LONG-TERM NO-TILL ALTERNATIVE CROPPING SYSTEMS RESEARCH AT THE RON JIRAVA FARM: YEAR 6

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We have completed six years of an ongoing cropping systems research project at the Ron Jirava farm near Ritzville, Washington. Annual precipitation was less than the long-term average in five of the six years. Over the years, annually cropped no-till soft white spring wheat (SW) averaged 35 bu/a with net returns of $8.52 acre/year that was statistically equivalent to the traditional winter wheat - summer fallow system. This is the first economic "good news" for annual cropping in the low-precipitation zone. Spring planted barley, safflower, and yellow mustard showed negative net returns. Rhizoctonia root rot 'bare patch' disease first appeared in 1999 and is an ever-increasing problem. Phase II of the project, that began in the 2001 crop year, includes two 4-year rotations that contain recrop soft white winter wheat. Similar to spring-planted crops, recrop winter wheat failed during extreme drought in 2001. In 2002, recrop winter wheat yields were the same as spring wheat. Downy brome, which was not present for five and six years with continuous spring crops, heavily infested winter wheat in both 2001 and 2002. One referred journal article on disease was published, and two other journal articles (on economics and insects) were submitted in 2002. The long-term cropping systems research project at the Jirava farm will continue for the foreseeable future.

SOIL QUALITY CHANGES WITH NO-TILL MANAGEMENT ADOPTION FOR WIND EROSION CONTROL

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We are characterizing the biological, physical and chemical soil quality parameters as affected by tillage, crop species and management systems. Research is being conducted in conjunction with the ongoing wind erosion projects initiated at various locations representing a range of time into no-till and several precipitation zones. Soil was sampled at sites near Genesee, ID, Colfax, WA, Ritzville, WA and Lind, WA from the 0 to 2 inch and 2 to 4 inch depths in early spring and mid-summer or fall to monitor soil quality changes over time. Soil quality and crop production data will be used to assess the influence of management practices on soil quality.

Organic matter in surface soils increased over time with long-term no-till. Changes in the microbial community and other soil quality parameters such as pH, electrical conductivity and microbial enzyme activity were variable in their response. Soil quality changes during the transition to no-till take longer, are less perceptible and are more variable in the low (150-to 300 mm annual) precipitation zones compared to the higher (300-to 550 mm annual) precipitation zones. The addition of irrigation water to Lind soils appears to shorten the transition time. In these plots, the continuous winter wheat burn plow treatment is showing signs of being degradative to soil quality. The lower disturbance with direct seed has more of an impact on soil quality measurements than surface residue management. Data from these long-term experiments will allow us to better assess the productivity and quality of soils in the dryland cropping region of the Inland Pacific Northwest to aid farmers in the transition to no-till cropping.