Agriculture Canada

GRAIN RESEARCH LABORATORY

QUALITY OF 1985 CANADIAN WHEAT

CANADIAN GRAIN COMMISSION

Quality of 1985 Canadian Wheat

INTRODUCTION

This bulletin presents detailed information on the quality of the 1985 crop of the seven classes of Canadian wheat offered on the world market, namely:

- Canada Western Red Spring Wheat
- Canada Prairie Spring Wheat (a new class introduced August 1, 1985)
- Canada Western Red Winter Wheat
- Canada Utility Wheat
- Canada Western Soft White Spring Wheat
- Canada Western Amber Durum Wheat
- Canada Eastern White Winter Wheat

This is the initial edition of the publication "Quality of Canadian Wheat" and represents a change from previous practice. It contains wheat quality information previously published under the titles "Canadian Red Spring Wheat", "Canadian Amber Durum Wheat" and "Quality of Western Canadian Grain Crop - Preliminary Report". These bulletins will no longer be issued.

Quality data for red winter, soft white spring, soft white winter and Canada Prairie Spring wheat composites are published for the first time. Canada Prairie Spring is a new class of wheat set up to accommodate high yielding varieties of medium protein content that are visually distinguishable from other classes of wheat and can thus be handled and marketed without risk of compromising the purity of Canadian wheat classes. Quality data are also presented for a composite made up of wheat falling into the category "Sample account variety". Until now unlicensed wheat varieties have automatically been graded into the Canada Feed grade. This year, however, samples of unlicensed Red Spring Wheat varieties will be segregated and marketed as a separate category of milling wheat.

Detailed information on the collection of samples and on the methods used to obtain the quality data is given at the end of this bulletin.

The year 1985 has been an exceedingly difficult one for Western Canadian producers who had to endure a wide range of hardships including severe drought, grasshopper infestations and, later, extremely cool wet conditions that resulted in the latest harvest in many years.

Because of the extremely late harvest, the Grain Research Laboratory's 1985 new crop survey represents a much smaller proportion of the crop than usual. It is based on samples harvested up until around the end of September, by which time less than one third of the crop on average was estimated by Provincial Departments of Agriculture to have been combined. Most of the early wheat was of high grade and, conversely, most of the later harvested wheat will fall into the lower grades. For this reason, quality data for lower grades must be

viewed within the context of their preliminary nature and will probably not realistically predict the quality of subsequent cargo shipments. In particular, the impact of weathering and sprouting and their effect on alpha-amylase activity and related measurements has not yet been fully determined.

Wheat falling number and flour amylograph viscosity values are expected to be considerably lower in cargo shipments than for new crop composites of all grades except No. 1. The grading system will, as usual, provide adequate protection for No. 1 Canada Western Red Spring Wheat. Statistics Canada estimates (as at October 4, 1985) that the area seeded to Spring wheat in Western Canada in 1985 was 11.18 million hectares compared with 10.95 million hectares in 1984. Corresponding estimates for durum wheat and winter wheat were 1.74 million hectares and 0.49 million hectares respectively, representing increases from the 1.68 million hectares and 0.26 million hectares sown in 1984. Current Statistics Canada production estimates may be somewhat high due to the fact that part of the crop may remain on the field until spring of 1986 and even then some of it may not be salvaged. There is no doubt, therefore, that production figures of 18.42 million tonnes, 1.88 million tonnes and 0.70 million tonnes for spring wheat, durum wheat and winter wheat respectively in the Prairie Provinces, may turn out to be significantly inflated. Final production figures for 1984 were 17.67 million tonnes, 2.09 million tonnes and 0.46 million tonnes for spring, durum and winter wheat in Western Canada.

In sharp contrast to the problems faced by Prairie farmers, Ontario wheat producers experienced excellent growing and harvesting conditions which contributed to a record crop of soft white winter wheat. Production is estimated at 0.97 million tonnes with a record yield of 4.58 tonnes/ha.

The following summarizes in more detail the weather conditions which influenced the growing and harvesting of the 1985 Prairie wheat crop.

Winter snowfall was generally normal to above normal in many areas of the grain belt, and this combined with early spring rains resulted in good soil moisture levels and fair-to-adequate sub-soil moisture reserves in most regions. Exceptions were the extreme south-central and southwest parts of Saskatchewan and the Pincher Creek, Cardston and Olds areas of Alberta which were all dry. There was substantial winter kill of autumn-seeded wheat (losses up to 40% in stands in Alberta, the southern third of Saskatchewan and southwest Manitoba) - with the result that many fields of red winter wheat were ploughed down.

Producers were able to begin field work by the last week of April in many southern regions of the Prairies, and seeding was general by about May 10 in most Crop Districts. By the last week of May seeding of amber durum wheat, which is grown mainly in the southern half of Saskatchewan, was considered complete, and seeding of the other spring wheats was virtually complete by June 7. Except for the Peace River region, which lacked spring rainfall, germination was generally excellent and uniform and crop prospects were very good.

Grasshopper and cutworm infestations were severe this year; and the lack of late-spring and early-summer precipitation resulted in drought stress by mid-July to wheat in the southern portions of Saskatchewan and Alberta and the Peace River region. Therefore, crop prospects became worse as the growing season progressed and damage due to drought and insects was the major concern until the second week of August when swathing of spring wheats became widespread. Crops in Manitoba were not as affected by the drought conditions and record production and yield were forecast. Harvesting of winter wheat was well underway by this time and was essentially complete by August 15.

Wet weather with cool temperatures became entrenched during the third week of August and persisted until mid-October. Snow was reported at many locations in the third week of September, and a major storm hit the grain belt from October 6 to 8 - leaving accumulations of snow up to 30 cm on fields. Some fine, drying weather followed; but into the last week of October, it is estimated that up to 30% of spring-seeded wheat remains unharvested in the northern half of the growing area. Predominant degrading factors this year are bleaching, mildew and sprouting associated with weathering.

Although the total Prairie wheat production may end up close to the long term average, the production of high grade wheat is greatly reduced this year. The Canadian Grain Commission estimates that only 20% of the 1985 red spring wheat crop will qualify for the grade No. 1 Canada Western, 32% for No. 2 Canada Western, 35% for No. 3 Canada Western with the balance of 13% grading Canada Feed. This is the lowest estimated proportion of No. 1 CW in a new crop since 1980 and comes immediately following a year when the proportion of 67% No. 1 CWRS was considerably higher than normal.

Grade estimates for amber durum wheat are 18% No. 1 CWAD, 26 % No. 2 CW, 32% No. 3 CW and 24% No. 4 CW and lower.

The "Prairie Grain Variety Survey", published by the Canadian Cooperative Wheat Producers Ltd., estimates the following distribution of Canada Western Red Spring wheat varieties grown in 1985, as percent of seeded area: Neepawa - 43.7%, Columbus - 22.0%, Katepwa - 19.0%, Park - 3.6%, Benito - 2.9%, Leader - 2.5%,. Sinton, Selkirk, Canuck, Manitou, Napayo, Thatcher and Chester each represent approximately 1% or less. The variety Glenlea represents almost all of the Canada Utility wheat grown and HY320 is the only variety presently eligible for the Canada Prairie Spring class. Fielder (92.7%) is the predominant Soft White Spring wheat variety grown, followed by Owens at 6.0%. Norstar (94.1%) and Sundance (4.7%) account for most of the Canada Western Red Winter wheat. Fredrick is the major Canada Eastern White Winter wheat variety seeded, with Augusta and Frankenmuth also grown to some extent. The breakdown for Amber Durum wheat is: Wakooma - 48.9%, Wascana - 28.6%, Coulter - 7.2%, Medora - 6.1%, others - 9.2%.

Detailed quality data on the 1985 protein survey and on grade composite samples of the seven classes of wheat are presented in a series of tables and figures. Specific comments on the quality characteristics of each of the classes now follow.

