AgriLIFE EXTENSION
Texas A&M System
Improving Lives. Improving Texas.

TEXAS IPM
Partners with Nature

Stephen Biles
186 CR 101
Port Lavaca, TX 77979

PEST MANAGEMENT NEWS

Calhoun, Refugio & Victoria Counties

(o) 361-552-3324
(m) 361-920-1138
biles-sp@tamu.edu

VOLUME 9 ***ISSUE 11*** ***October 23, 2013***

Soil Fertility

The major limiting factors to crop production are (in order of importance):

1. Soil moisture
2. Soil fertility
3. Plant genetics

After these factors, other influences on crop production such as weeds, insects and disease, only cause reductions from potential yield. While we are unable to influence rainfall, management decisions impact the soil nutrient availability and the genetics of the seed we plant.

This is the time of year to sample soils for proper application rates of fertilizers. Field studies conducted by Dennis Coker and Mark McFarland, Texas A&M AgriLife Extension Service Agronomists, were conducted at 26 sites throughout the Upper Coastal Bend (including Victoria and Calhoun Counties) and Central Texas Blacklands from 2008-2012 to determine the plant availability and effects on cotton, corn and grain sorghum yield of residual soil nitrate to a 24-inch depth of soil. Some of this data is included on the following pages.

To summarize this data, Corn grain yields and bushel weights were not affected at 25 of the 26 sites when carryover nitrogen was credited to 24 inches, indicating efficient recovery of profile soil nitrogen. Grain sorghum is also very effective at recovering residual soil nitrogen measured by soil testing to a depth below the traditional sampling depth of 6 inches.

The Extension publication "Nitrogen Management in Cotton" is also included in this email.

Mid-Coast Soil Sampling Program

The IPM Program is beginning a soil testing program to assist farmers with their soil fertility decision making. We will sample fields to a depth of 24 inches and have nutrient analysis done at the Texas A&M AgriLife Extension Service Soil, Water and Forage Testing Laboratory.

The cost for participation in this program is as follows:

- $40 per field for fields 160 acres or less in size. ($0.25 per acre over 160 acres)
- $15 per sample for each additional management zone per field.
- Nutrient Analysis costs at $21 per sample (routine analysis plus Micronutrients and residual nitrogen).

Contact the AgriLife Extension IPM Office for additional information. 361-552-3324, 361-920-1138 or biles-sp@tamu.edu

Sampling will be done on a first come first served basis as rainfall allows.

Support for the 2013 IPM Program comes from the following:

Woodsboro Farmer's Cooperative
WelFab, Inc.
Hlavinka Equipment
South Texas Cotton and Grain Association
Helena Chemical
Numerous Producers

2012 Yield Response of Corn and Grain Sorghum to Residual Soil NO_3-N
Upper Gulf Coast and Central Texas Blacklands

Table 1. Pre-plant, residual NO_3-N with soil depth and retail value of the N supporting corn and grain sorghum production. Upper Gulf Coast and Central Texas Blacklands regions. 2012.

	Amount and Value of Residual NO_3-N with Soil Depth				
Study Site & Crop	0 to 6 inches	6 to 12 inches	12 to 24 inches	0 to 24 inches	Value
	------------------------lb/A----------------------				$/A†
Guadalupe Corn	14	43	26	83	62.25
Guadalupe G. Sorghum	12	58	36	106	79.50
Medina Corn	16	66	42	124	93.00
Victoria Corn	28	44	30	102	76.50
Victoria G. Sorghum	46	125	34	204	153.00
Williamson G. Sorghum	12	16	52	80	60.00

†Based on April, 2012 retail survey, $0.75/lb of N.

Table 2. Effect of crediting nitrogen fertilizer rate according to pre-plant, residual NO_3-N on grain yield of corn and grain sorghum. Upper Gulf Coast and Central Texas Blacklands regions. 2012.

	Grain Yield†				
Study Site & Crop	According to Crop Goal	NO_3-N to 6 inches	NO_3-N to 12 inches	NO_3-N to 24 inches	Control
	---------------------------lb or bu/A----------------------------				
Guadalupe Corn	120.5‡	119.6	125.8	124.4	123.9
Guadalupe G. Sorghum	5,874	6,259	5,942	5,900	5,900
Medina Corn	179.8	188	175.6	179.6	179.6
Victoria Corn	116.2	111	100.4	106.7	100.8
Victoria G. Sorghum	5,576	---§	---	5,559	5,101
Williamson G. Sorghum	5,717	5,472	5,322	5,130	5,399

†Corn yields corrected to 15.5% moisture, grain sorghum yields to 14% moisture.
‡Means within rows were not different according to ANOVA F Test ($P \leq 0.05$).
§ Amount of residual N at interval soil depth was in excess of crop need.

Table 3. Effect of crediting nitrogen fertilizer rate according to pre-plant, residual NO_3-N on test weight of corn. Upper Gulf Coast and Central Texas Blacklands regions. 2012.

	Grain Test Weight†				
Study Site & Crop	According to Crop Goal	NO_3-N to 6 inches	NO_3-N to 12 inches	NO_3-N to 24 inches	Control
	-----------------------------lb/bushel--------------------------				
Guadalupe Corn	57.7‡	57.2	57.5	57.4	57.1
Medina Corn	59.2	58.2	58.8	58.2	58.2
Victoria Corn	53.2	53.3	52.7	53.4	53.5

†Yields corrected to 15.5% moisture.
‡Means within a row were not different according to ANOVA F Test ($P \leq 0.05$).

