Canadian Grain Commission | Commission canadienne des grains

ISSN 1920-9037

Quality of western Canadian lentils

2013

Ning Wang
Program Manager, Pulse Research

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 2013 harvest survey for western Canadian lentils. Samples were submitted by western Canadian producers to the Canadian Grain Commission's Grain Research Laboratory for analysis.

Growing and harvesting conditions

Cool temperatures in early spring resulted in delayed planting across the Prairies until May. In some areas, planting was delayed until June due to heavy rains. Warm, windy conditions, coupled with a lack of rainfall, depleted much of the surface soil moisture in some areas of Alberta, particularly in northern, central and southern regions. However, dry conditions helped seeding progress rapidly. Most seeding was completedby early June.

The weather across western Canada was relatively consistent during the growing season. Soil moisture conditions and warm weather in June and early July favoured early crop development. Exceptions were in parts of eastern Manitoba, where there were dry conditions, and in the Peace River region, where it was dry throughout the growing season. Elsewhere, soil moisture and weather conditions were excellent throughout most of the reproductive stage in late July and early August. As a result of these conditions, the crop matured with minimal stress and there was a long grain filling period.

Excellent weather conditions in late August and September advanced crop maturity and allowed harvest to progress rapidly. Dry conditions occurred in the Peace River region, northern Alberta and central Saskatchewan. Wet conditions in southern regions caused delays in harvest. However, most lentil crops were in the bin by mid-October.

Production review

Lentil production in 2013 was estimated to be 1.7 million tonnes, which was 13% higher than in 2012 and 42% higher than the 10-year average of 1.2 million tonnes (Table 1). Increase in production was due to an increase in yield, which was 20% higher than the yield for 2012. Saskatchewan continues to dominate lentil production in western Canada, accounting for 95% of production, while Alberta accounts for 5%.

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

	Harvested area		Production		Yield		Mean production
Province	2013	2012	2013	2012	2013	2012	2003–2012
	thousand hectares		thousand tonnes		kg/ha		thousand tonnes
Lentils							
Manitoba	-	-	-	-	-	-	-
Saskatchewan	907	955	1629	1407	1800	1460	1119
Alberta[2]	35	33	80	66	2260	2000	45
Western Canada	**942**	**994**	**1709**	**1473**	**1810**	**1480**	**1151**

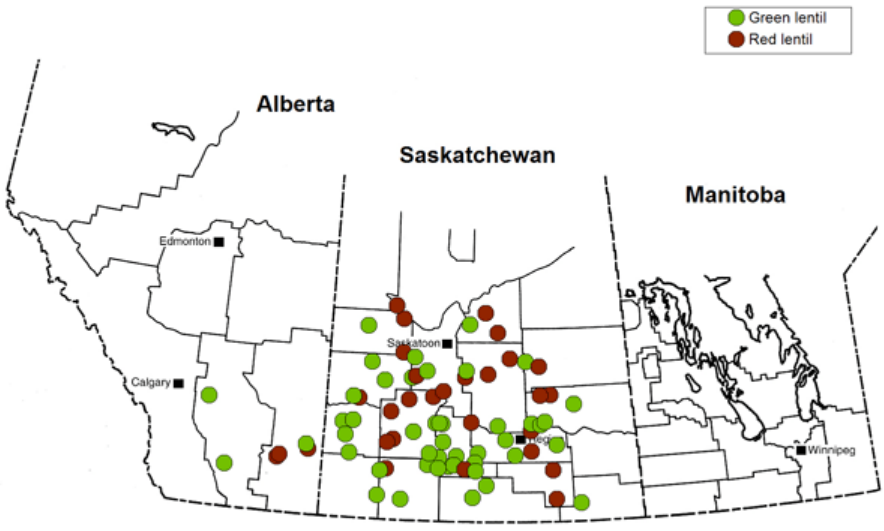
[1] Statistics Canada,
[2] Includes the Peace River area of British Columbia.

