



Gardening and Water Quality Protection: Using Nitrogen Fertilizers Wisely

G. Andrews

Plants need nitrogen to grow. However, if there is more nitrogen (in the form of nitrate) in the soil than plants need, some of it may leach below the rooting zone and end up in the groundwater that supplies your drinking water. High levels of nitrate in groundwater can cause a type of blue-baby syndrome, so contaminated water cannot be used for public water supplies. For an explanation of nitrogen in the soil and how leaching may occur, refer to EC 1492, *Gardening and Water Quality Protection: Understanding Nitrogen Fertilizers* (see “For more information,” back page).

This publication identifies six general strategies to avoid the leaching of nitrate into groundwater. Each strategy is followed by specific recommendations for you to use in your lawn and garden. Managing nitrogen can be complex and involves many factors. Consider the whole picture to develop a plan that best fits your own situation.

Gardening Strategies

- Add only the amount of nitrogen that is needed for reasonable plant growth.
- Time the application of nitrogen fertilizer to match the plants’ needs.
- Do not allow irrigation water to carry nitrate below the rooting zone.
- Do not have readily available nitrogen in bare soil, especially when it may rain.
- Carefully identify your plant or soil problem before adding more nitrogen fertilizer.
- Plan your landscape to need less nitrogen and water inputs.

Add only the amount of nitrogen that is needed for reasonable plant growth.

- Follow OSU Extension Service recommendations for lawns and garden plants. Never add more fertilizer than is recommended for the growing season. If other sources of nitrogen are available, as discussed in the following points, reduce the amount of fertilizer you apply.

- Large amounts of nitrogen may encourage more growth than is desirable for a healthy lawn or productive garden. The excess nitrate that produces this “super growth” also is leached very easily into the groundwater.



- If you have amended your soil with organic matter that also contains nitrogen, such as manure, be sure to take this nitrogen into account when you determine how much fertilizer to add. See FG 66, *Fertilizing Home Fruit, Vegetable, and Ornamental Gardens*, for information on the nitrogen content of manure from different animals.

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- If you've grown legumes in a plot, reduce the amount of nitrogen you add for the following crop. See FS 304, *Cover Crops for Home Gardens*, for estimates of the amount of nitrogen fixed by various legume crops.
- Mulching mowers leave grass clippings on the lawn. This returns much of the nitrogen to the soil. You'll need to add much less fertilizer, possibly none at all!

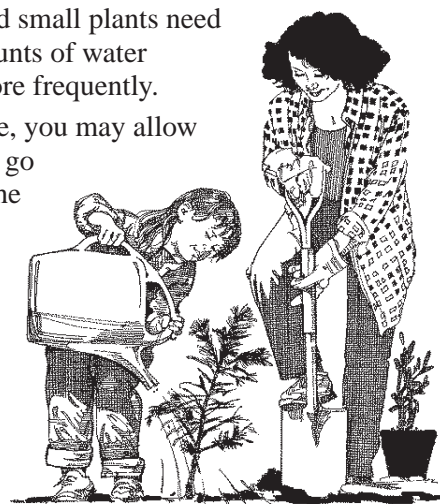
Time the application of nitrogen fertilizer to match the plants' needs.

- Lawns need a steady supply of nitrogen throughout the growing season. Use a fertilizer that is labeled as containing some slow-release nitrogen for a constant supply between applications. Or, split each recommended nitrogen application in half, and apply the second half a few weeks after the first application.
- Be aware that heavy spring rains can wash away most nitrate in the soil. If you use chemical fertilizers, you may opt to hold back part or the entire recommended amount of nitrogen fertilizer when preparing garden seedbeds in the spring. Instead, add the nitrogen fertilizer around the plants a few weeks after they emerge.
- Organic forms of fertilizer, such as blood meal, are converted gradually to available nitrogen. Using organic fertilizers when preparing your seedbed can reduce leaching and will provide nitrogen by the time plants emerge.

Do not allow irrigation water to carry nitrate below the rooting zone.

- Deep, infrequent watering promotes deep root growth, making plants more drought-tolerant. Water lawns and most mature garden vegetables to a depth of 6–8 inches whenever the surface inch or so feels dry.
- If you have sandy soils, nitrogen leaching is especially a problem. Give careful attention to how much water you apply to sandy soils.
- If you use a drip irrigation system, don't run it longer than necessary.
- Install timers on your sprinklers to avoid accidental over-watering.

- Seedbeds and small plants need smaller amounts of water delivered more frequently.
- If you choose, you may allow your lawn to go dormant in the summer by withholding water. With fall rains, the brown lawn will turn green quickly.



(Note: If your lawn won't be watered all summer, don't fertilize after April.)

Do not have readily available nitrogen in bare soil, especially when it may rain.

