Establishing and protecting trees in pastures

By: Gabriel Pent, Adam Downing, and John Fike

Planting trees in pastures isn’t a new idea, but it’s receiving some newfound interest. In some cases, the objective is to create a silvopasture, where tree production is integrated with forage-livestock systems to create multi-functional pastures. In other cases, the objective may be singular, such as when trees are established simply to provide shade for livestock. Regardless of the end goal, trees can provide numerous benefits, including improvements to animal welfare and productivity, soil conservation, water quality, and wildlife habitat.

Successfully integrating trees into pasture doesn’t mean that the pasture has to be de-stocked of livestock until the trees are grown, as we’ve shown in a research trial at the Shenandoah Valley Agricultural Research and Extension Center. A silvopasture project on this farm aims to demonstrate how a degraded hardwood stand on a medium quality site might be converted into a mixed-use forage- and timber-producing silvopasture. In this case, the silvopasture was developed by thinning an unmanaged timber stand full of invasive species (primarily bush honeysuckle (Lonicera spp.)), Green ash (Fraxinus pennsylvanica) was the dominant tree species in the stand. Unfortunately, the emerald ash borer found and decimated these trees and they had to be removed, leaving the resulting silvopasture with too few trees.

To increase the number of trees in this pasture back to a suitable density, we planted seedlings of three species - black locust (Robinia pseudoacacia), red oak (Quercus rubra), and shortleaf pine (Pinus echinata). We also tested four methods for protecting the new seedlings from cattle currently using the site. These included: an Arborshield tree guard, a homemade tree cage (like a tomato cage) made from fixed-knot fence, a conventional tree tube, and no protection. (Yes, “doing nothing” counts as a treatment in the research world.) Arborshield tree protectors are designed with bars to keep livestock and large wildlife (such as deer) away from the trees. The fixed-knot cages were constructed from 42” lengths of fencing to create a cage slightly larger than 12” in diameter. These and the Arborshield cages were secured with zip ties to three 5’ rebar (1/2”) stakes driven 1’ into the ground. The tree tube was secured with a PVC tube rather than a rigid wooden stake with the thought that the tube and tree might better survive if secured with a “bend, don’t break” approach.

Each of the four protection treatments was tested on three red oaks and three black locusts within each of the site’s four paddocks. For the shortleaf pine, only the Arborshield and “do nothing” treatments were tested. The trees and treatments were established in the spring of 2018, with help from the Department of Forestry. The Department of Forestry also donated the trees and Conservation Services donated the tree tubes. Cubes were rotationally stocked through these pastures throughout the summer. The trees and the treatments were assessed in the fall of 2018. We checked each tree to see whether it was alive or dead (or could not be found, which incidentally was the case for many of the “do nothing” trees). We also evaluated the protection treatments for functionality or damage due to the cattle. Finally, we looked at each tree for browse damage from the livestock or wildlife. These results are summarized in Table 1. (Many of the shortleaf pine did not survive or could not be found, so these are not included in the results.)

Table 1: Tree counts and evaluation of protection methods and browse damage.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Status</th>
<th>Protection</th>
<th>Browse damage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tree tube</td>
<td>Alive 1</td>
<td>Functional 8</td>
<td>Damaged 12</td>
</tr>
<tr>
<td>Fixed-knot cage</td>
<td>Alive 12</td>
<td>Functional 0</td>
<td>Damaged 12</td>
</tr>
<tr>
<td>Arborshield</td>
<td>Alive 11</td>
<td>Functional 11</td>
<td>Damaged 11</td>
</tr>
</tbody>
</table>

With the red oaks, only the Arborshield and “do nothing” treatments were tested. The trees and treatments were established in the spring of 2018, with help from the Department of Forestry. The Department of Forestry also donated the trees and Conservation Services donated the tree tubes. Cubes were rotationally stocked through these pastures throughout the summer. The trees and the treatments were assessed in the fall of 2018. We checked each tree to see whether it was alive or dead (or could not be found, which incidentally was the case for many of the “do nothing” trees). We also evaluated the protection treatments for functionality or damage due to the cattle. Finally, we looked at each tree for browse damage from the livestock or wildlife. These results are summarized in Table 2.

Table 2: Costs for materials of one of each protection method. Does not include time for assembly.

