The Sugarbeet is published by The Amalgamated Sugar Company. The magazine is prepared by the Agriculture 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, scientists, sugar company personnel, students, and others interested in this vital food crop.

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Address all communication to the Editor, The Sugarbeet, P.O. Box 8787, Nampa, ID 83653-8787.

**Agriculture Offices**

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CONTENTS

Mini-Cassia District - 2010 ........................................... 2
Nampa District - 2010 .................................................. 4
Twin Falls District - 2010 ............................................. 5
Elwyhee District - 2010 ............................................... 6
Washington District - 2010 ......................................... 6
Nyssa District - 2010 .................................................. 7
Controlling Severe Curly Top In Sugarbeet ...................... 8
40 Year Grower Award: Dorrance Standage .................... 10
40 Year Grower Award: Gordon Lee ............................... 10
The Shoe Doesn’t Fit And The Box Is Too Small ................. 11
The Declo Variety Trial 2010 ........................................ 12
Development Of Fungicide Application Recommendations Based On Soil Temperature, Leaf Stage, And Growing Degree Days For The Control Of Rhizoctonia Crown And Root Rot Tailored For Idaho ........................................ 14
Useful Information ..................................................... 16
Disease Notes — Early Season Wind Damage In Sugar Beets ........................................ 17
Comparison Of Different Foliar Fungicides For The Control Of Powdery Mildew .......... 18
Going Back Or Forward Into The Future ......................... 20
Realizing Value In Variability Using Aerial Photography .......... 22
Sugar Beet Rotation .................................................... 23
The Effect Of Nitrogen Placement On Sugarbeet Stands, Yield, Sugar And Nitrates In Strip Tillage ........................................ 26
Weed Control In Strip Tillage, Comparing Adjuvants Used With Glyphosate, And An Early Look At Direct Seeded Sugar Beets ........................................ 29
Determining The Economic Importance Of Damage From Leafminer Flies In Sugar Beets And Evaluating Proposed Action Thresholds In Idaho ...................... 31
MINI-CASSIA DISTRICT - 2010

TOP TEN PERCENT GROWER RECOGNITION

DISTRICT TOP TEN

<table>
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<tr>
<th>DISTRICT</th>
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Photo credits:
Bean Brothers: Have you been farming long?
Jeff Sigmon
Gary Evans and Family: Megan, Malee, Gary, Landon, Mary Lynn, Jake
Ken and LeeAnn Turpin
Front: Cloyd, Raymond, Kyle
Back: Kelly, Craig, Clifford Searle
Moo View Cow Palace
Ben Bergen, Derrick Maier
SEAGULL BAY / AMERICAN FALLS
Monty & Carolene Funk Partnership 160.0  9292
Gehring Agri-Business  85.0  9054

BETTVILLE
Glen E Larson  110.0  10241
Mike Beck  373.0  9479

ELCOCK
Moo View Cow Palace  398.0  10848
Kenneth Turpin  135.0  10361
Goldenview Inc.  225.0  10249

HATCH
Goldenview Inc.  503.0  9850
Moo View Cow Palace  596.0  9831
Shey E Taylor  110.0  9822

HOBSON
Scott Beck  410.0  10218

IDAHOME
Harper Family Partnership  1267.0  9375

KENYON
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YALE
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Webb Basin Dairy  450.0  9043

ADELAIDE
Triple T Farms  124.0  10837
Stevenson & Sons LLC  479.0  10261
Steve Neibaur Farms Inc  436.0  10122

PAUL FACTORY
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Derrick Maier & Ben Bergen  53.0  10974
Tuma Farms Inc.  398.0  9455
Monte Ball  184.0  9426
Zach Patterson & Arnold Patterson  149.0  9387
Brian Schuch  130.0  9385

MINIDOKA
Poteet Farms Inc  1072.0  9931
Mickelsen Farms Inc  530.0  9865

HYNES
Jeffrey A Wade  116.0  9951
Steve Schow  364.0  9812

MAX
Five Star Farms Inc  136.0  8939
Bryan Jentzsch & Jentzsch Kean Farms  1950.5  8768

MERIDIAN
Jentzsch Kean Farms  240.8  10289
Grant 4-D Farms  274.1  9666
Hansen Farms Joint Venture  438.0  9410
NAMPA DISTRICT - 2010

Top Ten Percent Grower Recognition

**TOP GROWERS - NAMPA DISTRICT**
- Mitch Bicandi - 24/7 Farms
- Sid Freeman
- Larry Christensen

**ERS/ACRE**
- Mitch Bicandi - 24/7 Farms: 13,509
- Sid Freeman: 13,299
- Larry Christensen: 12,577

**NAMPA FACTORY**
- Four Q Farms LLC: 12,561
- Phillips Brothers Cattle Co.: 12,273
- Don Mai: 12,155

**NAMPA DISTRICT**

**AMSCO**
- Quarter Circle DJ Ranch
- David L. Marchbanks
- Gary Bower
- Freezeout Farms, L.L.C.
- Sid Freeman
- Sam Rosti

**ERS/ACRE**
- Quarter Circle DJ Ranch: 11,612
- David L. Marchbanks: 11,449
- Gary Bower: 11,002
- Freezeout Farms, L.L.C.: 10,581
- Sid Freeman: 10,402
- Sam Rosti: 10,157

**MORA**
- Layne Thornton: 12,359

**MARSING**
- Kelly Lootens: 12,301

**NOTUS**
- Mitch Bicandi - 24/7 Farms: 13,509
- Sid Freeman: 13,299

**WILDER**
- E & B Farms, Inc.: 10,878
TWIN FALLS DISTRICT - 2010

Top Ten Percent Grower Recognition

Jeff Woody

Granville Eckert & Pat Elkin

Cody Bingham

TOP GROWERS - TWIN FALLS DISTRICT

ACRES     ERS/ACRE
Jeff Woody  120.0  12,344
Maurice H. Eckert and Sons  486.0  11,962
Cody Bingham  90.0  11,701

TWIN FALLS DISTRICT

ACRES     ERS/ACRE
HIDDEN VALLEY
R-AG  542.0  8,987
SCHODDE
Paul Tateoka  204.0  10,189
Allan Stevenson  97.0  10,134
SENTER
R. M. Robertson  486.0  10,254
DIETRICH
Star Gate Ranch  140.0  9,736
BLACK
Allan Stevenson  103.0  11,112
Mike Gott  120.0  10,559
SUGAR LOAF
Mix Miller Farms LLP  288.0  10,700
Valley View of Magic Valley, INC  835.0  10,061

