

# Cary's Peter Groffman discusses soil quality

Peter M. Groffman, microbial ecologist

By Eve Propp

While Peter Groffman, senior scientist at the Cary Institute of Ecosystems Studies, was telling me how much he loved his work, I was surprised to learn that contrary to popular belief earthworms are not a sign of good soil.

It turns out worms are adversely affecting nutrient retention in soil. The worms can also affect biodiversity and a forest's ability to take carbon out of the atmosphere and store it in the soil. Maybe it would have turned out differently if glaciers hadn't annihilated most of our native earthworms 15,000 years ago. European settlers brought foreign worms here in the early 1800's and more recently it is Asian worms that are invading our forests.

Groffman graduated from the University of Virginia with a degree in Environmental Science. He received his Ph.D. in 1984 in Ecology from the University of Georgia. He married his college sweetheart, Kay Bishop, who is now a nurse midwife at Vassar Brothers Hospital. Before coming to Cary Groffman taught and was a researcher at several universities. He and his wife have lived in Millbrook since 1992 and raised their three children here.

Besides earthworm studies, recent research efforts include investigation of the effects of atmospheric nitrogen deposition on nitrogen gas fluxes, nitrate dynamics in riparian buffer zones, winter climate effects on nitrogen dynamics in forests, effects of a whole watershed calcium addition on soil nitrogen and carbon cycling, carbon and nitrogen cycling in urban watersheds and ecosystems.

In January, as part of Cary's lecture series to acquaint the public with research being done by institute scientists, Groffman gave a talk entitled 'Snow is Good.' He discussed how mild winters threaten soil productivity, plant growth, and freshwater resources. Most people pay attention to climate change in the summer, when faced with heat waves, hurricanes, and severe thunderstorms. In the northeast, climate warming is actually more marked in the winter, and the loss of snow cover can have a ripple effect on tree growth and groundwater recharge. Groffman is delighted with the large turnout, over 100 people, who attend these lectures, bringing science to society.

In addition to the degradation of organic matter and nutrient cycling, microorganisms carry out other functions that are important at micro, ecosystem, landscape, and global scales. These functions include the production of a variety of "trace gases" (carbon dioxide - CO<sub>2</sub>, nitrous oxide - N<sub>2</sub>O, methane - CH<sub>4</sub>) that influence the chemistry and physics of the atmosphere, processing water, soil, and air pollutants, and maintenance of the physical structure of the soil. Groffman said he is interested primarily in the science, not in saving the planet but that the basic research that he is involved in is readily applicable to contemporary environmental problems. The detailed microbial processes that he studies help make crops grow better, combat climate change by taking carbon dioxide out of the atmosphere and storing it in the soil, and help forests produce clean water and air.

Groffman has written over 200 papers for scientific journals and jokingly explains that there are three criteria for finding success in science; publish, publish and publish. He makes the point however that Michael Pollan, and other popular writers do a better job of working the interface between science and society than scientists do, describing the places where nature and culture intersect: on our plates, in our farms and gardens, and in the built environment. Groffman suggested that a great challenge at this interface is keeping science and politics separate. Society has got to grapple with some serious environmental challenges, global climate change being the biggest. We have to decide if we are willing to address these challenges, and science has a big role to play in that decision making process. Politicizing the scientific issues, and attacking valid scientific consensus for political or economic reasons is going to make it much more difficult for society to address these problems.