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TEXAS A&M AGRILIFE EXTENSION

Inside this issue:



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# *General Area Crop Progress*

Temperatures are returning to normal and the snow is melting. Two common questions are: Were my fall planted crops damaged? and will the cold reduce insects? The short answer is probably not. There was a gradual hardening off of temperatures, then during the coldest temperatures (-1 or –2 F°) there was an insulating blanket of snow, and lastly the plants should have still been in the vegetative stage where they are more cold tolerant. Insects were either in a resting stage as an egg or pupa, or sought shelter. There may be a slight delay or reduction in some of the more tropical insects such as sugarcane aphids, fall armyworms, and red banded stink bugs. Below is a picture of some oats plants that are less winter hardy that have freeze burned leaves but the crowns are still green. Annual ryegrass, barley, wheat, triticale, and cereal rye all should be fine. The more cold tolerant species are listed last.

Figure 1. Wheat partially insulated by snow, left; Oats with upper leaves damaged by cold temperatures, right:. Photos taken at the Greenville Farm in Feb. 2021

Scouting wheat fields before the cold snap there were a few armyworms, spots of stripe and leaf rust in the susceptible varieties and the ever present spotted cucumber beetles also known as the southern corn rootworm. Soft Red Winter Wheat varieties also differed in their winter growth habit. See Figure below.

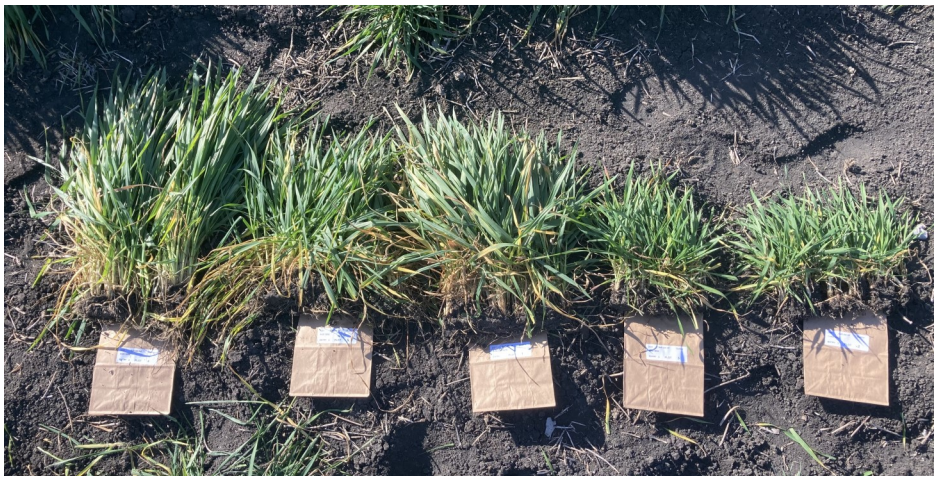

Figure 2. Early planted SRW wheat varieties on Feb. 8, 2021 going left to right AGS 3000, GoWheat 6000, AGS 3030, USG 3895, and Coker 9553.

Replicated Small Plot Fertilizer product by application method trial at Greenville TAMU University Research, Extension, and Teaching Farm

Summary
The Greenville TAMU trial compared several commercial fertilizer products and rates with in-furrow at planting, post emergence broadcast, and at silking foliar treatment applications with a broadcast nitrogen only treatment as a control. Two of the nine treatments were significantly different for yield compared to the nitrogen only. The highest yielding treatment, 115 bpa, was an in-furrow at planting treatment followed by a foliar at silking application, both with macro and micro nutrient formulations. The second best treatment was a macro and micronutrient formulation applied in furrow at planting that yielded 111.4 bpa. These two treatments were statistically different than the nitrogen only yield of 85.2 bpa, but were not statistically different from each other or any of the other phosphorus fertilizer treatments and applications methods tested, although numerically greater. Agronomic responses to fertilizer amendments varied by treatment and application method but positive statistically significant responses were also observed in test weight, kernel weight, ear weight, and V4-V5 seedling mass. Plots were tissue sampled for nutrient content at V4-V5 as seedlings and at silking by sampling ear leaves. No significant differences for tissue nutrient content were observed among treatments and most nutrients concentrations were within the sufficiency range with the exception of some low phosphorus, and high potassium and calcium results. Given a standard calculation of nutrient removal by the corn crop only the top two treatments came close to replacing nutrients used in grain production. These results demonstrate a yield response from various phosphorus fertilizer treatments and provide corn producers with information to help evaluate their corn fertility practices.