JEROME
Cody Bingham  90.0  11,701

KING
Jay Little  218.0  11,300

GOODING
Jentzsch Kearl Farms  474.4  11,735

PLATEAU
Salmon Falls Land & Livestock  243.0  9,874

MAGIC WATER
Maurice H. Eckert & Sons, INC.  486.0  11,962

FILER
Jeff Woody  120.0  12,344
Terry Hollifield  285.0  10,794

FACTORY
Bulcher Farms, INC.  210.0  10,394
Jim Patrick  145.0  10,135

MURTAUGH
Grant 4-D Farms  374.4  11,483
ELWYHEE DISTRICT - 2010

Top Ten Percent Grower Recognition

**TOP GROWERS - ELWYHEE DISTRICT**

- Jason Meyers
- Bob Bledsoe
- Lance Funk Farms

ELWYHEE DISTRICT

**ERS/ACRE**

- **REVERSE**
  - Bob Bledsoe
  - 12,011

- **LITTLE VALLEY**
  - Jack Post
  - 10,526

- **GRAND VIEW**
  - Fowers Inc.
  - 10,748

- **MURPHY**
  - Huey Farms, Inc.
  - 9,071

**TOP GROWERS - WASHINGTON DISTRICT**

- Brent Hartley Farms, LLC

WASHINGTON DISTRICT - 2010

Top Ten Percent Grower Recognition

**TOP GROWERS - WASHINGTON DISTRICT**

- Brent Hartley Farms, LLC
  - 13,266

**ERS/ACRE**

- 13,266
### NYSSA DISTRICT - 2010

#### Top Ten Percent Grower Recognition

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Controlling curly top in sugarbeet has been an industry priority in the western United States since the 1920s. Curly top can be caused by one of three virus species in the Curtovirus genus: Beet severe curly top virus (BSCTV; formerly the CFH strain), Beet mild curly top virus (BMC-TV; formerly the Worland strain), and Beet curly top virus (BCTV; formerly the Cal/Logan strain). The virus species are all vectored by the beet leafhopper, Circulifer tenellus, which survives over the winter on weed hosts, particularly mustard species. The adult females should be able to survive even our coldest southern Idaho winters. Once temperatures reach 55°F in the spring, the beet leafhopper becomes active and develops through various growth stages all of which are influenced by temperature. The egg stage may range from an average of 5.5 days at 100°F to an average of 43.8 days at 60°F. In Idaho we would expect to see three generations of beet leafhoppers in a normal year. However, if the weather in March is warmer than normal, the beet leafhopper can get an early start on population development. If warm spring weather coincides with dry conditions, the desert weeds dry up early and the beet leafhoppers move into beet fields at early plant growth stages. Beet plants are most susceptible to infection at early growth stages even if cultivars contain good resistance. Thus protecting the young plants from infection is of considerable importance.

When the industry switched from conventional cultivars to herbicide-tolerant cultivars, the seed companies struggled to maintain curly top resistance. The seed companies are making progress in restoring resistance, but even the best resistance in conventional cultivars would have benefited from additional control measures. Since the insecticide seed treatment, Poncho Beta, became available to growers, it has served the industry well under low to moderate pressure. However, Poncho Beta and other seed treatments were not evaluated under severe pressure. Thus, a study was conducted under severe pressure using seven treatments: 1 = non-treated check, 2 = Poncho Beta (60 g ai clothianidin + 8 g ai beta-cyfluthrin/100,000 seed), 3 = Poncho Beta + 2 Movento (5.0 fl oz/A) applications, 4 = Poncho Beta + 2 Movento and Provado (3.8 fl oz/A) applications, 5 = NipsIt (60 g ai clothianidin/100,000 seed), 6 = NipsIt + experimental fungicide, and 7 = Cruiser Force (60 g ai thiamethoxam + 8 g ai tefluthrin/100,000 seed). The treatments were evaluated on two conventional commercial cultivars at the North Farm in Kimberly, ID using the same severe curly top pressure (6 viruliferous beet leafhoppers per plant) utilized in the Curly Top Nursery. All six treatments provided better control (P < 0.0001) of curly top than the non-treated check with both cultivars (data for Beta 4430R in Fig. 1; data for Crystal 217R not shown) on all three evaluation dates (16 Jul, 16 Aug, and 16 Sep; only Sep data shown). In Figure 1, the curly top rating was reduced by 46 to 55% when comparing the insecticide treatments to the non-treated check. By the end of the growing season the non-treated checks for both Beta 4430R and Crystal 217R had severe curly top symptoms and very little root yield (1.28 and 3.21 t/A, respectively). Root yield for the six insecticide treatments ranged from 25.7 to 31.2 t/A for Beta 4430R (Fig. 2) and from 27.3 to 29.84 t/A for Crystal 217R (data not shown). Results were similar for estimated recoverable sucrose (Fig. 3; data for Crystal 217R not shown). Thus, even though curly top pressure was severe enough to almost eliminate the non-treated checks relying only on host resistance for protection, the insecticide seed treatments (Poncho Beta, NipsIt, and Cruiser Force) provided for respectable curly top control and yields. The foliar insecticide treatments (Movento and Provado) provided no detectable curly top control beyond that provided by the seed treatments.
Figure 1. Curly top ratings (scale 0 to 9; 0 = healthy and 9 = dead) on the sugarbeet cultivar Beta 4430R on 16 Sept 2011 in Kimberly, ID for seven treatments (1 = non-treated check, 2 = Poncho Beta, 3 = Poncho Beta + 2 Movento applications, 4 = Poncho Beta + 2 Movento and Provado applications, 5 = NipsIt, 6 = NipsIt + experimental fungicide, and 7 = Cruiser Force). Bars with a different letter were significantly different ($P > F < 0.0001$; mean comparison at $\alpha = 0.05$).

Figure 2. Root yield (t/A) with the sugarbeet cultivar Beta 4430R in Kimberly, ID for seven treatments (1 = non-treated check, 2 = Poncho Beta, 3 = Poncho Beta + 2 Movento applications, 4 = Poncho Beta + 2 Movento and Provado applications, 5 = NipsIt, 6 = NipsIt + experimental fungicide, and 7 = Cruiser Force). Bars with a different letter were significantly different ($P > F < 0.0001$; mean comparison at $\alpha = 0.05$).

Figure 3. Estimated recoverable sucrose (ERS; lb/A) with the sugarbeet cultivar Beta 4430R in Kimberly, ID for seven treatments (1 = non-treated check, 2 = Poncho Beta, 3 = Poncho Beta + 2 Movento applications, 4 = Poncho Beta + 2 Movento and Provado applications, 5 = NipsIt, 6 = NipsIt + experimental fungicide, and 7 = Cruiser Force). Bars with a different letter were significantly different ($P > F < 0.0001$; mean comparison at $\alpha = 0.05$).
**40 YEAR GROWER AWARD: DORRANCE STANDAGE**

Dorrance was introduced to sugar beets in 1946. When he was 11, his folks moved from Nebraska to the Sand Hollow area outside of Vale. He and his brother, Darrell, spent their summers hoeing beets which was pretty much a family chore.

In 1953, using much of his dad’s equipment, Dorrance rented 25 acres from a neighbor, using a four row planter, which he later converted to a six row. He remembers using a two row Keist harvester and two trucks for the harvesting.

Dorrance is a past board member of the Nyssa/Nampa Beet Growers Association. He and his brother farmed together for about 20 years. Currently he farms with his son, Larry, and grandson, Joe.

**40 YEAR GROWER AWARD: GORDON LEE**

My Father Cal Lee moved the family to Oregon in the fall of 1946 from Woodcross, Utah. I was 10 years old.

In the spring of 1947 we planted our first crop of sugar beets. My dad brought his team of horses and his cultivators, which we used for a few years. It was all four rows at the time. Early 50’s we bought a Farmall tractor. I wanted a John Deere, but my dad said “no way”. He never drove a hand clutch till the day he died.

Anyway, we planted the beets and had the bracero’s thin them. Twelve inches apart. Each seed I think sent up 3 plants. My 2 sisters and I spent the whole summer in the field, hoeing beets. You can’t even imagine the weeds. When fall came we teamed up with a neighbor. He had a John Deere B. We lifted two rows at a time. We drug a wood V down thru the rows to make room to throw the beets. We topped by hand, and loaded by hand. The beets had all their tails on. The beets were terrific. A couple of years went by and my dad bought a King Wize loader with a Wisconsin motor. It didn’t work very well, but it was better than what we had. In the middle of the 50’s, International came out with a lifter loader on an M Farmall, with a cart on behind. Now one man could harvest alone.

