Agricultural Economics Report No. 121 AUGUST, 1977

An Economic Evaluation Of Yield And Quality Differences Among Selected Hard Red Spring Wheat Varieties

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FOREWORD

This study provides producer knowledge of price differentials based on quality and yield characteristics for numerous varieties of hard red spring wheat. The authors express their appreciation to the many individuals who provided information for this publication, especially Mr. Orville Banasik, Chairman, Department of Cereal Chemistry and Technology; and Dr. David Ebeltoft, Department of Agronomy, North Dakota State University.

The research for this report was conducted under North Dakota Agricultural Experiment Station Project 3314, entitled "Market Development for Hard Red Spring and Durum Wheat."

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Highlights

This study was undertaken to evaluate the economic performance of wheat varieties available to North Dakota farmers.

Era ranked first in yield at all stations during the five-year varietal analysis except at the Carrington (Irrigation) Station where it ranked second. During the three-year varietal analysis, Era ranked number one at four of the seven stations and second at another station. Bounty 208 and Olaf tend to produce high yields as well at most stations. Under irrigation, Bounty 208 produced higher yields than all other varieties tested.

Waldron, Chris, and Justin produced high protein wheat at all stations. Semidwarf wheats tend to be relatively low in protein.

Era, Fortuna, Bounty 208, and WS 1809 produced wheat higher in test weight than average, except under irrigation. Chris and Ellar rank highest in test weight under irrigation.

Era ranked number one in gross dollar returns per acre in 18 of 28 selected study situations. Era ranked number one in gross returns per acre in 10 of 14 study situations during a long-term average premium period and 8 of 14 study situations during a selected high premium period. Era ranked second in two other study situations and at least fifth in five other study situations. Era was generally low in gross returns per acre when under irrigation.

Olaf, Bounty 208, Ellar, WS 1809, and Waldron typically ranked relatively high in gross returns per acre also. Ellar and Waldron are the only conventional varieties which consistently fall into the five most profitable varieties.

Quality is an important criterion when selecting a wheat variety. Producers of high-quality wheat in many areas of the state are currently not receiving a premium large enough to induce them to continue producing the high-quality wheat varieties. A lower quality wheat of higher yield will frequently return higher gross returns per acre than the more accepted high-quality varieties.

AN ECONOMIC EVALUATION OF YIELD AND QUALITY DIFFERENCES AMONG SELECTED HARD RED SPRING WHEAT VARIETIES*

by

John F. Mittleider and Donald E. Anderson**

Wheat producers have only recently been able to select from a wide range of agronomically acceptable wheat varieties, each having different yield and quality characteristics. In recent years, three important factors have caused quality to become an important criterion in the selection of a variety: 1) significant premiums for quality, 2) some variety discounts, and 3) new varieties which are relatively high yielding and high in quality.

Previous to 1974, relatively low premiums were offered for protein content in wheat. In 1974, premiums rose dramatically for high protein wheat because of a short supply of high protein wheat. Growers typically have been selecting wheat varieties on the basis of yield; but as a wider range of quality has become available in current varieties, these factors must also be considered when selecting seed.

This study examines yield, protein content, and test weight to determine per acre returns of selected hard red spring wheat varieties. Price differentials based on quality and yield relationships are becoming more critical in the proper selection among available wheat varieties for production and marketing. Wheat producers require information on the economics of raising relatively higher yielding, lower quality varieties compared to lower yielding, higher quality varieties. Wheat producers may use these data to compare the gross returns per acre of one wheat variety with another, enabling them to consider the price-quality relationships of various hard red spring wheat varieties.

Agronomic Characteristics of Semidwarf Wheat Varieties

Numerous new semidwarf wheat varieties have been released in recent years. Semidwarf breeding materials were originally introduced into the United States in 1945 from Japan. Semidwarf varieties have caused concern among millers, bakers, and farmers. Some agronomic characteristics of these varieties include:

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*This study was part of a contributing Regional Research project to NC-104.

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1. Their general appearance is the same as conventional varieties, but the stem normally is considerably shorter, which results in a shorter plant.
2. The straw of the plant normally is considerably stronger.
3. Semidwarf varieties generally resist shattering.
4. Many semidwarf wheats are insensitive to day length. This means they will mature in approximately the same number of days regardless of day length. This factor gives a wider geographic adaptation for insensitive semidwarf wheats.
5. High yield potential is shown under favorable fertility and moisture conditions.
6. The dense foliage in heavy stands may result in the tendency to develop foliar diseases.[1]

Originally, these semidwarf varieties were susceptible to rust and other diseases in the United States and were very low in quality. Many of the early semidwarf wheat varieties were not well adapted to North Dakota's growing conditions. The more recently released varieties have shown improvement in the milling and baking quality characteristics and have good stem and leaf rust resistance.

The production of semidwarf wheat varieties in North Dakota has increased in recent years, while conventional height wheat varieties have declined (Table 1). Sixty-six percent of the acreage of semidwarf wheat grown in North Dakota is grown in the eastern part of the state, while 66 percent of the acreage of the conventional height varieites is grown in the western and central areas of the state. Agronomically, semidwarf varieties tend to be better adapted to climatic and soil conditions in the eastern part of the state. Almost half of all wheat planted in the state is of the variety Waldron (Table 2). Waldron is grown on almost two-thirds of the wheat acreage in the western and central areas of the state.

Wheat producers normally obtain yields somewhat lower than the average yields calculated in this study. The test plots used to obtain these yields are usually about one-fortieth of an acre in size and, therefore, the yields discussed here are "calculated yields" from the experiment station test plots.

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[1]North Dakota State University, Cooperative Extension Service, "Semidwarf Wheat Varieties," Circular A-512, Fargo, November, 1967.

TABLE 1. PERCENT OF HARD RED SPRING WHEAT ACREAGE PLANTED, BY VARIETY, NORTH DAKOTA, 1970-1975

Variety	1970	1971	1972	1973	1974	1975
Waldron	26.6	62.0	52.7	53.8	52.0	49.6
Olaf	-	-	-	-	4.2	18.4
Era	-	a	a	2.5	6.9	8.0
Chris	16.8	9.8	8.9	5.9	4.1	2.7
Bounty 208	-	0.1	3.0	5.8	5.9	2.5
Ellar	-	-	-	-	-	2.2
WS 1809	a	1.8	11.2	9.1	4.1	2.0
Justin	8.0	3.9	3.1	2.1	2.4	1.9
Fortuna	7.0	2.7	2.8	1.6	1.7	1.5
Nowesta	-	-	-	-	-	1.4
Lark	-	-	1.1	9.1	8.6	1.2
Manitou	24.1	8.2	5.3	2.1	2.4	1.2
Profit 75	-	-	-	-	-	1.1
Other	17.5	11.6	11.9	8.1	7.7	6.3

[a]Not available.

