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**Economic Comparison
of No-Till Annual Crop
Rotations to Winter
Wheat-Summer Fallow
in Adams County, WA
2001-2004**

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 EXTENSION



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Economic Comparison of No-Till Annual Crop Rotations to Winter Wheat-Summer Fallow in Adams County, WA, 2001-2004

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Introduction

The search for a soil-saving no-till annual cropping system that is economically viable in arid eastern Washington is a challenging one. In this bulletin, we present comparisons of the production cost, profitability, and income risk of six no-till annual cropping rotations to conventional tillage winter wheat-summer fallow (WW/SF) during 2001-2004. Yield results are based on an experiment conducted from 1997-2004 at the Ron Jirava farm near Ritzville in Adams County, Washington (See figure 1). The site averages 11.5 inches of annual precipitation. A unique aspect of the 2001-2004 results is that no-till soft white winter wheat is included in rotation with no-till spring crops. Furthermore, this bulletin provides summary economic results for 1997-2004 for two no-till spring cereal rotations that were grown during the entire 8-year period.

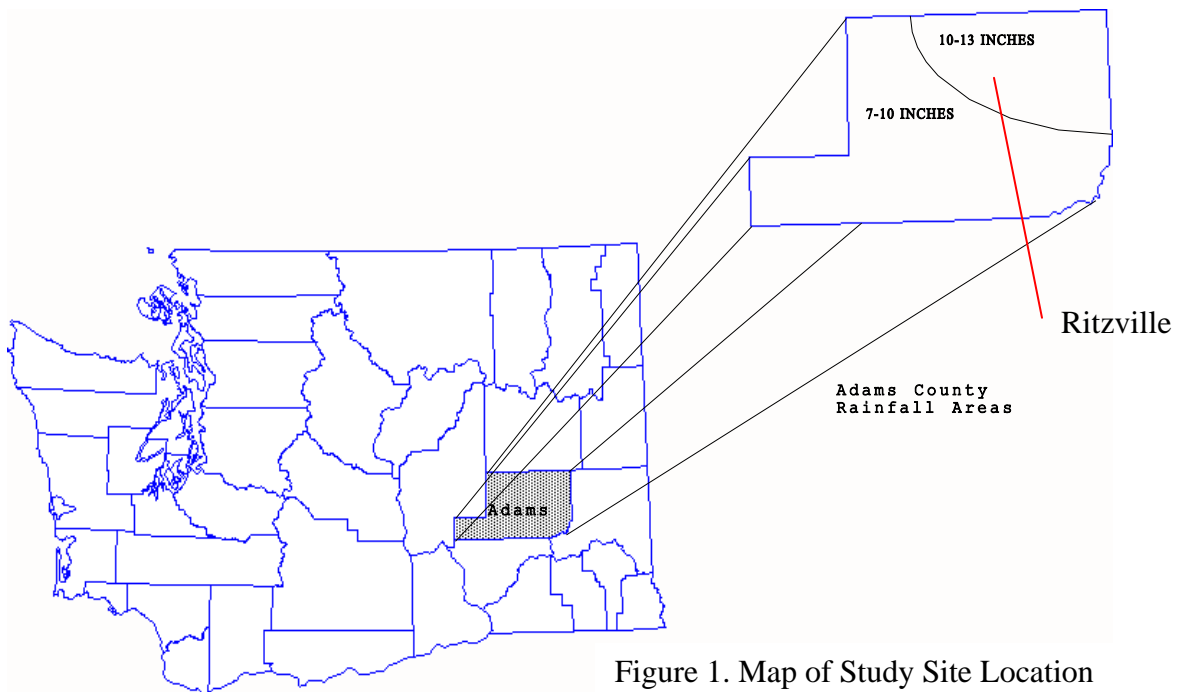


Figure 1. Map of Study Site Location

Results of the first five years of this experiment were reported previously (Juergens, L.A. D.L. Young, H.R. Hinman, W.F. Schillinger. 2003. *An Economic Comparison of No-Till Spring Wheat and Oilseed Rotations To Conventional Winter Wheat-Fallow in Adams County, WA, 2002*. EB 1956E. Washington State University, Pullman, WA.). The 1997-2000 experiment (extended through 2001) included crops of yellow mustard (YM), safflower (SAF), soft white

spring wheat (SWSW), and spring barley (SB) that were grown in three unique rotations. The three rotations were: 4-year SAF/YM/SWSW/SWSW, 2-year SWSW/SB, and continuous SWSW. Economic cost of production budgets were generated for each crop in each rotation in order to determine the economic competitiveness of the three rotations. Economic budgets differ from the more common cash budgets as they include opportunity costs. In this way, they account for all costs of production including those that do not necessarily require any cash outlay by the farmer, such as land rent on land that is owned, interest on owner's equity, and a charge for operator labor. The continuous SWSW rotation averaged the highest annual returns over total costs during 1997-2001 of \$4.90 per rotational acre. The SAF/YM/SWSW/SWSW and SWSW/SB rotations averaged annual returns over total costs of -\$12.73 and -\$4.90 per rotational acre for the same time period, respectively. A survey of nearby WW/SF farmers revealed an average return over total cost for WW/SF of \$8.71/ac for this period. The low returns of the SAF/YM/SWSW/SWSW rotation were attributed in part to soil moisture extraction by safflower, which depressed yields of the following crops. Riskiness of returns over total cost, measured by standard deviation (S.D.), was relatively high for no-till spring crop rotations from 1997-2001. The SWSW/SB rotation had the largest S.D. of \$41.69/ac over the five-year period. The SAF/YM/SWSW/SWSW and continuous SWSW rotations had S.D.'s of \$36.70/ac and \$40.86/ac, respectively. The income S.D. of surveyed WW/SF was only \$14.96/ac.

In summary, the best no-till rotation at Ritzville, continuous SWSW, displayed net returns that were statistically equivalent to WW/SF during 1997-2001, but income risk was higher. These no-till SWSW results were considerably more promising than previous results comparing hard red spring wheat (HRSW) to WW/SF. Economic analysis of experiments at Ralston in Adams County, WA and at the Horse Heaven Hills in Benton County, WA, indicated that continuous annual no-till HRSW systems averaged annual net returns over total costs that were about \$40 per acre below those for WW/SF (Young, D.L. 2002. *Economics of wind erosion control*, pp. 90-101. *Northwest Columbia Plateau Wind Erosion/Air Quality Project 2002 Annual Report*, Washington State University, Pullman, WA). Oilseed production that covers the costs of production in low precipitation areas is challenging (Hinman, H.R. 2003. *Cost of Producing Canola and Mustard Oilseeds in Eastern Washington and North Central Idaho*. EB 1960E. Washington State University, Pullman, WA).

The potentially promising economics from the first phase of this Ritzville experiment must be interpreted in the context of 1997-2001 precipitation, which was near the long-term average. Precipitation was well below the long-term average during the 2001-2004 period. This bulletin responds to concerns about the long run economic viability of no-till annual cropping systems in typical WW/SF regions of east-central Washington and north-central Oregon by providing economic analysis of a broader set of rotations at the Ritzville cropping system site during dry-to-drought years. The objectives of this study are to report on production cost, profitability, and income risk of six no-till annual cropping systems, including both spring and winter crops, from 2001-2004. Annual crops are compared economically to neighbors' conventional WW/SF systems. Economic comparisons are also summarized over 1997-2004 for the continuous SWSW and the SWSW/SB spring grain rotations that were continued over the entire eight-year experiment period.

Experiment Description

An eight-year experiment was conducted from 1997-2004 on twenty acres near Ritzville, Adams County, WA. Annual precipitation at the site averages 11.5 inches. The soil is uniform Ritzville silt loam (coarse-silty, mixed, mesic Calcic Haploxeroll) with a depth of no more than 6 feet, no restrictive layers, and slopes less than one percent. Economic results for the first five years of the experiment have been reported in the previously referenced source. As appropriate, comparisons will be made to the 1997-2000 experiment period (Phase I) to assess long term profitability and risk trends.

Phase II of the experiment from 2001-2004 included six rotations involving soft white spring wheat (SWSW), hard white spring wheat (HWSW), spring barley (SB), yellow mustard (YM), and soft white winter wheat (SWWW). The six rotations were structured as follows: rotation one was a four-year SWWW/SWWW/SWSW/SWSW sequence; rotation two was a four-year SWWW/SB/YM/SWSW sequence; rotation three was a two-year SWSW/SB sequence; rotation four was a two-year HWSW/SB sequence; rotation five was continuous SWSW; and rotation six was continuous HWSW. The SWSW/SB and continuous SWSW rotations were the only rotations that were in both Phase I and Phase II of the experiment and thus covered an eight-year period as opposed to a four-year period for all other rotations.

The experimental design was a randomized complete block with four replications. Each crop in all rotations occurred each year in 30 X 500 ft plots, making a total of 56 plots. Table 1 provides a description and timing of cultural practices used in the production of all the no-till rotations. All budgeting processes assume the use of a Flexi-Coil 6000 (Flexi-Coil Ltm., Saskatoon, SK, Canada S7K 3S5) air delivery no-till drill equipped with Barton II™ dual disk openers with 7.5-inch spacing for simultaneous and precision placement of seed and fertilizer in the same row. All plots were harvested with a commercial size combine and grain yield was determined on site by auguring grain into a weigh wagon.

The WW/SF rotation was not included in the experiment. However, the economic comparison of this traditional tillage-based system to the experiment's no-till annual cropping rotations was accomplished by conducting a multi-year yield survey of ten responding neighboring farmers growing WW/SF. A one-page questionnaire was mailed to the 17 farmers that have fields within a five-mile radius of the experiment site. The five-mile radius survey criteria was established in order to confine the comparison to fields with the same environmental conditions. The sample size of ten farmers represents a 59 percent response rate for the mailing. Of the ten participating farmers, one farmer reported on three different fields, with varying yields. This farmer's data were added independently, increasing the sample size to 12. The survey approach allowed us to derive average and standard deviation of winter wheat yields over time and over farmers, as well as the derivation of these statistics for the entire data set. Fixed and variable costs for the WW/SF rotation were computed from data provided by Ron Jirava, the farmer hosting the long-term experiment.

Table 1: Generalized Field Operations and Inputs for Winter-Planted Wheat, Spring-Planted Wheat, Barley, and Yellow Mustard at Ritzville, Adams County, WA, 2001-2004.

| Date | Winter-Planted Wheat | Spring-Planted Wheat | Barley | Yellow Mustard |
|----------------------|---|---|---|---|
| 30 Oct. ¹ | Planted at 58 lb/acre and fertilized at 32.5 lb of N/acre, 7.5 lb of P/acre, and 7.5 lb S/acre. | | | |
| 16 Mar. | Herbicide: 0.67 oz Maverick/acre and 3.2 oz R-11 surfactant/acre | Herbicide: 16.5 oz Roundup/acre and 3.2 oz R-11 surfactant/acre | Herbicide: 16.5 oz Roundup /acre and 3.2 oz R-11 surfactant/acre | Herbicide: 16.5 oz Roundup /acre and 3.2 oz R-11 surfactant /acre |
| 1 Apr. ² | | Planted at 65 lb/acre and fertilized at 33 lb N/acre, 4.5 lb P/acre, and 5 lb S/acre. | Planted at 67.5 lb/acre and fertilized at 33 lb N/acre, 4.5 lb P/acre, and 5 lb S/acre. | Planted at 7.5 lb/acre and fertilized at 33 lb N/acre, 4.5 lb P/acre, and 5 lb S/acre. Replanted in May 2002 and April 2004. |
| 28 Apr. | Herbicide: 13 oz 2,4-D/acre, 4 oz Banvel SGF/ acre, and 3.2 oz R-11 surfactant /acre. | | | |
| 17 May | | Herbicide: 2.7 oz Dicamba/acre and 9.3 oz Barrage/acre. | Herbicide: 2.7 oz Dicamba /acre and 9.3 oz Barrage/acre. | |
| 1 Aug. | Harvest | Harvest | Harvest | Harvest (No yellow mustard was harvested in 2002 due to crop failure.) |
| 12 Aug. | Postharvest Herbicide: 24 oz Surefire/acre and 3.2 oz LI-700 surfactant/acre | Postharvest Herbicide: 24 oz Surefire/acre and 3.2 oz LI-700 surfactant/acre | Postharvest Herbicide: 24 oz Surefire/acre and 3.2 oz LI-700 surfactant/acre | Postharvest Herbicide: 24 oz Surefire/acre and 3.2 oz LI-700 surfactant/acre |

¹ Dates, inputs used, and input levels are the 4-year averages of the specific field operations actually conducted during the experiment period.

² Plots were sown and fertilized simultaneously in one pass.

Budgeting Procedures and Assumptions

Detailed cost of production budgets were generated for each crop for all four years for each of the six rotations. Budgets were prepared using the Farm Enterprise Budget Simulator (FEBS) program at Washington State University. FEBS was also used to prepare production cost budgets for the WW/SF system. Many of these budgets were similar in terms of cultural practices and costs. In the interest of concision, detailed cost budgets by rotation and crop are presented in the Appendix only for the year 2002. Thirty-two detailed budgets (Appendix Tables A1-A32) appear for this single year. This section describes the procedures and assumptions used for creating the budgets upon which the economic results in this report are based.

The machinery complement of Ron Jirava, the no-till farmer who provided the land for this experiment, was used for the field operations in this study (see Appendix Table A33). The equipment included a 250-horsepower four-wheel drive tractor, 30' Flexi-Coil 6000 no-till drill with an air cart, chisel, rod weeder, skew treader, 80' homebuilt sprayer, 150-horsepower two-wheel drive tractor for spraying, and a combine with 24-foot wide cutting platform. Other equipment included two trucks, one semi, and a four-wheel all-terrain vehicle. The ages, purchase prices (used or new), sizes, annual hours use, and service lives of the farmer's machinery were considered typical of the area.

The total cost of production was estimated using WSU Extension's standard enterprise budgeting techniques with all costs allocated as either fixed or variable. For a given land and machinery base, fixed costs do not vary with the number of acres planted. Machinery fixed costs include depreciation, interest, taxes, housing, and insurance. The "Itemized Costs per Acre" tables in the Appendix itemize the costs appearing in the "Schedule of Operations and Costs Per Acre" tables. They also give farmers an opportunity to compare the costs reported in this publication to costs experienced on their own farm.

Tractor and machinery interest fixed costs are calculated on the basis of the average annual machine investment. The average machine investment is $(\text{Purchase cost} + \text{Salvage value})/2$. The interest charge made against this average investment represents either an opportunity cost (returns forgone by investing in the machine rather than in an alternative investment) or interest paid on money borrowed to finance machine purchases.

Land fixed costs include both land taxes and net rent. Net rent is either actual land rent paid by the farmer or rental income foregone for land they own. In the study region net rent is based on the prevailing 1/3 landlord and 2/3 tenant crop share with the landlord responsible for paying land taxes, 1/3 of the fertilizer expense, and 1/3 of the crop insurance expense when insurance is applicable. Farmers who own their land are still assessed net rent as an opportunity cost. An opportunity cost is the farmer's second best option and, in this case, the second best option is to lease out their land to another farmer. Including an opportunity cost for land allows for the standardization of budgets between farmers regardless of whether an individual farmer owns or rents their land.

Variable costs include any costs that vary with the level of production. Machinery repairs, fuel, labor, custom hire services, seed, fertilizer, pesticides, and crop insurance are all common examples of variable costs. Ritzville Chemical Inc. in Ritzville, WA provided estimates for fertilizer and herbicide costs. McKay Seed in Moses Lake, WA provided estimates of seed costs. Estimates of the cost of crop insurance were generated through the use of the cost estimation tool on the USDA Risk Management Agency website (www.rma.usda.gov). An estimate of the land tax cost was provided by the County Assessors Office in Adams County, WA. All other inputs costs including fuel and machinery labor values are from Patterson and Smathers (Patterson, P. and R. Smathers. 2004. *Idaho Crop Input Price Summary for 2004*, University of Idaho). Interest on capital invested in machinery and operating capital was assumed to be 6.5 percent. Overhead expenses for general items like farm lighting, utility sheds, and legal and accounting fees were computed at five percent of variable costs.

The utilized long run average price for SWSW and SWWW is \$3.24/bu and the long run average price for spring barley is \$89.84/ton. These values are based on five-year averages at the Lind, WA grain elevator from 2000-2004. The long run average price for yellow mustard is \$0.148/lb. This value is based on a five-year average of estimated annual regional contract values from 2000-2004 provided by McKay Seed in Moses Lake, WA. The long run average price for hard white spring wheat is \$3.88/bu. This value is based on a three-year average of farm gate prices from 2002-2004 provided by Central Washington Grain Growers, Inc. in Wilbur, WA.

Net returns in this study include only market returns, excluding government payments or crop insurance indemnities. Although government payments have been and are a very important source of farm income, the purpose of this study is to compare and rank the market profitability of different rotations, not to measure the total farm income of individual growers. Adding the predetermined (decoupled) portion of government payments, which do not vary by rotation, would not affect profitability rankings. Including government payments would require assumptions on the historical yields and base acreages of individual “representative farms.” These histories vary from farm to farm. Additionally, farm programs vary substantially from farm bill to farm bill and, in some years, include discretionary annual supplemental payments awarded by Congress. Readers may add government payments consistent with their particular assumptions to the base market returns reported here if desired.

Net return per rotational acre is used to correctly measure the profitability of different crop rotations. For example, a rotational acre of WW/SF includes 0.5 acre of winter wheat and 0.5 acre of fallow. This approach correctly portrays the annual income of farmers who annually allocate 1/n of their land to each crop in an n-year rotation. This annual diversification reduces annual income risk by including a “portfolio” of crops. The practice also permits more efficient use of machinery based on seasonal utilization by various crops.

Explanation of Appendix Budget Tables

The Appendix contains detailed budget tables for the crop rotations described earlier. Recall that rotation one is a four-year SWWW/SWWW/SWSW/SWSW sequence, rotation two is a four-year SWWW/SB/YM/SWSW sequence, rotation three is a two-year SWSW/SB sequence, rotation four is a two-year HWSW/SB sequence, rotation five is continuous SWSW, and rotation six is continuous HWSW. A complete listing of the appendix tables is listed in the “Appendix Tables” section of the table of contents of this report.

The appendix tables include both a “Schedule of Operations and Estimated Costs Per Acre” and a “Itemized Cost Per Acre” table for each crop in each rotation for the year 2002. When more than one field of a particular crop is included in the same rotation, as is the case with rotation one, the individual fields are identified as either position one or position two. The term “position” refers to the sequence of the planting of different fields of the same crop in the same rotation. For instance in rotation one, position one refers to a planting of SWWW that does not immediately follow a previous crop of SWWW. Position two refers to a planting of SWWW that is immediately preceded by position-one SWWW. Due to the nature of a rotational acre, both positions one and two may be planted at the same time on similar fields and have varying yields. The appendix tables also include a “Per Hour and Per Acre Machinery Costs” table that describes the costs associated with the various machines used throughout this project and a “Input and Commodity Price List 2004” that presents a list of the input and commodity prices used to calculate the various budgets and returns discussed throughout this paper.

Costs, Profitability, and Risk by Crop Rotation

This section provides a summary of crop yields, net returns over variable costs, net returns over total costs, and income risk by rotation. Varying annual precipitation strongly influenced yields. Annual precipitation was 8.00, 9.55, 10.59, and 7.41 inches for 2001, 2002, 2003, and 2004. The four-year average precipitation of 8.89 inches per year was 23 percent below the long-term average of 11.5 inches per year. Table 2 shows the yields for each crop in each rotation from 2001-2004. Four-year average yields and standard deviations for each crop per rotation are reported. The four-year average yield for yellow mustard includes a zero value for a 2002 crop failure. YM and SWWW display the highest yield variability as indicated by the coefficient of variation (CV).

The results of a 2001-2004 yield survey for conventional WW/SF from ten neighboring farms are reported in Table 3. Ten farmers responded to the survey and each has been assigned a number for identification purposes. Farmer No. 10 reported on three individual fields. Table 3 also shows the range, standard deviation (S.D.), average annual yields for each individual farmer, average annual yields for all farmers each year, and the average annual yield of all farmers computed over the entire four-year survey period. Due to incomplete survey responses, the 2001

yield for Farmer No. 7 and the 2003 yield for Farmer No. 10, Field B, were estimated assuming yields that were proportionately equivalent to those of the other farmers in that year.

Grain yield values varied greatly over years and among farmers. The lowest average annual yield was 38 bu/ac in 2001 and the highest was 52 bu/ac in 2003. All but Farmer No 7 experienced their lowest yield in 2001. The average yield across farms and years was 45.9 bu/ac. Standard deviations of yields across years are relatively low with a low value of 3.5 bu/ac in 2001 and a high value of 8.5 bu/ac in 2004. Standard deviations of yields by farmer had a greater range. The low was 3.9 bu/ac for both Farmer No. 3 and Farmer No. 10, Field C, and a high of 12.4 bu/ac for Farmer No. 4. Differences in precipitation likely contribute strongly to yield variability across years. Differences in microclimate, management, land quality, and pest and disease incidence also contribute to yield variability across farms in the same year.

