

The Way Forward

By: R. Michael Akers, Ph. D.  
Horace E. and Elizabeth F. Alphin Professor and Department Head

How We Got Here

We are approaching spring graduation on the campus in Blacksburg. The excitement and anticipation is slowly building, the Little All American dairy show and banquet was another grand success. The spring has been filled with activities as we rush to send another eager, confident, class of students into careers, building families and relationships, and the grand adventure of life and adulthood. At the same time, we look forward to the fall and another class of nervous, wide-eyed, freshmen and transfer students.

This spring we also completed a comprehensive review of the department. Conducted by a team of external experts, the results of the review mirrored much of what we as faculty members and many of you as alumni, stakeholders, and industry professionals have concluded about departmental success and progress over the past 5-6 years. Namely, this panel of experts was highly positive and complementary. The undergraduate program was praised for is breadth, wide appeal, reputation, and uniqueness. The graduate program was viewed as highly viable, relevant and appropriately focused. Scholarship and external funding success was judged to be excellent and places the department among the top 25% of animal departments in the country.

But there are clouds on the horizon. The reviewers also highlighted the blatantly evident need for faculty hires to restore expertise, experience, teaching, research, and scholarship capacity lost due to a disproportionate number of retirements since 2005 (the time of our previous review). They also recognized that it is essential to complete the dairy center relocation in a fashion that allows for continuing growth and excellence for a Department of Dairy Science that is recognized as a regional and national leader. Ours is also a department that is increasingly unique and valued by industry, producers, alumni and students. Our departmental website <http://www.dasc.vt.edu/> provides details about the materials prepared for the review, a summary of the external review results, a brief two page summary of departmental highlights, and links to other informational material related to agricultural land use and dairy center relocation.

As a brief reminder, the push to move the dairy center from its current location has arisen because of three elements: (1) expansion of the airport and the corresponding requirements for safety zones, (2) expansion of the VT corporate research park and loss of dairy center land, and (3) approved state funding for a highway interchange from the 460 by-pass to Southgate drive. As described in earlier articles and in links on our website, planning for this relocation was also part of a major land use study that was initiated by former Dean Dr. Sharon Quisenberry in 2007/2008. Detailed analysis considering, land availability, environmental impacts, nutrient management, etc. concluded that the most logical location for the lactating herd and the production unit was the Kentland farm located on the New River in Montgomery county approximately 10 miles from campus.

The initial planning committee composed of VT facilities representatives, department faculty, CALS officials; Hanbury Evans Wright Vlattas Company (Architecture and Planning) in association with the agricultural engineering firm Curry-Wille

& Associates and Draper Aden Associates produced the **2010 Agriculture Program Relocation Report**. This report was released by university and college officials in April of 2011. A copy of this document is available at the following link <http://www.cals.vt.edu/about/dairy-relocation/ag-relocation-report-april-2011.pdf>. Briefly, this summary provides conceptual designs for **three** sets of facilities needed for the research, teaching, and extension activities of the Department of Dairy Science, Agricultural Technology Program, Veterinary Medicine, and Animal and Poultry Sciences. These are: (1) Dairy buildings at Kentland including an intensive research barn and all production related facilities, (2) The Bovine Education Teaching and Research (BETR) building to be located along Plantation Road in the area of the current Alphin Stuart Arena, and (3) the Applied Reproduction Facility to be located at the Moore farm just off of Prices Fork road. The total estimated costs were \$21.1 M in late 2010.

Despite the fact that these concept plans were completed in late 2010, subsequent work to produce detailed construction plans was essentially dormant until just recently. As I understand, further planning monies were released in late March 2012 with subsequent meetings scheduled to begin again in May 2012. This however, is occurring against a backdrop in which the funding for the construction for the new interchange has been approved by the state of Virginia and VDOT is rapidly moving ahead with the project. Indeed, the most recent projection is that the current Dairy Center location is to be vacated in fall 2014. My opinion is that this is a very, very aggressive time-line.

On the Friday prior to this year’s Little All American, Provost Dr. Mark McNamee and Dean of the College of Agriculture and Life Sciences Dr. Alan Grant held an open forum to address the dairy relocation and other issues facing the Department of Dairy Science. The forum was attended by ~ 125 alumni, stakeholders, producers, students, faculty, staff and dairy industry professionals. While both Dr. McNamee and Dr. Grant, expressed support for the Department and the VT Dairy Center relocation, it was evident that there is not yet any clear funding mechanism to pay for the move or the construction of replacement facilities. The primary proposal being touted at this forum was to **‘unbundle’** the entire relocation project and move **only** the production facility. The cost of this portion of the project is estimated at \$12.3 M.

Yet, as the Provost and Dean indicated at the forum, even this funding is not yet settled. It was also stated that multiple scenarios are being considered to pull the necessary funding together. Among the discussion points, funding is likely to require support from the state of Virginia, possibly private sources, perhaps bond related funds etc. Those of you that follow Virginia news are certainly aware of the funding issues in the recently finished General Assembly session and the struggles that local school systems are dealing with currently. Further, because of a desire to limit tuition increases and linked political concerns it appears increasingly likely that the tuition increase that is approved by the university Board of Visitors will be substantially less than the amount necessary to offset the various fixed and mandated increased costs that are being passed to the university for the coming biennium. This matters because these funds are a part of the account that ultimately is used in the teaching and educational missions of the university. Certainly the current VT Dairy Center is acutely involved in the teaching missions of multiple departments and programs. Consequently, these funds (or lack) either directly or indirectly have an impact on the availability of university funds to

. dedicate to this project.

The conclusion from the forum was that that the intensive research barn, the BETR building, and Applied Reproduction Facility would **‘come on line’** as additional funding can be identified. In the interim, the suggestion was to ‘be creative’ to find ways to accomplish the research, teaching, and extension missions until these other elements can be constructed. While I have great confidence in the creative capacity of my faculty colleagues, it is difficult to imagine that a cobbled together string of stumble along, poorly functioning solutions to continue funded research projects, teaching and learning activities, and extension events will not be detrimental to all of the missions of the department and the college.

As I have indicated now repeatedly, as recommended in the **2010 Agriculture Program Relocation Report** and now our recent external review confirms – the relocation of the Virginia Tech Dairy Center is replacement of multiple functions in all of our missions – research, teaching, extension – and not simply the replacement of the production herd of cows. Moreover, these functions impact at least two colleges – Agriculture and Life Sciences and Veterinary Medicine as well as multiple departments – Dairy Science, Agricultural Technology, Production Animal Medicine, and Animal and Poultry Sciences.

