hard white winter line OR942504 and the hard white spring variety 'Macon' highly susceptible, which confirmed previous results. Segregating populations were developed by crossing resistant to susceptible genotypes. These populations will be used to determine whether the resistance is heritable (i.e. transmitted from parent to offspring) and for DNA marker analysis in conjunction with disease screening. Two genetic mapping populations are being constructed: 1) KS93U104 X OR942504 (winter types); and 2) Sunco X Macon (spring types). A double haploid population (250 individuals) will be created for the winter population, whereas recombinant inbred lines (250 F_5 developed using single seed descent) will be developed for the spring population. Both populations will be used for disease assessment and DNA marker analysis. KS93U104 also was crossed to Sunco to determine if the sources of tolerance in each genotype differ. If the tolerance to Pythium root rot identified in these genotypes is genetic in nature, we will identify and utilize DNA markers associated with resistance to rapidly incorporate this trait into adapted spring and winter wheat varieties.

Reduction of Rhizoctonia Bare Patch in Wheat with Barley Rotations

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Fig. 1. Rhizoctonia bare patches, seen here in barley, were mapped using a backpack-mounted global positioning unit.

Rhizoctonia bare patch caused by *Rhizoctonia solani* AG-8 is a major fungal root disease in no-till cropping systems. In an 8-year dryland no-till cropping systems experiment near Ritzville, Washington, Rhizoctonia bare patch first appeared in year 3 and continued unabated through year 8. Crop rotation had no effect on bare patch during the first 5 years. But from years 6 to 8, both soft white (SW) and hard white (HW) classes of spring wheat grown in a 2-year rotation with spring barley (SB) had an average of only 6.6% of total land area with bare patches compared to 15% in continuous annual SW or HW (i.e., monoculture wheat). Monoculture HW in patches was damaged or killed by Rhizoctonia before seedling emergence as evidenced by a 40% reduction in plant stand compared to monoculture SW and HW or SW in rotation with SB. In years 6 to 8, average grain yield of both SW and HW were greater ($P<0.001$) when grown in rotation with SB than in monoculture. Although both classes of wheat had less bare patch area and greater grain yield when grown in rotation with SB, monoculture HW was more severely affected by *Rhizoctonia* than SW. Soil water levels were higher in bare patches, indicating that roots of healthy cereals do not grow into/underneath bare patch areas. This is the first documentation of suppression of Rhizoctonia bare patch disease in low-disturbance no-till systems with rotation of cereal crops.

Control of Stripe Rusts of Wheat and Barley

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Stripe rusts of wheat and barley were accurately forecasted in 2004. Wheat stripe rust was severe while barley stripe rust was generally light. Fungicide application was implemented to control stripe rust on both winter and spring wheat crops, which prevented major losses. In Washington State, yield losses were reduced to 1.5% for winter wheat and 3% for spring wheat. High-temperature, adult-plant (HTAP) resistance to stripe rust, which is in most winter wheat and the major spring wheat and barley cultivars, continued to be the most effective and durable type of stripe rust resistance. In 2004, 28 races of the wheat