SOURCE: North Dakota Wheat Varieties, 1975, Agricultural Statistics Number 37, North Dakota Crop and Livestock Reporting Service, Fargo, January, 1976.

TABLE 2. PLANTED ACREAGE OF HARD RED SPRING WHEAT, BY VARIETY, NORTH DAKOTA, 1975

Variety	West		Central		East		State	
	Acreage	%	Acreage	%	Acreage	%	Acreage	%
Waldron	1,046,400	60.0	1,047,200	61.9	1,080,800	38.1	3,174,400	49.6
Olaf	217,800	12.0	237,600	11.6	755,600	25.3	1,177,600	18.4
Era	89,300	5.0	33,000	2.2	389,400	12.9	512,000	8.0
Chris	91,300	5.2	36,100	2.5	45,400	1.7	172,800	2.7
Bounty 208	21,600	1.2	42,300	2.4	91,100	3.2	160,000	2.5
Ellar	39,100	2.2	27,900	1.6	73,800	2.4	140,800	2.2
WS 1809	14,200	0.8	37,700	1.7	76,100	2.6	128,000	2.0
Other	243,300	13.6	278,300	16.1	412,800	13.8	934,400	14.6
TOTALS	1,763,000	100	1,740,100	100	2,925,000	100	6,400,000	100

SOURCE: North Dakota Wheat Varieties, 1975, Agricultural Statistics Number 37, North Dakota Crop and Livestock Reporting Service, Fargo, January, 1976.

The protein content calculated from the test plots is usually about 2.5 percent higher than the statewide average. The research plots are grown under favorable growing conditions, i.e., recommended fertilizer application; consistent soil texture; and plots absent of weeds, rocks, trees, hills, or low spots.

An important aspect of this analysis is a comparison of the economic performance of semidwarf varieties and the conventional height varieties. Table 3 denotes plant height and quality factors of various varieties.

TABLE 3. PLANT HEIGHT AND QUALITY FACTORS OF SELECTED HARD RED SPRING WHEAT VARIETIES GROWN IN NORTH DAKOTA, 1975

Variety	Height[a]	Quality Factors		
		Test Weight	Wheat Protein	Quality Rating[b,c]
Bounty 208	SD	High	Low	M
Chris	Med	Avg	Avg	S
Ellar	Med	Avg	High	S
Era	SD	Avg	Low	U
Fortuna	Med	Avg	Low	M
Glenlea	Med	Avg	Low	U
Justin	Med	Avg	High	S
Kitt	SD	Avg	Avg	M
Lark	SD	High	Low	U
Manitou	Med	Avg	Avg	M
Norana	SD	Avg	Avg	d
Nowesta	Med	Avg	Avg	d
Olaf	SD	Avg	Avg	M
Tioga	Med	Avg	High	S
Waldron	Med	Avg	High	S
WS 1809	SD	Avg	Low	M

[a] SD = Semidwarf, Med = Medium or conventional height varieties.
[b] M = Marginal, S = Satisfactory, U = Unsatisfactory.
[c] Tests conducted by Department of Cereal Chemistry and Technology at North
[d] Dakota State University.
[d] Not available.

SOURCE: North Dakota Wheat Varieties, 1975, Agricultural Statistics Number 37, North Dakota Crop and Livestock Reporting Service, Fargo, January, 1976.

Methods of Analysis

Numerous plots of selected wheat varieties are grown each year at Fargo and at each of the branch experiment stations throughout North Dakota.

The soil type, planting conditions, and other practices closely resemble those of farm producers in the adjacent areas. After harvest, wheat samples from the test plots are used to determine yield, protein content, test weight, and other milling and baking characteristics for each variety.

Three years' data (1973 through 1975) and five years' data (1971 through 1975) were used to determine average yield, test weight, and protein content. The three-year average includes newly released varieties for which data were not available for the longer period. Data were not available from the Fargo Station in 1974, the Langdon Station in 1973, and the Williston Station in 1971 due to hail damage. The five-year averages for these stations were calculated by including the 1970 data.

Price data and protein and test weight premiums and discounts were determined for two different time periods using the Minneapolis market as a base for these quotations (Table 4). The first time period involved a monthly quotation of prices and premiums from July, 1970, through June, 1976. The protein premiums in this time period may be regarded as those in a normal or long-run time period. The average price at the Minneapolis market for a bushel of 58-pound wheat was $3.72 over this time period.

TABLE 4. COMPARISON OF PROTEIN PREMIUMS AND DISCOUNTS FOR THE CROP YEARS 1970 THROUGH 1975, AND THE CROP YEAR 1975

Protein Content	1970-1975 (¢/Bu)	1975-1976 (¢/Bu)	Change (¢/Bu)	Change (Percent)
11%	-.06	-.32	-.26	-433
12%	.01	-.14	-.15	-1,500
13%	.08	.04	-.04	-50
14%	.17	.29	.12	70
15%	.29	.58	.29	100
16%	.40	.82	.42	105
17%	.45	.91	.46	102

SOURCE: "Daily Market Record," Warren E. Maul, Publisher, Minneapolis, Minnesota, 1970-1976.

The second time period included a biweekly price and premium quotation from July, 1975, through June, 1976. The protein premiums in this time period may be regarded as those in a high premium period. The average price for a bushel of wheat at the Minneapolis market was $4.13.

The test weight premium or discount remained the same in both time period (Table 5).

TABLE 5. TEST WEIGHT PREMIUMS AND DISCOUNTS, 1970 THROUGH 1976

Test Weight (Pounds)	Average Premium or Discount (Cents)
>60	Add two cents per bushel
59 and 60	Add one cent per pound per bushel
58	Add nothing
56 and 57	Subtract one cent per 1/2 bushel
<56	Subtract two cents per 1/2 bushel

SOURCE: "Daily Market Record," Warren E. Maul, Publisher, Minneapolis, Minnesota, 1970-1976.

Gross returns per acre (GRPA) were calculated to be: (Yield X Price) + dollar value of protein content and test weight.

Wheat producers may use the gross returns per acre figures to determine the profitability of producing various varieties and the range of GRPA which can be expected from these varieties. The figures may also be used to determine if a specific wheat variety is as profitable to produce with respect to other wheat varieties when a change in price or premiums occurs.

Per Acre Returns Among Selected Hard Red Spring Wheat Varieties

Carrington (Dryland) Station

Yield, protein content, test weight, and per acre returns were analyzed for 12 varieties at the Carrington (Dryland) Station for the three-year study period (Table 6). Kitt, Glenlea, and Nowesta were deleted for the five-year study period due to insufficient data.

Three-Year Average

Olaf was the highest average yielding variety for the three-year study period with 32.0 bushels per acre. Era ranked second in yield with 31.6 bushels per acre.

Kitt had the highest average protein content of 16.8 percent, followed by Waldron with an average protein content of 16.6 percent.

