

[MN- CCA column for The Farmer, April, 2017]

Should you skip pop-up starter this season?

BY Curt Burns

Minnesota farmers often have to plant corn in cool, wet soils — an environment that can slow nutrient uptake and early-season growth. Poor early-season growth is often associated with reduced phosphorus (P) uptake. Minnesota also has a lot of high-pH, calcareous soils that tie up phosphorus, making the nutrient unavailable to young plants.

Because of this, many growers apply in-furrow — or pop-up — starter fertilizer to help the crop get off to a good start and ensure the potential for maximum yields. In-furrow liquid starters are appealing because they are easy and cheap to apply.

But pop-up fertilizers are an expensive form of nutrients, pound-for-pound. Five gallons per acre of ammonium polyphosphate (10-34-0), which supplies 20 pounds of P₂O₅, costs \$12 to \$15/acre.

This spring, as margins remain tight, many farmers are taking a hard look at the profitability of pop-up fertilizers. Recent University of Minnesota (U-M) research can help you decide when it makes economic sense to apply in-furrow starter.

If you broadcast P, do you need starter, too?

A U-M study from 2012 to 2015 examined corn yield response to different pop-up fertilizer rates, with or without broadcast phosphorus.

The research was done on highly variable soils at ten locations from southeast to west central Minnesota. Soil P test levels ranged from low to very high, which allowed researchers to look at the response to pop-up and broadcast phosphorus across fields and also within soil P test levels. Previous research has shown that a yield response to P fertilizer is most likely on low and medium P test soils.

Pop-up treatments of 10-34-0 were applied to corn after soybeans at rates ranging from 0 to 7.5 gal/acre. Starter rates were tested both with and without 120 lb./acre of broadcast P₂O₅, a non-limiting rate for corn grown on low P testing soils.

The study showed that starter fertilizer produced a corn yield response *only* when broadcast P was *not* applied — regardless of the starter rate or soil P test levels. For this reason, starter fertilizer is not recommended if you are already broadcasting phosphorus at recommended rates for corn, says study leader Dan Kaiser, U-M Extension nutrient management specialist.

The study also found that corn yields on these variable soils were *not* affected by the starter rate, Kaiser says. “The surprising result was that the 2.5 gal./acre rate was the best in most circumstances for low, medium, or high P testing soils,” he says.

The finding suggests that currently, variable-rate starter application is not worth the trouble. If you do apply a pop-up, Kaiser recommends a uniform rate of 2.5 gal/acre of 10-34-0 for neutral to acid pH soils, and 5 gal./acre for high pH/low P soils. He also suggests 5 gal./acre for 20- to 22-inch rows.

Is pop-up starter needed for early-planted corn?

An earlier U-M study from 2010 to 2012 found that planting date did not affect pop-up fertilizer response in corn.

The field trials were performed on corn after soybeans at Lamberton and Waseca, where soil test levels for phosphorus ranged from medium to very high.

Ninety-four-, 99-, and 104-day corn hybrids were planted at two-week intervals, beginning in late April and extending to late May, simulating early, on-time and late planting dates. Two starter fertilizer treatments were tested for each hybrid and planting date combination: no starter versus 5 gal./acre of 10-34-0 placed in the seed furrow.

As expected, corn planted with starter did show greater growth in the early spring, Kaiser says. In addition, corn planted with the pop-up silked a couple of days earlier and had slightly reduced grain moisture at harvest.

However, the pop-up did not increase corn yields based on planting date or relative maturity, Kaiser found. In terms of economic benefits, lower grain moisture generally covered the cost of the pop-up, he says. But it did not produce a profitable return on soils that had medium to high soil P test levels.

Applying this research on your farm

What management conclusions can we draw from these research findings?

