

FLUID DIGEST®

Research Update from the Fluid Fertilizer Foundation

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STARTER PLUS NPK APPLIED WEED AND FEED BOOST CORN YIELDS AND DECREASE LODGING

Researcher Michael Mainz, University of Ill., compared the benefits of starter and method and time of N and PK applications on ridge-till and no-till corn. Total fluid nutrients applied as NPK weed and feed plus starter were 170 lb. of nitrogen, 45 lb. phosphate, 60 lb. potash, 2 lb. sulfur, and 0.5 lb. zinc. The starter was 7-18-6-2 S-0.5 Zn.

Note the increased corn yields from starter, weed and feed and the combination of the two (Chart 1). Likewise, note how the weed and feed treatment decreased corn lodging by 63 % (from 87 to 24%) (Chart 2).

In the no-till, treatments significantly increased yields. The weed and feed N, fall stripped PK (phosphate and potash) with starter increased the yield 47 bu/A (124 bu vs. 171 bu) and decreased the lodging from 73% to 24% (Chart 3).

On the ridge-till, the yield increases of starter alone netted \$14.42/A, while the NPK weed and feed without starter added \$89.92/A to profit. That treatment plus starter netted \$131.42/A. That's using \$2.50 corn and appropriate prices for the nutrients.

Chart 2. NPK weed and feed decreases lodging in ridge-till corn.

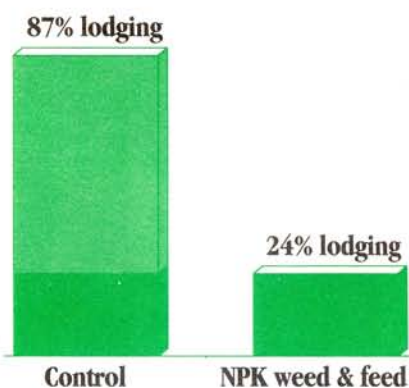


Chart 1. Starter plus NPK weed and feed increase corn yields.

Ridge till system-corn yield- bu/A

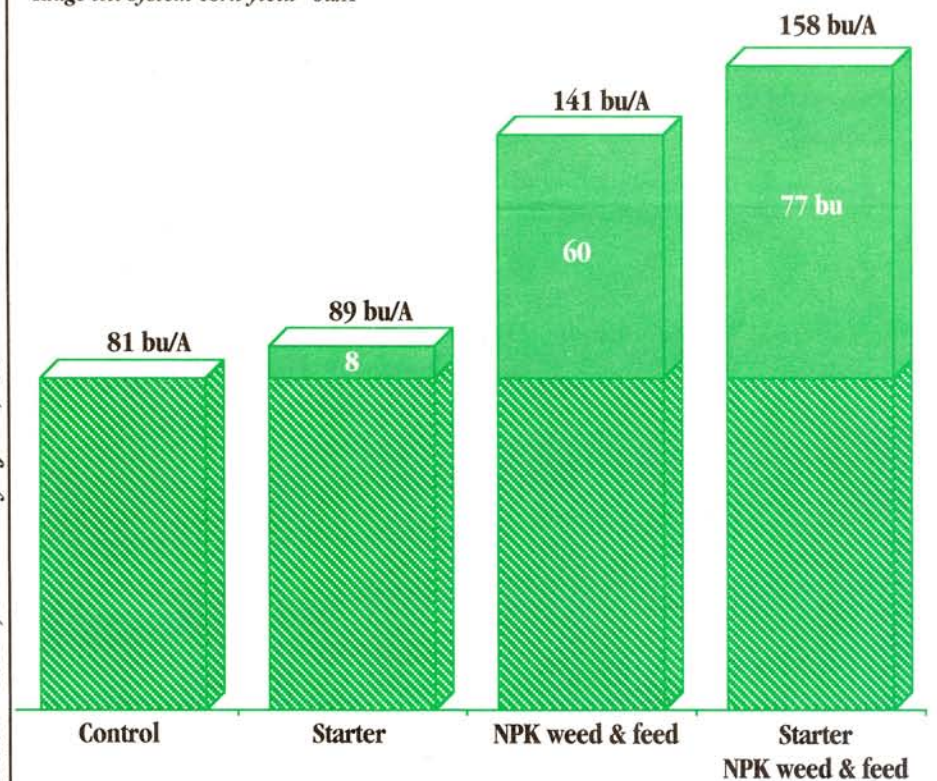
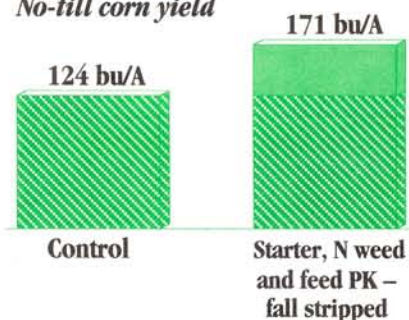
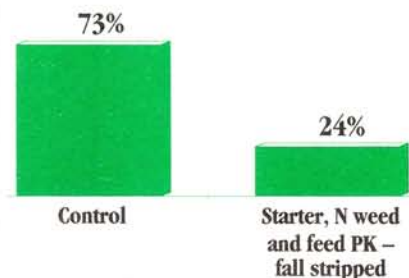


