Evaluation of Micro Carbon Technology® -Based P Fertilizer, Super Phos® in Spring Wheat

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INTRODUCTION

✓Proper phosphorus (P) nutrition is important for wheat root growth and tiller development. Furthermore, P is an essential component of energy-carrying phosphate compounds (ATP & ADP), nucleic acids, essential coenzymes, and phospholipids.

✓Phosphorus deficiency in wheat is expressed as slow-growing and late-maturing plants. Phosphate is the only form of P that plants are able to take up, yet only 1% of all P in most Montana agricultural soils is present in a phosphate form. Although typical Montana fields contain between 1 or 2 parts per million (ppm) to 20 or more ppm of P, its availability is directly affected by soil pH. In Montana's predominantly high pH calcareous soils, phosphate ions tend to react with calcium (Ca) and magnesium (Mg) to form less soluble compounds.

✓The primary P fertilizer sources in Montana are ammonium polyphosphate (APP; 10-34-0), diammonium phosphate (DAP; 18-46-0), and triple super phosphate (TSP; 0-46-0).

Super Phos® BASICS

✓Super Phos® (SP; 0-50-0) by Bio Huma Netics Inc. (Gilbert, AZ) is a Micro Carbon Technology® – based P fertilizer specifically formulated to resist "tie-up" with Ca and Mg to remain water soluble and available to plant roots. This product has been proven to aid P uptake in cold, high pH and calcareous soils.

✓Micro Carbon Technology® (MCT) is based on decomposition of organic plant material.

✓The proprietary process of producing MCT by Bio Huma Netics, Inc. creates small, organic molecules that increase the efficiency of essential mineral nutrients when applied to the soil or to the leaves.

✓The specific surface of the organic matter produced by MCT is greater, and therefore more chemically active, increasing the chemical activity of the organic matter which increases the efficiency of essential plant nutrients applied to plants (Crawford, 2013)

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OBJECTIVE

- ✓ To compare the Micro Carbon Technology® – Based Foliar P Product - Super Phos® (SP) with traditional ("conventional") P fertilizers – ammonium polyphosphate (APP), diammonium phosphate (DAP), and triple super phosphate (TSP).
- ✓ To compare the Micro Carbon Technology® – Based Foliar N Product - Super Nitro® (SN) with traditional ("conventional") N fertilizer (UAN)

MATERIALS AND METHODS

✓A field experiment in spring wheat was conducted during the 2013 and 2014 seasons near Conrad, MT.

✓The objective was to compare the effectiveness of topdress and foliar application of SP, with traditional P fertilizers – APP, DAP, and TSP – for optimizing spring wheat grain yield and quality.

✓Two P application rate/time combinations were evaluated: 33 kg P_20_5 ha^{-1} rate was applied at seeding as a sidedress (treatments 3, 5, and 7) and 16.8 kg P_20_5 ha^{-1} rate - at tillering (as a foliar spray of APP - treatments 4 and 6, and a sidedress of DAP – treatment 8).

✓Treatments 3 and 4 received P as SP, treatments 5 and 6 – as APP, and treatments 7 and 8 – as DAP.

FINDINGS

✓This poster presentation summarizes results from the second year (2014) of the study.

✓Results from 2013 growing season presented at the 2014 ASA-CSSA-SSSA meeting can be found here:

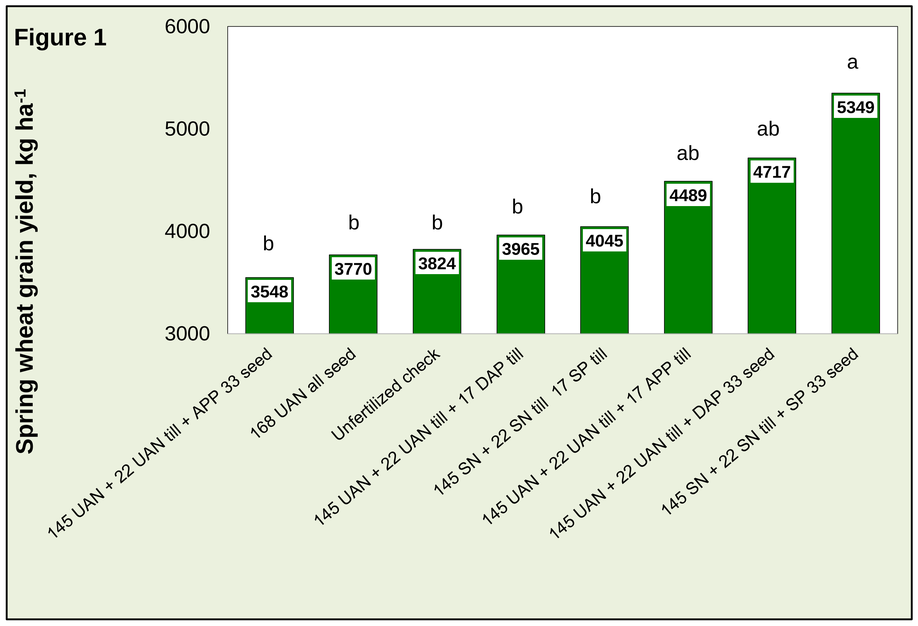
✓In both years, the best-yielding treatment was treatment 3 (Huma Gro® Super Nitro® followed by 33 kg P_20_5 ha^{-1} rate applied at seeding as SP).

✓Super Phos® has performed very well in terms of achieved grain yields, with acceptable grain protein levels.