Later, Gemco came out with a lifter loader. It worked very well. By then Parma Co. came out with a 2-row, 3–row, 4-row and finally 6 rows, where we are today. We went from a single drum beater to a double drum to a triple drum.

I got out of school in 1955. A neighbor rented me his farm. I started my farming life. I had sugar beets, spuds, onions, and corn. I had no trouble getting a loan because I had sugar beets. In those years a loan was tied to beets. He lent me money on everything but onions. He wrote “no value”, that still applies today. My father and I have raised beets for 63 years straight. I know beets have been a big part of my life. Where I am today.
THE SHOE DOESN’T FIT AND THE BOX IS TOO SMALL

Dennis Searle, Ag Services Manager

Would you believe that after 30 some years I have come to realize that maybe we haven’t had it right? For instance, we used to thin to one hundred beets in a hundred feet. We actually payed people to do it. Wrong! We now know that we need 180 beets in a hundred feet to get the best bang for our buck. We also sidedressed nitrogen until the 15th of July. That was actually a company recommendation. Wrong! We now know that we need the bulk of our fertilizer on up front while the beets are small so the nitrogen can be used in canopy development. By July 15th the canopy is complete and the amount of nitrogen needed to sustain the beet is minimal. Then there is the holding off on irrigation early on so the root goes down to moisture and gets real long. Well, if there is no moisture down there what is going to prompt the root to go down? The plant suffers because there is not enough moisture in the root area to sustain the plant in a healthy condition. We need to know where our moisture is at in the soil profile. Several years ago we were given the ability to number each individual field and build an agronomic history for each field. At the time it seemed like a lot of work for very little return. Wrong!

So what is my point? The point is: 1) We now have the technology to do a better job of raising a beet crop and if we are not using it we are costing ourselves money. 2) You can not blanket farm your beets any more. One fertilizer rate for all your beet fields is not the most profitable way. 3) Each field is unique and needs to be farmed accordingly. We have the technology to allow you to do that. 4) When the company talks they talk in averages. Averages are not the answer to your needs they are a talking point. A ball park figure that gives you an idea of where to start. They are not the final answer. 5) What your neighbor is doing may be right for him but wrong for you. What your grandfather and your father used to do may no longer be the best practice.

Things have changed! Economics have driven our industry to the point that, if we do not pay closer attention to our practices, survival could be jeopardized. We need to know what is going on in each field that we raise beets in. What are our moisture levels and where is the moisture in the soil profile? What is happening to our nitrates and when? What is mineralization doing to us? What stand count works best in a field? How often do I need to irrigate? Is a ten day schedule too much or too little? Is my tonnage low because of fertilizer problems, disease, timing of agronomic practices, over irrigation, under-irrigation, or soil type?

One size shoe or box does not fit all anymore and maybe it never did. It is important that we as producers use every tool that is available to us. Gordon Hardcastle has developed several programs that will help us meet some of the needs I have written about. Imagine being able to choose a variety from company wide growing information versus the five small plots that are currently used. We have that technology available now, all we have to do is input good solid information. We can build a history for each field you grow beets in. This history can help you make good decisions in the future. It will improve your bottom line and it will remove some of the guess work. It may also help explain some of the results that seem out of character.
Every year, various locations are selected across the Amalgamated Sugar Company’s growing area on which Official Variety Trials (OVTs) are conducted. These trials are used in determining which sugar beet seed varieties are approved for our growing areas. They are grown in the most ideal conditions possible to allow each variety a fair chance. If for some reason a trial has too much variability in it to be fair to all varieties, it is not used in the seed approval process; however, the data taken from that trial can still provide us with valuable information.

One such trial this last year was our Declo trial. Due to the harsh weather that we endured this spring, we had a difficult time getting a stand established. It was initially planted on April 14, 2010, but thanks to the frost that we had every morning from May 3rd through May 7th; enough seedlings were killed to necessitate replanting. On the 15th of May we sprayed the trial with Rely to eliminate the few seedlings that were left, then on the 17th of May we replanted. Because of more favorable weather conditions at the end of May, we had a much more uniform stand after replanting. The plots were hand thinned, cultivated, and Temik was applied.

Because of the mild summer and lack of heat units, company wide we experienced lower yields in 2010. Such was the case with our plots. We harvested the trial on September 29-30, 2010, and had an average yield of 31.5 tons/acre with an average sugar content of 16.5%. Generally yields in research plots tend to be a little higher than those in actual fields due to the level of control we have over the growing environment; however, our results do show that it can still be advantageous to replant as late as mid May. When compared with the results from our American Falls trial which was not replanted, we find that the Declo trials yielded about 5.5 tons/acre less than American Falls.

Although the yield was lower in the Declo trial than it was at other locations, it still showed varietal trends. Figure 1 and Figure 2 show the varietal trends regarding the Estimated Recoverable Sugar / Acre. We can see from these charts that the varietal trends at Declo for the most part mirrored those shown at other locations.

Because of the presence of varietal trends and the overall performance of the trial in a late replant situation; the results of the Declo trial can still be a valuable tool in making decisions regarding variety selection and replanting. It provides an idea of what one could possibly expect in a year with similar conditions to 2010. For complete variety trial results see the company website at www srcoop.com.
Figure 1: Estimated Recoverable Sugar / Acre
Commercial Varieties

Figure 2: Estimated Recoverable Sugar / Acre
Experimental Varieties
Development of Fungicide Application Recommendations Based on Soil Temperature, Leaf Stage, and Growing Degree Days for the Control of Rhizoctonia Crown and Root Rot Tailored for Idaho

Oliver T. Neher, University of Idaho, Twin Falls Research & Extension Center

Rhizoctonia solani AG 2-2 and AG 4 are soil-borne fungi ubiquitous to Idaho causing yield reductions up to 75% in sugar beets. They can cause seed rot, damping-off, and crown and root rot (Figure 1) of mature plants throughout the growing season. Effective control practices include crop rotation, resistant cultivars, and fungicide applications. The effectiveness of these practices for Idaho growers are limited, since corn and dry beans grown in this region serve as alternate hosts to R. solani and potentially increase the occurrence of this pathogen. A widely used and successful control practice is the application of fungicides, such as azoxystrobin (Quadris) or prothioconazole (Proline 480SC). These applications are normally based on developmental stages (4-6-leaf stage) or soil temperature measured at 2 or 4 inches. These recommendations were developed by relying on artificial inoculation and it is questionable if they can simulate natural conditions in the field. Historical observations (Greg Dean, personal communication) showed that Idaho growers face different environmental conditions, resulting in earlier or even later disease onset than other states, and therefore cannot rely on spray recommendations based on the 4-6-leaf stage alone.

The main objective of this study is to find a correlation between the most effective application timing (Table 1), soil temperatures at 4 inches and growing degree days, or leaf stages. We established research plots at three locations: two near Mountain Home, ID, and one near Weiser, ID. Locations in Mountain Home, ID, provided no usable data to compare different azoxystrobin application timings for their efficacy to control Rhizoctonia crown and root rot. Only the research plots near Weiser, ID, developed sufficient disease to justify root rot ratings. Rhizoctonia solani appeared to be well distributed, but after data were analyzed it showed that the untreated control had the least amount of disease present. Nevertheless, statistical analysis of percent root rot covering the beet surface (presented as disease index) and harvest data (yield and ERS in ton/A, percent sugar) provided information in regard to favorable application timings. Unfortunately, timings are not significantly different from each other; but a trend towards the need for multiple applications – at the 4-6-leaf stage followed by (fb) an application at row closure, fb an application after 2 weeks – is suggested. Plots treated with this application schedule had the lowest disease severity and the highest yield and ERS of all treatments (Table 1).