Western Canadian lentils _____ 2013

Harvest survey samples

Samples for the Canadian Grain Commission 2013 harvest survey were collected from producers across western Canada (Figure 1). The Canadian Grain Commission received a total of 235 lentil samples including 164 green and 71 red lentils for analysis. All samples were graded and tested for protein content and seed size distribution. Size distribution was determined using the image analysis technique. Composites for green lentils (No. 1 and No. 2 Canada combined) were prepared based on size (small, medium and large) and crop region. 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 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 2013 harvest survey lentil samples



Quality of 2013 western Canadian lentils

Protein content for green and red lentils in 2013 ranged from 23.4% to 30.5% (Table 2). The mean protein content was 26.5%, which was similar to the mean for 2012 (26.7%), but lower than the five-year mean of 27.1% (Figure 2). Table 3 represents the mean protein content for green and red lentils by crop region (Figure 3).

Table 4 shows chemical composition and physical characteristics for green lentil composites by size. Mean protein content for small-size green lentils (CDC Imvincible, CDC Milestone, CDC Viceroy, and Eston) was 27.6%. Mean protein content for medium-size green lentils (CDC Imigreen, CDC Impress, and CDC Richlea) was 27.3%. Protein content for large-size green lentils (CDC Glamis, CDC Grandora, CDC Greenland, CDC Impower, CDC Improve, CDC Plato, CDC Sedley, CDC Sovereign, and Laird) was 27.2%. Mean protein content for both medium-size and large-size lentils was higher than the means for 2012. Mean starch content for small-size green lentils was higher than the mean for 2012, while the mean for medium-size lentils was lower than the mean for 2012. Man ash content for all 3 green lentil sizes was similar to levels in 2012.

Mean 100-seed weight for small-size green lentils was 2.4 g (Table 4). Mean 100-seed weight for medium-size green lentils was 4.4 g. Mean 100-seed weight for large-size green lentils was 5.7 g. Mean 100-seed weights for all 3 sizes of lentils were lower than the means for 2012. Mean water absorption values were 0.74 g H_2O per g seeds for small-size lentils, 0.85 g H_2O per g seeds for medium-size lentils and 0.88 g H_2O per g seeds for large-size lentils.

Seed size distribution for green lentils was determined by the image analysis technique (Table 5). The reported results may differ from those obtained by conventional sieving techniques. For small-size green lentils, approximately 50.0% of the seeds fell within 4.0 to 5.0 mm. For medium-size green lentils, 56% fell within 5.0-6.0 mm. For large-size green lentils, 63% fell within 6.0-7.0 mm.

Table 6 shows 2013 quality data for red lentil composites. Mean protein content for red lentils, including the varieties CDC Impact, CDC Impala, CDC Imperial, CDC Maxim, CDC Redberry, CDC Rouleau and Crimson, was 26.6%, which was similar to the mean (26.8%) for 2012. Mean starch content (46.5%) was the same as the mean for 2012. Mean ash content was 2.6%, which was similar to the mean for 2012. Mean 100-seed weight was 3.1 g per 100 seeds and the mean water absorption was 0.76 g H_2O per g seeds.

The mean dehulling efficiency for red lentils was 81.9%, which was similar to the mean for 2012 (Table 6). 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 6). Approximately 75% of red lentils fell within the 4.0 to 5.0 mm range (Table 7).

Table 2 – Protein content for 2013 western Canadian lentils (green and red combined) by grade[1]

Grade	Protein content, % dry basis			
	2013			2012
	mean	min.	max.	mean
Manitoba				
Lentils, No. 1 Canada	-	-	-	-
Lentils, No. 2 Canada	-	-		-
Lentils, No. 3 Canada	-	-	-	-
All grades	**-**	**-**	**-**	**-**
Saskatchewan				
Lentils, No. 1 Canada	26.5	23.4	30.5	26.7
Lentils, No. 2 Canada	26.6	24.0	28.9	26.6
Lentils, No. 3 Canada	27.6	26.9	28.7	27.1
All grades	**26.5**	**23.4**	**30.5**	**26.7**
Alberta				
Lentils, No. 1 Canada	26.1	25.8	26.4	26.7
Lentils, No. 2 Canada	25.2	23.4	27.9	26.8
Lentils, No. 3 Canada	-	-	-	28.0
All grades	**25.6**	**23.4**	**28.9**	**26.8**
Western Canada				
Lentils, No. 1 Canada	26.5	23.4	30.5	26.7
Lentils, No. 2 Canada	26.4	23.4	28.9	26.6
Lentils, No. 3 Canada	28.0	26.9	28.9	27.2
All grades	**26.5**	**23.4**	**30.5**	**26.7**