Where Will We Go?

In recent summaries and as part of our external review, I have outlined the many of successes of our departmental academic, research, and extension missions over the past several years. But it is nonetheless relevant to list a few of these. In short, our department has done an admirable job of increasing in virtually all of the usual metrics used to judge the success of an academic department in the College of Agriculture and Life Sciences at Virginia Tech. I have to wonder is it not logical to nurture, foster, and promote the continuing growth and excellence of our program? Ours is clearly a program that has a demonstrated track-record of performance, value, and frankly uniqueness.

Undergraduate Program

Recognized regional and national leader, multiple awards and honors for student activities – Dairy Challenge Team, Dairy Club, Dairy Judging etc.

Approximately 70% out-of-state students, from approximately 12 different states

Nearly a doubling in enrollment since 2005

95% of students complete at least 1 internship

25% of students participate as undergraduate researchers or teaching assistants

Graduate Program

In 2011 alone 9 MS and 8 Ph.D. students enrolled; Graduated 8 MS and 4 Ph.D.

Graduates placed in positions of leadership in industry, government, and academics

Contracts and Grants – Research and experimentation depend on funding for graduate students, animals, equipment, materials and supplies, and services. External funding and support is critical. The total value of contracts and grants specific to Dairy Science has increased more than **8-fold** since 2005.

For 2011 the Dairy Science proportion was \$4.5MThere was also \$3.1M in additional funding submitted for consideration.

Office of Sponsored Programs expenditures for Dairy Science for 2011 was \$1.2M

External Review - The detailed review document and other materials are available on the departmental website <http://www.dasc.vt.edu/>

Just as we have concluded, the review team was also very concerned about the loss of faculty members and very strongly recommended the hiring of three tenure-track faculty to college administration.

They further concluded that it was essential that the dairy relocation occur in a manner that will allow **ALL** of the elements necessary for the success of the research, teaching, and extension programing to be built **before** the movement of any animals.

The Way Forward

Through all of this I have personally found it difficult to understand how or why, events or forces which seemingly have little to directly do with the academic success of the university – a longer runway, a new highway interchange, more land for a cooperative research park – appear to trump academics? If funding for a proper relocation is problematic, why not leave the current VT Dairy Center in place until funding is truly solidified. Why is this not a viable and reasonable option?

I know that many of you have very, very strong feelings about the formal education, training, advice and service that you or your children or others have gotten as consequence of interactions with this department and that these interactions have had and continue to have value. My goal for this department is not the status quo. I want to see us continue our trajectory of success to become not good, not adequate, and not satisfactory but positively the best. We seek to be a great, accomplished Department of Dairy Science and all that entails. Consequently, I believe it would be valuable for as many of you as possible to directly contact those university officials in positions to make such fundamental decisions. These contacts could be in multiple forms but it seems the personal letter has become more novel and unique in our electronic age. For your convenience I have listed addresses for Drs. Steger, McNamee, and Grant just below. Those with contacts with others in public service or other venues might also find it appropriate to follow those leads.

Without a doubt this is an important cross-road in the life of the Department of Dairy Science at Virginia Tech. I choose the road that makes us stronger, more valuable, and more beneficial. I choose a path that leads to greatness. Can you, will you, help us start that journey?

Contact Information – Virginia Tech

Dr. Alan Grant, Dean College of Agriculture and Life Sciences 104 Hutcheson Hall Blacksburg, VA 24061 540-231-4152 algrant@vt.edu	Dr. Charles Steger President Office of the President 210 Burruss Hall (0131) Blacksburg, VA 24061 540-231-6231 president@vt.edu
--	---

Dr. Mark McNamee  
Senior Vice President and Provost  
Office of the Provost  
210 Burruss Hall (0132)  
Blacksburg, VA 24061  
540-231-6123  
mmcnamee@vt.edu



### New Orchardgrass Variety Offers Improved Persistence and Yield

By Wayne Tankersley

Farmers looking for a high-yielding and more grazing persistent orchardgrass now have an excellent new choice with the release of Pennington's "Olympia". Olympia emerged from the breeding program of renowned forage plant breeder Joe Bouton while at the University of Georgia. Dr. Bouton's goal was to develop an orchardgrass that would have improved grazing, heat and drought tolerance leading to greater stand persistence than varieties currently available in the market place. Olympia originated from a population of long-term surviving orchardgrass plants found in north-central Georgia pastures.

Olympia combines superior grazing tolerance with outstanding forage yield. "In university trials, Olympia had final stands greater than other orchardgrass varieties when continuously grazed," according to Chris Agee, Pennington Forage Products Manager. (See Table 2) "In Virginia yield trials, it performed at the top in 4 years of cutting data." (See Table 1)

Orchardgrass is a tall-growing, cool-season perennial bunchgrass that begins growth early in the

Table 2

Percent basal coverage of orchardgrass varieties continuously grazed at the NW Ga. Research and Education Center - Calhoun, GA 2004-2009



Variety	Apr. 2009*
Olympia	52
Peridot	37
Benchmark Plus	34
Benchmark	21
Potomac	20
Shish	8
Vision	2

\*% basal coverage within row planted Nov. 2004

Table 1

2003-2004 Orchardgrass Variety Trial Northern Piedmont AREC, Orange, VA - Planted Apr. 2002

Variety	% Stand Apr. '04	2 Year Avg. Yield Lbs. DM/A
Olympia	98	9460
Benchmark Plus	98	9280
Benchmark	98	9076
Toka Po	95	8576
WP 300	97	8440



Olympia orchardgrass is marketed by Pennington Seed, Inc., Madison, Ga. For more information on this premium orchardgrass variety and its management or to find your nearest dealer, contact Pennington Seed, Inc. at 1-800-285-Seed or visit the Pennington website at [www.penningtonusa.com](http://www.penningtonusa.com).

Cow/Calf Page 2

the industry?

Does the beef producer gamble that beef prices will be on the upward trend in the beef cycle when he makes the decision to sell his beef herd? Fundamental economic principles dictate that at some time in the future, replacement heifer numbers will increase which will expand the national beef cow herd. This will increase the number of fat cattle being slaughtered and increase beef supplies. Consequently, the larger supplies of beef available in the market place will lower prices of feeder and fat cattle and profit margins. Beef prices are cyclical.

