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Grassroots

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Range 101: Grazing Resistance by Sandy Smart

Last issue I presented a brief historical view of plant succession. In this issue I want to explore the relationship between plant survival and grazing through the lens of the grazing resistance concept. Grazing resistance is defined as the ability of a plant to survive in a grazing environment. Plants generally display one of two mechanisms regarding their level of grazing resistance: avoidance or tolerance. The avoidance mechanism is the ability of the plant to reduce the probability of being grazed. The tolerance mechanism is the ability of the plant to regrow after it has been grazed.



Red threeawn left and little bluestem right. Everything has been grazed except for these species which demonstrates the avoidance mechanism (Photos A. Smart).

Avoidance mechanisms can include mechanical deterrents, like spines on a thistle or cactus, and chemical compounds that reduce the palatability. Plants like red threeawn and little bluestem have long awns or dense growth habit in which older dead stems deter livestock from grazing the new growth (see above photos). Most often we categorize species with avoidance mechanisms as increasers or invaders. Tolerance mechanisms include resprouting from basal buds, rhizomes, and increased photosynthesis. Plants with this mechanism are typically called ‘decreasers’ such as big bluestem, green needlegrass, etc. When these grasses are grazed moderately, they have the ability to regrow their canopy much quicker than avoidance species. That is why people often say “if you take care of your grass, it will take care of you”. The grass that can regrow will out compete “weeds” with avoidance mechanisms because they are putting all their photosynthate into new tissue rather than build spines or compounds to deter grazing. The only catch is that heavy grazing can trump the tolerance mechanism and cause the decreasers to die off. The grazing resistance concept is useful to understand how and why plants survive in a grazing environment.

How About an Internship? by Garnet Perman

Four years ago, inspired by friends with the Nebraska Grazing Lands Coalition, Rock Hills Ranch started an internship program. The internship serves two purposes. 1) We need extra seasonal help. 2) Many agencies that we do business with such as finance, insurance, extension, conservation, and agri-business used to have personnel with a farm background. Now, fewer and fewer do, which can present obstacles for everyone involved. Providing potential leaders with practical experience in holistic management, especially as it relates to livestock and grasslands benefits us all.

We provide room and board. Because the intern is part hired help, we offer some compensation based on experience. We make it a point to send them to or take them along on range tours or educational events that are scheduled during their stay. They attend our ranch meetings and are included in the decision making and problem solving as much as is possible.

For the last two years, over 100 mostly college students have applied. The overall quality of applicants is exceptional. Many do not have the practical skills we need to hit the ground running at this point, so last year we offered a one month unpaid internship we call Ranch Living Experience for two people. We suspended that internship this year, but plan to offer it again in the future. We have benefited from the skills, experience, knowledge, ideas and work ethic each intern has brought to the ranch.

The first year was completely experimental. Luke compiled an application and posted it on the Internet. Kelly Mercier, a University of Wisconsin/ Steven's Point Soils major with a dairy background was an excellent "guinea pig". She is currently doing PhD research on silvopasture at Virginia Tech. Her take on the internship, "I definitely was not considering going to grad school before working on the ranch. But being able to interact with a diverse group of people while on the ranch swayed me. I realized that my options were much wider than I had originally anticipated. ..I learned a lot about tying ranch/range management together with conservation, and I realized a passion for cattle, grass, and the land that I didn't know I had."

Garth Gatson's University of Missouri's meats judging team experience helped us better interpret our 2014 carcass data. He starts a Master's program at Kansas State in the fall. He said, "My degree will be in ruminant nutrition, but range ecology will be a large component of my work...I came to SD as a cow guy. I'm still a cow guy, but I'm also becoming more and more of a grass guy. When people ask me what about animal science interests me, I tell them that I am interested in cows, grass, and their interactions. A lot of people study cows or study grass, but I think that too many people ignore the overlap. I am focusing my studies on the point where the two fields intersect."

