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The Forage Leader

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Utilizing the BMR Trait in Sudangrass and Sorghums

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Cal/West Seeds

This article is a modification of a paper presented at the California Alfalfa and Forage Symposium, Dec. 12-14, 2005, Visalia, CA and published in the Proceedings of that conference (see http://alfalfa.ucdavis.edu for this and other proceedings.)

The genus *Sorghum* includes three distinct types that are used as forages: forage sorghums, sudangrass, and sorghum x sudangrass hybrids. These three types have grossly different phenotypes and different modes of principal utilization. Forage sorghums have very coarse stems and wide leaves, similar to corn, very low tillering capacity, and very slow speed of regrowth after cutting. Consequently they are used predominantly as a silage crop, and occasionally for hay production and direct pasture. Sudangrass in comparison is very grassy, characterized by very fine stems and narrow leaf blades, profuse tiller development, and exceptionally rapid recovery after cutting or grazing. Sorghum x sudangrass hybrids which result from crossing a sorghum female with a sudangrass male are generally intermediate in character expression between sorghum and sudangrass.

Of the *Sorghum* species grown for forage, sudangrass has the finest stems, tillers most profusely, and has the most rapid regrowth following cutting or grazing. The finer stems give it better drying characteristics than other *Sorghums* for hay making (Undersander, 2000). The fine stems, extensive tillering, and rapid regrowth of sudangrass make it better suited to pasturing than other types of *Sorghum* (Anderson and Guyer, 1986; Leep, 2005). Sudangrass and sorghum x sudangrass hybrids are widely grown commercially for direct pasture, hay, haylage, greenchop, and silage.

Brown midrib (BMR) is a visible marker associated with the reduction of lignin in corn, sorghum and pearl millet (Kuc and Nelson, 1964; Porter et al., 1978; Cherney et al., 1988). In *Sorghum* species the BMR trait is expressed in the midrib of young leaf tissue and in the stem, rind, pith, and vascular tissues of maturing plants. Leaf coloration tends to fade with advancing maturity. Intensity of coloration is not a measure of the reduction in lignin and has no bearing on relative differences in forage quality. Expression of BMR is merely an indicator that the gene(s) are present. Studies with corn and sorghum document the improved forage digestibility associated with BMR genes (Lechtenberg et al., 1972; Fritz et al., 1981).

In spite of well-understood benefits of BMR on forage quality, BMR mutants were not used commercially until the 1990s and widespread use was limited because BMR types showed lower yield and vigor in corn (Miller et al., 1983; Lee and Brubaker, 1984) and sorghum (Kalton et al., 1988). BMR forage sorghum and sorghum x sudangrass hybrids are being introduced into the market at a very fast rate (Miller and Stroup, 2003). The Sorghum

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Inside This Issue

The Gavel Exchange

Miles Kuhn, President AFGC

Groundhog Day has now passed and Punxsutawney Phil has given us his forecast of six more weeks of winter. So welcome to our "winter-spring" issue of *The Forage Leader*! I'll have to admit that this is the time of year that I don't want to think about any more snow. I enjoy the winter months but by my calendar, it's time for the mercury to start rising so we can look forward to the forages greening up and start to grow again.

This winter has been an extremely busy time for your board of directors. Back in the middle of November our executive director, Bandy and Associates, informed us that they would not be renewing their contract with AFGC beyond February 2010. During the last three years our organization has been blessed to have Michael and Dee Dee Bandy taking care of AFGC. During their time with AFGC they have helped guide our board in growing our membership, adding new affiliates, strengthening our finances, and much more. It's always good to introduce new thoughts and ideas into any leadership position. Their "can do attitude" has been a breath of fresh air and one of the main reasons AFGC is moving in a positive direction. I would like to take this opportunity to thank them for all that they have done for AFGC and wish them the best in their future endeavourers.

At the fall board meeting the board of directors put together a search committee to find a new executive director for AFGC. I'd like to report that this committee has been doing an exceptional job in getting the position posted and accepting applications. We met as a committee February 17 in Lexington, Kentucky to interview the top seven candidates that ranged from individuals to association management firms such as the Bandy's. We ranked all the candidates and have been in the process of checking references and negotiating a contract with the individual that was selected. Each and every one of the people that we interviewed was definitely qualified for the position.

