

# Still Important: Starters On High P Soils

*Maryland studies show P improves corn yields even when soil P levels are high.*

Continuing studies on corn response to starters on high phosphorus (P) soils on the Delmarva Peninsula indicate that some starter P is important for highest yields even when soil test P levels are high. Eliminating P in starters because of high P index values puts growers at a disadvantage through lower yields, particularly in high residue systems, and likely has negative implications for nitrogen (N) –use efficiency (NUE).

Complete starter formulations, including higher amounts of starter N, plus the inclusion of potassium (K), sulfur (S), and zinc (Zn), have proven to be advantageous compared to N-alone starters.

## Placement

### ***Banding vs. broadcast.***

Placement of fluid starter in a band behind one of the two planter V-shaped press wheels was as effective as placement beside the row with an opener, indicating flexibility in choosing how planters can be equipped for effective application of fluid starters.

Maryland studies have consistently shown that broadcast applications of a starter formulation prior to planting have been inferior to banding beside the seed row (2 x 2 placement) or banding on top of the soil beside the row. Broadcast rates of 48-20-5-1S produced some 52 bu/A less dryland corn than the same formulation banded 2 x 2 or behind one of the V-shaped press wheels (Figure 1). At a lower rate of starter N that difference ranged from 8 to 17 bu/A.

Evaluations of a banded 25-20-5-28S-0.6Zn starter on a Mattapex silt loam indicate the equality of 2 x 2 and starter dribbled in a press wheel groove (Table 1). With S rates this high in a starter and placement this close to the seed on a coarse-textured soil, our data suggest that ammonium sulfate may be a better choice (156 bu/A) than ATS plus KTS (146 bu/A) because of some



seedling effects. At lower rates of starter S, 5 to 7 lbs/A, differences between S sources are unlikely.

Placement of a band 1 x 1 was not as effective as 2 x 2, possibly because of diffusion into the seed row of the urea-containing solution used to increase the N content of the starter.

**Population problems** can result from such diffusion and the resulting free ammonia from urea hydrolysis. Coarse-textured soils are more susceptible to this kind of problem and thus N rates with 1 x 1 placement should be limited. Our studies have shown minimal problems when starter N in 1 x 1 placement was limited to around 24 lbs/A. Studies at other locations with finer-textured soils have shown that much higher N rates can be successfully banded 2 x 2 or 2 x 0 on soil surfaces beside the row. (Note results in article on page 17.)

**Timing.** Our starter N rate comparisons support the importance of adequate N close to the emerging plant in the first crucial days after planting. Broadcast N is not the same and, like high P soil tests under high residue, cold soil conditions do not provide high enough N (or P) concentrations in the young plants' root zone to overcome soil environmental restrictions to nutrient uptake. Numerous studies have also emphasized the importance of readily available NPKS and Zn close to the developing root system to meet the demands of young plant roots. Nutrient adsorption per unit of root length is extremely high in early growth stages (Figure 2).

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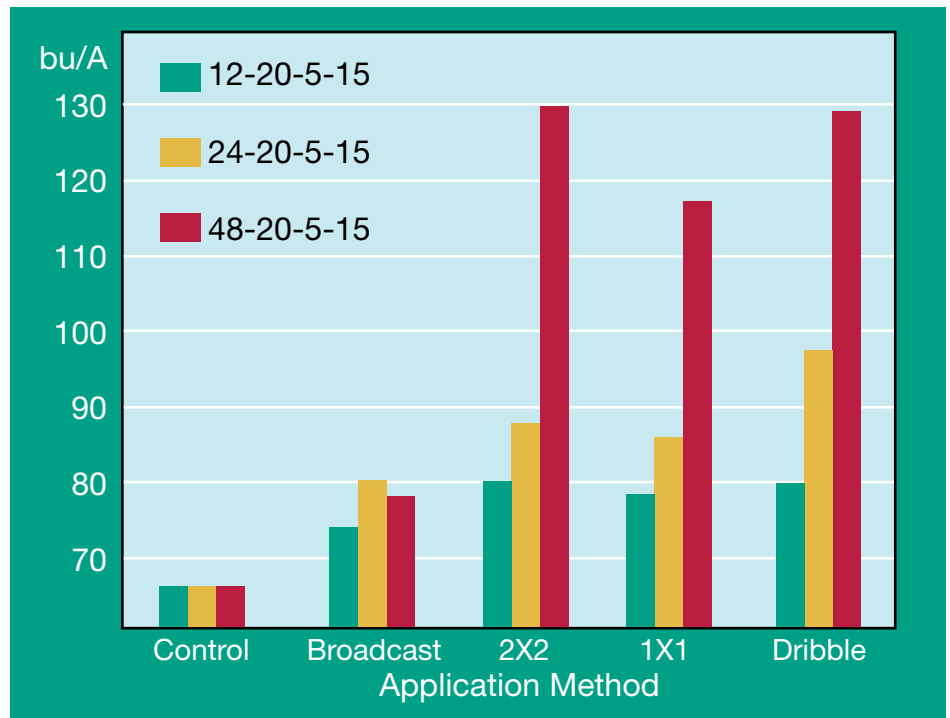


Figure 1. Effects of starter formulation on corn yields.

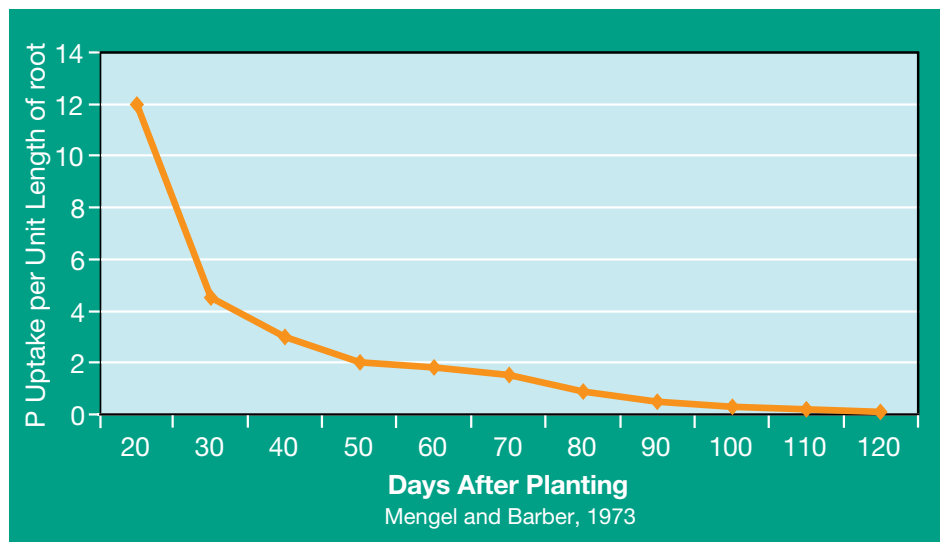


Figure 2. Soil becomes dominant source of P for corn at about the V-2 growth stage.

**Table 1. Band starter placements continue to show equality.**

Starter application Method	Starter formulation	
	25-20-5-28S-0.6Zn S as ammonium sulfate	25-20-5-28S-0.6Zn S as thiosulfate
2 x 2	156	----
2 x 0	155	146

*N and K constant on all plots*