Collected soil temperature and moisture data as well as growing degree day data have to be verified in 2011 and 2012 to be able to establish an accurate correlation between these environmental parameters and application timings. It was noticeable that soil temperatures (maximum and minimum) collected at the 2 and 4 inch level are similar until row closure. From this point on until the middle of August, maximum soil temperatures differ by roughly 3 °F, whereas minimum temperatures were not different from each other (Figure 2). Starting with the 4-6-leaf stage, minimum temperatures never dropped below the 54 °F mark (below this temperature R. solani will be inhibited) until the first week in September. The optimum growing range for R. solani (lower and upper temperatures, 68 °F and 91 °F, respectively) was reached shortly after the 4-6-leaf stage and extended until the first week in September (Figure 2). In combination with higher soil moisture, this time period could be regarded as the main infection period, since it provided the optimum growing conditions for R. solani.

Khan et al. (2004) established a management strategy under natural inoculum based on soil temperatures (62-67 °F) measured at 4 inch depth in North Dakota. At this temperature, applications with azoxystrobin resulted in significantly higher ERS when compared to the non-treated control. Khan et al. also reported that the average
growth stage observed at 62-67 °F was the 4-leaf stage, which had similar control results when used as a guideline in Montana (Jacobsen et al., 2003). The application made at 4-6-leaf stage fell in a similar temperature range as described by Khan et al. (62-67 °F, Figure 3), but by applying two additional sprays (row closure and 2 weeks past row closure) the control efficacy could be increased by 12% and the clean yield and ERS (ton/A) was also increased by 6% and 5%, respectively, when compared to the 4-6-leaf stage application (Table 1).

It is important to verify these findings and to develop application guidelines for the control of Rhizoctonia crown and root rot suitable for Idaho conditions. With these guidelines in place, Idaho growers will be able to effectively control R. solani in the field and hopefully, it will help to reduce field and potential storage losses. In addition, growers will be able to increase their stand and final yields and avoid unnecessary or ineffective fungicide applications.

Acknowledgment:

We would like to thank Terry Ketterling, Jack Post, and Ernie Chandler for providing field space and their collaboration. We would also like to acknowledge the help provide by Terry Cane, Bob Huffaker, Greg Dean, Dave Elison, and Dennis Searle (The Amalgamated Sugar Company).

<table>
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<th>Percent Sugar</th>
<th>ERS ton/A b</th>
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Table 1: Effects of different application schedules of azoxystrobin on the severity of Rhizoctonia crown and root rot.
Sugarbeet News Letter

Figure 2: Minimum and maximum soil temperatures at 2 and 4 inches for growing season 2010 overlaid with optimum growing temperatures (between 68 °F and 91 °F, with growth inhibition below 54 °F) for Rhizoctonia solani. GDD = growing degree days, based on 34 °F.

a Disease index was calculated based on estimation of rotten root surface (0% = 0%, 9 = 100%) with following formula: DI = (Disease class x number of roots within that class) / Total number of roots within plot.

b ERS = estimated recoverable sucrose.

c Treatment means followed by the same letter are not significantly different from each other (Fisher’s protected LSD P=0.05).

d LSD = Fisher’s protected least significant different value. Pr > F was the probability associated with the F value.

e NS = not significantly different.

USEFUL INFORMATION

Devon Weber

There is a new bait for our arsenal to help control rodents. Rozol vole bait was recently registered by EPA and the state of Idaho for control of voles around any crop, field borders, and rangeland. This product cannot be used in the field itself! This is a hand applied or ground broadcast label at 10 lbs. per acre. Rozol Vole bait is the #1 product for Vole control in the western states and has been used in orchards for many years.

Rozol is a first generation anti-coagulant rodenticide causing internal hemorrhaging. Anti-coagulants are cumulative, meaning the vole has to eat the poison for few days as accumulating a lethal dose before it dies. The advantage is that the slow onset of toxic effects allows anti-coagulant bait to have low concentrations of active ingredient (chlorophacinone) which reduces bait shyness and is not as toxic to non-target species.

The vole bait formulation is a paraffinized pellet that gives excellent weatherability to rain or snow. It has proven to be the most palatable of any rodenticide formulation by the USDA/NWRC.

In the fall, apply this product before snow cover to areas where the voles are harboring. Corners of pivots fields, along fence lines and areas of natural habitat where the voles are living now. In the spring, apply 7 – 10 days before planting in the same areas to prevent the voles from moving into your fields.

On Jan 31, 2011, Rozol was granted a special local needs label for Idaho to allow for aerial application on the same areas. To get a copy of this label, email Scott McCalley at mccalleys@liphatech.com.

Rozol Vole bait is a restricted use pesticide. Obtain a copy of the label before application.

Rozol Pellets are registered only for rat and mouse control and is a general use product.

Rozol Pocket Gopher bait is a wheat based formulation for control of gophers underground. It is a general use label unless used in a burrow builder.
With frequent high winds in our area, we can anticipate damage to our seedlings and young plants caused by blowing sand and soil particles or from turning and swinging back and forth. Look for symptoms such as shredded or ripped leaves, leaves with a silvery tint in association with mild necrosis, or deformed leaves caused by blowing sand. Plants that have girdled hypocotyls or root tissue (Figure 1) near the soil line are a good indication for damage caused by turning and swinging motions.

The only way to control wind damage is to decrease wind speed throughout your field by planting a cover crop (Figure 2) or by increasing standing residue on the soil surface as seen in strip tillage.

Keep in mind that symptoms do not have to be spread out over your whole field, but can be rather localized. The topographic layouts of your field can create areas with high or low winds causing different symptoms throughout the area.

Figure 1: Girdled sugar beet hypocotyls caused by early season high winds. Notice areas closest to the soil (a), where hypocotyls are nearly separated from the crown.

Figure 2: Sugar beets planted in cover crop to prevent early season wind damage.
Powdery mildew (PM) survives as mycelium in warmer climates, and each year conidia are blown from the south-west into Idaho and Oregon. The development of PM is favored by warm temperatures ranging from 59 to 86 °F with an optimum temperature of approximately 77 °F. Symptomatic white powdery mats of mycelium (Figure 1) tend to develop first on older leaves close to the soil surface. The susceptibility to PM increases with plant age and the disease develops more rapidly in in-furrow irrigated fields. Sprinkler irrigation might inhibit the disease progress since conidia get washed off and their germination is suppressed by free water on the leaf surface. If not controlled, PM can cause a decrease of root yield by 35% and sucrose concentrations as well as increased impurities. Applications of foliar fungicides are the main control tool, whereas cultural practices such as proper fertilization, irrigation, and planting of tolerant varieties have only supportive effects. Fungicides should be applied before PM is visible in the field or based on historical observations. Depending on disease pressure and location, one to two applications are necessary to minimize economic losses. Applications should be 14 to 21 days apart and overall good plant coverage needs to be ensured.

Nine fungicidal treatments consisting of individual foliar fungicides and their combinations were tested for their ability to control PM on sugar beets (Table 1). Research plots were located at the University of Idaho, Southwest Idaho Research & Extension Center, Parma, ID. The first application was made on 12 July and was followed by a second application on 04 August. The date for the first broadcast application was chosen based on historical data, and scheduled prior to disease onset. The treatments were evaluated four times three weeks apart starting at 12 July by rating the leaf area covered with PM. Data were used to calculate the diseased mature leaf area in percent (%MLAD) and individual ratings were used to calculate the area under the disease progress curve (AUDPC). Treatment effects were also determined by means of harvest data including clean yield, sugar content, and ERS.

