

SHEEP GRAZING PREFERENCE AND NUTRIENT CYCLING IMPLICATIONS AMONG COVER CROP SPECIES

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ABSTRACT

A replicated small-plot study was conducted in San Angelo, TX, using a randomized complete block design (5 × 20 ft plots; four replications) to evaluate forage yield, sheep grazing preference, and relative herbage removal among winter cover crop species and cultivars, including vetch, peas, turnips, oats, rye, triticale, barley, and wheat. Pre- and post-grazing biomass measurements and overhead imagery were used to quantify canopy reduction and grazing selection. Buckaroo barley produced the greatest herbage mass (3346 kg ha⁻¹), exceeding other cereal grains (mean = 1931 kg ha⁻¹) and legumes (mean = 744 kg ha⁻¹). Despite high biomass production, Buckaroo barley was among the least preferred species, exhibiting 66% less canopy reduction than wheat and 48% less than other winter cereals. Wheat and oats achieved the most favorable balance between biomass production and grazing preference, resulting in the greatest total herbage mass removed. These findings highlight the importance of considering both forage yield and animal preference when selecting cover crop species for integrated crop–livestock systems. Species that optimize both biomass production and grazing utilization may enhance nutrient redistribution efficiency and overall system performance.

INTRODUCTION

The vast and interspersed livestock and crop industries of Texas lend opportunity for livestock integration to benefit regional agricultural systems. Texas leads sheep production in the U.S. and small ruminant integration in crop systems has become an appealing opportunity in recent years due to strong meat markets and generally poor commodity crop markets. Many winter cover crops are likely suitable forages, and challenges of nutrient immobilization could be (at least partially) mitigated by ruminant digestion and excretion. Information is limited, however, regarding grazing preference and nutrient implications of different species.

MATERIALS AND METHODS

Cover crop species/cultivars were evaluated in a replicated small-plot trial at San Angelo, TX for forage yield, sheep grazing preference, and relative herbage removal. Treatments included hairy vetch (*Vicia villosa*), wooly pod vetch (*Vicia villosa* ssp.

dasycarpa), Austrain winter peas (*Pisum sativium*), purple-top turnips (*Brassica rapa subsp. rapa*), 'Bob' oats (*Avena sativa*), 'Elbon' rye (*Secale cereale*), 'Trical 813' triticale (\times *Triticosecale*), 'Buckaroo' barley (*Hordeum vulgare*), and 'Razor' wheat (*Triticum aestivum*). Treatments were arranged in a randomized complete block design composed of small plots (5 × 20 ft) with 4 replications. Forage biomass was sampled and overhead imagery of the plots were collected pre- and post-grazing with sheep.

RESULTS AND DISCUSSION

Buckaroo barley yielded greater herbage mass (3346 kg ha⁻¹) than the other cereal grains (mean = 1931 kg ha⁻¹) and legumes (mean = 744 kg ha⁻¹), but was among the least preferred, with 66% and 48% less canopy reduction from the sheep compared to wheat and the remaining winter cereals, respectively (Figure 1).

