Proposal for 2006 - 2007
Northwest Columbia Plateau PM\(_{10}\) Project

Objective 8: Develop Awareness and Acceptance of Best Management Practices via On-farm Testing of Improved Technologies in Farmers' Fields

Title: Direct Seeding in Irrigated Agricultural Systems for Wind Erosion Management

Personnel: Principal Investigator: Andy McGuire, WSU Extension; Technician: Sally Hubbs, WSU Extension; Cooperators: Alan Williamson, Eric Williamson, Wes Boorman, farmers; Sam Krautscheid, Krautscheid Consulting, farmer; Brian Lewis, Roger Willis, Pioneer Seed Representatives; Ron Hull, director of the Grant Conservation District; Justin Mount, NRCS agronomist.

Accomplishments
As a result of this project farmers in the Columbia Basin have become more aware of the advantages and challenges of using high residue farming systems on their irrigated fields. We have attracted 75 farmers to two annual workshops which cover various aspects of these systems. A few have begun to implement these systems on their farms, mainly using some type of system where tillage is limited to a strip around the row where the crop will be planted. Between these tilled strips, farmers are leaving sufficient residue to reduce wind erosion, eliminate the need for irrigation to reduce wind erosion, and improved their soils ability to take in applied water. We have recently initiated some on-farm research to determine if tillage can be reduced further on these farms, and we are planning a third annual workshop for December.

Objectives
1. To compare, under irrigation, the effects of direct seeding and current planting/tillage practices on residue levels, crop yield, and management needs.
2. To transfer direct seeding technology to irrigated farming regions of the Columbia Basin.

Recent Accomplishments
1. A meeting was held in early spring with farmers who are using a strip-till system to plant field and sweet corn. Two of them expressed interest in conducting on-farm research on their fields. We would like to compare their high disturbance systems with a lower disturbance system or no-till system. Currently, plans are being made to set out plots on one farm in early May.
2. We conducted a one-day workshop in Moses Lake, on Dec. 7, 2005. Paul Jasa, a no-till specialist from the University of Nebraska spoke for three different sessions during the day and was a wealth of information on how to plant in high-residue conditions. We also had two local farmers speaking about their systems and experience, a soil scientist who talked about soil changes, a speaker on fertilizer placement and then a discussion of how to get
started. Good feedback was received from many of the participants and several requests for the DVD have already been made although it has not been advertised as being available.

3. With 04-05 funds, we used a wind tunnel to compare the threshold friction velocity of soil particle entrainment in plots with and without mustard green manures, in two fields with different soil textures. No significant differences were found, with trends in mustard plots towards higher threshold velocities in one field but the opposite in the other field.

We also carried out comparisons of the soils in the two treatments on three fields. The soil factors measured were b-glucosidase, fluorescein diacetate activity, and active carbon, along with % sand, silt, and clay. There were no significant differences at two of the sites, but at the third site, with the heaviest soil, the two enzyme tests and active C were higher in the mustard plots. Unfortunately, we were unable to measure threshold velocities at this latter site because of surface roughness and therefore the soil factors could not be correlated to threshold velocity.

Finally, we began investigating the soil crusting that we see on sites receiving mustard green manures. A moss in the crust was identified as *Bryum argenteum*, silver tipped moss. Further work on the crusts will be carried out this spring.

**Planned Research**

**Objective 1:** To compare, under irrigation, the effects of high residue farming systems and current planting/tillage practices on residue levels, crop yield, and management needs.

We will conduct 1-2 on-farm, field comparisons of current planting/tillage systems and some form of high residue system. The crop will be field or sweet corn. We will set up randomized, replicated paired field strips with the two treatments and measure surface residues, before and after planting, and crop yield. We will also determine critical management considerations by interviewing cooperating farmers.

At least one trial will take place in the Black Sands area of Grant County, an area particularly prone to wind erosion, and where farmers are keenly aware of the costs associated with wind erosion including supplemental irrigation, increased tillage passes to reform crop beds, and replanting in some cases. Plans are for another trial to be carried out on heavier loam soils in the Eastern side of the irrigated Columbia Basin.

**Objective 2:** To transfer high residue farming systems technology to irrigated farming regions of the Columbia Basin.

This technology, including the knowledge gained through the on-farm research conducted as part of this project, will be transferred to farmers in the Columbia Basin through the following:

1. A high residue farming systems field day. This will give farmers an opportunity to see the equipment used in direct seeding and the crops that have been direct seeded. They will also hear the results of on-farm research, observations from cooperating farmers, and direct seeding basics from the local extension educator. Farmers attending this field day will receive the information they need to begin planning the residue management that they will need to do in the fall to prepare for direct seeding the following year. It will also give us the opportunity to hear from farmers what their concerns are with adopting direct seeding systems in irrigated areas.
2. Three farmers from separate regions of the Columbia Basin will be selected to travel to the Dakota Lakes Research Farm near Pierre, South Dakota. They will be accompanied by Andy McGuire, WSU Ag Systems Educator in the Upper Columbia Basin. Dr. Dwayne Beck, researcher, farm manager, and well known speaker on no-till systems will show us his irrigated system in action. These same farmers will then be expected to speak about their experience at the winter workshop (see #3 below) along with Dwayne Beck, as a primary speaker. Having local farmers that have seen long-term irrigated no-till systems will lend credence to what Dr. Beck presents at the workshop.

3. A high residue farming systems seeding winter workshop. For this workshop we will assist farmers in learning the latest in direct seeding technology through lectures and equipment displays. Experienced researchers will be brought in from areas where farmers are currently direct seeding in high amounts of residue. They will cover those critical management considerations identified in Objective 1 of this project.