Table 4 lists results for the annual net returns over *variable* costs per rotational acre for all no-till crop rotations and the surveyed WW/SF rotation. Table 5 lists results for the annual net returns over *total* costs per rotational acre for the same group. Net returns over total costs reflect the opportunity costs for farmers' land and machinery investments, as well as costs for their labor and other variable inputs. Four-year averages and standard deviations are listed for each rotation in each table. None of the no-till annual rotations were able to generate sufficient market returns to cover total costs during the relatively dry 2001-2004 years. Four of the six rotations earned statistically equivalent returns over variable costs (Table 4). Five of the six rotations earned statistically equivalent returns over total costs (Table 5). The HWSW/SB, SWSW/SB, and SWSW rotations all had average annual losses of about \$43 to \$44 per rotational acre. The HWSW/SB rotation was the most risky with a S.D. of \$18.81 per acre. Average net returns of the surveyed WW/SF rotation of \$43.47 and \$0.05 over variable and total costs, respectively, substantially exceeded those of all no-till annual rotations over 2001-2004. It may be reasonable to consider the WW/SF net returns averages as point estimates of the five-mile radius population they represent. The net return advantage of WW/SF over all annual rotations greatly exceeds the least significant difference test value at the 0.05 alpha level (LSD 0.05) for the experiment (Tables 4 and 5). The least significant difference test is used to determine whether the difference between two treatment means is statistically significant at the indicated alpha level. This indicates strong statistical support for the profit superiority of the conventional WW/SF system over 2001-2004. The low net returns for all rotations can largely be attributed to yields reduced by diminished precipitation during 2001-2004.

Table 2: Crop Yields by Crop and Rotation, Ritzville, Adams County, WA, 2001-2004.

| Rotation | Units | 2001 | 2002 | 2003 | 2004 | 4-yr Avg. | S.D. | C.V. (%) ¹ |
|-------------------------|-------------|------|------|-------|------|-----------|-------|-----------------------|
| 1. Four Year I | | | | | | | | |
| Soft White Winter Wheat | bu/acre | 7 | 21 | 30 | 18 | 19 | 9.5 | 49.9 |
| Soft White Winter Wheat | bu/acre | 9 | 21 | 29 | 14 | 18 | 8.7 | 47.6 |
| Soft White Spring Wheat | bu/acre | 8 | 23 | 19 | 23 | 18 | 7.1 | 38.8 |
| Soft White Spring Wheat | bu/acre | 10 | 23 | 25 | 27 | 21 | 7.7 | 36.1 |
| 2. Four Year II | | | | | | | | |
| Soft White Winter Wheat | bu/acre | 5 | 16 | 28 | 16 | 16 | 9.4 | 57.8 |
| Spring Barley | ton/acre | 0.16 | 0.65 | 0.69 | 0.73 | 0.56 | 0.3 | 47.9 |
| Yellow Mustard | lb/acre | 350 | 0 | 146 | 348 | 211 | 170.1 | 80.6 |
| Soft White Spring Wheat | bu/acre | 12 | 21 | 31 | 29 | 23 | 8.7 | 37.2 |
| 3. Two Year I | | | | | | | | |
| Soft White Spring Wheat | bu/acre | 12 | 25 | 27 | 34 | 25 | 9.2 | 37.5 |
| Spring Barley | ton/acre | 0.35 | 0.75 | 0.83 | 1.05 | 0.75 | 0.3 | 39.2 |
| 4. Two Year II | | | | | | | | |
| Hard White Spring Wheat | bu/acre | 10 | 22 | 27 | 29 | 22 | 8.5 | 38.7 |
| Spring Barley | ton/acre | 0.27 | 0.78 | 0.83 | 1.04 | 0.73 | 0.3 | 44.8 |
| 5. Continuous I | | | | | | | | |
| Soft White Spring Wheat | bu/acre | 14 | 22 | 24 | 27 | 22 | 5.7 | 25.5 |
| 6. Continuous II | | | | | | | | |
| Hard White Spring Wheat | bu/acre | 6 | 21 | 18 | 15 | 15 | 6.5 | 43.2 |
| Precipitation | inches/year | 8.00 | 9.55 | 10.59 | 7.41 | 8.89 | 1.45 | 16.3 |

¹C.V.=Coefficient of Variation = (S.D./Avg.)x100, expressed as a percent.

Table 3: Yield (bu/ac) of SWWW Following Fallow: Survey of Farmers Within a Five-Mile Radius of the Jirava Farm, Adams County, WA, 2001-2004

| Farmer No. | 2001 | 2002 | 2003 | 2004 | Range | S.D. | Average |
|------------------|-------|-------|-------|-------|-------|------------------|-------------------|
| 1 | 39 | 42 | 51 | 39 | 39-51 | 5.7 | 42.8 |
| 2 | 46 | 57 | 62 | 64 | 46-64 | 7.8 | 57.2 |
| 3 | 39 | 44 | 48 | 44 | 39-48 | 3.9 | 43.6 |
| 4 | 38 | 48 | 65 | 39 | 38-65 | 12.4 | 47.5 |
| 5 | 36 | 43 | 49 | 48 | 36-49 | 5.9 | 44.0 |
| 6 | 35 | 43 | 55 | 49 | 35-55 | 8.5 | 45.5 |
| 7 | 38 | 36 | 57 | 52 | 36-57 | 10.3 | 45.8 |
| 8 | 35 | 50 | 47 | 48 | 35-50 | 6.8 | 45.0 |
| 9 | 37 | 50 | 43 | 51 | 37-51 | 6.9 | 45.3 |
| 10a ¹ | 33 | 41 | 43 | 34 | 33-43 | 5.0 | 37.8 |
| 10b ¹ | 42 | 54 | 60 | 58 | 42-60 | 8.2 | 53.6 |
| 10c ¹ | 38 | 44 | 47 | 41 | 38-47 | 3.9 | 42.5 |
| Range | 33-46 | 36-57 | 43-65 | 34-64 | | | |
| S.D. | 3.5 | 6.0 | 7.4 | 8.5 | | 8.2 ² | |
| Average | 38 | 46 | 52 | 47 | | | 45.9 ² |

¹Farmer No.10 provided data for three separate fields

² Summary statistics for all observations

Table 4: Comparison of Net Returns Over Variable Costs by Rotation and Year for Six No-Till Crop Rotations and WW/SF, Ritzville, Adams County, WA, 2001-2004.

| Rotation | 2001 | 2002 | 2003 | 2004 | 2001-2004 | |
|----------------------------|--------------------------------------|--------|-------|--------|-----------------------|-------|
| | | | | | Average | S.D. |
| Experiment: | -----\$/Per Rotational Acre/Yr.----- | | | | | |
| ROT 1: SWWW/SWWW/SWSW/SWSW | -34.82 | -3.86 | 20.48 | -4.73 | -5.73abc ¹ | 22.64 |
| ROT 2: SWWW/SB/YM/SWSW | -30.00 | -28.86 | 6.56 | -6.40 | -14.68c | 17.85 |
| ROT 3: SWSW/SB | -26.49 | 2.90 | 16.54 | 31.05 | 6.00ab | 24.52 |
| ROT 4: HWSW/SB | -31.27 | 5.28 | 24.21 | 30.80 | 7.26a | 27.87 |
| ROT 5: Continuous SWSW | -15.21 | 1.07 | 15.07 | 17.26 | 4.55ab | 15.00 |
| ROT 6: Continuous HWSW | -39.57 | 8.99 | 5.20 | -13.98 | -9.84bc | 22.22 |
| Survey: | | | | | | |
| SWWW/Summer Fallow Average | 30.65 | 43.76 | 53.75 | 45.71 | 43.47 | 9.58 |

¹Average returns followed by the same lower case letter are not statistically different. LSD.05 is \$16.16/ac.

Table 5: Comparison of Net Returns Over Total Costs by Rotation and Year for Six No-Till Crop Rotations and WW/SF, Ritzville, Adams County, WA, 2001-2004.

| Rotation | 2001 | 2002 | 2003 | 2004 | 2001-2004 | |
|----------------------------|----------------------------------|--------|--------|--------|-----------------------|-------|
| | | | | | Average | S.D. |
| Experiment: | -----\$/Rotational Acre/Yr.----- | | | | | |
| ROT 1: SWWW/SWWW/SWSW/SWSW | -71.00 | -51.57 | -34.46 | -51.52 | -52.14ab ¹ | 14.93 |
| ROT 2: SWWW/SB/YM/SWSW | -68.97 | -74.12 | -43.38 | -56.67 | -60.79b | 13.72 |
| ROT 3: SWSW/SB | -65.20 | -45.95 | -36.22 | -27.13 | -43.63a | 16.31 |
| ROT 4: HWSW/SB | -69.23 | -44.73 | -31.44 | -27.62 | -43.26a | 18.81 |
| ROT 5: Continuous SWSW | -57.42 | -46.91 | -36.70 | -36.10 | -44.28a | 10.07 |
| ROT 6: Continuous HWSW | -75.47 | -42.38 | -43.94 | -57.58 | -54.84ab | 15.35 |
| Survey: | | | | | | |
| SWWW/Summer Fallow Average | -12.76 | 0.34 | 10.34 | 2.30 | 0.05 | 9.58 |

¹Average returns followed by the same lower case letter are not statistically different. LSD.05 is \$11.69/ac.

Summary of Costs and Profitability by Experiment Phase

The only two rotations maintained throughout the entire 1997-2004 experiment were continuous SWSW and SWSW/SB. Figure 2 shows that yields of both crops in the SWSW/SB rotation averaged lower in 2001-2004 (Phase II). Figure 3 represents a similar yield pattern for SWSW in the continuous SWSW rotation. Figure 3 also illustrates the rough correlation between annual precipitation and reduced yields in Phase II. Annual precipitation at the experiment site averaged 11.78 inches in 1997-2000 compared to only 8.89 inches in 2001-2004. Total and variable costs remained relatively constant over 1997-2004. Total costs for the continuous SWSW rotation averaged \$129.08/ac for 1997-2000 (EB1956E) and \$114.75/ac for 2001-2004. Total costs for the SWSW/SB rotation averaged \$123.85/ac for 1997-2000 (EB1956E) and \$116.78/ac for 2001-2004. Net returns per acre for continuous SWSW fell from \$17.92/ac for 1997-2000 to -\$44.28 in 2001-2004. The corresponding comparison for continuous SWSW/SB is \$8.12/ac versus -\$43.63.

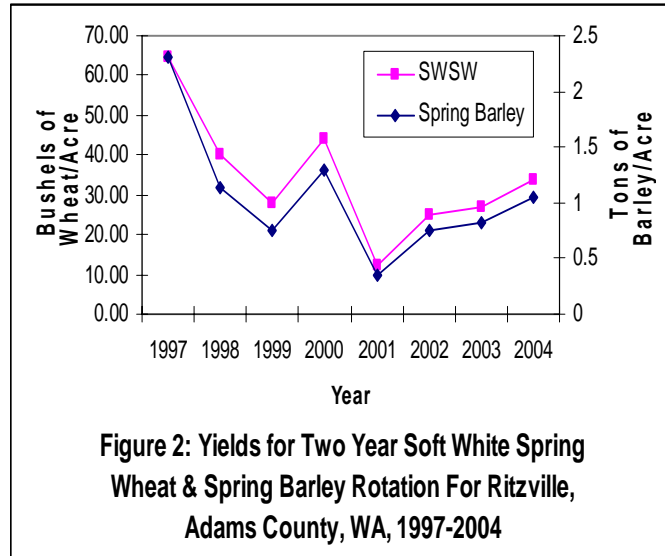


Figure 2: Yields for Two Year Soft White Spring Wheat & Spring Barley Rotation For Ritzville, Adams County, WA, 1997-2004

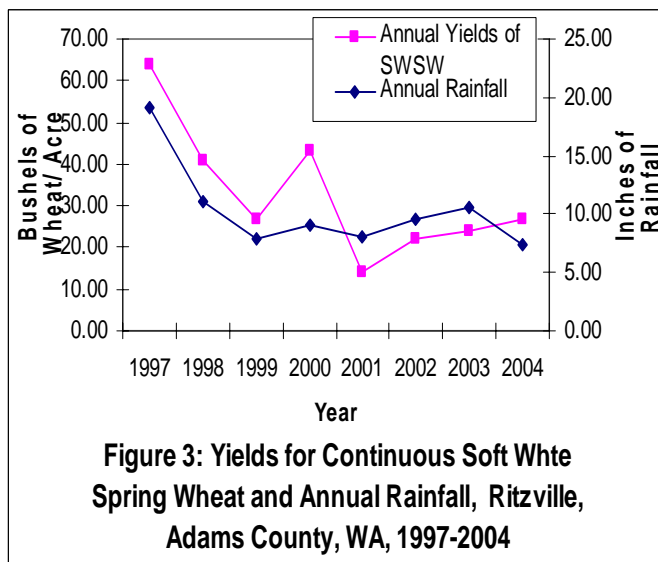


Figure 3: Yields for Continuous Soft White Spring Wheat and Annual Rainfall, Ritzville, Adams County, WA, 1997-2004

As Figure 4 shows, differences in commodity prices between Phase I and Phase II had little effect on gross revenue differences between different phases. If the five-year average commodity prices calculated from 2000-2004 are applied to the 1997-2000 yield averages for the SWSW/SB rotation, gross revenue only increases by \$1.29/ac. Most of the difference in gross revenue over the eight-year period is due to reduced yields in Phase II.

When returns over total costs are averaged over the full eight-year experiment, the best long run estimate of economic performance, the continuous SWSW and the SWSW/SB rotations

generated net returns over total costs per rotational acre of -\$13.18/ac and -\$17.75/ac, respectively (see Figure 5). The -\$13 and -\$18 estimates are based on eight years of data and represents the best long run estimate to date of the profitability shortfall of no-till annual systems relative to conventional WW/SF in this low rainfall region.

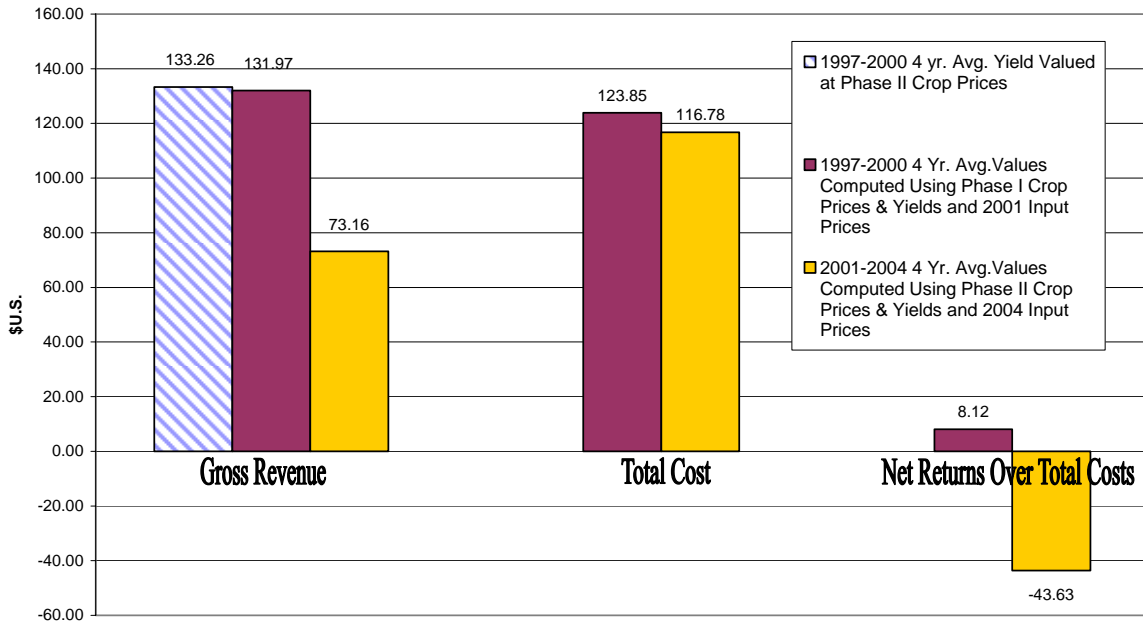


Figure 4: Comparison of Gross Revenue, Total Cost, and Net Returns Over Total Costs by Time Period and Crop Prices: Soft White Spring Wheat / Spring Barley Rotation, Ritzville, Adams County, WA, 1997-2004

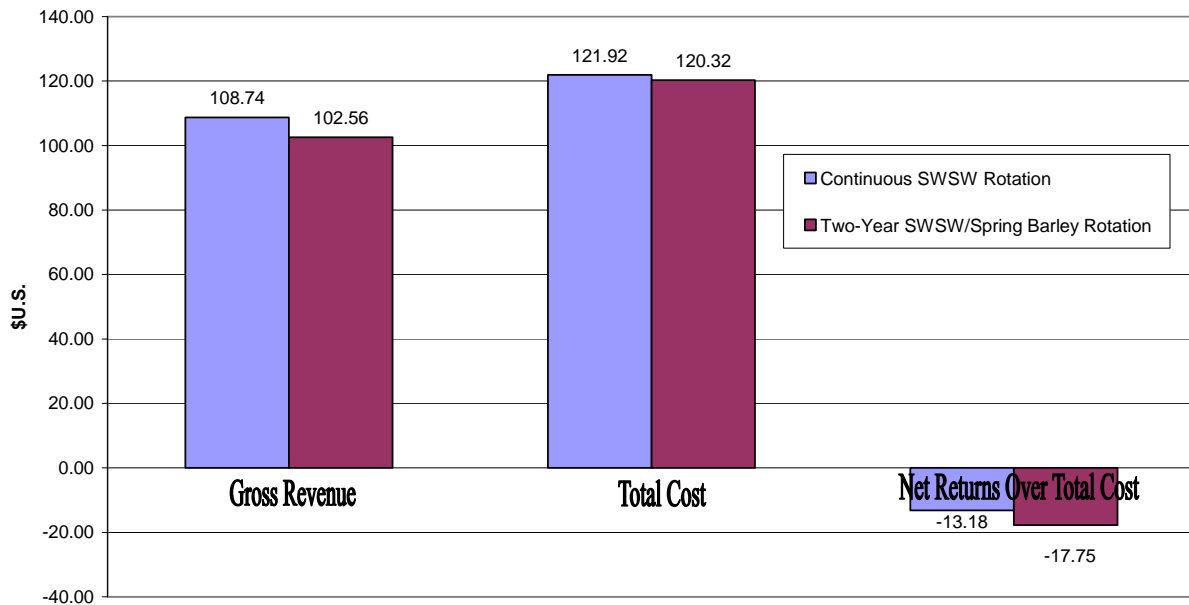


Figure 5: Eight-Year Gross Revenue, Total Cost, and Net Returns Over Total Cost For Continuous Soft White Spring Wheat & Two Year Soft White Spring Wheat and Spring Barley Rotations, Ritzville, Adams County, WA 1997-2004

The complete 1997-2004 results of the Ritzville experiment show that no-till rotations fell short in terms of profitability and income stability when compared to the traditional WW/SF system in this low precipitation region. The more promising results from 1997-2001 appear to have been dependent upon favorable weather. The eight-year results are consistent with previous multi-year experiments in east-central Washington that found that no-till HRSW lagged WW/SF by about \$40/ac/yr. Furthermore, the spring cropping systems at other low precipitation sites in Benton and Adams County have exposed growers to significantly more economic risk in dry years (Young, D.L., W.F. Schillinger, and F.L. Young. 2002. "How The 2001 Drought Affected The Economic Risk Of Continuous No-Till Hard Red Spring Wheat in Adams and Benton Counties Experiments." *2002 Field Day Proceedings: Highlights of Research Progress*. Tech. Report 02-1: 136-140. Dept. Crop and Soil Sciences, Wash. State University, Pullman).

Though yield-enhancing research for these soil and air quality conserving annual cropping systems might improve their economic competitiveness in the future, given current production abilities, no-till cropping systems are not economically viable. Another option in the search for an economically viable cropping system in this low precipitation region is a reduced tillage adaptation of the conventional tillage based wheat-fallow system. Minimum and delayed minimum tillage systems have been shown to produce wheat yields and have total costs of production similar to those of conventional tillage based systems in the low precipitation area near Ritzville, WA. Though the reduction in dust emissions is not as great with minimum tillage systems as with no-till systems, minimum tillage SWWW-fallow systems are expected to cut dust emissions by up to 54 percent relative to conventional fallow systems (Janosky, J.S., D.L. Young, and W.F. Schillinger. 2002. Economics of conservation tillage in a wheat-fallow region. *Agronomy Journal* 94:527-531). Given that minimum tillage SWWW-fallow and other soil conserving reduced tillage systems could provide a cost effective conservation cropping system for the region, researchers should continue to investigate these and other soil-conserving systems.

Some farmers might be able to trim the cost of production for no-till annual cropping to below the estimates presented here, but closing the entire gap is not likely. Other research has shown significant public valuation for higher levels of air quality provided by soil conserving cropping systems. Dust emissions from excessively tilled fields can harm human respiratory health, cause traffic accidents during dust storms, and increase household and industrial cleaning costs. Wind erosion also depletes soil productivity on vulnerable parts of the landscape. Fields in south-central Washington were reported to have lost 0.1 to 0.4 inches of topsoil (100-245 tons per acre) from wind erosion during the fall and winter of 1990 (Papendick, R.I. 1996. Farming systems and conservation needs in the northwest wheat region. *American Journal of Alternative Agriculture*. 11:52-57). Public cost sharing for no-till annual spring cropping would assist growers attempting to adopt these systems. However, Congress has not been inclined to substitute "green payments" for conventional commodity subsidies. No-till cropping systems might provide a cost effective alternative to large government conservation programs like the Conservation Reserve Program (CRP). The average CRP payment to farmers in east-central Washington is about \$45/ac plus 75% cost sharing during the first year. Based on the 1997-2004 results showing a \$13-\$18 per acre profit shortfall for no-till systems, if the government were to provide conservation incentives to cover the average annual losses incurred by farmers who use no-till cropping systems, no-till annual cropping might break even with CRP at about one third to one half of the cost to the government of current CRP rents. However, additional research into inclusive environmental and local economic effects of CRP versus no-till cropping systems is needed before making definitive conclusions. These alternative solutions are likely to have different effects, for example, on wildlife habitat, recreational values, and local agribusiness demand.

