



facts

THE NATIONAL FERTILIZER
SOLUTIONS ASSOCIATION

RESEARCH ON FLUID FERTILIZERS CONTINUES TO SHOW THAT FARMERS CAN PROFIT THROUGH PROPER MANAGEMENT OF FLUIDS

Research shows that fluids make ideal starter fertilizers:

- They can be placed with or beside the seed with planters more accurately than other fertilizer forms.
- Their stability in a homogeneous form increases the ease and application uniformity of low rates of fertilizer normally applied in a starter application.
- Practically any formulation can be easily blended to give a quality product.
- Generally, fewer problems have been encountered in the application of fluids with the seed (pop-up).
- Fertilizer nutrients are already in solution and are readily available to plants.

Starter helps yields when:

- Planting early on cold soils
- Using reduced or no-tillage
- Soils are compacted
- Soils have low or high pH
- Soils are low to medium in P and K



Even when
soils are
high in
fertility

Research shows that fluid starter fertilizer gives seedlings a quick start. Even though the soil may be high in plant food, it may not be within reach of the small roots at the early stages of growth. Starter fertilizer placed within reach of the seedling speeds up early feeding so plants can better capitalize on the full growing season.

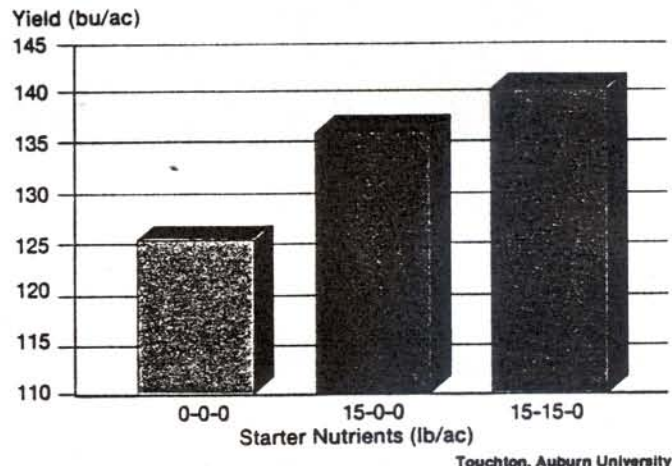
From the extreme northern to the extreme southern United States, profitable fertilizer responses on high fertility soils are common.

Coastal Plains

Research from Auburn University (Figure 1) shows that on silt loam with a high phosphorus test ($P_1 = 46$), no-till corn yield was boosted 15 bu/ac by applying 150 lb/ac of the $N-P_2O_5-K_2O$ grade, 15-15-0, two inches below and two inches to the side of the seed. This nitrogen-phosphorus combination gave a net return on fertilizer investment of \$27.50/ac when corn was sold at \$2.50/bu.

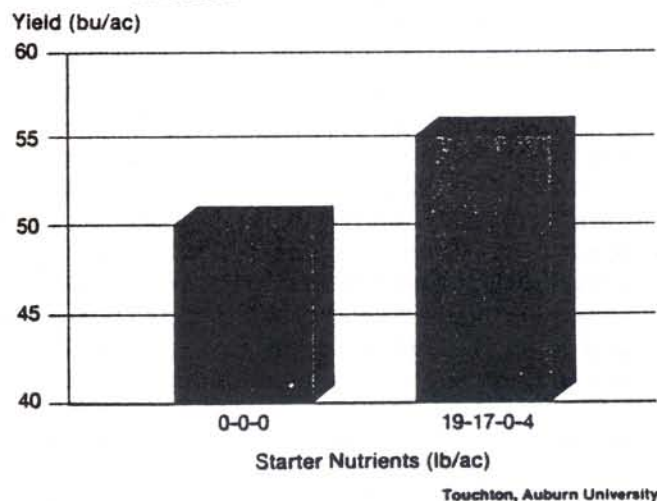
On a sandy loam, very high in phosphorus, that has a tendency to compact, similar yield boosts were found for milo grown in Alabama by applying 100 lb/ac of the $N-P_2O_5-K_2O-S$ grade, 19-17-0-4. The nitrogen-phosphorus-sulphur starter formulation in-

Figure 1. N-P Fluid Starter Boosts Corn Yields on High Fertility Soil in Alabama



creased yields by 5 bu/ac when compared to applying no starter, as shown in Figure 2. That would be about **\$2.50/ac net return on the fertilizer investment**. Greater profits probably would have been possible if the milo crop yield potential had not been reduced by excessive heat and dry weather.

