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Quality of western Canadian pulse crops

2007

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Table of contents

Introduction	4
Weather review	4
Seeding.....	4
Growing conditions.....	4
Harvest conditions.....	5
Production review	5
Quality of western Canadian peas—2007	7
Harvest survey samples	7
Quality of 2007 western Canadian peas	8
Western Canadian lentils—2007	13
Harvest survey samples	13
Quality of 2007 western Canadian lentils	14
Western Canadian pea beans—2007	22
Harvest survey samples	22
Quality of 2007 western Canadian pea beans	23
Western Canadian chick peas—2007	26
Harvest survey samples	26
Quality of 2007 western Canadian chick peas	27

Tables

Table 1 – Production statistics for western Canadian pulses	6
Table 2 – Mean protein content for 2007 western Canadian peas by grade	9
Table 3 – Quality data for 2007 western Canadian yellow peas	11
Table 4 – Quality data for 2007 western Canadian green peas	12
Table 5 – Protein content for 2007 western Canadian lentils by grade	15
Table 6 – Quality data for 2007 western Canadian green lentils by size	17
Table 7 – Seed size distribution for 2007 western Canadian green lentils	18
Table 8 – Quality data for 2007 western Canadian red lentils	19
Table 9 – Seed size distribution for 2007 western Canadian red lentils	20
Table 10 – Quality data on dehulling quality for 2007 western Canadian red lentils	21
Table 11 – Mean protein content for 2007 western Canadian pea beans	23
Table 12 – Quality data for 2007 western Canadian pea beans	25

Table 13 – Mean protein content for 2007 western Canadian Kabuli chick peas by grade	27
Table 14 – Quality data for 2007 western Canadian Kabuli chick peas.....	29

Figures

Figure 1 – Map of western Canada showing origin of 2007 harvest survey pea samples	7
Figure 2 – Mean protein content of western Canadian peas	10
Figure 3 – Map of western Canada showing origin of 2007 harvest survey lentil samples	13
Figure 4 – Mean protein content of western Canadian lentils.....	16
Figure 5 – Map of western Canada showing origin of 2007 harvest survey pea bean samples	22
Figure 6 – Mean protein content of western Canadian pea beans	24
Figure 7 – Map of western Canada showing origin of 2007 harvest survey chick pea samples	26
Figure 8 – Mean protein content of western Canadian Kabuli chick peas	28

Introduction

This report presents the quality data for the 2007 harvest survey for western Canadian pulse crops (peas, lentils, chick peas and pea beans). Samples submitted by western Canadian producers to the Canadian Grain Commission's (CGC) Grain Research Laboratory (GRL) were collected for data analysis.

Weather review

The prairie provinces experienced wet spring weather to start the 2007 growing year. A drier and warmer than normal growing period eventually stressed many crops in the south, but also allowed for quicker crop maturity and an earlier than normal harvest. The weather review for the 2007 crop year was provided by the Weather and Crop Surveillance department of the Canadian Wheat Board (CWB).

Seeding

Central Alberta and north-eastern Saskatchewan received heavy rains during the spring planting season, which resulted in a significant reduction in sown area. Late planting was also common in these areas, with significant acreage switched to earlier maturing crops. Planting in the northern areas wrapped-up during the first weeks of June, with significant cropped area left fallow in certain areas. The southern Prairies, conversely, were dry during the spring, which resulted in early planting in the region. The dryness also raised concerns about poor soil moisture levels, which have persisted since the 2006 growing season in the southern Prairies. Planting conditions in Manitoba were good across the province, with early planting reported in all areas except the north-western region.

Growing conditions

Precipitation during June was close to normal or above normal in most of the Prairie region, except in the southern areas of Alberta and Saskatchewan. These areas received enough moisture during June to sustain crop growth, but not enough to add to subsoil moisture reserves. Crop conditions at the end of June were mostly good to excellent. Above normal temperatures moved into the western areas of the Prairies during early July and migrated to eastern regions by the middle of the month. Temperature records were set in a number of locations in Alberta and Saskatchewan during July. The hot, dry conditions reduced yield expectations, especially in the southern growing areas of Alberta and Saskatchewan. In northern areas, the hot weather did help boost the development of crops that had been seeded later than normal. Cooler weather returned to the Prairies by the middle of August, with some scattered frosts reported in Alberta and Saskatchewan before the end of the month. The dry, hot conditions during July did help keep disease levels in check in most areas.

Harvest conditions

Pulse harvesting started during middle August and was completed in the southern Prairies by the middle of September, due to mostly dry weather during the month of August. Central and northern areas of the Prairies received cooler temperatures and more rainfall during August and September, which caused harvesting delays. The northern growing areas finished the harvest by mid-October. The delays were most acute in the Peace River district, where cool and wet conditions persisted through the growing season and into the harvest.

Production review

Pea production for 2007 was estimated to be 2.9 million tonnes, which was up slightly from 2006 and 17.8% higher than the 10-year average of 2.4 million tonnes (Table 1). The increase in production was due to an increase in harvested area. Saskatchewan accounted for 79% of Canadian pea production, while Alberta and Manitoba accounted for 18% and 3%, respectively.

Lentil production in 2007 was similar to production in 2006 and to the 10-year average (Table 1). Saskatchewan continues to dominate lentil production in Western Canada, accounting for about 100% of production.

In 2007, Manitoba accounted for 100% of western Canadian pea bean production, which decreased 19% compared to that in 2006 and was 35% lower than the 10-year average (Table 1). The decrease in production was due to decreased yield.

Production of chick peas for 2007 was estimated at 0.23 million tonnes, which was up 19% from 2006 and was 50% higher than the 5-year average (Table 1). The increased production in 2007 was a result of increased harvested area. Saskatchewan accounted for approximately 88% of western Canadian chick pea production in 2007, while Alberta accounted for 12%.

