

## Increasing Pollinator Plant Diversity in Pasture, Judith Basin County, MT

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**Objective:** Increase pollinator plant species diversity in smooth brome / alfalfa pasture

**County:** Judith Basin County

**Average Annual Precipitation:** 16 inches

**MLRA:** 46, Northern Rocky Mountain Foothills

**Dominant Soil Types:** Winifred clay loam

**Elevation:** 4430 ft

**Site Preparation:** Heavy livestock grazing followed by herbicide treatment

**Seeding Date:** May 2020

**Seeding Method:** Drill seed at the standard rate, seed mixes at 25 seeds/ft<sup>2</sup>

**Acres Seeded:** Species seeded individually, mixed, and in alternate rows of grasses and forbs

**Previous Site History:** Smooth brome / alfalfa pasture with other introduced grass species

**Herbicide:** Glyphosate (Roundup) at 6% solution was applied April 2020

**Irrigation:** None

**Grazing:** Wildlife

**Monitoring Dates:** Aug 2020



**Fig 1.** Sainfoin established in drill rows, especially in bare areas where vegetation was controlled by the herbicide. Notice the wildlife grazing on the seedlings.

### Introduction:

The field planting goal was to improve plant species diversity, particularly pollinator plants, in a smooth brome and alfalfa pasture. Prior to seeding, the area was heavily grazed by livestock and sprayed with glyphosate to reduce the existing plants and litter. Species seeded have done well in other field plantings, are quick establishers, and/or are species naturally growing with smooth brome (Table 1). Species were seeded individually, in a complete-species mix, and in alternate-rows of grasses and forbs. Grazing smooth brome in the spring and at boot stage may harm its root reserves and stress the plants. This grazing timing should not harm warm season grass species, but it may decrease the competitiveness of smooth brome to allow seeded species to establish. Alternate-row seeding tested if forbs establish better when seeded alone than when seeded as a grass-forb mix. For two expensive and harder-to-establish species (beebalm, Canada goldenrod), small areas (seed islands) were lightly raked and seeded to determine if the species would establish and then naturally spread throughout the site.

### Results Summary:

- Smooth brome and alfalfa re-established on site but were stunted compared to surrounding vegetation.
- Seeded species established better where herbicide provided control of existing plants (i.e. bare areas).
- Blanketflower was the best establishing native forbs and sainfoin was the best establishing introduced forb. Blanketflower did particularly well in the understory of existing vegetation.
- Tall wheatgrass was the best establishing grass and was scattered throughout the seed area. Other grass species establishment was patchy.

**Table 1.** Seeded species, their seeding rate and bloom period, and the 2020 evaluation results.

Common Name	Scientific Name	Cultivar	Origin/Season	Bloom Period <sup>1</sup>	lbs PLS/acre	Evaluation Notes
Sideoats grama	<i>Bouteloua curtipendula</i>	Bad River	Native, warm	-	6.0	No establishment this year
Switchgrass	<i>Panicum virgatum</i>	Forestburg	Native, warm	-	3.0	Patchy establishment, no seed production.
Tall wheatgrass	<i>Thinopyrum ponticum</i>	Alkar	Introduced, cool	-	10.0	Obvious drill rows of seedlings; up to 12 inches tall; seed production on 10% plants; up to 5% canopy cover in areas
Thickspike wheatgrass	<i>Elymus lanceolatus</i>	Critana	Native, cool	-	7.0	Trace establishment in bare areas
Blanketflower	<i>Gaillardia aristata</i>	Meriwether	Native	M, L	6.0	Up to 3 plants/ft; seedlings 3 inches tall; established in bare areas and under existing vegetation; widespread throughout the area
Prairie coneflower	<i>Ratibida columnifera</i>	Stillwater	Native	E, M, L	2.0	Scattered seedlings throughout the area; 3 inches tall; mostly in bare areas
Western yarrow	<i>Achillea millefolium</i>	Great Northern	Native	E, M, L	0.5	No establishment this year
Birdsfoot trefoil	<i>Lotus corniculatus</i>	Leo	Introduced	E, M, L	3.0	Scattered seedlings throughout seeding area; up to 7 inches tall with 10% of plants flowering
Red clover	<i>Trifolium pratense</i>	Mammoth	Introduced	E, M, L	4.0	Seedlings rare; plants average 3 inches tall and are larger in understory of existing vegetation
Sainfoin	<i>Onobrychis viciifolia</i>	Delaney	Introduced	E, M, L	34.0	Obvious drill rows of seedlings in bare areas; throughout seed area; plants grazed by wildlife
Beebalm	<i>Monarda fistulosa</i>	VNS	Native	E, M, L	1.0	No establishment this year
Canada goldenrod	<i>Solidago canadensis</i>	VNS	Native	M, L	0.5	No establishment this year

<sup>1</sup>Bloom periods: Early (April, May, June), Middle (July, August), and Late (September, October)



**Fig. 2.** Seeding into grazed and sprayed (Roundup) pasture with a plot drill, May 2020.



**Fig 3.** Blanketflower established well in drill rows, even in the understory of re-establishing smooth brome.



**Fig 4.** Blanketflower, red clover, and prairie coneflower seedlings establish together in the alternate-row seeding.