TABLE 6. AVERAGE YIELD, PROTEIN CONTENT, TEST WEIGHT, AND GROSS RETURNS PER ACRE FOR THE CARRINGTON (DRYLAND) STATION FOR SELECTED YEARS

Variety	Yield				Protein				Test Weight			
	1971 to 1975	Rank	1973 to 1975	Rank	1971 to 1975	Rank	1973 to 1975	Rank	1971 to 1975	Rank	1973 to 1975	Rank
Bounty 208	36.5	4	28.9	9	14.9	7	15.0	11	60.3	2	58.3	2
Chris	33.3	7	26.9	12	15.8	2	16.5	3	59.1	6	57.2	6
Ellar	35.6	5	30.1	7	15.6	4	16.3	6	59.5	4	57.8	4
Era	39.8	1	31.6	2	15.0	6	15.9	8	59.9	3	58.1	3
Glenlea	a		30.2	6	a		16.4	4	a		55.9	10
Kitt	a		31.2	3	a		16.8	1	a		56.4	7
Lark	32.0	9	27.4	11	14.9	7	15.7	10	58.8	7	55.9	10
Manitou	33.0	8	28.0	10	15.7	3	16.3	6	57.7	9	55.3	12
Nowesta	a		29.2	8	a		15.9	8	a		56.0	9
Olaf	39.0	2	32.0	1	15.6	4	16.4	4	59.2	5	57.3	5
Waldron	34.8	6	30.9	5	16.2	1	16.6	2	58.3	8	56.1	8
WS 1809	38.6	3	31.2	3	14.7	9	14.8	12	60.6	1	59.5	1
Overall	35.8		29.8		15.4		16.0		59.3		57.0	

Variety	Gross Returns Per Acre							
	Three-Year Varietal Average				Five-Year Varietal Average			
	Normal Premium	Rank	High Premium	Rank	Normal Premium	Rank	High Premium	Rank
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Bounty 208	111.59	9	131.45	9	140.66	4	164.21	4
Chris	105.60	12	125.09	12	129.54	7	150.70	7
Ellar	118.57	6	141.95	5	138.80	5	163.65	5
Era	122.97	2	145.03	3	151.47	1	173.93	1
Glenlea	116.81	7	139.31	7	a		a	
Kitt	120.70	4	143.81	4	a		a	
Lark	106.06	11	127.30	11	122.58	9	144.21	9
Manitou	108.02	10	129.27	10	127.25	8	148.77	8
Nowesta	112.73	8	135.33	8	a		a	
Olaf	124.27	1	148.42	1	149.73	2	173.35	2
Waldron	121.22	3	147.13	2	136.09	6	163.52	6
WS 1809	120.26	5	140.79	6	147.61	3	170.98	3
Overall	115.73		137.91		138.19		161.48	

[a]Not available.

SOURCE: Agronomic data provided by Department of Agronomy and quality data provided by Department of Cereal Chemistry and Technology at North Dakota State University.

The average test weight of 59.5 pounds per bushel for WS 1809 was the highest of all varieties evaluated over the three-year study period, followed by Bounty 208 with 58.3 pounds per bushel.

Olaf ranked number one in gross returns per acre for both premium periods. Olaf had GRPA of $124.27 for the normal premium period, followed by Era with $122.97, Waldron with $121.22, Kitt with $120.70, and WS 1809 with $120.26. A difference of only $4.01 existed between the GRPA of the number one ranked variety, Olaf, and the number five ranked variety, WS 1809, for the normal premium period. Olaf had GRPA of $148.42 for the high premium period, followed by Waldron with $147.13, Era with $145.03, Kitt with $143.81, and Ellar with $141.95. The gross returns per acre for Olaf were $6.47 higher than fifth ranked Ellar for the high premium period.

Five-Year Average

Era and Olaf ranked first and second in yield with an average of 39.8 and 39.0 bushels per acre, respectively, for the five-year study period.

The protein level of 16.2 percent for Waldron was the highest for all the varieties evaluated. Chris ranked second with an average protein content of 15.8 percent.

WS 1809 had the highest average test weight of 60.6 pounds per bushel, followed by Bounty 208 with an average test weight of 60.3 pounds per bushel.

Era ranked number one in gross returns per acre for both premium periods. Era had GRPA of $151.47 for the normal premium period, followed by Olaf with $149.73, WS 1809 with $147.61, Bounty 208 with $140.66, and Ellar with $138.80. The gross returns per acre for Era were only $1.74 more than second ranked Olaf, but $12.67 more than fifth ranked Ellar. Era had GRPA of $173.93 for the high premium period, followed by Olaf with $173.35, WS 1809 with $170.98, Bounty 208 with $164.21, and Ellar with $163.65. The difference in GRPA between the first and second ranked varieties, Era and Olaf, was only $.58, while the difference between the first and fifth ranked varieties, Era and Ellar, was $10.28.

Carrington (Irrigation) Station

Twelve varieties were analyzed at the Carrington (Irrigation) Station on the basis of yield and quality data for the three-year study period

(Table 7). Glenlea, Kitt, and Nowesta were dropped from the analysis based on the five-year study period due to insufficient data.

Three-Year Average

Bounty 208, a semidwarf variety, had the highest average yield with 51.9 bushels per acre for the three-year study period. Glenlea ranked second with an average yield of 49.8 bushels per acre.

An average protein content of 15.3 percent for Chris was the highest obtained, followed by 15.0 percent for Olaf.

Chris also produced the highest test weight wheat with an average of 60.7 pounds. Ellar ranked second in test weight with an average of 59.8 pounds.

Bounty 208 ranked number one in gross returns per acre for the normal premium period with GRPA of $194.57, followed by Glenlea with $190.66, Nowesta with $187.50, Kitt with $187.42, and Waldron with $185.05. A difference of $9.52 exists between the GRPA of the first and fifth ranked varieties, Bounty 208 and Waldron. Glenlea ranked first in GRPA for the high premium period with gross returns per acre of $224.05, followed by Bounty 208 with $218.23, Waldron with $216.97, Nowesta with $213.82, and WS 1809 with $212.97. The difference between Glenlea and Bounty 208, the first and second ranked varieties in GRPA, was $5.82; and the difference between Glenlea and WS 1809, the first and fifth ranked varieties in GRPA, was $11.08.

Five-Year Average

Bounty 208 yielded an average of 59.5 bushels per acre for the five-year study period, higher than any other variety. Lark ranked second in yield with an average of 57.4 bushels per acre.

The average protein content of 14.7 percent for Chris was the highest among the varieties in the five-year study period. Olaf and Waldron tied for second with an average protein content of 14.5 percent.

Chris had the highest average test weight wheat of 61.1 pounds, followed by 60.3 pounds for Ellar.