Table 1 – Production statistics for western Canadian pulses¹

Province	Harvested area		Production		Yield		Mean production ²
	2007	2006	2007	2006	2007	2006	1997-2006
	thousand hectares		thousand tonnes		kg/ha		thousand tonnes
Peas-dry							
Manitoba	39	32	98	91	2540	2810	146
Saskatchewan	1164	1101	2310	2127	1990	1930	1740
Alberta ³	241	245	528	588	2190	2400	529
Western Canada	1443	1378	2935	2806	2030	2036	2414
Lentils							
Manitoba	–	–	–	–	–	–	5
Saskatchewan	534	555	674	693	1260	1250	677
Alberta ³	–	–	–	–	–	–	9
Western Canada	534	555	674	693	1260	1250	689
Pea beans							
Manitoba	26	28	43	53	1640	1860	66
Saskatchewan	–	–	–	–	–	–	–
Alberta ³	–	–	–	–	–	–	–
Western Canada	26	28	43	53	1640	1860	66
Chick peas							
Manitoba	–	–	–	–	–	–	–
Saskatchewan	154	130	198	160	1290	1230	99 ⁴
Alberta ³	20	14	27	23	1320	1620	14 ⁴
Western Canada	174	144	225	183	1290	1270	113⁴

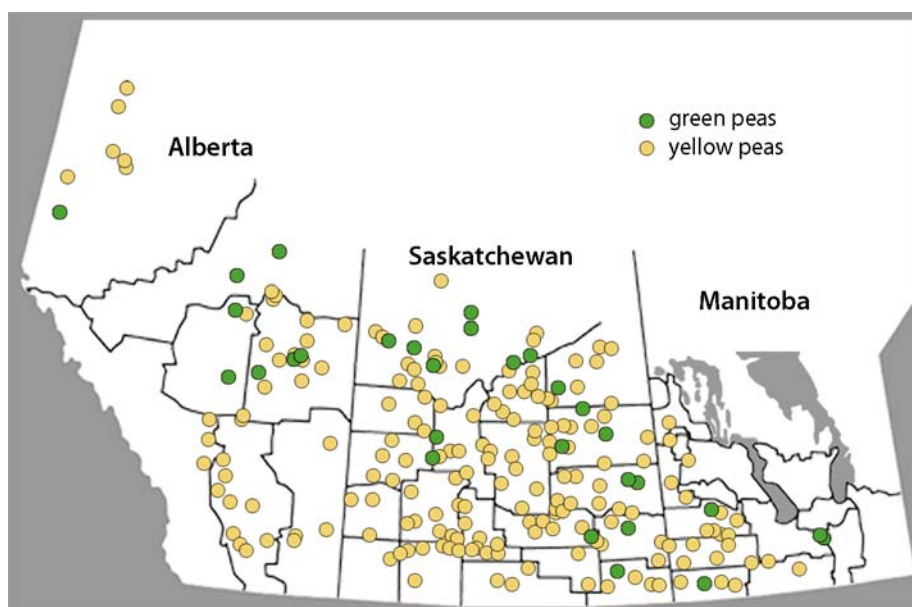
¹ Statistics Canada, *Field Crop Reporting Series*, Vol. 86, No. 8.² Statistics Canada, *Field Crop Reporting Series*, 1997-2006.³ Includes the Peace River area of British Columbia.⁴ Statistics Canada, *Field Crop Reporting Series*, 2002-2006

Quality of western Canadian peas _____ 2007

Harvest survey samples

Samples for the CGC's 2007 harvest survey were collected from producers across western Canada (Fig. 1). A total of 782 samples consisting of 621 yellow pea and 161 green pea samples were received at the CGC for analysis. All samples were graded and tested for protein content. Only those samples receiving a grade of Peas, No.1 Canada or Peas, No. 2 Canada were tested for 100-seed weight, water absorption, cooking time and firmness of cooked peas. Starch content was determined on selected samples. It is important to note that the samples reported by grade do not necessarily represent the actual distribution of grade.

Figure 1 – Map of western Canada showing origin of 2007 harvest survey pea samples



Quality of 2007 western Canadian peas

Protein content ranged from 16.2% to 30.5% for 2007 western Canadian peas, including yellow and green peas (Table 2). The average protein for 2007 western Canadian peas was 24.7%, which was similar to that for 2006 and higher than the five-year average of 23.9 % (Fig. 2). There was not much difference in protein content by grade level as shown in Table 2. Peas from Manitoba and Saskatchewan showed higher levels of protein than peas from Alberta.

Table 3 shows the quality data for 2007 yellow peas. The average protein content for 2007 Peas, No. 1 Canada Yellow was 24.8%, which was similar to 2006 (24.9%). The average protein content for 2007 Peas, No. 2 Canada Yellow was 25.0%, which was higher than for 2006. Both Peas, No. 1 Canada Yellow and Peas, No. 2 Canada Yellow in 2007 had a lower mean starch content than those from 2006.

Peas, No. 1 Canada Yellow and peas, No. 2 Canada Yellow had average 100-seed weights of 20.9 g and 20.5 g (Table 3), respectively, which were lower than the respective grades for 2006. This indicates that seed sizes for 2007 peas are smaller than those for 2006. The mean water absorption values for 2007 Peas, No.1 Canada Yellow and Peas, No. 2 Canada Yellow were 0.97 and 0.98 (g H₂O/g seeds), respectively, which were similar to the respective grades for 2006.

The mean cooking times for Peas, No. 1 Canada Yellow and Peas, No. 2 Canada Yellow were 19.2 and 16.1 min, respectively (Table 3). 2007 yellow peas had shorter cooking times than 2006. The mean firmness values of cooked yellow peas for 2007 Peas, No.1 Canada Yellow and Peas, No. 2 Canada Yellow were 8.1 and 7.2 kg/g cooked seeds, respectively. These values were also lower than the respective grades in 2006.

