

Project Title: *Medicago falcata* Trial

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Objective: Determine the performance of *M. falcata* in a forage legume/grass mixture.

#### Results:

A *Medicago falcata* germplasm accession was seeded alone (MF) and in mixture with orchard grass (OG) (*Dactylis glomerata* L.) or meadow brome grass (MB) (*Bromus biebersteinii*) in a dry land nursery on 4/23/04. *M. sativa* cv. 'Shea' (MS) was included alone and in the same mixtures for comparison. The mixtures contained either 20% or 40% legume seed. The 2 alfalfas, 2 grasses, and 8 combinations were planted in 5' x 20' plots in a randomized complete block design with 4 replicates. The trial was harvested 6/18, 7/26, and 9/24/07. For the first 2 harvests, subsamples from each species and mixture were weighed fresh and dry to determine dry matter content. Prior to drying, mixtures were separated into grass and legume components. Each component was weighed fresh then dried and weighed again to determine dry matter content.

Analysis of variance was calculated using the GLM procedure of SAS Ver.9.1 (2007). Critical value for a significant F-test was tested at P=0.05. Treatment effects were compared by LSD when the F test for treatment was significant.

#### Summary:

Fourth-year total forage production ranged from 1.20 t/a (Orchard grass, pure stand) to 4.89 t/a (OG80, MS20). MS alone and in mixtures produced significantly more forage than any other entry. Entries containing *M.sativa* had the highest legume yields while entries containing MB alone or in mixture with *M. falcata* had the highest grass forage yields. Because of poorer establishment and competitiveness, *M. falcata* stands were easily replaced by grasses.

Across the 3 harvest years (2005-2007) total forage yields of *M.sativa* pure stands have remained the most stable, between 4.59 and 6.37 t/a. *M.falcata* yields have also remained stable, but at 40% those of *M.sativa*. Meadow brome production has fallen off steeply between 2005 and 2007, but it still exceeds that of orchard grass.

*M.sativa* alone or mixed with orchard grass has provided the highest total legume yield. If a higher proportion of grass is desired, however, meadow brome alone or seeded with *M.falcata* may be the better choice.

Future Plans:

This trial will remain in production through 2008 to determine whether meadow brome maintains its superiority over orchard grass and whether *M.falcata* still persists in the mixtures.

*M. falcata* Trial

Kalispell, 2007

| Species   | Harv-1                |                     |                     | Harv-2                |                     |                     | Harv-3              | 2007            |               |              | 2005-07      |                 |                |
|-----------|-----------------------|---------------------|---------------------|-----------------------|---------------------|---------------------|---------------------|-----------------|---------------|--------------|--------------|-----------------|----------------|
|           | <u>alfalfa</u><br>t/a | <u>grass</u><br>t/a | <u>total</u><br>t/a | <u>alfalfa</u><br>t/a | <u>grass</u><br>t/a | <u>total</u><br>t/a | <u>total</u><br>t/a | TotalYld<br>t/a | Talf07<br>t/a | Tgr07<br>t/a | Total<br>t/a | Talf0507<br>t/a | Tgr0507<br>t/a |
| OG        | 0.09                  | 0.98                | 1.06                | 0.09                  | 0.01                | 0.09                | 0.00                | 1.20            | 0.14          | 1.05         | 6.75         | 0.85            | 5.63           |
| MB        | 0.00                  | <b>1.67</b>         | 1.67                | 0.00                  | 0.04                | 0.04                | 0.06                | 1.72            | 0.00          | <b>1.67</b>  | 10.46        | 0.01            | <b>10.13</b>   |
| Falcata   | 0.69                  | <b>1.36</b>         | 2.05                | 0.08                  | 0.01                | 0.19                | 0.05                | 2.22            | 0.80          | <b>1.28</b>  | 7.14         | 3.34            | 3.17           |
| Sativa    | <b>1.85</b>           | 0.42                | <b>2.27</b>         | <b>1.40</b>           | 0.03                | <b>1.43</b>         | <b>1.01</b>         | <b>4.59</b>     | <b>3.14</b>   | 0.45         | <b>16.13</b> | <b>11.64</b>    | 1.44           |
| O80F20    | 0.55                  | 0.93                | 1.48                | 0.02                  | 0.00                | 0.13                | 0.07                | 1.65            | 0.55          | 0.91         | 7.76         | 2.19            | 5.08           |
| O60F40    | 0.49                  | <b>1.34</b>         | 1.83                | 0.09                  | 0.00                | 0.13                | 0.07                | 1.93            | 0.58          | <b>1.24</b>  | 8.31         | 1.57            | 6.40           |
| B80F20    | 0.36                  | <b>1.91</b>         | <b>2.27</b>         | 0.00                  | 0.01                | 0.13                | 0.11                | 2.43            | 0.35          | <b>1.86</b>  | 11.39        | 0.70            | <b>10.18</b>   |
| B60F40    | 0.92                  | <b>1.67</b>         | <b>2.59</b>         | 0.05                  | 0.01                | 0.20                | 0.09                | 2.80            | 0.87          | <b>1.70</b>  | 12.17        | 1.82            | <b>9.79</b>    |
| O80S20    | <b>2.00</b>           | 0.98                | <b>2.98</b>         | <b>1.16</b>           | 0.01                | <b>1.17</b>         | <b>0.84</b>         | <b>4.89</b>     | <b>3.10</b>   | 0.95         | <b>16.12</b> | 9.18            | 4.38           |
| O60S40    | <b>2.16</b>           | 0.25                | <b>2.41</b>         | <b>1.23</b>           | 0.00                | <b>1.24</b>         | <b>0.91</b>         | <b>4.40</b>     | <b>3.25</b>   | 0.24         | <b>17.55</b> | <b>10.19</b>    | 4.25           |
| B80S20    | <b>1.69</b>           | <b>1.22</b>         | <b>2.90</b>         | 1.00                  | 0.01                | 1.01                | <b>0.79</b>         | <b>4.50</b>     | <b>2.56</b>   | 1.15         | <b>17.60</b> | 8.18            | 6.72           |
| B60S40    | 1.47                  | <b>1.38</b>         | <b>2.85</b>         | <b>1.25</b>           | 0.09                | <b>1.34</b>         | <b>0.77</b>         | <b>4.86</b>     | <b>2.85</b>   | <b>1.24</b>  | <b>19.35</b> | 9.20            | 7.26           |
| mean      | 1.02                  | 1.18                | 2.20                | 0.53                  | 0.02                | 0.59                | 0.40                | 3.10            | 1.52          | 1.14         | 12.56        | 4.90            | 6.20           |
| Pr>F      | < .0001               | .0020               | .0002               | < .0001               | .1423               | < .0001             | < .0001             | < .0001         | <             | .0001        | .0010        | <.0001          | <.0001         |
| LSD(0.05) | 0.48                  | 0.75                | 0.79                | 0.34                  | NS                  | 0.36                | 0.45                | 1.08            | 0.65          | 0.69         | 3.66         | 1.60            | 2.39           |
| CV(%mean) | 32.9                  | 44.7                | 25.0                | 45.1                  | 210.3               | 42.7                | 79.2                | 24.3            | 29.8          | 42.1         | 20.3         | 22.7            | 26.8           |