Virginia Cattle Industry Board

Final Report

9/30/2022

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Title: Creep-Grazing Brassica and Small Grain Forages for Fall-Born Calves (22-1)
Project Type: ☐ Education ☐ Market Development ☐ Promotion ☒ Research ☐ Youth Development

Original Funding Amount: $7,606
Remaining Balance: $944.28

Objectives and Results:
Were the objectives from the original proposal reached? How? If not, why not? Please discuss any problems or delays. Methods and resulting data should be reported as they pertain to each objective.

Our objective of determining the benefit of creep-grazing winter annual forages for fall-born calves was reached in part. Deer grazing pressure continues to significantly impact the growth and timing of the available forage in the creep-grazing paddocks, which delayed the time that we were able to provide creep-grazing access to the calves in the appropriate treatments. However, we were able to achieve some promising results despite these limitations.

In the second year of the project, we changed the seed mixture and attempted to exclude deer with some additional fencing. The exclusion efforts were only minimally successful, but the forage mixture grew much more vigorously through the fall and spring months.

The four treatments that we included in this project included:

- System 1: continuously stocked, tall fescue-based pastures
- System 2: rotationally stocked, tall fescue-based pastures
- System 3: rotationally stocked, tall fescue-based pastures with one native warm season grass paddock which is overseeded with winter annual forages for calf creep-grazing
- System 4: rotationally stocked, tall fescue-based pastures with one paddock which is seeded with winter annual forages for calf creep-grazing and summer annuals for cow grazing

Each experimental unit (16 acres) was stocked with eight cows, and treatment systems 1, 3, and 4 were replicated three times while treatment system 2 was replicated twice in the first year and three times in year two. Treatment system 4 was sprayed with glyphosate (2 qt/ac + 0.5% surfactant) in October in 2020 and in September in 2021. Creep forage (variety-not-stated rye at 70 lb/ac and rape cv. 'Barsica' at 3 lb/ac) was established in the native grass and winter annual pastures between September 24 – October 5, 2020. The creep forage seed mixture in 2021 consisted of 50 lb/ac oats cv. 'Reeves,' 50 lb/ac triticale cv. 'Surge,' 3 lb/ac rape cv. 'Barsica,' and 15 lb/ac crimson clover cv. 'Dixie.' This mixture was planted in system 4 and in a single paddock in system 3 in 2022. Nitrogen fertilizer was spread on the native grass and winter annual pastures on October 1, 2020 (80 lb/ac) and September 14, 2021 (60 lb/ac). Calves were provided access to creep forage in the native grass and winter annual pastures on April 8 in 2021 and April 1 in 2022. Calves in the continuous stocking treatment occasionally would graze cool season perennial forage by slipping under the single strand of electric wire around the hay feeding area in these

treatment pastures. Following weaning in both years, the cows grazed the creep paddock in treatment system 4 following weaning. A brown-midrib sorghum-sudangrass hybrid was then established and fertilized in these paddocks after the winter annual forage was sprayed.

Calves were weaned from dams on May 4 in 2021 and April 20 in 2022 using a fenceline weaning method. Calves in the native warm season grass and winter annual treatments were provided access to their creep-graze paddocks in addition to another cool season grass paddock. Calves in the rotational stocking and continuous stocking treatments were given access to cool season grass paddocks. Calves were removed from the paddocks 16 and 14 days later in 2020 and 2021, respectively, and re-weighed. While calves were provided access to the creep-grazing paddocks, there was no difference (P=0.7616) in available forage mass between the native warm season grass paddocks (1840 ± 90 lb/ac) and the winter annual paddocks (1880 ± 90 lb/ac), but forage mass increased over time within a season (P=0.0163). There was significantly more forage (P=0.0264) in year two than in year one.