Treatments

Untreated Control (Nitrogen Only 300 lbs/ac 46-0-0 with Nutri-sphere)
Grower Standard 10-34-0 @ 5.0 gal/ac + NACHURS CornGrow @ 1 qt/ac in furrow at planting
10-34-0 @ 10 gal/ac + NACHURS CornGrow @ 1 qt/ac in furrow at planting
NACHURS Triple Option @ 5 gal/ac + NACHURS CropMax @ 1 qt/ac in furrow at planting
NACHURS Impulse @ 4.75 gal/ac + NACHURS CropMax @ 1 qt/ac in furrow at planting
NACHURS Impulse @ 4.75 gal/ac + NACHURS CropMax @ 1 qt/ac post emergence
NACHURS Impulse @ 4.75 gal/ac + NACHURS CropMax @ 1 qt/ac + Kfuse @ 2 gal/ac in furrow at planting
NACHURS Impulse @ 5 gal/ac + NACHURS CropMax @ 2 qts/ac + Kfuse @ 2 gal/ac in furrow at planting
NACHURS Impulse @ 1.75 gal/ac + NACHURS Finish Line @ 1 qt/ac Foliar at V-12
NACHURS Impulse @ 5 gal/ac + NACHURS CropMax @ 1 qt/ac in furrow at planting followed by NACHURS Impulse @ 1.75 gal/ac + NACHURS Finish Line @ 1 qt/ac Foliar at V-12

Nutrient content of products
NACHURS Triple Option 4-13-17
NACHURS Impulse 10-18-4
NACHURS Kfuse 6-0-12 12% Sulfur
NACHURS CornGrow Chelated 0.4Cu 0.6Mn 3.5Zn
NACHURS CropMax 2-0-2 0.1B Chelated 0.15Cu 0.3Fe 1.5Mn 0.0005Mo 4 Zn
NACHURS Finishline 8-4-6 0.1B with Chelated 0.2 Cu,1 Zn,1 Mn,

Design

Randomized Complete Block with 4 replications
Plots were 4 rows X 32 ft
Hybrid DKC 65-99 seeded on April 16, 2020 @ 29,500 seeds per acre.

In-furrow at planting treatment using a seed firmer with a “Y-split” liquid applicator suppling 10 gallons per acre total volume.
Post-emergence foliar application 10 gallons total volume nozzle centered over the row. April 27, 2020,
Broadcast N application 300 lbs 46-0-0 treated with Nutri-sphere May 1, 2020,
Seedling harvest May 8, 2020,
Late foliar Application June 17, 2020 (#8) and July 2, 2020 (#9).
Ear leaf tissue sampling June 20, 2020,
Grain and stover Harvest August 24, 2020

Results

Yield and other agronomic differences were observed between phosphorus and other nutrient products, amounts, and application timing and methods. All products showed an increase in yield over nitrogen alone treatments. Agronomic measurements and yield components are presented in Tables 2 and 3.

