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Pioneer Premium Seed & Treatments, Crop Insurance, Agronomy Services, Field Days, Seed Wheat, Seed Delivery, & Personal Service

Inside this issue:

Corn Yield Gains Due to Genetic & Management Improvements

Ever-increasing crop yields has been one of the great success stories of modern history, helping to feed a growing global population, compensating for shrinking farm acres, and providing a source of not only food and feed, but also fuel and fiber. No crop has made more impressive gains than corn, which has more than doubled in yield in the last half century. These gains have been due to improvements in both corn genetics and crop management practices.

Whether farmers and scientists can continue to make yield gains at the same rate as in the past has been a point of recent debate. Some speculate that gains will necessarily level off as corn yields approach the "theoretical maximum" yield estimated by computer growth models. Others point to modern breeding techniques including use of transgenic traits, genetic markers, doubled haploids, improved information technology, and other advances that may actually increase the rate of genetic gain. Crop management gains are also a certainty as new technologies evolve.

Hybrid Corn Adoption in the United States

U.S. farmers began to evaluate the performance of hybrid corn vs. "open-pollinated" varieties during the early 1930s.

Adoption rates of hybrids reached 50% of corn area in Iowa during 1938 and 100% by 1942.

Adoption rates in the U.S. reached 50% during 1943 but only approached 100% by 1960

Addressing the "rate of yield gain" question is important, because the future potential of crop yields has profound impacts for farmers, landowners, consumers, input suppliers, policymakers and others. For this reason, DuPont Pioneer researchers conducted studies to help determine the genetic component of corn yield increases over time.

These studies were designed to measure genetic progress throughout the entire period of hybrid corn culture in the U.S. This article discusses the yield gains documented in those studies, as well as those resulting from improvements in crop management practices

In Summary "Era" studies compare corn hybrids from the past to current hybrids, allowing researchers to evaluate genetic progress.

In recent Pioneer studies, genetic gains averaged about 1.5 bu/acre per year since 1963 (the "single-cross" era) in both the target production environment and well- watered conditions, and 1.0 bu/acre per year under drought.

In addition to genetic gains, better crop management practices have also contributed to corn yield improvements.

Genetic gains accounted for about 70 to 75% of total yield gains. However, genetic and management gains cannot be totally separated, due to interactions between the two.

Today's hybrids have improved stress tolerance, a higher grain to stover ratio, less silk delay and barrenness, better stalks and roots, smaller tassels, more upright leaves, better staygreen, and deeper roots than older hybrids.

Corn yield gains show no signs of abating. Growers can expect future gains to continue if research is supported.

Intensively Manage Soybeans for Maximum Yields

Growing top-end yield soybeans involves intensive management throughout the growing season, from start to finish. You have already "set the stage" for top-end soybean yields on your farm by planting Pioneer soybean varieties and protecting them with Pioneer Premium Seed Treatment at optimum seeding rates. In addition, you have to implement an aggressive fertility program to meet your crop's potential needs, and follow through with an intensive weed management program. Now is the time to be thinking about the next steps of your high yield management plant o achieve your yield goal, whether it is adding 10 bu/ac to existing yield levels, or achieving 100+ bu/ac. Several key ideas to consider this summer are as follows.

Insect Control—Insect pressure in soybeans should be monitored regularly throughout the growing season to monitor potential threshold levels. Often times, one individual insect species may not be at threshold levels, but the combined numbers of multiple insect

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species may reach levels that warrant an insecticide treatment application.

Disease Control– Disease control begins with scouting to understand disease risks and their potential severity in each field. Variety selection, crop rotation, seed treatments, and foliar fungicides are the best tools available to counter most disease threats.

In-Season Nitrogen (N)- An 80 bu/ac soybean crop requires 416 lbs./ac of N uptake by the plant to achieve such yield levels. Although healthy soybean root nodules can provide adequate amounts of N for lower yield levels, high soybean yield goal environments (≥ 65 bu/ac) have shown a response to 30-50 lbs. N/ac applied at the early bloom (R1) to beginning pod (R3) growth stages. Caution must be taken to prevent leaf burn and canopy damage from application. Fertigation is a simple and safe method of in-season N application, however topdressing Urea with a urease inhibitor has shown to work well also.

In-season Potassium (K) and Sulfur (S) - As soybean plants prepare for pod formation and ultimate seed fill growth stages, the daily nutrient uptake of a soybean plant increases significantly. Research has shown soybean plants can uptake 5.8 lbs. to 9.6 lbs. K20/ac/day in the R2 and R3 stages. In-season application of 15-30 lbs. K20ac and 10-20 lbs. S/ac at the R2-R3 growth stages have shown positive yield response , even in fields with sufficient soil fertility levels for the respective nutrients. Fertilizer sources include, but are not limited to: P, thiosulfate, ammonium sulfate, and other fertilizer blends. Caution must be taken to evaluate fertilizer forms, rates and application methods to minimize crop injury from in-season fertilizer applications.

