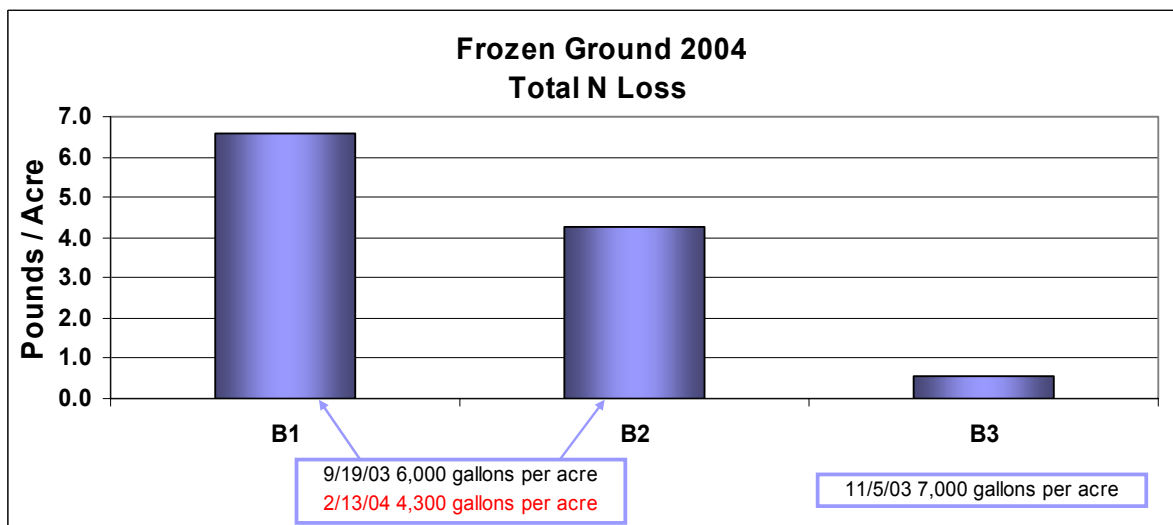


Wintertime Manure Applications
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Wintertime manure application is a hot topic in Wisconsin, with rules being discussed and developed by a wide range of governmental units. There are many questions about the true effects that manure applications have on surface-water runoff quality, particularly when the ground is frozen. The Discovery Farm program is looking at this issue at several core farms. In particular, one core farm in Lafayette County is at the forefront of this issue. The dataset being produced there helps answer some of those questions.

Three monitoring stations are located at field edges on the farm (sites B1, B2 and B3). The stations are designed to measure surface-water runoff and to collect water samples during periods of runoff. The volume of surface-water runoff is calculated, as well as sediment and nutrient concentrations. When combined, the volume and concentration data give us the ability to calculate losses/yields from the fields in pounds per acre.

In 2004, the producer surface-applied liquid dairy manure at a low rate (4,300 gallons per acre) to two of the basins (B1 and B2) five days prior to the commencement of snowmelt in February. Liquid dairy manure was surface-applied at a rate of 7,000 gallons per acre to the third basin (B3) on November 5, 2003.