Appendix
Budget Tables

TABLE A1. ITEMIZED COST PER ACRE FOR SOFT WHITE WINTER WHEAT,
POSITION ONE, ROTATION ONE, RITZVILLE, WA, 2002.

| | | PRICE OR | | VALUE OR | YOUR |
|-----------------------|------|----------------|----------|----------|-------|
| | | UNIT COST/UNIT | QUANTITY | COST | FARM |
| ----- | | | | | |
| VARIABLE COSTS | | \$ | | \$ | |
| S.W. WHEAT SEED | LB | .13 | 60.00 | 7.80 | _____ |
| SOLUTION 32 | LB | .16 | 95.66 | 15.11 | _____ |
| THIO-SULFATE | LB | .12 | 11.54 | 1.43 | _____ |
| AMM. PHOSPHATE | LB | .14 | 50.00 | 6.90 | _____ |
| MAVERICK | OZ | 15.25 | .67 | 10.22 | _____ |
| R-11 SURFACT | OZ | .09 | 3.20 | .28 | _____ |
| 2,4-D, LV6 | OZ | .14 | 12.00 | 1.74 | _____ |
| AIM | OZ | 5.47 | .50 | 2.73 | _____ |
| R-11 SURFACT | OZ | .09 | 3.20 | .28 | _____ |
| SUREFIRE | OZ | .29 | 24.00 | 7.03 | _____ |
| LI-700 SURFACT | OZ | .17 | 3.20 | .56 | _____ |
| CONT. WW INSUR | ACRE | 1.25 | 1.00 | 1.25 | _____ |
| MACHINERY FUEL/LUBE | ACRE | 4.05 | 1.00 | 4.05 | _____ |
| MACHINERY REPAIRS* | ACRE | 5.82 | 1.00 | 5.82 | _____ |
| LABOR (TRAC/MACH) | HOUR | 13.00 | 0.61 | 7.95 | _____ |
| OVERHEAD | ACRE | 3.81 | 1.00 | 3.81 | _____ |
| INTEREST ON OP. CAP. | ACRE | 3.12 | 1.00 | 3.12 | _____ |
| | | | | ----- | |
| TOTAL VARIABLE COST | | | | 80.07 | _____ |
| | | | | | |
| FIXED COSTS | | \$ | | \$ | |
| MACHINE DEPRECIATION* | ACRE | 13.55 | 1.00 | 13.55 | _____ |
| MACHINE INTEREST* | ACRE | 12.05 | 1.00 | 12.05 | _____ |
| MACHINE INSURANCE* | ACRE | 1.11 | 1.00 | 1.11 | _____ |
| MACHINE TAXES* | ACRE | 3.34 | 1.00 | 3.34 | _____ |
| MACHINE HOUSING* | ACRE | 1.85 | 1.00 | 1.85 | _____ |
| LAND RENT** | ACRE | 10.45 | 1.00 | 10.45 | _____ |
| LAND TAX | ACRE | 4.00 | 1.00 | 4.00 | _____ |
| | | | | ----- | |
| TOTAL FIXED COST | | | | 46.35 | _____ |
| | | | | ----- | |
| TOTAL COST | | | | 126.42 | _____ |
| ----- | | | | | |

*INCLUDES BUILDINGS, TOOLS AND TANKS.

** 1/3 CROP - 1/3 FERTILIZER COST - 1/3 CROP INSURANCE - 1 YR LAND TAXES.

WHEAT YIELD FROM EXPERIMENT IS 21 BUSHEL.

FIVE YEAR AVERAGE FARM GATE PRICE OF WHEAT IS \$3.24/BUSHEL.

TABLE A2. SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR SOFT WHITE WINTER WHEAT, POSITION ONE, ROTATION ONE, RITZVILLE, WA, 2002.

| OPERATION | TOOLING | MTH YEAR | MACH HOURS | LABOR HOURS | TOTAL FIXED COST | VARIABLE COST | | | | | TOTAL VARIABLE COST | TOTAL COST |
|----------------|--------------------------------|----------|------------|-------------|------------------|-----------------------|------------|---------|-------------|---------|---------------------|------------|
| | | | | | | FUEL, LUBE, & REPAIRS | MACH LABOR | SERVICE | MATER. | INTER. | | |
| PLANT | JD 8500, FLEXI COIL 6000 | NOV 2001 | .10 | .12 | \$ 15.88 | \$ 3.02 | \$ 1.50 | \$.00 | \$ 31.25(1) | \$ 2.13 | \$ 37.89 | \$ 53.77 |
| INSURANCE | CROP INSURANCE | SEA 2002 | .00 | .00 | .00 | .00 | .00 | 1.25 | .00 | .04 | 1.29 | 1.29 |
| SPRAY ONE | JD 4630, 80' HOMEBUILT SPRAYER | MAR 2002 | .02 | .02 | .42 | .23 | .27 | .00 | 10.49(2) | .42 | 11.41 | 11.82 |
| SPRAY TWO | JD 4630, 80' HOMEBUILT SPRAYER | APR 2002 | .02 | .02 | .42 | .23 | .27 | .00 | 4.75(3) | .17 | 5.42 | 5.83 |
| HARVEST | JD 8820 COMBINE | AUG 2002 | .10 | .12 | 1.16 | 2.58 | 1.50 | .00 | .00 | .04 | 4.12 | 5.28 |
| SPRAY THREE | JD 4630, 80' HOMEBUILT SPRAYER | AUG 2002 | .02 | .02 | .42 | .23 | .27 | .00 | 7.59(4) | .09 | 8.18 | 8.59 |
| HAUL | C-60 30000 GVW TRUCK | AUG 2002 | .05 | .06 | .50 | .42 | .78 | .00 | .00 | .01 | 1.21 | 1.71 |
| MISC. USE | MACHINE SHED & SHOP BUILDINGS | ANN 2002 | .00 | .00 | 6.17 | .92 | .00 | .00 | .00 | .03 | .95 | 7.12 |
| MISC. USE | FUEL & MISCELLANEOUS TANKS | ANN 2002 | .00 | .00 | 1.91 | .09 | .00 | .00 | .00 | .00 | .10 | 2.00 |
| MISC. USE | 1983 1-TON GMC SERVICE TRUCK | ANN 2002 | .08 | .08 | .51 | 1.03 | 1.04 | .00 | .00 | .07 | 2.14 | 2.65 |
| MISC. USE | 4-WHEEL ATV | ANN 2002 | .06 | .07 | .16 | .11 | .91 | .00 | .00 | .03 | 1.05 | 1.21 |
| MISC. USE | SHOP TOOLS | ANN 2002 | .00 | .00 | 3.19 | .46 | .00 | .00 | .00 | .01 | .48 | 3.66 |
| MISC. USE | 1990 1-TON GMC TRUCK | ANN 2002 | .10 | .11 | 1.17 | .54 | 1.43 | .00 | .00 | .06 | 2.04 | 3.21 |
| LAND TAX | LAND TAX | ANN 2002 | .00 | .00 | 4.00 | .00 | .00 | .00 | .00 | .00 | .00 | 4.00 |
| LAND RENT | NET RENT/OPPORTUNITY COST | ANN 2002 | .00 | .00 | 10.45 | .00 | .00 | .00 | .00 | .00 | .00 | 10.45 |
| OVERHEAD | UTILITIES, LEGAL, ACCT, ETC. | ANN 2002 | .00 | .00 | .00 | .00 | .00 | 3.81(5) | .00 | .00 | 3.81 | 3.81 |
| TOTAL PER ACRE | | | .54 | .61 | 46.35 | 9.87 | 7.95 | 5.06 | 54.08 | 3.12 | 80.07 | 126.42 |

MATERIALS:

1. 60 LBS. WHEAT SEED (\$7.80/AC), 11.54 LBS. THIO-SULFATE (\$1.43/AC), 50 LBS. AMM. PHOSPHATE (\$6.88/AC), 95.66 LBS. SOLUTION 32 (\$15.14/AC)
2. 0.67 OZ. MAVERICK (\$10.22/AC), 3.2 OZ. R-11 SURFACTANT (\$0.28/AC)
3. 0.5 OZ. AIM (\$2.73/AC), 3.2 OZ. R-11 SURFACTANT (\$0.28/AC)
4. 24 OZ SUREFIRE (\$7.03/AC), 3.2 OZ. LI-700 SURFACTANT (\$0.56/AC)
5. OVERHEAD = 5% OF TOTAL VARIABLE COST

TABLE A3. ITEMIZED COST PER ACRE FOR SOFT WHITE WINTER WHEAT,
POSITION TWO, ROTATION ONE, RITZVILLE, WA, 2002.

| | | PRICE OR | | VALUE OR | YOUR |
|-----------------------|------|----------------|----------|----------|-------|
| | | UNIT COST/UNIT | QUANTITY | COST | FARM |
| VARIABLE COSTS | | \$ | | \$ | |
| S.W. WHEAT SEED | LB | .13 | 60.00 | 7.80 | _____ |
| SOLUTION 32 | LB | .16 | 95.66 | 15.11 | _____ |
| THIO-SULFATE | LB | .12 | 11.54 | 1.43 | _____ |
| AMM. PHOSPHATE | LB | .14 | 50.00 | 6.90 | _____ |
| MAVERICK | OZ | 15.25 | .67 | 10.22 | _____ |
| R-11 SURFACT | OZ | .09 | 3.20 | .28 | _____ |
| 2,4-D, LV6 | OZ | .14 | 12.00 | 1.74 | _____ |
| AIM | OZ | 5.47 | .50 | 2.73 | _____ |
| R-11 SURFACT | OZ | .09 | 3.20 | .28 | _____ |
| SUREFIRE | OZ | .29 | 24.00 | 7.03 | _____ |
| LI-700 SURFACT | OZ | .17 | 3.20 | .56 | _____ |
| CONT. WW INSUR | ACRE | 1.25 | 1.00 | 1.25 | _____ |
| MACHINERY FUEL/LUBE | ACRE | 5.82 | 1.00 | 5.82 | _____ |
| MACHINERY REPAIRS* | ACRE | 1.08 | 1.00 | 1.08 | _____ |
| LABOR (TRAC/MACH) | HOUR | 13.00 | 0.61 | 7.95 | _____ |
| OVERHEAD | ACRE | 3.81 | 1.00 | 3.81 | _____ |
| INTEREST ON OP. CAP. | ACRE | 3.12 | 1.00 | 3.12 | _____ |
| TOTAL VARIABLE COST | | | | 80.07 | _____ |
| FIXED COSTS | | \$ | | \$ | |
| MACHINE DEPRECIATION* | ACRE | 13.55 | 1.00 | 13.55 | _____ |
| MACHINE INTEREST* | ACRE | 12.05 | 1.00 | 12.05 | _____ |
| MACHINE INSURANCE* | ACRE | 1.11 | 1.00 | 1.11 | _____ |
| MACHINE TAXES* | ACRE | 3.34 | 1.00 | 3.34 | _____ |
| MACHINE HOUSING* | ACRE | 1.85 | 1.00 | 1.85 | _____ |
| LAND RENT** | ACRE | 10.45 | 1.00 | 10.45 | _____ |
| LAND TAX | ACRE | 4.00 | 1.00 | 4.00 | _____ |
| TOTAL FIXED COST | | | | 46.35 | _____ |
| TOTAL COST | | | | 126.42 | _____ |

*INCLUDES BUILDINGS, TOOLS AND TANKS.

** 1/3 CROP - 1/3 FERTILIZER COST - 1/3 CROP INSURANCE - 1 YR LAND TAXES.

WHEAT YIELD FROM EXPERIMENT IS 21 BUSHEL.

FIVE YEAR AVERAGE FARM GATE PRICE OF WHEAT IS \$3.24/BUSHEL.

TABLE A4. SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR SOFT WHITE WINTER WHEAT, POSITION TWO, ROTATION ONE, RITZVILLE, WA, 2002.

| OPERATION | TOOLING | MTH YEAR | MACH HOURS | LABOR HOURS | TOTAL FIXED COST | VARIABLE COST | | | | | TOTAL VARIABLE COST | TOTAL COST |
|----------------|--------------------------------|----------|------------|-------------|------------------|-----------------------|------------|---------|----------|--------|---------------------|------------|
| | | | | | | FUEL, LUBE, & REPAIRS | MACH LABOR | SERVICE | MATER. | INTER. | | |
| | | | | | | \$ | \$ | \$ | \$ | \$ | \$ | \$ |
| PLANT | JD 8500, FLEXI COIL 6000 | NOV 2001 | .10 | .12 | 15.88 | 3.02 | 1.50 | .00 | 31.25(1) | 2.13 | 37.89 | 53.77 |
| INSURANCE | CROP INSURANCE | SEA 2002 | .00 | .00 | .00 | .00 | .00 | 1.25 | .00 | .04 | 1.29 | 1.29 |
| SPRAY ONE | JD 4630, 80' HOMEBUILT SPRAYER | MAR 2002 | .02 | .02 | .42 | .23 | .27 | .00 | 10.49(2) | .42 | 11.41 | 11.82 |
| SPRAY TWO | JD 4630, 80' HOMEBUILT SPRAYER | APR 2002 | .02 | .02 | .42 | .23 | .27 | .00 | 4.75(3) | .17 | 5.42 | 5.83 |
| HARVEST | JD 8820 COMBINE | AUG 2002 | .10 | .12 | 1.16 | 2.58 | 1.50 | .00 | .00 | .04 | 4.12 | 5.28 |
| SPRAY THREE | JD 4630, 80' HOMEBUILT SPRAYER | AUG 2002 | .02 | .02 | .42 | .23 | .27 | .00 | 7.59(4) | .09 | 8.18 | 8.59 |
| HAUL | C-60 30000 GVW TRUCK | AUG 2002 | .05 | .06 | .50 | .42 | .78 | .00 | .00 | .01 | 1.21 | 1.71 |
| MISC. USE | MACHINE SHED & SHOP BUILDINGS | ANN 2002 | .00 | .00 | 6.17 | .92 | .00 | .00 | .00 | .03 | .95 | 7.12 |
| MISC. USE | FUEL & MISCELLANEOUS TANKS | ANN 2002 | .00 | .00 | 1.91 | .09 | .00 | .00 | .00 | .00 | .10 | 2.00 |
| MISC. USE | 1983 1-TON GMC SERVICE TRUCK | ANN 2002 | .08 | .08 | .51 | 1.03 | 1.04 | .00 | .00 | .07 | 2.14 | 2.65 |
| MISC. USE | 4-WHEEL ATV | ANN 2002 | .06 | .07 | .16 | .11 | .91 | .00 | .00 | .03 | 1.05 | 1.21 |
| MISC. USE | SHOP TOOLS | ANN 2002 | .00 | .00 | 3.19 | .46 | .00 | .00 | .00 | .01 | .48 | 3.66 |
| MISC. USE | 1990 1-TON GMC TRUCK | ANN 2002 | .10 | .11 | 1.17 | .54 | 1.43 | .00 | .00 | .06 | 2.04 | 3.21 |
| LAND TAX | LAND TAX | ANN 2002 | .00 | .00 | 4.00 | .00 | .00 | .00 | .00 | .00 | .00 | 4.00 |
| LAND RENT | NET RENT/OPPORTUNITY COST | ANN 2002 | .00 | .00 | 10.45 | .00 | .00 | .00 | .00 | .00 | .00 | 10.45 |
| OVERHEAD | UTILITIES, LEGAL, ACCT, ETC. | ANN 2002 | .00 | .00 | .00 | .00 | .00 | 3.81(5) | .00 | .00 | 3.81 | 3.81 |
| TOTAL PER ACRE | | | .54 | .61 | 46.35 | 9.87 | 7.95 | 5.06 | 54.08 | 3.12 | 80.07 | 126.42 |

MATERIALS:

- 60 LBS. WHEAT SEED (\$7.80/AC), 11.54 LBS. THIO-SULFATE (\$1.43/AC), 50 LBS. AMM. PHOSPHATE (\$6.88/AC), 95.66 LBS. SOLUTION 32 (\$15.14/AC)
- 0.67 OZ. MAVERICK (\$10.22/AC), 3.2 OZ. R-11 SURFACTANT (\$0.28/AC)
- 0.5 OZ. AIM (\$2.73/AC), 3.2 OZ. R-11 SURFACTANT (\$0.28/AC)
- 24 OZ SUREFIRE (\$7.03/AC), 3.2 OZ. LI-700 SURFACTANT (\$0.56/AC)
- OVERHEAD = 5% OF TOTAL VARIABLE COST

TABLE A5. ITEMIZED COST PER ACRE FOR SOFT WHITE SPRING WHEAT,
POSITION ONE, ROTATION ONE, RITZVILLE, WA, 2002.

| | | PRICE OR | | VALUE OR | YOUR |
|-----------------------|------|----------------|----------|----------|-------|
| | | UNIT COST/UNIT | QUANTITY | COST | FARM |
| ----- | | | | | |
| VARIABLE COSTS | | \$ | | \$ | |
| ROUND-UP | OZ | .23 | 16.00 | 3.74 | _____ |
| R-11 SURFACT | OZ | .09 | 3.20 | .28 | _____ |
| S.W. WHEAT SEED | LB | .13 | 70.00 | 9.10 | _____ |
| SOLUTION 32 | LB | .16 | 110.34 | 17.43 | _____ |
| AMM. PHOSPHATE | LB | .14 | 25.00 | 3.45 | _____ |
| THIO-SULFATE | LB | .12 | 5.77 | .72 | _____ |
| BARRAGE | OZ | .25 | 8.00 | 1.97 | _____ |
| CLARITY | OZ | .74 | 2.00 | 1.48 | _____ |
| SUREFIRE | OZ | .29 | 24.00 | 7.03 | _____ |
| LI-700 SURFACT | OZ | .17 | 3.20 | .56 | _____ |
| CONT SW INSUR | ACRE | 1.47 | 1.00 | 1.47 | _____ |
| MACHINERT FUEL/LUBE | ACRE | 4.05 | 1.00 | 4.05 | _____ |
| MACHINERY REPAIRS* | ACRE | 5.82 | 1.00 | 5.82 | _____ |
| LABOR (TRAC/MACH) | HOUR | 13.00 | 0.61 | 7.95 | _____ |
| OVERHEAD | ACRE | 3.34 | 1.00 | 3.34 | _____ |
| INTEREST ON OP. CAP. | ACRE | 1.83 | 1.00 | 1.83 | _____ |
| TOTAL VARIABLE COST | | | | 70.21 | _____ |
| ----- | | | | | |
| FIXED COSTS | | \$ | | \$ | |
| MACHINE DEPRECIATION* | ACRE | 13.55 | 1.00 | 13.55 | _____ |
| MACHINE INTEREST* | ACRE | 12.05 | 1.00 | 12.05 | _____ |
| MACHINE INSURANCE* | ACRE | 1.11 | 1.00 | 1.11 | _____ |
| MACHINE TAXES* | ACRE | 3.34 | 1.00 | 3.34 | _____ |
| MACHINE HOUSING* | ACRE | 1.85 | 1.00 | 1.85 | _____ |
| LAND RENT** | ACRE | 13.15 | 1.00 | 13.15 | _____ |
| LAND TAX | ACRE | 4.00 | 1.00 | 4.00 | _____ |
| TOTAL FIXED COST | | | | 49.05 | _____ |
| TOTAL COST | | | | 119.27 | _____ |
| ----- | | | | | |

*INCLUDES BUILDINGS, TOOLS AND TANKS.

** 1/3 CROP - 1/3 FERTILIZER COST - 1/3 CROP INSURANCE - 1 YR LAND TAXES.

WHEAT YIELD FROM EXPERIMENT IS 23 BUSHEL.

FIVE YEAR AVERAGE FARM GATE PRICE OF WHEAT IS \$3.24/BUSHEL.