Chart 3. Starter, N weed and feed and PK fall stripped boost corn yield and decrease lodging.

No-till corn yield



No-till corn lodging



WHEAT RESPONSE TO PHOSPHATE PLACEMENT

Researchers Havlin and Lamond, Kansas State University, have been studying the effects of phosphate rate and placement on no-till wheat.

With a very low P (2ppm) test, the control plot with inputs other than phosphate produced 42 bu with 30 inches of rainfall, but only 26.7 bu with 11 inches of rainfall (Charts 4 and 5).

In the higher rainfall season, 15 lbs of P_2O_5 knifed below the seed was as effective as 3 times the amount (45 lb) surface broadcast. In the drier season, 15 lbs knifed below the seed doubled the yield increase of surface broadcast. Both broadcast and knifed increased profits (See Soils Testing Low).

In terms of yield increases and profitability, the returns for phosphate are as good or better in the drier years.

Chart 4. Effects of phosphate rate and placement on no-till wheat with high rainfall. 1990

September – June Rainfall = 30 inches
80 lb N Top dressed, 48lb K/A as KCl.

* = Phosphate surface broadcast
• = Phosphate knifed below seed

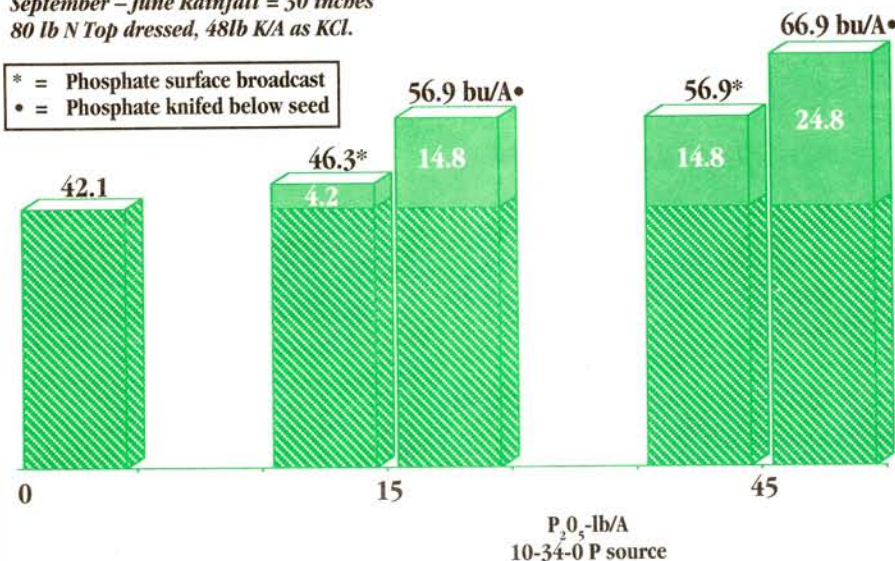
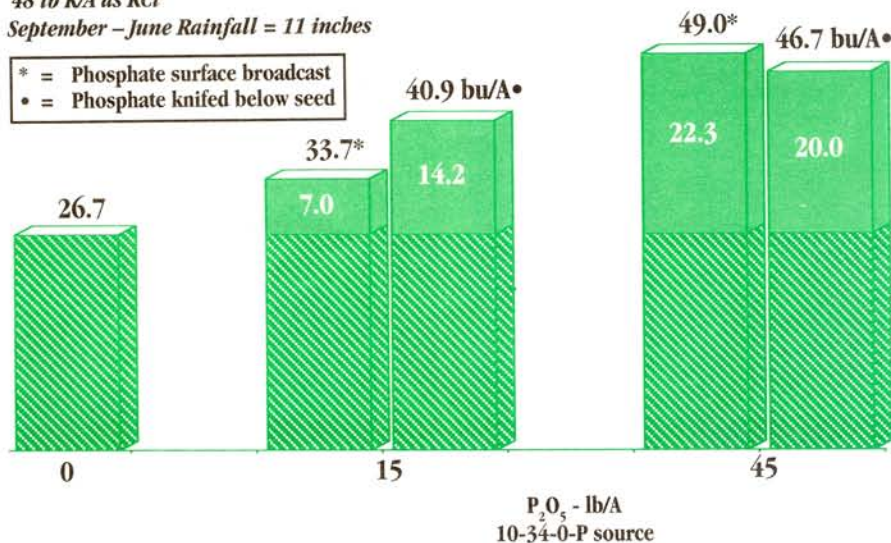