The average protein contents for Peas, No. 1 Canada Green and Peas, No. 2 Canada Green were 24.9 and 24.9% (Table 4), respectively, which were slightly higher than those for 2006. Peas, No. 1 or No. 2 Canada Green in 2007 had lower mean starch content than the respective grades in 2006. 2007 Peas, No. 1 Canada Green had a higher 100-seed weight and slightly higher water absorption values than those for 2006. 2007 Peas, No. 2 Canada Green had similar seed weight and water absorption value to those for 2006. 2007 green peas had much shorter cooking times and softer cooked texture than 2006.

Table 2 – Mean protein content for 2007 western Canadian peas by grade¹

Grade	Protein content, %			
		2007		2006
	mean	min.	max.	mean
Manitoba				
Peas, No. 1 Canada	24.2	21.7	25.2	24.6
Peas, No. 2 Canada	24.6	21.2	27.8	24.9
Peas, No. 3 Canada	24.8	23.2	27.7	24.1
All grades	24.5	21.2	27.8	24.9
Saskatchewan				
Peas, No. 1 Canada	25.0	20.0	30.3	25.0
Peas, No. 2 Canada	25.2	19.5	29.5	24.3
Peas, No. 3 Canada	24.9	20.1	28.5	24.1
All grades	25.0	19.5	30.3	24.6
Alberta				
Peas, No. 1 Canada	23.3	16.2	30.5	23.8
Peas, No. 2 Canada	24.1	17.4	27.4	24.2
Peas, No. 3 Canada	23.9	18.8	28.6	24.6
All grades	23.8	16.2	30.5	24.3
Western Canada				
Peas, No. 1 Canada	24.8	16.2	30.5	24.9
Peas, No. 2 Canada	25.0	17.4	29.5	24.4
Peas, No. 3 Canada	24.7	18.8	28.6	24.2
All grades	24.7	16.2	30.5	24.5

¹ Protein content (N x 6.25) is determined by near infrared measurement calibrated against the Combustion Nitrogen Analysis reference method.

Figure 2 – Mean protein content of western Canadian peas

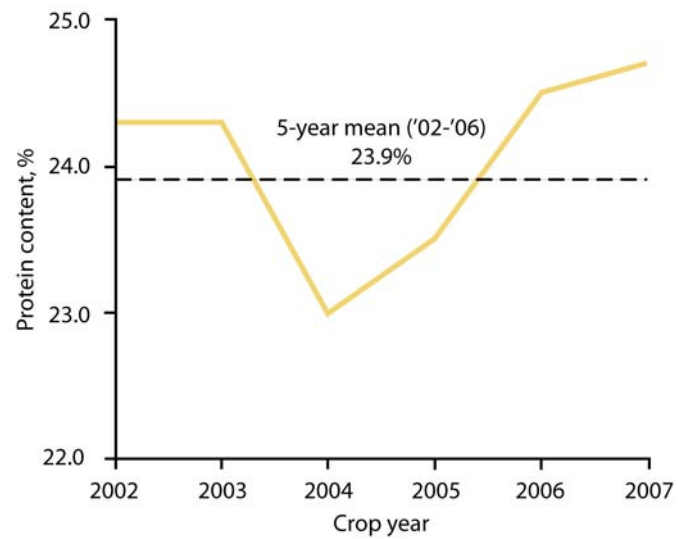


Table 3 – Quality data for 2007 western Canadian yellow peas

Quality parameter	Peas, No. 1 Canada Yellow		Peas, No. 2 Canada Yellow	
	2007	2006	2007	2006
Protein, % dry basis				
Number of samples	222	328	303	321
Mean	24.8	24.9	25.0	24.4
Standard deviation	2.1	2	1.9	1.6
Minimum	16.2	16.9	17.4	19.8
Maximum	30.5	30.6	29.5	30.4
Starch, % dry basis				
Number of samples	69	51	70	50
Mean	47.8	49.0	47.7	48.9
Standard deviation	2.0	1.5	2.1	1.6
Minimum	43.4	45.6	41.8	45.3
Maximum	52.5	52.8	51.8	52.8
100-seed weight, g/100 seeds				
Number of samples	219	294	292	281
Mean	20.9	21.4	20.5	21.6
Standard deviation	1.8	2.1	2.4	2.2
Minimum	16.5	12.3	9.7	11.0
Maximum	28.2	28.6	30.7	29.3
Water absorption, g H₂O/g seeds				
Number of samples	219	294	292	281
Mean	0.97	0.98	0.98	0.95
Standard deviation	0.10	0.09	0.11	0.10
Minimum	0.45	0.49	0.2	0.5
Maximum	1.14	1.14	1.2	1.17
Cooking time, min				
Number of samples	71	43	71	42
Mean	19.2	26.3	16.1	28.2
Standard deviation	11.7	8.0	7.0	6.5
Minimum	7.1	9.7	6.8	13
Maximum	40	38.8	40	40
Firmness, kg/g cooked seeds				
Number of samples	91	9	94	8
Mean	8.1	11.4	7.2	10.1
Standard deviation	2.6	3.3	2.0	3.6
Minimum	3.7	6.2	3.4	5.2
Maximum	15.2	14.8	12.7	17.3

