TEXAS-OKLAHOMA PRODUCER COTTON MARKET SUMMARY: 1999/2000

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Abstract

The size of the Texas-Oklahoma spot market for the 1999/2000 marketing year increased considerably from the previous year and the average producer price declined for the fourth year in a row. The average price received by producers during the 1999/2000 marketing year was about 37.82 cents/lb., which was 13.32 cents/lb. lower than the previous marketing year. The 1999 crop was generally of good quality, but the average for staple length and strength declined compared to the 1998 crop. The percentage of bales having level 2 bark, and level 1 and 2 other extraneous matter also increased marginally when compared to the 1998 crop. With the exception of the first digit of the color grade, level 1 bark, and level 2 other extraneous matter, price discounts for the 1999 crop decreased for all quality attributes. The premiums for the first digit of the color grade and staple both increased, while the premium for strength decreased.

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Introduction

This report summarizes the price, premium, and discount estimates for the 1999/2000 marketing year (also referred to as the 1999 crop year). These estimates were obtained from the Daily Price Estimation System (DPES), which is maintained and operated by the Department of Agricultural and Applied Economics, Texas Tech University. The DPES is a computerized price analysis system that uses an econometric model to analyze producer cotton prices and estimate quality premiums and discounts for the West Texas and East Texas/Oklahoma cotton marketing regions on a daily basis (Brown et al. 1995). The DPES receives data each day from electronic spot markets operating in these regions and uses these data for daily price analysis and estimation of premiums and discounts. These data represent only producer spot market transactions, which do not include contracted cotton, commission sales to mills, or sales among merchants. The reported results are based on the official HVI grading standards used by the U.S. Dept. of Agriculture.

1999/2000 Crop Statistics

Table 1 provides a summary of the crop statistics, including the simple average and 95% population range, for the past 4 marketing years. For the 1999/2000 marketing year, a total of 896,788 bales (734,952 bales from West Texas and 161,836 bales from East Texas/Oklahoma) and 12,072 sales transactions were used in the DPES estimations. This represents about 17% of the 5.2 million bale crop in Texas and

Table 1. Texas-Oklahoma Crop Statistics from the DPES, by Marketing Year.

	Average				95% Population Range[a]			
Attribute	1999/2000	1998/1999	1997/1998	1996/1997	1999/2000	1998/1999	1997/1998	1996/1997
Price (cents/lb.)	37.82	51.14	57.99	63.48	29.15 - 46.49	44.05 - 58.23	49.87 - 66.10	56.01 - 70.96
Bales per Sale	74	82	87	65	1 – 286	1 - 281	1 – 347	1 - 244
Leaf Grade	2.74	3.29	3.40	3.18	0.88 - 4.60	1.40 - 5.19	1.37 - 5.43	1.48 - 4.87
First Digit of Color Grade	2.37	2.84	2.48	2.62	1.03 - 3.72	1.58 - 4.09	1.06 - 3.91	1.34 - 3.91
Second Digit of Color Grade	1.19	1.37	1.70	1.46	1 - 1.91	1 - 2.25	1 - 3.15	1 - 2.56
Staple	32.58	33.21	33.57	34.23	29.94 - 35.22	30.86 - 35.56	31.31 – 35.83	31.87 - 36.59
Strength	27.62	27.70	28.68	27.33	24.55 - 30.69	25.30 - 30.06	25.49 – 31.87	23.80 - 30.86
Micronaire	4.17	4.17	3.95	3.77	3.13 - 5.22	3.25 - 5.10	3.08 - 4.83	2.71 - 4.83
Level 1 Bark (%)	6.03	11.90	22.74	26.14	0 - 39.72	0 - 49.67	0 - 80.57	0 - 88.75
Level 2 Bark (%)	0.02	0.00	0.95	0.06	0 - 2.00	0 - 0.37	0 - 8.95	0 - 3.12
Level 1 Other (%)	0.60	0.30	0.86	0.87	0 - 9.95	0 - 4.00	0 - 11.09	0 - 12.64
Level 2 Other (%)	0.03	0.00	0.48	0.12	0 - 2.30	0 - 0.47	0 - 7.71	0 - 5.36

[a]The range within which 95% of the observed values fell.

Oklahoma (USDA/NASS, 2000) and about 31**%** of the producers' cash market sales for these regions.

The number of sale transactions and bales sold received by the DPES for the 1999 crop year increased by about 12% from the previous year. This higher volume could be attributed to the increase in the 1999 crop size and a decrease in forward contracting from 28% in 1998/1999 (USDA/AMS, 1999) to 5% in 1999/2000 (USDA/AMS, 2000). The number of bales per sale decreased marginally from 82 bales in 1998/1999 to 74 bales in 1999/2000 (Table 1). This reflects a continuation of the trend of a decrease in number of bales per sale observed over the last 2 years. However, the variation in lot size did not follow this trend: 95% of the 1999 crop transactions fell between 1 and 286 bales per lot versus 1 and 281 bales per lot in the previous year.

The 1999 crop was characterized by an average length marketing year, running from the beginning of October to the beginning of April, compared to the shorter 1998 marketing year, which ran from mid October through mid March. Figure 1 illustrates the pattern of sale transactions during the 1999/2000 marketing year. After February 7, sales dropped off sharply and several periods of little to no market activity occurred throughout the remainder of the season. The average price received by producers declined for the fourth year in a row, falling to 37.82 cents/lb. Variation in prices also declined, with 95% of the prices falling between 29.15 and 46.49 cents/lb. In the previous year, there was a clear downward trend in the base price movement throughout the marketing year. In contrast, the base price fell during the first half and then rose during the second half of the 1999/2000 marketing year (Figure 2). The average leaf grade decreased

