DIVISION OF AGRICULTURE
RESEARCH & EXTENSION
University of Arkansas System

Agriculture and Natural Resources

FSA3165

Forage Management on Small Acreages

Jonathan Kubesch
Assistant Professor – Forage, Animal Science

Bronc Finch
Assistant Professor – Soil Fertility

Danny Griffin
Van Buren County Staff Chair

Scott Hayes
Drew County Extension Agent - Agriculture

Harley Warren
Saline County 4-H Agent

Arkansas Is Our Campus

Visit our web site at:
https://www.uaex.uada.edu

Introduction

Individuals and families who choose to move to smaller acreages from urban or suburban settings may do so with the desire to have livestock. Often families are moving onto properties larger than the quarter-acre suburban lot, but smaller than 10 acres. These small acreages can support livestock production, but forage management experience and goal setting may not match that capacity.

Many subdivisions or small acreages have low soil fertility, weak pasture stands, and a legacy of reduced production. Frequently smaller parcels cannot support the herds and flocks of the new owners without aggressive supplementation with hay and purchased feeds. These extra costs can strain the operational budget and reduce the pleasure that hobbyists, homesteaders, and small farmers might gain from their farms.

As new landowners identify the resources available on these small acreages, forage management may feel impossible at this spatial scale. While principles of forage growth and livestock production apply across spatial scales, special considerations are warranted to adjust and apply Extension recommendations. This factsheet aims to provide practical suggestions on those adjustments and applications.

Set an Appropriate Stocking Rate Across all Livestock on the Property

Arkansas pastures can be expected to produce 2 to 4 tons acre^{-1} Horses and cattle individually require at least 3 acres per year, assuming typical grazing management (Table 1). Sheep or goats individually require ~0.5 acres (Table 1). Since many small farms use novel breeds that are much larger or smaller than popular commercial breeds, stocking rates need to be adjusted in terms of animal demand rather than the number of head. The total number of livestock on a property determines the carrying capacity, so trade-offs may be necessary to prioritize the desired classes of livestock. For example, a mixed cattle and sheep operation might have three animal units consisting of two cattle and two ewes that will require nine acres.

The carrying capacity of a farm can be increased by importing stored feed and hay onto the property. However, these external expenses are often ineffective given the potential return of the increased herd size. A Saline County demonstration found that ~80% of the feed needed to meet the requirements of two growing steers on 6 acres had to be purchased from off the property. This extreme example might be justified if the animals can be marketed at a higher value than is currently seen in most livestock markets. Furthermore,

Animal Species	Animal Unit (AU)	Acres Needed to Support Animal*
Horse	1.3	3-5
Beef cows	1.3	3-5
Ewes or does	0.2	0.3-0.6

Table 1. Animal species, animal units, and acres needed to support an individual animal.

*This assumes pasture grows 2-4 ton acre^{-1} annually, pastures are effectively utilized with rotational stocking, and animals graze for 300 days on their dry matter intake. Adapted from https://agrilife.org/agnewsandviews/files/2018/06/Exotics-wildlife-livestock-AU-chart1.pdf.

this approach often leads to the development of heavy use areas where forage production is limited despite the nutrient loading. Landowners should determine whether the pasture is a feed resource for livestock or an exercise lot; the former approach has been repeatedly seen as preferable (Figure 1).

Identify Baseline Resources on the Property

Small-acreage pasture stands frequently stem from lax management. Weed and brush encroachment is common in older fields. A lot of development is occurring on recently cleared timber ground. Fencing and water are often yet to be developed. Some properties may have shade trees or a barn, but frequently this infrastructure is absent. Often these components are prioritized over the need to assess the pasture. A productive pasture stand can often be the most challenging component of a grazing system to develop (Figure 1).

Taking inventory of forage composition is an excellent first step to developing a grazing system. In addition to the pasture composition, forage must be estimated. A pasture inventory can provide the botanical composition of the pasture, after which a soil test can be used to estimate soil fertility levels. Additionally, an estimate will allow the landowner to understand how much "feed" is present in the acreage. Once the pasture composition is known, fertilizers and herbicides can be applied to favor the preferred pasture composition. Pastures require some level of fertility and weed control investments annually to support or improve the forage stand. When weeds exceed 15-20% of the stand, a control strategy is warranted. When forage species are less than 40% stand, the pasture needs to be fully renovated. For a forage inventory template, please visit https://www.uaex.uada.edu/farm-ranch/animals-forages/pastures/JJennings%20-%20NEW%20LOGO%20Pasture%20inventory%20sheet%20portait%20version%202014.pdf

Figure 1. Stockers grazing annual ryegrass on a six-acre farm in Saline County.

Pasture renovation—simply the partial suppression or complete elimination of the existing pasture to plant new forages—can require investments in tillage, seed, herbicides, fertilizer and time. Renovation knocks a field out of production between 60 days and a year and should be pursued only when a pasture is partially functional. Different approaches are available for renovation. Please refer to FSA3134, *Interseeding Clover and Legumes in Grass Sod*, and FSA3164, *Tips & Techniques for Forage Plantings*, for more information.

