Better Choices, Bigger Rewards:
Our Decisions Dictate Our Future

2017 Top Grower Recognition
p. 17

What drives sugar?
The Sugarbeet is a publication of The Amalgamated Sugar Company LLC. The magazine is prepared by the Sugarbeet Quality Improvement (SBQI) Department to provide growers with up-to-date information on growing and harvesting sugarbeets. The magazine is also published to help upgrade the standards of the U.S. beet industry by providing a reliable source of information for agronomists, sugar company personnel, students, and others interested in this vital food crop.

Articles appearing in The Sugarbeet, with the exception of those items credited to other sources, may be quoted or reprinted without permission; however, mention of this publication is requested when material herein is reprinted. Although every effort is made to ensure that the material is accurate, no responsibility can be assumed for errors over which the editor has no control. Mention or illustration of methods, devices, equipment, or commercial products does not constitute an endorsement by the Company.

Please address all communications to: Managing Editor, The Sugarbeet, 138 W Karcher Rd, Nampa, Idaho 83687, or by emailing calder@amalsugar.com.

The Sugarbeet is a free publication, published three times per year. Anyone can subscribe to the magazine by logging on to www.srcoop.com and clicking on “The Sugarbeet” icon, or under the “Member Login” tab on www.amalgamatedsugar.com. You can also subscribe via telephone or email by calling 208-383-6500 or emailing info@amalsugar.com.

A Fresh Look launched on September 15, 2017 with the goal of providing trustworthy, research-based information to consumers about the benefits of GMO farming methods. When Amalgamated Sugar, Betasweet, Western Sugar and Wyoming Sugar came together to form A Fresh Look, it was uncertain if impacting people’s perceptions about GMOs would be possible. Although early messaging seemed to be effective in improving opinions of GMO safety, there were still many questions regarding the efficacy of a broader effort.

A Fresh Look began its “digital-first” campaign using some of the most sophisticated consumer targeting available to engage with a select group of several million moms who do not have hardened opinions about GMOs. The overarching goal was to help consumers make informed food choices, and feel comfortable with their knowledge of GMO Farming benefits for people and the planet.

The campaign has engaged approximately 1,600 growers from across the agricultural community to share their voices and first-hand experiences, which are backed by thousands of studies from the global scientific community. Many of these growers have played an active role in the creative content of this campaign. Within a month of the digital launch, growers in La Grande, Oregon participated in a photo/video shoot, which helped generate content for A Fresh Look’s social media channels.

An element of the campaign that message testing has found to be very effective is the amplification of farmer moms who share stories about the choices they make to raise healthy families. These farmer moms face the same parenting pressures as other moms, putting them in a unique position to talk about the benefits of GMO Farming methods — not only for the families they help feed, but for the food they put on their own tables. Although A Fresh Look has been heavily backed by sugarbeet growers and the sugarbeet industry, the information provided is not focused on one specific crop. Rather, the effort explains the benefits of GMO Farming overall.

In contrast to other GMO education efforts, A Fresh Look embraces the term GMO and brings it back to the farm. Too many people associate GMOs with a laboratory, and incorrectly assume they are artificial ingredients, added to food unnecessarily. The reality is that beneficial traits in seeds farmers use have sparked a revolution in the ways crops can be grown — which the campaign calls GMO Farming methods.

Two points arise from these survey results. The first is that it is possible to shift public perceptions on GMOs with well-crafted messaging and consistent efforts. Secondly, there is still much to be done in the effort to inform the public of the benefits of GMO Farming methods.

The campaign and its funders are working to develop a strategy that includes year-two of the campaign, and goals for the inclusion of future supporters. The team at A Fresh Look are constantly adapting techniques and content to operate the campaign as effectively and efficiently as possible. Amalgamated Sugar is committed to working alongside A Fresh Look’s partners to help reach the campaign’s goal of providing fact and science-based information about GMOs to American consumers.
The Board of Directors of Snake River Sugar Company is elected by the Members to make strategic choices that improve the sustainability of the Cooperative. In that regard, the Board has made numerous decisions in the last several years designed to improve the long-term rewards of being a Member of the Cooperative.

The Board has (i) authorized the investment of over $450 million in capital improvements and maintenance in the last 10 years; (ii) approved the hiring and promotion of high quality personnel to run the Cooperative; (iii) recommended changes to the Cooperative’s governing documents to ensure the Cooperative is run by and for the benefit of our sugarbeet farmers; (iv) amended the grower payment system to promote higher sugarbeet quality and the efficient use of the Cooperative’s processing assets; and (v) helped build a culture of continuous and purposeful improvement based on transparency, integrity and accountability.

Our Cooperative is owned and operated by its Members for their mutual benefit. This edition of The Sugarbeet magazine is dedicated to the fundamental belief that when we make better choices in the management of this business, both individually and collectively, we deliver bigger rewards to all our Members.

Duane Grant, Chairman of the Board of Directors, Snake River Sugar Company

Better Choices, Bigger Rewards: A Message from Chairman of the Board

Who are these “unsung heroes”, they are the team of agriculture managers and 20 crop consultants. Once harvest is finished and all the sugarbeets have been delivered to one of 72 receiving stations around the Company, our “second” season begins; the storage campaign. Nearly 5 million tons must be managed through the winter and spring weather until the last beet is sliced at one of the three factories. Amalgamated Sugar agriculture staff are tasked with managing 141 separate piles spread across 535 miles.

We have realized significant improvement in reducing pile losses over the course of the past two campaigns and want to build on this. To what do we owe this improvement? First, we are seeing the real benefits of harvesting cooler and cleaner sugarbeets. Most importantly, we have brought back the practice of walking all our sugarbeet piles. This is “boots-on-the-ground” hard work performed about every 10 days by your agriculture staff. The crop consultants team up in groups of 2 or 3 and walk every single pile in their area, noting any issues, such as hot spots, frost cones, etc. Then, together with the district agriculture manager, they work their pile management plan. Notes, photographs, and actions are filed into a common database.

We have found that there is no substitute for climbing on top of a sugarbeet pile for a close-up inspection with our eyes and noses. With all the technology available today, including overhead thermal imagery and drone flights, we have found that what was “old” is new again and is delivering results.

In this issue, we again recognize our top 2017 Members representing all receiving stations across the Company. We have traditionally used the Estimated Recoverable Sugar/Acre (ERS/A) metric as a ranking tool. Starting last year and continuing with crop year 2017, we will also rank Members using ERS/Ton. For crop year 2017, ERS/Ton will be used to rank our top Members and ERS/A will be used as a secondary ranking. ERS/Ton is a direct measure of our advancement to reach, maintain, and build on 18% sugar content, placing a greater emphasis on improving sugar content. With record yields and our factories operating at full capacity, it is more imperative than ever that we continue to improve sugarbeet quality and sugar content.

I wish all Members a safe and successful 2018!

Pat Laubacher, Vice President of Agriculture
What Drives Sugar?

Just as humans need food as our fuel, the sugarbeet plant makes sugar for fuel which is continually needed to stay alive. This process to produce sugar in the leaves is called photosynthesis. The sugars produced in the leaves are transported throughout the plant for energy. Sugar is moved through the phloem for growth and storage in the tap root (fig. 1). The phloem can be thought of as a pipe that allows water, nutrients and sugar to go from the top of the plant towards the bottom while the xylem is the pipe that takes nutrients and water from the roots up the plant. Anything that affects photosynthesis and transportation of nutrients and water in the plant can affect the stored sugar in the tap root.

The first eight weeks after a sugarbeet plant emerges, there are eight cambium rings formed (fig. 1 shows four innermost rings) with an additional four to five more rings forming later. The inner-most six rings make up 75% of the tap root. The cells in the root are larger the further away from the vascular tissue (where these phloem tubes exist) and the sugar concentration in these cells is less the further away from the vascular tissue. Research has shown that cells further from the phloem contain increased water and non-sugar dry matter such as potassium and sodium.

The control for the partitioning of the sugar to the root has been found to be primarily in the root, although the genes and molecular pathways are not completely understood. Sugar content in the tap root has been found to be multigenic (controlled by more than one gene) but is still affected by environmental and cultural practices.

Figure 1. Cross section of sugar beet showing rings.


Vascular Tissue: the cambium is located in the center, the phloem is located very close to and on the outside of the cambium and the xylem is located very close to the inside of the cambium.

Variety

We know that varieties affect the sugar content of sugarbeets. Taking advantage of the Official Variety Trials and personal experience found on each farm, will enable each Grower to choose the best variety for their farms. It is recommended to choose several of the top sugarproducing varieties in regards to your disease and insect resistance needs, and try them on your farm. The Snake River Sugarbeet Research & Seed Alliance LLC has implemented a plan to bring higher sugar content varieties to the Snake River Sugar Company Members.

Placing Date/Replant

Studies show a decrease in sugar content when planting or replanting starts the first part of May, middle of May, or later. It is theorized that later planting pushes the canopy development later and this causes the root and sugar development to be later also. The sugar content will continue to increase in the root until harvested or temperatures are cold enough to stop photosynthesis, which is believed to be between 24 and 26 degrees Fahrenheit. This late planting situation can also lend itself to higher beet nitrates, especially if nitrogen is applied as if the yield will be the same as if planted earlier. The table below shows Crop Year 2013 when the Cooperative had high replanted acres combined with a warm summer and fall. The sugar percentage was low and the nitrates were higher than normal.

<table>
<thead>
<tr>
<th>Year</th>
<th>Planted (Acres)</th>
<th>Replanted (Acres)</th>
<th>Sugar (%)</th>
<th>Nitrate (ppm)</th>
<th>Season</th>
<th>Temp</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>186,313</td>
<td>84,684</td>
<td>15.87</td>
<td>384</td>
<td>Warm</td>
<td>Aug &amp; Sept</td>
</tr>
</tbody>
</table>

Available Nitrogen

Applied nitrogen increases plant and root dry weight and leaf area. The root also takes up the nitrogen at the expense of stored sugar. Plants given more nitrogen do not send less sugar to the root, but the sugar is metabolized to grow the tap root. With additional nitrogen, the number of root rings remain the same but are larger; there is generally not an increase in the number of root cells, but there is an increase in the volume of each cell as you go further from the vascular tissue. As previously mentioned, these larger root cells have less sugar and increased weights of water and non-sugar dry matter.

The key is to have less nitrogen available the last few weeks of growth in the late summer and fall to allow the sugar to be stored in the root and not go to top growth and excess cell growth in the root. Through July and August, soil nitrogen mineralization (microbial breakdown of nitrogen from organic matter) can provide much of the plant nitrogen needs.

Chart 1 is a graph of the sugar content versus nitrates from 2010 to 2017. As we can see, the lower nitrates in the beet correspond with an increase of sugar in the beet, emphasizing the importance of nitrogen management.

Diseases and Insects

Anything that affects photosynthesis and its transport of sucrose throughout the plant will affect yield and sugar content. That is why it is critical to buy disease and insect resistant varieties that fit your needs and to be timely in the use of pesticides.

Weather

Low night time temperatures in August and September increase the sugar content in the beet. These low temperatures, along with moisture received, killing frost, and replants account for much of the sugar differences between years and growing areas. The cultural practices, especially nitrogen available to the beet crop, explain much of the difference of sucrose content between Growers in the same area for the same year.

If Mother Nature helps us with a warm spring and summer coupled with cool nights in August and September, we have an excellent chance of high yields and excellent sugar percentage in the sugarbeet crop.

Conclusion

Of course, the weather is beyond our control, but if a crop is managed properly with seed variety selection, planting date, proper fertility (especially nitrogen), and disease and insect control, the Grower will be in the driver seat and able to realize the rewards of excellent sugarbeet quality, yield, and ultimately, increase his bottom line and that of the Cooperative.