In year one, there was no difference in the percent of the sward as rye (41 ± 11%; P=0.5739), native warm season grasses (2 ± 2%; P=0.2254), clover (7 ± 6%; P=0.2153), winter annual weeds (28 ± 14%; P=0.2685), or bare ground (5 ± 1%; P=0.4226). There was significantly more (P=0.0438) cool season perennial grasses as percent cover in the native grass pastures (29 ± 2%) than in the winter annual forage pastures (13 ± 2%). Forage species composition was not analyzed in 2022, although annual forage germination and production in the single system 3 paddock that was planted was of little significance. The native grass paddocks consisted largely of cool season perennial forages by the winter of the second year. In year one, forage crude protein was similar in the native grass and the winter annual forage pastures (16.5 ± 0.9%). In year 2, forage crude protein tended (P=0.0571) to be slightly higher in the winter annual forage pastures (21.0 ± 0.9%) than in the native grass pastures (17.7 ± 0.9%). Crude protein declined in both pastures over time in both seasons (<0.0001). Forage total digestible nutrients were similar (P=0.2338) in both treatment pastures (64.4 ± 0.7%), but tended (P=0.0841) to be greater in year one than in year two.

Calf weaning weights were adjusted to 205-day age adjusted weaning weights (AdjWW) using the American Angus Association dam age adjustment factors. For this analysis, we calculated 205-day age adjusted weaning weights using the weaning weight collected when calves were removed from weaning paddocks (around two weeks after removing from the dam). Results are reported as means across both years due to no treatment by year interaction.

The AdjWW of calves in the rotational stocking treatment (461 ± 9 lb) were significantly less (P≤0.0028) than the AdjWW of calves in the continuous stocking treatment (505 ± 8 lb), native grass treatment (515 lb ± 8 lb), and winter annual treatment (513 ± 8 lb). There was no significant difference in AdjWW of the calves in the latter three treatments.

With only one year's worth of hay feeding and production data, we are not able to finalize our economic analysis, but we can provide some preliminary figures. Using a partial budget analysis created from the costs incurred by implementing each treatment, we compared the relative profitability of the three treatments to the control treatment (rotational stocking).

We used the VDACS 10-year average prices for steers and heifers by weight class to determine the change in gross returns to calf sales using AdjWW. With an assumed value of hay of $110/ton, we assumed that the continuous stocking treatment would be fed hay for the same amount of time as the rotational stocking treatment while the native grass and winter creep treatment would be fed hay for two less weeks and the winter and summer annual forages treatment would be fed hay for four less weeks.

The significant cost of establishing the summer annuals eliminated the benefit of the increased AdjWW of the calves from that treatment, while providing creep forage in native grass pastures was slightly more profitable per cow than the control treatment in year one but not in year two (**Table 1**). Increasing costs of glyphosate and fertilizer in year two have further negated any improvements to weaning weight from the creep-grazing treatments. These data should be considered as preliminary, due to the assumptions noted above and the limitations of our study due to the wildlife damage to the creep-paddocks.

Table 1: Relative profitability of creep-grazing treatments for fall-born calving systems using a partial budget analysis (all numbers reported as relative difference in dollars per cow-calf pair compared to rotational stocking treatment)

Treatment	***Continuous stocking***		***Native warm season and creep***		***Winter creep and summer annuals***	
	Year 1	*Year 2*	*Year 1*	*Year 2*	*Year 1*	*Year 2*
Variable costs for establishing winter annual forages	$0	$0	$80.67	$47.54	$96.42	$166.53
Variable costs for establishing summer annual forages	$0	$0	$0	$0	$164.23	$193.13
Net benefit of decreased hay feeding days	$0	$0	$25.03	$25.03	$50.05	$50.05
Net change in calf sales	$82.26	$26.73	$85.74	$16.09	$80.93	$17.61
Net annual profitability	$82.26	$26.73	$30.39	-$6.43	-$129.68	-$292.00

Even though we were only able to provide creep-forage to the calves for about 30 days prior to weaning, we still saw an improvement in AdjWW of around 53 lb compared to the rotational stocking treatment. However, the expense of seed and fertilizer eliminate any financial benefit to establishing annual forages for creep-grazing. We are hoping to continue this project one more year to determine the effect of yearly weather patterns on the project results, as well as to fully account for the costs and benefits associated with each grazing system.

Overall Benefit for Virginia Cattle Industry:
Please indicate the number of people that were impacted by or involved with this grant: How will your results improve Virginia's Cattle Industry?

