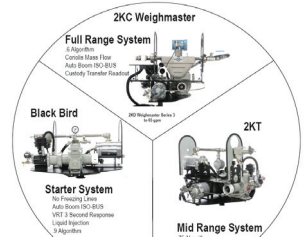




TEXAS A&M Test Plots Backfired



Comparison of Exactrix and Conventional Fertilizer Application in Corn

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Introduction

The cost of nitrogen fertilizer increased dramatically in 2008 compared to previous years. As a result, producers began looking for ways to increase their nitrogen use efficiency. One product being promoted was an Exactrix system that injects anhydrous ammonia (NH_3) as a liquid. The manufacturer of the Exactrix system claimed that nitrogen (N) rates could be reduced by as much as 30 to 40% while increasing corn yield up to 10%.

Brent Bean who carried out this plot did not use primary nitrogen (82) for plot comparison. He should have used a pressure reducing NH_3 system....with freezing lines and gas and liquid state flow of NH_3 at the injection point.

Brent Bean did not compare the process....He compared two different chemicals.

Comparing two different chemicals means he must compare the two materials economically.

Since the difference is \$60 to \$75 per acre in favor of Exactrix TAPPS.

Specs on 32 and 82.....from Simplot are shown on the back two pages..

The plot was set up to indicate that Exactrix does not increase yields....the goal was to not compare the process or Exactrix vs. Non-Exactrix.....

Brent Bean's goal was to prove you can could raise higher yields with 32-0-0 as he writes in his summary.

The Secondary nitrogen source 32-0-0...is Salvage and Convenience fertilizer that normally costs about 150% more than NH_3 .

The advantage of 32-0-0...is liquid streaming flow....and mixing of the two products. Also 32-0-0 has more carbon in the band....so it is not a primary nitrogen material.

So if he had done the plot correctly there would also be Humic Acid with the NH_3 to reflect the same amount of carbon. Over 50% of the N had Carbon stored in the Urea and this is why the material weighs more.

Approximately \$9.00 of Humic Acid at 1.5 gallon would be required.



Crystalline TAPPS at Groom, Texas, Jan. 20, 2008 Cotton field

Timing was leveraged to 32-0-0....The banding plot should have been carried out in March rather than late April. This would be representative of how NH₃ is applied at Amarillo.

If he had tested with Aqua Ammonia with a liquid streaming flow....then he would have had a better comparison of how Exactrix NH₃ works.

Liquid Streaming Flow at the injection is the powerful combination at high pH in an Acid Base Reaction with APP/ATS/KTS. The band width remains constant with liquid streaming flow.

Long Ago....Discovered and Promoted by the TVA at Muscle Shoals....Liquid Fertilizers are more crop effective.

In the extensive test plots Exactrix produced 8 more bushels over 2 years.

The economic difference in this extensive plot is. The 32-0-0 treatment would need to produce 5 more bushels of corn per acre annually to break even.

Risk was increased with 32-0-0....And for the Risk involved with the 32-0-0 should have produced 7 more bushels per acre annually to get a 2:1 return on investment.

32-0-0...45 to 65 gallons per acre required a lot more handling and slows the application process down. NH₃ was applied at 28 gallons to 50 gallons per acre.

11.01 pounds per gallon....allows 1,000 gallons of 32-0-0 on board. NH₃ typically has 2,000 gallons at 5.14 pounds on board with fills to 95% with liquid delivery.

37 pounds N came from APP/ATS. 123 pounds N comes from 32-0-0 or NH₃ at 160 total pounds N per acre.

Current prices for Corn and Nutrients based on Dec. 10, 11 at Hugoton, KS Coop. Elkhart.

42 cent N as NH₃

68 cent N as URAN or 32-0-0.

Best Results were at 160 pounds N.

That is 26 cent difference in N times 123 pounds. That is \$31.98 per acre annually or \$63.96 over the 2 year period.

The Yield advantage over 2 years was 8 bu. per acre. Or at \$7.00 per bushel....about \$56.

Over the 2 year period....the advantage was \$119.96 or about \$60.00 per acre advantage annually.

The further investigation of the plot....resulted in these facts following interviews with the producers.

1. The plots were paid for by the solution 32-0-0 fertilizer dealer in the area.
2. The Exactrix owner in the plot, Matt Galbreath is not changing a thing. He is a happy producer with the Exactrix.
3. The second year the corn was planted on top of the TAPPS bands within 19 days....and the waiting period is 30 days for mellowing the bands. Root Burning occurred as indicated but still higher.
4. The optimum rate of N is known to be less....somewhere between 120 and 140 pounds N per acre in TAPPS formulation...any higher and yield curve goes backwards.
5. Strange Event...The Yield Curve did not go back ward above 160 pounds N....The yield curve is still climbing at 240 pounds N... Exactrix systems yield curve drops off after 160 pounds N.
6. Typically the plots are set at 80, 100, 120, 140, 160 and 200 pounds N....Current plot designs do not go above 200 pounds N. The sweet spot is known to be between 120 and 140 pounds N.

