

# HIGHLIGHTS

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## **Vegetation Responses to Roller Chopping and Buffelgrass Seeding in Argentina**

Lisandro J. Blanco, Carlos A. Ferrando, Fernando N. Biurrun, Enrique L. Oriente, Pedro Namur, Dario J. Recalde, and German D. Berone

Roller chopping and simultaneous buffelgrass seeding is a widespread technique for restoring forage capacity in degraded shrublands of the Argentinean Chaco Arido region. We evaluated short-term effects of roller chopping and simultaneous buffelgrass seeding on vegetation response at a regional scale. We found the application of this technique increased grass yield and decreased shrub cover but did not affect shrub and tree density, species number, diversity index, or evenness. These results indicate, in the short term, that roller chopping and simultaneous buffelgrass seeding rapidly restores forage capacity without affecting species diversity on degraded shrublands of the study region.

## **Herbaceous Response to Cattle Grazing Following Juniper Cutting in Oregon**

Jon D. Bates

The rapid expansion of western juniper woodlands across the northern Great Basin during the past 100 years has reduced forage productivity, thus stimulating management efforts to remove trees and restore livestock carrying capacity. This study measured understory plant recovery subjected to grazed and ungrazed prescriptions following chainsaw cutting of western juniper. The results demonstrated that 1) juniper removal stimulated significant increases in understory plant cover, biomass, and seed production; and 2) early-season, short-duration grazing of cut woodlands did not limit herbaceous recovery. The results imply that juniper cutting had a greater effect on herbaceous dynamics than the grazing application.

## **Vegetation Cover and Forb Responses to Cattle Exclusion: Implications for Pronghorn**

Matthew R. Loeser, Sharon D. Mezulis, Thomas D. Sisk, and Tad C. Theimer

Cattle grazing is often implicated as a factor that reduces vegetative cover and forage for pronghorn. We studied potential hiding cover and forb diversity following 5 years of cattle removal and before cattle use of annually grazed plots. Cattle removal increased horizontal hiding cover by 8% at a distance of 5 m but had little effect at greater distances. Forb species richness was 16% lower because of cattle removal, whereas the canopy cover of forbs was unaffected by cattle removal. In cases where immediate habitat improvements are important to population persistence, additional management actions should be considered.

## **Relationships Between Chihuahuan Desert Perennial Grass Production and Precipitation**

Godfrey Khumalo and Jerry Holechek

Determination of forage production is typically time-consuming and expensive. It has long been recognized that forage production on rangelands is closely associated with annual precipitation amount and timing. Detailed information on perennial grass production and monthly precipitation was collected for 34 years on Chihuahuan Desert rangeland in south-central New Mexico. Our objective was to evaluate the relationship between perennial grass yield and precipitation characteristics for these data using correlation and regression analyses. Our study showed that perennial grass yields could be predicted from total December-through-September precipitation with adequate accuracy for most management decisions.

## **Evaluation of GPFARM for Simulation of Forage Production and Cow-Calf Weights**

Allan A. Andales, Justin D. Derner, Patricia N.S. Bartling, Lajpat R. Ahuja, Gale H. Dunn, Richard H. Hart, and Jon D. Hanson

The Great Plains Framework for Agricultural Resource Management (GPFARM) model was designed to assess impacts of alternative management decisions before field implementation, but its forage and livestock modules have not been tested against field data. Accuracy of simulated forage and cow-calf production was evaluated against 3 years of forage production and 6 years of cow-calf data from the

Central Great Plains. The GPFARM model simulated forage and cow-calf production with satisfactory accuracy at 2 semi-arid-temperate sites. The evaluation lends credibility to the subsequent use of GPFARM as a decision-support tool for assessing impacts of alternative ranch management decisions.

