Canadian Grain Commission | Commission canadienne des grains

ISSN 1920-9037

Quality of western Canadian lentils

2012

Ning Wang
Program Manager, Pulse Research

Contact: Ning Wang
Program Manager, Pulse Research
Tel : 204 983-2154
Email: ning.wang@grainscanada.gc.ca
Fax : 204-983-0724

Grain Research Laboratory
Canadian Grain Commission
1404-303 Main Street
Winnipeg MB R3C 3G8
www.grainscanada.gc.ca

Canada

Table of contents

Tables

Figures

Introduction

This report presents the quality data for the 2012 harvest survey for western Canadian lentils. Western Canadian producers submitted samples to the Canadian Grain Commission's (CGC) Grain Research Laboratory (GRL) for data analysis.

Growing and harvesting conditions

The Prairie provinces experienced sufficient rainfall early in the growing season, followed by hot and dry conditions over the summer months. Favorable weather in fall resulted in good quality and yield.

Adequate soil moisture and favourable weather conditions aided seeding in the Prairie provinces. Some frost affected Alberta in late May, but seeding was still 95% complete by early June. By the end of May, pulse crops were observed to be at normal stages of development and in good to excellent condition.

Hot and dry weather in July and August advanced crops quickly, except in northern Alberta where the cool, wet weather caused crop development delays. Some heat stress on the crops was noted, but approximately 90% of crops were still in good to excellent condition in early August.

Harvest began in early August for lentils across all three provinces. Rain in Alberta, and rain and hail in Saskatchewan slowed harvest in September. However, because of the early start, 92% of lentils were harvested by the beginning of October, well ahead of schedule. Some areas had slightly lower yields than expected because of the hot conditions in July and August.

Production review

Lentil production in 2012 was estimated to be 1.5 million tonnes, which was similar to 2011 and significantly higher (50%) than the 10-year average of 1.0 million tonnes (Table 1). Both the overall harvested area and yield in 2012 were similar to 2011. Saskatchewan continues to dominate lentil production in Western Canada, accounting for 96% of production, while Alberta accounts for 4% of production.

Table 1 – Production statistics for western Canadian lentils (green and red combined)[1]

	Harvested area		Production		Yield		Mean production[2]
Province	2012	2011	2012	2011	2012	2011	2002-2011
	thousand hectares		thousand tonnes		kg/ha		thousand tonnes
Lentils							
Manitoba	-	-	-	-	-	-	-
Saskatchewan	961	955	1407	1455	1460	1500	960
Alberta[3]	33	43	66	77	2000	1800	24
Western Canada	**994**	**998**	**1473**	**1532**	**1480**	**1500**	**984**

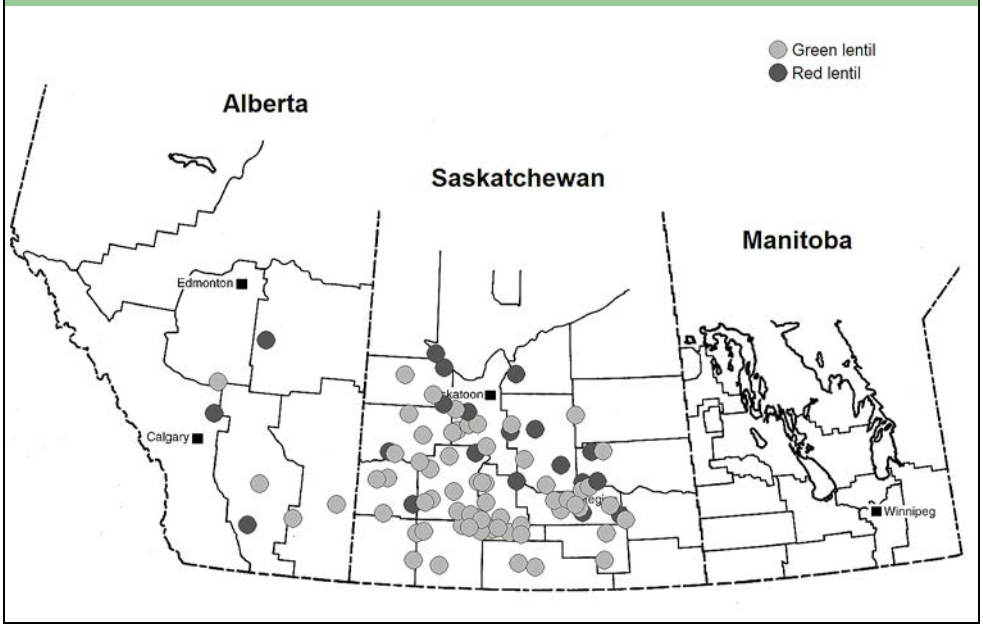
[1] Statistics Canada, *Field Crop Reporting Series, Vol. 91, No. 8.*
[2] Statistics Canada, *Field Crop Reporting Series*, 2002-2011.
[3] Includes the Peace River area of British Columbia.

