

Hairy Vetch Cover Crop Systems

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Cover crops are grown because they reduce soil erosion, water and chemical runoff, weed growth, and because they add organic matter to soils. Currently, winter rye is the predominant cover crop in New England and New York. However, legume cover crops, particularly winter annuals such as hairy vetch, can add nitrogen to soils. Yet legume cover crops are uncommon on vegetable farms in this region. Three years of research, supported by the University of Massachusetts and the LISA granting program, have shown both environmental and economic benefits from alternative cover crop systems. A reduction in nitrogen fertilizer use can be achieved with the use of leguminous cover crops (Figures 1 and 2). We suggest the inclusion of rye with vetch to provide more winter cover and for uptake of nitrogen left over from the previous crop.

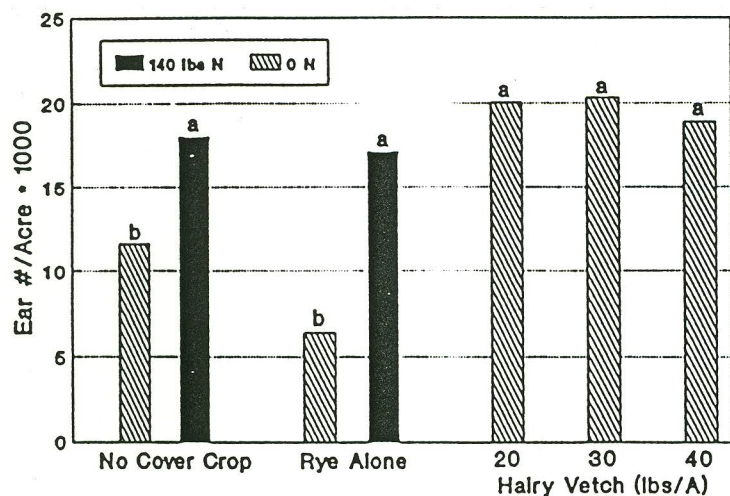


Figure 1. Marketable sweet corn ears for 7 cover crop regimes. Cover crops were seeded Aug. 26, 1990. Sweet corn was planted June 11, 1991. 23,1991.

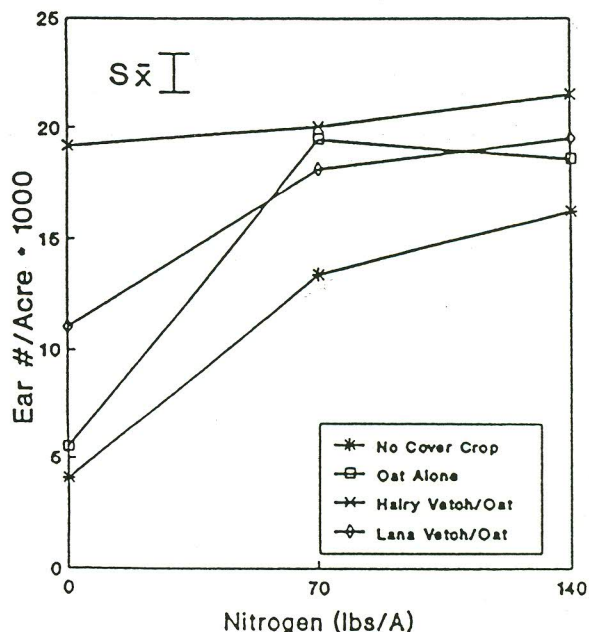


Figure 2. Marketable sweet corn ears for 4 crop regimes. Cover crops seeded Aug. 7, 1990. Sweet was corn planted April

Seed costs for alternative legume cover crops have been a deterrent to their adoption. Preliminary data from research in Massachusetts have shown that seeding rates of hairy vetch may be reduced from the currently recommended 40 lbs/acre to 25-30 lbs/acre without a reduction in the biomass of hairy vetch accumulated in the spring. To help farmers adopt these new systems, we have developed partial enterprise budgets. These show hairy vetch/rye cover crops to be more profitable than rye alone when reduced seeding rates are used.

The economic benefit of the hairy vetch/rye cover crop over the conventional rye

cover crop is in part a function of the price of nitrogen (N) fertilizer, the residual N and N supplied by the hairy vetch cover crop, and the hairy vetch seeding rate. A sensitivity analysis examining the economics of varying seeding rate and nitrogen fertilizer price is shown in below. Table 1 simulates what might be expected from fall (late August-early September) seeded hairy vetch - rye, with an early (May 1) plowdown while Table 2 simulates the response from late summer seeding (August 5) with early plowdown or fall seeding and late (May 30) plowdown.

ASSUMPTIONS (from partial enterprise budgets)

COVER CROP ASSUMPTIONS:

Rye:	Rye seed (\$/lb)	\$0.11	Hairy Vetch/Rye:	Vetch seed	\$0.95
	Rye rate (Lbs/ac)	112		Rye rate	56

NITROGEN ASSUMPTIONS:

Vetch seed lbs./acre	Residual N Late April	(lb/acre) Late May	Estimates of residual N available (used in Tables 1 and 2) are conservative based on our research. Further field studies are needed to determine regional variability in N contribution.
20	50	80	
30	60	85	
40	65	85	

BENEFIT/(COST) OF HAIRY VETCH/RYE MIXTURE OVER RYE ALONE at different prices of N and different seeding rates of vetch.

Table 1. (based on residual N for late April)

Price of N (\$/lb)	Vetch Seed Rate (lbs/acre)		
	20	30	40
\$0.25	(\$0.91)	(8.38)	(17.11)
\$0.30	1.59	(5.38)	(13.86)
\$0.35	4.09	(2.38)	(10.61)
\$0.40	6.59	0.62	(7.36)

Table 2. (based on residual N for late May)

Price of N (\$/lb)	Vetch Seed Rate (lbs/acre)		
	20	30	40
\$0.25	\$6.59	(2.13)	(12.11)
\$0.30	10.59	2.12	(7.86)
\$0.35	14.59	6.37	(3.61)
\$0.40	18.59	10.62	0.64

It is difficult to characterize the full economic benefit of cover crop systems. The full value of nitrogen from legumes, for example, is not available for some years. Similarly the dollar value of nutrients lost in eroded soil is also difficult to calculate. Hence the above tables may underestimate the true value of adopting these alternative cover crop systems.