CANADA WESTERN RED SPRING WHEAT

This year's crop is characterized by having excellent milling and baking quality. In particular, farinograph and baking absorption values show a welcome return to the high levels expected for this class of wheat after two relatively low absorption crops.

Test weights for all grades are lower than normal but flour yields are above average for Western Prairie composites and similar to long term averages for Eastern Prairie composites. Flour ash values for this year's crop are slightly higher than in 1984 but flour color values are similar to those of last year and better than average. Despite the adverse harvest conditions alpha-amylase activities are not as high as might have been expected for the lower grades. Although it is too early to determine the full impact of the effect of weathering on the 1985 crop, these preliminary data suggest that the grading system will provide adequate protection for the milling grades of Canada Western Red Spring Wheat. As indicated earlier, however, it is likely that falling number values of cargoes from this year's crop will be lower than indicated by the new crop composites for the No. 2 and No. 3 Canada Western grades.

Physical dough characteristics for this year's No. 1 C.W. composites are slightly stronger than those of last year while for the No. 2 C.W. composites they are similar and for No. 3 C.W. they are somewhat weaker.

Overall baking results indicate good quality with, as usual, high loaf volumes per unit of flour protein. Based on sponge-and-dough and Canadian Short Process baking results (not shown) oxidation requirements appear to be similar to those of last year's crop (e.g., about 20 ppm potassium bromate in the sponge-and-dough procedure). However, somewhat lower loaf volumes were obtained relative to the 1984 crop at low levels of oxidation.

Protein Survey - Preliminary Data for Red Spring Wheat

The 1985 crop averages 13.4% protein. This is a preliminary estimate based on 5,628 samples tested up to October 25. The 1985 mean value is 0.9 percentage units lower than that of last year and is close to the 20-year average of 13.5%.

Table 1 shows the new crop wheat from Alberta to be the highest in protein content at 14.0%, followed by Saskatchewan wheat at 13.3% and Manitoba wheat at 13.0%. This is in sharp contrast to 1984 results which showed Manitoba to be the highest protein province at 14.6% and Alberta to be the lowest at 13.9%. For all three Prairie provinces, the protein content of wheat entering the Canada Western Grades decreases progressively the lower the grade, although the decrease is much more pronounced in Alberta and Saskatchewan. Overall, No. 1 C.W. wheat averages 14.0% protein, No. 2 C.W. averages 13.4% and No. 3 C.W. averages 12.7%.

The preliminary protein map for No. 1 Canada Western Red Spring wheat (as at October 11, 1985) is based on 2,271 samples from 601 stations. Although the mean protein content of all samples is 14.0%, there is, as usual, a wide variation between crop districts. Protein content increases markedly going from east to west and from north to south.

1. Protein Content of 1985 Crop Red Spring Wheat

(Preliminary as at October 25, 1985)

Grade	Protein Content, %*			
	Manitoba	Saskatchewan	Alberta	Prairies
No. 1 Canada Western	13.1	13.8	14.7	14.0
No. 2 Canada Western	13.1	13.1	14.2	13.4
No. 3 Canada Western	12.8	12.3	13.2	12.7
Canada Feed	12.9	12.7	13.1	13.0
Mean - All Grades	13.0	13.3	14.0	13.4

* N x 5.7; 13.5% moisture content basis.

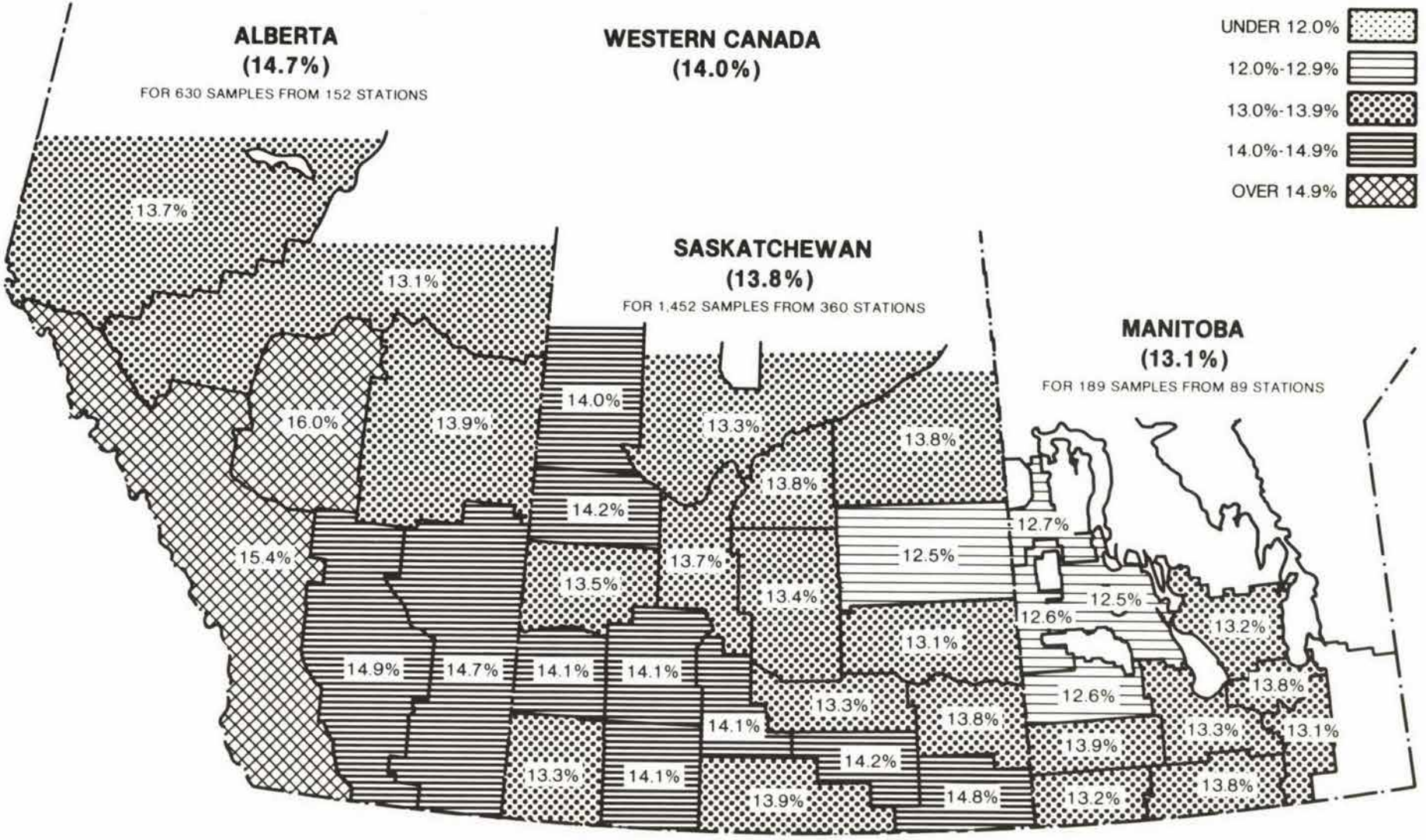
2. Protein Content of Red Spring Wheat for the Period 1965 to 1984

Year	Protein Content, %*			
	Manitoba	Saskatchewan	Alberta	Prairies
1965	13.2	13.7	12.9	13.5
1966	13.0	13.3	12.8	13.2
1967	12.9	14.1	13.4	13.8
1968	13.4	14.2	13.1	13.9
1969	13.5	14.0	13.6	13.9
1970	13.3	13.4	12.6	13.2
1971	12.8	13.7	13.4	13.5
1972	12.6	13.1	12.7	13.0
1973	12.9	13.4	13.3	13.3
1974	13.5	13.7	13.0	13.5
1975	13.5	13.0	12.4	13.0
1976	12.6	12.8	12.7	12.8
1977	12.7	13.1	13.3	13.1
1978	13.0	12.9	13.2	13.0
1979	13.5	13.2	13.6	13.4
1980	14.3	14.1	13.1	13.9
1981	13.9	14.1	13.5	13.9
1982	14.0	13.5	13.3	13.5
1983	14.8	14.1	13.3	14.1
1984	14.6	14.5	13.9	14.3
1965-84 Mean	13.4	13.6	13.2	13.5

* N x 5.7; 13.5% moisture content basis.

