

Yield, Oil Content and Water Use of Summer-Planted Winter Canola in Semiarid

Introduction

Winter canola has customarily been planted in early September in dryland fields in eastern Oregon. Stand establishment is very difficult at this time because of low seedzone water content and high surface soil temperature. To avoid these severe limitation, winter canola was planted in June and July when seedzone water content and soil temperatures are more favorable. Four winter canola cultivars were sown in a 4 replication split plot experiment at 3 planting date in 2010, 2011, and 2012. Planting date was the main plot treatment and cultivar the subplot variable. Stand establishment and yield were best when winter canola were planted in June or July and poorest when planted in September in 2010 and 2011. In 2012, stand establishment was equal for all planting dates, and yield greatest in the September planting. Soil water content in June and July plantings were 50 to 75 mm lower in March just prior to bolting than September plantings. After harvest, soil water content was equal for all planting dates. Planting date influenced when soil water was utilized but didn't influence the total water used. Oil content was not affected by planting date. Summer planting of winter canola in dryland Oregon is a practice that increases stand establishment and lowers risk. Soil water is depleted earlier in the crop year, so yields can be expect to be lower in years of early spring drought.

Procedures

Time of planting of winter canola was investigated in over the 2011 to 2014 and 2012 growing seasons at the Columbia Basin Agricultural Research Center near Pendleton, Oregon (45°43'06" N, 118°37'39" W). Soil type is a Walla Walla silt loam, coarse-silty mixed, superactive, mesic Typic Haploxerolls. A split-split plot randomized block design was used . The main plot treatment was planting date (Fig. 1 & 2), subplot treatment was cultivar and the sub-subplot treatment was seeding rate. Target planting dates were mid-June, July, and early September (Tab. 1). Cultivars were Amanda, Athena, Baldur, and Salute in 2011 and 2012 and Amanda and Baldur in 2013 and 2014. Planting rates were 4, 6, and 8 lb/acre. Minimum plot width was 5 X 20 ft. If soil water content was adequate in the surface 2-inches planting was done with a double disk drill. If soils were dry in the surface 2-inches a John Deere HZ on 14-inch row spacing (Fig. 1) was used. Harvest was done with a plot combine with a 5foot header and equipped with auger feed and canola sieves. Grain yield, and oil content were determined from the various treatments and compared using appropriate statistical methods. Yields will be based on combine weights adjusted for seed water content. oil content were measured using NIR Spectrophotometry. In addition soil water use over the growing season was measured on the cultivar Amanda at the 6-lb seeding rate for all planting dates use neutron attenuation. Soil water measurements were determined monthly from planting to harvest,