Chart 5. Responses to phosphate are just as good under low rainfall. 1991

120 lb N top dressed
48 lb K/A as KCl
September – June Rainfall = 11 inches

* = Phosphate surface broadcast
• = Phosphate knifed below seed



CORN POPULATION INTERACTIONS WITH NITROGEN

Peter Thomison and colleagues at Ohio State University have shown that yields of corn hybrids under drought stress did not increase with higher N rates or higher plant populations.

Under moderate stress when 50 lb N as UAN solution was banded after planting and 25 lb N was dribbled at the 6-leaf stage (V_6), the three hybrids yielded the same. When populations were increased from 16,000 to 24,000 plants per acre (PPA), two of the hybrids showed a 12-14 bu/A yield increase. The third hybrid showed a 9 bu/A yield decrease, indicating how differently hybrids may respond.

SOILS TESTING LOW IN PHOSPHORUS

Many soils in the Great Plains test low in extractable phosphorus. Every year farmers lose millions of dollars on small grain and wheat production because of inadequate phosphate rates. Adequate phosphorus and other nutrients are needed to effectively use soil and fertilizer nitrogen.

Broadcast (45 lb P_2O_5) phosphate boosted profits \$40.10/A in the higher rainfall season, while knifed netted \$75.10/A. In the drier season those respective rates and methods of application netted \$66.35 and \$58.30/A. (Charts 4 and 5.)

THE ADVANTAGE OF PK APPLICATION ON LOW TEST SOILS

George Rehm's research, University of Minnesota, shows the advantage of method of application and maintaining higher PK soil test levels. Note the benefit of subsurface banded PK, especially on the low soil PK (128 vs. 84 bu).

Corn Yields

	Soil Test Level			
	Low PK		High PK	
	84	bu/A Yield Increase	154	Yield Increase
PK applied*				
Broadcast	117	+33	155	1
Surface band	119	+35	154	0
Subsurface band	128	+44	161	7

* 44 lb P_2O_5 and 87 lb K_2O , N rates were the same.