PROTEIN CONTENT OF NO. 1 C.W. RED SPRING WHEAT 1985 CROP

AS AT OCTOBER 11, 1985



3. Quality Data for Eastern Prairie Grade Composite Samples of 1985 Crop No. 1 Canada Western Red Spring Wheat

Quality Parameter	Minimum Protein Level			No. 1 C.W. 13.5	
	14.5	13.5	12.5	1984	Mean*
Number of samples	477	631	600	-	-
WHEAT					
Test Weight, kg/hL	79.5	80.3	80.9	80.6	81.9
1000 Kernel Weight, g	26.6	27.8	30.0	27.7	30.2
Protein Content, % (N x 5.7)	14.7	13.8	12.6	13.9	13.7
Ash Content, %	1.49	1.52	1.43	1.53	1.58
Alpha-amylase Activity, units/g	7.7	5.7	14.8	2.5	N/A
Falling Number, s	365	380	365	415	375
Flour Yield, %	75.5	75.8	75.6	76.1	75.4
FLOUR					
Protein Content, %	14.3	13.4	12.1	13.3	13.1
Wet Gluten Content, %	41.6	38.4	34.8	40.1	39.3
Ash Content, %	0.49	0.49	0.48	0.47	0.47
Color, units	-0.3	-0.5	-0.8	-0.6	-0.2
Alpha-amylase Activity, units/g	1.4	2.0	9.3	0.5	N/A
Amylograph Peak Viscosity, B.U.	640	610	585	770	715
Maltose Value, g/100 g	1.9	2.0	2.3	2.0	N/A
Starch Damage, Farrand units	30	31	34	30	28
Baking Absorption, %	65	65	64	62	64
BREAD					
Loaf Volume, cm^3	940	880	780	910	855
Appearance	8.2	8.0	7.5	8.5	8.0
Crumb Structure	6.5-o	6.5-o	6.8-o	6.5-o	6.5-o
Crumb Color	6.2-dy	6.0-dy	5.2-dy	6.0-dy	6.2-dy
Blend Loaf Volume, cm^3	785	725	680	730	700
FARINOGRAM					
Absorption, %	65.9	65.5	65.3	63.1	65.5
Development Time, min	5.75	5.00	4.75	4.50	5.00
M.T.I., B.U.	25	30	35	30	30
Stability, min	11.00	7.50	7.50	6.50	8.00
EXTENSIGRAM					
Length, cm	23	24	22	24	22
Height at 5 cm, B.U.	280	270	255	255	260
Maximum Height, B.U.	470	450	410	435	415
Area, cm^2	150	145	125	140	130
ALVEOGRAM					
Length, mm	147	138	113	-	-
P (height x 1.1), mm	98	94	110	-	-
Area, cm^2	66	59	59	-	-
W, x 10^3 ergs	429	386	386	-	-

* Mean values are for the 10-year period 1974 to 1983.

4. Quality Data for Western Prairie Grade Composite Samples of 1985 Crop No. 1 Canada Western Red Spring Wheat

Quality Parameter	Minimum Protein Level			No. 1 C.W. 13.5	
	14.5	13.5	12.5	1984	Mean*
Number of samples	1089	1076	729	-	-
WHEAT					
Test Weight, kg/hL	79.9	80.3	81.1	81.1	82.4
1000 Kernel Weight, g	27.5	28.3	28.5	27.6	30.6
Protein Content, % (N x 5.7)	14.6	13.9	12.7	13.7	13.6
Ash Content, %	1.46	1.58	1.43	1.49	1.53
Alpha-amylase Activity, units/g	3.8	3.9	6.0	3.7	N/A
Falling Number, s	385	375	365	395	370
Flour Yield, %	75.9	76.1	76.5	75.4	75.4
FLOUR					
Protein Content, %	14.1	13.5	12.2	13.3	13.1
Wet Gluten Content, %	42.3	39.1	34.4	39.7	38.8
Ash Content, %	0.48	0.47	0.49	0.48	0.46
Color, units	-0.5	-0.6	-0.8	-0.7	-0.3
Alpha-amylase Activity, units/g	0.9	1.5	1.5	1.0	N/A
Amylograph Peak Viscosity, B.U.	705	675	680	715	670
Maltose Value, g/100 g	1.8	2.0	2.3	2.0	N/A
Starch Damage, Farrand units	29	31	36	29	30
Baking Absorption, %	65	64	63	62	64
BREAD					
Loaf Volume, cm^3	955	900	815	880	850
Appearance	8.2	8.2	7.8	8.5	8.0
Crumb Structure	6.5-o	6.5-o	6.8-o	6.8-o	6.5-o
Crumb Color	6.2-dy	6.0-dy	5.5-dy	6.0-dy	6.2-dy
Blend Loaf Volume, cm^3	780	735	695	730	690
FARINOGRAM					
Absorption, %	65.4	65.2	65.1	63.1	65.4
Development Time, min	5.50	5.25	4.50	4.75	4.75
M.T.I., B.U.	25	25	35	25	30
Stability, min	9.00	9.50	8.50	7.50	8.00
EXTENSIGRAM					
Length, cm	22	22	21	22	22
Height at 5 cm, B.U.	270	270	270	275	260
Maximum Height, B.U.	445	465	445	450	420
Area, cm^2	140	140	125	135	130
ALVEOGRAM					
Length, mm	148	143	125	-	-
P (height x 1.1), mm	84	95	108	-	-
Area, cm^2	57	61	64	-	-
W, x 10^3 ergs	371	402	415	-	-

* Mean values are for the 10-year period 1974 to 1983.

5. Quality Data for Eastern Prairie Grade Composite Samples of 1985 Crop No. 2 Canada Western Red Spring Wheat

Quality Parameter	Minimum Protein Level		No. 2 C.W. 13.5	
	13.5	12.5	1984	Mean*
Number of samples	618	715	-	-
WHEAT				
Test Weight, kg/hL	79.2	79.6	79.7	80.3
1000 Kernel Weight, g	30.8	30.8	29.3	30.5
Protein Content, % (N x 5.7)	13.6	12.7	13.9	13.7
Ash Content, %	1.52	1.47	1.68	1.61
Alpha-amylase Activity, units/g	12.0	7.1	3.3	N/A
Falling Number, s	340	365	440	365
Flour Yield, %	75.8	75.7	74.7	75.1
FLOUR				
Protein Content, %	13.2	12.2	13.4	13.0
Wet Gluten Content, %	38.4	35.3	40.3	38.8
Ash Content, %	0.50	0.50	0.48	0.48
Color, units	-0.2	-0.4	-0.5	0.1
Alpha-amylase Activity, units/g	3.4	2.6	0.8	N/A
Amylograph Peak Viscosity, B.U.	450	460	720	600
Maltose Value, g/100 g	2.1	2.2	1.8	N/A
Starch Damage, Farrand units	31	34	27	27
Baking Absorption, %	64	63	62	64
BREAD				
Loaf Volume, cm^3	870	795	910	860
Appearance	7.8	7.5	8.5	8.0
Crumb Structure	6.5-o	6.5-o	6.5-o	6.5-o
Crumb Color	6.0-dy	5.0-dy	6.0-dy	6.2-dy
Blend Loaf Volume, cm^3	720	680	725	690
FARINOGRAM				
Absorption, %	64.6	64.3	62.8	64.6
Development Time, min	4.50	4.00	4.75	4.25
M.T.I., B.U.	35	35	40	35
Stability, min	7.50	7.00	7.00	7.50
EXTENSIGRAM				
Length, cm	22	21	23	22
Height at 5 cm, B.U.	245	245	275	250
Maximum Height, B.U.	375	365	450	400
Area, cm^2	120	110	145	120
ALVEOGRAM				
Length, mm	134	113	-	-
P (height x 1.1), mm	95	108	-	-
Area, cm^2	57	57	-	-
W, x 10^3 ergs	373	372	-	-

* Mean values are for the 10-year period 1974 to 1983.