7. The Proven Yield method is not used with Exactrix. The Economic method is used at 12% of the gross.
8. Normally 70% to 80% of the corn root mass is in the top 18 inches of the soil profile. Avoiding abnormal N in the lower part of the soil profile is a federal and state goal.



Orthman strip-till, 30 inch, Groom, TX. Jan 20, 2008 Case SDX, Single disc applicator, no-till.
Pre-plant corn production, Panhandle, TX.

Most of the 30 inch strip till banding at Amarillo is done all winter long....and finishes about March 15, 11. The Planting typically starts April 22.

Solution 32-0-0 is not used because of all the hauling, the fact that it can easily leach if applied too early, and it costs too much. It is not primary nitrogen.

Banding is always superior and band centers are best at 10 to 15 inch for TAPPS. 32-0-0 will easily leach if banded on 10 or 15 inch centers.

Solution 32-0-0 is not a primary nitrogen source.

Leaching occurs with 32-0-0 if it is banded ahead....during the winter.

Higher Yields are possible.

The most likely scenario for getting higher yields was the 30 inch band centers creating root burn.

The highest yields and best economics typically come at 140 pounds N in TAPPS formulation on 30 inch band spacing...the curve is shifting typically downward at 160 pounds N.

Humic Acid can be used in the band to provide more carbon and improve the Cation Exchange Capacity.

Some producers at Amarillo band NH₃ with Single Disc Openers on 15 inch centers at half rates.....and then strip till band at ½ rates to produce a warmer seed bed later in the season which does avoid a concentrated 30 inch band. Highest yields are always attained with 15 inch or less band spacing.

The highest yields achieved at Amarillo are in the 300 plus bushel range....Donny Carpenter, Exactrix owner. Winner of the National Corn Yield Contest.

Exactrix does produce higher yields with TAPPS and TAPPKTS.....when properly compared.....and always Exactrix TAPPS, TAPPKTS, and Humic Acid does produce more net dollars....In this case \$60 to \$75 more net income per acre. Exactrix owners have less risk in the growing crop because of good old NH₃ and Super Phosphoric Acid.stabilized with ATS....and also now with Humic Acid.

The Exactrix Agronomy Guide explains how Exactrix Works.

Guy Swanson
Exactrix
Spokane.

UAN-32

Urea Ammonium Nitrate Solution

GUARANTEED ANALYSIS: 32-0-0

TOTAL NITROGEN (N)	32.0%
7.75% Ammoniacal Nitrogen	
7.75% Nitrate Nitrogen	
16.50% Urea Nitrogen	

Derived from Ammonium Nitrate and Urea.

Warning: This product contains a chemical known to the State of California to cause cancer, birth defects or other reproductive harm. Proposition 65, the Safe Drinking Water and Toxic Enforcement Act of 1986, requires notification of potential exposure to substances identified by the State of California as causing cancer, birth defects or other reproductive harm.

Information regarding the contents and levels of metals in this product is available on the Internet at <http://www.regulatory-info-jr.com>

PHYSICAL CHARACTERISTICS

Specific Gravity @ 68°F:	1.327
Weight (lbs./gal.) @ 68°F:	11.08
Total Nitrogen (lbs./gal.):	3.54
Ammoniac Nitrogen	0.86
Nitrate Nitrogen	0.86
Urea Nitrogen	1.82
Salting Out Temperature:	32°F
Solution pH:	6.8
Free Ammonia:	0.01%

CONSTRUCTION OF STORAGE & TRANSFER EQUIPMENT

1. Mild steel, stainless steel, aluminum and certain fiberglass materials are suitable. Copper and alloys containing copper (brass) should not be used.

COMPATIBILITY

1. Compatible with ammonium phosphate solutions such as 10-34-0, 11-37-0, 9-30-0, etc.
2. Compatible with potash solutions and combinations of potash and ammonium phosphate solutions.
3. Compatible with many herbicides. NOTE: Consult pesticide label or manufacturer before mixing UAN-32 with pesticide chemicals.

USES

1. A nonpressure solution—is well adapted for a wide range of application practices. Direct application in preplant plow-down programs, injecting or banding in the soil, or applied through various irrigation systems—sprinkler, drip, flood or furrow.
2. Is the preferred source of nitrogen in liquid blending plants and in combination with herbicides for "weed and feed" programs.

