



Background Research Article

PLANT GROWTH AND SOUND

The following *New Scientist* article provides scientific support to the theory that certain types of sound, such as music can improve plant growth. It suggests that the exposure of plants to certain types of sound waves frequencies can result in "sound sensitive" genes being activated and plant growth improving.

The article also makes mention of some difficulties associated with using techniques such as playing music or exposure to soundwave frequencies to improve plant growth. What are these difficulties? Can you think of anymore?

Crops have ears, so shout for a good harvest

CAN plants hear? They all respond to light, which affects how they optimise growth and survival. Plants also have a sense of touch, allowing them to stiffen in response to wind, and a "taste" for nutrients. But whether they respond to sound is a mystery.

Now Mi-Jeong Jeong of the National Institute of Agriculture Biotechnology in Suwon, South Korea, and colleagues claim to have identified two genes in rice that respond to sound waves. They also say that the promoter of one of the sound-sensitive genes could be attached to other genes to make them respond to sound too.

The findings follow a host of similar, but unsubstantiated, claims that plants respond to sound. If the researchers are correct, they say their discovery could enable farmers to switch



specific crop genes on and off, such as ones for flowering. By blasting sound into the fields. That might be cheaper and more environmentally friendly than proposed techniques, such as activating genes with chemicals.

The researchers discovered the sound-responsive genes by exposing rice plants to noise while monitoring levels of gene activity. At first they played the

"Farmers could switch crop genes on and off by blasting sound into fields"

plants 14 different classical pieces, including Beethoven's *Moonlight Sonata*, while monitoring for differences in the expression of various genes. They only found differences, however, when they played the plants sounds at specific frequencies.

The genes *rbcS* and *Ald* became more active at 125 and 250 hertz and less active at 50 hertz. As both are known to respond to light, the researchers repeated the tests in the dark and found that the two genes still responded to sound. "These results suggest that sound could be an alternative

to light as a gene regulator," they report in the journal *Molecular Breeding* (DOI: 10.1007/s11032-007-9122-x).

Jeong's team also wanted to see if the promoter of the *Ald* gene could respond to sound on its own. They attached the promoter to the *beta-glucuronidase* (*GUS*) gene and inserted the combination into the rice genome. By exposing the rice to different frequencies they were able to control the expression of *GUS*, which wouldn't respond to sound on its own. That suggests the *Ald* promoter gene is sensitive to sound and could be "pasted" next to any gene to make it sound sensitive.

The intriguing findings have been greeted with profound scepticism. Philip Wigge of the John Innes Centre in Norwich, UK, doesn't trust the results because he says the techniques are dated, key controls are missing and too few samples were analysed.

Even if sound does affect gene expression, it might not have an effect in practical situations. Factors such as wind, which is known to affect *rbcS*, might drown out the sound effect, says Martin Parry, who studies the gene at the Institute for Arable Crops Research-Rothamsted in Harpenden, UK. **Andy Coghlan** ●

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Can you find any other articles or support material in the library/ internet that supports or disagrees with the theory that music or different types of sound can improve plant growth?

Using the research material you obtain create your own objective hypothesis in regards to music/ soundwaves and plant growth.