TABLE A6. SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR SOFT WHITE SPRING WHEAT, POSITION ONE, ROTATION ONE, RITZVILLE, WA, 2002.

| OPERATION | TOOLING | MTH | YEAR | MACH HOURS | LABOR HOURS | TOTAL FIXED COST | VARIABLE COST | | | | | TOTAL VARIABLE COST | TOTAL COST |
|-----------------|--------------------------------|-----|------|------------|-------------|------------------|-----------------------|------------|---------|----------|--------|---------------------|------------|
| | | | | | | | FUEL, LUBE, & REPAIRS | MACH LABOR | SERVICE | MATER. | INTER. | | |
| | | | | | | \$ | \$ | \$ | \$ | \$ | \$ | \$ | |
| SPRAY ONE PLANT | JD 4630, 80' HOMEBUILT SPRAYER | MAR | 2002 | .02 | .02 | .42 | .23 | .27 | .00 | 4.02(1) | .17 | 4.69 | 5.10 |
| INSURANCE | JD 8650, FLEX COIL 6000 | APR | 2002 | .10 | .12 | 15.88 | 3.02 | 1.50 | .00 | 30.70(2) | 1.14 | 36.35 | 52.24 |
| SPRAY TWO | CROP INSURANCE | SEA | 2002 | .00 | .00 | .00 | .00 | .00 | 1.47 | .00 | .05 | 1.52 | 1.52 |
| HARVEST | JD 4630, 80' HOMEBUILT SPRAYER | MAY | 2002 | .02 | .02 | .42 | .23 | .27 | .00 | 3.45(3) | .11 | 4.06 | 4.47 |
| SPRAY THREE | JD 8820 COMBINE | AUG | 2002 | .10 | .12 | 1.16 | 2.58 | 1.50 | .00 | .00 | .04 | 4.12 | 5.28 |
| HAUL | JD 4630, 80' HOMEBUILT SPRAYER | AUG | 2002 | .02 | .02 | .42 | .23 | .27 | .00 | 7.59(4) | .09 | 8.18 | 8.59 |
| MISC. USE | C-60 30000 GVW TRUCK | AUG | 2002 | .05 | .06 | .50 | .42 | .78 | .00 | .00 | .01 | 1.21 | 1.71 |
| MISC. USE | MACHINE SHED & SHOP BUILDINGS | ANN | 2002 | .00 | .00 | 6.17 | .92 | .00 | .00 | .00 | .03 | .95 | 7.12 |
| MISC. USE | FUEL & MISCELLANEOUS TANKS | ANN | 2002 | .00 | .00 | 1.91 | .09 | .00 | .00 | .00 | .00 | 1.00 | 2.00 |
| MISC. USE | 1983 1-TON GMC SERVICE TRUCK | ANN | 2002 | .08 | .08 | .51 | 1.03 | 1.04 | .00 | .00 | .07 | 2.14 | 2.65 |
| MISC. USE | 4-WHEEL ATV | ANN | 2002 | .06 | .07 | .16 | .11 | .91 | .00 | .00 | .03 | 1.05 | 1.21 |
| MISC. USE | SHOP TOOLS | ANN | 2002 | .00 | .00 | 3.19 | .46 | .00 | .00 | .00 | .01 | .48 | 3.66 |
| MISC. USE | 1990 1-TON GMC TRUCK | ANN | 2002 | .10 | .11 | 1.17 | .54 | 1.43 | .00 | .00 | .06 | 2.04 | 3.21 |
| LAND TAX | LAND TAX | ANN | 2002 | .00 | .00 | 4.00 | .00 | .00 | .00 | .00 | .00 | .00 | 4.00 |
| LAND RENT | NET RENT/OPPORTUNITY COST | ANN | 2002 | .00 | .00 | 13.15 | .00 | .00 | .00 | .00 | .00 | .00 | 13.15 |
| OVERHEAD | UTILITIES, LEGAL, ACCT, ETC. | ANN | 2002 | .00 | .00 | .00 | .00 | .00 | 3.34(5) | .00 | .00 | 3.34 | 3.34 |
| TOTAL PER ACRE | | | | .54 | .61 | 49.05 | 9.87 | 7.95 | 4.81 | 45.76 | 1.83 | 70.21 | 119.27 |

MATERIALS:

- 16 OZ. ROUNDUP (\$3.75/AC), 3.2 OZ. R-11 SURFACTANT (\$0.28/AC)
- 70 LBS. WHEAT SEED (\$9.10/AC), 5.77 LBS THIO-SULFATE (\$0.72/AC), 25 LBS. AMM. PHOSPHATE (\$3.44/AC), 110.34 LBS. SOLUTION 32 (\$17.46/AC)
- 8 OZ. BARRAGE (\$1.97/AC), 2 OZ. CLARITY (\$1.48/AC)
- 24 OZ. SUREFIRE (\$7.03/AC), LI-700 SURFACTANT (\$0.56/AC)
- OVERHEAD = 5% OF TOTAL VARIABLE COST

TABLE A7. ITEMIZED COST PER ACRE FOR SOFT WHITE SPRING WHEAT,
POSITION TWO, ROTATION ONE, RITZVILLE, WA, 2002

| | | PRICE OR | | VALUE OR | YOUR |
|-----------------------|------|----------------|----------|----------|-------|
| | | UNIT COST/UNIT | QUANTITY | COST | FARM |
| VARIABLE COSTS | | \$ | | \$ | |
| ROUND-UP | OZ | .23 | 16.00 | 3.74 | _____ |
| R-11 SURFACT | OZ | .09 | 3.20 | .28 | _____ |
| S.W. WHEAT SEED | LB | .13 | 70.00 | 9.10 | _____ |
| SOLUTION 32 | LB | .16 | 110.34 | 17.43 | _____ |
| AMM. PHOSPHATE | LB | .14 | 25.00 | 3.45 | _____ |
| THIO-SULFATE | LB | .12 | 5.77 | .72 | _____ |
| BARRAGE | OZ | .25 | 8.00 | 1.97 | _____ |
| CLARITY | OZ | .74 | 2.00 | 1.48 | _____ |
| SUREFIRE | OZ | .29 | 24.00 | 7.03 | _____ |
| LI-700 SURFACT | OZ | .17 | 3.20 | .56 | _____ |
| CONT SW INSUR | ACRE | 1.47 | 1.00 | 1.47 | _____ |
| MACHINERY FUEL/LUBE | ACRE | 4.05 | 1.00 | 4.05 | _____ |
| MACHINERY REPAIRS* | ACRE | 5.82 | 1.00 | 5.82 | _____ |
| LABOR (TRAC/MACH) | HOUR | 13.00 | .61 | 7.95 | _____ |
| OVERHEAD | ACRE | 3.34 | 1.00 | 3.34 | _____ |
| INTEREST ON OP. CAP. | ACRE | 1.83 | 1.00 | 1.83 | _____ |
| TOTAL VARIABLE COST | | | | 70.21 | _____ |
| FIXED COSTS | | \$ | | \$ | |
| MACHINE DEPRECIATION* | ACRE | 13.55 | 1.00 | 13.55 | _____ |
| MACHINE INTEREST* | ACRE | 12.05 | 1.00 | 12.05 | _____ |
| MACHINE INSURANCE* | ACRE | 1.11 | 1.00 | 1.11 | _____ |
| MACHINE TAXES* | ACRE | 3.34 | 1.00 | 3.34 | _____ |
| MACHINE HOUSING* | ACRE | 1.85 | 1.00 | 1.85 | _____ |
| LAND RENT** | ACRE | 13.15 | 1.00 | 13.15 | _____ |
| LAND TAX | ACRE | 4.00 | 1.00 | 4.00 | _____ |
| TOTAL FIXED COST | | | | 49.05 | _____ |
| TOTAL COST | | | | 119.27 | _____ |

*INCLUDES BUILDINGS, TOOLS AND TANKS.

** 1/3 CROP - 1/3 FERTILIZER COST - 1/3 CROP INSURANCE - 1 YR LAND TAXES.

WHEAT YIELD FROM EXPERIMENT IS 23 BUSHEL.
FIVE YEAR AVERAGE FARM GATE PRICE OF WHEAT IS \$3.24/BUSHEL.

TABLE A9. ITEMIZED COST PER ACRE FOR SOFT WHITE WINTER WHEAT, ROTATION TWO, RITZVILLE, WA 2002

| | | PRICE OR | | VALUE OR | YOUR |
|-----------------------|------|----------------|----------|----------|-------|
| | | UNIT COST/UNIT | QUANTITY | COST | FARM |
| ----- | | | | | |
| VARIABLE COSTS | | \$ | | \$ | |
| S.W. WHEAT SEED | LB | .13 | 60.00 | 7.80 | _____ |
| SOLUTION 32 | LB | .16 | 95.66 | 15.11 | _____ |
| THIO-SULFATE | LB | .12 | 11.54 | 1.43 | _____ |
| AMM. PHOSPHATE | LB | .14 | 50.00 | 6.90 | _____ |
| MAVERICK | OZ | 15.25 | .67 | 10.22 | _____ |
| R-11 SURFACT | OZ | .09 | 3.20 | .28 | _____ |
| 2,4-D, LV6 | OZ | .14 | 12.00 | 1.74 | _____ |
| AIM | OZ | 5.47 | .50 | 2.73 | _____ |
| R-11 SURFACT | OZ | .09 | 3.20 | .28 | _____ |
| SUREFIRE | OZ | .29 | 24.00 | 7.03 | _____ |
| LI-700 SURFACT | OZ | .17 | 3.20 | .56 | _____ |
| CONT. WW INSUR | ACRE | 1.25 | 1.00 | 1.25 | _____ |
| MACHINERY FUEL/LUBE | ACRE | 4.05 | 1.00 | 4.05 | _____ |
| MACHINERY REPAIRS* | ACRE | 5.82 | 1.00 | 5.82 | _____ |
| LABOR (TRAC/MACH) | HOUR | 13.00 | .61 | 7.95 | _____ |
| OVERHEAD | ACRE | 3.81 | 1.00 | 3.81 | _____ |
| INTEREST ON OP. CAP. | ACRE | 3.12 | 1.00 | 3.12 | _____ |
| | | | | ----- | |
| TOTAL VARIABLE COST | | | | 80.07 | _____ |
| | | | | | |
| FIXED COSTS | | \$ | | \$ | |
| MACHINE DEPRECIATION* | ACRE | 13.55 | 1.00 | 13.55 | _____ |
| MACHINE INTEREST* | ACRE | 12.05 | 1.00 | 12.05 | _____ |
| MACHINE INSURANCE* | ACRE | 1.11 | 1.00 | 1.11 | _____ |
| MACHINE TAXES* | ACRE | 3.34 | 1.00 | 3.34 | _____ |
| MACHINE HOUSING* | ACRE | 1.85 | 1.00 | 1.85 | _____ |
| LAND RENT** | ACRE | 5.05 | 1.00 | 5.05 | _____ |
| LAND TAX | ACRE | 4.00 | 1.00 | 4.00 | _____ |
| | | | | ----- | |
| TOTAL FIXED COST | | | | 40.95 | _____ |
| | | | | | |
| TOTAL COST | | | | 121.02 | _____ |
| ----- | | | | | |

*INCLUDES BUILDINGS, TOOLS AND TANKS.

** 1/3 CROP - 1/3 FERTILIZER COST - 1/3 CROP INSURANCE - 1 YR LAND TAXES.

WHEAT YIELD FROM EXPERIMENT IS 16 BUSHEL.

FIVE YEAR AVERAGE FARM GATE PRICE OF WHEAT IS \$3.24/BUSHEL.

TABLE A10. SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR SOFT WHITE WINTER WHEAT, ROTATION TWO, RITZVILLE, WA, 2002.

| OPERATION | TOOLING | MTH | YEAR | MACH HOURS | LABOR HOURS | VARIABLE COST | | | | | | TOTAL VARIABLE COST | TOTAL COST |
|----------------|--------------------------------|-----|------|------------|-------------|------------------|-----------------------|------------|---------|----------|--------|---------------------|------------|
| | | | | | | TOTAL FIXED COST | FUEL, LUBE, & REPAIRS | MACH LABOR | SERVICE | MATER. | INTER. | | |
| | | | | | | \$ | \$ | \$ | \$ | \$ | \$ | \$ | \$ |
| PLANT | JD 8500, FLEXI COIL 6000 | NOV | 2001 | .10 | .12 | 15.88 | 3.02 | 1.50 | .00 | 31.25(1) | 2.13 | 37.89 | 53.77 |
| INSURANCE | CROP INSURANCE | SEA | 2002 | .00 | .00 | .00 | .00 | .00 | 1.25 | .00 | .04 | 1.29 | 1.29 |
| SPRAY ONE | JD 4630, 80' HOMEBUILT SPRAYER | MAR | 2002 | .02 | .02 | .42 | .23 | .27 | .00 | 10.49(2) | .42 | 11.41 | 11.82 |
| SPRAY TWO | JD 4630, 80' HOMEBUILT SPRAYER | APR | 2002 | .02 | .02 | .42 | .23 | .27 | .00 | 4.75(3) | .17 | 5.42 | 5.83 |
| HARVEST | JD 8820 COMBINE | AUG | 2002 | .10 | .12 | 1.16 | 2.58 | 1.50 | .00 | .00 | .04 | 4.12 | 5.28 |
| SPRAY THREE | JD 4630, 80' HOMEBUILT SPRAYER | AUG | 2002 | .02 | .02 | .42 | .23 | .27 | .00 | 7.59(4) | .09 | 8.18 | 8.59 |
| HAUL | C-60 30000 GVW TRUCK | AUG | 2002 | .05 | .06 | .50 | .42 | .78 | .00 | .00 | .01 | 1.21 | 1.71 |
| MISC. USE | MACHINE SHED & SHOP BUILDINGS | ANN | 2002 | .00 | .00 | 6.17 | .92 | .00 | .00 | .00 | .03 | .95 | 7.12 |
| MISC. USE | FUEL & MISCELLANEOUS TANKS | ANN | 2002 | .00 | .00 | 1.91 | .09 | .00 | .00 | .00 | .00 | .10 | 2.00 |
| MISC. USE | 1983 1-TON GMC SERVICE TRUCK | ANN | 2002 | .08 | .08 | .51 | 1.03 | 1.04 | .00 | .00 | .07 | 2.14 | 2.65 |
| MISC. USE | 4-WHEEL ATV | ANN | 2002 | .06 | .07 | .16 | .11 | .91 | .00 | .00 | .03 | 1.05 | 1.21 |
| MISC. USE | SHOP TOOLS | ANN | 2002 | .00 | .00 | 3.19 | .46 | .00 | .00 | .00 | .01 | .48 | 3.66 |
| MISC. USE | 1990 1-TON GMC TRUCK | ANN | 2002 | .10 | .11 | 1.17 | .54 | 1.43 | .00 | .00 | .06 | 2.04 | 3.21 |
| LAND TAX | LAND TAX | ANN | 2002 | .00 | .00 | 4.00 | .00 | .00 | .00 | .00 | .00 | .00 | 4.00 |
| LAND RENT | NET RENT/OPPORTUNITY COST | ANN | 2002 | .00 | .00 | 5.05 | .00 | .00 | .00 | .00 | .00 | .00 | 5.05 |
| OVERHEAD | UTILITIES, LEGAL, ACCT, ETC. | ANN | 2002 | .00 | .00 | .00 | .00 | .00 | 3.81(5) | .00 | .00 | 3.81 | 3.81 |
| TOTAL PER ACRE | | | | .54 | .61 | 40.95 | 9.87 | 7.95 | 5.06 | 54.08 | 3.12 | 80.07 | 121.02 |

MATERIALS:

- 60 LBS. WHEAT SEED (\$7.80/AC), 11.54 LBS. THIO-SULFATE (\$1.43/AC), 50 LBS. AMM. PHOSPHATE (\$6.88/AC), 95.66 LBS. SOLUTION 32 (\$15.14/AC)
- 0.67 OZ. MAVERICK (\$10.22/AC), 3.2 OZ. R-11 SURFACTANT (\$0.28/AC)
- 0.5 OZ. AIM (\$2.73/AC), 3.2 OZ. R-11 SURFACTANT (\$0.28/AC)
- 24 OZ SUREFIRE (\$7.03/AC), 3.2 OZ. LI-700 SURFACTANT (\$0.56/AC)
- OVERHEAD = 5% OF TOTAL VARIABLE COST

TABLE A11. ITEMIZED COST PER ACRE FOR SPRING BARLEY, ROTATION TWO,
RITZVILLE, WA, 2002.

| | | PRICE OR | | VALUE OR | YOUR |
|-----------------------|------|----------------|----------|----------|-------|
| | | UNIT COST/UNIT | QUANTITY | COST | FARM |
| ----- | | | | | |
| VARIABLE COSTS | | \$ | | \$ | |
| ROUND-UP | OZ | .23 | 16.00 | 3.74 | _____ |
| R-11 SURFACT | OZ | .09 | 3.20 | .28 | _____ |
| BARLEY SEED | LB | .15 | 70.00 | 10.50 | _____ |
| SOLUTION 32 | LB | .16 | 110.34 | 17.43 | _____ |
| THIO-SULFATE | LB | .12 | 5.77 | .72 | _____ |
| AMM. PHOSPHATE | LB | .14 | 25.00 | 3.45 | _____ |
| BARRAGE | OZ | .25 | 8.00 | 1.97 | _____ |
| CLARITY | OZ | .74 | 2.00 | 1.48 | _____ |
| SUREFIRE | OZ | .29 | 24.00 | 7.03 | _____ |
| LI-700 SURFACT | OZ | .17 | 3.20 | .56 | _____ |
| BARLEY INSURANC | ACRE | 2.07 | 1.00 | 2.07 | _____ |
| MACHINERY FUEL/LUBE | ACRE | 4.05 | 1.00 | 4.05 | _____ |
| MACHINERY REPAIRS* | ACRE | 5.82 | 1.00 | 5.82 | _____ |
| LABOR (TRAC/MACH) | HOUR | 13.00 | .61 | 7.95 | _____ |
| OVERHEAD | ACRE | 3.45 | 1.00 | 3.45 | _____ |
| INTEREST ON OP. CAP. | ACRE | 1.89 | 1.00 | 1.89 | _____ |
| | | | | ----- | |
| TOTAL VARIABLE COST | | | | 72.38 | _____ |
| | | | | | |
| FIXED COSTS | | \$ | | \$ | |
| MACHINE DEPRECIATION* | ACRE | 13.55 | 1.00 | 13.55 | _____ |
| MACHINE INTEREST* | ACRE | 12.05 | 1.00 | 12.05 | _____ |
| MACHINE INSURANCE* | ACRE | 1.11 | 1.00 | 1.11 | _____ |
| MACHINE TAXES* | ACRE | 3.34 | 1.00 | 3.34 | _____ |
| MACHINE HOUSING* | ACRE | 1.85 | 1.00 | 1.85 | _____ |
| LAND RENT** | ACRE | 7.57 | 1.00 | 7.57 | _____ |
| LAND TAX | ACRE | 4.00 | 1.00 | 4.00 | _____ |
| | | | | ----- | |
| TOTAL FIXED COST | | | | 43.47 | _____ |
| | | | | | |
| TOTAL COST | | | | 115.85 | _____ |
| ----- | | | | | |

*INCLUDES BUILDINGS, TOOLS AND TANKS.

** 1/3 CROP - 1/3 FERTILIZER COST - 1/3 CROP INSURANCE - 1 YR LAND TAXES.

BARLEY YIELD FROM EXPERIMENT IS 0.65 TONS.

FIVE YEAR AVERAGE FARM GATE PRICE OF BARLEY IS \$89.84/TON.

TABLE A12. SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR SPRING BARLEY, ROTATION TWO, RITZVILLE, WA, 2002.

| OPERATION | TOOLING | MTH | YEAR | MACH HOURS | LABOR HOURS | TOTAL FIXED COST | VARIABLE COST | | | | | TOTAL VARIABLE COST | TOTAL COST |
|----------------|--------------------------------|-----|------|---------------|----------------|------------------------|-----------------------------|---------------|---------|----------|--------|---------------------------|---------------|
| | | | | | | | FUEL, LUBE, & REPAIRS | MACH LABOR | SERVICE | MATER. | INTER. | | |
| | | | | | | \$ | \$ | \$ | \$ | \$ | \$ | \$ | |
| SPRAY ONE | JD 4630, 80' HOMEBUILT SPRAYER | MAR | 2002 | .02 | .02 | .42 | .23 | .27 | .00 | 4.02(1) | .17 | 4.69 | 5.10 |
| PLANT | JD 8500 FLEXI COIL 6000 | APR | 2002 | .10 | .12 | 15.88 | 3.02 | 1.50 | .00 | 32.10(2) | 1.19 | 37.80 | 53.68 |
| INSURANCE | CROP INSURANCE | SEA | 2002 | .00 | .00 | .00 | .00 | .00 | 2.07 | .00 | .07 | 2.14 | 2.14 |
| SPRAY TWO | JD 4630, 80' HOMEBUILT SPRAYER | MAY | 2002 | .02 | .02 | .42 | .23 | .27 | .00 | 3.45(3) | .11 | 4.06 | 4.47 |
| HARVEST | JD 8820 COMBINE | AUG | 2002 | .10 | .12 | 1.16 | 2.58 | 1.50 | .00 | .00 | .04 | 4.12 | 5.28 |
| SPRAY THREE | JD 4630, 80' HOMEBUILT SPRAYER | AUG | 2002 | .02 | .02 | .42 | .23 | .27 | .00 | 7.59(4) | .09 | 8.18 | 8.59 |
| HAUL | C-60 30000 GVW TRUCK | AUG | 2002 | .05 | .06 | .50 | .42 | .78 | .00 | .00 | .01 | 1.21 | 1.71 |
| MISC. USE | MACHINE SHED & SHOP BUILDINGS | ANN | 2002 | .00 | .00 | 6.17 | .92 | .00 | .00 | .00 | .03 | .95 | 7.12 |
| MISC. USE | FUEL & MISCELLANEOUS TANKS | ANN | 2002 | .00 | .00 | 1.91 | .09 | .00 | .00 | .00 | .00 | .10 | 2.00 |
| MISC. USE | 1983 1-TON GMC SERVICE TRUCK | ANN | 2002 | .08 | .08 | .51 | 1.03 | 1.04 | .00 | .00 | .07 | 2.14 | 2.65 |
| MISC. USE | 4-WHEEL ATV | ANN | 2002 | .06 | .07 | .16 | .11 | .91 | .00 | .00 | .03 | 1.05 | 1.21 |
| MISC. USE | SHOP TOOLS | ANN | 2002 | .00 | .00 | 3.19 | .46 | .00 | .00 | .00 | .01 | .48 | 3.66 |
| MISC. USE | 1990 1-TON GMC TRUCK | ANN | 2002 | .10 | .11 | 1.17 | .54 | 1.43 | .00 | .00 | .06 | 2.04 | 3.21 |
| LAND TAX | LAND TAX | ANN | 2002 | .00 | .00 | 4.00 | .00 | .00 | .00 | .00 | .00 | .00 | 4.00 |
| LAND RENT | NET RENT/OPPORTUNITY COST | ANN | 2002 | .00 | .00 | 7.57 | .00 | .00 | .00 | .00 | .00 | .00 | 7.57 |
| OVERHEAD | UTILITIES, LEGAL, ACCT, ETC. | ANN | 2002 | .00 | .00 | .00 | .00 | .00 | 3.45(5) | .00 | .00 | 3.45 | 3.45 |
| TOTAL PER ACRE | | | | .54 | .61 | 43.47 | 9.87 | 7.95 | 5.52 | 47.16 | 1.89 | 72.38 | 115.85 |