Table 4 – Quality data for 2007 western Canadian green peas

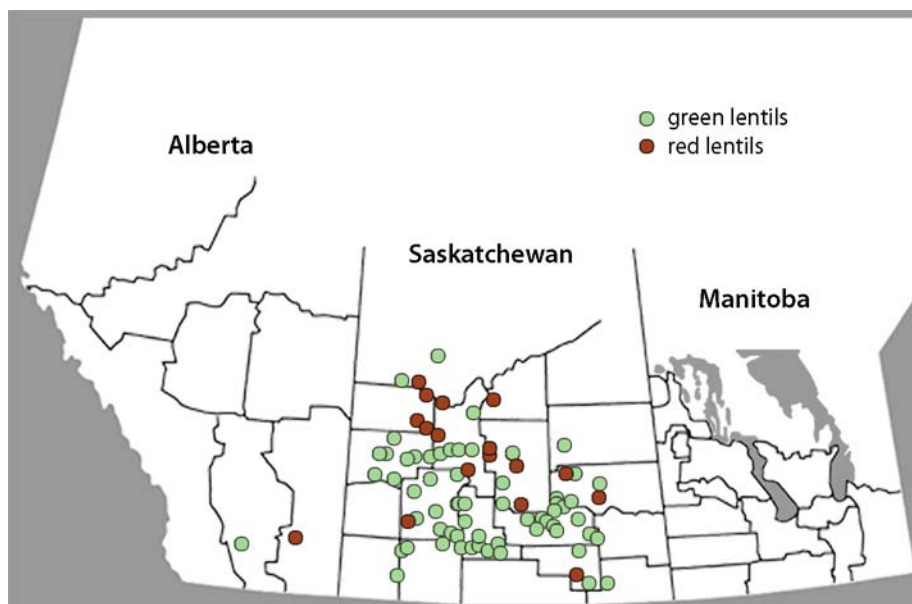
Quality parameter	Peas, No. 1 Canada Green		Peas, No. 2 Canada Green	
	2007	2006	2007	2006
Protein, % dry basis				
Number of samples	28	40	17	43
Mean	24.9	24.7	24.9	24.4
Standard deviation	1.6	1.2	1.6	1.2
Minimum	22.0	22.1	21.2	22.1
Maximum	28.0	26.7	27.4	27.5
Starch, % dry basis				
Number of samples	28	23	17	27
Mean	47.2	48.3	46.8	48.2
Standard deviation	1.9	2.1	1.7	1.5
Minimum	43.2	41.2	43.7	44.7
Maximum	49.9	51.3	49.5	51.8
100-seed weight, g/100 seeds				
Number of samples	28	36	17	36
Mean	21.8	20.1	21.2	21.1
Standard deviation	2.3	2.1	2.6	2.8
Minimum	17.0	15.7	16.8	12.9
Maximum	25.0	24.2	26.2	26.5
Water absorption, g H₂O/g seeds				
Number of samples	28	36	17	36
Mean	0.94	0.92	0.93	0.95
Standard deviation	0.15	0.17	0.13	0.14
Minimum	0.59	0.5	0.68	0.62
Maximum	1.14	1.14	1.12	1.15
Cooking time, min				
Number of samples	28	14	17	16
Mean	14.3	29.3	14.6	29.1
Standard deviation	8.8	6.7	8.5	5.9
Minimum	6.4	18.8	6.8	20.1
Maximum	40.0	39.4	40	37.4
Firmness, kg/g cooked seeds				
Number of samples	27	9	17	8
Mean	6.7	11.8	6.3	10.4
Standard deviation	2.6	1.3	1.7	2.3
Minimum	3.4	10.0	3.5	6.8
Maximum	13.5	13.7	9.0	13.3

Western Canadian lentils 2007

Harvest survey samples

Samples for the CGC's 2007 harvest survey were collected from producers across western Canada (Fig. 3). A total of 333 lentil samples including 259 green lentils and 74 red lentils were received at the CGC for analysis. All samples were graded and tested for protein content and seed size distribution using the Image Analysis technique. Only those samples receiving a grade of Lentils, No. 1 Canada or Lentils, No. 2 Canada were tested for 100-seed weight and water absorption. Starch content was determined on selected samples. Dehulling quality of red lentils was also evaluated. It is important to note that the samples reported by grade do not necessarily represent the actual distribution of grade.

Figure 3 – Map of western Canada showing origin of 2007 harvest survey lentil samples



Quality of 2007 western Canadian lentils

Protein content ranged from 22.2% to 31.4% for 2007 western Canadian lentils, including green and red lentils (Table 5). The average protein content for 2007 was 27.6% which was slightly higher than the 2006 average of 27.4% and also higher than the five-year average of 26.6% (Fig. 4). The average protein content for lentils from Alberta in 2007 was higher than that for lentils from Saskatchewan.

Small green lentils (Eston, Milestone and Viceroy), medium green lentils (Meteor, Richlea and Vantage) and large green lentils (Glamis, Grandora, Laird, Plato, Sedley and Sovereign) had average protein contents of 27.6%, 26.8% and 27.2%, respectively, which were higher than the respective type of lentils for 2006 (Table 6). The mean starch content for small or large green lentils was 46.6%, which was higher than that for the respective type of green lentils in 2006, while 2007 medium green lentils had similar starch content to 2006.

Small green lentils in 2007 survey had a mean 100-seed weight of 3.3 g, which was higher than that in 2006 (Table 6). Medium and large green lentils in the 2007 had mean 100-seed weights of 4.4 g and 5.9 g (Table 6), respectively, which were lower than in the 2006 survey. The mean water absorption values were 0.91 g H₂O/g seeds for small lentils, 1.06 H₂O/g seeds for medium lentils and 1.04 H₂O/g seeds for large lentils, respectively. 2007 green lentils had higher average water absorption value than 2006.

The seed size distribution for green lentils (Table 7) was determined by the Image Analysis technique developed at the CGC. The reported results may differ from those obtained by the conventional sieving techniques. For small green lentils in 2007, 65% fell within 4.0 to 5.0 mm, while in 2006, 68% fell within 4.0 to 5.0 mm. In 2007, 68% of medium lentils fell in the range of 5.5-7.0 mm while in 2006, 71% were in this range. In 2007, 52% of large lentils were within the range of 6.0 to 7.5 mm as compared to 69% in 2006.

Red lentils, including the varieties Blaze, Crimson, CDC Impact, CDC Imperial, CDC Redberry, CDC Rouleau and Robin, had a mean protein content of 28.6% (Table 8), which was similar to that in 2006. Red lentils in 2007 had a lower mean starch content than in 2006. The mean 100-seed weight for 2007 red lentils was 3.2 g, which was similar to that in 2006. The mean water absorption value for 2007 was higher than that for 2006.