Stacey Camp, Senior Research Agronomist

Better Choices, Bigger Rewards

EVERYONE IS faced with choices every day. For some, those choices may be as simple as whether to hit the snooze button again. On the other hand, it could be a little more complicated, such as signing a multi-billion dollar merger with another large company. Regardless of the scope or difficulty of the choices people are faced with, there is one underlying principle that applies to every decision we make: Will this actually improve the current state of things? If not immediately, will it set us up for success down the road?

At Amalgamated Sugar we know that without well-researched, thoroughly vetted, and productively sought-after solutions, a company cannot progress in today’s marketplace and reap the rewards of staying relevant and competitive—a characteristic that is of the utmost importance to our 700+ Grower-Owners who depend on us to be on the cutting edge of our market.

This article illustrates three real-world examples inside The Amalgamated Sugar Company LLC where the concept of “better choices equals bigger rewards” is exercised in our factories, through our resource management, and with our finances.

Sugar Storage

Big plans are underway for the Mini-Cassia facility. These plans include building three new concrete silos with integrated sugar feed and reclaim systems. The new silos will add 450,000 cwt of sugar storage capacity, increase utilization of the current storage capacity, and allow for adequate maintenance time on the older silos. The total Project cost will be $17.1 million.

Mini-Cassia currently has three silos; these were built in the mid 1960’s when only 600,000 cwt of sugar was produced. Last year, Mini-Cassia produced over 9,000,000 cwt of granulated sugar. These were the last silos Amalgamated Sugar has built. Since the 1960’s, the only other increase in sugar-silo storage that Amalgamated Sugar completed was the Colorado silo facilities, which were acquired in the 1980’s. Amalgamated Sugar has five locations where sugar is stored in silos. (see table on opposite page)

There have been three recent expansions to sugar storage capacity in the United States:

- **2013**: Wyoming Sugar - (2) concrete silos - 50 ft. dia. x 167 ft. high (330,000 cwt storage capacity)
- **2016**: Southern Minnesota - (6) concrete silos - 50 ft. dia. x 147 ft. high (800,000 cwt)
- **2017**: American Crystal Sugar - (1) dome concrete silo - 184 ft. dia. x 134 ft. high (1.3 Million cwt)

The existing three silos at Mini-Cassia are Weibul-type steel silos. They are 116 ft. in diameter and 90 ft. high.

The Weibul silos have a discharge and reclaim screw conveyor that travels up and down a center column to fill and reclaim sugar within the silo.

This type of filling and reclaiming is classified as a “First In-Last Out” type of sugar storage system. Because of the necessity to cure sugar five days before packaging or shipping in bulk, these types of silos can only utilize about 70% of the full capacity of the silo. Because of this feed system and cure time, the existing three silos at Mini-Cassia are underutilized for their full capacity. The working capacity is only 800,000 cwt whereas the full capacity is 1,200,000 cwt. Mini-Cassia produces an average of 28,000 cwt/day; therefore, they only have 30 days of storage capacity for their 7-month campaign. The factory produces sugar 330 days a year. Because of this, and to clear silo storage, the silos, warehouse and shipping can be down only 14 days. The necessary maintenance on the silos cannot be accomplished in this narrow time frame. Additionally, the feed and reclaim system does not allow individual silo isolation for major maintenance. The last major maintenance on these silos took place over 14 years ago.

The three new silos, as well as the new feed and reclaim system, will allow every silo to be isolated for maintenance.

Due to market demand, we must send sugar constantly from Mini-Cassia to our off-site storage facilities to keep the silos from filling up and slowing down sugar production. Slowing down sugar production during campaign can result in slowing down beet slice which can lead to discarded sugarbeets. The extra freight and handling costs in and out of our off-site locations ranges from $3.43/cwt to as high as...
$4.98/cwt, depending on the location of the outside facility.

By installing the three new silos, we will not only gain the 450,000 cwt capacity of the new silos, but also be able to utilize the full capacity of the three existing silos; as a result, our total silo capacity at Mini-Cassia will increase to 1,650,000 cwt. The new silos will allow the direct shipment of more sugar to customers, bypassing off-site storage and therefore save the extra freight and handling costs for sugar.

The three new silos will be 58 ft. in diameter x 150 ft. tall and hold 100 ft. of sugar in each. Each silo will hold a maximum capacity of 150,000 cwt.

The concrete silos will be poured in place by Slip-Form Concrete Techniques. https://www.youtube.com/watch?v=G_6_5bZFIL0

The silos will be bottom discharge with multiple outlets, that will create a Mass Flow design and create a “First In-First Out” filling and reclaim operation that will optimize our storage and movement.

Summary
1. Three new concrete silos will be installed at Mini-Cassia that will include a new sugar feed and reclaim conveying system.
2. This will increase working sugar storage at Mini-Cassia from 800,000 cwt to 1,650,000 cwt.
3. This will allow much needed maintenance on our existing silos.
4. The increased storage at Mini-Cassia will allow us to direct-ship more sugar to customers.
5. The total project cost is $17.1 million.

The project will begin January 2018, with actual silo construction beginning summer 2018 and scheduled for completion spring of 2019.

Resource Management

The beet sugar value chain and its core agricultural and production processes have stood strong for more than 120 years at The Amalgamated Sugar Company LLC. During the past century, we have relied on technology to enhance the time-honored traditions and proven methods that make our Cooperative one of the most successful sugar producers in the United States. We do so with breakthroughs in science and with the technical innovations that have increased efficiency within every aspect of our beet processing and product development models.

Over the last 10 years we have used emerging technology in agriculture to help us increase our crop yield and raise the sugar content in our beets. This increase means more sugar, per beet, per acre, and greater rewards for our Growers. The same is true for our business systems. Just like applying advances in agriculture to increase our sugar content and yield each year, the latest technology will provide us with more timely and accurate information to run our business.

As we look to the future, Amalgamated Sugar must plan for the next iteration of change in the sugar industry. The missing element that was needed for better decision making and automated, streamlined business operations was the investment in business process technology. In 2017, Amalgamated Sugar embarked on a two-year project to re-implement an information technology platform with its foundation built on the core structure that has repeatedly delivered support to Amalgamated Sugar for nearly two decades. This project, the JDE Integrated Business Systems Project, is applying the most current technology to the computer systems that run our business operations. By upgrading and deploying an enterprise-wide resource management platform, Amalgamated Sugar will deliver major enhancements to our financial administration, human capital management, production and asset monitoring, and company performance.

“You can have data without information, but you cannot have information without data.”

– Daniel Keys Moran

Do we have the data? Which system is the data in? How do we access the data? How long will it take to pull the data together and analyze? Can we get actionable information from the data? These are a few of the many questions that people are asking today. The JDE Project is working to provide answers to these questions and implement the most current version of JDE with advanced functionality and reporting. What that translates to is accurate and rapid reporting on the entire enterprise which will provide management with better information to make better decisions. For the Grower, this will help ensure we have the information necessary to make each step in the sugar manufacturing chain more efficient.

Although sugar is our #1 focus, data has become the new currency for business. We produce just as much data daily as we do sugar. In order, for data to be turned into useful and actionable information that is readily accessible, the right system must be in place. This requires focusing on the right data, structured in a meaningful way, and located in a centralized and easy to access location. This data becomes a vital component of Amalgamated Sugar for business operations, reporting and analysis, and better decision making.

This is the number one priority of the JDE Integrated Business Systems project. The new design and future functionality of the JDE system will provide one source of the truth for decision making, and real-time reporting and analytics to enhance our competitiveness. This will be accomplished through proactive management focused on providing insight to drive decisions that support our strategic goals to increase profitability.

Key Reasons for Change
1. Improved Decision Making – Provide centralized, consistent data for effective reporting and analytics to enhance competitiveness through proactive management and better decision making.
2. Increased Automation – Increase efficiency by streamlining and automating cross-departmental business processes and reducing manual and redundant tasks.
3. Enhanced Financial Controls – Improve financial controls by utilizing JDE functionality and implementing Best Practice policies and procedures.
4. Reinforced Platform for Growth – Implement an integrated system that supports a billion-dollar company and is scalable for future growth.
The Value of Sugar Content

The Cooperative has spent considerable time and energy reviewing, analyzing, and changing the way we pay the Members over the past couple of years. In June 2016, the Board approved the new Quality Incentive Program that was implemented on the November 30, 2017 beet payment. In September 2017, the Board approved a new Beet Payment Formula to be phased-in beginning with crop year 2019. Both the new Quality Incentive Program (“QIP”) and the new Beet Payment Formula (“BPF”) were implemented in efforts to help achieve our first strategic initiative to increase average tare lab sugar content to 18% by December 31, 2020.

Why is the increase of sugar content our first strategic initiative and why is the Board and Management driving these changes? Simply put, we sell sugar. The biggest driver on the return to the Members (“the beet payment”) is the market price we receive for sugar. For years, the Cooperative and its Members have engaged and spent significant time and resources to maintain and improve the Sugar Program in the United States. This has involved working with industry groups, the USDA, and Congress to manage and maintain the Sugar Program and a market price that returns an adequate value to the Members. We must and will continue these efforts.

The second biggest driver of increasing the beet payment is to increase the amount of sugar that is available to sell. Since the Cooperative is at capacity on slicing beets, to increase the amount of sugar that is available to sell, one of two things must take place. Significant capital improvements in expanding or adding slice capacity at facilities, or increase the amount of sugar in the crop and the recovery of that sugar. Due to significant capital costs and a domestic sugar program that does not currently support expanding beet processing facilities, the Cooperative is focused on increasing the sugar content in the crop and the recovery of the sugar.

When we increase the sugar content, what will the value be? Let’s calculate the potential value by using the average base crop statistics and increase the sugar content by half a point.

<table>
<thead>
<tr>
<th>Acres</th>
<th>181,840</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yield</td>
<td>38.5</td>
</tr>
<tr>
<td>Tons Purchased</td>
<td>7,000,000</td>
</tr>
<tr>
<td>Sugar Content</td>
<td>17.0%</td>
</tr>
<tr>
<td>CWT Produced</td>
<td>20,800,000</td>
</tr>
<tr>
<td>Increased Sugar to Sell</td>
<td>613,000</td>
</tr>
<tr>
<td>Contribution Margin per CWT</td>
<td>$26.00</td>
</tr>
<tr>
<td>Total Value</td>
<td>$15,938,000</td>
</tr>
<tr>
<td>Per Ton Purchased</td>
<td>$2.28</td>
</tr>
</tbody>
</table>

In the example above, we see that an increase in sugar content of 17.0% to 17.5% on a crop of 7.0 million tons, raises the sugar available to sell by 613,000 CWT. The value of the additional sugar is $15.9 million dollars and increases the beet payment by $2.28/ton. This is due to the beet industry having high annual fixed costs to maintain our facilities and workforce. In addition, the majority of the variable operating costs are driven by the amount of tons we slice and not the amount of sugar we produce. Thus, the contribution margin to the beet payment on the additional sugar produced is quite high as the fixed costs and per ton variable operating costs do not change. A one percent increase in sugar would lead to a $4.55/ton increase. As this example demonstrates, there is significant value to the Members of the Cooperative if we collectively can increase the sugar content of beets.

The Cooperative has changed and is changing the way we pay the Members to incentivize them to make decisions in their agricultural growing and seed selection processes that will lead to increases in sugarbeet quality and increases in sugar content. If achieved, these efforts will result in a better beet payment to the Members.