Figure 2. N-P-S Starter Improves Grain Sorghum Yield When Crop is Moisture and Heat Stressed

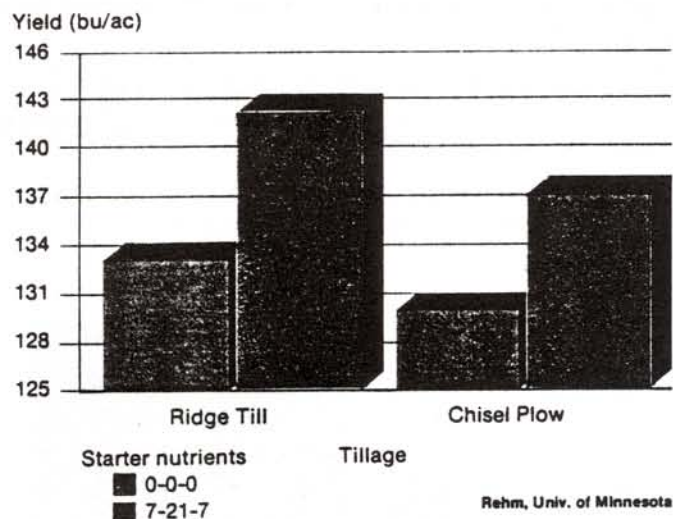


Upper Midwest

On cold, fertile soils, University of Minnesota starter fertilizer studies have shown the value of including all major nutrients in a complete starter package . . . that's why many farmers in northern states use an

N-P-K starter blend. One such study result (Figure 3) shows increased net returns of \$13.70 and \$8.70/ac on ridge-tilled and chisel plowed corn, respectively, by applying 100 lb/ac of the N-P₂O₅-K₂O starter grade, 7-21-7.

Figure 3. N-P-K Starter Pays off with Increased Corn Yields in Minnesota



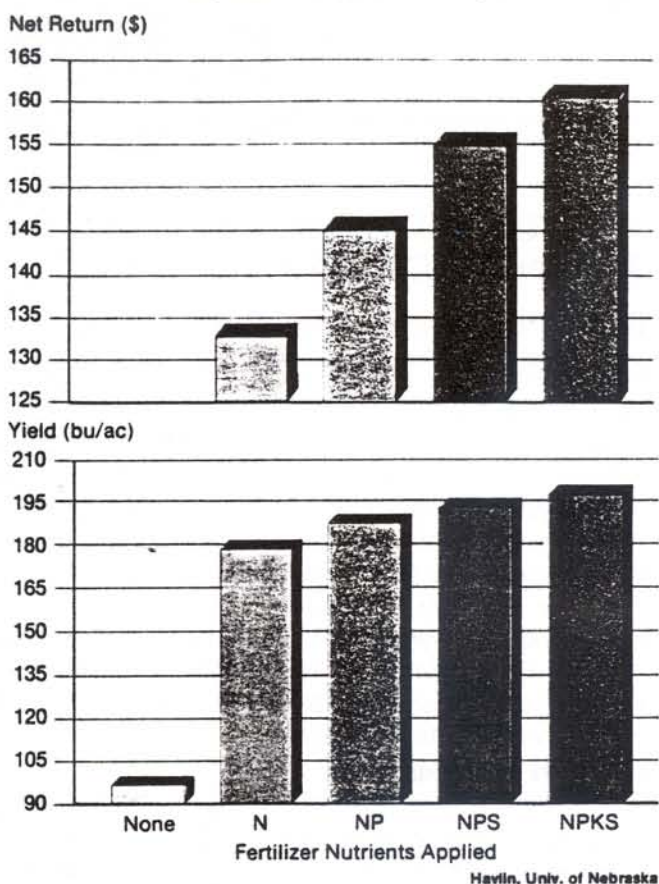
Midwest

Potash and sulphur fertilizer tended to increase Nebraska no-till corn profits when knifed together with nitrogen and phosphorus on sandy soils testing high in potassium and sulphur.

Combining phosphate, potash and sulphur with a nitrogen application may make sense on sandy soils in low rainfall areas. Since compaction is more of a problem on sandy soils than on other soils, roots are usually restricted to exploring a smaller volume of soil, generally that volume near and beneath the row. Nutrient movement within compacted soil zones can also be restricted because as soil compacts, the water holding capacity of the soil declines causing a reduced movement of nutrients within the compacted zone. **Nutrients must be solubilized in soil water before they can move from soil particles to plant roots;** therefore, reduced soil pore space holds less water which is needed to transport plant nutrients.

If roots are confined to grow in a small volume of soil, and if soil physical properties limit nutrient movement through the soil, nutrient availability to roots can be restricted even though the soil may be fertile. Fertilizer bands placed close to the row can alleviate such nutrient unavailability. These may be reasons why a Nebraska study shows that **corn yield and profits tended to benefit from fluid potash and sulphur fertilizer** when knifed four inches below and

Figure 4. Yield and Dollar Returns Peak with NPKS Fluid Fertilizer Investment on a High Fertility Soil



two inches to the side of the seed on a soil that was high in potash and sulphur but deficient in nitrogen and phosphorus (Figure 4).

As expected, nitrogen and phosphorus fertilizer gave a good yield increase of 89.8 bu/ac and net profits of \$144.90/ac. That's a 182% net return for every dollar spent on fluid nitrogen and phosphate. Even though potassium and sulphur were high in the soil, knifing 40 lb potash and 20 lb sulphur/ac with 250 lb nitrogen and 40 lb phosphate/ac increased yields another 9.5 bu/ac, or gave a net return of \$14.95/ac. That a 175% net return for every \$1.00 spent on fluid potash and sulphur.

Identify the Conditions

The above examples demonstrate the value of applying fluid fertilizer on soils high in fertility. You should determine if you have cropping conditions similar to those that have been discussed here, and if you do, attempt to capitalize on the economic returns provided by properly applying fluid fertilizers.