





By Mark Flegenheimer, President and CEO

As spring fast approaches, it is time to plant another crop of beets. Looking ahead at the prospects for the 2007 crop and beyond, there are

a number of exciting and nerve-wracking challenges.

One of the biggest advancements our industry has seen in many, many years, is biotechnology in seed varieties. This year, we will grow and process 250 acres of Roundup Ready beets as a commercial demonstration in the Croswell area. This demonstration will pave the way for 2008 when we anticipate that up to one half of our total acreage will be planted to Roundup Ready varieties. Weed control has been a constant battle in trying to raise a profitable crop of beets. We hope the introduction of genetically modified beets in Michigan will increase the ease and net return of growing beets.

Also, this year, we expect a new farm bill to be written. The sugar industry will be working with the new democratically-controlled congress to develop a sugar program that allows growers to make a reasonable return on sugarbeets and sugar cane. We are hopeful the new bill will be completed by the end of 2007.

On January 1, 2008, we face a great deal of uncertainty as NAFTA becomes fully implemented and free trade of sugar begins to flow between Mexico and the United States. The greatest concern is that Mexico will import large quantities of high fructose corn syrup and world priced sugar, then flood the United States with excess sugar. While this is indeed possible, such a scenario would also destroy the Mexican sugar industry. We expect there will be some volatility during the transition, but eventually a program will be developed between the two countries which will maintain viable industries North and South of the border.

As you plant your 2007 beet crop, keep in mind that the new quality contract will be used this year to "divide the payment pie" amongst the growers. In order to maximize your returns, do what you can to improve quality while increasing sugarbeet yield.

I hope your 2007 crop is bountiful. 🐴

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Cover: Early emerging sugarbeets grown by Hadeway Farms, Inc., Fairgrove, MI.



A LOOK BACK AT HARVEST AND OUR STORAGE SEASON



By Paul Pfenninger, Vice President of Agriculture

Wow, what a harvest! We experienced the earliest start ever to a harvest and then proceeded to deliver a record 3,870,670 tons of beets. Along

the way, we had measurable rainfall on 27 out of the 60 days available for harvest and we experienced temperatures as low as 19°F on November 4.

Our yield of 23.61 tons per acre was two tons greater than average and a sugar content of 17.98% was respectable, considering we received 6.19 inches of rainfall from September 15 through November 15. A clear juice purity of 94.33% and an amino nitrogen of 7.08 are also indications of a good quality crop. A total of 713,240 tons of beets were delivered under the revised early delivery program which was new for 2006. That represents 18% of overall production and it was delivered in an efficient manner at locations where beets were needed the most.

The biggest scare and challenge to the 2006 harvest was the freezing temperatures we experienced on November 3 and 4. Confirmed temperatures of 19°F in Gratiot County and 21°F in Huron County on November 4 really put a strain on storage following this severe freeze. Seventy-five percent of the beets

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THE NEWSBEET is published by Michigan Sugar Company, Bay City, Michigan. It is prepared for grower members of Michigan Sugar Company, from information obtained from sources which the Company believes to be reliable. However, the Company cannot guarantee or assume any responsibility for the accuracy of the information or be responsible for the results obtained. Mention or illustrations of a special technique, specific equipment or products does not constitute endorsement by the Company. Reprinting or quoting articles appearing in *The Newsbeet* is granted with the exception of those items credited to outside sources. were harvested at the time of the freeze and November weather was all that remained to finish the crop. We harvested just over 1,000,000 tons of beets following the freeze event and immediately went to work on recovery and transfer of all beets received from that point onward.

With good cooperation from contractors hauling beets and good slice rates at all four factory sites, we were able to slice all of these potentially frozen beets without incident. It was ironic that the warmest beets we received all season came just three days after the freeze and they too were sliced along with the beets received on November 6 and beyond.

The strange weather we experienced during harvest did not correct itself during the time we were trying to store these beets for our lengthy campaign. In November, there were 14 days with daytime highs above 50°F, including four days in the low 60s. On November 29, the nighttime low was only 52.6°F! In December, there were 15 days with daytime highs above 40°F, including two days in the lower 50s. On December 22, 2006, the daytime high was 52.4°F. In January, the warm temperatures continued until the middle of the month. It was 50.6°F on January 4 and 49.8°F on January 5! The nighttime low on January 5 was 44°F! This warm weather is definitely a "weather event" which does have a negative impact on beet storage. Cold temperatures did arrive on January 16 and 17 and winter finally settled in. Our first measurable snowfall occurred on January 15.

MAWN (Michigan Automated Weather Network) Weather Data. Location: Helmreich Farms in Freeland

Month	High°F	Low°F	Precipitation
November	49.96	31.58	2.37"
December	39.88	28.77	2.80"
January 1–12	41.18	30.29	0.61"

My "hats off" to all the growers for delivering a record-breaking crop under some less than desirable conditions and a big "thank you" to everyone who helped along the way. When we work together, we truly work as a Cooperative and good things happen.

THE 2007 FARM BILL DEBATE



By Ray VanDriessche, Director of Community & Government Relations

Trade agreements and the sugar policy within the farm bill are two major factors that determine market price, our ability to plant our maximum number of shares, and run our factories at capacity. The current farm bill expires in September and a commitment has been made by the House and Senate Committee Chairmen to bring a new farm bill up for passage in August or September. Let us take a look at the political environment as we lead up to the development and passage of a new farm bill.

We are all very aware that the current administration gave unjustified additional import access to Mexico in July of 2006 at the expense of the domestic sugar industry and to the benefit of large sugar users and the high fructose corn sweetener industry. This has affected the potential returns that our industry could have enjoyed at least through January of 2008. Efforts to restart WTO negotiations are underway and caps on all commodity support programs (subsidies) could have an impact on the sugar industry because of the way the sugar program is scored in the

"amber box," even though we receive no direct payments.

As in the past, the Sweetener Users Association (confectioners, bakers, candy makers, and etc.), along with free traders, would like to see the sugar policy in the farm bill eliminated or effectively rendered useless. They are suggesting we have a traditional commodity program with subsidy payments estimated at a cost of \$1.5 billion dollars to the federal budget. This would most likely result in the call to eliminate the sugar policy in the farm bill by fiscally-minded legislators and other commodities who would have their subsidies cut in order to balance the agriculture appropriations budget. The logical question is, "Why would the Users make such an effort if there was not significant gain for them?" Direct subsidy payments would result in cheap sugar for the Users and past history has shown "no pass through" to the consumer.

Another option to reduce an oversupplied market due to excess imports is a "sucrose to ethanol" program which could be mandated as part of the energy bill or be addressed in the farm bill. Although this may be very difficult to accomplish, because of a necessary tax credit which would have to be higher than the corn to ethanol industry receives, this option is being studied and pursued by the sugar industry and legislators. The elections are behind us and a shift in the control of the House and Senate has resulted in a much more favorable position for our industry as the 2007 farm bill discussions shift into high gear. As these talks intensify, it is extremely important that the Congress and Senate, especially new members, understand our concerns. This takes hard work, phone calls, letters, congressional visits and an industry with integrity.

Co-op board members and management will have the opportunity to take our message to our legislators as we visit Washington D.C. on a number of occasions before the 2007 farm bill is put up for passage this fall. The ASGA annual meeting was held in Washington, D.C., in February along with an industry-wide organized lobbying effort, which took place the last week of February and the first week of March. In addition, the ASGA summer meeting is scheduled to take place in Washington, D.C., in July.

The bottom line is that our industry will fight hard to retain a policy very similar to the current sugar policy. The sugar industry has never lost a farm bill vote and although the environment creates a challenge, every effort will be made to continue this record of success.

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(The following report was given by Thomas Zimmer, Chairman of Michigan Sugar Company's Board of Directors)

Welcome to your Co-op's annual meeting. It is always good to have you in attendance as that shows that you have an interest in your co-op.

When Michigan Sugar became a co-op in February of 2002, your Board of Directors, along with management, decided to meet once a year for the sole purpose of strategic planning, both shortterm and long-term. Once set, the plans are reviewed quarterly to see if we (board and management) are on track. Mark and his management team work diligently throughout the year to implement our objectives. Let me give you a few examples. One thing we realized early on was that our company's sugar production of 6 million hundredweight was too small. That problem was fixed in 2004, with the merger of the Monitor sugarbeet growers and the purchase of the Bay City factory. Now our yearly sugar production is 10 million hundredweight. This has, and will continue, to increase the Co-op's efficiency.

Improving our fuel efficiency is another one of our core strategies. With increased throughput comes increased fuel costs, and fuel costs at the Bay City facility have always been a concern of the board and management. Our investment in the steam dryer will greatly reduce our fuel expense at the Bay City plant. This investment has a three to four-year payback.

Enhancing our top line revenue is yet another focus area of our

co-op. We have accomplished this by increasing the value of our byproducts (pulp, molasses and betaine). We joined Midwest Agri-Commodities along with the three sugarbeet co-ops in Minnesota and North Dakota to market our byproducts. Midwest Agri's president, Jim Eichenberger, will be making his report later this morning and some of his charts show the strength of this marketing alliance.

Another strategy that reduces fuel and improves revenue is our pressed pulp program. This year our pressed pulp sales will again increase.

A major revenue improvement has been accomplished by handling all sugar sales in-house. We now have one price for our sugar, not one from us and one from Imperial. Also, we no longer use brokers as we now sell everything directly to our customers.

Two final focus areas I would like to comment on are asset utilization and beet quality. In an effort to fully utilize our assets, we now deliver beets early so the factories can slice more beets in the fall, not in the spring. In an effort to improve beet quality, this year, we will have a quality contract in place so that all grower-owners will get paid on the sugar that they produce. The grower relations committee which is made up of the district presidents, board members and management staff has worked very hard on this. Their recommendation to the board has been put in place for the 2007 crop.

These are just a few of the things that we have been working on in five short years. Mark and his staff continue to implement key pieces of our core strategy while improving our co-op.

I just mentioned a few projects the board has undertaken to improve our co-op. What have you as shareholders done? Did you deliver early? Did you use the right amount of nitrogen to improve quality? Did you spray for leafspot enough and early? Did you comply with the heat or freeze shutdowns?

We are a co-op and what we do or don't do affects all the other co-op members. I truly believe that if we cooperate with one another, we will be successful.

The sugar industry has one of the finest oiled machines in Washington, D.C., to look out for our best interests. After the November elections, our Washington representatives feel we have a good chance to maintain or improve the sugar section of the Farm Bill. Representative Collin Peterson of Minnesota is now Chairman of the Ag Committee and he has the largest acreage of sugarbeets in his district of anyone. We need your PAC money and I would hope that you consider contributing to our PAC. That gives us an opportunity to visit with many congressional people about our concerns, not only on the Farm Bill, but also on the Mexican situation and other trade agreements.

This will be my last time to speak with you as chairman of the board. I have truly enjoyed these five years as a co-op board member and been honored to be your chairman during that time. I can assure you that the Co-op Board, Mark, and his management team, and all of our employees work very hard to improve our co-op. While everything at the co-op may not be done exactly as you would do it on your farm, the actions taken are done with all owners' best interests in mind. We will become more successful if we support all our employees and work together with them.

This board that I have served on is comprised of very dedicated and hard-working people. Their goal is to have our co-op be very successful. I hope that is also your goal. Our guest speaker, Dave Kragnes, Chairman of American Crystal Sugar Company, knows, from firsthand experience, what it is like to be a new co-op with many of the same issues and challenges we now face. They worked with each other and with their management team to overcome their challenges. Today, American Crystal Sugar Company is very successful. Do you want Michigan Sugar to be a successful co-op? Are you willing to work cooperatively with each other to be successful? I know my sons and I do!!

Thank you for your support and God bless you and our co-op.







WHAT IS RWST AND HOW DOES IT IMPACT **RETURN ON INVESTMENT?**



By Paul Pfenninger, Vice President of Aariculture

What is RWST? Recoverable White Sugar Per Ton is a

calculation which uses sugar content and clear juice purity to calculate the theoretical amount of white crystalline sugar which can be extracted from a particular ton of beets. The formula takes into consideration the following parameters:

- Difference between cossette sugar and grower sugar
- Factory losses in production
- Differences between clear juice purity and factory thin juice purity
- Molasses purity in production

Clear juice purity is actually the percentage of total solids in the beet which are sucrose.

