbs of N per square ft.	
	(0.5 lbs N)	(1 lbs N)
*6-2-0	8.3	16.6
*10-10-10	5.0	10.0
*12-4-8	4.1	8.3
*16-8-8	3.1	6.2
20-0-16	2.5	5.0
*23-3-7	2.1	4.3
28-0-12	1.8	3.6
31-0-0	1.6	3.2
33.5-0-0	1.5	3.0
38-0-0	1.3	2.6
46-0-0	1.1	2.2

*Phosphorus fertilizer can **only** be used for gardens, trees and agricultural crops or for newly established lawns.

Fall



Photo by Minnesota Pollution Control Agency

Applied correctly, soil amendments conserve moisture, improve infiltration of rainfall water and unlock existing nutrients in the soil. Common soil amendments include lime, sulfur, ash, compost and manure.

Changing the pH of your Soil

The correct soil pH is essential for optimum plant growth. Sulfur and lime are common amendments used to balance soil pH. Elemental sulfur makes soil more acidic. Dolomitic limestone adds calcium and magnesium as it increases pH to make soil more alkaline. Wood ashes also raise soil pH, but you must apply twice as much ash as limestone. Never use coal ashes or more than 20 pounds of wood ash per 1000 square feet, as toxicity may result.

Adding Nutrients to your Soil

Commercial fertilizers are the most common amendments for adding nutrients to soil. Other nutrient sources include cottonseed meal, kelp meal, leather meal and worm castings, each of which contains nitrogen, phosphorus and potassium in some amount. Common potassium sources also include granite meal, which releases potassium slowly, and greensand, which is more readily dissolved.

The regular addition of manure, compost and other organic matter can improve soil structure and nutrient content to the point that little or no synthetic fertilizer is needed. This rarely happens with a single addition but requires a long-term program.

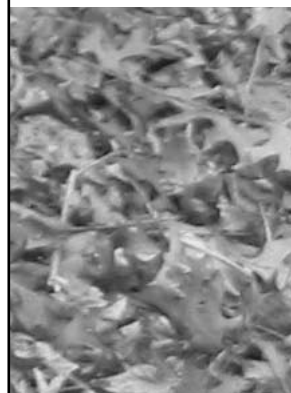
Fresh manure is quite high in nitrogen and may burn plants in a growing garden. It is best applied in the fall and tilled under. Manure is not recommended for lawns due to its high phosphorus content. Compost, typically made from yard clippings, kitchen scraps and fallen leaves, can be added to gardens when tilled in the spring or placed beneath mulch in plant beds. Composting produces a valuable source of nutrients, and the resulting dark earth, called humus, helps soil retain moisture.

Making Use Of Fallen Leaves

Deciduous trees provide cooling shade through the summer and let sunlight warm your home in the winter. But if you have large trees adorning your property, you may consider yourself cursed in the fall, when all those leaves need to be raked and carted away. This year, try a different strategy. Instead of turning leaves into garbage, turn them into beneficial compost for next year's flower and vegetable beds. A compost pile need not take up a large area. Nor does a properly maintained compost pile produce offensive odors.

TIP:

Organic fertilizers typically contain more calcium, magnesium and micronutrients than commercial fertilizers.



Fall



Build a compost pile

- Select a location for composting. Many people build wooden or wire enclosures for composting, and some purchase mounted rotating bins. However, the microbes that produce good compost are content with a simple pile of leaves and grass clippings.
- Rake clippings from tall grass to use in your compost pile. They provide an excellent nitrogen source, especially if you are without access to manure. If the grass is green, however, do not add too much at once.
- Add other lawn wastes such as leaves (dry and fresh), straw, sawdust and wood chips. These provide carbon and nitrogen to the compost. Consider using your lawn mower to shred leaves before composting them.
- You can compost kitchen waste such as orange peels and apple cores, but avoid adding scraps that will attract pets or wild animals.
- Add diseased or insect-infested plant parts and weeds only if you are certain your compost pile will heat up enough to kill the pest organisms and weed seeds.
- Add an occasional layer of soil and some ground limestone to aid the decomposition process. Turn the compost occasionally.



It is often necessary to give your plants a little extra attention in the fall to help them make it through winter and start spring in peak condition.

Landscape with Winter in Mind

Begin by selecting hardy plants that can survive snow and freezing temperatures. Native plants are your best bet because they are uniquely adapted to Minnesota's climate. Also be sure to plant trees and shrubs in an appropriate site. Avoid poorly drained soil, low spots that create frost pockets and sites that experience rapid fluctuations in temperature. Consider the wintertime patterns of sun and shade in your yard.