At this time I'd like to officially announce that we have a signed contract with our new association management company, IAM Solutions (Innovative Association Management Solutions, LLC) located in Berea, Kentucky effective March 1, 2010. AFGC's new executive director is Tina Bowling and will be working with project manager Marie Fore. During the interview process it became very clear that these two individuals are a great fit for AFGC. They have a tremendous amount of association management experience, backed by an enthusiasm to meet all of our needs and help us to grow in the future. The committee is very excited about IAM and what the future has to offer for our organization. Please see below for the new contact information for AFGC, Tina, and Marie. The Website will stay the same: http://www.afgc.org. When you visit the website you will also notice that the information below has been updated. If you have any questions please don't hesitate to call or e-mail.

AFGC
PO Box 867
Berea, KY 40403
Tel: 800.944.2342 (AFGC)
Tina Bowling: Tina.Bowling@afgc.org
Marie Fore: Marie.Fore@afgc.org

AFGC Event Calendar

For the latest AFGC, AFGC Affiliate Council and related events, please visit the AFGC web site at www.afgc.org. AFGC welcomes suggested events. Affiliate Councils, in particular, should send their meeting details via e-mail to info@afgc.org. Please be sure to include dates, times, locations, contact information and a brief summary.

2010 AFGC Annual Conference
Mon Jun 21, 2010 8:00 AM - Wed Jun 23, 2010 10:00 PM
For more information, contact: Tina Bowling; Phone: 800.944.2342; E-mail: tina.bowling@afgc.org

PA Ag Progress Days
Tue Aug 17, 2010 8:00 AM - Thu Aug 19, 2010 5:00 PM
For more information contact: Richard Hann, E-mail hannr54@comcast.net

PFGC 50th Anniversary Celebration
Wed Nov 17, 2010 5:00 PM - Thu Nov 18, 2010 5:00 PM
For more information contact: Richard Hann, E-mail hannr54@comcast.net

AFGC News and Updates

AFGC Gets a New Home

As noted in "The Gavel Exchange", AFGC recently retained new management for the organization. Effective immediately, the new contact information is:

AFGC
PO Box 867
Berea, KY 40403
Tel: 800.944.2342 (AFGC)

Please make a note of this information to help avoid delays during the transition.

Exhibiting and Sponsorship Opportunities Available

The 2010 AFGC Conference will bring producers, scientists and forage industry professionals together from across the United States and Canada to learn about the benefits of managed grazing systems, improved forage production systems, increased profitability and more. This is your chance to be a major exhibitor and/or sponsor of this high-profile conference and educational event. You'll be acknowledged throughout the conference based on your level of participation.

Current sponsors and exhibitors include:

- AMPAC Seed Company—Silver Sponsor
- Dow AgroSciences—Platinum Sponsor
- DuPont Crop Protection—Silver Sponsor
- Grassworks Weed Wiper LLC—Exhibitor
- Grazing Lands Conservation Initiative—Exhibitor
- K-Line Irrigation NA—Exhibitor
- PowerFlex Fence—Bronze Sponsor
- Smith Seed Services—Exhibitor

Details on exhibiting and sponsorship are available on the web at www.afgc.org.

Conference Housing

The University Plaza Hotel in Springfield, Missouri has been selected for this year's conference. The AFGC rate is $99 King or Two Double; $119 King Suite. A limited number of rooms will be available to government agencies at the government per diem rate on a first come, first served basis. Must show valid government ID at check-in. For reservations, call 417.864.7333 and identify that you are with the American Forage and Grassland Council. The deadline is May 28, 2010, by 5 p.m.

Contests Held in Conjunction With Annual Conference

Several contests and competitions are a part of the AFGC Annual Conference including the National Hay Show, National Photo Contest, Forage Spokesperson Competition, Emerging Scientist Competition, Forage Bowl, and Youth in Grazing Management Competition. In part, these programs are made possible through the generous support of our sponsors:

- Emerging Scientist Competition - Dow AgroSciences
- Forage Bowl Competition - The Samuel Roberts Noble Foundation
- Forage Spokesperson Competition - Forage Genetics International
- National Photo Contest - Ampac Seed
- Youth in Grazing Management - R.L. and Pat Dalrymple & Elstel Farm & Seed

Visit the AFGC web site to access the Contests section and details on these programs.

Annual Awards

Now is the time to nominate your colleagues who should be recognized. AFGC sponsors several award programs, including Distinguished Service, Merit and Medallion. The deadline for entries has been extended to **April 23, 2010**. For details on the AFGC recognition awards, visit the web site at www.afgc.org.