Powdery mildew developed later in 2010 than in recent years and could not be observed until 04 August. The most successful treatments for controlling PM as measured by the AUDPC were treatments containing both Proline 480SC and GEM 500SC or Headline followed by (fb) Inspire XT (Table 2). They were not significantly different from other treatments but showed on average an 84% reduction in disease severity. GEM 500SC fb Proline 480SC + Induce had the highest clean yield and ERS (ton/A) when compared to the non-treated control, but was not significantly different from other treatments.

The sequence or the timing of the individual products had more effect on the AUDPC than on ERS. Proline 480SC fb GEM 500SC decreased the disease severity by 42% when compared to the application in reversed order (GEM 500SC fb Proline 480SC), but only GEM 500SC fb Proline 480SC resulted in a significant increase in ERS.
in an increase of ERS (ton/A) by 9%. Differences could also be observed for Headline fb Inspire XT and Quadris fb Inspire XT where the AUDPC was reduced by additional 52% and 14%, respectively. Product sequences could only provide an increase of ERS (ton/A) of 6.5% and 7%, respectively, when compared to the reversed order. Nevertheless, when data were analyzed individually, no significant differences could be observed. It seems that the sequence of individual products plays a minor role in the control of PM and that the application timing is more important.

Always read and follow the instructions printed on the pesticide label. Prevent the development of fungicide resistance by rotating between fungicide groups and chemistries.

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<tr>
<th>Trade name</th>
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Nonionic adjuvant
Induce Helena Chemical Co.

DMI = Demethylation inhibitor of sterol biosynthesis
QoI = Quinone outside inhibitors - Strobilurin

Table 1: Fungicides evaluated for their efficacy to control powdery mildew on sugar beet.
With the current battle going on about Roundup Ready technology in sugar beets, the courts have ruled that Roundup Ready sugar beets must go back to being regulated until an Environmental Impact Statement (EIS) has been completed. USDA Animal, Plant Health Inspection Service (APHIS) has come up with three plans until the statement is completed. Do nothing different, grow Roundup Ready beets with a set of rules and regulations or not to allow any Roundup Ready sugar beet plantings until the EIS has been completed.

While we wait for the courts and APHIS to decide what our future will be, we must be planning for what is to be done for weed control within a Roundup Ready or a conventional herbicide program.

Several things are a general rule no matter what kind of weed control program we use.

1) Always start with a clean sprayer. Too often a field has had crop injury or loss due to a sprayer that has not been properly cleaned. Make sure that every aspect of the sprayer has been cleaned with a good spray tank cleaner. Include every surface that might come in contact with the spray solution. Clean the tank, all screens, nozzles and lines. Rinse and flush with clean, fresh water and drain all rinse water. Rinse water left in any of the equipment could have enough residue left that could cause injury to the crop being sprayed. Grass herbicides and AMS make great tank cleaners, even in a spray solution.

2) Make sure all parts are in good working condition. Replace cracked or checked hoses. Pressure gauge working properly? Replace as needed.

3) Nozzles. Are they the correct size? Do they give you the correct gallons per minute and are of the correct band or broadcast width? Replace nozzles as a set so all have the same amount of wear.

4) Calibrate your sprayer. Do this at the beginning of the season and repeat it during the year to verify that you are applying the correct amount of spray solution. Calibration can and does change as we go through the year.

Always use clean, fresh water. Avoid using water off of a sprinkler mainline that could have come from an open dirt ditch or pond. Soil particles in the water can plug screens and nozzles plus neutralize or reduce the effectiveness of glyphosate spray solution.

5) Keep good records of what you did. Include date and time of application, chemicals and rates used, water volume and source, crop and weed condition including stage of growth. Broadcast or band width. Weather conditions and when you cleaned the sprayer are also good to note. Take notes of what did or didn’t work. Records and notes allow you to fine tune your spray program and helps in problem solving should they arise.

Most of all remember to always wear the proper protective equipment. Keep safety a priority.

Next let’s take a look back over the past few years at what we’ve learned about the use of glyphosate in sugar beets.

1) Start early and spray often. Spray weeds before weeds exceed beets in size. Do not let weeds compete with the sugar beets. Keep beets clean until 8 true leaf stage.

2) Always add ammonium sulfate (AMS) at the rate of 17 lbs per 100 gallons of water. Always add it to the water first. Remember that you are treating the water for hardness and not the spray solution.

3) Remember the label? It allows a maximum of 96 oz/ac per year in season applications. At emergence to 8 true leaf stage, apply a minimum of 22 oz of Roundup per acre and a maximum of 32 oz or a total of 56 oz per acre. 8 true leaf to 30 days before harvest, the label allows a maximum of 22 oz per application with a total of 44 oz per acre. Use a non-ionic surfactant when conditions consist of large hard to kill weeds, dust or drought.
4) Control dust. Dust is always a challenge. Glyphosate is a negatively charged molecule that will tie up when attracted to a positively charged cation such as clay particles and organic matter found in soil. When possible spray after a light irrigation or rain. The wider the sprayer boom the less passes or wheel track there is to create dust. Find other ways to reduce dust.

5) When in rotation with Roundup Ready corn, add a grass herbicide to control volunteers. Treat early and repeat as needed.

6) Roundup kills weeds. Cultivate for things other than weed control. Cultivating can stir up new weed seeds that will later have to be dealt with. Cultivate for furrow establishment and water penetration among other things.

Returning to the use of conventional herbicides has created a fair amount of anxiety with sugar beet producers. It can be difficult going back when we have found a better way of getting good weed control. We should be reminded that we have a fair amount of experience in this area. What should a conventional herbicide program look like?

1) For fields with potential for heavy weed pressure consider a pre-emergence broadcast Roneet herbicide application or post plant pre-emergence band application of Nortron.

2) A broadcast pre-emergence application of Roundup will give you a clean sweep of the field prior to the beets emerging.

3) For in season weed control you have a choice of either band or broadcast applications. Band applying saves costs on herbicides but can leave strips with uncontrolled weeds. Band widths can range from 7 to 11 inches on 12 to 36 row sprayers. Broadcasting allows treating a field faster with the use of wider booms and controls weeds across the whole field.

4) For in season weed control you have Progress, Betamix or Betamix tank mixed with Nortron sc. A tank mix could include Upbeet for improved control of kochia, night shade, pigweed and mustard. A grass herbicide should be added for increased control on annual grasses and volunteer grains. Caution should be taken to not add a crop oil. Progress and Betamix contain enough oil that adding could cause crop injury. For control of canada thistle, cocklebur, sun flowers and legumes include Stinger to the mix. Rates of these herbicides will vary depending on size of the crop and weeds, band width and row spacing or if it is being broadcasted. Always read the label for proper rates and timing for all chemicals being tank mixed.

5) Caution should be taken to not spray if there has been a frost 3 days prior to treatment. When daytime temperatures are high, stop spraying 1-2 hours before temperatures reach the 80-85 degree mark. Leaf burning can occur. Resume in the evening when the temperature is moving downward.

6) Treatment should start as early as the cotyledon stage continuing every 5-7 days.

7) A soil active herbicide should be at least considered for extended weed control. Herbicides such as Treflan 4EC, Eptam SC, Outlook and Dual Magnum all have been effective in giving extended suppression or control of weeds. Timing of application should be before the last Betamix or Progress application. Read the label for rates and best time of application. Ask for advice from your White Satin crop consultant.

