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| Table 1. Monthly precipitation and cover crop GDD (Tbase = 0 °C) at Fort Ellis and NGV, MT. Growing season is Apr–July. GDD calculated from day after seeding to day of termination for each cover crop mixture. Long-term average (LTA) calculated from 1981-2010, Western Regional Climate Center. WRCC station number and distance to field site are listed below site name. | | | | | | |
|  | Fort Ellis | | | | NGV | |
| (241044, 5.5 km) | | | | (240622, 14.5 km) | |
|  | 2015 | 2016 | | LTA | 2016 | LTA |
| Annual Precipitation (mm) | 450 | 472 | | 501 | 336 | 357 |
| Annual Temperature (°C) | 8.2 | 7.8 | | 7.1 | 6.9 | 6.0 |
| Growing Season Rainfall (mm) | 214 | 166 | | 254 | 155 | 193 |
|  |  |  | |  |  |  |
| Cover Crop Mixture | Cool | | Warm | | Cool | Warm |
|  |  | |  | |  |  |
| GDD (°C) | 902 | | 944 | | 862 | 961 |

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| Table 2. Pre-planting soil characterization of Fort Ellis and NGV, MT. | | |
|  | Fort Ellis  (2015) | NGV  (2016) |
|  |  |  |
| Location | 45.667314°, -110.977771° | 45.904128°, -111.153556° |
| Elevation (m) | 1493 | 1432 |
| Soil Texture | Silt loam | Silt loam |
| pH | 6.5 | 5.9 |
| Soil Organic Matter (%) | 5.3 | 2.6 |
| Nitrate (mg kg-1) | 9.1 | 4.8 |
| Olsen P (mg kg-1) | 56 | 39 |
| Sample Date | 24 Apr. 2015 | 6 May 2016 |
| Previous crop | Spring barley | Winter wheat |
| All samples analyzed by AgVise Laboratories, Northwood, ND of samples from the 0 to 15 cm depth. | | |

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| Table 3. Agronomic management for cover crop mixtures and spring wheat at Fort Ellis and NGV, MT. | | | |
| Event | 2015 | 2016 | 2016 |
|  | -----------Fort Ellis-------- | | --NGV-- |
|  |  | |  |
| Soil sample date | Apr 24 | Apr 13 | May 6 |
| Cool-season cover crop seeding date | Apr 29 | N/A | May 5 |
| Cool-season cover crop stand counts | May 28 | N/A | Jun 1 |
| Cool-season cover crop pre-termination biomass | Jun.30 | N/A | Jul 4 |
| Cool-season cover crop termination | Jul. 1 | N/A | Jul 5 |
| Cool-season cover crop post-termination biomass | Jul 2 | N/A | Jul 6 |
| Cover crop supplemental spraying (grazed plots) | Aug 3 | N/A | Aug 11 |
| Soil sample date (NO3 and H2O only) | Jul 10 | N/A | Jul 12 |
| Warm-season cover crop seeding date | Jun 15 | N/A | Jun 20 |
| Warm-season cover crop stand counts | Jul. 7 | N/A | Jul 17 |
| Warm-season cover crop pre-termination biomass | Aug 3 | N/A | Aug 10 |
| Warm-season cover crop termination | Aug 4 | N/A | Aug 10 |
| Warm-season cover crop post-termination biomass | Aug 5 | N/A | Aug 11 |
| Soil sample date (NO3 and H2O only) | Aug 17 | N/A | Aug 18 |
| Spring wheat seeding date | N/A | Apr 12 | N/A |
| Spring wheat stand counts | N/A | May 10 | N/A |
| Spring wheat biomass at antithesis | N/A | Jul 6 | N/A |
| Spring wheat harvest date | N/A | Aug 17 | N/A |
| First frost date (0 °C)\* | Oct 3 | Oct 6 | Oct 6 |
| Warm-season radish termination date (-4 °C)\* | Nov 6 | Oct 11 | Oct 11 |
| \*Data from Western Regional Climate center station (241044). | | | |

|  |  |  |
| --- | --- | --- |
| Table 4. Study treatments, termination methods and cover crop mixtures for year-1 at Fort Ellis and year-2 at NGV, MT. | | |
| Treatment | Termination Method | Cover Crop Mixture |
| 1) Chemical-Fallow  (fallow) | None | None |
| 2) Cool-season – graze  (cool graze) | grazed by lambs and sprayed with Glyphosate | radish, pea and oat |
| 3) Cool-season – spray out  (cool spray) | sprayed with glyphosate | radish, pea and oat |
| 4) Warm-season – graze  (warm graze) | grazed by lambs and frost kill | radish, soybean and sorghum/millet\* |
| 5) Warm-season – spray out  (warm spray) | Sprayed with Glyphosate and frost kill | radish, soybean and sorghum/ millet\* |
| 6) Warm-season – swath  (warm hay)\*\* | swathed and frost kill | radish, soybean and sorghum/ millet\* |
| \*Millet was substituted for sorghum in the warm-season mixture in year-2 as sorghum can produce toxic levels of prussic acid (hydrocyanic acid) and poison livestock (Sher et al., 2012).  \*\* In year-2, due to low biomass growth, treatment 6 was swathed and the biomass was left on the plots to simulate mowing. | | |