

Getting More Bang From No-Tilled Phosphorus

Make sure you aren't wasting dollars on this essential no-till nutrient.

By Lynn Grooms

APPLYING THE smallest amount of phosphate for the biggest bang for the buck is what your goal should be. A small amount of seed-placed phosphate can do that, maintains Terry Good, sales manager for the Canadian operations of Na-Churs Alpine Solutions in New Hamburg, Ontario.

In making these recommendations, Good refers to phosphorus research conducted by the University of Guelph's Murray Miller

"55 years has shown that actual lowering of phosphorus values does not occur..."

and Tom Bates, other university studies and Good's own 18 years of research.

Application Options. These studies indicate that placing phosphate with the seed is a more efficient and economical way of supplying phosphate to a growing no-till corn plant than broadcast or 2- by 2-inch band applications. Phosphate should be made available to the corn plant prior to the critical six-leaf stage, stresses Good.

"When plant roots are small, you have a weak plant and need to develop an aggressive root system," he says. "Phosphate does that for you. It helps the plant with photosynthesis, respiration, energy storage and transfer."

Good cites Miller's research, suggesting that corn yield is influenced by tissue phosphorus concentration prior to the six-leaf stage regardless of the amount of phosphate supplied at later stages. Once you get past the six-leaf stage (ear initiation and cob setting time), Good says the corn plant has grown a large

enough root system so soil phosphorus will supply what is needed from then on.

Seed-placed phosphate is efficient, Good says, because phosphorus will move less than 1/10 inch in the soil and the only phosphorus the plant will take up is what it intercepts through the roots. With 2- by 2-inch placement or broadcast application, roots may or may not come in contact with enough phosphorus when young no-till corn plants most need it.

Phosphate does not move through diffusion or mass flow like nitrogen or potash, Good adds. Research published in the April 2000 issue of *Farm Journal* indicates you can achieve improved yield response by moving fertilizer closer to the seed.

Place Closer, Boost Yields. Good says no-till corn yields consistently better when starter fertilizer is placed 3/4 inch to the side and 1/2 inch below the seed compared to fertilizer placed 2 inches to the side and 2 inches below the seed. Averaged over four field sites, there was an 8-bushel per acre yield advantage for placing phosphorus closer to the seed.

The article suggests that if closer is better, then

why not put the starter in the furrow with the seed? Good says seed safety is a concern.

"You must be careful with the salt content and impurity levels of seed placed fertilizer," he notes. "Germinating seed is very sensitive

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to salt."

Na-Churs Alpine has conducted 176 plot trials over 18 years and has compared seed-placed 6-24-6 (ortho phosphate product) to 10-34-0 (a poly phosphate product). "We're averaging 6.7 bushels better with the ortho product," says Good.

Good also cites research by Purdue University where scientists placed radioactive isotopes in the fertilizer and traced it in the corn plant.

They found 5 pounds of phosphate on the seed got as much phosphate into the plant as 20 pounds of phosphate placed 2 inches under the seed. "If that's not efficiency, I don't know what is," says Good, adding that "Your soil test is not your report card, as high phosphate levels don't mean high yields. You want money back from putting phosphate down."

Critical Stages. "We don't need a lot of total pounds of phosphate to meet the crop's critical stage," Good adds. He believes that if you place 10 or 12 pounds of phosphate in the seed zone, you will likely get enough nutrients to the plant during the critical stage.