8) Should we be cultivating? Cultivate for a reason. Furrow establishment, water penetration, or controlling weeds. As mentioned before, cultivating can stir up new weed seeds.

While we all remain hopeful that we will have the ability to utilize Roundup Ready technology in sugar beets, we must all take a close look at what we need to do in each of our own operations to maintain the best weed control possible.
Probably no single occupation deals with as much variability as farming. Growers deal with variability in markets, weather, soil, and many others. Trying to attain the best price for their commodities and extract a high yield crop from the ground year after year is a huge challenge, considering the variables with which they have to contend. Aerial photography is a highly effective tool to give growers a “big picture” view of the many variables that go into producing the best crop possible.

Color infrared aerial photography has been used for many years to help farmers track and document changes in their fields. Color infrared imagery is false color imagery using green, red and near infrared bands to create a composite image. The infrared band is perfect because the chlorophyll in vigorous, healthy plants reflects almost all of the near-infrared light from the sun. But, when plants are stressed, they begin to absorb this light (this effect is similar to the way that a lush green lawn will turn brown when your teenager forgets to move the sprinklers for a few days in July). Thus, variations in plant health and vigor are seen earlier using cameras sensitive to near-infrared wavelengths.

To be useful to farmers, aerial imagery must be relevant, timely, and consistent.

To be relevant, the image must convey to the user some information about the field or the crop that can be used to make decisions in the future. We recommend taking the first picture of the year as soon as the water is turned on. In Figure 1, we see a circle with spokes on the left side and a big dry ring in the middle. Finding this problem before it affected the crop saved this grower many times the initial cost of the photo. At a minimum, each field should be imaged 4 times per season. The first should be when the water is turned on. The second and third images should be taken before and after row closure. The last picture should be taken within three weeks of harvest.

The timeliness of an aerial photograph is crucial. Consider Figure 1; every revolution the center pivot makes after the picture is taken diminishes the value of the information. Ideally, the grower should be able to view his or her fields within 24 hours.

Figure 1: The dry ring in this 120 acre potato circle equals approximately 8 acres.

Figure 2: This field has a nice even irrigation pattern with just a few light spokes.
To get the most value out of your investment in aerial photography, it is important that the imagery be consistent. When you have photos taken at regular intervals, you can see the results of your decisions and you can also plan more accurately for the future. For example, the manager of the field sees a nice, even irrigation pattern and can allocate resources at other locations. Controlling for scale and color balance gives a consistency to the images, which highlights the actual changes in the field from week to week.

Variability in a field caused by soil type, planting date, variety changes or irrigation anomalies are usually very apparent and recognizable. Occasionally however, a slight color shift in the crop can be an indication of disease, insect infestation, or chemical misapplication. If you are involved in an herbicide drift case, the before/after photos are extremely valuable to document the severity and extent of the problem.

Relevant, timely and consistent aerial images are a valuable investment to help farmers manage the variability of some of the variables in farming and produce the best crop possible.

Tad Fickel is the President of Infrared Baron, Inc. He has been taking aerial pictures of crops in the northwest for 18 years. Email info@infraredbaron.com for more information.

In the 2010 sugar beet growing season many acres became affected by diseases and insects that are perpetuated by short rotations. Many fields were identified with nematodes, rhizomania, and root aphids during the season. These diseases and pests are also growing in severity due to close rotations that some growers are using to be economical in their operations. In order for Amalgamated Sugar and individual growers to remain economical, our yields and sugar content need to remain constant and preferably increase.

Fields with blinkers from rhizomania were abundant this past year. (Picture 1) Digging up these blinkers reveals sugar beets showing severe rhizomania symptoms. (Picture 2) Rotation is the best way to slow down the progress of rhizomania. Research has

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**SUGAR BEET ROTATION**

By Dave Bateman

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Picture 1: Blinkers in Field

Picture 2: Sugar beet with Rhizomania
shown that a four year rotation is best for rhizomania management.

So what do we do if we cannot have a four year rotation? Proper irrigation is important in slowing the disease early in the season. Areas of a field that have excessive soil moisture will be more susceptible to rhizomania. Taking the time to manage irrigation will pay off. Early planting of sugar beets allows the beets to be established before the disease can take hold. Rhizomania is not active below 60 degrees. The earlier the beets are planted; rhizomania is less likely to take control. In addition, better stand populations lessen rhizomania effects. Growers need to choose varieties that have more resistance for fields that are known to have rhizomania. Sugar beets infected with severe rhizomania do not store well and lose more sugar in storage. We cannot afford to raise sugar then have it disappear before we process the beets.

Sugar beet cyst nematodes are nothing new to beet growers, but they still are costing growers tons and sugar. (Pictures 3 & 4) If a grower has a known field with severe nematode pressure the field should be on at least a four year rotation for sugar beet. This allows cyst counts in the soil to lower without breeding more, like an every other year rotation. Early planting allows the beets to be established before nematodes. Less damage occurs when older beet plants become infected. New sugar beet varieties with nematode resistance are doing amazing, but we do not want to lose the resistance of these varieties.

Green manures have also proven to do wonders in reducing the effects of nematode. Green manure guidelines have been published by the University of Idaho. Using the guidelines a grower can effectively grow a green manure which will provide many benefits not only for nematodes, but agronomical as well. A few growers are also using products from fertilizer companies and are also seeing good results in lowering the losses from nematodes. Testing needs to be done on these products to see how well they perform compared to known treatments.

The loss of Temik will be occurring in the next few years. Growers need to plan ahead for how they will control nematodes without some of the chemical aids that we currently have. Fumigation controls are also
being more restricted. We need to use every tool that is available to keep nematodes in check.

During the past several years fields have been identified with root aphids. (Pictures 5 & 6) In the 2010 growing season a field was scouted having severe root aphid pressure. The field never closed the rows and yield loss was high. Grower’s inputs are almost the same whether a field is good or bad, but Amalgamated Sugar and the grower lose money when any field turns out bad. Root aphids have no chemical control and close rotations promote increased populations. Growers who have identified root aphids also need to plant varieties that have root aphid resistance. Visit with seed representatives to buy a variety that has aphid resistance. Irrigation scheduling is necessary to the control of root aphids. Proper application of water controls the spreading of root aphids.

The sugar beet growing areas of Amalgamated Sugar Co. has been in production from 60-100 years. We want to continue being effective in raising and processing sugar. Farm ground is in short supply which makes long rotations almost impossible. Right now Amalgamated Sugar has the ability to sell more sugar than we can produce. A balanced approach to disease and pest control will allow us to stay in business. We need to use all of the tools that we have to raise sugar more efficiently and make increase the bottom line.
The past two years we have been studying the effect that nitrogen rates have on sugarbeet stands in strip tillage. We soil tested the plots and determined they needed a total of 120 lbs N/A. We wanted to determine how changing that rate might affect sugarbeet stands, yield, sugar and nitrates. The fertilizer rates consisted of a half rate at 60 lbs N/A, a second at ¾ recommended rate, at 90 lbs N/A and a full rate at 120 lbs N/A. A John Deere air planter was used to plant the study at 5 and 15/16 inch drop.

In 2009, fertilizer was placed 5 inches deep with a Schlagel strip till machine. On April 9, sugarbeet seed variety 27RR10 was planted. Plots used for stand counts were 5 rows by 20 feet randomly selected at four sites within the total plot area which was approximately 9 acres. Stand counts were taken on May 12, 15, 20 and 29. There were no significant differences in stand counts between fertilizer rates (Figure 1).

On June 12, the 60 and 90 lb nitrogen rates were top dressed to bring the total available nitrogen to 120 lbs N/acre. To monitor nitrogen uptake in the plants, petioles were taken and graphed using The Amalgamated Sugar Company petiole curve (Figure 2).