MATERIALS:

1. 16 OZ. ROUNDUP (\$3.75/AC), 3.2 OZ. R-11 SURFACTANT (\$0.28/AC)
2. 70 LBS. BARLEY SEED (\$10.50/AC), 5.77 LBS THIO-SULFATE (\$0.72/AC), 25 LBS. AMM. PHOSPHATE (\$3.44/AC), 110.34 LBS. SOLUTION 32 (\$17.46/AC)
3. 8 OZ. BARRAGE (\$1.97/AC), 2 OZ. CLARITY (\$1.48/AC)
4. 24 OZ. SUREFIRE (\$7.03/AC), LI-700 SURFACTANT (\$0.56/AC)
5. OVERHEAD = 5% OF TOTAL VARIABLE COST

TABLE A13. ITEMIZED COST PER ACRE FOR YELLOW MUSTARD, ROTATION TWO, RITZVILLE, WA, 2002.

| | | PRICE OR UNIT COST/UNIT | QUANTITY | VALUE OR COST | YOUR FARM |
|-----------------------|------|----------------------------|----------|------------------|--------------|
| ----- | | | | | |
| VARIABLE COSTS | | \$ | | \$ | |
| ROUND-UP | OZ | .23 | 16.00 | 3.74 | _____ |
| R-11 SURFACT | OZ | .09 | 3.20 | .28 | _____ |
| Y MUSTARD SEED | LB | 1.00 | 8.00 | 8.00 | _____ |
| SOLUTION 32 | LB | .16 | 110.34 | 17.43 | _____ |
| THIO-SULFATE | LB | .12 | 5.77 | .72 | _____ |
| AMM. PHOSPHATE | LB | .14 | 25.00 | 3.45 | _____ |
| Y MUSTARD SEED | LB | 1.00 | 8.00 | 8.00 | _____ |
| SUREFIRE | OZ | .29 | 24.00 | 7.03 | _____ |
| LI-700 SURFACT | OZ | .17 | 3.20 | .56 | _____ |
| MACHINERY FUEL/LUBE | ACRE | 4.00 | 1.00 | 4.00 | _____ |
| MACHINERY REPAIRS* | ACRE | 5.65 | 1.00 | 5.65 | _____ |
| LABOR (TRAC/MACH) | HOUR | 13.00 | .53 | 6.90 | _____ |
| OVERHEAD | ACRE | 3.38 | 1.00 | 3.38 | _____ |
| INTEREST ON OP. CAP. | ACRE | 1.92 | 1.00 | 1.92 | _____ |
| | | | | ----- | |
| TOTAL VARIABLE COST | | | | 71.07 | _____ |
| | | | | | |
| FIXED COSTS | | \$ | | \$ | |
| MACHINE DEPRECIATION* | ACRE | 19.09 | 1.00 | 19.09 | _____ |
| MACHINE INTEREST* | ACRE | 17.47 | 1.00 | 17.47 | _____ |
| MACHINE INSURANCE* | ACRE | 1.62 | 1.00 | 1.62 | _____ |
| MACHINE TAXES* | ACRE | 4.84 | 1.00 | 4.84 | _____ |
| MACHINE HOUSING* | ACRE | 2.69 | 1.00 | 2.69 | _____ |
| LAND TAX | ACRE | 4.00 | 1.00 | 4.00 | _____ |
| | | | | ----- | |
| TOTAL FIXED COST | | | | 49.71 | _____ |
| | | | | | |
| TOTAL COST | | | | 120.77 | _____ |
| ----- | | | | | |

*INCLUDES BUILDINGS, TOOLS AND TANKS.

TABLE A14. SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR YELLOW MUSTARD, ROTATION TWO, RITZVILLE, WA 2002.

| OPERATION | TOOLING | MTH YEAR | VARIABLE COST | | | | | | | | TOTAL VARIABLE COST | TOTAL COST |
|----------------|--------------------------------|----------|---------------|----------------|------------------------|-----------------------------|---------------|----------------|----------|------|---------------------------|---------------|
| | | | MACH HOURS | LABOR HOURS | TOTAL FIXED COST | FUEL, LUBE, & REPAIRS | MACH LABOR | SERVICE MATER. | INTER. | | | |
| SPRAY ONE | JD 4630, 80' HOMEBUILT SPRAYER | MAR 2002 | .02 | .02 | .42 | .23 | .27 | .00 | 4.02(1) | .17 | 4.69 | 5.10 |
| PLANT ONE | JD 8500, FLEXI COIL 6000 | APR 2002 | .10 | .12 | 15.88 | 3.02 | 1.50 | .00 | 29.60(2) | 1.11 | 35.22 | 51.10 |
| PLANT TWO | JD 8500, FLEXI COIL 6000 | MAY 2002 | .10 | .12 | 15.88 | 3.02 | 1.50 | .00 | 8.00(3) | .34 | 12.85 | 28.73 |
| SPRAY TWO | JD 4630, 80' HOMEBUILT SPRAYER | AUG 2002 | .02 | .02 | .42 | .23 | .27 | .00 | 7.59(4) | .09 | 8.18 | 8.59 |
| MISC. USE | MACHINE SHED & SHOP BUILDINGS | ANN 2002 | .00 | .00 | 6.17 | .92 | .00 | .00 | .00 | .03 | .95 | 7.12 |
| MISC. USE | 1990 1-TON GMC TRUCK | ANN 2002 | .10 | .11 | 1.17 | .54 | 1.43 | .00 | .00 | .06 | 2.04 | 3.21 |
| MISC. USE | FUEL & MISCELLANEOUS TANKS | ANN 2002 | .00 | .00 | 1.91 | .09 | .00 | .00 | .00 | .00 | .10 | 2.00 |
| MISC. USE | 1983 1-TON GMC SERVICE TRUCK | ANN 2002 | .08 | .08 | .51 | 1.03 | 1.04 | .00 | .00 | .07 | 2.14 | 2.65 |
| MISC. USE | 4-WHEEL ATV | ANN 2002 | .06 | .07 | .16 | .11 | .91 | .00 | .00 | .03 | 1.05 | 1.21 |
| MISC. USE | SHOP TOOLS | ANN 2002 | .00 | .00 | 3.19 | .46 | .00 | .00 | .00 | .01 | .48 | 3.66 |
| LAND TAX | LAND TAX | ANN 2002 | .00 | .00 | 4.00 | .00 | .00 | .00 | .00 | .00 | .00 | 4.00 |
| OVERHEAD | UTILITIES, LEGAL, ACCT, ETC. | ANN 2002 | .00 | .00 | .00 | .00 | .00 | 3.38(5) | .00 | .00 | 3.38 | 3.38 |
| TOTAL PER ACRE | | | .47 | .53 | 49.71 | 9.65 | 6.90 | 3.38 | 49.21 | 1.92 | 71.07 | 120.77 |

MATERIALS:

1. 16 OZ. ROUNDUP (\$3.75/AC), 3.2 OZ. R-11 SURFACTANT (\$0.28/AC)
2. 8 LBS. YELLOW MUSTARD SEED (\$8.00/AC), 5.77 LBS THIO-SULFATE (\$0.72/AC), 25 LBS. AMM. PHOSPHATE (\$3.44/AC), 110.34 LBS. SOLUTION 32 (\$17.46/AC)
3. 8 LBS. YELLOW MUSTARD SEED (\$8.00/AC)
4. 24 OZ. SUREFIRE (\$7.03/AC), LI-700 SURFACTANT (\$0.56/AC)
5. OVERHEAD = 5% OF TOTAL VARIABLE COST

TABLE A15. ITEMIZED COST PER ACRE FOR SOFT WHITE SPRING WHEAT,
ROTATION TWO, RITZVILLE, WA, 2002.

| | | PRICE OR | | VALUE OR | YOUR |
|-----------------------|------|----------------|----------|----------|-------|
| | | UNIT COST/UNIT | QUANTITY | COST | FARM |
| ----- | | | | | |
| VARIABLE COSTS | | \$ | | \$ | |
| ROUND-UP | OZ | .23 | 16.00 | 3.74 | _____ |
| R-11 SURFACT | OZ | .09 | 3.20 | .28 | _____ |
| S.W. WHEAT SEED | LB | .13 | 70.00 | 9.10 | _____ |
| SOLUTION 32 | LB | .16 | 110.34 | 17.43 | _____ |
| AMM. PHOSPHATE | LB | .14 | 25.00 | 3.45 | _____ |
| THIO-SULFATE | LB | .12 | 5.77 | .72 | _____ |
| BARRAGE | OZ | .25 | 8.00 | 1.97 | _____ |
| CLARITY | OZ | .74 | 2.00 | 1.48 | _____ |
| SUREFIRE | OZ | .29 | 24.00 | 7.03 | _____ |
| LI-700 SURFACT | OZ | .17 | 3.20 | .56 | _____ |
| CONT SW INSUR | ACRE | 1.47 | 1.00 | 1.47 | _____ |
| MACHINERY FUEL/LUBE | ACRE | 4.05 | 1.00 | 4.05 | _____ |
| MACHINERY REPAIRS* | ACRE | 5.82 | 1.00 | 5.82 | _____ |
| LABOR (TRAC/MACH) | HOUR | 13.00 | .61 | 7.95 | _____ |
| OVERHEAD | ACRE | 3.34 | 1.00 | 3.34 | _____ |
| INTEREST ON OP. CAP. | ACRE | 1.83 | 1.00 | 1.83 | _____ |
| | | | | ----- | |
| TOTAL VARIABLE COST | | | | 70.21 | _____ |
| | | | | | |
| FIXED COSTS | | \$ | | \$ | |
| MACHINE DEPRECIATION* | ACRE | 13.55 | 1.00 | 13.55 | _____ |
| MACHINE INTEREST* | ACRE | 12.05 | 1.00 | 12.05 | _____ |
| MACHINE INSURANCE* | ACRE | 1.11 | 1.00 | 1.11 | _____ |
| MACHINE TAXES* | ACRE | 3.34 | 1.00 | 3.34 | _____ |
| MACHINE HOUSING* | ACRE | 1.85 | 1.00 | 1.85 | _____ |
| LAND RENT** | ACRE | 10.99 | 1.00 | 10.99 | _____ |
| LAND TAX | ACRE | 4.00 | 1.00 | 4.00 | _____ |
| | | | | ----- | |
| TOTAL FIXED COST | | | | 46.89 | _____ |
| | | | | | |
| TOTAL COST | | | | 117.11 | _____ |
| ----- | | | | | |

*INCLUDES BUILDINGS, TOOLS AND TANKS.

** 1/3 CROP - 1/3 FERTILIZER COST - 1/3 CROP INSURANCE - 1 YR LAND TAXES.

WHEAT YIELD FROM EXPERIMENT IS 21 BUSHEL.

FIVE YEAR AVERAGE FARM GATE PRICE OF WHEAT IS \$3.24/BUSHEL.

TABLE A16. SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR SOFT WHITE SPRING WHEAT, ROTATION TWO, RITZVILLE, WA, 2002.

| OPERATION | TOOLING | MTH | YEAR | MACH HOURS | LABOR HOURS | TOTAL FIXED COST | VARIABLE COST | | | | | TOTAL VARIABLE COST | TOTAL COST |
|----------------|--------------------------------|-----|------|------------|-------------|------------------|-----------------------|------------|---------|----------|--------|---------------------|------------|
| | | | | | | | FUEL, LUBE, & REPAIRS | MACH LABOR | SERVICE | MATER. | INTER. | | |
| | | | | | | \$ | \$ | \$ | \$ | \$ | \$ | \$ | |
| SPRAY ONE | JD 4630, 80' HOMEBUILT SPRAYER | MAR | 2002 | .02 | .02 | .42 | .23 | .27 | .00 | 4.02(1) | .17 | 4.69 | 5.10 |
| PLANT | JD 8650, FLEX COIL 6000 | APR | 2002 | .10 | .12 | 15.88 | 3.02 | 1.50 | .00 | 30.70(2) | 1.14 | 36.35 | 52.24 |
| INSURANCE | CROP INSURANCE | SEA | 2002 | .00 | .00 | .00 | .00 | .00 | 1.47 | .00 | .05 | 1.52 | 1.52 |
| SPRAY TWO | JD 4630, 80' HOMEBUILT SPRAYER | MAY | 2002 | .02 | .02 | .42 | .23 | .27 | .00 | 3.45(3) | .11 | 4.06 | 4.47 |
| HARVEST | JD 8820 COMBINE | AUG | 2002 | .10 | .12 | 1.16 | 2.58 | 1.50 | .00 | .00 | .04 | 4.12 | 5.28 |
| SPRAY THREE | JD 4630, 80' HOMEBUILT SPRAYER | AUG | 2002 | .02 | .02 | .42 | .23 | .27 | .00 | 7.59(4) | .09 | 8.18 | 8.59 |
| HAUL | C-60 30000 GVW TRUCK | AUG | 2002 | .05 | .06 | .50 | .42 | .78 | .00 | .00 | .01 | 1.21 | 1.71 |
| MISC. USE | MACHINE SHED & SHOP BUILDINGS | ANN | 2002 | .00 | .00 | 6.17 | .92 | .00 | .00 | .00 | .03 | .95 | 7.12 |
| MISC. USE | FUEL & MISCELLANEOUS TANKS | ANN | 2002 | .00 | .00 | 1.91 | .09 | .00 | .00 | .00 | .00 | .10 | 2.00 |
| MISC. USE | 1983 1-TON GMC SERVICE TRUCK | ANN | 2002 | .08 | .08 | .51 | 1.03 | 1.04 | .00 | .00 | .07 | 2.14 | 2.65 |
| MISC. USE | 4-WHEEL ATV | ANN | 2002 | .06 | .07 | .16 | .11 | .91 | .00 | .00 | .03 | 1.05 | 1.21 |
| MISC. USE | SHOP TOOLS | ANN | 2002 | .00 | .00 | 3.19 | .46 | .00 | .00 | .00 | .01 | .48 | 3.66 |
| MISC. USE | 1990 1-TON GMC TRUCK | ANN | 2002 | .10 | .11 | 1.17 | .54 | 1.43 | .00 | .00 | .06 | 2.04 | 3.21 |
| LAND TAX | LAND TAX | ANN | 2002 | .00 | .00 | 4.00 | .00 | .00 | .00 | .00 | .00 | .00 | 4.00 |
| LAND RENT | NET RENT/OPPORTUNITY COST | ANN | 2002 | .00 | .00 | 10.99 | .00 | .00 | .00 | .00 | .00 | .00 | 10.99 |
| OVERHEAD | UTILITIES, LEGAL, ACCT, ETC. | ANN | 2002 | .00 | .00 | .00 | .00 | .00 | 3.34(5) | .00 | .00 | 3.34 | 3.34 |
| TOTAL PER ACRE | | | | .54 | .61 | 46.89 | 9.87 | 7.95 | 4.81 | 45.76 | 1.83 | 70.21 | 117.11 |

MATERIALS:

- 16 OZ. ROUNDUP (\$3.75/AC), 3.2 OZ. R-11 SURFACTANT (\$0.28/AC)
- 70 LBS. WHEAT SEED (\$9.10/AC), 5.77 LBS THIO-SULFATE (\$0.72/AC), 25 LBS. AMM. PHOSPHATE (\$3.44/AC), 110.34 LBS. SOLUTION 32 (\$17.46/AC)
- 8 OZ. BARRAGE (\$1.97/AC), 2 OZ. CLARITY (\$1.48/AC)
- 24 OZ. SUREFIRE (\$7.03/AC), LI-700 SURFACTANT (\$0.56/AC)
- OVERHEAD = 5% OF TOTAL VARIABLE COST

TABLE A17. ITEMIZED COST PER ACRE FOR SOFT WHITE SPRING WHEAT,
ROTATION THREE, RITZVILLE, WA, 2002.

| | | PRICE OR | | VALUE OR | YOUR |
|-----------------------|------|----------------|----------|----------|-------|
| | | UNIT COST/UNIT | QUANTITY | COST | FARM |
| VARIABLE COSTS | | \$ | | \$ | |
| ROUND-UP | OZ | .23 | 16.00 | 3.74 | _____ |
| R-11 SURFACT | OZ | .09 | 3.20 | .28 | _____ |
| S.W. WHEAT SEED | LB | .13 | 70.00 | 9.10 | _____ |
| SOLUTION 32 | LB | .16 | 110.34 | 17.43 | _____ |
| AMM. PHOSPHATE | LB | .14 | 25.00 | 3.45 | _____ |
| THIO-SULFATE | LB | .12 | 5.77 | .72 | _____ |
| BARRAGE | OZ | .25 | 8.00 | 1.97 | _____ |
| CLARITY | OZ | .74 | 2.00 | 1.48 | _____ |
| SUREFIRE | OZ | .29 | 24.00 | 7.03 | _____ |
| LI-700 SURFACT | OZ | .17 | 3.20 | .56 | _____ |
| CONT SW INSUR | ACRE | 1.47 | 1.00 | 1.47 | _____ |
| MACHINERY FUEL/LUB | ACRE | 4.05 | 1.00 | 4.05 | _____ |
| MACHINERY REPAIRS* | ACRE | 5.82 | 1.00 | 5.82 | _____ |
| LABOR (TRAC/MACH) | HOUR | 13.00 | .61 | 7.95 | _____ |
| OVERHEAD | ACRE | 3.34 | 1.00 | 3.34 | _____ |
| INTEREST ON OP. CAP. | ACRE | 1.83 | 1.00 | 1.83 | _____ |
| TOTAL VARIABLE COST | | | | 70.21 | _____ |
| FIXED COSTS | | \$ | | \$ | |
| MACHINE DEPRECIATION* | ACRE | 13.55 | 1.00 | 13.55 | _____ |
| MACHINE INTEREST* | ACRE | 12.05 | 1.00 | 12.05 | _____ |
| MACHINE INSURANCE* | ACRE | 1.11 | 1.00 | 1.11 | _____ |
| MACHINE TAXES* | ACRE | 3.34 | 1.00 | 3.34 | _____ |
| MACHINE HOUSING* | ACRE | 1.85 | 1.00 | 1.85 | _____ |
| LAND RENT** | ACRE | 15.31 | 1.00 | 15.31 | _____ |
| LAND TAX | ACRE | 4.00 | 1.00 | 4.00 | _____ |
| TOTAL FIXED COST | | | | 51.21 | _____ |
| TOTAL COST | | | | 121.43 | _____ |

*INCLUDES BUILDINGS, TOOLS AND TANKS.

** 1/3 CROP - 1/3 FERTILIZER COST - 1/3 CROP INSURANCE - 1 YR LAND TAXES.

WHEAT YIELD FROM EXPERIMENT IS 25 BUSHEL.

FIVE YEAR AVERAGE FARM GATE PRICE OF WHEAT IS \$3.24/BUSHEL.