However simple it may sound, our decisions dictate our future. At Amalgamated Sugar, significant dedication goes into every decision we make in order to create the largest positive impact possible for our Company and our Members — because at the end of the day, when one of us wins, we all win, and as history has illustrated, better decisions really do come with bigger rewards.

Kent Quinney, Director of Operations and Engineering
Nicole Foster, JDE Project Manager
Craig Hanks, Vice President of Finance & Treasurer

"...However simple it may sound, our decisions dictate our future..."
Fertilizer burn or herbicide carryover. These could be nematodes, Root Aphid, Root Maggot, Leaf-miner, Black Bean Aphid, Cutworm, or other insects. It could be foliar-related Cercospora Leaf Spot, Powdery Mildew, chemical burn, or water stress. Diseases can be prevented and factors favoring disease development need to be monitored so timely action can be taken.

Early season scouting should be a high priority as this is when potential problems can be addressed before becoming real problems. Scout your fields! The front of your field may look great from the road, but your perceptions can change as you enter the field and take a closer look. Count the plant stands, starting with crop stand counts that equal 100 ft. of row. It is preferable to count the plant stands, planting, mice and birds “feeding” may all reduce stands.

Additional, nutrient deficiencies may show up and be fixed in a timely manner. Look for evidence of insect damage such as Cutworm, Wireworm, Leaf-mine, Root Maggot, Black Bean Aphid, Root Aphid, Spider-mites, etc.; all of these problems at threshold limits can cause economic losses. Find out if the field has a history of seedling, root, or other diseases, that can be managed through variety selection or fungicide seed treatments to protect the young seedling from disease. Keep records for future reference, and be aware that scouting methods are often insect/pathogen/ weed and host specific. Keeping such resources where they are easily accessible allows for an accurate diagnosis — no one knows everything. The SBQI Team has a valuable tool, Index Cards of the Most Common Diseases and Pests in The Amalgamated Sugar Company LLC Production Area. Contact your Crop Consultant for a copy of this valuable tool.

Survey Patterns

There are many survey patterns used when scouting a field. Some pests and diseases are spread uniformly over the entire field. When scouting for a pest with this distribution, sample sites are evenly distributed, excluding obvious factors, such as field edges. Other pests and diseases are expected to be concentrated in particular areas of a field.

If pests are detected in one spot and not in others, subsamples should be taken in that region to determine more accurately the extent and severity of the problem. Pests fitting into this pattern include nematodes, wireworm, Rhizoctonia Root Rot, Cercospora Leaf Spot or other root diseases may be distributed in high or low spots or areas where water systems overlap.

Lastly, pests that appear at field edges first can be detected by simply walking field edges. Pests fitting into this pattern include Spider-mites, Armyworm and Grasshoppers, Powdery Mildew, etc.

Thresholds

Pests are to be expected with any agricultural crop. Yet, what level of pests is acceptable? A key to approaching that question is to have a good handle on pest populations in the field. Some examples of threshold treatment levels and levels of economic damage are:

Leaf-miner: Treat when beets are in the four-leaf stage and average 16 eggs and larvae per plant. Losses: yield loss up to 10% can be expected if plants are infected in the four-leaf stage.

Black Bean Aphid: Treat if 3-5% of your plants are infected 12-16 weeks from emergence, a plant is infected if aphids are present covering 20-40% of the leaf surface. Losses: sugar losses up to 10% can be expected if plants are infected late June early July.

Two-Spotted Spider Mites: Treat if spider mites infestations are increasing between scouting sessions and if conditions are favorable to increasing development, such as high temperatures and low relative humidity. Losses: yield loss up to 25% can be expected with early season high infestations.

Cercospora Leaf Spot: Treat when the average of 100 sampled leaves equals 5-10 spots/leaf. Losses: Economic losses of 3% or more can occur, if 3% or more of the leaf surface (80 spots/leaf), happens early in the season under favorable conditions. Think: 60 degrees Fahrenheit nighttime temperature, 90% relative humidity, 5 hrs. leaf wetness, and 5-10 lesions/leaf equals treatment!

Powdery Mildew: Treat at first sign of infestation or if known that a nearby field is infested. Treat and reapply so long as environmental conditions are conducive for disease spread.

Losses: if untreated and under severe conditions, sugar losses up to 25-30% can occur.

Aphanomyces and Rhizoctonia: Symptoms on the roots need to be detected early so irrigation can be adjusted accordingly (less frequent, longer sets) to avoid further disease spread and losses. If signs of damage are expressing themselves on the leaves, disease has progressed significantly, and economic losses can occur.

The examples listed above are early season thresholds and losses. Some pests and diseases can have multiple generations and infect your crop multiple times during the season. The threshold limits increase later in the season, but economic losses can still occur if left untreated. This is the reason for scouting your fields from emergence to harvest. With all these pests and diseases contact your Amalgamated Sugar Crop Consultant with any concerns or questions about treatment or threshold limits.

Field scouting is an ever more crucial part of agriculture today. To properly scout for pests, you must know where they live, what they look like, how they develop, and how to find and count them. A combination of good scouting procedures and a solid knowledge of pest biology allows you to collect the information required to make sound management decisions, ensuring a higher degree of crop protection and a higher quality crop at the end of the season.

Jeff Schow, Senior Agriculturalist
As another crop year peaks around the corner, many growers are reviewing reports to see what the highlights of last season were and where improvements can be made. Looking to increase efficiency and profitability, the conversation often turns to the best producing seed varieties, water management, and weather conditions. As this takes place, tillage and fertilizer applications are in full swing and timing of such may be overlooked as an area of improvement.

To contribute to the profitability of the crop, tillage must be performed with purpose. Variables such as personal preference, Mother Nature, the size of an operation, or accessibility to equipment, may dictate when a grower accesses the field. Whatever the reason, the focus of tillage should be to kill weeds, incorporate residue into the soil, alleviate compaction, minimize erosion, enable seed-to-soil contact, and aid moisture and fertilizer movement within the soil. Ultimately, the focus of tillage is to create an optimal soil environment at the most opportune time for stand establishment and growth.

Bedding

Bedding is a tillage program where all groundwork is completed and seed beds are marked out prior to planting. This is highly preferred and used in certain growing regions to prepare the soil in either the fall or the spring. Some advantages of bedding include: a level seed bed, increased moisture for seed germination, fertilizer placement, furrows to aid in equipment guidance and defoliation efficiency as well as to reduce tare. Considering these advantages may beg the question, should bedding take place in the fall or the spring?

Fall Bedding

Bedding in the fall allows the grower to plant directly into moisture without the need for spring groundwork. This reduces the risk of erosion, soil compaction and is an ideal practice in heavier soils. Commonly tied to fall bedding is the application of fertilizer, usually phosphate and/or micronutrients, directly in the seed bed. This is often viewed as more efficient due to the fertilizer placement in the root zone. In addition, growers often need to top-dress remaining nitrogen the following spring, thereby simplifying their fertilizer program.

However, one concern with placing fertilizer in a fall bed is the increased risk of fertilizer tie up or loss due to prolonged exposure to the calcareous soils commonly found throughout the Snake River Sugar Company’s growing area. Whether or not fertilizer is applied, late season moisture may be a limiting factor in the fall and could suspend bedding until the spring.

Spring Bedding

When following an exceptionally wet winter, white soils are at high risk of hardening. In this situation, bedding may be more effective when done in the spring to alleviate planting and stand establishment problems. In addition, bedding fertilizer in the spring can increase plant availability by reducing tie-up. Despite these benefits, some challenges of spring bedding include timing and maintaining moisture.

Spring & Fall Tillage

Widely used across many growing regions in the Snake River Sugar Company is performing deep tillage in the fall, followed with light tillage in the spring prior to planting. If timed correctly, this creates a consolidated soil profile, similar to fall bedding, resulting in good seed to soil contact and enhanced moisture movement. This approach is a little more forgiving where the light soil tillage in the spring allows growers to rework the top few inches of soil if the weather is uncooperative in either fall or spring.

Spring vs. Fall Fertilization

Like tillage, a grower’s choice to fertilize in the spring or fall can be critical to optimum sugarbeet production. Some fertilizers, like dry phosphate, compost, or manure, require additional time in the soil to break down and are best applied in the fall to allow adequate time for the nutrients to become available to the crop. Fertilizers such as nitrogen, potash, and micronutrients, are more rapidly available and can be effectively applied in the spring. Ultimately, the goal of any fertilizer program should be to maximize nutrient availability based on the plant’s needs, while minimizing tie-up or loss.

Single vs. Multiple Applications

Another consideration in maximizing nutrient availability is whether to apply all needed fertilizer before planting or to do split applications during the growing season. The Snake River Sugar Company recommends that all nitrogen inputs be applied and available prior to the beets reaching 4 to 6 true leaves. This ensures nutrients will be available to the plant to photosynthesize and reach row closure. Applying all fertilizer prior to planting can help a grower save on multiple application worries and costs, increase availability early in the growing season, and can be more forgiving of over-fertilization. However, in sandy soils an upfront application may be detrimental, especially in fields irrigated with hand or wheel lines. In these situations, several nitrogen applications may be required to reduce nutrient loss in the soil. Overall, the goal of any fertilizer program should be to have all nutrients available to the plant to maximize growth and maturity.

Soil types, moisture, accessibility, and resource availability all play a major role in how tillage is performed and when fertilizer is applied. Every farm is faced with different situations, so growers should evaluate and be cognizant of their tillage and fertilizer programs as a new growing season nears.

Being prepared involves a well laid out tillage and fertilizer plan—an integral part of a package that will increase the possibility of another successful season with bigger rewards.

Bryce Dayton, Crop Consultant
Kyle Gelles, Crop Consultant
Nutrient Recap: A Word on Nitrogen, Phosphorus and Potassium

Like any living, breathing organism, plants require certain nutrients to grow and to thrive. Sugarbeets are no exception. There are 17 essential nutrients that are required for adequate and proper plant growth, with 9 being labeled as macronutrients and 8 as micronutrients. Too much, or too little of any of these nutrients can hinder the growth, quality, and production of crops. The quantity of micronutrients needed in a crop is generally very small. Still, not having enough of any of the nutrients, results in stunted plants, plant abnormalities, and lower yields. Of the macronutrients: nitrogen, phosphorus, and potassium are each required in much larger amounts for successful plant growth and are usually major components in most applied fertilizers.

Nitrogen (N)

One of the main macronutrients necessary in plant development is nitrogen. Nitrogen is a key element in chlorophyll and tissue growth, especially leaf development. Chlorophyll is essential for all plants to be able to absorb energy from light which is the basis for photosynthesis. The first two months in the life of a sugar beet are the most critical for top growth, root development, and sugar storage. During this period, sugarbeets need to rapidly expand their leaf canopy in order to maximize light absorption and photosynthesis. Plant sugars are then converted to plant use in the tops. The excess is stored as sucrose in the root. The faster the beet plant can achieve row closure, the more time the beets will have for maximized photosynthesis. Sugarbeets require a delicate balance of nitrogen. When there is not enough nitrogen, the results are stunted growth and reduced yields. Too much nitrogen can cause excess top growth, lower sugar yield, and quality issues.

Phosphorus (P)

Phosphorus (P) is a crucial component in many plant processes including photosynthesis. Most importantly phosphorus is needed in creating and transporting energy. It is involved in storing and transferring energy in the form of adenosine triphosphate (ATP) throughout the plant. ATP is created during photosynthesis. It then becomes available as an energy source that can be stored and used whenever the plant is in need of it. In addition, phosphorus is an important part of cell division and in the formation of new plant tissue. When phosphorus is added to the soil, it helps promote root growth and higher sugar yields. Plants deficient in phosphorus will be stunted and likely have lower sugar content. Phosphorus is also thought to help the plant to be more resistant to diseases.

