Cover Crop Following Irrigated Winter Wheat Harvest near Hardin

Evan Van Order, NRCS Soil Conservationist, Hardin MT

County: Big Horn
Average annual precip: 11-12”
MLRA: 58A, Northern Rolling Plains
Dominant Soil Type: Vanada Clay, 0-1% slope
Acres: 89.6
Planting Date: July 30, 2016
Seeding Rate: 667,568 seeds/acre, or 29.4 lb/acre
Seed cost: $29.15/acre (inoculant, seed, and delivery)
Seeding Method: Sunflower No-till Grain drill, Double Disk
Row Spacing: 7.5”
Tillage: No-till
Previous Crop and Year: 2016 winter wheat; 2015, Sugar Beets
Herbicides: Pre: Glyphosate
Post: N/A
Insecticides/Fungicides: N/A
Fertilizer: N/A
Irrigation: N/A
Termination Method and Date: Frost kill Nov. 15
Next Crop: Soybeans

Introduction:
A cover crop mix was planted following winter wheat harvest to utilize the rest of the growing season, add diversity to the cropping system, keep a living root in the soil, and increase soil organic matter. The field is 89.6 acres. Approximately 80 of those acres are irrigated by center pivot and two corners are flood irrigated. The field will be planted to soybeans in 2017. The cover crop was terminated by frost in November and residue was left in the field. No grazing of the cover crop occurred.

Results:
Winter wheat was harvested in July 2016. The cover crop was planted with no-till methods into the standing 4” winter wheat stubble, on July 30, 2016. No additional fertilizer was applied. All ten species of the mix established well and were well represented throughout the stand. On Sept. 19th, 2016 sampling was conducted on 3 clipping sites which were randomly selected across each cover crop stand. All sites were on Vanada clay soils. There were 51 growing days from the time of planting to the time of clipping. There were 1576 Growing Degree Days (base 40) from the time of seeding to the sampling date. Plants were separated by species in the field and air-dried at the
Hardin Field Office. Total aboveground biomass after air-drying was 1346 lb/acre, or 0.67 ton/acre. Assuming 910 lbs of forage per animal month, and 50% utilization rate on 89.6 acres, there were 66.3 AUMs available in this field.

Summary and Discussion:
Overall, this cover crop grew well with good biomass accumulation in the limited amount of growing days. The warm season grasses in the stand were noticeably yellow in appearance, indicating a possible nitrogen deficiency. Possible causes of the nitrogen deficiency could be vigorous winter wheat growth in the previous crop that used all available N in the soil profile. Likewise, some N could be tied-up in the wheat residue left in the field. A small portion of the field included an area that was formerly a corral, in this area the cover crop was noticeably darker green in color and more vigorous in growth. In the future, producers may want to consider applying starter fertilizer when seeding a cover crop immediately after small grain harvest.

<table>
<thead>
<tr>
<th>Cover Crop</th>
<th>Seed Mix %</th>
<th>Wheat Field Plant Biomass %</th>
<th>Old Corral Area Plant Biomass %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Legumes</td>
<td>23.4</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Brassicas</td>
<td>19.7</td>
<td>33</td>
<td>10</td>
</tr>
<tr>
<td>Warm season grasses</td>
<td>41.1</td>
<td>29</td>
<td>25</td>
</tr>
<tr>
<td>Broadleaves</td>
<td>15.8</td>
<td>30</td>
<td>37</td>
</tr>
<tr>
<td>Cool Season Grasses</td>
<td>0</td>
<td>5</td>
<td>23</td>
</tr>
</tbody>
</table>

Fig. 3. Cover crop after winter wheat, Sept 21, 2016. Note yellowing, indicating potential nutrient deficiency.

Fig. 4. The same cover crop planted in an old corral area, Sept 21, 2016. Note deep green color, indicating nutrient sufficiencies. Note yellowed cover crop in background.

Fig. 5. Comparison of planned seed mix percentage vs actual aboveground biomass percentage