

Invertebrate biodiversity in hemlock forest studied

By Betsie Blumberg

AT SHENANDOAH NATIONAL PARK (Virginia), stands of hemlock forest are distinctive habitat for many species of invertebrates. Unfortunately the hemlock forests at the park and throughout the mid-Atlantic are threatened by an exotic insect pest, the hemlock wooly adelgid (*Adeleges tsugae*). To assess the invertebrate biodiversity of hemlock forests, a study was undertaken at the park by a multidisciplinary team of researchers from the Pennsylvania State University. Specimens were collected in August 1997 at two forest stands: Limberlost, a hemlock forest, and, for comparison, Mathews Arm, a hardwood forest. The specimens were identified and prepared at the Frost Entomological Museum at the Pennsylvania State University and the project report, “Biodiversity Associated with Eastern Hemlock Forests: Assessment and Classification of Invertebrate Biodiversity,” was completed this year.

This study of 13,169 invertebrate specimens produced new records and documented 10 species that are potentially new to science. The discovery of new species was anticipated because scientists believe that less than 50% of North American insect and arachnid species are known. Findings in the two stands were compared using biodiversity profiles and guild analysis (sorting species based on feeding behavior). The study revealed that several orders of invertebrates contained families and species that seem to be unique to hemlock forests.

The report produced a number of management recommendations for future research. Among them was an emphasis on the importance of developing biodiversity inventories for specific habitats and

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ecosystems before the outbreak of a stressor such as the hemlock wooly adelgid. Because a stressor of this type can change the structure of an ecosystem and affect biodiversity, inventories conducted after the infestation can indicate the process of biodiversity turnover and measure the impact of the infestation.

Understanding the biodiversity of the hemlock forest habitat yields insight into the devastation resulting from the hemlock wooly adelgid infestation; with the loss of the trees comes the loss of the special ecosystem they foster. ■

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The white, cottony material on the back of this hemlock twig (top) reveals an infestation of the hemlock wooly adelgid and foretells destruction of hemlock forests at Shenandoah National Park (bottom). A recent survey of invertebrates indicates that not only are the hemlocks threatened but so are many species that occupy the special habitat they create.



NPSFACT

The National Park Service began tracking the number of new scientific research and collecting permits issued annually throughout the National Park System in 2001 when 2,231 such permits were issued.* This number increased to 2,367 in calendar year 2002 and 2,501 in 2003.

**Permits are required for scientific research activities that involve natural resource or social science fieldwork and specimen collecting of biological, geological, and paleontological resources. Activities such as birding and noncommercial photography are not regulated by permit; some official research and collecting conducted by NPS staff require a permit. Other permit procedures apply to scientific activities pertaining solely to cultural resources.*