



Best Management Practices for New York State Golf Courses

Applying Fertilizers

Proper application of fertilizers is possible only with accurately calibrated sprayers or spreaders. Incorrectly calibrated equipment can easily apply too little or too much fertilizer, resulting in damaged turf, excess cost, and contamination of the environment. Therefore, sprayers and spreaders should be calibrated at first use and after every fourth application. The time it takes to calibrate application equipment is returned many fold in improved results.

An excellent resource for spreader care and calibration can be found on the Penn State Plant Science website (<http://plantscience.psu.edu/reduce-runoff/best-management-practices/calibrating-your-fertilizer-spreader>). Spreaders should also be thoroughly cleaned after use due to the high salt content that corrodes metal parts. However, the wash water will likely contain N or P and should be disposed of properly.

Granular Fertilizer Application

Fertilizer is applied to turf in both granular and liquid forms. When applied in a granular form, it is distributed with a drop, rotary, or pendulum-type spreader. The drop, or gravity-type, spreader has a series of openings at the bottom of the hopper through which the fertilizer drops a few inches to the ground directly beneath. The rate of application can be changed by adjusting the size of the openings. Drop spreaders distribute fertilizer precisely and uniformly.

Drop spreaders are usually two feet wide, but wider models are available. Drop spreaders are normally preferred for the application of fine or very light particles such as ground limestone or granular pesticides that must stick to the foliage. Too much overlapping or misses between application swaths can result in streaking because of uneven nitrogen distribution.

Rotary spreaders are also called centrifugal, broadcast, or cyclone spreaders. Most have a plate, called an impeller, which is attached beneath the hopper and spins as the spreader wheels turn. When fertilizer drops through the adjustable openings at the bottom of the hopper, it falls onto the rotating impeller and is thrown away from the spreader in a semicircular pattern. Rotary spreaders broadcast granular materials over a wider area and faster than the drop type. The spreading width normally ranges from 6 feet for small spreaders to 60 feet for very large ones. Streaking is less likely with rotaries because the swaths are overlapped and the edge of the distribution pattern is not as sharp as that produced by a drop spreader. Rotary spreaders do not provide as accurate and uniform an application as drop spreaders, but the distribution can be satisfactory if the proper overlap is used. Spreading mixed materials of different sizes is a problem because larger, heavier granules are thrown farther than smaller, lighter particles and ground limestone often drifts when applied with a rotary spreader. The speed at which the spreader is pushed or driven has a major impact on application rate.

Pendulum-type spreaders have a spout that moves from side to side. They are pulled by a tractor or turf vehicle, have a large hopper capacity, and can throw dry materials a great distance when the spout moves rapidly.

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Liquid Fertilizer Application

Liquid fertilizer applications allow for lower rates and more precise applications than granular application. Liquid application is usually less expensive than granular applications, though the initial cost of the sprayer equipment is high compared to the cost of a spreader. If not expecting foliar uptake of nutrients, a minimum two gallon spray volume of the fertilizer-water mixture is applied per 1,000 ft² to ensure that fertilizer washes into the root zone.

Fertigation is the application of nutrients through the irrigation system. Minute amounts of fertilizer are regularly metered into the irrigation lines and distributed along with the irrigation water through the sprinkler heads. For fertigation, the irrigation system must be capable of distributing water uniformly. The advantages of fertigation include a more efficient plant use of nutrients, a steadier growth rate, and a savings on labor costs. Fertigation is not widely used yet on NYS golf courses, but could significantly improve nutrient application efficiency and water quality protection. So far, it has been most widely used during grow in to aid establishment, or for applying about half of the total yearly amount of N.