Although feeder cattle prices have declined due to the drought, current prices are relatively high compared to historical prices. Prior to the increase in feeder calf prices in April 2010, the ten year average price for Virginia producers was approximately \$1.00 per pound for feeder steers.<sup>(1)</sup> For farmers who plan to sell their herds in the next five to ten years, this may be an excellent time to disperse their herds since current prices are well above the ten year average. The bottom line is as follows: does the producer want to remain in control of his business and decide to sell the farm on his time frame (maintaining equity for retirement) or will he let others (e.g. bank, doctors) make these decisions for him?

On the other hand, producers who elect to stay in business for for the long run need to position their businesses to remain competitive for the inevitable decline in feeder cattle prices. In the coming years, the cow/calf producers who survive and remain competitive (maintain and increase equity) are the ones who have the

lowest production costs in a volatile world market place. Maximizing profit per unit of production (cwt.) can be achieved by year round grazing. Many producers incorporate stockpiling forages into their grazing systems as a way to eliminate the need to bale hay to feed their animals during the winter months. By having the cattle harvest their forage year round, producers are able to use less machinery and reduce their overhead costs.

Sometimes producers may need to reduce stocking rates in order to have enough acreage for the animals to graze year round. This is an excellent time to cull marginal animals from their herds and cash in on above average fat cattle prices.

In previous years, producers have occasionally liquidated their entire herds during periods of high prices. Then these producers took their profits and restocked their herds in the future when cattle prices were significantly lower. By pursuing the policy of selling herds at high prices and restocking at low prices, some of these producers have generated significant increases in their saving accounts! In addition they were able to take vacations and not worry about who was caring for their herds!

The recent record high prices of feeder cattle are presenting cow/calf producers the opportunity of their lifetimes. The old adage "On the plains of hesitation bleach the bones of countless millions" can be used to describe the opportunities that are presented by the recent record high prices of feeder and fat cattle. For producers contemplating retirement in the next five to ten years, the sale of their cow/calf herds at current prices will increase the size of their retirements. For younger producers who have made the decision to remain in the industry for the "long haul" (10-15 years), these near record prices provide them the opportunity to position their businesses to weather the inevitable decline in prices. Consequently, producers need to make the decision to exit or remain in the cow/calf industry before there are further declines in feeder cattle prices. Otherwise they will squander a prime opportunity that has the potential to significantly increase the size of their bank accounts.

Reference : Virginia Market News Service. Virginia Department of Agriculture and Consumer Services.

Peter Callan ([peter.callan@vt.edu](mailto:peter.callan@vt.edu)), Extension Agent, Farm Business Management, Northern District

This article was reprinted with permission from Farm Business Management Update.

## No pasture too big or small

Whether you have a small pasture or large; horse, dairy or beef pasture; Southern States has the right forage seed, fertilizer and weed-control products to keep your pastures in top production.

Be more efficient with advice from a Southern States GrowMaster professional and let profitability become a result.



Brands you trust. People who know.

[www.southernstates.com](http://www.southernstates.com)

Your complete farm inputs partner

## Upcoming Events

**September 8, 2012**  
2012 Family and Farm Day  
Blackstone, VA

**January 9-11, 2013**  
AFGC Annual Conference  
Covington, KY  
[www.afgc.org](http://www.afgc.org)

**January 21-25, 2013**  
2013 VFGC Winter Conferences  
[www.vaforages.org](http://www.vaforages.org)

### IMPROVED VARIETIES IN IMPROVED MIXES







Our university-tested and genetically improved forages will improve your animal's performance and provide them with more nutritional value and better palatability. For more information, please visit: [www.ampacseed.com](http://www.ampacseed.com)

**EVERGREEN SEED, LLC**  
Serving VA & the Carolinas  
**1-877-804-7333**





**Augusta Co-Op**  
Staunton (540)885-1265  
Weyers Cave (540)234-9275  
Fairfield (540)377-6798  
Scottsville (434)286-2650  
Bedford (434)546-0771

### Your first source for forages!

- Experienced Certified Crop Advisors (CCAs) on staff to make agronomy recommendations
- Large selection of forage seeds in stock
- Bulk & bagged fertilizer
- Crop Protectants & Foliar Feeding products
- Application services for fertilizer & crop protectants
- Nutricription™ nutrient recommendation service to better match forage nutrient requirements
- No till drill rental
- Fencing & watering supplies

[www.augustacoop.com](http://www.augustacoop.com)

### VIRGINIA FORAGE AND GRASSLAND COUNCIL 2012 BOARD OF DIRECTORS

<b>INDUSTRY</b> E. N. Garnett Southern State Cooperative 4201 Pagebrook Farm Charlottesville, VA 22903	Carl Stafford Extension Agent ANR, Animal Science 101 S. West Street Culpeper, VA 22701
Scott Stevens Southern States Roanoke Coop. Inc. Troutville & Franklin County Branches 4737 Breckinridge Mill Road Fincastle, VA 24090	J. B. Daniel NRCS-Forage and Grassland 100-D Dominion Drive Farmville, VA 23901
Brian Jones Pioneer Hi-Bred Int'l 53 LeHigh Rd Craigsville, VA 24430	John Welsh 965 Pleasant Valley Rd Harrisonburg, VA 22801
Marnie Caldwell Rockbridge Coop. 645 Waddell St. Lexington, VA 24450	Dana Ernst NRCS Culpeper 351 Lakeside Drive Culpeper, VA 22701
Butch Johns Evergreen Seed Co. PO Box 27 Rice, VA 23966	<b>TREASURER AND REGISTERED AGENT</b> David Fiske 128 McCormick Farm Circle Raphine, VA 24472
Earnie Dodson CFC Farm & Home PO Box 2002 Culpeper, VA 22701	<b>EDUCATIONAL ADVISORS</b> Dr. Gordon Groover AAEC Dept. (0401) Virginia Tech Blacksburg, VA 24061
Robert Shoemaker, (President) VA Dept of Cons & Rec 98 Alexandria Pike, Suite 33 Warrenton, VA 20136	Dr. Ben Tracy 425-A Smyth Hall (0404) Virginia Tech Blacksburg, VA 24061
John Genho Eldon Farms Manager 4432 Sperryville Pk Woodville, VA 22749	Dr. John Fike 365 Smyth Hall Virginia Tech Blacksburg, VA 24061
Terry Slusher 1956 Rush Fork Rd, SW Floyd, VA 24091	Dr. Chris Teutsch SPAREC 2375 Darvills Road Blackstone, VA 23824
Danny Boyer 8784 Spring valley Rd Fries, VA 24330	<b>MANAGING EDITOR, VIRGINIA FORAGER &amp; ADMIN ASSISTANT</b> Margaret J. Kenny 3599 Indian Oak Road Crewe, VA 23930
Patty Johnson 25325 Old Office Rd Culpeper, VA 22701	<b>PRODUCER ADVISORS</b> Bill Tucker 713 Indian Creek Road Amherst, VA 24521
Charlie Wootton Piedmont SWCD 100-B Dominion Dr. Farmville, VA 23901	Mike Goldwasser 790 Birchtree Rd Hillsville, VA 24343
<b>AGENCY</b> Carrie Swanson VCE-Albemarle County 460 Stagecoach Rd Charlottesville, VA 22902	Alan Spivey 261 Good Hope Church Road Aroda, VA 22709
Dennis Jones USDA - NRCS 100 Dominion Drive Farmville, VA 23901	Leo Tammi 826 Burke's Mill Road Mt. Sidney, VA 24467
	Michael Webert Locust Hill Farm LLC PO Box 247 Middleburg, VA 20118