Last year, schedules allowed two interns for three months each, Sam Newell, a Utah State Pre-Vet major and John Wendt, a Range Ecology major from Colorado State. Come August, Sam will be a manager at Deseret in central Florida, one of the largest ranches in the country.

Internship continued on Page 3

Internship Continued by Garnet Perman

John has a job as resource technician with Synergy Resource Solutions in Bozeman, MT following graduation. “Synergy is a small consulting business that does private and government contracting, especially on range-related projects. I will be all over NV, UT, and MT this field season. During the hiring process, Jack Alexander, Synergy's owner, was especially interested in knowing that I had some degree of experience with and knowledge of the private side of range management.”

Miranda Craig, an Ag Communications U of Florida “Gator”, and Melanie McComsey, a linguistic anthropology PhD candidate were our one month interns. Miranda enters a Master's program in Ag Leadership at Texas A&M later this year and Melanie is on staff at a large research hospital in San Diego. Both gained a new understanding of the environmental impact of livestock on the landscape as well as some of the practical aspects of ranch living that they will tell others about.

We tweak the internship every year depending on our needs, family events and the exit interview from the previous year. This year we are excited to have SDSU grad, Rob Folies with us for six months.

So far, the internship has met our objectives and been a beneficial experience for the fine young people we've been privileged to mentor. We've learned that a large number of young people interested in agricultural careers need /want more practical experience than they have. We encourage other producers to address that demand and would be happy to share what we've learned with others. Contact us at www.rockhillsranch.com.

Garnet Perman is a freelance writer and ranches with her husband, Lyle, near Lowry, SD

South Dakota Shines at 65th Annual National Land and Range Judging Contest by Dave Ollila

The Wessington Springs 4-H Range Team received top honors for their performance in the National 4-H Range Judging Competition held in the Oklahoma City area May 3-5th 2016. Seven hundred FFA and 4-H members competed in the National Land and Range Judging contest held May 3-5, according to the Oklahoma Association of Conservation Districts, the contest's principal sponsor. The USDA Agricultural Research Service -Grazinglands Research Station at Ft. Reno hosted the Range and Land judging event on May 5th. Total registration for the event exceeded 1000 people with coaches, sponsors, officials and group leaders in addition to the contestants.

Hailey Bruckner was recognized as Reserve National Champion individual along with Wyatt Stevens placing 3rd, Trinity Brunsen placing 5th and Chase Voneye placing 11th, respectively and coached by Mr. Craig Shryock. The Lemmon FFA Range Judging Team placed 10th in the FFA Range division, team members included Kelli Schopp, Quirt Beer, Baillie Beer and Aubrey Weishaar and coached by Mr. Ryan Beer – USDA NRCS Area Range Management Specialist.

To see the complete story visit
<https://igrow.org/news/national-range-judging-champions/>

Dave Ollila is an Extension Sheep Field Specialist in Rapid City, SD.

The Green Side Up: Sensitive Site Registry Can Help Others Understand the Importance of Pasture Diversity by Pete Bauman

I often have the opportunity to speak with grassland managers about the future of our grassland resource. What is often surprising, but perhaps shouldn't be, is that while some ranch managers have an incredible gift of knowledge of their pastures and the diversity of the plants and animals in them, others do not have this gift and must rely on what others tell them is or is not important in their pasture's plant and animal communities.

I think it is safe to assume that if you are reading this article you are more or less interested in healthy grassland communities, regardless of whether they are native rangelands, tame pastures, or plantings for livestock and wildlife use (if you are curious about the differences of these grass categories, see my article in the March issue of Grassroots).

Regardless of grassland type, healthy usually can be equated to diverse. Decades ago, the average native South Dakota pasture was extremely diverse with native plants. Then came the onset of more intensive management, invasive and noxious species, and technology to develop and apply herbicides and insecticides to vast swaths of native rangelands and crop fields.