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit cost</th>
<th>Unit number</th>
<th>Total cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do nothing</td>
<td>$0</td>
<td>0</td>
<td>$0</td>
</tr>
<tr>
<td>Tube</td>
<td>$2.50</td>
<td>1</td>
<td>$2.50</td>
</tr>
<tr>
<td>Pipe (3/4” Sch 40)</td>
<td>$1.55</td>
<td>1</td>
<td>$1.55</td>
</tr>
<tr>
<td>Zip ties</td>
<td>$0.06</td>
<td>2</td>
<td>$0.12</td>
</tr>
<tr>
<td>Fixed-knot cage</td>
<td>$8.30</td>
<td>2</td>
<td>$16.60</td>
</tr>
<tr>
<td>Fixed-knot fence</td>
<td>$0.68</td>
<td>4</td>
<td>$2.72</td>
</tr>
<tr>
<td>Rebar (0.5”)</td>
<td>$1.80</td>
<td>3</td>
<td>$5.40</td>
</tr>
<tr>
<td>Arborshield</td>
<td>$24.68</td>
<td>1</td>
<td>$24.68</td>
</tr>
<tr>
<td>Tree protector</td>
<td>$19.10</td>
<td>1</td>
<td>$19.10</td>
</tr>
<tr>
<td>Rebar (0.5”)</td>
<td>$1.80</td>
<td>3</td>
<td>$5.40</td>
</tr>
<tr>
<td>Zip ties</td>
<td>$0.06</td>
<td>3</td>
<td>$0.18</td>
</tr>
</tbody>
</table>

It will be important to track these protectors over time as the trees begin to grow out of the top of the cages. We don’t expect browse damage on the scaffold branches of these trees to result in any long-term damage to the value or health of the tree, but damage to the stem leader may harm the long-term form or slow the upward growth of the trees. Soil compaction or manure deposition by livestock may also negatively affect trees. This will be more of an issue in pastures with little shade available and should not be an issue in a well-managed silvopasture where shade is evenly distributed across the pasture and livestock are rotated through the pastures for short durations with plenty of forage (i.e., no bare ground which is more prone to compaction). As riparian buffers are fenced out and fencelines are cleaned up, many producers are finding themselves with insufficient shade in their pastures for livestock. In some cases, this might mean that they must construct or purchase expensive shade structures that will deprecate in value over time. For other producers, strategically planting trees might be the best long-term solution. Shade won’t come instantaneously, but our work to date suggests that with fairly simple inputs, pastures can be kept in production while the trees are being established. One effective device to protect these trees from live-

As logic would suggest, the data support that “doing nothing” after planting a tree in a pasture will not be a very successful way to establish a healthy tree in a pasture. Most of the black locusts without any protection were missing or dead, while half of the red oaks without protection were missing or dead. Perhaps also not surprisingly, the tree tubes were not an effective means of protecting trees. One-third of the black locust trees protected with a tube were missing or dead and only one-third of the tubes were still intact. The red oaks in tree tubes did not sustain as much damage as the black locusts, perhaps because their foliage is not as preferred a browse by livestock. They may be subject to deer pressure, however, and we will need to follow that next year. Both the Arborshield and the “tomato cage” protected these young trees from livestock and withstood any trampling or rubbing by the cattle. In terms of browse, the black locust were more preferred by livestock or wildlife. A breakdown of the costs for each protector are listed in Table 2.
POSITION ANNOUNCEMENT

Title: Applied Forage Systems Specialist (70% extension and 30% research), Non-Tenure Track

Virginia Tech’s College of Agriculture and Life Sciences is searching for an Applied Forage Systems Specialist. The position will be located at the Southern Piedmont Agricultural Research and Extension Center (SPAREC). This is a calendar year, non-tenure track Administrative and Professional (AP) faculty position with a 70% extension and 30% research appointment. The Applied Forage Systems Specialist will develop a nationally recognized, highly visible, integrated extension and research program that focuses on practices and strategies to improve the economic competitiveness, viability, and stability of forage and forage-based livestock production. The individual will work in an interdisciplinary environment which includes collaboration with faculty, extension agents, and producers to conduct extension programs as well as develop and incorporate research and demonstration projects to support these efforts. The individual will also be expected to develop a focused and cohesive research and Extension program that addresses the needs of forage producers in Virginia and the region and supports the publication of peer-reviewed extension materials, popular press articles, refereed scientific articles, and social media. Areas of interest may include, but are not limited to: forage establishment and fertilization, grazing management, stored forage production (hay, baleage, silage, etc.), soil-plant interactions, pest management, alternative forage crops, remote sensing technologies, and watershed management. In addition to the Southern Piedmont AREC, land and facilities for collaboration exist on campus (Blacksburg) and at the Virginia ARECs in Shenandoah Valley (Raphine) and Southwest Virginia (Glade Springs).