TABLE A18. SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR SOFT WHITE SPRING WHEAT, ROTATION THREE, RITZVILLE, WA, 2002.

| OPERATION | TOOLING | MTH | YEAR | MACH HOURS | LABOR HOURS | TOTAL FIXED COST | VARIABLE COST | | | | | TOTAL VARIABLE COST | TOTAL COST |
|----------------|--------------------------------|-----|------|------------|-------------|------------------|-----------------------|------------|---------|---------------|------|---------------------|------------|
| | | | | | | | FUEL, LUBE, & REPAIRS | MACH LABOR | SERVICE | MATER. INTER. | | | |
| | | | | | | \$ | \$ | \$ | \$ | \$ | \$ | \$ | \$ |
| SPRAY ONE | JD 4630, 80' HOMEBUILT SPRAYER | MAR | 2002 | .02 | .02 | .42 | .23 | .27 | .00 | 4.02(1) | .17 | 4.69 | 5.10 |
| PLANT | JD 8650, FLEX COIL 6000 | APR | 2002 | .10 | .12 | 15.88 | 3.02 | 1.50 | .00 | 30.70(2) | 1.14 | 36.35 | 52.24 |
| INSURANCE | CROP INSURANCE | SEA | 2002 | .00 | .00 | .00 | .00 | .00 | 1.47 | .00 | .05 | 1.52 | 1.52 |
| SPRAY TWO | JD 4630, 80' HOMEBUILT SPRAYER | MAY | 2002 | .02 | .02 | .42 | .23 | .27 | .00 | 3.45(3) | .11 | 4.06 | 4.47 |
| HARVEST | JD 8820 COMBINE | AUG | 2002 | .10 | .12 | 1.16 | 2.58 | 1.50 | .00 | .00 | .04 | 4.12 | 5.28 |
| SPRAY THREE | JD 4630, 80' HOMEBUILT SPRAYER | AUG | 2002 | .02 | .02 | .42 | .23 | .27 | .00 | 7.59(4) | .09 | 8.18 | 8.59 |
| HAUL | C-60 30000 GVW TRUCK | AUG | 2002 | .05 | .06 | .50 | .42 | .78 | .00 | .00 | .01 | 1.21 | 1.71 |
| MISC. USE | MACHINE SHED & SHOP BUILDINGS | ANN | 2002 | .00 | .00 | 6.17 | .92 | .00 | .00 | .00 | .03 | .95 | 7.12 |
| MISC. USE | FUEL & MISCELLANEOUS TANKS | ANN | 2002 | .00 | .00 | 1.91 | .09 | .00 | .00 | .00 | .00 | .10 | 2.00 |
| MISC. USE | 1983 1-TON GMC SERVICE TRUCK | ANN | 2002 | .08 | .08 | .51 | 1.03 | 1.04 | .00 | .00 | .07 | 2.14 | 2.65 |
| MISC. USE | 4-WHEEL ATV | ANN | 2002 | .06 | .07 | .16 | .11 | .91 | .00 | .00 | .03 | 1.05 | 1.21 |
| MISC. USE | SHOP TOOLS | ANN | 2002 | .00 | .00 | 3.19 | .46 | .00 | .00 | .00 | .01 | .48 | 3.66 |
| MISC. USE | 1990 1-TON GMC TRUCK | ANN | 2002 | .10 | .11 | 1.17 | .54 | 1.43 | .00 | .00 | .06 | 2.04 | 3.21 |
| LAND TAX | LAND TAX | ANN | 2002 | .00 | .00 | 4.00 | .00 | .00 | .00 | .00 | .00 | .00 | 4.00 |
| LAND RENT | NET RENT/OPPORTUNITY COST | ANN | 2002 | .00 | .00 | 15.31 | .00 | .00 | .00 | .00 | .00 | .00 | 15.31 |
| OVERHEAD | UTILITIES, LEGAL, ACCT, ETC. | ANN | 2002 | .00 | .00 | .00 | .00 | .00 | 3.34(5) | .00 | .00 | 3.34 | 3.34 |
| TOTAL PER ACRE | | | | .54 | .61 | 51.21 | 9.87 | 7.95 | 4.81 | 45.76 | 1.83 | 70.21 | 121.43 |

MATERIALS:

1. 16 OZ. ROUNDUP (\$3.75/AC), 3.2 OZ. R-11 SURFACTANT (\$.28/AC)
2. 70 LBS. WHEAT SEED (\$9.10/AC), 5.77 LBS THIO-SULFATE (\$.72/AC), 25 LBS. AMM. PHOSPHATE (\$3.44/AC), 110.34 LBS. SOLUTION 32 (\$17.46/AC)
3. 8 OZ. BARRAGE (\$1.97/AC), 2 OZ. CLARITY (\$1.48/AC)
4. 24 OZ. SUREFIRE (\$7.03/AC), LI-700 SURFACTANT (\$.56/AC)
5. OVERHEAD = 5% OF TOTAL VARIABLE COST

TABLE A19. ITEMIZED COST PER ACRE FOR SPRING BARLEY, ROTATION
THREE, RITZVILLE, WA, 2002.

| | | PRICE OR | | VALUE OR | YOUR |
|-----------------------|------|----------------|----------|----------|-------|
| | | UNIT COST/UNIT | QUANTITY | COST | FARM |
| ----- | | | | | |
| VARIABLE COSTS | | \$ | | \$ | |
| ROUND-UP | OZ | .23 | 16.00 | 3.74 | _____ |
| R-11 SURFACT | OZ | .09 | 3.20 | .28 | _____ |
| BARLEY SEED | LB | .15 | 70.00 | 10.50 | _____ |
| SOLUTION 32 | LB | .16 | 110.34 | 17.43 | _____ |
| THIO-SULFATE | LB | .12 | 5.77 | .72 | _____ |
| AMM. PHOSPHATE | LB | .14 | 25.00 | 3.45 | _____ |
| BARRAGE | OZ | .25 | 8.00 | 1.97 | _____ |
| CLARITY | OZ | .74 | 2.00 | 1.48 | _____ |
| SUREFIRE | OZ | .29 | 24.00 | 7.03 | _____ |
| LI-700 SURFACT | OZ | .17 | 3.20 | .56 | _____ |
| BARLEY INSURANC | ACRE | 2.07 | 1.00 | 2.07 | _____ |
| MACHINERY FUEL/LUBE | ACRE | 4.05 | 1.00 | 4.05 | _____ |
| MACHINERY REPAIRS* | ACRE | 5.82 | 1.00 | 5.82 | _____ |
| LABOR (TRAC/MACH) | HOUR | 13.00 | .61 | 7.95 | _____ |
| OVERHEAD | ACRE | 3.45 | 1.00 | 3.45 | _____ |
| INTEREST ON OP. CAP. | ACRE | 1.89 | 1.00 | 1.89 | _____ |
| | | | | ----- | |
| TOTAL VARIABLE COST | | | | 72.38 | _____ |
| | | | | | |
| FIXED COSTS | | \$ | | \$ | |
| MACHINE DEPRECIATION* | ACRE | 13.55 | 1.00 | 13.55 | _____ |
| MACHINE INTEREST* | ACRE | 12.05 | 1.00 | 12.05 | _____ |
| MACHINE INSURANCE* | ACRE | 1.11 | 1.00 | 1.11 | _____ |
| MACHINE TAXES* | ACRE | 3.34 | 1.00 | 3.34 | _____ |
| MACHINE HOUSING* | ACRE | 1.85 | 1.00 | 1.85 | _____ |
| LAND RENT** | ACRE | 10.57 | 1.00 | 10.57 | _____ |
| LAND TAX | ACRE | 4.00 | 1.00 | 4.00 | _____ |
| | | | | ----- | |
| TOTAL FIXED COST | | | | 46.47 | _____ |
| | | | | | |
| TOTAL COST | | | | 118.85 | _____ |
| ----- | | | | | |

*INCLUDES BUILDINGS, TOOLS AND TANKS.

** 1/3 CROP - 1/3 FERTILIZER COST - 1/3 CROP INSURANCE - 1 YR LAND TAXES.

BARLEY YIELD FROM EXPERIMENT IS 0.75 TONS.

FIVE YEAR AVERAGE FARM GATE PRICE OF BARLEY IS 89.84/TON.

TABLE A20. SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR SPRING BARLEY, ROTATION THREE, RITZVILLE, WA, 2002.

| OPERATION | TOOLING | MTH | YEAR | MACH HOURS | LABOR HOURS | TOTAL FIXED COST | VARIABLE COST | | | | | TOTAL VARIABLE COST | TOTAL COST |
|----------------|--------------------------------|-----|------|---------------|----------------|------------------------|-----------------------------|---------------|---------|----------|--------|---------------------------|---------------|
| | | | | | | | FUEL, LUBE, & REPAIRS | MACH LABOR | SERVICE | MATER. | INTER. | | |
| | | | | | | \$ | \$ | \$ | \$ | \$ | \$ | \$ | |
| SPRAY ONE | JD 4630, 80' HOMEBUILT SPRAYER | MAR | 2002 | .02 | .02 | .42 | .23 | .27 | .00 | 4.02(1) | .17 | 4.69 | 5.10 |
| PLANT | JD 8500 FLEXI COIL 6000 | APR | 2002 | .10 | .12 | 15.88 | 3.02 | 1.50 | .00 | 32.10(2) | 1.19 | 37.80 | 53.68 |
| INSURANCE | CROP INSURANCE | SEA | 2002 | .00 | .00 | .00 | .00 | .00 | 2.07 | .00 | .07 | 2.14 | 2.14 |
| SPRAY TWO | JD 4630, 80' HOMEBUILT SPRAYER | MAY | 2002 | .02 | .02 | .42 | .23 | .27 | .00 | 3.45(3) | .11 | 4.06 | 4.47 |
| HARVEST | JD 8820 COMBINE | AUG | 2002 | .10 | .12 | 1.16 | 2.58 | 1.50 | .00 | .00 | .04 | 4.12 | 5.28 |
| SPRAY THREE | JD 4630, 80' HOMEBUILT SPRAYER | AUG | 2002 | .02 | .02 | .42 | .23 | .27 | .00 | 7.59(4) | .09 | 8.18 | 8.59 |
| HAUL | C-60 30000 GVW TRUCK | AUG | 2002 | .05 | .06 | .50 | .42 | .78 | .00 | .00 | .01 | 1.21 | 1.71 |
| MISC. USE | MACHINE SHED & SHOP BUILDINGS | ANN | 2002 | .00 | .00 | 6.17 | .92 | .00 | .00 | .00 | .03 | .95 | 7.12 |
| MISC. USE | FUEL & MISCELLANEOUS TANKS | ANN | 2002 | .00 | .00 | 1.91 | .09 | .00 | .00 | .00 | .00 | .10 | 2.00 |
| MISC. USE | 1983 1-TON GMC SERVICE TRUCK | ANN | 2002 | .08 | .08 | .51 | 1.03 | 1.04 | .00 | .00 | .07 | 2.14 | 2.65 |
| MISC. USE | 4-WHEEL ATV | ANN | 2002 | .06 | .07 | .16 | .11 | .91 | .00 | .00 | .03 | 1.05 | 1.21 |
| MISC. USE | SHOP TOOLS | ANN | 2002 | .00 | .00 | 3.19 | .46 | .00 | .00 | .00 | .01 | .48 | 3.66 |
| MISC. USE | 1990 1-TON GMC TRUCK | ANN | 2002 | .10 | .11 | 1.17 | .54 | 1.43 | .00 | .00 | .06 | 2.04 | 3.21 |
| LAND TAX | LAND TAX | ANN | 2002 | .00 | .00 | 4.00 | .00 | .00 | .00 | .00 | .00 | .00 | 4.00 |
| LAND RENT | NET RENT/OPPORTUNITY COST | ANN | 2002 | .00 | .00 | 10.57 | .00 | .00 | .00 | .00 | .00 | .00 | 10.57 |
| OVERHEAD | UTILITIES, LEGAL, ACCT, ETC. | ANN | 2002 | .00 | .00 | .00 | .00 | .00 | 3.45(5) | .00 | .00 | 3.45 | 3.45 |
| TOTAL PER ACRE | | | | .54 | .61 | 46.47 | 9.87 | 7.95 | 5.52 | 47.16 | 1.89 | 72.38 | 118.85 |

MATERIALS:

1. 16 OZ. ROUNDUP (\$3.75/AC), 3.2 OZ. R-11 SURFACTANT (\$0.28/AC)
2. 70 LBS. BARLEY SEED (\$10.50/AC), 5.77 LBS THIO-SULFATE (\$0.72/AC), 25 LBS. AMM. PHOSPHATE (\$3.44/AC), 110.34 LBS. SOLUTION 32 (\$17.46/AC)
3. 8 OZ. BARRAGE (\$1.97/AC), 2 OZ. CLARITY (\$1.48/AC)
4. 24 OZ. SUREFIRE (\$7.03/AC), LI-700 SURFACTANT (\$0.56/AC)
5. OVERHEAD = 5% OF TOTAL VARIABLE COST

TABLE A21. ITEMIZED COST PER ACRE FOR HARD WHITE SPRING
WHEAT, ROTATION FOUR, RITZVILLE, WA 2002.

| | | PRICE OR | | VALUE OR | YOUR |
|-----------------------|------|----------------|----------|----------|-------|
| | | UNIT COST/UNIT | QUANTITY | COST | FARM |
| ----- | | | | | |
| VARIABLE COSTS | | \$ | | \$ | |
| ROUND-UP | OZ | .23 | 16.00 | 3.74 | _____ |
| R-11 SURFACT | OZ | .09 | 3.20 | .28 | _____ |
| HW WHEAT SEED | LB | .16 | 70.00 | 11.20 | _____ |
| SOLUTION 32 | LB | .16 | 110.34 | 17.43 | _____ |
| THIO-SULFATE | LB | .12 | 5.77 | .72 | _____ |
| AMM. PHOSPHATE | LB | .14 | 25.00 | 3.45 | _____ |
| BARRAGE | OZ | .25 | 8.00 | 1.97 | _____ |
| CLARITY | OZ | .74 | 2.00 | 1.48 | _____ |
| SUREFIRE | OZ | .29 | 24.00 | 7.03 | _____ |
| LI-700 SURFACT | OZ | .17 | 3.20 | .56 | _____ |
| CONT SW INSUR | ACRE | 1.47 | 1.00 | 1.47 | _____ |
| MACHINERY FUEL/LUBE | ACRE | 4.05 | 1.00 | 4.05 | _____ |
| MACHINERY REPAIRS* | ACRE | 5.82 | 1.00 | 5.82 | _____ |
| LABOR (TRAC/MACH) | HOUR | 13.00 | .61 | 7.95 | _____ |
| OVERHEAD | ACRE | 3.45 | 1.00 | 3.45 | _____ |
| INTEREST ON OP. CAP. | ACRE | 1.90 | 1.00 | 1.90 | _____ |
| | | | | ----- | |
| TOTAL VARIABLE COST | | | | 72.49 | _____ |
| | | | | | |
| FIXED COSTS | | \$ | | \$ | |
| MACHINE DEPRECIATION* | ACRE | 13.55 | 1.00 | 13.55 | _____ |
| MACHINE INTEREST* | ACRE | 12.05 | 1.00 | 12.05 | _____ |
| MACHINE INSURANCE* | ACRE | 1.11 | 1.00 | 1.11 | _____ |
| MACHINE TAXES* | ACRE | 3.34 | 1.00 | 3.34 | _____ |
| MACHINE HOUSING* | ACRE | 1.85 | 1.00 | 1.85 | _____ |
| LAND RENT** | ACRE | 16.76 | 1.00 | 16.76 | _____ |
| LAND TAX | ACRE | 4.00 | 1.00 | 4.00 | _____ |
| | | | | ----- | |
| TOTAL FIXED COST | | | | 52.66 | _____ |
| | | | | | |
| TOTAL COST | | | | 125.15 | _____ |
| ----- | | | | | |

*INCLUDES BUILDINGS, TOOLS AND TANKS.

** 1/3 CROP - 1/3 FERTILIZER COST - 1/3 CROP INSURANCE - 1 YR LAND TAXES.

WHEAT YIELD FROM EXPERIMENT IS 22 BUSHEL.

THREE YEAR AVERAGE FARM GATE PRICE OF HARD WHITE WHEAT IS \$3.88/BUSHEL.

TABLE A22. SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR HARD WHITE SPRING WHEAT, ROTATION FOUR, RITZVILLE, WA, 2002.

| OPERATION | TOOLING | MTH | YEAR | MACH HOURS | LABOR HOURS | TOTAL FIXED COST | VARIABLE COST | | | | | TOTAL VARIABLE COST | TOTAL COST |
|----------------|--------------------------------|-----|------|---------------|----------------|------------------------|-----------------------------|---------------|---------|------------------|------|---------------------------|---------------|
| | | | | | | | FUEL, LUBE, & REPAIRS | MACH LABOR | SERVICE | MATER. INTER. | | | |
| | | | | | | \$ | \$ | \$ | \$ | \$ | \$ | \$ | |
| SPRAY ONE | JD 4630, 80' HOMEBUILT SPRAYER | MAR | 2002 | .02 | .02 | .42 | .23 | .27 | .00 | 4.02(1) | .17 | 4.69 | 5.10 |
| INSURANCE | CROP INSURANCE | SEA | 2002 | .00 | .00 | .00 | .00 | .00 | 1.47 | .00 | .05 | 1.52 | 1.52 |
| PLANT | JD 8500, FLEXI COIL 6000 | APR | 2002 | .10 | .12 | 15.88 | 3.02 | 1.50 | .00 | 32.80(2) | 1.21 | 38.52 | 54.40 |
| SPRAY TWO | JD 4630, 80' HOMEBUILT SPRAYER | MAY | 2002 | .02 | .02 | .42 | .23 | .27 | .00 | 3.45(3) | .11 | 4.06 | 4.47 |
| HARVEST | JD 8820 | AUG | 2002 | .10 | .12 | 1.16 | 2.58 | 1.50 | .00 | .00 | .04 | 4.12 | 5.28 |
| SPRAY THREE | JD 4630, 80' HOMEBUILT SPRAYER | AUG | 2002 | .02 | .02 | .42 | .23 | .27 | .00 | 7.59(4) | .09 | 8.18 | 8.59 |
| HAUL | C-60 30000 GVW TRUCK | AUG | 2002 | .05 | .06 | .50 | .42 | .78 | .00 | .00 | .01 | 1.21 | 1.71 |
| MISC. USE | MACHINE SHED & SHOP BUILDINGS | ANN | 2002 | .00 | .00 | 6.17 | .92 | .00 | .00 | .00 | .03 | .95 | 7.12 |
| MISC. USE | FUEL & MISCELLANEOUS TANKS | ANN | 2002 | .00 | .00 | 1.91 | .09 | .00 | .00 | .00 | .00 | .10 | 2.00 |
| MISC. USE | 1983 1-TON GMC SERVICE TRUCK | ANN | 2002 | .08 | .08 | .51 | 1.03 | 1.04 | .00 | .00 | .07 | 2.14 | 2.65 |
| MISC. USE | 4-WHEEL ATV | ANN | 2002 | .06 | .07 | .16 | .11 | .91 | .00 | .00 | .03 | 1.05 | 1.21 |
| MISC. USE | SHOP TOOLS | ANN | 2002 | .00 | .00 | 3.19 | .46 | .00 | .00 | .00 | .01 | .48 | 3.66 |
| MISC. USE | 1990 1-TON GMC TRUCK | ANN | 2002 | .10 | .11 | 1.17 | .54 | 1.43 | .00 | .00 | .06 | 2.04 | 3.21 |
| LAND TAX | LAND TAX | ANN | 2002 | .00 | .00 | 4.00 | .00 | .00 | .00 | .00 | .00 | .00 | 4.00 |
| LAND RENT | NET RENT/OPPORTUNITY COST | ANN | 2002 | .00 | .00 | 16.76 | .00 | .00 | .00 | .00 | .00 | .00 | 16.76 |
| OVERHEAD | UTILITIES, LEGAL, ACCT, ETC. | ANN | 2002 | .00 | .00 | .00 | .00 | .00 | 3.45(5) | .00 | .00 | 3.45 | 3.45 |
| TOTAL PER ACRE | | | | .54 | .61 | 52.66 | 9.87 | 7.95 | 4.92 | 47.86 | 1.90 | 72.49 | 125.15 |

MATERIALS:

- 16 OZ. ROUNDUP (\$3.75/AC), 3.2 OZ. R-11 SURFACTANT (\$.28/AC)
- 70 LBS. WHEAT SEED (\$11.20/AC), 5.77 LBS THIO-SULFATE (\$.72/AC), 25 LBS. AMM. PHOSPHATE (\$3.44/AC), 110.34 LBS. SOLUTION 32 (\$17.46/AC)
- 8 OZ. BARRAGE (\$1.97/AC), 2 OZ. CLARITY (\$1.48/AC)
- 24 OZ. SUREFIRE (\$7.03/AC), LI-700 SURFACTANT (\$.56/AC)
- OVERHEAD = 5% OF TOTAL VARIABLE COST

TABLE A23. ITEMIZED COST PER ACRE FOR SPRING BARLEY, ROTATION FOUR,
RITZVILLE, WA, 2002.

| | | PRICE OR | | VALUE OR | YOUR |
|-----------------------|------|----------------|----------|----------|-------|
| | | UNIT COST/UNIT | QUANTITY | COST | FARM |
| ----- | | | | | |
| VARIABLE COSTS | | \$ | | \$ | |
| ROUND-UP | OZ | .23 | 16.00 | 3.74 | _____ |
| R-11 SURFACT | OZ | .09 | 3.20 | .28 | _____ |
| BARLEY SEED | LB | .15 | 70.00 | 10.50 | _____ |
| SOLUTION 32 | LB | .16 | 110.34 | 17.43 | _____ |
| THIO-SULFATE | LB | .12 | 5.77 | .72 | _____ |
| AMM. PHOSPHATE | LB | .14 | 25.00 | 3.45 | _____ |
| BARRAGE | OZ | .25 | 8.00 | 1.97 | _____ |
| CLARITY | OZ | .74 | 2.00 | 1.48 | _____ |
| SUREFIRE | OZ | .29 | 24.00 | 7.03 | _____ |
| LI-700 SURFACT | OZ | .17 | 3.20 | .56 | _____ |
| BARLEY INSURANC | ACRE | 2.07 | 1.00 | 2.07 | _____ |
| MACHINERY FUEL/LUBE | ACRE | 4.05 | 1.00 | 4.05 | _____ |
| MACHINERY REPAIRS* | ACRE | 5.82 | 1.00 | 5.82 | _____ |
| LABOR (TRAC/MACH) | ACRE | 13.00 | .61 | 7.95 | _____ |
| OVERHEAD | ACRE | 3.45 | 1.00 | 3.45 | _____ |
| INTEREST ON OP. CAP. | ACRE | 1.89 | 1.00 | 1.89 | _____ |
| | | | | ----- | |
| TOTAL VARIABLE COST | | | | 72.38 | _____ |
| | | | | | |
| FIXED COSTS | | \$ | | \$ | |
| MACHINE DEPRECIATION* | ACRE | 13.55 | 1.00 | 13.55 | _____ |
| MACHINE INTEREST* | ACRE | 12.05 | 1.00 | 12.05 | _____ |
| MACHINE INSURANCE* | ACRE | 1.11 | 1.00 | 1.11 | _____ |
| MACHINE TAXES* | ACRE | 3.34 | 1.00 | 3.34 | _____ |
| MACHINE HOUSING* | ACRE | 1.85 | 1.00 | 1.85 | _____ |
| LAND RENT** | ACRE | 11.46 | 1.00 | 11.46 | _____ |
| LAND TAX | ACRE | 4.00 | 1.00 | 4.00 | _____ |
| | | | | ----- | |
| TOTAL FIXED COST | | | | 47.36 | _____ |
| | | | | | |
| TOTAL COST | | | | 119.74 | _____ |
| ----- | | | | | |

*INCLUDES BUILDINGS, TOOLS AND TANKS.

