

## PLANT MATERIALS TECHNICAL NOTE

---

### WAYNE BERRY COMPARATIVE EVALUATION PLANTING PERFORMANCE SUMMARY 1994-2002

Larry Holzworth, Plant Materials Specialist  
Joe Fidel, Resource Conservationist  
Susan Winslow, Agronomist  
Mark Majerus, Bridger Plant Materials Manager

#### Abstract

There is interest in the Northern Great Plains to use warm-season grasses for extending the “green period” for mid- and late-summer grazing and to increase species diversity in the revegetation of deteriorated rangelands, mine reclamation, and conservation practices applied through farm bill programs. The Bridger Plant Materials Center (PMC), in cooperation with the Bismarck PMC, the Sidney, Montana Natural Resources Conservation Service (NRCS) field and area office, and Mr. Wayne Berry established a study to evaluate warm-season and cool-season forages in east-central Montana. The Wayne Berry field evaluation planting was established on a dryland site in east-central Montana, to study the adaptation, performance, and use of new native and introduced pasture plants in comparison to commonly used species/cultivars. A replicated warm- and cool-season grass, forb, and shrub study featuring 56 accession/cultivars was planted in May 1994. The plots are four-rows, six meters (19.68 ft) long, and replicated four times in randomized complete blocks. The plots were evaluated for field emergence, plant vigor, basal cover and biomass production over nine years. The best performing cool-season species were *Elytrigia intermedia*, *Elytrigia repens x pseudoroegneria*, *Agropyron cristatum x desertorum*, *Pascopyron smithii*, and *Psathyrostachys juncea*. Warm-season grasses and forbs from southern latitudes, i.e., South Dakota, performed better than North Dakota eco-types, supporting the theory that southern eco-types perform better than northern eco-types in northern latitudes.

The performances of the species’ entries are reported sequentially from the best to the worst by species over the life of the study.

#### Grasses

‘Reliant’, ‘Greenleaf’, ‘Rush’, ‘Manska’, Mandan 759, ‘Luna’, and ‘Oahe’ intermediate/pubescent wheatgrasses yielded the most forage and rated the best stands over the eight years of the study (see Table 5). Reliant production ranged from a low of 1,320 pounds/acre (1,480 kg/ha) in 2002 to a high of 2,690 (3,015 kg/ha) in 1999. The highest yielding species correlated to the highest stand ratings. Overall, Oahe intermediate wheatgrass yielded less than ‘Rodan’ western wheatgrass. Rodan and ‘Rosana’ produced the highest biomass and established the best stands of all native species’ entries.

- ‘NewHy’ hybrid wheatgrass established good stands and produced more than Rosana.
- ‘Hycrest II’ and ‘Hycrest’ hybrid crested wheatgrass stands and forage yields were similar.
- ‘Trailhead’ established better stands than ‘Magnar’, but forage production was similar.
- ‘Bozoisky-Select’ Russian wildrye performed better than ‘Mankota’, 9055892, ‘Vinall’, and then ‘Swift’.
- ‘Critana’ thickspike wheatgrass established excellent stands, produced less than ‘Lodorm’ green needlegrass, but significantly more than ‘Bannock’ (9021076) thickspike wheatgrass.
- ‘Pryor’ and ‘Revenue’ slender wheatgrasses established good stands that deteriorated over time.
- ‘Forestburg’ switchgrass performed best, then 9005439, then Dacotah.
- ‘Whitmar’ outperformed ‘Secar’ and ‘Goldar’ bluebunch wheatgrasses.
- ‘Nezpar’ ranked higher than ‘Rimrock’ (478833) or ‘Paloma’ Indian ricegrass.
- Blue grama, Bad River germplasm (9063064) was better than ‘Hachita’, ‘Lovington’, or ‘Alma’.

### Forbs

Maximilian sunflower, Medicine Creek Germplasm (9008065) produced the most biomass whereas stiff sunflower, Bismarck Germplasm (9047223) established the best stands of all the sunflowers. Stands increased and then declined over the life of the study. After the study was discontinued, stands increased.

- Bismarck Germplasm (9006032) purple prairieclover performed better than Antelope (478834) Germplasm slender white prairieclover or ‘Kaneb’ purple prairieclover.
- ‘Delar’ small burnet established good stands 15.5 percent as compared to ‘Appar’ Lewis flax 18.5 percent over the life of the trial. Production of both were relatively low.

### Shrubs

‘Wytana’ established the best stand and produced more biomass than the Open Range (9063535), and Northern Cold Desert (9067481) germplasm winterfat. However, both species’ vigor and production increased following the discontinuation of the study.

The tables on pages three and four show the plant performance ratings averaged over nine years and ranked from the highest to the lowest yield.

Wayne Berry Field  
Evaluation Planting.



Sampling from replicated plots to determine forage yields.

