A Two-Year Report Comparing Herbicide-Tolerant and Non-herbicide-Tolerant Soybeans in East Central North Dakota

Steve Metzger

With the increased emphasis on both production and profitability, soybean producers are continually looking for items that will give them an edge in these areas. The continued growth in acreage of herbicide tolerant (HT) soybeans, often referred to as Roundup-Ready® soybeans, often raises the question as to how they compare in profitability to the conventional or non-herbicide tolerant (NHT) varieties. This report is the second in what is intended to be a three-year review of the profitability of soybeans in east-central North Dakota.

Data for this report was gathered through the Carrington Area Farm Business Management Program in conjunction with the North Dakota Farm Business Management Education Program. The primary 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 data used in this study was confined to that involving soybeans on cash rented land only. The cash rented production was chosen because it carries a direct land charge as compared to owned or share-cropped acreage. The data collected from a total of 16,269 acres covering 50 fields and 27 farms in the 2003 production year was added to the 2002 production data which included 7,017 acres from 34 fields and 17 different farms. Of the total 23,286 acres (Table 1), 16,186 were designated as HT with 5,467 being listed as conventional or NHT. The remaining 1,633 acres were determined to be a mix of both HT and NHT soybeans and therefore were not included in either of the two main categories.

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 from the year 2002 that reflected yields of less than 25 bushels per acre, due to extensive hail damage, were deleted from the data base. No such deletions were necessary in 2003 and the smallest yield recorded for that year was 24 bushels.

The conventional soybeans showed additional income of $14.63 per acre with a gross of $198.60 as compared to $183.97 for the HT soybean group. The conventional soybeans also posted the highest total costs per acre at $144.61, an increase of $4.66 over the HT soybeans. The yields as calculated on a two-year average were led by the NHT varieties at 34.2 bushels for an advantage of 1.9 bushels per acre over the HT soybean group which achieved a two-year average of 32.3 bushels per acre.

The combined expenses for seed and chemical favored the HT soybeans by $2.09 per acre with the NHT group having a total of $40.10 versus $38.01 for the HT soybeans. Overhead expenses were quite similar and totaled $27.43 and $26.58 per acre, respectively for the HT and NHT groups. With all costs considered and using the two-year average prices of $5.72 and $5.80, respectively for the HT and NHT soybean groups, the respective breakeven yields were calculated to be 24.4 bushels and 24.9 bushels. With the inclusion of the government direct and counter-cyclical payments these yields would be reduced to 22.5 and 23.1 bushels, respectively. Any Loan Deficiency Payments (LDPs) are included in the average value per bushel of the soybeans.

The net return per acre, before direct and counter-cyclical payments, favored the NHT soybeans at $53.99 per acre for a difference of $9.97 when compared to the HT soybeans which achieved a net return of $44.02 per acre. Producers are reminded that this comparison of profitabilility levels does include all the various seeding widths for both types of soybeans for the 2002 and 2003 growing seasons.

When a $35.00 charge per acre was added to cover operator labor or management and principal payments, the breakeven yields were then calculated to be 28.6 and 29.1 bushels, respectively for the HT and NHT groups. With a loan rate of $4.49 per bushel these breakeven levels rose significantly to 36.4 and 37.6 bushels, respectively.

In addition to the type of soybean produced, the question of the most appropriate row width spacing is also one that arises. As noted in Table 2, in all three of the two-year average scenarios soybeans seeded in the 10" to 18" row spacing had a very distinct advantage over those seeded in rows of less than 10" in width. Rows of less than 10" in width would also include those seeded in 10" rows where the seed is flared out from 2 to 3 inches from the center of the row, resulting in the new plants being only 4 to 6 inches apart in row width.

