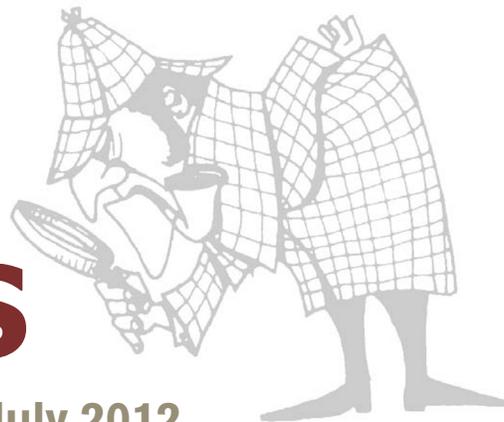


HIGHLIGHTS

Rangeland Ecology & Management, July 2012



Functional Resource Heterogeneity Increases Livestock and Rangeland Productivity

Richard W. S. Fynn

This paper addresses the issue of conceptual flaws in many rotational grazing practices. Grazing management should allow flexible adaptation to variation of forage quality and quantity over time and space. We base our conclusions on a review of wildlife adaptive grazing patterns and how they relate to livestock management. The review shows that adaptation to large spatial and temporal variability in grass productivity and quality in rangelands is possible only under mobile and flexible grazing management. The implications are that informed adaptive management, which may include season-long grazing and season-long rest, can improve rangeland and livestock productivity.

Using Very-Large-Scale Aerial Imagery for Rangeland Monitoring and Assessment: Some Statistical Considerations

Jason W. Karl, Michael C. Duniway, Sarah M. Nusser, Jean D. Opsomer, and Robert S. Unnasch

Very-large-scale aerial (VLSA) imagery may become a routine tool for rangeland monitoring and assessment. However, it is crucial to understand the statistical implications of designing and implementing VLSA image studies. VLSA image scale should match monitoring questions, landscape element size, and landscape spatial variability. VLSA image studies should use probability-based sampling and can efficiently use designs like systematic sampling not often used in field studies. It is critical to define the sampling unit and understand the relationship between image-based measurements and estimates. Finally, it is important to statistically validate estimates produced from VLSA images.

Profitability of Carbon Sequestration in Western Rangelands of the United States

John P. Ritten, Christopher T. Bastian, and Benjamin S. Rashford

This paper examines the potential firm-level revenues from enrolling rangelands in voluntary carbon offset programs. We estimate revenues for short-term voluntary offsets given historical prices and prices projected under cap-and-trade legislation. Results suggest that recent carbon prices or low-end projected prices from cap-and-trade legislation are not likely to encourage producer participation. Medium and high carbon price projections for cap-and-trade legislation may make carbon sequestration a more attractive option for rangeland managers given the requirements for projects to meet international guidelines. However, many issues remain before range managers will be interested in carbon sequestration.

Sagebrush Control: At What Canopy Cover Is It Economically Justified?

Christopher T. Bastian, Dannele E. Peck, Michael A. Smith, and James J. Jacobs

We determined the economic threshold level for big sagebrush control based on 18 years of forage-response data from an experiment in Carbon County, Wyoming. We analyzed the impacts of climatic variables and site characteristics such as sagebrush abundance, precipitation, and understory composition on forage response and threshold level. In this study the economic threshold level of sagebrush infestation was between 8% and 24%. Precipitation and understory composition influenced forage response and the resulting economics of sagebrush control. Range managers should consider potential control site characteristics and precipitation variability when considering sagebrush control.

Using Unmanned Helicopters to Assess Vegetation Cover in Sagebrush Steppe Ecosystems

Robert P. Breckenridge, Maxine Dakins, Stephen Bunting, Jerry L. Harbour, and Randy D. Lee

Monitoring rangelands on the ground is very costly and labor intensive. This article explores the option of using unmanned aerial vehicles (UAVs; e.g., a helicopter) and digital equipment to collect and analyze images for estimation of cover on sagebrush-steppe ecosystems. Image evaluation showed a high degree of agreement with field measurements for litter, bare ground, and grass and reasonable agreement for dead shrubs. UAV technology can provide a viable method for monitoring vegetative cover on rangelands in less time and with lower costs.

Grazing Distribution and Diet Quality of Angus, Brangus, and Brahman Cows in the Chihuahuan Desert

Morgan L. Russell, Derek W. Bailey, Milt G. Thomas, and Barbara K. Witmore

Cattle breeds may differ in their ability to utilize extensive desert rangelands. Movement patterns and diet quality of mature Angus, Brangus, and Brahman cows were monitored using GPS tracking collars and fecal near-infrared spectroscopy analyses in the Chihuahuan Desert. Brahman cows traveled farther each day than Angus or Brangus cows, but we did not detect any differences among breeds for diet quality or grazing distribution. Although Brahman cows walked farther each day, they did not have any advantage over Angus and Brangus cows in use of areas distant from water, because their paths were more tortuous than the other breeds.