[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

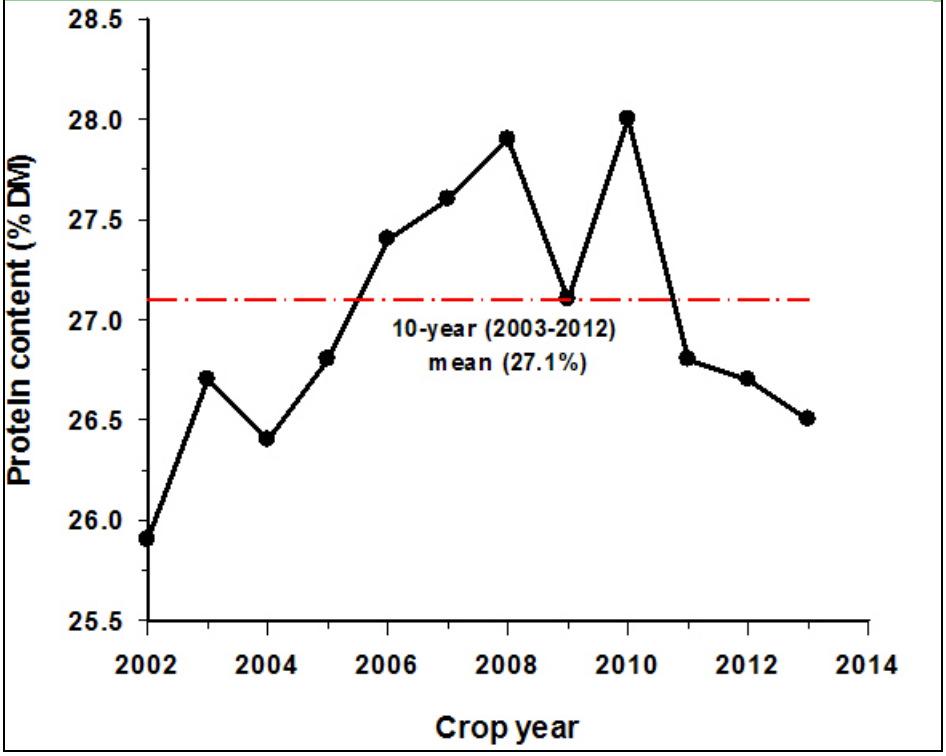


Figure 3 – Crop regions in western Canada

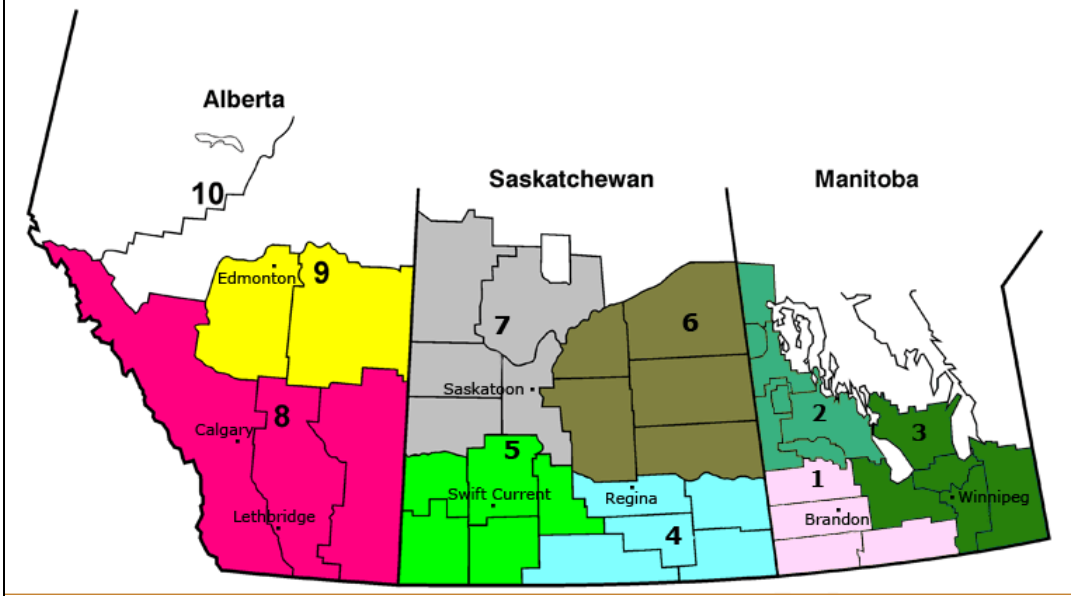


Table 3 – Mean protein content for 2013 western Canadian lentils (green and red combined) by crop region