Bounty 208 had the highest gross returns per acre for both premium periods. Bounty 208 had GRPA of $223.17 for the normal premium period, followed by Lark with $212.99, WS 1809 with $206.82, Era with $200.53,

TABLE 7. AVERAGE YIELD, PROTEIN CONTENT, TEST WEIGHT, AND GROSS RETURNS PER ACRE FOR THE CARRINGTON (IRRIGATION) STATION FOR SELECTED YEARS

Variety	Yield				Protein				Test Weight			
	1971 to 1975	Rank	1973 to 1975	Rank	1971 to 1975	Rank	1973 to 1975	Rank	1971 to 1975	Rank	1973 to 1975	Rank
Bounty 208	59.5	1	51.9	1	13.4	9	13.7	11	60.0	3	58.3	8
Chris	45.3	8	40.3	11	14.7	1	15.3	1	61.1	1	60.7	1
Ellar	49.0	6	46.9	8	14.1	5	14.7	6	60.3	2	59.8	2
Era	53.9	4	44.0	10	13.5	7	14.1	9	60.0	3	58.8	5
Glenlea	a		49.8	2	a		14.8	4	a		58.3	8
Kitt	a		49.5	4	a		14.1	9	a		58.7	7
Lark	57.4	2	47.6	7	13.5	7	14.4	8	58.7	9	56.2	12
Manitou	40.4	9	37.8	12	13.9	6	14.5	7	59.9	5	59.5	3
Nowesta	a		49.6	3	a		13.6	12	a		59.3	4
Olaf	51.7	5	45.7	9	14.3	4	15.0	2	59.4	7	58.3	8
Waldron	47.9	7	48.5	6	14.5	2	14.9	3	59.7	6	58.8	5
WS 1809	54.5	3	48.8	5	14.5	2	14.8	4	59.0	8	57.3	11
Average	51.1		46.7		14.0		14.5		59.8		58.7	

Variety	Gross Returns Per Acre							
	Three-Year Varietal Average				Five-Year Varietal Average			
	Normal Premium	Rank	High Premium	Rank	Normal Premium	Rank	High Premium	Rank
	- - - - - - - - - - - - - - - - $ - - - - - - - - - - - - - - - -							
Bounty 208	194.57	1	218.23	2	223.17	1	247.39	1
Chris	157.04	11	188.25	10	174.24	8	204.15	8
Ellar	179.46	7	210.21	7	185.85	6	213.86	6
Era	165.80	10	185.87	11	200.53	4	221.65	5
Glenlea	190.66	2	224.05	1	a		a	
Kitt	187.42	4	210.74	6	a		a	
Lark	178.10	8	203.55	9	212.99	2	235.05	3
Manitou	144.98	12	169.74	12	152.40	9	173.87	9
Nowesta	187.50	3	213.82	4	a		a	
Olaf	175.62	9	208.46	8	195.36	5	224.25	4
Waldron	185.05	5	216.97	3	182.23	7	211.10	7
WS 1809	184.13	6	212.97	5	206.82	3	239.76	2
Average	177.53		205.24		192.62		219.01	

[a]Not available.

SOURCE: Agronomic data provided by Department of Agronomy and quality data provided by Department of Cereal Chemistry and Technology at North Dakota State University.

and Olaf with $195.36. The gross returns per acre for Bounty 208 for the normal premium period were $10.18 higher than those of second ranked Lark. Bounty 208 had GRPA of $247.39 for the high premium period, followed by WS 1809 with $239.76, Lark with $235.05, Olaf with $224.25, and Era with $221.65. The gross returns per acre for Bounty 208 for the high premium period were $7.63 higher than second ranked WS 1809 and $25.74 higher than those of fifth ranked Era.

Dickinson Station

Twelve varieties were analyzed at the Dickinson Station on the basis of yield and quality data for the three-year study period (Table 8). Ellar, Glenlea, Kitt, Norana, and Nowesta were dropped in the analysis based on the five-year study period due to insufficient data.

Three-Year Average

Era had the highest average yield with 54.4 bushels per acre for the three-year study period, followed by Olaf with an average of 47.1 bushels per acre.

Kitt wheat had the highest protein level at a 16.6 percent average for the three years studied, followed by Waldron with an average protein content of 16.5 percent.

Fortuna produced the highest average test weight wheat with 61.6 pounds, followed by Olaf with 61.1 pounds.

Era had the highest gross returns per acre for both premium periods. Era had GRPA of $204.71 for the normal premium period, followed by Olaf with $184.56, Kitt with $179.09, Norana with $167.00, and Waldron with $166.63. The gross returns per acre for Era for the normal premium period were $20.15 higher than those of second ranked Olaf. Era had GRPA of $231.14 for the high premium period, followed by Kitt with $218.64, Olaf with $215.99, Waldron with $203.88, and Glenlea with $199.67. The gross returns per acre for Era for the high premium period were $12.50 higher than those of second ranked Kitt and $31.47 higher than those of fifth ranked Glenlea.

Five-Year Average

Era was the highest yielding variety with an average of 45.1 bushels per acre for the five-year study period. Second place Olaf yielded an average of 38.3 bushels per acre.

TABLE 8. AVERAGE YIELD, PROTEIN CONTENT, TEST WEIGHT, AND GROSS RETURNS PER ACRE FOR THE DICKINSON STATION FOR SELECTED YEARS

Variety	Yield				Protein				Test Weight			
	1971 to 1975	Rank	1973 to 1975	Rank	1971 to 1975	Rank	1973 to 1975	Rank	1971 to 1975	Rank	1973 to 1975	Rank
Chris	33.9	5	39.6	9	15.6	3	16.1	4	58.6	7	59.5	10
Ellar	a		39.3	10	a		16.1	4	a		60.3	6
Era	45.1	1	54.4	1	13.0	7	13.5	12	61.0	1	60.7	3
Fortuna	32.7	6	38.7	11	14.8	5	15.1	9	60.9	2	61.6	1
Glenlea	a		42.6	5	a		15.5	6	a		58.3	12
Kitt	a		44.7	3	a		16.6	1	a		58.6	11
Lark	37.2	3	41.4	6	13.9	6	14.7	10	60.7	3	60.4	5
Norana	a		43.8	4	a		14.4	11	a		59.9	8
Nowesta	a		40.7	8	a		15.5	6	a		60.1	7
Olaf	38.3	2	47.1	2	15.0	4	15.3	8	60.6	4	61.1	2
Tioga	31.9	7	37.1	12	15.7	2	16.2	3	60.2	5	60.5	4
Waldron	34.9	4	41.4	6	16.1	1	16.5	2	58.7	6	59.9	8
Average	36.3		42.6		14.9		15.5		60.1		60.1	

Variety	Gross Returns Per Acre							
	Three-Year Varietal Average				Five-Year Varietal Average			
	Normal Premium	Rank	High Premium	Rank	Normal Premium	Rank	High Premium	Rank
	- - - - - - - - - - - - - - - - $ - - - - - - - - - - - - - - - -							
Chris	157.09	9	190.66	8	133.09	5	160.68	5
Ellar	156.02	10	189.31	10	a		a	
Era	204.71	1	231.14	1	169.21	1	188.54	1
Fortuna	151.70	11	177.76	12	127.23	6	148.75	7
Glenlea	165.84	6	199.67	5	a		a	
Kitt	179.09	3	218.64	2	a		a	
Lark	160.32	7	190.29	9	141.98	3	163.36	4
Norana	167.00	4	193.75	6	a		a	
Nowesta	159.34	8	191.56	7	a		a	
Olaf	184.56	2	215.99	3	149.21	2	174.28	2
Tioga	148.36	12	181.98	11	126.68	7	153.16	6
Waldron	166.63	5	203.88	4	139.26	4	170.42	3
Average	166.72		198.72		140.95		165.60	

[a]Not available.

