



# CASE STUDY: Giving beef calves a choice of pasture type influences behavior and performance

H. T. Boland<sup>1,2</sup> and G. Scaglia,<sup>3</sup> PAS

Department of Animal and Poultry Sciences, Virginia Polytechnic Institute and State University, Blacksburg 24061-0306

## ABSTRACT

A study was conducted to determine the performance and behavior of spring-born Angus crossbred steer calves during the backgrounding period when grazing endophyte-free tall fescue [*Lolium arundinaceum* (Schreb.) S.J. Darbyshire = *Festuca arundinacea* Schreb.] or alfalfa (*Medicago sativa* L. ssp. *sativa*) monoculture paddocks or when given a choice between the 2 forages grown as adjacent monocultures in paddocks of 50% tall fescue and 50% alfalfa (FA) by area. Steers were fitted with pedometers that recorded percentage of time spent standing, lying, or active and steps per day. These data were subsequently analyzed to estimate time spent grazing. Steers in the alfalfa spent more ( $P < 0.0001$ ) time grazing (39.1%) than did steers in tall fescue (36.5%), whereas steers in FA pastures spent the least amount of time grazing

(33.0%). Consequently, steers in alfalfa monocultures took more ( $P < 0.0001$ ) steps (3,050/d) than did steers in tall fescue (2,892/d), whereas steers in FA pastures took the fewest steps (2,408/d). Steers in tall fescue spent the greatest ( $P = 0.003$ ) amount of time each day lying down (47.6%) compared with steers in FA or alfalfa (45.2 and 45.7%, respectively). Steers grazing in the tall fescue and alfalfa monocultures spent less ( $P < 0.0001$ ) time standing still per day (15.4 and 14.8%, respectively) than did steers in FA pastures (21.6%). Steers grazing alfalfa had less ADG (0.62 kg) than did steers grazing tall fescue (0.82 kg;  $P = 0.04$ ) or FA (0.85 kg;  $P = 0.08$ ). The use of adjacent monocultures in pasture-based livestock production systems has the potential to improve animal performance by modifying grazing behavior as well as ADG.

**Key words:** adjacent monocultures, backgrounding, dietary choice, grazing behavior, performance

30% grass (Rutter, 2006). The use of adjacent monocultures has been an essential tool for determining this dietary preference. Adjacent monocultures allow cattle to self-select their diet without the physical constraints that occur in a mixed sward (Parsons et al., 1994a). The use of mixed swards of grasses and legumes is common in animal production systems. Although mixed swards allow grasses to benefit from the nitrogen fixing ability of legumes, these mixtures are inherently unstable due to differing plant physiology and selective grazing by livestock (Parsons et al., 1991). The legumes face competition in mixed swards with grasses (Fales et al., 1996; Hoveland et al., 1999) and may end up accounting for only 5 to 20% of the forage available in a mixed sward (Clark and Ulyatt, 1985; Nolan et al., 2001). From a forage production standpoint, greater production of legumes may be obtained if managed as a monoculture as opposed to a mixed sward. From the animal production standpoint, a mixed sward forces a grazing animal to search through the pasture to find its preferred forage species and thereby limits the ability of the animal to consume its preferred diet (Parsons

## INTRODUCTION

Previous research on grazing behavior has shown that cattle and sheep will select a mixed diet and have a preference of 70% legume and

<sup>1</sup> Present address: Mississippi State University, Prairie Research Unit, PO Box 60, 10223 Hwy 382, Prairie, MS 39756.

<sup>2</sup> Corresponding author: holly.boland@msstate.edu

<sup>3</sup> Present address: Louisiana State University Agricultural Center, Iberia Research Station, 603 LSU Bridge Rd., Jeanerette, LA 70544.

et al., 1994a). This additional searching may also potentially waste energy that would otherwise be used for production. Champion et al. (2004) reported that time spent eating was greater but DMI was less for ewes in mixed pastures compared with ewes in adjacent monoculture or monoculture pastures. Adjacent monocultures remove the need to search because the forage species are spatially separated, which makes it easier for the animal to self-select its diet.

Few studies have been conducted to evaluate animal performance when grazing adjacent monocultures, and the majority of these have occurred in the UK or New Zealand. Those studies primarily used white clover (*Trifolium repens* L.) and perennial ryegrass (*Lolium perenne* L.), and most were conducted with sheep. In the majority of studies, animal weight gain on clover monocultures was equal to that on adjacent monocultures of clover and ryegrass. Diet preference trials have been conducted with tall fescue and alfalfa and have shown that beef cattle have a partial preference for alfalfa of about 65%; however, animal performance was not measured in those trials (Boland, 2009). Therefore, the objective of this study was to evaluate backgrounding ADG and behavior of beef calves grazing monocultures of tall fescue or alfalfa or grazing these forages as adjacent monocultures.