In 2007, about 68% of the red lentils fell within 4.0 to 5.0 mm (Table 9), while in 2006, about 55% fell within 4.0 to 5.0 mm. This indicated that red lentils in 2007 had larger mean seed size than in 2006.

Table 10 shows the dehulling quality for 2007 western Canadian red lentils. 2007 red lentils had a mean dehulling efficiency of 82.1% as compared to 83.6% in 2006. The powder and broken seeds produced during dehulling for 2007 were similar to those for 2006. In 2007, red lentils had more undehulled whole

seeds after the dehulling process than in 2006. Colour of dehulled lentils was measured using a Hunterlab LabScan XE spectrophotometer with the CIE L*, a* and b* colour scale. Dehulled splits exhibited more brightness (L*), similar redness (a*) and more yellowness (b*) as compared to dehulled whole seeds (Table 10). There were no differences in L* values between 2007 and 2006 dehulled whole and split seeds. Redness (a*) and yellowness (b*) were higher for 2007 dehulled whole and split seeds than for those in 2006.

Table 5 – Protein content for 2007 western Canadian lentils by grade¹

Grade	Protein content, %			
	2007		2006	
	mean	min.	max.	mean
Manitoba				
Lentils, No. 1 Canada	-	-	-	29.9
Lentils, No. 2 Canada	-	-	-	-
Lentils, No. 3 Canada	-	-	-	-
All grades	-	-	-	29.9
Saskatchewan				
Lentils, No. 1 Canada	27.8	24.3	31.4	27.6
Lentils, No. 2 Canada	27.3	22.2	30.5	26.7
Lentils, No. 3 Canada	27.7	24.9	29.4	26.8
All grades	27.6	22.2	31.4	27.4
Alberta				
Lentils, No. 1 Canada	28.2	27.6	29.1	27.7
Lentils, No. 2 Canada	27.2	27.2	27.2	27.1
Lentils, No. 3 Canada	-	-	-	-
All grades	28.0	27.2	29.1	27.4
Western Canada				
Lentils, No. 1 Canada	27.8	24.3	31.4	27.6
Lentils, No. 2 Canada	27.3	22.2	30.5	26.9
Lentils, No. 3 Canada	27.8	24.6	31.0	26.8
All grades	27.6	22.2	31.4	27.4

¹ Protein content (N x 6.25) is determined by near infrared measurement calibrated against the Combustion Nitrogen Analysis reference method.

Figure 4 – Mean protein content of western Canadian lentils

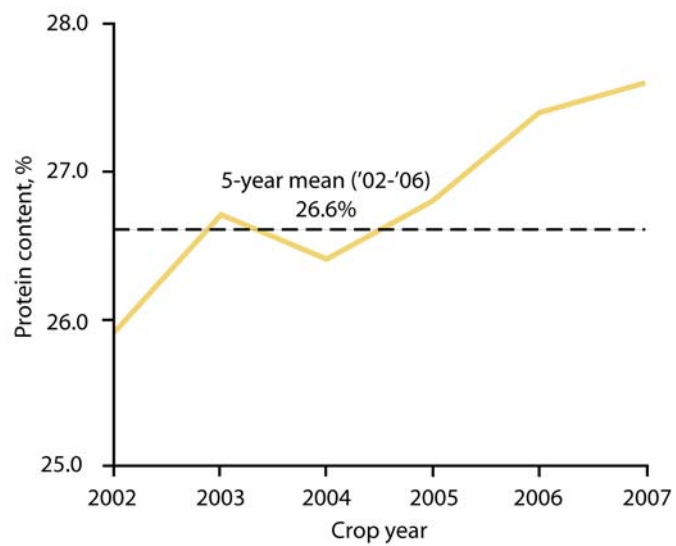


Table 6 – Quality data for 2007 western Canadian green lentils by size¹

Quality parameter	2007			2006		
	SL ²	ML ³	LL ⁴	SL ²	ML ³	LL ⁴
Protein, % dry basis						
Number of samples	40	4	191	41	13	158
Mean	27.6	26.8	27.2	26.6	26.2	26.6
Standard deviation	1.3	1.4	1.2	1.5	1.3	1.0
Minimum	23.9	25.2	22.2	21.5	24.1	22.7
Maximum	30.8	28.4	29.8	29.2	29.2	29.4
Starch, % dry basis						
Number of samples	24	4	65	24	13	31
Mean	46.6	46.6	46.6	45.9	46.7	46.1
Standard deviation	1.5	1.8	1.4	2.3	2.1	1.8
Minimum	43.2	44	43.7	43.6	43	42.5
Maximum	50.6	48.1	49.4	52.2	51	50.5
100-seed weight, g/100 seeds						
Number of samples	39	4	191	33	9	156
Mean	3.3	4.4	5.9	2.9	5.5	6.2
Standard deviation	2.2	0.6	0.5	0.4	0.5	0.6
Minimum	2.4	3.9	4.8	2.4	4.4	5.0
Maximum	3.7	5.2	8.0	3.8	6.2	8.0
Water absorption, g H₂O/g seeds						
Number of samples	39	4	191	33	9	156
Mean	0.91	1.06	1.04	0.84	1.00	0.98
Standard deviation	0.07	0.08	0.09	0.11	0.08	0.09
Minimum	0.60	0.95	0.76	0.58	0.86	0.67
Maximum	1.04	1.12	1.21	0.99	1.10	1.21

¹ Lentils, No. 1 Canada and Lentils, No. 2 Canada combined.

² SL=small lentils including Eston, Milestone and Viceroy.

³ ML=medium lentils including Meteor, Richlea and Vantage.

⁴ LL=large lentils including Glamis, Grandora, Laird, Plato, Sedley and Sovereign.

