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ROW WIDTH IN SOYBEAN PRODUCTION

Row width is one of the management practices most often considered by growers as potentially important to increased soybean yields and profits. For that reason, numerous research studies have been conducted over the last 40 years to determine optimal soybean row spacing. Soybean yield potential is usually greater with row spacing's narrower than 30 inches. Despite these relatively consistent results, narrow-row soybean adoption has varied widely.

Extensive research studies conducted over many locations and years have compared drilled narrow rows vs. 30 inch rows in soybeans have generally shown a significant yield advantage for drilled narrow rows. A compilation of these studies by Purdue University showed an average 6.2 bu/acre yield advantage for drilled soybeans. Drilled soybeans have fallen out of favor in many areas, likely due to inferior seed placement and singulation capabilities of drills vs. planters and the cost of planting additional seed. Soybeans planted in 15 inch rows have gained in popularity as a way to capture some of the yield benefit of drilled narrow rows while using a planter instead of a drill.

RECENT ROW SPACING RESEARCH

A review of soybean row spacing studies published within the past 10 yrs. generally confirms previous results comparing 30 inch rows and drilled narrow rows. In 5 studies drilled soybeans out yielded 30 inch row soybeans by an average of 4.1 bu/acre. Six studies that compared 30 inch rows and 15 inch rows found similar results, with 15 inch rows holding 3.6 bu/acre yield advantage. Yields were similar between 15 inch row and drilled narrow-row soybeans in these studies.

CONDITIONS FAVORING NARROW ROWS

Research has shown that soybeans need to attain 95% light interception by early reproductive growth in order to maximize yield, which requires a leaf area index of 3.5 x 4.0. Narrower rows spacing's are likely to provide a greater yield benefit in systems where soybeans have a limited time frame for vegetative growth prior to flowering. Such scenarios include northern soybean-production regions where the growing season is shorter, early soybean production systems where short maturity varieties are planted early to avoid drought, delayed planting situations and double-crop systems.

CONDITIONS THAT MAY NOT FAVOR NARROW ROWS

Research has also shown that narrow rows may have reduced or no yield advantage under some conditions. Several experiments over the years have shown that moisture stress can reduce the yield benefit of narrow rows. Brown stem rot, white mold, nitrogen stress and soybean cyst nematode may also tend to negate the benefit of narrow rows.

CURRENT ROW SPACING TRENDS

In recent years soybean acreage in North American has been somewhat evenly divided between less than 12 inch drilled , 15 inch

Continued on page 2

2020 PIONEER SAVINGS PROGRAM

There is still time to lock in on your Pioneer seed purchase for 2020.

Silver Level

QUALIFIERS
 Invoice & Payment by Feb 28th 2020

BENEFITS
 50% Replant
 Pioneer Agronomy App
 Financing: Prime -1 @ 15% discount
 Corteva Cash & Corteva Prepay Incentive

AG RISK MANAGEMENT

Crop Insurance today offers...Lots of choices, if you want a crop insurance agent that can help you make choices from a farmers perspective contact Steve McGinn 316-284-1935

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KANSAS CORN & K-STATE EXTENSION CORN SCHOOLS

Register through www.kscorn.com or email smartinez@ksgrains.com or call 785-410-5009
 Feb 5th - Salina—Hilton Garden Inn

NO-TILL ON THE PLAINS

Jan 28th -Wichita <http://www.notill.org/events/24th-annual-winter-conference-0>

KANSAS CORN SYMPOSIUM

Jan 23rd -Manhattan [Register at kansascommodityclassic.com](http://www.kansascommodityclassic.com)

KANSAS COMMODITY CLASSIC

Jan 24th -Manhattan [Register at kansascommodityclassic.com](http://www.kansascommodityclassic.com)

CROP QUEST GROWER FOCUS MEETING

Feb 7th - Dodge City To Register call 620-225-2233 or www.GrowerFocus.com

WOMEN MANAGING THE FARM

Feb 13th-14th—Hilton Garden Inn —Manhattan
 Register at [womenmanagingthefarm.com](http://www.womenmanagingthefarm.com), or by calling 785-532-2560.

