Cover Crop Variety and Seeding Date Trial for Weed Suppression Under Organic Management

This organically managed demonstration provides valuable information on a set of cover crop combinations for use in the Prince Albert region to help organic and conventional producers to adopt cover cropping as a promoted best management practice to store carbon and reduce greenhouse gases. In 2021, six combinations of cover crops (oats, 2x oats, peas, oats/peas, Sudan grass, and Sudan grass/peas) were established on two different seeding dates (June and July). In 2022, a cash crop of barley was direct seeded into the cover crop mulches. This trial was managed as an organic demonstration on certified organic land.

2021 was a dry year, but all cover crops established very well. Plant density was lower for the later seeded cover crops (Fig 1). Sudan grass had both the highest and lowest biomass dependant on seeding date. When growing conditions are unfavorable, higher seeding rates and earlier seeding can aid in ensuring sufficient biomass is created. All cover crops naturally terminated in the frost.

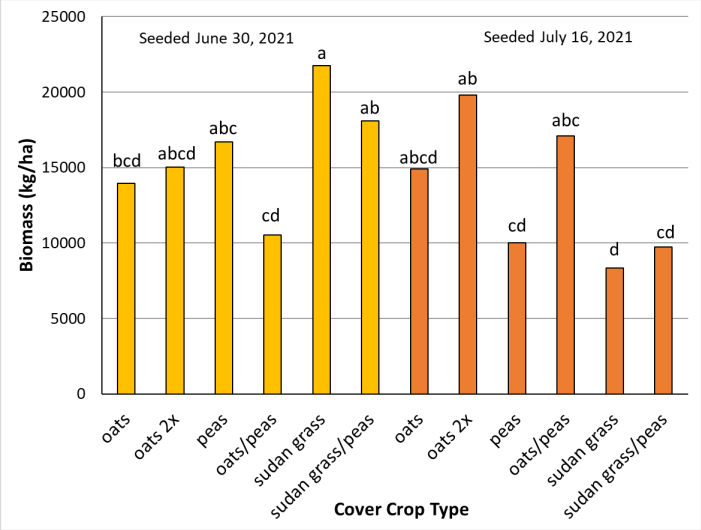

Figure 1. Mean biomass of various organically managed cover crops seeded at two different dates in 2021 near Prince Albert, SK. Means with the same letter are not significant (P>0.05). Yellow bars indicate earlier seeding date, orange bars are later seeded cover crops.

Barley yields were 69-95 bu/ac. None of the previous seeded cover crops influenced barley emergence or yield. Cover crops that produced higher amounts of biomass in 2021 had better ground cover with less visible bare soil in 2022. Soil temperature was greatest with cover crop treatments that had the lowest biomass in 2021 (Fig 2), including early seeded oats/peas, and late seeded Sudan grass and Sudan grass/peas ($p<0.05$; $p=0.0151$). The coolest soil temperatures corresponded with the greatest biomass producing cover crops, early seeded Sudan grass and late seeded 2x forage oats. This suggests enough biomass was created to reduce light penetration and warming of the soil.

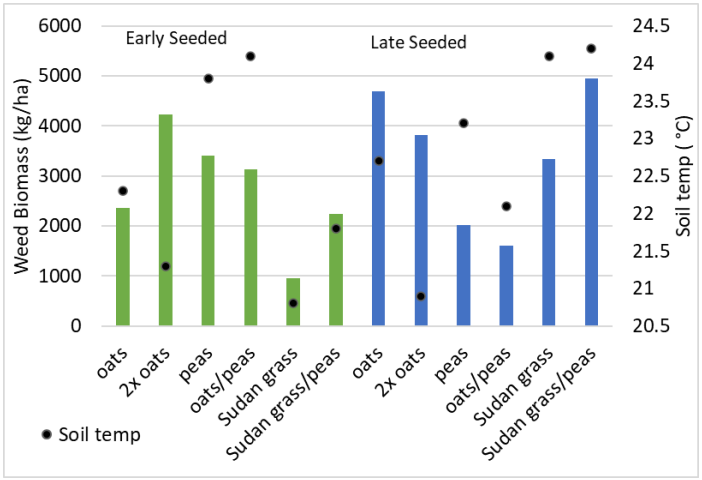

Figure 2. Comparison of various cover crop's ability to suppress weeds in the subsequent year when seeded to a barley cash crop.

Weed density was lowest in both early seeded Sudan grass treatments ($p<0.1$; $p=0.0517$), and weed biomass was lowest in the early seeded Sudan grass ($P<0.1$; $p=0.0707$). Cover crop biomass did not always equate to best weed control. Peas alone and some oat cover crops had the poorest weed control (>14.5 weeds/0.25m^2). However, the inclusion of peas in a cover crop would be for N fixing ability to increase soil fertility for subsequent crops. Peas tend to decompose relatively quickly, while the oat cover crop remained upright and may have allow greater light penetration into the canopy.

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