Garden Cover Crops

Cover crops maintain and even improve the nutrients in your garden soil during the winter. The cover crop's roots hold the soil, decreasing erosion. When tilled under in the spring, the crop adds valuable organic material to the soil.

Plant winter cover crops in September or October. Till under plant wastes from the summer, then broadcast the seed and rake it evenly into the soil. If you have fall crops growing, you can sow cover crop seed between rows within a month of harvest without hampering your vegetables.

Some cover crops are legumes such as crimson clover, fava beans or hairy vetch. Others include barley, winter rye and winter wheat. Mixtures of two cover crops are often very effective.

Prune at the Right Time

Proper pruning throughout the year reduces damage by ice and snow. Trim branches so that limbs are not weighted down by ice and snow. Avoid late summer pruning, however, as it stimulates new growth, exhausting the nutrients a plant needs to survive winter.

TIP:

Many varieties of rhododendron, azalea, camellia, daphne and holly should be planted on the northern or eastern side of a building or wall to protect them from prevailing winds and intense winter sun.



Fall

TIP:

Remove snow from branches with a broom. Always sweep upward with the broom to lift snow off. When branches are frozen and brittle, avoid disturbing them. Wait until a warmer day.



Water Properly

Be sure your plants have enough water. If autumn rains have been insufficient, give plants a deep soaking that will supply water to the entire root system before the ground freezes. This practice is especially important for evergreens.

Apply Mulch

Mulch helps to control erosion, retain moisture and stabilize soil temperature, as well as controlling weed growth. A two-inch layer of mulch material will reduce water loss and maintain uniform soil moisture around roots. Mulch also reduces repeat freezing and thawing of the soil, which causes significant damage to some shallow-rooted plants. Mulch can even be applied to garden beds in lieu of cover crops to prevent winter erosion. Use shredded hardwood mulch in rain gardens to prevent your mulch from floating away.

Protect Newly Planted Trees

Bark splitting, especially dangerous to young trees, results from extreme fluctuations in temperature. Afternoon sun warms exposed trunks, and the sudden temperature drop at nightfall causes splits and cracks. Prevent bark splitting by wrapping trunks with burlap strips or a commercial tree wrap.



Photo by Lynn Vernon

More Information

University of Minnesota Extension

Local Extension agents

www.extension.umn.edu/offices

Yard and Garden Info

www.extension.umn.edu/gardeninfo

Gardening and commercial horticulture

www.extension.umn.edu/garden

Forestry and woodland stewardship

www.myminnesotawoods.umn.edu

Minnesota Department of Natural Resources

Bird feeding, gardens and native plants, living with wildlife, shoreland management, tree care

www.dnr.state.mn.us/backyard

Minnesota Pollution Control Agency

Water monitoring, water quality data

www.pca.state.mn.us/water

Minnesota Department of Agriculture

Animals and livestock, agricultural chemicals and fertilizers, plants, pests and pest control

www.mda.state.mn.us

U.S. Department of Agriculture

Natural Resources Conservation Service

Backyard conservation

www.nrcs.usda.gov

(804) 287-1691

U.S. Environmental Protection Agency

Conservation, water quality

www.epa.gov

(202) 272-0167

U.S. Fish and Wildlife Service

Wildlife habitat

www.fws.gov

(800) 344-WILD

American Horticultural Society

SmartGarden program, seasonal yard-care tips

www.ahs.org

(800) 777-7931

Blue Thumb - Planting for Clean Water

Native gardens, raingardens and shoreline plantings

www.bluthumb.org

Minnesota State Horticultural Society

Resources, classes, garden clubs

www.northerngardener.org

Minnesota Landscape Arboretum

Plant information, collections, classes

www.arboretum.umn.edu

Wild Ones

Native plants and natural communities

www.for-wild.org

Minnesota Water - Let's Keep it Clean

Resources and information about stormwater

www.cleanwatermn.org

Photo Credits

Large front and back cover photo:

Native plant garden - Rice Creek Watershed District

Front cover (clockwise from lower left):

Raingarden - Valley Branch Watershed District

Shoreline planting - Rice Creek Watershed District

Carpenter Nature Center - Lynn Vernon

Shoreline planting - Rice Creek Watershed District

Back cover:

Raingarden - Bonnie Juran

Inside cover:

Shoreline planting - Rice Creek Watershed District



www.BlueThumb.org

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