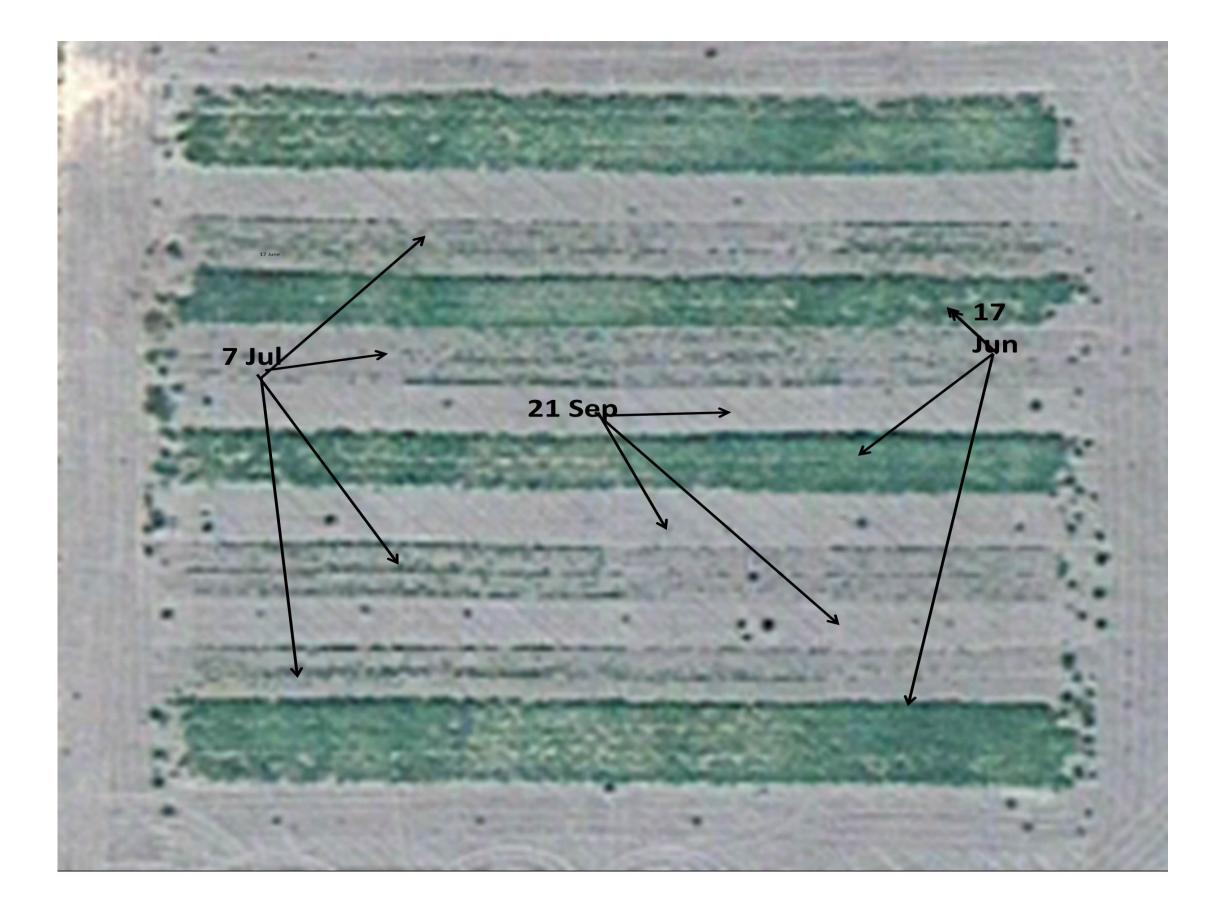


Figure 1. Experimental plot August 10, 2011

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Figure 2. June 17 planting on September 21, 2011

Table 1 Canola Plantings

	Planting Dates		
Year	1	2	
2011	17-Jun	7-Jul	21
2012	8-Jun	12-Jul	6
2013	18-Jun	10-Sep	ç
2014	6-Jun	9-Sep	

