

An Economic Analysis of Foliar Fungicides Used in Northeast Texas Wheat Production

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Introduction

The U.S. wheat production mayor challenges are related to foreign competition and few alternative options under government programs. Nonetheless, the U.S. continues to be the world's largest wheat producer and exporter. Texas is ranked as the 8th largest wheat producing state with wheat being the third largest crop planted in this state (USDA, 2007).

The U.S. wheat industry is also affected by economic, environmental and biologic factors. Among biologic factors, fungal diseases are the number one cause of wheat losses around the world (McGrath, 2012). Up to 42% of the yield loss caused by fungal diseases can be prevented by applying foliar fungicides to winter wheat (Wiik and Rosenqvist, 2009).

This study conducts an Economic Analysis Foliar Fungicides Used in Northeast Texas wheat production.

Purposes

- ❑ To assist farmers in North East Texas in finding the profit-maximizing doses of fungicide treatment.
- ❑ To determine the effect of applying foliar fungicides on net returns from North East Texas wheat production.
- ❑ To determine the feasibility and profitability of spraying and non-spraying tebuconazole to control wheat fungal diseases in Northeast Texas.

Methodology

A four-year (2009, 2010, 2011, and 2012) study was conducted by The AgriLife Extension Personnel in Commerce, TX. They evaluated the effects of spraying versus non-spraying tebuconazole to control leaf rust, steam rust and glume blotch on four commercially planted wheat varieties (Magnolia, Terral LA 841, Pioner 25R47, and Coker 9553) in Northeast Texas, including Royse City, Howe town, and Leonard city.

The performance of tebuconazole in controlling fungal diseases was evaluated by comparing the yield response change (bushels per acre) from the four varieties in the three different locations in the study.

Production Model Analysis:

Production= Area Planted * Yield

Area Planted= $f(P_{\text{wheat}}, P_{\text{other commodities}}, \text{Wages}, P_{\text{fungicides}}, P_{\text{fertilizer}}, \text{Area Planted Previous years})$

Yield= $f(P_{\text{wheat}}, \text{Wages}, P_{\text{fungicides}}, P_{\text{fertilizer}})$

Profitability Analysis:

Total Profit= Total Revenues- Total Cost

Total Profit= $(\text{Yield} * \text{Price}_{\text{wheat}}) - (P_{\text{fungicide}} + P_{\text{fertilizer}} + C_{\text{Spraying}} + C_{\text{Harvest}} + C_{\text{transport}} + C_{\text{drying}})$

Results

Table 1. Yield Increase (Bu/A) Obtained with a Single Application of Tebuconazole in 2009.

Variety	Royse City	Leonard	Average (All locations)
Terral La 841	+9.6*	+2.9	+6.3
Magnolia	-1.4	+0.8	-0.3
Pioneer 25R47	+11.0*	+0.6	+5.8
Coker 9553	+2.3	-4.5	-1.1

Source: Texas AgriLife Extension Service, Commerce, TX (2012)

Table 2. Yield Increase (Bu/A) Obtained with a Single Application of Tebuconazole in 2010.

Variety	Royse City	Leonard	Average (All locations)
Terral La 841	+3.1	+2.8	+3.0
Magnolia	-2.5	+4.0	+0.8
Pioneer 25R47	+2.8	+3.7	+3.3
Coker 9553	-1.2	+4.0	+1.4

Source: Texas AgriLife Extension Service, Commerce, TX (2012)

Table 3. Yield Increase (Bu/A) Obtained with a Single Application of Tebuconazole in 2011.

Variety	Royse City	Leonard	Average (All locations)
Terral La 841	+0.2	+1.9	+1.0
Magnolia	+2.8	-2.4	+1.2
Pioneer 25R47	-3.8	+1.3	-0.7
Coker 9553	+1.6	+2.7	+1.9

Source: Texas AgriLife Extension Service, Commerce, TX (2012)

*Statistical significant differences in net returns.

+Improve in net returns.

-Random variations

Returns on investment by spraying tebuconazole for leaf rust in 2009, 2010 and 2011 on the four varieties were marginal (Texas AgriLife, 2012). The positive returns that were observed on Terral La 841 and Pioneer 25R47 in 2009 were achieved by controlling glume blotch, not leaf rust (Tables 1, 2, and 3)

Table 4. Yield Increase (Bu/A) Obtained with a Single Application of Tebuconazole in 2012.

Variety	Royse City	Leonard	Howe	Average (All locations)
Terral La 841	+5.1	+4.3	+13.8*	+1.0
Magnolia	+6.2	+6.6	+19.7*	+1.2
Pioneer 25R47	+0.8	-1.8	+9.7*	-0.7
Coker 9553	+6.9	+3.8	+4.5	+1.9

Source: Texas AgriLife Extension Service, Commerce, TX (2012)

Tebuconazole did not provide a positive return on investments in controlling low levels of fungal diseases but it did in controlling late season fungal infestation in the four varieties in 2009 in Royse City and 2012 in Howe (Texas AgriLife, 2012).

Conclusions

- ❑ Studies have demonstrated better results when applying fungicides to control wheat fungal diseases in North East Texas (Texas AgriLife, 2012).
- ❑ Foliar fungicides do not enhance yields; they only protect potential yields from loss to fungal diseases and they are not profitable in the absence of disease.
- ❑ The use of tebuconazole to control low leaf rust damage in wheat does not consistently provide a positive return. Tebuconazole controls late season glum blotch infection. (Texas AgriLife, 2012).

Recommendations

- ❑ Before making a fungicide spray decision other factors such: as yield variety potential, wheat price, fungicide cost, and disease infestation should be considered.
- ❑ High yielding resistant varieties should be used in a timely manner.
- ❑ Management for optimum yet realistic yields should be implemented.

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