6. Quality Data for Western Prairie Grade Composite Samples of 1985 Crop No. 2 Canada Western Red Spring Wheat

Quality Parameter	Minimum Protein Level		No. 2 C.W. 13.5	
	13.5	12.5	1984	Mean*
Number of samples	485	388	-	-
WHEAT				
Test Weight, kg/hL	78.9	79.5	80.1	80.7
1000 Kernel Weight, g	30.4	30.7	29.3	31.0
Protein Content, % (N x 5.7)	13.8	12.8	13.8	13.7
Ash Content, %	1.51	1.44	1.58	1.54
Alpha-amylase Activity, units/g	8.8	6.9	4.8	N/A
Falling Number, s	340	365	380	355
Flour Yield, %	76.0	76.3	75.0	75.2
FLOUR				
Protein Content, %	13.3	12.3	13.3	13.1
Wet Gluten Content, %	39.8	36.3	39.2	38.7
Ash Content, %	0.48	0.49	0.47	0.48
Color, units	-0.5	-0.7	-0.6	0.2
Alpha-amylase Activity, units/g	3.0	2.0	1.3	N/A
Amylograph Peak Viscosity, B.U.	445	550	660	540
Maltose Value, g/100 g	2.0	2.1	1.9	N/A
Starch Damage, Farrand units	30	31	31	30
Baking Absorption, %	64	64	63	64
BREAD				
Loaf Volume, cm^3	880	795	870	855
Appearance	8.0	7.5	8.2	8.0
Crumb Structure	6.5-o	6.5-o	7.0-o	6.5-o
Crumb Color	5.8-dy	5.2-dy	6.0-dy	6.2-dy
Blend Loaf Volume, cm^3	725	705	725	685
FARINOGRAM				
Absorption, %	65.0	64.5	63.2	65.7
Development Time, min	5.00	4.75	4.25	4.50
M.T.I., B.U.	25	35	30	35
Stability, min	9.00	7.50	7.00	7.50
EXTENSIGRAM				
Length, cm	22	22	22	22
Height at 5 cm, B.U.	265	260	260	235
Maximum Height, B.U.	400	390	420	365
Area, cm^2	120	120	130	115
ALVEOGRAM				
Length, mm	148	122	-	-
P (height x 1.1), mm	89	96	-	-
Area, cm^2	58	54	-	-
W, x 10^3 ergs	379	353	-	-

* Mean values are for the 10-year period 1974 to 1983.

7. Quality Data for Grade Composite Samples of 1985 Crop
No. 3 Canada Western Red Spring Wheat

Quality Parameter	No. 3 C.W.	
	Eastern Prairie	Western Prairie
Number of samples	955	706
WHEAT		
Test Weight, kg/hL	78.2	78.2
1000 Kernel Weight, g	31.8	31.7
Protein Content, % (N x 5.7)	12.6	13.3
Ash Content, %	1.51	1.53
Alpha-amylase Activity, units/g	7.8	19.2
Falling Number, s	365	285
Flour Yield, %	75.2	75.5
FLOUR		
Protein Content, %	12.0	12.6
Wet Gluten Content, %	33.2	34.7
Ash Content, %	0.51	0.52
Color, units	-0.2	0.5
Alpha-amylase Activity, units/g	4.7	5.6
Amylograph Peak Viscosity, B.U.	285	230
Maltose Value, g/100 g	2.2	2.5
Starch Damage, Farrand units	32	34
Baking Absorption, %	63	64
BREAD		
Loaf Volume, cm^3	780	785
Appearance	7.2	7.2
Crumb Structure	6.5-o	6.5-o
Crumb Color	5.8-dy	5.2-g
Blend Loaf Volume, cm^3	680	700
FARINOGRAM		
Absorption, %	63.8	64.9
Development Time, min	3.75	4.25
M.T.I., B.U.	45	40
Stability, min	6.50	7.50
EXTENSIGRAM		
Length, cm	20	20
Height at 5 cm, B.U.	285	260
Maximum Height, B.U.	410	375
Area, cm^2	115	100
ALVEOGRAM		
Length, mm	93	105
P (height x 1.1), mm	117	113
Area, cm^2	54	56
W, x 10^3 ergs	356	370

CANADA UTILITY WHEAT

Canada Utility (CU) wheat is characterized by its hard kernel characteristics and very strong physical dough properties. This wheat is excellent for blending purposes and can also be used for the production of pan breads and hearth breads. The average protein content of this year's crop is estimated at 12.4%. Flour yield is good but flour ash is higher than that for CWRS grades. Wheat falling number and amylograph peak viscosity values are lower than in previous years. Alveograph and extensigraph curves showed typical properties associated with very strong physical dough properties. Farinograph data are misleading since the standard farinograph speed is insufficient to properly develop the dough. At higher farinograph speed (90 rpm) dough development times for this class of wheat are normally around 8-10 min. As with CWRS, water absorption is higher than that of last year. Very high loaf volume per unit protein responses were obtained with both grades using the Remix-to-Peak and Remix blend baking procedures. Lower values are obtained with the Remix procedure because doughs are not adequately developed under the standard conditions of the test.

CANADA PRAIRIE SPRING WHEAT

Canada Prairie Spring is a new class of Canadian wheat introduced in 1985. Pilot scale and commercial scale tests have indicated that this wheat is suitable for the production of French-type hearth breads and flat breads. It can also be used alone or in blends to produce various types of noodles, steam breads, pan breads and crackers. This wheat has a medium protein content (11.5-12.5%), medium-strong and extensible dough properties and medium to soft kernel characteristics. Commercial milling trials indicated that Canada Prairie Spring wheat gives high milling yields provided that tempering conditions and mill flow are optimized to take account of its softer kernel characteristics compared with Canada Western Red Spring wheat.

The average protein content of this year's new crop is estimated at 11.8%. Dough properties are somewhat weaker than would normally be associated with this class of wheat under better harvesting conditions. Loaf volume is very good for the protein level. Water absorption is similar to that of Canada Western Red Winter wheat despite slightly lower levels of flour protein and starch damage.

CANADA WESTERN RED WINTER WHEAT

This is a hard wheat suitable for the production of a wide variety of products including French-type hearth breads, certain types of noodles, flat breads, steamed breads and related products. Top grades show excellent milling properties. Flours are normally characterized by having low ash and low color values and strong physical dough properties.

The average protein content of this year's red winter wheat crop is estimated at 11.5%. Milling characteristics of composites of the top grades are very good in terms of yield, ash and color although not quite as good as those of previous harvests. Baking quality is excellent for the protein content although absorption, as usual, is considerably lower than

that for spring wheat of an equivalent protein content. Because red winter wheat is harvested earlier than spring wheat these 1985 new crop composites are more representative of the crop and alpha-amylase activity values are probably more realistic than for other classes.

CANADA WESTERN SOFT WHITE SPRING WHEAT

This wheat is suitable for the production of cookies, cakes and pastry products and for various types of flat breads, noodles, steamed breads and chapattis. Protein survey results for this year's crop indicate an average protein content of 10.5%. Flour yields are lower than those for last year's crop but ash and color values are superior. Wheat falling number and flour amylograph peak viscosities are considerably lower than those of 1984 results due to adverse harvesting conditions. They are also lower than those of corresponding 1985 red spring wheat grades. This is consistent with the lack of dormancy and susceptibility to sprouting of white wheats relative to red. Farinograph and alveograph results illustrate the typical weak dough properties associated with this class of wheat. Farinograph absorption is slightly higher this year.