### **Inference of Animal Activity From GPS Collar Data on Free-Ranging Cattle**

Eugene D. Ungar, Zalmen Henkin, Mario Gutman, Amit Dolev, Avraham Genizi, and David Ganskopp

The utility of animal-borne global positioning system (GPS) collars for range science is greatest if the corresponding activity of the animal can be inferred. We evaluated Lotek GPS collars, which incorporate motion sensors to predict activity of cows on extensive rangeland in the United States and Israel using synchronized field observations. The best statistical models used distance and motion sensor data and were able to correctly classify almost all grazing observations, although other activities were sometimes misclassified as grazing. Grazing, traveling, and resting activities of free-ranging cattle can be inferred with reasonable accuracy from data provided by Lotek GPS collars.

### **Cattle and Salmon I: Cattle Distribution and Behavior in a Northeastern Oregon Riparian Ecosystem**

Teena M. Ballard and William C. Krueger

When an endangered or threatened species is present, special care in grazing practices is recommended to avoid damage to the species. Often grazing is prohibited in an attempt to protect the endangered species. We studied cattle grazing behavior for 2 years in a riparian pasture to quantify their activities and to interpret how their behavior would affect chinook salmon during the spawning period. The pasture was stocked at a level that maximizes sustainable grazing. Direct interactions between cattle and salmon were rare. Defecation directly into the stream by cattle was slight. Cattle grazing in this environment did not appear to disadvantage chinook salmon spawning success.

### **Cattle and Salmon II: Interactions Between Cattle and Spawning Spring Chinook Salmon (*Oncorhynchus tshawytscha*) in a Northeastern Oregon Riparian Ecosystem**

Teena M. Ballard and William C. Krueger

It is important to understand the potential impacts of livestock grazing on threatened and endangered species. To prevent damage to populations of chinook salmon, grazing is usually controlled or prohibited in pastures where cattle have access to a spawning stream during the spawning period. We studied direct interactions between cattle and chinook salmon to determine if cattle disturbed spawning salmon or caused physical damage to their spawning sites. There were

no apparent negative impacts on integrity of salmon spawning behavior or reductions in salmon spawning caused by cattle grazing near the spawning sites of chinook salmon.

### **Survival of *Escherichia coli* in Beef Cattle Fecal Pats Under Different Levels of Solar Exposure**

Cindy L. Meays, Klaas Broersma, Rick Nordin, and Asit Mazumder

Understanding the survival and transport of *E. coli* in feces on land and in water is important when trying to assess contamination of water by grazing animals. A fecal pat experiment was conducted in July and August of 2003, to investigate the survival of *E. coli* under four levels of solar exposure controlled by using shade cloth. By the end of the experiment (day 45), fecal pats under the 0% shade cloth had the lowest *E. coli* concentrations followed by the 40, 80, and 100% treatments (0.018, 0.040, 0.11, and 0.44  $\times 10^6$  colony forming units (CFU)  $g^{-1}$  respectively). Scientific knowledge from experiments directed at the survival and transport can be applied to improve management plans and reduce both the impact of fecal pollution on water quality, and risk associated with human health.

### **The Use of Brush Management Methods: A Texas Landowner Survey**

Urs P. Kreuter, Heidi E. Amestoy, Mort M. Kothmann, Darrell N. Ueckert, W. Allan McGinty, and Scott R. Cummings

Adoption of effective brush management methods is critical to achieving many rangeland management objectives, but landowners have often been reluctant to adopt new practices. A questionnaire was mailed to 1,058 landowners in 49 Texas counties to identify factors that influence land management decisions, especially with respect to brush management practices. Respondents indicated that kind of brush and cost of brush control were important factors affecting the selection of preferred treatment type and that user-friendly information and cost effectiveness had led to the increased adoption of individual plant treatments. This suggests that the adoption of sound rangeland management practices is dependent on the development and effective dissemination of user-friendly information about low-cost techniques that produce quick results.

### **Seedling Growth of Two Honey Mesquite Varieties Under CO<sub>2</sub> Enrichment**

Justin D. Derner, Charles R. Tischler, H. Wayne Polley, and Hyrum B. Johnson

Honey mesquite (*Prosopis glandulosa*) is a leguminous shrub that has invaded many former grasslands in the southwestern United States. An experiment was conducted to determine how varieties from wet and dry environments respond to increased levels of atmospheric carbon dioxide (CO<sub>2</sub>).

