

Minnesota is one of the top five corn producing states in the United States. The high ranking is the result of management practices applied to our productive soils. Maintaining these soils for future generations should be an extremely important goal for American agriculture.

One component of successful corn production is to apply the nutrients in an economically and environmentally sustainable fashion. The three principal nutrients applied to corn in this region are nitrogen (N), phosphorus (P) and potassium (K). These three nutrients were discussed in our lectures. Phosphorus and potassium are considered non-mobile elements. As long as the soil particles containing these elements stay in our fields they will support the crops to be grown there. If the soil particles are allowed to erode from a field into rivers, streams, ditches or lakes, the nutrients attached to the soil will over fertilize those water bodies creating algae blooms and lowering the water quality.

Nitrogen is the other fertilizer element commonly applied to corn (non legume crops). Nitrogen is considered a mobile element and will move in the soil profile dependent upon the temperature and moisture conditions in the field. The goal is to have the nitrogen available to the plant at the time the plant needs it the most. This nutrient is in high demand by the plant during its vegetative growth phase.

Applying excess nitrogen is costly in two ways. First, the cost of this nitrogen fertilizer is high and any not used by growing plants is a waste of money. Second, because nitrogen is mobile, it percolates into the groundwater creating similar environmental problems to P & K.

In calculating the appropriate nitrogen fertilizer rate, many variables are considered. For this lab the standard rate will be 140 pounds of actual nitrogen per acre, as recommended by the agronomist for my farm. Using the information below, please determine how much 46% N (Urea) we will need to place into the pots to provide the rates listed on the lab sheet.

Calculate surface area of your pot in acres:

$$\text{Formula for surface area: } \pi R^2$$

$$\text{Square feet per acre} = 43560 \text{ (convert square feet to square inches to do your math)}$$

$$\text{Pot area (inches}^2\text{)} \div \text{Acre area (inches}^2\text{)} = \text{acres}$$

Calculate standard N fertilizer rate for pots in grams

$$\text{Full nitrogen rate for corn is } 140 \text{ lbs per acre}$$

$$\text{Convert pounds to grams: } 453.59 \text{ g/lb}$$

$$\text{Fertilizer Rate (grams)} \div \%N = \text{grams/acre needed}$$

Multiply grams per acre by acres in pot.

100 % Rate \_\_\_\_\_ 200% Rate \_\_\_\_\_ 50% Rate \_\_\_\_\_ 10% Rate \_\_\_\_\_