The daylong conference will be repeated at four locations: Tuesday, January 22, Warren County Community Center, Front Royal  
Wednesday, January 23, Weyers Cave Community Center, Weyers Cave  
Thursday, January 24, Wytheville Meeting Center, Wytheville  
Friday, January 25, Southern Piedmont AREC, Blackstone

The conferences will run from 8:30 am to 3:15 pm. For more information or to register for the conference, contact Margaret Kenny ([makenny@vt.edu](mailto:makenny@vt.edu)) at (434) 292-5331. The \$35 early registration fee must be postmarked by Jan. 3, 2012. After the New Year, the registration fee is \$50 per person. The U.S. Department of Agriculture Natural Resources Conservation Service are also sponsoring the conference. Please visit the VFGC web site (<http://vaforages.org>) for additional details and registration information.

Tips for Stockpiling

Stockpiling tall fescue can significantly reduce winter feed costs for cow-calf herds in the mid-Atlantic region. The following steps will help to optimize your stockpiling program.

*Choose a strong tall fescue sod in a field that is well drained.* To get the maximum yield response to nitrogen applications you will need a healthy stand of tall fescue. Choosing a field that is well-drained will help to ensure that the stockpile can be grazed with minimal pugging damage during the wet winter months.

*Clip pastures that will be stockpiled to 3-4 inches prior to applying nitrogen.* Clipping pastures removes old growth and increases the forage quality of the stockpiled grass.

*Apply 60-80 lb of nitrogen per acre in late August to early September.* Applying nitrogen too early can stimulate summer annual weed growth, while applying nitrogen too late decreases dry matter yield.

*Allow growth to accumulate until mid-December before grazing.* If limited grazing is available, feed hay during this accumulation period rather than the winter months.

*Graze stockpiled pastures that contain legumes first.* Legumes deteriorate at faster rate than grass and should be grazed first to minimize losses.

*Strip graze tall fescue to maximize grazing days.* Allocating only enough stockpiled grass for 2-3 days will increase grazing days per acre by 30%.

*Frost seed legumes on grazed areas.* Closely grazed stockpile provides an excellent opportunity to establish legumes in grass dominated pastures. Broadcasting the seed as the pasture is being grazed can enhance soil-seed contact and increase overseeding success.



**Your Range & Pasture Specialists**



Violent Storms Leave Livestock Without Water

By J.B. Daniel NRCS Grassland Agronomist

The violent storm and excessive winds that swept through Virginia on Friday night June 29<sup>th</sup> wreaked havoc with downed trees on homes, farm buildings and fences and leaving thousands of VA residents without electricity for up to a week and in some cases longer. Extended power loss is bad enough but at a time when temperatures soar to the upper 90’s and push over 100 almost daily the danger of the situation reaches a higher level for people and our livestock.

Over the years many VA farmers have voluntarily installed exclusion fencing and buffers to keep their livestock away from open springs, creeks and ponds to achieve a high level of natural resource stewardship. These voluntary exclusion measures are making tremendous positive impacts to conserving a higher quality of water on farms throughout the Commonwealth. For many of these conservation projects when the surface water was fenced and excluded, an alternative clean water source was developed such as through a well or spring development and pumped to water troughs strategically placed across the pasture landscape.

As you know pumping water requires electricity, and when the power goes out the water stops. Livestock can go a few days with limited feed but they cannot survive long without water, especially when temperatures are topping 100°F daily. When the storm came through that Friday night and knocked the power out, many people were unprepared for this long-term outage. Not everyone has on-farm generators equipped as a backup for emergency power of the water system in times like these. Those who don’t often have to haul water and they quickly realize that a large beef cow really can drink 35 gallons of water a day when it is hot and dry. At that rate, depending on the size of your livestock operation hauling water can be an all day every day job until the power is restored. During this recent emergency situation I was told several people had to cut fences to provide emergency access to water.

When farmers choose to voluntarily install conservation practices on farms they have to remember the “animal resource” or the livestock in the system is equally as important as the soil and water resources. Making sure the livestock have access to available water, especially in emergency situations, must be a priority in planning. I have said many times that conservation practices cannot be planned just for average expected conditions; instead it must take into consideration the rare and unexpected events that will happen periodically.



When fences are built to exclude livestock from surface water, the farmer should strongly consider installing a gate on the riparian fence boundary as needed for emergency access to water during power outages. The VA NRCS Fence Standard (Code 382) includes this specific consideration and repeats it in the construction specification. Farmers must be able to provide water to livestock for the health of the animals and to prevent the unexpected death of livestock which could jeopardize economic sustainability of the entire farm operation.

Understanding the Role of Wick Applicators in Pasture Weed Control

By: Blox Daugherty

Interest in wick type application is pretty high, driven primarily by the desire to achieve some weed control without any injury to legumes. Pastures with 25- 30% legumes require no supplemental nitrogen because the nitrogen fixing bacteria on the legumes will provide the nitrogen for the grasses. (Some of the legume roots die and decay every year, and are converted to usable nitrogen by the soil microbes.) Since every herbicide labeled for control of weeds in grass pasture except 2-4-D will knock out the legumes, and there is often a need for weed control above that provided by 2-4-D, the wick can be an attractive herbicide application tool. And, for those who are not familiar with the use of sprayers and/or are reluctant to spray for weed control, the wick provides a viable alternative. However, there are some issues that need to be thought through.

