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# Quality of western Canadian peas

## 2019

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**Canada** 

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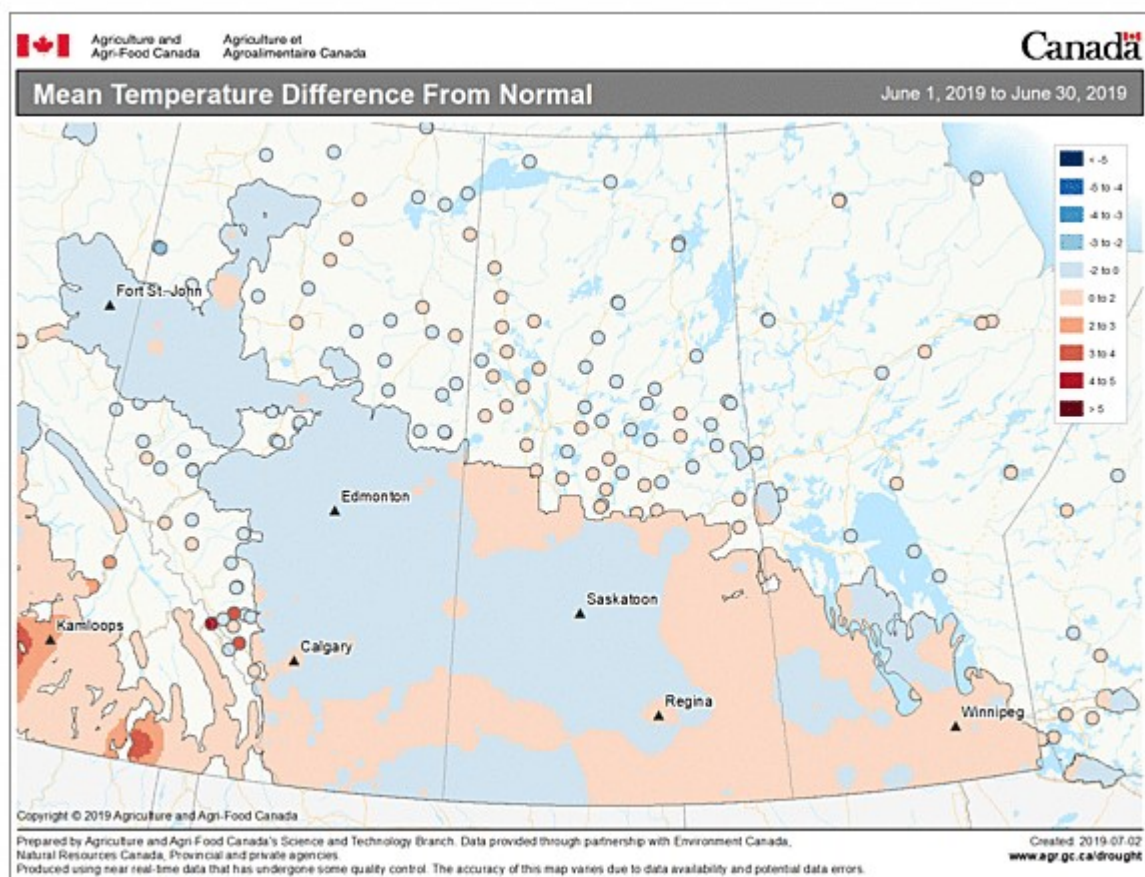
# Introduction

This report presents quality data for 2019 western Canadian peas from Canadian Grain Commission's Harvest Sample Program. Samples were submitted by western Canadian producers to the Canadian Grain Commission's Grain Research Laboratory for analysis.