K-STATE SOYBEAN SCHOOLS *Register for the K-State schools by contacting your local

KSU Research and Extension office

K-STATE SORGHUM SCHOOLS

Great Bend Jan 30th 830-1 PM
 Jan 30th—Hutchinson 23-7 PM

**GAIN KEY INSIGHTS FOR THE 2020 SEASON AND BEYOND!
 JOIN US AT THE 2020 PIONEER AGRONOMY CROP SHOP**

Wednesday, February 12th, 2020 Pottorf Hall at Cico Park 1710 Avery Ave, Manhattan, Kansas 66503 39.199233, -96.622081
 SCHEDULE 9:00 a.m. Registration 9:25 a.m. - 12:00 p.m. Lunch served at Noon

Please RSVP by February 5th by calling Korey, Tye, or Mike

TOPICS Include

2019 Kansas Climate Summary — What's Next? - Jeff Hutton, National Weather Service

Nitrogen - Management, Modeling and In-season adjustments - Matt Clover,

Pioneer Corn Physiology—Explaining the weird things we see in the field - Dr. Ignacio Ciampitti, Kansas State University

Crop Protection Contingency Plans - Jeff Ellis, Corteva Agriscience

Agronomy Quick Hits - Your Local Pioneer Field Agronomists

ROW WIDTH IN SOYBEAN PRODUCTION CONTINUED

and 30 inch row spacing's. However row spacing practices vary widely across different areas. One consistent trend across North America over the last several years has been the move away from drilled soybeans. Drilled soybeans have declined from 29% of soybeans acres to 21% in 2011.

Planters generally provide better seed placement and seedling emergence than drills. Which has helped reduce seeding rates and associated costs, although improvements in seed placement with newer drills make this less of an issue than it has been in the past.

In many cases, this decline in drilled soybeans has been accompanied by an increase in acres planted to 15 inch rows, which is now the most common row spacing for soybeans. However, acreage planted to 30 inch rows has also increased over the last few years reversing the long-term trend away from wide rows. This recent shift toward wider row spacing runs counter to the higher yields consistently demonstrated in narrower rows, which indicates that other factors beyond yield are driving grower decisions in this area.

FACTORS DRIVING ROW SPACING TRENDS EQUIPMENT AND TIME MANAGEMENT

Other than yield, the most important factor driving soybean row spacing practices is equipment and time management during the planting season. One of the key issues growers must consider is whether the economics of their farm justify having a machine dedicated specifically to planting soybeans. Larger farms are more able to justify the expense of a dedicated soybean planter and provide an operator for it. They are more likely to be planting soybeans in 15 inch rows. For smaller farms, it may be more practical to share a soybean planter with another crop, such as a drill for wheat or 30 inch planter with corn. This often results in more 30 inch or drilled soybeans for smaller farms.

To plant more acres during the available window, some growers have opted to use their 30 inch planter for soybeans. Because 30 inch planters are typically wider than 15 inch planters, they can cover the ground more quickly. It is difficult to weigh the potential yield benefit of narrow row soybeans against equipment costs, time constraints, and operator availability. Equipment and workload considerations are unique for every farm operation and ultimately come down to the needs of each individual grower.

OTHER ROW SPACING CONSIDERATIONS FOLIAR FUNGICIDE AND INSECTICIDE APPLICATIONS

The need for fungicide and /or insecticide applications may also impact row spacing decisions. When an application is made during vegetative growth, plants are generally able to compensate for damage caused by the sprayer wheels with little reduction in yield. For applications made following the R1 growth stage, which would include most foliar fungicide and insecticide applications, wheel damaged areas will have lower yield. A research study found significant yield reductions due to sprayer wheel damage in R4 soybeans planted in 7.5 inch and 15 inch row spacing, whereas soybeans planted in 30 inch and wider row spacing's did not sustain any sprayer wheel damage. Actual yield loss due to wheel traffic will vary according to boom width.

Although 30 inch rows would generally be expected to allow sprayer wheels to pass through without damage, wheel traffic damage may not always be negligible. Wheel damage will likely always be greater in drilled narrow-row and 15 inch soybeans partly offsetting the increased yield potential associated with narrow rows. For example the average yield benefit of 15 inch rows relative to 30 inch rows is reduced by more than one-third when accounting for the wheel traffic damage of a ground application during reproductive growth assuming at 90 foot boom width.

Because fungicides are only locally systemic and are not translocated from upper to lower portions of the canopy, spray coverage is critical for maximum efficacy for that reason, it is important to consider the effect of row spacing on spray coverage. Research has found that spray penetration into the lower canopy was similar among soybeans planted in 7.5, 15 and 30 inch row spacing's and that a minimum carrier volume of 15 GPA was more important to maximizing spray coverage than was row spacing.