CANADA EASTERN WHITE WINTER WHEAT

Canada Eastern White Winter wheat is characterized by its low protein content, soft kernel characteristics and weak physical dough properties which make it highly suitable for the production of cookie, cake and pastry flours. The overall average protein content of this year's crop is estimated at 9.3%. Flour yields are lower than those for last year's crop but ash and, particularly, color values are excellent. Eastern Canada experienced good harvesting conditions so that this soft winter wheat is sound and produces flour low in alpha-amylase activity. Farinograph absorption is higher than that of last year due to an increase in kernel hardness and related starch damage. Cookie quality is very good.

"SAMPLE ACCOUNT VARIETY"

Over the past few years increasing numbers of farmers have chosen to grow unlicensed high yielding semi-dwarf red spring wheat varieties. These varieties are grown in the United States spring wheat area but are of a quality not acceptable for the class Canada Western Red Spring wheat. In normal circumstances such varieties would be eligible only for the grade Canada Feed. This year samples of such varieties that meet the physical grade specifications of No. 3 Canada Western Red Spring wheat will be segregated and marketed under the category "Sample Account Variety". The new crop composite is made up mainly of the varieties Marshall and Solar and samples originated primarily in the Eastern half of the Southern Prairie growing area.

Compared with No. 3 Canada Western Red Spring wheat, water absorption is substantially lower both in the Farinograph test (by 4.4 percentage units) and in baking (by 5 percentage units). Protein content is lower and alpha-amylase activity is significantly higher. Other quality characteristics are similar to those of No. 3 CWRS wheat.

8. Quality Data for Grade Composite Samples of 1985 Crop Canada Utility Red Spring Wheat

Quality Parameter	No. 1 C.U.	No. 2 C.U.	No. 1 C.U. 1984
Number of samples	147	38	-
WHEAT			
Test Weight, kg/hL	77.7	75.0	78.4
1000 Kernel Weight, g	39.9	37.8	37.1
Protein Content, % (N x 5.7)	12.1	13.2	13.6
Ash Content, %	1.43	1.67	1.74
Alpha-amylase Activity, units/g	15.5	37.5	-
Falling Number, s	335	255	380
Flour Yield, %	75.0	74.8	76.0
FLOUR			
Protein Content, %	11.4	12.4	13.0
Wet Gluten Content, %	33.4	36.6	37.0
Ash Content, %	0.56	0.56	0.57
Color, units	0.2	1.2	0.4
Alpha-amylase Activity, units/g	5.0	13.6	-
Amylograph Peak Viscosity, B.U.	290	115	555
Maltose Value, g/100 g	2.9	3.6	2.9
Starch Damage, Farrand units	42	38	42
Baking Absorption, %	62	62	62
BREAD			
Loaf Volume, cm^3	570	625	520
Loaf Volume (Remix to Peak), cm^3	845	900	930
Time (Remix to Peak), min	4.7	4.2	5.8
Blend Loaf Volume, cm^3	725	735	770
FARINOGRAM			
Absorption, %	62.1	62.9	60.1
Development Time, min	2.00	2.00	2.50
M.T.I., B.U.	30	35	20
Stability, min	9.00	6.50	12.00
EXTENSIGRAM			
Length, cm	24	24	23
Height at 5 cm, B.U.	360	360	425
Maximum Height, B.U.	720	690	840
Area, cm^2	235	225	260
ALVEOGRAM			
Length, mm	110	122	-
P (height x 1.1), mm	116	116	-
Area, cm^2	74	83	-
W, x 10^3 ergs	480	543	-

9. Quality Data for Grade Composite Samples of 1985 Crop Canada Prairie Spring Wheat

Quality Parameter	Canada Prairie Spring		HY320*
	No. 1 C.P.S.	No. 2 C.P.S.	1984
Number of Samples	318	182	-
WHEAT			
Test Weight, kg/hL	79.7	77.9	80.8
1000 Kernel Weight, g	40.4	39.1	35.5
Protein Content, % (N x 5.7)	11.7	11.2	12.3
Ash Content, %	1.27	1.56	1.30
Alpha-amylase Activity, units/g	14.0	20.7	-
Falling Number, s	265	240	380
Flour Yield, %	76.3	76.9	76.3
FLOUR			
Protein Content, %	10.9	10.4	11.7
Wet Gluten Content, %	32.8	31.2	34.8
Ash Content, %	0.53	0.57	0.53
Color, units	1.4	2.6	1.3
Alpha-amylase Activity, units/g	4.0	12.4	0.4
Amylograph Peak Viscosity, B.U.	330	140	860
Maltose Value, g/100 g	1.4	1.8	-
Starch Damage, Farrand units	14	15	11
Baking Absorption, %	56	55	57
BREAD			
Loaf Volume, cm^3	705	645	765
Appearance	6.8	5.8	7.8
Crumb Structure	6.5-o	5.8-o	6.0-o
Crumb Color	5.5-d	4.5-g	5.8-d
FARINOGRAM			
Absorption, %	56.9	56.4	55.7
Development Time, min	3.00	3.00	3.50
M.T.I., B.U.	90	100	55
Stability, min	4.50	4.00	5.50
EXTENSIGRAM			
Length, cm	25	22	27
Height at 5 cm, B.U.	195	210	230
Maximum Height, B.U.	280	280	360
Area, cm^2	100	95	145
ALVEOGRAM			
Length, mm	192	187	-
P (height x 1.1), mm	44	44	-
Area, cm^2	25	25	-
W, x 10^3 ergs	164	162	-

* HY320 is the first variety licensed for the new Canada Prairie Spring wheat class for which grade schedules were introduced August 1, 1985. The 1984 new-crop composites of HY320 would now qualify for the grade "No. 1 C.P.S."

10. Quality Data for Grade Composite Samples of 1985 Crop
Canada Western Red Winter Wheat

Quality Parameter	Canada Western Red Winter			No. 1 C.W.R.W.
	No. 1 C.W.	No. 2 C.W.	No. 3 C.W.	1984
Number of samples	634	296	318	-
WHEAT				
Test Weight, kg/hL	80.8	81.2	80.4	82.1
1000 Kernel Weight, g	25.4	29.5	31.9	28.0
Protein Content, % (N x 5.7)	12.2	11.1	9.6	11.8
Ash Content, %	1.21	1.28	1.31	1.23
Alpha-amylase Activity, units/g	14.2	35.4	83.7	1.8
Falling Number, s	315	240	175	395
Flour Yield, %	76.2	76.5	76.6	76.8
FLOUR				
Protein Content, %	11.5	10.3	8.8	11.1
Wet Gluten Content, %	33.1	29.7	23.4	33.1
Ash Content, %	0.46	0.45	0.43	0.44
Color, units	-0.6	-0.7	-0.8	-0.9
Alpha-amylase Activity, units/g	5.4	20.5	41.0	0.6
Amylograph Peak Viscosity, B.U.	365	115	55	775
Maltose Value, g/100 g	1.9	2.5	3.3	1.6
Starch Damage, Farrand units	22	23	21	22
Baking Absorption, %	57	55	54	56
BREAD				
Loaf Volume, cm^3	835	745	625	770
Appearance	8.5	7.5	6.2-old	8.5
Crumb Structure	6.2-o	6.5-o	6.0	7.0-o
Crumb Color	6.5-d	6.0-d	5.0-d	5.8-dy
FARINOGRAM				
Absorption, %	56.7	55.6	54.9	54.4
Development Time, min	5.25	4.25	1.75	6.00
M.T.I., B.U.	40	50	95	35
Stability, min	10.00	8.00	2.50	10.50
EXTENSIGRAM				
Length, cm	22	22	22	22
Height at 5 cm, B.U.	290	280	230	320
Maximum Height, B.U.	510	485	345	600
Area, cm^2	150	140	100	185
ALVEOGRAM				
Length, mm	157	163	120	-
P (height x 1.1), mm	55	51	49	-
Area, cm^2	42	38	28	-
W, x 10^3 ergs	275	248	183	-

