

## FAQs About the New Lime Recommendations in A2809

### **Q1. Why are there new equations in the updated version of A2809?**

A1. There are a few reasons for the new equations. 1) A new laboratory method to measure buffer pH is being used. 2) The old equations could produce very large lime recommendations in situations that wouldn't necessarily require a lot of lime. For example, if a soil had a SMP buffer pH of 6.7, soil pH of 5.9, and an organic matter content of 7.0% and the client wanted to lime to a target pH of 6.8, the recommendation was about 20 T/a of 60-69 lime. 3) Organic matter and soil pH influenced the old recommendations more than the SMP buffer pH. The exact reasoning for this is unknown because research from the 1960's showed that the SMP buffer pH was the best predictor of lime requirement compared to other soil properties.

### **Q2. Why is there a new laboratory method for buffer pH?**

A2. The previous method, SMP, contains both parnitrophenol and chromium, which are carcinogens. The waste from this procedure, soil plus buffer reagent, should be handled as a hazardous waste. The new buffer pH method, Sikora, contains no hazardous waste. Thus, the new method results in no exposure of laboratory personnel to carcinogens and is more environmentally friendly than the old method. Additionally, disposing of the hazardous waste is expensive. Labs may see reduced costs in waste handling, if they were handling and disposing of the waste from the SMP method as a hazardous waste. As a result, the net cost to the labs should be lower in the long term, even though the reagent costs for the Sikora buffer are a bit more than for the SMP buffer.

### **Q3. How was the new buffer pH method correlated to lime recommendations?**

A3. A laboratory study was initiated using 24 acid soils from throughout Wisconsin. These soils were incubated with lime to determine the lime requirement at different target pH levels. Two different buffer pH methods along with soil properties were evaluated for their ability to predict lime requirement. The new equations were developed from the data generated in this study. The new equations were statistically compared to the old equations with regard to how well they could predict lime requirement. The new equations predicted lime requirement better than the old equations and had less error associated with them. The new equations have a field liming factor of 2.15 built into them, so that the recommendation should be similar in magnitude to the old recommendations, which also included a factor to account for field mixing inefficiency.

### **Q4. I had my fall 2006 soil sample retested for Sikora buffer pH and the lime recommendation was quite a bit different than what it was with the old recommendations. Which recommendations should I believe?**

A4. Comparisons were made between the new and old lime recommendations using 379 soil samples from the two University soil testing labs and two private labs during the summer of 2006. Each lab measured organic matter, pH, SMP buffer pH, and Sikora buffer pH. The comparisons show that there can be considerable variation in lime recommendations between the

## FAQs About the New Lime Recommendations in A2809

old and new equations. This variability is larger at higher target pH levels where lime recommendations tend to be greater. Also remember that the University recommends that not more than 8 T/a of lime be applied to potatoes and no more than 12 T/a of lime be applied to any other crop, even if more lime is needed to neutralize acidity. This is largely because of the cost involved in large lime recommendations. Additionally, when routinely testing soils every 3-4 years, changes in pH can be monitored.

Examination of the data showed that there was less variability in the data for some labs compared to others. It is unknown if this is related to different types of soils being more predominant in some labs compared to others, or because this was the first time that the labs were using this new test. All labs should be able to perform this new test as well as the old one, so you should not lose faith in the accuracy of your lab based on this one test. Based on the rigorous statistical analyses that went into building the new lime recommendations, they should be very sound. If, however, you feel that over- or under-liming is occurring with these recommendations please contact John Peters (715-387-2523) or Carrie Laboski (608-263-2795).

### **Q5. When calculating a lime recommendation with the new equations, I get a negative number. What does this mean?**

A5. It is possible to get a negative result from the equations. For example, if alfalfa is going to be grown and the target pH is 6.8 and a soil sample has a pH = 6.1 and the Sikora buffer pH = 6.9, the lime recommendation is -0.1 T/a. Lime clearly needs to be applied because the soil pH is more than 0.2 units less than the target pH. Thus, for medium- and fine-textured soils (Soil groups A-D) a minimum lime application of 2 T/a should be recommended when the soil pH is more than 0.2 units less than the target pH. For coarse-textured and organic soils (Soil groups E and O), a minimum lime application of 1 T/a should be recommended if the equations produce a result less than 1.5 T/a.

### **Q6. Can I use SMP buffer pH in the new equations, or use Sikora buffer pH in the old equations?**

A6. While the two buffer pH methods produce similar results, the University of Wisconsin is advising against using an equation with a buffer pH for which it was not calibrated. It is unknown how much more error may be introduced into the lime recommendation by using the wrong buffer in an equation; at a minimum lime recommendation would be more variable.