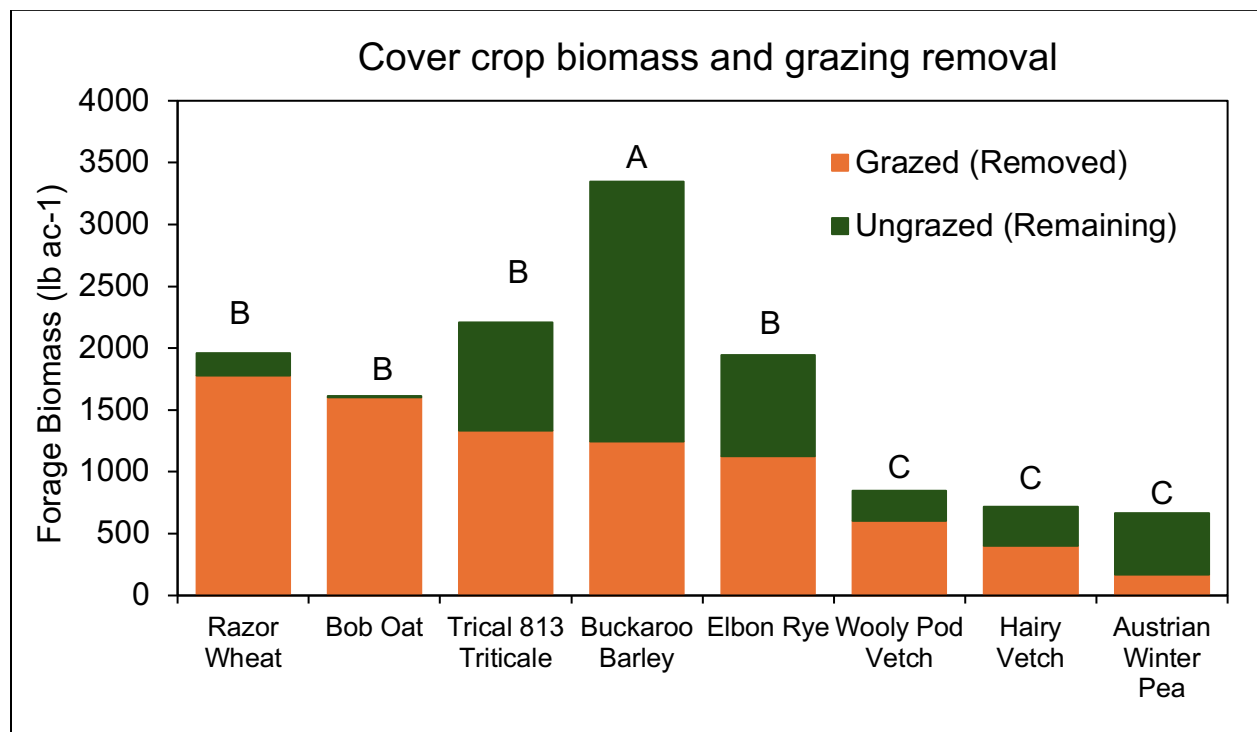


Figure 1. Cover crop effect on total, grazed, and ungrazed forage.

Wheat and oats represented the greatest herbage mass grazed (Figure 1), indicating the most advantageous balance between biomass production and grazing preference. Measured biomass reductions likewise aligned with imagery-derived measurements of canopy reduction (Figures 2 and 3), associating overall canopy reduction with forage utility. Beyond implications of single-species planting, these findings are anticipated to help inform optimum species mixtures for grazing potential and cover crop function.

Entry	Before	After	Green-Leaf Index Change
Purple Top Turnip			
Bob Oat			
Woolly Pod Vetch			
Austrian Winter Pea			
Razor Wheat			
Balansa Clover			
Elbon Rye			
Hairy Vetch			
Silver River Sweetclover			
Buckaroo Barley			
Trical 813 Triticale			

Figure 2. Cover crop imagery before vs. after sheep grazing and change in green-leaf index.

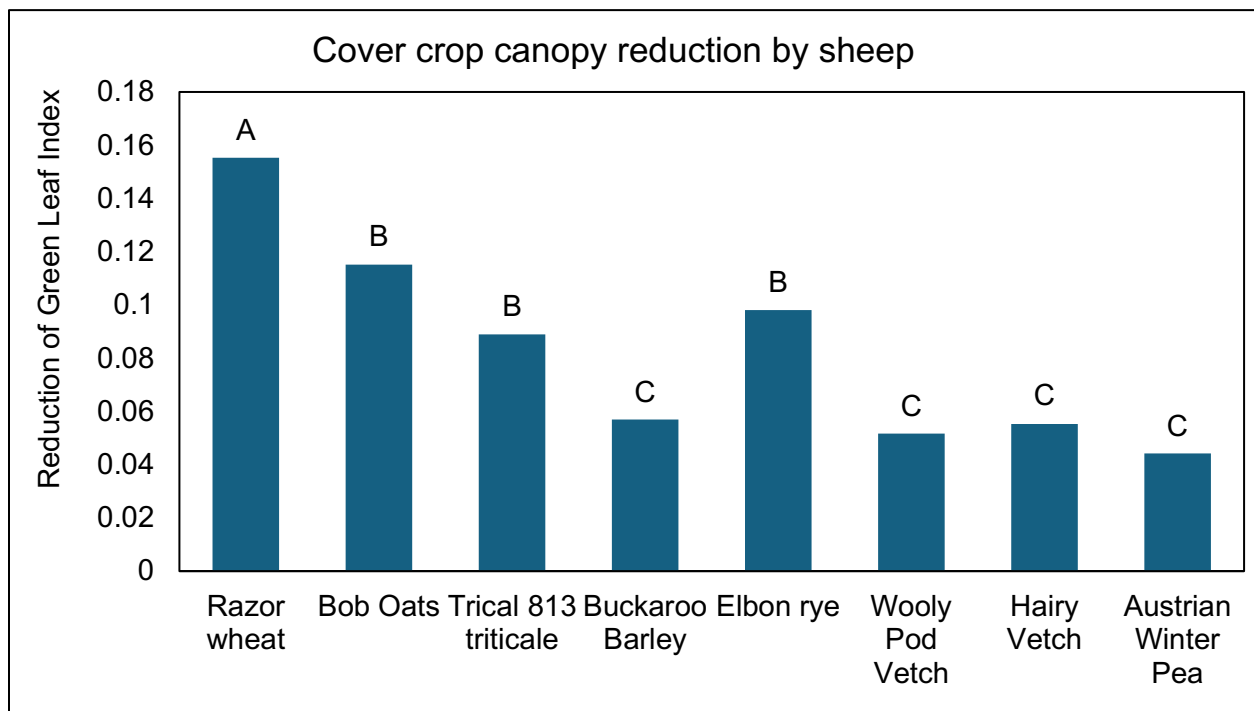


Figure 3. Cover crop variety impact on green-leaf index change pre- and post-grazing.