In Sugar Technology, a book written by P.W. VanderPoel, H. Schiwech and T. Schwartz, they list the chemical composition of the beet as follows: Water: 73-76.5%

Dry Substance:	23.5-27%
Sucrose:	14–20%
Non Sucrose Substan	ices: 7.0-9.5%
Water Insoluble C	Compounds
Soluble Compour	nds
Nitrogen Free Cor	mpounds
Nitrogeneous Cor	npounds
Inorganic Compo	unds

BeetCast Trials — 2005 Average of 8 Trials					
% Sug	ar % CJP	RWST	Payment Per Ton		
	(Clear Juice Purity)	Recoverable White	(\$36 Per Ton Avg.)		
		Sugar Per Ton			
18	95.7	270.0	36.74		
18	95.2	267.2	36.37		
18	94.7	264.4	35.99		
18	94.2	261.6	35.61		
18	93.7	258.8	35.23		

The Clear Juice Purity does influence the recoverable sugar per ton. Table one illustrates how the per ton beet payment is impacted when sugar stays the same but Clear Juice Purity (CJP) changes.

If the beet is 75% water and 18% sugar, that leaves 7% of the matter to be something other than sugar.

You, as a producer, make choices every day regarding the potential quality of your beet crop. Here are just a few:

- 1. Variety Selection–Every variety has a different potential RWST. Variety selection is critical.
- 2. Planting Date-The length of the growing season is critical to overall quality. Be ready in the spring and be prepared to plant as soon as the soil conditions are favorable. Do not delay or worry about the potential for a frost.
- 3. Plant Population–Based on the emergence potential of the variety you selected, you should strive for 80 to 160 beets per 100 ft of row at harvest. If the overall survival rate is 60%, plant accordingly.
- 4. Nitrogen Applied—The amount of nitrogen applied to your crop has a direct correlation to the overall purity of the beets you deliver.
- 5. Timing of Applied Nitrogen-Not only is the amount of nitrogen important, the timing of application will also impact your overall quality. Do not wait until June to sidedress your beet crop.

TABLE 1



- 6. Control of Diseases—Controlling Rhizoctonia crown rot and Cercospora leafspot are critical to good quality.
- 7. Beet Defoliaton—green leafy material on the beet will lower overall quality. Both sugar content and purity are higher in the middle of the root than in the crown or tail. Our studies show a loss of 11.2 pounds per ton of recoverable white sugar when beets are poorly defoliated.
- 8. Harvest Date—The overall quality improves with every day of the growing season. You need to start early to provide beets for slice, and must be prepared to harvest the crop in a timely manner in late October or early November.

The new quality payment program will incorporate percent sugar and clear juice purity into a payment schedule. Payment per ton will reflect the value of the crop delivered to the Cooperative. By paying attention to the details, the grower payment has the potential to increase if clear juice purity is increased. By raising the overall quality of the sugarbeet crop, return on investment can only improve.



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BEST MANAGEMENT PRACTICES FOR PRODUCING HIGH QUALITY SUGARBEETS



By Jim Stewart, Director of Research and Lee Hubbell, Research Agronomist



The quality of the beets delivered to the factories is extremely important to Michigan Sugar Company. Quality is the measure of

the extractability of the sugar in a sugarbeet. Two beets with the same percent sucrose may not yield the same amount of sugar during processing. Why? A higher quality beet has less impurities. Every pound of impurities in the beets will cause about 1.5 pounds of sugar to be lost to molasses. Michigan Sugar Company loses an estimated \$15 million dollars for each percent loss in sugar and \$5 million for each percent loss in purity. In addition, an individual grower can lose approximately \$5 per acre for each percent loss in sugar and \$2 per acre for each percent loss in purity.

Starting with the crop you will be planting in 2007, the purity of the beet along with the sugar content will be used to determine your payment. Commonly referred to as the quality payment system, percent sucrose and percent clear juice purity are put into a formula which calculates recoverable white



sugar per ton, or RWST. From now on, the tons of beets per acre you produce will be adjusted by your RWST to determine your payment. Other sugar cooperatives have been using similar systems for years and for good reasons. Now Michigan Sugar Company is following what has worked for others and is implementing a quality payment system.

Growers are naturally curious and some are apprehensive about the new payment system, but almost all are asking the question, "What can I do to improve my quality?" Many of the factors which influence sugarbeet quality have been studied extensively. The reason that sugar companies across the nation have adopted a quality payment program is because they are all grower owned and the extra profit is returned directly to the growers.

FIGURE 1

At first glance, putting together a management program for producing high quality sugarbeets may seem complicated, but most growers are already well on their way to doing just that. Significant improvements have been made over the past five to ten years with respect to nitrogen management, plant

FIGURE 2

population, variety improvement, disease control and other management factors. All of these factors will improve quality and yield.

NITROGEN MANAGEMENT

Proper nitrogen management must be a part of your program if you are serious about producing high quality sugarbeets and it appears that many growers understand this. Nitrogen use has declined in the Michigan Sugar Company growing region from 146 to 117 lbs per acre since 1999. During the same time period, yield increased steadily, from 19 to 23.5 tons per acre (Figure 1). Nitrogen is essential to sugarbeet production and timing of nitrogen application is critical. Young seedlings need nitrogen to promote early season growth. A healthy canopy is important to intercept sunlight and to encourage root development; however, one of the keys to sugar accumulation is for the plant to begin running low on nitrogen. Too much nitrogen in the fall promotes leaf growth at the expense of transporting sugar to the roots. On the other hand, too little nitrogen early in the growing season will result in reduced canopy growth, premature yellowing and reduced root vields. Eighteen trials conducted by Sugarbeet Advancement show that when nitrogen rates were increased by 90 lbs per acre over the optimum rate of 85 lbs per acre, yield was not increased but sugar content was reduced by one-half percent and clear juice purity was decreased by more than



one-half percent. The loss in sugar and purity resulted in a loss of 9 lbs of sugar per ton (RWST), which would cost a grower somewhere around \$2.50 per ton, depending upon the payment and vield. More than 50 Michigan State University (MSU) and sugar company research trials conducted over the past 20 years have found that sugarbeet quality declined steadily as nitrogen rates increased. In these trials, the maximum recoverable white sugar per acre (RWSA) was produced with an average nitrogen rate of around 70 pounds per acre. Also over threequarters of a percent of sugar, and one percent of purity equaling 20 Ibs of sugar per ton were lost by increasing the nitrogen rate from 70 to 150 lbs per acre (Figure 2). By following recommended nitrogen rates and by applying nitrogen early in the season, growers will be able to grow a high yielding and a high quality sugarbeet crop.

CERCOSPORA LEAFSPOT

The growers in Michigan lost an estimated \$15 million to Cercospora leafspot in 2005 because they did not manage the disease properly, especially late in the season. To effectively control leafspot, fungicides need to be applied just prior to the first sign of disease and then on a regular basis until the threat of the disease is over. For the majority of our growing area, the BeetCast model does a good job of predicting when to apply fungicides to manage leafspot. Ongoing research, to finetune BeetCast, will provide growers in outlying areas with improved recommendations. It is important not to be late with the

FIGURE 3

first fungicide application. It is the most important application, and it is a good idea to use the most effective fungicides first. Research indicates that uncontrolled leafspot will reduce sugarbeet yield by several tons per acre and will also significantly lower sugarbeet quality. Thirty-five Michigan Sugar Company small plot trials conducted over the past five years illustrate the quality losses caused by Cercospora leafspot in Michigan (Figures 3 and 4). Leafspot reduced sugar content and purity by one percent on average in these trials. Some of these trials had heavy leafspot pressure and some had light pressure, but most were in the range of about 50% burndown. Other researchers have reported similar results. If a field burns down, you can expect to lose over three tons per acre and a percent of sugar content and purity. If it doesn't burn down, but you can see it driving by the field, at least one ton of sugarbeets per acre and one-half to one percent of sugar content and purity will be lost. Planting varieties tolerant to Cercospora leafspot can be an effective management tool, especially with the introduction of the highly resistant variety, Crystal 355.

DEFOLIATION

Three years of research at Michigan Sugar Company has shown that poorly topped beets can result in 11 pounds of sugar per ton lost to molasses (Table 1). Similar research conducted by Sugarbeet Advancement found that inadequate defoliation reduced recoverable sugar per ton by 9 pounds. Proper



FIGURE 4



Figure 3 illustrates the reduction in sugar content from not managing Cercospora leafspot. Figure 4 illustrates the reduction in clear juice purity from not managing Cercospora leafspot.

defoliation actually begins at planting time. A good stand of evenly spaced beets makes proper defoliation easier. Gaps, doubles, and weeds create major problems at harvest time. Defoliator speed should not be more than 3.5 to 4.0 mph. Defoliator repair and



adjustment, proper ground speed and yearly planter test stand evaluations significantly will improve defoliation. If all other factors have been done correctly all season but the beets are defoliated poorly, quality and RWST will suffer. A poor job of defoliating will reduce profitability.

PLANT POPULATIONS

Numerous studies have shown that there is a direct correlation between plant population and sugarbeet quality. A higher plant population will produce higher quality sugarbeets. Michigan Sugar Company crop records have consistently shown that tons per acre, percent sugar and percent purity have all improved with an increase in sugarbeet population. The old theory of 100 beets per 100 feet of row equaling a full stand is no longer true. The current recommendation for sugarbeet populations in 28 or 30 inch rows is in the range of 150 to 200 beets per 100 feet of row and most growers are following these recommendations (Table 2). A three-year study at Michigan Sugar Company illustrates the relationship between sugarbeet populations and sugarbeet quality. As the sugarbeet population declined from 270 beets to 150 beets per 100 feet of row, sugarbeet quality declined gradually; however, as the sugarbeet population dropped below 150 beets per 100 feet of row, the loss in quality was more dramatic. The range from 120 to 270 beets per 100 feet of row before harvest produced similar returns per acre. The losses in recoverable white sugar

Year	Complete Defoliation	Poorly Defoliated	Loss to Poor Defoliation
		RWST	
1991	251.7	241.1	10.6
1994	267.2	254.9	12.3
	259.1	249.4	9.7
1997	259.8	247.8	12.0

TABLE 2

Seed spacing and sugarbeet population

Row Width	Seed Spacing	Beets/ 100 Ft	Plants/ Acre	Seed Spacing	Beets/ 100 Ft	Plants/ Acre	Seed Spacing	Beets/ 100 Ft	Plants/ Acre
30"	4.3	153	27,019	3.7	180	31,363	3.34	200	34,848
28"	4.3	153	29,019	4.0	167	31,196	3.6	186	34,662
22"	4.3	153	36,933	5.0	134	31,762	4.6	145	34,524

FIGURE 5



per ton (RWST) was attributable to losses in both percent sugar and percent clear juice purity (Figure 5). The average seeding survival rate is 55.7 percent. The average seed spacing is about 4.3 inches, which should result in 153 beets per 100 feet of row. Many factors are involved in achieving a good stand including variety selection, soil conditions, seed spacing and weather. Progress is being made with improved varieties, primed seed and earlier planting dates. It is important to utilize the information and technology available to help achieve a good sugarbeet stand. VARIETY SELECTION

Michigan Sugar Company growers have a large number of varieties to choose from to satisfy their particular needs. We have high yielding varieties, high quality varieties, varieties that are tolerant to Rhizomania, Cercospora leafspot, Rhizoctonia crown rot, nematodes and soon Roundup. Selecting varieties based on field history is important. When two varieties are available with the traits you need, select the variety that will produce higher purity and RWST. The variety information is widely available in late November of each year. Growers should meet with their agriculturists and go over the Official Trial Results as well as the Sugarbeet Advancement Trials and choose the varieties that are most suitable to their particular fields.