Required Qualifications:
A master’s degree in agronomy, soil science, plant science, animal science, or related discipline with a major emphasis in forage crop production and management is required. Must have a strong background in knowledge of the Southern Eastern US, with an understanding of forage agronomy, pasture-based livestock systems, and the region’s production systems. Ability to effectively communicate with industry and producer stakeholders is essential; therefore, strong communication and interpersonal skills are required. Demonstrable success in publishing research results is required. Demonstrable ability to develop strong and focused integrated Extension and research programs. Must possess or obtain commercial (VDACS category 10) pesticide applicators license within 12 months of employment.

Preferred Qualifications:
Demonstrable success in securing extramural funding. Candidates with a PhD are encouraged to apply.

Responsibilities:
- Extension (Primary appointment)
  Facilitate and conduct on-farm forage production research, organize grazing schools and pasture walks, and other activities directed at improving forage systems. Develop and deliver effective educational programs to support county-based Extension agents and producers. Publish peer-reviewed extension materials, popular press articles, refereed scientific articles, and social media materials.
- Research (Secondary appointment)
  Develop a highly visible, integrated research and extension program that focuses on practices and strategies to improve the economic competitiveness, viability, and stability of forage and forage-based livestock production while enhancing the mechanistic understanding of how ecological, hydroedaphic, and climatic factors interact with grazing management. Secure extramural funding, publish in peer-reviewed journals, and participate on graduate student committees.

Salary: The position is a full-time appointment with salary commensurate with education and experience. Virginia Tech offers a comprehensive benefits package. For a full description of the position and requirements, and to apply, please go to www.jobs.vt.edu, posting AP0180355. Attach a cover letter, curriculum vitae, copy of transcript, statement of extension philosophy and research interests, and of three references to the online faculty application. Review of applications will begin on December 5, 2018 and continue until a suitable candidate is identified. The position will start in May 2019; however, an earlier starting date is negotiable. Individuals with disabilities desiring accommodations in the application process or needing this material in an alternate format should notify Dr. Carol Wilkinson at 434-818-5535 or wilki@vt.edu by the review date. Virginia Tech does not discriminate against employees, students, or applicants on the basis of age, color, disability, gender, gender expression, national origin, political affiliation, race, religion, sexual orientation, genetic information, or veteran status; or otherwise discriminate against employees or applicants who inquire about, discuss, or disclose their compensation or the compensation of other employees, or applicants; or any other basis protected by law.

For inquiries regarding non-discrimination policies, contact the executive director for Equity and Access at 540-231-2010 or Virginia Tech, North End Center, Suite 2300 (0318), 300 Turner St. NW, Blacksburg, VA 24061.
Alternative Forages for Grazing Systems: Unlocking Your Farms’ Production Potential is the theme of the 2019 VFGC Winter Forage Conferences.

Tall fescue was once the new kid on the forage block in Virginia. Today it makes up the predominant forage base on pastures and hay fields across the Commonwealth, but it’s primarily productive in the spring and fall. The utilization of alternative forages that fill the gaps left by tall fescue is the focus of the 2019 Winter Forage Conferences, hosted by the Virginia Forage and Grassland Council (VFGC) and Virginia Cooperative Extension (VCE).

Two speakers will highlight the use and benefits of two categories of alternative forages: annual forages and native warm-season grasses. Dr. Matt Poore, Professor and Extension Specialist in ruminant nutrition at North Carolina State University, will address annual forages and the situations in which they are most profitable. Annual grasses, legumes, and forbs may be used to provide large amounts of high-quality forage in both the summer and winter.

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The production potential of native summer forages will be covered by Dr. Patrick Keyser, Professor and Director of the Center for Native Grasslands Management at the University of Tennessee. Native summer forages are very productive in the summer and well-adapted to Virginia. Dr. Keyser will also address some of the key steps for successfully establishing these native forages.

The VFGC winter conferences will also feature local livestock producers who utilize alternative forages on their farms. Conference participants will be provided with real-world overviews of how annuals and native grasses are helping farmers produce forage for their livestock at critical times throughout the year.

The daylong conference will be repeated at four locations:
- Wytheville Meeting Center, Wytheville, January 15, 2019
- Blackstone, Southern Piedmont AREC, January 16, 2019
- Brandy Station Fire Dep., Brandy Station, January 17, 2019
- Weyers Cave Community Center, Weyers Cave, January 18, 2019

The conferences will run from 8:30 am to 3:00 pm. For more information about the conferences, to register on-line, or for a mail-in registration form, please visit the VFGC website: https://vaforages.org. The $35 early registration fee must be received or postmarked by December 31, 2018. The registration fee will increase to $50 for registrations made after December 31st. For more information, contact Margaret Kenny: vfgcforages@gmail.com.