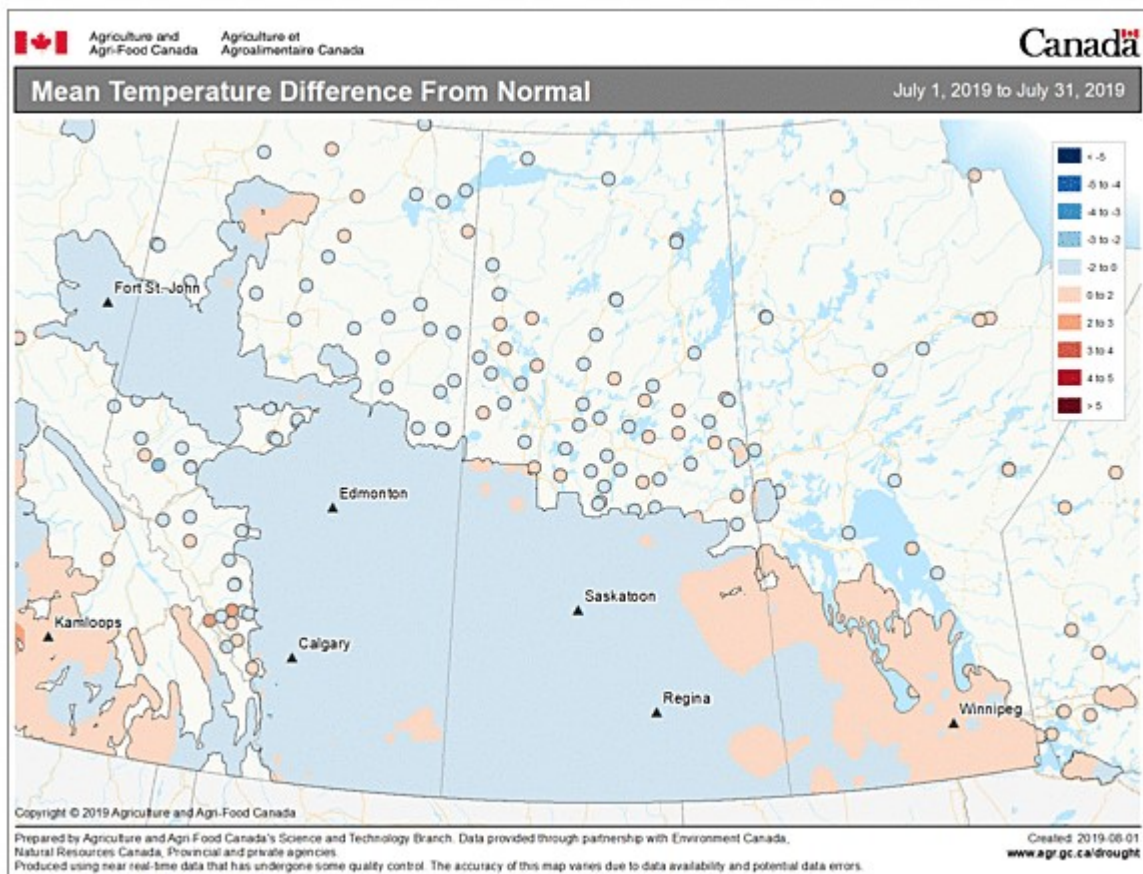
## Growing and harvesting conditions

Figures 1a and 1b show monthly mean temperature difference from normal (Prairie Region) during 2019 growing season (June and July). Figures 2a and 2b display total precipitation (Prairie Region) from April 1 to June 30, 2019 and from April 1 to October 31, 2019.