Irrigation Management– the effect of drought stress on soybeans is most critical during the beginning bloom to mid-seed fill period (growth stages R1-R5.5). Many soybean fields across the area are at R1 (beginning bloom), and will soon be at the R2-R3 (full bloom to beginning pod) growth stages. Total crop water use from evapotranspiration (ET) at these growth stages typically ranges from .25-.32" water per day or 1.8"-2.3" per week, however daily ET rates can be as high as .5" per day. As witnessed in recent years, it is critical to not delay irrigation to the point of depleting the 2nd foot of soil moisture before initialing irrigation. Doing so can make it very difficult to maintain crop water needs without large well capacity and /or the help of timely rainfall.

Soil Temperature and Corn Emergence

Successful corn emergence is a combination of three key factors– environment, genetics, and seed quality:

- Environment: Temperature, residue, compaction and water
- Genetics: Stress tolerance and vigor
- Seed Quality: Harvest moisture, drying and conditioning.

Hybrid genetics provide the basis for tolerance to cold stress. High seed quality helps ensure that the seed will perform up to its genetic ability. Environmental factors may dictate stand establishment.

Soil temperatures at planting are a key environmental component of stand establishment. It is generally recommended to plant corn when soil temperatures are at or above 50 degrees F. However, conditions after planting are also critical-low soil temperatures after planting are also critical—low soil temperatures after planting can greatly reduce stands at emergence .

Optimal Temperature for Early Corn Growth

Corn is a warm season crop and does best under warm conditions. In North America, early-season planting typically puts stress on the corn seedlings. In germination tests using temps ranging from 59-95 degrees growth rates of both roots and shoots were measures. All three hybrids were averaged to determine the optimal temperature for corn growth. Both exhibited the fastest growth rate at 86 degrees suggesting optimal germination and emergence occur at much higher soil temps than is common most corn producing areas.

Planting date remains a critical management factor to help minimize the risks associated with sub-optimal conditions for germination. Planting into cold, wet soils, inflicts stress on corn seed emergence, as does planting just ahead of a cold spell. In some years, corn maybe planted prior to a cold rain or snow. This imposes very high stress on corn emergence due to seeds imbibing chilled water or prolonged exposure to cold, saturated soils.

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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

susannah.mcginn@plantpioneer.com

Helicopter JD 8000 front mount fertilizer tank 400 gallons. $1,000 obo. 316-284-1935. NEW

Agri-Products JD 8000 saddle fertilizer tanks 500 gallon size. $1500 OBO. 316-284– 1935.

Strobel 3-box seed tender with inoculator & Kohler 9.5hp engine. Good condition, always parked inside. $10,000 obo. 620-345-6616

Berkeley 8x6 pump w/trailer. $1000. 316-772-0147.

1200 feet of gated 8" PVC pipe. 620-386-0569.

Western Land Roller Tailwater Pump. Single phase motor 5 HP. 316-650-2678.

Irrigation gear head 6-5 ratio. 620-386-0569

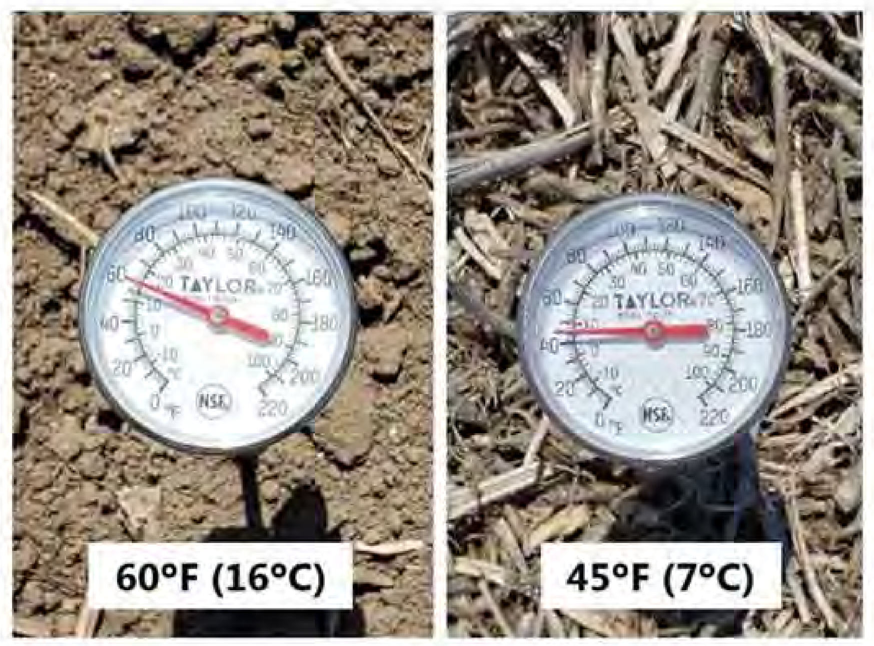
Precision Planting parts—Call Mike for pricing on parts. 316-772-7171.

