Liquid vs Dry Phosphorus Fertilizer Formulations with Air Seeders
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Research Question
The objective of this research is to compare HRSW biomass, P accumulation, and grain yield response to various rates of preplant broadcast and band (with the seed) applications of liquid (10-34-0) and dry (11-54-0) P fertilizer sources when the seed is banded in 4 inch wide bands with an air seeder.

Results
A preliminary analysis showed no difference in grain yield in response to liquid compared to the dry source of P-fertilizer. A more detailed analysis, including the whole plant uptake of P have not been completed.

Application/Use
HRSW producers operate on tight economic margins. This research will determine if growers should consider using liquid P sources to enhance HRSW grain yields instead of dry P sources, especially when applied with air seeders using broad band or ribbon seeding patterns. Optimizing and potentially reducing the annual P fertilizer gift can improve the profit margins for HRSW by reducing input cost and/or increasing grain yields.

This research also has broader environmental implications; as public opinion and political pressure mount to reduce production agriculture’s impact on the environment, research as described in this proposal can lay the foundation on which sound, science based, policy recommendations can be made.

Materials and Methods
The experiment consisted of 20 treatments replicated 4 times for a total of 80 plots at each location using a randomized complete block design. The research was conducted at two sites near Crookston rated low for phosphorus using the Olsen soil test.

One set of plant samples was taken from each plot at about soft dough to determine total biomass production and total P accumulation in the plant. The plots were harvested with a small plot combine at maturity and grain was analyzed for yield, protein, and test weight.

Economic Benefit to a Typical 500 Acre Wheat Enterprise
At this point in time it is unclear whether liquid sources of P-fertilizer provide any advantage over dry sources of P-fertilizer on the soils common in the Red River Valley Basin.

Appendix