In summary, canola appears to be the most viable biofuels crop in western Washington, but still faces serious obstacles, including lack of local processing capacity, and exclusion zones where canola cannot be grown because of risk of contamination of brassica seed crops. Although not a biofuel use, organic production of canola could yield organic canola oil for food and organic canola meal for dairies, beef cattle, and poultry that is limited in supply and could command a high price.

Canola and Camelina Diseases

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In 2011 our project focused on identifying potential canola (primarily *Rhizoctonia*) and camelina (downy mildew) diseases in WA, and screening for resistance to those pathogens.

Canola: Previous with resistance to Rhizoctonia diseases has been done with *R. solani* AG 2-1, and little is known about the virulence of two other groups common in the PNW: AG-10 and *Ceratobasidium* spp. We screened 20 canola cultivars to test for resistance/tolerance to soils inoculated with the diseases. None of the cultivars exhibited resistance to AG 2-1; all were killed in the experiment. One *B. napus* hybrid (Visby) showed high level of tolerance to damping-off from *R. solani* AG 8, AG 10 and the binucleate *Rhizoctonia*, while two genotypes (Amanda and Baldur) exhibited high level of tolerance to *R. solani* AG 10.

Camelina: Downy mildew of camelina was observed in fields in 2010 and 2011, with an incidence of less than 5%, but it may be impacting yield. We planted seed infested with downy mildew, and found that infected plants resulted from infested seed, indicating that the disease is seed transmitted. The pathogen was confirmed as *Hyaloperonospora camelinae*. Growers should use certified or tested seed, and seed treatment with mefanoxam may control the disease.

We will continue to monitor and investigate canola and camelina diseases in 2012. We will verify the identity of pathogen on camelina and relation to *H. parasitica* (downy mildew of Brassicas) with DNA work, and confirm if isolates from camelina are cross-pathogenic to canola.

Fig. 1. Flowering stem of camelina infected with downy mildew (*Hyaloperonospora camelinae*).

Winter Canola Rotation Benefit Experiment

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A winter canola rotation benefit study was initiated in August 2007 at the Hal Johnson farm located east of Davenport, WA. Average annual precipitation at the site is 18 inches. The traditional 3-year winter wheat (WW)-spring wheat (SW)-no-till fallow (NTF) rotation is compared to a 3-year winter canola (WC)-SW-NTF rotation. All crops are produced using direct seeding. Experimental design is a randomized complete block with six replications (total area per site is 0.9 acres). Fertilizer rate is based on soil test. All crops are planted and fertilized with a no-till hoe-opener drill and grain yield is determined using a plot combine. In addition to grain yield, soil volumetric water content is measured in all plots just after harvest in August, in mid March, and again after grain harvest.

Excellent stands of WC were once again achieved from mid August 2010 planting into no-till summer fallow. The WC plants survived the winter in good shape and produced a revised seed yield of 2910 lbs/acre in 2011 (Fig. 1 and Fig. 2). This is, by far, the best WC seed yield obtained during the first four years of the experiment. Winter wheat planted into no-till fallow produced 115 bu/acre in 2011; the highest WW yield so far obtained (Fig. 1).

One very interesting phenomena in 2011 was that SW after WC produced a significantly higher 67 bu/acre compared to 60 bu/acre after WW (Fig. 1) despite the fact that there were no differences in soil water content after harvest of WC and WW in August 2010. These data show that WC provided a significant rotation benefit to spring wheat compared to WW that was not related to