exhibiting different directional growth angles. The single tap root exhibits greater potential seedling susceptibility to ammonium toxicity from banded fertilizer. Depth of rooting, water and N extraction appears to be similar to that of cereal crops, to depths of at least 4 ft for winter and spring canola. Tap root thickening occurs in winter canola from 1 inch wide at base, tapering to 1 mm diameter at 1 ft depth, potentially creating vertical macropores for postharvest water infiltration and soil water storage. Oilseed root hairs are longer, but less dense than wheat, flax or lentil, suggesting oilseeds may have greater ability to extract soil immobile nutrients such as ammonium, phosphate and potassium.

A Comparison of Oilseed and Grass Crop Residue Silicon and Fiber Composition and Impacts on Soil Quality

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Arid and semi-arid agronomic regions that have adopted conservation management practices, such as reduced tillage, may be prone to soil crusting. Surface crusting is predominantly caused by the combination of raindrop impact and excessive Si in the soil. It can reduce water infiltration, enhance runoff & erosion, and interfere with seed germination. Structural components (e.g. lignin and silicon (Si)) vary between crop types. Grasses such as wheat tend to have higher levels of Si and lower amounts of lignin when compared to oilseeds. When such residue is left on the soil surface these components, specifically Si, may contribute to soil crusting. The main goal of this research is to characterize specific structural components in crop residue from several species of oilseed and grass crops and to understand the potential of such residues to resist degradation and impact soil crusting.

Wheat (*Triticum aestivum* L.) and canola (*Brassica napus* L.) residues from field and greenhouse experiments were analyzed for neutral detergent fiber (NDF), acid detergent fiber (ADF), acid detergent lignin (ADL), total carbon (C), nitrogen (N) and Si. Fiber and Si varied among crop types and an inverse relationship between ADL and Si was found. Wheat had high Si (1.2 g/100g) and low ADL (10.8%), whereas canola had high ADL (13.0%) and low Si (0.1 g/100g).

Table 1. Fiber, C:N, and Si amounts for wheat and canola residues.

Crop	%NDF	%ADF	%ADL	C:N	Silicon (g/100g)
Wheat	85.5 a	70.0 a	10.8 b	178.8 a	1.2 a
Canola	76.7 b	61.4 b	13.0 a	117.0 b	0.1 b

In order to compare the effects of rotation history, a soil incubation was conducted with two soil types. The first soil was collected from a field traditionally grown in a winter wheat-fallow rotation and the second soil was collected from a spring canola-fallow rotation. Initial values of soil Si were significantly higher in the soil collected from the wheat field when compared to the canola field. Three rates of silica solution (SiO_2) representative of amounts that would be found in wheat and canola residues were added to each soil type. High amounts of Si solution and soil Si had a positive effect on soil crust thickness (Fig. 1)

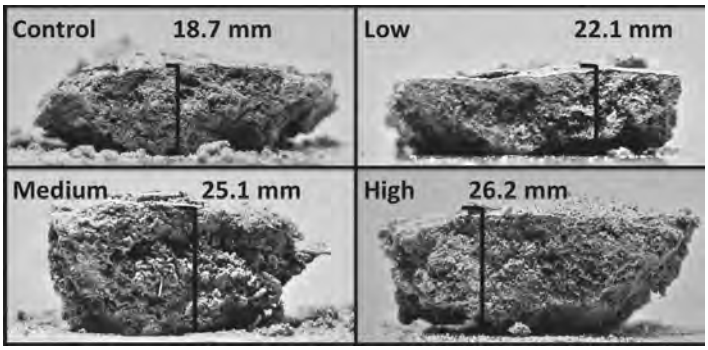

Fig. 1. Visual representation of crust thickness for each treatment.

and surface resistance (Fig. 2), suggesting that crops high in Si have the ability to contribute to soil crusting. Therefore, it may be beneficial to consider crops with lower amounts of Si when planning crop rotations in areas where soil crusting can be a concern. Further research on this topic will include conducting a field survey on comparable fields this summer.

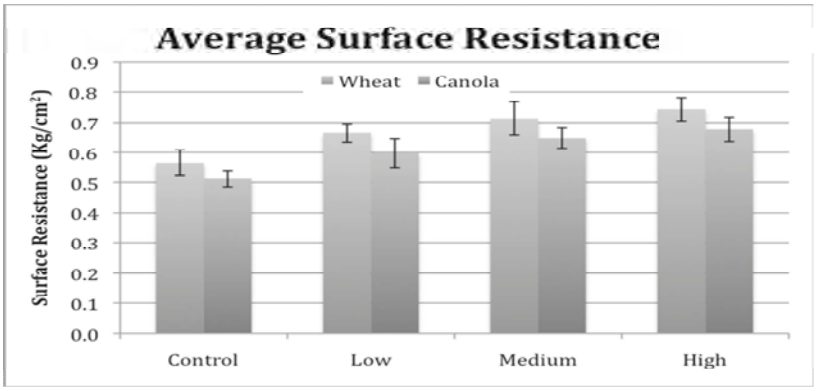

Fig. 2. Average surface resistance of wheat and canola soil per treatment.

Emerging Diseases of Canola and Camelina in the Pacific Northwest

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Blackleg, caused by the fungus *Leptosphaeria maculans*, is the most economically important disease of canola in North America and world-wide. It is endemic in the Midwest, southern US and the prairie provinces of Canada. However, Washington and Idaho have been considered blackleg free, which gives them an advantage in producing disease- free seed. The lack of the disease has also greatly simplified canola breeding for the northwest compared to other areas. The situation will change radically if the disease becomes established. The disease is also a big part of the reason that canola production has been banned from key brassica seed crop production areas of the northwest, like Skagit Valley and parts of the Columbia Basin and Willamette Valley. If the disease moved to those areas, it would be economically devastating.

In Aug. 2011, we detected the disease in samples from Bonner's Ferry in N. Idaho. All putative blackleg isolates were identified as *L. maculans.* Koch's postulates were performed in the greenhouse in Manitoba on susceptible varieties, with cotyledon inoculation and all isolates gave a high level of disease, showing a high level of virulence. Additional testing will be done to determine the race structure of the isolate. Growers should become aware of the dangers of planting non-certified seed that has not been tested with a phytosanitary certificate, especially if seed is traded among growers or imported from Canada.

A downy mildew disease was observed in most camelina fields and breeding plots monitored in 2010, 2011 and 2112. This has been the only prevalent disease or pest problem noted in camelina production in recent years. Efforts to determine the causal agent and epidemiology of the disease were therefore undertaken. Symptoms were not observed until plants were flowering. Symptoms often included dark colored stunted branches or racemes that developed poorly and sometimes white sporulation (figure below). We suspected the pathogen could be a downy mildew, performed DNA assays which confirmed that the causal pathogen was *Hyaloperonospora camelinae.* To determine whether *H. camelinae* is a seed-transmitted pathogen, seeds collected from infected plants were planted in growing mix and grown in a growth chamber. Disease symptoms were observed in 96% of the seedlings grown from seed from infected plants and only 3% of the seedlings grown from seed from asymptomatic plants. This indicates that *H. camelinae* is a seed-transmitted pathogen. Seeds treated with mefenoxam, a fungicide specific for Oomycetes, significantly reduced the incidence of the disease.