Affiliate Councils Are Asked to Nominate Candidates for the 2010 Competition

Each year, AFGC Affiliate Councils are asked to nominate individuals to participate in the Forage Spokesperson Competition. AFGC encourages each council to begin thinking about this process ***NOW*** and to submit your candidate for the 2010 competition in Springfield, Missouri. Competition details appear on the AFGC web site, www.afgc.org.

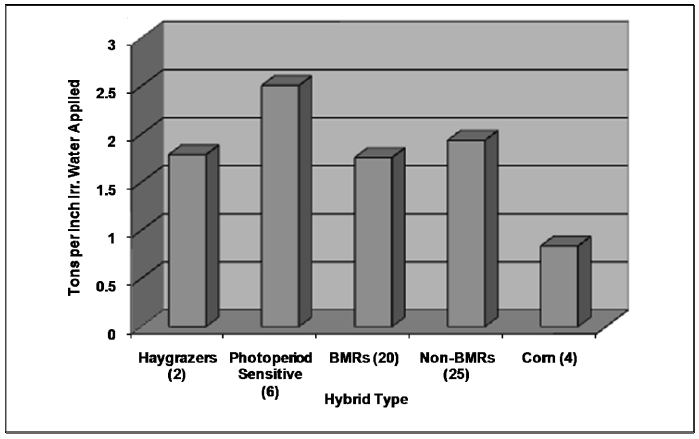
BMR Trait
Continued From Page 1

Industry estimates that within five years as much as 80-85% of the forage market will be brown midrib. In the present market, some forage sorghum and sorghum x sudangrass hybrids have experienced significant problems with lodging under field production conditions. The first true sudangrass x sudangrass hybrids with the BMR trait are currently being introduced into the market.

Results and Discussion

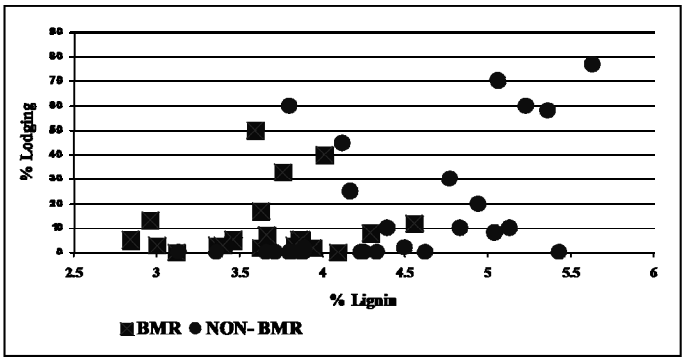
A 1999 study compared forage quality among conventional (normal midrib) and BMR forage sorghum and sorghum x sudangrass hybrids from ten seed companies at the Texas A&M University Bushland, Texas Research Center. Lignin content of BMR hybrids was 33% lower (3.1% vs. 4.6%) and IVTD was 20% higher (78.6% vs. 65.6%). A 2001 study compared 53 sorghum and 4 corn hybrids in an irrigated trial at Bushland. The 53 sorghum hybrids (combination of BMR and conventional) averaged 1.93 tons/inch of water consumed; BMR hybrids produced 1.76 tons/ inch while conventional hybrids produced 1.94 tons/inch. Photoperiod sensitive hybrids produced 2.51 tons/inch of water consumed. In contrast, corn was very inefficient in water use producing only 0.84 tons/inch of water consumed or 56% less efficient than the average of the sorghum hybrids (see Graph 1). From the same 2001 trial at Bushland, 20 BMR sorghum hybrids averaged 18% lower in lignin, 6% lower in NDF, 8% lower in ADF and 8% higher in IVTD compared to the 25 non-BMR hybrids.

Graph 1. Irrigated Sorghum Silage Trial – Water Use Efficiency. Courtesy of TAMU Research Center, Bushland, TX. http://soilcrop.tamu.edu/research/crops/corn-sorghum/croptesting



Lodging scores taken on the 2001 trial at Bushland show that lodging is not associated with the BMR trait, per se, but with the genetic background of a particular hybrid. The scatter diagram shown in Graph 2 shows the relationship between % lignin and % lodging for the 53 hybrids. Certain non-BMR hybrids with high lodging scores are actually high in lignin content while certain BMR hybrids that are among the lowest in % lignin are also among the lowest in % lodging. The data clearly indicates that it is not possible to generalize about lodging in BMR or non-BMR hybrids or the relationship between % lignin and % lodging.

