ANNUAL FINAL REPORT
Canola Agronomic Research Program (CARP)

The Annual Final Report should fully describe the work completed for the year and note the personnel involved. It should also note any deviations from the original plan and next and/or corrective steps as may be required if deviations are noted. The report should also provide an update on the status of the Project including forecasted date of completion. A complete statement of expenses should be included. In the event major changes are anticipated within the budget supporting notes along with a proposed budget should also be included. The report should also capture a complete summary of activity for the year.

Project Title: Determining best practices for summer storage of canola

Research Team Information

Lead Researchers:		
Joy Agnew	**PAMI**	**General grain storage expertise**
Research Team Members		
Jay Mak	**PAMI**	**Data analysis and grain storage expertise**

Project Start Date: May 20, 2016 **Project Completion Date:** February 15, 2017

Reporting Period: December 1, 2016 **to** March 31, 2017

CARP Project Number: 2016.39

Instructions: This Annual Report shall be completed and submitted on or about March 31st of each fiscal year that the agreement is in effect. The Lead Researcher of the project in question shall complete and submit the report on behalf of his/her complete research team.

This Report is a means by which to provide a detailed update on the status of the project and summarize project activities. Details may be general in nature unless major issues or changes arise (e.g., change of scientists, significant change or delay of activities) including impacts on budgets. Please note that financial reports of major impact on budgets.

The following template is provided to assist you in completing this task. Please forward the completed document electronically to your appropriate CCC contact.

1. Forecasted Date of Completion:

February 15, 2017

2. Status of Activity: (please check one)

_____ Ahead of Schedule _____ On Schedule _____Behind Schedule ___X__ Completed

Data collection was completed by late August, 2016. A preliminary review of the data was completed in October 2016, and the full review and final report was completed in February 2017.

3. Completed actions, deliverables and results; any major issues or variance between planned and actual activities.

Stored canola in three treatment bins was monitored from early June to late August 2016. This study was concerned with canola with a higher moisture content (9%) than that studied in 2014 (6%). Canola in one bin was turned, in another was aerated (in late June), and the canola in the third bin was left alone. Detailed analysis has determined that the canola in the bin left untouched had the most stable conditions throughout the summer, validating the results from the 2014 study.

One variance from the research plans was the availability of intermittently monitored bins. The number of available bins was reduced due to the relatively low number of bins with canola in a 200 km radius of Humboldt and to excessive rainfall in the course of the season. Damp conditions caused access and safety concerns related to both the use of existing bin ladders and of the special equipment used in our study.

In addition, it is thought that the weather caused connections problems with some of the wiring of the instruments. Once this was repaired, data collection resumed, but in-grain data was lost for days 1 to 12 and days 33 to 55.

4. Significant Progress/Accomplishments

Generally, the results obtained in 2014 were validated; not touching stored canola, as opposed to turning or aerating results in the most stable conditions throughout the summer.

It was found that there was a slight variance in temperature (less than 3°C) in the grain at the edge of the bin depending on whether it was on the side of the bin with greater exposure to the sun or on the shadier side.

Although turning or aerating helped to equalize the temperature distribution, it also has potential to cause condensation due to the contact of grain with disparate temperatures. However, no condensation or spoilage issues were reported in these test cases upon unloading.

The turned bin had the lowest average temperature at the end of the test period and a small temperature gradient between the core and the edge of the bin. The aerated bin had the most uniform temperature distribution but the highest average temperature. A comparison between the initial and final conditions within the three treatment bins is shown in Table 1.

Table 1. Comparison between the initial and final canola conditions.

	Control (Bin 20)		Aerated (Bin 21)		Turned (Bin 22)	
	Initial	Final	Initial	Final	Initial	Final
Average temperature (°C)	8.4	17.0	8.1	20.2	9.0	15.6
Max temperature gradient (°C)	21.0	18.5	19.4	4.7	15.9	12.0
Maximum temperature (°C)	13.9	22.5	14.4	22.3	15.8	21.5

These results suggest the following:

- Canola storage should be monitored on a regular basis due to the inevitable heating during the spring and summer months.

- Turning the bin assisted in unifying the temperature distribution and resulted in the lowest average temperature throughout the summer. However, partially turning the bin resulted in unstable conditions immediately after turning.
- Aerating the bins minimized the temperature variation within the bin but resulted in the highest average bin temperature with signs of warm localized grain for a short duration. However, the temperature was quickly equalized after the aeration period and the aeration process did not add a significant amount of moisture to the grain.
- Doing nothing resulted in generally stable conditions throughout the summer months and similar average and maximum temperatures to the treatment bins.

A summary of the data collected from the intermittently monitored bins is presented in Table 2.

Table 2. Canola temperature comparison from various sites with the control treatment (all temperatures are reported in °C).

		Temperature in intermittently monitored bin [Temperature in control bin for comparison]		
Bin details	Date	North	Center	South
10,000 bu Viterra bin	June 16, 2016	14.1 [14.1]	2.35 [12.0]	7.5 [13.6]
5,000 bu Westeel-Rosco	June 24, 2016	19.1 [15.8]	14.9 [13.8]	17.9 [14.9]
	August 2, 2016	22.6 [21.9]	21.3 [19.3]	22.2 [20.1]
2,700 bu Wooden bin	July 26, 2016	11.6 [21.7]	10.5 [13.0]	11.8 [21.3]
3,300 bu Westeel-Rosco	July 26, 2016	14.9 [21.7]	11.5 [13.0]	15.1 [21.3]
3,300 bu Westeel-Rosco	July 26, 2016	13.5 [21.7]	12.5 [13.0]	16.6 [21.3]

Based on all data collected (including 2014 study), leaving the grain alone resulted in the most stable and favourable storage conditions. It should be noted, however, that this recommendation is for dry canola (<10% moisture content) that had been uniformly frozen (to <-5°C) over the winter. Periodic monitoring of stored canola is advised during spring and summer due to the higher risk of temperature and moisture migration during the spring and summer months.

5. Research and Action Plans/Next Steps

The results of this project are available to producers and other stakeholders through a variety of methods:

- Blog updates on the Canola Council of Canada's *CanolaWatch* newsletter.
- Articles resulting from interviews with media (e.g., *Western Producer*, *Country Guide*, *Farming for Tomorrow*, etc.).
- Presentations and seminars at various events (e.g., CropConnect, North East Ag Update, CanoLAB, Farm Progress Show, etc.).
- Detailed final report on PAMI's website.

These activities will continue beyond the project end date due to PAMI's ongoing grain storage research and commitment to continually provide relevant research updates to producers.

6. Budget impacts in the event major issues or variance between planned and actual is noted:
The project was completed on budget. Although the number of intermittently monitored bins was reduced, the cost to collect data from the intermittently monitored bins was higher than expected due to safety issues.

Please forward an electronic copy of this completed document to:

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