To JOIN the Virginia Forage and Grassland Council on-line at:
http://www.vaforages.org

Contact Margaret Kenny at vfgcforages@gmail.com

Program Registration
No refunds for cancellation after December 31, 2018

Name ____________________________________________
Name ____________________________________________
Address __________________________________________
City State Zip ______________________________________
County __________________________________________
Daytime Phone __________________________
Email ____________________________________________

Check which meeting you will attend:
☐ Wytheville Meeting Center, Wytheville
☐ Blackstone, Southern Piedmont AREC, January 16, 2019
☐ Brandy Station Fire Dep., Brandy Station
☐ Weyers Cave Community Center, Weyers Cave

$35.00 early registration per attendee
After December 31, 2018
$50.00 late registration per attendee

Student Registration $15.00 per student
Harlan White Scholarship
Amount $________
Early registration must be post marked before December 31, 2018

Make Check Payable to: VFGC

Mail Check and Registration to:
2019 Winter Forage Conference
Margaret Kenny
3599 Indian Oak Road
Crewe, VA 23930
or on-line at www.vaforages.org

Agenda:
11:00am LUNCH provided – please register
11:30am Welcome – Werter Willis, Farm Owner
11:35am Overview and Purpose: What is Stockpiled Fescue and Why Measure Its Response to Fertilizer
12:00 noon First Cut Results in the Two Cut System, October 16, 2018
12:30pm Expected Fescue Growth Response to Various Rates of Phosphorus and Nitrogen, Does the Yield Difference Pay? – Dr. Alan Frankluebbers, USDA, ARS, Soil Scientist, NC State
1:00pm Utilizing Stockpiled Fescue at Homeland Farm, Ripleyville, Virginia – Roy Boldridge, Beef Producer
2:00pm Discussion and Conclusion – Carl Stafford

To REGISTER call or text Carl Stafford: 540-359-5532
Demonstrating the conversion of tall fescue pastures to native warm-season grasses

By: Gabriel Pent and J. B. Daniel

While most of Virginia's livestock pastures rely on tall fescue, this grass has reduced summer productivity, in some cases hosts a toxic endophyte, and forms a dense sod that impairs travel and reduces cover for ground nesting birds. Native warm-season grass (NWSG) species, however, provide beneficial wildlife structure, are non-toxic to grazing livestock, and are highly productive even during summer droughts with minimal inputs. A new NRCS initiative, the Working Lands for Wildlife Program, aims to increase Virginia's acreage in these species by allowing landowners who convert fescue pastures to native grasses to utilize these grasses for summer forage for their livestock.

In addition, with a new project funded by the NRCS through the Conservation Innovation Grant program, we will demonstrate and document the steps necessary for converting fescue pastures to NWSG pastures. We will document the conversion process of tall fescue pastures to NWSG species at two Virginia Tech research farms, including the Southern Piedmont Agriculture and Research Extension Center (AREC) and the Middleburg AREC, and four cooperating farms across the state. The pastures at the research farms will be used to document the production and health of animals grazing on these forages compared to tall fescue. We will work with Virginia Cooperative Extension agents across Virginia and the Cooperative Extension in Maryland to develop a NWSG establishment and forage variety trial in various plant hardiness zones around Virginia. The species that will be included in this trial will include big bluestem, indiangrass, switchgrass, and eastern gamagrass. Locations for this trial will include Blackstone, Glade Springs, Middleburg, Raphine, and Suffolk.

At this point, the demonstration pastures have been sprayed and planted into a winter cover crop. Our next steps will be to harvest and kill the winter cover crop and residual weeds with another spray prior to planting the native grasses in the spring. We will also be working to develop a page dedicated to this project on the VFGC website (vaforges.org). We will post updates and results from our work periodically to this page as the project progresses.

For more information on establishing and utilizing native grasses in your grazing system, be sure to attend one of the 2019 winter forage conferences. Dr. Pat Keyser, Director of the Center for Native Grasslands Management at the University of Tennessee, will be presenting what he has learned after years of experience with these grasses throughout the event. This project is supported by a USDA-NRCS Conservation Innovation Grant.

