**Cover crops**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **2018** | **2018** | **2018** | **2019** | **2019** | **2019** |
| **Cover crop treatment** | **Planting date** | **GDDs accumulated at xxx sampling** | **CC biomass at sampling (Mg ha-1)** | **Planting date** | **GDDs accumulated at xxx sampling** | **CC biomass at sampling** |
| **No cover crop** | **NA** | **NA** |  | **NA** | **NA** |  |
| **Early planted mix** |  | **3079** | **235** |  | **2859** | **688** |
| **Mid-season planted mix** |  | **1758** | **26.2** |  | **1311** | **203** |
| **Mid-season planted radish** |  | **1758** | **1950** |  | **1311** | **793** |
| **After-harvest planted radish** |  | **1033** | **443** |  | **612** | **223** |

**Grain yields**

Crop yields ranged from 1.7 to 5.6, 2.4 to 5.4, and 1.7 to 5.8 Mg ha-1 in spring barley, oat, and faba bean, respectively. Grain yields varied significantly by crop (p < 0.01), but the crop impact did not interact with any other factors (p-values ranging from 0.10 to 0.95). The impact of tillage depended on the straw management (p < 0.01). When straw was removed, the no-till treatment yielded less (M(SE)=0.47(0.10) Mg ha-1) less than the tilled treatments. When straw was retained, tillage treatments produced the same crop yields. The cover crop treatment significantly impacted crop yields (p<0.01), but this effect was not moderated by other factors (p-values ranging from x to x) but had a significant effect on crop yields (p < 0.01). Crop yields were lowest in the early-planted mix cover crop treatment (M(SE)=3.82(0.16)), and highest in the mid-season planted radish treatment (M(SE)=4.20(0.16) Mg ha-1). The no-cover crop treatment had intermediate crop yields (XX), and while there were statistical differences between the mixtures and the mid-season planted radish treatments, none of the cover crop treatment yields were statistically different from the no-cover treatment.

**Fall biomass**

Unless otherwise stated, significance was assigned at p <0.01. Full statistical reports including means, standard errors, and p-values for all marginal means and comparisons can be found in supplementary material.

Removing straw after harvest significantly decreased fall vegetative biomass by a small amount (298 and 119 kg ha-1 in 2018 and 2019, respectively), regardless of tillage or cover crop treatment. In 2018 (hot/dry) no-till resulted in significantly higher (+874 kg ha-1) fall vegetative biomass compared to both tilled systems, while in 2019 (hot/wet) fall vegetative biomass amounts did not differ by tillage.

Year had the largest impact on fall biomass, and the impacts of cover crop treatment and tillage depended on the year. Due to the complex three-way interactions and large differences in weather conditions between the two years, results are presented separately for each year.