Corn Yield Response to Residual Nitrogen and Phosphorus in Calhoun County
Texas AgriLife Extension Service
Calhoun County

Cooperator: Joe D. Brett

Authors: Dennis Coker, Extension Program Specialist - Soil Fertility
Stephen Biles, Calhoun, Refugio & Victoria IPM Agent

Summary
This test was located on the Joe D. Brett Farm, field adjacent to FM 1679, near its intersection with Sanders Road. Soil moisture conditions were adequate at planting but less than optimal during the vegetative and reproductive phases. There was not a statistical difference between the treatments in which the lowest rate of additional nitrogen (N) or no additional phosphorus (P) were applied as compared to treatments with additional units of fertilizer added.

Objective
To determine yield response of corn to residual nitrogen found in the soil profile and to evaluate yield response to different phosphorus rates.

Materials and Methods
Soil samples were taken down to a depth of 4 feet on February 24, 2011. Soil test recommendations were based on a 130 bushel per acre yield goal. According to soil test results, cumulative residual NO_3-N to a depth of 48 inches was 41 lb/acre. Amounts of residual NO_3-N present in increments of soil depth were: 0-6 inches (9 lb/A); 6-12 inches (12 lb/A); 12-24 inches (20 lb/A); 24-36 inches (16 lb/A); 36-48 inches (14 lb/A). Rates of N applied (treatments) were then based on credit toward the amount of residual NO_3-N in increments of soil depth. Fertilizer applications were made in a band application to a depth of 4-6 inches on April 6, 2011. Five randomized complete blocks were established with the following treatments:

1. No additional N; soil test P_2O_5 recommended is 20 lb/A
2. 91 lb N/A and 20 lb P_2O_5/A
3. 107 lb N/A and 20 lb P_2O_5/A
4. 119 lb N/A and 20 lb P_2O_5/A
5. 130 lb N/A and 20 lb P_2O_5/A
6. N based on yield goal: 140 lb/A and 20 lb P_2O_5/A
7. N based on yield goal: 140 lb/A and 40 lb P_2O_5/A
8. N based on yield goal: 140 lb/A and 0 lb P_2O_5/A

Corn was planted in 38-inch rows on February 27, 2011. Plant stand counts were taken at harvest with average plant population across all plots being 22,604 plants per acre.
According to Texas AgriLife Research’s online Crop Weather Program, rainfall during the growing season was 9.9 inches below normal totaling 1.5 inches and occurred as follows; March=0.6, April = 0 inches, May= 0.1 inches, June=0.8 inches.

Ten feet from each of two yield rows per plot were hand harvested on July 7, 2011.

Results and Discussion

In Table 1, there was a statistical difference between the control (0-20-0) and all other treatments that received application of N fertilizer. Treatment two (91-20-0) with residual nitrate-N credited to a 36-inch soil depth was statistically the same as treatment six (N application based on yield goal) and represented the cheapest and best option under these field conditions. However, treatment three (107-20-0) was the next cheapest option which reflects residual nitrate-N credited to a 24-inch soil depth, the lowest increment of consistent focus across site-year studies.

Table 1. Comparison of corn test weight, grain yield, and treatment cost as it relates to application of nitrogen fertilizer on the Jodi Brett Farm, Calhoun County, Texas, 2011.

Treatment	Test Weight (lb/bu)	Grain Yield† (bu/A)	Treatment Cost ($/A)
1. 0-20-0	54.8	94.6 b	18.38
2. 91-20-0	55.3	117 a	71.54
3. 107-20-0	55.4	121.8 a	81.54
4. 119-20-0	55.2	118.2 a	89.04
5. 130-20-0	55.8	120 a	95.91
6. 140-20-0	55.6	115.8 a	102.16
Pr>F	0.1624	0.0002	
$LSD_{0.05}$	ns	10.2	
CV	1.04	6.74	
Grand Mean	55.3	114.6	

†Yields corrected to 15.5% moisture.

There was no statistical difference between the control (140-0-0) and either treatment that received additional phosphate fertilizer (Table 2). Thus, an additional 20 lb of phosphate was not needed by the crop under these field conditions. According to soil test results, most of the available phosphorus to 48 inches was present in the top 12 inches.

Table 2. Comparison of corn test weight, grain yield, and treatment cost as it relates to application of phosphate fertilizer on the Jodi Brett Farm, Calhoun County, Texas, 2011.

Treatment	Test Weight (lb/bu)	Grain Yield† (bu/A)	Treatment Cost ($/A)
6. 140-20-0	55.6	115.8	102.16
7. 140-40-0	55.6	115.7	116.83
8. 140-0-0	55.6	120.8	87.5
Pr>F	1.0	0.7478	
$LSD_{0.05}$	ns	ns	
CV	0.9	10.07	
Grand Mean	55.6	117.4	

†Yields corrected to 15.5% moisture.

Conclusions

In this study, corn did an excellent job at using residual N and P in the soil profile that was carried over from the previous cropping season. As seen in the results, there was not a statistical difference between treatments in which the lowest amount of N or no additional P was applied as compared to treatments where additional units were applied. With mean corn yield at 15 bushels less than the yield goal target, drier than normal growing conditions likely had a considerable effect on crop response to added N fertilizer at this study location.

These observations are consistent with the three previous years of studies focused on management of carryover, residual N for corn. Potential reductions in fertilizer N application rates through deeper profile sampling not only improve production economics, but also reduce potential nonpoint source N losses to both surface and groundwater resources.

It is important to note, that soil test recommendations for fertilizer are made assuming a broadcast application. If the nutrients are applied in a subsurface band, P rates could be reduced up to 50%.

Acknowledgements
The support and cooperation of Jodi Brett for establishing and maintaining this study in 2011 and previous seasons is appreciated.