wheat grown at four locations in eastern Washington over two crop years were analyzed for neutral detergent fiber (NDF), acid detergent fiber (ADF), acid detergent lignin (ADL), C, and N contents, and this information related to straw hemicellulose, cellulose and lignin content. Acid detergent lignin was highest in spring barley (9.9%), and least in winter wheat (9.2%) and hard white spring wheat (9.5%). Fiber components and nutrient content varied by location, precipitation zone, and cultivar. Residue in the drier year of the study had lower NDF, ADF, ADL, C, and C:N ratio. Foot-rot (*Fusarium* spp.) resistant winter wheat cultivars had higher NDF, ADF, and ADL than susceptible cultivars. The analysis used to determine fiber content of straw is expensive and labor intensive. In 2009 we are developing near-infrared spectroscopy (NIRS) as a rapid, non-destructive, chemical-free method to predict residue fiber and nutrient content. Future research will also include residue tannin analysis to help predict straw decomposition. Fiber and nutrient characteristics of residue from wheat and barley cultivars currently produced in the Pacific Northwest can be used to predict residue decomposition in cropping systems that conserve soil and water, and enhance build-up of soil organic matter.

From the Genetic Model *Arabidopsis thaliana* to the Oil-seed Crop *Camelina sativa*

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The Neff lab studies how external light signals and internal hormone-regulated pathways control seedling development in the model genetic organism *Arabidopsis thaliana*, a plant in the brassica family. We have recently begun translating some of the genetic knowledge gained from these studies for manipulating seedling and adult growth in the closely related oil-seed crop *Camelina sativa*. To do this we have employed and improved previously published methods for transformation of genetically engineered DNA. Using this technique we have initiated a genetic screen for gene-over-expression and gene-deletion mutations that modulate the elongation of seedlings as they transition from growth in the dark (under the soil) to growth in the light. We have also initiated genetic, physiological and biochemical studies to further characterize a family of DNA binding proteins that regulate plant size. Our initial studies suggest that over-expressing a unique mutation in one of these family members leads to larger seeds and taller, more robust seedlings; both traits that may lead to enhanced stand establishment and yield in dry-land cropping systems. In addition to continuing to study the activity of these and other genes in *Arabidopsis* and *Camelina*, we are also working on identifying similar genes in wheat and barley with the ultimate goal of generating taller seedlings that still maintain semi-dwarf growth as adult plants.

Camelina Survives Bitter Cold Air Temperatures

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Lind experienced very cold air temperatures and high winds in December 2008. During the 3rd week of December, there was a full day of high wind (average wind speed 27 mph with gusts to 38 mph) where the maximum air temperature for the day was 8 degrees F. There was about two inches of snow cover on the soil prior to the windstorm, but afterwards more than 80% of the ground was bare. Then, on the evening of December 16-17, air temperatures dropped to a low of –10 degree F and stayed below 0 degree F for 12 hours.

Following this bitterly cold night with essentially no snow cover, we conducted "grow out" tests of camelina sampled in the field. We initially feared that the cold had killed the camelina, as the cotyledon leaves of plants appeared to be dead. However, after more than a week on the lab bench, camelina sprouted its first true leaves (Fig. 1). Camelina in the field survived the cold. With one year of data from an extremely cold winter event without snow cover, we feel that camelina (at least the Calena variety) may have as much cold tolerance as most winter wheat varieties.

Fig. 1. First true leaves of a camelina plant emerge after more than a week wrapped in a wet towel on a laboratory bench. The plant was collected from a field without snow cover following a night of –10 degree F air temperature. Such preliminary observation indicates that camelina has excellent cold tolerance similar to that of winter wheat.