

**PERFORMANCE OF PM 2326 RR AND  
PM 2200 RR ON THE TEXAS HIGH PLAINS  
- A TWO YEAR SUMMARY -  
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**Abstract**

Yield and fiber quality characteristics of transgenic varieties must be evaluated over differing environments and seasons to evaluate any changes, if any, in yield or fiber properties when compared to the recurrent parent line. Equally important to evaluate are the associated costs and returns of any new farming practice to ensure its true value.

**Introduction**

Paymaster Cottonseed in cooperation with Monsanto Company has collected and summarized agronomic and economic data during the 1996 and 1997 growing seasons from the Texas High Plains. The 1997 season marks the second year of significant Roundup Ready™ cotton acreage on the Texas High Plains. Extensive research evaluating yield potential, fiber properties and tolerance to applications of Roundup Ultra® has been conducted on PM 2326 RR and PM 2200 RR during the 1996 and 1997 growing seasons. No significant changes in yield potential or fiber qualities were found with PM 2326 RR or PM 2200 RR when compared to their recurrent parents HS 26 and HS 200 respectively. However, economic results showed higher economic returns associated with the Roundup Ready Systems.

**Discussion**

**PM 2326 RR**

A total of eighteen replicated yield trials were conducted in 1996 and 1997 representing many differing growing environments on the Texas High Plains. PM 2326 RR outyielded HS 26 by an average margin of 35.8 pounds per acre (Table 1.). Agronomically, PM 2326 RR has equal or better yield potential as HS 26. Producers do not have to resort to genetically inferior cultivars to gain access to the new transgenic technologies. Table 2 compares the fiber qualities of the two lines. Fiber qualities of PM 2326 RR have remained very similar to that of HS 26. Yield trials for these two Roundup Ready varieties were purposely not sprayed with Roundup Ultra, so that pure genetic yield potentials could be established. The economic trials that will be discussed further in this paper have received applications of Roundup Ultra to show yield stability while implementing the Roundup Ready system.

**PM 2200 RR**

Yield trials for the PM 2200 RR versus HS 200 were conducted in both 1996 and 1997. From the eleven replicated trials conducted during this time, PM 2200 RR showed an average 29.9 pounds.) yield advantage over HS 200 (Table 3). This data shows again that the transgenic lines have the same or better yield potential as the recurrent parent. Fiber quality of PM 2200 RR has remained very similar to HS 200 (Table 4.). There has been a slight increase in micronaire for PM 2200 RR. This is an asset for PM 2200 RR in that HS 200 tends to be on the low side of the micronaire range.

**1996 Economic Analysis  
of the Roundup Ready System**

The 1996 season started the first “real world” or side-by-side comparisons of the Roundup Ready weed control system to conventional weed control systems on the Texas High Plains. Eight economic comparison trials were conducted in 1996 evaluating weed control input costs with their associated yields and net dollar returns after weed control expenses were subtracted. Table 5 compares the average inputs, yields, and returns for the trials conducted in 1996. Dollar amounts in the Inputs column include any pre-plant incorporated herbicides, pre-emerge herbicides, in-season chemical herbicides, technology fees (\$5 per acre for Roundup Ready cotton only), hand- hoeing costs and any cultivations. Gross returns per acre were calculated by multiplying the yield by \$0.68 cent cotton. Net returns per acre were calculated by subtracting all weed control input expenses from the gross return per acre. Yields from the Roundup Ready systems averaged 81 pounds more per acre more than the conventional systems. An average \$45.99 higher net returns per acre was realized for the Roundup Ready systems resulting from their higher yields. Some factors contributing to the higher Roundup Ready system yields could be less weed competition, better water conservation from fewer cultivations and less root pruning.

**1997 Dryland Economic Analysis  
of the Roundup Ready System**

At the time this presentation was prepared, data from twenty one 1997 dryland economic comparison trials had been compiled and summarized (Table 6.). Data in Table 6 is arranged similar as Table 5 with the associated input expenses and gross and net dollar returns per acre assuming a cotton lint price of \$0.68 cents per pound. The 1997 season was ushered in by a very wet Spring, thus creating ideal conditions for weeds to germinate and compete with the cotton crop. Therefore more weed control inputs were put into the 1997 crop than the 1996 crop. Again the weed control inputs include all those mentioned above plus \$1.20 more per acre for the transgenic varieties due to the increase in seed cost. Roundup Ready system inputs ranged from approximately \$23.00 to \$63.00 compared to \$5.00 to \$102.00 for the conventional system. The conventional

systems averaged more than twice as many cultivations as the Roundup Ready systems at 2.0 compared to 0.9. The single input that created the largest variance in weed control inputs was the cost of hand-hoeing the conventional fields. An average of \$6.00 per acre was spent on hand-hoeing the conventional fields while no money was spent hand-hoeing the Roundup Ready system fields. Costs for hand-hoeing the conventional cotton ranged from \$6.50 to \$75.00 per acre. The Roundup Ready systems averaged 1.0 over-the-top applications and 0.6 Post-directed applications of Roundup Ultra during the season. Taking all the weed control inputs associated with each of the systems and their yields, the dryland Roundup Ready systems returned an average \$34.49 more dollars per acre back to the producer than the conventional system.