While chemicals have become a popular management tool, the long-term and broad-scale effects of the broad array of chemicals now available are poorly understood. However, specifically in rangelands, we do know that repeated application of broad-leaf chemicals can severely impact diversity. Because of that reality, many producers - even those who've relied heavily on chemicals in the past for pasture management - have begun to think more critically about how, when, and why they utilize chemicals in pasture management.

The SD Dept. of Ag. recently announced updates to the Sensitive Site Registry. First launched in 2013, the Sensitive Site Registry is designed for producers and applicators (private and commercial) to better understand where chemical and fertilizer drift and misapplications are to be avoided. SDDA specifically created the registry to provide information about farms and ranches that would be adversely affected by accidental fertilizer or pesticide application or drift. The registry is user friendly, easily navigable, and includes a tutorial that walks producers and applicators through the simple registration process.

The registry not only provides a host of pre-determined categories to choose from ranging from bee apiaries to organic hay/pasture to grassfed beef (see legend at right), it also offers producers the opportunity to self-identify whatever 'product' they may want protected.

| Legend | |
|--------|---|
| | Bee Apiary |
| | Certified Organic Nursery, Horticulture, Floriculture, & Greenhouse Crops |
| | Certified Organic Vegetables |
| | Certified Organic Herbs and Spices |
| | Certified Organic Fruit or Nut Trees |
| | Certified Organic Berries |
| | Certified Organic Vineyard |
| | Certified Organic Field Crops |
| | Certified Organic Hay/Pasture |
| | Certified Organic Dairy |
| | Certified Organic Livestock |
| | Certified Organic Bison |
| | Certified Organic Poultry |
| | Nursery, Horticulture, Floriculture, & Greenhouse Crops |
| | Vegetables |
| | Herbs and Spices |
| | Fruit or Nut Trees |
| | Berries |
| | Vineyard |
| | Field Crops |
| | Hay/Pasture |
| | Dairy |
| | Grass Fed Beef |
| | Livestock |
| | Poultry |

The Green Side Up Continued by Pete Bauman

Some examples of self-identified options might include areas where biological control agents have been released, native prairie seed production, high diversity CRP or pollinator plantings, or a variety other land uses or products.

I personally logged on and tested the site and found that it is extremely user friendly, easily navigable and includes a very nice tutorial that walks you through the simple process. At the April Board Meeting I gave a short demonstration to your Director, and all thought this would be a great tool for the members of the SD Grassland Coalition to take advantage of. I see use of this registry as a very powerful tool in ensuring that our native rangelands and diverse grassland plantings receive the attention they deserve as repositories that represent the diversity of South Dakota's native plant and insect communities.

While SD law is specific in regard to chemical application standards, including the requirement that chemicals be applied by appropriately licensed applicators and that chemicals not be applied to non-target areas, accidents can occur. Producers need not submit their site information to the registry to be fully covered by the law and the process by which the SDDA handles drift complaints. The registry will help in avoiding these situations from the outset by providing applicators with a 'reminder' that sensitive sites exist in their application area. Those of you who are private or commercial applicators are strongly encouraged to register as well, as you will receive regular updates when sensitive sites are added in your work area.

The registry is designed as a two-part process. Part one is related to "producers". Producers are those who want to register a sensitive site. A producer logs onto the registry site, creates a user name and password, provides a bit of background/contact information, identifies what is sensitive, and then draws the boundary of the site. Once submitted SDDA sends an email confirming the site has been accepted into the Registry. Part two of the systems is built for applicators. Registered applicators receive updates of sensitive sites in their normal work area, providing them a very useful tool when planning their spray applications.

The registry does not limit your ability to manage your own property. Timing, chemical type and conditions all dictate the 'appropriate' chemical application plan. By utilizing the registry, producers are given an opportunity to proactively remind applicators to avoid undesirable chemical drift that is not consistent with their management of the property.