Readings started out above The Amalgamated Sugar Company petiole curve but lowered after time. The cooperator decided to add 25 units of nitrogen through the sprinkler in late July. It did raise nitrate readings above the curve but they quickly dropped down again to the Company curve. Plots were harvested on October 12. Sugar samples were taken from each plot at the rate of 2 samples per truck. Yields were above average and the nitrates were low. It appears that in 2009, fertilizer rates did not adversely affect stand, tonnage, sugar content or nitrates (Figure 3).

In 2010, we planted on April 19. However, after a killing frost on May 7, we replanted with ACH RR968 on May 15. The plots used for stand counts were 5 rows by 20 feet. Any sugarbeet plants that survived the first planting and emerged were removed before the first counting date. Stand counts were taken on May 26, 28, June 1, 3 and 8. This year, there were significant differences between treatments on May 28, June 1

![Figure 1. Stand counts in 2009.](image-url)
and 3. Stand counts in the 60 lbs N/A rate were significantly lower than 120 lbs N/A rate (Figure 4).

This was partially due to soil differences. The area in the 60 lbs N/A was more calcareous than the rest of the field. At the final stand count on June 8 there were not sig-

ificant differences between fertilizer rates. On June 15, the 60 and 90 pound nitrogen rates were top dressed to bring the total available nitrogen to 120 lbs of nitrogen per acre. Petioles were taken to monitor the nitrates (Figure 5). Uptake of nitrogen in the 60 and 90 lbs N/A occurred 7 days earlier than the 120 lbs N/A. This was due to top dressing nitrogen in these plots. The downward movement of nitrogen in the soil contributed to the slower up-

<table>
<thead>
<tr>
<th>Nitrogen Rate</th>
<th>Tons/Acre</th>
<th>Percent Sugar</th>
<th>Nitrate PPM</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>35</td>
<td>16.44</td>
<td>97</td>
</tr>
<tr>
<td>90</td>
<td>36</td>
<td>16.78</td>
<td>102</td>
</tr>
<tr>
<td>120</td>
<td>38</td>
<td>16.8</td>
<td>176</td>
</tr>
</tbody>
</table>

Figure 2. Petiole nitrate readings in 2009.

Figure 3. Sugarbeet sugar, tonnage and nitrates.

Figure 4. Sugarbeet stand counts in 2010.
take of nitrates in the 120 lbs N/A.

This lag time in nitrogen uptake as indicated by the petiole nitrate reading appears also to have reduced sugar beet tonnage (Figure 6).

Plots were harvested on October 12 and sugar samples were taken on each plot at a rate of 2 samples per truck. Yields were lower than in 2009 due to replanting, but sugars and nitrate readings were good. Fertilizer rates also affected yields in 2010, due probably to replanting. The full rate, 120 lbs N/A, was lower due to the later availability of nitrate to replanted seedlings resultant from leaching of N lower in the profile early.

In summary, it appears that high rates of liquid fertilizer placed 5 to 6 inches below the seed did not adversely affect stands, sugars or nitrates. However, it appears nitrogen placed at this depth when replanted with no additional nitrogen added did cause sugarbeet root yields to be lower.

<table>
<thead>
<tr>
<th>Nitrogen rate</th>
<th>Tons/Acre</th>
<th>Percent Sugar</th>
<th>Nitrate PPM</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>26.8</td>
<td>17.39</td>
<td>86</td>
</tr>
<tr>
<td>90</td>
<td>29.58</td>
<td>16.88</td>
<td>99</td>
</tr>
<tr>
<td>120</td>
<td>24.01</td>
<td>16.56</td>
<td>76</td>
</tr>
</tbody>
</table>

Figure 5. Petiole nitrate readings for 2010.

Figure 6. 2010 sugarbeet tonnage, percent sugar and nitrates.
In 2010 we conducted four sugar beet weed control experiments the Kimberly Research and Extension Center that were funded by the Idaho Sugar Beet Growers Association and Amalgamated Sugar Company. All were conducted with Roundup Ready sugar beets. The experiments included: 1) comparing soil-active herbicides tank mixed with glyphosate for weed control in strip tillage; 2) comparing various soil-active herbicide tank mixtures with glyphosate in furrow irrigated strip tilled sugar beets; 3) evaluating different nonionic surfactants, drift control agents, and ammonium sulfate application rates used with glyphosate; and 4) a preliminary comparison of conventional tillage, strip tillage and direct seeding (no tillage) sugar beet production. Each of the four studies is summarized below.

Glyphosate and soil-active herbicide tank mixtures in strip tillage. This field experiment was similar to what we have been doing in conventionally tilled sugar beets the past several years. In this experiment, we compared glyphosate tank mixtures with soil active herbicides for crop safety, weed control and yield in strip tilled Roundup Ready sugar beets. In a strip tilled field, it is not known what effect crop residue on the soil surface might have on the movement of soil-active herbicides into the soil compared to conventionally tilled soil. The soil-active herbicides included Outlook at two rates (16 and 21 fl oz/A), Nortron at 32 fl oz/A, Dual Magnum at 21 fl oz/A, Eptam at 3.4 pt/A, and an experimental formulation of Eptam at 3 lb ai/A. All of these were tank mixed with glyphosate (22 fl oz/A) in separate treatments and applied when the beets were in the two-leaf stage. Glyphosate was applied a second time to control a few escapes from the first application. A final treatment consisted of glyphosate applied alone at 22 fl oz/A three times.

Weed control with all of these tank mix treatments was excellent and equal to making three glyphosate alone applications. There also was no difference between the two Outlook rates used. With sprinkler irrigation, it does not appear that any of the soil-active herbicides are getting tied up in the crop residue. Sugar beet yields ranged from 37 to 41 ton/A among the highest yielding treatments. The untreated control yielded 10 ton/A. We plan to continue looking at this in 2011.

Weed control in furrow irrigated strip tillage and conventional tillage sugar beets. One of the questions about strip tilled sugar beets is whether weed control with glyphosate tank mixtures with soil-active herbicides might be affected since there is no way for the soil-active herbicides to get moved into the soil like they can with sprinkler irrigation. To prepare for this experiment, barley was planted in 2009 and grown under furrow irrigation on 44-inch beds. In 2010, we strip tilled the grain stubble following the corrugates made in 2009. During the strip tillage operation, we encountered problems with residue falling back into the furrows, which made it difficult to irrigate this study. The soil-active herbicides applied in combination with glyphosate were Outlook at 16 and 21 fl oz/A, Nortron at 32 fl oz/A, Dual Magnum at 21 fl oz/A and Eptam at 3.4 pt/A. Weeds evaluated in this study...
included kochia, common lambsquarters, redroot pigweed, annual sowthistle, Russian thistle, green foxtail and barnyardgrass.

There was no difference in weed control or sugar beet yield between the conventionally tilled and strip tilled treatments. Thus, weed control for each herbicide treatment was averaged over the tillage treatments. The weed control ranged from 94 to 100% for all of the herbicide treatments. Sugar beet yields ranged from 28 to 32 ton/A among the herbicide treatments with no statistical difference between herbicide treatments. The untreated check yielded 16 ton/A.

Comparing spray adjuvants rates used with glyphosate. Growers have asked if there is a difference between one nonionic surfactant and another and if the amount of ammonium sulfate (AMS) added to a glyphosate application makes a difference in weed control. We set up a field study to determine if different surfactants and AMS rates influenced crop injury, weed control and sugar beet yield.