Although CO<sub>2</sub> enrichment did not exaggerate growth differences between varieties, mesquite seedlings possess the capacity to markedly respond to CO<sub>2</sub> enrichment. The greater root depth of mesquite seedlings, exposed to CO<sub>2</sub> enrichment confers a competitive advantage to these seedlings over grass seedlings suggesting that honey mesquite should continue to aggressively encroach into grasslands in future CO<sub>2</sub>-enriched environments.

### **Fourwing Saltbush Seed Yield and Quality: Irrigation, Fertilization, and Ecotype Effects**

Joseph L. Petersen and Darrell N. Ueckert

Fourwing saltbush (*Atriplex canescens*) seed yield and quality are highly variable from harvests of wildland stands. We studied the effects of irrigation, fertilization, and ecotype selection on seed yield and quality and plant mortality in an experimental seed orchard in west-central Texas. Selection of an adapted ecotype was of more importance than irrigation or fertilization, and constancy of superior reproductive traits of parental plants was not exhibited by clones. Identification of effective technology for seed orchards could enhance the quality and quantity of seeds for restoration of degraded rangelands.

### **Nutritive Value of *Desmanthus* Associated With Kleingrass During the Establishment Year**

E.A. Gonzalez-Valenzuela, M.A. Hussey, and J.A. Ortega-S.

Seasonal variation in production and quality of warm-season grasses is a limitation for livestock productivity. We evaluated the nutrient content of kleingrass and bundleflower mixtures during the establishment year. The crude protein (CP) concentration of *Desmanthus* leaves was greater than Illinois bundleflower; however, the CP on a whole-plant basis was greater in the Illinois bundleflower. Associations had greater CP yield than kleingrass monoculture. The legumes did not affect kleingrass nutrient content when established in association; however, the high CP of both legumes and their high levels of calcium (Ca) and magnesium (Mg) may help improve the animals' diet when grazing kleingrass–*Desmanthus* associations.

### **Research Note: Plant Adaptation Regions: Ecological and Climatic Classification of Plant Materials**

K.P. Vogel, M.R. Schmer, and R.B. Mitchell

Rangeland and restoration project managers often lack resources to determine adaptation areas for plant materials because of the number of species that are used and the large geographical areas that are serviced. Ecoregion and plant-hardiness zone classification systems integrate climatic and geographic variables that determine plant adaptation. Plant Adaptation Regions (PARs) were developed for the United States by merging a widely used ecoregion map and the US Department of Agriculture Plant Hardiness Zone Map. Based on their geographic origin, plant materials can be classified for their general adaptation areas using PARs. A PAR map is available in both conventional and geographic information system (GIS) format.

### **Research Note: Spring Habitat Requirements of Captive-Reared Attwater's Prairie Chicken**

Mitchell A. Lockwood, Michael E. Morrow, Nova J. Silvy, and Fred E. Smeins

Knowledge of range sites and management practices preferred by pen-reared Attwater's prairie chickens is crucial when considering release sites. Fine-scale habitat use of pen-reared Attwater's prairie chickens was evaluated in Colorado County, Texas. Potential release sites should be managed to produce vegetation structure with an obstruction of vision < 15 cm, plant height < 67 cm, litter depth < 2.7 cm, and bare ground < 16%. Otherwise, there is a high likelihood of liberated Attwater's prairie chickens dispersing from release sites.

### **Research Note: Sire Influence on Juniper Consumption by Goats**

Chad R. Ellis, Royce E. Jones, Cody B. Scott, Charles A. Taylor, Jr., John W. Walker, and Dan F. Waldron

Goats avoid eating redberry juniper (*Juniperus pinchottii* Sudw.) when other palatable forages are available but will increase intake of juniper when exposed to the plant for several days. The purpose of this study was to determine the influence of sires on juniper consumption. Freshly weaned Boer-cross goats from different sires were fed juniper in individual pens for 10 days. Heritability of juniper consumption was low. Offspring from different sires consumed similar amounts of juniper on a daily basis. A sire's ability to consume juniper does not appear to affect their offsprings' acceptance of juniper. ♦