

***Proposal for 2008-2009
Northwest Columbia Plateau PM₁₀ Project***

Objective 8: **Develop Awareness and Acceptance of BMPs via On-Farm Testing of Improved Technologies in Farmers' Fields**

Title: ***Horse Heaven Hills On-farm Undercutter Evaluation***

Personnel: **Principal investigators: Phil J. Petersen, WSU Extension;
Cooperator: William Schillinger, WSU.**

Project Objectives

To evaluate the effectiveness of the undercutter to maintain surface roughness and residue while maintaining grain yield in the winter wheat-summer fallow cropping systems in the Horse Heaven Hills of south-central Washington using field length on-farm trials.

Recent Accomplishments

This is a new project.

Planned Research

Winter wheat- summer fallow (WW-SF) is the predominant cropping system in the Horse Heaven Hills area of south-central Washington (Schillinger and Young, 2004). In this region approximately 300,000 acres are farmed using a WW-SF cropping system. Soil loss due to wind blown dust is a significant problem in the area due to a lack of sufficient residue and roughness during the summer fallow period. Studies conducted by Schillinger (2001) have shown the use of the undercutter as the primary tillage tool to be an effective management technique in improving the surface roughness and residue cover while maintaining seed-zone soil moisture.

Four on-farm studies of the undercutter will be conducted in the Horse Heaven Hills. The study will consist of two treatments and six replications of each treatment. Plots will be field length with individual plots 60-ft wide. Treatment one will be conventional primary tillage of the grower. This will likely also involve a separate pass to inject either aqua or anhydrous nitrogen into the soil. Treatment two will be a minimum tillage regime using the undercutter plus aqua fertilizer delivery as the primary tillage tool. Depth of primary tillage for both the conventional and undercutter method of primary tillage will be five inches. Subsequent field operations will be rodweeding conducted perpendicular to the direction of primary tillage to control Russian thistle and other weeds as needed.

After primary tillage but before the first rodweeding, flattened verse standing stubble will be measured by clipping and gathering all aboveground residue within a one-meter-diameter ring. Surface residue remaining after deep-furrow seeding in late summer will be measured using the line point evaluation method. Surface roughness will be measured in several areas of each plot using the bicycle chain method. Stand establishment will be measured

approximately 21 days after seeding using a meter-long stick from several areas within each plot. Grain yield will be measured by cutting a full combine header width of each replication for the length of the field (measured distance) and auguring grain into a weigh wagon.

All implements used in the study will be owned and operated by the cooperating farmers. This is the first year of a planned three-year project. Plots will be shown and discussed with farmers at the annual Horse Heaven Hills field tour in June. The data will be evaluated using appropriate analysis of variance procedures. Results from the study will be published in *Wheat Life*, as a WSU Extension Bulletin, and in a refereed journal article.

References cited

- Schillinger, W. F. 2001. Minimum and delayed conservation tillage for wheat-fallow farming. *Soil Sci. Soc. Am. J.* 65:1203-1209.
- Schillinger, W.F. and D.L. Young. 2004. Cropping systems research in the world's driest rainfed wheat region. *Agron. J.* 96:1182-1187.