Dryland Cover Crop for Grazing, Yellowstone County
Shalaine Watson, NRCS Soil Conservationist, Billings, MT

**County:** Yellowstone, near Broadview  
**Average annual precip:** 10-12"  
**MLRA:** 58A, Northern rolling plains  
**Dominant Soil Type:** El- Elso clay loam, 7-15% slope  
**Acres:** 41 ac  
**Planting Date:** June 12-14, 2015  
**Seeding Rate:** 967,500 seeds/acre, or 25 lb/acre  
**Seed cost:** $21.89/acre (seed and delivery)  
**Seeding Method:** John Deere 787 air seeder, ¾” dutch openers  
**Row Spacing:** 15”  
**Tillage:** No-till for over 10 years  
**Previous Crop and Year:** 2014, malt barley, 35 bu/acre  
**Herbicides:** Pre: glyphosate  
**Fertilizer:** none  
**Irrigation:** dryland  
**Termination Date:** August 2015  
**Termination Method:** Grazed Aug 2015, frost-kill in fall, will spray Spring 2016 if needed  
**Next Crop:** 2016, malt barley

**Monthly Precipitation at Billings, MT**

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<th>N</th>
<th>D</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>30 yr avg 1981-2010</td>
<td>0.50</td>
<td>0.51</td>
<td>1.03</td>
<td>1.63</td>
<td>2.22</td>
<td>2.12</td>
<td>1.27</td>
<td>0.84</td>
<td>1.32</td>
<td>1.09</td>
<td>0.64</td>
<td>0.50</td>
<td>13.67</td>
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<tr>
<td>2014</td>
<td>1.02</td>
<td>2.06</td>
<td>1.32</td>
<td>1.18</td>
<td>2.25</td>
<td>1.75</td>
<td>0.34</td>
<td>1.97</td>
<td>0.57</td>
<td>0.16</td>
<td>0.74</td>
<td>0.67</td>
<td>14.03</td>
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<tr>
<td>2015</td>
<td>1.09</td>
<td>0.21</td>
<td>0.37</td>
<td>1.57</td>
<td>2.43</td>
<td>1.60</td>
<td>1.66</td>
<td>0.91</td>
<td>0.27</td>
<td>1.80</td>
<td>0.48</td>
<td>0.57</td>
<td>12.96</td>
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**Introduction:** This forty-one acre dryland field is located in northwestern Yellowstone County. The producer has a diverse rotation of small grains, alfalfa, and sunflowers and corn and has been using no-till practices for about 20 yrs. He planted the cover crop to build soil organic matter and provide supplemental income from leased grazing. The cover crop mix consisted of spring forage peas, spring lentils, sorghum-sudan, white wonder millet, proso millet, purple top turnip, rapeseed, sunflower, buckwheat and phacelia.

**Results:** NRCS staff visited the site on July 31, 2015 and took three biomass clippings in a random pattern. Cover crop was starting to dry down, and the canopy had not closed completely during growth stage. Plants were clipped by total biomass, not by individual species, and were air dried in the office. There were 49 days from cover crop planting to sampling, with 1553 growing degree days (base 40). Total aboveground biomass was 1767 lb/acre, or 0.9 ton/acre. For grazing purposes, there were about 1 AUM/ac, or 41 total AUMs available in the field. In practical terms, this would mean approximately 100 head of cattle for ten days of grazing.

**Summary and Discussion:** 2015 was drier than normal, but at the time of photos the cover crop was the greenest field in the surrounding landscape of small grains and native range. Forage peas performed well in the early season until the hot weather hit in July. At the time of sampling, the peas had formed seed pods. Lentils were rarely present and dried out. Sorghum-sudan and the millets produced the most grazeable forage, as compared to the other species in the mix. Buckwheat was present in the expected proportion and provided pollinator forage. Turnip and rapeseed were fairly rare and plant size was small. Sunflower did well, but phacaelia was rarely seen. It should be
noted that all plant performance information is solely based on visual observation. The field was leased to a
neighbor for grazing of cattle in August. The cover crop field was not fenced separately and was in the same
paddock with other crop fields and surrounding rangeland. Cattle preferred the cover crop over the grain stubble or
native range. As a result, about 75% of the cover crop was grazed, leaving less than ideal aboveground residue for
building organic matter in the long-term. Overall, the predominately warm-season cover crop mix was well matched
to the mid-June planting window and brought some diversity to this rotation. What is unknown is the impact the
cover crop will have on the 2016 malt barley crop due to soil moisture use. Yield information from 2016 is needed to
provide complete information on the relative success of this cover crop. Dryland producers with a low risk tolerance
or just starting a cover crop practice might consider planting a predominately cool-season cover crop mix in early
spring and terminating by mid-June to early July to match the peak precipitation window. While this decreases the
plant diversity in the rotation, it also decreases the risk of yield reduction in the subsequent cash crop. It may take
several appearances of the cover crop in the rotation for positive benefits to be realized.

\[\text{Fig 3. Cover crop at sampling July 31, 2015. Shalaine Watson.}\]

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 & Seeding Rate (lb/acre) & Seeds per acre & Percent of Mix by \\
 & & & # of Seeds \\
\hline
Peas, spring forage & 10 & 32,000 & 3 \\
Lentil & 4 & 60,000 & 6 \\
Sorghum-sudan & 3 & 54,000 & 6 \\
Millet, white wonder & 1 & 200,000 & 21 \\
Millet, proso & 1 & 120,000 & 12 \\
Turnip & 1 & 170,000 & 18 \\
Rapeseed & 1 & 175,000 & 18 \\
Sunflower & 1 & 8,000 & 1 \\
Buckwheat & 2 & 36,000 & 4 \\
Phacelia & 0.5 & 112,500 & 12 \\
Total & 24.5 & 967,500 & 101 \\
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\[\text{Fig 4. Cover crop seed mix.}\]