Residual soil nutrients and veterinary pharmaceuticals in an abandoned beef feedlot site

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INTRODUCTION

Animal congregation around feeding and water sources is common in beef production operations including backgrounding. Beef manure contain significant amounts of nutrients and ingested pharmaceutical compounds. Intense manure and urine deposition by animal congregation can elevate nutrients and veterinary pharmaceutical compound levels soils around feeder areas (Dantzman et al., 1983). High soil nutrient levels and nutrients entering water bodies can deteriorate soil and water quality. Antimicrobial pharmaceuticals in deposited manure can contribute antibiotic resistance which is an emerging public health concern (Witte, 1988).

In this study, we examined feeder and nearby area of an abandoned beef backgrounding site just after abandoning and after 6 years of hay harvesting for soil P, Cu, Zn, and antibiotic Monensin concentrations.

STUDY SITE , SOIL SAMPLING, AND ANALYSIS

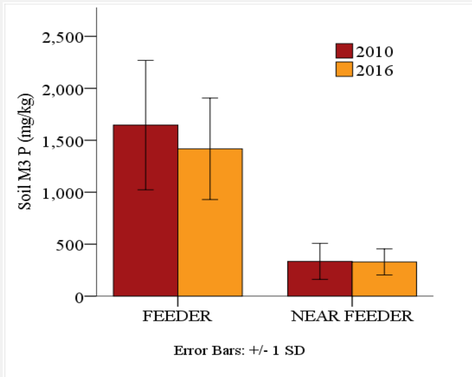
This study was conducted at the Western Kentucky University Agriculture Research and Education Complex, Bowling Green, KY. from 2010-2015.The backgrounding site had 8 years of history. This site annually hosted six batches of steers (120-130 heads in each). While active, manure in the feeder area of the site was removed once in every year (march).

The first soil sampling was performed just after the final manure removal before abandoning the site in 2010. The subsequent soil sampling was carried out after six years of hay harvesting in 2016.

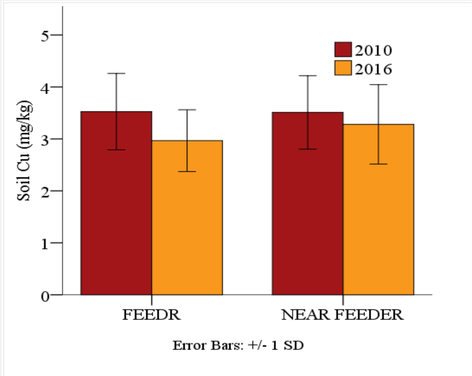
Soil P, Cu, and Zn contents were determined by Mehlich-3 extracting (Mehlich, 1984). Monensin concentration was determined by LC-MS/MS.

