Winter Canola Feasibility in Rotation with Winter Wheat

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Abstract:

Producers in the dryland (>12 inches annual precipitation) cropping region of Eastern Washington continue looking for profitable alternatives to winter wheat (*Triticum aestivum* L.) to limit grassy weed resistance to Group 2 herbicides. Winter canola (*Brassica napus* L.) is an oil seed crop that offers non Group 2 grassy weed herbicide options but has a very limited history in this region as agronomic and economic risks are elevated. The objective of this research is to help producers determine market prices needed to minimize risks, increase profitability, and decrease potential for herbicide resistance. An on-farm test (OFT) was initiated in the fall of 2006 examining two treatments: 1. winter canola, summer fallow, winter wheat; 2. winter wheat, summer fallow, winter wheat. The OFT was a RCBD with 4 replications and was 6.5 acres in size. Total production costs between the two crops were similar. Winter wheat produced greater yield and gross economic return at 43.5 bu and $355/ac compared to canola at 34.5 bu and $293/ac. Subsequent winter wheat yield was 39.3% greater following canola and over the total cropping sequence, no significant difference in gross economic returns were determined between winter wheat and canola averaging $493/ac. In conclusion, yield differences were documented between winter wheat and canola but market price differential between the two crops has a larger influence on the profitability and can vary dramatically from year-to-year. Overall winter canola needs to have a 26.4% price advantage per bushel over wheat to produce significantly greater gross economic returns.

Winter wheat and canola emergence

Background:

Winter wheat-summer fallow rotations are predominate in the dryland cropping region (>12" of annual precipitation) of Eastern Washington. Farmers in this region rely heavily on continuous applications of Group 2 herbicides for winter annual grassy weed control and suppression. This repeated application of Group 2 herbicides that includes trade names Beyond, Maverick, Olympus, Olympus Flex, Osprey, and PowerFlex increases the potential for herbicide resistant populations of winter annual grassy weeds downy brome (*Bromus tectorum* L.) and jointed goatgrass (*Aegilops cylindrica*) (Mallory-Smith *et al*., 2007). Winter canola (*Brassica napus* L.) is an oil seed crop that offers non Group 2 grassy weed herbicide options including Roundup Ready™ technology but has a very limited history in this region and elevates short term agronomic and economic risks in rotation. The objective of this research is to help producers determine market prices needed to minimize risks and increase profitability as well as improve weed control and decrease potential for herbicide resistance grassy weeds.

Study Location:

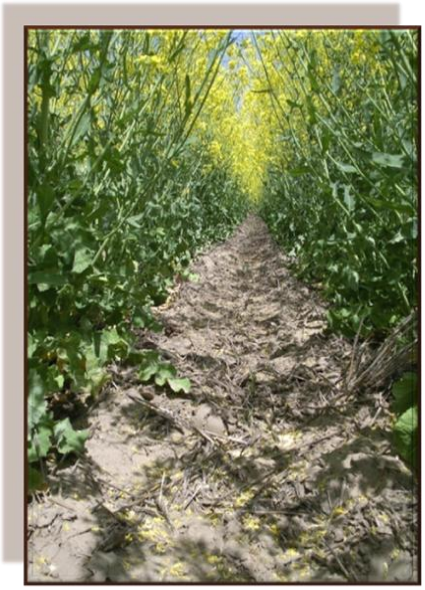
Location: 9 miles east of Ritzville, WA.
Annual precipitation: 11-12 inches.
Soil type: Silt loam.
Crop sequence: winter wheat, summer fallow.

Winter wheat and canola in bloom

Treatments and Operations:

An on-farm test (OFT) was initiated examining two treatments: 1. winter canola, summer fallow, winter wheat; 2. winter wheat, summer fallow, winter wheat. The OFT was a RCBD with 4 replications and was 6.5 acres in size. 'DKA 13-86 RR' winter canola and 'Eltan' winter wheat treatments were seeded with John Deere HZ deep furrow drills into a tilled summer fallow system. Canola was seeded at 8 lb/ac on August 22, 2006 and wheat was seeded at 52 lb/ac on September 1, 2006. Fertilizer was applied at 70-0-0-7 to both treatments prior to seeding in the summer fallow system. Downy brome and jointed goatgrass grassy weeds along with multiple species of broadleaf weeds were identified prior to spraying. Wheat was sprayed on April 13, 2007 with 4.75 oz/ac Osprey (Group 2), 16 oz/ac MCPA, 2 qt/100 gal non-ionic surfactant and 3 lb/ac ammonium sulfate. Canola was sprayed on April 16, 2007 with 16 oz/ac Roundup PowerMAX™ (Group 9) and 1 qt/100-gal non-ionic surfactant. Both spray treatments were applied at 11.7 gal/ac. Subsequent 'Eltan' winter wheat was seeded into summer fallow on September 2, 2008 and harvested on August 18, 2009. It was fertilized at 70-0-0-7 and seeded at 52 lb/ac.

Study timeline and treatments		
Crop Year	Treatment #1	Treatment #2
2006	Summer fallow	Summer fallow
2007	Winter canola	Winter wheat
2008	Summer fallow	Summer fallow
2009	Winter wheat	Winter wheat



Grassy weed ***CONTROL***
in winter canola
with Roundup (Group 9)

Grassy weed ***SUPPRESSION***
in winter wheat
with Osprey (Group 2)

NO herbicide application
in winter canola

Agronomic and Economic Results:

Total production costs between the two crops were similar, thus economic results are presented as gross economic returns only. Wheat gross economic returns were calculated using Ritzville Warehouse Company F.O.B. (free on board) price on September 15 each year. Canola gross economic returns were calculated using the local contract price. As anticipated, wheat produced greater yield and economic returns than canola at the given market prices (Table 1). Subsequent winter wheat yields and gross economic returns were greater following canola (Table 2). Over the total cropping sequence, no significant difference in gross economic returns was determined between wheat and canola averaging $493/ac.