** 1/3 CROP - 1/3 FERTILIZER COST - 1/3 CROP INSURANCE - 1 YR LAND TAXES.

BARLEY YIELD FROM EXPERIMENT IS 0.78 TONS.

FIVE YEAR AVERAGE FARM GATE PRICE OF BARLEY IS \$89.84/TON.

TABLE A24. SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR SPRING BARLEY, ROTATION FOUR, RITZVILLE, WA, 2002.

| OPERATION | TOOLING | MTH | YEAR | MACH HOURS | LABOR HOURS | TOTAL FIXED COST | VARIABLE COST | | | | | TOTAL VARIABLE COST | TOTAL COST |
|----------------|--------------------------------|-----|------|---------------|----------------|------------------------|-----------------------------|---------------|---------|------------------|------|---------------------------|---------------|
| | | | | | | | FUEL, LUBE, & REPAIRS | MACH LABOR | SERVICE | MATER. INTER. | | | |
| | | | | | | \$ | \$ | \$ | \$ | \$ | \$ | \$ | |
| SPRAY ONE | JD 4630, 80' HOMEBUILT SPRAYER | MAR | 2002 | .02 | .02 | .42 | .23 | .27 | .00 | 4.02(1) | .17 | 4.69 | 5.10 |
| PLANT | JD 8500 FLEXI COIL 6000 | APR | 2002 | .10 | .12 | 15.88 | 3.02 | 1.50 | .00 | 32.10(2) | 1.19 | 37.80 | 53.68 |
| INSURANCE | CROP INSURANCE | SEA | 2002 | .00 | .00 | .00 | .00 | .00 | 2.07 | .00 | .07 | 2.14 | 2.14 |
| SPRAY TWO | JD 4630, 80' HOMEBUILT SPRAYER | MAY | 2002 | .02 | .02 | .42 | .23 | .27 | .00 | 3.45(3) | .11 | 4.06 | 4.47 |
| HARVEST | JD 8820 COMBINE | AUG | 2002 | .10 | .12 | 1.16 | 2.58 | 1.50 | .00 | .00 | .04 | 4.12 | 5.28 |
| SPRAY THREE | JD 4630, 80' HOMEBUILT SPRAYER | AUG | 2002 | .02 | .02 | .42 | .23 | .27 | .00 | 7.59(4) | .09 | 8.18 | 8.59 |
| HAUL | C-60 30000 GVW TRUCK | AUG | 2002 | .05 | .06 | .50 | .42 | .78 | .00 | .00 | .01 | 1.21 | 1.71 |
| MISC. USE | MACHINE SHED & SHOP BUILDINGS | ANN | 2002 | .00 | .00 | 6.17 | .92 | .00 | .00 | .00 | .03 | .95 | 7.12 |
| MISC. USE | FUEL & MISCELLANEOUS TANKS | ANN | 2002 | .00 | .00 | 1.91 | .09 | .00 | .00 | .00 | .00 | .10 | 2.00 |
| MISC. USE | 1983 1-TON GMC SERVICE TRUCK | ANN | 2002 | .08 | .08 | .51 | 1.03 | 1.04 | .00 | .00 | .07 | 2.14 | 2.65 |
| MISC. USE | 4-WHEEL ATV | ANN | 2002 | .06 | .07 | .16 | .11 | .91 | .00 | .00 | .03 | 1.05 | 1.21 |
| MISC. USE | SHOP TOOLS | ANN | 2002 | .00 | .00 | 3.19 | .46 | .00 | .00 | .00 | .01 | .48 | 3.66 |
| MISC. USE | 1990 1-TON GMC TRUCK | ANN | 2002 | .10 | .11 | 1.17 | .54 | 1.43 | .00 | .00 | .06 | 2.04 | 3.21 |
| LAND TAX | LAND TAX | ANN | 2002 | .00 | .00 | 4.00 | .00 | .00 | .00 | .00 | .00 | .00 | 4.00 |
| LAND RENT | NET RENT/OPPORTUNITY COST | ANN | 2002 | .00 | .00 | 11.46 | .00 | .00 | .00 | .00 | .00 | .00 | 11.46 |
| OVERHEAD | UTILITIES, LEGAL, ACCT, ETC. | ANN | 2002 | .00 | .00 | .00 | .00 | .00 | 3.45(5) | .00 | .00 | 3.45 | 3.45 |
| TOTAL PER ACRE | | | | .54 | .61 | 47.36 | 9.87 | 7.95 | 5.52 | 47.16 | 1.89 | 72.38 | 119.74 |

MATERIALS:

1. 16 OZ. ROUNDUP (\$3.75/AC), 3.2 OZ. R-11 SURFACTANT (\$0.28/AC)
2. 70 LBS. BARLEY SEED (\$10.50/AC), 5.77 LBS THIO-SULFATE (\$0.72/AC), 25 LBS. AMM. PHOSPHATE (\$3.44/AC), 110.34 LBS. SOLUTION 32 (\$17.46/AC)
3. 8 OZ. BARRAGE (\$1.97/AC), 2 OZ. CLARITY (\$1.48/AC)
4. 24 OZ. SUREFIRE (\$7.03/AC), LI-700 SURFACTANT (\$0.56/AC)
5. OVERHEAD = 5% OF TOTAL VARIABLE COST

TABLE A25. ITEMIZED COST PER ACRE FOR SOFT WHITE SPRING WHEAT,
ROTATION FIVE, RITZVILLE, WA, 2002.

| | | PRICE OR | | VALUE OR | YOUR |
|-----------------------|------|----------------|----------|----------|-------|
| | | UNIT COST/UNIT | QUANTITY | COST | FARM |
| ----- | | | | | |
| VARIABLE COSTS | | \$ | | \$ | |
| ROUND-UP | OZ | .23 | 16.00 | 3.74 | _____ |
| R-11 SURFACT | OZ | .09 | 3.20 | .28 | _____ |
| S.W. WHEAT SEED | LB | .13 | 70.00 | 9.10 | _____ |
| SOLUTION 32 | LB | .16 | 110.34 | 17.43 | _____ |
| AMM. PHOSPHATE | LB | .14 | 25.00 | 3.45 | _____ |
| THIO-SULFATE | LB | .12 | 5.77 | .72 | _____ |
| BARRAGE | OZ | .25 | 8.00 | 1.97 | _____ |
| CLARITY | OZ | .74 | 2.00 | 1.48 | _____ |
| SUREFIRE | OZ | .29 | 24.00 | 7.03 | _____ |
| LI-700 SURFACT | OZ | .17 | 3.20 | .56 | _____ |
| CONT SW INSUR | ACRE | 1.47 | 1.00 | 1.47 | _____ |
| MACHINERY FUEL/LUBE | ACRE | 4.05 | 1.00 | 4.05 | _____ |
| MACHINERY REPAIRS* | ACRE | 5.82 | 1.00 | 5.82 | _____ |
| LABOR (TRAC/MACH) | HOUR | 13.00 | .61 | 7.95 | _____ |
| OVERHEAD | ACRE | 3.34 | 1.00 | 3.34 | _____ |
| INTEREST ON OP. CAP. | ACRE | 1.83 | 1.00 | 1.83 | _____ |
| ----- | | | | | |
| TOTAL VARIABLE COST | | | | 70.21 | _____ |
| ----- | | | | | |
| FIXED COSTS | | \$ | | \$ | |
| MACHINE DEPRECIATION* | ACRE | 13.55 | 1.00 | 13.55 | _____ |
| MACHINE INTEREST* | ACRE | 12.05 | 1.00 | 12.05 | _____ |
| MACHINE INSURANCE* | ACRE | 1.11 | 1.00 | 1.11 | _____ |
| MACHINE TAXES* | ACRE | 3.34 | 1.00 | 3.34 | _____ |
| MACHINE HOUSING* | ACRE | 1.85 | 1.00 | 1.85 | _____ |
| LAND RENT** | ACRE | 12.07 | 1.00 | 12.07 | _____ |
| LAND TAX | ACRE | 4.00 | 1.00 | 4.00 | _____ |
| ----- | | | | | |
| TOTAL FIXED COST | | | | 47.97 | _____ |
| ----- | | | | | |
| TOTAL COST | | | | 118.19 | _____ |
| ----- | | | | | |

*INCLUDES BUILDINGS, TOOLS AND TANKS.

** 1/3 CROP - 1/3 FERTILIZER COST - 1/3 CROP INSURANCE - 1 YR LAND TAXES.

WHEAT YIELD FROM EXPERIMENT IS 22 BUSHEL.

FIVE YEAR AVERAGE FARM GATE PRICE OF WHEAT IS \$3.24/BUSHEL.

TABLE A26. SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR SOFT WHITE SPRING WHEAT, ROTATION FIVE, RITZVILLE, WA, 2002.

| OPERATION | TOOLING | MTH | YEAR | MACH HOURS | LABOR HOURS | TOTAL FIXED COST | VARIABLE COST | | | | | TOTAL VARIABLE COST | TOTAL COST |
|----------------|--------------------------------|-----|------|---------------|----------------|------------------------|-----------------------------|---------------|---------|----------|--------|---------------------------|---------------|
| | | | | | | | FUEL, LUBE, & REPAIRS | MACH LABOR | SERVICE | MATER. | INTER. | | |
| | | | | | | \$ | \$ | \$ | \$ | \$ | \$ | \$ | |
| SPRAY ONE | JD 4630, 80' HOMEBUILT SPRAYER | MAR | 2002 | .02 | .02 | .42 | .23 | .27 | .00 | 4.02(1) | .17 | 4.69 | 5.10 |
| PLANT | JD 8650, FLEX COIL 6000 | APR | 2002 | .10 | .12 | 15.88 | 3.02 | 1.50 | .00 | 30.70(2) | 1.14 | 36.35 | 52.24 |
| INSURANCE | CROP INSURANCE | SEA | 2002 | .00 | .00 | .00 | .00 | .00 | 1.47 | .00 | .05 | 1.52 | 1.52 |
| SPRAY TWO | JD 4630, 80' HOMEBUILT SPRAYER | MAY | 2002 | .02 | .02 | .42 | .23 | .27 | .00 | 3.45(3) | .11 | 4.06 | 4.47 |
| HARVEST | JD 8820 COMBINE | AUG | 2002 | .10 | .12 | 1.16 | 2.58 | 1.50 | .00 | .00 | .04 | 4.12 | 5.28 |
| SPRAY THREE | JD 4630, 80' HOMEBUILT SPRAYER | AUG | 2002 | .02 | .02 | .42 | .23 | .27 | .00 | 7.59(4) | .09 | 8.18 | 8.59 |
| HAUL | C-60 30000 GVW TRUCK | AUG | 2002 | .05 | .06 | .50 | .42 | .78 | .00 | .00 | .01 | 1.21 | 1.71 |
| MISC. USE | MACHINE SHED & SHOP BUILDINGS | ANN | 2002 | .00 | .00 | 6.17 | .92 | .00 | .00 | .00 | .03 | .95 | 7.12 |
| MISC. USE | FUEL & MISCELLANEOUS TANKS | ANN | 2002 | .00 | .00 | 1.91 | .09 | .00 | .00 | .00 | .00 | .10 | 2.00 |
| MISC. USE | 1983 1-TON GMC SERVICE TRUCK | ANN | 2002 | .08 | .08 | .51 | 1.03 | 1.04 | .00 | .00 | .07 | 2.14 | 2.65 |
| MISC. USE | 4-WHEEL ATV | ANN | 2002 | .06 | .07 | .16 | .11 | .91 | .00 | .00 | .03 | 1.05 | 1.21 |
| MISC. USE | SHOP TOOLS | ANN | 2002 | .00 | .00 | 3.19 | .46 | .00 | .00 | .00 | .01 | .48 | 3.66 |
| MISC. USE | 1990 1-TON GMC TRUCK | ANN | 2002 | .10 | .11 | 1.17 | .54 | 1.43 | .00 | .00 | .06 | 2.04 | 3.21 |
| LAND TAX | LAND TAX | ANN | 2002 | .00 | .00 | 4.00 | .00 | .00 | .00 | .00 | .00 | .00 | 4.00 |
| LAND RENT | NET RENT/OPPORTUNITY COST | ANN | 2002 | .00 | .00 | 12.07 | .00 | .00 | .00 | .00 | .00 | .00 | 12.07 |
| OVERHEAD | UTILITIES, LEGAL, ACCT, ETC. | ANN | 2002 | .00 | .00 | .00 | .00 | .00 | 3.34(5) | .00 | .00 | 3.34 | 3.34 |
| TOTAL PER ACRE | | | | .54 | .61 | 47.97 | 9.87 | 7.95 | 4.81 | 45.76 | 1.83 | 70.21 | 118.19 |

MATERIALS:

1. 16 OZ. ROUNDUP (\$3.75/AC), 3.2 OZ. R-11 SURFACTANT (\$0.28/AC)
2. 70 LBS. WHEAT SEED (\$9.10/AC), 5.77 LBS THIO-SULFATE (\$0.72/AC), 25 LBS. AMM. PHOSPHATE (\$3.44/AC), 110.34 LBS. SOLUTION 32 (\$17.46/AC)
3. 8 OZ. BARRAGE (\$1.97/AC), 2 OZ. CLARITY (\$1.48/AC)
4. 24 OZ. SUREFIRE (\$7.03/AC), LI-700 SURFACTANT (\$0.56/AC)
5. OVERHEAD = 5% OF TOTAL VARIABLE COST

TABLE A27. ITEMIZED COST PER ACRE FOR HARD WHITE SPRING WHEAT, ROTATION SIX, RITZVILLE, WA, 2002.

| | | PRICE OR | | VALUE OR | YOUR |
|-----------------------|------|----------------|----------|----------|-------|
| | | UNIT COST/UNIT | QUANTITY | COST | FARM |
| ----- | | | | | |
| VARIABLE COSTS | | \$ | | \$ | |
| ROUND-UP | OZ | .23 | 16.00 | 3.74 | _____ |
| R-11 SURFACT | OZ | .09 | 3.20 | .28 | _____ |
| HW WHEAT SEED | LB | .16 | 70.00 | 11.20 | _____ |
| SOLUTION 32 | LB | .16 | 110.34 | 17.43 | _____ |
| THIO-SULFATE | LB | .12 | 5.77 | .72 | _____ |
| AMM. PHOSPHATE | LB | .14 | 25.00 | 3.45 | _____ |
| BARRAGE | OZ | .25 | 8.00 | 1.97 | _____ |
| CLARITY | OZ | .74 | 2.00 | 1.48 | _____ |
| SUREFIRE | OZ | .29 | 24.00 | 7.03 | _____ |
| LI-700 SURFACT | OZ | .17 | 3.20 | .56 | _____ |
| CONT SW INSUR | ACRE | 1.47 | 1.00 | 1.47 | _____ |
| MACHINERY FUEL/LUBE | ACRE | 4.05 | 1.00 | 4.05 | _____ |
| MACHINERY REPAIRS* | ACRE | 5.82 | 1.00 | 5.82 | _____ |
| LABOR (TRAC/MACH) | HOUR | 13.00 | .61 | 7.95 | _____ |
| OVERHEAD | ACRE | 3.45 | 1.00 | 3.45 | _____ |
| INTEREST ON OP. CAP. | ACRE | 1.90 | 1.00 | 1.90 | _____ |
| | | | | ----- | |
| TOTAL VARIABLE COST | | | | 72.49 | _____ |
| | | | | | |
| FIXED COSTS | | \$ | | \$ | |
| MACHINE DEPRECIATION* | ACRE | 13.55 | 1.00 | 13.55 | _____ |
| MACHINE INTEREST* | ACRE | 12.05 | 1.00 | 12.05 | _____ |
| MACHINE INSURANCE* | ACRE | 1.11 | 1.00 | 1.11 | _____ |
| MACHINE TAXES* | ACRE | 3.34 | 1.00 | 3.34 | _____ |
| MACHINE HOUSING* | ACRE | 1.85 | 1.00 | 1.85 | _____ |
| LAND RENT** | ACRE | 15.47 | 1.00 | 15.47 | _____ |
| LAND TAX | ACRE | 4.00 | 1.00 | 4.00 | _____ |
| | | | | ----- | |
| TOTAL FIXED COST | | | | 51.37 | _____ |
| | | | | | |
| TOTAL COST | | | | 123.86 | _____ |
| ----- | | | | | |

*INCLUDES BUILDINGS, TOOLS AND TANKS.

** 1/3 CROP - 1/3 FERTILIZER COST - 1/3 CROP INSURANCE - 1 YR LAND TAXES.

WHEAT YIELD FROM EXPERIMENT IS 21 BUSHEL.

THREE YEAR AVERAGE FARM GATE PRICE OF HARD WHITE WHEAT IS \$3.88/BUSHEL.

TABLE A28. SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR HARD WHITE SPRING WHEAT, ROTATION SIX, RITZVILLE, WA, 2002.

| OPERATION | TOOLING | MTH | YEAR | MACH HOURS | LABOR HOURS | TOTAL FIXED COST | VARIABLE COST | | | | | TOTAL VARIABLE COST | TOTAL COST |
|----------------|--------------------------------|-----|------|---------------|----------------|------------------------|-----------------------------|---------------|---------|----------|--------|---------------------------|---------------|
| | | | | | | | FUEL, LUBE, & REPAIRS | MACH LABOR | SERVICE | MATER. | INTER. | | |
| | | | | | | \$ | \$ | \$ | \$ | \$ | \$ | \$ | |
| SPRAY ONE | JD 4630, 80' HOMEBUILT SPRAYER | MAR | 2002 | .02 | .02 | .42 | .23 | .27 | .00 | 4.02(1) | .17 | 4.69 | 5.10 |
| PLANT | JD 8500, FLEXI COIL 6000 | APR | 2002 | .10 | .12 | 15.88 | 3.02 | 1.50 | .00 | 32.80(2) | 1.21 | 38.52 | 54.40 |
| INSURANCE | CROP INSURANCE | SEA | 2002 | .00 | .00 | .00 | .00 | .00 | 1.47 | .00 | .05 | 1.52 | 1.52 |
| SPRAY TWO | JD 4630, 80' HOMEBUILT SPRAYER | MAY | 2002 | .02 | .02 | .42 | .23 | .27 | .00 | 3.45(3) | .11 | 4.06 | 4.47 |
| HARVEST | JD 8820 | AUG | 2002 | .10 | .12 | 1.16 | 2.58 | 1.50 | .00 | .00 | .04 | 4.12 | 5.28 |
| SPRAY THREE | JD 4630, 80' HOMEBUILT SPRAYER | AUG | 2002 | .02 | .02 | .42 | .23 | .27 | .00 | 7.59(4) | .09 | 8.18 | 8.59 |
| HAUL | C-60 30000 GVW TRUCK | AUG | 2002 | .05 | .06 | .50 | .42 | .78 | .00 | .00 | .01 | 1.21 | 1.71 |
| MISC. USE | MACHINE SHED & SHOP BUILDINGS | ANN | 2002 | .00 | .00 | 6.17 | .92 | .00 | .00 | .00 | .03 | .95 | 7.12 |
| MISC. USE | FUEL & MISCELLANEOUS TANKS | ANN | 2002 | .00 | .00 | 1.91 | .09 | .00 | .00 | .00 | .00 | .10 | 2.00 |
| MISC. USE | 1983 1-TON GMC SERVICE TRUCK | ANN | 2002 | .08 | .08 | .51 | 1.03 | 1.04 | .00 | .00 | .07 | 2.14 | 2.65 |
| MISC. USE | 4-WHEEL ATV | ANN | 2002 | .06 | .07 | .16 | .11 | .91 | .00 | .00 | .03 | 1.05 | 1.21 |
| MISC. USE | SHOP TOOLS | ANN | 2002 | .00 | .00 | 3.19 | .46 | .00 | .00 | .00 | .01 | .48 | 3.66 |
| MISC. USE | 1990 1-TON GMC TRUCK | ANN | 2002 | .10 | .11 | 1.17 | .54 | 1.43 | .00 | .00 | .06 | 2.04 | 3.21 |
| LAND TAX | LAND TAX | ANN | 2002 | .00 | .00 | 4.00 | .00 | .00 | .00 | .00 | .00 | .00 | 4.00 |
| LAND RENT | NET RENT/OPPORTUNITY COST | ANN | 2002 | .00 | .00 | 15.47 | .00 | .00 | .00 | .00 | .00 | .00 | 15.47 |
| OVERHEAD | UTILITIES, LEGAL, ACCT, ETC. | ANN | 2002 | .00 | .00 | .00 | .00 | .00 | 3.45(5) | .00 | .00 | 3.45 | 3.45 |
| TOTAL PER ACRE | | | | .54 | .61 | 51.37 | 9.87 | 7.95 | 4.92 | 47.86 | 1.90 | 72.49 | 123.86 |

MATERIALS:

- 16 OZ. ROUNDUP (\$3.75/AC), 3.2 OZ. R-11 SURFACTANT (\$0.28/AC)
- 70 LBS. WHEAT SEED (\$11.20/AC), 5.77 LBS THIO-SULFATE (\$0.72/AC), 25 LBS. AMM. PHOSPHATE (\$3.44/AC), 110.34 LBS. SOLUTION 32 (\$17.46/AC)
- 8 OZ. BARRAGE (\$1.97/AC), 2 OZ. CLARITY (\$1.48/AC)
- 24 OZ. SUREFIRE (\$7.03/AC), LI-700 SURFACTANT (\$0.56/AC)
- OVERHEAD = 5% OF TOTAL VARIABLE COST

TABLE A29. ITEMIZED COST PER ACRE FOR SURVEYED SUMMER FALLOW,
RITZVILLE, WA, 2002

| | | PRICE OR | | VALUE OR | YOUR |
|-----------------------|-------|----------------|----------|----------|-------|
| | | UNIT COST/UNIT | QUANTITY | COST | FARM |
| ----- | | | | | |
| VARIABLE COSTS | | \$ | | \$ | |
| ROUND-UP | OZ | .23 | 8.00 | 1.87 | _____ |
| AQUA N | LB | .25 | 50.00 | 12.50 | _____ |
| THIO-SULFATE | LB | .12 | 5.00 | .62 | _____ |
| MACHINERY FUEL/LUBE | ACRE | 4.51 | 1.00 | 4.51 | _____ |
| MACHINERY REPAIRS* | ACRE | 4.81 | 1.00 | 4.81 | _____ |
| LABOR (TRAC/MACH) | HOURL | 13.00 | .63 | 8.20 | _____ |
| OVERHEAD | ACRE | 1.68 | 1.00 | 1.68 | _____ |
| INTEREST ON OP. CAP. | ACRE | 1.01 | 1.00 | 1.01 | _____ |
| | | | | ----- | |
| TOTAL VARIABLE COST | | | | 35.19 | _____ |
| | | | | | |
| FIXED COSTS | | \$ | | \$ | |
| MACHINE DEPRECIATION* | ACRE | 9.29 | 1.00 | 9.29 | _____ |
| MACHINE INTEREST* | ACRE | 7.47 | 1.00 | 7.47 | _____ |
| MACHINE INSURANCE* | ACRE | .69 | 1.00 | .69 | _____ |
| MACHINE TAXES* | ACRE | 2.07 | 1.00 | 2.07 | _____ |
| MACHINE HOUSING* | ACRE | 1.15 | 1.00 | 1.15 | _____ |
| LAND TAX | ACRE | 4.00 | 1.00 | 4.00 | _____ |
| | | | | ----- | |
| TOTAL FIXED COST | | | | 24.66 | _____ |
| | | | | | |
| TOTAL COST | | | | 59.86 | _____ |
| ----- | | | | | |

*INCLUDES BUILDINGS, TOOLS AND TANKS.