Graph 2. Comparison of % Lodging and % Lignin Among BMR and Conventional. Forage Sorghum and Sorghum x Sudangrass Hybrids. Courtesy of TAMU Research Center, Bushland, TX. http://soilcrop.tamu.edu/research/crops/corn-sorghum/croptesting.



Replicated trials comparing BMR sorghum x sudangrass hybrids with a standard non-BMR check (SX 17) showed that while the BMR hybrids had somewhat lower forage dry matter yield (4.65 vs. 5.08 tons/acre) they were significantly higher in forage quality having 28% lower lignin (4.4 vs. 6.1%) and 17% higher TDN (61.8 vs. 52.7%) (Miller and Stroup, 2003). Predicted milk produced per ton of forage consumed was 27% higher (2525 vs. 1988 lb) and milk production per acre was 14% higher (11,560 vs. 10,096 lb/acre) for BMR vs. conventional sorghum x sudangrass hybrids.

The first sudangrass x sudangrass hybrids with the BMR trait are becoming commercialized. Replicated trials comparing BMR sudangrass x sudangrass hybrids with Piper demonstrate that the BMR hybrids have similar forage dry matter yield and improved forage quality. Across locations and years, the BMR hybrids average 4.4% lower NDF, 20.1% lower lignin, 6.4% higher crude protein, 7.8% higher fiber digestibility, 11.0% higher milk per ton, and 16% higher milk per acre (See Table 2). Replicated grazing trials conducted at Mississippi State University in 2005 documented that beef cattle grazing a BMR sudangrass x sudangrass hybrid produced 20% more weight gain per head per day and 20% more weight gain per acre compared to Piper. Commercial hay of a BMR hybrid sudangrass and Piper were produced side by side under identical management in a field near El Centro, CA in 2005. Composite bale samples of dry hay were analyzed using wet chemistry by Dairyland Laboratories in Arcadia, WI. Lignin content of the BMR sudangrass hay was 7.6% lower than Piper hay and 24-hour fiber digestibility (estimated by NDFd) was 18.9% higher. Nitrate content of the BMR sudangrass hay was also significantly lower than the Piper hay, while sugar content was higher. Commercial hay brokers and buyers from Japanese trading companies rated the BMR sudangrass hay as acceptable as the Piper hay based on physical characteristics. These

results suggest that over the next several years Piper sudangrass being produced in the Imperial Valley for the export hay market to Pacific Rim countries will largely be replaced by BMR sudangrass x sudangrass hybrids.

Table 2. Forage quality of three BMR sudangrass hybrids compared to Piper in replicated trials conducted between 2002 and 2005.

	# Cuts	CP	NDF	ADL	NDFd	Milk/Pound
BMR 1	16	16.2	56.8	6.4	77.0	2917
Piper	16	15.4	59.1	8.0	71.6	2654
% Advantage BMR 1		5.2%	-3.9%	-20.0%	7.5%	9.9%
BMR 2	11	16.5	59.8	6.2	76.1	2796
Piper	11	15.7	61.8	7.5	71.5	2564
% Advantage BMR 2		5.1%	-3.2%	-17.3%	6.4%	9.1%
BMR 3	8	17.2	57.0	5.7	75.5	2854
Piper	8	15.8	60.7	7.4	69.0	2503
% Advantage BMR 3		8.9%	-6.1%	-23.0%	9.4%	14.0%
Average BMR Advantage		6.4%	-4.4%	-20.1%	7.8%	11.0%

Summary

Sudangrass, forage sorghum, and sorghum x sudangrass hybrids represent distinct morphotypes within the genus *Sorghum* and possess different modes of principal utilization. Sudangrass is best adapted for hay production and responds most favorably to intensive rotational grazing systems. Sudangrass is one of the preferred forages for the sizable export hay market to Japan. Sorghum x sudangrass hybrids are well adapted for direct pasturage and silage and are suitable for production of coarse hay. Forage sorghums are adapted for production of silage in one-cut systems and can be grazed in situations where rapid recovery after grazing is not important. Sudangrass, forage sorghum, and sorghum x sudangrass hybrids with the BMR trait demonstrate acceptable yield with superior forage quality compared to conventional (non-BMR) counterparts. The BMR gene conditions significant reductions in lignin content which contributes to higher fiber and whole plant digestibility. BMR hybrids are consumed preferentially by cattle, enable higher weight gain per head per day and per acre in beef cattle, and higher milk production per ton of feed consumed and per acre compared to conventional types.