Agronomic and Economic Data:

Table 1. Average yield and gross economic return in winter canola and wheat treatments in an on-farm test at Hennings' farm east of Ritzville, WA.

Treatments	Yield (bu/ac)	Gross economic Return ($/ac)
Canola	34.5	293
Wheat	43.5	355
Level of Significance	0.01	0.05

Table 2. Average yield and gross economic return of subsequent winter wheat crop following winter canola and wheat treatments in an on-farm test at Hennings' farm east of Ritzville, WA.

Treatments	Yield (bu/ac)	Gross economic Return ($/ac)
Canola	47.5	197
Wheat	34.1	142
Level of Significance	0.05	0.05

Conclusions:

Winter canola has the potential to be a viable crop to incorporate into a winter wheat summer fallow rotation to compete economically and improve weed control and reduce potential for Group 2 herbicide resistant weed populations. Canola yielded less than wheat but winter wheat following canola yielded 39.3% better. Despite these yield differences winter wheat and canola market price differential between the two crops has a larger influence on the profitability and can vary dramatically from year-to-year. Overall canola needs to have a 26.4% price advantage per bushel over wheat to produce significantly greater gross economic returns (Figure 1).

Winter wheat and canola at maturity

Citation:

Mallory-Smith, C., A. Hulting, D. Thill, D. Morishita, J. Krenz. 2007. Herbicide-Resistant Weeds and Their Management. In *Pacific Northwest Conservation Tillage Handbook.* Extension bulletin No. PNW 437.

Wheat ($/bu)	Canola ($/bu)										
	$5.00	$5.50	$6.00	$6.50	$7.00	$7.50	**$8.00**	$8.50	$9.00	$9.50	$10.00
$4.00	-$54	-$72	-$89	-$106	-$123	-$141	**-$158**	-$175	-$192	-$210	-$227
$4.25	-$44	-$61	-$78	-$95	-$113	-$130	**-$147**	-$164	-$182	-$199	-$216
$4.50	-$33	-$50	-$67	-$85	-$102	-$119	**-$136**	-$154	-$171	-$188	-$205
$4.75	-$22	-$39	-$56	-$74	-$91	-$108	**-$125**	-$143	-$160	-$177	-$194
$5.00	-$11	-$28	-$46	-$63	-$80	-$97	**-$115**	-$132	-$149	-$166	-$184
$5.25	$0	-$18	-$35	-$52	-$69	-$87	**-$104**	-$121	-$138	-$155	-$173
$5.50	$11	-$7	-$24	-$41	-$58	-$76	**-$93**	-$110	-$127	-$145	-$162
$5.75	$21	$4	-$13	-$30	-$48	-$65	**-$82**	-$99	-$117	-$134	-$151
$6.00	**$32**	**$15**	**-$2**	**-$19**	**-$37**	**-$54**	**-$71**	-$88	-$106	-$123	-$140
$6.25	$43	$26	$9	-$9	-$26	-$43	-$60	-$78	-$95	-$112	-$129
$6.50	$54	$37	$19	$2	-$15	-$32	-$50	-$67	-$84	-$101	-$119
$6.75	$65	$48	$30	$13	-$4	-$21	-$39	-$56	-$73	-$90	-$108
$7.00	$76	$58	$41	$24	$7	-$11	-$28	-$45	-$62	-$80	-$97
$7.25	$86	$69	$52	$35	$17	$0	-$17	-$34	-$52	-$69	-$86
$7.50	$97	$80	$63	$46	$28	$11	-$6	-$23	-$41	-$58	-$75
$7.75	$108	$91	$74	$56	$39	$22	$5	-$13	-$30	-$47	-$64
$8.00	$119	$102	$84	$67	$50	$33	$16	-$2	-$19	-$36	-$53
$8.25	$130	$113	$95	$78	$61	$44	$26	$9	-$8	-$25	-$43
$8.50	$141	$123	$106	$89	$72	$54	$37	$20	$3	-$15	-$32
$8.75	$152	$134	$117	$100	$83	$65	$48	$31	$14	-$4	-$21
$9.00	$162	$145	$128	$111	$93	$76	$59	$42	$24	$7	-$10
$9.25	$173	$156	$139	$121	$104	$87	$70	$52	$35	$18	$1
$9.50	$184	$167	$150	$132	$115	$98	$81	$63	$46	$29	$12
$9.75	$195	$178	$160	$143	$126	$109	$91	$74	$57	$40	$22
$10.00	$206	$188	$171	$154	$137	$119	$102	$85	$68	$51	$33

Price structure winter wheat is more profitable…ww average yield of 43.4 bu/ac

Price structure winter canola is more profitable…wc average yield of 1,724 lb/ac

Price to consider weeds, soil moisture, price stability, etc.

Figure 1. Profitability of winter wheat in comparison to winter canola given a specific market price from an on-farm trail at Hennings' in 2006-09. This included the rotational value of canola.

Example: if wheat is selling for $6.00/bu, canola selling at $8.00/bu will be significantly better off economically generating $71/ac more profit.

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