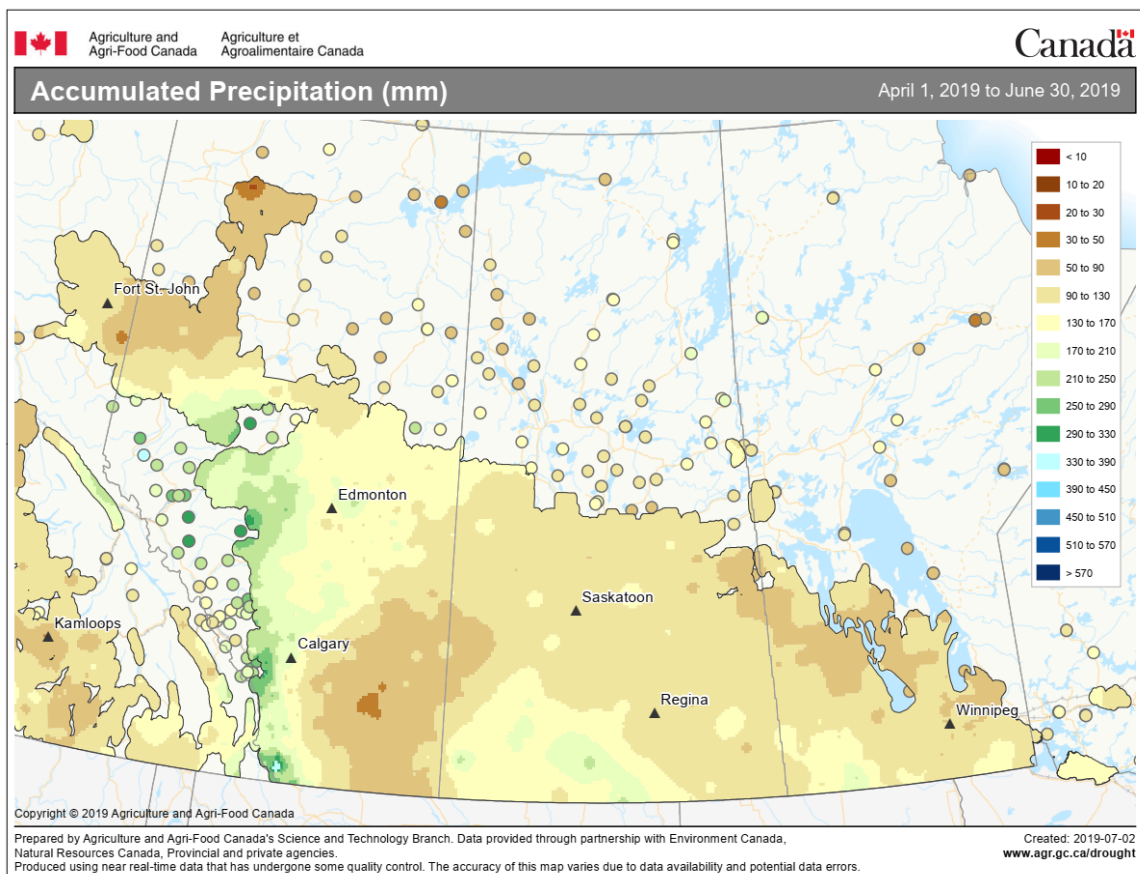
**Figure 1a – Monthly mean temperature difference from normal (Prairie Region) during growing season (June 2019)**



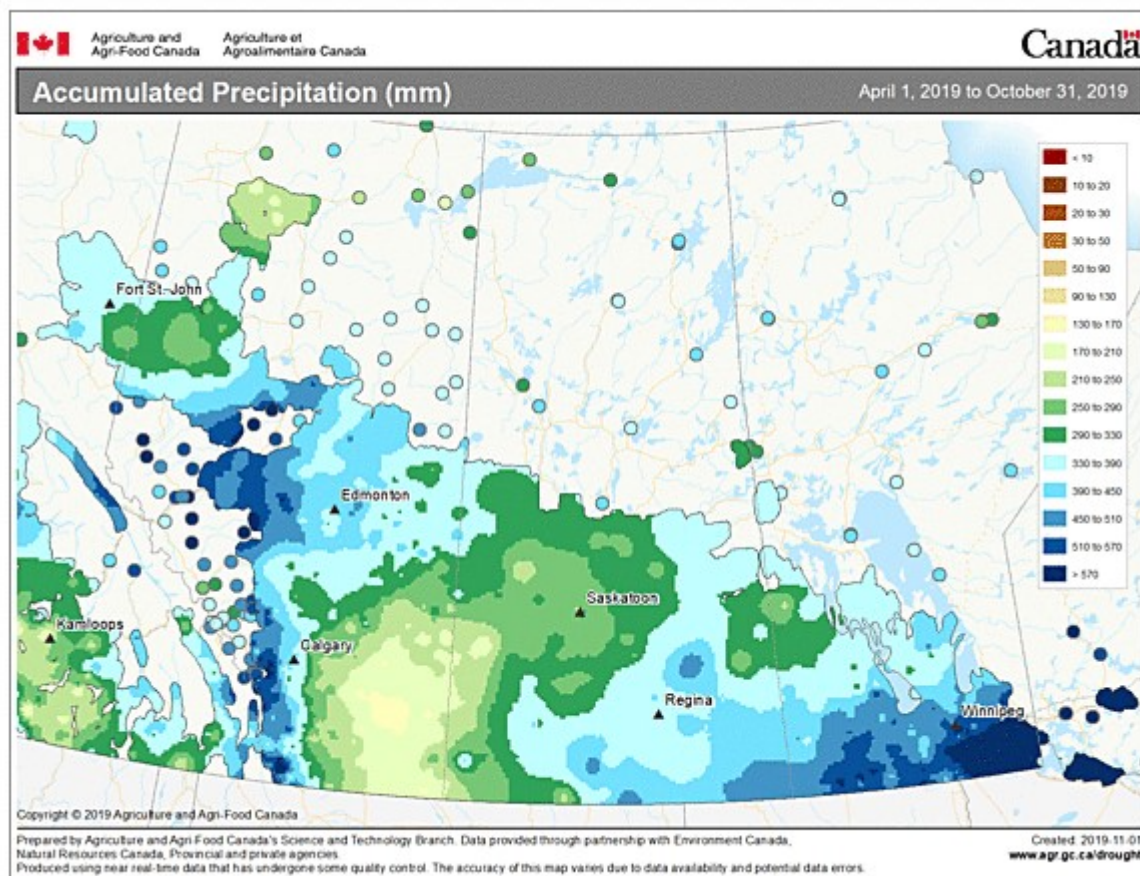
**Figure 1b – Monthly mean temperature difference from normal (Prairie Region) during growing season (July 2019)**



