

Optimizing Winter Wheat Management (Approved July 2012)

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In 2012 growing season the emphasis of this research effort will continue to address the potential need for chloride fertilizers as an aid to managing root and leaf spotting diseases in spring and winter wheat. Work will continue to evaluate the potential role of sulfur in enhancing wheat quality characteristics. This will be done with Alice hard white wheat.

Background:

A 2010 experiment (sponsored by the Wheat Commission) with winter wheat starter programs in Potter County indicated that low rates of seed-placed chloride sources have increased the plant chloride to levels considered adequate for leaf spotting disease suppression. Potential impacts on rood disease were not evaluated in that study. Early protection of the plant is important to allow proper development. There is also a desire to minimize the need for early season fungicide applications. The small leaf area makes it difficult to attain proper coverage with the fungicide. Additionally, Canadian scientists are concerned that early fungicide applications may be having negative impacts on beneficial fungi that suppress the development of pathogenic fusarium species.

Progress in calendar year 2011:

The 2011 growing season project emphasized copper fertilization studies. Neither seed applied or foliarly applied copper sources had an impact on yield of spring wheat in a replicated, field scale experiment in Potter County. This is not different from what has been found before. Work with sulfur fertilization was abandoned due to problems with application equipment. It will be done again this year.

Project for FY2013:

The chloride fertilizer study in the summer of 2012 will involve 3 winter wheat and one spring wheat site. Two of the winter wheat sites received four chloride treatments: (1) MAP alone-no chloride fertilizer in the starter program (2) MAP plus KCL-a low rate of chloride as KCL with the starter (3) MAP starter plus broadcast KCL-a high rate of KCL was broadcast but no KCL with the seed; and (4) MAP plus KCL starter plus broadcast high rate of KCL. One of the winter wheat sites and one of the spring wheat sites have broadcast ammonium chloride, broadcast potassium chloride and a check. Potassium chloride is significantly more expensive than ammonium chloride as the producer wants to only apply chloride.

Plant samples will be collected at Feekes 6 and analyzed for total nutrient concentrations of multiple elements including chloride. Plants and roots will be examined at Feekes 4 and Feekes 6. If differences in disease reaction are evident, these samples will be forwarded to the SDSU plant analysis laboratory for further verification and quantification.

Yield differences will be estimated by hand harvest on small plots and by combine weigh wagon yields on the replicated strip trials.

The sulfur treatments will occur at the Dakota Lakes Research Farm on dryland wheat fields. Nitrogen will be applied at Feekes 5 in replicated strips as urea alone or as urea blended with ammonium sulfate to produce a 10:1

ratio of N to S. The N rate will be based on soil nitrate-N levels. The strips will be harvested for yields and composite samples from both treatments will be sent to a commercial laboratory for quality analysis.

If the preliminary work on sulfur and chloride prove promising, more comprehensive experiments will be established in the Fall of 2012.