Table 1. Seedling weight and tissue nutrient content, ear leaf nutrient content, followed by test weight and grain yield for the Greenville TX Corn fertility trial 2020

| Treatment | V4-V5 dry matter weight (g) | V4-V5 % N Tissue | V4-V5 P ppm Tissue | V4-V5 K ppm Tissue | Ear Leaf % N Tissue | Ear Leaf P ppm Tissue | Ear Leaf K ppm Tissue | Twt Lbs/ Bushel | Grain Yield Adj 15.5% moisture |
|---|---|---|---|---|---|---|---|---|---|
| NACHURS Impulse 10-18-4 @ 4.75 gal/ac + NACHURS CropMax @ 1 qt/ac in furrow fb NACHURS Impulse 10-18-4 @ 1.75 gal/ac + NACHURS Finish Line @ 1 qt/ac foliar at silking | 6.30 ab | 3.5 | 4566 | 43985 | 1.8 | 1572 | 23994 | 59.0 a | 115.0 a |
| 10-34-0 @ 10 gal/ac + NACHURS CornGrow @ 1 qt/ac in furrow | 5.36 b | 3.5 | 4748 | 39372 | 2.0 | 1461 | 22427 | 58.7 a | 111.4 ab |
| NACHURS Triple Option 4-13-17 @ 5.0 gal/ac + NACHURS CropMax @ 1 qt/ac in furrow | 6.00 ab | 3.5 | 4885 | 42826 | 2.0 | 1640 | 24315 | 58.5 a | 105.2 abc |
| NACHURS Impulse 10-18-4 @ 4.75 gal/ac + NACHURS CropMax @ 1 qt/ac in furrow | 6.09 ab | 3.2 | 4716 | 41321 | 1.8 | 1582 | 23918 | 57.9 ab | 103.5 abc |
| NACHURS Impulse 10-18-4 @ 4.75 gal/ac + NACHURS CropMax @ 1 qt/ac + NACHURS K-fuse @ 2.0 gal/ac in furrow | 5.31 b | 3.5 | 5078 | 44211 | 1.7 | 1497 | 24213 | 58.0 ab | 101.1 abc |
| NACHURS Impulse 10-18-4 @ 4.75 gal/ac + NACHURS CropMax @ 1 qt/ac broadcast post emergence at 10 gal total volume | 5.15 b | 3.6 | 5366 | 43064 | 1.8 | 1469 | 25311 | 58.2 ab | 100.3 abc |
| NACHURS Impulse 10-18-4 @ 4.75 gal/ac + NACHURS CropMax @ 2 qt/ac + NACHURS K-fuse @ 2.0 gal/ac in furrow | 7.58 a | 3.8 | 4247 | 41146 | 1.7 | 1611 | 23128 | 57.6 ab | 99.8 abc |
| Grower Standard 10-34-0 @ 5.0 gal/ac + NACHURS CornGrow @ 1 qt/ac in furrow | 7.47 a | 3.2 | 4832 | 42017 | 1.8 | 1385 | 24371 | 57.7 ab | 95.8 abc |
| Nothing in furrow NACHURS Impulse 10-18-4 @ 1.75 gal/ac + NACHURS Finish Line @ 1 qt/ac foliar at silking | – | - | - | - | 1.7 | 2089 | 24198 | 57.7 ab | 89.9 bc |
| Untreated (138 units N only) | 4.49 b | 3.7 | 4818 | 41666 | 1.65 | 1389 | 25497 | 56.7 b | 85.2 c |
| Mean | 5.97 | 3.5 | 4807 | 42127 | 1.8 | 1556 | 24232 | 57.9 | 99.4 |
| Statistical Probability (F) | 0.0059 | No statistically significant differences observed | | | | | | 0.0025 | 0.0007 |

Table 2 Plant population, seedling weight, ear weight, kernel number, kernel weight, stover mass, grain to stover ratio, test weight, and grain yield of a Corn fertility trial at TAMU Farm in Greenville, TX 2020.