Potassium (K)

While potassium is not used as part of the chemical structure of a plant, it plays an important role in the development of a plant. Potassium is used in the activation of around 60 different enzymes essential to plant growth, thus determining the rates at which chemical reactions within the plant can progress. Potassium also helps to regulate the amount of water that is taken into the plant. Potassium is also essential for regulating the opening and closing of stomates, the pores in the leaf epidermis responsible for water vapor, carbon dioxide and oxygen exchange. When potassium moves into the guard cells that are surrounding the pores it allows for those pores to absorb more water, which then allows for the pores to open up and allow gases (oxygen and carbon dioxide) to move in and out more freely. If there is an inadequate amount of potassium within the plant, plants are not able to absorb as much water and other nutrients from the soil, which will cause the plant to become stressed.

When plants are provided with the proper nutrients, in the appropriate amounts, they are able to thrive, producing healthier, better yielding, and higher quality crops. It is important to remember that each nutrient is different and helps the plants perform a different way. If a plant is lacking any of these 17 essential nutrients, it could have a huge impact on the yield of the crop. The opposite is true as well, too much of a good thing could be just as damaging to the plant. Stay educated about what your sugar beet crop needs as it is growing and remember to talk to your Amalgamated Sugar Crop Consultant to determine a good plan of action that will ensure the best sugar beet crop possible.

Dylan Dean, Research Technician

The Amalgamated Sugar Company would once again like to recognize the commitment and dedication of each of our Grower Owners to producing the best sugar beet crop they can year in and year out. Despite opposition from Mother Nature and other unforeseen challenges, our Growers continue to put their best foot forward in adjusting and adapting to the ever-changing landscape that is agriculture. On the following pages, we highlight Growers whose efforts rewarded them exceptionally well in crop year 2017. Congratulations on another good crop and the best of luck in the season to come!
## Mini-Cassia District
Station (alphabetical by growing region)

<table>
<thead>
<tr>
<th>Aberdeen</th>
<th>ERS/T</th>
</tr>
</thead>
<tbody>
<tr>
<td>NB Farms</td>
<td>303</td>
</tr>
<tr>
<td>Kron Farm</td>
<td>302</td>
</tr>
<tr>
<td>Val Wahlen</td>
<td>302</td>
</tr>
<tr>
<td>American Falls</td>
<td></td>
</tr>
<tr>
<td>Conrad Isaak</td>
<td>318</td>
</tr>
<tr>
<td>James B Tiede</td>
<td>316</td>
</tr>
<tr>
<td>LaMar Isaak</td>
<td>315</td>
</tr>
<tr>
<td>Blackfoot</td>
<td></td>
</tr>
<tr>
<td>VO Enterprises</td>
<td>325</td>
</tr>
<tr>
<td>Thane Christensen</td>
<td>320</td>
</tr>
<tr>
<td>Dean Evans</td>
<td>312</td>
</tr>
<tr>
<td>Center Pleasant Valley</td>
<td></td>
</tr>
<tr>
<td>D&amp;R Farms</td>
<td>324</td>
</tr>
<tr>
<td>Driscoll Brothers</td>
<td>309</td>
</tr>
<tr>
<td>Andy Povey</td>
<td>307</td>
</tr>
<tr>
<td>Fingal</td>
<td></td>
</tr>
<tr>
<td>Marc B Foster</td>
<td>330</td>
</tr>
<tr>
<td>Bruce Foster</td>
<td>303</td>
</tr>
<tr>
<td>Kendell Farms</td>
<td>301</td>
</tr>
<tr>
<td>Homestead</td>
<td></td>
</tr>
<tr>
<td>Burusco Farms</td>
<td>310</td>
</tr>
<tr>
<td>Schritter Farms Inc</td>
<td>308</td>
</tr>
<tr>
<td>Ruff Times Farms</td>
<td>305</td>
</tr>
<tr>
<td>Liberty</td>
<td></td>
</tr>
<tr>
<td>M&amp;M Farms LLC</td>
<td>334</td>
</tr>
<tr>
<td>Douglas Evans</td>
<td>320</td>
</tr>
<tr>
<td>Thompson Farms Inc</td>
<td>319</td>
</tr>
<tr>
<td>North Pleasant Valley</td>
<td></td>
</tr>
<tr>
<td>Pahl Farms</td>
<td>311</td>
</tr>
<tr>
<td>US-2 Farms</td>
<td>303</td>
</tr>
<tr>
<td>Driscoll Brothers</td>
<td>303</td>
</tr>
<tr>
<td>Seagull Bay</td>
<td></td>
</tr>
<tr>
<td>Gehring Agri-Business</td>
<td>300</td>
</tr>
<tr>
<td>DA West Farms</td>
<td>299</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>American Falls</th>
<th>ERS/T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Henry Hornbacher</td>
<td>12,794</td>
</tr>
<tr>
<td>Conrad Isaak</td>
<td>12,602</td>
</tr>
<tr>
<td>James B Tiede</td>
<td>12,212</td>
</tr>
<tr>
<td>Blackfoot</td>
<td></td>
</tr>
<tr>
<td>Rich Lane Farms</td>
<td>13,303</td>
</tr>
<tr>
<td>Thane Christensen</td>
<td>13,130</td>
</tr>
<tr>
<td>Dean Evans</td>
<td>12,357</td>
</tr>
<tr>
<td>Center Pleasant Valley</td>
<td></td>
</tr>
<tr>
<td>Driscoll Brothers</td>
<td>14,409</td>
</tr>
<tr>
<td>Val Wahlen</td>
<td>14,057</td>
</tr>
<tr>
<td>Andy Povey</td>
<td>13,488</td>
</tr>
<tr>
<td>Fingal</td>
<td></td>
</tr>
<tr>
<td>Aberdeen Farms Inc</td>
<td>14,002</td>
</tr>
<tr>
<td>Dwight W Horsch</td>
<td>13,391</td>
</tr>
<tr>
<td>Bruce Foster</td>
<td>12,611</td>
</tr>
<tr>
<td>Homestead</td>
<td></td>
</tr>
<tr>
<td>Driscoll Brothers</td>
<td>14,612</td>
</tr>
<tr>
<td>Kim Wahlen</td>
<td>13,872</td>
</tr>
<tr>
<td>Burusco Farms</td>
<td>13,801</td>
</tr>
<tr>
<td>Liberty</td>
<td></td>
</tr>
<tr>
<td>Nicholas Christensen</td>
<td>13,161</td>
</tr>
<tr>
<td>Thompson Farms Inc</td>
<td>13,158</td>
</tr>
<tr>
<td>M&amp;M Farms LLC</td>
<td>12,839</td>
</tr>
<tr>
<td>North Pleasant Valley</td>
<td></td>
</tr>
<tr>
<td>Driscoll Brothers</td>
<td>14,725</td>
</tr>
<tr>
<td>US-2 Farms</td>
<td>14,304</td>
</tr>
<tr>
<td>Ruff Times Farms</td>
<td>13,466</td>
</tr>
<tr>
<td>Seagull Bay</td>
<td></td>
</tr>
<tr>
<td>Gehring Agri-Business</td>
<td>14,934</td>
</tr>
<tr>
<td>Wild West Farms LLC</td>
<td>12,446</td>
</tr>
</tbody>
</table>
## South Pleasant Valley

<table>
<thead>
<tr>
<th>Grower</th>
<th>ERS/T</th>
</tr>
</thead>
<tbody>
<tr>
<td>US-2 Farms</td>
<td>313</td>
</tr>
<tr>
<td>Wade Povey</td>
<td>312</td>
</tr>
<tr>
<td>Driscoll Brothers</td>
<td>306</td>
</tr>
</tbody>
</table>

## Springfield

<table>
<thead>
<tr>
<th>Grower</th>
<th>ERS/T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hymark Farms</td>
<td>317</td>
</tr>
<tr>
<td>Ladd Wahlen</td>
<td>316</td>
</tr>
<tr>
<td>M&amp;M Farms LLC</td>
<td>311</td>
</tr>
</tbody>
</table>

## Beetsville

<table>
<thead>
<tr>
<th>Grower</th>
<th>ERS/T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glen E Larson</td>
<td>307</td>
</tr>
<tr>
<td>Moss Farms Operations LLC</td>
<td>304</td>
</tr>
<tr>
<td>Fred Hawker</td>
<td>304</td>
</tr>
</tbody>
</table>

## Elcock

<table>
<thead>
<tr>
<th>Grower</th>
<th>ERS/T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moss Farms Operations LLC</td>
<td>316</td>
</tr>
<tr>
<td>Heward Brothers Family</td>
<td>309</td>
</tr>
<tr>
<td>Jeff &amp; Brian Darrington</td>
<td>307</td>
</tr>
</tbody>
</table>

## Golden Valley

<table>
<thead>
<tr>
<th>Grower</th>
<th>ERS/T</th>
</tr>
</thead>
<tbody>
<tr>
<td>G5 Land Company LLC</td>
<td>317</td>
</tr>
<tr>
<td>A-3 Farms LLC</td>
<td>306</td>
</tr>
<tr>
<td>Pine View Farms LLC</td>
<td>298</td>
</tr>
</tbody>
</table>

## Hatch

<table>
<thead>
<tr>
<th>Grower</th>
<th>ERS/T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moss Farm Operations LLC</td>
<td>315</td>
</tr>
<tr>
<td>LLC DRA Moss Farms</td>
<td>314</td>
</tr>
<tr>
<td>Derrick Mater</td>
<td>314</td>
</tr>
<tr>
<td>Marsh Creek Springs Ranch E</td>
<td>305</td>
</tr>
<tr>
<td>Christensen</td>
<td>305</td>
</tr>
</tbody>
</table>

## Hobson

<table>
<thead>
<tr>
<th>Grower</th>
<th>ERS/T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benjamin J Beck</td>
<td>319</td>
</tr>
<tr>
<td>Bart Beck</td>
<td>314</td>
</tr>
<tr>
<td>Moss Farms Operations LLC</td>
<td>309</td>
</tr>
<tr>
<td>LLC DRA Moss Farms</td>
<td>309</td>
</tr>
</tbody>
</table>

## Idaho Home

<table>
<thead>
<tr>
<th>Grower</th>
<th>ERS/T</th>
</tr>
</thead>
<tbody>
<tr>
<td>D Jay Harper</td>
<td>314</td>
</tr>
<tr>
<td>Moss Farms Operations LLC</td>
<td>313</td>
</tr>
<tr>
<td>LLC DRA Moss Farms</td>
<td>313</td>
</tr>
<tr>
<td>Harper Family Partnership</td>
<td>300</td>
</tr>
</tbody>
</table>