Crop region[1]	Protein content, % dry basis		
	2013		2012
	Mean	Range	Mean
1	-	-	-
2	-	-	-
3	-	-	-
4	26.3	24.0 – 30.5	26.6
5	26.4	23.4 – 29.0	26.5
6	27.6	26.3 – 28.9	27.2
7	26.3	25.0 – 28.6	27.6
8	25.8	23.4 – 28.9	26.9
9	-	-	-
10	-	-	-

[1] Manitoba crop regions: 1 (South West Manitoba), 2 (North West Manitoba), and 3 (Eastern Manitoba); Saskatchewan crop regions: 4 (South East Saskatchewan), 5 (South West Saskatchewan), 6 (North East Saskatchewan), and 7 (North West Saskatchewan); Alberta crop regions: 8 (Southern Alberta), 9 (Central Alberta), and 10 (Northern Alberta).

Table 4 – Quality data for 2013 western Canadian green lentil composite by size[1]

Quality parameter	2013			2012		
	SL[2]	ML[3]	LL[4]	SL[2]	ML[3]	LL[4]
Chemical composition						
Protein content, % dry basis	27.6	27.3	27.2	27.7	25.3	26.3
Starch content, % dry basis	45.8	46.9	46.4	44.5	48.8	46.7
Ash content, % dry basis	2.5	2.7	2.7	2.7	2.6	2.6
Physical characteristic						
100-seed weight, g/100 seeds	2.4	4.4	5.7	3.0	4.9	6.6
Water absorption, g H_2O/g seeds	0.74	0.85	0.88	0.80	0.96	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 5 – Seed size distribution for 2013 western Canadian green lentils[1]

Seed size distribution	2013			2012		
	SL[2]	ML[3]	LL[4]	SL[2]	ML[3]	LL[4]
<3.5 mm, %	5.0	0.4	0.1	3.5	0.1	0.1
3.5–4.0 mm, %	23.7	3.3	0.3	17.8	0.4	0.2
4.0–4.5 mm, %	47.2	10.2	0.7	43.8	0.9	0.4
4.5–5.0 mm, %	22.7	27.5	3.0	32.3	9.1	2.1
5.0–5.5 mm, %	1.2	34.6	8.8	2.6	37.8	5.8
5.5–6.0 mm, %	-	20.9	24.1	-	43.3	16.5
6.0–6.5 mm, %	-	3.0	46.0	-	8.3	43.3
6.5–7.0 mm, %	-	0.1	16.6	-	0.2	30.1
7.0–7.5 mm, %	-	-	0.4	-	-	1.6
>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 6 – Quality data for 2013 western Canadian red lentil composite[1]				
Quality parameter		2013	2012	
Chemical composition				
Protein content, % dry basis		26.6	26.8	
Starch content, % dry basis		46.5	46.5	
Ash content, % dry basis		2.6	2.7	
Physical characteristic				
100-seed weight, g/100 seeds		3.1	3.5	
Water absorption, g H_2O/g seeds		0.76	0.89	
Dehulling quality				
Dehulling efficiency, %		81.9	81.0	
Powder, %		2.1	2.4	
Broken seeds, %		0.8	0.5	
Undehulled whole seeds, %		4.7	5.7	
Colour of dehulled seeds	**Whole**	**Splits**	**Whole**	**Splits**
Brightness, L*	61.2	62.9	61.0	62.6
Redness, a*	30.3	31.0	29.9	30.7
Yellowness, b*	36.5	39.0	37.1	40.2

[1] Lentils, No. 1 Canada and Lentils, No. 2 Canada 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 7 – Seed size distribution for 2013 western Canadian red lentils[1]

Seed size distribution[2]	2013	2012
<3.5 mm, %	2.2	2.0
3.5–4.0 mm, %	12.1	10.6
4.0–4.5 mm, %	34.7	31.4
4.5–5.0 mm, %	40.7	43.0
5.0–5.5 mm, %	9.9	12.6
5.5–6.0 mm, %	0.5	0.4
6.0–6.5 mm, %	-	-
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.