ADVANTAGES

1. Provides both fast acting and long lasting plant food from its three forms of nitrogen. Quick response from nitrate, longer lasting from ammoniac and sustained feeding from the water soluble organic nitrogen in urea.
2. Enjoys great compatibility with other fertilizers and many chemicals. Makes possible two or more jobs in one trip over the field. Saves time, labor and money.
3. Is easy to store, handle and calibrate for accurate application in the field.
4. Is safe—being a nonpressure neutral solution, eliminates safety hazards associated with corrosive materials and high pressure systems.

SAFETY

Not generally considered toxic. Avoid contact with eyes and skin. In case of contact, thoroughly flush eyes and skin with water. 32-0-0 is not regulated by DOT.

PRECAUTIONS

1. Do NOT spray UAN-32 full strength on crops other than pastures.
2. Do NOT mix with aqua ammonia as the blend is very corrosive.

ANHYDROUS AMMONIA

82-0-0

GUARANTEED ANALYSIS

Total Nitrogen (N) 82.0%
 82.0% Ammoniacal Nitrogen
 Derived from Ammonia.

Warning: This product contains a chemical known to the State of California to cause cancer, birth defects or other reproductive harm. Proposition 65, the Safe Drinking Water and Toxic Enforcement Act of 1986, requires notification of potential exposure to substances identified by the State of California as causing cancer, birth defects or other reproductive harm.

Information regarding the contents and levels of metals in this product is available on the Internet at <http://www.regulatory-info-jr.com>

PHYSICAL CHARACTERISTICS

Composition 82% as ammoniacal nitrogen
 Lbs. of nitrogen per gallon 4.22 @ 60°F
 Lbs. of nitrogen per pound of ammonia 0.82 lbs.
 Specific Gravity @ 60°F 0.617
 Weight per gallon 5.15 lbs./gal.
 Gallons per ton 388.5 gal/ton
 Vapor Pressure @ 75°F 125 P.S.I.
 Temperature of Vaporization -28°F @ atmospheric pressure
 pH 14 (highly alkaline)

CONSTRUCTION OF STORAGE & TRANSFER EQUIPMENT

1. Tanks and Vessels: Must be constructed of high strength steel meeting the requirements of the American Society of Mechanical Engineers (ASME) unified pressure vessel code. They normally must be designed for 250 PSIG operating pressures.
2. Piping, fittings, valves: High strength steel or certain nonferrous alloys are suitable for piping, fitting and valves. Galvanized pipe should never be used since ammonia containing even trace amounts of water readily attacks zinc. Ammonia also rapidly corrodes copper and many nonferrous alloys, such as brass. Piping, fittings and valves must be designed for working pressures of 250 PSIG. Only valves designed for anhydrous ammonia service may be used.
3. Hoses: Only hoses and couplings specifically designed for anhydrous ammonia service should be used. These hoses are designed for working pressures of 350 PSIG and minimum burst pressure of 1750 PSIG.

COMPATIBILITY

1. Anhydrous ammonia is commonly combined with poly phosphoric acid to produce poly-phosphate solutions.
2. Avoid contact with chlorine.
3. Anhydrous ammonia is not compatible with zinc, copper, or alloys of these materials.

USES

1. 82-0-0 is suited for most crops.
2. 82-0-0 is a gas under pressure and should be injected 6-8 inches deep into the soil. It should not be injected when fields are wet or cloddy.
3. 82-0-0 can be used for pre-plant applications, side dressed in the soil, or injected into irrigation water for surface irrigation.

ADVANTAGES

1. Low cost, concentrated source of nitrogen.
2. Resists leaching – After soil temperature drops below 50 degrees F, anhydrous ammonia can be injected in the fall without fear of leaching loss. It immediately attaches to the soil particle and will not leach or volatilize out of the soil.

SAFETY

Ammonia 82-0-0 – A compressed and liquified gas. Vapors extremely irritating. Will ignite in high concentrations and at high temperatures. Breathing protection and full protective clothing required when handling. Always protect yourself with gas mask or goggles, rubber gloves and full clothing. Do not breathe ammonia vapor. Do not get in eyes, on skin or clothing. If an accidental contact is made, immediately flush skin or eyes with water for at least 15 minutes. Call a physician at once if an ammonia victim is unconscious or has suffered ammonia burns, especially to the eyes, nose or throat. Identification number for shipping: UN1005.

Side bar.

In late 2007 and early 2008 in Western Kansas and the Texas Pan Handle, about 50 irrigated corn producers on large acreages converted to Exactrix.

The fertilizer dealers that offered solution 32-0-0 and inventoried the material began a strong program to convert Exactrix owners back to 32-0-0 to be applied with the Pivot.

Their science did not measure up.since these large producers made \$100,000 to \$250,000 investments in Exactrix that were bringing between \$500,000 to \$1.5 million more net.

A very small group of producers strip till with 32-0-0. Small producers may use 32-0-0 due to a larger investment required to apply NH₃.