South Dakota's native pastures still harbor some excellent species diversity in many locations. It is not uncommon to hear complaints from producers who receive drift from spray operations that occur on neighboring pastures or crop fields. With the continually heightening awareness of the value of high plant diversity for livestock, wildlife, and pollinators, this tool can also help producers proactively protect species diversity in pastures and prairies across the state. We have to remember that not all yellow flowers are leafy spurge, not all purple flowers are Canada thistle, and not all broadleaf plants are 'weeds' to be sprayed out. Diversity is the key, and this registry can help grassland managers proactively ensure that only approved, specific, targeted, and well timed chemical applications occur on the ranch.

The Green Side Up continued on page 6

The Green Side Up Continued by Pete Bauman

How to Access the Sensitive Site Registry:

If receiving this newsletter electronically, click here or copy this link to a search engine to get started: <http://arcgis.sd.gov/server/ag/sensitivesites/default.aspx>

OR visit sdd.sd.gov. Click on 'Agricultural Services' and on the dropdown menu select 'Pesticide Program' and then 'Compliance'. At the bottom of the compliance list you will see a label 'Sensitive Sites'. Click on the label 'Pesticide Sensitive Crop Registry for Commercial Crop and Livestock Producers and Pesticide Applicators'. A great "Producer Overview Video" is available which walks you through a simple step by step registration procedure.

For more information on SD law related to chemical and fertilizer use, see SD Codified Law Chapter 38-21: Agricultural Pesticide Application, or click on the link provided here: http://legis.sd.gov/Statutes/Codified_Laws/DisplayStatute.aspx?Type=Statute&Statute=38-21.

Pete Bauman is an Extension Range Field Specialist in Watertown, SD.



SDSU Hires New Extension Range Specialist by Sandy Smart

Sean Kelly was raised Winner, SD. Sean's family includes his parents Dennis Kelly (Winner) and Patricia Tobin (Lincoln, NE), his sister Abby Tobin (Lincoln, NE), and fiancé Tracy Beck (Gregory). Influential people in his life include his father Dennis Kelly. Dennis is a livestock order-buyer. Sean tagged along with him to salebarns across SD and NE ever since he was a little kid. Sean learned a lot about cattle from him. Dave Pravecek is farmer/feeder from Winner that Sean worked for throughout middle and high school. Sean also worked for him full time for 4 years before he went back to school at SDSU. Sean learned a lot about farming and ranching from Dave over the years as well.



Sean Kelly, SDSU Extension Range Field Specialist was hired in April 2016.

Sean received his BS degree in Range Science from SDSU in 2006 and MS in Ranch Management from Texas A&M Kingsville King Ranch Institute for Ranch Management in 2008. Sean's research project Master's thesis was conducting financial and economic analyses for the feedlot division of the Padlock Ranch (Ranchester, WY) to determine its value to the Padlock Ranch and to determine if the Padlock Ranch should continue or exit the feedlot business. His research revealed that utilizing the feedlot division in the overall ranch operation resulted in the highest annual net profit for the ranch.

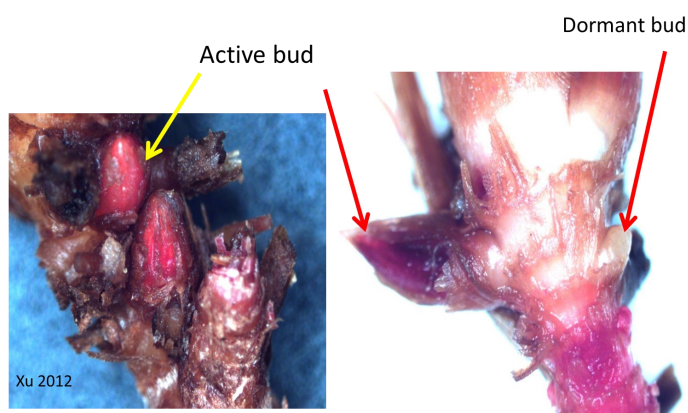
Sean will provide expertise in range management outreach to South Dakota. Please welcome Sean back to South Dakota.