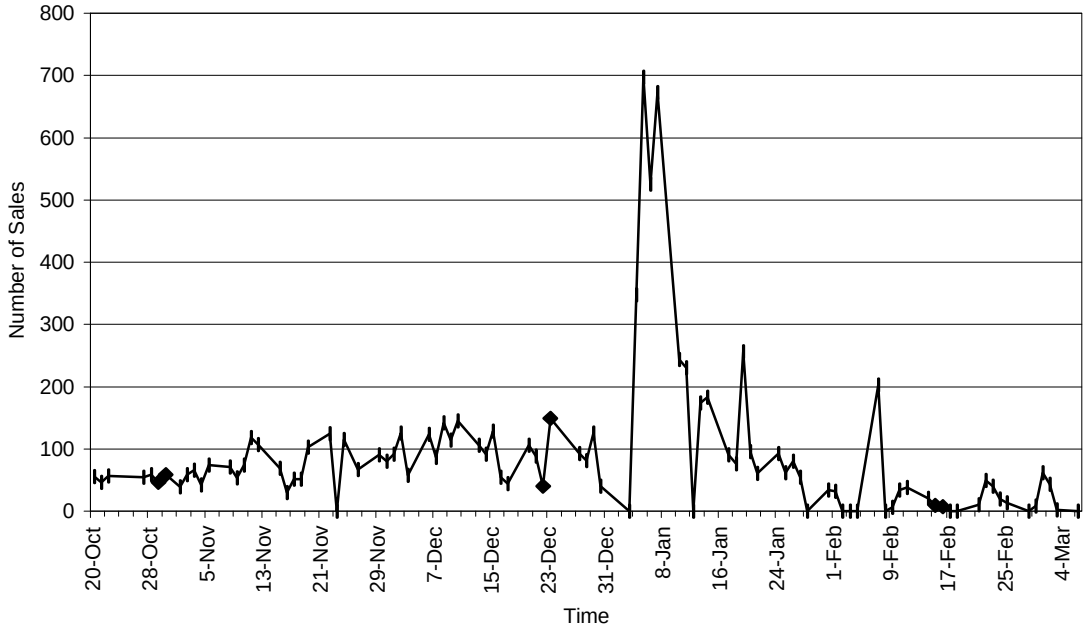

Figure 1: Daily Volume of Transactions for the 1999/2000 Marketing Year.

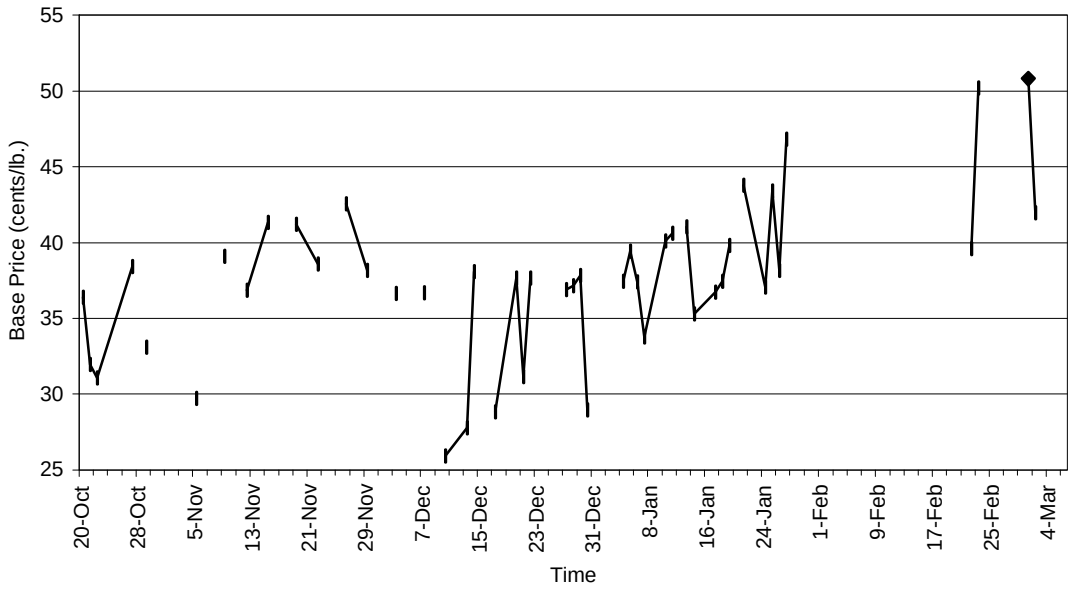

Figure 2: Movement of Base Prices for the 1999/2000 Marketing Year, West Texas.

from 3.29 in 1998/1999 to 2.74 in 1999/2000 (Table 1). The first digit of the color grade, indicating the degree of reflectance (grayness), improved to an average of 2.37. The second digit of the color grade, indicating the degree of yellowness, decreased (improved) from 1.37 in 1998 to 1.19 for the 1999 crop year, which was the lowest observed in the last 4 years. The range of variation in yellowness also decreased to a 95% sample range of between 1 and 1.91.

The average staple length fell marginally from 33.21 32nds/inch in 1998 to 32.58 32nds/inch in 1999. The variation in staple length also decreased with 95% of sales ranging between 29.94 and 35.22 32nds/inch. Average strength decreased from 27.70 grams/tex to 27.62 grams/tex, ranging between 24.55and 30.69 grams/tex. Micronaire remained constant at the previous year level of 4.17, but with an increase in the variation ranging from 3.13 to 5.22.

Bark is reported as the percentage of bales having level 1 or 2 bark. Average level 1 bark decreased by about 50% from the previous year, and the 95% population range decreased from an upper bound of 49.67% in 1998 to 39.72% in 1999. The average for level 2 bark was 0.02%, which was about the same as last year's. Other extraneous matter is also reported as the percentage of bales in a lot containing either level 1 or level 2 other extraneous matter (largely grass content). Average level 1 other extraneous matter remained relatively low at 0.60%, while the percentage for average level 2 other extraneous matter increased to 0.03%.

The 1999 crop was generally of good quality. In relative terms, all quality characteristics except for staple, strength, level 2 bark, level 1 other extraneous matter, and level 2 other extraneous matter, showed improvement compared to the 1998 crop. In

spite of this, the prices received by producers for the 1999 crop were significantly lower than in the previous year, continuing the steady decline observed during the past four years.

Average 1999/2000 Prices, Premiums, and Discounts

The DPES utilizes an econometric model to disaggregate the price of cotton with respect to seven quality characteristics: leaf grade, color grade, staple length, strength, micronaire, bark content, and other extraneous matter content. These are the same quality characteristics used by the USDA for the classification and grading of U.S. cotton through the 1999/2000 marketing year. Parameter estimates obtained from the econometric model are used to calculate the daily premiums and discounts. Appendix A contains a more detailed discussion of the econometric procedures utilized.

A set of parameter estimates (see Appendix A), representing a weighted average of the estimates for the entire crop year, was used to calculate the premiums and discounts for the 1999/2000 marketing year for the West Texas (Table 2) and East Texas/Oklahoma (Table 3) regions. The upper half of the table presents the color grade/staple matrix, which contains the discounts and premiums for color grade and staple length, and the base price at color grade 41 and staple length 34 (all other quality attributes held at the base levels). For example, the average base price for the West Texas region was 37.58 cents/lb. (100 points = 1 cent). For a color grade of 51 and staple length 33, the discount with respect to that base price was about 3.66 cents/lb. The bottom half of the table presents the average discounts for micronaire, bark, and other extraneous matter content, and the premiums and discounts for strength and leaf grade.

Table 2: 1999/2000 Weighted Average Price Estimates from the DPES, West Texas.

