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Effect of Soil Additives on Water Infiltration on Kentucky Soils

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Many products are advertised and sold in Kentucky as soil additives to aid the movement of water into and through the soil. Most of these additives contain compounds that reduce the surface tension of water. That means that they change the way water is absorbed onto surfaces that have a tendency to repel water. However, their effectiveness in this regard has been questioned due to the huge volume of soil to be effected and the fact that our Kentucky soils are not hydrophobic. In order to determine the effectiveness of these types of products, an experiment was designed to test one of these products on the infiltration of water into the soil.

METHOD

The product was used according to the manufacturer's recommendation on a Crider and a Zanesville soil. The soil was conventionally tilled for planting. Infiltration rings were then placed into the soil to contain the water so that the rate of water movement into the soil could be measured. The soil additive was sprayed onto the soil surface. Within an hour after the treatment, water was added to the rings and rate of movement into the soil was measured.

RESULTS

It was found that any effect from the soil additive was too small to measure. There was more change among replicated plots than between treated and untreated plots. This suggests that the biggest effect of internal drainage is in the soil condition. On the Zanesville soil, 3 of the 5 replications showed better infiltration when treated with the additive. However, the overall infiltration rate was higher in the untreated plots. After the first determination, all plots were then compacted to close the pores and cracks in the soil and a second infiltration test was made. This time, 2 of the 5 replications showed higher infiltration rates when treated with the soil additive but the overall infiltration rate was still higher in the untreated plots.

On the Crider soil, 3 of the 8 replications and the overall infiltration rate were higher when treated with the soil additive. After the first determination, all plots were treated with the additive and a second infiltration test was made. If the additive was effective in aiding drainage through this soil then the drainage rates through the previously untreated plots should increase when compared to the ones treated both times. This aid not happen. In fact, the comparison actually widened.

CONCLUSION

Apparently the soil additive was not effective in increasing the water infiltration rates into these two soils under the conditions which they were tested. These soils exhibit very few hydrophobic properties and additives that reduce surface tension of water may offer little advantage in improving water infiltration. There are soils, such as high organic matter soils, especially, high organic matter sands, that demonstrate hydrophobic properties. Certain soil additives do aid water infiltration into these soils. However, few if any of these soils are located in Kentucky.