## MATERIALS AND METHODS

This study was conducted at the Virginia Tech Kentland Farm, Blacksburg (37°11' N, 80°35' W). The experimental site consisted of Unison-Braddock soils, which are deep and well-drained, gentle to moderately steep with clay subsoil, and formed on old alluvium on stream terraces and alluvial fans (USDA, 1985). Pastures were established in 2004. All paddocks were sprayed with Roundup (9 L/ha, glyphosate 41%, Monsanto, St. Louis, MO) in May to remove existing pasture species. Two weeks after spraying, foxtail millet (*Setaria italica*, 34 kg/ha) was planted as a

suppression crop. In late July, the millet was harvested for hay and 2 weeks later the paddocks were sprayed again with Roundup (2 L/ha) for weed suppression. Areas of tall fescue received 168 kg/ha of diammonium phosphate (18-46-0), and the alfalfa received 168 kg/ha of diammonium phosphate (18-46-0) plus 112 kg/ha of potash (0-0-60). On September 2 and 3, paddocks were planted with 'Jesup' endophyte-free tall fescue (28 kg/ha) or with 'AmeriStand' 403T alfalfa (22 kg/ha). Tall fescue paddocks received 34 kg/ha of nitrogen in October and then again in March 2005 to promote growth and tillering. All alfalfa pastures received 37 mL/ha of Harmony GT (thifensulfuron-methyl 75%, Dupont, Wilmington, DE) and 2 L/ha Poast Plus (sethoxydim 13%, BASF, Research Triangle Park, NC) with 1 L/ha of surfactant in April 2005. All tall fescue pastures received 1 L/ha of 2-4D (2,4-dichlorophenoxyacetic acid 46.6%, Helena Holding Co., Wilmington, DE) and 0.6 L/ha Banvel (3,6-dichloro-0-anisic acid 48.2%, Micro Flo, Memphis, TN) in April 2005.

Pastures were rotationally stocked by forage treatment during the summer grazing seasons of 2005 to 2007. Pastures were fertilized in April 2007, with tall fescue receiving 35-20-45 (224 kg/ha) and alfalfa receiving 0-46-0 (145 kg/ha) and boron (2 kg/ha). Alfalfa paddocks were sprayed with Harmony GT in April 2007 for control of thistle and with Baythroid ( $\beta$ -cyfluthrin 12.7%, Bayer, Research Triangle Park, NC) for insect control in July 2007 according to manufacturer recommendations. Summer grazing ceased on August 21, 2007, and pastures were allowed to regrow until the present experiment began on September 13 (d 1).

Procedures were approved by the Virginia Tech Animal Care and Use Committee. Spring-born Angus crossbred steer calves ( $n = 54$ , initial BW =  $228 \pm 1$  kg) from the Shenandoah Valley Agricultural Research and Extension Center in Steeles Tavern, Virginia (37°9'N, 79°20'W), were used in this experi-

ment. Before weaning, cow-calf pairs grazed predominantly 'Kentucky-31' E+ pastures in groups of 6 pairs per paddock as described by Scaglia et al. (2008). Calves were vaccinated 5 wk before weaning with Pyramid 4 (Fort Dodge Animal Health, Fort Dodge, IA) for infectious bovine rhinotracheitis, parainfluenza-3, bovine viral diarrhea, bovine respiratory syncytial virus, and *Mannheimia* (P.) *hemolytica*. Vision 7 (Intervet, Boxmeer, the Netherlands) was administered for clostridial disease control. At weaning, all steers were treated with a pour-on anthelmintic (Cydectin, Fort Dodge Animal Health). Calves were fence-line weaned on September 6, 2007, and then transported 172 km (3 h in transit) on September 12 to Kentland Farm. Steers remained in a dry lot overnight, with grass hay and water provided ad libitum. The experiment was a randomized complete block design with steers blocked by BW on d 0 and randomly allotted to 3 forage treatments that were replicated 3 times ( $n = 6$  steers per pasture). Forage treatments were tall fescue monocultures, alfalfa monocultures, or adjacent monocultures of tall fescue and alfalfa (FA). In these adjacent monocultures 50% of the area was tall fescue planted contiguous to the other 50%, which was alfalfa. Within each replicate, calves were rotationally stocked through 3 paddocks, and no paddock was grazed more than once. A 45-d grazing period (beginning on September 13) was planned; however, cattle only grazed for 39 d at which point alfalfa was no longer productive due to decreasing ambient temperatures. Cattle were weighed unshrunk on d 0, 1, 23, and 39 on an electronic scale (Tru-Test Inc., Mineral Wells, TX). All calves had access to mineral salt and water ad libitum. Calves grazing tall fescue were provided with mineral salt (Ca 11.8%, P 6.5%, Mg 11.2%, Zn 0.51%, Cu 0.25%, I 0.014%, Mn 0.40%, Se 0.012%) and vitamins D<sub>3</sub> and E at 185,600 and 1,100 IU/kg, respectively (King AG Products Inc., Pulaski, VA). Calves grazing alfalfa or FA pastures were provided with blocks containing poloxalene

Download English Version:

<https://daneshyari.com/en/article/2454147>

Download Persian Version:

<https://daneshyari.com/article/2454147>

[Daneshyari.com](https://daneshyari.com)