## 2016 Top Growers

- **Cassia**
  - **Benjamin and Nikki Beck with Father, Joe Beck, and Children, Hannah, James, and Sara**
  - **Benjamin Beck**
    - **314.66 ERS/T**
  - **Jentzsch Kearl Farms**
    - **11,558**
  - **D Jay Harper and Grandson, Jason Harper**
    - **314.18 ERS/T**
  - **South Pleasant Valley**
    - **ERS/T**
      - **US-2 Farms**
        - **313**
      - **Wade Povey**
        - **312**
      - **Driscoll Brothers**
        - **306**
    - **Springfield**
      - **Hymark Farms**
        - **317**
      - **Ladd Wahlen**
        - **316**
      - **M&M Farms LLC**
        - **311**
    - **Beetville**
      - **Glen E Larson**
        - **307**
      - **Moss Farms Operations**
        - **304**
      - **Fred Hawker**
        - **304**
    - **Elcock**
      - **Moss Farms Operations**
        - **316**
      - **Heward Brothers Family**
        - **309**
      - **Jeff & Brian Darrington**
        - **307**
    - **Golden Valley**
      - **G5 Land Company LLC**
        - **317**
      - **A-3 Farms LLC**
        - **306**
      - **Pine View Farms LLC**
        - **298**
    - **Hatch**
      - **Moss Farm Operations**
        - **315**
      - **LLC DRA Moss Farms**
        - **314**
      - **Derrick Mater**
        - **314**
      - **Marsh Creek Springs Ranch E**
        - **305**
      - **Christensen**
        - **305**
    - **Hobson**
      - **Benjamin J Beck**
        - **319**
      - **Bart Beck**
        - **314**
      - **Moss Farms Operations**
        - **309**
      - **LLC DRA Moss Farms**
        - **309**
    - **Idahome**
      - **D Jay Harper**
        - **314**
      - **Moss Farms Operations**
        - **313**
      - **LLC DRA Moss Farms**
        - **313**
      - **Harper Family Partnership**
        - **300**
  - **South Pleasant Valley**
    - **ERS/A**
      - **Driscoll Brothers**
        - **13,671**
      - **US-2 Farms**
        - **13,250**
      - **Wade Povey**
        - **13,033**
    - **Springfield**
      - **Scott E Poulson**
        - **12,732**
      - **Hymark Farms**
        - **12,725**
      - **Bruce Foster**
        - **12,313**
    - **Beetville**
      - **DMB Farms LLC**
        - **12,786**
      - **Bowen Farms LLC**
        - **12,147**
      - **Glen E Larson**
        - **11,794**
    - **Elcock**
      - **Jeff & Brian Darrington**
        - **14,289**
      - **Duane Searle**
        - **13,320**
      - **David W Edgar**
        - **13,303**
    - **Golden Valley**
      - **Pine View Farms LLC**
        - **13,198**
      - **A-3 Farms LLC**
        - **12,495**
      - **Cranney Ranches LLC**
        - **12,015**
    - **Hatch**
      - **Darrington Farms Inc**
        - **15,358**
      - **Brent Stoker**
        - **13,351**
      - **Jeff & Brian Darrington**
        - **12,954**
    - **Hobson**
      - **Craig S Larson**
        - **12,376**
      - **Mark Hobson**
        - **12,318**
      - **Jentzsch Karl Farms**
        - **11,558**
    - **Idahome**
      - **Harper Family Partnership**
        - **12,376**
Kenyon  
Benjamin J Beck  
Moss Farms Operations LLC DBA Moss Farms  
Thomas H Garrard  
ERS/T  
309  
302  
301

Yale  
Flying W Farms Inc  
Woodworth Inc  
Call Farms  
ERS/T  
312  
309  
302

Adelaide  
Grant 4-D Farms LLC  
Harper Family LLC  
Newton Farms LLC  
ERS/T  
321  
318  
316

Hynes  
Kevin Koch  
Beaver Machine & Cattle Company  
Estate of Jim Schaeffer  
ERS/T  
304  
303  
302

Max  
Ida Ridge Farms LLC  
Bryan Jentzsch  
Circle D LLC  
ERS/T  
312  
310  
304

Meridian  
Double H Ag Inc  
Aaron Ball Farms Inc  
Derrick Maier  
ERS/T  
302  
299  
296

Minidoka  
Grant 4-D Farms LLC  
Kalvin W Miller  
Paul Mickelsen Farms Inc  
ERS/T  
305  
301  
297

Paul Factory  
Scott A Stevenson  
Scott Abo  
Grant 4-D Farms LLC  
ERS/T  
305  
304  
303

Kenyon  
Antelope Hills Inc  
Eugene Matthews  
Moss Farms Operations LLC DBA Moss Farms  
ERS/A  
13,580  
13,310  
12,755

Yale  
Call Farms  
Flying W Farms Inc  
Woodworth Inc  
ERS/A  
12,613  
12,465  
12,428

Adelaide  
Idaho Farms LLC  
Don Suhr  
Michael Telford  
ERS/A  
13,223  
12,701  
12,625

Hynes  
Bruce Pincock  
Pay Dirt Farms LLC  
Estate of John Firth  
ERS/A  
13,459  
12,437  
12,422

Max  
Ida Ridge Farms LLC  
Circle D LLC  
Grant 4-D Farms LLC  
ERS/A  
14,295  
12,128  
11,336

Meridian  
Brent D Griffin  
Double H Ag Inc  
Aaron Ball Farms Inc  
ERS/A  
13,666  
12,612  
12,244

Minidoka  
Aaron Ball Farms Inc  
Circle D LLC  
Poteet Farms Inc  
ERS/A  
12,773  
11,139  
10,993

Paul Factory  
Smith Farms Inc  
Lynn Rogers  
5-S Farms Inc  
ERS/A  
12,728  
12,644  
12,550
Twin Falls District
Station (Alphabetical by Growing Region)

<table>
<thead>
<tr>
<th>Filer</th>
<th>ERS/T</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRC Farms Inc</td>
<td>315</td>
</tr>
<tr>
<td>Travis Mai</td>
<td>302</td>
</tr>
<tr>
<td>Friesen Farms LLC</td>
<td>302</td>
</tr>
<tr>
<td>Magic Water</td>
<td></td>
</tr>
<tr>
<td>Maurice H Eckert &amp; Sons Inc</td>
<td>281</td>
</tr>
<tr>
<td>FT Freestone Jr</td>
<td>309</td>
</tr>
<tr>
<td>Giles &amp; Meyers Farms LLC</td>
<td>304</td>
</tr>
<tr>
<td>Walter P Freestone</td>
<td>303</td>
</tr>
<tr>
<td>E &amp; M Farms Inc</td>
<td>294</td>
</tr>
<tr>
<td>Ron Patrick</td>
<td>291</td>
</tr>
<tr>
<td>Yourree Land &amp; Livestock Inc</td>
<td>287</td>
</tr>
<tr>
<td>Dave E Gordon</td>
<td>323</td>
</tr>
<tr>
<td>Don Montgomery</td>
<td>310</td>
</tr>
<tr>
<td>Allan Stevenson</td>
<td>309</td>
</tr>
<tr>
<td>Benjamin R Marshall</td>
<td>316</td>
</tr>
<tr>
<td>K Dewitt Marshall</td>
<td>309</td>
</tr>
<tr>
<td>Tim Waters</td>
<td>308</td>
</tr>
<tr>
<td>Driscoll Brothers</td>
<td>306</td>
</tr>
<tr>
<td>Pierson Farms Inc</td>
<td>302</td>
</tr>
<tr>
<td>Jentzsch Kearl Farms</td>
<td>301</td>
</tr>
<tr>
<td>Windy Acres Inc</td>
<td>300</td>
</tr>
<tr>
<td>c/o Larry Gillette</td>
<td></td>
</tr>
<tr>
<td>Ryan H Serr</td>
<td>311</td>
</tr>
<tr>
<td>Tri-R Farms</td>
<td>306</td>
</tr>
<tr>
<td>R-Ag Inc</td>
<td>291</td>
</tr>
<tr>
<td>Jeff Woody</td>
<td>14,417</td>
</tr>
<tr>
<td>Friesen Farms LLC</td>
<td>14,140</td>
</tr>
<tr>
<td>SRC Farms Inc</td>
<td>13,533</td>
</tr>
<tr>
<td>M &amp; R Farms Inc</td>
<td>14,151</td>
</tr>
<tr>
<td>Maurice H Eckert &amp; Sons Inc</td>
<td>13,472</td>
</tr>
<tr>
<td>Magic Irrigators Inc</td>
<td>12,415</td>
</tr>
<tr>
<td>E &amp; M Farms Inc</td>
<td>14,135</td>
</tr>
<tr>
<td>Giles &amp; Meyers Farms LLC</td>
<td>13,645</td>
</tr>
<tr>
<td>Grant 4-D Farms LLC</td>
<td>13,180</td>
</tr>
<tr>
<td>E&amp;M Farms Inc</td>
<td>14,285</td>
</tr>
<tr>
<td>Chap Farms Inc</td>
<td>14,046</td>
</tr>
<tr>
<td>Rogerson Farms LLC</td>
<td>13,642</td>
</tr>
<tr>
<td>Triple Ace Inc</td>
<td>13,381</td>
</tr>
<tr>
<td>K Dewitt Marshall</td>
<td>14,262</td>
</tr>
<tr>
<td>Benjamin R Marshall</td>
<td>13,708</td>
</tr>
<tr>
<td>Tim Waters</td>
<td>13,364</td>
</tr>
<tr>
<td>Driscoll Brothers</td>
<td></td>
</tr>
<tr>
<td>Pierson Farms Inc</td>
<td>13,505</td>
</tr>
<tr>
<td>Rett Cameron</td>
<td>12,923</td>
</tr>
<tr>
<td>Windy Acres Inc</td>
<td>12,144</td>
</tr>
<tr>
<td>c/o Larry Gillette</td>
<td></td>
</tr>
<tr>
<td>Tri-R Farms</td>
<td>12,188</td>
</tr>
<tr>
<td>R-Ag Inc</td>
<td>11,828</td>
</tr>
</tbody>
</table>
Jerome

RL Brown Farms LLC 314
4B's Farms Inc 300
Larry A Walter 292

King

KG Land & Livestock Inc 323
Carlquist & Son LLC 321
BPL Farms Inc 315

Schodde

Iron Horse Farm Inc 13,948
BLN Huettig Farm 13,755
Carlquist & Son LLC 13,196

Senter

RM Robertson Farms Inc 328
Michael Telford 325
Michael Woodland 315

Sugar Loaf

Valley View of Magic Valley Inc 297

Jerome

K Dewitt Marshall 13,780
Valley View of Magic Valley Inc 13,314
4B's Farms Inc 13,155

King

Cody Bingham Farms Inc 12,598

Schodde

Iron Horse Farm Inc 13,948
BLN Huettig Farm 13,755
Carlquist & Son LLC 13,196

Senter

RM Robertson Farms Inc 13,042

Sugar Loaf

Mix-Miller Farms LLP 13,113
Valley View of Magic Valley Inc 12,932

Top Growers

Twin Falls
North Side

Ryan Robertson of RM Robertson Farms Inc

327.75 ERS/T

Michael Telford

325.06 ERS/T

Dave and Justin Gordon

322.97 ERS/T
Top Growers
Nampa

Greg and Justine Mai with daughters, Lana and Annabelle
316.28 ERS/T

Thomas Swartz
305.04 ERS/T

Bryce and Richard Durrant of Big D Ranch Inc
303.6 ERS/T

Nampa District
Station (Alphabetical by Growing Region)