Most wick units are pulled or mounted behind a tractor or ATV, so the weeds that the tractor or ATV tires mash down will get little or no treatment. Assuming an ATV has 12” tires, pulling a 6’ wick might result in a 33% reduction in weed control before you start. Assuming 80% herbicide efficacy would equate to 52.8% weed control, and require a second pass to obtain good results of existing weeds. For a 10’ wick unit, the reduction is 20%, and 80% herbicide efficacy would equate to 64% weed control, again requiring re-treatment to achieve good results. Multiple applications add to the cost of obtaining good results with the wick applicators.

As there will be no residual weed control in wick applications, separate application will be necessary for control of any subsequent weed flush. These additional costs may need to be figured in. The benefit of applying weed control every three or four years, usually obtainable with herbicides with good soil residual, may not be obtained.

Wick applications work better in pastures than in hayfields because the height differential between weeds and grass is greater. It can be done in hayfields, but unless the weeds get some height above the grass, there may not be enough of the weed available to wick. Horsenettle, a relatively short weed, is a good example of a weed that could be hard to control in a hayfield with a wick. Tall weeds like ironweed or wingstem would usually be easy. But applying herbicides to tall emerged weeds means that the weed control will fall into the “revenge killing” category, where the forage yield losses MUST FIRST be incurred in order to attempt weed control. This runs counter to the real objective of weed control, which is to preserve or improve forage yield, by growing more grass.

The amount of time and labor to wick one time is three to five times more than it is to spray, if you consider a ten foot wide wick to a boom sprayer or a boomless sprayer nozzle. Wick applications are harder work, and are expensive compared to spraying. (But, if all you’ve ever done is a 6’ bush hog, then this drawback might not sound so bad).

As mentioned, stands containing 25-30% legumes are deemed to not require additional nitrogen fertilizers, worth \$25 to \$50 per acre in today’s fertilizer market. But in swards containing 5% or 10% clover, where a lot of pastures with legumes fall, this benefit does not exist because there is not enough clover to provide adequate amounts of nitrogen. Saving small amounts of clovers does not make much sense if the forage losses from weeds are higher than costs of a broadcast sprayer application and some clover seed. (Clover seed for an acre costs \$10-\$15. If there is a “seed

bank” of clover seed in the field, then additional seed would not be necessary.)

When weeds die, they break down, releasing nitrogen as the soil microbes consume their tissues. Legumes will release even more. The yield response is very noticeable, and can be equivalent to a 100# application of nitrogen, worth \$70 today, which is less than the \$15 in seed needed to replace it. Sometimes you can make money by killing legumes. Sometimes killing the old legumes to establish some newer variety is a great idea that will make you money.

What herbicides work well with the wick? There was a nice study done by Dr. Rakeesh Chandra at WVU using different herbicides with the wick in a hayfield with a nice infestation of ironweed. Across the board, there was no statistical difference between Grazon, Surmount, Remedy, and PastureGard, all of which provided control over 81%, rated 10 weeks after treatment. Grazon and Surmount had the highest ratings at 88 and 92%. ForeFront was not statistically lower, but rated at 77%. Roundup was statistically lower, at 64%, and Crossbow was not effective at all, with a rating of only 27% control (not enough Remedy in it to get the job done.) So the general suggestion is to select a pasture herbicide based on the weeds that are present, as if a sprayer broadcast application were to be used. If Johnson grass, or some other grass, is the target weed, then go with Roundup.

Rates that have been used with wick applications are a 5% herbicide solution. There is so much art to these applications that no two people would probably hit the “spray button” the same, the weeds density varies, the heights and amount of “wick” on the weeds vary, etc., etc. So far, the 5% approach seems to be successful. Whether the rates can be lowered is anybody’s guess. There are some savings in chemical costs, because its like spot spraying a field vs. broadcast spraying, so in cases where the weeds are in patches, there can be some decent reductions in the amount of herbicide used. In heavy weed pressure there may be no reduction in the amount of herbicide used, but in moderate situations it has been reduced by about half.

So to sum it up, in pastures where a really good stand of clover should not be sacrificed, the wick applicator is the best way to apply grassland herbicides, and in pastures where spot spraying would be preferable, the wick application may still be a very good way go. And in situations where a sprayer is not available or where the expertise to use it just isn’t available, or where there’s a general fear of spraying, the wick applicator offers a viable alternative. Other than in those situations, the sprayer usually offers a lot more benefits than the wick applicator: better weed control, less time with the application, lower application costs.

And finally, there is nothing sadder than putting time and money into renovating a pasture or hayfield with legumes than to have them be inundated with weeds or die out because of low pH. So I am encouraging organizations that rent drills used for legume establishment in pasture renovations to insist that the weed issues and pH issues in the field to be renovated be addressed BEFORE they rent the equipment to the producer.

Blox Daugherty is with Dow AgroSciences and also serves on the VFGC board.



While all parts of the live tree (except the fruit) are toxic, newly wilted leaves are the most toxic. Horses and livestock must consume large quantities of fresh leaves for symptoms to be fatal (~25% of their body weight), but very small amounts of damaged leaves (as little as 2 ounces). Symptoms of toxicity include: slobbering, increased respiration, weak pulse, staggering, convulsions and rapid death.

For horses, Red Maple trees (*Acer rubrum*) are also a big concern. These trees grow up to 100 feet in height, and have characteristic leaves with three to five lobes that turn bright red in the fall. While fresh green leaves and other parts of the tree are not toxic, newly wilted leaves are very toxic and remain toxic for up to 30 days. The unknown toxin contained in these leaves causes death of red blood cells and acute anemia. Symptoms include: weakness, increased respiration and heart rates, dark mucous membranes and red or brown urine. Approximately 50-75% of cases result in death. A fatal dose can be a little as .3% of body weight (or 3 lbs of leaves for a 1000 lbs horse). Horses usually come into contact with these leaves when a live branch is knocked down in the summer or fall by high winds and/or heavy rain.

Horses and livestock are naturally curious and are drawn to new things in their pastures and unlike most poisonous plants, wilted leaves from these two trees taste good! They say an ounce of prevention is worth a pound of cure...so, save yourself some heartache and vet bills, and walk your fence lines to determine if these trees are present. If so, remove the trees or make a note to check for down limbs after strong winds or rains.

Carrie Swanson is an Extension agent with Albemarle County and serves on the VFGC Board.



