quality provided by soil conserving cropping systems. No-till cropping systems might provide a cost effective alternative to large government conservation programs like the Conservation Reserve Program (CRP). However, political support for CRP could continue as growers might perceive it to provide a higher and completely stable return relative to cropping.

Comparing Plateau and Conventional Nitrogen Response Functions for Crop Yield and Quality

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Comparison of nitrogen response statistical functions with maximum yield horizontal plateaus to conventional non-plateau functions showed mixed results. The plateau functions had better goodness of fit for hard red spring wheat protein and yield data in eastern Washington and for yield in Coastal Bermuda Grass hay in Alabama. However non-plateau functions provided a better fit for Alberta, Canada hard red spring wheat yield and protein. These and earlier results suggest that some crops may conform to a plateau pattern for a considerable range. There was also statistical support that protein response to nitrogen in hard red spring wheat may exhibit a finite-plateau in one data set.

These results, which introduce fertilizer response plateau properties for crop quality, as well as crop yield, justify exploration of these functions for a broader set of crops and regions. The findings that plateau functions, when ranked higher, imply lower nitrogen rates has important implications for both private and public decision makers. If these plateau functions accurately describe the nitrogen response process for some crops, decreased fertilizer rates will also help protect water from nitrogen leaching and runoff.

Future research should extend comparisons of plateau and non-plateau yield and quality nitrogen response functions to other crops and regions. These analyses could also broaden the scope of mathematical functional forms utilized. Finally, future work should seek formal statistical tests including possible generalized log likelihood ratios for comparing the type of functions used in this study.

Broadleaf Incorporation into an Intense Direct Seeded Cereal Rotation

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A series of on-farm tests were carried out over a 4-year period near Wilbur, Washington in a 12-inch precipitation zone. Tests were designed to better understand the value of mustard as an alternative crop in an intense cereal grain cropping rotation under direct seed conditions in the dryland cropping region of eastern Washington. The two treatments: spring barley and yellow mustard, were seeded with a Flexi-Coil 5000 direct seed drill on 12-inch row spacing on ground that had an intense cereal grain history. The treatments were harvested and the yield and market price was collected. Subsequent spring cereal crops (wheat or barley) in the study were direct seeded with the same drill. Cereal crops following each treatment were harvested and the yield; grain quality, and market price were collected. The trial is a randomized complete block design with 4 replications.

Mustard yielded less than barley averaging 647 lb/ac compared to 1,640 lb/ac. Mustard as the previous crop had 82% less weeds, and had greater amounts of nitrogen remained in the top 1-foot. Little difference was detected in the subsequent cereal crop production following either barley or mustard. Cereal following barley produced the greatest yield at 1,854 lb/ac compared to 1,625 lb/ac following mustard. However, the yield differential varied over duration of the study. Mustard followed by cereal had the highest 2-year total return at $186/ac compared to
only $175/ac for barley followed by cereal; however these differences varied among years. In conclusion mustard has value as alternative crop in an intense cereal grain cropping rotation in the dryland cropping region of eastern Washington. Over the duration of this study, mustard in rotation produced $11/ac more gross economic return than barley included in rotation. However gross economic return is both a function of crop production and market price.

*Glyphosate and Diesel Price Changes Benefit Conservation Tillage

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Using 2005 versus 1998 input prices for the economic analysis of a winter wheat-summer fallow (WW-SF) tillage system experiment at Lind strengthened the relative profitability of two conservation tillage systems compared to traditional tillage. Sharp increases in diesel prices by 2005 penalized the traditional tillage (TT) WW-SF system due to more diesel consumption. However, all three WW-SF systems in this experiment used fairly similar quantities of diesel. In areas where zero-tillage direct-seeding is feasible, relative cost savings would be even greater. The conservation tillage systems consumed more glyphosate herbicide, but that cost was cushioned by a decline in glyphosate prices. Use of aqueous NH₃-N instead of anhydrous NH₄-N also favored the conservation tillage systems as aqueous NH₄-N experienced a more moderate price increase between 1998 and 2005. Using the same N fertilizer source for all three tillage systems would have narrowed the profitability advantage for the conservation tillage systems, but they would have still remained significantly more profitable than TT. The updated economic results in this comparison provide strong evidence for the relative profitability of conservation tillage, such as those using the undercutter implement, for winter wheat-summer fallow farming in low precipitation regions of eastern Washington under current economic conditions.

*How Do Government Crop Subsidies and Crop Insurance Influence the Profitability of Conservation Cropping Systems?

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The purpose of this research was to examine the effects of government subsidies and crop insurance on the relative profitability of conservation and conventional dryland cropping systems in arid eastern Washington. Special attention is devoted to the direct payments, countercyclical payments, and loan deficiency payments (LDP’s) included in the 2002 Farm Bill. Even with the inclusion of government subsidies and crop insurance, none of the six annual no-till crop rotations in the low-precipitation Phase II (2001-2004) of a Ritzville experiment generated sufficient returns to cover total costs, nor did any approach the profitability of the winter wheat-summer fallow (WW-SF) which averaged $16.93 per rotational acre with subsidies and insurance. During 2001-2004, subsidies and insurance boosted the highest ranked annual no-till crop rotation, soft white spring wheat-spring barley (SWS-SB), by $24 per rotational acre, increased the lowest ranked soft white winter wheat (SWW)-SB-yellow mustard (YM)-SWS rotation by $17.26 per rotational acre, but also lifted the traditional WW-SF system by $16.88 per rotational acre. These results reflect the proverb that “a rising tide raises all ships.” A similar comparison for an experiment in the Horse Heaven Hills of Benton County also showed no reversals of rankings between annual no-till hard red spring wheat and traditional WW-SF with and without subsidies and crop insurance.

If Congress reverts to subsidies that are coupled to current production, inclusion of such subsidies would be an essential part of accurate economic comparisons of cropping systems. But present World Trade Organization rules discourage coupled payments. Also, where specific environmental “green payments” are available from state or federal agencies for conservation farming systems, their inclusion in economic assessments would be needed for valid private profitability comparisons. To date, however, most federal farm programs enacted by Congress have been tied to historic or current crop production rather than to environmental practices.