TEMPORAL CHANGE

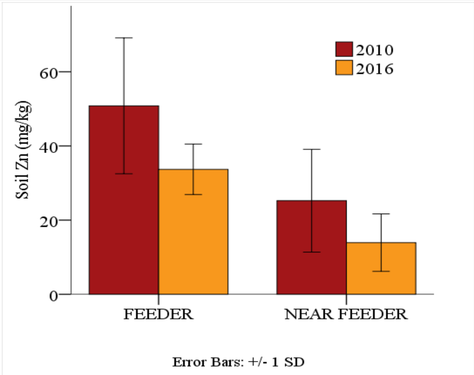
Soil test P content



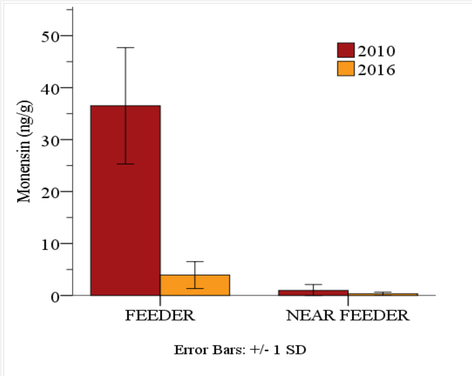
Soil Cu Content



Soil Zn Content

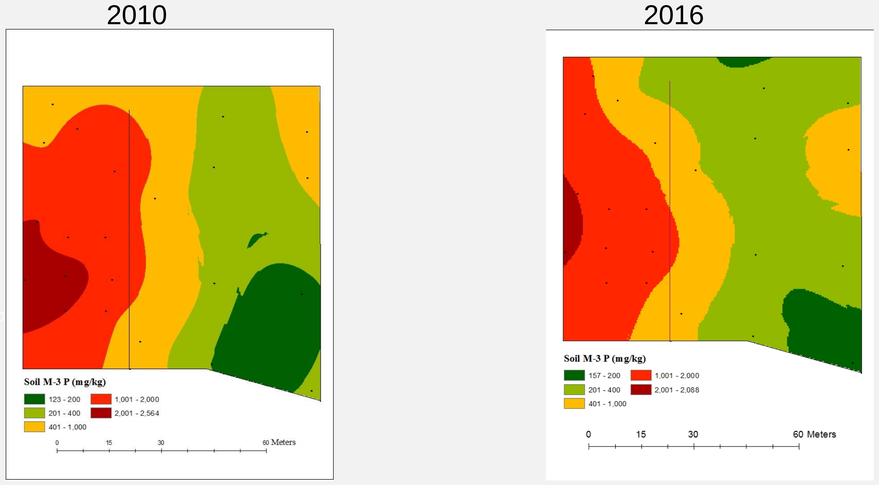


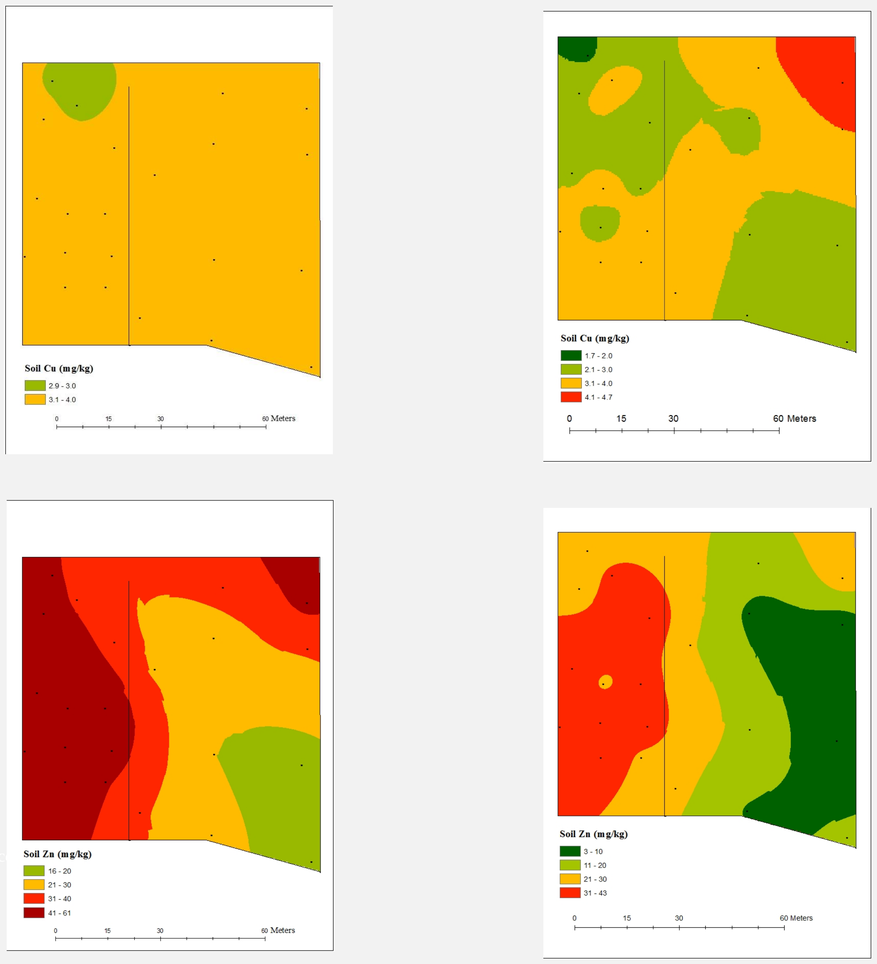
Soil Monensin content



SPATIAL CHANGE

2010 | 2016





OBSERVATIONS

- In the feeder area, all soil nutrients levels were decreased. Except for soil P, the other soil nutrient concentrations were decreased in the near grazing area.
- In both feeder and near grazing areas, monensin concentrations were decreased.
- The spatial patterns show that after 6 years of continuous hay harvesting, feeder areas with high soil nutrient concentrations were decreased

REFERENCE

Dantzman, C.I., M.F. Ritchter, and F.G. martin. 1983. Chemical elements in soils under cattle pens. J. Environ. Qual. 37:1238-1244.

Witte, W. 1988. Medical consequences of antibiotic use in agriculture. Science 279: 996.

Mehlich, A. 1984. Mehlich 3 soil test extractant: A modification of Meclich 2 extractant. Commun. Soil Sci. Plant Anal. 15:1409-1416.

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