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2010 AFGC Conference Schedule-at-a-Glance

Below is a current schedule of activities for the upcoming AFGC conference in Springfield, Missouri, June 21-23 at the University Plaza Hotel. Complete details and registration are available on the AFGC web site at www.afgc.org.

Sunday, June 20

8 a.m. - 5 p.m.	Set Up
7:30 a.m. - 5 p.m.	Cool Season Grass Initiative Workshop (by invitation only)
4 - 7 p.m.	Forage & Grassland Foundation Board of Directors Meeting

Monday, June 21

8 a.m. - Noon	Set Up
8 a.m. - Noon	AFGC Board of Directors Meeting
8 a.m. - 1 p.m.	Exhibitor & Poster Set Up
8 a.m. - 5 p.m.	Registration Open
1 - 3 p.m.	CGP Exam
1 - 5 p.m.	Exhibit Hall Poster Sessions Hay Show Silent Auction
2 - 3:30 p.m.	Opening Session/Keynote Address
3:30 - 4 p.m.	Break in Exhibit Area
4 - 6 p.m.	Forage Bowl
6 - 7:30 p.m.	Reception/Mixer

Tuesday, June 22

8 a.m. - 1 p.m.	Registration Open
8 a.m. - 12:30 p.m.	Exhibit Hall Poster Sessions Hay Show Silent Auction
8 - 9:30 a.m.	Breakout Session Breakout Session Breakout Session Breakout Session
9:30 - 10 a.m.	Break in Exhibit Area
10 a.m. - 12:30 p.m.	Forage Spokesperson Competition
1 - 6 p.m.	Professional Tours
6 - 8 p.m.	Missouri Night

Wednesday, June 23

7 a.m. - 3 p.m.	Registration Open
7 a.m. - 3 p.m.	Exhibit Hall Poster Sessions (end at 12:30 p.m.) Hay Show Silent Auction
7 - 8:30 a.m.	Industry/Affiliate Council Breakfast
7 - 8:30 a.m.	Breakout Session Breakout Session Breakout Session Breakout Session
8:30 - 9 a.m.	Break in Exhibit Area
9 - 11 a.m.	Emerging Scientist Competition
11 a.m. - 12:30 p.m.	Breakout Session Breakout Session Breakout Session Breakout Session
12:30 - 1:30 p.m.	Luncheon
1:30 - 3 p.m.	Breakout Session Breakout Session Breakout Session Breakout Session
3 - 3:45 p.m.	Affiliate Council Meeting
3:45 - 4:45 p.m.	AFGC Business Meeting
3 - 5 p.m.	Exhibits Tear Down
5 - 6 p.m.	Reception
6 - 8 p.m.	Dinner & Awards Banquet

Thursday, June 24

8 a.m. - Noon	AFGC Board of Directors Meeting

AFGC Silent Auction

Don't forget to bring your items for the AFGC Silent Auction! Everything from books, to artwork, to electronics, to gift baskets...be creative...plan to donate and bid. You can bring items with you and drop them off on-site or ship them ahead to:

Recipient's (Guest's) Name
AFGC Conference
c/o The University Plaza Hotel
333 John Q. Hammons Parkway
Springfield, MO 65806

PLEASE DO NOT SEND ANY SHIPMENTS TO ARRIVE BEFORE MONDAY, JUNE 14.

Same Day Haylage and 300 lbs More Potential Milk in Every Ton of Dry Matter

By Tom Kilcer
Advanced Ag System LLC

Traditional haylage is cut directly to narrow windrows, allowed to dry for 2 – 3 days, and then chopped. It is as dry as baled hay on the outside and wet as fresh mowed on the inside. This appears practical but flies in the face of new information on how forages dry for silage and **exacts a high price in digestible components you have lost**.

Silage does not dry the same as hay. The factors that affect drying of forages are assumed to be the same from start to finish. **This is not true.** Drying occurs in three phases. Phase I is very rapid loss of moisture down to 60 – 65% moisture – the level at which silage is made. Phase II is a slower process down to approximately 40% moisture. Phase III is the longest phase with moisture levels ultimately safe for storing dry hay.

Phase I: At the start of drying, moisture moves **along the stem and through the leaf** as the primary pathway in the early stages of drying. At least 35% of the moisture contained in the alfalfa stem at cutting exits the plant through the leaf during field drying (Harris and Tulberg, 1980). This is similar for grass leaves. The younger and more tender the plant, the more moisture is removed through the leaves.