Forage Allowance as a Target of Grazing Management: Implications on Grazing Time and Forage Searching

Júlio K. Da Trindade, Cassiano E. Pinto, Fabio P. Neves, Jean C. Mezzalira, Carolina Bremm, Teresa C. M. Genro, Marcelo R. Tischler, Carlos Nabinger, Horacio L. Gonda, and Paulo C. F. Carvalho

We studied the relationship between grazing behavior, forage structure, and daily forage allowance (forage available per animal) on native grasslands. Heifers spent the least amount of time grazing when forage mass was between 1,400 kg and 2,200 kg dry matter per hectare, the sward height was between 9 cm and 13 cm, and tussock frequency less than 35%, regardless of forage allowance and season. Heifers spent more time grazing and traveled farther when the forage structure was below or above these conditions. Managing for forage structure can be more important than forage allowance to increase animal performance.

Biomass Production and Net Ecosystem Exchange Following Defoliation in a Wet Sedge Community

Chad S. Boyd and Tony J. Svejcar

Sedges play a crucial role in maintaining the integrity of riparian ecosystems, but little is known about their production and ecophysiological responses to defoliation. We evaluated production and net ecosystem exchange of CO₂ (NEE) for clipped wet sedge communities. Clipping to 10 cm had minimal impact on above- or below-ground production compared to the influence of yearly fluxes in water availability, but recovery of NEE was compromised with late-season (July) clipping. These results suggest that moderate grazing will not compromise within-year sedge production, but regular late-season grazing may decrease long-term sustainability of sedges.

Physical Characteristics, Shade Distribution, and Tall Fescue Effects on Cow Temporal/Spatial Distribution in Midwestern Pastures

Douglas A. Bear, James R. Russell, and Daniel G. Morrical

Grazing has been associated with nonpoint source pollution of water resources. However, how pasture characteristics influence grazing cattle distribution is not well defined in Midwestern pastures. Cow locations were recorded with GPS collars for 5–14 days in the spring, summer, and fall on five to eight pastures with different sizes, shapes, and shade distributions over 3 years in the Rathbun Lake watershed in Iowa. Cattle presence in and near streams and ponds increased with increasing proportion of the total area and shade in the water zone. Nonpoint source pollution may be minimized by recognition of the physical characteristics of each site.

Grass Seedling Demography and Sagebrush Steppe Restoration

J. J. James, M. J. Rinella, and T. Svejcar

Seeding is a key management tool for semiarid and arid rangeland, but sown seed often fails to establish. Over 3 years we tracked sown seed and seedling fate to adult plant establishment for three grass species widely used for restoration. We found that germination was rapid and high, often exceeding 50%, 2 weeks after sowing, yet emergence of germinated seed was slow, with up to 90% of the germinated seed failing to emerge. Management tools that reduce early-season seedling deaths, such as delayed seeding or minimizing disturbance, could greatly improve seeding success rates on rangeland.

Preemergent Control of Medusahead on California Annual Rangelands With Aminopyralid

Guy B. Kyser, Vanelle F. Peterson, and Joseph M. DiTomaso

High rates of aminopyralid applied in the fall, before medusahead (*Taeniatherum caput-medusae*) emergence, were found to suppress medusahead in three California annual grassland sites. At the maximum labeled broadcast rate (123 g · ha⁻¹ Milestone), aminopyralid reduced medusahead cover by 59%; at a spot treatment rate (245 g · ha⁻¹), medusahead cover was reduced by 89%. These treatments also resulted in increased cover of forage grasses such as slender oat (*Avena barbata*) and Italian ryegrass (*Lolium perenne*). Aminopyralid treatments suppress but do not eliminate medusahead; nevertheless this may be part of an effective revegetation strategy, especially if a target site is also infested with noxious thistles.

Arbuscular Mycorrhizal Fungi Can Accelerate the Restoration of Degraded Spring Grassland in Central Asia

Tao Zhang, Yu Sun, Zhaoyong Shi, and Gu Feng

Three years of field inoculation experiments were carried out in a central Asian desert to understand the effects of arbuscular mycorrhizal fungi (AMF) on the restoration of degraded grassland. The results indicate that AMF highly increased the total seedling numbers per square meter in all 3 years. The total cover of the plant community significantly improved after inoculation with AMF. Moreover, inoculation with AMF significantly increased community productivity. This study concludes that AMF can speed up the regeneration process of grassland, and this may be used as an effective biological approach in the restoration of degraded desert grassland.