Weekly Weighted Average of the Daily Spot Cotton Price Estimates

Dept. of Ag. and Applied Econ., Texas Tech Univ. # Sales: 9573

Date: 1999 YEAR Region: WEST TEXAS # Bales: 734952

Color Grade and Staple Premiums and Discounts in Points/lb.[a]

	Staple Length										
Col Grade	28	29	30	31	32	33	34	35	36	37	38
11	-873	-688	-504	-321	-141	34	203	364	515	656	--
21	-873	-688	-504	-321	-141	34	203	364	515	656	--
31	-918	-735	-554	-373	-196	-24	142	301	45	588	--
41	-1021	-846	-670	-497	-326	-160	37.58[b]	153	296	430	--
51	-1178	-1012	-847	-683	-522	-366	-215	-71	65	190	--
61	-1378	-1225	-1072	-921	-773	-629	-489	-356	-231	-115	--
71	--	--	--	--	--	--	--	--	--	--	--
12	-951	-771	-591	-413	-238	-68	96	253	400	537	--
22	-951	-771	-591	-413	-238	-68	96	253	400	537	--
32	-994	-817	-640	-464	-292	-124	37	191	337	471	--
42	-1095	-924	-754	-585	-419	-257	-101	47	187	317	--
52	-1247	-1086	-925	-766	-610	-457	-310	-170	-38	84	--
62	-1442	-1293	-1145	-998	-853	-713	-577	-448	-326	-214	--
23	-1122	-953	-784	-617	-453	-293	-139	8	147	275	--
33	-1163	-996	-830	-665	-503	-346	-194	-49	87	213	--
43	-1257	-1097	-937	-778	-622	-470	-324	-185	-53	69	--
53	-1400	-1249	-1098	-948	-801	-658	-520	-389	-265	-150	--
63	-1583	-1443	-1304	-1166	-1030	-898	-771	-650	-536	-430	--
34	-1406	-1255	-1105	-955	-809	-666	-528	-397	-274	-159	--
44	-1492	-1347	-1201	-1058	-916	-779	-646	-520	-401	-290	--
54	-1621	-1484	-1348	-1212	-1079	-949	-824	-705	-593	-489	--

Micronaire Differences Points/lb.

Mike Range	
24&below	-851
25-26	-724
27-29	-528
30-32	-325
33-34	-188
35-49	0
50-52	-295
53&above	-421

Leaf Grade Differences Points/lb.

Leaf Grade	Disc./ Prem.
1	--
2	97
3	75
4	0
5	-124
6	-292
7	-497

Bark Discounts Points/lb.

Bark Code	Disc.
Level 1	-208
Level 2	-522
Other Discounts Points/lb.	
Other Code	Disc.
Level 1	-522
Level 2	-752

Strength Differences Points/lb.

Grams/ Tex.	Disc./ Prem.
18&below	--
19	--
20	--
21	-163
22	-109
23	-61
24 & 25	0
26	48
27	72
28	90
29	102
30	107
31&above	107

[a]100 points = 1 cent

[b]Base Price in cents/lb.

Table 3: 1999/2000 Weighted Average Price Estimates from the DPES, East Texas/Oklahoma.

Weekly Weighted Average of the Daily Spot Cotton Price Estimates

Dept. of Ag. and Applied Econ., Texas Tech Univ. # Sales: 2499

Date: 1999 YEAR Region: EAST TEXAS/OKLA. # Bales: 161836

Color Grade and Staple Premiums and Discounts in Points/lb.[a]

	Staple Length										
Col Grade	28	29	30	31	32	33	34	35	36	37	38
11	-882	-695	-508	-324	-142	35	205	367	520	662	--
21	-882	-695	-508	-324	-142	35	205	367	520	662	--
31	-926	-742	-559	-377	-198	-24	144	304	454	594	--
41	-1031	-854	-677	-502	-329	-162	37.94[b]	154	299	434	--
51	-1189	-1022	-855	-690	-527	-369	-217	-72	65	192	--
61	-1391	-1236	-1083	-930	-780	-634	-494	-360	-234	-117	--
71	--	--	--	--	--	--	--	--	--	--	--
12	-960	-778	-597	-417	-240	-68	97	255	404	542	--
22	-960	-778	-597	-417	-240	-68	97	255	404	542	--
32	-1003	-825	-646	-469	-295	-126	38	193	340	476	--
42	-1259	-933	-761	-590	-423	-259	-102	48	189	320	--
52	-1259	-1096	-934	-773	-615	-461	-313	-172	-39	85	--
62	-1455	-1305	-1156	-1007	-861	-719	-583	-452	-329	-216	--
23	-1133	-962	-792	-623	-457	-296	-140	8	148	278	--
33	-1174	-1006	-838	-672	-508	-349	-196	-50	88	215	--
43	-1269	-1107	-946	-785	-628	-475	-327	-186	-54	69	--
53	-1414	-1261	-1108	-957	-809	-665	-525	-393	-268	-152	--
63	-1598	-1457	-1316	-1177	-1040	-907	-778	-656	-541	-434	--
34	-1419	-1267	-1115	-965	-817	-672	-534	-401	-276	-161	--
44	-1506	-1359	-1213	-1068	-925	-786	-652	-525	-405	-293	--
54	-1637	-1499	-1360	-1224	-1089	-958	-832	-712	-599	-493	--

Micronaire Differences Points/lb.

Mike Range	
24&below	-859
25-26	-731
27-29	-533
30-32	-328
33-34	-190
35-49	0
50-52	-298
53&above	-425

Leaf Grade Differences Points/lb.

Leaf Grade	Disc./ Prem.
1	--
2	98
3	75
4	0
5	-125
6	-295
7	-502

Bark Discounts Points/lb.

Bark Code	Disc.
Level 1	-210
Level 2	-527
Other Discounts Points/lb.	

Other Code	Disc.
Level 1	-527
Level 2	-759

Strength Differences Points/lb.

Grams/ Tex.	Disc./ Prem.
18&below	--
19	--
20	--
21	-164
22	-110
23	-62
24 & 25	0
26	48
27	73
28	91
29	102
30	108
31&above	108

[a]100 points = 1 cent

[b]Base Price in cents/lb.

The zeros in the premium and discount columns for micronaire, leaf, and strength represent the base quality as defined by USDA through the 1999/2000 marketing year.

Patterns of Premiums and Discounts

The following section summarizes the average premiums and discounts for each fiber quality attribute observed throughout the 1999/2000 marketing year. The movements of each individual attribute's premiums and discounts over the marketing year are presented and analyzed. While a specific quality attribute is being discussed, all other attributes are held at their base level. Seasonal patterns and comparisons are illustrated using the quality attribute premiums and discounts of the West Texas marketing region, which are not appreciably different from those of the East Texas/Oklahoma region.

Leaf Grade

Figure 3 presents the leaf grade 3 premiums for the 1999/2000 marketing year. The variation in premiums was similar to that in the previous marketing year, with the majority of premiums (illustrated with leaf grade 3) fluctuating between 25 and 140 points/lb. throughout this marketing year. Figure 4 illustrates the average premiums and discounts associated with each leaf grade for the 1999/2000 marketing year in comparison with the 1998/1999 marketing year. While the premiums did not experience a significant change from the previous year, discounts for high leaf levels in the 1999/2000 marketing year appeared to decrease slightly.

