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SPREADERS

What kinds of spreaders are commonly available? Most fertilizer spreaders are either drop or broadcast (rotary).

What are the common problems with drop spreaders? If the holes are placed too far apart, you get banding and cross striping. If there is too much space between passes or two much overlap, you get striping.

Which spreader is more uniform? Broadcast (rotary) spreaders usually have 1-3 ports in the bottom and a rotary impeller that flings material out in an arc shape. Small spreaders have one impeller, large ones may have two. Two impellers help to provide patterns that are symmetrical from side to side but this still doesn't guarantee uniform patterns of fertilizer application.

There is also a pendulum type of broadcast spreader, which provides a way to adjust swath width but there is still no guarantee of pattern uniformity even though uniformity with this kind of spreader is usually pretty good.

A pneumatic type of spreader has a central metering and distribution system that meters granules into multiple streams carried out to booms which blow the fertilizer products on the ground or hit a deflector which spreads the distribution over the ground.

Which spreader pattern is most efficient? Broadcast (rotary) spreaders can throw in several different shapes. Trapezoidal and triangular patterns are most effective because they provide a uniform application when properly overlapped. M or W patterns of throw are VERY common but can create problems because they typically require a DOUBLE overlap and still may not be uniform even when overlapped!

The most common type of spreader for turf work is the single impeller broadcast (rotary) spreader, but differences in size and shape of granules will cause some to leave the impeller sooner than others. Broadcast (rotary) spreaders tend to segregate particles by size, throwing large particles farther than small ones. Look for impellers with more than one fin type which will provide a more uniform distribution.

Professional (not homeowner grade) spreaders usually have a way to adjust the pattern, e.g., changing the points at which the pellets hit the impeller by moving the impeller, moving metering ports, moving the deflector between the ports and even moving the impeller. Some types may also have a truncated spiral cone you can mount between the ports and the impeller and rotating the cone moves the drop point in or out on the impeller and the cone surface also serves as a deflector to even out the distribution pattern. This actually gives the BEST patterns for walk behind turf spreaders
You can also rotate the ports in the hopper bottom to move the drop point angularly. This is effective mainly for compensating for material or operational variables in an otherwise ok

pattern. You could always open or close some of the ports to change the center of the drop zone on the impeller. Bear in mind that partially or completely closing a port changes the shape of the pattern, and changes that delivery rate so you also have to CHANGE THE RATE SETTING which means recalibrating

Homeowner spreaders actually have an advantage in that they can throw prills in a 360 degree arc which eliminates skewing of the majority of the fertilizer throw to one side or another. Commercial models mostly throw a limited arc to the front or the rear of the spreader. If you purchased large or high density granules remember that the pattern will be larger compared to lighter, smaller granules. If you were using a 360 degree spreader, your pattern would actually look like a slinky that got run over. There is also a hybrid broadcast spreader that allows the spreader to act more like a drop spreader to give a 360 degree-like pattern and it has a skirt around the impeller that helps to deflect the pellets to give greater uniformity.

Which spreader has the best distribution uniformity? Drop spreaders are very precise and uniform across swath widths compared to broadcast spreaders.

What about distribution consistency? Patterns from drop spreaders stay the same as long as they are used with compatible products. Patterns from broadcast spreaders vary with the physical characteristics of the product.

What about feathering along the edges of the spread pattern? Broadcast patterns feather at the edges to compensate for overlap and compensate for minor errors in swath width. Drop spreader patterns are sharply defined and must have exact swath width match up to avoid striping

What about wind effect? Wind affects a drop spreader pattern much less than broadcast patterns because the drop point is closer to the ground and granules plummet straight down.

What about granule size? Broadcast spreaders generally handle larger granules than drop spreaders. Why? Broadcast spreaders have a smaller number of larger ports.

What about safety to surrounding areas like water bodies? Drop spreaders are safer for surrounding areas than broadcast because granules are not thrown beyond the spreader, i.e., you'll have less "drift" from a drop spreader.

What about ground clearance? Drop spreaders normally have hoppers closer to the ground than broadcast spreaders so they have less ground clearance than a rotary spreader. Drop spreaders are thus more susceptible to damage from rocks, roots and obstacles.

What about how hard you'll have to work to push the spreader? Drop spreaders require more force to push or pull, a good fact to know for those of you with bad backs.

What about speed effects? Drop spreader speed affects rate but not pattern.
Broadcast spreader speed affects rate AND pattern.

What about port plugging? Drop spreaders are more susceptible to plugging due to many small ports. Lower clearance of drop spreaders also makes them more likely to plug up from wet foliage rubbing against the bottom.

What about construction material? Drop spreaders are usually steel construction while broadcast spreaders can be plastic to reduce corrosion and cost. However, plastic may warp and throw off calibration or wear out more quickly.

What about swath width? Broadcast spreaders deliver a much wider effective swath
Drop spreaders are limited to a swath width of the spreader itself.

What about calibration? Two items must be considered when calibrating a spreader.
The first is the distribution pattern the product makes as it strikes the ground after being thrown out by the spreader's impeller. The spreader should be calibrated separately for every product to be applied. Spreader calibration should be checked at least once a month, or more often when the spreader is used frequently. The second item is the product application rate, which is the amount of product applied per thousand square feet.
This is important because over-application can be costly and may cause plant injury, while under-application will reduce the effectiveness of the product.

