Application of urea on snow and frozen soil.
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People rightly worry about ammonia volatilization from the soil enzyme breakdown of urea to carbon dioxide and free ammonia. When the ground is frozen, this transformation is very slow. However, urea is very soluble and until the urea is broken down into ammonia, it is not retained well by soil. When urea is applied to frozen soil with or without snow, the urea stays at the surface. If there is snowmelt in the spring, the urea can easily dissolve and move with melt water to the pools within a field or even off the field depending on the configuration of the land. If the urea cannot penetrate all the way through snow, it is incorporated into the snow and can blow wherever the snow blows to. Research during the winter of 1995-1996 shows the consequences of this really poor urea application practice.

Application of urea to frozen soils preceding spring wheat, Carrington, Endres, Schatz and Franzen, winter of 1995-1996.

Application timing	Yield, bu/a	Protein, %
Fall applied, incorporated	45.4	14.5
Soil frosted, not deeply frozen, November	45.8	13.8
Soil deeply frozen, December	27.6	12.7
Soil deeply frozen, March	33.3	13.0
Applied prior to seeding, April incorporated	49.6	14.6
LSD, 5%	5.0	0.5