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Transgenic Sugarbeets: Potential for Increased Farm Income

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Market Report	Yr Ago	4 Wks Ago	3/17/00
Livestock and Products, Average Prices for Week Ending			
Slaughter Steers, Ch. 204, 1100-1300 lb Omaha, cwt.	$104.00	$68.08	$71.94
Feeder Steers, Med. Frame, 600-650 lb Dodge City, KS, cwt.	76.74	91.96	93.44
Feeder Steers, Med. Frame 600-650 lb, Nebraska Auction Wght. Avg.	83.53	98.05	98.07
Carcass Price, Ch. 1-3, 550-700 lb Cent. US, Equiv. Index Value, cwt.	97.36	104.36	112.16
Hogs, US 1-2, 220-230 lb Sioux Falls, SD, cwt.	28.25	41.00	44.50
Feeder Pigs, US 1-2, 40-45 lb Sioux Falls, SD, hd.	37.00	58.50	57.50
Vacuum Packed Pork Loins, Wholesale, 13-19 lb, 1/4" Trim, Cent. US, cwt.	78.70	113.50	112.00
Slaughter Lambs, Ch. & Pr., 115-125 lb Sioux Falls, SD, cwt.	*	*	75.92
Carcass Lambs, Ch. & Pr., 1-4, 55-65 lb FOB Midwest, cwt.	150.00	168.00	170.00
Crops, Cash Truck Prices for Date Shown			
Wheat, No. 1, H.W. Omaha, bu.	2.87	2.99	2.89
Corn, No. 2, Yellow Omaha, bu.	2.05	1.97	2.10
Soybeans, No. 1, Yellow Omaha, bu.	4.62	4.84	4.94
Grain Sorghum, No. 2, Yellow Kansas City, cwt.	3.56	3.30	3.62
Oats, No. 2, Heavy Sioux City, IA , bu.	1.25	1.23	1.37
Hay, First Day of Week Pile Prices			
Alfalfa, Sm. Square, RFV 150 or better Platte Valley, ton.	107.50	82.50	87.50
Alfalfa, Lg. Round, Good Northeast Nebraska, ton.	42.50	85.00	82.50
Prairie, Sm. Square, Good Northeast Nebraska, ton.	62.50	*	*

* No market.

Sugarbeets are grown on nearly 1.5 million acres in the United States, with a production value in excess of $1.1 billion for the 1997 crop year. In Nebraska, sugarbeets are grown on over 65,000 acres in a dozen western counties generating over $36 million dollars in farm revenue. There are two active sugar refineries in the area that contribute to the local economy in terms of value added activity.

At the present rate of growth in world sugar consumption, the world will need an additional 25 million tons of sugar by 2010, roughly a 20 percent increase. This increase likely will come from fewer acres of prime agricultural land if current population growth and urban sprawl continue. The lower acreage, in combination with increased demand for sugar, will require that sugarbeet productivity increase to satisfy this demand. One of the ways to meet these needs is for producers to continue to adopt the use of new technologies, including transgenic sugarbeets.

Over the past 40 years, real sugar prices have fallen by between 1.5 and 2.0 percent per year. Production costs, on a per pound of sugar basis have fallen at the same pace, enabling this industry to remain profitable. Much of the drop in production costs can be attributed to increases in productivity from new technology. If real sugar prices continue to fall, sugarbeet producers will need to continue to improve efficiencies to remain competitive. Transgenic sugarbeets may provide sugarbeet producers another tool for reducing costs and improving production efficiency.

Establishment of a weed-free stand is critical to profitable sugarbeet production. Hand weeding, mechanical cultivation, preplant herbicide application and postemergence herbicide application have all been used alone or in combinations for weed control in sugarbeet production systems. Recent development of transgenic sugarbeets with Roundup Ready® or Liberty Link®

technology presents another potential tool for weed control in sugarbeet production. From a farmer's viewpoint, the value of transgenic sugarbeets can be determined by comparing the profitability of growing transgenic sugarbeets to the profitability of growing sugarbeets with traditional methods of weed control.

Field experiments were conducted near Scottsbluff and Mitchell, Nebraska during the 1997, 1998 and 1999 growing seasons. Sugarbeets were treated with the appropriate labeled postemergence chemical regime (Betamix) based on the type of seed planted in each plot. Standard production practices were used for all field operations and furrow irrigation practices. Transgenic and non-transgenic varieties were planted at each site, and evaluated for yield, percent sucrose and sucrose loss to molasses at harvest each year.

Gross returns were calculated for each plot based on the present Western Sugar grower contract payment schedule. Cost of production for each plot was determined using the 1999 Nebraska Crop Budgets as the basis for production costs. In addition, costs for each herbicide

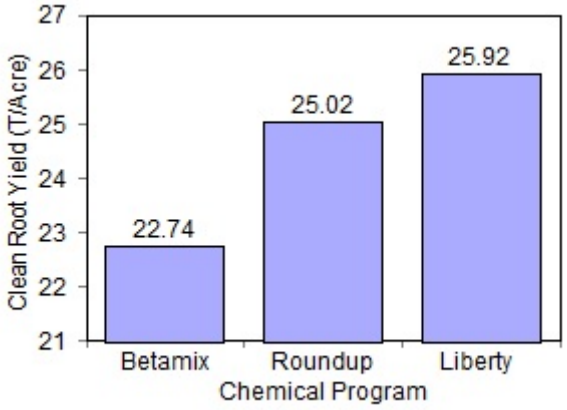

Figure 1. Clean sugarbeet root yield for each chemical program.

treatment were calculated and included in the costs. The return to investment and management (net return) was calculated for each plot.

