# PRELIMINARY REPORT COMPARING HERBICIDE TOLERANT AND NON-HERBICIDE TOLERANT SOYBEANS IN EAST-CENTRAL NORTH DAKOTA

Steve Metzger

As producers continue to increase their annual seeded acreage of soybeans and reflect upon the yields and profitability of their production there is increased interest in how herbicide tolerant soybeans, often referred to as Roundup-Ready® soybeans, compare in profitability to conventional or non-herbicide tolerant varieties. In addition to the comparison based on herbicide tolerance, this study will also look at how the selection of seed row width may affect the overall profitability of this crop. This report is the first in what is intended to be a three-year review of the profitability levels in soybeans in east-central North Dakota.

Data for this preliminary report was gathered through the Carrington Area Farm Business Management Program in conjunction with the North Dakota Farm Business Management Education Program. The main geographic area from which the data for this study was collected included an area approximately 20 miles north or south and approximately 50 miles east or west of Carrington, North Dakota.

The information in this study was confined to that involving soybean production in 2002 on cash rented acres. The cash rented acreage production was selected for this review because it carries a direct land cost as compared to owned or share-cropped acreage. A total of 34 fields from 17 farms were reported. The total acreage involved in these cash rented fields was 7,017 acres (Table 1) with 3,771 acres of herbicide tolerant soybeans and 2,764 of conventional type soybeans. Any summary field data that included both types of soybeans for a single acreage was excluded from the herbicide tolerant and the conventional type soybean columns but was included in the total averages column. Several farms did report production data for both types of soybeans.

The data for this study was collected from the operators' field record books or computerized accounting programs in conjunction with all other financial and enterprise records for the farm units. Whenever possible actual scale tickets and assembly sheets were used for determining yield quantities, but some quantities recorded were based upon estimated bin measurements as recorded by the appropriate producers. It must also be noted that in this review those fields reflecting harvested yields of less than 25 bushels per acre due to extensive hail damage were deleted from the data base.

The average yield per acre favored the conventional type soybeans by .70 bushels with a yield of 34.5 bushels per acre. The value per bushel also favored the conventional type soybeans by a very small margin of $.08 with a recorded value of $5.20 per bushel. Gross income per acre was recorded at $180.06 for the conventional type soybeans versus $173.39 for the herbicide-tolerant type. The total direct costs favored the herbicide tolerant type soybeans by $2.32 per acre. The value of any chemical if provided with any of the herbicide tolerant soybeans was deducted from the seed cost and included in the chemical costs for the appropriate crop.

The herbicide-tolerant soybean acreage did incur a larger overhead cost at $27.90 per acre as compared to $23.65 for the conventional type soybeans. This average difference of $4.25 per acre was mainly due to greater amounts spent in the areas of hired labor and depreciation, with those being $2.52 and $1.16 respectively. Total costs per acre were calculated at $137.77 and $135.84 for the herbicide tolerant and the non-herbicide tolerant types respectively.

Total net return per acre was calculated at $44.22 for the conventional type soybeans or $8.60 greater than the $35.62 net return for the herbicide-tolerant type. The calculated net return figures do not include any government payments such as PFC or Direct payments, although any Loan Deficiency Payments earned were included in the price per bushel as noted in Table 1. In addition, no allowance is made for operator labor or management in the calculation of the net returns per acre. As noted at the bottom of Table 1, if $35.00 for operator labor and principal payments was added onto each of the respective totals for listed costs per acre, at a price or CCC loan rate of $4.49 per bushel the required breakeven production figure per acre of herbicide tolerant soybeans would be 36.1 bushels. The non-herbicide tolerant soybeans would require just slightly less production at 35.7 bushels per acre. Essentially at the same price both of these soybean types would require almost the same production per acre to meet the required cash flow needs.

In addition to the type of soybeans produced the question of the most appropriate row width spacing is also one that concerns producers. As noted in Table 2, in all three scenarios soybeans seeded in 10" to 18" rows had a distinct advantage over those in a row width spacing of less than 10". Overall there was a $25.64 advantage per acre for those seeded in rows spaced at 10" to 18". In a very limited data base the non-herbicide tolerant soybeans seeded in a row spacing of less than 10" were more profitable by $10.35 per acre when compared to herbicide tolerant soybeans seeded in the same row width spacing. Caution must be observed when reviewing these results due to the limited number of fields in each of these sub-divided data bases. A more accurate picture of this comparison will be available as the data base is expanded to include the next two years. As previously indicated the calculation for the net return per acre does not include any charge for operator labor and management or for principal payments.

