Combine Header Modification and Losses during Direct Harvest

Purpose:

Straight combining canola can save a lot of time during harvest, reduce green seed, and increase seed oil content but can also expose canola to increased pre-harvest and harvest shatter losses. In Ontario several farmers have experimented with modifying a traditional grain head to reduce header losses when straight combining canola. To evaluate the benefit of a head modified for canola, a field trial was conducted in a commercial field during 2012 to evaluate header losses from 3 types of headers. The initial results from the field trial look encouraging.

Methods:

Combine header losses were measured from 3 different types of headers; New Holland 9060 combine with 740 CF 35ft flex header, Case IH 8120 Combine with 40 ft Draper Head and John Deere 9550 Combine with custom built header. The modified head was a JD 930 flex that had the flex pan replaced with a solid pan which had an 18 inch extension and a vertical side cutter knife. Header losses were measured by placing 8 ice cream pails (5.75 inch diameter) on the ground in the canola canopy across the width of the header (Figure 1). In addition 4 pans measuring a total area of 0.64 sq ft were placed on the divider side of the header to measure crop divider losses. Containers were placed where combines exited the canola plot to ensure the headers were operated to receive normal capacity of plant material. There were 3 replications for each combine.

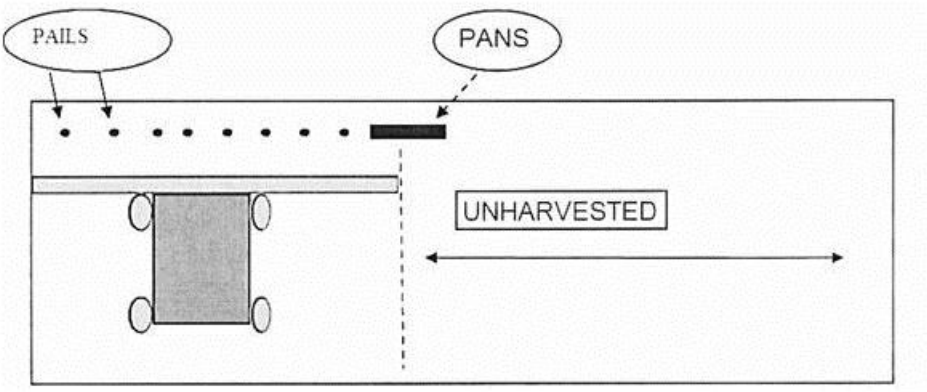

Figure 1: Setup of Sampling Containers in the Field.

Results:

The average yield of the field was 2250 lb/acre. Table 1 is a summary of losses measured for each combine. The different widths for each header will significantly affect the overall field loss. A wider header will require fewer passes to harvest a field reducing the overall field loss experience at the divider assuming losses are equal across header types. By way of example a 100 acre field measuring 3300 ft. long X1320 ft. wide is used to calculate loss and compare headers. Divider loss is calculated as the loss per 1 sq. foot under the divider (pans) multiplied by the number of combine passes X length of

field (3300 feet). This ignores headlands and therefore tends to slightly underestimate total loss especially for smaller headers. Since the pans used for collecting divider loss would also collect some seed from the edge of the header, it would slightly overestimate divider loss. To adjust for this, header width was reduced by 1 foot i.e. 30 foot header loss is calculated as 29 foot wide.

Losses for the custom modified header were 0.9% compared to 2.2% for the draper and 10% for the flex header. The divider knife on the custom header had the lowest loss, which was 50-66% less than the other 2 combine heads. The divider loss was less than 10% of the total loss for both the draper and custom header. It could not be determined why the total loss for the flex head was quite high, and indicates the need to do further testing.

Table 1: Estimated Header Losses on a 100 Acre Field (lbs.)

	Divider Loss	Header Loss	Total Loss	% Loss on 2000 lb./ac Average Yield
Flex Header	246	19696	19942	10.0%
Draper Head	331	3997	4328	2.2%
Custom Header	126	1648	1774	0.9%
	Economic $ Loss on 100 Acres			
	Divider $	Header $	Total $	
Flex Header	$70	$5,585	$5,655	
Draper Head	$94	$1,133	$1,227	
Custom Header	$36	$467	$503	

Summary:

Both the draper header and modified custom header reduced losses compared to the flex header in this trial. The loss measured from each header type varied quite a bit between each replication, so absolute values of the losses should be interpreted with caution. However the results clearly indicate that the custom header had significantly lower loss than the other two combine head types. Initial results of this trial indicate the need to further evaluate headers modified for direct harvest of canola and compare this to other header types and under different field conditions. Numerous factors including crop density, header adjustments, and knife sharpness can significantly affect losses and should be considered in comparing headers.

Next Steps:

A next step would also be to include a comparison with other standard grain headers, a European style header and after-market header attachment designed for canola and small grains next year.

Acknowledgements:

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Location of Project Final Report: