

MINNESOTA

Companion crops for organic alfalfa establishment

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In organic cropping systems, alfalfa supplies nitrogen to subsequent crops, improves soil organic matter content, and provides year-round soil coverage that reduces soil erosion. In these systems, alfalfa is typically seeded with a companion crop. Companion crops suppress weeds, reduce soil erosion, and provide insurance of crop yield, but can also reduce alfalfa establishment. Our objective is to determine which companion crops provide the least risk to establishment and yield of spring-seeded alfalfa. The research, funded by the USDA Risk Management Agency, is being conducted on organic land at 4 sites in Minnesota to provide data for developing a risk assessment tool. In spring 2006, Pioneer '54H91' organic alfalfa was seeded at 14 lb/ac (70 seeds/ft²). Small grains, peas, and flax were harvested for grain.

Representative seeding-year results from Rosemount, MN, are shown. Alfalfa stands were similar for all treatments, averaging ~20 plants/ft². Seeding-year alfalfa yield averaged only ~900 lb/acre, reflecting the effect of competition by companion crops and weeds. Total seeding-year alfalfa yields were similar with all small grains; but were reduced by pea, which formed a dense canopy. A rapid-maturing brassica companion crop resulted in greater alfalfa yield than small grain companions, and equal or greater yield than the solo-seeded control. In 2007, residual yields will be measured to assess effects on long-term yields.

Seeding-year yield (two harvests) of organically grown alfalfa seeded with different companion crops in late April 2006 at Rosemount, MN.

Cover Crop (<i>Variety</i>)	Seeding Rate		Alfalfa Yields	
			1 st Harvest	Total Season
	<i>Seeds/ft²</i>	<i>~ lb/ac</i>	<i>lb/ac</i>	<i>lb/ac</i>
Spring Oat (<i>Jim</i>)	28	75	153	838
	14	37	219	822
Spring Wheat (<i>Alsen organic</i>)	28	87	226	1021
	14	43	248	862
Spring Barley (<i>Lacey organic</i>)	28	85	240	755
	14	43	96	608
Field Pea (<i>Trapper</i>)	7	130	47	436
	3.5	65	21	561
Winter Wheat (<i>Expedition organic</i>)	25	75	178	1052
Annual Flax (<i>Omega3 golden</i>)	85	42	111	728
Brassica (<i>Rapid cycling</i>)	177	15	562	1337
Annual Ryegrass (<i>Common</i>)	14	3	530	1102
None	0	0	684	1360
<i>Average</i>			255	883
<i>LSD (0.05)</i>			361	400