Irrigated Warm-Season Cover Crop for Grazing, Carbon County

Ted Nelson, NRCS District Conservationist, Columbus, MT

County: Carbon, near Bridger
Average annual precip: 13-14”
MLRA: 58A, Northern rolling plains
Dominant Soil Type: Hs – Heldt Silty Clay Loam
Acres: 13
Planting Date: June 23, 2015
Seeding Rate: 26.5 lbs/ac
Seed cost: unknown
Seeding Method: Double disc drill
Row Spacing: unknown
Tillage: Plow, disc
Previous Crop and Year: Grass/legume hay
Herbicides: Pre: none
Post: none
Insecticides/Fungicides: none
Fertilizer: none. Inoculant only.
Irrigation: Gated pipe
Termination Method and Date: Frost-kill, Nov.
Next Crop: Grass/legume mix for hay and forage

<table>
<thead>
<tr>
<th>Monthly Precipitation at Bridger, MT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Brider</strong></td>
</tr>
<tr>
<td>30 yr avg 1981-2001</td>
</tr>
<tr>
<td>2014</td>
</tr>
<tr>
<td>2015</td>
</tr>
</tbody>
</table>

Fig. 2. Monthly precipitation at Bridger, MT. Western Regional Climate Center, station #241102.

Introduction:
This was a grass/legume hay field that was due for renovation. The producer wanted to try a multi-species cover crop to be used for grazing for one year before reseeding the field back to a perennial grass/legume mix in 2016. The species mix would not only provide forage but also benefit the soil by introducing more broadleaf plants and warm-season grasses.

Results:
NRCS staff visited the field on September 10, 2015. The cover crop was actively growing and vigorous. Three random clippings were taken and oven-dried, but not separated by species. There were 78 days between the planting and sampling dates, with 2326 growing degree days (base 40) during this same period. The average production from the clippings was 8136 lbs. of dry matter per acre, or 4.1 t/ac. Budgeting three-fourths of the forage for grazing and allowing 910 lbs/AUM results in 6.7 AUMs/ac, or 87 AUMs for the entire 13 acre field. Assuming $30.00/AUM, the forage value is $2610 for the field. As mentioned, species were not separated after clipping but generalizations can be made. Sorghum-sudangrass dominated the mix and provided the bulk of the aboveground biomass. The radishes and turnips were successful as were the sunflowers, safflowers, and millet. The pinto beans were not successful. Cattle were turned in for grazing in November after the first frost, and after the risk of prussic acid toxicity in the sorghum-sudan.
A concern with sorghum-sudangrass when used for forage is the risk of prussic acid (hydrocyanic acid) toxicity. A sudden disruption of growth such as frost, drought, or cutting causes prussic acid to be released inside the plant at a more rapid rate. High prussic acid levels can be lethal to cattle. Prussic acid will break down in one to two weeks so material made into hay or silage is safe to use. Horses should not be allowed to graze these plants as they can develop a potentially fatal cystitis syndrome and pregnant mares may abort. Cattle can safely graze a week after a killing frost as the prussic acid usually dissipates within 7 days. Excessive nitrate levels can also occur if a high level of nitrogen fertilizer was applied, there is prolonged drought followed by rain, or any condition which kills the leaves while the roots and stems remain active. When in doubt, have the forage tested for nitrates before feeding.

Summary and Discussion:
Overall, this cover crop grew extremely well and was the top-producing site we sampled across the twelve–county area in 2015. The combination of irrigation, sorghum-sudangrass, and a warm-season growing window resulted in very impressive growth. We were very pleased to see low weed pressure and excellent biomass production. There was significant nocturnal grazing pressure from an elk herd that resided nearby, but the producer was very pleased with the results. This would appear to be an economical and soil-health-building tool for livestock producers who are renovating irrigated hay fields.

![Fig. 3. Cover crop on September 29, 2015. Ted Nelson.](image)

<table>
<thead>
<tr>
<th>Seed Mix %</th>
<th>Cover Crop Biomass</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Legumes</strong></td>
<td>13</td>
</tr>
<tr>
<td><strong>Brassicas</strong></td>
<td>9</td>
</tr>
<tr>
<td><strong>Warm-Season Grasses</strong></td>
<td>26</td>
</tr>
<tr>
<td><strong>Warm-Season Broadleaves</strong></td>
<td>52</td>
</tr>
</tbody>
</table>

![Fig. 4. Seed mix and observed biomass performance.](image)