

Small grain cover crop seeding rate effect on small grain forage and grain yield and on alfalfa production

D.J. Undersander and Shawn Conley

¹Department of Agronomy University of Wisconsin, Madison, WI, 53706

Introduction

Seeding alfalfa (*Medicago sativa*) with a small grain cover crop in the spring can increase return to growers by providing additional income from grain or increased forage yield. It can also reduce early wind and water erosion and reduce weed establishment.

However, tall cover may reduce alfalfa stand and yield during hot periods over summer and result in both short term and long term alfalfa yield reductions.

Therefore this study was established to determine the effect of small grain seeding rate on small grain forage and grain yield and to determine effect of several plant densities of oats, spring wheat and barley cover crops on alfalfa establishment and on alfalfa yield in succeeding years.

Materials & Methods

This study was conducted at University of Wisconsin Arlington, Lancaster, Spooner and Marshfield Agricultural Research Stations.

In each of two years alfalfa was seeded at 13 kg ha⁻¹ or 56 seeds m⁻². Three small grains (Hazen Spring barley {*Hordeum vulgare*}, Esker Spring Oat {*Avena sativa*} and Glenn spring wheat {*Triticum aestivum*}) were seeded at three rates (108, 270, and 432 seeds m⁻²) in a split plot design.

	kg seeded ha ⁻¹		
	108 Seeds m ⁻²	270 Seeds m ⁻²	432 Seeds m ⁻²
wheat	38	96	153
oats	38	95	152
barley	44	110	176

Small grain harvest method was a further split. Small grain was harvested either at the boot stage for forage or at grain maturity for grain.

Locations were considered to be whole plots and grain versus haylage were split plots with grain type and seeding rate randomized within.

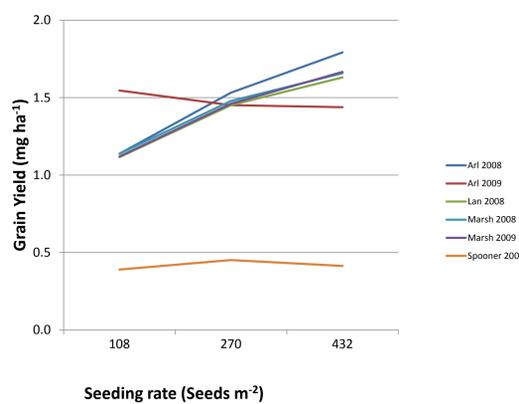
Alfalfa yield was measured the year after establishment.

Table 1. Yield of alfalfa in first production year as affected by cover crop the preceding year

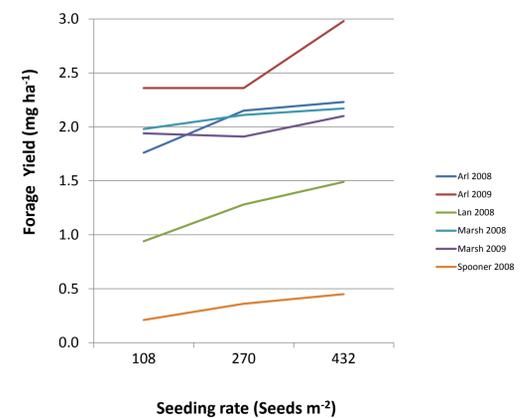
Cover Species Seeded	Harvested as	Alfalfa Yield First Production year (mg ha ⁻¹)	Alfalfa 2-year total yield (mg ha ⁻¹)
Barley	Grain	12.9	13.6
Oats	Grain	13.0	13.6
Wheat	Grain	12.8	13.4
Barley	Silage	12.9	16.0
Oats	Silage	13.0	16.2
Wheat	Silage	12.9	16.0

¹Differences not significant for species or small grain harvest method.

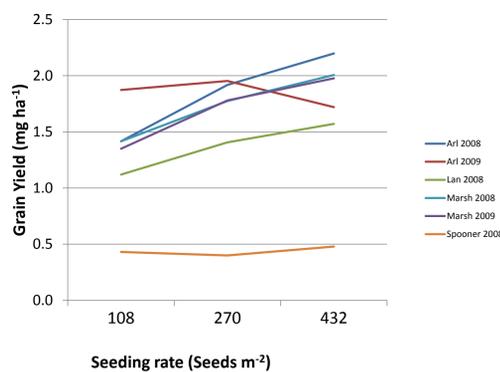
Barley grain yield



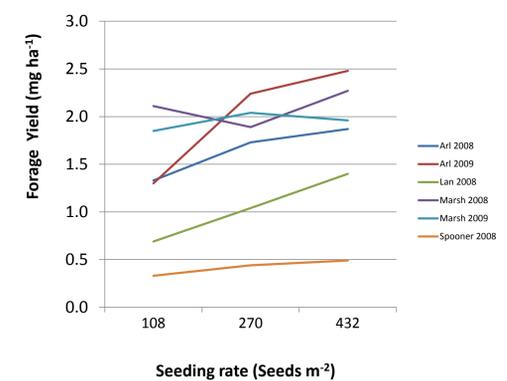
Barley forage yield



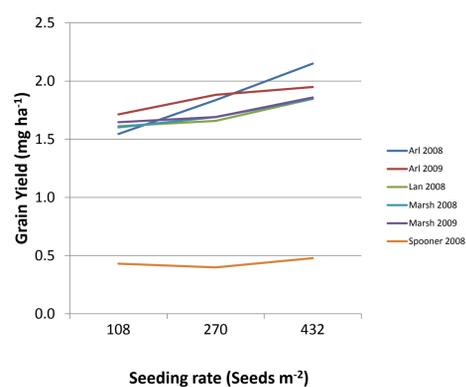
Oats grain yield



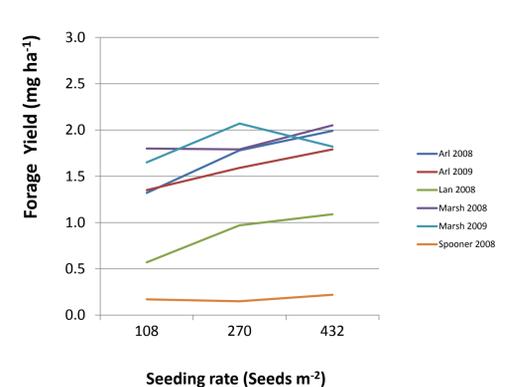
Oat forage yield



Wheat grain yield



Wheat forage yield



Conclusions

- 1) Forage yield increased with higher seeding rates (above 108 seeds m⁻²):
 - 1) for barley 11 and 24%,
 - 2) for oats 23 and 38%,
 - 3) wheat 22 and 31%.
- 2) The grain yield increases for seeding rates (above 108 seeds m⁻²) were:
 - 1) for barley 23 and 33%,
 - 2) for oats 24 and 31%,
 - 3) for wheat 10 and 20%.
- 3) Higher seeding rates of the small grain did not affect alfalfa yield in the seeding year or in the first production year.