

Pasture Improvement, Cascade County, MT

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July 2020

Objective: Diversify and improve smooth brome pasture
County: Cascade County
Average Annual Precipitation: 14 - 16 inches
MLRA: 52, Brown glaciated plains
Dominant Soil Types: Hilger very stony loam
Elevation: 3447 ft
Site Preparation: Applied glyphosate prior to seeding
Seeding Date: April 26, 2019
Seeding Method: Drill seeded
Acres Seeded: Each species was seeded individually in 0.25 plot. Mix of four species seeded in 0.25-acre plot.
Previous Site History: Smooth brome and wheatgrass dominated pasture with some weeds present.
Herbicide: Glyphosate (Roundup) applied at 4 qt/ac April 22, 2019
Irrigation: None
Grazing: None in 2019 or 2020
Monitoring Dates: July 2019 and 2020



Fig. 1. Seeding with a rangeland drill into glyphosate treated rangeland, April 2019.

Introduction:

The goal of this field planting was to improve the smooth-brome dominated pasture by adding legumes and other palatable forb species (Table 1). The legumes, cicer milkvetch and sainfoin, provide high quality forage for livestock and wildlife. Small burnet provides excellent forage for livestock and wildlife during all seasons. Forage chicory is not commonly planted in Montana but was tested here because it is highly palatable and similar in nutritional and mineral content to alfalfa or cool-season grasses. The site was not grazed for 18 months after seeding to allow species to establish. No irrigation was added but there was above average precipitation and below average temperature spring 2019 following seeding.

Table 1. Seeded species and their seeding rate.

Common Name	Scientific Name	Cultivar	Description	Ibs PLS/acre
Small burnet	<i>Sanguisorba minor</i>	Delar	Hardy, long-lived forb, rose family	15
Cicer milkvetch	<i>Astragalus cicer</i>	Lutana	Long-lived, non-bloat legume	8
Sainfoin	<i>Onobrychis viciifolia</i>	Eski	Deep-root, perennial legume	34
Forage chicory ¹	<i>Cichorium intybus</i>	VNS	Deep-root, perennial, sunflower family	3
Mix of four species	Mix			25 seeds/ft

¹Chicory is a county listed noxious weed in Lincoln County, MT and a declared weed in several WY counties. This species should be closely monitored and not allowed to spread from the site.

Results:

In 2019, the species were slow to establish in the cool wet weather following seeding. By July 2019, all the species had established but were seedlings with no flower stalks forming. Forage chicory, sainfoin, and small burnet had over 1.25 plants per square foot but were small plants with a low canopy cover (Table 2). Species establishment was patchy throughout the field and may be a result of competition with the existing plant



species on site. The density and height of small burnet, cicer milkvetch, and chicory increased in 2020, and the canopy cover of small burnet and cicer milkvetch increased in 2020. Cicer milkvetch plants were particularly robust, and all three of these species were spreading on site. Sainfoin was struggling to compete with other species on site and decreased in density, cover and height in 2020.

The 2019 herbicide treatment did a good job of reducing smooth brome and wheatgrass species to allow seeded forbs to establish. Where Roundup was used in the spring, smooth brome decreased from approximately 50% canopy cover to 5% cover. Where species were seeded without herbicide treatment, either no species established or were sparse (i.e. some chicory established). By 2020, smooth brome had recovered on site and was a robust plant. Warm-season grasses were not affected by the herbicide treatment and many native and non-native forbs also remained on the site.

Table 2. Species characteristics, July 2019 and 2020.

Common Name	2019			2020		
	Density (plants/ft ²)	Canopy Cover (%)	Height (inch)	Density (plants/ft ²)	Canopy Cover (%)	Height (inch)
Small burnet	1.25	5	5	1.5	10	7
Cicer milkvetch	0.1	1	6	3	15	16
Sainfoin	2	10	8	1	5	4
Forage chicory ¹	2.5	15	7	3	15	24
Mix of four species	1	10	7	-	-	-

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Fig 2. Drill rows of forage chicory, July 2019.



Fig 3. Cicer milkvetch increased in density, cover, and height in 2020 and were robust plants even with smooth brome competition.

Summary:

- Drill seeded small burnet, cicer milkvetch and/or forage chicory into glyphosate-treated pasture can establish and increase in density, canopy cover, and height over time. These three species can be used to improve the diversity of smooth brome and wheatgrass dominated pastures.
- Sainfoin established on the site but decreased in density, canopy cover, and height as the smooth brome recovered from the herbicide treatment in 2020.