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Stockedpiled Bermudagrass for Fall-Winter: Continuous Stocked vs Strip-Stocked Methods of Utilization

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Warm-season perennial grasses such as bermudagrass are the basic forage for pastures in much of the eastern half of Texas and throughout the lower southeastern US. Hybrid bermudagrasses such as 'Coastal', released in 1943 by Dr. Glenn Burton at USDA/ARS in Tifton, GA, have proven to be productive, responsive to nitrogen fertilization, persistent, and have adequate nutritive value for livestock performance. Livestock operations, especially beef cattle, graze actively growing bermudagrass during spring-summer-early fall. Managers make efficient utilization of the forage production cycles by harvesting hay during peak growth periods. Hay making provides a stored forage product for use or sale, enhances nutritive value of the regrowth forage for grazing or haying, and provides a management strategy to avert risk during the winter period. Bermudagrass pastures become dormant with the first killing frost and generally to not emerge as an active-growing forage until after the last freeze in the spring. Thus, livestock managers must buffer the bermudagrass dormancy period with cool-season perennial or annual forages and/or hay. Numerous research experiments and demonstrations have been conducted since the 1950's on best management practices for harvesting bermudagrass for hay. Once hay has been made as rectangular, small bales, large round bales, etc., hay must be moved from the hay meadow and stored until time of feeding in the late-fall and winter months. Methods of feeding hay have received substantial attention by scientists to reduce hay waste without adverse, negative effects on animal performance. All forage intended for fall-wintering does not have to be harvested as hay. Alternative management strategies that target grazing in contrast to harvesting hay have been incorporated in stockpiling or deferred-use of forages.

Stockpiling Forage

Forage that has been deferred and not grazed or hayed during the late-summer and early-fall has been termed stockpiled forages. Some of the management strategies for stockpiling and utilization of bermudagrass has been presented by several research and extension faculty such as Redmon in Texas (http://forages.tamu.edu), Jennings et al in Arkansas (FSA 3133), Hancock in Georgia (CSS-2009, F042), and Rouquette et al in Texas (2004). Bermudagrass that is to be stockpiled, for example, may be fertilized in late summer and allowed to grow ungrazed and un-harvested until late fall and the onset of winter. Thus, forage that is to be used in a stockpiled method preferably should have been allowed to grow for 6 to 8 weeks prior to first killing frost. Stockpiled forage needs to accumulate mass, but with a modest level of nutritive value. Forage deferred for 10 to 12 weeks is very mature and with low nutritive value.

Method of Using Stockpiled Forage

Management strategies for using stockpiled forage may vary from an intensive, daily allotment of forage mass for the herd to an "open gate policy" wherein all cattle have unrestricted access to all stockpiled forage. Restricted use of stockpiled forage using electric fencing has been shown for either bermudagrass or tall fescue in Arkansas by Jennings et al (FSA 3133). These strategies involve estimates of available forage mass, number and weight of cattle, and estimates of daily forage intake by the herd. The information they provided for the allocation of a portion of the available stockpiled forage includes: 1) estimates of daily forage intake by animals; 2) electric fencing requirements; 3) estimates of forage mass; 4) land area required for daily and weekly DM requirements by animals; 5) estimates of forage needed based on desired grazing utilization; and

6) calculations to estimate stockpiled acreage and electric fencing needs for twice-a-week allocation of new forage area. Rouquette et al (2004 a, b) conducted a 2-year study to evaluate the late-summer stockpiling of bermudagrass for use from mid-October to mid-December (Year 1) or to late January (Year 2) with fall-calving cows. Two methods of utilization the stockpiled bermudagrass included: 1) Two replicate Coastal bermudagrass that were grazed free-access, continuously (CONT) without any restrictions on space allocation; and 2) Coastal bermudagrass that was strip-stocked (STRP) to restrict access to forage to attain a desired level of utilization. For the STRP method, the pasture (meadow) was electric fenced, pre-stocking, into four strips. Cattle were allowed initial access to stockpiled bermudagrass on October 15 in Year 1 and October 6 in Year 2. Total forage mass was nearly 6000 lbs/ac in Year 1 and 7150 lbs/ac in Year 2 in STRP method. The management strategy for STRP in this study was to allow cows and calves access to about 25% of the stockpiled area at initiation of stocking. Bermudagrass forage conditions and visual appraisal of forage height and leaf:stem components were the criteria used for movement decisions. At the time of allowing cattle access to another STRP area, existing, grazed stockpiled forage was about 4-inches in height and had an estimated 10% leaf and 90% stem. At the time of opening a new stockpiled area for STRP cattle, the previous strip remained open and available for regrazing if cattle desired. The 2-year dataset (Rouquette et al. 2004) are presented in Table 1 (STRP) and Table 2 (CONT). At the termination of grazing the stockpiled forage, there was complete utilization of leaves with only stems remaining in the sward.

