Residue Decomposition of Canola Cultivars

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Little is known about the residue characteristics of spring and winter canola cultivars, and how those factors affect decomposition and soil quality. Winter canola residue was collected from Univ. of Idaho Canola Variety Trials at Odessa, WA (irrigated site), Moscow and Genesee, ID and spring canola residue was collected at Davenport and Colfax, WA and Moscow, ID after harvest in 2011 and 2012. Residue was analyzed for neutral detergent fiber (NDF), acid detergent fiber (ADF), acid detergent lignin (ADL), carbon (C) and nitrogen (N). The goal of this research was to quantify the cultivar traits and factors controlling residue decomposition of canola cultivars currently or potentially planted by growers in the Pacific Northwest. Stalks of canola residue contained higher NDF, ADF, ADL and C/N than litter (small stalks, leaves, pods); and spring canola residue contained higher NDF, ADF, ADL and C/N than winter canola residue (Fig. 1; $P<0.05$).

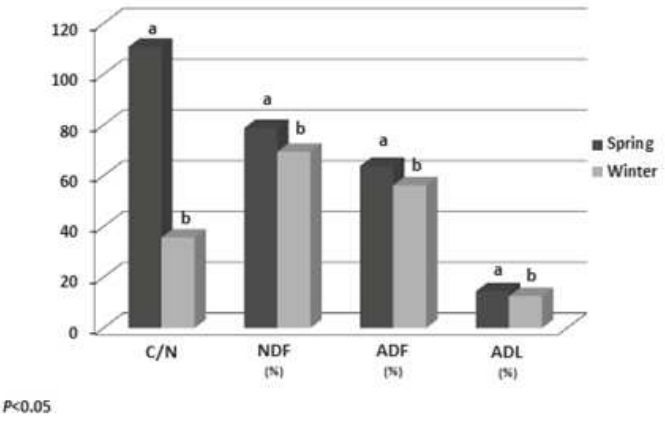

Fig. 1. 2011-12 spring and winter canola residue fiber components, C and N

Higher NDF, ADF, ADL and C/N are indicators of slower decomposition. In general, when moving from lower rainfall locations to higher rainfall, canola plant fiber, C and N increased ($P<0.05$), indicating residue from higher rainfall locations would be expected to decompose more slowly. Winter and spring cultivars vary in their fiber, C and N components, and further investigation is needed to confirm those results. Characterization of root residues and laboratory decomposition studies are ongoing. We believe this to be the first work to characterize canola root and shoot residue composition and decomposition among types, locations, cultivars and years. The data collected will be used to better predict residue decomposition in the field, examine canola cultivars for their contributions to soil fertility and soil quality, and assist growers in identifying traits for residue management. Information on residue traits and decomposition will be useful in developing alternative uses for canola residue, such as biofuel. Marketing opportunities for oilseed crops are increasing, and information on residue decomposition will be useful to growers who wish to incorporate canola into their rotations in both conventional and conservation farming systems.

Oilseed Root Characteristics: Implications for Water and Nutrient Management

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Canola and camelina have distinctly different root systems compared to the cereal crops grown in the PNW. Some of these differences should be considered when designing soil and fertilizer management schemes for maximizing water and nutrient use efficiencies. Root morphology and activity analysis was accomplished with in-soil digital scanning, and root excavation and monolith construction at Ralston, WA, and pre-plant vs. post-harvest soil water and nitrate analysis of extraction depths at Wilke and Pullman. A primary difference in the root morphology can be seen immediately following germination. The oilseeds initiate one main tap root radical with vertical directional growth, and horizontally-oriented lateral branches. In contrast, wheat and barley exhibit a multiple seminal axes root system with each axis