Due to the limited size of this sub-divided database caution must be observed when reviewing these results. It should be noted that the 10" to 18" HT sub-group provided the largest net return at a two-year average of $79.63 per acre. The NHT soybeans produced a two-year average of $60.64 per acre. Both of these net income figures are calculated without including the direct or counter-cyclical government payments. Due to the greater number of HT fields and acres seeded at the less than 10" row width, the results, as shown in Table 1, do show a more positive return to NHT soybeans. If based on these two-year averages, the choices were confined to only the 10" to 18" row width spacing, the HT soybeans would show a positive profitability gain over the NHT soybeans of $18.99 per acre before government payments.

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

Literature Cited

Metzger, S.S. 2003.Preliminary Report Comparing Herbicide Tolerant and Non-Herbicide Tolerant Soybeans In East-Central North Dakota, Pages 23-25 in 2003 Carrington Research Extension Center Annual Report, Volume 44, NDSU.

Table 1. Soybean Costs and Returns for 2002-2003 (Per acre basis)				
			100% Herbicide	Non-Herbicide
		Average	Tolerant	Tolerant
Number of Fields		84	49	30
Number of Farms		44	33	16
Total acres of crop		23,286	16,186	5,467
Yield in bushels per acre		32.6	32.3	34.2
Value per bushel (Includes LDP)	$	5.74	5.72	5.80
Total crop income per acre	$	185.77	183.65	198.15
Misc. income per acre (Insur. & other)	$	0.52	0.32	0.45
Gross income per acre	$	186.29	183.97	198.60
Direct Costs/Acre				
Seed		24.17	27.82	15.72
Fertilizer		11.65	10.17	14.00
Crop chemicals		14.04	10.19	24.38
Crop insurance		6.57	6.76	6.72
Fuel and oil		5.75	5.43	6.55
Repairs		9.08	8.42	10.36
Custom hire		5.22	4.90	4.06
Land rent		35.08	35.16	34.11
Misc.		0.26	0.26	0.07
Operating interest		3.01	3.41	2.06
Total Direct Costs/Acre	$	114.83	112.52	118.03
Return over Direct Costs/Acre	$	71.46	71.45	80.57
Overhead Costs/Acre				
Hired labor		2.88	3.36	3.31
Machinery & building leases		1.89	2.17	1.18
Farm insurance		1.97	2.00	1.81
Utilities		1.31	1.32	1.43
Dues and prof. fees		0.56	0.49	0.61
Interest		2.23	2.38	2.02
Machinery and building depreciation		12.27	12.70	11.77
Miscellaneous		3.42	3.01	4.47
Total Overhead Costs/Acre	$	26.52	27.43	26.58
Total Listed Costs/Acre	$	141.35	139.95	144.61
Net Return per Acre without Gov't. Payments	$	44.94	44.02	53.99
Direct Costs per bushel	$	3.52	3.48	3.45
Total Listed costs per bushel	$	4.34	4.33	4.23
Net Return per bushel	$	1.38	1.36	1.58
Breakeven yield per acre at listed value		24.5	24.4	24.9
Gov't. payments (Direct & Co.Cyc.) per acre	$	10.29	10.98	10.20
Breakeven yield with Gov't. payments		22.7	22.5	23.1
Breakeven Yield at CCC Loan Rate of $4.49		29.1	28.7	29.8
Total costs including $35/acre for estimated operator labor and principal payments	$	176.35	174.95	179.61
Breakeven yield including estimated operator labor and principal payments		28.8	28.6	29.1
Breakeven Yield at CCC Loan Rate of $4.49		36.9	36.4	37.6

Table 2. Soybean Production Results by Row Width for 2002 and 2003

		All Cash Rented Acres		Herbicide-Tolerant		Non-Herbicide Tolerant	
		<10"	10"-18"	<10"	10"-18"	<10"	10"-18"
Number of Fields for 2 Years		47	36	33	15	10	20
Number of Farms for 2 Years		29	16	22	11	6	11
Total Acres for 2 Years		12,487	10,279	9,394	6,272	1,611	3,856
Average Yield in Bu. Per Acre		29.4	36.3	29.0	37.3	31.7	34.9
Average Net Return Per Acre	$	21.93	72.50	20.65	79.63	27.20	60.64
Excluding Gov't. Payments							