**Figure 2a – Total precipitation (Prairie Region) during growing season (April 1 to June 30, 2019)**



**Figure 2b – Total precipitation (Prairie Region) during growing season (April 1 to October 31, 2019)**



Seeding started in late April to early May in Manitoba, Saskatchewan and Alberta and was completed in early June for all three Prairie Provinces. Some crops were behind their normal development due to cooler temperatures (Figure 1a) and/or lack of moisture across the Prairies in the spring (Figure 2a). Weather was warmer in Manitoba compared to other Prairie Provinces (Figure 1b). The timely rainfalls in July helped the crop to develop across the Prairies. However, Central, Eastern and Interlake regions of Manitoba, southern Alberta and the northern half of the Peace River region remained below average moisture, affecting seed filling of later maturing crops and causing premature ripening. Contrarily, a higher than normal precipitation along the foothills and northwest region of Alberta caused root rotting, crop yellowing and crop drowning. Harvest began by mid-August in the three provinces. Harvest was delayed in September due to wet conditions in the three provinces and an early-winter storm brought heavy snow to parts of Alberta and Saskatchewan. Nevertheless, field pea harvest was completed by mid-September in Manitoba. By late September, a 94% and a 78% of field peas were harvested in Saskatchewan and Alberta, respectively. Southern Manitoba also received a heavy snowfall during Thanksgiving weekend causing crop damage and extended power outages, affecting grain dryers and aeration bins from operation. Harvest continued across the Prairies as weather and field conditions permitted (Figure 2b). By mid-November, field pea harvest was completed in Saskatchewan and an additional 19% of pea was in the bin for Alberta, totaling 97%. The Peace River region of Alberta had the most crops unharvested. Crops came off damp and required drying and/or aeration. Quality of the late harvested crops was below average due to sprouting, bleaching and staining.

## Production

Pea production for 2019 was estimated to be 4.2 million tonnes, which was up approximately 18.3% from 2018, and 18.1% higher than the 10-year average of 3.6 million tonnes (Table 1). The production growth was the result of 19.5% increase in harvested area from 2018. Saskatchewan accounted for 55% of Canadian pea production, while Alberta accounted for 41% and Manitoba accounted for 4%.

**Table 1 – Production statistics for western Canadian peas<sup>1</sup>**

	Harvested area		Production		Yield		Mean production
Province	2019	2018	2019	2018	2019	2018	2009–2018
	thousand hectares		thousand tonnes		kg/ha		thousand tonnes
Peas							
Manitoba	49	33	164	105	3318	3200	81
Saskatchewan	930	768	2313	1781	2488	2300	2103
Alberta <sup>2</sup>	725	625	1743	1682	2390	2700	1389
Western Canada	1704	1426	4220	3568	2500	2500	3573