Western Canadian lentils 2012

Harvest survey samples

Samples for the CGC's 2012 harvest survey were collected from producers across western Canada (Fig. 1). A total of 302 lentil samples including 217 green lentils and 85 red lentils were received at the CGC for analysis. All samples were graded and tested for protein content and seed size distribution. Size distribution was determined using the Image Analysis technique developed at the CGC. Composites for green lentils were prepared based on size (small, medium and large), crop region and grade (No. 1 and No. 2). The composites were tested for protein content, starch content, ash content, 100-seed weight and water absorption. Composites for red lentils were prepared based on crop region and variety (No. 1 and No. 2 Canada Red combined). In addition to the quality evaluations done on green lentils, red lentils were also evaluated for their dehulling quality. 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 2012 harvest survey lentil samples



Quality of 2012 western Canadian lentils

Protein content ranged from 23.4% to 29.9% for 2012 western Canada lentils, including green and red lentils (Table 2). The mean protein content for 2012 was 26.7%, which was similar to 2011 (26.8%), but lower than the five-year average of 27.5% (Fig. 2). Grade level and province did not show much variation of protein content.

Small size (CDC Imvincible, CDC Milestone, CDC Viceroy, and Eston), medium size (CDC Imigreen, CDC Impress, and CDC Richlea) and large size green lentils (CDC Glamis, CDC Grandora, CDC Greenland, CDC Impower, CDC Improve, CDC Plato, CDC Sedley, CDC Sovereign, and Laird) had mean protein contents of 27.7%, 25.3% and 26.3%, respectively, which were higher than their respective type of lentil in 2011 (Table 3). Small size and large size green lentils had a lower mean starch content in 2012 (44.5% and 46.7%, respectively) than in 2011 (45.9% and 47.7%, respectively), while medium size lentils had higher (48.8% and 47.6%, respectively). Ash content was similar for all three green lentil sizes and for both 2012 and 2011.

Small size green lentils in 2012 had a mean 100-seed weight of 3.0 g (Table 3), which was similar to 2011 (2.9 g), but their mean water absorption for 2012 was lower than that for 2011 (0.80 g H_2O/g seeds and 0.89 g H_2O/g seeds, respectively). Medium and large size green lentils in 2012 had mean 100-seed weights of 4.9 g and 6.6 g, respectively, which were lower than in 2011 (5.3 g and 6.8 g, respectively). Mean water absorption values for medium lentils were higher in 2012 than in 2011 (0.96 g H_2O/g seeds and 0.92 g H_2O/g seeds, respectively), while values for large lentils were similar.

The seed size distribution for green lentils (Table 4) was determined by the image analysis technique developed at the Canadian Grain Commission. The reported results may differ from those obtained by conventional sieving techniques. For small size green lentils in 2012, 80.4% of the seeds fell within 4.0 to 5.0 mm, which was higher than 2011 (70.2%). Most medium size green lentils fell within 5.0-6.0 mm for both 2012 (80.1%) and 2011 (77.9%). In 2012, large size green lentils were similar in size to 2011, as shown by the majority of seeds for both years (73.4% and 68.3%, respectively) falling in 6.0-7.0 mm.

Red lentils, including the varieties CDC Impact, CDC Impala, CDC Imperial, CDC Maxim, CDC Redberry, CDC Rouleau and Crimson, had a mean protein content of 26.8% in 2012 (Table 5), which was similar to 2011 (26.6%). Red lentils displayed higher mean starch content for 2012 (46.5%) than 2011 (45.8%). Ash content was similar for both 2012 and 2011. The mean 100-seed weight and mean water absorption was similar in 2012 (3.5 g/100 seeds and 0.90 g H_2O/g seeds, respectively) and 2011 (3.7 g/100 seeds and 0.88 g H_2O/g seeds).

