

Study of dead wood in old-growth Iranian forest provides information for forest management

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Kiomars Sefidi stands in front of an enormous old-growth tree in Iran's Kheyroud Experimental Forest. Credit: Kiomars Sefidi.

Dead wood, such as old stumps and logs, is often overlooked when examining forest's vitality; however, new research from old-growth forests in Iran point out the importance of this often-overlooked forest feature.

"Dead wood is great habitat for wildlife, provides a sheltered environment for young seedlings, holds soil and moisture on the site, and stores carbon," said Carolyn Copenheaver, associate professor of [forest ecology](#) in Virginia Tech's College of Natural Resources and Environment. "So woody debris management is important for conservation, but it requires baseline measurements of relatively undisturbed mature forests, which haven't yet been done in some parts of the world, including Iran."

When Kiomars Sefidi, then a doctoral student in natural resources at the University of Tehran, undertook such a study at the university's Kheyroud Experimental Forest, his committee chair was Mohammad R. Marvie Mohadjer, professor in silviculture and [forest ecology](#) at the University of Tehran, and his graduate committee members were Reinhard Mosandl, chair of silviculture at the Technical University of Munich, and Copenheaver. Their research appears in the July 2013 issue of *Natural Areas Journal*.

According to the article, "The three research objectives for this study were to: (1) characterize the volume of coarse and fine woody debris present in old-growth beech forests in the Caspian Hyrcanian mixed forest of northern Iran; (2) compare the number and volume of different forms of coarse woody debris (logs, snags or stumps); and (3) correlate the understory coarse woody debris volume to the overstory forest structure."

The authors emphasize, "These research objectives are very timely given the documented loss and degradation of Iranian Hyrcanian forests due to illegal logging, fuel wood cutting, expansion of agricultural fields, and expanding construction to support nature-based tourism."

Working in 15 2.5-acre plots, the researchers recorded diameter, height, and species of living trees; measured coarse woody debris, including

snags, logs, and stumps; and noted degree of decay.

Oriental beech was the dominant species in the overstory and made up 80 percent of coarse woody debris and 74 percent of fine woody debris. "Most of the dead Oriental beech was in an advanced state of decay," the article reports.

But in terms of volume, the coarse woody debris in the section of the Kheyroud Experimental Forest is significantly less than in the Kheiroud Forest, also in northern Iran, which Sefidi and Marvie Mohadjer had also studied, and about half of the volume in old-growth beech forests in Turkey and Albania, which have been studied by others.

"We believe there may have been some livestock grazing that prevented tree establishment for a few years many decades ago," said Copenheaver.

Most of the coarse wood debris in the forest was in an advanced state of decay, meaning the trees, mostly now in the form of rotting logs, had been dead 12 to 59 years, although the most advanced decay erased tree rings so that age could not be determined.

"The study also yielded another important observation," said Copenheaver. "Almost 40 percent of the total volume of dead wood was fine woody debris—a size class that has received little attention."

Fine woody debris is important to predicting fire behavior, the researchers note. "Some old-growth characteristics may be desirable for managers to incorporate into managed stands," such as increasing coarse [woody debris](#) to levels consistent with natural stands in order to increase habitat potential and biodiversity.

However, as with the findings of lower than natural volume of coarse

woody material at the Kheyroud Experimental Forest site, "it is important to understand all of the influences on a stand's condition before using it as a reference for restoration and conservation of forests," the researchers conclude in their article.

The research was funded by Sefidi's graduate assistantship award from the University of Tehran. He is now a researcher with the Department of Rangeland and Watershed Management at the University of Mohaghegh Ardabili, Iran.

The research team has partnered on four manuscripts. "I have come to appreciate the Caspian forests that span the northern part of Iran and border the Caspian Sea," Copenheaver said.

More information: "Coarse and Fine Woody Debris in Mature Oriental Beech (*Fagus orientalis* Lipsky) Forests of Northern Iran." Kiomars Sefidi, Mohammad R. Marvie Mohadjer, Reinhard Mosandl, and Carolyn A. Copenheaver. *Natural Areas Journal* 2013 33 (3), 248-255. doi: [dx.doi.org/10.3375/043.033.0303](https://doi.org/10.3375/043.033.0303)

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