The primary method for moisture loss through the leaves is evapo-transpiration through the stomata. Stomata are pores in the plant leaf where carbon dioxide and oxygen can freely pass and moisture, drawn from the stem, can leave the plant. Stomata respond to light temperature, water availability and other stimuli. They generally close at night or in the shade, and open during the day. For this reason the drying rate of intact forage plants is considerably greater than that of equivalent amounts of detached leaves and stems (Whitney et. al., 1969). Plant moisture is 57 – 65 % at stomata closure, well within the range for making excellent silage. Thus **loss through stomata is THE PRIMARY MECHANISM for reducing plant moisture to silage making levels**. Field curing is relatively inefficient compared with the natural evapo-transpiration of the crop (Rotz, 1995)

Traditional haylage making focused on field curing to the detriment of evapo-transpiration. Mowing into narrow swaths immediately shaded the majority of the forage, closing the stomata rather quickly. Closing the stomata stops the primary mechanism for moisture loss in silage. Spreading the swath to the full width of the cutterbar maximizes exposure to sunlight. Leaves exposed to light lose moisture quickly (Moser, 1995). This is the most critical factor in accelerating drying for silage. Sunlight keeps stomata open until moisture falls below silage levels. Wide swaths in our research received three times more sunlight than the narrow swath. This both stimulates moisture loss from the plant, and simultaneously increases the radiant heating in the spread crop because of the greater area subjected to incoming radiation.

Accelerating the negative effect of shading in narrow windrows is the breaking of the capillary flow from the lower stem to the leaves due to mechanical crushing during conditioning of the stems. **This reduces initial drying rate for silage**. Adding to the negative effect is the density of the narrow swath. Laundry does not dry in a pile; neither does haylage. Wright et.al. (1997) reported that the rate of water loss was dependent on the weight of grass per unit area of ground and this factor had a greater impact on the rate of water loss than conditioning, mixing, or turning the mown swath. The narrow swath covered 18% of the ground compared to 90% for the wide swath. This resulted in a narrow swath that was 5.5 times denser than the wide swath.

More Potential Milk
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More Potential Milk
Continued From Page 7

Phase II: A drier moisture than at which silage is made. As moisture movement through the stem to the leaves slows, migration from the center of the stem to the surface becomes the main moisture loss. This loss of moisture out through the side of the alfalfa stems is 10X less than the movement the length of the stem and out the leaves. Removing the epidermis of the stem by conditioning can greatly increase the drying rate of forages. This middle stage of drying is more typical of the popular understanding of the mechanism of drying, with heavy reliance on mechanical conditioning. It is only beneficial at moisture levels well below that used for silage.

Phase III: This removes the tightly held water. Phase III is below 45% moisture and continues until it is dry enough to store for hay. It is highly dependent on weather conditions.

The bottom line is that mowing without conditioning, and laying into a swath greater than 85% of cutter bar width will maximize the Phase I drying rate of the forage for silage.

How you dry, directly affects quality by impacting water soluble carbohydrates (energy) in silage. A plant is a living organism. Immediately after cutting the plant remains alive. Plant tissue continues to respire until the cells are no longer alive. The greatest change that occurs in drying is the loss of carbohydrates through respiration. This loss of readily digestible carbohydrates makes even small respiratory losses important, representing ~14% of the total dry matter losses for wilted silage. Under wet and humid conditions, carbohydrates lost by respiration under poor drying conditions may be as high as 16% - 30% of initial dry matter. This is exactly the condition that exists in the center of a narrow swath of haylage in the field. A narrow swath is basically a composting windrow. Adding insult to injury, the better the forage quality the greater the respiration losses. Therefore, the better the forage is, the more it respires. Respiration ceases in a plant when the dry matter reaches 35 – 40%. Each hour the silage sits in the field, you are losing energy and milk potential. Simpson (1961) showed that crushing didn't help, but actually increased the respiration rate of alfalfa 15% higher than uncrushed stems.

Respiration occurs whether the plant is in the sun or in the shade. As mentioned above, the wide swath has more than three times more plants exposed to sunlight. Thus a **wide swath can actually gain carbohydrate from photosynthesis more than that lost by respiration**. This reduction of respiratory loss by photosynthesis ceases about the time you are ready to chop for silage.