| Treatment | Plant Population | V4-V5 Seedling weight | Average Ear Weight (g) | Kernel Number Per Ear | Kernel Weight 1000k (g) | Stover Pounds Per Acre | Grain To Stover Ratio | Twt Lbs/ Bushel | Grain Yield Adj 15.5% moisture |
|---|---|---|---|---|---|---|---|---|---|
| NACHURS Impulse 10-18-4 @ 4.75 gal/ac + NACHURS CropMax @ 1 qt/ac in furrow fb NACHURS Impulse 10-18-4 @ 1.75 gal/ac + NACHURS Finish Line @ 1 qt/ac foliar at silking | 29,039 | 6.30 ab | 114.2 a | 428 | 240 a | 6320 | 0.493 | 59.0 a | 115.0 a |
| 10-34-0 @ 10 gal/ac + NACHURS CornGrow @ 1 qt/ac in furrow | 28,448 | 5.36 ab | 111.2 a | 409 | 241 a | 6539 | 0.497 | 58.7 a | 111.4 ab |
| NACHURS Triple Option 4-13-17 @ 5.0 gal/ac + NACHURS CropMax @ 1 Qt/ac in furrow | 28,754 | 5.99 ab | 110.1 a | 427 | 228 ab | 5623 | 0.532 | 58.5 a | 105.2 abc |
| NACHURS Impulse 10-18-4 @ 4.75 gal/ac + NACHURS CropMax @ 1 qt/ac in furrow | 28,827 | 6.09 ab | 105.5 a | 422 | 223 ab | 5764 | 0.498 | 57.9 ab | 103.5 abc |
| NACHURS Impulse 10-18-4 @ 4.75 gal/ac + NACHURS CropMax @ 1 qt/ac + NACHURS K-fuse @ 2.0 gal/ac in furrow | 28,338 | 5.03 ab | 104.0 ab | 432 | 218 ab | 5361 | 0.479 | 58.0 ab | 101.1 abc |
| NACHURS Impulse 10-18-4 @ 4.75 gal/ac + NACHURS CropMax @ 1 qt/ac broadcast post emergence at 10 gal total volume | 28,805 | 5.15 ab | 96.8 ab | 393 | 221 ab | 5729 | 0.470 | 58.2 ab | 100.3 abc |
| NACHURS Impulse 10-18-4 @ 4.75 gal/ac + NACHURS CropMax @ 2 qt/ac + NACHURS K-fuse @ 2.0 gal/ac in furrow | 28,502 | 7.58 a | 99.7 ab | 401 | 222 ab | 5960 | 0.474 | 57.6 ab | 99.8 abc |
| Grower Standard 10-34-0 @ 5.0 gal/ac + NACHURS CornGrow @ 1 qt/ac in furrow | 29,023 | 7.47 a | 98.5 ab | 400 | 220 ab | 6081 | 0.471 | 57.7 ab | 95.8 abc |
| Nothing in furrow NACHURS Impulse 10-18-4 @ 1.75 gal/ac + NACHURS Finish Line @ 1 qt/ac foliar at silking | 28,618 | - | 102.0 ab | 428 | 210 ab | 6269 | 0.495 | 57.7 ab | 89.9 bc |
| Untreated (138 units N only) | 28,007 | 4.49 b | 83.5 b | 387 | 203 b | 5411 | 0.485 | 56.7 b | 85.2 c |
| Mean | 28,599 | 5.97 | 4807 | 42127 | 221 | 5853 | 0.490 | 57.9 | 99.4 |
| Statistical Probability (F) | 0.0663 | 0.0059 | 0.0178 | 0.3800 | 0.0223 | 0.6191 | 0.6285 | 0.0025 | 0.0007 |

Two treatments had statistically significant differences from the nitrogen only treatment for yield. The highest yielding, 115 bu/ac; was an infurrow treatment of 5 gallons of 10-18-4 plus micronutrients followed by a foliar treatment of 2 gallons of 10-18-4 plus micronutrients. This was 29.8 bu/ac higher than the control N only treatment. The next highest, 111.4 bu/ac; was a 10 gallon rate of 10-34-0 plus micronutrients in furrow. This was 18.3 bushels greater than no additional fertilizer. These were numerically greater than each other and the other fertilizer treatments but none of the fertilizer treatments could be separated by a statistical $\alpha$=0.05 confidence level. All infurrow at planting treatments increased yield by at least 10.6 bu/ac. The foliar treatments also increased yield but timing and type of treatment made small numerical differences. The early post emergence application of the same infurrow treatment increased yield by 15 bushels per acre over the untreated but was 3.2 bushels less than the infurrow timing. The at silking foliar treatment with a reduced nutrient content increased yield by 11.5 bu/ac when combined with an infurrow treatment but showed a small 4.7 bu/ac yield increase when that was the only treatment. Adding additional potassium and sulfur at planting or doubling the micronutrient to 2 quarts per acre showed small differences in yield. Repeating the study in additional years should help separate differences between the treatments. All of these treatments and products should be carefully evaluated by producers in terms of soil test recommendations, cost, and ease of application.

