Abstract: In 2001, soil health and productivity were surveyed in riparian grassland buffers adjacent to Bear Creek in northern Story County, Iowa. The investigators resampled these 24 plots in 2014 using the same techniques to see what changes had resulted from the conservation practices applied in the intervening years.

What was done and why?

In 2001, an extensive survey of soil health and productivity was undertaken in riparian grassland buffers adjacent to Bear Creek in northern Story County, Iowa. The investigators for this project resampled the same 24 plots in 2014, using the same techniques. The overall objective was to evaluate changes in soil health and aboveground biomass production that occurred over the past 13 years across this diverse array of grass buffers on five different farms. The buffers were planted on row-cropped and heavily grazed pasture soils in 1990, 1994, 1997, 1999 and 2001, and thus were zero to 11 years old during the initial sampling in 2001. In 2014, they were 13-24 years old.

Specific project objectives were to quantify changes in four areas of soil tilth that occurred after 13 years as assessed by:

- Biomass of active and total soil bacteria and fungi,
- Abundance and diversity of soil organisms,
- Total soil respiration, and
- Plant biomass and production.

What did we learn?

In switchgrass-dominated buffers, total soil bacterial biomass was 14 times greater in 2014 than in 2001. Total fungal biomass in the switchgrass buffers was five times greater in 2014 than in 2001. Total protozoan densities increased by 18 times. Nematode diversity was similarly high in both years, from both generic and trophic-guild perspectives, despite relatively low nematode densities. These data suggest that the populations of soil microbiota continue to develop as already-established riparian-zone grass buffers continue to grow over their second decade after establishment. The data collected from crop fields (in corn-soy rotation) next to the grass buffers, on the same soil type, support the conclusion that improvement in soil food web communities occurred in the second decade following establishment. Soil bacteria and fungi are primary decomposers present in these soils; they are responsible for the breakdown of complex carbohydrates and proteins into substrates that are used by plants and other organisms.