Cutting in the evening in order to have higher sugars in the forage does not work in the humid east were night time maintains the swath at 100% humidity—thus prolonging respiration. This was also seen in the author's field research where the **narrow swath decreased in potential milk production** (as measured by Milk 2000) from the time it was cut until it was dry enough to chop for silage. **The wide swath consistently INCREASED potential milk production/ton dry matter** as photosynthesis apparently produced readily digestible carbohydrates in excess of that lost by respiration. The majority of this showed up as starch rather than sugars (starch is composed of 2,000 to 200,000 sugar molecules).

Owens et.al. (1998) further found that starch levels decreased by 57% in red clover and 56% in alfalfa during wilting. This is a significant loss of readily digestible carbohydrates between mowing and ensiling. It reflects what the author found in the consistent loss of milk where narrow swath forage had to stay in the field overnight until it achieved moisture levels necessary for ensiling the following day. The dry matter loss in cut alfalfa was greatly influenced by night temperature, with dry matter losses doubling from 37°F to 65°F. Thus second and some third cutting, made in the heat of the summer, are even more prone to loss if not ensiled the same day they are cut.

Owens et.al. (1998) found that 73 - 94% of the sugar in wilted forage was used during ensiling. The pH of red clover silage was higher in 1993 than in other years which also indicates that fermentation may have been substrate limited. The majority of starch was degraded during wilting rather than during ensiling. Prolonged wilting can reduce the concentration of sugar to levels below that required for successful fermentation thus causing a change in the concentration and distribution of fermentation products in the silo—the ratio of lactate to acetate. We found that wide swath consistently had better lactic to acetic ratios than narrow swaths. Thus prolonged wilting may reduce silage quality and bunk life. Because of the very short field drying time, the use of an inoculant is highly recommended.

The benefits followed through to feeding in that fermented samples from rapidly dried **wide swath contained 300 more potential pounds of milk/ton of dry matter than the forage produced by the slower drying narrow swaths.** This translates into more than $40/ton of dry matter forage fed that was harvested by wide swathing. On a northern Hudson dairy of 150 cows and 275 acres of

haylage at 3 tons of dry matter/acre this means $33,000 is on the table for you to pick up—or leave—by your choice of how you make your silage.

Field Results: The main problem from wide swaths is getting the forage too dry. Farms consistently report 65% moisture haylage in 1.5 – 4 hours—and they are not mentally or physically ready to chop that soon. As leaves are last to dry they are retained better. Because leaves are the last to dry and stems are not crushed, a rain appears to do much less damage to a wide swath.

Bottom line: Width matters more than conditioning for silage. You are not getting the majority of the wide swath benefit unless your mower leaves a swath greater than 85% of the cutter bar width. If your mower does not allow this, then open it as wide as you can to achieve as much drying benefit as possible (until you can get the right mower). If you have a 13-14 foot mower that only can leave a swath of six feet, then the added cost of tedding will be beneficial until you can trade in for the proper mower.

Most farms that switch quickly realize that the mower is the limiting factor. When you had 50 cows you had a nine foot mower. Now that you have 200 cows you need a 36 foot mower just to be as efficient as the 50 cow farm. Many are going for two or three mowers.

The final caution is if you utilize the double or triple windrow method of managing wide swaths. The silage will come in much faster than ever before. You will need to upgrade the tractor weight on the silo to keep packing at the correct level. If you don't, then all the savings in improved forage quality from wide swaths will be lost by spoiled silage.

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New Tool Extends Grazing Season

Valent U.S.A. Corporation announced RyzUp SmartGrass™ Plant Growth Regulator has received certification from the Organic Materials Review Institute (OMRI) for use in organic production. *RyzUp SmartGrass* is specifically designed for use in dairy, beef, equine, sheep, and goat pasture and forage operations to increase growth in cool-season grass species.

Research has shown applying *RyzUp SmartGrass* under cool-weather conditions stimulates growth and increases pasture production.

"OMRI certification is an elite organic designation for *RyzUp SmartGrass*," said Steve Slaveck, product manager for Valent. "Now organic growers can increase their production naturally by starting earlier in the spring and extending grazing later in the fall."

Best results in trials with *RyzUp SmartGrass* occurred when temperatures were between 40 and 60 degrees Fahrenheit. Under these conditions, producers using the product experienced accelerated pasture growth for up to three or four weeks.

"In 21 to 28 days, the pasture trials with *RyzUp SmartGrass* were thicker," said Mike Ponsford, a third-generation dairyman from Salem, Ind. "This was the last growth of late fall, and we were able to graze the cows a second day on the *RyzUp* paddock versus only one day on the untreated pastures. The cows could tell there was just more grass there."