**Raymond Taylor**  
 Director of  
 Sales and Marketing  
 Amory, MA 38821  
 Phone: 662-256-3511  
 Phone: 334-566-5144  
 Email: raymond@wax.ms

**America's # 1 Ryegrasses !**

**Marshall                      Jackson**

---

Superior Varieties of Southern Peas

Top Pick Pinkeye  
 Top Pick Brown Crowder  
 Top Pick Cream

From Page 3 Amazing

grazing management helped transform these pastures, field day attendees gazed at the diversity of forage species in the orchardgrass base including alfalfa, red clover white clover, bluegrass, ryegrass, common chicory and other forbs readily grazed by his cattle. J.C. emphasizes, “By my calculation, annual forage production averages 4 tons dry matter per acre on this farm and these calves convert that into 40,000 lbs of beef.”

Winstead is a meticulous manager, attentive to the needs of his livestock but arguably even more aware of the thickness and vigor of his

pasture and the amount of standing forage ahead of the grazing herd. Although J.C. casually refers to his management as rotational grazing, it falls into a category many people would call ultra-high density stocking. “I push my animals to maximize forage utilization,” exclaims Winstead. “I’m here at the farm each day, so I currently move the temporary fence twice a day allotting the calves fresh forage and stocking them heavy enough (> 245,000 lbs livestock per acre) to utilize almost all of it.”



As the tour continued we walked into the paddock with the heifers and there seemed to be no leafy vegetation left on the near end of the paddock. Participants looked in awe at the trampled stems completely covering the ground, a faded straw color by the June sun, thinking this has been grazed too hard. The cattle wait contently looking at the forage in the next paddock consisting of orchardgrass with seed heads chest high mixed with alfalfa waist deep and common chicory over 6 feet tall. Tour participants were able to move from paddock to paddock back up the mountain looking at the progression of forage growth and recovery from the previous 2 weeks of grazing. It was amazing to see 6+ inches of thick green forage already regenerated and soaking up solar rays. “Spring forage growth is typically so fast that it may be only 14 days rest between grazing events, explained J.C.; however, as summer approaches and regrowth slows down, it will likely be close to 45 days before the herd is back to graze this paddock again.”

About 13 years ago J.C. was encouraged by his former Extension Agent, Mr. Roy Kizer, to consider rotational grazing management. After experimenting with a grazing demonstration on the farm, J.C. quickly realized the benefits. After further study and reading all he could on the topic of grazing management, J.C. designed the layout of his own paddock system. He captured water from a strong spring on the mountain and allowed it to gravity flow to 12 tire troughs down the pasture landscape. The interior fencing is single-strand, high-tensile electric wire providing a series of paddocks that are easily subdivided multiple times using polytape for higher density stocking. The gravity flow water system is supplemented by a pressurized system from the farmhouse. The pressure system feeds an underground pipeline with several quick couple connections for using temporary water troughs strategically located to facilitate intense grazing management.

The improvements implemented by J.C. have been calculated and implemented intentionally on a tight budget. Winstead is proud to report, “I installed a very functional fencing and watering system conservatively, without the use of any government financial assistance.” J.C. is living proof that with a good plan and a commitment to improved grazing management, the infrastructure can be installed on a modest budget with sustainable long-term results to the production, economics, and the natural resources of the forage-livestock system.

J. B. Daniel is a NRCS Grassland Agronomist and also serves on the VFGC Board.

### An Amazing Grazing Experience

By: J.B. Daniel

A crowd of over 70 people slowly filtered onto the Winstead’s farm west of New Castle, VA, on June 19th as the VFGC forge field day was about to begin, but most of us did not know what we would witness before the end of the day. J.C. Winstead was featured in the Gaining Ground Successful Graziers Tell Their Stories video released last year and many people were anxious to have an opportunity to visit his farm in person.



The tour began with J.C. providing the background and overview of his farm operation, explaining the condition of the neglected pastures 30 years ago and how he transformed this mountain farm into a highly productive forage-livestock system .

J.C. currently manages 115 heifer calves on approximately 90 acres of pasture and hayland. He buys them small (400-500 lbs) in September and October, grazes them over the winter and through spring then targets to sell them in July. “The carrying capacity on these 90 acres has more than doubled. The best thing I have done on this farm is implement rotational grazing. My forage base has greatly improved,” explains Winstead. As J.C. continued to describe how

Page 10 Amazing



**Recyc Systems<sup>®</sup> Inc.**

Contact us today to improve soil conditions, increase yields and improve your bottom line, consider including **BIOSOLIDS** in your farm management plan on crops, hay or pastures.

800.352.3261                      www.recycsystems.com

**Since 1983 Proudly Serving Family Farms**

**Traffic Tested<sup>®</sup>**



**www.americasalfalfa.com**

We’re proud to offer a full lineup of conventional and herbicide tolerant Traffic Tested<sup>®</sup> alfalfa varieties. Visit us online for more information about our high yielding, resistant varieties.

### Corporate Sponsors

**America’s Alfalfa**  
Dwight Tuttle  
800 873-2532

**Augusta Cooperative Farm Bureau, Inc.**  
540/885-1265

**Best of What's Around LLC**  
Chris Schmidt  
434/286-4430

**Countryside Natural Products**  
Kevin Fletcher  
540/946-8080

**Culpeper Farmers Coop., Inc.**  
540/825-2200

**Dow AgroSciences**  
Scott Goodwin  
336/605-2804

**Evergreen Seed Co.**  
L. E. "Butch" Johns  
434/392-2266

**GrassWork USA, LLC**  
Bobby Umberson and Linda K. Reed  
417/839-7181

**Pennington Seed, Inc.**  
706/342-1234

**Piedmont Environmental**  
Sue Ellen Johnson  
540-347-2334

**Recyc Systems, Inc.**  
Susan Trambo  
800/352-3261

**Southern State Cooperative, Inc.**  
800/584-6556

**Stay-Tuff Fence Mfg., Inc.**  
Lewis Sapp  
336/918-7236

**Winfield Solutions**

To JOIN the *Virginia Forage and Grassland Council* a membership form can be found on the web at <http://vaforages.org> - Contact Margaret Kenny at [makenny@vt.edu](mailto:makenny@vt.edu) or call 434-292-5331