SOURCE: Agronomic data provided by Department of Agronomy and quality data provided by Department of Cereal Chemistry and Technology at North Dakota State University.

Waldron had the highest protein level with a 16.1 percent average, followed by Tioga with an average protein content of 15.7 percent.

Era produced the highest test weight wheat of 61.0 pounds, followed by Fortuna with an average of 60.9 pounds.

Era had gross returns per acre higher than all other varieties for the normal and high premium period. Under the normal premium period, Era returned $169.21 per acre, followed by Olaf with $149.21, Lark with $141.98, Waldron with $139.26, and Chris with $133.09. The GRPA for Era for the normal premium period were $20.00 higher than those of second ranked Olaf. Era had gross returns per acre of $188.54 for the high premium period, followed by Olaf with $174.28, Waldron with $170.42, Lark with $163.36, and Chris with $160.68. The GRPA for Era for the high premium period were $14.26 higher than those of second ranked Olaf and $27.86 higher than fifth ranked Chris.

Fargo Station

Nine varieties were analyzed at the Fargo Station for the three-year study period (Table 9). Bounty 208 and Lark were omitted for the five-year study period due to insufficient data.

Three-Year Average

Era and Olaf ranked one and two, respectively, in yield for the three-year study period with an average of 57.6 and 53.1 bushels per acre.

Justin had the highest protein level with a 15.8 percent average, followed by Ellar with an average of 15.5 percent.

Era produced the highest average test weight wheat of 61.4 pounds. Bounty 208 was second in test weight with an average of 60.8 pounds.

Era ranked number one in gross returns per acre for both premium periods. During the normal premium period, Era had GRPA of $217.78, followed by Olaf with $204.20, Waldron with $198.47, Ellar with $191.44, and Bounty 208 with $180.16. The GRPA for Era for the normal premium period were $13.58 higher than second ranked Olaf, and $37.62 higher than fifth ranked Bounty 208. Era had gross returns per acre of $240.71 per acre during the high premium period, followed by Waldron with $233.46, Olaf with $233.11, Ellar with $225.22, and Chris with $210.53. The GRPA for Era for the high premium period were $7.25 higher than those for second ranked Waldron and $30.18 higher than fifth ranked Chris.

TABLE 9. AVERAGE YIELD, PROTEIN CONTENT, TEST WEIGHT, AND GROSS RETURNS PER ACRE FOR THE FARGO STATION FOR SELECTED YEARS

Variety	Yield				Protein				Test Weight			
	1970 to 1975	Rank	1972 to 1975	Rank	1970 to 1975	Rank	1972 to 1975	Rank	1970 to 1975	Rank	1972 to 1975	Rank
Bounty 208	a		47.7	5	a		13.7	7	a		60.8	2
Chris	44.7	5	46.1	8	14.8	4	15.0	4	60.3	4	60.3	5
Ellar	49.9	4	49.2	4	15.2	2	15.5	2	60.5	3	59.7	6
Era	57.3	1	57.6	1	13.6	7	13.5	8	61.9	1	61.4	1
Justin	41.6	7	42.8	9	15.7	1	15.8	1	60.0	6	59.1	8
Lark	a		47.0	6	a		13.4	9	a		60.4	4
Manitou	44.4	6	46.2	7	14.7	5	14.8	5	59.7	7	58.5	9
Olaf	54.0	2	53.1	2	14.5	6	14.6	6	61.3	2	60.7	3
Waldron	51.2	3	51.0	3	15.0	3	15.3	3	60.3	4	59.3	7
Average	49.0		49.0		14.8		14.6		60.6		60.0	

Variety	Gross Returns Per Acre							
	Three-Year Varietal Average				Five-Year Varietal Average			
	Normal Premium	Rank	High Premium	Rank	Normal Premium	Rank	High Premium	Rank
	- - - - - - - - - - - - - - - - $ - - - - - - - - - - - - - - - -							
Bounty 208	180.16	5	199.22	8	a		a	
Chris	178.42	6	210.53	5	172.57	5	203.83	5
Ellar	191.44	4	225.22	4	193.42	4	228.06	4
Era	217.78	1	240.71	1	217.01	1	239.79	1
Justin	167.27	9	199.58	7	163.49	7	196.69	7
Lark	175.46	8	191.77	9	a		a	
Manitou	176.83	7	206.07	6	170.35	6	198.41	6
Olaf	204.20	2	233.11	3	206.76	2	234.63	2
Waldron	198.47	3	233.46	2	198.62	3	234.11	3
Average	187.78		215.52		188.89		219.36	

[a]Not available.

SOURCE: Agronomic data provided by Department of Agronomy and quality data provided by Department of Cereal Chemistry and Technology at North Dakota State University.

Five-Year Average

Era was the highest yielding variety with an average of 57.3 bushels per acre for the five-year study period. Second ranked Olaf yielded an average of 54.0 bushels per acre.

Justin produced the highest protein wheat with an average of 15.7 percent, followed by Ellar with an average of 15.2 percent.

Era had the highest average test weight of 61.9 pounds. Olaf ranked second with an avergae of 61.3 pounds.

Era ranked number one in GRPA for both premium periods. Era had gross returns per acre of $217.01 for the normal premium period, followed by Olaf with $206.76, Waldron with $198.62, Ellar with $193.42, and Chris with $172.57. The GRPA for Era for the normal premium period were $10.25 greater than those of second ranked Olaf and $44.44 greater than those of fifth ranked Chris. Era had GRPA of $239.79 for the high premium period, followed by Olaf with $234.63, Waldron with $234.11, Ellar with $228.06, and Chris with $203.83. The gross returns per acre for Era for the high premium period were $5.16 greater than second ranked Olaf and $35.96 greater than fifth ranked Chris.

Langdon Station

Ten varieties were analyzed at the Langdon Station on the basis of yield and quality data for the three-year study period (Table 10). Lark and Olaf were deleted from the five-year study period due to insufficient data.

Three-Year Average

Era ranked number one in yield with 57.2 bushels per acre for the three-year study period. The yield for Era was considerably higher than the 46.2 bushels per acre average yield of second ranked Olaf.

An average protein content of 15.7 percent for Justin was the highest found for the three-year study period at the Langdon Station. Waldron ranked second in protein content with an average of 15.4 percent.

