



Plant Nutrients in Rainfall

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It's commonly known that rainfall contains some essential plant nutrients. However, many people don't know which nutrients and just how much are supplied by rainfall. These facts beg many questions, such as; how can plant nutrients in rainfall affect producers, how can producers take advantage of plant nutrients in rainfall, and, is acid rain a problem in Oklahoma?

A study conducted in the mid 1980's at various locations across the Southern Plains concluded that inputs of Nitrogen (N) and sulfur (as SO4) from rainfall could contribute considerable amounts of these nutrients for plant use. However, rainfall doesn't contain significant amounts of phosphorus (P), potassium (K), chloride (Cl), and the other essential plant nutrients.

Nitrogen is often the most limiting nutrient for crop production in Oklahoma. Each year producers spend millions of dollars on nitrogen fertilizers. Although rainfall adds a small amount of nitrogen to the Oklahoma landscape, it cannot be relied upon as the only source of nitrogen needed for high production farming. Nitrogen in rainfall occurs in mostly equal parts nitrate and ammonium (as in NO3-N and NH4-N). Together, they add about 7 pounds plant available nitrogen (PAN) per acre each year (see table below). As most producers know, this is a very small amount of nitrogen compared to the amount needed to produce an average non-legume crop. However, the small amount of N supplied by rain may be very useful in those years when environmental conditions are better than average and the crop could use just a little extra N to push it above an average yield.

Average Amount of Nutrients from Rainfall in Central Oklahoma

Table with 7 columns: Location, pH, Nitrate - N, Ammonium - N, Total PAN, Sulfate - S, Chloride - Cl. Rows include El Reno, Woodward, Chichasha, and an Average row.

Adopted from Sharpley et al., 1985. The chemical composition of rainfall in the Southern Plains and it's impact on soil and water quality. Technical Bulletin T-162, Oklahoma Agricultural Experiment Station, Oklahoma State University.

In addition to N, rainfall provides about 70 pounds sulfur per acre each year. This is more than enough sulfur needed by most plant species, since plants only need one part sulfur for every 20 parts of N.

These values listed in the table above were collected from the central portion of Oklahoma. As rainfall amount decreases from eastern to western Oklahoma, nutrient amounts will also vary. Eastern Oklahoma should expect higher amount of nutrients from precipitation than those in western Oklahoma. Recently, scientists have reported the occurrence of acid rain in some parts of the United States. On most of the research sites in Oklahoma, rainfall was near neutral. This suggests rainfall in Oklahoma will have little or no impact on soil pH.

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