

Land Application of Cranberry Presscake

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The cranberry industry is one of the most important agricultural activities in Massachusetts, ranked first nationally in cranberry production for 1991, with 200 million pounds of fresh fruit worth approximately \$100 million. The industry generates a sizeable amount of solid waste (cranberry presscake) from the juice extraction process which until just recently presscake was disposed of in landfills. Cranberry presscake is fairly acidic, with pH values between 3.0 and 4.0. Presscake is approximately 50% dry matter and low in nitrogen, about 1.0% on a dry weight basis.

Corn represents the largest acreage of all annual crops grown on Massachusetts soils and is the largest possible repository of cranberry presscake. Field experiments at the UMASS Experiment Station with field corn and alfalfa were designed in 1991 to measure the effect of increasing rates of cranberry presscake application on corn silage and alfalfa yields. Corn tolerates depressed soil pH better than most crops. However, alfalfa which is planted in rotation with corn on most Massachusetts dairy farms is pH sensitive. In the alfalfa study presscake was applied at the rate of 34 ton/acre with three different rates of lime application (0, 1000, 2000 lb. lime/ac). In the corn experiment, five rates of presscake (0, 10, 25, 40, 50 t/ac) were applied with 5 rates of nitrogen (50, 110, 200, 290, 350 lb. N/ac) and 5 rates of lime (0, 400, 1000, 1600, 2000 lb. lime/ac).

In April 1991, cranberry presscake was applied at the rate of 34 ton/acre and incorporated planted to alfalfa. Biomass samples were taken in June 1991 (Figure 1). Alfalfa plots which received 34 ton/acre of presscake experienced delayed establishment of alfalfa stands. Weed seed germination was also delayed. Plots receiving presscake had reduced forage yields for the first cutting; however, at the second and third cuttings of alfalfa, there was no significant difference between the 0 and 34 t/ac plots (Figure 2).

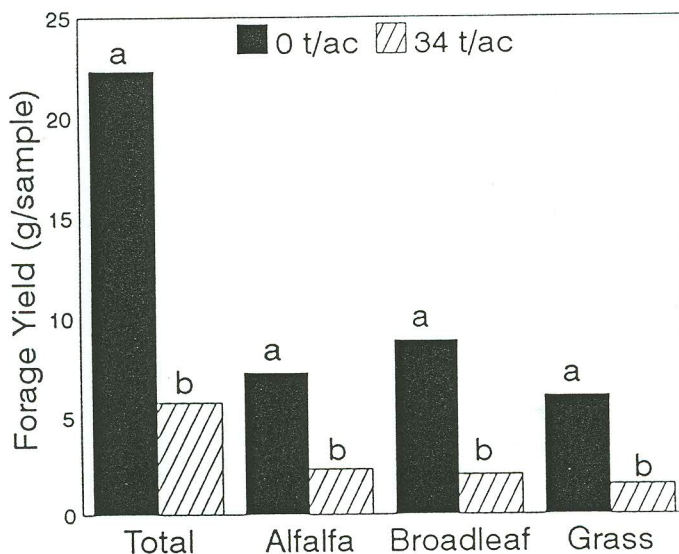


Figure 1. June 1991 alfalfa and biomass sampling.

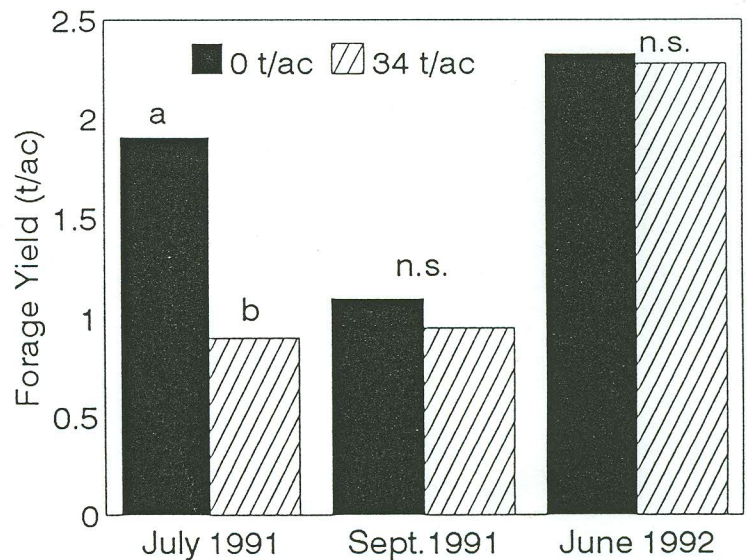


Figure 2. 1991 and 1992 alfalfa yields.