Soil Temperature and Corn Emergence continued

Timing of Cold stress Impacts Germination

Data suggests that planting just before a stress event such as a cold rain or snow can cause significant stand loss. The chances of establishing a good stand are greatly improved if hybrids are allowed to germinate at least one day in warmer, moist conditions before a cold-stress event. Choosing a hybrid with a higher stress emergence score can help moderate stand losses due to cold stress.

One reason why temperature doing imbibition is critical to corn emergence is the fact that seed imbibes most of the water needed for germination very rapidly.



Data show that seed imbibes the most water within the first 30 minutes after exposure to saturated conditions. If this early imbibition occurs at cold temperatures, it could kill the seed or result in abnormal seedlings. You should consider the soil temperature at planting but also the expected temperatures when seed begins rapidly soaking up water. Seed planted in warmer, dry soils can still be injured if the dry period is followed by a cold, wet event.

Soil Temperature Fluctuations and Emergence

Often you are able to plant fields with sandier soils earlier in the spring because they dry out faster than heavier soils. However, reduced stands after early planting have often been noted in sandier soils. Sandy soils are more porous and have lower water-holding capacity than heavier soils and will experience wider temperature fluctuations.

Data has shown that day-night temperature fluctuations after planting can pose an added stress on germinating corn. You should be aware of expected nighttime temperatures when choosing a planting date.

High amounts of residue can alter soil temperatures. Residue tends to hold excess water and significantly lower soil temperature in the spring, depriving seed of critical heat units needed for rapid emergence. These conditions can also promote seedling disease, particularly in fields that are not well drained or have a history of seeing blights.

Impact of Cold stress on Stand Establishment

The optimal temperature for corn emergence is in the range of 80-90 degrees F. Emergence is greatly reduced at lower temperatures and is effectively halted around 50-55 F or below. Emerging seed may experience a degree of stress and potential damage from this as emerging temperatures are almost never optimal.

For success full emergence to occur, all parts of the shoot must working a coordinated way to push the coleoptile above the soil surface and allow the first leave to unfurl. Damage to any one of these structures will likely result in loss of the seedling and its yield potential.

When the dry seed bed imbibes cold water (50F or below) imbibitional chilling injury may result. The degree of damage ranges from seed death to abnormalities such as corkscrews or fused coleoptiles. The potential for cold-water damage generally decreases as the seedlings emerge. This may explain why early planted corn that was followed by favorable weather emerged better than corn planted later followed by a cold spell or snow cover.

Damage to the emerging root usually has less severe consequences on seedling survival. The primary root plays a relatively minor role in seedling establishment compared to the lateral and nodal roots. Seedling establishment an usually progress normally if the later and nodal roots are intact. Any damage to the roots will likely reduce vigor and increase the potential for disease and insect injury. Cold damage to emergence is generally irreversible. It can be difficult to diagnose since it usually occurs below the soil surface, long before the crop emerges. Above-ground symptoms of damage may take weeks to become apparent.

YouTube — **Cost-Effective Weed Control Tips for Winter Annual Weeds**

Type this into the search bar to find it or use your phone camera to scan this code.

Thinking Ahead On Double Crop Acres for 2023

Flexibility in double crop in 2023 might merit more consideration than in past years. Using a product like Quelex instead of Finesse on these acres will allow for all double crop options to be available to you for planting after wheat harvest.

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Seed Delivery 2023

We are beginning to deliver seed in the area and we will be reaching out to check with you about your seed to see if you are willing to take it soon.

If you are ready to take your seed please contact us so that we can arrange a delivery time and day that works best. Please remember that not everyone will be able to get their seed the day before planting , so if you can make room in your shed for it now that would be greatly appreciated!

Plots & Side By Sides

Several of you do plots and side by side comparisons each year. If you have not done this in the past and would like to try some products for potential future use, please let us know. We are happy to help you and provide the seed for trying new varieties.

Pioneer has always encouraged farmers to test new hybrids and varieties. It has been our policy to provide seed for these trials. Our only request is that we be allowed to harvest and weigh the hybrids being tested. Bushel weight and moisture can have a large effect on final yield.

Accurate measurements with a weigh wagon moisture testing equipment will provide reliable yield results. If you would like to test a particular hybrid or hybrids please let us know and we will be happy to provide the seed.