Table 7 – Seed size distribution for 2007 western Canadian green lentils¹

Seed size distribution	2007			2006		
	SL ²	ML ³	LL ⁴	SL ²	ML ³	LL ⁴
	Number of samples			Number of samples		
	29	4	208	44	13	364
<3.5 mm, %	2.6	0.2	0.5	4.1	0	0.1
3.5–4.0 mm, %	14.5	0.4	1.9	10.7	0.2	0.3
4.0–4.5 mm, %	37.8	5.9	4.3	33	1	0.8
4.5–5.0 mm, %	27.3	17.3	5.8	35.2	6.1	2.1
5.0–5.5 mm, %	6.7	6.7	10	7.6	21.2	6.8
5.5–6.0 mm, %	6.8	13.2	25.2	0.7	33.4	20.3
6.0–7.0 mm, %	4.4	54.6	51.4	1.8	37.5	65.3
7.0–7.5 mm, %	0	1.9	0.9	0	0.6	3.5
>7.5 mm, %	0	0	0	0	0	0

¹ Seed size including all grades determined by an Image Analysis technique.

² SL=small lentils including the varieties Eston, Milestone and Viceroy.

³ ML=medium lentils including the varieties Meteor, Richlea and Vantage.

⁴ LL=large lentils including the varieties Glamis, Grandora, Laird, Plato, Sedley and Sovereign.

Table 8 – Quality data for 2007 western Canadian red lentils¹

Quality parameter	2007	2006
Protein, % dry basis		
Number of samples	68	132
Mean	28.6	28.8
Standard deviation	1.4	1.1
Minimum	25.5	24.1
Maximum	31.4	31.2
Starch, % dry basis		
Number of samples	47	110
Mean	46.8	47.7
Standard deviation	1.4	2.0
Minimum	43.4	42.9
Maximum	48.9	52
100-seed weight, g/100 seeds		
Number of samples	67	127
Mean	3.2	3.1
Standard deviation	0.5	0.4
Minimum	2.2	2.2
Maximum	4.2	4.4
Water absorption, g H₂O/g seeds		
Number of samples	67	127
Mean	0.95	0.91
Standard deviation	0.06	0.09
Minimum	0.78	0.57
Maximum	1.17	1.28

¹ Red lentils (Blaze, Crimson, CDC Impact, CDC Imperial, CDC Redberry, CDC Rouleau and Robin). Lentils, No. 1 Canada Red and Lentils, No. 2 Canada Red combined.

Table 9 – Seed size distribution for 2007 western Canadian red lentils¹

Seed size distribution ²	2007	2006
	Number of samples	
	76	148
<3.5 mm, %	2.7	6.4
3.5–4.0 mm, %	15.4	24.6
4.0–4.5 mm, %	35.8	36.1
4.5–5.0 mm, %	32.5	18.9
5.0–5.5 mm, %	9.1	3.1
5.5–6.0 mm, %	1.9	0.2
6.0–7.0 mm, %	2.6	0
>7.0 mm, %	0	0

¹ Red lentils including the varieties Blaze, Crimson, CDC Impact, CDC Imperial, CDC Redberry, CDC Rouleau and Robin.

² Seed size including all grades determined by the Image Analysis technique.

Table 10 – Quality data on dehulling quality for 2007 western Canadian red lentils¹

Quality parameter	2007	2006		
Dehulling efficiency, %				
Number of samples	65	91		
Mean	82.1	83.6		
Standard deviation	5.1	4.7		
Minimum	66.6	54.1		
Maximum	87.9	88.5		
Powder, %				
Number of samples	65	91		
Mean	2.1	2.2		
Standard deviation	0.4	0.4		
Minimum	1.5	1.5		
Maximum	3.2	4.2		
Broken seeds, %				
Number of samples	65	91		
Mean	0.5	0.4		
Standard deviation	0.6	0.8		
Minimum	0.1	0.1		
Maximum	3.0	8.0		
Undehulled whole seeds, %				
Number of samples	65	91		
Mean	4.8	4.2		
Standard deviation	3.6	4.6		
Minimum	1.2	0.1		
Maximum	16.3	36.9		
Colour ²	Whole	Splits	Whole	Splits
Brightness, L*				
Number of samples	65	65	91	91
Mean	59.4	61.8	59.7	61.3
Standard deviation	1.1	1.1	0.9	0.9
Minimum	57.4	60.0	57.8	59.2
Maximum	61.9	64.2	62.2	63.6
Redness, a*				
Number of samples	65	65	91	91
Mean	32.4	32.3	31.9	32
Standard deviation	1.3	1.5	1.5	1.3
Minimum	29.0	28.9	28.9	28.5
Maximum	34.7	35.2	33.9	34.6
Yellowness, b*				
Number of samples	65	65	91	918
Mean	40.9	42.5	39.7	41.8
Standard deviation	1.1	1.3	1.51	1.5
Minimum	38.2	39.4	35.6	38.2
Maximum	42.8	44.8	42.5	44.7

¹ Red lentils (Blaze, Crimson, CDC Imperial, CDC Redberry, CDC Rouleau and Robin). Lentils, No. 1 Canada and Lentils, No. 2 Canada combined.

² L*=darkness (0) to brightness (+); a*=greenness (-) to redness (+); b*=blueness (-) to yellowness (+).

Western Canadian pea beans 2007

Harvest survey samples

Samples for the CGC harvest survey were collected from producers across Manitoba, Canada (Fig. 5). For the 2007 harvest survey, 36 pea bean samples from Manitoba were received at the CGC for analysis. All samples were graded and analyzed for protein content. Only those samples receiving a grade of Pea beans, No. 1 Canada, Pea beans, No. 1 Canada Select, Pea beans, Extra Canada No. 1 or Pea beans, No. 2 Canada were tested for 100-seed weight, water absorption, cooking time and firmness of cooked beans. Starch content was determined on selected samples. It is important to note that the samples reported by grade do not necessarily represent the actual distribution of grade.