COTTON

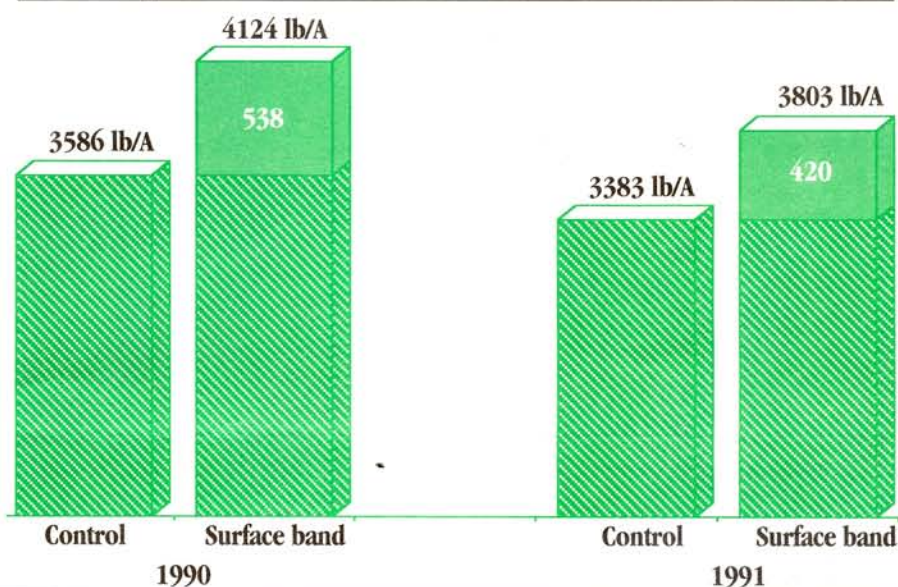
Surface Banded APP Over-the-Row at Planting Continues to Pay on Soils Testing High in Phosphorus

A three-inch surface band of 11-37-0 applied at 12 gallons per acre at seeding on a Commerce silt loam, testing 480 lb P/A, produced significant seed cotton yield increases again in 1991 (John Kovar and Eddie Funderberg, Louisiana State University). The 1990 and 1991 results for that treatment are shown (Chart 6).

A 1.5 gal/A in furrow treatment increased seed cotton yield 413 lb/A in 1990.

Kovar is working on a FFF project to identify the reasons for these responses on high P soils, as well as the soils on which they can be expected.

Chart 6. Surface banded 11-37-0 over the row (3-inch) at seeding increases seed cotton yield. 1990 and 1991.



John Kovar and Eddie Funderberg, Louisiana State Univ.

N INCREASES YIELD AND PROTEIN IN WHEAT

Research from Peter Kettlewell, Harper Adams Agricultural College, in 1991 shows that spring top-dressed UAN and foliar urea boost wheat yield and quality in studies conducted in England.

Thirty six pounds of foliar N applied at flowering boosted yields by 9.7 bu/A, a net of \$24.20/A. With 36 lb of N spring top-dressed UAN, foliar urea increased the yield an additional 7.2 bu/A — a yield response almost equal to 81 lb of top-dressed N (Chart 7).

Foliar N on the control plots also increased grain protein by 1.23 percent. Overall, combinations of top-dressed and

foliar N increased total grain protein from 8.1 to 10.25 percent, which is important when producers are paid a premium for quality.

Foliar N showed an average yield response of 5.85 bu/A, over all levels of top-dressed N at the Eyeworth site (Chart 8). That's an average return of \$11.30/A. The 132 lb/A N rate top-dressed returned \$35.60.

Chart 7. Spring top dressing and foliar urea help wheat yields.