While it is not feasible to measure adoption of the practices presented in this project, the results of this project have been broadly shared to cattle producers in Virginia, including in the Virginia Cattlemen's newsletter, the Virginia Forage and Grassland Council's newsletter, and the 2022 Shenandoah Valley AREC's Field Day Proceedings. Over 130 participants attended the SVAREC Field Day in 2022 and had an opportunity to see this project and learn about the results. Given the increase in input costs this year, the creep-grazing systems are not proving to be profitable. The take-home message for producers to increase profitability is thus to manage input costs and increase the number of days grazing instead of feeding hay.

Activities Associated with Project:
List any activities held in association with this project, including date, type (article, brochure, training, event, etc.), purpose, and any pertinent results.

Virginia Cattle Industry Board
Grant Reporting

The results from this work were shared at the 2022 Shenandoah Valley AREC Biennial Field Day to over 130 participants on August 3, 2022. The work was also published in the Field Day Proceedings, which may be found online at https://www.arec.vaes.vt.edu/arec/shenandoah-valley/arec-updates/2022-field-day-proceedings.html. Additional articles will be published on this work in industry newsletters.

Lessons Learned:
Comment on what worked, what did no work, and what you would do differently.

While creep-grazing for fall-born calves appears to improve calf weaning weights, the additional input costs of these systems reduce their profitability. Additional efforts need to be taken to reduce deer grazing pressure on these winter annual forages.

Future Work:
Discuss continuation of the project or how results will direct future activity.

We have submitted a proposal for a third year of funding from the VCIB. We are hoping to continue this project for the next year to determine the effect of yearly weather patterns on the project results. We might also may be able to distinguish differences between the continuous stocking treatment and creep-grazing treatments if we continue this project for multiple years.

Regions:
Please indicate what Virginia cattle production areas were impacted by this grant activity:
Select all that apply:

☒ District I – Western South West
Buchanan, Dickenson, Lee, Russell, Scott, Smyth, Tazewell, Washington, Wise

☒ District II – Eastern South West
Bland, Carroll, Floyd, Giles, Grayson, Henry, Montgomery, Patrick, Pulaski, Wythe

☒ District III – Southern Valley
Alleghany, Amherst, Augusta, Bath, Botetourt, Craig, Highland, Nelson, Roanoke, Rockbridge

☒ District IV – Northern Valley
Clarke, Frederick, Page, Rockingham, Shenandoah, Warren

☒ District V – Northern Piedmont
Accomack, Albemarle, Arlington, Caroline, Culpeper, Essex, Fairfax, Fauquier, Fluvanna, Gloucester, Goochland, Greene, King and Queen, King George, King William, Hanover, Henrico, Lancaster, Louisa, Loudoun, Madison, Matthews, Middlesex, New Kent, North Hampton, Northumberland, Orange, Prince William, Rappahannock, Richmond, Stafford, Spotsylvania, Westmoreland

☒ District VI – Southern Piedmont
Amelia, Appomattox, Bedford, Brunswick, Buckingham, Campbell, Charlotte, Charles City, Chesapeake, Chesterfield, Cumberland, Dinwiddie, Franklin, Greensville, Hampton, Halifax, Isle of Wight, James City, Lunenburg, Mecklenburg, Newport News, Powhatan, Nottoway, Pittsylvania, Prince Edward, Prince George, Suffolk, Sussex, Southampton, Surry, Virginia Beach, York

Final Budget and Justification:

Virginia Cattle Industry Board
Grant Reporting

Item Type	Original Awarded Amount	Final Amount Spent
Personnel	$3,120	$814.56
Fringe	$242	$0
Travel	$0	$0
Supplies & Materials	$662	$4,668.16
Contractual	$3,582	$1,179
Other	$0	$0
Total	$7,606.00	$6,661.72

[How does the original budget relate to the final? Discuss any differences. Please include source and amount of other supporting funds, facilities, and personnel, if applicable.]

Less labor was required on this project than we originally expected due to help from other funds for staff salaries. Input costs were higher than expected.

Credits: Please list how the Virginia Cattle Industry Board was recognized as a sponsor of this grant project.

The VCIB was acknowledged as the sponsor of this work at the 2022 Shenandoah Valley AREC Field Day and in the Field Day Proceedings. Participants to the Field Day were also informed about the process for applying for VCIB grant funds.