**Amsco**
- Lower Snake River Farms 289
- M Chris Clelland 284
- JG & Sons 282

**Bowmont**
- Thomas Swartz 305
- Michel J Swartz 295
- Rasgorshek Farms Inc 291

**Marsing**
- Robert L Greenfield 293
- Chad B Neeley 289
- JP Lete 285

**Mora**
- Big D Ranch Inc 303
- Maslonka Farms LLC 298
- D-Yam Farms LLC 290

**Nampa Factory**
- Big D Ranch Inc 322
- Greg Mai 316
- Brent C Mai 302

**Notus**
- Robert L Greenfield 295
- Rohrbacher Farms LLC 291
- Lammey Farms LLC 288

**Wilder**
- WBH Farms LLC 284

**Apple Valley**
- Stokes Brothers Farms LLC 284

**Buckingham**
- Hall Poor Farm LLC 310
- Stokes Brothers Farms LLC 294
- Winegar Farms Inc 290

**Amsco**
- 24/7 Farms LLC 13,608
- Sam Rosti 11,987

**Bowmont**
- Jerry Summersall Jr 16,321
- Rasgorshek Farms Inc 13,959
- Duane Yamamoto 13,767

**Marsing**
- DT Farms 15,277
- Chad B Neeley 14,524
- JP Lete 13,991

**Mora**
- Layne Thornton 12,854
- D-Yam Farms LLC 12,654
- Duane Yamamoto 11,785

**Nampa Factory**
- Don Mai 12,748
- Phillips Brothers Cattle Company 12,003
- Josh Janicek 11,679

**Notus**
- 24/7 Farms LLC 13,100
- Anthony J Marchbanks 13,043
- Robert L Greenfield 12,651

**Wilder**
- T&R Farms Inc 12,389
- E&B Farm Inc 12,196
- Greenleaf Farms Inc 12,022

**Apple Valley**
- Stokes Brothers Farms LLC 11,245
- Winegar Farms Inc 10,658

**Buckingham**
- Winegar Farms Inc 13,403
- Rick Purdum 13,302
- Stokes Brothers Farms LLC 12,533

Top Growers
Nampa

Greg and Justine Mai with daughters, Lana and Annabelle
316.28 ERS/T

Thomas Swartz
305.04 ERS/T

Bryce and Richard Durrant of Big D Ranch Inc
303.6 ERS/T
<table>
<thead>
<tr>
<th>Location</th>
<th>Name</th>
<th>ERS/T</th>
<th>Name</th>
<th>ERS/T</th>
<th>Name</th>
<th>ERS/T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homedale</td>
<td>Ryan Rupp</td>
<td>287</td>
<td>Jerome G Wanders</td>
<td>13,927</td>
<td>Steve A and John I Lejardi</td>
<td>13,687</td>
</tr>
<tr>
<td></td>
<td>T&amp;K Farms Inc</td>
<td>279</td>
<td>T&amp;K Farms Inc</td>
<td>12,390</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jamieson</td>
<td>Estate of Steven H Netcher</td>
<td>308</td>
<td>Y-1 Farms Inc</td>
<td>11,959</td>
<td>Corey Maag</td>
<td>11,467</td>
</tr>
<tr>
<td></td>
<td>Corey Maag</td>
<td>295</td>
<td>Estate of Fred G Heid</td>
<td>10,874</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Y-1 Farms Inc</td>
<td>290</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>La Grande</td>
<td>John A Frisch</td>
<td>321</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Trico Farms Joint Sugar</td>
<td>314</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rovey Farms</td>
<td>307</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Luse</td>
<td>WBH Farms LLC</td>
<td>306</td>
<td>Bruce Corn</td>
<td>13,872</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Arcadia Valley Farms LLC</td>
<td>302</td>
<td>WBH Farms LLC</td>
<td>12,641</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Imperial Agriculture Inc</td>
<td>286</td>
<td>Gressley Farms LLC</td>
<td>12,476</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nyssa Factory</td>
<td>Arcadia Valley Farms LLC</td>
<td>307</td>
<td>Mountain Valley Enterprises</td>
<td>12,049</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Imperial Agriculture Inc</td>
<td>294</td>
<td>Bruce Corn</td>
<td>11,886</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bruce Corn</td>
<td>292</td>
<td>Imperial Agriculture Inc</td>
<td>11,254</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overstreet</td>
<td>Morinaka Farms</td>
<td>305</td>
<td>Ralph Thornley Farms LLC</td>
<td>11,349</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Barlow Farms LLC</td>
<td>294</td>
<td>Neil Allison</td>
<td>10,731</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Neil Allison</td>
<td>293</td>
<td>WBH Farms LLC</td>
<td>10,709</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parma</td>
<td>Pace &amp; Nielsen Farms Inc</td>
<td>300</td>
<td>Rohrbacher Farms LLC</td>
<td>12,396</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Russell E Klahr</td>
<td>284</td>
<td>Story Farms Inc</td>
<td>11,809</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Russell E Klahr</td>
<td>11,085</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Payette</td>
<td>Freerer Farm Inc</td>
<td>294</td>
<td>Craig Crawford</td>
<td>12,234</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DT Farms</td>
<td>288</td>
<td>DT Farms</td>
<td>11,235</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nagaki Farms Inc</td>
<td>279</td>
<td>Nagaki Farms Inc</td>
<td>11,205</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vale</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Andrew Wilcox</td>
<td>11,552</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Recla Farms</td>
<td>11,417</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Jerry Wilcox</td>
<td>11,248</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weiser</td>
<td>John C Bonner</td>
<td>299</td>
<td>Laubacher Farms Inc</td>
<td>13,619</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gish Amano</td>
<td>298</td>
<td>Colton Chandler</td>
<td>12,459</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Michael Hartnett</td>
<td>288</td>
<td>Herb Haun &amp; Kelly Haun</td>
<td>12,142</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

309.89 ERS/t

Javier Galindo, Jane Bannister, and David Hernandez of Trico Farms Joint Sugar

313.88 ERS/t

Neil and Diana Hall with children, Miriam, Moses, Amos, Zerede, Nehemiah, Naomi, Abe, Susanna, Titus, and Simon of Hall Poor Farm LLC

320.50 ERS/t

John and Dian Frisch with son, Patrick. Daughter, Maggie, not pictured
### Top Growers

**Elwyhee**

<table>
<thead>
<tr>
<th>Ranch Name</th>
<th>ERS/T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rocky and Rusty Trail of Trail</td>
<td>297.73</td>
</tr>
<tr>
<td><strong>Ranches Inc</strong></td>
<td></td>
</tr>
<tr>
<td>Bruneau</td>
<td>303.64</td>
</tr>
<tr>
<td><strong>Ranches Inc</strong></td>
<td></td>
</tr>
<tr>
<td>Glenns Ferry</td>
<td>286</td>
</tr>
<tr>
<td>Nomad Farms Inc</td>
<td>304</td>
</tr>
<tr>
<td>Trail Ranches Inc</td>
<td>298</td>
</tr>
<tr>
<td>Ken Patterson DBA</td>
<td>287</td>
</tr>
<tr>
<td>Ken Patterson Farms</td>
<td></td>
</tr>
<tr>
<td>Grand View</td>
<td>289</td>
</tr>
<tr>
<td>Jett T Fowers</td>
<td></td>
</tr>
<tr>
<td>Howard Joe Field</td>
<td>283</td>
</tr>
<tr>
<td>Little Valley</td>
<td>301</td>
</tr>
<tr>
<td>Jett T Fowers</td>
<td></td>
</tr>
<tr>
<td>Leslie D Isaac</td>
<td>288</td>
</tr>
<tr>
<td>Murphy</td>
<td>296</td>
</tr>
<tr>
<td>Owyhee Farming Co LLC</td>
<td></td>
</tr>
<tr>
<td>Reverse</td>
<td>308</td>
</tr>
<tr>
<td>Jack Post</td>
<td></td>
</tr>
<tr>
<td>Tim Healy</td>
<td>304</td>
</tr>
<tr>
<td>Eric Orr DBA Jecko Futures</td>
<td>291</td>
</tr>
<tr>
<td>Sunheaven 2</td>
<td>295</td>
</tr>
<tr>
<td>Brent Hartley Farms LLC</td>
<td></td>
</tr>
<tr>
<td>Sunheaven 3</td>
<td></td>
</tr>
<tr>
<td>Brent Schulties Farms</td>
<td></td>
</tr>
</tbody>
</table>

---

**Bruneau**

- **ERS/T**
  - Ryan Johnson: 286
  - Glenns Ferry: 304
  - Nomad Farms Inc: 298
  - Trail Ranches Inc: 287
  - Ken Patterson DBA: 287
  - Ken Patterson Farms: 287

- **ERS/A**
  - **Grand View**
    - Jett T Fowers: 14,583
    - Howard Joe Field: 12,714
    - Douglas R Meyers: 11,331
  - **Little Valley**
    - Jett T Fowers: 14,528
    - Fowers Inc: 13,443
    - Leslie D Isaac: 12,797
  - **Murphy**
    - Owyhee Farming Co LLC: 11,112
    - Jack Post: 11,602
    - Eric Orr DBA Jecko Futures: 11,501
  - **Sunheaven 2**
    - Brent Hartley Farms LLC: 13,760
  - **Sunheaven 3**
    - Brent Schulthies Farms: 13,980

---

**Ranches Inc**

- Ryan Johnson
- Glenns Ferry
- Nomad Farms Inc
- Trail Ranches Inc
- Ken Patterson DBA
- Ken Patterson Farms

- Grand View
  - Jett T Fowers
  - Howard Joe Field

- Little Valley
  - Jett T Fowers
  - Leslie D Isaac

- Murphy
  - Owyhee Farming Co LLC

- Reverse
  - Jack Post
  - Tim Healy
  - Eric Orr DBA Jecko Futures

- Sunheaven 2
  - Brent Hartley Farms LLC

- Sunheaven 3
  - Brent Schulthies Farms

---

**Elwyhee**

<table>
<thead>
<tr>
<th>Ranch Name</th>
<th>ERS/T</th>
</tr>
</thead>
<tbody>
<tr>
<td>rocky and rusty trail of trail</td>
<td>297.73</td>
</tr>
<tr>
<td><strong>Ranches Inc</strong></td>
<td></td>
</tr>
<tr>
<td>Bruneau</td>
<td>303.64</td>
</tr>
<tr>
<td><strong>Ranches Inc</strong></td>
<td></td>
</tr>
<tr>
<td>Glenns Ferry</td>
<td>286</td>
</tr>
<tr>
<td>Nomad Farms Inc</td>
<td>304</td>
</tr>
<tr>
<td>Trail Ranches Inc</td>
<td>298</td>
</tr>
<tr>
<td>Ken Patterson DBA</td>
<td>287</td>
</tr>
<tr>
<td>Ken Patterson Farms</td>
<td></td>
</tr>
<tr>
<td>Grand View</td>
<td>289</td>
</tr>
<tr>
<td>Jett T Fowers</td>
<td></td>
</tr>
<tr>
<td>Howard Joe Field</td>
<td>283</td>
</tr>
<tr>
<td>Little Valley</td>
<td>301</td>
</tr>
<tr>
<td>Jett T Fowers</td>
<td></td>
</tr>
<tr>
<td>Leslie D Isaac</td>
<td>288</td>
</tr>
<tr>
<td>Murphy</td>
<td>296</td>
</tr>
<tr>
<td>Owyhee Farming Co LLC</td>
<td></td>
</tr>
<tr>
<td>Reverse</td>
<td>308</td>
</tr>
<tr>
<td>Jack Post</td>
<td></td>
</tr>
<tr>
<td>Tim Healy</td>
<td>304</td>
</tr>
<tr>
<td>Eric Orr DBA Jecko Futures</td>
<td>291</td>
</tr>
<tr>
<td>Sunheaven 2</td>
<td>295</td>
</tr>
<tr>
<td>Brent Hartley Farms LLC</td>
<td></td>
</tr>
<tr>
<td>Sunheaven 3</td>
<td></td>
</tr>
<tr>
<td>Brent Schulties Farms</td>
<td></td>
</tr>
</tbody>
</table>

---

**Sunheaven**

- Brent Hartley Farms LLC: 13,760
- Brent Schulties Farms: 13,980

---

**Nomad Farms Inc**

- Jason Meyers with children, Hailee and Kevin of Nomad Farms Inc
- 304.35 ERS/T

---

**Ranches Inc**

- Tim Healy
  - 303.64 ERS/T

---

**Ranches Inc**

- Tim Healy
  - 303.64 ERS/T

---

**Nomad Farms Inc**

- Jason Meyers with children, Hailee and Kevin of Nomad Farms Inc
  - 294.35 ERS/T
Top Growers for each growing region are determined using the following requirements.

