

only slightly over the control in all of the tillage systems.

Total bioavailable P losses (**Figure 4**) followed the same general pattern of loss as that for soluble P. This was because nearly all of the bioavailable P that was lost was in the form of soluble P. Under conditions with more soil loss, the percentage of contribution of bioavailable P from particulate P would likely have been greater. Nearly all of the bioavailable P that was lost occurred during the first couple of runoff events after the P fertilizer was applied. This pattern of P loss suggests that broadcast P should be incorporated before first runoff occurs.

The results of this study suggest that on fields where conservation tillage systems do not significantly reduce runoff, fertilizer P needs to be subsurface applied to prevent elevated levels of bioavailable P losses. In tilled

systems, fertilizer P should be subsurface applied or incorporated before first runoff occurs.

The following are some cropland BMPs that can help minimize P losses in surface water runoff:

- subsurface apply or incorporate P fertilizer and manure prior to first runoff
- avoid surface soil buildup of soil test P
- periodically invert P-stratified soils
- use conservation tillage, terraces, contour farming, grass waterways, vegetative filter strips, cover crops, and other impoundments where appropriate to reduce runoff and soil loss. **BC**

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Quebec: Phytotoxicity of Banded Urea Amended with Triple Superphosphate and Potassium Chloride

Laboratory and field experiments were conducted to study the phytotoxicity of banded urea amended with triple superphosphate (TSP) and muriate of potash (KCl). In the laboratory, three soils were used to evaluate the effects of band placement of four rates of TSP and two rates of KCl on corn germination and growth compared to an unfertilized control. Field experiments were conducted on two soils, using two rates of urea and three rates of TSP, either compacted or blended. Results were as follows.

- In the laboratory, ammonia, nitrite and pH decreased with TSP and KCl, due to delayed hydrolysis of urea.
- Soil electrical conductivity (EC) increased with KCl, but was not affected by TSP.

- Corn growth decreased with increased soil ammonia concentration and EC.
- In the field study, corn germination increased with banded TSP and decreased with banded urea at day 10 after planting. No difference was found at day 20.
- Compacted mixtures of urea and TSP...compared to blended mixtures at the same phosphorus (P) rate... increased corn germination, growth, nitrogen (N) uptake, and yield.

Researchers concluded that compaction of urea and TSP might provide an effective way to improve the efficiency of banded urea for corn production. **BC**

Source: Agron. J. 90:734-739 (1998)