Soil testing is a great way to identify potential fertilizer and lime needs and prioritize investments. Soil samples can be submitted to the UADA Marianna Soil Test Laboratory through the local county extension office at no cost to the landowner. The results from a representative soil sample will inform the exact needs of the fields. For more information on soil testing, please refer to FSA2121, *Test Your Soil for Plant Food and Lime Needs.*

Invest in a Productive Pasture Stand

On small acreage, it may be harder to source or handle some of the lime and fertilizers commonly available. For example, agricultural lime in Arkansas is generally 47% to 57% RNV, whereas pellet lime can be as high as 90% RNV. For more information on liming materials, please refer to FSA2201, *Not all Liming Materials are Created Equal*. Not all liming materials are created equal. Lime should be applied during the dormant or fallow seasons, typically during the fall to allow for winter precipitation to improve incorporation. Phosphorus (P) and potassium (K) fertilizers can be applied at planting or spring green-up, but can also be split into in-season

applications if needed. Nitrogen should be applied through split applications, at green-up and every 4 – 6 weeks of grazing, to target plant needs and reduce potential losses. Pasture maintenance crop notes provided on soil tests provide guidance to help match fertilizer management to crop need and animal movement through pastures.

Hay feeding and other purchased feeds can help to import nutrients onto smaller farms. Often grains or commodity feed blends will help to import P to the farm. Hay contains high levels of K, which can be cycled through the animals to the soil as part of the feeding process. Further, hay can serve as an organic amendment, improving soil structure, water infiltration, and providing carbon for soil microbiology. For more information about the fertilizer value of hay, please refer to FSA2209, *Estimating Nutrient Removal of Hay Production in Arkansas*. Farms with a history of poultry litter application or currently maintaining poultry often have high soil test P levels in the surrounding soils which should be considered when planning fertilizer applications, especially in or near watershed areas. Applying the manure from confined swine or poultry to pastures or moving these species through pasture spaces can improve nutrient cycling in pastures, but supplemental nutrients may be needed to build soil nutrient levels over time. Soil tests and forage inventories may be beneficial for guiding hay feeding, grazing patterns, and manure applications.

Many small-acreage landowners are unlikely to have sufficient training or licensing to apply most herbicides. As such, proactive weed control is essential to prevent weed encroachment. Prioritizing cultural practices can help maintain an aggressive, actively growing forage stand. Simple weed control programs on small acreage should prioritize keeping easily killed weeds from encroaching into pastures and targeted applications on more challenging weeds. Most broadleaf weeds afflicting grass pastures can be controlled with selective herbicides such as 2,4-D. For more detailed information on herbicides, please consult MP44, *Recommended Chemicals for Weed and Brush Control.*

Irrigation is often impractical for forage production at large scales but may make economic sense when used to strategically improve establishment of cool-season annual grasses in late summer or to increase forage production in slow periods of the calendar year. The costs of irrigation should be compared to the value of the forage produced as well as the practical feasibility. It takes 27,154 gallons of water to apply one inch of water per acre, which can provide 600-1000 lb acre^{-1} of additional forage growth, according to Missouri and Nebraska resources. This rate of irrigation over areas larger than an acre or two can go beyond what many home wells and farm ponds can provide in a timely manner. A 4-ft deep, 1-acre pond could provide enough water to provide ~5” of irrigation water over a single acre. Arkansas hay producers generally target 1-2” of rainfall and irrigation weekly for optimal growth. However, this rate of use would empty the pond well before rainfall could refill it. Municipal or city water is often too costly to justify watering pastures, unless the cost of stored feed exceeds that of the water used for additional forage growth.

How Does the Grass Grow?

No single grass grows consistently throughout the year. Cool-season grasses, such as tall fescue and annual ryegrass, grow most quickly in spring and fall. Warm-season grasses, such as bermudagrass and bahiagrass, grow most quickly in the summer. Tall fescue, bermudagrass and bahiagrass are the predominant forage species found on small acreages. These species are often considered a forage base, or the primary plant around which to base management decisions. Complementary grazing systems of cool- and warm-season grasses are often necessary to provide a more consistent forage supply.

Most small acreages will have a consistent forage base, and so the appropriate complementary forage will often be intuitive: when does the grass grow slowest over the calendar year? North of I-40 a warm-season forage will be needed to complement tall fescue. In addition to limited summer growth, tall fescue acreage also reduces animal performance in the summer. Most fescue acreage in Arkansas have a toxic endophyte that negatively affects animal health, particularly in the summer. South of I-40 a cool-season forage will be needed to complement bermudagrass or bahiagrass. Warm-season perennials often have reduced nutritive value relative to cool-season perennials.

Complementary forages need to be managed in separate fields or out-of-season with the growing season of the forage base. Mixing perennial grasses in one stand often results in competition and suppression of one or more of the desirable forages. Maintaining a field of complementary perennial or repeatedly overseeding annual forages can maintain out-of-season supplies. Cool-season perennial stands can be overseeded with improved crabgrass or annual lespedeza. For more information, please refer to FSA3138, *Crabgrass for Forage,* and FSA3050, *Forage Lespedeza*. Warm-season perennial stands can be annually overseeded with annual ryegrass, annual clovers, or small grains. For more information, please refer to FSA3137, *Annual and Perennial Forage Clovers for Arkansas,* and FSA3064, *Using Cool-Season Annual Grasses for Grazing Livestock*. When overseeding stands, the annual forage must be kept in balance with the perennial forage base, which can be more challenging in cool-season systems than in warm-season systems.