1) A grower must be an active Member of the Cooperative.
2) A grower must own and be growing a minimum of 20 acres.
3) The Grower’s ERS must be above the average ERS for his/her growing region.

The qualifying averages for the 2017 season are listed in the table at right.

<table>
<thead>
<tr>
<th>Growing Region</th>
<th>ERS/T</th>
<th>ERS/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper Snake</td>
<td>296</td>
<td>11,916</td>
</tr>
<tr>
<td>Minidoka</td>
<td>290</td>
<td>10,815</td>
</tr>
<tr>
<td>Cassia</td>
<td>292</td>
<td>11,405</td>
</tr>
<tr>
<td>TF North Side</td>
<td>292</td>
<td>11,649</td>
</tr>
<tr>
<td>TF South Side</td>
<td>279</td>
<td>12,147</td>
</tr>
<tr>
<td>Elwyhee</td>
<td>279</td>
<td>10,618</td>
</tr>
<tr>
<td>Nampa</td>
<td>278</td>
<td>11,116</td>
</tr>
<tr>
<td>Nyssa</td>
<td>278</td>
<td>10,215</td>
</tr>
<tr>
<td>Washington</td>
<td>279</td>
<td>13,443</td>
</tr>
</tbody>
</table>

The Sugarbeet would also like to thank photographers Amberlee Harder, Carl Hobson and Jessica McAnally for photographing our 2017 Top Growers.

The Hurst Family has a rich sugarbeet heritage beginning long ago with Winfield Hurst. Early in his youth, Winfield worked for a sugarbeet farmer near Woodville, Idaho. Horse drawn implements, hand thinning, and hand harvesting defined this era.

Winfield’s farm work continued until he entered church missionary service. After serving a mission, Winfield courted and later married Arvella Thorne on September 12, 1917. Life changed dramatically as Winfield was drafted and entered military service on October 10, 1917 during World War I. Corporal Hurst led 15 fighting men in the trenches of France. Norman recalls tales of his father’s elation as the armistice was signed and the fighting ceased.

Following military service, Winfield and Arvella decided to move to northern Montana and homestead 160 acres. Growing sugar beets for Utah and Idaho Sugar (U&I Sugar) was their mainstay. Settling in Zurich, near the Milk River, proved challenging as there was no electricity and it was most definitely frontier living. Winfield’s skills as a productive sugarbeet farmer surfaced and he was later hired to be a fieldman for U&I Sugar.

Norman was born March 26, 1929 and 3 years later his family left Montana to relocate near Declo, Idaho. Norman vaguely recalls his father loading his sugarbeet equipment on a train car and shipping it to Declo. They traveled the dirt roads all the way from Montana, encountering their first paved road near Pocatello. The first night in Declo, Norman and his siblings laid awake staring at an electric light bulb for their first time.

Winfield began farming in Declo during the spring of 1933 where he raised sugar beets for Amalgamated Sugar along
with potatoes, grain, and hay. Norman recalls harvesting sugarbeets with a 1-row, horse-drawn puller. He would follow behind, pick up the beets, cut the tops off with a beet knife and load them onto wagons. They would then be delivered to the Declo receiving station. The beets were dried prior to being loaded onto a piler using a system of pulleys that would lift and dump the side-hinging wagon box. The piler loaded rail cars to be shipped to the old Burley sugarbeet factory. During World War II, Norman collected German prisoners of war helping with sugarbeet harvest on the Hurst farm.

Small acreages were common during this era. Winfield planted 15 acres of furrow irrigated beets with a 4-row, horse-drawn planter and boasted the straightest rows in the county. Those same horses, successfully trained not to step on beets, were used to cultivate and later harvest the crop.

Norman and his siblings spent countless hours thinning and weeding sugarbeets. Many times, Norman would ask his father if there would ever be an easier way to control the weeds. Winfield’s reply was someday weed control would be simple and efficient. Norman recalls the transition from horse drawn implements to tractor operated machinery during the late 1940’s on the Hurst farm.

Norman Hurst

Norman left the farm for a time to pursue his education with hopes and dreams of becoming a lawyer. He first attended Albion Normal college for 2 years, leaving for a time to fill church missionary service. Upon returning from his mission, Norman applied to the University of Utah and was accepted to begin his law school education. However, plans were changed when he was drafted into the United States Army. He left for basic training during 1952 but managed to find enough time on leave to marry his sweetheart, Joy Richins. Norman spent his military service as an occupation soldier in post-war Germany, returning home in 1953.

Upon his return, Norman found employment with Union Pacific Railroad. Norman and Joy decided it would be best for him to continue his education. He did so and received his Bachelor’s in Education from the newly renamed Utah State University in 1957. While attending college, Norman began renting his first farm and raised sugarbeets. He would farm during the summer and attend school during the winter. In 1960, Norman and Joy bought their first farm near Declo, Idaho and have raised sugarbeets ever since.

Norman combined his farming with a career in education. He taught school in Cassia County from 1957 to 1970 whereupon he entered the central office as an administrator. In 1980, Norman became the Superintendent of Schools for Cassia County and served in this position until his retirement in 1993. Norman’s wife Joy also filled a career as an elementary school teacher. Norman and Joy, along with the help of their children, balanced farming, operating a small dairy, church service, and careers as educators for many years. Joy was an integral part of the farm. She could often be found on the tractor preparing seed beds, cultivating beets, swathing hay, and driving truck.

Wayne Hurst

Norman’s son Wayne, with a passion for farming, returned home to the family farm in 1980 after filling a church mission and attending Brigham Young University. Together, Wayne and Norman raised potatoes, sugarbeets, hay, grain, beans, and corn along with operating their dairy. In 1997, Wayne and Norman bought into the newly formed Snake River Sugar Cooperative and have raised about 160 acres of sugarbeets each year since that time.

During Norman and Wayne’s sugarbeet farming career they have witnessed some significant changes to the industry. Norman recalls fondly the advent of mono-gem seed. Prior to this time, beets would grow in clumps of 3 plants and had to be hand thinned to 1 plant, often on his hands and knees. Wayne recalls implementing the first pre-emergence herbicides during the 1980’s. Both Wayne and Norman remember the historic buy-out of Amalgamated Sugar by the Cooperative of farmers of which they were a part. Winfield’s prediction of easier weed control came true during 2008 when Norman and Wayne implemented glyphosate resistant sugarbeets on their farm. They gladly bid farewell to the days of hand weeding fields multiple times throughout the season.

Wayne continues a family legacy of farming and raising sugarbeets. Along with his farming enterprise, Wayne served as president of the Idaho Grain Producers Association and later as president of National Association of Wheat Growers. He is currently an officer in the National Wheat Foundation. Norman and Wayne have expressed the importance of the sugarbeet industry to their heritage, both past and current.

Aaron Firth, Crop Consultant
Jonathan Shurtliff, Senior Agriculturalist

Jonathan Shurtliff, Senior Agriculturalist
ALL SEATS are adjustable as to height from the ground, from approximately 1 inch up to 10 inches. The foot rests are adjustable, not only up and down, but lengthwise to allow for long-legged operators.

The machinery requires no steering on the field as it readily follows the corrugation. However, slight adjustments are made with the handle bar arrangement on the front wheel and individual brakes on the rear wheels for speedy turning at the end of the row. Speed of travel down the row is regulated by shifting the car transmission as well as changing drive pulleys on the motor in accordance with the speed needed in the particular crop being worked on.

As pictured, the machines will move approximately 660 feet in 35 minutes with the motor idling. Rear wheel spread is variable from 72 in. to 76 in., difference being regulated by turning the dish of the wheels in or out. The two rear seats are on a hinged frame to allow easier hauling of the machine on a truck between fields.

The power motor is air cooled two-cycle 2.3 horse-power, which seems to be more power than is actually needed due to the fact that a newer model built by the Platt Bros., is powered by a 5/8 horse-power motor and seems to have all the power needed for work. The heavy construction of the frame seems to eliminate vibration as well as eliminating possibly all breakdown. The entire machine will be covered by an awning for a sunshade and will carry its own water can.

EDITOR’S NOTE. As you can see by the above, much progress is being made in developing aids for thinners. The next issue of the Sugar Beet will have some figures on what this machine accomplished and also one built by the company and now being demonstrated throughout the territory.
A NEW ERA in thinning beets is fast approaching with emphasis on mechanization. The Amalgamated Sugar Company’s experimental riding beet thinner, used with four or six thinners, evoked considerable favorable comment throughout the territory where it was used this past spring in various demonstrations.

As a labor saving device, riding beet thinners are expected to be used in ever increasing quantities in coming years and in 1947, it is believed there will be many of these machines in use in the territory.

During this past season, the machine’s greatest apparent value was shown by the willingness of persons to thin beets, who would not or could not thin beets in the conventional manner. In one instance a grower and his hired man and the wives of both completely thinned 25 acres of beets.

A normal crew can thin approximately three-fourths of an acre per person in a 10 hour day where the beets have been planted with segmented seed. The operating cost of the thinner is practically negligible with gasoline consumption listed at approximately three gallons per 10 hours.

The December issue of THE SUGAR BEET will explain greater length and with pictures the potentialities of the riding beet thinner.

The picture on this page is an engineer’s drawing of the new Platt Hoeing and Weeding Cart to be made by Olson Manufacturing Company in Boise. A picture of the original Platt Brothers Machine was published in the June, 1946 issue of the SUGAR BEET.

Capacity, six persons with all seats adjustable as to position and height. Powered by 1 1/2 to 2 Horse Power air cooled gas engine. Adjustable speeds attained through multiple drive sheaves. Speeds now suggested range from 5 to 10 feet per minute. Price estimated at approximately $350 retail. Deliveries in time for 1947 beet thinning season.

Send all inquiries direct to OLSON MANUFACTURING COMPANY, POST OFFICE BOX 1487, BOISE, IDAHO.
Static Nitrogen Management

This Sugar Guide summarizes available data supporting static N management in the TASCO area sugar beet production.

Nitrogen (N) management is critical in optimizing yield and quality of sugar beet. Available data from several sugar beet growers in the TASCO growing area could benefit from the use of a static N management program in place of the historical yield goal N management. Data shows that total available spring soil N (soil NO3-N and NH4-N to a depth of 3 ft + fertilizer N) of less than 180 lbs N/acre for heavier texture soils (sandy loams to clays) and less than 200 lbs N/acre for course texture (loamy sands to sands) or shallow soils will maximize yields, sucrose concentration, and quality. These static supply recommendations represent maximum N supplies, and suggests that growers that utilize good soil sampling techniques and irrigation management practices could potentially lower static N supplies even more. Mineralization of N in the soil after soil sampling will also supply N to sugarbeet, but does not need to be accounted for in static N management.

**YIELD GOAL N MANAGEMENT**

Sugarbeet N management in the TASCO area has historically been based on a yield goal approach. The basis of yield goal N management is to determine a N supply (soil NO3-N and NH4-N to a depth of 3 ft + fertilizer N) needed to maximize yield from the projected sugar beet root yield multiplied by the amount of N needed to grow a ton of sugarbeet roots. The amount of N needed to grow a ton of sugarbeet roots is called the N requirement (N r) factor and had the units of lbs N/ton roots. Some N r factors determined by research over time were 8 lbs N/ton (published in 1977), 7.3 lbs N/ton (published in 1997), and 5.5 lbs N/ton (data collection finalized in 2011, published in 2016). These N r factors were used across all potential yield goals to determine the required N supply. A major flaw in the yield goal management approach assumes that the N r values were valid when yield goals increased above the actual yields obtained during the research period. For example, if research conducted from 1974 to 1977 determined that the N r factor was 8 lbs N/ton, and the average root yield in these research trials was 21 tons/acre, would the 8 lbs N/ton be valid for an average root yield of 30 tons/acre?