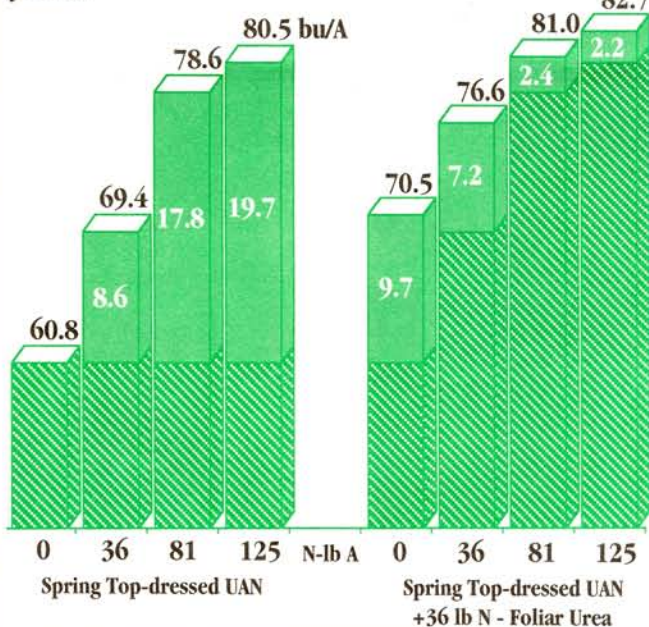
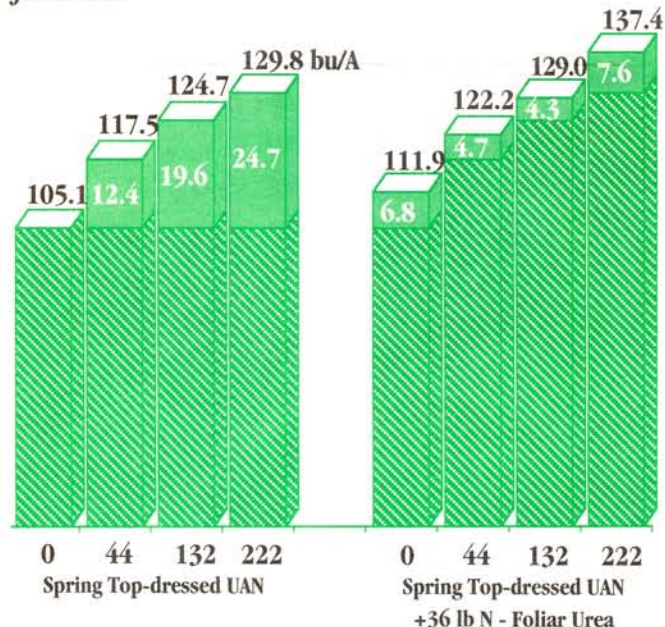


Chart 8. Benefits of top-dressed UAN and foliar urea N for wheat.



Kettlewell, Harper Adams Ag College 1991

FOUNDATION NEWS



**from your
Research Director,
BOB MUNSON**

1992 FOUNDATION SYMPOSIUM HELD

Project researchers presented their results last month at the 1992 Foundation Symposium. The theme of the Symposium was "Creating the Future through Research." The Symposium Proceedings will be published and sent to Foundation supporters.

Other information from the projects will be reported in upcoming issues of FLUID DIGEST and other publications, as well as in articles in SOLUTIONS Magazine.

The Research and Development Committee met for a day and a half in February to review projects for continued funding. They reviewed 27 new proposals and prioritized those approved, which were forwarded to the Foundation Board for consideration based on availability of funds.

FLUID FERTILIZER FOUNDATION CELEBRATES ITS TENTH ANNIVERSARY

Having just completed the Foundation's tenth anniversary, it is a good time to reflect on some of the things we've accomplished. You, through the Foundation, have invested more than \$1.7 million dollars in 80 completed projects at 34 universities.

While few university researchers were using fluids in their soil fertility projects ten years ago, now use of fluid N, NP, P, NK, NCa, NS, NB, K, KS, NPK, or NPKS, often containing micronutrients, such as boron, chlorine (Cl⁻), copper, manganese or zinc, is common in projects. Method, placement and timing of fluid nutrient applications have been studied on many crops in different tillage systems. Fluid nutrients have been soil, fertigated and foliarly applied in experiments.

Foundation projects have provided fluid data that has been used in extension meetings and publications. Projects also have provided results for articles that have appeared in SOLUTIONS Magazine. Project leaders are frequent speakers on NFSA's Round-Up and Convention programs. Project results have been used in the FLUID DIGEST and the FLUID FACTS, as well as farm press publications. During this 10-year period fluids have grown to 40.2 percent of the total applied plant nutrients used in the US market.

The Foundation has placed greater emphasis on information dissemination of the results from research projects to the dealers, farmers and regional farm press. Dealers are the vital link in getting research results to farmers. This effort will continue during 1992.

The foresight of those who initially formed the Foundation has paid off. It is time to establish the goals and direction of the program for the next decade. Our thanks to the founders, and to all of you who continue to invest in the future by supporting the research and development efforts of the Foundation.

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