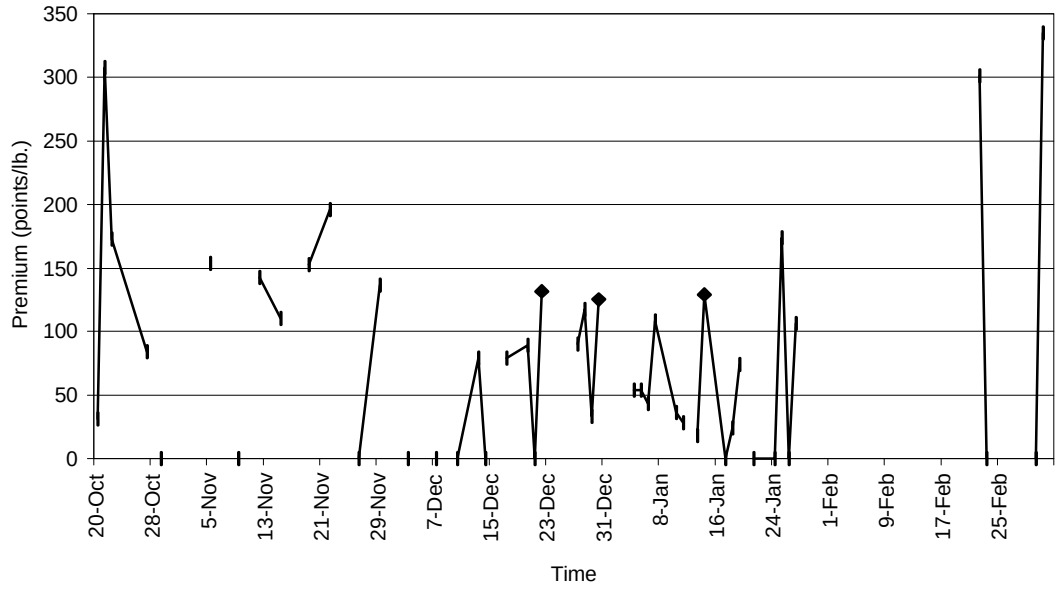

Figure 3: Leaf Grade 3 Premiums for the 1999/2000 Marketing Year, West Texas.

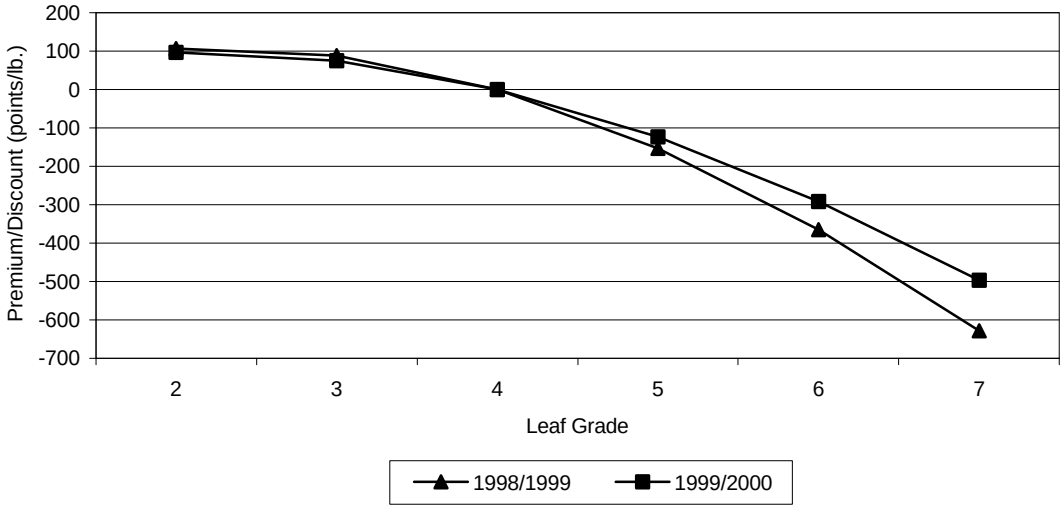

Figure 4: Leaf Grade Premiums/Discounts, 1998/1999 and 1999/2000, West Texas.

Color Grade

The discount for color grade 42 (Figure 5) was somewhat erratic throughout the 1999/2000 marketing year. In comparison with prior marketing years, the 1999/2000 marketing year had considerably fewer days in which color grade had an impact on prices. During the month of January, however, the color grade once again began to have an effect on price with the majority of discounts falling between 50 and 200 points/lb., a pattern similar to that in the previous year. Figure 6 provides a comparison of the premiums and discounts for the first digit of the color grade for the 1999/2000 and 1998/1999 marketing years. Both the premiums and discounts increased from the 1998/1999 marketing year to the 1999/2000 crop year. This implies that color grades 1, 2, or 3 received a higher premium than in the previous year, while levels of reflectance above the base level were discounted more severely in 1999/2000. The increased premium from the 1998 crop in relation to the 1999 crop could be linked to a change in the demand for higher quality cotton. The higher discounts could be attributed to ready availability of cotton with the first digit of the color grade of 4. Discounts for the second digit of the color grade (Figure 7) decreased compared to the 1998 crop year, even more so for high second digit values. Cotton with increasing levels of yellowness was less severely discounted than in the 1998/1999 marketing year.

Staple

The discounts for staple length 33 in the 1999/2000 marketing year were as stable as those from the 1998/1999 marketing year. They exhibited a slight downward trend from November to mid January where fluctuations remained between 150 to 300 points/lb. (Figure 8). From mid January to the end of the marketing season,

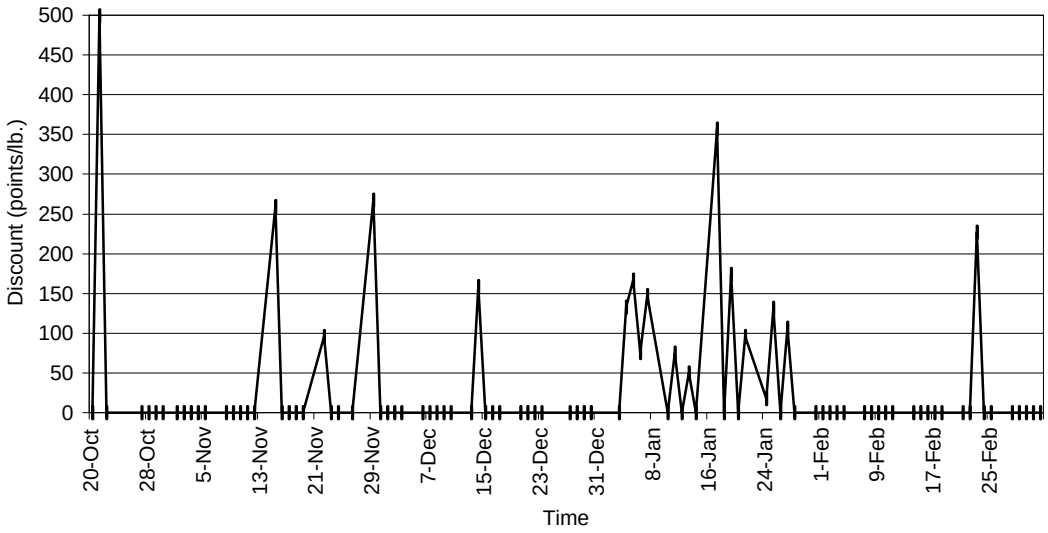

Figure 5: Color Grade 42 Discounts for the 1999/2000 Marketing Year, West Texas.