University trials in the United States also have shown substantial increases in dry matter production when *RyzUp SmartGrass* was applied either alone or as part of a fertilizer program.

"As both dairy and beef producers look for ways to make full use of their pastureland, we see *RyzUp SmartGrass* as a tool to sustainably increase their bottom line," Slaveck said.

For more information on *RyzUp SmartGrass* Plant Growth Regulator, call 888.99RyzUp (997-9987) or visit www.valent.com.

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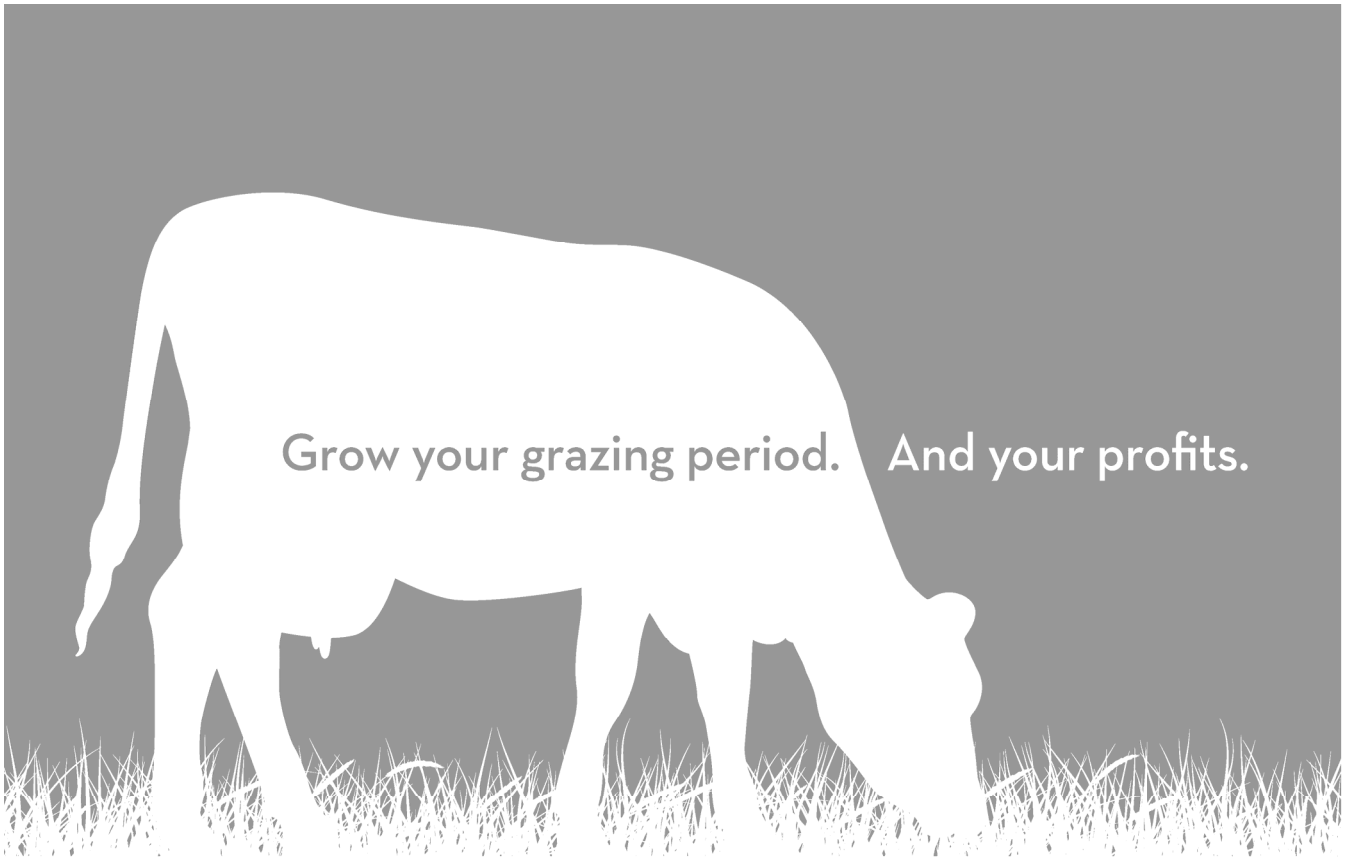

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