WHAT FACTORS AFFECT RATE OF FERTILIZER APPLICATION?

Humidity: Every fertilizer has a critical relative humidity (CRH) which is the humidity at which the fertilizer starts to take on water from the air. The longer the fertilizer remains exposed to air above its CRH, the more moisture the fertilizer will absorb until it reaches saturation. Humidity has two primary effects on delivery rate.
1. as fertilizer picks up moisture it becomes less flowable and delivery rate through ports will decrease.
2. if fertilizer picks up enough moisture it will begin to build up on the spreader in certain areas, e.g., under the agitator, which can further reduce the delivery rate and hugely increase the force needed to turn the agitator.
These factors affect both both drop and broadcast spreaders

Speed: Speed has major effect on spreader delivery rate. Small broadcast spreaders may be GRAVIMETRIC, meaning that if ground speed changes, a given amount of material will be applied to more or less area. Volumetric spreaders are unaffected by speed
Drop spreaders are neither totally gravimetric or volumetric, but tend to be more gravimetric in that speed does have an effect on delivery rate: increase speed, decrease application rate.

Product: Granule size is important. Particle size distribution is important. Labeling may make it seem like two products are identical with respect to size or size distribution but they may actually be very different. Particle *shape* is also important for the way the particle lies in the spreader---and then affects delivery rate.

Moisture: Moisture affects how the product lies and friction between particles and machinery affects delivery rate.

Changes in product carrier: These affect delivery rate.

Changes in BATCH, or shipping and handling of different batches: These can affect delivery rate .

Spreader Angle/Handle Height: This is primarily a problem with plastic drop type spreaders due to tilting because granule flow is a function of vertical openings
With some plastic spreaders, a 6" change in handle height can change the delivery rate by 50% or more!!!

FACTORS THAT AFFECT PATTERN

***Wind*:** Wind from the side is more of a problem than wind in the direction of travel because of skewing. Light/small granules are disturbed more. Avoid applications when wind velocity is greater than 5 mph---if you see tree leaves moving at all it is windy enough to skew the pattern.

***Granule Type*:** The larger the granule, the wider the pattern. Size is more important that density.

***Humidity*:** Humidity affects the distribution pattern shape and uniformity. Humidity causes fertilizer granules to soften and become sticky, trapping buildup on the impeller. The extent largely depends on the fertilizer. For example, ammonium nitrate softens, and skews, but does not stick due to its cold water solubility. Urea formaldehyde and methylene urea will build up on the impeller and result in progressive pattern deterioration with increasing humidity above the CRH. This problem is compounded by the need to apply early in the morning to avoid the skew of wind.

Speed: Speed affects the pattern of uniformity and delivery rate and often causes a change in effective swath width. Usually if speed is reduced, granules will not be thrown as far. Rotary spreaders will experience changes in pattern shape with impeller speed change of 25% or more. A decrease in speed has more of an effect on pattern quality than an increase in speed, so at the end of the day when your tail is dragging, your fertilizer applications may be a trifle demented.

***Roughness of surface*:** Rough areas are a detriment to spreader pattern, and usually they are consistently skewed to the right with smaller granules more affected than larger ones.

Impeller/Spout Angle: Impellers or spouts must be level or the pattern is skewed and a spreader usually throws towards the "high side". For a rotary spreader, the pattern and width are affected by the impeller being not level from front to rear.

***Granule Segregation*:** If your fertilizer product is a mix of 2 or more components you may have segregation in your application with larger, heavier granules being thrown farther than small ones. The upshot of this is that if your N was in small prills compared to P or K, you could end up with more N in the center of your swath and more P &K on the overlaps. If your are using a weed and feed product (we wish you wouldn't) this can also make pesticide distribution especially uneven.

Pattern of walking:

> ***Circuitous vs. back and forth***: no difference
>
> ***Right angles vs half width***: You can go with half width, half delivery rate, but not routinely needed with a good spreader but may need with homeowner or semi-professional spreaders. NEVER go with the right angle method for any spreader for product, but okay for grass seed, lime.

FERTILIZER SPREADER TIPS:

-Always push the spreader; do not pull.
-Push the spreader at a consistent speed (approximately 3 m.p.h. is recommended).
-Always close the operating lever before filling the hopper (you laugh, I cry.)
-Be sure the screen is in place to prevent lumps or paper scraps from plugging the holes in the hopper bottom.
-Always start walking forward before opening the operating lever, close the operating lever before forward motion is stopped.
-Hold the handle at a height that will keep the impeller level.
-Empty the spreader after each use.
-Lubricate all moving parts. Apply grease to the five grease fittings: two in the axle supports, two in the gear support and one in the idler wheel (if the idler wheel has a steel hub.)
- Keep the impeller clean. Hot water usually loosens and cleans most of the residue. Encapsulated slow release product build ups may require abrasion or solvents
-Allow to dry before storage, may have to tip or invert it.
-Use your owner's manual.
-WD-40 may be a no-no because it dissolves ABS plastic (used for knobs and such)
-Too much grease is a no-no and gears on many spreaders should not be greased at all because it increases the risk of dirt build-up and thus abrasion damage to gears.
-Keep cover on gear set to reduce dirt.
-Nylon-molybdenum disulfide gears are self lubricating.
-Store spreaders with the mechanism in the open or on position, relieving the load on the operating spring and preventing moisture from being trapped.
-Store with rate setting moved to largest setting.