

# Manure application timing and economics of manure fertilization

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## Introduction

A study of the effects of spring-applied and fall-applied manure compared to traditional spring urea application on spring wheat shows that fall-applied manure can yield the greatest economic benefit.

## Materials and Methods

This study had four treatments. One treatment, the untreated check, had no nitrogen added. Other treatments were 150 pounds of nitrogen in the form of spring-applied urea, 150 pounds of nitrogen in the form of spring-applied manure, and 150 pounds of nitrogen in the form of fall-applied manure. Commercial phosphorus was added to the urea treatment to match the phosphorus levels in the manure-treated plots.



**Applying manure to test plots, Spring 2010.**

## Results

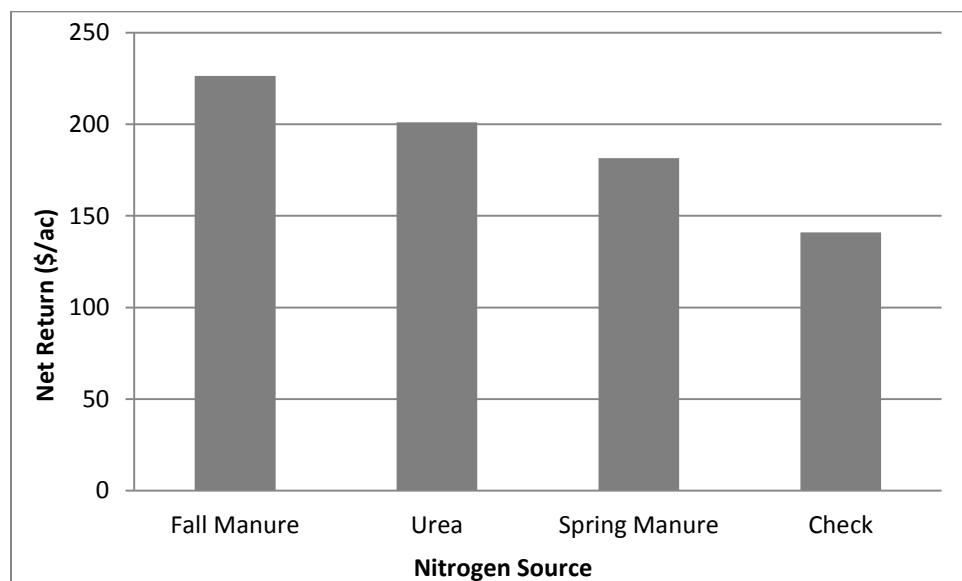
Spring wheat yield and protein results indicated that the urea treatment ranked highest (48 bu/ac, 15.3% protein), followed by fall-applied manure (45 bu/ac, 14.5% protein) then spring-applied manure (40 bu/ac, 14.1% protein), and finally the untreated check (30 bu/ac, 13.9% protein). Abnormally cold 2008 and 2009 growing seasons may have contributed to the inferior grain yield and quality of the manure treatments.

To provide an economic perspective, nitrogen prices were factored into this study. Area fertilizer dealers provided urea price quotes that equated to \$0.45/lb of available nitrogen. An \$0.11/lb value of manure nitrogen was determined from manure fertility analysis combined with the cost of hauling and applying the manure at the Carrington Research Extension Center. The nitrogen input costs were \$67.50/ac for urea and \$16.50/ac for manure treatments, respectively. Costs associated with urea application were not included since it is often combined with other field operations.

Gross income was determined by multiplying the price of a bushel of wheat (discounted for protein) by the yield for each treatment. By producing the most and highest quality wheat, the urea treatment grossed the highest at \$273.60/ac for 48 bu/ac at \$5.70/bu. Gross income on the fall-applied manure

treatment was \$243.00/ac for 45 bu/ac at \$5.40/bu, and the spring-applied manure treatment grossed \$198.00/ac for 40 bu/ac at \$4.85/bu. The untreated check grossed \$141.00/ac for 30 bu/ac at \$4.80/bu.

Although the urea treatment grossed the most money the urea nitrogen bill was more than four times greater (\$67.50/ac) than the manure treatments (\$16.50/ac). Calculating the net return (market price less nitrogen costs) on the use of the fertilizer shows fall-applied manure (\$226.50/ac) netted the most with traditional urea (\$206.10/ac) second, followed by spring-applied manure (\$181.50/ac). The untreated check (\$141.00/ac) was last (Figure 1).



**Figure 1.** Dollars netted from different nitrogen sources applied on spring wheat.

### Conclusion

While urea out produces manure when only yield is considered, fall-applied manure can return a greater profit per acre because of its cost effectiveness. As a side note, fall manure applications produce higher yields and better quality spring wheat than spring-applied manure.