The mean dehulling efficiency for 2012 red lentils was 81.0%, as compared to 76.0% in 2011 (Table 5). The dehulling efficiency was higher in 2012 than in 2011 due to a lower amount of broken seeds (0.5% and 1.7%, respectively) and undehulled whole seeds (5.7% and 8.9%, respectively). Powder content was

similar for 2012 and 2011. Colour of dehulled lentils was measured using a Hunterlab LabScan XE spectrocolorimeter 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 5). Whole and split red lentils from 2012 had similar respective colour values to 2011.

In 2012, 74.4% of the red lentils fell within the 4.0-5.0 mm range, while in 2011 only 69% fell within this range (Table 6). This indicates that the 2012 seeds had a larger diameter than the 2011 seeds.

Table 2 – Protein content for 2012 western Canadian lentils (green and red combined) by grade[1]

	Protein content, %			
Grade	2012			2011
	mean	min.	max.	mean
Manitoba				
Lentils, No. 1 Canada	-	-	-	-
Lentils, No. 2 Canada	-	-		-
Lentils, No. 3 Canada	-	-	-	28.5
All grades	**-**	**-**	**-**	**28.6**
Saskatchewan				
Lentils, No. 1 Canada	26.7	23.4	29.9	26.7
Lentils, No. 2 Canada	26.6	23.5	29.7	26.8
Lentils, No. 3 Canada	27.1	26.1	27.7	27.3
All grades	**26.7**	**23.4**	**29.9**	**26.8**
Alberta				
Lentils, No. 1 Canada	26.7	25.9	28.1	25.7
Lentils, No. 2 Canada	26.8	26.4	27.6	27.4
Lentils, No. 3 Canada	28.0	28.0	28.0	28.6
All grades	**26.8**	**25.9**	**28.1**	**27.1**
Western Canada				
Lentils, No. 1 Canada	26.7	23.4	29.9	26.7
Lentils, No. 2 Canada	26.6	23.5	29.7	26.8
Lentils, No. 3 Canada	27.2	26.1	28.0	27.6
All grades	**26.7**	**23.4**	**29.9**	**26.8**

[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 lentils

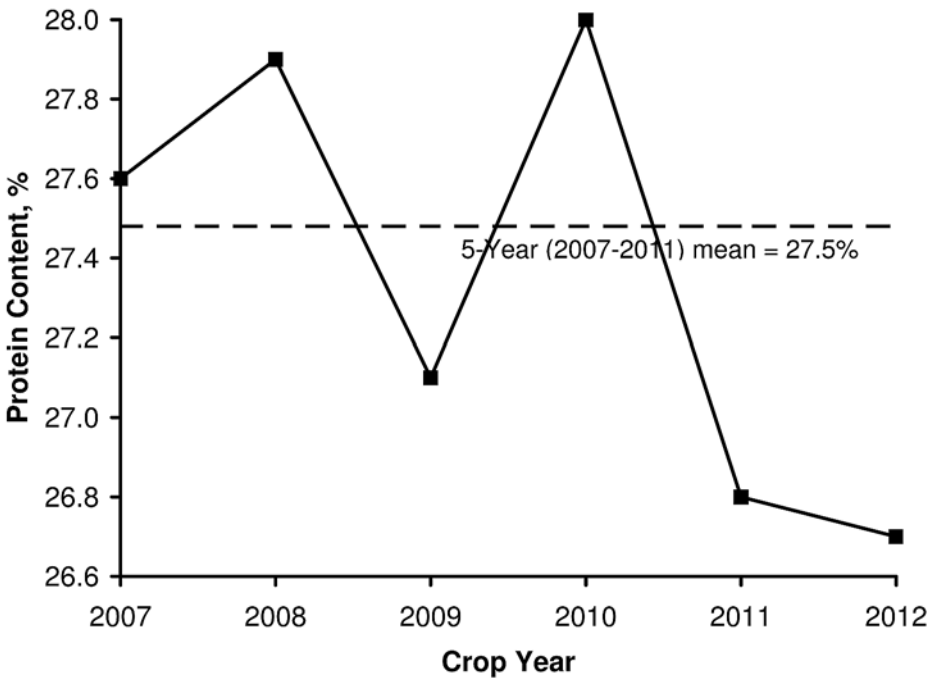


Table 3 – Quality data for 2012 western Canadian green lentil composites by size[1]