Vision, leadership, and hard work are probably the most important characteristics of a successful organization. Luckily all three thrive within the Virginia Forage and Grassland Council. The main goal of the Virginia Forage and Grassland Council is to provide educational opportunities for all that wish to become involved in the forage industry. We have conducted field days, conferences, and fencing schools. VFGC has developed very unique relationships with our partners such as Soil and Water Districts, Extension, USDA Natural Resource Conservation Service, the Virginia Department of Conservation and Recreation, and the Chesapeake Bay Foundation. Our activities have a high financial cost and are heavily subsidized by many private sponsors. The VFGC Board of Directors and the producer and agency advisors have provided great leadership and vision to accomplish the many events held throughout the Commonwealth. All of the members of the Board of Directors volunteer their time. There is no compensation with exception of possibly an overnight meal or mileage when one is helping with a Field Day. So the next time you see a member of the Virginia Forage and Grassland Council Board please take a moment and tell them thank you for all their dedication. Please share your thoughts on how VFGC can better serve your needs. VFGC is always looking for better ways to promote Virginia’s forage industry. The focus of the next Board of Directors meeting will try to chart the many opportunities that lie ahead. Have our programs been successful? How will an ever-changing World affect the challenges ahead of us? Are we doing the best job possible of listening to and serving our members’ needs? How much can we accomplish with limited resources and still be effective with high quality programs? You might want to consider becoming more involved in the Virginia Forage and Grassland Council. A Board of Director serves a three-year term and can be reelected once. We are always looking for dedicated and qualified producers, agribusiness representatives, and government agency representatives. VFGC will only continue to be successful if it develops leadership for the future. Contact me or another Board member if you are interested in stepping up to the plate. Finally let me say thank you to all those outside of the Virginia Forage and Grassland Council that have made our events a success. Thanks to the farmers that have let us use their operations as a site for Field Days. Thanks to the Soil and Water Districts, Extension and NRCS along with our sponsors, and partner organizations. In summary I am in awe of all that is going on. Yet even more so I am inspired by the opportunity that lies ahead for the Virginia forage industry. Together, with vision, leadership and hard work, we can continue to make good things happen.

Best Regards,  
Robert Shoemaker  
President, VFGC

Should I Exit the Cow/Calf Industry?

By: Peter Callan  
In March 2012, the prices of feeder cattle reached record highs. By mid July 2012, the severe drought in the Midwest and the Plains has caused soybean and corn prices to reach record high prices. Feeder cattle prices have declined due to the record grain prices and forced liquidation of herds due to drought. Many producers are contemplating their future in the industry. Should they hang on and purchase feed or exit the industry? What will feeder cattle prices be in 2013? Who makes this decision? The owner? The bank? Will health issues force the dispersal of the herd? Sometimes producers are forced to sell their herds ASAP when they are faced with life threatening health issues. Does the owner want to stay in business and perhaps lose all his hard earned equity? In my opinion, I feel that psychology plays a prominent role in the decision making process to exit the industry. For many producers, the operation of a cow/calf herd is both a life style and a business. Many producers have the attitude that “The beef industry has always had times of high and low prices. We have had low prices before and stayed in business. We just have to “dig in” and .keep going. Eventually prices will increase. They always have before. When we decide to sellout there are always farmers who want to expand and buy more land and cattle. We will be ok. There is nothing to worry about.” The owner’s pride interferes with making sound economic

decisions. In addition, fear of the unknown plays a major part in deciding to stay on the farm and continue raising cattle. Where will we live? Who is going to hire a middle aged man who has always raised cattle and farmed for a living? Human nature says that people like security and do not want to leave their comfort zone. Thus producers decide to hang on and the losses in equity mount as feeder cattle prices decline. All businesses will be sold to either a family member or an outside party. We do not live forever. Many producers have made minimal contributions to social security. Consequently, they will receive minimum payments of social security benefits in their retirement years. The proceeds from the sale of cattle, equipment and land fund retirements. What happens when a producer sells assets and after debts are repaid and taxes are paid, the producer has few if any funds to show for a life’s work? What will the producer live on their retirement years? Do producers want to live in poverty in their retirement years? What is your farm’s exit strategy? On many farms, the younger generation is not interested in taking over. On these final generation farms, the big question is timing the sale of the beef herd and the farm. A well known auctioneer stated that the best time to sell out is when prices are high. To most people, this statement is common sense. With the average age of American farmers around 58 years old, many farmers contemplate retiring and selling their farms in five to ten years. What levels will feeder cattle prices be at when they decide to exit

How many years have you been a member of the VFGC?  
over 20\_\_\_\_\_ 15-20\_\_\_\_\_ 10-15\_\_\_\_\_ 0-10\_\_\_\_\_

Please rank the following in terms of your preferred work the Council should focus on?  
getting grants for work\_\_\_\_\_  
education and science-based information\_\_\_\_\_  
outreach events\_\_\_\_\_  
collaboration with existing partners like the Cattleman’s Association\_\_\_\_\_  
policy issues\_\_\_\_\_

Are you satisfied/pleased with the work effort of the Council Board to advance the Forage and Grassland Council Mission?  
fully satisfied\_\_\_\_\_ moderately satisfied\_\_\_\_\_ partially satisfied\_\_\_\_\_ not satisfied\_\_\_\_\_

If not satisfied or only partially satisfied, what changes would you recommend?

Comments Box

Should the Forage and Grassland Council hold more outreach events like the winter seminar series?  
yes\_\_\_\_\_ maybe a couple more\_\_\_\_\_ just about right\_\_\_\_\_ less\_\_\_\_\_

Should the Forage and Grassland Council charge money or more money for these outreach events to cover costs?  
yes\_\_\_\_\_ accept slightly more cost per event\_\_\_\_\_ no, too much now\_\_\_\_\_

The role of the Extension Service and Virginia Tech connection with the Council has decreased over the years. Do you believe Extension is a critical element in the success of the Council?  
yes, absolutely\_\_\_\_\_  
nice but not absolutely critical for success\_\_\_\_\_  
some connection important\_\_\_\_\_  
Extension not needed for success\_\_\_\_\_

There exists many agricultural organizations in Virginia such as the Cattleman’s Association. What type of relationship should the Council strive for with these groups?  
close and collaborative\_\_\_\_\_  
removed slightly but connected on issues\_\_\_\_\_  
only slightly connected, i.e. on each other’s mailing list for events\_\_\_\_\_  
no relationship at all\_\_\_\_\_

Comments Box

How would the Council recruit new and/or younger members to the organization?  
personal contact\_\_\_\_\_  
bring a recruit to an event\_\_\_\_\_  
send out a targeted outreach mailing including the “Forager” newsletter\_\_\_\_\_  
attend similar organizations events and search for possible recruits\_\_\_\_\_

Other ideas in Comments Box

Conservation and production can go hand in hand in agricultural operations. Does the Council adequately promote this relationship between these important elements?  
yes\_\_\_\_\_ mostly\_\_\_\_\_ hardly ever\_\_\_\_\_ never or not enough\_\_\_\_\_

Please complete this survey and mail to VFGC, 3599 Indian Oak Rd, Crewe, VA 23930 or go to

<http://www.surveymonkey.com/s/K269KWQ> to complete this survey online.