WEED CONTROL

The growing prevalence of weed populations resistant to glyphosate has made weed management more challenging in some area, consequently it is becoming increasingly necessary to consider the impact of cropping system factors such as row spacing on weed growth. In general weed growth will be reduced in soybeans planted in narrower row spacing's and earlier shading by the soybean canopy will help suppress the emergence of new weeds. The extent of this effect will vary by weed species and weed emergence timing relative to the crop.

PLANTING AND HARVEST EFFICIENCY

Crop residue can be an important considerations when planting soybeans, particularly in the northern corn belt where residue management is more of a challenge. Some growers in high residue systems prefer wider rows because there is more room to deposit residue between the rows, which helps prevent residue interference with planting and emergence.

Narrow-row soybeans offer some harvestability advances over soybeans in 30 inch rows. The lowest pods will tend to be higher in narrow-row soybeans, potentially reducing harvest losses. The more even distribution of plants in narrow rows also allows plants to feed into the combine head more smoothly, although some growers have found that harvesting 30 inch row soybeans at an angle can help improve harvestability.

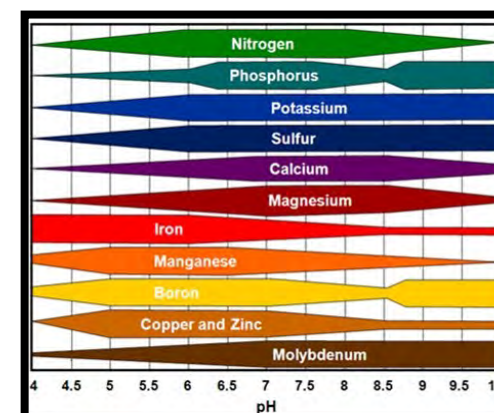
CONCLUSION

Recent studies have shown a 3-4 bu/acre yield advantage for soybeans planted in drilled narrow rows or 15 inch rows compared to 30 inch rows. Row spacing preferences vary greatly across North America and 30 inch rows soybeans are common and even gaining in many areas. Many different considerations beyond simply yield potential can affect the best practices for each individual grower. Factors such as equipment cost, workload management, and disease management all play an important role. When those issues are accounted for, narrow-row planting is not necessarily the best economic choice for all operations. Because of this complexity, no one-size fits all answer should be applied. Each grower should carefully consider the costs, risks and benefits of soybean row spacing options in their farming operation.

SOIL FERTILITY—REMEMBER THE BASICS

Soil fertility is always a hot topic this time of year. P and K fertilizer is fairly cheap right now. Some financially sound operations are talking about putting on extra P and K with the current lower prices. Others trying to really “pinch their pennies” on rented ground, or even their own, are talking about cutting way back to cut costs. However, soil sampling is a good option in this situation.

The Power of Lime. Paying for lime is some of the best money a grower can spend on his farm. Maintaining pH in the proper range will maximize the efficiency of other crop inputs and decrease the risk of yield losses. For example liming a soil from a salt pH of 4.5 to 6.0 can increase soybean yields by 15%.



If you look at the picture to the left you will see that a pH too low will render some essential nutrients less available to plants. Also when applying “blanket” applications of lime you can push pH beyond the optimal level where other nutrients may not be as available. Increasing your soil pH to 7 or above would also limit some of your herbicide options.

Keeping pH in the desired range also supports beneficial microorganism activity in the soil, such as *Bradyrhizobium japonicum*, which is responsible for fixing nitrogen in soybean root nodules. One caution with adding lime to no-till situations is ensuring that your liming application doesn't create too high a pH at the soil surface. This can be avoided by only applying lime when soil tests dictate a need and restricting single applications of ag lime to no more than 1,500 pounds ENM per acre regardless of soil requirement. Additional lime could be applied a year later if soil pH still dictates the need.