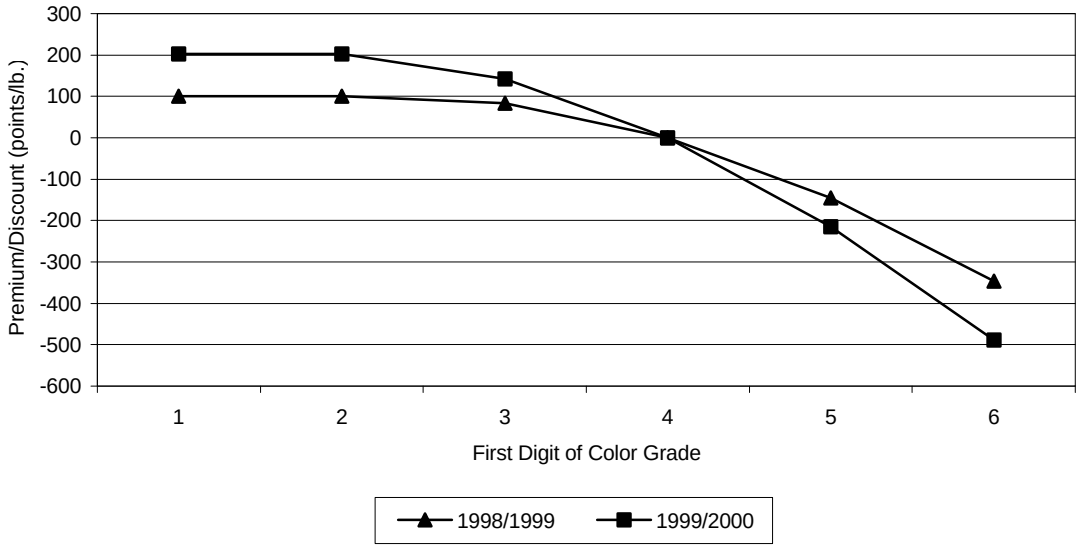

Figure 6: First Digit of the Color Grade Premiums/Discounts, 1998/1999 and 1999/2000, West Texas.

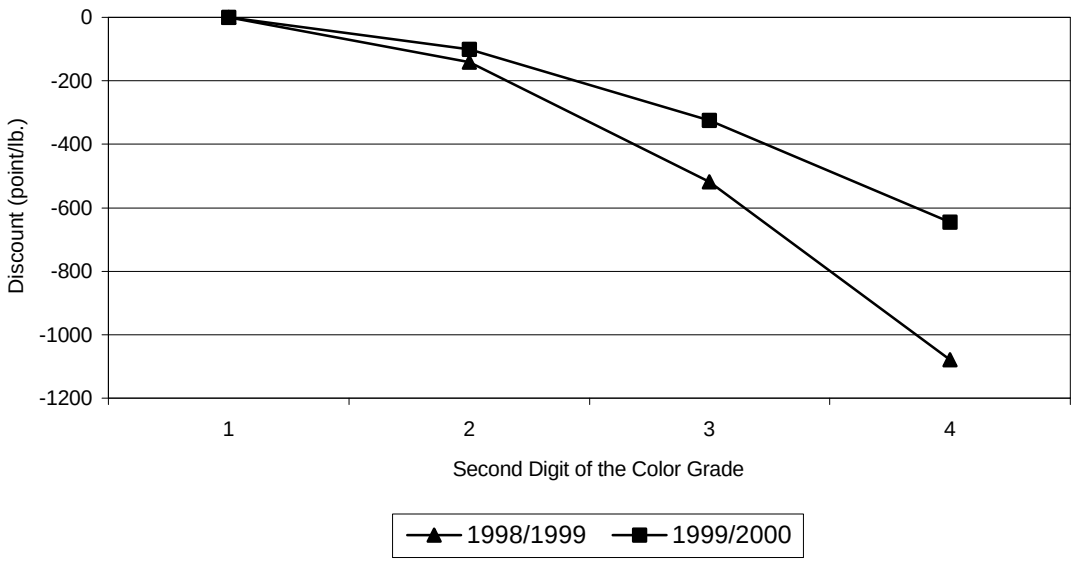

Figure 7: Second Digit of the Color Grade Discounts, 1998/1999 and 1999/2000, West Texas.

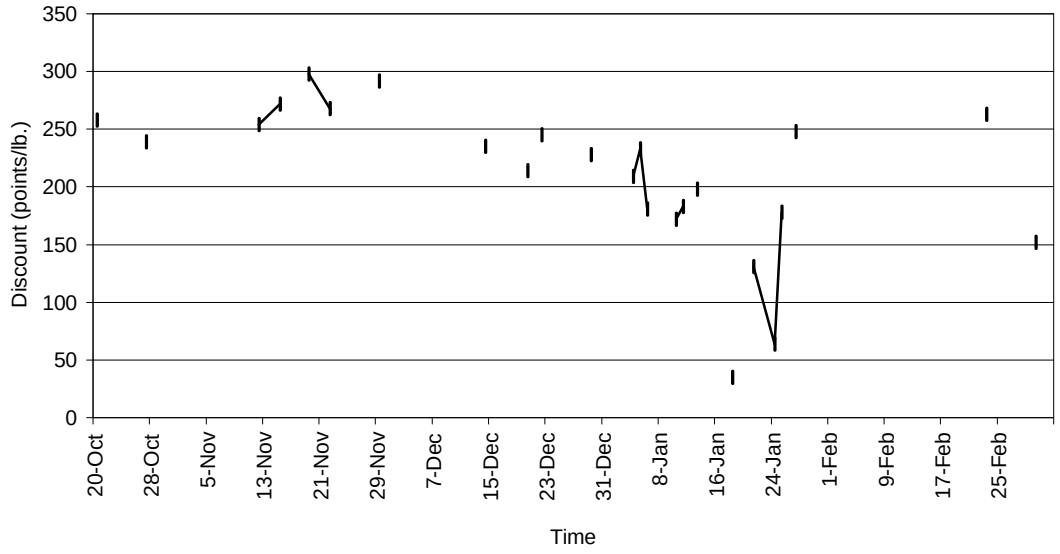

Figure 8: Staple Length 33 Discounts for the 1999/2000 Marketing Year, West Texas.

the discounts became somewhat erratic. Figure 9 illustrates that lower staple levels were discounted less severely in the 1999/2000 marketing year than in the 1998/1999 year, while higher staple levels received higher premiums than the previous year. This change in the discount and premium pattern can be attributed to the lower average staple experienced in the 1999 crop year.