Research Update: Bud Bank Ecology for Understanding Perennial Grass Persistence by Lan Xu

Grassland ecosystems often demonstrate very remarkable resiliency to severe natural and anthropogenic disturbances. Such resiliency following disturbances comes from either seed banks (germinable seeds in the soil) or bud banks (meristems or buds, such as bulbs, bulbils, and buds on rhizomes, corms, and tubers, that generate vegetative tissues). Although seeds are important for dispersal, initial colonization, and maintenance of genetic diversity; few grass seeds persist in the soil more than five years, plus seed production often is unreliable under grazing. Recent studies have demonstrated that >99% of aboveground stems in undisturbed tallgrass prairie were recruited from the bud bank while <1% were recruited from the seed bank. Even under grazed or disturbed sites in tallgrass prairie, belowground buds make a significantly larger contribution (80%) to plant recruitment than do seeds (20%).

Most grassland ecosystems, like the Great Plains, are dominated by vegetatively reproducing perennial grasses. The populations of perennial grasses are strongly driven by stem recruitment from the belowground bud banks. The maintenance of a healthy bud bank has important ecological and managerial implications of perennial grasses. The bud bank plays a critical role for maintaining populations, regulating vegetation dynamics and community assemblage, productivity, resilience to stress and responses to changing environments. The ecological benefits of the maintenance of a healthy bud banks include: 1) plants can respond rapidly to increased resource availability because bud activated stems are generally faster than from seeds, and are stronger than seedlings, 2) buds can increase growth through the production of a larger population of new stems because bud and stem production depend on each other, 3) buds provide capacity for high compensatory growth following disturbance such as grazing, fire, and haying, and 4) for native species, buds have the ability to rapidly colonize empty spaces and resources, limiting the opportunities for establishment by exotic invasive plant species. However, it also is true for the invasive species, if they have a large bud bank, which will provide them the advantage to occupy empty spaces and out-compete native species.

Recent studies reported vegetative reproduction through rhizome and new stem outgrowth from axillary buds is the primary means for the local spread, penetrating to adjacent prairie communities, neighborhood competition, and persistence of smooth brome grass (Figure on the right). Since bud banks serve as reservoirs for recruitment of future aboveground stems, understanding the role of the belowground bud bank in regulating the persistence of invasive species in the response to management practices will provide the knowledge needed to develop adaptive management strategies that sustain long-term control effectiveness and preventing resurgence. A study was initiated in 2013 to examine smooth brome grass belowground bud and rhizome production in response to different mowing (simulated grazing and haying) frequency treatments. We found defoliation at the most vulnerable growth stage can effectively hinder bud formation, stem recruitment, and reduce food reserve in the rhizome of perennial grasses. Our results from this study clearly demonstrated that repeated defoliation treatment reduced axillary bud production and rhizome biomass, suggesting they could form the basis for a long-term management plan.



Smooth brome grass (*Bromus inermis*) crowns stained to reveal active and dormant buds (Photo by Lan Xu, 2012).

Lan Xu is an Associate Professor in the Department of Natural Resource Management at SDSU.



Sandy Smart
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Brookings, SD 57007

Calendar of Events

| Event | Date | Location | Contact Person | Phone |
|--------------------------|------------|----------------------|----------------|---------------------|
| SRM Tour | June 7 | Red Owl | Tanse Herrmann | 605-347-4952 ext 3 |
| Range Camp | June 8-10 | Sturgis | Dave Ollila | 605-394-1722 |
| Annual Bird Tour | June 10-11 | Ft. Pierre | Judge Jessop | 605-280-0127 |
| Rangeland and Soils Days | June 21-22 | Wall | Lesa Stephens | 605-279-2451, ext 3 |
| Soil Health and SRM Tour | June 30 | Willow Lake | Shane Jordan | 605-472-0102 ext 3 |
| Happy Cow Bus Tour | July 29 | Clear Lake/Brookings | Pete Bauman | 605-880-6542 |

Please remit any comments, suggestions, or topics deemed necessary for further review to: Sandy Smart, SDSU Box 2170, Brookings, SD 57007, alexander.smart@sdstate.edu, (605) 688-4017