TABLE A30. SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR SURVEYED SUMMER FALLOW, RITZVILLE, WA, 2002.

| OPERATION | TOOLING | MTH | YEAR | MACH HOURS | LABOR HOURS | TOTAL FIXED COST | VARIABLE COST | | | | | TOTAL VARIABLE COST | TOTAL COST |
|----------------|--------------------------------|-----|------|---------------|----------------|------------------------|-----------------------------|---------------|---------|------------------|--------|---------------------------|---------------|
| | | | | | | | FUEL, LUBE, & REPAIRS | MACH LABOR | SERVICE | MATER. INTER. | | | |
| CHISEL ONE | JD 8500, IH 55 CHISEL | NOV | 2000 | .07 | .08 | \$ 1.39 | \$ 1.56 | \$ 1.04 | \$.00 | \$.00 | \$.15 | \$ 2.76 | \$ 4.15 |
| SPRAY ONE | JD 4630, 80' HOMEBUILT SPRAYER | MAR | 2001 | .02 | .02 | .42 | .23 | .27 | .00 | 1.87(1) | .09 | 2.46 | 2.88 |
| SKEW TREAD | JD 8500, SKEWTREADER | MAR | 2001 | .03 | .04 | 1.98 | .70 | .52 | .00 | .00 | .05 | 1.27 | 3.25 |
| CHISEL TWO | JD 8500, IH 55 CHISEL | MAY | 2001 | .07 | .08 | 1.39 | 1.31 | 1.04 | .00 | 13.12(2) | .42 | 15.89 | 17.28 |
| ROD WEED ONE | JD 8500, JD 500 RODWEEDER | JUN | 2001 | .03 | .03 | .63 | .65 | .39 | .00 | .00 | .02 | 1.06 | 1.68 |
| ROD WEED TWO | JD 8500, JH 500 RODWEEDER | JUL | 2001 | .03 | .03 | .63 | .65 | .39 | .00 | .00 | .02 | 1.05 | 1.68 |
| ROD WEED THREE | JD 8500, JD 500 RODWEEDER | AUG | 2001 | .03 | .03 | .63 | .65 | .39 | .00 | .00 | .01 | 1.05 | 1.67 |
| MISC. USE | FUEL & MISCELLANEOUS TANKS | ANN | 2001 | .00 | .00 | 1.91 | .09 | .00 | .00 | .00 | .00 | .10 | 2.00 |
| MISC. USE | FARM BUILDINGS | ANN | 2001 | .00 | .00 | 6.17 | .92 | .00 | .00 | .00 | .03 | .95 | 7.12 |
| MISC. USE | 4-WHEEL ATV | ANN | 2001 | .06 | .07 | .16 | .11 | .91 | .00 | .00 | .03 | 1.05 | 1.21 |
| MISC. USE | 1 TON SERVICE TRUCK | ANN | 2001 | .08 | .08 | .51 | 1.03 | 1.04 | .00 | .00 | .07 | 2.14 | 2.65 |
| MISC. USE | 1-TON PICKUP TRUCK | ANN | 2001 | .10 | .11 | 1.17 | .54 | 1.43 | .00 | .00 | .06 | 2.04 | 3.21 |
| MISC. USE | C-60 TRUCK 30000 GVW | ANN | 2001 | .05 | .06 | .50 | .42 | .78 | .00 | .00 | .04 | 1.23 | 1.73 |
| MISC. USE | SHOP TOOLS | ANN | 2001 | .00 | .00 | 3.19 | .46 | .00 | .00 | .00 | .01 | .48 | 3.66 |
| LAND TAXES | LAND TAXES | ANN | 2001 | .00 | .00 | 4.00 | .00 | .00 | .00 | .00 | .00 | .00 | 4.00 |
| OVERHEAD | UTILITIES, LEGAL, ACCT., ETC. | ANN | 2001 | .00 | .00 | .00 | .00 | .00 | 1.68(3) | .00 | .00 | 1.68 | 1.68 |
| TOTAL PER ACRE | | | | .57 | .63 | 24.66 | 9.32 | 8.20 | 1.68 | 14.99 | 1.01 | 35.19 | 59.86 |

MATERIALS:

1. 8 OZ. ROUNDUP (\$1.87/AC)
2. 50 LB AQUA N(\$12.50/AC), 5 LBS. THIO-SULFATE (\$0.62/AC)
3. OVERHEAD = 5% OF TOTAL VARIABLE COST

TABLE A31. ITEMIZED COST PER ACRE FOR SURVEYED SOFT WHITE WINTER WHEAT
AFTER SUMMER FALLOW, RITZVILLE, WA, 2002

| | | PRICE OR | | VALUE OR | YOUR |
|-----------------------|------|----------------|----------|----------|-------|
| | | UNIT COST/UNIT | QUANTITY | COST | FARM |
| ----- | | | | | |
| VARIABLE COSTS | | \$ | | \$ | |
| S.W. WHEAT SEED | LB | .13 | 30.00 | 3.90 | _____ |
| SALVO (2,4-D) | OZ | .23 | 8.00 | 1.84 | _____ |
| HARMONY EXTRA | OZ | 13.25 | .25 | 3.31 | _____ |
| INSURANCE WWSF | ACRE | .98 | 1.00 | .98 | _____ |
| MACHINERY FUEL/LUBE | ACRE | 3.18 | 1.00 | 3.18 | _____ |
| MACHINERY REPAIRS* | ACRE | 4.48 | 1.00 | .14 | _____ |
| LABOR (TRAC/MACH) | HOUR | 13.00 | .54 | 6.96 | _____ |
| OVERHEAD | ACRE | 1.26 | 1.00 | 1.26 | _____ |
| INTEREST ON OP. CAP. | ACRE | .55 | 1.00 | .55 | _____ |
| | | | | ----- | |
| TOTAL VARIABLE COST | | | | 26.46 | _____ |
| | | | | | |
| FIXED COSTS | | \$ | | \$ | |
| MACHINE DEPRECIATION* | ACRE | 7.74 | 1.00 | 7.74 | _____ |
| MACHINE INTEREST* | ACRE | 6.33 | 1.00 | 6.33 | _____ |
| MACHINE INSURANCE* | ACRE | .58 | 1.00 | .58 | _____ |
| MACHINE TAXES* | ACRE | 1.75 | 1.00 | 1.75 | _____ |
| MACHINE HOUSING* | ACRE | .98 | 1.00 | .98 | _____ |
| SF COST+INT. | ACRE | 63.75 | 1.00 | 63.75 | _____ |
| LAND RENT** | ACRE | 36.88 | 1.00 | 36.88 | _____ |
| LAND TAX | ACRE | 4.00 | 1.00 | 4.00 | _____ |
| | | | | ----- | |
| TOTAL FIXED COST | | | | 122.02 | _____ |
| | | | | | |
| TOTAL COST | | | | 148.48 | _____ |
| ----- | | | | | |

*INCLUDES BUILDINGS, TOOLS AND TANKS.

** 1/3 CROP - 1/3 FERTILIZER COST - 1/3 CROP INSURANCE - 2 YR LAND TAXES.

WHEAT YIELD IS ASSUMED TO BE 45.9 BUSHEL.

FIVE YEAR AVERAGE FARM GATE PRICE OF WHEAT IS \$3.24/BUSHEL.

TABLE A32. SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR SURVEYED SOFT WHITE WINTER WHEAT AFTER FALLOW, RITZVILLE, WA, 2002

| OPERATION | TOOLING | MTH | YEAR | MACH HOURS | LABOR HOURS | TOTAL FIXED COST | VARIABLE COST | | | | | TOTAL VARIABLE COST | TOTAL COST |
|----------------|--------------------------------|-----|------|---------------|----------------|------------------------|-----------------------------|---------------|---------|---------|--------|---------------------------|---------------|
| | | | | | | | FUEL, LUBE, & REPAIRS | MACH LABOR | SERVICE | MATER. | INTER. | | |
| | | | | | | \$ | \$ | \$ | \$ | \$ | \$ | \$ | |
| PLANT | JD 8500, JD 82 616 DRILL | SEP | 2000 | .07 | .08 | 2.21 | 1.27 | 1.04 | .00 | 3.90(1) | .03 | 6.25 | 8.46 |
| CROP INSURANCE | CROP INSURANCE | ANN | 2001 | .00 | .00 | .00 | .00 | .00 | .98 | .00 | .03 | 1.01 | 1.01 |
| SPRAY ONE | JD 4630, 80' HOMEBUILT SPRAYER | APR | 2001 | .02 | .02 | .42 | .23 | .27 | .00 | 5.15(2) | .18 | 5.83 | 6.25 |
| HARVEST | JD 8820 COMBINE | JUL | 2001 | .10 | .12 | 1.16 | 2.58 | 1.50 | .00 | .00 | .07 | 4.14 | 5.31 |
| HAUL | C-60 30000 GVW TRUCK | JUL | 2001 | .05 | .06 | .50 | .42 | .78 | .00 | .00 | .02 | 1.22 | 1.71 |
| SUMMER FALLOW | SUMMER FALLOW COST + INTEREST | ANN | 2001 | .00 | .00 | 63.75 | .00 | .00 | .00 | .00 | .00 | .00 | 63.75 |
| MISC. USE | FUEL & MISCELLANEOUS TANKS | ANN | 2001 | .00 | .00 | 1.91 | .09 | .00 | .00 | .00 | .00 | .10 | 2.00 |
| MISC. USE | 4-WHEEL ATV | ANN | 2001 | .06 | .07 | .16 | .11 | .91 | .00 | .00 | .03 | 1.05 | 1.21 |
| MISC. USE | 1 TON SERVICE TRUCK | ANN | 2001 | .08 | .08 | .51 | 1.03 | 1.04 | .00 | .00 | .07 | 2.14 | 2.65 |
| MISC. USE | 1-TON PICKUP TRUCK | ANN | 2001 | .10 | .11 | 1.17 | .54 | 1.43 | .00 | .00 | .06 | 2.04 | 3.21 |
| MISC. USE | SHOP TOOLS | ANN | 2001 | .00 | .00 | 3.19 | .46 | .00 | .00 | .00 | .01 | .48 | 3.66 |
| MISC. USE | FARM BUILDINGS | ANN | 2001 | .00 | .00 | 6.17 | .92 | .00 | .00 | .00 | .03 | .95 | 7.12 |
| LAND TAXES | LAND TAXES | ANN | 2001 | .00 | .00 | 4.00 | .00 | .00 | .00 | .00 | .00 | .00 | 4.00 |
| LAND RENT | LAND RENT (OPPORTUNITY COST) | ANN | 2001 | .00 | .00 | 36.88 | .00 | .00 | .00 | .00 | .00 | .00 | 36.88 |
| OVERHEAD | UTILITIES, LEGAL, ACCT., ETC. | ANN | 2001 | .00 | .00 | .00 | .00 | .00 | 1.26(3) | .00 | .00 | 1.26 | 1.26 |
| TOTAL PER ACRE | | | | .48 | .54 | 122.02 | 7.66 | 6.96 | 2.24 | 9.05 | .55 | 26.46 | 148.48 |

MATERIALS:

1. 30 LBS. SWSW SEED (\$3.90/AC)
2. 8 OZ. 2,4D (\$1.16/AC), .25 OZ. HARMONY (\$3.31/AC)
3. OVERHEAD = 5% OF TOTAL VARIABLE COST

TABLE A33. PER HOUR AND PER ACRE MACHINERY COSTS

| MACHINERY | PURCHASE PRICE | YEARS | | ANNUAL HOURS | DEPREC- IATION | INTER- EST | INSUR- ANCE | TAXES | HOUSING | TOTAL FIXED COST | REPAIR | FUEL AND LUBE | TOTAL VARIABLE COST | TOTAL COST |
|------------------|----------------|-------------------------|------|--------------|----------------|------------|-------------|-------|---------|------------------|--------|---------------|---------------------|------------|
| | | TO TRADE | | | | | | | | | | | | |
| | \$ | -----COST PER HOUR----- | | | | | | | | | | | | |
| JD8500-250HP1985 | 45,000.00 | 10 | 350 | 7.14 | 6.04 | .56 | 1.67 | .93 | 16.34 | 5.71 | 10.83 | 16.55 | 32.88 | |
| JD8500-250HP1985 | 45,000.00 | 10 | 350 | 7.14 | 6.04 | .56 | 1.67 | .93 | 16.34 | 5.71 | 14.44 | 20.16 | 36.49 | |
| JD4630-150HP1975 | 26,000.00 | 10 | 150 | 8.33 | 8.56 | .79 | 2.37 | 1.32 | 21.37 | 6.67 | 5.42 | 12.08 | 33.45 | |
| FLEXI COIL 6000 | 120,000.00 | 12 | 100 | 58.33 | 55.25 | 5.10 | 15.30 | 8.50 | 142.48 | 10.00 | .00 | 10.00 | 152.48 | |
| JD82-616,32'DRIL | 8,000.00 | 15 | 60 | 7.78 | 4.88 | .45 | 1.35 | .75 | 15.20 | 1.67 | .00 | 1.67 | 16.87 | |
| 80'SPRAYER | 3,000.00 | 10 | 100 | .50 | 1.79 | .17 | .50 | .28 | 3.22 | 1.50 | .00 | 1.50 | 4.72 | |
| 26" IH 55 CHISEL | 2,500.00 | 20 | 70 | 1.07 | 1.63 | .15 | .45 | .25 | 3.55 | 2.14 | .00 | 2.14 | 5.69 | |
| JD 500 RODWEEDER | 1,625.00 | 15 | 40 | 1.88 | 1.73 | .16 | .48 | .27 | 4.50 | 5.00 | .00 | 5.00 | 9.50 | |
| SKEWREADER | 8,000.00 | 7 | 30 | 35.71 | 9.21 | .85 | 2.55 | 1.42 | 49.74 | 3.33 | .00 | 3.33 | 53.07 | |
| JD 8820 COMBINE | 20,000.00 | 5 | 300 | 6.67 | 3.25 | .30 | .90 | .50 | 11.62 | 15.00 | 10.83 | 25.83 | 37.45 | |
| 1983 GMC 1-TON | 4,000.00 | 15 | 70 | 2.86 | 2.32 | .21 | .64 | .36 | 6.39 | 7.14 | 5.78 | 12.92 | 19.31 | |
| 1976 CHEVY C60 | 10,000.00 | 20 | 100 | 3.75 | 4.06 | .38 | 1.13 | .63 | 9.94 | 2.00 | 6.32 | 8.32 | 18.26 | |
| 1990 1-TON GMC | 20,000.00 | 20 | 170 | 5.44 | 4.11 | .38 | 1.14 | .63 | 11.70 | 1.47 | 3.97 | 5.44 | 17.14 | |
| 1974 IH4200 SEMI | 10,000.00 | 6 | 190 | 1.75 | 3.08 | .28 | .85 | .47 | 6.44 | 2.63 | 8.12 | 10.76 | 17.20 | |
| 4- WHEEL ATV | 6,000.00 | 15 | 250 | 1.20 | .98 | .09 | .27 | .15 | 2.69 | .60 | 1.16 | 1.76 | 4.44 | |
| COIL PACKER | 17,000.00 | 20 | 40 | 13.13 | 19.09 | 1.76 | 5.29 | 2.94 | 42.21 | 1.25 | .00 | 1.25 | 43.46 | |
| | | -----ACRES COVERED----- | | | | | | | | | | | | |
| | | -----COST PER ACRE----- | | | | | | | | | | | | |
| FARM BUILDINGS | 80,000.00 | 30 | 1085 | 2.33 | 2.52 | .23 | .70 | .39 | 6.17 | .92 | .00 | .92 | 7.09 | |
| SHOP TOOLS | 30,000.00 | 15 | 1085 | 1.75 | .94 | .09 | .26 | .15 | 3.19 | .46 | .00 | .46 | 3.65 | |
| FUEL&MISC TANKS | 25,000.00 | 30 | 1085 | .77 | .75 | .07 | .21 | .12 | 1.91 | .09 | .00 | .09 | 2.00 | |

Table A34: Input and Commodity Price List 2004

| Material | Unit | Price (\$/unit) |
|--|---------------|------------------------|
| Chemicals³ | | |
| Aqua N | Pound | 0.25 |
| Round-Up | Gallon | 30.00 |
| Round-Up Ultra | Gallon | 25.04 |
| Round-Up RT | Gallon | 33.34 |
| 2,4-D, LV6 | Gallon | 18.50 |
| Banvel SGF | Gallon | 37.50 |
| Surefire | Gallon | 37.50 |
| LI-700 Surfactant | Gallon | 22.40 |
| R-11 Surfactant | Gallon | 11.00 |
| Maverick | Ounce | 15.25 |
| Aim | Quart | 175.00 |
| Barrage | Gallon | 31.50 |
| Clarity | Gallon | 95.00 |
| RT Master | Gallon | 24.00 |
| Diacamba | Gallon | 73.75 |
| Salvo (2,4-D) | Gallon | 29.50 |
| Harmony Extra | Ounce | 13.25 |
| Solution 32 | Ton | 316.45 |
| Aqua Ammonia 21% | Ton | 156.31 |
| Aqua Thio-Sulfate (12-0-0-26) | Ton | 248.19 |
| Aqua Amm. Phosphate (16-20-0-14) | Ton | 275.00 |
| Amm. Sulfate-granular | Ton | 265.00 |
| Seeds⁴ | | |
| Barley-"Baronesse" | Pound | 0.15 |
| Soft White Winter Wheat-"Eltan" | Pound | 0.13 |
| Soft White Spring Wheat-"Alpowa" | Pound | 0.13 |
| Hard White Spring Wheat-"377S" | Pound | 0.16 |
| Yellow Mustard | Pound | 1.00 |
| Safflower | Pound | 0.40 |
| Other Costs⁵ | | |
| Gasoline | Gallon | 2.01 |
| Diesel ¹ | Gallon | 1.57 |
| Electricity | Kilowatt-Hour | 0.04 |
| Interest Rate | Percentage | 0.065 |
| Machinery Labor | Hour | 13.00 |
| Land Tax | Acre | 4.00 |
| Crop Insurance | Acre | 3.35 |
| Commodity Prices (5-year average)⁶ | | |
| Soft White Spring Wheat | Bushel | 3.24 |
| Soft White Winter Wheat | Bushel | 3.24 |
| Hard White Spring Wheat ² | Bushel | 3.88 |
| Spring Barley | Ton | 89.84 |
| Yellow Mustard | Pound | 0.148 |

¹Excluding road use tax.

²Not a 5-year average, see below for further detail.

Sources:

³ Chemical input prices were provided by Ritzville Chemical, Inc. in Ritzville, WA.

⁴ Seed input prices were provided by McKay Seed in Moses Lake, WA.

⁵ Estimates of the cost of crop insurance were generated through the use of the cost estimate tool on the USDA Risk Management Agency website (www.rma.usda.gov). An estimate of land tax cost was provided by the County Assessors Office in Adams County, WA. All other inputs costs including fuel and machinery labor values are from Patterson and Smathers (Patterson, P. and R. Smathers. 2004. Idaho Crop Input Price Summary for 2004, University of Idaho).

⁶ SWSW, SWWW, and spring barley prices are all five year averages based on prices at the Lind, WA elevator from 2000-2004. Yellow mustard and safflower prices are based on a five-year average of estimated annual regional contract values from 2000-2004 provided by McKay Seed in Moses Lake, WA. The long run average price for Hard White Spring Wheat is based on a three year average of farm gate prices from 2002-2004 provided by Central Washington Grain Growers, Inc. in Wilbur, WA.



College of Agricultural, Human, and Natural Resource Sciences

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