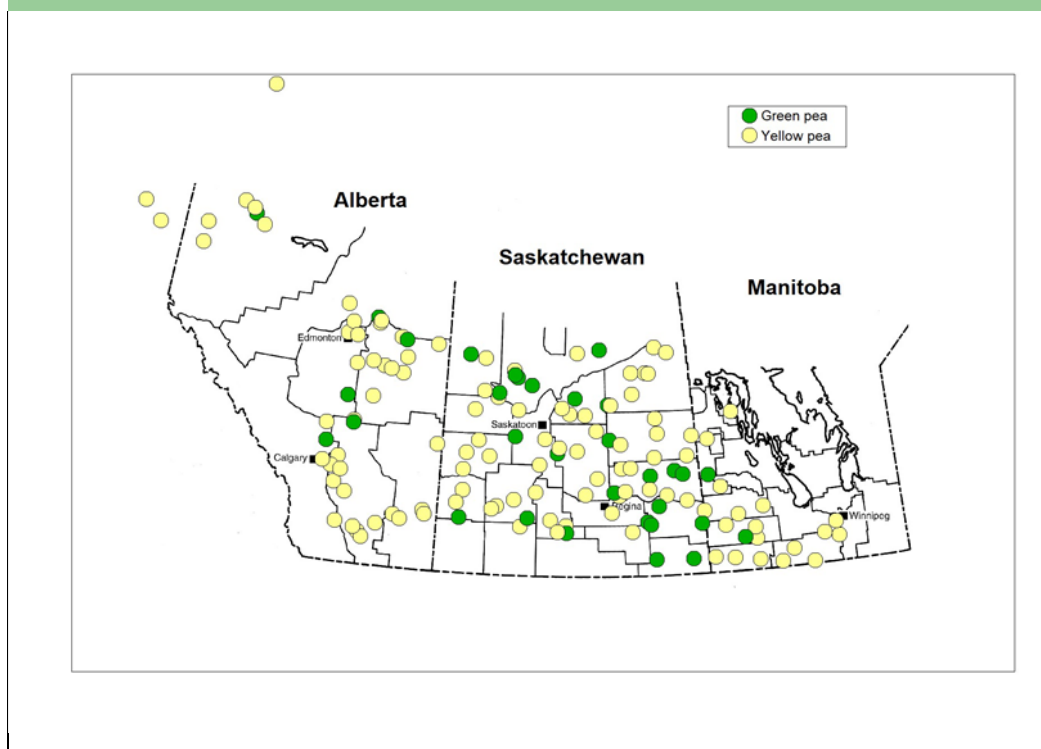
<sup>1</sup>Statistics Canada.

<sup>2</sup>Includes the Peace River area of British Columbia.

## Pea samples

Samples for the Canadian Grain Commission's Harvest Sample Program were collected from producers across western Canada (Figure 3). The Canadian Grain Commission received 787 pea samples consisting of 644 yellow pea samples and 143 green pea samples. All samples were graded and tested for protein content. Composite samples were prepared based on class (yellow and green), crop region and grade (No. 1 and No. 2). All composites were tested for chemical composition (moisture, protein, starch, total dietary fiber and ash content), mineral content, functional properties (water holding capacity and oil emulsifying capacity), and physical and cooking characteristics (100-seed weight, water absorption, cooking time and firmness of cooked peas). 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 2019 pea samples from CGC's Harvest Sample Program**



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## Quality of 2019 western Canadian peas

Protein content for yellow and green peas ranged from 16.4% to 31.4% (Table 2). The mean protein content for western Canadian peas was 23.1%, which was the same as the mean for 2018 and was higher than the ten-year mean of 22.8% (Figure 4). Table 3 represents the mean protein and starch content for yellow and green peas by crop region (Figure 5).

Table 4 shows the quality data for 2019 yellow peas. Mean protein content for No. 1 Canada Yellow peas was 23.1%, which was slightly lower than the mean for 2018. Mean protein content for No. 2 Canada Yellow peas was 23.5%, which was the same as the mean for 2018. Mean starch content for No. 1 Canada Yellow peas was 45.8% and for No. 2 Canada Yellow peas was 45.7%. Both values were lower than the mean starch contents of 2018. Mean total dietary fiber content for No. 1 Canada Yellow peas was 14.7% and for No. 2 Canada Yellow peas was 14.2%. Both values were lower than the mean total dietary fiber contents of 2018. Mean ash contents were similar to or the same as the 2018 values for No. 1 and No. 2 Canada Yellow peas.

Potassium (K) was the most abundant macroelement present in yellow peas, followed by phosphorus (P), magnesium (Mg) and calcium (Ca) (Table 4). Among microelements, iron (Fe) was the highest, followed by zinc (Zn), manganese (Mn), and copper (Cu).

Mean water holding capacity for No. 1 Canada Yellow peas was 0.89 g H<sub>2</sub>O per g sample, which was lower than the mean value for 2018 (Table 4). Mean water holding capacity for No. 2 Canada Yellow peas was 0.90 g H<sub>2</sub>O per g sample, and was similar to the 2018 value. Mean oil emulsifying capacity of No. 1 Canada Yellow peas (261.3 mL oil per g sample) and No. 2 Canada Yellow peas (265.6 mL oil per g sample) were higher than the 2018 values.

