At one time selecting fertilizer spreaders for turf care was easy. The first mechanized broadcast spreader wasn't introduced until the late 1860s. It took until the mid-1950s to put that technology on wheels. Now the numerous products available for applying fertilizers, soil amendments, seed, topdressing materials and pesticides makes spreader selection a complex project.

This proliferation of products provides options that allow the turf manager to match equipment to the specific needs of the facility and to the limitations of the available budget.

The first step in the selection process is defining those needs. Prepare a list of activities for which spreading equipment will be required or could reduce time and labor expenditures. Then prepare a list of existing spreaders, the processes for which they are currently used, and their age and state of repair. The gap between the two lists defines needs.

The second step is exploring the options. Spreaders range from wheeled, hand-push drop and broadcast types to equipment-attached models with drop, broadcast or pendulum delivery methods.

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Photos courtesy: John Deere Company.
Broadcast Spreaders

Broadcast spreaders generally have a long, narrow hopper. Material is fed to a series of openings that stretch along the base of the hopper. The material is agitated and channeled to the openings by the projections or blades attached to a shaft that turns with the motion of the wheels. A plate at the base of the hopper is manipulated to control the size of openings and thus the amount of material to be discharged through each one.

A drop spreader delivers a uniform amount of material across the width of the openings. The speed at which the spreader travels, the consistency of that speed, and the type of terrain, all contribute to the overall uniformity of application.

Because the hopper is placed between the spreader's wheels and material is spread directly from the openings at the hopper's base, it's necessary to overlap each swath for even coverage. Too much or too little overlap will result in too much or too little material being applied to the overlap areas. On some drop spreaders, the operator makes the calculations to calibrate the correct discharge opening setting and monitors the material application. On other drop spreaders, the area to be covered and amount of material to be distributed are fed into a mechanical control unit that automatically calibrates the settings and monitors the rate of material distribution. These systems alert the operator of uneven coverage that may be caused by erratic ground speeds, terrain fluctuations or equipment problems.

Drop spreader sizes range from 24 inches up to 12 feet or more.

Broadcast Spreaders

Broadcast or rotary spreaders generally have a taller, circular or conical shape. Material is channeled to an opening or a series of openings at the base of the hopper by a centrally mounted, single- or multiple-armed agitator. The agitator may spin in a clockwise or counterclockwise motion. The material is fed through the hole or holes onto an impeller that has a surface pattern of spines or ridges. The shape of the impeller and design of the ridge pattern combine to contribute to the trajectory the material follows as it is channeled from the impeller to the ground.

The material moves out from the broadcast spreader's impeller to the area ahead and to the sides of the hopper, in fan or modified bell pattern, creating a wider swath than that of drop spreaders. Normally, material distribution is heavier close to the spreader and lighter further from the spreader. The swath area and pattern and the distribution of material within the swath differ according to the spreader design and size. Spread pattern width can range to 40 feet or more. The agitator, number and placement of discharge holes, and shape and ridge pattern of the discharge plate combine to affect the uniformity of material distribution.

As with drop spreaders, the size of the discharge opening or openings can be manipulated to control the rate of material flow. Broadcast spreader models with multiple discharge openings also offer the option of closing some of the holes to block delivery of material to one or both sides of the application pattern. There are also special optional attachments for some models that block flow to one side of the application pattern.

The speed at which the spreader travels, the consistency of that speed, the fluctuations of the terrain, and the speed and direction of the wind all combine to affect the uniformity of material delivery. Again, the swath pattern must be overlapped to achieve uniform application.

Broadcast spreader calibration and monitoring can be controlled by the operator, mechanized equipment, or a combination of the two methods.

Pendulum Spreaders

Pendulum spreaders usually have cone-shaped hoppers. Material is channeled to a discharge spout located at the base of the hopper. As with broadcast spreaders, a single- or multiple-armed agitator stirs the material and sends it toward the surface of the opening. As the spreader travels, the spout swings back and forth distributing material over a swath that may range from quite narrow to 40 feet or more. Different-sized spouts are offered to accommodate materials in varying sizes and densities, from fine seed to fertilizers to de-icers, and to control the width of the swath. Agitator extensions may be available to ensure proper movement of fine materials such as powdered fertilizers, salt or sand.

Material distribution is generally heavier in the center of the swath, lighter at the outside edges. Again, overlap is necessary for uniform application. Calibration and monitoring may be controlled by the operator, by mechanized equipment, or by a combination of the two.

Factors for Consideration

Spreaders may be operated in conjunction with tractors, all-terrain vehicles, utility vehicles, and more. Specific requirements for proper operation vary with the individual spreader.

Depending on the sophistication of any mechanized spreader unit, the operator may watch a monitor for signals that ground speed is erratic and make appropriate adjustments, or material application rate may be adjusted automatically to compensate for changes in ground speed or terrain.

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With blended or mixed fertilizers, nitrogen (N), phosphorus (P) and potassium (K) are incorporated on different carriers that are then combined in the proper proportions to create the desired total formula. Homogeneous fertilizer forms incorporate the desired ratios of N, P and K on each particle.

Testing compared the results of applications of various types of blended and homogenous fertilizer formulas. Initially it might appear that all blended products would by nature be less uniform in their delivery of N, P and K than the homogeneous materials. However, Dr. Karnok reported that when fertilizer blends were uniform in particle size and density, good distribution was achieved even if N, P and K were incorporated on separate granules.

Where blended materials contained wide ratios in size and/or density, individual particles were segregated out in the spreading process. Heavier particles moved further from the spreader source, while lighter particles didn’t travel as far, tending to concentrate closer to the spreader — which meant that the different nutrients were unevenly dispersed.

According to Dr. Karnok, looks were sometimes deceiving. A blended material that initially appeared fairly uniform might not spread as well as another material that appeared less uniform. Particle size and density combined to determine uniformity of distribution.

“Other factors appear to be more critical than the fertilizer formula in spreading fertilizers easily,” Karnok said. “Accurate spreader calibration, operator control, proper and consistent speed, the terrain, the cleanliness and maintenance of the spreader, all play major roles in uniform application. If everything else were done accurately, the spreader itself — a homogeneous or a blend with uniform particle size and density — would be more of a factor. Uniformity of distribution would also be an issue to consider with combination products such as the incorporation of herbicides or insecticides with fertilizer.”

With the time, money and effort expended on achieving the desired results, it just makes sense to shoot for the highest degree of uniformity when spreading material.