(14.36%), flax (14.90%) and canola (12.69%) did not differ significantly from one another but were significantly greater than wheat (5.50%) and *Arundo* (6.70%) which did not differ from one another. Carbon to nitrogen ratio for these crops was as follows: camelina (109:1), flax (72:1), canola (117:1), wheat (39:1) and *Arundo* (25:1). Overall fiber trends were similar between camelina, flax and canola, which are in the families, Brassicacea and Linaceae (flax), but variable from wheat and *Arundo*, which are in the Poaceae family. High cellulose content in camelina, flax and canola suggest that these varieties have good potential as cellulosic feedstocks, but the high lignin content indicates that cellulose would be difficult to extract from these crops. However, plant residues with a high C:N could be ideal for soil amendments and carbon sequestration. Lower contents of complex compounds in wheat and *Arundo* may have resulted from the presence of grain in the wheat sample and immature *Arundo*. A slight indication that management practices or location could impact levels of carbon compounds in plant residues was also noted in preliminary findings. Further research on the nature and properties of specific lignin and cellulose compounds in these crops would be necessary to fully understand their potential uses and hindrances. Understanding the biochemical make up of these products can allow producers and researchers realize the potential uses and overcome difficult production barriers.

Oilseed Crop Fertility

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A project was established as part of the WA State Biofuels Cropping Systems Program (see http://css.wsu.edu/biofuels/final_report_2008/), to 1) Develop baseline growth and nutrient uptake curves to characterize major oilseed crop nutrient needs; 2) Develop nutrient (primarily nitrogen and sulfur) management recommendations for major oilseed crops that maximize oil yield and quality, 3) Disseminate information on oilseed crop fertility management to growers in extension bulletins, and to the scientific community in peer-reviewed journal articles and 4) Evaluate phosphorus requirements of oilseed crops, and rotational benefits of oilseed alternatives on subsequent crops of wheat.

Winter canola was planted on chemical fallow at Davenport and Pullman in fall 2007. Treatments consisted of a range of nitrogen rates (0 to 160 lb N/acre in 40 lb increments with 15 lb S/acre) applied in treatments replicated four times in a randomized complete block experiment design. Winter canola failed to establish at the Pullman location due to lack of moisture. At Wilke, establishment was acceptable but the stand suffered major damage due to a June 2008 frost and was abandoned. Spring canola was sown on the winter site near Pullman; spring canola and camelina were sown on a new site near Davenport. Camelina failed to establish. Spring canola was grown to maturity and harvested to determine seed yield, oil yield and oil quality (oil yield and quality analysis is pending).

An additional P rate study was conducted north of Kamiak Butte to determine phosphorus requirement for oilseed crops (canola, camelina, and flax) compared to lentil in 2008.

There was a curvilinear response to N rate for spring canola at both locations. At both locations, the slope of the response indicated 4.5 lb seed yield increase with each lb of nitrogen applied. There was an 87 lb/ac (15.5%) seed yield response to sulfur at Davenport but no response at Pullman. Nitrogen application timing did not influence yield. There was no significant effect of P rate. This may be a result of elevated residual phosphorus levels, crop growth limited by water availability, or increased crop phosphorus uptake efficiency for all species.

Composition of Cereal Crop Residue in Dryland Cropping Systems

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Cereal crops and cultivars vary in their composition, and also in their decomposition and contribution to soil organic matter. Large quantities of cereal crop residue that decompose slowly present an obstacle to the adoption of minimum till or no-till seeding, conversely lower quantities of crop residue that decompose more rapidly may leave the soil vulnerable to erosion by wind and water. Decomposition of cereal crop residues is associated with fiber and nutrient content, and growers have observed differences in decomposition among cultivars; however, little information exists on their residue characteristics. Cultivars of spring barley, spring wheat, and winter