

Polymer Additives Improve Starter Fertilizer Efficiency

Help circumvent tightening supplies and continuing hikes in fertilizer prices.

In the Eastern Corn Belt, 10-34-0, at rates of 10 to 15 gal/A, has been a common starter fertilizer in a 2 x 2 band placement. However, 10-34-0 prices have increased nearly threefold since April of 2007, leaving many growers asking the question, "how much do I really need to apply." In addition, with supplies being tight, the prospect of growers cutting back is real.

We need to keep in mind what the goal of starter fertilizer is and not sacrifice yield or profitability as changes are made. The purpose of starter fertilizer is to enhance early nutrient uptake, increase early plant and root growth, and increase yields.

Starter is most beneficial when crops are planted into cool wet soils in early spring. Reduced-till conditions, earlier planting, and the goal of increasing corn yields continue to drive starter fertilizer use. If rates of 10-34-0 in the 2 x 2 band are reduced, yield can be maintained by increasing the rate of nitrogen (N) in the band. For example, using a starter fertilizer with a 1:1 N:P ratio by blending 10-34-10 and UAN (28%) has been shown to maintain yields. A study was conducted in 2006 on a sandy loam soil at The Andersons Agronomic Land Lab in Tekonsha, Michigan, to evaluate a high N starter in comparison with 10-34-0. Starter fertilizer placed in a 2 x 2 band at 15 gal/A resulted in 196.7 bu/A for 10-34-0 and 198.6 bu/A for 19-17-0. Starter fertilizer blends with 50 percent UAN and 50 percent 10-34-0 are working well in the Eastern



Figure 1. Starter fertilizer 2x2 band placement + popup in-furrow in comparison to 2x2 only. 2007, M. Bauer.

Corn Belt and can give growers a viable alternative to running straight 10-34-0.

Supply/cost pressures

As the pressures of tight supply and costs continue to escalate, growers are wondering what else they can do to improve efficiency of their starter fertilizer programs. The addition of low salt popup

placed in-furrow can provide some added efficiency and improved early growth. The combination of a 2 x 2 band placement and a low rate (3 to 5 gal/A) of a low salt popup in-furrow has improved early growth and yield. In a study conducted on a sandy loam soil at The Andersons Agronomic Land Lab in Tekonsha in 2007, a 2 x 2 placement of starter fertilizer, plus 3 gal/A of 6-24-6 low

