Bird’s-foot Trefoil Response to Planting Method and Harvesting Frequency

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Introduction
Bird’s-foot trefoil is a promising forage legume that has potential to increase quality and production of livestock in the U.S., including Wyoming. It can be used as an alternative to alfalfa due to its non-bloating property, high persistence, and improved forage quality. Though bird’s-foot trefoil cannot replace alfalfa, it can reduce the pressure on alfalfa as an alternative forage legume. It can be grown and grazed as a single crop as well as in mixture with grasses, and it has shown to increase milk and meat quality of cattle and feed-use efficiency. Planting bird’s-foot trefoil with a companion crop helps in reducing weed competition. Bird’s-foot trefoil can also be seeded with stubble of a previous crop to help prevent weeds and save resources on seed-bed preparation. Some studies suggest that fewer harvests can be economical for bird’s-foot trefoil as the total yield compared to forage quality remains the same due to quality deterioration by the end of growing season. Bird’s-foot trefoil production, however, is limited due to lack of information on its agronomic management and practices.

Objectives
The objectives of the study are to determine the effects of planting methods, harvesting frequency, and different cultivars on yield and quality of bird’s-foot trefoil.

Materials and Methods
The study was conducted at the James C. Hageman Sustainable Agriculture Research and Extension Center (SAREC) near Lingle. The study had 81 plots arranged in a randomized complete block design, and planting took place in June 2015. Each plot has a combination of three distinct treatments. The first involved planting three different bird’s-foot trefoil cultivars: ‘Leo’, ‘Norcen’, and ‘Bruce’. The second treatment involved different planting methods: clean-tilled planting, planting in standing wheat, and planting in wheat stubble. The third treatment was harvesting frequency, which included either harvesting once, twice, or three times during the growing season.

Data collection included seedling emergence, plant height, crop canopy coverage, and weed coverage. All plots were mowed twice (last week of July and September) to help control weeds and enhance establishment of bird’s-foot trefoil. Dry matter (DM) yield was estimated at the end of the growing season by clipping each plot. Forage quality was also determined using the clipped samples. The samples were dried and ground, and then forage quality was analyzed using near-infrared spectroscopy (NIRS) in the University of Wyoming forage agronomy lab.

Results and Discussion
Variations were observed among treatments in all growth and quality parameters. Initially, the seedling emergence was about 80% for all treatments; however, it started to decline with advancement of time (data not shown). The highest decline was in the standing-wheat plot, which later declined to zero, followed by less decline in the other two plots. Additional growth parameters (height and canopy coverage) were higher for bird’s-foot trefoil planted in clean-tilled plots than in plots with wheat stubble (data not shown). Dry matter yield was greatly affected by planting methods (Figure 1). No bird’s-foot trefoil survived in standing-wheat planting, whereas clean-tilled and stubble planting produced similar DM yield. Cultivar performance was not much different within planting method. Norcen did the best in clean-tilled plots as well as in wheat stubble. The relative feed

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value (RFV) of bird’s-foot trefoil in clean-tilled plots was slightly better than in wheat stubble, but there were some RFV variations among cultivars (Figure 2). Bruce had the highest RFV in clean-tilled plots, whereas Leo had the best RFV in wheat stubble. These preliminary results suggest that bird’s-foot trefoil can be successfully established both in clean-tilled and stubble.

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Figure 1. Effects of planting methods and cultivars on dry matter (DM) yield of bird’s-foot trefoil.

Figure 2. Effects of planting methods and cultivars on relative feed value of bird’s-foot trefoil.
*Relative feed value (RFV) ranks forages relative to the digestible dry matter intake at full-bloom alfalfa.