11. Quality Data for Grade Composite Samples of 1985 Crop Canada Western Soft White Spring Wheat

Quality Parameter	No. 1 C.W.	No. 2 C.W.	No. 1 C.W. SWS 1984
Number of Samples	70	44	-
WHEAT			
Test Weight, kg/hL	82.1	80.1	82.3
1000 Kernel Weight, g	38.3	36.3	35.5
Protein Content, % (N x 5.7)	10.5	10.7	10.8
Ash Content, %	1.43	1.44	1.40
Alpha-amylase Activity, units/g	12.4	31.2	14.9
Falling Number, s	295	215	300
Flour Yield, %	72.6	72.3	74.6
FLOUR			
Protein Content, %	9.1	9.3	9.7
Wet Gluten Content, %	29.0	28.3	30.9
Ash Content, %	0.41	0.41	0.46
Color, units	-0.6	-0.2	0.1
Alpha-amylase Activity, units/g	2.6	8.6	0.8
Amylograph Peak Viscosity, B.U.	790	305	1050
Maltose Value, g/100 g	1.2	1.3	1.0
Starch Damage, Farrand units	10	9	9
AWRC, units	78.4	77.6	-
FARINOGRAM			
Absorption, %	55.2	55.4	54.5
Development Time, min	1.25	1.25	1.25
M.T.I., B.U.	175	175	190
Stability, min	1.50	1.50	1.00
ALVEOGRAM			
Length, mm	136	159	134
P (height x 1.1), mm	26	24	24
Area, cm^2	9	8	8
W, x 10^3 ergs	56	56	57

12. Quality Data for Grade Composite Samples of 1985 Crop Canada Eastern White Winter Wheat

Quality Parameter	1985		1984	
	No. 1 C.E.W.W.	No. 2 C.E.W.W.	No. 1 C.E.W.W.	No. 2 C.E.W.W.
Number of Samples	80	167	-	-
WHEAT				
Test Weight, kg/hL	81.8	80.1	81.1	80.1
1000 Kernel Weight, g	40.3	40.7	35.0	34.2
Protein Content, % (N x 5.7)	9.5	8.9	9.2	9.2
Ash Content, %	1.36	1.35	1.28	1.62
Alpha-amylase Activity, units/g	8.0	8.2	4.0	4.9
Falling Number, s	355	355	350	345
Flour Yield, %	73.6	74.3	75.6	75.2
FLOUR				
Protein Content, %	8.6	8.1	8.4	8.1
Wet Gluten Content, %	25.4	22.4	25.8	24.0
Ash Content, %	0.42	0.46	0.46	0.47
Color, units	-1.7	-1.7	-1.3	-1.1
Alpha-amylase Activity, units/g	1.1	1.2	1.4	1.9
Amylograph Peak Viscosity, B.U.	415	385	460	410
Maltose Value, g/100 g	1.0	1.0	0.9	0.9
Starch Damage, Farrand units	10	9	4	4
AWRC, units	70.6	69.9	-	-
COOKIE				
Spread, mm	9.5	8.5	-	-
Ratio	4.0	4.0	-	-
Color, units	3.5	4.0	-	-
Appearance, units	4.0	3.5	-	-
Uniformity, units	4.5	4.5	-	-
Total Score, units	25.5	24.5	-	-
FARINOGRAM				
Absorption, %	52.2	50.9	50.2	49.4
Development Time, min	1.00	1.00	0.75	0.75
M.T.I., B.U.	170	175	185	170
Stability, min	1.50	1.50	1.00	1.00
ALVEOGRAM				
Length, mm	121	116	146	119
P (height x 1.1), mm	22	19	19	18
Area, cm^2	8	6	9	7
W, x 10^3 ergs	50	43	58	48

13. Quality Data for 1985 Crop Composite "Red Spring Wheat, Sample account variety" *

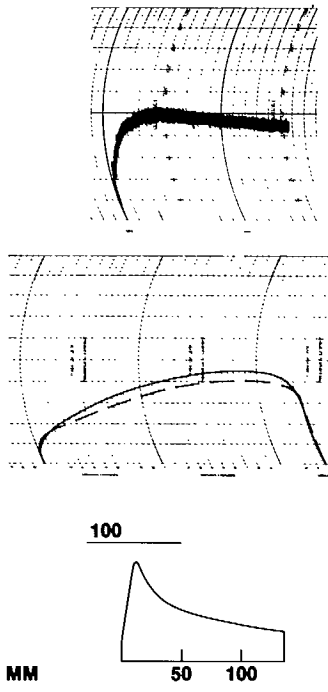
Quality Parameter	
Number of samples	272
WHEAT	
Test Weight, kg/hL	79.2
1000 Kernel Weight, g	30.6
Protein Content, % (N x 5.7)	12.0
Ash Content, %	1.56
Alpha-amylase Activity, units/g	34.5
Falling Number, s	245
Flour Yield, %	75.2
FLOUR	
Protein Content, %	11.4
Wet Gluten Content, %	33.8
Ash Content, %	0.50
Color, units	0.3
Alpha-amylase Activity, units/g	22.7
Amylograph Peak Viscosity, B.U.	90
Maltose Value, g/100 g	3.1
Starch Damage, Farrand units	28
Baking Absorption, %	58
BREAD	
Loaf Volume, cm^3	755
Appearance	7.2
Crumb Structure	6.5-o
Crumb Color	5.8-d
Blend Loaf Volume, cm^3	665
FARINOGRAM	
Absorption, %	59.4
Development Time, min	3.75
M.T.I., B.U.	65
Stability, min	7.00
EXTENSIGRAM	
Length, cm	23
Height at 5 cm, B.U.	220
Maximum Height, B.U.	360
Area, cm^2	115
ALVEOGRAM	
Length, mm	160
P (height x 1.1), mm	61
Area, cm^2	40
W, x 10^3 ergs	260

* Composite consists of unlicensed Red Spring Wheat varieties not eligible for any existing class. Physical grade specifications are approximately equal to those for No. 3 Canada Western Red Spring Wheat.

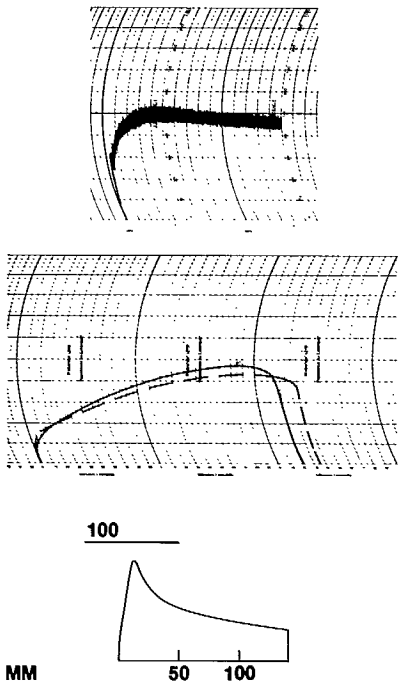
Farinograms, Extensigrams and Alveograms for Selected 1985 New Crop Composite Samples

No. 1 Canada Western Red Spring Wheat (13.5% protein)