Strength

Figure 10 provides an illustration of the pattern of premiums for strength 27, which exhibited wide fluctuations during the 1999/2000 marketing year. There were several days during the 1999/2000 marketing year when strength did not have any impact on price (Figure 10). Lower levels of strength experienced less severe discounts than in the 1998/1999 marketing year, while higher levels of strength received lower premiums (Figure 11). This could indicate that the strength of the fiber was not of as much concern in the 1999/2000 marketing year as it was in the previous year.

Micronaire

Discounts for micronaire 3.35 in 1999/2000 showed an erratic pattern quite similar to that of the previous year (Figure 12). The discounts remained mostly within a range of 100 to 250 points/lb., which is similar to the previous year. The discounts for both high and low ranges of micronaire were lower in the 1999/2000 marketing year compared to the previous year (Figure 13).

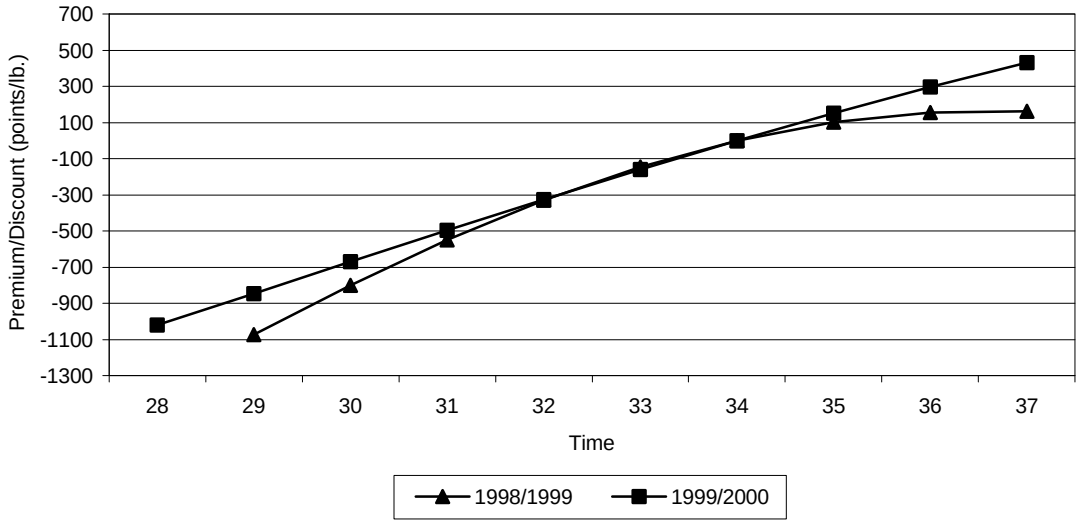

Figure 9: Staple Length Premiums/Discounts, 1998/1999 and 1999/2000, West Texas.

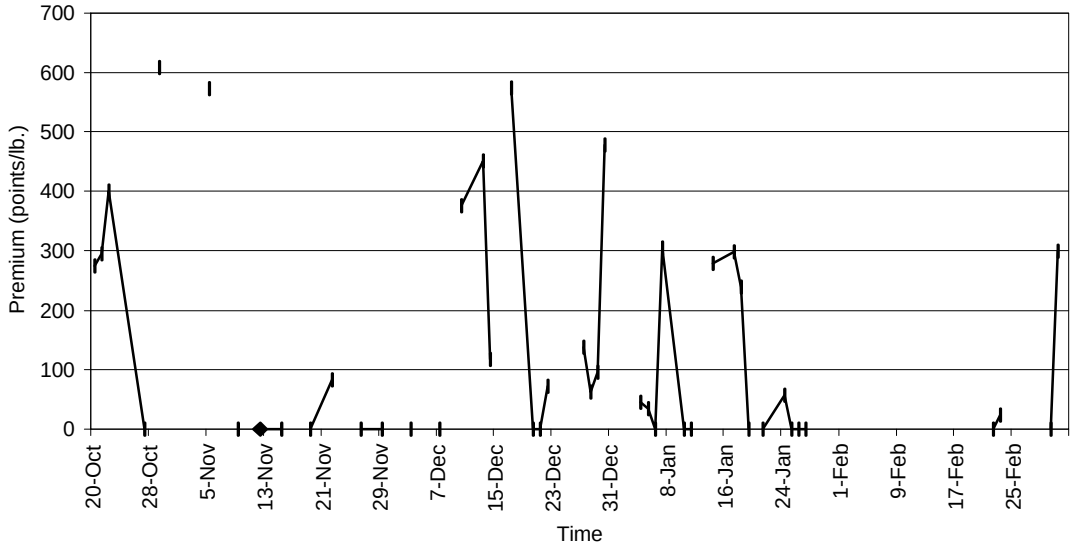

Figure 10: Strength 27 Premiums for the 1999/2000 Marketing Year, West Texas.

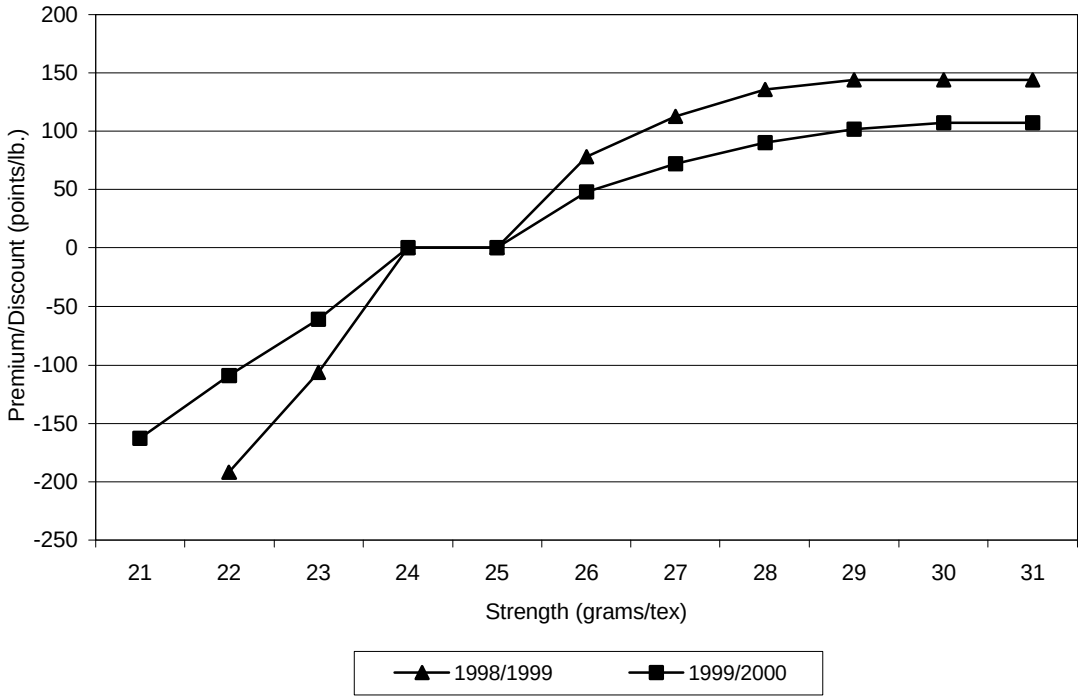

Figure 11: Strength Premiums/Discounts, 1998/1999 and 1999/2000, West Texas.