Figure 5 – Map of western Canada showing origin of 2006 harvest survey pea bean samples



Quality of 2007 western Canadian pea beans

Protein content ranged from 23.0% to 27.6% for 2007 western Canadian pea beans (Table 11). The average protein for 2007 western Canadian pea beans was 25.5%, which was higher than 2006 and the same as the five-year average of 25.5 % (Fig. 6).

Pea beans, No. 1 Canada in 2007 had higher protein but lower starch content than in 2006 (Table 12). The average seed weight for 2007 Pea beans, No. 1 Canada was similar to that for 2006. The average water absorption value in 2007 was similar to that in 2006.

Pea beans, No. 1 Canada in 2007 had a shorter mean cooking time and softer texture of cooked seeds than in 2006 (Table 12).

Table 11 – Mean protein content for 2007 western Canadian pea beans¹

Grade	Protein content, %			
		2007		2006
	mean	min.	max.	mean
Manitoba				
Pea beans, Extra No. 1 Canada	-	-	-	24.6
Pea beans, No. 1 Canada Select	25.7	23	27.3	25.9
Pea beans, No. 1 Canada	25.4	23.1	27.6	25
Pea beans, No. 2 Canada	-	-	-	25.9
Pea beans, No. 3 Canada	-	-	-	-
Pea beans, No. 4 Canada	-	-	-	-
All grades	25.5	23.0	27.6	25.1

¹ Protein content (N x 6.25) is determined by near infrared measurement calibrated against the Combustion Nitrogen Analysis reference method.

Figure 6 – Mean protein content of western Canadian pea beans

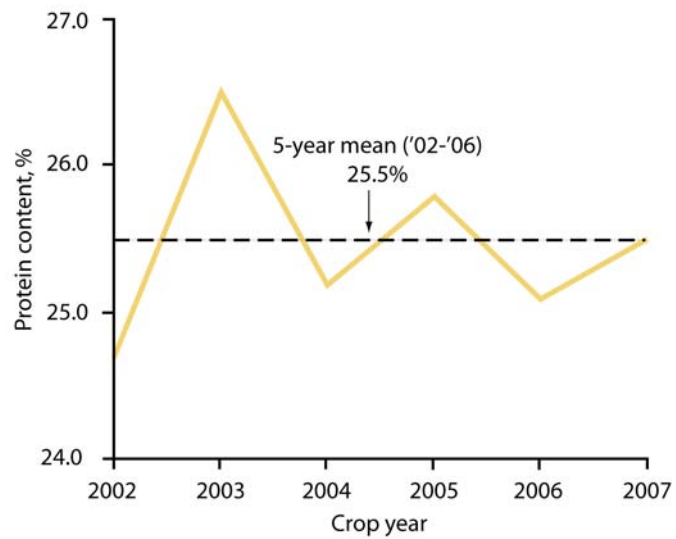


Table 12 – Quality data for 2007 western Canadian pea beans

Quality parameter	Pea beans, No. 1 Canada ¹		Pea beans, No. 2 Canada	
	2007	2006	2007	2006
Protein, % dry basis				
Number of samples	33	56	NA ²	NA
Mean	25.5	25.1	NA	NA
Standard deviation	1.0	1.4	NA	NA
Minimum	23.0	21.3	NA	NA
Maximum	27.6	29.6	NA	NA
Starch, % dry basis				
Number of samples	32	54	NA	NA
Mean	40.2	41.8	NA	NA
Standard deviation	1.2	1.4	NA	NA
Minimum	37.9	39.4	NA	NA
Maximum	42.4	45.6	NA	NA
100-seed weight, g/100 seeds				
Number of samples	55	27	NA	NA
Mean	17.7	19	NA	NA
Standard deviation	1.6	1.0	NA	NA
Minimum	14.2	16.3	NA	NA
Maximum	21.1	21.1	NA	NA
Water absorption, g H₂O/g seeds				
Number of samples	33	55	NA	NA
Mean	0.95	0.95	NA	NA
Standard deviation	0.07	0.04	NA	NA
Minimum	0.80	0.83	NA	NA
Maximum	1.13	1.06	NA	NA
Cooking time, min				
Number of samples	33	49	NA	NA
Mean	15.5	22.8	NA	NA
Standard deviation	2.3	4.7	NA	NA
Minimum	11.7	15.5	NA	NA
Maximum	20.3	32.9	NA	NA
Firmness, kg/g cooked seeds				
Number of samples	33	54	NA	NA
Mean	9.3	15.8	NA	NA
Standard deviation	2.3	3.2	NA	NA
Minimum	3.9	9.2	NA	NA
Maximum	12.5	23.5	NA	NA

¹ Including Pea beans, Extra No. 1 Canada, Pea beans, Pea beans, No. 1 Canada and Pea beans, No. 1 Canada Select.

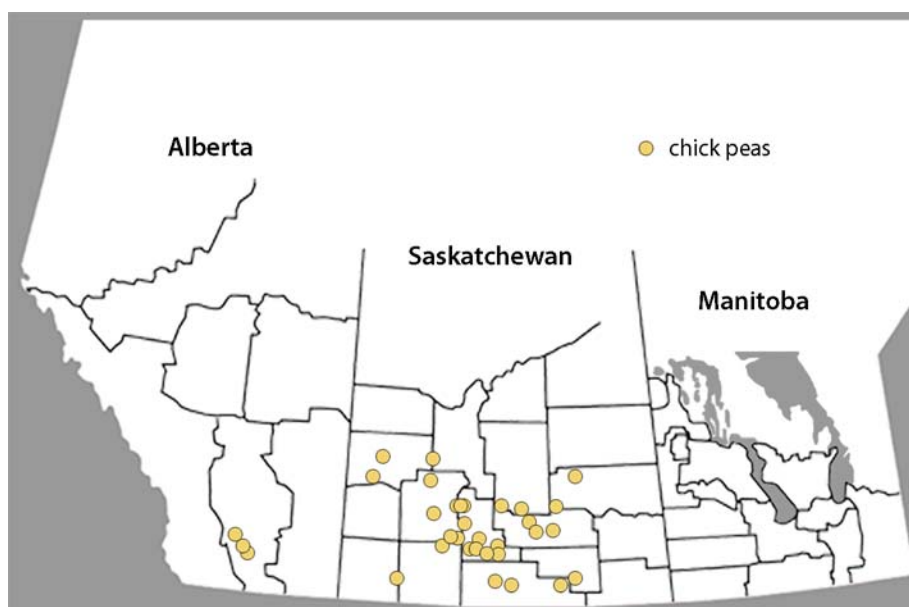
² NA=not available due to a small number of samples received.