Average Plant Performance over Eight Years - Berry Field Evaluation Planting 1994-2002						
Origin	Accession	Scientific Name	Stand <sup>1</sup>	Vigor <sup>2</sup>	Height	Yield
					inches	Lbs/acre
ND	Reliant	<i>Elytrigia intermedia</i>	43.6	2.6	45.8	2115.0
Canada	Greenleaf	<i>Elytrigia intermedia</i>	39.3	2.7	44.8	1801.7
ID	Rush	<i>Elytrigia intermedia</i>	36.9	2.7	44.4	1783.6
ND	Manska	<i>Elytrigia intermedia</i>	39.0	2.8	40.2	1442.3
ND	Mandan-759	<i>Elytrigia intermedia</i>	38.3	3.1	39.1	1419.3
NM	Luna	<i>Elytrigia intermedia</i>	33.9	3.4	40.9	1374.0
ND	Rodan	<i>Pascopyrum smithii</i>	41.5	2.6	32.5	1314.2
SD	Oahe	<i>Elytrigia intermedia</i>	31.4	3.7	40.1	1266.5
China	9057946	<i>Astragalus adsurgens</i>	29.7	2.4	50.2	1120.9
UT	NewHy	<i>Elytrigia repens</i> x <i>pseudoroegenania</i>	35.3	3.1	34.8	1046.6
MT	Rosana	<i>Pascopyrum smithii</i>	42.4	2.7	31.0	1044.3
UT	Hycrest II	<i>Agropyron cristatum</i> x <i>desertorum</i>	34.0	3.3	37.0	991.6
MT	Trailhead	<i>Leymus cinereus</i>	15.8	4.1	54.0	970.8
UT	Bozoisky	<i>Psathyrostachys juncea</i>	42.2	2.8	27.6	969.3
UT	Hycrest	<i>Agropyron cristatum</i> x <i>desertorum</i>	33.5	3.0	34.0	942.5
ND	Lodorm	<i>Nassella viridula</i>	29.3	2.8	31.5	934.2
MT	Critana	<i>Elymus lanceolatus</i> ssp. <i>lanceolatus</i>	45.2	3.0	23.5	884.4
Canada	Magnar	<i>Leymus cinereus</i>	7.7	5.2	48.3	854.2
WY	9005438	<i>Panicum virgatum</i>	20.0	4.2	35.0	823.3
ND	Mankota	<i>Psathyrostachys juncea</i>	34.6	3.7	23.3	811.8
ND	9008065	<i>Helianthus maximiliani</i>	7.0	3.6	51.2	763.7
ND	Forestburg	<i>Panicum virgatum</i>	26.5	3.9	36.1	762.5
Canada	Prairieland	<i>Leymus angustus</i>	7.7	4.3	36.9	732.9
ND	9006032	<i>Dalea purpurea</i>	15.6	3.1	27.9	715.4
Canada	Revenue	<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>	18.0	4.5	30.5	710.1
WY	9005439	<i>Panicum virgatum</i>	18.0	4.2	41.2	695.5
WY	Pryor	<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>	23.2	4.3	29.7	656.8
ID	9021076	<i>Elymus lanceolatus</i> ssp. <i>lanceolatus</i>	25.4	4.4	28.1	641.7
UT	9055892	<i>Psathyrostachys juncea</i>	36.1	3.0	26.5	641.3
UT	478008	<i>Nassella viridula</i>	25.6	3.3	29.3	622.1
Europe	313965	<i>Leymus racemosus</i>	2.4	5.7	38.5	599.6
ID	Delar	<i>Sanguisorba minor</i>	15.5	3.9	18.7	540.9
UT	9005595	<i>Nassella viridula</i>	15.2	4.8	24.8	520.9
		<sup>1</sup> Percent basal cover				
		<sup>2</sup> Plant Health: 1 = excellent; 9 = very poor				

Average Plant Performance over Eight Years - Berry Field Evaluation Planting 1994-2002 (Continued)						
Origin	Accession	Scientific Name	Stand <sup>1</sup>	Vigor <sup>2</sup>	Height inches	Yield Lbs/acre
ND	Vinall	<i>Psathyrostachys juncea</i>	19.9	5.0	19.4	495.2
Canada	Swift	<i>Psathyrostachys juncea</i>	37.4	4.3	20.2	493.9
WA	Whitmar	<i>Pseudoroegneria spicata</i> ssp. <i>inermis</i>	23.3	4.3	26.4	490.9
MT	Wytana	<i>Atriplex x aptera</i>	4.4	3.7	32.6	456.9
ND	478834	<i>Dalea candida</i>	13.0	4.5	25.2	390.9
ND	9047233	<i>Helianthus pauciflorus</i> ssp. <i>paucifloru</i>	12.2	4.5	18.5	361.3
WA	Secar	<i>Pseudoroegneria spicata</i> ssp. <i>spicata</i>	9.8	5.3	29.0	343.7
ND	Dacotah	<i>Panicum virgatum</i>	23.8	6.7	31.3	342.6
ID	Appar	<i>Linium lewisii</i>	18.5	3.9	29.5	337.6
ID	Goldar	<i>Pseudoroegneria spicata</i> ssp. <i>spicata</i>	11.3	5.3	23.8	334.4
ND	9063064	<i>Bouteloua gracilis</i>	21.9	4.1	12.2	219.4
WY	9063535	<i>Krascheninnikovia lanata</i>	7.3	3.5	27.8	182.9
ID	Nezpar	<i>Oryzopsis hymenoides</i>	4.4	4.9	26.2	129.3
NM	Hachita	<i>Bouteloua gracilis</i>	1.8	2.9	15.4	109.9
Europe	540441	<i>Leymus racemosus</i>	0.1	0.9	3.6	82.9
MT	478833	<i>Oryzopsis hymenoides</i>	3.4	5.2	24.4	73.6
KS	Kaneb	<i>Dalea purpurea</i>	4.5	2.8	29.7	66.0
ID	9067480	<i>Atriplex canescens</i>	1.1	4.3	36.9	47.0
NM	Lovington	<i>Bouteloua gracilis</i>	0.7	4.6	8.3	46.9
Europe	Volga	<i>Leymus racemosus</i>	2.5	5.4	38.2	43.3
ID	9067481	<i>Krascheninnikovia lanata</i>	0.8	4.3	32.8	3.6
NM	Paloma	<i>Oryzopsis hymenoides</i>	0.7	5.1	21.7	1.0
CO	Alma	<i>Bouteloua gracilis</i>	2.9	3.1	15.0	0.0
		<sup>1</sup> Percent basal cover				
		<sup>2</sup> Plant Health: 1 = excellent; 9 = very poor				