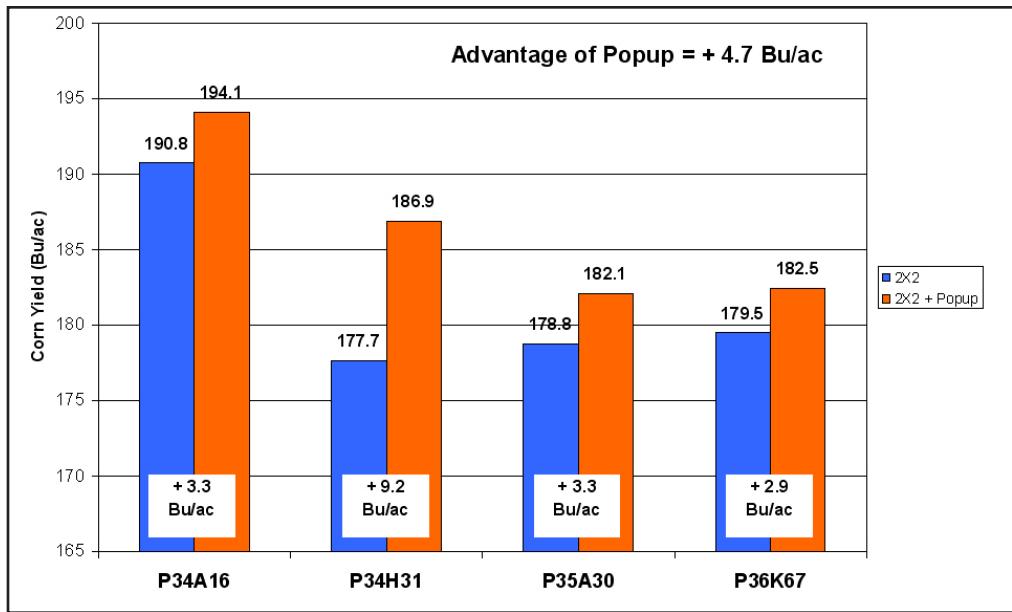


Figure 2. Starter fertilizer 2x2 (19-17-0 Zn 15gal/ac) band placement + popup (6-24-6 3gal/ac) in-furrow in comparison to 2x2 only across four different Pioneer hybrids near Butler, IN. 2005, M. Bauer.

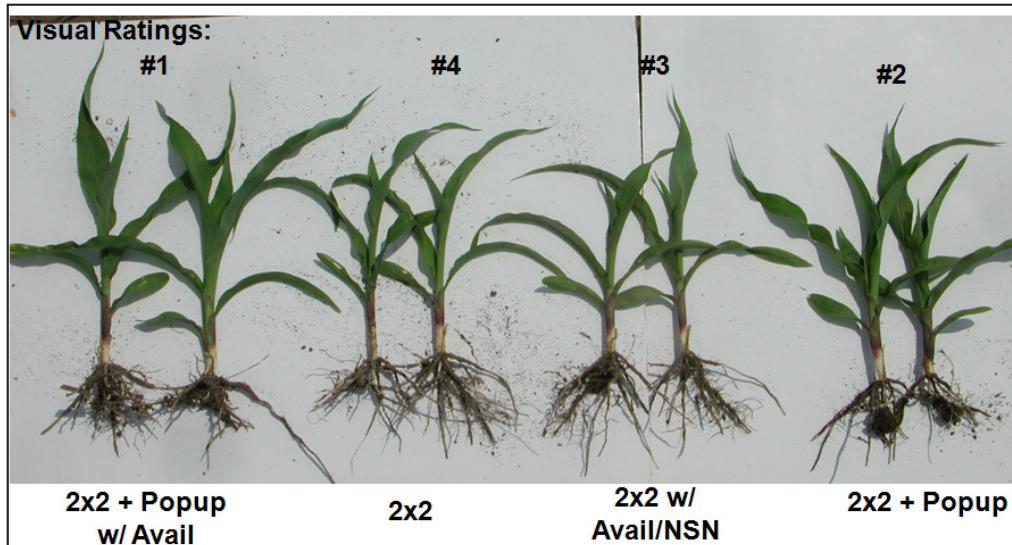


Figure 3. Starter fertilizer Avail plot. All treatments had 15 gal/ac 22-10-0 .12Zn 2x2. Popup was 3gal/ac 6-18-6 In-furrow. Plot located near Coldwater, MI. 2008, M. Bauer.

