Canola Response to N Fertilizer in Irrigated Cropping Systems

Joan R. Davenport*, Robert G. Stevens, and Jeffrey D. Lunden
Irrigated Agriculture Research and Extension Center
Washington State University Prosser, WA 99350

Introduction

In considering producing canola (*Brassica campestris* L.) for oil production for biofuels, optimizing N fertilizer rates is an important consideration to determine the feasibility of energy generation. Additionally, irrigated row crop producers of the inland Pacific Northwest need alternative crops in potato (*Solanum tuberosum* L.) production systems since disease pressure precludes planting potatoes more frequently than every 3 – 5 years in a given field. The objective of this research was to determine optimal N rates for winter canola grown under irrigation in Central Washington.

Materials and Methods

Two Cultivars of Canola: Athena and Rapier

Fall Planted (Table 1)

Sprinkler irrigated based on soil moisture status

Plots (4.8m x 9.1m) : Randomized block design
Four replicates
Five N rates (urea)
Ranging from very low to high

Yield: Harvested center one-third of each plot
Wintersteiger plot combine
Seed collected and weighed
kg/ha and kg/m^3 (bu weight) determined
Seed sub sample saved for oil analysis
(oil data not presented)

Data Analysis with P. C. SAS

Table 1: Planting and harvest dates for winter canola grown under 5 different N rates under sprinkler irrigation.

Planting and Harvesting Dates		Treatment #	N Rate 2007/8	N Rate 2008/9
Crop Year	Date		kg/ha	
2007/8 Planted	5-7 Sept.	1	56	0
2007-8 Harvested	20 July – 1 Aug	2	168	56
		3	224	168
2008-9 Planted	4 Sept	4	280	224
2008-9 Harvested	16 – 28 July	5	336	280

Results

Yield, both in terms of the per hectare yield and bushel weight, were highly influenced by year and cultivar (Table 2). Thus, data were analyzed by year and variety to further evaluate N treatment effects.

Table 2: Levels of significance for Winter Canola yield from 2008 and 2009 plantings using the varieties Athena and Rapier under 5 different nitrogen fertilizer rates.

Parameter	Degrees of Freedom	Bushel Weight kg/m^3	Yield kg/ha
Year (Y)	1	0.0001	0.0001
Cultivar (C)	1	0.4236	0.0001
Nitrogen Treatment (N)	4	0.0753	0.8631
Y*C	1	0.0328	0.1271
Y*N	4	0.1878	0.9000
C*N	4	0.6847	0.9372
Y*C*N	4	0.2185	0.3435

Neither yield not bushel weight differed with N fertilizer rate for Athena or Rapier in 2008 or 2009 (Figures 1 & 2)

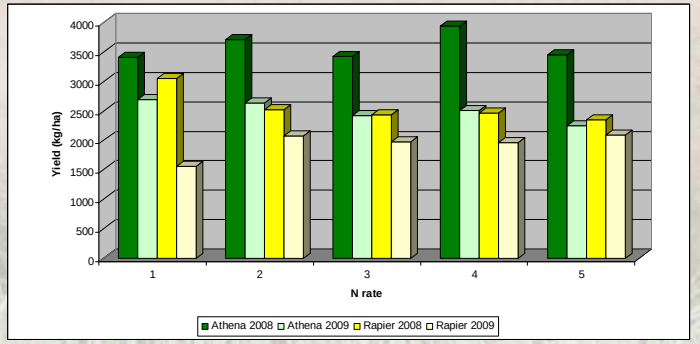

Figure 1: Average yield of two irrigated winter canola varieties over two growing seasons with 5 different N fertilizer rates, from low to high (1 – 5). Yield was not significantly different with N fertilizer rates.

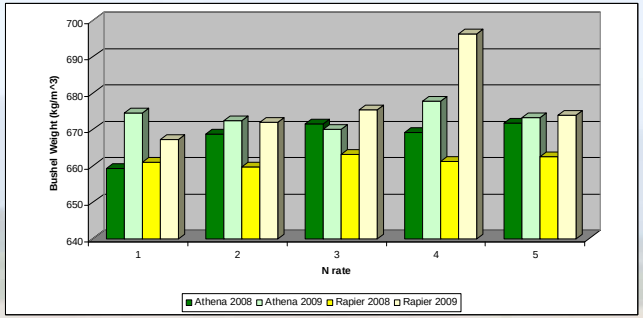

Figure 2: Average bushel weight of two irrigated winter canola varieties over two growing seasons with 5 different N fertilizer rates, from low to high (1 – 5). Yield was not significantly different with N fertilizer rates.

Conclusions/Management Implications

Canola yielded as well with no fertilizer N added as with high rates.

Planting canola after early potato offers an opportunity to produce a crop and utilize any N remaining in the soil in irrigated Pacific Northwest growing areas.

Acknowledgements

This project was funded with funds for bio-fuels research from the state of Washington and partial support from the Washington State University Agricultural Research Center. Thanks to Tanya Winkler for poster composition, Kelly Whitley, Jaimi Marden, and Kyle Bair for their help in 2008. For those of you who did not know – Bob Stevens has retired.