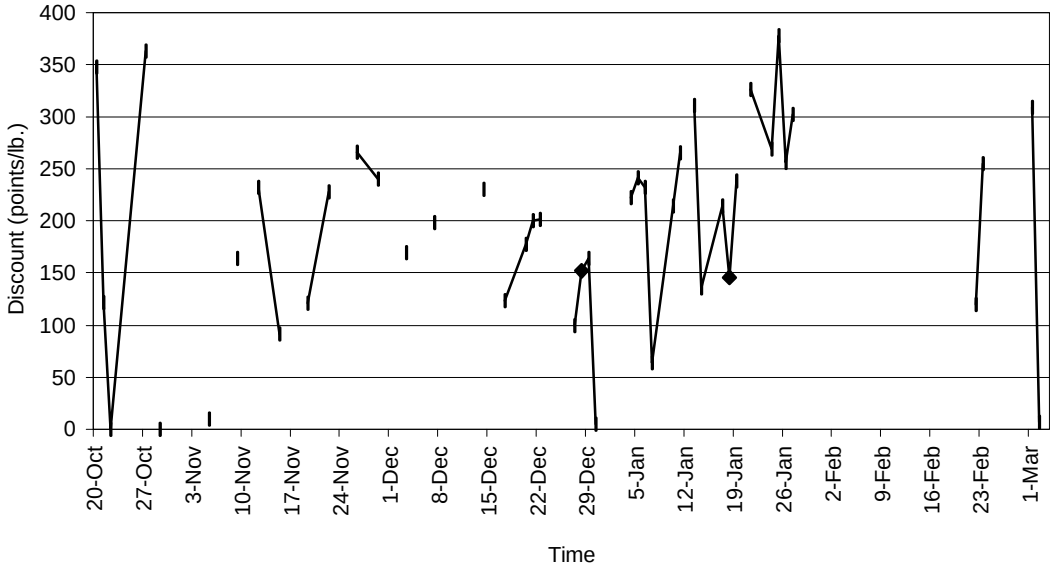

Figure 12: Micronaire 3.35 Discounts for the 1999/2000 Marketing Year, West Texas.

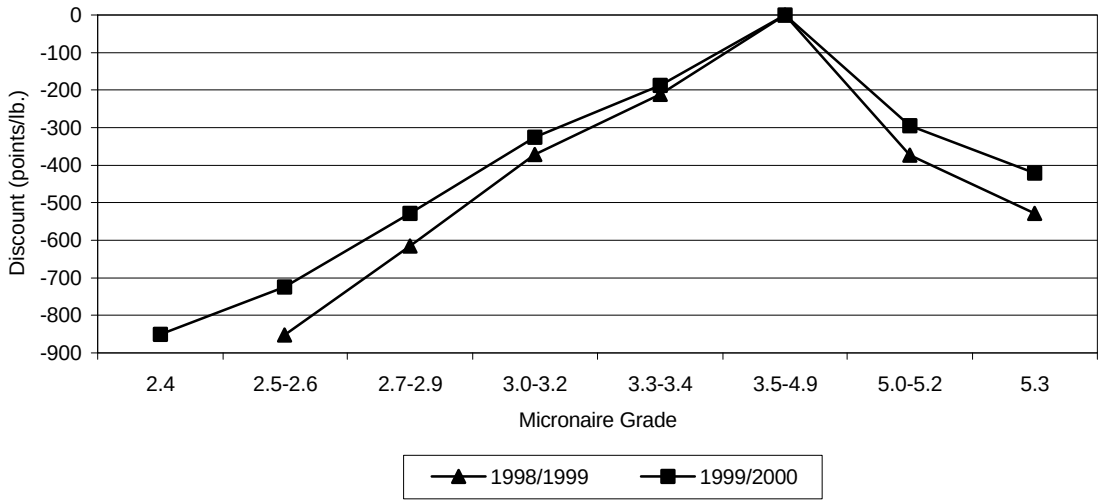

Figure 13: Micronaire Discounts, 1998/1999 and 1999/2000, West Texas.

Bark

Discounts for level 1 bark fluctuated widely throughout the year (Figure 14). The majority of the season's discounts fell between 50 and 450 points/lb., which are lower than the 1998/1999 marketing year. There were many days when the level of bark did not affect the price. Figure 15 illustrates a comparison of level 1 and level 2 bark discounts between the 1999/2000 and 1998/1999 marketing years. The 1999 crop discounts for level 1 bark were slightly higher than during the previous year, while the discounts for level 2 bark were lower in the 1999/2000 marketing year (Figure 15).

Other extraneous matter

The average discount for both level 1 and level 2 other extraneous matter decreased from those of the previous year. The incidence of other extraneous matter was particularly low (below 1% of bales per lot for both levels), which makes it difficult to interpret and draw conclusions on the patterns of these attributes.

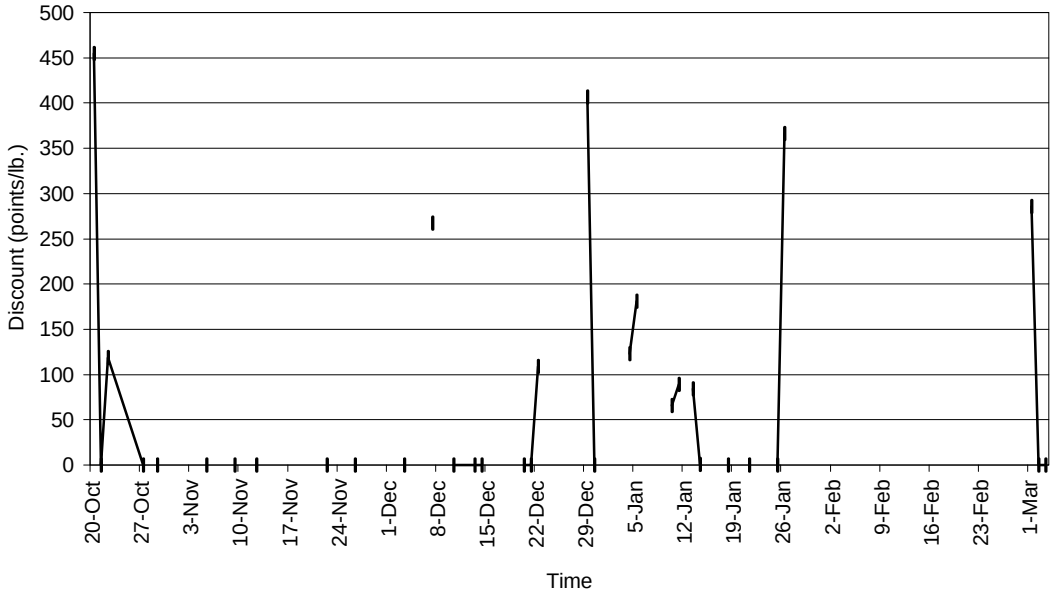

Figure 14: Level 1 Bark Discounts for the 1999/2000 Marketing Year, West Texas.