Bounty 208 ranked first in test weight with an average of 61.1 pounds, followed by WS 1809 with an average of 61.0 pounds.

Era ranked number one in gross returns per acre for both premium periods. Era had GRPA of $213.07 per acre for the normal premium period,

TABLE 10. AVERAGE YIELD, PROTEIN CONTENT, TEST WEIGHT, AND GROSS RETURNS PER ACRE FOR THE LANGDON STATION FOR SELECTED YEARS

Variety	Yield				Protein				Test Weight			
	1970 to 1975	Rank	1972 to 1975	Rank	1970 to 1975	Rank	1972 to 1975	Rank	1970 to 1975	Rank	1972 to 1975	Rank
Bounty 208	50.9	3	45.3	4	14.0	6	14.2	7	61.3	2	61.1	1
Chris	47.2	4	43.9	6	14.8	3	14.4	6	59.7	5	59.2	10
Ellar	45.7	6	41.2	9	14.8	3	15.0	3	60.9	4	60.8	4
Era	62.3	1	57.2	1	12.9	8	13.0	10	61.2	3	60.9	3
Justin	39.1	8	38.5	10	15.4	1	15.7	1	59.3	7	59.3	9
Lark	a		45.7	3	a		13.9	8	a		60.6	5
Manitou	43.1	7	41.9	8	14.7	5	14.8	4	59.6	6	59.7	8
Olaf	a		46.2	2	a		14.5	5	a		59.9	6
Waldron	46.5	5	42.2	7	15.4	1	15.4	2	59.0	8	59.9	6
WS 1809	54.1	2	44.9	5	14.0	6	13.7	9	61.6	1	61.0	2
Average	48.6		44.7		14.5		14.5		60.3		60.2	

Variety	Gross Returns Per Acre							
	Three-Year Varietal Average				Five-Year Varietal Average			
	Normal Premium	Rank	High Premium	Rank	Normal Premium	Rank	High Premium	Rank
	$				$			
Bounty 208	172.92	3	201.00	3	193.92	3	224.15	3
Chris	166.51	7	191.78	7	181.39	5	213.64	5
Ellar	159.94	9	190.90	8	176.86	6	210.42	6
Era	213.07	1	233.26	1	231.98	1	255.05	1
Justin	151.43	10	182.63	10	152.90	8	183.41	8
Lark	172.49	4	195.47	4	a		a	
Manitou	162.06	8	190.26	9	165.67	7	193.71	7
Olaf	176.94	2	206.18	2	a		a	
Waldron	166.74	6	195.26	5	182.15	4	216.63	4
WS 1809	170.76	5	193.94	6	206.89	2	235.41	2
Average	171.29		198.07		186.47		216.55	

[a]Not available.

SOURCE: Agronomic data provided by Department of Agronomy and quality data provided by Department of Cereal Chemistry and Technology at North Dakota State University.

followed by Olaf with $176.94, Bounty 208 with $172.92, Lark with $172.49, and Ws 1809 with $170.76. The gross returns per acre for Era for the normal premium period were $36.13 higher than second ranked Olaf. The gross returns for Era were $233.26 for the high premium period, followed by Olaf with $206.18, Bounty 208 with $201.00, Lark with $195.47, and Waldron with $195.26. The GRPA for Era for the high premium period were $27.08 higher than second ranked Olaf.

Five-Year Average

Era ranked number one in yield with an average of 62.3 bushels per acre for the five-year study period. WS 1809, the second ranked variety, produced 54.1 bushels per acre.

Justin and Waldron had identical average protein levels of 15.4 percent, the highest protein content obtained over the study period.

WS 1809 ranked number one in test weight with an average of 61.6 pounds, followed by Bounty 208 with an average of 61.3 pounds.

The gross returns per acre for Era were higher than those of all other varieties for both premium periods. Era had GRPA of $231.98 for the normal premium period, followed by WS 1809 with $206.89, Bounty 208 with $193.92, Waldron with $182.15, and Chris with $181.39. The gross returns per acre for Era for the normal premium period were $25.09 higher than second ranked WS 1809. Era had GRPA of $255.05 for the high premium period, followed by WS 1809 with $235.41, Bounty 208 with $224.15, Waldron with $216.63, and Chris with $213.64. The gross returns per acre for Era for the high premium period were $19.64 higher than those of second ranked WS 1809 and $41.41 higher than those of fifth ranked Chris.

Minot Station

Twelve varieties were analyzed at the Minot Station for the three-year study period (Table 11). Due to insufficient data, Glenlea, Kitt, Lark, and Nowesta were omitted in the five-year analysis based on yield and quality averages.

Three-Year Average

Era ranked number one in yield with 49.6 bushels per acre in the analysis using the three-year study period. Glenlea ranked second in yield with 47.6 bushels per acre.

TABLE 11. AVERAGE YIELD, PROTEIN CONTENT, TEST WEIGHT, AND GROSS RETURNS PER ACRE FOR THE MINOT STATION FOR SELECTED YEARS

Variety	Yield				Protein				Test Weight			
	1971 to 1975	Rank	1973 to 1975	Rank	1971 to 1975	Rank	1973 to 1975	Rank	1971 to 1975	Rank	1973 to 1975	Rank
Bounty 208	43.3	3	40.3	5	13.6	7	14.6	9	61.8	2	61.2	3
Chris	39.6	6	39.2	9	14.6	3	15.4	4	61.4	6	61.0	5
Ellar	37.3	8	38.4	11	14.6	3	15.5	3	61.0	7	60.8	8
Era	52.9	1	49.6	1	12.0	8	12.5	12	61.8	2	60.9	6
Fortuna	42.1	4	39.1	10	14.1	6	15.0	6	62.2	1	61.8	1
Glenlea	a		47.6	2	a		13.6	11	a		60.3	10
Kitt	a		46.1	3	a		14.7	8	a		59.6	12
Lark	a		39.6	8	a		14.1	10	a		60.9	6
Nowesta	a		40.3	5	a		14.9	7	a		60.5	9
Olaf	46.3	2	43.6	4	14.3	5	15.2	5	61.6	4	61.5	2
Tioga	40.0	5	37.1	12	14.8	2	15.6	2	61.6	4	61.1	4
Waldron	37.9	7	40.2	7	15.0	1	15.7	1	60.4	8	60.1	11
Average	42.4		41.7		14.1		14.7		61.5		60.8	

Variety	Gross Returns Per Acre							
	Three-Year Varietal Average				Five-Year Varietal Average			
	Normal Premium	Rank	High Premium	Rank	Normal Premium	Rank	High Premium	Rank
	$				$			
Bounty 208	153.72	7	178.69	9	162.67	3	182.08	4
Chris	152.69	8	182.41	8	152.27	6	178.04	6
Ellar	151.01	10	183.47	7	143.80	8	168.77	8
Era	183.20	1	196.73	4	195.07	1	206.66	1
Fortuna	151.29	9	178.63	10	160.18	4	182.09	3
Glenlea	177.69	2	197.95	3	a		a	
Kitt	176.65	3	204.70	1	a		a	
Lark	149.53	11	170.47	12	a		a	
Nowesta	155.74	6	183.63	6	a		a	
Olaf	169.16	4	202.24	2	176.39	2	204.12	2
Tioga	144.95	12	174.14	11	153.49	5	178.81	5
Waldron	158.43	5	192.64	5	147.32	7	175.06	7
Average	160.34		187.14		161.40		184.45	

[a]Not available.