VIRGINIA FORAGE AND GRASSLAND COUNCIL  
3599 Indian Oak Road  
Crewe, Virginia 23930



**THE FORAGE OF THE FUTURE IS HERE!**

Adding Durana white clover to your pasture can reduce the cost to produce a pound of beef on your farm by 50%!





**FREE NITROGEN** **REDUCE OR ELIMINATE PROTEIN SUPPLEMENTS**

**IMPROVED ANIMAL PERFORMANCE**

AND Durana has over 90% more stolons, increasing persistence up to 3 times longer than other white clovers!

**1-800-285-SEED**  
www.PenningtonSeed.com

**CFC FARM HOME CENTER**  
www.cfcfarmhome.com  
Serving farmers, homeowners & contractors for 75 years



**Complete agronomy technical support!**

- ❖ Lime spreading
- ❖ Soil testing
- ❖ No till drill rental
- ❖ Fertilizer spreading - dry & liquid
- ❖ Chemical recommendations & application
- ❖ Dry/blend fertilizer
- ❖ Bag fertilizer
- ❖ Liquid nitrogen application
- ❖ Aerial spraying available

**6 stores!**

<b>Culpeper</b>	<b>540-364-1533</b>	<b>Caroline</b>	<b>804-448-0266</b>
<b>Rappahannock</b>	<b>540-987-8555</b>	<b>Morrisville</b>	<b>540-439-3254</b>
<b>Marshall</b>	<b>540-364-1533</b>	<b>Warrenton</b>	<b>540-347-7100</b>

**Thorvin Kelp • Redmond Salt • Free Choice Minerals**  
**OMRI Approved Fertilizers • Certified Organic, Soy-Free Feeds**  
**Animal Health Products • Sainfoin-Rich Herbal Ley Seed Mix**  
**Monthly Delivery to Much of Virginia**



**Countryside Organics**

**www.countrysideorganics.com**  
801 2nd Street, Waynesboro, VA 22980 • 888-699-7088

**ALFALFAS**  
OVER 50 YEARS OF INNOVATION

**PLANT THE BEST**

**HIGH TONNAGE, HIGH PROFIT ALFALFAS**

**FROM W-L RESEARCH**

**AVAILABLE FROM EVERGREEN SEED, INC. 877.804.7333**

# THE VIRGINIA FORAGER

A publication of the Virginia Forage and Grassland Council



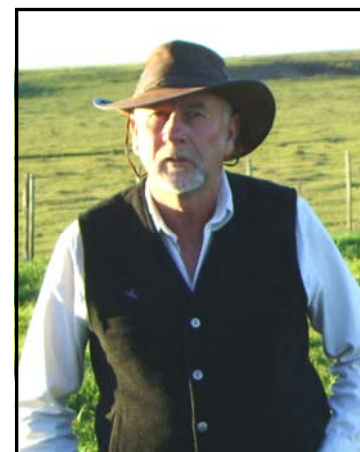
Volume 33 Number 4

Fall 2012

## Jim Gerrish of American GrazingLands Services to Speak at the 2013 Winter Forage Conferences

By: Gordon Groover

**Kicking the Hay Habit: Increasing the Profitability of Virginia's Ruminant Livestock Operations** is the theme for the Virginia Forage and Grassland Council (VFGC) and Virginia Cooperative Extension winter forage conferences. Hay costs purchased or homegrown are at record highs driven by high input costs. Producers will have an ideal opportunity to gain an understanding and the details needed to determine if a kicking the hay habit and year round grazing system make cents for their livestock operations.



This year's keynote speaker is Jim Gerrish of American GrazingLands Services LLC a international national known expert on forage-livestock systems. He has 20 years of systems research and outreach while on the faculty of the University of Missouri, as well as 20 years of commercial cattle and sheep production on their family farm in northern Missouri. The University of Missouri - Forage Systems Research Center rose to national prominence as a result of his research leadership. His research encompassed many aspects of plant-soil-animal interactions and provides foundation for many of the basic principles of Management Intensive Grazing. It is a pleasure to welcome Mr. Gerrish back to Virginia. In his morning presentation, he will cover matching your calving season to your forage resources and environment, inventorying and budgeting forages resources, selecting the right cow-type for extended grazing systems, and winter grazing options. After lunch, Mr. Gerrish will discuss the practical points of how to successfully graze winter pastures including pasture utilization and rumen function, supplementation on winter pastures, and tools and tips for getting the job done.

### INSIDE THE VIRGINIA FORAGER

Page 2...President's Message  
Page 2...Cow/Calf Industry  
Page 3...Amazing Grazing  
Page 4...Tips for Stockpiling

Page 4...Livestock Water  
Page 6...The Way Forward  
Page 9...Wick Applicators  
Page 11...Member Survey

Participants will also hear from Dr. Greg Halich, Associate Professor and Extension Specialist, Agricultural Economics, University of Kentucky, and J.B. Daniel, Forage & Grassland Agronomist, USDA-NRCS. Dr. Halich will provide famers with knowledge of profitability differences of grazing systems including spring verse fall calving and the cost of grazing verses making and feeding haying. Mr. Daniel will help farmers understand how to plan and developing farm infrastructure to support grazing systems and the details of NRCS/costs- share programs.

This year, VFGC will also feature local livestock producers at each workshop site to discuss "How I've extended the grazing season on my farm?" These producers will provide conference participants with real insight on the challenges and benefits of implementing grazing systems that reduce the need for conserved forage.

Gerrish Page 4

## Toxic Storm Damage?

By: Carrie Swanson

Summer storms often bring high winds, which can damage trees in pastures and along fence lines. It's important to know what types of trees are in or near your pastures, and what dangers downed trees or limbs present to your grazing animals. Two common Virginia trees can be very toxic to horses and other livestock in these situations: Wild Cherry (also known as Black or Choke Cherry) and Red Maple.



Cherry trees (*Prunus virginiana*) grow up to 30 feet tall, have white or pink flowers (from April – July) and bare black or deep red fruit (from July – September).

These trees are a danger because of the cyanogenic precursors that release cyanide when leaves are damaged (by frost, drought, wilting, etc.).

Toxic Page 10

Reporting the progress of Virginia's forage industry