	2012			2011		
Quality parameter	SL[2]	ML[3]	LL[4]	SL[2]	ML[3]	LL[4]
Chemical composition						
Protein content, % dry basis	27.7	25.3	26.3	27.0	25.2	26.2
Starch content, % dry basis	44.5	48.8	46.7	45.9	47.6	47.7
Ash content, % dry basis	2.7	2.6	2.6	2.6	2.6	2.7
Physical characteristic						
100-seed weight, g/100 seeds	3.0	4.9	6.6	2.9	5.3	6.8
Water absorption, g H_2O/g seeds	0.80	0.96	0.98	0.89	0.92	0.98

[1] Lentils, No. 1 Canada and Lentils, No. 2 Canada combined.
[2] SL=small lentils including CDC Imvincible, CDC Milestone, CDC Viceroy and Eston.
[3] ML=medium lentils including CDC Imigreen, CDC Impress, and CDC Richlea.
[4] LL=large lentils including CDC Glamis, CDC Grandora, CDC Greenland, CDC Impower, CDC Improve, CDC Plato, CDC Sedley, CDC Sovereign, and Laird.

Table 4 – Seed size distribution for 2012 western Canadian green lentils[1]

Seed size distribution	2012			2011		
	SL[2]	ML[3]	LL[4]	SL[2]	ML[3]	LL[4]
<3.5 mm, %	3.5	0.1	0.1	4.9	0.2	0.1
3.5–4.0 mm, %	17.8	0.4	0.2	22.6	0.4	0.3
4.0–4.5 mm, %	43.8	0.9	0.4	43.8	1.9	0.7
4.5–5.0 mm, %	32.3	9.1	2.1	26.4	11.6	2.6
5.0–5.5 mm, %	2.6	37.8	5.8	2.2	38.8	7.3
5.5–6.0 mm, %	-	43.3	16.5	0.1	39.1	18.9
6.0–6.5 mm, %	-	8.3	43.3	-	8.0	41.5
6.5–7.0 mm, %	-	0.2	30.1	-	0.1	26.8
7.0–7.5 mm, %	-	-	1.6	-	-	1.7
>7.5 mm, %	-	-	-	-	-	-

[1] Seed size including all grades determined by the image analysis technique.
[2] SL=small lentils including CDC Imvincible, CDC Milestone, CDC Viceroy, and Eston.
[3] ML=medium lentils including CDC Imigreen, CDC Impress, and CDC Richlea.
[4] LL=large lentils including CDC Glamis, CDC Grandora, CDC Greenland, CDC Impower, CDC Improve, CDC Plato, CDC Sedley, CDC Sovereign, and Laird.

Table 5 – Quality data for 2012 western Canadian red lentil composites[1]				
Quality parameter		2012	2011	
Chemical composition				
Protein content, % dry basis		26.8	26.6	
Starch content, % dry basis		46.5	45.8	
Ash content, % dry basis		2.7	2.7	
Physical characteristic				
100-seed weight, g/100 seeds		3.5	3.7	
Water absorption, g H_2O/g seeds		0.89	0.88	
Dehulling quality				
Dehulling efficiency, %		81.0	76.0	
Powder, %		2.4	2.4	
Broken seeds, %		0.5	1.7	
Undehulled whole seeds, %		5.7	8.9	
Colour of dehulled seeds	**Whole**	**Splits**	**Whole**	**Splits**
Brightness, L*	61.0	62.6	60.7	62.3
Redness, a*	29.9	30.7	30.2	30.3
Yellowness, b*	37.1	40.2	37.5	39.6

[1] Lentils, No. 1 Canada and Lentils, No. 2 Canada are combined. Red lentils including CDC Impact, CDC Impala, CDC Imperial, CDC Maxim, CDC Redberry, CDC Rouleau and Crimson

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

Table 6 – Seed size distribution for 2012 western Canadian red lentils[1]

Seed size distribution[2]	2012	2011
<3.5 mm, %	2.0	2.1
3.5–4.0 mm, %	10.6	10.8
4.0–4.5 mm, %	31.4	30.1
4.5–5.0 mm, %	43.0	38.9
5.0–5.5 mm, %	12.6	14.7
5.5–6.0 mm, %	0.4	3.1
6.0–6.5 mm, %	-	0.3
6.50–7.0 mm, %	-	-
>7.0 mm, %	-	-

[1] Red lentils including CDC Impact, CDC Impala, CDC Imperial, CDC Maxim, CDC Redberry, CDC Rouleau and Crimson..
[2] Seed size determined by the Image Analysis technique.