

Forage cover crops and their potential benefits and unknowns to western cattle operations

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Integrated crop-livestock systems are increasing in popularity across the Pacific Northwest. Annual crops can provide nutritious forage for livestock at various times in the growing season, and the animals in turn provide nutrient additions to the soil. Incorporating grazing livestock onto annual crop land also often involves the use of diverse annual crop mixtures (also known as polycrops, polycultures, or cocktail mixtures) that can contribute to a range of other ecosystem services. Polycultures can provide several benefits compared to monocultures including increased yield and yield stability, reduced inputs and weed suppression benefits, improved soil fertility, and increased yield of subsequent crops (e.g., Lithourgidis et al. 2011; Szumigalski and Van Acker 2006).

In our research, we have explored the utility of using diverse annual forage crops as forage in the Canadian Prairies. There appears to be the potential improvement of forage dry matter production, but production is impacted by site and seasonal growing conditions (Bainard et al. 2020a). Under poor growing conditions, biomass production can be particularly limited by weeds (Bainard, unpublished). In other cases (and under good growing conditions) there is some evidence of improved weed control with the inclusion of crops such as barley and radish (Bainard et al. 2020a).

In regards to forage quality, the inclusion of diverse annual crops can improve forage nutrition. In particular, mixtures had higher organic matter digestibility, lower acid detergent fiber and neutral detergent fiber, and higher crude protein as compared to an oats monoculture (Bainard et al. 2020b). Other nutrients were also found to increase in the mixtures including calcium, copper, potassium, and phosphorus (Bainard et al. 2020b). These factors point to the importance of feed tests to ensure livestock are receiving the appropriate balance of nutrients when grazing diverse annual crops. There are also concerns related to potential toxicity of grazing brassicas that are high in nitrates and sulfur (e.g., Barry 2013).

While there appears to be several benefits to grazing diverse annual crops, there are still many unknowns and some possible limitations linked to productivity and quality under difficult growing conditions. Continued research into forage potential across different production practices and geographic regions will be important.

Literature Cited:

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