

Project Title: 2004 *Medicago falcata* Trial

Project Personnel: Louise Strang

Objectives: Test feasibility of combining selected forage grasses

This trial was initiated in 2004 to test the feasibility of combining *Medicago falcata* (Mf) with orchard grass (OG)(*Dactylis glomerata* L.) or meadow brome grass (MB)(*Bromus biebersteinii* Roem. and Schult) for a cool-season forage crop in comparison with the same grasses seeded with *Medicago sativa* (Ms). Monocrops of Mf, Ms, OG, and MB were seeded at 10 lb/acre in 5-ft. by 15-ft. plots. The mixtures were seeded at 20% or 40% legume seed by weight mixed with the grass seed at the same total rate. The 4 monocrops + 8 mixtures were planted in a randomized complete block design with 4 replicates. The trial was grown on Flathead fine sandy loam soil with no irrigation. Total crop year precipitation and Growing Degree Days (base 32°F) are in Table 1.

The forage was harvested 3 times in 2005-2007 and twice in 2008. Total forage production was highest in 2005 and 2006, when crop year precipitation was highest. The *M. sativa* alone and in mixtures produced the most total forage. The *M. falcata* alone and in combination with the grasses produced only 54% of the total forage yield of the *M. sativa* and its mixtures.

When grown as sole species (monocrops) *M. falcata* produced only 25-31% as much alfalfa as *M. sativa* (Table 3). *M. falcata* mixtures also resulted in much lower alfalfa yields than the *M. sativa* mixtures (Table 4).

The two *falcata* /brome grass mixtures resulted in the highest yield of grass in any mixture (Table 5). Meadow brome alone and mixed with *M. falcata* produced the highest grass yields of any system (Table 6). This suggests that, after the first production year, meadow brome grass is a more aggressive grass species in this environment. If a grassy pasture with a small legume component is desired (the legume presumably increasing the feed quality of the forage), then a *falcata* x brome mixture may be desirable.

Table 1. Crop year precipitation and growing degree days. 2005-2008.

<u>Year</u>	<u>CYPrecip.</u> <i>inches</i>	<u>GDD₃₂</u> <i>Apr-Aug</i>
2005	21.28	3655
2006	23.34	3546
2007	16.71	3889
2008	19.05	3446

Table 2. Total dry matter yield, 2005-2008.

Species	2005	2006	2007	2008	means
	TotalYld <i>t/a</i>	TotalYld <i>t/a</i>	TotalYld <i>t/a</i>	TotalYld <i>t/a</i>	
OG	2.99	2.55	1.20	1.42	2.04
MB	4.94	3.79	1.72	1.24	2.92
Falcata	2.03	2.88	2.22	2.15	2.32
Sativa	5.17	6.37	4.59	4.69	5.21
O80F20	3.18	2.93	1.65	2.39	2.54
O60F40	3.28	3.11	1.93	2.34	2.66
B80F20	5.32	3.65	2.43	1.97	3.34
B60F40	4.98	4.40	2.80	2.52	3.67
O80S20	4.70	6.53	4.89	4.20	5.08
O60S40	5.44	7.72	4.40	4.42	5.49
B80S20	6.17	6.93	4.50	4.44	5.51
B60S40	6.75	7.74	4.86	4.05	5.85
mean	4.58	4.88	3.10	2.99	
Pr>F	< 0.0001	< 0.0001	< 0.0001	< 0.0001	
LSD(0.05)	1.64	1.49	1.08	0.79	
CV(%mean)	24.8	21.2	24.3	18.4	

Table 3. Total alfalfa yield in the *Medicago* sp. Monocrops.

Total Alfalfa Yield (t/a)		
Year	<i>M.sativa</i>	<i>M.falcata</i>
2005	3.82	1.12
2006	4.68	1.43
2007	3.14	0.80
2008	4.48	1.26
mean	4.03	1.15
SE	0.2272	0.2272
Pr>t	<.0001	0.0041

Table 4. Total alfalfa yield in mixed forage.

Species	2005	2006	2007	2008	means
	TotalAlf <i>t/a</i>	TotalAlf <i>t/a</i>	TotalAlf <i>t/a</i>	TotalAlf <i>t/a</i>	
O80F20	1.03	0.62	0.55	0.89	0.77
O60F40	0.43	0.56	0.58	1.07	0.66
B80F20	0.14	0.21	0.35	0.98	0.42
B60F40	0.17	0.79	0.87	1.56	0.85
O80S20	3.16	2.92	3.10	3.58	3.19
O60S40	3.30	3.63	3.25	3.21	3.35
B80S20	2.76	2.87	2.56	3.93	3.03
B60S40	3.05	3.31	2.73	2.80	2.97
Year mean	1.75	1.86	1.75	2.25	
SE	0.11				
Pr>F	<.0001				

Table 5. Grass yields in the alfalfa/grass mixtures from 2005-2008.

Grass Yield (t/a)					
	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>MixMeans</u>
B60F40	4.81	3.40	1.70	0.96	2.72
B60S40	3.70	2.75	1.36	1.24	2.26
B80F20	5.18	3.31	1.86	1.00	2.83
B80S20	3.41	2.58	1.15	0.51	1.91
O60F40	2.85	2.41	1.24	1.28	1.94
O60S40	2.14	2.37	0.24	1.21	1.49
O80F20	2.15	2.11	0.91	1.51	1.67
O80S20	1.55	2.24	0.95	0.66	1.35
					SE: 0.2044
Year Means	3.22	2.65	1.17	1.04	Pr>t: <.0001
	SE: .1360				
	Pr>t: <.0001				

Table 6. Total grass production in all monocrops and mixtures.

Species	2005	2006	2007	2008	means
	TotalGr <i>t/a</i>	TotalGr <i>t/a</i>	TotalGr <i>t/a</i>	TotalGr <i>t/a</i>	
OG	2.53	2.18	1.04	1.14	1.72
MB	4.94	3.64	1.67	1.09	2.83
Falcata	0.91	1.07	1.28	0.90	1.04
Sativa	1.35	0.44	0.45	0.22	0.61
O80F20	2.15	2.11	0.91	1.51	1.67
O60F40	2.85	2.41	1.24	1.28	1.94
B80F20	5.18	3.31	1.86	1.00	2.83
B60F40	4.81	3.40	1.70	0.96	2.72
O80S20	1.55	2.24	0.95	0.66	1.35
O60S40	2.14	2.37	0.24	1.21	1.49
B80S20	3.41	2.58	1.15	0.51	1.91
B60S40	3.70	2.75	1.36	1.21	2.26
Year mean	2.96	2.37	1.15	0.97	
	SE=.1208				
	Pr>F: <.0001				