



Feeding hybrid rye replacing wheat grain with or without enzyme to grow-finish hogs

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Background

A new European hybrid rye grown in western Canada is more resistant to ergot and fusarium. This hybrid rye results in greater yield per unit of land, and has lower content of anti-nutritional factors. Rye has greater non-starch polysaccharides (NSP) such as arabinoxylans than wheat and barley grain, which could therefore benefit from NSP enzyme inclusion in diets. Enzymes could potentially hydrolyze NSP in rye to improve its nutrient digestibility. Net energy value, lysine content, and price of rye fall between those of wheat and barley grain, making rye a potential cereal feedstuff that can be cost effective for swine.

Our objective

The objective of this trial was to compare the growth performance and carcass traits of growing-finishing barrows and gilts fed increasing hybrid rye level replacing wheat grain, with or without NSP enzymes, to market weight.

What we did

- We conducted this commercial-scale pig trial at a contract grower barn set up as a test facility (Lougheed, AB).
- 504 barrows and 504 gilts (~44 kg BW) were housed in 48 pens by sex, 21 pigs per pen, 6 pens per rye inclusion x sex.
- Barrows and gilts were fed diets with one of three rye (var. Bono; KWS LOCHOW GMBH) levels replacing wheat grain: low (1/3rd of wheat replaced), medium (2/3rd replaced), or high (all wheat replaced), either with or without inclusion of enzyme (200 mg/kg; Endofeed WDC, GNC Bioferm).
- For all 4 growth phases (Grower 2: d0-22, Grower 3: d23-42, Finisher 1: d43-63, Finisher 2: d64-slaughter), diets were formulated to equal g SID Lys/Mcal NE.
- Pen BW and feed intake (ADFI) were measured at day 0, 22, 42, 63, 76, 91, and at target slaughter weight (130 kg).
- Pigs were slaughtered at Maple Leaf (Brandon, MB). Individual warm carcasses were weighed and graded.

What we observed

Effects on growth performance

Body weight was not affected by either increasing hybrid rye level or enzyme inclusion throughout the trial. For the entire trial (d0-76), pigs fed increasing hybrid rye level replacing wheat grain had decreased ($P < 0.050$) ADFI and ADG whereas feed efficiency (G:F) was not affected (Figure 1). Enzyme inclusion did not affect ADFI but tended ($P = 0.080$) to increase ADG by 20 g/d (Figure 1). Enzyme inclusion improved ($P < 0.050$) G:F only in pigs fed the high rye level.

