

KEPCO, power company in Japan, taps nature to revitalize trees

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Kansai Electric Power Co. in Japan has developed a new method for rejuvenating trees using mycorrhizal fungi, which form mutually beneficial relationships with plants.

The new technology is the fruit of a 20-year study on how to reinvigorate pine, cherry and other trees weakened by disease or insects. KEPCO will begin marketing the [fungi](#) in October.

[Mycorrhizal fungi](#) are related to mushrooms; matsutake and truffles, for example, are mycorrhizal mushrooms. Mycorrhizal fungi adhere to the roots of plants and absorb sugar that the plants produce through photosynthesis.

In exchange, the fungi provide the plants with nutrition and water from the ground.

KEPCO began paying attention to mycorrhizal fungi and their interdependent relationship with plants in 1991. The company was working to develop afforestation technologies at the time, with aim of lowering the [carbon dioxide emissions](#) from its power plants, and its researchers noticed that the fungi helped plants grow.

"The energy business has a huge impact on the Earth's environment, and companies in the field have an obligation to cut CO2 emissions," said Hiroyuki Koyama, 48, chief researcher of the company's Environmental Research Center.

"Developing greening technologies is part of that obligation," Koyama said.

KEPCO researchers collected thousands of species of mycorrhizal fungi from across Japan and selected 89 especially beneficial to the growth of trees.

In 2008, they attached the fungi to saplings of Japanese black pine and someiyoshino cherry in a greenhouse and began experiments to examine the fungi's effect on trees.

They found that if the most suitable species of mycorrhizal fungi were attached to young trees, more than 90 percent of the plants were able to survive even in extremely harsh conditions with almost no water or fertilizer.

In addition, mycorrhizal fungi were found to hinder the development of white root-rot, a disease that kills apple trees and other plants in the rose family. The researchers succeeded in preventing the disease from harming the plants in more than 80 percent of cases by combining mycorrhizal fungi with microorganisms in the soil.

"In the past, rejuvenating plants and preventing disease has relied on agrichemicals and chemical fertilizers," said Eiji Okuda, a 33-year-old researcher in charge of the study.

"But agrichemicals also kill earthworms and microorganisms in the soil that are good for plants. Using mycorrhizal fungi makes it possible to improve plants' health without chemicals," Okuda said.

KEPCO plans to begin selling the fungi for Japanese black pine and someiyoshino cherry trees in autumn. It also aims to expand the range of plants to include red pine, shidarezakura cherry, zelkova and other tree

species.

"We want to utilize this technology to rejuvenate waning forests in this country and overseas, to help create a world with lower [CO2 emissions](#)," Okuda said.

According to the Environment Ministry, Japan emitted 1.214 billion tons of CO2 in 2008. Direct emissions from electric power [plants](#) and other energy-conversion businesses accounted for 34 percent of this amount, the most of any sector.

[Electric power](#) companies have been making efforts to cut their emissions. KEPCO has worked to promote afforestation and develop technologies to recollect CO2 from exhaust gases at thermal [power plants](#).

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