### **1997 Irrigated Economic Analysis of the Roundup Ready System**

Data from fifteen irrigated economic trials comparing the input costs, yields and dollar returns has been summarized in Table 7. Roundup Ready system weed control inputs ranged from approximately \$28.00 to \$64.00 per acre compared to \$16.00 to \$92.00 per acre for the conventional weed control systems. Again the conventional weed control systems averaged more than twice as many cultivations as the Roundup Ready systems; 2.2 compared to 1.0. Hand-hoeing was a large source of variation for computing weed control input costs. The Roundup Ready systems averaged \$1.60 per acre for hand-hoeing expenses compared to \$14.10 per acre for the conventional weed control systems. Other sources of input expenses for the conventional weed control systems included chemical cost for applications of Dual, Staple and Propanil. The Roundup Ready systems received an average of 1.3 over-the-top applications and 0.5 Post-directed applications of Roundup Ultra during the season. After multiplying the average yield per acre by \$0.68 cents per pound and subtracting out weed control inputs, the irrigated Roundup Ready weed control systems averaged \$70.95 more net return per acre than the conventional weed control systems.

### **Summary**

The new transgenic varieties coupled with the new technologies that are available to producers offer new avenues for potentially more profitable farming. Both of the cultivars evaluated in this presentation, PM 2326 RR and PM 2200 RR, are solid, proven performers with equal or better yield potential and have very similar fiber qualities as their recurrent parents HS 26 and HS 200. After evaluating the Roundup Ready weed control system across time and locations, the advantages become very obvious. Higher yields with more efficient water use, more effective and timely weed control and the potential to significantly lower or even eliminate hand-hoeing are some of the greatest advantages of the Roundup Ready system. Producers can continue to depend on the high yields and

quality fiber of HS 26 and HS 200 when they plant PM 2326 RR and PM 2200 RR. Producers can also maintain high yields with more efficient weed control by implementing the cost effective Roundup Ready weed control system.

Table 1. Summary of 18 replicated yield trials from the Texas High Plains during the 1996 and 1997 seasons.

<u>Variety</u>	<u>Yield (lbs/A)</u>
PM 2326 RR	938.3 a
HS 26	<u>902.5 a</u>
Difference	35.8 LSD = 52.2

Table 2. Fiber data summary from 20 Texas High Plains trials in 1996 and 1997.

<u>Variety</u>	<u>Length (in)</u>	<u>Strength (g/tex)</u>	<u>Mic</u>
PM 2326 RR	1.062	29.6	4.53
HS 26	1.077	30.9	4.22

Table 3. Summary of 11 replicated yield trials from the Texas High Plains during the 1996 and 1997 seasons.

<u>Variety</u>	<u>Yield (lbs/A)</u>
PM 2200 RR	993.1 a
HS 200	<u>963.2 a</u>
Difference	29.9 LSD = 55.4

Table 4. Fiber data summary from 18 Texas High Plains trials in 1996 and 1997.

<u>Variety</u>	<u>Length (in)</u>	<u>Strength (g/tex)</u>	<u>Mic</u>
PM 2326 RR	1.097	29.3	4.17
HS 26	1.117	29.9	3.94

Table 5. 1996 Summary of weed control costs, yields and returns comparing the Roundup Ready weed control system to conventional weed control. (Means calculated from 8 locations)

	<u>RR System</u>	<u>Conventional System</u>	<u>Difference</u>
Inputs *(\$/A)	28.55	19.46	9.09
Yield (lbs/A)	811	730	81
Gross Return (\$/A)	551.48	496.4	55.08
Net Return (\$/A)	522.93	476.94	45.99

\* weed control inputs only

Table 6. 1997 Economic summary of weed control costs, yields and returns comparing the Roundup Ready weed control system to conventional weed control. (Means calculated from 21 dryland locations)

	<u>RR System</u>	<u>Conventional System</u>	<u>Difference</u>
Inputs *(\$/A)	37.35	29.58	7.77
Yield (lbs/A)	461	399	62
Gross Return (\$/A)	313.58	271.32	42.26
Net Return (\$/A)	276.23	241.74	34.49

\* weed control inputs only

Table 7. 1997 Economic summary of weed control costs, yields and returns comparing the Roundup Ready weed control system to conventional weed control. (Means calculated from 15 irrigated locations)

	<u>RR System</u>	<u>Conventional System</u>	<u>Difference</u>
Inputs *(\$/A)	44.02	47.47	3.45
Yield (lbs/A)	862.7	763.5	99.2
Gross Return (\$/A)	586.64	519.16	67.48
Net Return (\$/A)	542.64	471.69	70.95

\* weed control inputs only