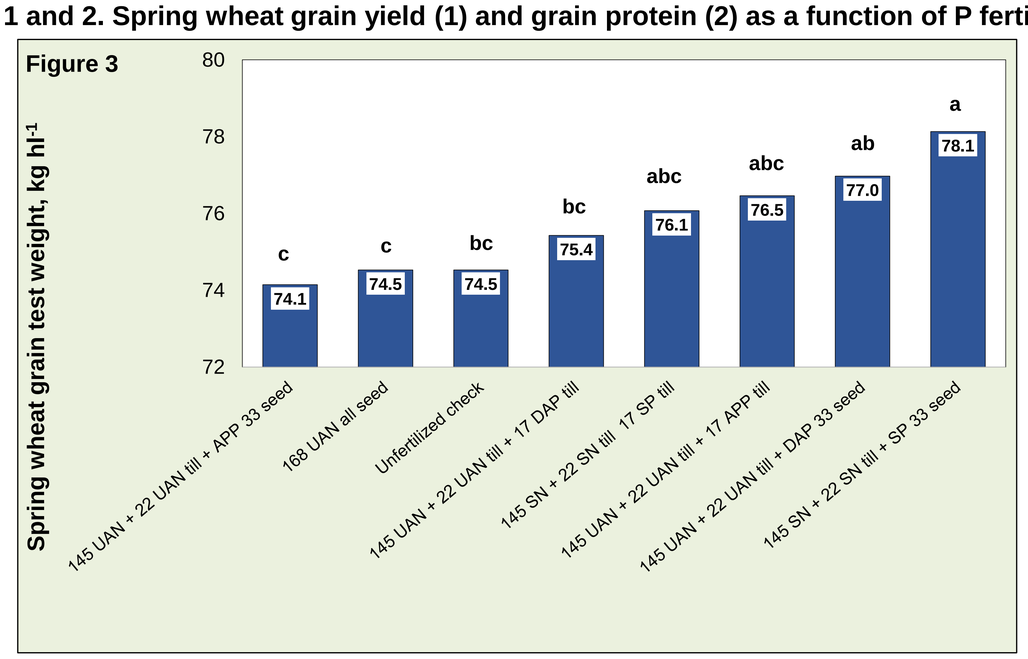
✓Substantial advantage in grain production was noted with SP application in 2013, and especially – in 2014 season, where both grain yield and grain test weights were highest.

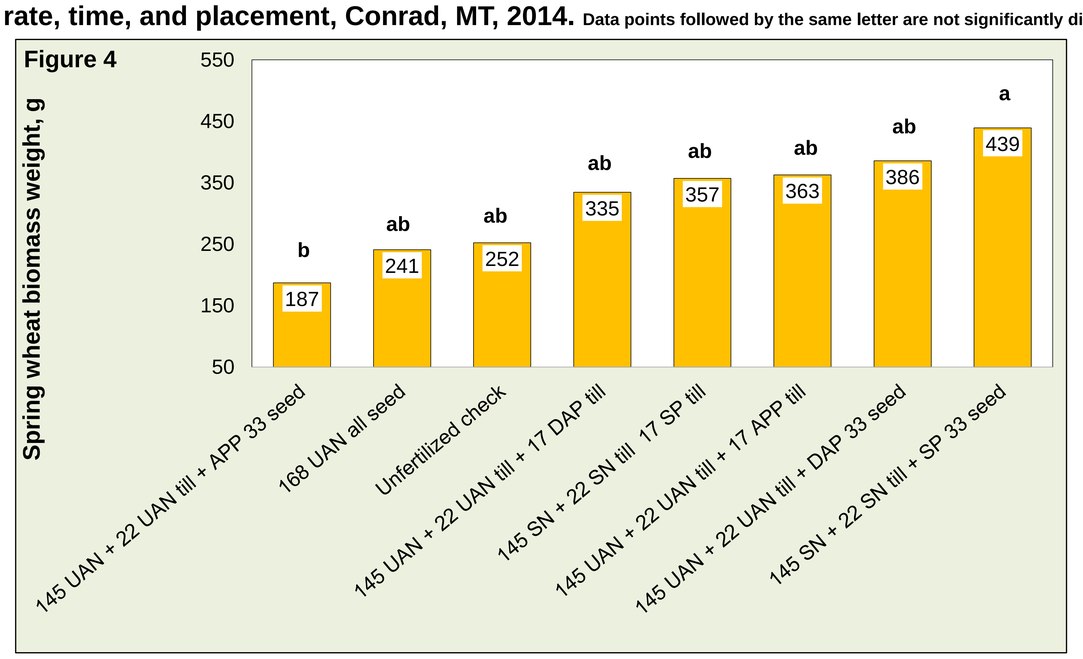
✓**This two-year study results also indicate that SP is less corrosive and less likely to cause damage to the seeds as a dribble and suggest that SP could be applied with the seed at a higher rate compared to other P sources.**

✓Further analysis is required to fully access the economic efficacy of Super Phos® compared to traditional P fertilizers.



Figures 1 and 2. Spring wheat grain yield (1) and grain protein (2) as a function of P fertilizer source, rate, time, and placement, Conrad, MT, 2014. Data points followed by the same letter are not significantly different (p<0.05).





Figures 3 and 4. Spring wheat test weight (3) and biomass weight (4) as a function of P fertilizer source, rate, time, and placement, Conrad, MT, 2014. Data points followed by the same letter are not significantly different (p<0.05).

We are grateful to Bio Huma Netics, Inc for funding this project. Contact information: Dr. Olga Walsh, University of Idaho, Southwest Idaho Research and Extension Center; Address: 29603, U of I lane, Parma, ID 83660; Telephone: (208)722-6701