Rotational Stocking is a Necessity

Rotational stocking—or rotational grazing—is a critical component of improving forage utilization and maintaining pastures on small acreages. There is evidence that utilization can double under rotational systems compared to continuous systems. Additionally, pasture growth can be increased

~30% over continuous systems. Developing an effective rotational system starts with developing strong perimeter fencing and water sources reasonably positioned across the pastures. Most benefits of rotational stocking are achieved by maintaining at least three fields through which the animals move. Most Arkansas forages will benefit from grazing periods of less than seven days in duration and rest periods between 28-35 days. Subdivisions within pasture areas can be accomplished with temporary electric fencing, which can be set up and removed to accomplish field operations. Existing recommendations across Arkansas forages suggest a 4-8 paddock system, which can be accomplished with existing fencings, as well as temporary electric fences.

Using 2026 retail values for labor, stored feed costs, typical utilization, and the production of stands, moving once or twice a week is justified for most livestock classes. There are diminishing returns to moving more frequently than twice a week in terms of the improved forage utilization relative to the labor.

Rotational stocking will involve adjusting grazing and rest periods to reflect regrowth rates that vary over the year. In drought and slumps of growth, shorter grazing periods and longer rest periods will be needed. In wetter periods or humps of growth, livestock may need help keeping up with the pasture. Excess growth may need to be clipped immediately following each grazing period to maintain the nutritive value of the stand.

Having a permanent or alternating sacrifice lot where animals can be fed when pasture growth is limited becomes more critical on smaller acreage where typical pasture damage will affect a larger proportion of the total grazing area. Feeding hay on the weakest paddock within a system and then reseeding to a new forage is an increasingly popular practice to better capture the nutrients from purchased feeds.

Purchasing Hay is Preferable

Stored feeds and/or hay are the costliest component of livestock production in Arkansas and the southern U.S, Hay-feeding can be reduced through improved grazing management, though some hay will likely need to be fed because year-round forage growth is unlikely in this state. It is uneconomical for most small acreages and smaller herds or flocks to justify owning equipment and making hay. Walk-behind harvesters and balers are available, but typically at a retail price similar to conventional tractor equipment.

Custom harvesting might be an opportunity to harvest hay on small acreages but can often be challenging to coordinate on smaller fields. Custom harvesters will often pursue larger properties to take advantage of economies of scale. Economic budgets for hay production are available from across Arkansas, such as those created through the in-state hay verification program. More information on the hay verification program can be found at FSA3161, *Economic Summary of 2022 Arkansas Hay Verification Program*, MP582, *Summary of the 2023 Arkansas Hay Verification Progam,* MP587, *Summary of the 2024 Arkansas Hay Verification Progam*, and MP591, *Summary of the 2025 Arkansas Hay Verification Progam.* Additionally, enterprise budgets for warm-season hay sold by the ton or by the bale have been generated based on hay verification results. The budgets can be found at https://www.uaex.uada.edu/farm-ranch/economics-marketing/farm-planning/budgets/livestock-budgets.aspx.

Hay purchases are described in terms of how far removed a bale is from the point of harvest. Bales can be purchased from the field, in the barn, or from a retail point of sale. Purchasing hay from the field will be the cheapest way to bring hay onto small acreage. Regardless of source, a representative sample should be gathered for forage testing, following the procedure outlined in FSA3114, *Test Hays for Nutrient Composition Before Feeding*. Results can be evaluated in the Hay Quality Calculator on the Arkansas Forage Advisor webpage to determine how well the hay will meet animal nutrient requirements. Purchased hay and other stored feeds should be stored off the ground and under cover from the elements whenever possible. Storage and feeding losses can account for up to half of hay brought on the farm never making it into an animal.

Summary

- Great pastures are possible on small acreages.
- An appropriate stocking rate is critical to maintaining pasture stands.
- Identify the baseline resources on a property.
- Invest in productive pasture stands.
- Different forage plants will grow at different points in the year.
- Rotational stocking is a critical component of maintaining stands.
- Purchasing hay will likely make more sense than making hay.

Forage management on small acreages will follow the same guiding principles as needs to be done on larger acreages. For more information on developing a grazing system, please refer to FSA3139, *Arkansas 300 Days Grazing System – Getting Started*. Adjusting and applying Extension recommendations to a smaller land base requires clear goal setting and a commitment to developing a functional grazing system.

DR. JONATHAN KUBESCH, is assistant professor of forage, BRONC FINCH is an assistant professor of soil fertility. Both are with the University of Arkansas Division of Agriculture in Little Rock. DANNY GRIFFIN is the county Van Buren County extension agent - staff chair. SCOTT HAYES is a Drew County extension agent - agriculture. Harley D. Warren is a Saline County 4-H agent.
FSA3165-PD-7-2026