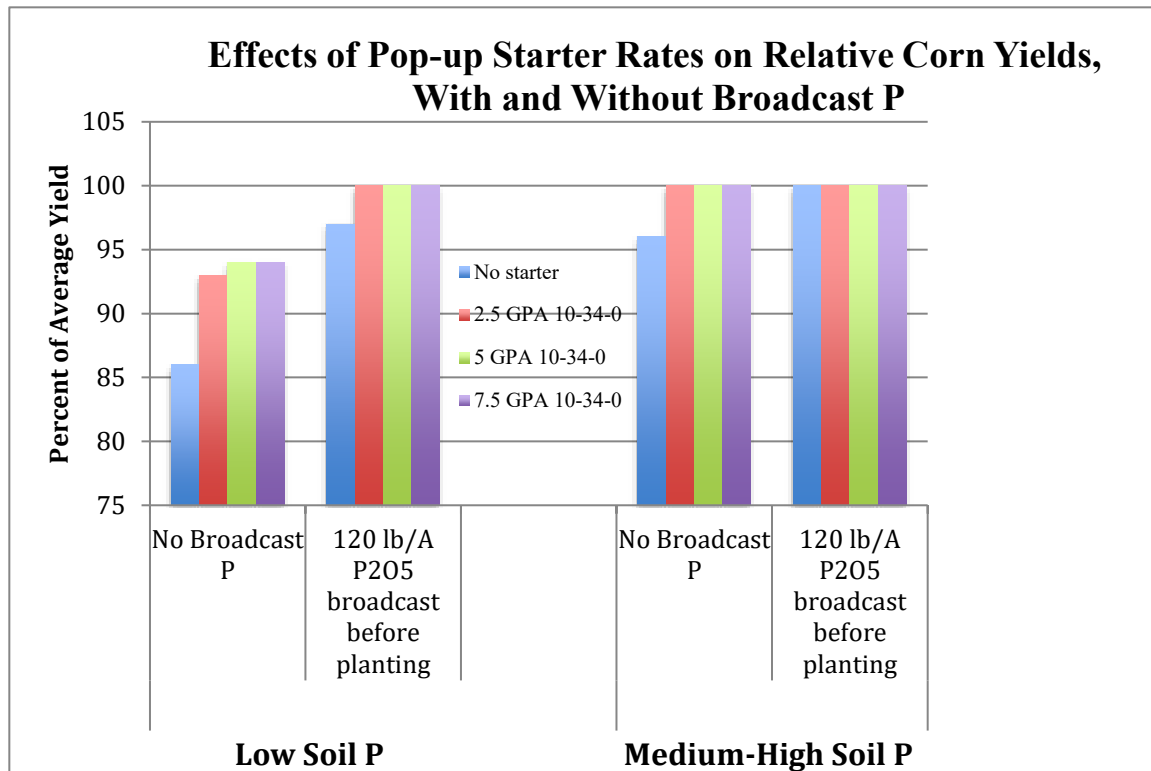
- The decision to use pop-up fertilizer should not be based on planting date or hybrid relative maturity, but rather on nutrient needs revealed by soil tests.
- There's little or no economic benefit to using starter on top of recommended rates of broadcast P.
- If you need to cut corn input costs this spring on high soil P test fields, consider skipping phosphorus application for corn after soybeans.
- If you need to cut corn input costs on medium soil P test fields, consider applying 2.5 to 5 gal./acre of 10-34-0 instead of broadcasting higher rates of dry fertilizer. While this is not an adequate long-term nutrient management strategy, it is a low-risk option for one or two seasons, especially on cropland in short-term rental contracts.
- Keep in mind that there's not one right strategy for P management, which is influenced by many variables, including soils, prices, and agronomic factors such as crop rotation and genetics. Your crop consultant can help you sort out what makes sense on your farm.

Burns, owner of C.B. Agronomics, is a crop consultant from Stewart. Find information and links to Minnesota certified crop advisers at <http://www.mcpr-cca.org>

Key points

- It may not pay to apply pop-up starter fertilizer in the current economic environment.
- Pop-up starter can be an economical short-term substitute for broadcast P on medium or high soil P test fields.
- Minnesota research found no significant corn yield benefit for pop-up starter on medium and higher P test soils.

[Graphics]



Source: Dan Kaiser, University of Minnesota, "Corn Response to Starter Fertilizer using a Modified Strip Trial Design, 2015"

University of Minnesota replicated trials from 2012 to 2015 at ten locations in southern and west central Minnesota evaluated the effects of pop-up starter rates — with and without broadcast P — on corn yields. As the chart above shows, in-furrow starter fertilizer (10-34-0) increased corn yields significantly *only* when broadcast P was *not* applied. The bars represent the percentage of average corn yield for each treatment. The chart also shows that the *rate* of starter did not significantly affect yield response in either set of treatments, regardless of soil test P levels.