Western Canadian chick peas _____ 2007

Harvest survey samples

Samples for the CGC harvest survey were collected from producers in Saskatchewan and Alberta (Fig. 7). For the 2007 harvest survey, a total of 84 chick pea samples, consisting of 75 kabuli samples and 9 desi samples, were received at the CGC for analysis. All samples were graded and analyzed for protein content. Due to the small number of desi chick pea samples received, only results for kabuli chick peas were included in the 2007 quality report. Starch content was determined on selected samples. It is important to note that the samples reported by grade do not necessarily represent the actual distribution of grade.

Figure 7 – Map of western Canada showing origin of 2007 harvest survey chick pea samples



Quality of 2007 western Canadian chick peas

Protein content ranged from 19.7% to 28.8% for 2007 western Canadian chick peas (Table 13). The average protein for 2007 was 24.5%, which was slightly higher than 2006 and also higher than the five-year average of 22.7% (Fig. 8).

The starch content was 42.3% for Chick peas, Kabuli, No. 1 Western Canada and 43.1% for Chick peas, Kabuli, No. 2 Western Canada, respectively (Table 14), which was lower than that for the respective grades for 2006. 2007 Kabuli chick peas had lower mean 100-seed weight than 2006. Water absorption values in 2007 for Chick peas, Kabuli, No.1 and No. 2 Western Canada were higher than those in 2006.

Table 13 – Mean protein content for 2007 western Canadian Kabuli chick peas by grade¹

Grade	Protein content, %			
	2007		2006	
	mean	min.	max.	mean
Saskatchewan				
Chick peas, Kabuli, Canada Western No. 1	24.7	19.7	28.8	24.9
Chick peas, Kabuli, Canada Western No. 2	24.3	19.8	27.7	23.7
Chick peas, Kabuli, Canada Western No. 3	20.1	20.1	20.1	23.6
All grades	24.5	19.7	28.8	24.5
Alberta				
Chick peas, Kabuli, Canada Western No. 1	24	23	25	23.1
Chick peas, Kabuli, Canada Western No. 2	-	-	-	21.5
Chick peas, Kabuli, Canada Western No. 3	-	-	-	23.2
All grades	24.3	23	25.9	22.2
Western Canada				
Chick peas, Kabuli, Canada Western No. 1	24.6	19.7	28.8	24.7
Chick peas, Kabuli, Canada Western No. 2	24.3	19.7	27.7	23.4
Chick peas, Kabuli, Canada Western No. 3	20.1	20.1	20.1	23.5
All grades	24.5	19.7	28.8	24.2

¹ Protein content (N x 6.25) is determined by near infrared measurement calibrated against the Combustion Nitrogen Analysis reference method.

Figure 8 – Mean protein content of western Canadian Kabuli chick peas

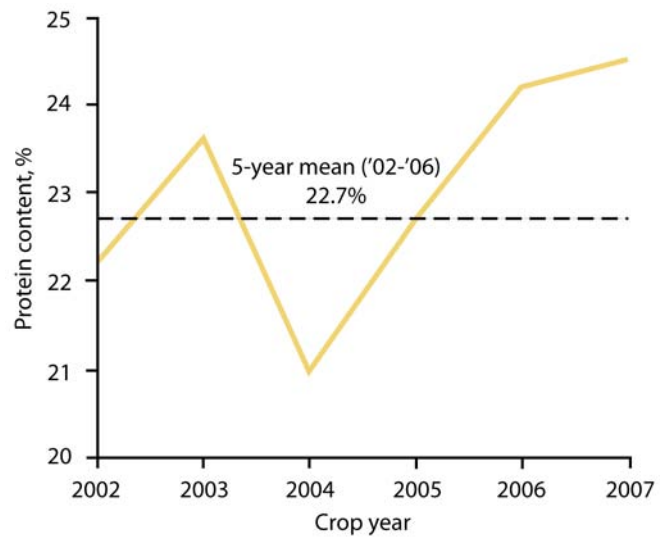


Table 14 – Quality data for 2007 western Canadian Kabuli chick peas

Quality parameter	Chick peas, Kabuli, No. 1 Canada Western		Chick peas, Kabuli, No. 2 Canada Western	
	2007	2006	2007	2006
Protein, % dry basis				
Number of samples	56	31	10	16
Mean	24.6	24.7	24.1	23.3
Standard deviation	1.9	1.9	2.2	2.7
Minimum	19.7	20.9	19.7	18.8
Maximum	28.8	28.6	27.7	28.4
Starch, % dry basis				
Number of samples	51	31	9	14
Mean	42.3	42.9	43.1	44.7
Standard deviation	2.6	2.5	2.5	2.4
Minimum	37.4	37.5	39.2	41.0
Maximum	47.3	48.4	47.6	48.6
100-seed weight, g/100 seeds				
Number of samples	56	34	10	16
Mean	30.1	35.3	29.9	36.3
Standard deviation	6.5	9.3	8.5	8.7
Minimum	20.6	22.4	21.0	25.3
Maximum	45.8	51.1	48.4	48.4
Water absorption, g H₂O/g seeds				
Number of samples	56	34	10	16
Mean	1.1	1.08	1.12	1.06
Standard deviation	0.09	0.04	0.06	0.03
Minimum	0.61	1.00	1.00	0.99
Maximum	1.23	1.16	1.20	1.10