An Analysis of Agricultural Tile Drainage and the Impact of Crop Residue Retention

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The Red River Valley has seen large quantities of rainfall in recent years, which has caused many farmers to tile their fields. I constructed and tested a simulated tiled environment to see if nutrients are leaving the soil via tile runoff, and if crop residue retention will mitigate the runoff of nutrients. I collected water samples from tile pumps, 30' away from the tile pumps, and 60' away from the tile pumps to analyze the quantity of Nitrates, Phosphates, Salinity, Conductivity, and pH of these waters. I also conducted a lettuce seed bioassay test to see if there is herbicidal runoff from tiled fields. I then created a simulated tile environment to see if crop residue retention will mitigate the runoff of nutrients. 4" of simulated rainfall was put through the columns 5 times for a total of 20" of simulated rainfall put through each column, which were tested for Nitrates, Phosphates, Salinity, Conductivity, and pH. I found that there was delayed germination from seeds with water that came directly from the tile pumps. I also found that there was a strong presence of Nitrates, Phosphates, and other important nutrients in the water samples. Large quantities of Nitrogen, Phosphorus, and other important nutrients are being taken out of the soil due to agricultural tiling. Crop residue retention is a great way to keep these nutrients in the soil while also increasing organic matter content in the soil.

Awards Won:

Fourth Award of $500