



## NEWS COLUMN

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### **Cation Exchange Capacity Not a Factor in Applying Anhydrous Ammonia**

URBANA – Despite popular belief, corn growers should not worry about the cation exchange capacity (CEC) of the soil when determining how much anhydrous ammonia to apply, said University of Illinois Extension specialist in soil fertility and plant nutrition.

“A false concept has been circulating this winter that anhydrous ammonia applications should not exceed 10 pounds of nitrogen per unit of CEC,” Fernandez said. “This concept has no scientific foundation.”

CEC is a soil property that is important in determining liming application rates to correct pH or to determine the capacity of a soil to supply plant nutrients such as  $\text{Ca}^{++}$ ,  $\text{Mg}^{++}$ ,  $\text{K}^+$ , and  $\text{NH}_4^+$ . When anhydrous ammonia ( $\text{NH}_3$ ) is applied in the soil, ammonia reacts with organic matter; clay; and most important, it dissolves in water.

Anhydrous means “no water.” When anhydrous ammonia is applied in the soil, it reacts with water to form ammonium. In essence,  $\text{NH}_3$  takes a hydrogen ion from water to form the positively charged  $\text{NH}_4^+$  ion. Once the  $\text{NH}_4^+$  ion is formed, it is held on the soil exchange complex and kept from moving with water.

“The initial reactions with water, organic matter and clays limit the mobility of ammonia and help retain nitrogen that otherwise could be lost by ammonia volatilizing to the atmosphere,” Fernandez said. “However, CEC does not have a direct relationship to how much ammonia a soil can hold at the time of application.”

Other factors that are important in ammonia retention include soil texture, soil structure and method of application (including depth of injection and proper closure of the knife track). In some U of I trials, after ensuring adequate soil moisture conditions and proper application depth, researchers have successfully applied more than 200 pounds of nitrogen per acre in sandy-textured soils.

For more information about when and how to apply nitrogen this spring, read *The Bulletin* at <http://bulletin.ipm.illinois.edu/>.