In previous studies we have looked at various adjuvants in combination with glyphosate that was applied at 22 fl oz/A and have not seen any differences between surfactant brands or AMS rates. With the suggestion of chemical industry representatives in 2010, we looked at several adjuvants applied with glyphosate at 11 fl oz/A. Industry representatives suggested we would see bigger differences between the adjuvants when the glyphosate rate was reduced. This suggestion proved to be true. We did see differences in weed control with reduced glyphosate rates and the different adjuvants. In this study we applied glyphosate at 11 and 22 fl oz/A with varying rates of ammonium sulfate and different adjuvants. The adjuvants tested included Bronc (ammonium sulfate), Bronc Max (ammonium sulfate and silicone), Bronc Plus Dry EDT (AMS, NIS, deposition aid, and anti-foam agent), Coverage 20-G (drift management agent), R-11 (nonionic surfactant), Class Act NG (water conditioner + NIS), and Alliance (water conditioner + NIS). Some weed species such as redroot pigweed, hairy nightshade, and green foxtail were effectively controlled with 11 fl oz/A of glyphosate with or without an adjuvant. At the same rate however, kochia, common lambsquarters and Russian thistle control were variable depending on the adjuvant used. Glyphosate at 11 fl oz/A + Alliance at 1.25% v/v had the best overall weed control with the lower glyphosate rate. However, most of the glyphosate plus adjuvant treatments applied at 22 fl oz/A controlled one or more weed species better than glyphosate at 11 fl oz/A + Alliance at 1.25% v/v. The most consistent weed control was with glyphosate at 22 fl oz/A regardless of the adjuvant used. Comparing all the treatments, root yields ranged from 1 to 34 ton/A and sucrose yields ranged from 368 to 9,283 lb/A. Even without any surfactant, weed control with glyphosate applied at 22 fl oz/A was as good as glyphosate plus any of the adjuvants used in the study. The lowest yielding treatments were glyphosate applied at 11 fl oz/A + Bronc Max + R-11 and Alliance + sucrose. Sugar beet root and sucrose yields were ranked in the same order, which indicates that herbicide treatment did not influence sugar content.

Comparing conventional tillage sugar beets to strip tillage and direct seeding (no tillage). Large strip plots were established in barley stubble. The direct seeded plots received no seedbed preparation prior to planting. The conventional tillage plots were prepared by roto-tilling the soil about 7-inches deep. Due to the configuration of the plots, this was the only way the soil could be tilled. At harvest, each of these strips was harvested. The average yield of the conventional tillage, strip tillage and direct seeding plots was 30, 27 and 25 ton/A, respectively. There were several things we saw that we need to change in the planting system, but we feel it may be worth looking into direct seeding sugar beets to see if that may be an alternative to conventional and strip tillage.
A field experiment was conducted to clarify the importance of damage from the beet leafminer to Idaho sugar beet production. In particular, the study was designed to: (1) determine whether mid- to late-season damage from leafminers affects sugar yield, (2) experimentally evaluate the utility of proposed leafminer action thresholds in Idaho, and (3) determine the duration of control of leafminers using Poncho Beta seed treatment. The experimental treatments established on field plots at the U-Idaho Kimberly R & E Center were as follows: (1) untreated check, (2) early-season leafminer removal (leafminer eggs physically removed from emergence until June 18), (3) early- to mid-season leafminer removal (leafminer eggs physically removed from emergence until July 1), (4) Poncho Beta (clothianidin + beta-cyfluthrin) insecticide seed treatment, (5) 50% infestation threshold (i.e., applying Temik [aldicarb] when 50% or more of plants are infested with eggs or larvae), and (6) a “late” application of Temik (i.e., during the eight- to ten-leaf stage, which is thought to be the point at which leafminers are no longer causing economic damage to sugar beets).

Weekly mine and egg counts over twelve weeks indicated that the two removal treatments successfully protected plants from leafminer damage relative to the untreated check. Poncho Beta treatment significantly reduced leaf mines relative to the untreated check until July 1 (i.e., about two months after planting), at which point there was no difference in the number of mines between the Poncho Beta treatment and the untreated check for the remainder of the season. Temik was applied for the 50% threshold treatment plots on June 3 and remained effective against leafminers until the end of July. The “late” application of Temik was made on June 18; these plots had a relatively high number of mines until July 1, and the Temik remained effective against leafminers until the end of July. By August leafminer densities were low across all treatments.

Yield (tons per acre) and Estimated Recoverable Sucrose (ERS) differed significantly among treatments, but percent sucrose did not (Table 1). ERS per acre did not differ significantly among the untreated check, the two removal treatments, and the Poncho Beta treatment; however, ERS was significantly higher for the 50% threshold Temik treatment relative to the untreated check and the two removal treatments. ERS was significantly higher for the “late” Temik treatment relative to all other treatments except the 50% threshold treatment. If leafminers had significantly affected sugar yield in this study, one would have expected to see an increase in yield for one or both of the removal treatments relative to the untreated check, which was not the case. Moreover, if the period from beet emergence to the eight-leaf stage is the critical time period for leafminer damage, then the “late” control with Temik treatment should have exhibited reduced yield relative to the 50% threshold treatment. Despite the fact that leafminers were allowed to infest plants on the “late” treatment for two additional weeks before treatment, no significant reductions in yield were observed.

Although data from the 2010 field season do not provide clear evidence that leafminer damage affects sugar yield, weather during spring 2010 was unusually cool and wet, which delayed population development of leafminers; thus, populations were likely relatively small during the critical early growth stage of sugar beets. This study will have to be repeated at least one more season before definitive conclusions can be drawn. Additionally, previous studies have shown that sugar beets that are protected with seed
treatments from even minor insect feeding damage maintain higher sugar contents when held for months in storage. Pending continued support, this study will be repeated during 2011 and, in addition to recording sugar yields at harvest, beets will be evaluated for sugar loss over time during storage.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Yield (tons per acre)</th>
<th>% sucrose</th>
<th>ERS (pounds per acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Untreated check</td>
<td>34.8 ± 0.76ab</td>
<td>16.9 ± 0.18a</td>
<td>10,186.5 ± 149.2a</td>
</tr>
<tr>
<td>2. Early removal</td>
<td>36.0 ± 1.04abc</td>
<td>17.0 ± 0.17a</td>
<td>10,497.8 ± 220.9a</td>
</tr>
<tr>
<td>3. Early-mid removal</td>
<td>34.1 ± 0.87a</td>
<td>17.5 ± 0.08a</td>
<td>10,401.4 ± 317.1a</td>
</tr>
<tr>
<td>4. Poncho Beta</td>
<td>36.5 ± 0.72bc</td>
<td>17.2 ± 0.13a</td>
<td>10,909.3 ± 303.4ab</td>
</tr>
<tr>
<td>5. 50% threshold (season control with Temik)</td>
<td>37.9 ± 1.10cd</td>
<td>17.3 ± 0.26a</td>
<td>11,441.4 ± 321.8bc</td>
</tr>
<tr>
<td>6. “Late” control with Temik</td>
<td>39.5 ± 0.75d</td>
<td>17.5 ± 0.17a</td>
<td>11,975.6 ± 168.5c</td>
</tr>
</tbody>
</table>

1Means within a column that share the same letter are not significantly different.

Table 1. Mean ± Standard Error of yield parameters compared among treatments.
Perrine Bridge Twin Falls
A bridge to a stronger economy.
Picture By: Danelle Montalbo
White Satin Sugar
SUGAR CONTENT ANOTHER 1/2%

ASK ME HOW

ASK YOUR WHITE SATIN FIELD STAFF