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LETTER: Acid rain, invasive plants and deer threaten PA's forests

- Mar 17, 2025

Our state is part of the region that consistently leads the nation in emissions of acid rain-producing sulfur dioxide and nitrogen oxides. Pennsylvania is a leader in acid rain in the U.S.

Acid rain has long been known to be a threat to streams, forests and human health. The 1990 Clean Air Act, which targeted key pollutants, did help. But acid rain is still an ongoing environmental problem. And the acid rain that has accumulated in our soil remains.

Invasive plants are also a major threat to forest plants and trees, according to the Pennsylvania Department of Conservation and Natural Resources.

And while Pennsylvania deer density has dropped in the last 20 years, hungry deer still eat tree seedlings and native plants.

Dr. Danielle Begley-Miller, Penn State Ecosystem Science & Management scholar, presented her research “One Size Does Not Fit All: Complex Interactions of Soil Chemistry and Deer-Browsing Explain Forest Plant Regeneration” in her Feb. 27 Friends of White’s Woods webinar.

Begley-Miller and her team are concluding a 13-year study of 24 randomly selected sites in central Pennsylvania forests that investigates both the independent and the combined impact of acidic soil, invasive plants and deer-browsing on forest regeneration — both tree seedlings and native plants. This study’s goal is to identify whether, or how much, deer-exclosure fencing, treatment of soil acidification, and/or application of herbicides helps forest regeneration.

Generally, deer-exclosure fencing had the greatest positive impact on forest regeneration, though in some cases the treatment of the acidic soil was nearly as effective. Herbicide application, which itself changes soil chemistry, was not judged to be a particularly useful approach.

Begley-Miller emphasized that suppression of forest regeneration is likely due to multiple factors, and that those factors may play out differently in parts of the same forest.

This researcher also mentioned that new tree seedlings in her study, as in Pennsylvania forests in general, were largely red maple and explained that researchers are unclear on why this new regeneration pattern is occurring. She also discussed the significant impact of climate change on Pennsylvania forests.

You can view this webinar at https://www.friendsofwhiteswoods.org/events.

David Dahlheimer

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