

Cereal Cover Crops for Early Season Weed Control in Organic Field Beans.

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Background:

Cover crops can be a successful weed control tool in integrated farming systems. Research has shown that cover crops can reduce weed pressure either through direct competition for resources, by altering the soil surface conditions as a mulch or by reducing germination through the exudation of allelochemicals.

In the Midwestern United States, there has been substantial research on the use of fall rye cover crops in soybeans. However, there are few studies in Manitoba on cover crops or their use in pulse production. Organic field beans in particular stand to benefit since they are very poor competitors. The addition of a cover crop could also reduce tillage, which is the primary method of weed control.

Project Overview:

This study compares three cereal cover crops, fall rye (*Secale cereal* L.), barley (*Hordeum vulgare* L.) and oat (*Avena sativa* L.) to a no cover crop control for early season weed suppression in organic field beans (*Phaseolus vulgaris* L.). The objectives are to compare weed suppression by evaluating the physical effects of cover crops and their management on several microclimate parameters.

Cover crops were seeded in September, 2010 in 4 m x 8 m plots using 15 cm row spacing. Prior to seeding field beans in early June 2011, the main plot is split into tillage and no-till sub-plots. Navy bean (cv. 'Envoy') was seeded in 15 cm row spacing. Barley and oats are spring annuals and winter kill, offering an alternative to fall rye which requires active termination. Termination of fall rye no-till plots is done by mowing at fall rye anthesis 18 days after planting (DAP).

Preliminary results show that at pulse seeding, fall rye had reduced weed biomass (46 kg/ ha) compared to barley (117 kg/ha), oats (302 kg/ ha) and the control (329 kg/ ha). Mean light interception was highest in fall rye no-till plots (948 $\mu\text{mol s}^{-1} \text{m}^{-1}$) 18 DAP. Also at pulse seeding, mean surface soil nitrate (0-15 cm) was lowest in fall rye plots (3.2 kg/ha). Plots that received tillage had higher soil nitrate (0-15 cm) 18 DAP and higher weed richness compared to no-till plots.

Conclusions:

Fall rye provided superior weed control, however early season competition for resources may have contributed to delayed pulse development. Tillage plots may have higher resource availability which is contributing to higher weed richness.

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