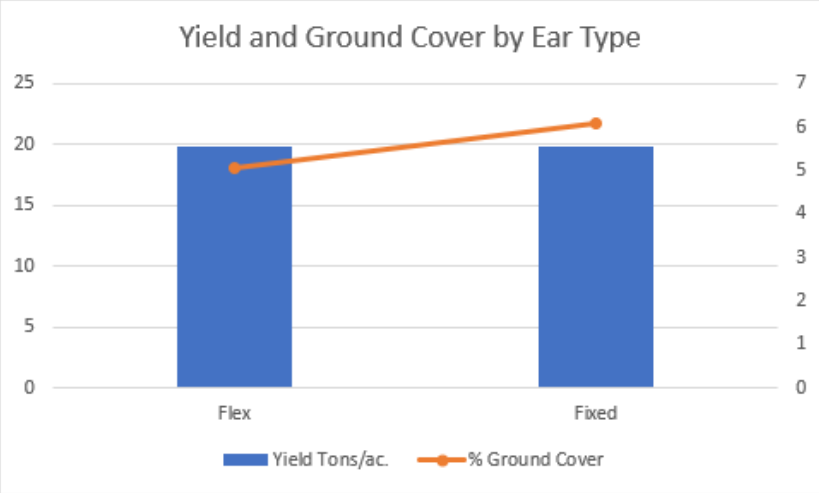
Cost of Production Utilizing Flex and Fixed Ear Corn Varieties with Cover Crops

As part of a Northeast SARE project (grant ONE20-379), *Evaluating "Flex Ear" Corn Varieties for Agronomic and Conservation Performance*, the University of Vermont Extension evaluated three "flex" ear corn varieties and three "fixed" ear corn varieties for their ability to maintain yield while changing the seeding rate populations to allow for better cover crop establishment.

Although widely adopted, barriers remain to establishing a successful interseeded cover crop. Cover crop growth can be inhibited by the inability of light to penetrate the corn canopy cover which impedes cover crop photosynthesis. Shade from the corn canopy can be reduced with lower corn populations or leaf architecture that is more vertical. Understandably, farmers are reluctant to decrease corn populations in order to promote cover crop growth out of concern about decreasing crop yield.

Figure 1. Corn silage yield and cover crop ground cover by ear type, 2022.



In our project the only variables in the model were the cost of seed based on the population rates and the resulting yields. All other costs were the same. The cover crop data associated with this project did not vary significantly across the treatments so no difference in the value of the overall system is attributed to the cover crop. **The primary goal of the project was to investigate if corn populations could be significantly changed without compromising yields by utilizing "flex" ears which would grow larger at lower populations to maintain yields levels and result in better cover crop establishment due to better light penetration to the soil surface.** In both years of this project, the cover crops were not well established across the populations and ear type. Figure 1 shows the data from one of the project locations for 2022.

The data indicates that there are other factors influencing the establishment of cover crops other than corn plant population. The % ground cover does not correlate with yields, planting population, or ear type in a statistically significant manner. Cover crops continue to prove to be challenging to consistently establish in a growing corn crop.

Using a cost of production model to evaluate the costs of producing corn silage in a system that utilizes cover crops was evaluated. Table 2 contains the data used to do the evaluation.

Image 1. Established corn field.

Table 2. Cost of production to evaluate the costs of producing corn silage in a system that utilizes cover crops.

Seeding Rate	Seed Cost	CC Seed Cost and Application Cost/Acre	Manure Cost/ Acre	Fertilizer Costs/ Acre	Chemical Cost/ Acre	Fuel Cost/ Acre	Labor Cost/ Acre	Harvest Cost/ Acre	Planting Cost/ Acre	Total Cost/ Acre	Yield (tons/ acre)	Revenue (at $35/ ton)	Net Revenue /Acre
26000	$78	$46	$105	$30	$34	$25	$70	$60	$22	$470	22.6	$791.00	$321.00
28000	$84	$46	$105	$30	$34	$25	$70	$60	$22	$476	20.0	$700.00	$224.00
30000	$90	$46	$105	$30	$34	$25	$70	$60	$22	$482	22.2	$777.00	$295.00
32000	$96	$46	$105	$30	$34	$25	$70	$60	$22	$488	20.3	$710.50	$222.50
34000	$102	$46	$105	$30	$34	$25	$70	$60	$22	$494	22.7	$794.50	$300.50
36000	$108	$46	$105	$30	$34	$25	$70	$60	$22	$500	19.9	$696.50	$196.50

The table indicates that the only variable costs in the costs of production was the price of seed based on planting population. The yield data in tons of corn silage per acre determined the net revenue per acre more than any other factor.

Image 2. Interseeder planting cover crop seed.

Additional research is needed on the corn silage/cover crop system to better evaluate cover crop establishment. With the highly variable results and climate change influencing our cropping systems, it is very important that we can interseed cover crops that are effective and beneficial to the environment and the farm's viability. **The results from this project indicate that weather and cultural practices such as herbicide selection and tillage influence the establishment of cover crops more than what type of ear corn or the seeding population you are planting at**. One important outcome from this project is that population rates above 28,000 do not statistically significantly change net revenue per acre. As the costs of seed continue to rise this is an important consideration.

The use of "flex" or "fixed" ear corn doesn't appear to have a significant impact on for cover crop establishment. Seeding rates between 26,000 and 36,000 did not significantly impact cover crop establishment in our project. However population seeding rates by should be considered along with moisture, herbicide usage, timing of cover crop establishment (V4), existing weed pressure, and cover crop species selection should all be evaluated for the best potential for interseeded cover crops to make a positive impact in any corn cropping system.

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