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Devastation in a Colombian forest. The pressure on producing paper from natural forests can be "transferred" to cultivated forests, says CBD's Stanley Hirsch. AP

## CBD's `giving tree'

By Zuri Dar

About six months ago movie-goers were offered "The Day After Tomorrow," which portrays environmental damage building up and snowballing, and leading to an ecological catastrophe that suddenly returns planet earth to the Ice Age. Although this was "only a movie," the greenhouse effect, for example, is gaining momentum at an alarming rate. Every month the newspapers are full of reports on the hole in the ozone above Australia, the melting polar ice caps, vicious hurricanes in the United States and the giant tsunamis in Asia; all these and more attest to Nature losing her patience.

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The greenhouse effect is exacerbated by the destruction of the tropical rain forests even more than by the gases emitted by cars and industrial plants, because the trees recycle the carbon-dioxide and act as the earth's lungs.

"Each year the natural forest area cleared worldwide equals the size of Portugal - five times the size of Israel," says Dr. Stanley Hirsch, CEO of CBD Technologies, a bio-tech startup in Rehovot. "In Southeast Asia - in countries like Indonesia - the trees are not only cut down, but millions of acres of them are burned to make way for agriculture. The ecological damage is immense."

CBD has found a solution: The company has developed a unique technology that accelerates tree growth and could halt the destruction of the rain forests. The technology is based on a gene called "cellulose binding domain," which was discovered by Prof. Oded Shoseyov of the agriculture faculty at Hebrew University in Rehovot and the University of British Columbia in Vancouver, Canada.

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At first, CBD focused on the biological separation of molecules, mainly for the pharmaceutical industry. In 2000, however, the company changed its direction and began delving into the genetic modification of plants. The company attempted to slow the growth of trees via the CBD gene, but research found that this gene can actually effect the opposite result. Following this discovery, CBD spent the past two years developing a method for treating plants in order to accelerate their growth and enhance them.

How does this work? The CBD gene is introduced into the DNA of young plant cells, thus altering the plant's properties. The treated plant cells produce new proteins that alter the quality of the cell wall, enhancing the cell fiber and accelerating the plant's growth by hundreds of percent.

Hirsch has a graph comparing the growth rates of normal poplar trees and poplar saplings treated with CBD. Over a two-year period, the treated trees grew four times as much as the untreated trees.

"We also checked the quality of the paper produced from treated trees, and in terms of durability, elasticity and tearability, it was significantly better [than that produced from regular trees]," he explains. "The worldwide forestry and paper industry generates \$400 billion annually. Only 35 percent of this comes from cultivated forests. We can change that if we transfer the pressure on the natural forests to cultivated forests."

### Fast-growing eucalyptuses

CBD is currently focusing on improving the growth of eucalyptus trees. Hirsch explains that after pine, eucalyptus is the second-most popular tree for the paper industry and that there are some 130,000 square kilometers of eucalyptus forests worldwide.

"The advantages of the eucalyptus," he notes, "are that it is very common in subtropical regions like its native Australia, Brazil and Southeast Asia. Unlike pine trees, eucalyptus trees do not spread and stay only where they are planted."

About three years ago CBD signed a strategic agreement with Brazilian pulp and paper giant Suzano, which manages some 3,000 square kilometers of forests - almost one-seventh of the area of Israel - throughout Brazil. Suzano supplies CBD with suitable cuttings, which CBD genetically alters and then returns to Suzano for reforestation projects there.

Hirsch: "Regular eucalyptus trees are usually cut down after seven years, during which they grow to a height of about 20 meters. Trees treated with CBD can reach that height within three years or less."

Once CBD completes its field trials with Suzano, the two companies plan to set up a joint company that will market engineered eucalyptus trees in South America.

Hirsch notes that the CBD gene can also be used to promote root vegetable growth and that a field trial on potatoes is under way in Europe. Since CBD makes stems and leaves grow faster, root vegetables will develop faster, too, and help farmers in areas with short growing seasons.

Essentially, CBD's only competitor is ArborGen, an American company backed by the two largest paper producers in the U.S.: International Paper and Westvaco. Practically no venture capital funds are investing in it, as genetic engineering is not very popular in the West or, particularly, in Europe.

"The opposition to genetic engineering is absurd," says Hirsch. "Agricultural crops are plants that grew naturally and were domesticated and nurtured over thousands of years. What we are doing is basically continuing that practice. Green groups don't really know how to digest what we are doing. On the one hand, some of them object to genetic engineering, but on the other, the Kyoto Accord supports reforestation as a means of reducing the greenhouse effect.

"A one hectare (10-dunam) forest consumes 10 tons of carbon annually from

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the carbon dioxide [that the trees `breathe']. Clearly, a forest that grows twice as fast consumes twice as much and contributes to the shrinking of the hole in the ozone."



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