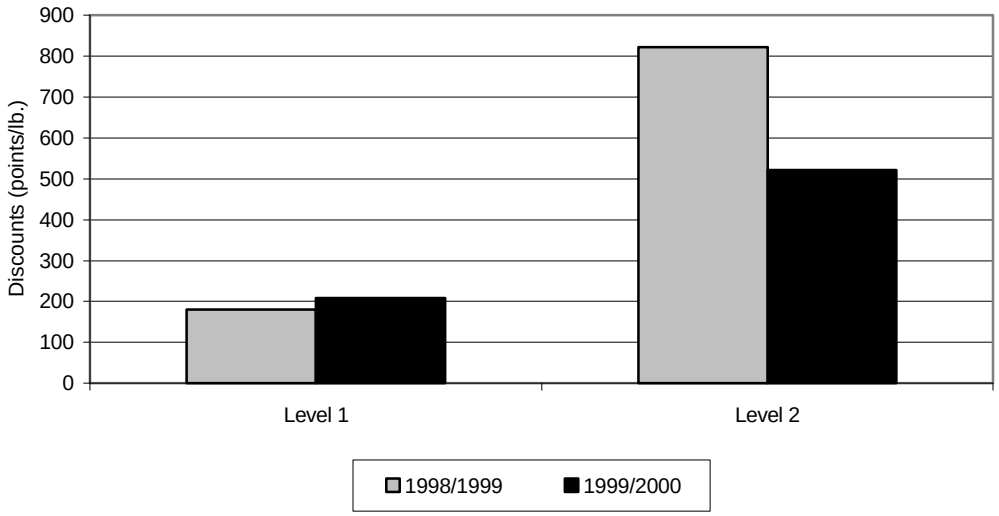

Figure 15: Bark Discounts, 1998/1999 and 1999/2000, West Texas.

Summary

The average price for the 1999/2000 marketing year was the lowest average price observed since the 1993/94 marketing year. The average price decreased by 13.32 cents/lb. to 37.82 cents/lb from the 1998/1999 marketing year. The volume of producer spot market sales as recorded by the DPES showed a 12% increase in 1999/2000 from the 1998/1999 marketing year. This was due to an increase in the Texas/Oklahoma crop size and a decrease in the percent of forward contracting, from 28% for the 1998 crop to 5% of the 1999 crop.

Overall, the 1999 crop for Texas and Oklahoma was generally of good quality. In comparison to the 1998/1999 marketing year, discounts decreased for all quality attributes except for the first digit of the color grade, level 1 bark, and level 2 other extraneous matter, while premiums increased for all attributes except strength. The decrease in the average producer price experienced during the 1999/2000 marketing year cannot be strictly attributed to changes in cotton quality attributes or variations in these attributes; the decrease is likely due to external market forces. Although prices at the beginning of the 1999 season were at about the same level as the previous year's ending price, producer prices gradually increased towards the middle of the season. However, the availability of more cotton on the spot market due to a larger crop size and less forward contracting may have had a negative impact in cotton prices during the 1999 crop year.

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Appendix A

The DPES Model and Yearly Parameter Estimates

The Daily Price Estimation System is a computerized econometric model based on the theory of hedonic price analysis (Brown and Ethridge, 1995). The premise of this approach is that the value of a commodity is determined by the value of the utility-bearing characteristics that comprise the commodity. The implicit prices of these characteristics may be determined by disaggregating the price of the commodity into its measurable characteristic components. In the DPES, the relationship between the price of cotton and its various measurable quality attributes is estimated using a nonlinear regression model. The equation used for regression analysis is:

$$P = \beta_0 e^{\beta_1 LF + \beta_2 LF^2 + \beta_3 C1 + \beta_4 C1^2 + \beta_5 C2 + \beta_6 C2^2 + \beta_7 STA + \beta_8 STA^2 + \beta_9 STR}$$
$$e^{b_{10} STR^2 + b_{11} M + b_{12} M^2 + b_{13} LB + b_{14} HB + b_{15} LO + b_{16} HO + b_{17} R}$$

The variable definitions and parameter estimates are presented in Appendix Table A1.

At the end of each marketing year, the data for that year are compiled and diagnostic tests are run on the model. The purpose of running diagnostics tests is to detect any systematic error that might have occurred in the DPES, but which remained undetected in the daily diagnostics. The model specification above is the result of the year-end diagnostic analysis for the 1999/2000 marketing year. The procedures of Brown et al. (1995) indicated that this model specification best fits the 1999/2000 marketing year data. The parameters of the 1999/2000 year model were computed by weighting the individual estimates for each day by the number of sales transactions during that day.

Appendix Table A1: Definition of Variables and Parameter Estimates for the 1999/2000 Marketing Year Model. Dependent Variable = Log(Price)

Definition of the Variables	Variables	Parameters	Estimates
Constant Term		$\ln\beta_0$	-2.149330
Average leaf grade (1 through 7)	LF	β_1	0.028782
Average leaf grade squared	LF^2	β_2	-0.006910
Average first digit of the color grade (1 through 7)	C1	β_3	0.038857
Average first digit of the color grade squared	$C1^2$	β_4	-0.010850
Average second digit of the color grade (1 through 4)	C2	β_5	0.026170
Average second digit of the color grade squared	$C2^2$	β_6	-0.017810
Average staple length (32nds of an inch)	STA	β_7	0.168334
Average staple length squared	STA^2	β_8	-0.001860
Average strength of the cotton (grams/tex)	STR	β_9	0.050789
Average strength squared	STR^2	β_{10}	-0.000830
Average micronaire reading	M	β_{11}	0.713064
Average micronaire squared	M^2	β_{12}	-0.086430
Percentage of bales classed as level 1 bark	LB	β_{13}	-0.056840
Percentage of bales classed as level 2 bark	HB	β_{14}	-0.149540
Percentage of bales classed as level 1 other extraneous matter	LO	β_{15}	-0.223210
Percentage of bales classed as level 2 other extraneous matter	HO	β_{16}	-0.140360
Region (R=0 for West Texas, R=1 for East Texas and Oklahoma)	R	β_{17}	0.009445

Weighted average of R-Squared: 0.72