RHIZOCTONIA

Rhizoctonia root and crown rot causes over 10 million dollars of loss annually to our sugarbeet

industry. Some fields have documented losses of over 10 tons per acre. The pathogen overwinters in soils and in plant debris and becomes active when the soil warms significantly. Sugarbeets grown on poorly drained soils are more susceptible to the disease. Infection can result from aggressive cultivation which will move soil into the crown. We have made significant progress, in the past five years, learning how to use Quadris. Data from 14 Sugarbeet Advancement trials demonstrated that under heavy Rhizoctonia pressure, a single Quadris application improved sugarbeet yield by five tons per acre and sugar by one percent. Similar research from five Michigan Sugar Company small plot trials showed an increase of one percent of sugar, one-half percent purity and 19 lbs of RWST between applying Quadris and untreated checks (Figure 6). Managing Rhizoctonia through resistant varieties, proper crop rotations, improved soil quality and fungicides can have a large impact on raising quality and RWST. In addition to yield and quality losses, beets infected with Rhizoctonia crown rot will not store well in piles.

RHIZOMANIA

Rhizomania is considered the most destructive disease of sugarbeets worldwide. First discovered in Michigan in 2002, it has spread to the majority of our growing region in five years. Rhizomania can infect both young and mature sugarbeet plants. The severity of the infection varies greatly, depending upon how early the infection occurs, soil moisture conditions and other factors. Early infections are more likely to exhib-



FIGURE 6

FIGURE 7

it classic visual symptoms and cause serious vield and quality losses. Warm, wet soils encourage the development of the disease. Infected sugarbeets often have narrow upright and yellow leaves with elongated petioles. The roots often appear stunted, hairy and bearded. The taproot is often constricted giving it a distinct wineglass shape. Foliar symptoms generally appear in small patches in fields and can be confused with water damage or nitrogen deficiency. Rhizomania has a significant impact on quality as well as yield. Figure 7 illustrates the effect of Rhizomania on the quality of some popular varieties. Beta 5451 and Crystal 271 are typically high quality varieties, but when infected with Rhizomania quality can be reduced dramatically. Conversely, Beta 5833R and HM 7172RZ (Rhizomania tolerant varieties) are not adversely affected by Rhizomania. There is no silver bullet for managing Rhizomania. For growers who don't have Rhizomania on their farm, the best management tool is to try to keep it that way. Try to limit soil movement onto the farm: however. the disease can be spread not only by soil on machinery but also by wind, water, mud on the roads, car and pickup traffic, even by animals such as deer. Resistant varieties may be the most effective tool we have for combatting the disease. Each year higher quality Rhizomania varieties are being developed.

Planting early is also important. Planting early will get beets growing before the soils get warm and



wet – the conditions that favor Rhizomania. Proper drainage is essential. Waterlogged soils make ideal conditions for Rhizomania. Good tile and surface drainage will help reduce the conditions favorable to the disease. Increasing crop rotation intervals between sugarbeet crops will help delay the buildup of the inoculum. Disposing of tare dirt where you do not plan to grow beets will help to delay the disease. If you have Rhizomania on your farm, you should plant only Rhizomania varieties. If you haven't identified the problem but are in an area with Rhizomania around your farm, you should at least be planting strips of Rhizomania varieties in each sugarbeet field to see if you are getting a response from planting a resistant variety. The triploid resistant varieties have a moderate level of

resistance and generally have higher quality than diploids. The diploid varieties have a higher level of resistance. Planting non-Rhizomania resistant varieties will provide better yield and quality for growers who do not have Rhizomania.

NEMATODES

Sugarbeet cyst nematodes are present in Michigan and cause large losses in a few fields and some loss in many other fields. The extent of the problem should be documented better this summer. Soil samples will be taken randomly throughout our growing area and analyzed for cyst nematodes. Seed companies are working on resistant varieties. One variety, Beta 5534N, is available at this time. Sales have been limited because it is susceptible to Cercospora leafspot, Rhizoctonia, and

FIGURE 8

Aphanomyces. This variety does not meet approval because of low Cercospora resistance and low RWST. In locations without a significant nematode problem, this variety should not be planted. In fields with moderate to high nematode pressure, this variety has increased yield by up to 17 tons per acre and RWST by up to 41 pounds per ton. Figure 8 illustrates the effect nematodes had on resistant and non-resistant varieties in strip trials in 2005. A higher yielding and higher quality nematode tolerant variety, Beta 1643N may be available to growers in 2008; however, this variety still lacks Cercospora tolerance. Variety resistant to sugarbeet cyst nematode is exciting, but varieties are needed with better resistance to other problems we have before they will be planted on a large scale.

HARVEST DATE

Late harvest should result in higher sugar and quality, but not all beets can be harvested at the end of October. In five years of testing, 33 days difference in harvest date produced an increase of 1.41 tons per acre and 2.55 percent sugar. The factories need beets early and the early harvest premium compensates for the loss of yield and RWST.

PLANTING DATE

The longer sugarbeets have to grow the higher the potential for increased yield, sugar content and quality. Growers have done well in recent years by being prepared to plant early. Taking advantage of



early opportunities to plant will pay big dividends.

In summary, what can growers do to improve quality?

- Use a realistic nitrogen application rate.
- Control Cercospora leafspot and other diseases.
- · Defoliate properly.
- Have optimum beet populations.
- Select varieties that have higher quality.
- Use Rhizomania resistant varieties where needed.
- Harvest the bulk of the crop when quality is highest.
- Plant early.

QUALITY IS ESSENTIAL TO OUR FUTURE

The production of high-quality sugarbeets is essential to Michigan Sugar Company and the introduction of a quality payment system makes it important to each grower. We have the tools and knowledge to accomplish this goal. Significant agronomic advances have been made in recent years and continuous improvements are coming in the form of better varieties, improved weed and disease control and other innovations. Our agriculturists have access to the latest information. They are your best, unbiased source of information. Consult with your agriculturist, study Michigan Sugar Company and Sugarbeet Advancement research data and use all the tools available to produce a high-quality, profitable crop. It is the key to our future.



MANAGING SUGARBEET CYST NEMATODE



Steve Poindexter, Michigan State University Extension Sugar Beet Educator

Managing Sugarbeet Cyst

Nematode (SBCN) the past 30 years has been extremely difficult. During that period, the number of SBCN positive fields have increased dramatically, resulting in significant yield loss and decreased profitability. The spread of nematodes throughout the growing region and nematode population increases within nematode infested fields has occurred because of several factors. First, Michigan has been growing beets for over 100 years. As with most crops, the longer they are grown the more opportunity for problems to occur. Shorter intervals between growing sugarbeets have certainly allowed the pest to reproduce and build populations quickly. Each nematode is capable of two generations per year and each cyst may contain 300 eggs. The SBCN is uniquely equipped to lay dormant in the soil for years within its own protected armor called a "cyst." Viability of a cyst decreases with more years between host crops. Poor soil health contributes to increased SBCN populations by decreasing the number and diversity of beneficial organisms that may attack the nematode. Finally, the spread of nematodes has occured

in a variety of ways. Nematodes will move with the soil. Blowing soil, tare dirt, or dirty equipment are the most common ways that nematodes spread. Be aware that every grower is at risk of this pest becoming a problem in their fields.

WHAT CAN WE DO?

Many growers may have SBCN at low population levels, which may not be impacting yield. A moderate population of nematodes may allow the beets to look normal but still reduce yield by one to three or more tons per acre. It is recommended that every sugarbeet field be soil and root sampled for the presence of SBCN. Ideal sampling times are mid to late summer, in an existing sugarbeet field. Many times, the cyst can be seen on the roots during the growing season. Your agriculturist is well trained to help you identify the pest.

No single approach for managing SBCN is as effective as a multifaceted effort. Long beet rotations are critical to lowering SBCN populations in highly infested fields. Four-year rotations should be considered the minimum. Improving soil health can be achieved through use of cover crops, clover, manure and diverse rotations. Organic matter helps to increase soil fauna activity, which will help improve the balance of beneficial and antagonistic organisms. Oilseed radish is



QUALI

currently very effective as a SBCN

TABLE 1

trap crop. By planting this cover crop, the nematodes are tricked into hatching and then are unable to reproduce on the roots of the radish. This has been effective in lowering populations of SBCN and improving yield. The newest tool that has become available is a SBCN resistant variety. Michigan Sugar Company along with Sugarbeet Advancement has been testing a new release; B-5534N. The results have been impressive with an average yield increase of 9.6 tons per acre in high population SBCN fields (Table 1). This variety should only be planted in confirmed SBCN fields. This variety has very little leafspot resistance (see picture) and is susceptible to Rhizoctonia crown rot. It should be considered a high management variety which will require additional fungicide sprays for both diseases. In the absence of nematodes, it has poor quality and will not pass the Michigan Sugar Company approval system, however, used in the right field and managed properly, it can make unprofitable fields productive again. Research has shown an additive effect of improved yields when management tools are combined such as incorporating extended rotations with oilseed radish, manure and a resistant variety. In the Spring of 2007, a random sugarbeet cyst nematode survey will be conducted by Michigan Sugar Company and Sugarbeet Advancement. The goal of the survey is to determine exactly how wide spread the sugarbeet cyst nematode

Sugarbeet Y 1	ield with 1 Trials / I	Severe Michigan	Nemat -2005/	ode Pres 06	ssure
TREATMENT	RWSA	T/A	RWST	% Sugar	% CJP
B-5534 Resistant	6785	27.60	246	16.50	94.40
Check Susceptible	4327	18.0	241	16.00	94.70
AVERAGE	5556	22.80	244	16.29	94.5
LSD (5%)	403	2.5	105	NS	NS

Table 1 illustrates the increase in yield from planting a sugarbeet cyst nematode resistant variety compared to planting a susceptable variety in fields infested with SBCN.



problem is within the Michigan Sugar Company growing region.



THE USE OF DUAL MAGNUM AND OUTLOOK IN MICHIGAN SUGARBEET PRODUCTION



Graduate Research Assistant, and Christy L. Sprague, Assistant Professor, Dept. of Crop and Soil Sciences, Michigan State University

Scott L. Bollman,

Weed control in sugarbeets continues to be a challenge due to limited herbicide

options, slow crop canopy development, and the long growing season. With the registration of Dual Magnum and Outlook, Michigan sugarbeet growers have two additional options for residual control of late-emerging weeds. Currently, both of these herbicides are labeled for lay-by application after sugarbeets have reached the 2-leaf stage (2-fully expanded leaves) and Dual Magnum has had a 24(C) Special Local Needs Label for preemergence (PRE) and preplant incorporated (PPI) applications. However, under certain conditions growers have observed significant injury from applications of Dual Magnum and Outlook alone and in tank-mixtures with other herbicides. In 2004, research was initiated to compare sugarbeet injury, weed control, and yield from the inclusion of Dual Magnum and Outlook in sugarbeet weed control programs. To address these concerns two separate field studies were conducted. We would like to thank Michigan Sugar Company and the USDA-ARS Special Grant for funding to help support this project.

The first study examined Dual Magnum and Outlook applied PRE prior to four micro-rate applications and in combination with the first, second, third, or fourth micro-rate at full- and split-rates. This research was conducted at two locations in 2004 and 2005, and at one location in 2006. The base micro-rate treatment consisted of Betamix (8 fl oz/A) + UpBeet (0.125 oz/A) + Stinger (1 fl oz/A) + 1.5 % v/v of MSO applied four times at 225 growing degree day (base 34F) intervals. The full-rate of Dual Magnum was 1.33 pt/A and the full-rate of Outlook was 16 fl oz/A. Early-season precipitation and the time of Dual Magnum and Outlook applications had the greatest affect on sugarbeet injury. Under wet conditions, Dual Magnum and Outlook at full- and split-rates applied PRE and in the first micro-

rate application consistently caused more injury than the base microrate treatment. At one location, applying Outlook at one-fourth the rate in all four micro-rate applications also caused significant sugarbeet injury compared to the base micro-rate treatment. Applying either Dual Magnum or Outlook at the full-rates in the third or fourth micro-rate timings or splitting the applications between the second and fourth micro-rate applications did not increase injury over the base micro-rate treatment. The addition of Dual Magnum or Outlook to the micro-rate program improved control of common lambsquarters and pigweed (redroot pigweed and Powell amaranth) by varying degrees over the base micro-rate treatment. Late-season giant foxtail control was also improved, except when Dual Magnum or Outlook was applied in the fourth micro-rate application; by the fourth micro-rate application giant foxtail had already emerged.