SOURCE: Agronomic data provided by Department of Agronomy and quality data provided by Department of Cereal Chemistry and Technology at North Dakota State University.

Waldron had the highest protein level with an average of 15.7 percent, followed by Tioga with an average protein content of 15.6 percent.

Fortuna produced the highest average test weight wheat of 61.8 pounds. Olaf ranked second with an average test weight of 61.5 pounds.

Era had the highest gross returns per acre for the normal premium period with $183.20, followed by Glenlea with $177.69, Kitt with $176.65, Olaf with $169.16, and Waldron with $158.43. Era returned $5.51 more in GRPA than second ranked Glenlea and $24.77 more than fifth ranked Waldron for the normal premium period. For the high premium period, Kitt ranked number one in GRPA with $204.70, followed by Olaf with $202.24, Glenlea with $197.95, Era with $196.73, and Waldron with $192.64. The gross returns per acre for Kitt for the high premium period were only $2.46 more than second ranked Olaf and $12.06 more than fifth ranked Waldron.

Five-Year Average

Era had the highest average yield with 52.9 bushels per acre for the five-year study period. The average yield for Era was considerably higher than that of second ranked Olaf with an average of 46.3 bushels per acre.

Waldron had the highest protein average with 15.0 percent, followed by Tioga with an average of 14.8 percent.

Fortuna produced the highest average test weight of 62.2 pounds. Bounty 208 and Era ranked second in test weight with an average of 61.8 pounds.

Era ranked number one in gross returns per acre for both premium periods. Era had gross returns per acre of $195.07 for the normal premium period, followed by Olaf with $176.39, Bounty 208 with $162.67, Fortuna with $160.18, and Tioga with $153.49. The GRPA for Era for the normal premium period were $18.68 higher than second ranked Olaf. The gross returns per acre for Era for the high premium period were $206.66, followed by Olaf with $204.12, Fortuna with $182.09, Bounty 208 with $182.08, and Tioga with $178.81. Era had GRPA which were only $2.54 higher than second ranked Olaf, but $24.57 higher than third ranked Fortuna.

Williston Station

Fifteen wheat varieties were analyzed at the Williston Station for the three-year study period (Table 12). Glenlea, Kitt, Lark, Norana, Nowesta, Olaf, and Tioga were omitted from the five-year study period due to insufficient data.

TABLE 12. AVERAGE YIELD, PROTEIN CONTENT, TEST WEIGHT, AND GROSS RETURNS PER ACRE FOR THE WILLISTON STATION FOR SELECTED YEARS

Variety	Yield				Protein				Test Weight			
	1970 to 1975	Rank	1973 to 1975	Rank	1970 to 1975	Rank	1973 to 1975	Rank	1970 to 1975	Rank	1973 to 1975	Rank
Bounty 208	24.3	4	23.2	1	15.7	6	16.5	10	58.8	2	56.4	4
Chris	22.6	7	20.1	14	16.3	2	17.3	2	57.6	7	55.0	11
Ellar	24.2	5	22.4	5	15.8	5	16.3	11	58.5	3	56.3	5
Era	25.6	1	21.8	8	14.9	8	16.0	14	58.3	4	55.7	8
Fortuna	24.8	3	22.4	5	15.5	7	16.2	13	59.6	1	57.8	1
Glenlea	a		21.9	7	a		17.1	4	a		55.1	10
Justin	22.9	6	20.4	13	16.7	1	17.3	2	57.9	5	55.9	7
Kitt	a		21.2	11	a		17.5	1	a		53.2	15
Lark	a		21.8	8	a		17.0	7	a		54.9	12
Manitou	22.6	7	20.0	15	16.3	2	17.1	4	56.2	8	53.3	14
Norana	a		23.2	1	a		15.7	15	a		56.0	6
Nowesta	a		20.5	12	a		16.3	11	a		54.7	13
Olaf	a		22.9	3	a		16.8	8	a		57.3	2
Tioga	a		21.7	10	a		17.1	4	a		56.9	3
Waldron	25.0	2	22.8	4	16.0	4	16.7	9	57.8	6	55.4	9
Average	24.0		21.8		15.9		16.7		58.1		55.6	

Variety	Gross Returns Per Acre							
	Three-Year Varietal Average				Five-Year Varietal Average			
	Normal Premium	Rank	High Premium	Rank	Normal Premium	Rank	High Premium	Rank
	$				$			
Bounty 208	90.87	2	109.60	2	94.35	5	110.68	5
Chris	79.69	13	96.97	13	88.50	7	105.20	7
Ellar	88.31	6	105.63	7	94.59	4	112.45	3
Era	85.02	10	102.97	10	97.74	1	113.99	2
Fortuna	88.41	5	104.04	9	96.30	3	112.22	4
Glenlea	86.71	8	105.82	6	a		a	
Justin	81.92	12	99.28	12	91.22	6	109.90	6
Kitt	82.40	11	100.40	11	a		a	
Lark	85.69	9	104.60	8	a		a	
Manitou	78.27	15	95.28	15	87.81	8	105.40	8
Norana	89.99	3	106.84	4	a		a	
Nowesta	78.95	14	95.55	14	a		a	
Olaf	91.92	1	112.11	1	a		a	
Tioga	87.44	7	106.38	5	a		a	
Waldron	89.45	4	107.30	3	97.50	2	116.06	1
Average	85.67		103.52		93.50		110.86	

[a]Not available.

SOURCE: Agronomic data provided by Department of Agronomy and quality data provided by Department of Cereal Chemistry and Technology at North Dakota State University.

Three-Year Average

Bounty 208 and Norana had identical yields of 23.2 bushels per acre for the three-year study period. This was the highest average yield found.

Kitt produced the highest average protein content of 17.5 percent, followed by Justin and Chris with 17.3 percent.

Fortuna had the highest average test weight of 57.8 pounds. Olaf ranked second in test weight with an average of 57.3 pounds.

Olaf returned the highest gross returns per acre for both premium periods. Olaf had gross returns per acre of $91.92 for the normal premium period, followed by Bounty 208 with $90.87, Norana with $89.99, Waldron with $89.45, and Fortuna with $88.41. The GRPA for Olaf for the normal premium period were only $3.51 higher than those of fifth ranked Fortuna. Olaf had GRPA of $112.11 for the high premium period, followed by Bounty 208 with $109.60, Waldron with $107.30, Norana with $106.84, and Tioga with $106.38. The gross returns per acre for Olaf were $5.73 greater than fifth ranked Tioga.