Mean 100-seed weight for No. 1 Canada Yellow peas was 22.5 g (Table 4), while mean 100-seed weight for No. 2 Canada Yellow peas was 22.3 g. Both Grades were similar to the mean 100-seed weight values of 2018. The water absorption value for No. 1 Canada Yellow peas was 0.82 g H<sub>2</sub>O per g seeds and for No. 2 Canada Yellow peas was 0.85 g H<sub>2</sub>O per g seeds. Water absorption values for both grades were lower than the 2018 values.

Mean cooking time of No. 1 Canada Yellow peas (17.7 min) and No. 2 Canada Yellow peas (18.7 min) were shorter than the 2018 values (Table 4). Mean firmness value of No. 1 Canada Yellow peas was slightly higher than the 2018 value, while that of No. 2 Canada Yellow peas was lower than the 2018 value.

Table 5 shows the 2019 quality data for No. 1 and No. 2 Canada Green peas. Mean protein contents were 23.3% and 23.7%, mean starch contents were 46.1% and 45.2% and mean total dietary fiber were 14.6%, and 14.8% for No. 1 and No. 2 Canada Green peas, respectively. All values were lower than the 2018 values. Mean ash content was slightly higher than the 2018 value for No. 1 Canada Green peas but was similar to 2018 for No. 2 Canada Green peas.

Similar trends to yellow peas for both macroelements and microelements in green peas were noted (Table 5).

Mean water holding capacity of 2019 for No. 1 Canada Green peas (0.89 g H<sub>2</sub>O per g sample) and No. 2 Canada Green peas (0.90 g H<sub>2</sub>O per g sample) were higher than the 2018 values (Table 5). Mean oil emulsifying capacity was 267.6 mL oil per g sample for No. 1 Canada Green peas and 259.5 mL oil per g sample for No. 2 Canada Green peas, and both were higher than the means for 2018.

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Mean 100-seed weight for No. 1 Canada Green peas was 20.1 g and for No. 2 Canada Green peas was 20.7 g. These values were lower than that of the 2018 (Table 5). Mean water absorption values for No. 1 Canada Green peas was slightly higher, but for No. 2 Canada Green peas was lower than the 2018 values.

Both No. 1 and No. 2 Canada Green peas had lower mean cooking time and lower mean firmness values as compared to the 2018 values (Table 5).

**Table 2 – Mean protein content for 2019 western Canadian peas (yellow and green combined) by grade<sup>1</sup>**

Grade	Protein content, % dry basis			
	2019			2018
	Mean	Min.	Max.	Mean
<b>Manitoba</b>				
Peas, No. 1 Canada	22.6	21.0	25.3	22.4
Peas, No. 2 Canada	22.6	19.8	26.1	22.8
Peas, No. 3 Canada	23.1	22.0	26.2	22.6
<b>All grades</b>	<b>22.7</b>	<b>19.8</b>	<b>26.2</b>	<b>22.6</b>
<b>Saskatchewan</b>				
Peas, No. 1 Canada	22.8	17.5	29.5	23.2
Peas, No. 2 Canada	23.3	17.5	28.8	23.2
Peas, No. 3 Canada	23.6	20.5	27.4	23.5
<b>All grades</b>	<b>23.2</b>	<b>17.5</b>	<b>29.5</b>	<b>23.3</b>
<b>Alberta</b>				
Peas, No. 1 Canada	23.1	19.0	27.2	23.2
Peas, No. 2 Canada	23.1	16.4	31.4	23.0
Peas, No. 3 Canada	22.7	16.8	28.1	22.9
<b>All grades</b>	<b>23.0</b>	<b>16.4</b>	<b>31.4</b>	<b>23.0</b>
<b>Western Canada</b>				
Peas, No. 1 Canada	22.9	17.5	29.5	23.1
Peas, No. 2 Canada	23.2	16.4	31.4	23.1
Peas, No. 3 Canada	23.1	16.8	28.1	23.2
<b>All grades</b>	<b>23.1</b>	<b>16.4</b>	<b>31.4</b>	<b>23.1</b>