In addition to examining the fit of Dual Magnum and Outlook in micro-rate herbicide programs, a field trial was conducted to evaluate the response of twelve sugarbeet varieties to Dual Magnum and Outlook applied PRE, and when

FIGURE 1

sugarbeets were at the 2-, and 4leaf growth stages. Application rates were 1.33 pt/A for Dual Magnum and 16 fl oz/A of Outlook. Outlook applied PRE and to 2-leaf sugarbeets resulted in the greatest crop injury. Outlook caused more injury than Dual Magnum (Figure 1). Sugarbeet injury from Dual Magnum applied PRE ranged from 16 to 33% compared with 25 to 46% injury from PRE applications of Outlook across all varieties. Applications of either herbicide to sugarbeets at the 4-leaf stage caused little to no sugarbeet injury. All herbicide treatments reduced sugarbeet leaf area at least 10%, but the greatest reduction in leaf area was from PRE applications of Outlook. Of the twelve sugarbeet varieties tested, Beta 5833R was more tolerant to both herbicides compared with the other eleven varieties and HM 7172RZ was the most sensitive variety.

Overall, including Dual Magnum or Outlook in sugarbeet weed management programs improved control of several species, especially late-season grass control. Application of these herbicides prior to the 2nd micro-rate or to sugarbeets with less than 2-fully expanded leaves increases the chance of significant sugarbeet injury and possible yield reduction. Here are our current recommendations. Dual Magnum should not be applied prior to sugarbeets reaching the 2-true-leaf stage. In a micro-rate application this is typically the second micro-rate application. When using Outlook, growers may want to wait to apply

Sugarbeet injury from preemergence (PRE), and postemergence applications (2- and 4-leaf) sugarbeets of Dual Magnum and Outlook averaged over 4 locations and 12 sugarbeet varieties.



Outlook when sugarbeets are at the 4-leaf stage. At this timing the potential for significant injury is greatly reduced. Keep in mind when applying Dual Magnum or Outlook it is important that the target weeds have not emerged since neither of these products will control emerged weed species.





STAYING AHEAD OF COMMON LAMBSQUARTERS CONTROL IN 2007



Christy L. Sprague, Assistant Professor, Dept. of Crop and Soil Sciences, Michigan State University

Rainfall and inclement weather conditions can often lead to non-optimal application timings of herbicides in sugarbeets, particularly with micro-rate herbicide programs. When application timings are missed, common lambsquarters is often the number one weed escape. Common lambsquarters escapes have been extremely common in sugarbeet fields at harvest. These escapes can reduce yield by competing for moisture and light, cause problems with topping and harvest, and produce seed that will lead to future problems. In fact, one common lambsquarters plant can produce as many as 72,000 seeds per plant and these seeds can remain viable in the soil for as many as seven decades. For example, if one common lambsquarters plant escapes control and produces 72,000 seeds, after 12 years as many as 36,000 of those seeds will still remain in the soil. Missed micro-rate application timings and erratic weed control due to unfavorable conditions, can exacerbate these problems. So, in 2006 with the help of funding by Michigan Sugar Company, two studies were designed to determine the best options for common lambsquarters control if a microrate herbicide application timing was missed. Since common lambsquarters escapes can also occur with other weed control programs, the second trial was conducted to examine rescue treatments for common lambsquarters control.

MISSED MICRO-RATE APPLICATION TIMINGS

A standard micro-rate treatment of Betamix at 8 fl oz/A + Stinger at 1 fl oz/A + UpBeet at 0.125 oz/A + 1.5% v/v of methylated seed oil (MSO) was applied to all treatments when common lambsquarters were less than 1/8-inch in height after planting. To simulate a missed micro-rate application, the second micro-rate application was delayed until 400 growing degree days, base 34F (GDD) after the first micro-rate (0.25- to 0.75-inch lambsquarters) application for half of the treatments and 500 GDD (0.5 to 1.25-inch lambsquarters) for the other half of the treatments. The strategies examined to overcome a missed micro-rate application included: 1) increasing the Betamix rate in the next micro-rate application (12 fl oz/A and 16 fl oz/A), 2) adding Nortron to the next micro-rate treatment (2 fl oz/A and 4 fl oz/A), 3) increasing the Betamix rate and the Stinger rate to 2 fl oz/A in the next micro-rate treatment, 4) shortening the interval for the next micro-rate treatment to ~75-100 GDD (3 to 5 d), and 5) switching

to a standard-split application of 2 pt/A of Betamix + 0.25 oz of UpBeet + 0.5 fl oz/A of Stinger + 0.25% v/v of non-ionic surfactant (NIS). Each of these strategies were implemented at the two missed micro-rate timings and compared with a standard microrate treatment. The third and fourth applications of the standard micro-rate were then applied 225 GDD after the second micro-rate application for all treatments. Seven days after the last micro-rate application, common lambsquarters control was 75% when the standard micro-rate treatment was delayed 400 GDD and 71% when it was delayed 500 GDD (Figure 1 on page 24). Regardless of the missed micro-rate timing, shortening the interval between the missed micro-rate and the next micro-rate application or switching to a standard-split application provided the greatest common lambsquarters control, 90% or greater. Increasing the Betamix rate and Stinger rate to 2 fl oz/A or adding 4 fl oz/A of Nortron to the standard micro-rate also improved common lambsquarters control compared with the standard micro-rate treatment for smaller common lambsquarters. For the larger common lambsquarters, increasing the rate of Betamix to 16 fl oz/A in the micro-rate also improved common lambsquarters control compared with the standard micro-rate treatment.

RESCUE TREATMENTS FOR COMMON LAMBSQUARTERS CONTROL

In 2005 a study was conducted that examined several different options for control of escaped common lambsquarters. This study focused on increasing rates of micro-rate treatments and incorporating several different herbicides and adjuvants. At the time that the herbicides were applied in this trial, common lambsquarters height ranged from 2- to 12-inches tall. There were no treatments other than glyphosate that showed any promise of lambsquarters control at this stage. Currently, without Roundup Ready sugarbeets, control of common lambsquarters escapes will continue to be a challenge. The first step in keeping lambsquarters under control is to treat it at a much smaller stage. It is extremely important to recognize common lambsquarters escapes early. In our 2006 trial, we treated common lambsquarters when plants were 1to 5-inches tall and sugar beets were in the 4- to 6-leaf stage. Treatments that provided the greatest common lambsquarters control 14 and 21 days after treatment included: 3 to 4.5 pt/A of Betamix + 4 fl oz/A of Nortron + 4 fl oz/Aof Stinger + 0.25% v/v of NIS or 6 pt/A of Betamix + 4 fl oz/A of Stinger + 0.25% v/v of NIS (Figure 2). Initially the treatments with Nortron caused more sugar beet injury. All of these treatments are quite expensive, so it is important to get control of common lambsquarters before they get to this point. 🐴

Common lambsquarters control 7 days after the last micro-rate application from strategies to overcome a missed micro-rate application. Standard HIB (12 oz) HI2 B (16 oz) + 2 oz Nortron + 4 oz Nortron HIB + Stinger (2 oz) Short. Int (~75 GDD) Std. Split **100** 80 Control (%) 60 40 20 O. 0.5 to 1.25 in. (1 in.) 0.25 to 0.75 in. (0.5 in.) **Common Lambsquarters Heights**

FIGURE 2



FIGURE 1



ONTARIO SUGARBEET RESEARCH UPDATE: 2006



Nurse, Research Scientist, Agriculture and Agri-Food Canada (AAFC), Harrow, ON, and Dr. Darren E. Robinson, Assistant Professor, University of Guelph, Ridgetown Campus, Ridaetown, ON

By Dr. Robert E.

The 2006 growing season for sugarbeets in Southwestern Ontario was good, but the wet spring raised several weed management issues. Three trials were established, with field locations at Agriculture and Agri-Food Canada (Harrow) and the University of Guelph, Ridgetown Campus. Sugarbeets were seeded on April 27 (Harrow) and April 19 (Ridgetown). Crop emergence was excellent. The majority of sugarbeet seedlings emerged by May 11 (Harrow) and April 29 (Ridgetown). We thank the Ontario Sugarbeet Growers Association, Michigan Sugar Company, and the Pest Management Centre of AAFC for research advice and financial support.

Precipitation levels were above average in the 2006 growing season. For example, at Harrow, precipitation averaged above 4.5 inches for each growing season month, representing a 30% increase in comparison to the 30-year average. Fungicides were foliar applied to sugarbeets following Ontario Ministry of Agriculture and Rural Affairs (OMAFRA) and BEETCAST recommendations. Careful scouting confirmed these disease control measures were effective at both locations in 2006.

TRIAL 1 – CROP TOLERANCE AND WEED CONTROL WITH GOLTIX (A.I. = METAMITRON)

Goltix is a pre or postemergence broadleaf herbicide registered for application on sugarbeets grown in Europe. It remains unclear if Goltix will be a candidate for registration in Canada or the United States.

The objectives of this trial were two-fold. First, we wanted to evaluate the tolerance and spectrum of weed control when Goltix was applied postemergence under growing conditions in Southwestern Ontario. Second, we sought to determine if the addition of Goltix into a tank-mix with Betamix, Upbeet, and Lontrel (Stinger) would improve percent weed control and increase sugarbeet yield by decreasing competition with weeds.

All herbicides in this trial were applied at the 1st, 2nd, 3rd, and 4th flush of cotyledon weeds. Our trial had four chemical treatments: 1) Goltix alone, applied at 0.8 lbs ai/acre, 2) Goltix alone, applied at 1.6 lbs ai/acre, 3) Betamix (0.11 lbs ai/acre) + Upbeet (0.004 lbs ai/acre) + Lontrel (0.03 lbs ai/acre), and 4) Betamix + Upbeet + Lontrel + Goltix, where the Goltix was applied at a rate of 0.8 lbs ai/acre. The trial also had a weedy and weed-free control for comparison.

Crop safety was excellent with Goltix. Crop safety was maintained even with Goltix applied at twice the normal application rate.

Weed control was greatest when Goltix was tank-mixed with Betamix, Upbeet, and Lontrel. In some cases, redroot pigweed, common lambsquarters, common ragweed, and velvetleaf control was increased by 20% in comparison to the tank-mix without Goltix. Weed control was monitored up to 56 days after treatment (DAT); however, by harvest there was very heavy pressure from later emerging broadleaf weeds, suggesting minimal soil residual control from this tank-mix.

Sugarbeet yield was increased by 12% when Goltix was added into the tank-mix with Betamix, Upbeet, and Lontrel vs. the tank-mix without Goltix (Figure 1 page 26). When Goltix was applied alone, crop yield was dramatically lower (>30%) than the tank-mix treatments. If registration is pursued, Goltix may have potential for use on Southwestern Ontario-grown sugarbeets.

TRIAL 2 – SUGARBEET TOLERANCE AND WEED CONTROL TO TANK-MIXES OF BETAMIX MICRO-RATES WITH SINGLE AND SPLIT APPLI-CATIONS OF DUAL II MAGNUM

FIGURE 1

Dual II Magnum is now registered for post-emergence annual grass control in Ontario-grown sugarbeets. Under some growing conditions, Dual II Magnum caused some injury when applied at the full label rate (1.07 lbs ai/acre). Previous research has shown that the timing and rate of Dual II Magnum has impacted sugarbeet tolerance and percent weed control. Therefore, the objective of this trial was to optimize the application timing of Dual II Magnum, applied as a split application with micro-rates of Betamix, in order to improve crop tolerance and weed control.

All herbicides in this trial were applied at the 1st, 2nd, 3rd, and 4th flush of cotyledon weeds. The trial consisted of 6 chemical treatments: 1) Betamix (0.11 lbs ai/ acre) + Upbeet (0.004 lbs ai/acre) + Lontrel (Stinger) (0.03 lbs ai/acre), 2) Betamix + Upbeet + Lontrel with the addition of the full rate of Dual II Magnum (0.53 L/ac) at the 3rd flush of weeds, 3) Betamix + Upbeet + Lontrel with a split application of Dual II Magnum at the 2nd and 4th flush of weeds, 4) Betamix + Upbeet + Lontrel with a split application of Dual II Magnum at the 1st and 3rd flush of weeds, 5) the full label rate of Dual II Magnum alone at the 3rd flush of weeds, and 6) a split application of Dual II Magnum alone at the 2nd and 4th flush of weeds. The trial also had weedy and weed-free controls.