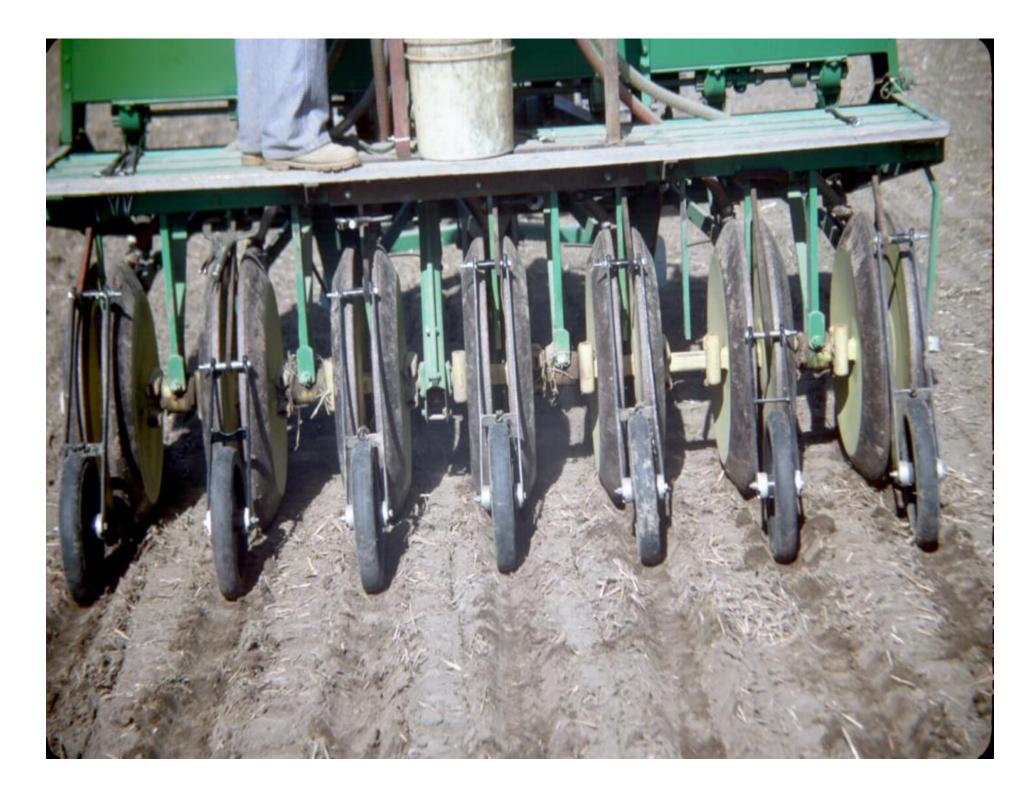
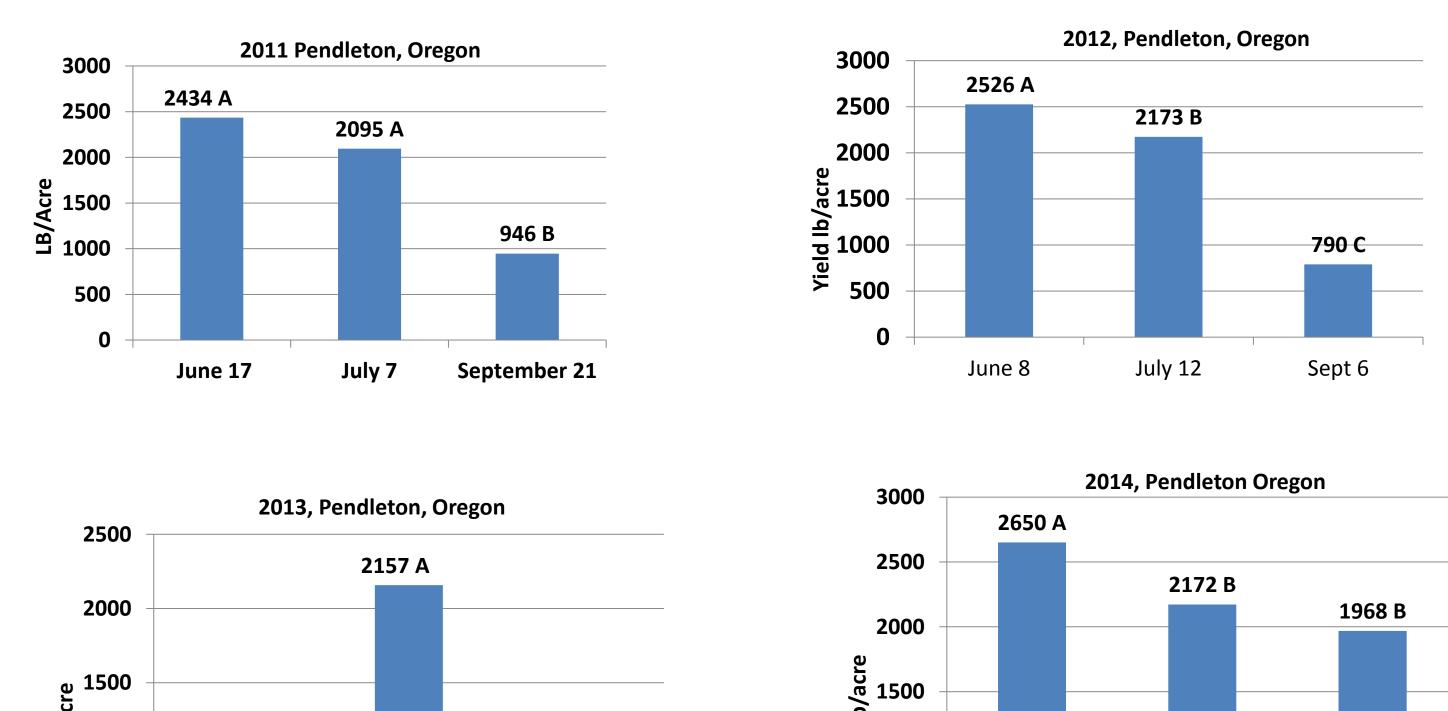


Figure 3. HZ Drill with added packer wheels for planting canola

Results Early planted canola consistently out yielded later planting of canola with the exception of 2013 (Fig. 4). The primary reason for better performance of earlyplanted canola is much better stand establishment (Tab. 2). Later-planted canola consistently had much poorer stands due to hot dry seedbed conditions. In 2013, the September planting performed better due to growing season rain in June, which was too late for the early-planted canola. Seeding rates showed little affect on yield on early-planted canola, but had significantly affected later plantings. Early-planted canola had much better stand and plants were able to branch where stands were thin. Oil content didn't vary by planting date or sowing rate, but slight differences were observed in cultivars. Soil water content at harvest was nearly the same. Later planting used slightly less water that earlier plantings (Fig 5.). Early-planted canola used 2-3 inches of water by September. This accounted for the poor performance of early-planted canola in 2013 when only 11.55 inches of annual precipitation was received.