Yield and Yield Components

Fertility treatments increased the yield components of test weight, average ear weight, and average kernel weight. The kernel number and amount of plant biomass also increased but not at a statistically significant level.

Seedling Size and Seedling Nutrient Content

In-furrow at planting nutrient application increased V4-V5 seedling size compared to the untreated plots. There were no significant differences in seedling nutrient content for the macro and micronutrients measured. The seedling nutrient content was within the general sufficiency range of published recommendations. Seedling size and nutrient content did not correlated well with final grain yield. In two treatments, 10 gallons per acre (gpa) of 10-34-0 and 5 gpa Impulse 10-18-4 plus 2 gpa K-fuse 6-0-12-12, there was reduced seedling size, possibly attributed to nutrient salinity; but this did not have a negative effect on final grain yield. This high volume nutrient treatment would be of greater seedling damage risk in lighter textured soils

Plant Population

There were no statistically significant differences in plant population at a strict $\alpha = 0.05$ but the difference between the untreated control and the infurrow treatment with the highest yield was 1032 plants per acre with a probability of $P = 0.06$. All fertilized treatments had higher plant populations than the untreated control suggesting fertilizer application can positively affect population.

Ear Leaf Nutrient Concentrations.

There were no statistically significant ear leaf nutrient content differences between treatments. Average nutrient levels of N & P were borderline and low respectively. K and Ca were high and the rest of the micronutrients were in the sufficiency range. There was one numerical increase in ear leaf P attributed to a foliar treatment 3 days prior to sampling leaves in one of the treatments.

General Soil Fertility and Cropping Sustainability

Plot soil tests showed low phosphorus and zinc with nutrients decreasing with sampling depth. Samples were submitted to the Texas A&M Soil Testing Lab in College Station and processed using Mehlich 3. Table 4 shows the average soil test results and the critical level for recommending amendments if results are below that level.

Table 3. Soil test phosphorus and zinc of 2020 corn fertility plots

| Sample depth (inches) | Phosphorus | Zinc |
|---|---|---|
| 0”-6” | 19 ppm | 0.65 |
| 6”-18” | 9 ppm | 0.26 |
| 18”-30” | 1 ppm | 0.44 |
| Critical Level | 50 ppm | 0.81 ppm |

The above soil tests would generate amendment P2O5 recommendations of up to 75 lbs per acre and Zinc of up to 4 lbs per acre. These amounts were not applied in the trial. Another way to look at nutrient amount is to consider the amount removed by the crop. Using the Greenville trial average for yield of 99.4 bushels per acre this crop would remove N-P-K in the following amounts:

Nitrogen: 99.4 X 0.9 = 89 pounds/ac

Phosphorus 99.4 X 0.37 = 36.8 pounds/ac

Potassium 99.4 X 0.27 = 26.8 pounds/ac

Only the two highest yielding treatments come close to replacing the nutrients removed by the grain and neither one meets the phosphorus recommendations for a broadcast fertilizer recommendation. It should be noted that direct phosphorus placement in the root zone reduces recommendations compared to broadcasting prior to tillage. If these are the only nutrient inputs producers are using than soil nutrient levels would most likely be declining. Crop nutrient removal would be even greater with higher yield or if the complete plant was removed for example if the stubble was baled for hay.

## **Greenville Multi-Year Summary of Corn Fertility Trials with products applied in-furrow at planting.**

In-furrow and foliar fertility trials have been conducted at the Greenville farm since 2017. There are not many significant differences between products rates and application timings but there are significant differences between most fertilizer treatments and no treatment. Below is a table summarizing three treatments that were the same in 3 or 4 years from 2017-2020.