Five-Year Average

Era produced the highest average yield for the five-year study period with 25.6 bushels per acre, followed by Waldron with 25.0 bushels per acre.

Justin produced the highest average protein wheat of 16.7 percent. Chris and Manitou ranked second with an average protein content of 16.3 percent.

The highest average test weight was 59.6 pounds for Fortuna. Bounty 208 ranked second with an average test weight of 58.8 pounds.

Era had the highest gross returns per acre for the normal premium period with $97.74, followed by Waldron with $97.50, Fortuna with $96.30, Ellar with $94.59, and Bounty 208 with $94.35. The GRPA for the normal premium period was only $3.39 greater than fifth ranked Bounty 208. Waldron had GRPA of $116.06 for the high premium period, followed by Era with $113.99, Ellar with $112.45, Fortuna with $112.22, and Bounty 208 with $110.68. The gross returns per acre for Waldron for the high premium period were $5.38 greater than fifth ranked Bounty 208.

APPENDIX

APPENDIX TABLE 1. RANKING AND GRPA OF FIVE HRS WHEAT VARIETIES HIGHEST IN GRPA FOR A NORMAL PREMIUM PERIOD, THREE-YEAR VARIETAL AVERAGE, BY DRYLAND EXPERIMENT STATION, NORTH DAKOTA

Williston

Rank	Variety	GRPA
1	Olaf	$91.92
2	Bounty 208	90.87
3	Norana	89.99
4	Waldron	89.45
5	Fortuna	88.41

Minot

Rank	Variety	GRPA
1	Era	$183.20
2	Glenlea	177.69
3	Kitt	176.65
4	Olaf	169.16
5	Waldron	158.43

Langdon

Rank	Variety	GRPA
1	Era	$213.07
2	Olaf	176.94
3	Bounty 208	172.92
4	Lark	172.49
5	WS 1809	170.76

Carrington (Dryland)

Rank	Variety	GRPA
1	Olaf	$124.27
2	Era	122.97
3	Waldron	121.22
4	Kitt	120.70
5	WS 1809	120.26

Dickinson

Rank	Variety	GRPA
1	Era	$204.71
2	Olaf	184.56
3	Kitt	179.09
4	Norana	167.00
5	Waldron	166.63

Fargo

Rank	Variety	GRPA
1	Era	$217.78
2	Olaf	204.20
3	Waldron	198.47
4	Ellar	191.44
5	Bounty 208	180.16

APPENDIX TABLE 2. RANKING AND GRPA OF FIVE HRS WHEAT VARIETIES HIGHEST IN GRPA FOR A HIGH PREMIUM PERIOD, THREE-YEAR VARIETAL AVERAGE, BY DRYLAND EXPERIMENT STATION, NORTH DAKOTA

Williston

Rank	Variety	GRPA
1	Olaf	$112.11
2	Bounty 208	109.60
3	Waldron	107.30
4	Norana	106.84
5	Tioga	106.38

Minot

Rank	Variety	GRPA
1	Kitt	$204.70
2	Olaf	202.24
3	Glenlea	197.95
4	Era	196.73
5	Waldron	192.64

Langdon

Rank	Variety	GRPA
1	Era	$233.26
2	Olaf	206.18
3	Bounty 208	201.00
4	Lark	195.47
5	Waldron	195.26

Carrington (Dryland)

Rank	Variety	GRPA
1	Olaf	$148.42
2	Waldron	147.13
3	Era	145.03
4	Kitt	143.81
5	Ellar	141.95

Dickinson

Rank	Variety	GRPA
1	Era	$231.14
2	Kitt	218.64
3	Olaf	215.99
4	Waldron	203.88
5	Glenlea	199.67

Fargo

Rank	Variety	GRPA
1	Era	$240.71
2	Waldron	233.46
3	Olaf	233.11
4	Ellar	225.22
5	Chris	210.53

APPENDIX TABLE 3. RANKING AND GRPA OF FIVE HRS WHEAT VARIETIES HIGHEST IN GRPA FOR A NORMAL PREMIUM PERIOD, FIVE-YEAR VARIETAL AVERAGE, BY DRYLAND EXPERIMENT STATION, NORTH DAKOTA

Williston

Rank	Variety	GRPA
1	Era	$97.74
2	Waldron	97.50
3	Fortuna	96.30
4	Ellar	94.59
5	Bounty 208	94.35

Minot

Rank	Variety	GRPA
1	Era	$195.07
2	Olaf	176.39
3	Bounty 208	162.67
4	Fortuna	160.18
5	Tioga	153.49

Langdon

Rank	Variety	GRPA
1	Era	$231.98
2	WS 1809	206.89
3	Bounty 208	193.92
4	Waldron	182.15
5	Chris	181.39

Carrington (Dryland)

Rank	Variety	GRPA
1	Era	$151.47
2	Olaf	149.73
3	WS 1809	147.61
4	Bounty 208	140.66
5	Ellar	138.80

Fargo

Rank	Variety	GRPA
1	Era	$217.01
2	Olaf	206.76
3	Waldron	198.62
4	Ellar	193.42
5	Chris	172.57

Dickinson

Rank	Variety	GRPA
1	Era	$169.21
2	Olaf	149.21
3	Lark	141.98
4	Waldron	139.26
5	Chris	133.09

APPENDIX TABLE 4. RANKING AND GRPA OF FIVE HRS WHEAT VARIETIES HIGHEST IN GRPA FOR A HIGH PREMIUM PERIOD, FIVE-YEAR VARIETAL AVERAGE, BY DRYLAND EXPERIMENT STATION, NORTH DAKOTA

Williston

Rank	Variety	GRPA
1	Waldron	$116.06
2	Era	113.99
3	Ellar	112.45
4	Fortuna	112.22
5	Bounty 208	110.68

Minot

Rank	Variety	GRPA
1	Era	$206.66
2	Olaf	204.12
3	Fortuna	182.09
4	Bounty 208	182.08
5	Tioga	178.81

Langdon

Rank	Variety	GRPA
1	Era	$255.05
2	WS 1809	235.41
3	Bounty 208	224.15
4	Waldron	216.63
5	Chris	213.64

Carrington (Dryland)

Rank	Variety	GRPA
1	Era	$173.93
2	Olaf	173.35
3	WS 1809	170.98
4	Bounty 208	164.21
5	Ellar	163.65

Dickinson

Rank	Variety	GRPA
1	Era	$188.54
2	Olaf	174.28
3	Waldron	170.42
4	Lark	163.36
5	Chris	160.68

Fargo

Rank	Variety	GRPA
1	Era	$239.79
2	Olaf	234.63
3	Waldron	234.11
4	Ellar	228.06
5	Chris	203.83

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