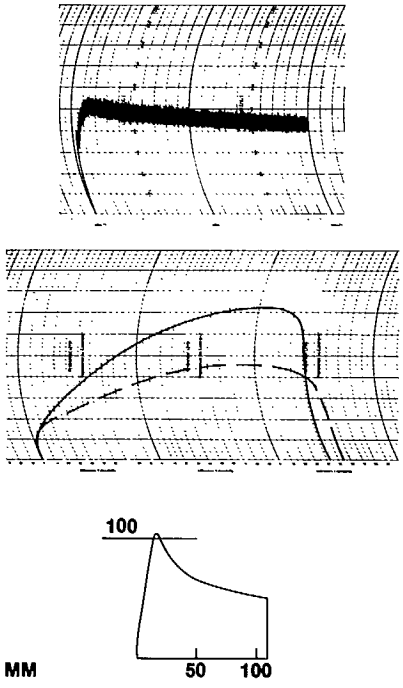
Eastern Prairie



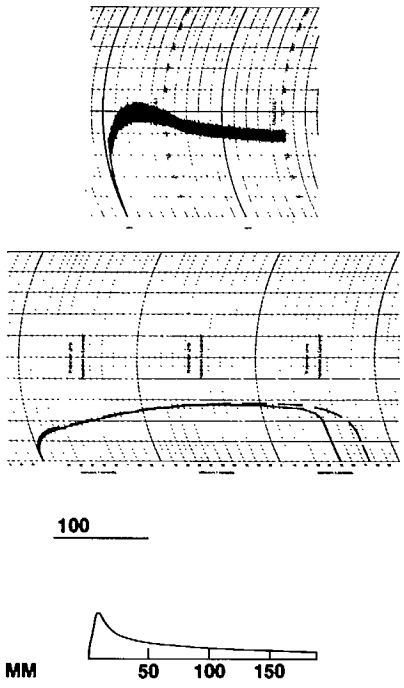
Western Prairie



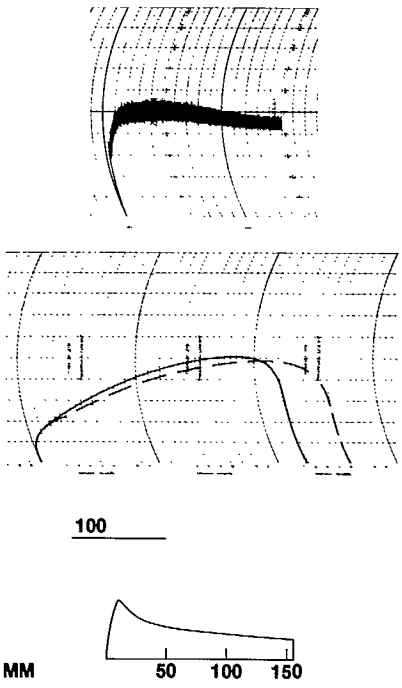
Canada Utility Wheat



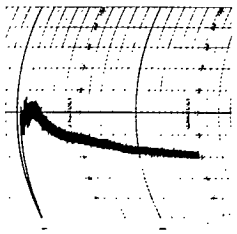
Canada Prairie Spring Wheat



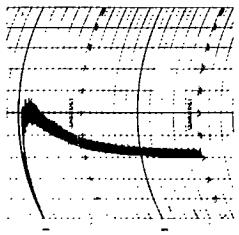
Canada Western Red Winter Wheat



Canada Western
Soft White Spring Wheat



Canada Eastern
White Winter Wheat



AMBER DURUM WHEAT

The overall quality of the 1985 durum crop is good despite the adverse conditions during the growing and harvest season. Because of prolonged cool, wet weather from late summer into fall, later harvested crop suffered from weathering with some sprouting and mildew. The Falling Number values of the grades No. 3 and No. 4 CWAD indicate some degree of sprout damage.

Protein content of 14.1% (Table 14) is 0.6 percentage units lower than that of the 1984 crop, but well above the 20 year mean of 13.4% (Table 15). The greatest decrease in protein content is seen in the grade No. 3 CWAD, down 1.4 percentage units from the 1984 level of 15.1%. Although test weight for each grade is about the same as that for the 1984 crop, average kernel size, as reflected in the 1000 kernel weight, is larger. Semolina yield, however, is lower in the new crop. Ash content in both the wheat and semolina is desirably low. Spaghetti color, as has been the case in the past decade, is excellent. Textural characteristics of cooked spaghetti is satisfactory but surface stickiness values are somewhat higher than those of the 1984 crop.

14. Protein Content of 1985 Crop Amber Durum Wheat

(Preliminary as at October 25, 1985)

Grade	Protein Content, %*				
	Manitoba	Saskatchewan	Alberta	Prairies	Prairies 1984
No. 1 CWAD	13.3	14.4	14.8	14.5	14.4
No. 2 CWAD	13.9	14.0	15.8	14.2	14.8
No. 3 CWAD	13.0	13.7	15.8	13.7	15.1
No. 4 CWAD	12.6	13.0	14.8	12.9	13.7
Mean - All Grades	13.0	14.0	15.2	14.1	14.7

* N x 5.7; 13.5% moisture content basis.

15. Protein Content of Amber Durum Wheat for the Period 1965 to 1984

Year	Protein Content, %*			
	Manitoba	Saskatchewan	Alberta	Prairies
1965	11.7	13.7	12.9	13.6
1966	11.5	13.4	12.7	13.2
1967	11.3	14.1	13.6	13.8
1968	12.0	14.0	11.5	13.4
1969	11.5	13.4	12.1	13.2
1970	11.2	13.1	12.1	12.9
1971	11.4	13.3	13.6	13.2
1972	11.6	12.9	12.7	12.8
1973	11.8	13.4	14.7	13.4
1974	13.2	13.4	14.3	13.5
1975	13.0	13.3	12.8	13.2
1976	13.0	12.8	13.7	12.9
1977	12.6	13.4	14.6	13.4
1978	12.6	12.9	13.5	12.9
1979	13.5	13.4	14.2	13.5
1980	14.8	14.3	13.1	14.2
1981	14.1	14.1	13.2	14.0
1982	12.9	13.1	13.1	13.1
1983	14.0	13.7	14.0	13.8
1984	14.5	14.6	15.5	14.7
1965-84 Mean	12.6	13.5	13.4	13.4

* N x 5.7; 13.5% moisture content basis.

16. Quality Data for Grade Composite Samples of 1985 Crop
Amber Durum Wheat

Quality Parameter	No. 1 C.W.A.D.	No. 2 C.W.A.D.	No. 3 C.W.A.D.	No. 4 C.W.A.D.	1 C.W.A.D. 1984
Number of Samples	467	341	264	117	423
WHEAT					
Test Weight, kg/hL	80.8	79.9	78.8	78.4	80.9
Weight per 1000 Kernels, g	38.5	37.9	39.3	40.0	36.6
Vitreous Kernels, %	92	88	82	59	90
Protein Content, %	14.4	14.1	13.7	12.9	14.6
Ash Content, %	1.45	1.47	1.55	1.57	1.50
SDS Sedimentation, mL	49.0	47.5	48.5	48.0	41.8
Falling Number, s	365	355	270	215	430
Milling Yield, %	75.6	75.2	75.1	75.0	77.1
Semolina Yield, %	63.0	62.2	62.7	61.9	64.8
SEMOLINA					
Protein Content, %	13.4	13.4	12.8	12.2	13.3
Wet Gluten Content, %	34.0	33.6	32.0	29.7	34.8
Ash Content, %	0.64	0.64	0.66	0.62	0.64
AGTRON Color, units	74	74	72	72	74
Speck Count, per 50 cm^2	14	22	33	46	14
SPAGHETTI					
Dried at 39°C					
Color:					
Brightness, %	48.7	49.2	49.0	48.2	47.6
Purity, %	62.4	61.8	61.8	60.2	64.2
Dominant Wavelength, nm	577.2	577.4	577.4	577.3	577.6
Cooking Quality, CQP	14.0	16.2	11.2	11.1	14.5
Stickiness, N/m^2	1150	1215	1220	1285	1025
Cooking Loss, %	9.2	9.4	9.6	10.6	8.0
Dried at 70°C					
Color:					
Brightness, %	49.2	48.8	48.3	47.8	47.4
Purity, %	57.2	57.6	58.0	58.3	58.6
Dominant Wavelength, nm	577.4	577.6	577.4	577.4	578.0
Cooking Quality, CQP	20.4	20.1	21.0	18.2	17.2
Stickiness, N/m^2	945	930	1000	1005	790
Cooking Loss, %	7.4	7.5	7.4	7.2	6.2

METHODS

Notes on the methods used by the Laboratory are given below. Analytical results for wheat are reported on a 13.5% moisture content basis, and for flour on a 14.0% moisture content basis. The AACC methods cited are those of the American Association of Cereal Chemists given in "Cereal Laboratory Methods", Eighth Edition, 1983. The ICC methods are those of the International Association for Cereal Chemistry.

