

EFFECTS OF A WINTER RYE DOUBLE CROP AFTER CORN SILAGE ON BIOMASS PRODUCTION, WATER QUALITY, AND SOIL NUTRIENT STATUS

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A typical cropping system for confinement dairy production may include consecutive years of corn silage accompanied by annual manure application. Because there is little plant growth for much of the year, this farming system may not achieve maximum annual biomass production. Accompanying high manure application may also lead to soil nutrient buildup, nutrient leaching, and soil erosion. We hypothesize that double-cropping rye after corn silage may maximize annual biomass while addressing the environmental issues associated with corn silage production. Two studies have been designed to test this hypothesis. The first involves cooperation with a large dairy farmer while the other is a small-scale project designed to mimic dairy management practices. On the farm, corn silage production with and without a rye cover crop is compared on adjacent 60-ha fields. The effect of the rye on biomass production, nutrient leaching, and soil nutrient status will be reported. Rye was planted after corn in the fall of 2007 and will be killed prior to corn planting in 2008. At the plot scale, four treatments were compared: corn planted in early May, corn planted in mid-May, corn planted in mid-May after rye, and corn planted in early June after rye. Rye planted October 23 was low yielding in the spring of 2007 and reduced subsequent corn yield. Reduced yield was attributed to lower soil moisture and nitrogen at corn planting. Total biomass from single-cropped corn silage was greater than the double cropped when fall rye growth was limited. Further study is necessary to determine the effectiveness of the double-crop system when rye is established earlier in the fall. The experiment was repeated for 2008 with rye seeded September 14, 2007. If yield can be maximized, this double-cropping system may also have application where corn is grown for energy production.

KEY WORDS: rye, double crop, corn silage, water quality

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