Injury was only observed in the sugarbeets when Dual II Magnum was applied alone at the full label rate. There were no injury concerns when Dual II Magnum was applied



as a split application. Weed control was optimal when Dual II Magnum was applied as a split application either at the 1st and 3rd flush or 2nd and 4th flush of cotyledon weeds. Although lower, percent weed control was not significantly different when Dual II Magnum was applied in a tankmix with micro-rates of Betamix only at the 3rd flush of weeds.

At Harrow, yield was highest when Dual II Magnum was applied with micro-rates of Betamix at the 1st and 3rd flush of weeds. In contrast, at Ridgetown the highest yields were obtained when Dual II Magnum was applied in the tank mix at the 2nd and 4th flush of weeds. Yields were dramatically reduced when Dual II Magnum was applied alone. This was not due to crop injury, but rather competition with uncontrolled broadleaved weeds. In summary, our results show that crop tolerance, weed control, and yield are improved when Dual II Magnum is applied as a split application.

TRIAL 3 – TIMING OF ROUNDUP WEATHERMAX APPLICATION IN ROUNDUP READY SUGARBEETS

Roundup Ready sugarbeet varieties may be planted by Canadian sugarbeet growers in 2008. Roundup is a powerful weed management tool and efficient application to sugarbeets is essential given that sugarbeet crops may be grown in rotation with other Roundup Ready crops, such as soybeans or corn. Proper stewardship of Roundup use hopefully will avoid or delay the development of

FIGURE 2



herbicide resistant weed populations. The main objective of this trial was to determine the best timing and frequency of Roundup application in sugarbeets sufficient for commercially acceptable weed control and yield.

Roundup WeatherMax applied at 0.8 lbs ae/acre, in single or sequential applications at the cotyledon, 2nd, 4th, or 6th leaf stages of the sugarbeets, did not cause injury. Control of redroot pigweed, common lambsquarters, velvetleaf, smartweed, and common ragweed was not commercially acceptable when Roundup was applied as a single application at the cotyledon, 2nd, or 4th leaf stage. Competition with weed escapes in these treatments caused significant yield loss in comparison to a weed-free control (Figure 2). The best weed control was obtained when Roundup WeatherMax was applied to sugarbeets at cotyledon beets, followed by another application at 4 or 6 leaf stage beets or when initially applied to 2 leaf stage beets followed by an application at the 6 leaf stage. Sequential applications resulted in the highest sugarbeet yield. At Harrow, sequential applications of Roundup WeatherMax at the 2 leaf stage followed by an application at the 4 leaf stage did not differ from a single application, resulting in a commercially unacceptable yield.

Visual observations of weed control after canopy closure suggested either a delay in the second application of Roundup WeatherMax or addition of a third application just prior to canopy closure may be required to provide satisfactory weed control and yield. These observations will impact new treatment plans for the 2007 growing season.

COMPARISON OF CONVENTIONAL AND AIR ASSIST SPRAYERS FOR WEED CONTROL IN SUGARBEET



Alan Dexter (left), John Luecke and Vernon Hofman North Dakota State University and the University of Minnesota, Fargo, ND

The concept of using an air stream to help carry spray droplets from the spray nozzle to the target weeds is not new. A company called Sprayfoil Industrial Corporation in Minneapolis, MN began building the air assist Sprayfoil sprayer in the late 1950s. The Sprayfoil sprayer product line has been owned by a few different companies over the years and has been modified from the original design. The sprayer line was purchased by a company in Carseland, Alberta in 1984. The name of the sprayer was changed from the Sprafoil to Spray-Air and the name of the company became Spray-Air Technologies, LTD. A problem with the old Sprafoil sprayer was that the distribution of the spray droplets was not uniform across the boom so weed control was sometimes not uniform. The Shear Guard Plus nozzles, presently utilized in the Spray-Air, are much improved over the old Sprafoil nozzles and the present version of the Spray-Air sprayer produces a relatively uniform droplet distribution across the boom.



The small plot version of the Spray-Air sprayer constructed by Vernon Hofman at North Dakota State University.

Vern Hofman at North Dakota State University constructed a small version of the Spray-Air sprayer for small-plot research in 2005. The small-plot air-assist sprayer was compared to a conventional spray boom at Prosper, ND in 2005 and 2006 for weed control in sugarbeet. Both the airassist and the conventional boom were mounted on one unit which was attached with a three-point hitch behind a small tractor. The sprayers were set to deliver 5 or 10 gpa in 2005 and 10 gpa in 2006. The air-assist sprayer was operated at 4 mph and the conventional sprayer was operated at 40 psi and 4.5 mph for 10 gpa through XR80015 nozzles or at 6 mph for 5 gpa through XR8001 nozzles. The air volume control on the air-assist sprayer was set at 10 inches in 2005 and at 10 or 20 inches in 2006. Herbicide treatments were Progress + UpBeet +

Stinger + Select + MSO at the micro-rate of 5.7 fl oz + 0.13 oz + 1.3 fl oz + 2.0 fl oz/A + 1.5% v/v; the mid-rate of 8.5 (time 1)/23.5 (time 2)/35.6 (time 3) fl oz + 0.13 oz + 1.3 fl oz + 2 fl oz/A + 1.5%v/v: the conventional rate of 17.8 (time 1)/32.5 (time 2)/35.6 (time 3) fl oz + 0.26 oz + 2.6 fl oz + 3 fl oz/A with no MSO: 75% of the micro-rate and 50% of the micro-rate for a total of five herbicide treatments. All treatments were applied three times at 6 to 10-day intervals. The target interval was 7 days but weather sometimes affected the application timing. Bioassay species amaranth (pigweed), canola (mustard), quinoa (lambsquarters), flax, and sugarbeet were seeded across all plots. The center 7 feet of an 11-foot wide by 50 foot long plot was treated. Injury to the bioassay crops was evaluated visually.



Herbicides applied at 5 gpa in 2005 gave bioassay crop injury similar to herbicides applied at 10 gpa. Several of the sugarbeet herbicide labels specify that they must be applied in a minimum of 10 gpa of spray solution. After considering the label restrictions and the lack of benefit from using 5 gpa, all treatments were applied at 10 gpa in 2006. In 2006, results were similar when using 10 inches or 20 inches of air with the airassist sprayer so only the 10 inch results will be discussed. Also, the risk of spray drift would be reduced with the higher water volume and the lower air volume.

The air-assist sprayer gave 76% control and the conventional sprayer gave 72% control averaged over all bioassay crops and herbicide rates in 2005. In 2006, the airassist sprayer gave 81% control and the conventional sprayer gave 73% control averaged over all bioassay crops and herbicide rates. The total rainfall in May and June at the plot location was 8.9 inches in 2005 and was only 2.1 inches in 2006. The air-assist sprayer may have shown a larger advantage over the conventional sprayer in 2006 due to the dryer conditions in 2006 as compared to 2005. Sugarbeet injury averaged 15% from the air-assist sprayer and 9% from the conventional sprayer in 2005. Sugarbeet injury in the relatively dry conditions of 2006 was minimal and averaged only 4% from the air-assist sprayer and 2% from the conventional sprayer. Sugarbeet injury was greater from the air-assist sprayer in both years

but the differences were not great enough to be a major concern.

The amount of air through the air-assist sprayer and droplet size settings can affect the risk of spray drift. The air should dissipate when it contacts the target foliage and should not curl back up off the ground and suspend droplets in the air. An air-assist sprayer, when set properly, can reduce the risk of off-target movement of spray droplets but an improper setting with excess air volume and reduced droplet size can cause increased spray drift compared to a conventional sprayer. Proper sprayer set-up is essential for drift control with the air-assist sprayer.

The results from 2005 and 2006 indicated superior control of bioassay species with the air assist sprayer as compared to the conventional sprayer at all tested herbicide rates. A typical sugarbeet grower question after hearing that one sprayer performed better than the other is: "Can herbicide rates be reduced if I use the better sprayer?" The species control observations in 2005 and 2006 indicated that control of bioassav species increased as herbicide rate increased with both sprayers. Application of a lower rate in the air -assist sprayer than in the conventional sprayer resulted in less control of bioassay species in 2005. In 2006, a 25% reduction in rate in the air-assist sprayer often gave similar control of bioassay species compared to the conventional sprayer with the 25% greater rate. So, a reduced rate through air-assist sprayer may be equally successful in some environments but less effective than a normal rate through a conventional sprayer in other environments. The results of this research suggest that the air-assist spraver should be considered and appreciated for more consistent results across environments and not as a means of reducing herbicide rate.



BODY

QUALITY

VENTILATION UPDATE



By Corey Guza, Ph.D Agronomist

Producing a quality sugarbeet can result in increased economic return. Maintaining

that quality as the beet is stored is also important for improving profitability. Weather conditions can have an impact on sugarbeet storage and with increasingly mild winter temperatures, the risk of storage loss can increase.

Ventilating sugarbeet piles can reduce the risk of storage loss due to weather. Warm temperatures and rapid fluctuations in pile temperatures can lead to increased sugar loss due to respiration or, even worse, rotting of beets in the pile. Ventilation is used to reduce losses in the pile by maintaining pile temperatures near 35°F, a temperature in which respiration loss has proven to be minimized.

Bay City	RWST	% CJP	%Sugar
Non-ventilated beets - before	203	90.65	15.41
Ventilated beets	207	91.40	15.38
Non-ventilated beets - after	198	90.38	15.10
Sebewaing			
Non-ventilated beets - before	202	90.96	15.20
Ventilated beets	224	93.07	15.95
Non-ventilated beets - after	213	91.93	15.60

The 2006–2007 campaign was the second year of testing for the ventilation project in Michigan. The project was again conducted in the Bay City and Sebewaing piling yards. The first year of testing was successful. On average, the ventilation project produced an additional 18 lbs of sugar per ton compared to non-ventilated beets processed at the same time. The non-ventilated control beets in the study were, on average, 7°F warmer than the ventilated beets

TABLE 1







The new white vinyl plenums at Sebewaing.

throughout the storage period. Hot spots also developed in the non-ventilated check at both Sebewaing and Bay City requiring the non-ventilated beets in the study to be processed one month earlier than the ventilated beets.

The 2005–2006 ventilated beets were processed in mid-February in Sebewaing and early March in Bay City. Since the control beets were already processed at this time, the ventilated beets were compared to the best beets that were available for processing. By sampling factory cossettes, the ventilated beets in Sebewaing resulted in 11 to 22 lbs of additional sugar per ton compared to the best beets in the factory yard while the ventilated beets at Bay City contained an additional 4 to 9 lbs of sugar per ton (Table 1). The same measurements will again be taken on the 2006–2007 ventilation project.

New for 2006–2007 is a new plenum design in Sebewaing. The new plenums are made of white vinyl and are lower cost than steel plenums. They appear to be durable and have survived the Michigan winter. Passive ventilation was also tried this year in Bay City. Passive ventilation can be difficult to manage since it requires manual opening of the tube covers to allow air to flow through. Temperatures in the passive ventilated piles are quite variable and ranged from 29 to 40°F compared to consistent temperatures of 35°F when computer controlled fans were used to ventilate beets.



Springtime, summertime and harvest time, your Crystal sugarbeet seed sales team is there for you. We stand ready to meet the ever-changing demands placed on your operation and the sugarbeet industry. As the emerging force in sugarbeet seed, we've met these demands and today we've fully grown into the company that you've come to count on for great service, strong variety performance, and high quality seed. Sunup to sundown - we'll be there.

