2008 USDA-CSREES National Water Conference
Sparks, NV

Improving Forage Production Systems for Organic Dairy Producers

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Abstract Text:

ALTERNATIVE CROPPING SYSTEMS FOR ORGANIC DAIRY PRODUCERS:
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Issue

Producing quality forage with minimal weed pressure is a goal of organic dairy producers. Growers need new tools that include effective crop rotations, and timely cultivation. A four-year experiment was initiated in 2004 to evaluate an alternative cropping system strategy for organic dairy producers that would better balance crop emergence, growth, and time to canopy closure compared to silage corn. Our interest was to: 1) quantify yield, quality, and weed pressure of winter and spring small grains and brown midrib sorghum sudan grass (BMRSS) double crops; 2) quantify yield, quality and weed pressure of organic corn produced using two tine and two row cultivations; and 3) determine if crop ecology and narrow crop row spacing would more effectively control weeds compared to cultivation under organic production systems.

Methods

In each year, we planted small grains in the third week of September: winter triticale, winter barley, winter wheat, and oats at approximately 140 lbs/ac. Manure was applied at roughly 15 tons/ac, and was disked in immediately to supply approximately 70 lbs of N, 85 lb P2O5 and 125 lbs K2O/acre. In the spring, we disked in the winter-killed oats and sewed spring barley at the same plant density. Grains were harvested at soft dough. Winter barley was harvested approximately 10 days prior to the winter wheat, triticale and spelt and spring barley reached maturity at roughly the same time a week following the winter wheat and triticale. Following small grain harvest, manure was applied to the stubble and disked in immediately. BRMSS seed was drilled at 70 lbs/ac. In two years of the four, two harvests of BMRSS were possible. All grain samples were dried and weighed. Samples were ground and forage quality was determined through NIR methods.

Results

With four cultivations (2 tine and 2 row cultivations), the 4-yr average corn yield was 11,182 lbs dry matter/ac or 18.6 tons/ac at 30% dry matter. Weed biomass (predominantly red root pigweed, lambsquarters and yellow foxtail) was 1733 lbs dry matter/ac or roughly 13.4% of total (weed + forage) dry matter yield. Yields of winter wheat, triticale and barley are presented in Table 1. Winter barley yields were most damaged by winter kill. In one year, total loss was reported. In another year, there was about 20 percent loss. The advantage of winter barley is that it reaches soft dough about 7 – 10 days prior to wheat or triticale. The disadvantage is winter kill and lower yields. Yields of winter triticale was the highest. Forage quality is good, and the rye genetics give it superior winter hardiness over winter wheat. Spring barley appeared to have the most variable yield year to year. Variable moisture, temperature and nitrogen mineralization appeared to play a role in yield variation. Of the three systems, overall yield was lowest with this double crop system. Adding to this is the fact that we were able to get only one BMRSS

cut off the spring barley double crop system. Weeds in each of the double crop systems were significantly lower than the corn system, and there was no effect on small grain phenology on weed biomass.

The analysis of the forage feed quality is still in process. If what we saw in 2004 – 2006 continues for 2007, we will see that corn is the highest energy yielding cropping system. The triticale/BMRSS and winter wheat/BMRSS cropping systems have produced similar tonnage, but feed energy has been significantly lower. Growers adopting the double crop system may see weed seed banks decrease, but they will need to either grow some corn or import some onto the farm to make up for the lack of energy in the forage. So, in short, the alternative forage system provides a cropping system that has lower weed pressure, efficient yields, and quality forage. More work is needed to see how the system holds up over diverse winter weather conditions in the upper Northeast.

Table 1. Yield of Small Grains – 2005

Forages	Dry Matter Yield (lbs/ac)		Weed Biomass (%)
Corn	11183 a	13.7 a	
Triticale/BMRSS (3-yrs)		11125 a	0.44 c
Winter Wheat/BMRSS (3-yrs)		9944 b	0.18 c
Spring Barley/BMRSS (4-yrs)		9131 b	3.4 b
Winter Barley/BMRSS (2-yrs)		6855 c	3.12 a
LSD (0.05)	890	0.93	

Impact Statement:

By having an effective double crop system, growers have an economic reason to keep fields covered during the late fall and early spring periods. We have shown growers that this system has promise to protect soil resources.