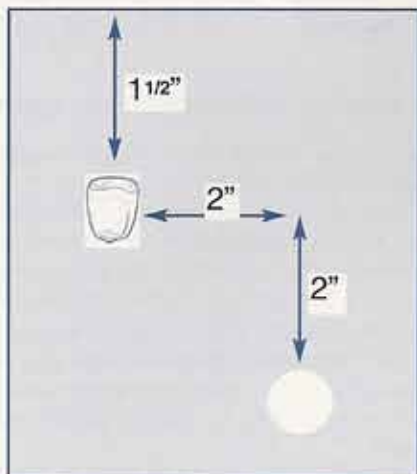
Good says that applying 10 pounds of seed-placed phosphate is equivalent to 40 pounds of 2 by 2 inch applied phosphate, which is equivalent to 400 pounds of broadcast

Why Precision Phosphorus Placement Pays With No-Tilled Corn



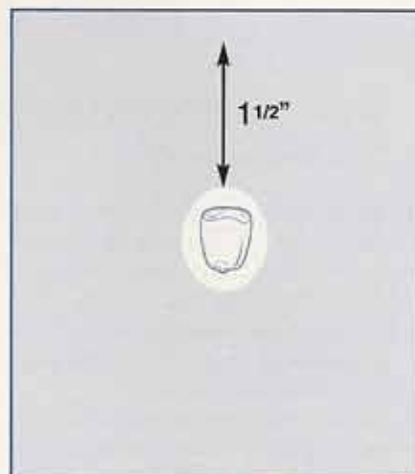
BROADCAST (No Efficiency).

1. Leaves the corn plant potentially short of phosphorous at critical growth stage.



2-BY 2-INCH (Inefficient).

1. Leaves the plant potentially short of phosphorous at critical growth stage.
2. Roots may or may not come in contact with fertilizer during the critical growth period.



ON THE SEED (Efficient).

1. Fulfills the need of your corn plants in regards to phosphorous requirements.
2. Phosphorus is placed for maximum plant efficiency.
3. Roots are in immediate contact with fertilizer.
4. Phosphorus will move less than 1/10 inch in the soil.
5. Crop roots will come in contact with approximately 2 percent of the soil area.
6. Meets the early critical needs of the crop, when the soil can't keep up with phosphorus demand.
7. Immediately available to the growing no-till corn seedling.



phosphorus (in regards to plant uptake).

Na-Churs Alpine specializes in liquid seed-placed fertilizer and Good notes that many no-till customers are spending only \$8 to \$12 per acre for a total phosphorus program. This includes applying 4 to 5 gallons per acre of seed-placed phosphate, 10 gallons of 28 percent sidedressed liquid nitrogen and the remainder of the needed nitrogen sidedressed as the balance of the fertility program.

If a 180-bushel per acre no-till corn crop removes 72 pounds of phosphorus per acre and you put down 5 gallons per acre of 6-24-6 (13.32 pounds of P205), Good says the soil has to supply about 58 pounds of phosphate.

Yet some farmers have applied 10 or 12 pounds of phosphate per acre annually for 20 to 40 years and have never added phosphate to make up for that 58 pounds. What's more, their soil test levels are the same or higher than 10 to 30 years ago.

How Can That Be? Good says what one reads from a soil test as available phosphate is about 1/2 percent to 1 percent of the total phosphate in the soil. The key, he says, is to separate "available" from "total" phosphate. "If you have 1 percent (30 parts per

"The closer starter fertilizer is to the seed, the better the yield response..."

million, which is a typical soil test in many areas), you have 6,000 pounds of phosphate per acre in your soil.

"If you went 20 years without putting any phosphate on your no-till ground, mathematically speaking you would remove 1,440 pounds of phosphate. Subtract that from 6,000 pounds and you are left with 4,560

pounds. This still shows a soil test reading of 23 parts per million.

"I bet there are a lot of guys who thought that if they didn't put any phosphate on for 20 years they would be devoid of it. But it's not the case.

"Some 55 years of experience has shown that actual lowering of phosphorus levels does not typically occur. Not that it never happens, but if it does, it is a very slow decline in soil phosphorus. Actual field results show little to no decline."

If farmers need to raise soil tests, Good recommends they use a Triple Super Phosphate.

"Don't buy 10-34-0 or some expensive blend if all you're trying to do is run your soil tests up," he says. "Triple Super or rock phosphate is cheap.

"We tell our customers that we don't know how long you can go without needing extra phosphate beyond this 10 or 12 pounds of seed placed phosphate, but let's wait. Some guys are still waiting."