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ROUNDUP READY SUGARBEET PROJECT 2007



By Corey Guza, Ph.D Aaronomist

Interest in Roundup Ready sugarbeets has increased recently due to increased

acceptance of Roundup Ready crops, the discovery of ALS-resistant weeds and a need to decrease the input costs for growing sugarbeets. Michigan Sugar Company announced that up to 40,000 units or appoximatly 80,000 acres of three Roundup Ready varieties from Hilleshog, 9027, 9028, and 9029 may be planted in 2008. The current Roundup Ready varieties do not meet all of the approval criteria required by the Michigan Sugar Company Seed Committee. Generally, they are more susceptible to Cercospora leafspot and lower in recoverable white sugar per ton than the current approved varieties. In 2006, a demonstration project was conducted in Idaho to compare Roundup Ready sugarbeets to conventional sugarbeets. The test was a success, demonstrating that under growing conditions in Idaho, the Roundup Ready sugarbeet varieties preformed similarly to the conventional varieties. A similar test will be conducted in Michigan for 2007.

The demonstration trial will be conducted in the East District. Sugarbeets grown for the trial will need to be delivered to the Croswell factory for processing. Since the beets need to be delivered to Croswell, the trial beets need to be grown relatively close to the factory. From Decker to Croswell, MI, four grower groups and fields were selected to conduct the Roundup Ready demonstration trial based on grower interest and geographic location. In the Decker area, Allan K. Shaw Farms Inc. operated by Allan, Les, Steve and Mark Shaw, will grow an 80 acre trial. Near Deckerville, Allen and Debora Gentner-Bischer will grow a 160 acre trial. Al and Clint Stoutenburg will also grow a 160-acre trial near Sandusky. East of Croswell, D&D Thom Farms operated by, Don and Dave Thom will grow a 100-acre trial. In total, 500 acres of demonstration beets will be grown, 250 acres of Roundup Ready sugarbeets and 250 acres of conventional sugarbeets.

The 500 acres of sugarbeets will be grown on a contract basis for Sugar Tech, Inc., a subsidiary of the Beet Sugar Development Foundation which is supported by beet sugar cooperatives throughout North America. Growers will be reimbursed for their production and transportation costs but will not be paid on a per ton basis for the beets. The Roundup Ready beets will be grown with production practices similar to the conventional beets other than using Roundup for weed control. The trial will be monitored closely by Michigan Sugar Company agricultural staff.

The 500-acre project will be harvested during the early delivery period in late September. Production and yield data will be recorded by the agricultural staff. The Roundup Ready and conventional sugarbeets will be piled in separate piles in the Croswell factory yard. The beets will be processed shortly after delivery. The Croswell factory was selected as the processing site due to the ability to separate the sugar easily. The sugar produced from the Roundup Ready sugarbeets will be stored and marketed separately from the conventional sugar.

The 2007 demonstration trial in Michigan will help to build on the excitement generated from the 2006 trial that was conducted in Idaho. The Michigan sugarbeet industry will be "in the spotlight" as groups from around the nation and the world have plans to visit the trial. The Roundup Ready trial in 2007 will be another positive step for adopting Roundup Ready sugarbeets in Michigan.

GROWING SUGARBEETS IN GERMANY



By Wayne Hecht, Secretary, Michigan Sugar Company Board of Directors

Due to an interest in local history,

the hosting of a German student for a five-month internship and an interest in ancestral roots, I have been afforded some very special experiences in Germany. My family and I are sugarbeet growers. We live near Richville, MI. Richville was formerly named Frankenhilf. It was the last of four communities founded by immigrants in 1845 to 1851. They were from Franconia in Northern Bavaria of Germany.

Through a succession of experiences since 1990, including the internship, becoming acquainted with more recent German immigrants in Ontario, receiving the gift of a Hecht family tree history reaching back to 1570 and the hosting of a number of European visitors, I have accumulated a long



Ruben Mossner, Fred Hinz, George Helmreich, Herman Painter, Stefen Hessler, Andreas Haag, Horst Rothe, Rainer Fuge, and Wayne Hecht, at the Ropa Machinenbua Works in Sittelsdorf.

list of friends and contacts overseas. My landlord, Fred Hinz, and I traveled to Franconia in August of 2006. At the same time, Ruben and Dorothy Mossner, long-time beet growers from Frankenmuth, were visiting there too. The hospitality of the German people is superb. As visitors from Michigan, we were truly guests as we stayed in homes in rural villages or "Dorfs" as they are called.

My host, Horst Rothe and I visited the Würzburg area wine country to see the research and demonstration site in Seligenstadt. This tract of land was acquired by the Catholic Church in the 1500s and is some of the best farmland in Franconia. Every sixth year, all makes of beet harvesters made in Europe are invited to demonstrate at a field day in October. Over 9,000 people attend this event. Dr. Klaus Ziegler, Manager, and Ernst Hahn Jr., 2nd V.P. of the Franconian Sugar Beet Growers and Mr. Köstner took time to show us around. Preparations

City of Rothenburg o.d.T. at the intersection of Romantic and Castle Rds.

were being made for this year's event when we were there. In 2006, the 5,800 Franconian Growers had 60,500 acres of sugarbeets with an average yield of 27.2 tons/acre. The average farm has 10.4 acres of beets.

We then drove to Ochsenfurt where we met Dr. Michael Schaefer and Mr. Ernst Merz, field manager, who gave us a tour of their modern sugarbeet factory. It has a daily slice of 16,500 tons. Truckloads of beets that arrive at the factory are identified with a new radio frequency id (RFID) system. This factory is one of 43 factories in the Suedzucker group and the only one with a campaign of 100 days or more. It ends near Christmas. The sugar from Suedzucker's 1,112,000 acres represents 21.8% of the EU Maximum Quota. The above figures are a 16% cut from 2005 as a result of a WTO ruling that will reduce European sugar production 25% by the year 2009. Suedzucker has an ethanol plant in Zeitz in former East Germany using 80% wheat and 20% sugarbeet hick juice as the feed stock. In 2007, they are building a farmer-financed ethanol plant using 100% thick juice from sugarbeets, also in Zeitz. The fuel for these plants is brown coal.

Mr. Rainer Weiss of the BBV (Bavarian Farmers Assn.) took us to Sittelsdorf, south of Regensburg, to the site of the Ropa Machinenbau self propelled beet harvester and loading Maus works. Mr. Rainer Fuge flew in from northern Germany for the day just to give us a tour. We also met Mr. Paintner who invented this style harvester. The German people there referred to it



Sugarbeet yield in European countries that are members of the Südzucker group. Green (top) numbers are sugarbeet yield in metric tons per hectare (multiply by 0.45 to calculate tons per acre) for individual countries. Red (bottom) numbers are the percent sugar content of the beets. For example, Poland has an average sugarbeet yield of 21.9 tons per acre with a sugar content of 18.41 percent.



Dr. Klaus Ziegler, Manager of the Frankonian Sugarbeet Growers Assn.



Sugar factory at Ochsenfurt Germany - part of Südzucker Group.



Dr. Michael Schaefer, Ernst Mertz, Horst Rothe, Ernst Hahn Jr. and Wayne Hecht inside the Ochsenfurt Sugarbeet Factory.



Front of Ropa Harvester.

as an "American Dream." A farmer said there has to be a better way and he went to a local machine shop and started to build. It is now a \$60 million per year business selling harvesters in 23 countries. One half of their harvesters go into Russia and are paid for before they leave the yard. We literally waved to a truck driver as he departed for Russia. On the return trip, we visited an alfalfa drying cooperative near Windsbach, which is fueled with locally produced wood chips. Much of their product is sold to herdsmen in the Alps.

A few evenings later, through the efforts of Rainer Weiss and my host, Horst Rothe, I was invited to be a guest at a private audience in Unternbiebert along with local and state leaders of the Bauern Verband (their equivalent of our Farm Bureau) as we met with the organization's district president and parliament member, Jurgend Stroebel, and national president, Gerd Sonnleitner. Later, the group joined 1,000 farmers gathered in a huge festival tent to hear their farm leaders speak to them. The Michigan visitors were graciously introduced in both languages.



Ropa Harvester loaded for delivery to Russia.

In Germany, many of the red clay tile roofs in the rural villages are covered with solar panels that produce 10 times the electrical needs of their owners. Several biogas units were seen producing methane from a mix of green chop grains, manure and wheat. The methane generators also generate electricity that can be sold off the farm.

This trip was a very interesting combination of Old World culture, new technology, sightseeing and learning, and of visiting old friends and making new ones.

HOW IS THE BEET PAYMENT CALCULATED?



By Brian Haraga, Chief Financial Officer

Most businesses can provide products or services that have

measurable prices specific to the economic model of supply and demand. Beet prices are no different. No, the beets themselves are not priced specifically in the same manner, but the market conditions in which we sell the products processed from the beets (sugar, pulp, and molasses) and the resources required to effectively and efficiently produce and process the beets are the driving factors. The Co-op's beet payment results from subtracting annual operating costs from total sales in accordance with generally accepted accounting principles ("GAAP"). The end product (sugar and the associated cost of sales, selling, general and administrative costs, interest expenses and other business incomes and expenses) net the result in an amount available for shareholders. The total amount available is simply divided by total tons delivered for the average per ton payment. The annual results are recorded by your Co-op's finance and accounting personnel, audited by an independent third party (retained by the board of directors' audit committee) and presented in the Michigan Sugar Company Annual Report, specifically in the Consolidated Statement of Operations.

The statement presented is a summary of revenues and costs, following guidelines established by the Financial Accounting Standards Board and are in conformity with accounting principles generally accepted in the United States. There are essentially four major categories that capture the essence of the beet payment; (1) revenues, (2) cost of sales, (3) selling, general and administration, and (4) other.

REVENUES

The revenues are primarily **sugar sales** for sugar produced during the year. The sales and marketing teams work extremely hard at providing the customer the products they demand at competitive prices. Sales of sugar products include bulk and liquid to large commercial industrial food processors, as well as packaged products to meet the demands of the retail sector. Pricing is influenced by many factors including world trade supply and demand, U.S. governmental actions, trade agreements, and weather events in the U.S.

COST OF SALES

Production costs include customer freight, discounts, allowances, and the costs associated with purchased sugar, beet seed and chemical sales. Plant **costs** are the costs associated with a wide variety of activities from receiving and transporting beets to operating the four factories, then packaging and warehousing the final products. The largest component of plant costs involves energy, coke and limestone purchases. The market condition of natural gas, coal and oil has a substantial impact on the costs associated with running the plant. To provide some cost leverage and combat energy cost volatility, Michigan Sugar Company purchased and stored natural gas during the summer preceding 2006–07 campaign.



Lime is great for agricultural soils because:

- It neutralizes acidic soils, increasing soil pH
- Increases microbiological activity; accelerating decomposition of crop residue
- Improves legume growth
- Improves stand, root growth, and sugar content of sugarbeets

Give your crops the extra edge to increase yield potential.

For more information, CALL your nearest Michigan Sugar Company processing facility during business hours.* Monday—Friday, 7:30 a.m. to 3:00 p.m.

We'll even load it for you!

Bay City (989) 686-1549, ext. 2	222
Caro (989) 673-7560	Croswell (810) 679-3740
Carrollton (989) 753-9491	Sebewaing (989) 883-3201

This offer is available from your friends at Michigan Sugar Company, producers of Pioneer and Big Chief Sugar. Locally grown. Locally owned.

- * Truckers/users of lime must comply with DEQ/MI Department of Agriculture regulations. A brief outline of the applicable regulations are as follows:
- Truckers: the same regulations for hauling quarry lime apply. You may need to take steps to prevent blowing of dust from the truck.
- Users: the nutrient loading should be accounted for in your fertilizing program. The sugarbeet lime contains: Nitrogen 5.5 pounds per ton, Phosphorus 1.0 pound per ton, Potassium 0.36 pounds per ton, Calcium 570 pounds per ton (80% as CaCO₃ or limestone, Organic content 8%, Moisture content 10%–15%, and Micro nutrients typical background levels

Application should be conducted to not impact any water. A more detailed discussion can be found in the Generally Accepted Agricultural and Management Practices for Nutrient Utilization as approved by the Michigan Commission of Agriculture at the following internet address: http://www.michigan.gov/mda/0,1607,7-125-1567_1599_1605-70361-,00.html



HOW IS THE BEET PAYMENT CALCULATED? (CONT'D.)