In May 1991, presscake, lime and nitrogen were applied at the aforementioned rates and incorporated, then field corn was planted. Plots which received the highest rate of presscake experienced a slight yield depression for silage (Figure 3); however, earcorn yields remained fairly constant across treatments. In 1992, the experiment was repeated on the same plots, and the yield reduction for silage was more pronounced as presscake application was increased (Figure 4), but again there was no significant difference among treatments for earcorn yield. In both the corn and alfalfa experiments, pH levels did not change dramatically and did not seem to effect yields.

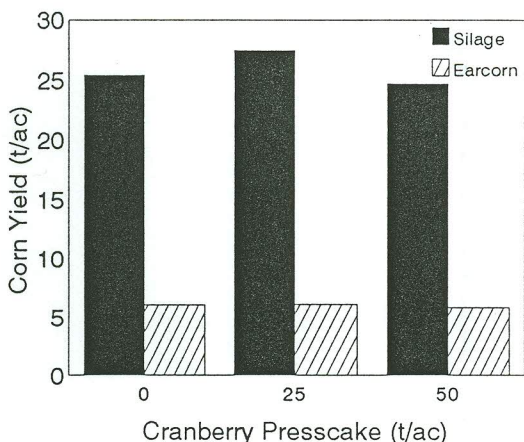


Figure 3. 1991 silage and earcorn yields with 200 lb. N and 1000 lb. lime/acre.

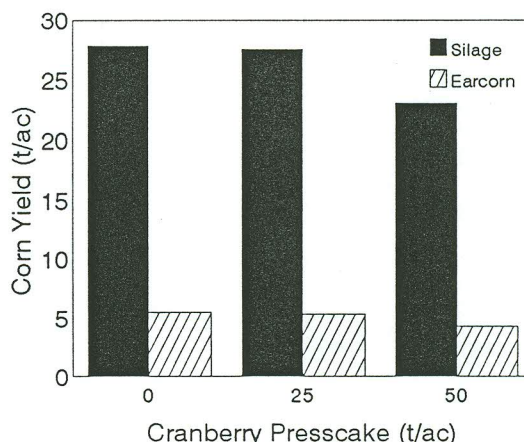


Figure 4. 1992 silage and earcorn yields with 200 lb. N and 1000 lb. lime/acre.

With the cooperation of a Middleboro dairy farmer, an on-farm experiment with cranberry presscake application to field corn was initiated in 1992. Two different forms of the presscake residue (with and without ricehulls) were applied at the rates of 0, 20, 40 t/ac, with two levels of nitrogen (80 lb. N at planting plus either 50 or 100 lb. N/ac at sidedressing). Prior to sidedressing, soil samples were taken and measured for NO₃-N. Plots receiving higher rates of ricehull/presscake residue had significantly lower levels of NO₃-N (Figure 5). At harvest, these plots also had lower silage yields (Figure 6). Although there seems to be no adverse long-term effects to crops from the land application of cranberry presscake (aside from the immobilization of soil nitrogen), more on-farm research must be completed before this practice can be recommended to farmers.

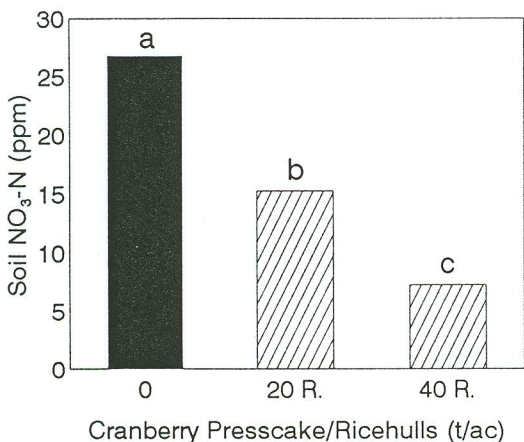


Figure 5. Middleboro Soil NO₃-N June 1992.

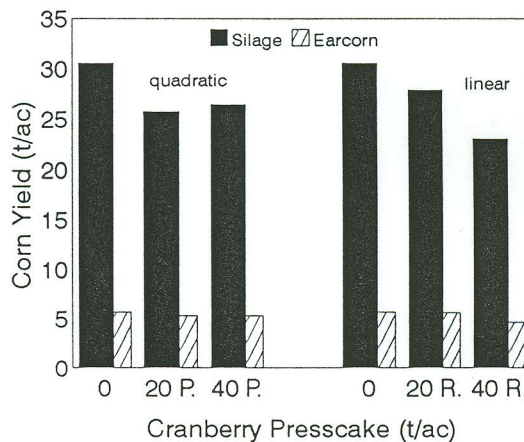


Figure 6. Middleboro 1992 corn yield.