Table 4. Average corn yields (bu/ac) for three in-furrow at planting fertilizer treatments compared to no in-furrow at planting treatment at Greenville, TX 2017-2020.

| Year | Untreated | 10-34-0 @ 5 gal/acre + 1 Qt CornGrow | NACHURS imPulse (10-18-4) @ 5 gal/ac + 1Qt CornGrow or CropMax | 10-34-0 @ 10 gal/ac + 1Qt NACHURS CornGrow | Yield Increase between untreated and average of treated |
|---|---|---|---|---|---|
| 2017 | 127.4 | Not tested in 2017 | 169.0 | 166.2 | 36.9 |
| 2018 | 107.8 | 113.8 | 122.5 | 117.5 | 10.2 |
| 2019 | 118.4 | 132.1 | 143.6 | 129.7 | 16.7 |
| 2020 | 85.2 | 95.8 | 103.5 | 111.4 | 18.4 |
| 4 yr Ave. | 109.7 | - | 134.7 | 131.2 | 23.3 |

**Corn Seed Treatment Study at Greenville, TX 2020**

This study was planted to look at control of chinch bugs which are a problem in NE TX especially in late planted corn. BASF funded a study looking at experimental products but as standard checks there was a fungicide only untreated check and two insecticide treatments Poncho 250 and Poncho 500. It was also late planted in a field that had a history of chinch bugs to maximize the differences in the treatments but reduced the overall yield. Other insect observed were billbugs, click beetles, aphids, and beneficial insects. Some insignificant agronomic differences were observed.

The corn grain yield results showed an advantage to the insecticide seed treatment compared to the untreated but not statistically different between Poncho 250 and Poncho 500.

| Treatment | Grain Yield | Stand Uniformity | Final Plant Population per acre | Chinch bug nymphs per plt |
|---|---|---|---|---|
| Poncho 500 | 62.5 bu/ac | 63.8 % | 41,250 | 1.75 |
| Poncho 250 | 60.3 bu/ac | 56.3 % | 35,000 | 1.5 |
| Fungicide only | 47.3 bu/ac | 47.7 % | 36,500 | 4.5 |

**Greenville 2020 Corn Plant Population Studies.**

Two hybrids were tested by the Texas A&M AgriLife Extension Variety testing program at Greenville in 2020.

The images of ears are below with the maximum yield falling at 32,000 plants per acre.


TEXAS A&M AGRILIFE EXTENSION

TEXAS SPEAKS

# IDENTIFYING THE STRENGTHS AND NEEDS OF TEXAS COMMUNITIES

**AgriLife Extension is conducting a campaign to gather information from stakeholders. The goal is to receive responses from 10% of the population. Go to the following site below to give your input and share it with others**

**TexasSpeaks URL**

tx.ag/texasspeaks

**TexasSpeaks QR Code**

*Texas A&M AgriLife Extension*
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# Calendar

PPF Fish Fry March 11, 2021 6 pm RSVP by March 9th 903-395-7999

East Texas Forage Conference (Virtual) March 19, 2021 Contact Rains, Wood, or Van Zandt County Offices

Remember that most **Pesticide Applicator Licenses** renew in February. The usual reminders have not received by producers to date. Find more information at https://www.texasagriculture.gov/LicensesRegistrations/BRIDGEInstructions.aspx

Suffer losses in our February Storms? Check with disaster.gov and the local FSA office.

For information on COVID-19

The Texas A&M AgriLife Extension Service is leading an education effort helping local governments with the Coronavirus Aid, Relief, and Economic Security (CARES) Act.

https://agrilifeextension.tamu.edu/coronavirus/

Extension Disaster Education Network (EDEN)

EDEN information on the Coronavirus can be found at:

https://texashelp.tamu.edu/coronavirus-information-resources/

USDA Resources can be found at:

http://usda.gov/coronavirus