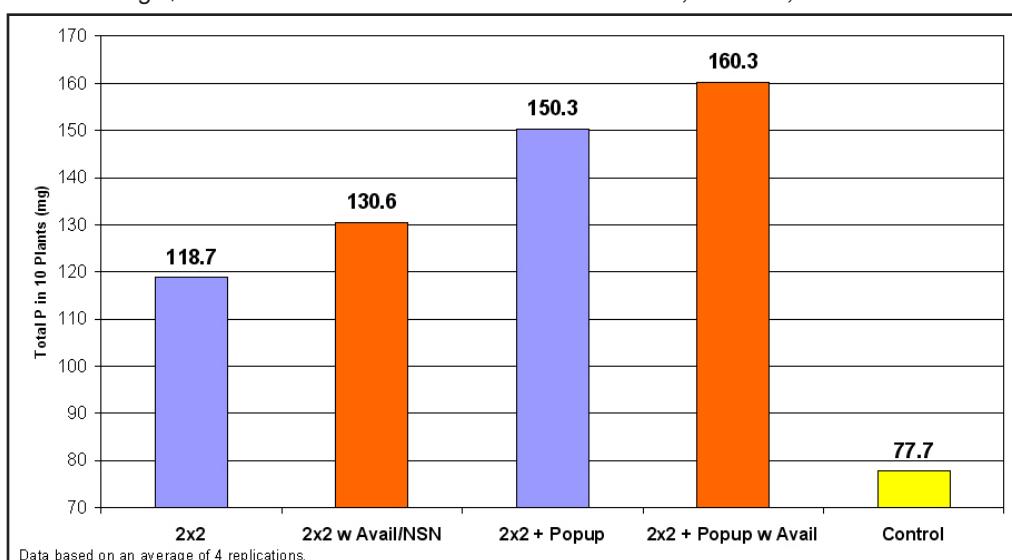


Figure 4. Starter fertilizer study evaluating the Avail and Nutrisphere-N (NSN) additive for total phosphorus in 10 plants at the V6 growth stage. All treatments had 15gal/ac 19-17-0 plus Zn 2x2 except for the control which had zero starter fertilizer. Popup was 3gal/ac 6-18-6 In-furrow. Plot located near Coldwater, MI. 2008, M. Bauer.

salt in-furrow compared to 2 x 2 alone, resulted in an average plant height of 2.86 inches taller at the V6 growth stage. Figure 1 shows the visual difference in the plants early in the growing season. In 2005, a study near Butler, Indiana, evaluating four different Pioneer hybrids, resulted in yields gains ranging from 2.9 to 9.2 bu/A by adding popup fertilizer in-furrow in combination with 2 x 2 versus 2 x 2 alone (Figure 2). As phosphorus (P) rates in the 2 x 2 band are reduced, adding low rates of popup in-furrow may help to maintain early growth and yield.

Polymers help

A relatively new idea for improving starter fertilizer efficiency is adding a polymer product called Avail®. The polymer is a dicarboxylic copolymer that sequesters antagonistic cations out of soil solution around P fertilizers, thereby improving P efficiency. In current studies in NE Indiana, Southern Michigan, and NW Ohio, adding the polymer to current 2 x 2 starter fertilizer or a low salt popup in-furrow has improved early plant and root growth. In high N starters that use a blend of UAN (28%) and 10-34-0, a combination of Avail® and Nutrisphere-N® is used to treat the solution. Nutrisphere-N® is also a polymer that is designed to reduce N loss. At a plot location in Waterloo, Indiana, adding these polymers into a 2 x 2 starter fertilizer (19-17-0 at 15 gal/A) increased early-season plant height an average of 2.8 inches. Visual observations were noted at several plot locations in the spring of 2008 as shown in Figure 3. The addition of Avail® resulted in an increased level of P in the plant when tested at the V6 plant growth stage. The addition of both polymers to a 19-17-0 (15 gal/A) blend placed in a 2 x 2 band increased P milligrams in the plant tissue by 9 percent (Figure 4). The addition of Avail® with 6-18-6 (3 gal/A) popup placed in-furrow resulted in a 6 percent milligram increase of P in the plant

at the V6 growth stage. Also note the improved efficiency of P uptake with the addition of the 6-18-6 at 3 gal/A in-furrow.

More for less

Yield results from 12 different starter fertilizer trials in 2007 (replicated and on-farm side by sides) averaged a yield increase of 5.4 bu/A when Avail® was added, showing the additive may be one option of increasing fertilizer efficiency. Yield

results from 27 different starter fertilizer trials in 2008 (replicated and on-farm sides by sides) averaged a yield increase of 5.2 bu/A when the same polymer was added. It may also provide more opportunity to look at starters with a N:P ratio of 2:1. For example, if the additive can maintain P levels in the plant, a blend of two-third UAN (28%) and one-third 10-34-0 can help growers deal with tight supplies of 10-34-0 and high costs without sacrificing crop yield.

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