Discussion as to the appropriateness or adequacy of including a charge of $35.00 per acre for labor and management and principal payments would certainly be appropriate. Farm size and the level of indebtedness for the individual farm would certainly be factors in determining the most accurate charges for any particular farm. Individual farm operators are encouraged to determine their own profitability levels based upon their own costs and returns.

| Table 1. Soybean Costs and Returns for 2002 (Per acre basis) | | | | |
|---|---|---|---|---|
| | | | 100% Herbicide | Non-Herbicide |
| | | Average | Tolerant | Tolerant |
| Number of Fields | | 34 | 15 | 18 |
| Number of Farms | | 17 | 10 | 10 |
| | | | | |
| Total acres of crop | | 7,017 | 3,771 | 2,764 |
| Yield in bushels per acre | | 34.0 | 33.8 | 34.5 |
| Value per bushel (Includes LDP) | $ | 5.16 | 5.12 | 5.20 |
| Total crop income per acre | $ | 175.43 | 173.27 | 179.34 |
| Misc. income per acre (Insur. & other) | $ | 0.35 | 0.12 | 0.72 |
| Gross income per acre | $ | 175.78 | 173.39 | 180.06 |
| | | | | |
| Direct Costs/Acre | | | | |
| Seed | | 22.42 | 27.11 | 15.65 |
| Fertilizer | | 12.86 | 11.06 | 13.29 |
| Crop chemicals | | 13.48 | 9.07 | 19.72 |
| Crop insurance | | 4.86 | 5.39 | 4.40 |
| Fuel and oil | | 5.41 | 4.96 | 6.13 |
| Repairs | | 10.06 | 9.42 | 9.52 |
| Custom hire | | 4.51 | 3.67 | 6.18 |
| Land rent | | 35.24 | 35.08 | 34.79 |
| Misc. | | 0.20 | 0.12 | 0.13 |
| Operating interest | | 3.51 | 3.99 | 2.38 |
| Total Direct Costs/Acre | $ | 112.55 | 109.87 | 112.19 |
| Return over Direct Costs/Acre | $ | 63.23 | 63.52 | 67.87 |
| | | | | |
| Overhead Costs/Acre | | | | |
| Hired labor | | 2.52 | 3.77 | 1.25 |
| Machinery & building leases | | 2.48 | 2.81 | 2.17 |
| Farm insurance | | 1.95 | 1.98 | 1.56 |
| Utilities | | 1.36 | 1.44 | 1.16 |
| Dues and prof. fees | | 0.53 | 0.40 | 0.51 |
| Interest | | 2.27 | 2.46 | 2.11 |
| Machinery and building depreciation | | 11.56 | 12.17 | 11.01 |
| Miscellaneous | | 3.35 | 2.87 | 3.88 |
| Total Overhead Costs/Acre | $ | 26.02 | 27.90 | 23.65 |
| Total Listed Costs/Acre | $ | 138.57 | 137.77 | 135.84 |
| Net Return per Acre | $ | 37.21 | 35.62 | 44.22 |
| | | | | |
| Direct Costs per bushel | $ | 3.31 | 3.25 | 3.25 |
| Total Listed costs per bushel | $ | 4.08 | 4.07 | 3.94 |
| Net Return per bushel | $ | 1.10 | 1.05 | 1.28 |
| Breakeven yield per acre at listed value | | 26.8 | 26.9 | 26.0 |
| | | | | |
| Govt. payments (PFC or Direct) per acre | $ | 10.14 | 10.43 | 9.70 |
| Breakeven yield with Govt. payments | | 24.8 | 24.8 | 24.1 |
| Breakeven Yield at CCC Loan Rate of $4.49 | | 28.5 | 28.3 | 27.9 |
| Total costs including $35/acre for estimated | $ | 173.57 | 172.77 | 170.84 |
| operator labor and principal payments | | | | |
| Breakeven yield including estimated | | 31.6 | 31.7 | 30.9 |
| operator labor and principal payments | | | | |
| Breakeven Yield at CCC Loan Rate of $4.49 | | 36.3 | 36.1 | 35.7 |

**Table 2. Soybean Production Results by Row Width (Per Acre Basis)**

| | | All Cash Rented Acres | | Herbicide-Tolerant | | Non-Herbicide Tolerant | |
|---|---|---|---|---|---|---|---|
| | | <10" | 10"-18" | <10" | 10"-18" | <10" | 10"-18" |
| Number of Fields | | 19 | 15 | 11 | 4 | 7 | 11 |
| Number of Farms | | 9 | 8 | 6 | 4 | 4 | 6 |
| Total Acres | | 4,367 | 2,650 | 2,632 | 1,139 | 1,254 | 1,511 |
| Yield In Bushels Per Acre | | 32.7 | 36.1 | 32.4 | 37.2 | 33.6 | 35.3 |
| Net Return Per Acre | $ | 27.53 | 53.17 | 26.43 | 56.85 | 36.78 | 50.39 |
| Excluding Gov't. Payments | | | | | | | |