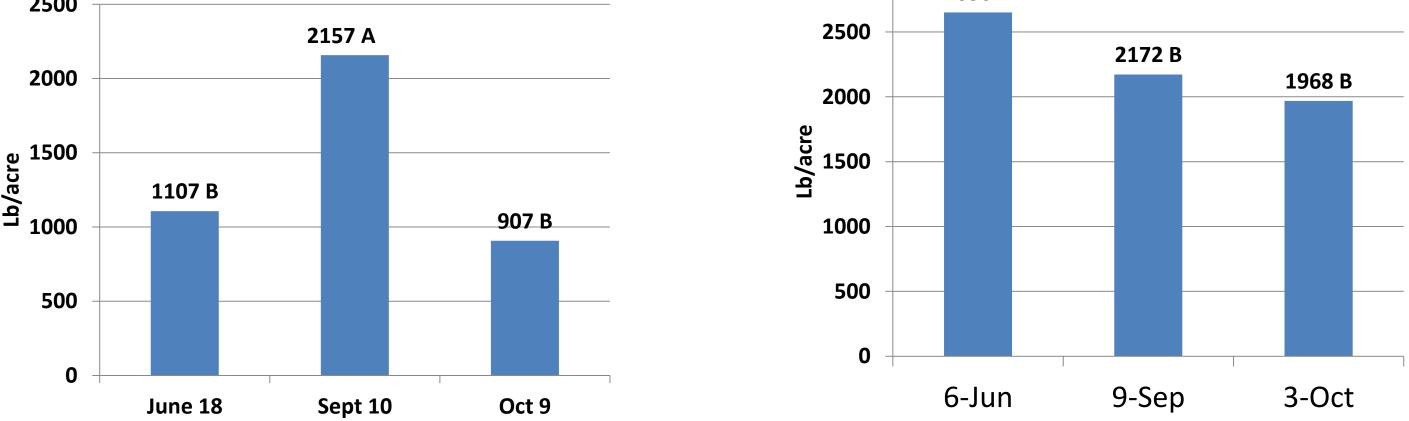
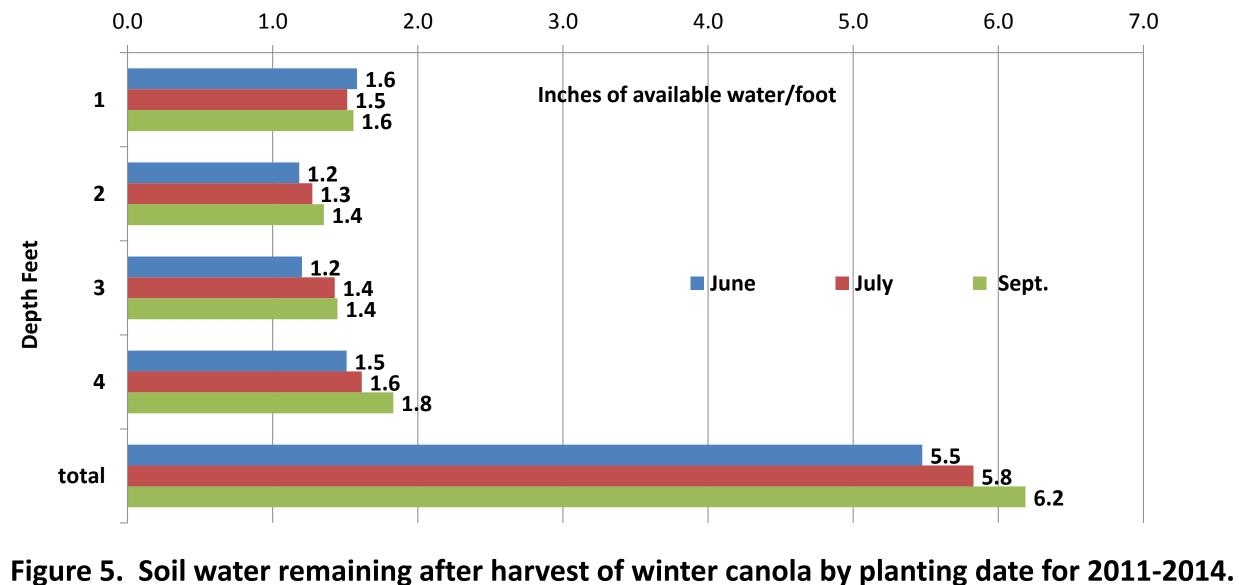


Figure 4. Yield of winter canola by planting date for 2011-2014.

Table 2. Plant stand by planting 2011-2014 Canola Plantings Planting Date

Year	1	2
	Plants/ sq. ft	
2011	7.1	2.0
2012	6.3	3.4
2013	5.3	5.8
2014	6.8	3.1



Summary

- Winter canola consistently preformed better when planted
- 2. Better performance is attribute to consistent stand establishment because of better seedzone water content at planting and cooler temperatures compared to later plantings.
- Early-planted canola uses 2-3 inches of water over summer, which was detrimental in 2013 because of drought. This may be more significant in lower rainfall zones
- 1. Seeding rate and cultivar choice had little affect, compared to planting date, provided plant stand was sufficient. Early-planted canola had consistently adequate stand regardless of sowing rate, while later plants and poor stands at even the highest sowing rate
- 5. Oil content did not vary by planting date