If you look at it from this perspective. The amount of money you are wasting on fertilizer by having an acid pH:

| Soil Acidity | Percent Utilized | | | Fertilizer Wasted |
|------------------------|------------------|-----------|--------|-------------------|
| | Nitrogen | Phosphate | Potash | |
| Extremely Acid 4.5pH | 30% | 23% | 33% | 75% |
| Very Strong Acid 5.0pH | 53% | 34% | 52% | 54% |
| Strong Acid 5.5pH | 77% | 48% | 77% | 33% |
| Medium Acid 6.0pH | 89% | 52% | 100% | 20% |
| Neutral 7.0pH | 100% | 100% | 100% | 0% |

You are wasting a significant amount of fertilizer by having your pH's running in the 5's. Even at a pH of 6.0 you are still wasting a signifi-

cant amount of phosphate. Remember, a neutral pH is 7.0, and this is why it is desirable. Optimum nutrient availability is at that level.

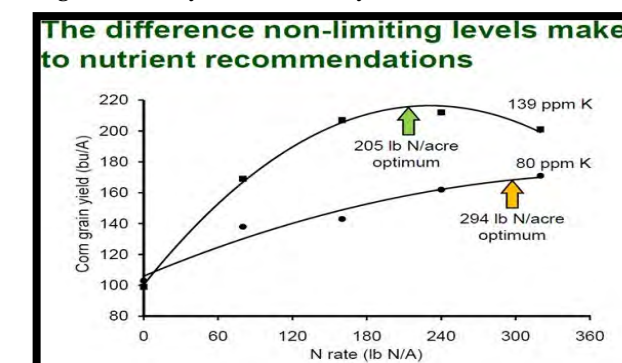
Balance the P and K Checkbook. Big crops = big P and K removal rates. The table below shows the various removals of P₂O₅ and K₂O per unit of yield for 3 of the major crops in Missouri. Using the table you can see that a 60 bu/acre soybean crop would remove about 48 lbs. P₂O₅ and 84 lbs. K₂O from the soil in the grain. Keeping your yields in mind and consulting the estimate you placed on your soil sample submission form will help ensure that you don't forget to make up the removal after an above average crop.

| Crop | Unit of yield | Nutrient removed per unit of yield | |
|-------------------|---------------|------------------------------------|------------------|
| | | P ₂ O ₅ | K ₂ O |
| | | ----- lb unit ----- | |
| Corn - Feed grain | bushel | 0.37 | 0.27 |
| Silage | ton | 3.30 | 8.00 |
| Soybeans | bushel | 0.80 | 1.40 |
| Wheat - Grain | bushel | 0.63 | 0.37 |
| Straw | bushel | 0.09 | 0.91 |

Drawdown can Equal Tough Buildup. If you skip a few years on P fertility and just assume you will build it back up later, be sure you realize the consequences. Just like with pH, the lower it gets the more it takes to build it back up. If you maintain P near an optimum level it takes less phosphate fertilizer to increase it one lb. P on the soil test.

The lower you let it get, the more phosphate fertilizer it takes to move it one lb. of P. For instance, if soil test P is 20 lb./A it takes 11.6 lbs. of phosphate to increase the soil test P one lb. However, if your soil test P was 45, it would only take 6.6 lbs. of phosphate to increase the soil test P one lb. The more you draw it down, the worse it gets.

Potassium Impacts a Lot. Potassium levels can influence standability, drought tolerance, disease tolerance, etc. It also impacts nitrogen efficiency. The graph below shows that higher yields with less nitrogen applied are possible when soil test potassium is at optimum levels. You may be impacting more than you think when you drawdown soil test potassium.



2020 CORTEVA CA\$H PROGRAM

CORTEVA CASH Growers who purchase and pay for Pioneer® brand seed by February 28, 2020 will earn Corteva Cash equal to 2% of their seed invoice adjusted gross value that can be used to purchase Corteva Crop Protection products.

Corteva Prepay Incentive Growers who fund a Corteva Crop Protection prepay account by March 13, 2020 through a Pioneer sales professional or participating retailer are eligible for the Pioneer® brand seed discounts shown in the table on the right.

| Crop Protection Prepay | Pioneer Seed Discount |
|------------------------|-----------------------|
| > \$50,000 | 3% Discount |
| > \$25,000 | 2% Discount |
| > \$7500 | 1% Discount |

HAVE SOMETHING TO SELL?

IF YOU WANT TO ADVERTISE FARM EQUIPMENT OR FARM RELATED ITEMS YOU MAY DO SO FREE OF CHARGE. DEADLINE IS THE LAST DAY OF EACH MONTH. SEND YOUR AD TO

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MISC. ALUMINUM IRRIGATION Fittings \$25 each.

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