

When Banding Near the Seed, Be Careful!

Best if there is a small amount of soil between the seed and fertilizer.

Summary: While the use of 10-34-0 produced higher sugarbeet yields, yields at one site with sandy soil were lower when a high rate of all materials (10-34-0, 3-18-18, and 4-10-10) was used in contact with the seed. There was also reduced emergence when a high rate of 10-34-0 was placed in contact with the seed for crops grown on sandy soil. The 4-10-10 and 3-18-18 had no negative effect on emergence. Crop yields were not directly related to emergence. Treatment had no effect on corn yield when soil texture was a silty clay loam. Risk of damage can be reduced substantially if there is a small amount of soil between seed and fertilizer.

Grower interest in the use of banded fertilizer at planting is increasing. The renewed interest is due, in part, to frequent observations that banded fertilizer increases crop growth and subsequent yield. Compared to the once popular 2 x 2 placement (commonly called starter fertilizer), there are now several inexpensive attachments that can be used to place fertilizer in a band near the seed at planting time. These attachments provide an easy way for fluids to be placed close to the seed while allowing for some soil between the seed and fertilizer. A multi-row planter can easily be modified to apply banded fertilizer near the seed for a relatively low cost.

Research funded by the Fluid Fertilizer Foundation in the mid-'90s showed that relatively high rates of fluids (10-34-0, 7-21-7, 4-10-10) could be applied in direct contact with corn seed

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Table 1. Varied rates and fluid sources used to evaluate options for banding other than the traditional 2 x 2 starter placement, 2004

Fluid grade	Crop and rate					
	Corn		Soybean		Sugarbeet	
	high	low	high	low	high	low
gallons/A						
10-34-0	10.0	5.0	6.0	3.0	4.0	2.0
4-10-10	7.8	3.9	4.6	2.3	3.2	1.6
3-18-18	5.2	2.6	3.2	1.6	3.2	1.6

at planting with no negative impact on either emergence or yield when soils were not sandy or dry. The soybean crop was less tolerant of seedplaced fertilizer. Recent research in Iowa has documented the positive benefits of several fluids placed near but not in contact with or very close to corn and soybeans. More recent research in northwestern Minnesota by Dr. Al Sims has shown that 10-34-0 applied at low rates in contact with the seed has very positive effects on both yield and quality of the sugarbeet crop.

Because of the ease of handling and accuracy in calibration, placement of fluid fertilizers near the seed is an ideal fit. Therefore, this study was conducted to evaluate the effect on emergence and yield of corn, soybeans, and sugarbeets when placing fluid fertilizers near the seed.

Procedure

This 2004 study was conducted in the fields of five cooperating crop producers. Corn was the test crop at two sites with different soil textures

(silty clay loam, loamy fine sand). Soil texture in the soybean field was silty clay loam. The two sugarbeet fields had different soil textures (sandy loam, silty clay loam).

Soil samples (0 to 6 inches) were collected prior to planting. In general, soil test values for phosphorus (P) and potassium (K) were high or very high. Therefore, if differences in yield were measured, they could be attributed to treatment rather than a response to the fertilizer applied. For this study, all combinations of three fluid sources (10-34-0, 4-10-10, 3-18-18) were applied at two rates in three positions near the seed (with seed, dual band above seed, single band above seed). The rates and sources of fluid fertilizer applied are shown in Table 1.

Adequate nitrogen (N) was applied to all treatments for corn and sugarbeets. Split applications of N were used at the irrigated corn site. Sulfur (S) was also broadcast and incorporated (25 lbs/A) before planting at this site.

Crop emergence

Table 2. Corn yield as affected by application of two rates of three fertilizers at three positions near the seed at planting, 2004.