Test Weight is determined using the Schopper Chondrometer equipped with the 1 litre container. The weight in grams of the measured litre of wheat is divided by 10 and the result is reported on an "as is" moisture content basis.

Weight per Thousand Kernels is determined using an electronic seed counter. Broken kernels and foreign material are first removed by hand-picking. A 20 g sample is then weighed.

Protein Content (N x 5.7) is determined by the Kjeldahl method as modified by Williams, "Journal of the Science of Food and Agriculture" 24:243,1973.

Alpha-amylase Activity of wheat and of flour is determined by the method of Kruger and Tipples, "Cereal Chemistry" 58:271-274, 1981.

Falling Number is determined on a 7 g sample of ground wheat by the method of Hagberg, "Cereal Chemistry" 38:202-203, 1961. Wheat (300 g) is ground in a Falling Number Laboratory Mill 3100 (ICC Standard Method No. 107).

Milling (flour) is carried out in an Allis-Chalmers laboratory mill using the GRL sifter flow as described by Black et al, "Cereal Foods World" 25:757-760, 1980.

Wet Gluten Content. Ten grams of flour and 6 ml of distilled water are mixed by hand for about 2 min. The dough is then washed for 12 min in a Theby Gluten Washer using a salt-phosphate buffer of pH 6.7; this is followed by 2 min hand washing. The resulting gluten is worked between the fingers until it becomes tacky, and is then weighed.

Ash Content is determined on a 4 g sample in a silica dish incinerated overnight at 585°C. After cooling, the dish and ash are weighed, the ash brushed out, the dish reweighed, and the weight of ash determined by difference.

Flour Color. A color index is obtained with the Kent-Jones and Martin Flour Color Grader which gives the relative reflectance (with filter No. 58) of a flour-water slurry. Results are reported as arbitrary scale units; the lower the number the brighter the flour.

Starch Damage is determined on a 5 g sample by the method of Farrand, "Cereal Chemistry" 41:98-111, 1964.

Amylogram. Sixty-five grams of flour (14.0% moisture content basis) and 450 ml distilled water are used with the Brabender Amylograph and the pin stirrer; other details are as in the AACC method. Peak viscosity is reported in Brabender Units.

Maltose Value is determined according to AACC method 16-22.

Baking is carried out by the Remix baking test procedure of Irvine and McMullan, "Cereal Chemistry" 37:603-613, 1960, as described in detail by Kilborn and Tipples, "Cereal Foods World" 26:624-628, 1981.

Remix-to-peak is a modification of the Remix method in which dough is mixed to optimum (peak) consistency.

Farinogram. Fifty grams of flour (14.0% moisture content basis) are mixed in the small stainless steel farinograph bowl (63 r.p.m. drive) for 15 min with sufficient distilled water to give a maximum dough consistency centered about the 500 Brabender Unit line. Farinograph absorption is the amount of water which must be added to a flour of 14.0% moisture content to give the required consistency, and is reported as percent. Dough development time is the time required for the curve to reach its maximum height.

Extensigram. Doughs are made from 300 g flour (14.0% moisture content basis), 6 g salt, and distilled water equal to the farinograph absorption less 2.0 percentage units to compensate both for the salt and for the substitution of the large stainless steel farinograph bowl. Doughs are mixed for 1 min, rested for 5 min, and mixing is then continued until the curve is centered about the 500 Brabender Unit line. Curves are drawn for duplicate doughs at 45 and at 135 min though doughs are also rounded and shaped at 90 min. Average curves for 45 and 135 min are reproduced, but measurements (length in centimeters, height in Brabender Units, and area in square centimeters) are reported only for the 135 min curve (solid line). The Extensigraph is set so that 100 Brabender Units equal a 100 g load.

Alveogram. The ICC Standard Method No. 121 is followed, using the constant pressure Model MA82 equipment. The instrument used prior to this year was a variable water pressure model. Alveograms from these models are not directly comparable for some classes of wheat.

Vitreous Kernels. This determination is made according to the Grain Inspection Division on a 25 g sample of clean wheat. The vitreous kernels are handpicked and weighed.

SDS Sedimentation values are determined according to the method of Axford and Redman, "Cereal Chemistry" 56:582(1979), using 3% SDS.

Milling (semolina). Wheat is cleaned, scoured and tempered overnight to 16.5% moisture content prior to milling by a modified Buhler Laboratory Mill (Black and Bushuk, "Cereal Science Today" 12:164, 1967) in conjunction with a laboratory purifier (Black, "Cereal Science Today" 11:533, 1966). The mill flow described by Dexter et al ("Canadian Institute of Food Science and Technology Journal" 15:225, 1982) was lengthened to achieve a higher extraction. Milling yield (including flour) and semolina yield (less than 1% through a 149 micron sieve) are reported, on a constant moisture content basis, as a percentage of the cleaned tempered wheat. The millroom is controlled for temperature (22°C) and humidity (60%).

Semolina Color is determined according to the A.A.C.C. method. An AGTRON direct reading reflectance spectrophotometer is used.

Speck Count is determined as described by Dexter and Matsuo, "Cereal Chemistry" 59:63 (1982).

Spaghetti is processed from semolina on a DEMACO laboratory-scale continuous extrusion press as described by Matsuo et al "Cereal Chemistry" 55:744 (1978) and dried both by a conventional low-temperature drying cycle (39°C) and by a high-temperature cycle (70°C) as described by Dexter et al, "Journal of Food Science" 46:1741 (1981).

Spaghetti Color. Whole strands of spaghetti are mounted on white cardboard for color measurements. Dominant wavelength, purity, and brightness are determined, using the Ten Selected Ordinates method, in a Beckman Color DB-G Spectrophotometer (Daun, "Cereal Chemistry" 55:692, 1978).

Spaghetti Cooking Quality is determined according to the method of Dexter and Matsuo, "Canadian Journal of Plant Science" 57:717-727, 1977.

Stickiness of Cooked Spaghetti is measured on the GRL Compression Tester as described by Dexter et al, "Cereal Chemistry" 60:139, 1983.

Cooking Loss, the amount of material lost in the cooking water, is determined as described by Dexter and Matsuo, "Cereal Chemistry" 56:394, 1979.

Farinogram (semolina). Fifty grams of semolina (14% moisture content basis) is mixed with distilled water (31.5% absorption) in the small stainless steel farinograph bowl (59 r.p.m. drive), using the rear sensitivity setting.

Alkaline Water Retention Capacity (AWRC) is determined by the method of Yamazaki et al, "Crop Science" 8:199, 1968.

Cookie Test is performed according the AACC method.

Collection of Samples. The samples of Canada Eastern White Winter Wheat are obtained from the Grain Inspection Division office at Chatham, Ontario, and the samples of the other classes of wheat are obtained from grain companies operating primary elevators in Western Canada. The grade composites of Red Spring Wheat are prepared by using samples from Manitoba and the eastern half of Saskatchewan for the Eastern Prairie composites and from Alberta and the western half of Saskatchewan for the Western Prairie composites. Samples collected up to and including the following dates were used:

September 27 - No. 1 C.W. Red Spring, No. 1 C.W. Amber Durum, all grades of Western Red Winter and Eastern White Winter.
October 10 - No. 2 C.W., No. 3 C.W. and No. 4 C.W. Amber Durum.
October 15 - All grades of Canada Prairie Spring, Canada Utility and "Sample Account Variety".
October 17 - No. 2 C.W. and No. 3 C.W. Red Spring and all grades of Western Soft White Spring.

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