The STRP technique used in this study was an effective method to control and limit cattle access to available forage mass. The overall efficiency of forage utilization in this 2-year study was similar for both STRP or CONT. The primary consideration in any grazing scenario should be the resultant animal body condition and the expected/desired performance of the cow herd. Forage intake should not be restricted for a prolonged period for the sake of any management strategy that is designed to enhance efficiency of utilization. When incorporating any method of strip grazing on limited-access to the pasture, providing a "new strip" or allowing additional previously ungrazed area for stocking should be based on stubble height and percent leaf remaining in the grazed areas.

Nutritive Value of Stockpiled Forage

The nutritive value of the stockpiled forage will provide management with knowledge of whether or not to provide energy and/or protein supplementation. Under grazing conditions in which forages are actively growing, cattle select leaves which are higher in nutritive value compared to stems. In addition, when given adequate supply of forage under low to moderate stocking rates, cattle will graze previously grazed areas (regrowth) in preference to more mature forage. Stockpiled bermudagrass has limited-restricted opportunity to make forage regrowth due to season of the year and advancing killing freeze. Thus, awareness of nutritive value is important for management decisions related to grazing management, supplementation, etc.

Table 3 shows the crude protein (CP) and acid detergent fiber (ADF) of the various strata of bermudagrass (top, mid, and bottom). The CP and ADF of stockpiled bermudagrass was similar to that from numerous other studies and analyses of bermudagrass for the top, mid-, and bottom thirds of the stand at this stage of maturity. With advancing date, the forage available for selection had decreased CP and increased ADF.

As shown in Tables 1 and 2, cattle were forced to graze the bottom strata of the forage that has deficient nutrient status implications for most all classes of cattle. Although forage available for consumption under CONT was low in nutritive value, the forage was slightly higher than that in STRP. This is a similar nutritive value scenario for forage in continuous vs rotationally stocked bermudagrass pastures. Thus, forcing cattle to consume low quality forage can result in loss of weight and body condition score.

Nutritive value of bermudagrass is affected primarily by cultivar, physiological, and chronological maturity. In addition, CP is also affected by soil N and/or fertilizer N applications.

Stockpiled bermudagrass does not improve in nutritive value; therefore, management should have knowledge via forage test of existing nutritive value. Stocking methods can then be implemented that do not force prolonged consumption of low nutritive value forage.

Implications of Utilization Methods

The desire to obtain maximum forage utilization on an area (pasture) prior to movement to another area, and/or the reluctance to offer hay often has negative implications with respect to body condition score and the desired-expected level of performance from lactating cows. Although strip-stocking can be a good method to optimize efficiency of use of stockpiled forage, it can also lead to weight loss situations that can negatively impact cow condition, lactation, and rebreeding.

References

1. Coblentz, W., K. Coffey, G. Davis, and J. Turner. 1999. Evaluation of stockpiled bermudagrass after hay and pasture summer management. Arkansas Animal Science Department Report Research Series 464:43-45.
2. Hancock, D. 2009. Stockpiling bermudagrass for fall grazing. Univ. of Georgia Cooperative Extension.
3. Jennings, J., K. Simon, P. Beck, S. Gadberry, S. Jones, T. Troxel, D. Philipp. 2014. Grazing stockpiled forages to reduce hay feeding during fall and winter. Univ. of Arkansas Res. & Ext. FSA3133. http://www.uaex.edu.
4. Lalman, D.L., C.M. Taliaferro, F.M. Epplin, C.R. Johnson, and J.S. Wheeler. 2000. Review: Grazing stockpiled bermudagrass as an alternative to feeding harvested forage. Proceedings of the American Society of Animal Sciences. Available online at http://www.caes.uga.edu/commodities/fieldcrops/forages/questions/042FAQ-stockpilebermuda.pdf (Verified 1 July 2016).
5. Redmon, L.A. Stockpiling bermudagrass or bahiagrass for fall/winter grazing. Texas A&M AgriLife Ext. Serv. http://forages.tamu.edu.
6. Rouquette, F. M., Jr., J. L. Kerby, and G. H. Nimr. 2004 a. Continuous stocked vs strip-stocked stockpiled Coastal bermudagrass during fall-winter. Overton Res. Ctr. Tech. Rept. 2004-1:57-58.
7. Rouquette, F. M., Jr., G. H. Nimr, and J. L. Kerby. 2004 b. Nutritive value of stockpiled bermudagrass under continuous or strip-stocked management. Overton Res. Ctr. Tech. Rept. 2004-1:59-60.

Table 1. Two-Year strip-stocking of stockpiled Coastal bermudagrass pasture (PAS) during the fall-winter.

