also included as a check. There are 40 plots (3 crops x 3 stubble management practices + check x 4 replications). Measurements include: grain yield, diseases, soil quality assessment, soil water dynamics and weeds. Excellent stands and yields of spring barley direct seeded into 10,000 lb/acre winter wheat stubble have been consistently achieved. Winter canola stands, weed pressure, and grain yield have been somewhat hampered by direct seeding into barley stubble compared to burning. Disease pressure has been low except for Pythium root rot of winter canola in all residue treatments. Differences in soil enzyme activity and microbial analyses between burn/plow and the direct seed treatments become more apparent each year. Farmers and urban dwellers are closely following this study because direct seeding into heavy residue with a diverse 3-yr crop rotation eliminates smoke emissions and air quality concerns created by stubble burning.

POLYMER SEED COATINGS FOR LATE FALL DORMANT PLANTING OF CEREALS

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Fall or dormant seeding is a management practice where spring crops are sown in the fall instead of March or April. The list of benefits of dormant seeding include faster spring growth to compete with Russian thistle and other broadleaf weeds, reduced heat and water stress, and higher yields. Dormant seeding is not without risks. Warm temperatures after late-fall seeding may result in emergence of spring wheat seedlings that may easily winter kill. In this study at Lind, we are evaluating hard red spring wheat (Scarlet), soft white spring wheat (Alpowa), spring barley (Baronesse), and soft white winter wheat (Eltan) planted in late November with and without polymer seed coating. The polymer "Extender^{TM}" has been developed to prevent seed from imbibing water until soil temperatures begin to warm in late winter - early spring. The trial was planted in the last week of November in both 2001 and 2002 and again in mid March in 2002 and 2003 (planned). The four cereal entries are planted with and without the polymer coating into undisturbed spring wheat stubble with a Cross-slot drill equipped with a cone seed feeder. Planting rate for all entries is 70 lbs/acre and fertilizer rate is 40 lbs N, 10 lbs P, and 10 lbs S per acre. Experimental design is a randomized complete block with four replications.

For the 2002 crop year, plant stand establishment for all cereal entries was significantly reduced when planted in late November compared to mid March regardless of whether or not seed was coated with the polymer (Fig. 1a). Scarlet was the only entry that had better emergence from November planting without the polymer compared to with the polymer. The polymer had no effect on stand establishment on any of the four cereal entries from the mid-March planting (Fig. 1b). Within cereal entries, Eltan planted in late November without the polymer had significantly greater grain yield than late November planting with the polymer as well as mid March planting (both with and without the polymer) (Fig. 1b). For the other entries, there were no within-cereal grain yield differences as affected by planting date or polymer coating for Scarlet, Alpowa, or Baronesse (Fig. 1b). This project is ongoing.

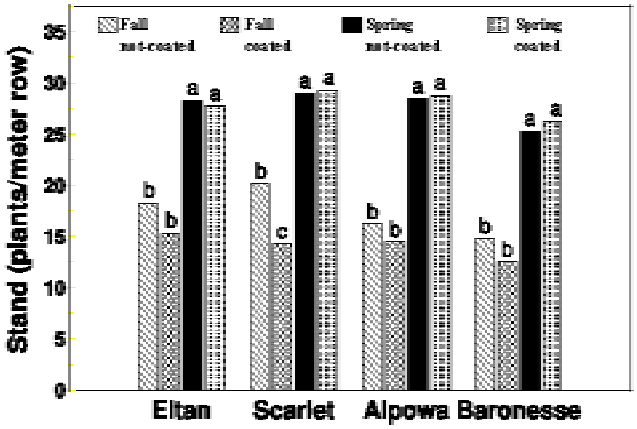

Figure 1a. Stand establishment of four cereal cultivars in 2002 with and without polymer seed coating planted in late fall (dormant seeding) and early spring.

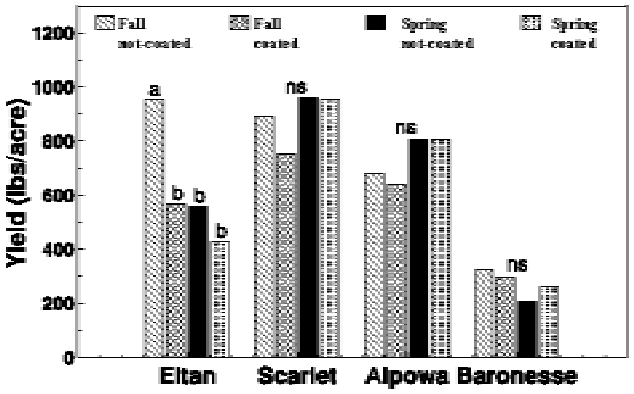

Figure 1b. Grain yield of four cereal cultivars in 2002 with and without polymer seed coating planted in late fall (dormant seeding) and early spring.

*FALL FERTILIZATION FOR SPRING WHEAT PRODUCTION IN DIRECT SEED ANNUAL CROP ROTATIONS

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The objectives of this research are to evaluate the benefits of fall fertilization and the impact on nitrogen movement in soils and the impact on spring wheat establishment, yield, and quality. Two on-farm research projects were initiated in the fall of 2001, one, six miles north of Sprague WA, and the other, five miles south of Lamont, WA both located in the 10 to 12 inch rainfall area. Plot areas were fall fertilized using a low disturbance 'Blue Jet' coulter applicator. Treatments at both locations were fall fertilized with the low disturbance applicator (fall LD), spring fertilized with the low disturbance applicator (spring LD), fertilizer was dribbled on the soil surface (spring dribble), and spring fertilized with high disturbance one or two pass fertilizer/seed system (spring HD).

Nitrogen fertilizer applied in the fall with the LD applicator did not move past the first foot of soil by spring (Figure 1). Cooler soil conditions at fertilization, combined with less than normal precipitation limited nitrogen movement into the profile. There were no significant differences in wheat seedling establishment between the four treatments. At Sprague, wheat yield, test weight and protein were not significantly different between treatments. At Lamont, wheat yield for fall LD was significantly greater than spring LD or spring dribble but not spring HD. The spring HD treatment had significantly greater protein and lower test weight, and the spring

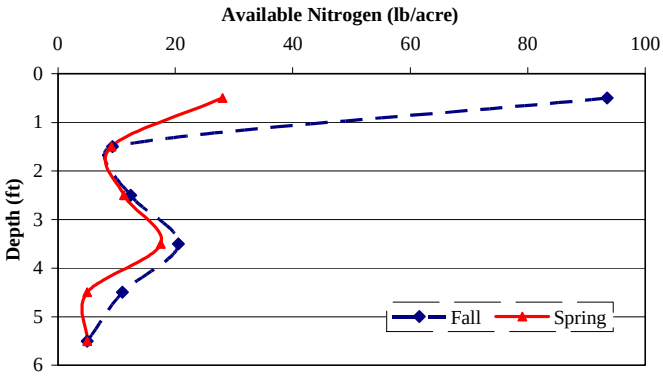

Figure 1. Available nitrogen fertilizer in the spring of the year after fall fertilization and prior to spring fertilization in an on-farm trial near Lamont, WA.

*indicates full article available on the Web: http://css.wsu.edu