Root yield increased for both transgenic treatments over the traditional non-transgenic treatment (Figure 1). Increased root yields range from 2.26 tons per acre for Roundup Ready® to 3.18 tons per acre for Liberty Link®. Higher percent sucrose results in a higher price per ton paid for the crop. The percent sucrose remain statistically constant, only varying 0.66 percent from highest (Liberty Link®) to the lowest (Roundup Ready®) for this study.

The gross return values for transgenic sugarbeets are higher than the non-transgenic varieties. The increases in yield coupled with constant percent sucrose values results in gross return increases of $49.34 to $136.11 per acre for Roundup Ready® and Liberty Link® sugarbeets, respectively. The net return as defined in this study is return to investment in machinery and land plus the return to operator management. Not only was there an increase in gross return for transgenic beets, but production costs also were lower. As a result, net returns increased $100.56 per acre for Roundup Ready® and $168.82 for Liberty Link® sugarbeets over the non-transgenic varieties (Figure 2). This increase in net return can be attributed to both increases in yield and herbicide cost savings (Figure 3). For the Roundup Ready® sugarbeets, the increase in net returns of $100.56 per acre was based on an increase in revenue of $46.67, attributed to increased yield and $53.88 herbicide cost savings. For the Liberty Link® sugarbeets,

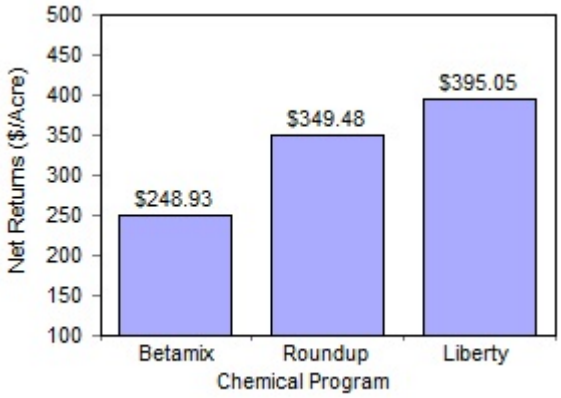

Figure 2. Net returns for sugarbeets produced in each program.

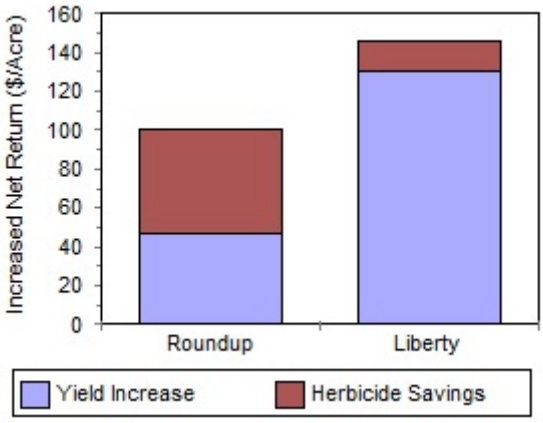

Figure 3. Amount of increased net return attributed to yield increase and herbicide cost savings

the increased net return of $168.82 per acre was primarily due to an increase in gross return of $129.89 from the increased yield and there was only $16.23 herbicide cost savings.

One of the key issues to determine grower profitability of this technology will be the actual technology fee that seed companies will charge for the transgenic seed (no technology fee was charged in this analysis). Technology fees of $50.00 to $80.00 per acre may still make transgenic sugarbeets attractive to some growers (Figure 4).

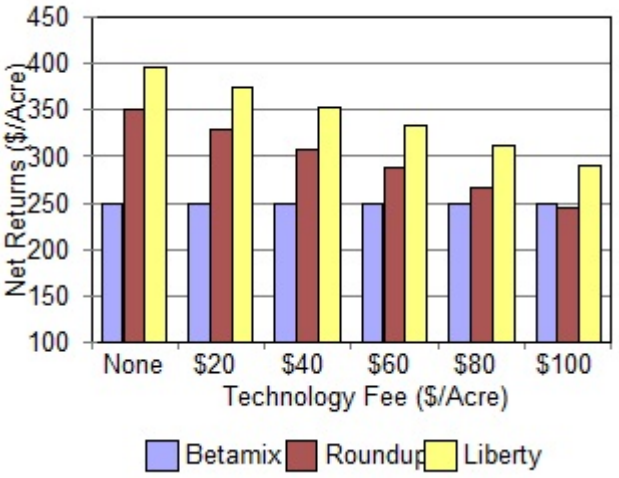

Figure 4. Expected net returns at different technology fee levels.

The results from this University of Nebraska study suggest that root yields increased under the transgenic production systems, without significantly changing the percent sucrose or sucrose loss to molasses. The transgenic varieties do not experience the crop injury that is present using the traditional postemergence herbicide treatments. Without this injury, the root yield is positively influenced by the transgenic system. With the increase in yield, producers have potential gains in gross returns per acre, allowing for the potential of additional production income. The corresponding cost of herbicide treatment is significantly lower using the herbicides available with the transgenic treatments. The lower cost of production, when combined with the increases in yield, present a significant economic benefit to producers. The difference between transgenic and non-transgenic returns are large enough to influence producers to move toward adoption of the technology when or if the technology is made available to the production system. The production of transgenic sugarbeets has the potential to increase profits to producers if the technology fee charged for the seed is not set at a level that captures all of the increased profits for the seed companies.

Acceptance of the transgenic sugarbeet varieties will be influenced by the potential of sugar processors to move the final product into the market. The majority of sugarbeet production is destined for the domestic market, reducing the impact of concerns that have recently surfaced from the European Union. For transgenic sugarbeets to be accepted in the United States, the consumer must be confident that the sugar produced is a wholesome product with no health risk. If consumers will accept the product, there will be significant interest in production of herbicide tolerant sugarbeets to reduce production costs.

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