**JUSTIFICATION OF STATIC N MANAGEMENT**

Average sugar beet yields in the TASCO area have continually increased over time (Figure 1) and will likely continue to increase in the future. In yield goal N management, as yields increase so will the recommended N application rates. Evaluation of past data suggests that increasing N supply above an optimum level as yields increase is not valid.

**SUMMARY AND STATIC N RECOMMENDATIONS**

As yields increase, a yield goal N management approach can lead to over-supply of N, increasing impurities and decreasing profit. Sample in the spring to a depth of 3 ft to account N (NO3-N and NH4-N). On heavy textured soils (sandy loams to clays), supply no more than 180 lbs N/acre (soil N + Fertilizer N). On coarse-textured or shallow soils (loamy sands to sands), supply no more than 200 lbs N/acre (soil N + Fertilizer N). Under good N management practices these static supplies could be reduced. Reductions will be based on grower-based data and knowledge of their systems. Use Brei N results to further refine on farm N needs (recent results suggest Brei N levels should less than 200 ppm at harvest).

**CONTACTS/CONTRIBUTORS:**

David Tarkalson, USDA-ARS Soil Scientist/Systems Agronomist; david.tarkalson@ars.usda.gov; (208) 423-6503
Dave Bjornberg, USDA-ARS Agricultural Engineer; dave.bjornberg@ars.usda.gov; (208) 423-6521
Greg Dean, TASCO Manager of Sugar beet Quality Improvement; gdean@amalsugar.com; (208) 841-5717
Stacy Camp, TASCO Senior Research Agronomist; scamp@amalsugar.com; (208) 411-5064
Dave Ellison, TASCO Senior Research Agronomist; delison@amalsugar.com; (208) 411-5052
Paul Foster, TASCO Senior Research Agronomist; pfoster@amalsugar.com; (208) 411-5087
Dave Scantlin, TASCO District Agronome Manager; dscantlin@amalsugar.com; (208) 614-1107

**New Research**

Use Brei N results to further refine on farm N needs.
CERCOSpora LEAF SPOT ON SUGARBEET
IMPORTANCE, IDENTIFICATION, and MANAGEMENT

Oliver T. Neher, Manager of Plant Health, The Amalgamated Sugar Company LLC, Boise, ID. Dragana Budakov, University of Novi Sad, Novi Sad, Serbia. Ed Bechinski, University of Idaho, Moscow, ID.

Introduction

Cercospora leaf spot (CLS) is a minor but reoccurring disease problem on sugar beet grown in Idaho, Oregon and Washington. In production areas with warm humid summers such as Europe, the United Kingdom, and parts of North America, CLS is considered the most destructive foliar disease affecting sugar beet. Disease severity increases with warm, humid conditions in combination with leaf wetness for periods longer than 11 hours. Under severe disease pressure losses up to 40% or more are not uncommon when not controlled by fungicide applications (figure 1). Crop losses include decreased tonnage and percent sucrose as well as increased losses during storage. In addition, increased impurities and decayed roots reduce sucrose extraction during processing.

Symptoms

Initial symptoms of CLS are most commonly found on older leaves and petioles. Numerous circular spots (figure 2) ranging from 2/100 in (0.5 mm) at early infection to 2/10 in (6 mm) at maturity can be observed. Individual lesions have a brownish to reddish purple border and a tan to light brown center (figure 3). Under high relative humidity, the color of the centers can turn to a gray shade due to the production of conidiophores producing conidia. Lesion size and color is a distinctive feature of Cercospora leaf spot. CLS can be distinguished from Alternaria, Phoma, Ramularia and bacterial leaf spots (figure 4), since CLS leads to smaller circular to oval shaped lesions with black spore bearing pseudostromata (figure 3) in the middle. As disease progresses, individual spots will coalesce and form large areas of necrotic tissue (figures 2). This goes along with a change of leaf color from healthy green to yellow and resulting in an overall brownish color associated with necrotic and dead leave tissue (figure 5).

Causal organism

Cercospora beticola Sacc. the causal agent of CLS is a necrotrophic, imperfect fungus without known sexual transfer of genetic material. Genetic diversity within populations is facilitated by hyphal anastomosis. During anastomosis hyphal branches of two different colonies fuse, which allows for the exchange of genetic material. Hyphae are gassy to pale brown in appearance and septated. Intertwoven hyphae growing intercellularly, eventually form pseudostromata in the leaf tissue. Pseudostromata (figure 3 and 6) serve as basis for conidiophores which will emerge through cracks or stomata in the leaf. These pale brown, septated conidiophores produce asexual spores (conidia), which are clear, needle shaped and multiseparted (figure 7).

Disease cycle and epidemiology

The causal pathogen C. beticola will survive as conidia and pseudostromata on infected leaves and petioles in sugar beet debris and on plants of the current season crop. Common weed hosts for this pathogen include lambquarters, pigweed, mallow, and bindweed. The pathogen can also be found on safflower and crops closely related to sugar beet such as table beet, Swiss chard, and spinach. Pseudostromata allow for long-term survival (1-2 years) whereas conidia can only survive for 1-4 months. Conidal germination and
production require warm (68 to 79 °F) and humid conditions (98% relative humidity or free water). Once released from conidiohspores, conidia can be spread by splashing water (rain or overhead irrigation), insects, workers or equipment. In addition, conidia can be dispersed by wind for distances up to 300 feet. Conidia deposited on a suitable host can penetrate the leaf surface directly or invade open stomata. Once C. beticola colonizes internal leaf tissue the production of phytotoxins such as cercospin and beticin will as well as hydrolytic enzymes will weaken the host cells which will eventually result in cell death.

Cercospora leaf spot is a polycyclic disease and depending on temperature, light, and host physiology (plant age and tolerance) an infection cycle can be completed within 7 to 21 days. Optimum conditions include temperatures ranging from 77-95 °F with approximately 5-8 hours of free moisture or above 90% relative humidity. The infection cycle will be shortened with increased temperatures and susceptibility of the host but will slow down when temperatures exceed 98 °F or drop below 60 °F.

Management

Under Idaho, Oregon and Washington conditions CLS is normally not of economic importance. Rarely will the disease reach thresholds that would warrant fungicide applications especially in fields that are being treated for powdery mildew (please consult PNW 643 for more information about this disease). However the use of susceptible varieties, conducive microclimates and local reoccurrence of CLS might make it necessary to implement management practices.

Cultural practices

Pseudostromata and conidia of C. beticola are not very competitive when exposed to soil microbes. To reduce primary inoculum, infected leaves and petioles should be plowed under to encourage decomposition. In addition, newly planted crops should be separated at least 300 feet from previously infected fields and a minimum 3 year crop rotation should be implemented.

The infection with C. beticola is highly temperature and moisture driven. In areas with severe CLS pressure it is advisable to reduce plant density to promote air circulation which will minimize leaf wetness. Additionally, overhead irrigation should be scheduled to avoid irrigation during the night and to allow plant canopy to be dry by night.

Disease monitoring and timing of control measures

The strict requirements of C. beticola on temperature and humidity for germination and infection make it an easy target for scouting and prediction models. Production areas in MI, MN, ND, as well as CO, NE, MT, and WY rely on prediction models such as BEErast or DIV (daily infection values). These models take relative humidity and temperature in consideration when predicting potential periods for disease development. The current CLS pressure and disease severity in ID, OR and WA does not warrant the use of tolerant varieties. However, the increase of fungicide resistant isolates and the lack of other management tools might make it necessary to employ genetic tolerance to minimize the effects of CLS.

Chemical control

Fungicide applications are normally not necessary for the control of CLS. As mentioned earlier, light infestation is most likely controlled by fungicide applications made to manage powdery mildew. Areas with a potential for heavy infestation should be considered for fungicide applications. The likelihood for severe infection will increase with preexisting inoculum, predicted environmental conditions favoring infection and varietal susceptibility. Applications of a systemic or contact fungicide should be made at the earliest observed onset of CLS. Good crop coverage is essential for effective control of CLS. Fungicides should be applied with enough water to ensure good coverage.

Fungicides belonging to the following groups provide acceptable control of CLS:

- Cell-respiration inhibitors (Qo1) (strobilurins, Group 11)
- Cell-respiration inhibitors (organosulphur compounds) (fenitrothion, Group 39)

In addition, other growing areas suggest the use of Demethylation inhibitors (DMIs) (triazoles, Group 3).

For current availability of fungicides and proper rates, check with local crop consultants, chemical company representatives, Cooperative Extension Service representatives, or the annually revised Pacific Northwest Plant Disease Management Handbook (http://pnwhandbooks.org/plantdiseases/). Be sure to read and follow all label information.

Tolerant varieties

Many production areas outside of the Pacific Northwest require moderately to highly tolerant varieties. The level of tolerance expressed in the field may vary, depending on environmental conditions, fertilization and water management, and overall plant health. Still, disease development in a tolerant variety is usually slower than in susceptible varieties and will not reach the same level of severity. To further reduce the severity, tolerant variety should be used in combination with foliar applied fungicides.

Currently, the disease pressure in Idaho does not warrant the use of tolerant varieties. However, the increase of fungicide resistant isolates and the lack of other management tools might make it necessary to employ genetic tolerance to minimize the effects of CLS.

Further Reading


Glossary

Anastomosis. The fusion between branches of the same or different hyphae leading to a hyphal network for the exchange of genetic material.

Conidiophore. Asexual sporulating structures consisting of simple or branched hyphae.

Conidium (plural = conidia). An asexual spore produced on a conidiophore.

Hypha (plural = hyphae). Tubular filaments that form the body of a fungus.

Mycelium (plural = mycelia). Mass of interwoven hyphae forming the body/colony of a fungus.

Nectrotroph. An organism that kills surrounding host cells to obtain its energy from them.

Pseudostromata. Intervern hyphae forming a cushion-like mass (stroma) in which spore bearing structures are formed.

Septum (plural = septa). Cross walls or partitions in hyphae.

Systemic fungicides are products with active ingredients (a.i.) which can be translocated within the applied leaf and in certain cases throughout the whole plant. This feature allows the product to reach and protect areas that are not initially contacted by the chemical. Most systemic fungicides possess preventative and curative properties that extend for a longer period of time. However, the high specificity (single site activity) of the a.i. can lead more easily to fungicide resistance in the target organism.

Contact fungicides need to be in direct contact with the target organism. These products need to be applied before the pathogen is deposit so they can form a protective layer on the leaf surface. In comparison to systemic fungicides, these products are prone to being washed off by rain and irrigation water. Therefore, good coverage is a must to ensure overall protection. Contact fungicides possess no curative action and are generally less effective. However, contact fungicides are less likely to develop fungicide resistance because of their multi-site activity and are typically less expensive.
When it comes to Crystal brand beet seed, it’s all about the sugar because there’s no other seed that promises more. Thanks to a deep collaboration between growers and Crystal, record-breaking yields and sugar is an achievable goal. From the moment you open a box of Crystal seed you’re set up to do what you do best—produce maximum sugar. Good things come from common ground.

Crystal brand sugar beet seed is distributed by: ACH Seeds, Inc. 877-224-7333 or Crystal Beet Seed 218-236-4788.