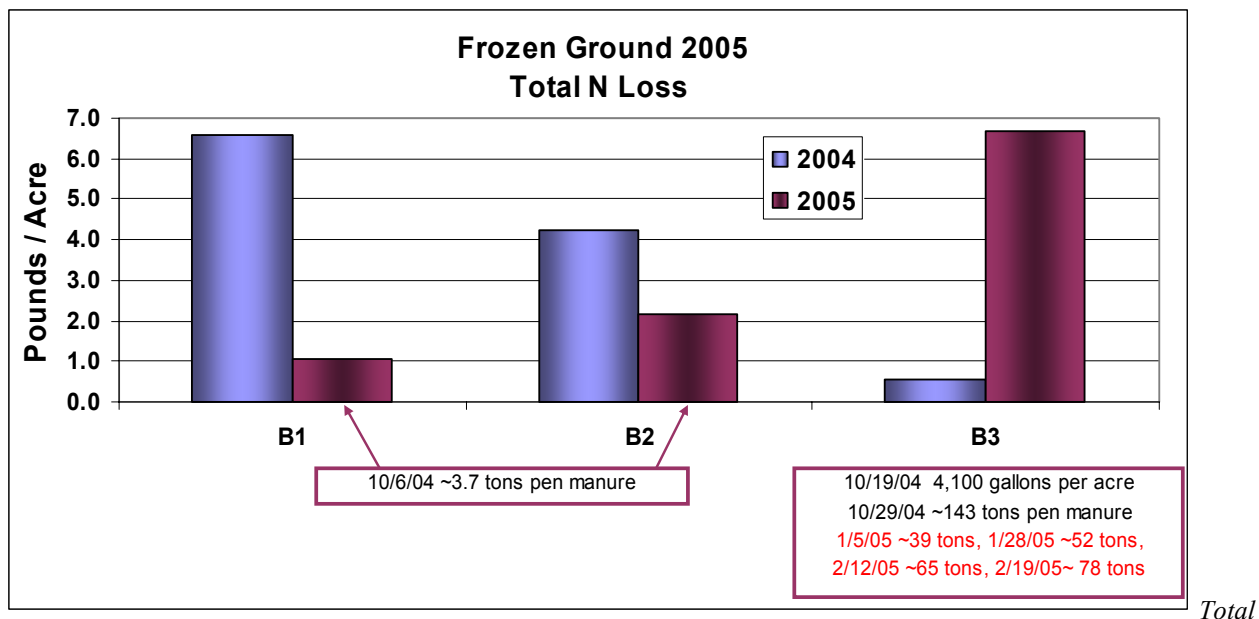


Total nitrogen losses from 2004 snowmelt (frozen-ground period only).

Due to the elevated levels of total nitrogen loss in B1 and B2 compared to B3, it is apparent that the manure application to B3 on November 5, 2003 had little or no impact to the overall surface-water runoff quality during the frozen-ground period. Conversely, in basins B1 and B2, the manure application on February 13, 2004 appeared to have a significant impact on the surface-water runoff quality, indicated by increased total nitrogen values. The same relationships hold for total phosphorus (not shown). These results indicate that liquid dairy manure spread on melting snow – (shortly preceding snowmelt) – has an impact on surface-water runoff quality.

In 2005, the producer applied manure taken from an outside feedlot. This lot manure is largely in the solid form, but it does not contain a high level of bedding or other organic solids. This pack manure

was applied to basin B3 shortly preceding and on melting snow. The same manure (pack) was also applied to basins B1 and B2 in October of 2004.



nitrogen losses for 2004 and 2005 snowmelt (frozen-ground period only).

As you can see in the above figure, it is apparent that the solid manure applications shortly preceding and on melting snow had an affect on the surface-water runoff quality in 2005. The elevated total nitrogen values for basin B3 are much greater than those at basins B1 and B2. As with the 2004 data, these same relationships hold for total phosphorus (not shown). When comparing total nitrogen losses between 2004 and 2005, it is apparent that at basin B3 in 2004, the total nitrogen values represent a “normal” loss, and the application of the solid manure in 2005 affected the surface-water runoff quality. The reduction of total nitrogen yields in basins B2 and B3 between 2004 and 2005 also support the interpretation that elevated nutrient losses in 2004 were a result of the application of liquid dairy manure shortly preceding snowmelt. This can be assumed because no manure was applied in 2005 during the frozen-ground period.

These data collected, with the help of this producer, are unique and finally start to approach the real consequences of manure applications during the frozen-ground period. The nutrient losses that occur during snowmelt can likely be corrected through changes in farm management, but more information is needed. With the assistance of the producers, studies are being conducted to examine many of the different application times, manure types, and rates to determine *what, how much, and when* is a good time to apply manure when the ground is frozen. On this particular farm, for the 2006 snowmelt, the producer is planning to apply manure needed for the crops in basin B3 as early as possible (September or October, 2005). Manure will be applied to basins B1 and B2 during frozen ground with little or no snow (December, 2005 and early January, 2006) to see if these applications will show an impact to surface-water runoff quality.

Manure applications during the frozen-ground period are vital to some producers, but the data shows that there is a high risk of affecting surface-water quality when applications are made shortly preceding snowmelt events. As the Discovery Farms program continues to do more work to better understand the links between manure management and surface-water runoff quality, it is the goal of the program to develop low-cost manure-handling recommendations that will not only benefit the environment but be producer-friendly as well.