Shape and Size Make Little Difference in Performance

Corn growers and researchers have been evaluating the effect of corn seed size on yield potential since the 1930s. Conclusions from these on-farm trials and research studies have been consistent; corn seed size or shape is not related to genetic yield potential under normal conditions. Regardless of the seed size or shape, when plant stands were similar, yields were usually the same.

Seed size is affected by genetics and growing conditions, especially during the pollination and grain fill period, and may result in a variety of sizes and shapes from the same product. Typically, large rounds come from the base of the ear, flats from the center, and small flats and small rounds from the tip (Figure 1). Plateless seed usually comes from the base or the tip.

Germination and Emergence

There can be differences in germination related to seed size when conditions are not ideal. Large seed may not germinate as well in dry soil conditions because large seed requires more moisture to germinate compared to small seed. Small seed may not germinate as well in cool or crusted soils because the energy needed for emergence may be greater than the amount stored in the seed. After tasseling, differences in germination related to seed size are usually no longer apparent. Regardless of seed size and shape, similar silking dates and yield potential are expected when established stands are the same.

Planter Adjustments for Seed Size and Shape

*Planter settings should be set for accurate seed positioning, placement, and seeding rate.* When a planter has been adjusted for the appropriate seed size, it can more accurately singulate and deliver the seed. An excessive number of doubles or skips can occur if the planter has not been adjusted properly. This can result in reductions in grain yield potential of 3 to 10 bushels per acre.

*Adjustments for Vacuum Planters.* Adjustments can be made to the vacuum pressure, disk and/or cell size, and seed singulation devices that can affect plantability. Planters equipped with cell or flat disks have different requirements for adjustment. Regardless of disk type, it is important to examine the way the disk is adjusted relative to the meter housing. Having the disk rub the housing with light contact can help improve singulation, reduce seed damage, and help load the planter drives, improving their consistency.

Use talc, graphite, or a blend of the two to help improve seed flow and drop, especially with high rates of seed treatments and/or humid conditions. It may be necessary to use higher amounts of talc or graphite with small seed because the total surface area is greater with small seed. Talc or graphite should be mixed well throughout the hopper or tank to provide adequate coverage.
Plantability and Germination of Corn Seed

Adjustments for Vacuum Planters with Cell Disks. With cell disks, seed is partially held in place by the cell and partially by the vacuum pressure. Different cell sizes and vacuum pressures should be matched to fit a given seed size and shape. Doubles are more likely to occur with disks that have cells on the larger end of the acceptable range for a given seed size, even if the vacuum pressure is adjusted to the lower end of the acceptable range. Skips can occur when low vacuum pressures are used because seed can be more easily shaken off of the disk when planting over rough ground. To help reduce doubles and skips, use disks with cells on the smaller end of the acceptable range while running vacuum pressures on the higher end of the acceptable range.

Adjustments for Vacuum Planters with Flat Disks. Flat disks are less sensitive to different seed sizes and shapes and can provide more consistent plantability while reducing the need to adjust vacuum pressure. Examples are the Precision Planting® eSet® and vSet® systems and the John Deere® ProMAX 40 Flat Disk. Use of flat disks usually requires an additional component or two for singulation. For ease of use, the eSet and vSet systems use a floating singulator that requires no adjustments while the ProMAX 40 Flat Disk uses a double eliminator and a knock-out wheel. Flat seed disks may need a slightly different environment than cell disks and users may benefit by visiting their equipment dealer for inspection and testing of their seed meters.

Adjustments for Finger Pick-up Planters. Finger pick-up planters should be properly maintained to help minimize planting errors. The following items can be evaluated and adjusted to operator manual specifications:

- Proper tension on the fingers
- Condition of meter brushes and carrier plate
- Pliability of seed delivery belt
- Seed baffle cleanliness
- Proper lubrication (graphite) rate
- Good alignment with meter drive and the lugs on the unit drive sprocket
- Well-maintained and lubricated drive chains

Plantability Studies

Plantability tests have been conducted to provide planter setting recommendations for seed lots. Results are represented in terms of percent singulation (the percentage of single seeds released by the seed meter at the proper time). A multiple is when the seed sensor detects two seeds where only one should be; a skip is when the sensor detects nothing where a seed should be. Percent singulation is determined by taking 100% properly timed single seed drops and subtracting the percentage of multiples and skips. Figures 2 and 3 depict singulation data for vacuum or finger pick-up planters with various seed sizes and shapes. The finger pick-up units were calibrated for larger seed, and data for smaller seed sizes and shapes are not presented. Simulated planter speed was 5.5 miles per hour. Data was collected using seed harvested in 2004 through 2010 for planting seasons in 2005 through 2011, respectively.

Sources:

Individual results may vary, and performance may vary from location to location and from year to year. This result may not be an indicator of results you may obtain as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible.

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