- Never add inorganic fertilizers (ammonia and nitrate formulations) if you prepare your garden beds in the fall for spring planting.
- Cover bare soil with coarse organic matter or aged compost to bind up any available nitrogen.
- Plant winter cover crops, or grow winter vegetables if the temperature is mild enough.
- Avoid spreading fresh manure unless a crop will be growing. Fresh manure contains ammonia that easily can convert to nitrate and leach.

Important

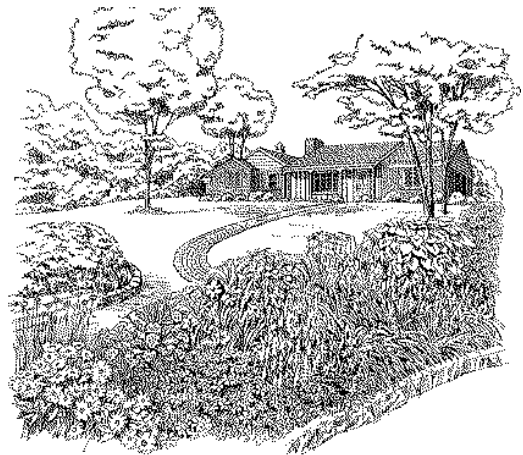
Your groundwater is at higher risk of contamination from excess nitrogen fertilizer if you have soils that drain quickly, such as river loam, coastal sand, or volcanic deposits. *Do you know what kind of soil you have?*

Carefully identify your plant or soil problem before adding more nitrogen fertilizer.

- Signs of nitrogen deficiency are leaves yellowing from the tips towards the stem, plants yellowing from the ground up, and stunted growth.
- If your plants show signs of nitrogen deficiency but you've already added recommended amounts of nitrogen, your soil pH may be out of the optimal range. Check your pH and adjust according to recommendations. Refer to FG 66 and EC1492 (see "For more information," back page).
- If your soil is too acidic, you can add ground limestone or dolomite lime to correct the problem. The pH won't change immediately, so replant the area with a more tolerant crop or cover the area with mulch.
- A variety of plant symptoms may be related to nutrients other than nitrogen, such as potassium, phosphorous, iron, sulfur, and others. Check in a gardening book, or contact your county office of the OSU Extension Service to determine if you have a soil related problem.
- You may choose to have a soil test if you suspect an imbalance in soil nutrients. Do not add extra fertilizer until you know what type and how much you need.
- Diseases or insects cause some plant problems. In some cases, plants are more susceptible if they don't have proper nutrients. First diagnose and treat the source of the problem. Add extra nitrogen only if you have evidence that this deficiency contributed to a weakened plant condition.
- Make sure plants are in the right spot for their needs. Symptoms of too much or too little sun may appear similar to a nitrogen deficiency.

Plan your landscape to need less nitrogen and water inputs.

- Many drought-tolerant plants are available. (See EC 1455, *Selecting and Maintaining Water-efficient Landscape Plants*.)
- Eco-lawns, or low-maintenance lawns, require a minimal amount of water and no fertilization. (Call the OSU Department of Horticulture at 541-737-4364 for more information.)
- Native plants are adapted to the natural soils and climate of your area, so they generally require fewer inputs.



- If you prefer a green lawn all year, reduce the size of the maintained lawn. Create borders of shrubs, perennial flowers, or non-grass ground cover. Plant islands of low-maintenance plants. Establish gravel walkways or sawdust play areas. You also will save some time spent mowing, and reduce air and noise pollution from the lawn mower.

Your gardening strategies notes

For more information

OSU Extension publications

Cover Crops for Home Gardens, FS 304, Rackham, Robert L., and Ray McNeilan (revised 1994). No charge

Fertilizing Home Fruit, Vegetable, and Ornamental Gardens, FG 66, Hart, John, Ray McNeilan, et. al. (reprinted 1995). No charge

Fertilizing Home Lawns, EC 1278, Cook, Thomas W., and John M. Whisler (reprinted 1994). 50¢

Fertilizing Shade and Ornamental Trees, FS 103, McNeilan, Ray A. (reprinted 1997). No charge

Gardening and Water Quality Protection: Understanding Nitrogen Fertilizers, EC 1492, Andrews, Gail G. (1998). \$1.00

Gardening with Composts, Mulches, and Row Covers, EC 1247, Mansour, N.S. (reprinted 1997). \$1.00

Grow Your Own set—available for many garden vegetables

Planning and Preparing Your Vegetable Garden Site, EC 1228, Mansour, N.S. (reprinted 1994). 50¢

Selecting and Maintaining Water-efficient Landscape Plants, EC 1455, Bauer, Michael E. (1995). 75¢

The above publications were published by Oregon State University, Corvallis, OR.

Other publications

Backyard Composting in the 1990's, WAEB 1784, Cogger, Craig G., Dan M. Sullivan, and Susan K. Duncan (Washington State University, Pullman, reprinted 1995). \$1.00

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