

Seeding Rates of Cover Crops in Cover Crop-Corn Rotation

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Previous studies in the Research Farm of University of Massachusetts have demonstrated that using grass-legume cover crop mixtures, such as rye/vetch or oat/vetch, in rotation with corn could increase corn yield and minimize ground water pollution by nitrate. However, legume seed expense could be excessive for farmers. This experiment was design to explore the possibility of reducing the seed cost when using legume cover crops.

The experiment was initiated in the fall of 1990. The following treatments were included.

| Cover Crop Type | Seeding Rate (lb/ac) | Nitrogen Rate (lb/ac) |
|-----------------|----------------------|-----------------------|
| No cover crop | 0 | 0, 140 |
| Rye alone | 90 | 0, 140 |
| Rye/Vetch | 56/20, 56/30, 56/40 | 0 |

In the fall of 1994, the rye/vetch mixtures were changed to oat/vetch mixtures, and the seeding rate of oat was changed to 40 lb/ac while the vetch seeding rates remained the same. Cover crop samples were taken immediately before incorporation at the end of May. Samples were oven dried then ground, and nitrogen contents determined. Sweet corn (Sweet Sal) yields were harvested by hand at the end of August each year.

Sweet corn yields (Fig. 1) for the three vetch seeding rate treatments showed no difference and attained the yields of no cover crop or rye treatments with 140 lb/ac of N fertilizer in the first year (1991). As the soil nitrogen built up each year by the incorporation of vetch, rye became more competitive, and vetch growth was suppressed. Therefore, the contribution of N from vetch decreased to less than 40lb/ac for all the three seeding rates in 1994 after four years of using the rye/vetch mixture (Fig. 2). This was reflected by the sweet corn yields of rye/vetch mixture treatments with low vetch seeding rates (20 and 30 lb/ac) in 1994 which were significantly lower than the treatments with 140 lb/ac of N fertilizer (Fig. 3).

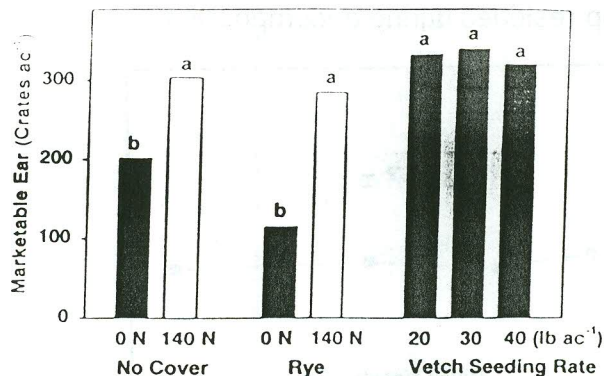


Figure 1. Marketable sweet corn ear yield for 7 cover crop regimes in 1991.

In 1995 and 1996, the N contributions from vetch in oat/vetch mixture were similar among the three seeding rates (Fig.2), but they were much higher than the N from vetch in rye/vetch mixtures in 1994. This was because the oat was winter-killed and the vetch in the oat/vetch

mixtures could grow to its potential in the spring without the competition from the grass cover crop as in rye/vetch mixture. The sweet corn yields in 1996 (Fig. 4) showed no significant difference among the three seeding rates of oat/vetch treatment. Yield responses in 1995 were similar to 1996. Therefore, we recommend using an oat/vetch mixture in rotation with sweet corn or late vegetables with a seeding rate for oat/vetch of 40/25 lb/ac instead of the commonly recommended vetch seeding rate of 40 lb/ac.

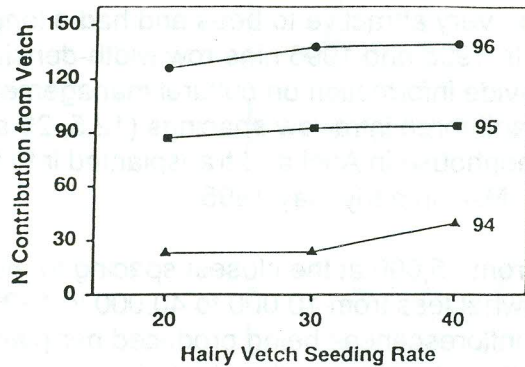


Figure 2. Nitrogen content from above ground growth of hairy vetch.

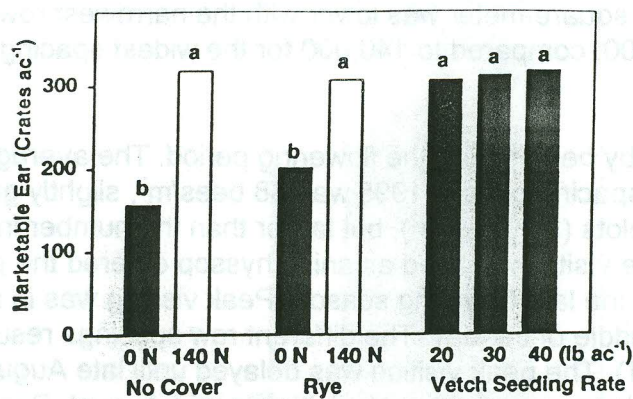


Figure 3. Marketable sweet corn ear yield (vetch planted with rye) in 1994.

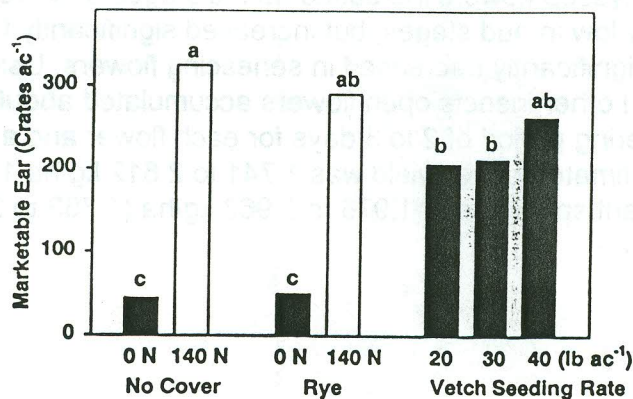


Figure 4. Marketable sweet corn ear yield (vetch planted with oat) in 1996.