Other plant costs for the purposes of processing sugar and the associated co-products include campaign factory labor. The factories also require annual repairs and maintenance on the buildings and the equipment. Agriculture costs include beet receiving labor, beet transfer costs, equipment repairs and R&D. Packaging, warehouse and outside storage are required to ensure the proper distribution of the finished sugar products. The management team and board of directors review costs on a month-to-month basis and consistently seek opportunities for improvement. The remaining costs include depreciation, disposal, property taxes, insurance, security and safety. Capital acquisition for land, buildings and machinery and equipment are assets that are purchased. According to GAAP, the Co-op does not expense (or reduce the beet payment) in the year of acquisition. The asset has an estimated life and the cost of the asset is said to be amortized over that life. The amortization or depreciation is expensed annually for the duration of the asset's estimated life. That expense is what is recorded and is a cost expressed as a plant cost in determining the average beet cost per ton delivered.

By-Product Sales are recognized as a reduction to costs. The co-products are primarily from beet molasses and pulp. Additionally, the molasses desugarization process produces CMS and betaine as a co-product. Many of these products are marketed and sold through Midwest Agri-Commodities. At Bay City, the high cost of energy in 2006 made the drying and selling of pulp pellets prohibitive. With that said, a new market for pressed pulp was realized.

GENERAL AND ADMINISTRATIVE

This section of costs accounts for all expenses associated with the selling and administrative responsibilities of the Co-op which includes the sales and marketing staff, accounting, communication, human resources, purchasing, information technology, safety, operations and agriculture staffs. The Co-op's employee payroll taxes, employee benefits (primarily health care costs), workers' compensation, legal and audit costs, pension costs, management information costs, banking fees, US Beet and Sugar Association, are its major costs. The annual Imperial marketing fee resulting from the Co-op's origination is also expressed in this cost center. The effects of combining the past two years of labor negotiations and Carrollton suspension, the Co-op was able to reduce employee heath benefits by over 25%. Combining the corporate administrative staffs from Bay City and Saginaw, suspending operations in Carrollton, reduced salary headcount, reduced pension expense and reduced payroll taxes. As in plant costs, the management team and the board of directors review costs on a monthly basis and consistently look for opportunities for improvement.

OTHER (EXPENSE) INCOME

Interest expense is deducted from operating income. Interest cost is an expensive consequence of the Co-op's high debt leverage. As our debt-toequity improves, the benefit will fall straight to beet payment improvement. This past year, interest costs increased as a result of the prime rate moving from 6.25 to 8.25%. To counter high interest rates, the Co-op purchased an interest rate swap with a member of the bank group to limit exposure to the variability of interest rates over a four-year period. Other income-net is also deducted. The drivers of "other" are primarily royalties received on mineral rights owned by the Co-op, gain and losses on sale of assets, and natural gas storage hedge gains and losses. The net result of revenues, less expense, is defined as the distribution of net proceeds, commonly referred to as the "gross beet payment."

In conclusion, the beet payment is the result of the annual efforts from the shareholders' growing, to the agricultural staff and operations' processing, to the marketing and selling of sugar and its co-products. Revenues less production, plant, general and administrative, and other expenses, result in the net proceeds that are available for distribution. It is a combined effort of management, employees and owners utilizing its resources to provide the best possible return.



PRESSED BEET PULP

Begin thinking about your 2007 sugarbeet pressed pulp needs now.

Our pressed pulp program gives you two options for purchase; either pick up at any of our four factory locations or have pulp delivered to your farm. There are also several discount or rebate options to help you reduce your feed costs. Pressed pulp is made to order, with a guaranteed moisture level that will not exceed 75%.

Pressed pulp can be fed fresh or ensiled in a bunker or Ag-Bag. Properly ensiled pulp contains more than 20% dry substance, is light gray in color and maintains its texture well.

Sugarbeet pulp has been recognized as a valuable livestock feed. It has high energy value, is a good source of protein and contains minerals essential for animal health. Pressed pulp is highly digestible and can reduce digestive disturbances. It is a key ingredient in livestock rations, especially for dairy and beef cattle.

How to contact us for more information:

Contact us at 989-686-1549, ext. 243 or ext. 253. Orders for specific tonnage must be placed two days prior to delivery to ensure availability.

Loading is normally scheduled during daylight hours during the processing season (late September to mid-February). Specific loading hours for each factory can be determined when orders are placed.

Payments will be due 15 days following an invoice. All trucks are weighed at the factory to determine quantities sold.



Crude Protein	Minimum	1.33%
Crude Fat	Minimum	0.04%
Crude Fiber	Maximum	3.83%
Moisture	Maximum	75.00%
N-Free Extract	Minimum	8.67%
Ash		1.50%
Composed of sugarbee	t residue after extrac	tion of sucrose.

MEET YOUR NEW BOARDS



By Julie K. Perry, Executive Assistant, Administration

The three district boards (West,

Central and East) were hard at work last fall preparing to implement the restructuring put into play with the bylaws changes the members voted in previously, requiring that the district board members all be elected at their December 2006 annual meetings. Those elections were held and the new boards promptly determined their terms of office, and chose their executive directors and committee representatives.

The Co-op board of directors has now been downsized and three new directors joined; Charles Bauer from the West District (who filled the vacancy created by the resignation of Michael Mulders), **Rick Gerstenberger and Thomas** Wadsworth, both elected from the East District. Exiting members of the board were recognized for their service at the annual shareholder meeting held this past January. They were Carl Bednarski, Brian Fox, Chris Grekowicz, Michael Mulders, Jack Tagget and Thomas Zimmer. Mr. Zimmer was retiring as Chairman after holding that seat since 2002.

The Co-op board of directors, at their reorganization meeting, named Gene Meylan as Chairman, Marty Lewis as Vice Chairman, Wayne Hecht as Secretary and Clay Maxwell as Treasurer. The board now consists of 13 directors (four from each of the three districts, plus Chris Peterson, outside director).



CO-OP BOARD

- Gene Meylan (West) Chairman
- Marshall Lewis (East) Vice Chairman
- Wayne Hecht (Central) Secretary
- Clay Maxwell (West) Treasurer
- Charles Bauer (West)
- Rick Gerstenberger (East)
- Tom Gettel (Central)
- William Herford (Central)
- Loren Humm (West)
- Richard Maurer (East)
- Dr. Christopher Peterson (Outside director)
- Rich Sylvester (Central)
- Thomas Wadsworth (East)

WEST DISTRICT

President, Chris Ratajczak **Vice President**, Steve Hoard **Secretary**, Matt Brown **Treasurer**, Tom Fleischmann

Directors:

Clay Crumbaugh David Helmreich Rick Leach Art McClintic Michael Schmidt

CENTRAL DISTRICT

President, Rob Henne **Vice President**, Brian Rayl **Secretary**, Kent Houghtaling

Highlighted above is a recap of the boards as they are today, as well as a listing of the Co-op's committees. You can find contact information for the Co-op board Treasurer, Randy Elenbaum Directors: Brian Adam Lee Butts Jim Goretski Michael Richmond Doug Vader

EAST DISTRICT

President, John Tanton Vice President, Scott Shaw Secretary, Mark Lumley Treasurer, Gerald Keinath

Directors:

Jim Roggenbuck Chad McNaughton

COMMITTEES:

Grower Relations Seed PAC Sugarbeet Advancement Youth Advisory Committee

CO-OP BOARD COMMITTEES:

Executive Compensation Audit ASGA Sugar Association Policy Midwest Agri-Commodities Ethanol

of directors, district boards and committees in the Co-op directory on the grower website (www.michigansugar.com/members), under "Secure Documents."





By Ray VanDriessche, Director of Community & Government Relations

Frequent and clear communication is a key element to the long-term success of any business and this is especially true with cooperatives. Company representatives and share-

holders alike at Michigan Sugar place a high priority on good communication between the company, its shareholders and the public. It has been the goal of Management and the Co-op Board of Directors to have a smooth flow of information to shareholders, employees and the public that is timely and accurate. With that goal in mind, there is a constant effort to analyze and improve the channels from which the information is disseminated.

Let's take a look at the many different avenues from which information is shared and questions are answered.

GROWER REPRESENTATIVE TO GROWER

- The Cooperative has a board of directors consisting of 12 directors who are growers, representing its three districts, and an outside director. In addition, there are also district boards (East, Central and West) consisting of six or nine grower representatives from each district. The combination of these boards amounts to 37 representatives who are involved in decision making along with company management and the dissemination of information that works out to a ratio of approximately one representative for every 40 shareholders. A listing of these board members and their contact information can be found on the grower website at www.michigansugar.com/member under Secure Documents.
- Grower-to-Grower Forum On the grower website, there is a grower-togrower forum that provides an avenue for growers to share their ideas and techniques with each other.
- District Meetings Each year in December, all growers in each district are invited to attend a meeting held in the growing district to hear committee reports from district board members and company management, elect their district and Co-op board members and voice their questions and concerns.

MANAGEMENT TO SHAREHOLDER

• From the President & CEO, Mark Flegenheimer

- Direct contact Mark has an open line to all shareholders, whether it is by phone or a personal visit to his office to address questions and concerns.
- 2. **Tool shed meetings** In the winter of each year, a number of "tool shed" meetings are held in growers' tool sheds spread throughout the growing area, giving all growers an opportunity for open discussion with Mark.
- 3. The Coffee Shop Bulletin Board on the grower website – This is another opportunity to ask questions or express concerns with a prompt response back from Mark, which can be viewed by all shareholders on the website.
- 4. Anonymous Suggestion Box There is also an Anonymous Suggestion Box on the grower website that will forward directly to Mark for his review. No replies will be sent to the originator. This vehicle will allow topics of private concern to be aired directly with the President of the Co-op.
- 5. **The Sugar Scoop** Mark writes a monthly newsletter, *The Sugar Scoop*, updating shareholders and employees alike following the monthly Board of Directors' meetings providing for timely announcements of any major decisions or actions taken at the meeting. Mark also takes this opportunity to give updates on sales, market conditions, factory operations, farm bill policy, and grower payments. *The Sugar*

Scoop is available on the grower website (in the Secure Documents area), and all agricultural offices. New in 2007, a copy has been mailed directly to those who have specifically requested a mailing.

- Annual Meeting and Banquet Held each year, in January, all shareholders are invited to hear annual reports given by management and corporate Board officers along with the opportunity to vote on specific issues and voice questions and concerns.
- Website Growers can access general information about the company through links on the public portion of the website and grower specific information through a password-protected area of the site, such as agricultural updates, grower calendar with meeting dates, bylaws, and much, much more.
- Annual Report In December of each year, Michigan Sugar's annual report is mailed out to all shareholders providing audited financial statements for the past year, historical statistics, and a letter from the Chairman and the CEO.
- Newsbeet Magazine In the spring and fall of each year, the Newsbeet magazine is published and sent to all shareholders providing timely updates on Ag issues, financial and operations reports, farm bill and political issues, the Youth Sugarbeet Project and a variety of other topics.



MEDIA

- Press Releases Newspapers, radio and television
- Interviews When an interview is requested by the media on a particular subject, either Ray VanDriessche, as the media contact person, or Mark Flegenheimer, as CEO, will respond. We always request to see the article before it is printed to check for accuracy, but seldom are we allowed to do so. Unfortunately, we sometimes find ourselves trying to correct information that came out in the media with no input from anyone here in the company that is extremely inaccurate and misleading. Please keep in mind what you hear and see in the media many times has not been reported correctly. Also, it is important to note that the only way many of our neighbors and members of our communities learn about

Michigan Sugar is through the media. Maintaining a friendly and positive relationship with our neighbors is very important. Having positive, upbeat stories in the news are good for your Co-op.

Company/Grower-related issues – We have had occasions in the past, such as the August payment, where growers contacted press before discussing the issue with management or board of director members. This causes misinformation and dampens the positive image the Cooperative works very hard to build within our communities. Keep in mind that what is printed in the media is read by our lenders, the legislators that support us, and other commodity groups. Please contact management or a board member before contacting the press with concerns.