Material	Placement and rate					
	With seed		Dual band above		Single band above	
	high	low	high	low	high	low
bu/A						
Silty clay loam						
10-34-0	208.5	199.9	211.7	212.5	218.3	218.0
4-10-10	215.5	211.1	220.3	223.4	211.6	202.7
3-18-18	207.6	202.9	220.3	216.1	215.9	212.0
Loamy fine sand						
10-34-0	184.2	202.2	172.4	188.5	181.3	187.5
4-10-10	181.2	182.0	197.6	192.5	195.7	187.9
3-18-18	190.2	180.7	186.6	188.9	190.5	178.4

Soil effects. For most of the treatments, emergence was greater than 100 percent of the control. These observations agree with a general perception that fertilizer banded near the seed will frequently improve emergence. Corn was planted on April 19 at the site with loamy fine sand texture and on April 27 at the site with silty clay loam texture. In both cases, the soil was cold and wet at planting depth. With these conditions, fertilizer near the seed would be expected to improve crop emergence.

It is notable that 10-34-0, regardless of placement, reduced crop emergence when applied at a high rate to loamy fine sand. This effect was also measured when 10 gal/A of 10-34-0 was applied with the seed in silty clay loam soil. At a rate of 10 gal/A, more N was applied with the 10-34-0 compared to the 4-10-10. These stand measurements indicated that the N near the seed at high rates was responsible for reduction in corn emergence.

Sugarbeet emergence varied with soil texture. The positive effect of fertilizer, regardless of treatment, was measured at the site with a silty clay loam texture. By contrast, treatments appeared to have negative effect on crop emergence at the site with a sandy loam texture. Variability in emergence was substantial at this site. This variability may have

masked positive or negative effects. Because of this variability, it is not possible to arrive at a firm conclusion for the sandy loam texture site.

Rainfall effects. Because of above-average rainfall from mid-May through mid-June, soybean planting was delayed until June 6. The soil was very wet at the time of planting. Therefore, soybean emergence was not affected by treatment. This observation is not consistent with observations in past research projects. Excess soil moisture at planting in 2004 probably buffered any effect of the applied fertilizer.

Yield

Corn yields (Table 2) were excellent even though the growing season was much cooler than normal. Treatment had no significant effect on yield at the site with silty clay loam texture. Although the application in contact with the seed (10-34-0 at a rate of 10 gal/A) appeared to cause a reduction in emergence, the reduced emergence was not reflected in grain yield.

For the site with loamy fine sand texture, most treatments increased yield compared to the control. Statistical analysis showed that the main effects evaluated (material, rate, and placement) had no significant effect on yield. However, there was significant

Table 3. Sugarbeet yield as affected by application at two rates of three fertilizers near the seed at three positions near the seed at planting, 2004.

Material	Placement and rate					
	With seed		Dual band above		Single band above	
	high	low	high	low	high	low
tons/A						
Silty clay loam						
10-34-0	25.4	25.1	24.3	24.3	25.3	23.3
4-10-10	23.2	23.2	23.3	22.0	25.1	23.6
3-18-18	22.8	23.1	23.8	22.8	22.8	23.2
Sandy loam						
10-34-0	22.5	21.1	21.5	23.2	20.9	21.5
4-10-10	21.3	20.6	20.5	19.6	21.4	21.8
3-18-18	19.6	17.1	21.3	20.2	21.3	20.3

interaction between material and rate. This interaction was the result of the lower yields associated with the application of a high rate of 10-34-0 when averaged over three placements.

When averaged over the two rates, yields were higher when the 10-34-0 and 4-10-10 were applied with the seed. This was not the case with 3-18-18. Thus, there was a significant interaction between material and placement.

Sugarbeet yield at the site with silty clay loam texture was significantly affected by material and rate (Table 3). There were no significant interactions. When averaged over placement and rate, yields were higher when 10-34-0 was applied. When averaged over material and placement, yields were higher when the high rate was used.

For the site with sandy loam texture, yield was only significantly affected by material. When averaged over placement and rate, yields were lower when 3-18-18 was used.

Soybean yields were seriously affected by the cool summer, late planting, and an early frost and are not reported here.

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