

Abstract

During 1996, approximately 40 percent of the cotton acreage within Louisiana was located on the Macon Ridge in Franklin, Richland and West Carroll Parishes. There were concerns raised that nitrate from fertilizer application to cotton could leach into the underlying ground water aquifer, known as the Mississippi River alluvial aquifer. The drinking water limit for nitrate-N, recognized by the U.S. Environmental Protection Agency is 10 parts per million (ppm).

The objective of the project was to determine if contamination of ground water by nitrate fertilizer occurs within the Macon Ridge and whether two management practices could reduce the potential of nitrate movement through the soil profile. The first practice was to reduce the application of nitrate available for leaching during the early growing season (early-May to mid-June). The second management practice was to immobilize any nitrate left in the soil after harvest, with a cover crop of winter wheat.

The results of the project indicated that nitrate-N concentrations in the upper 10 feet of the aquifer were found to exceed the critical limit of 10 ppm between August and December. The occurrence of the excessive nitrate-N was seasonal and dependent upon annual rainfall distribution and availability of nitrate to be leached. Leaching simulations with the computer model NLEAP did indicate that split applications of nitrogen and a winter wheat cover crop had the potential to reduce the amount of nitrate-N available during the wet years. It is important to note that all of the observations and simulations were made using a nitrogen fertilizer application rate of 80 lb/acre. The level of nitrate contamination would be expected to increase with higher application rates.