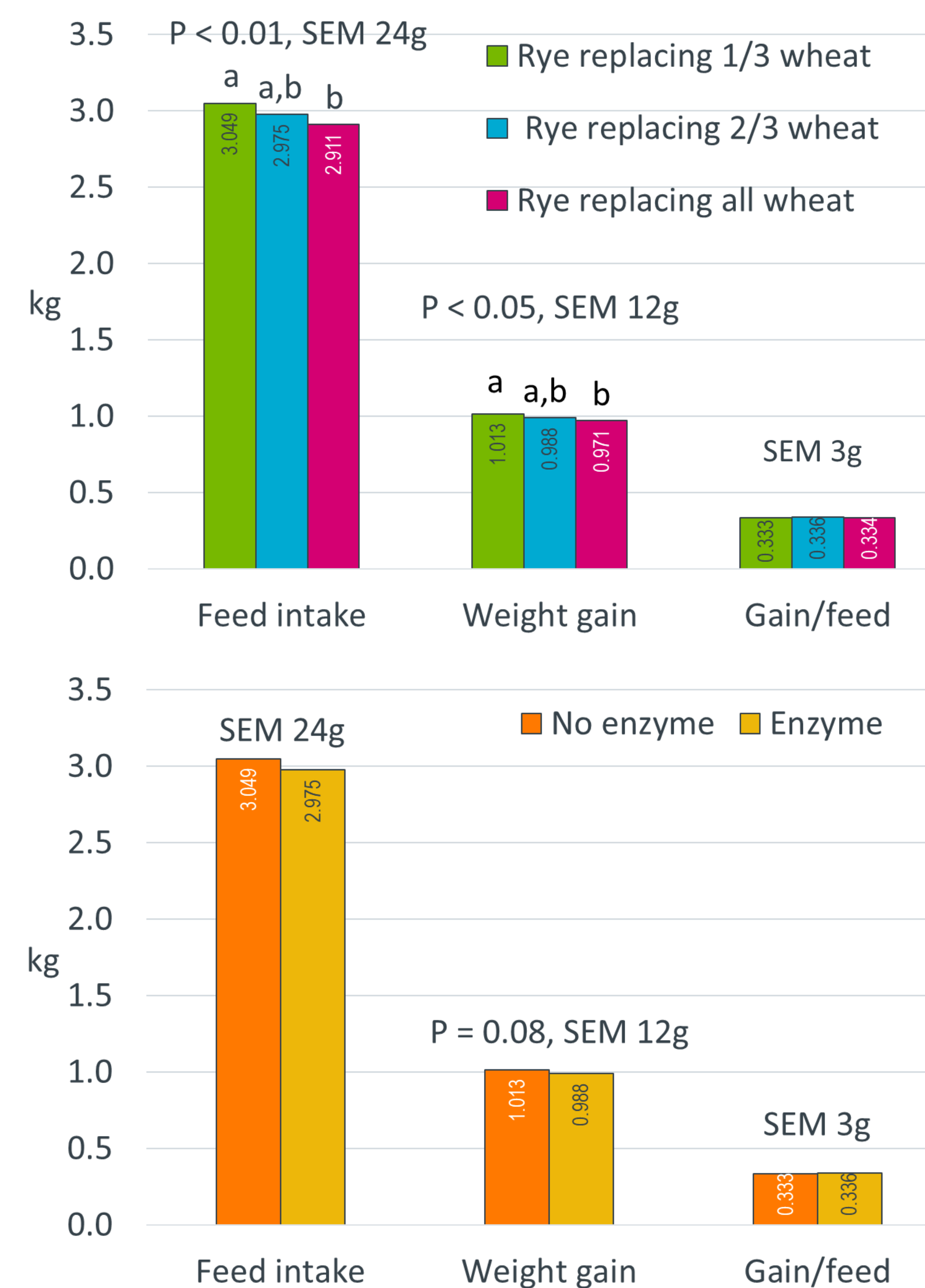


Figure 1. Effect of increasing rye inclusion replacing wheat grain and enzyme inclusion on growth performance (SEM=Standard Error of the Mean)

Effects on carcass traits

Most carcass traits were not affected by increasing hybrid rye level replacing wheat grain or by enzyme inclusion (Table 1).

Effects on costs vs. benefits

Increasing hybrid rye level replacing wheat grain increased ($P < 0.001$) cost per tonne of feed, but did not affect feed cost per pig or per kg BW gain (Table 2). Enzyme inclusion increased ($P < 0.001$) cost per tonne of feed by \$1.79. However, feed cost per pig and per kg BW gain were reduced ($P < 0.050$) by \$1.70 and \$0.02, respectively when enzyme was included (Table 2).

Table 1. Effect of increasing rye inclusion replacing wheat grain and enzyme inclusion on carcass characteristics

	Rye inclusion			With enzyme		SEM	P value	
	Low	Medium	High	No	Yes		Rye	Enzyme
Ship weight, kg	133.4 ^a	132.0 ^b	132.5 ^{ab}	132.7	132.6	0.4	<0.050	0.910
Carcass wt, kg	104.7	103.5	103.6	103.9	103.9	0.3	0.074	0.979
Dressing	78.2	78.2	78.2	78.1	78.3	0.2	0.981	0.447
Backfat, mm	18.0	17.6	17.6	17.7	17.7	0.3	0.434	0.828
Loin depth, mm	62.7	63.6	64.1	63.2	63.7	0.4	0.123	0.394
Lean yield, %	61.0	61.3	61.3	61.1	61.2	0.1	0.120	0.627
Index	110.5 ^b	112.0 ^a	110.2 ^b	111.4	110.4	0.3	<0.050	0.050
Carcass revenue, \$	174.28	173.39	170.95	173.65	172.10	0.98	0.141	0.273

Table 2. Effect of increasing rye inclusion replacing wheat grain and enzyme inclusion on cost vs. benefits

	Rye inclusion			With enzyme		SEM	P-value	
	Low	Medium	High	No	Yes		Rye	Enzyme
Feed cost/tonne	240.28 ^c	241.28 ^b	242.20 ^a	240.36	242.15	0.11	<0.001	<0.001
Feed cost/kg BW gain	0.94	0.95	0.95	0.96	0.94	0.01	0.340	<0.050
Feed cost/pig	80.57	81.55	81.75	82.14	80.44	1.00	0.305	<0.050
Income subtracting feed cost/shipped pig	30.66	28.20	28.31	28.53	29.59	1.38	0.133	0.338

Take home message

Fall planted hybrid rye can completely replace wheat grain in grow-finish hog diets without affecting feed efficiency, feed cost/pig or feed cost/kg BW gain. Inclusion of NSP enzyme is recommended for diets containing high rye levels to improve feed efficiency and ADG.