<sup>1</sup>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 peas

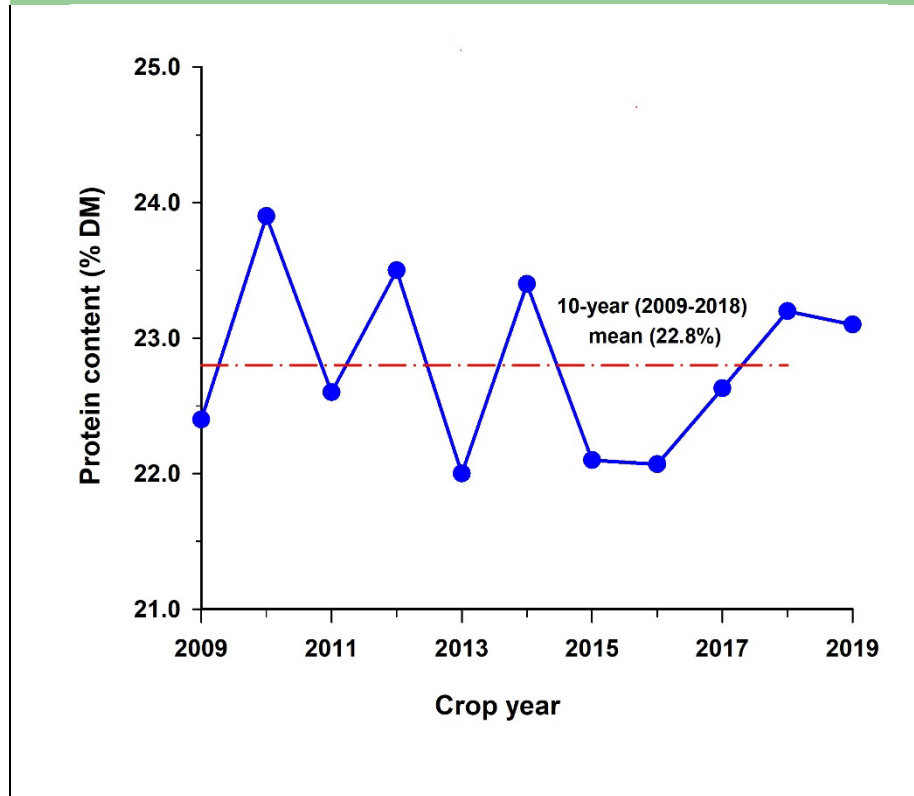
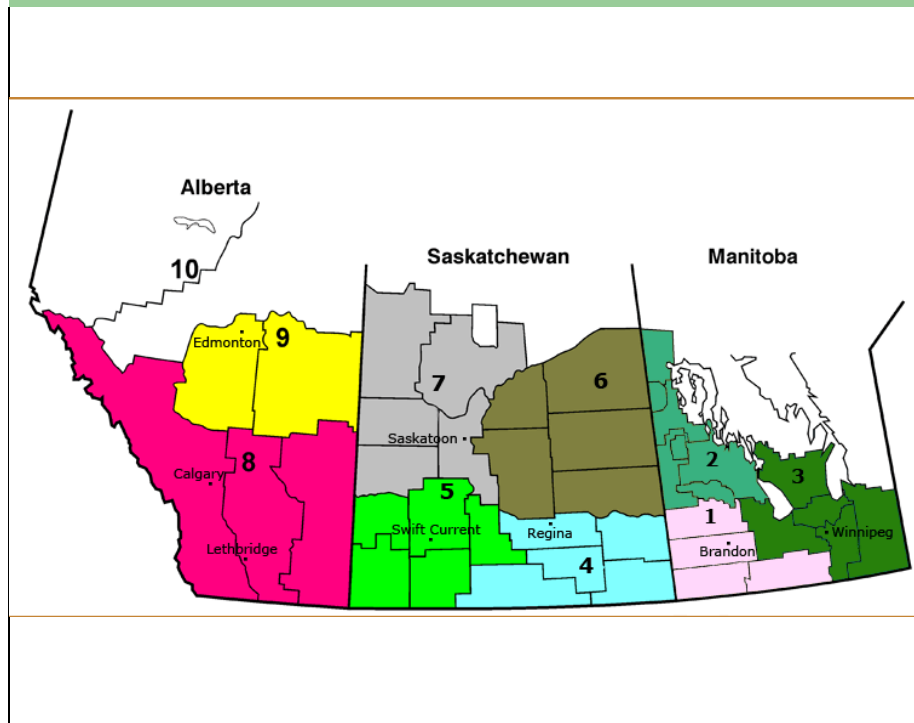


Figure 5 – Crop regions in western Canada



**Table 3 – Mean protein and starch content for 2019 western Canadian peas (yellow and green combined) by crop region**

Crop region <sup>1</sup>	Protein content, % dry basis		Starch content, % dry basis	
	2019	2018	2019	2018
1	22.6	22.8	46.6	47.8
4	23.3	23.7	46.4	47.7
5	24.7	24.3	44.9	48.1
6	22.5	22.8	46.3	48.4
7	22.5	23.1	46.0	47.2
8	24.1	24.8	45.4	47.1
9	23.2	23.1	44.6	47.7
10	22.3	21.3	45.8	48.4

<sup>1</sup> Manitoba crop regions (Figure 5): 1 (Southwest 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 2019 western Canadian yellow pea composite by grade**

Quality parameter	Peas, No. 1 Canada Yellow		Peas, No. 2 Canada Yellow	
	2019	2018	2019	2018
<b>Chemical composition</b>				
Moisture content, %	10.2	10.4	10.1	10.3
Protein content, % dry basis	23.1	23.4	23.5	23.5
Starch content, % dry basis	45.8	47.3	45.7	48.1
Total dietary fiber, % dry basis	14.7	17.6	14.2	17.0
Ash content, % dry basis	2.6	2.6	2.7	2.6
<b>Mineral (mg/100 g dry basis)</b>				
Calcium (Ca)	82.6	85.5	89.6	91.8
Copper (Cu)	0.76	0.78	0.77	0.76
Iron (Fe)	5.2	5.2	5.7	5.4
Potassium (K)	1056.1	979.8	1053.3	966.7
Magnesium (Mg)	136.0	135.4	137.9	132.4
Manganese (Mn)	1.3	1.1	1.3	1.3
Phosphorus (P)	348.3	338.7	356.6	330.2
Zinc (Zn)	3.1	3.5	3.3	3.7
<b>Functional property</b>				
Water holding capacity, g H <sub>2</sub> O/g sample	0.89	0.96	0.90	0.91
Emulsifying capacity, mL oil/g sample	261.3	258.6	265.6	257.1
<b>Physical characteristic</b>				
100-seed weight, g/100 seeds	22.5	22.4	22.3	22.5
Water absorption, g H <sub>2</sub> O/g seeds	0.82	0.92	0.85	0.90
<b>Cooking characteristic</b>				
Cooking time, min	17.7	22.9	18.7	25.9
Firmness, N/g cooked seeds	23.9	23.6	23.4	24.4

**Table 5 – Quality data for 2019 western Canadian green pea composite by grade**

Quality parameter	Peas, No. 1 Canada Green		Peas, No. 2 Canada Green	
	2019	2018	2019	2018
<b>Chemical composition</b>				
Moisture content, %	10.3	10.3	10.1	10.0
Protein content, % dry basis	23.3	24.3	23.7	24.1
Starch content, % dry basis	46.1	48.0	45.2	46.1
Total dietary fiber, % dry basis	14.6	16.4	14.8	16.5
Ash content, % dry basis	2.8	2.6	2.8	2.7
<b>Mineral (mg/100 g dry basis)</b>				
Calcium (Ca)	77.5	77.0	80.6	75.2
Copper (Cu)	0.69	0.71	0.69	0.78
Iron (Fe)	4.9	5.3	5.4	5.2
Potassium (K)	1089.1	1032.7	1085.8	979.8
Magnesium (Mg)	131.5	124.1	128.0	135.4
Manganese (Mn)	1.2	1.1	1.3	1.1
Phosphorus (P)	355.8	340.1	372.4	338.7
Zinc (Zn)	3.2	3.5	3.4	3.5
<b>Functional property</b>				
Water holding capacity, g H <sub>2</sub> O/g sample	0.89	0.86	0.90	0.86
Emulsifying capacity, mL oil/g sample	267.6	255.7	259.5	251.3
<b>Physical characteristic</b>				
100-seed weight, g/100 seeds	20.1	22.9	20.7	22.2
Water absorption, g H <sub>2</sub> O/g seeds	0.86	0.84	0.81	0.87
<b>Cooking characteristic</b>				
Cooking time, min	13.6	17.9	11.1	13.5
Firmness, N/g cooked seeds	23.94	24.2	20.5	21.5