AGRICULTURE DEPARTMENT TO GROWER

- Direct line and email to the Vice President of Agriculture, agricultural managers and agronomists.
- Contact with agriculturists via farm visits and cell phones
- Grower hotline phone number Updated report from each factory manager during harvest.
- Spring production overview meetings.
- · Website updates.



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There is a clear recognition by management and the board of directors that as shareholders and growers you are owner/operators of your own business and have a real desire and need to have timely and concise information. If you have the internet and have not yet provided your email address to the company please do so. If you haven't read or taken advantage of the numerous communication items discussed earlier in this article, I encourage you to do so - I'm sure you will learn something about your Co-op.





By Wayne Martin, Agriculturist, East District

Leon and Colette Leclair live in the small town of Grande Pointe,

situated about two miles inland from the eastern shore of Lake St. Clair and about two miles south of the Dover receiving station. They have three children, Kristopher (13), Kaelyse (11), and Josh (5). They farm approximately 1,000 acres of land scattered between Mitchell's Bay and the Thames River.

The Leclairs raise sugarbeets, processing tomatoes, corn, soybeans and wheat. They enhance their farm operation by taking on custom work with their harvesting equipment. The Leclair harvest group delivers about 300 acres of beets to the Dover receiving station every year.

The Leclairs started raising beets in 1997 when beets were introduced back into the area. Leon and their Dad, Arthur, initiated beets into the operation when they signed their first contracts to grow for Michigan Sugar Company. Since then, Art has "sort of" retired and spends a lot of time fishing; however, still manages to find time to help on the farm at the peak times of planting and harvesting.

Leon likes to be on the cutting edge of things. He believes that he can and will always learn new and exciting things. He was at the piling yard just the other day testing and learning to operate his GPS auto steer. Leon knows the bottom line depends not solely on what he can generate, but also on

what he can keep. After carefully analyzing his soil nitrogen test, he made the decision to not sidedress his 2006 beet crop. He had no more than 40 to 50 lbs per acre of N on his crop because the test indicated there was sufficient N available to meet his targeted tonnage. That field was harvested November 11 and yielded 28.9 per acre tons with a 17.8 sugar; Dover average sugar being 16.8. His decision to stray from the practices he was accustomed to was difficult; however, after seeing the results, it appears to have been the right call. Leon insists that trying and learning is what matters. "He who has never failed has done nothing at all."

Leon is also a part of a buying group—as yet another attempt to reduce cost and network with other like-minded growers. As a member of a buying group, the participants use collective buying power to achieve reduced input costs and facilitate the buying process by way of delegation. Another role of the members is to identify and analyze new opportunities budding on the horizon within their industry.

Leon is in the process of acquiring his CCA accreditation and is enrolled in the Advanced Farm Manager Program by Farm Credit Corporation (FCC). Leon believes that "Chance favors the prepared mind." — Louis Pasteur

Leon improves his operation by disciplining himself to do what very few of us like to do...keeping accurate and up-todate farm records. He believes that good record keeping is vital to a healthy farm operation,



Kristopher, Colette, Josh, Kaelyse, and Leon Leclair

enabling him to make sound management decisions.

When Leon is not farming, he turns his attention to his family and also volunteers as a foundation member for Children's Aid Society. As a member of this foundation, Leon participates in managing money by way of directing bursaries for the education of underprivileged children. Leon is also a member of the Chatham-Kent Strategic Implementation Committee. The role of this group is to make Chatham-Kent more attractive for new business. The area has lost more than its fair share of industry over the last 20 vears. The committee's efforts to make a difference in our community are praiseworthy to say the least.

Leon considers himself a shaker and a mover. He strives to have and maintain a good relationship with others in the agricultural industry. He feels working together is very important for everybody. Leon is very optimistic about the future. He knows he is very fortunate to be farming because it is what he wants to do. Leon is very proud to be a farmer and is proud of his industry.

MICHIGAN SUGAR YOUTH SUGARBEET PROJECT REPLACES 4-H-FFA PROJECT

In an effort to enhance the Sugarbeet Project and increase interest and participation, a new format was developed to open the project up to all youth who have an interest in learning about the production of sugarbeets and promoting our industry. The new program is entitled "Michigan Sugar Youth Sugarbeet Project" and does not require that a participant be a 4-H or FFA member or that they live on a family farm. The new project has an "Adopt a Farmer" program which allows someone from off the farm to interact with a sugarbeet grower who sponsors the participant's sugarbeet production project.

CARO PRODUCTION AREA—CENTRAL DISTRICT

The Caro Michigan Sugar Youth Sugarbeet Project had a good year in 2006. It started with sugarbeet project meetings hosted by respective 4-H Club Leaders. Participants were told about the sugarbeet project and were informed about project requirements. In mid-July, each member had to dig and prepare three uniformly-sized beet roots that would be displayed at the local county fair. The agriculture staff, with help from the local district growers, judged the entries and a large majority of them received blue ribbons. The size of the beet at this early juncture indicated that the 2006 crop had a huge potential.

The next big event was the summer trip. This year the group went to KoKomos in Saginaw and enjoyed three hours of free-run through the fun park. It featured laser tag, putt-putt golf, go-karts, bumper-boats and more. Everyone had a great time and enjoyed pizza and pop for lunch. The three hours went by very fast.

Later in the year, it was time for project interviews where each participant's book, story and knowledge of sugarbeet production was thoroughly tested by a panel of judges. The panel consisted of Jim Mantey, MSU extension, Ralph Fogg, MSC Chief Agronomist, Kent Houghtaling, Central District Board Member and Kent Graf, Caro Agricultural Manager. The annual awards banquet was held at the Brentwood Restaurant on December 4. The following participants received recognition for award winning projects.

Prestige Award Recipents: Ryan Schian (parents Jeff and Ronnie), Joe Bublitz (parents Curt and Ann), Nathan Bednarski and Mike Bednarski (parents Carl and Lisa). Premier Grower Award Recipients: C.J. Bednarski, Eric Schian, Kristen Reinbold, Dave Houghtaling, Dana Schian, Hillary Zwerk, Eric Houghtaling, Andrew Houghtaling, Jennifer Mossner, and Haley Zwerk.

BAY CITY PRODUCTION AREA-WEST DISTRICT

The West District held their annual Youth Sugarbeet Project Awards Banquet on January 9, 2007, at the Trillium Banquet Center in Saginaw. Entertainment was provided by Joel Tacey, a juggling comedian. There were 32 project participants this past year. Six were named Premier and three were Prestige Award recipients.

Those receiving recognition, for the Premier Award, were Ben Brown, Amber Brown, Jackie Albosta, Ben Fleischmann, Amy Hecht, Hunter Hrabal and Marsha Weiss.

Participants receiving the Prestige Award were Alyssa Brown (parents Matt and Nanette), Danelle Albosta (parents Bruce and Lori), and Amanda Hecht (parents Gary and Kay).



Ryan Schian



Nathan Bednarski



Danelle Albosta



Alyssa Brown



(Change



Mike Bednarski



Amanda Hecht



CROSWELL PRODUCTION AREA-EAST DISTRICT

The East District held their sugarbeet 4-H and FFA Project Awards Banquet in Sandusky on January 8. There were 46 participants in this season's project resulting in nine Premier Award recipients and three Prestige Award recipients. The banquet was held at Woodland Hills Country Club in Sandusky. Entertainment was provided by Dave Kujat, featuring solo saxophone and contemporary music. The music was enjoyed by all in attendance.

Ubly High School senior, Rita Gentner, was the mistress of ceremonies for the evening. The Sanilac County 4-H King (Dennis Wheeler) and Queen representative (Shannon Barry) explained their roles as 4-H representatives. All participants received a Pioneer Sugar waste basket basketball hoop.

Those receiving Premier Awards and recognition were: Jolene Maurer, Rita Gentner, Janelle Kirsch, Jacqueline Kirsch, Lisa Volmering, Adam Maurer, Luke Maurer, Rebecca Gentner, and Jesse Grekowicz. The Premier award was an atomic clock radio.

Receiving top honor Prestige Awards and recognition were Travis Volmering (parents Dan and LaDonna), Andrew Gordon (parents Ken and Debbie), and Courtney Maurer (parents Rich and Barbara). The Prestige Award was an mp3 player with external speakers.



Travis Volmering



Courtney Maurer

SEBEWAING PRODUCTION AREA—CENTRAL DISTRICT



Andrew Gordon



David Maust



Lance Schuette



Cody Kurzer

Participants in the Sebewaing area started signing up for the sugarbeet project at contracting time. Late in the spring, we held an orientation meeting to explain the point-value of each part of the project to the participants. We gave examples of test and interview questions during this meeting and handed out the sugarbeet project books. When the first interview and test were given, they were to have completed their books up to that point in time. The top point achievers (adding together the book, test, and interview scores, participation of the summer trip and exhibiting at the fair) came back for a second interview. This interview pertained to every aspect of the sugarbeet industry. It dealt with sugarbeet production techniques, processing aspects, and political interventions within our business. The top achievers from this second interview were our prestige growers for the Sebewaing area. The

participants and leaders who completed the Sugarbeet Project. Prestige Grower Awards and Recognition: Cody Kurzer (parents Raymond and Candra), David Maust (parents Clifford and Marie), Lance Schuette (parents Troy and Leann). Premier Grower Awards and Recognition: Bryce Armbruster, Brittany Armbruster, Corey Haag, Jesse Maust, Katie Smith, Sara Smith, and Eric Sneller. 4 5

other participants invited to the second interview became premier growers. At the end of the year, a banquet was held to honor the





By Richard List, Agriculturist, West District

In 1850, after the lumber barons had cleared some of the Saginaw

Valley of the majestic white pines, the Appold family left Germany to settle in the Bay City area. Around 1900, this family started raising sugarbeets for the German-American Co-op. The Appolds had one of the first contracts. Their farm is still in the same location, nestled along the Saginaw River about one mile south of the Bay City plant on Stone Island Road.

Today, Warren "Whitey" Appold and his father, Marv, farm about 300 acres in this low lying area. To protect their land from the onslaught of flooding waters each spring, the Appolds and their neighbors continue to maintain a series of levees and pumping stations that were built years ago.

The soils on their farm range from sand, to heavy clay, to high organic muck. Warren and Marv stay diversified by planting a rotation of corn, sugarbeets, wheat soybeans and vegetables. These soils, being high in organic matter, make it quite adaptable to vegetable production.

About 12 years ago, Warren and his cousin, Randy Appold, purchased the Hoerauf vegetable farm from Warren's father-in-law. Acres of radishes, cauliflower, lettuce, cucumbers and cabbage are planted each year and sold to local and state markets. The harvesting of vegetables starts in May and continues until November.



Warren, Rylan, Weston and Marv Appold.

When raising sugarbeets, Warren and Marv follow either corn or soybeans. After corn, they moldboard plow and follow soybeans with a subsoiler. They try to plant their sugarbeets as early as possible. With good tile and a well drained soil, planting can start in late March or early April. Before planting, urea and fertilizer are spread and worked in. Sugarbeet seeds are planted about four inches apart. Pyramin is sprayed after planting, but before the first rain is forecast, to make sure it is not lost to dry weather. Later, split rates and cultivation, along with some hand labor, are used to keep the sugarbeets clean.

In the fall, after days of harvesting vegetables, Warren and Marv will spend many evenings harvesting sugarbeets. Marv will start to defoliate late in the day. The two of them will then fill their two tandems and head to the factory to unload and return to fill the tandems again. The Appolds have also played a part in sugarbeet research. Dr. George Bird of Michigan State University has a continuous plot in the middle of their farm for studying nematodes. Dr. Bird has been studying the effects of different chemicals and farming practices used in trying to reduce the number of sugarbeet cyst nematodes.

Warren started helping his dad farm when he was old enough to drive a tractor, probably around age 10. Now, the fifth generation of beet producers has started on the Appold Farm. Warren's sons, Weston, 12, and Rylan, 10, are starting to help Dad and Grandpa.

When Warren has time off, he enjoys spending time in the great outdoors. Hunting, fishing and snowmobiling are some of his favorite outdoor activities. He and his wife, Angie, also enjoy watching their sons play basketball, football and baseball. The Appolds are members of Saint Paul Lutheran Church in Frankenlust Township.

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