Heaven Hills is approximately 7500 acres, with half in winter wheat and half in summer fallow. Given that a farmer can cover about 160 acres per day with a primary tillage implement, it takes approximately 24 days to complete primary spring tillage. If the farmer waits until mid June to begin primary spring tillage, substantial evaporative soil loss may occur on non-tilled ground by mid July.

Data from our study also suggest that farmers in the extreme dry western region of the Horse Heaven Hills should practice NTF in all but very wet years as they rarely have adequate seed-zone water for late-August planting, even with TF. The widespread practice of NTF would dramatically reduce wind erosion and likely save on operating costs compared to TF. In addition, farmers committed to practicing NTF in the long term could receive monetary payments from federal farm programs that reward environmental stewardship.

Residue Protects Emerging Winter Wheat Seedlings from Rain-Induced Soil Crusting

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Farmers in the low-precipitation region of the Pacific Northwest practice a 2-year tillage-based winter wheat- summer fallow rotation. Winter wheat is planted deep into moisture in late August or early September and seedlings emerge through 4 to 6 inches of dry soil cover. Rain showers that occur after planting create fragile soil crusts that the emerging first leaf often cannot penetrate. A rainfall simulator was used to conduct a 5 -factor factorial laboratory experiment to evaluate emergence of WW planted deep in pots. Factors were: (i) rainfall intensity and duration (0.05 inch per for 3 hours, and 0.10 inch per hour for 2 hours); (ii) timing of rainfall after planting (1, 3, and 5 days after planting + controls); (iii) variety (standard-height vs. semi-dwarf), (iv) residue on the soil surface (0, 750, and 1500 lbs/ acre); and v) air temperature (70^0 and 86^0F). The high-intensity rain caused a 2.3-fold reduction in emergence compared to the low-intensity rain. Emergence improved proportionally with increasing quantities of surface residue (Fig. 1). The standard-height cultivar had four times greater emergence than the semi-dwarf. Air temperature and timing of rainfall had no significant effect on WW emergence. Results show that planting a WW cultivar with long coleoptile and first leaf as well as maintaining high quantities of surface residue to intercept rain drops will enhance WW stand establishment after rain showers to benefit both farmers and the environment.

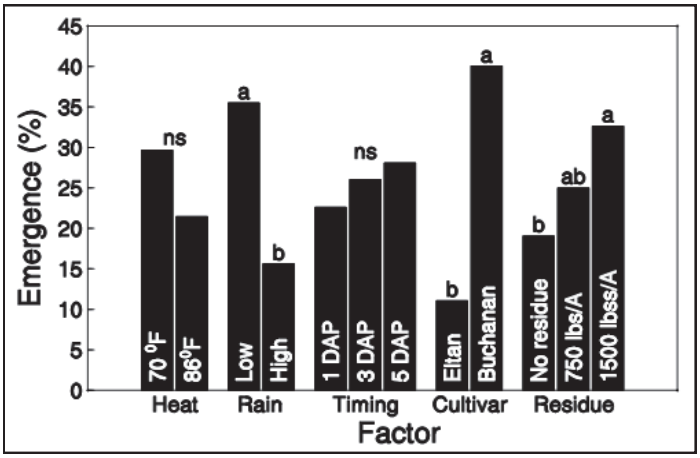

Fig 1. Percent emergence of Eltan and Buchanan winter wheat varieties planted deep into pots as affected by rainfall intensity and duration, residue cover, timing of rainfall, and heat. Data are the average from three runs. Data are combined for the two varieties. DAP = days after planting

No-till Summer Fallow is a Good Fit in the Western Horse Heaven Hills

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Blowing dust from excessively tilled summer-fallowed fields in the Horse Heaven Hills (HHH) is a major air quality concern in the Tri-cities, Washington. We conduct a 5-year on-farm field experiment at two HHH sites to determine the effects of no-till summer fallow, conservation tillage summer fallow, and traditional tillage summer fallow on: i) seed-zone moisture in late August, ii) wheat plant establishment, iii) wheat grain yield, and iv) dust emissions.

Beginning in March 2006, replicated experiments were established on the David Pearson and Mike Nichols farms. The Pearson