				CANOPY DM					
PAS	**GRZ[1] STATUS**	**DATE**	**AVG HT**	**TOP 1/3**	**MID 1/3**	**BOT 1/3**	**TOTAL**	**STEM**	**LEAF**
		Year 1	**(in)**	**---------- (lbs/ac) ----------**				**------- % --------**	
STRP I	INIT	10-15	10	696	1726	3487	5909	55	45
	NEXT	10-29	3.6				1394	86	14
STRP II	INIT	10-29	11.5	636	1822	3446	5904	55	45
	NEXT	11-11	6.3				2182	75	25
STRP III	INIT	11-11	13	816	1596	3974	6386	60	40
	NEXT	11-26	3.8				1363	94	6
STRP IV	INIT	11-26	13.8	912	1982	3127	6022	60	40
	FINAL	12-12	3.4				1392	100	0
		Year 2							
STRP I[2]	INIT	10-06	12	638	2194	4318	7150	55	45
	NEXT	11-03	4.3				2299	83	17
	FINAL	1-23	4.0				1030	100	0
STRP II	INIT	11-03	12.5	696	2030	4625	7351	56	44
	NEXT	11-25	6.0				3442	95	5
	FINAL	1-23	4.0				1159	98	2
STRP III	INIT	11-25	12.5	773	2237	5143	8153	57	43
	NEXT	12-17	4.6				1932	99	1
	FINAL	1-23	4.3				1159	100	0
STRP IV	INIT	12-17	11.9	1176	2225	3039	6440	63	37
	FINAL	1-23	4.8				2002	100	0

[1]Grazing status (GRZ) of strips at initiation of grazing (INIT) and opening of the next strip area (NEXT).
[2]Initiated feeding round baled hay *ad lib* on 02 Jan and protein supplement on 24 Oct in Year 2.

Table 2. Two-year continuous (CONT) stocking of stockpiled Coastal bermudagrass pasture (PAS) during the fall-winter.

			CANOPY DM					
PAS	**DATE**	**AVG HT**	**TOP 1/3**	**MID 1/3**	**BOT 1/3**	**TOTAL DM**	**STEM**	**LEAF**
	Year 1	**(in)**	**---------- (lbs/ac) ----------**				**--------- % ---------**	
CONT-1	10-15	9.4	638	982	1378	3998	55	45
CONT-1	10-32	5				2074		
CONT-1	11-26	2.5				1344		
CONT-1	12-12	2.9				816	99	1
CONT-2	10-17	14.3	434	1454	2174	4063	60	40
CONT-2	10-31	7.5				3672		
CONT-2	11-26	4.4				1613		
CONT-2	12-12	5.5				1622	94	6
	Year 2							
CONT-1[1]	10-1	12.5	734	2069	4742	7546	50	50
CONT-1	11-7	4.1				2078	81	19
CONT-1	11-25	4.1				1217	90	10
CONT-1	12-17	3.3				1210	99	1
CONT-1	1-23	2.5				775	100	0
CONT-2[2]	10-17	13.1	730	1512	3074	5316	50	50
CONT-2	11-11	3.5				1380	93	7
CONT-2	11-25	3.4				1298	96	4
CONT-2	12-17	3.3				938	99	1
CONT-2	1-23	3.8				485	100	0

[1]Initiated feeding round bales ad lib 7 Nov and protein supplement 24 Oct in Year 2.
[2]Initiated feeding round bales ad lib 24 Oct and protein supplement 14 Nov in Year 2.

Table 3. Percent Crude Protein and Acid Detergent Fiber (ADF) of top, middle (MID), and bottom (BOT) thirds of stockpiled bermudagrass (BG) canopy under continuous (CONT) or strip stocking.

STOCKING METHOD	**DATE**	**BG CANOPY**			**BG CANOPY**		
		TOP	**MID**	**BOT**	**TOP**	**MID**	**BOT**
	Year 1	**---------- % Protein ----------**			**---------- % ADF ----------**		
CONT	10-15	10.8	10.1	8.8	34	35	36
STRIP I	10-15	10.6	10.3	8.3	32	33	36
STRIP II	10-28	10.0	11.0	8.0	34	33	35
STRIP III	11-11	8.2	7.6	6.2	35	35	36
STRIP IV	11-26	8.6	7.5	7.6	36	35	38

Table 4. Percent Crude Protein and Acid Detergent Fiber (ADF) of stockpiled bermudagrass at initiation (INIT) and movement of cattle on strip stocked vs. continuous stocked (CONT) areas.

STOCKING METHOD	STATUS[1]	DATE	CRUDE PROTEIN	ADF
		Year 1	**%**	**%**
CONT		10-15	10.5	35
STRIP I	INIT	10-15	9.2	35
STRIP I		10-29	7.5	37
CONT		10-29	6.9	39
STRIP II	INIT	10-29	9.1	34
STRIP II		11-11	7.5	39
CONT		11-11	7.7	38
STRIP III	INIT	11-11	7.0	36
STRIP III		11-26	7.4	40
CONT		11-26	7.2	42
STRIP IV	INIT	11-26	7.7	37
STRIP IV		12-12	5.9	43
CONT		12-12	7.0	42

[1]Bermudagrass sampled at initiation (INIT) of stocking each strip. Forage was also sampled from continuous (CONT) stocked, and in strips that were continually stocked after opening of a new paddock.