We had our first taste of winter yesterday. I woke up with sleet hitting the windows, gusting winds, and 28 degrees. Of course, the first thing I thought of was October calves. Even though the cattle are still grazing, I did unroll a bale because they were holed up in a hollow. I still worried all night but when I went out this morning the sun was out and the calves were running and playing.

This has been a great year for grazing and stockpiling fescue even though making hay has been a challenge. I hope you have a long grazing season this winter.

Included in this issue of the Forager is the letter that was sent to several persons responsible for hiring a replacement forage specialist for the Southern Piedmont Experiment Station. This letter is self-explanatory. If you know someone that can help with this situation please contact them.

See you at the Winter Conference, Alan Spivey, President, VFGC

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</tbody>
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**President’s Message**

We lost a great colleague, friend, and impeccable leader on Friday November 16, 2018 unexpectedly. To many people (faculty, students and the general public), David was that guy who worked tirelessly, loved every minute of his work and the people he came in contact with. David was a man who never knew the word “NO” to any request regardless of the fact that he may or may not have the time to do it. In addition to his strong dedication to research and extension work, David was undoubtedly the most self-directed leader I have ever known. He was flexible, a good listener and accommodating; superb qualities that made David an outstanding individual.

David’s other valuable contributions are to the Virginia Forage and Grassland Council. He had uninhibited enthusiasm and love for the forage industry. Over the last 15 years or so, he had dedicated himself to various leadership roles that requires high organizational skill, and passion for the organization. Professionally, he offered unusual talents covering a broad spectrum of practical knowledge in the areas of forages and livestock, and he was a fine historian and storyteller (about McCormick Farm).

David guided many graduate students and directed their development as a mentor and friend. Personally, I cannot thank God enough for crossing David’s paths. May God bless his soul!

Ozzie Abaye

David Fiske Superintendant of the Virginia Tech Shenandoah Valley Research Farm an Board member and treasurer of the Virginia Forage and Grassland Council.
The sad news of the passing of our friend and colleague David Fiske was a shock to all of us on the morning of November 16, 2018. His untimely death is a tragic loss to his family, beloved friends, colleagues and his community. I first got to know David personally 10 years ago, when I began serving on the VFGC Board of Directors. I was introduced to him that day as the Treasurer of the Board, and it wasn’t long after that first meeting that I realized he was so much more. David worked diligently and with the utmost professionalism in everything he did. David set a pattern of high performance as he approached every project or event with a level of focus, organization and determination that guaranteed success and often resulted in perfection. David answered the call to speak at winter conferences, forage field days and grazing schools when asked, but he was always instrumental behind the scenes in planning, coordinating and facilitating events to make them as beneficial as possible to the participants in attendance. His practical advice founded on decades of experience and research was respected by all who heard and learned from him. David’s conversational approach resonated with producers and they naturally gravitated towards David to ask and learn more.

As good as David was at all he did, he never seemed boastful or proud in his actions. In fact, he was always humble, never seeking the spotlight for himself but often lifting those up who worked with and around him. David was someone I very much looked up to as a trusted mentor, providing practical real-world answers to my technical questions. Not sugar coating anything to tell you what you wanted to hear but speaking the truth directly, telling you what you needed to hear. David never commanded respect from anyone, but he was revered with respect by almost everyone.

David had a wonderful sense of humor, often playing practical jokes while building relationships with his colleagues and friends. His dry wit was always successful in obtaining a smile or laugh out of everyone.

A Life of Service

David was so much more than an officer of VFGC Board, he was a dedicated servant member, holding steadfast to the mission and the values of the VFGC, working steadfast to promote the practical and best use of forages and the management of livestock on grasslands in Virginia.

I’m grateful for the 10 years that I knew David, for all that he taught me and shared with me, and how he demonstrated living a life of service through his career and in his active membership in many community and statewide organizations.

Let us remember David Fiske, A humble servant, quiet leader, consummate professional and dedicated friend, Long live his legacy through those he touched and shaped in this world.

Respectfully, JB Daniel

Virginia agriculture lost a valuable leader, educator and innovator with the passing of David Fiske. David dedicated his life to all aspects of agriculture. He was one of those rare individuals that could instantly evaluate a situation and present multiple options. As treasurer of the VFGC he was a fierce protector of council finances, a trait that we teased him about at every opportunity. The VFGC offers its sincerest sympathy to his family.

Dear Friend I will respect, admire and miss you forever.

Alan Spivey

David was, above all else, a tireless steward of the time and talents he was given. His life was one of selfless service to others, and his impact will ripple outward long past his death. May David’s life be an example for each of us to follow.

Matt Booher