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Science and technology | The ears of corn

Plants don't have ears. But they can still detect sound

Sometimes they produce it, too

Sep 6th 2023

In 1986, when he was a mere prince, King Charles, Britain's **eco-minded** monarch, told a television interviewer that it was important to talk to one's plants. He was widely mocked. But that piece of princely wisdom seems to have been ahead of its time, for there is now plenty of evidence that plants can detect sound, react to it, and even, perhaps, produce it.

Scientists have been experimenting with playing sounds to plants since at least the 1960s, during which time they have been exposed to everything from Beethoven to Michael Jackson. Over the years, evidence that this sort of thing can have an effect has been growing. One paper, published in 2018, claimed that an Asian shrub known as the telegraph plant grew substantially larger leaves when exposed to 56 days of Buddhist chants—but not if it was exposed to Western pop music, or silence. Another, published last year, found that marigolds and sage plants exposed to the noise of traffic from a busy motorway suffered stunted growth, and produced a range of stress compounds.

If all that sounds strange, perhaps it should not. After all, sound carries useful information about an organism's environment. From an evolutionary point of view, there is no reason to expect that information to be exploited only by animals.

I'm picking up bad vibrations

Plants have been evolving alongside the insects that pollinate them and eat **them** for hundreds of millions of years. With that in mind, Heidi Appel, a botanist now at the University of Houston, and Reginald Cocroft, an entomologist at the University of Missouri, wondered if plants might be sensitive to the sounds made by the animals with which they most often interact. The researchers recorded the

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vibrations made by certain species of caterpillar as they chewed on leaves. These vibrations are not powerful enough to produce sound waves in the air. But they are able to travel across leaves and branches, and even to neighbouring plants if their foliage touches.

The researchers then **exposed** Thale cress—the plant biologist's version of the laboratory mouse—to the recorded vibrations while no caterpillars were actually present. Later, they put real caterpillars on the plants to see if exposure had led them to prepare for an insect attack. The results were striking. Leaves that had been exposed had significantly **higher** levels of defensive chemicals like glucosinolates and anthocyanins, making them much harder for the caterpillars to eat. Leaves on control plants that had not been exposed to vibrations showed no such response. Other sorts of vibration—caused by the wind, for instance, or other insects that do not eat leaves—had no effect.

Dr Appel and Dr Cocroft published their findings in 2014. They have since been replicated many times in both cress and the tobacco plant, another common lab organism, and with a variety of caterpillars. While the vibrations created by different insects chewing on different leaves vary, the plants in question are consistently able to recognise them as a threat and defend themselves accordingly.

The research **may** have practical consequences, too. "Drones armed with speakers and the right audio files could warn crops to act when pests are detected but not yet widespread," says Dr Cocroft. Unlike chemical pesticides, sound waves leave no toxic residue. With the help of weather forecasts, the system could even be used to prepare crops for cold snaps. The **findings** suggest that, in the absence of soil moisture, pea plants can detect the sound of water in pipes and follow **it** to its source. That too could prove to be valuable information. Plant roots are a big cause of damage to sewer systems all over the world. In Germany, the annual cost of root removal and associated pipe repair is around €28m ($30m). The assumption had been that it was leaks that attracted the roots. Dr Gagliano's results suggest that even watertight pipes might still come under attack. The solution, she says, might be to invest in pipes that are silent as water runs through them.

A cry for help

And while plants are able to detect sounds, some also produce them, albeit unintentionally. This was demonstrated in April by the team at Tel Aviv University. Lilach Hadany, the team's leader, knew that plants could sometimes be made to vibrate. This can happen when they do not have enough water. That causes air bubbles to form in the xylem, a specialised tissue that transports water from a plant's roots to its leaves. When those bubbles collapse, they transmit small shock waves into the **surrounding** tissues.

So, the researchers put tomato and tobacco plants inside a microphone-lined box. The microphones picked up very little sound from healthy plants. But those lacking water, or which had been cut, made a fair bit of noise, albeit at frequencies too high for humans to hear. Different stresses

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produced different kinds of sound. When the recordings were fed to a machine-learning algorithm, it was able to tell the sounds emitted from thirsty plants from those from the damaged ones.

Farmers monitor the health of their crops by eye. (Mosaic virus, for instance, is so named because of the mottled pattern produced on the leaves of suffering plants.) That can be hard to do properly over an entire field. But if plants are broadcasting auditory indicators of distress, then wiring a field with microphones might help farmers keep an ear out for trouble.

That plants live in a world full of sound is no longer in doubt. But plenty of questions remain. One is the effect of human civilisation. Researchers might even apply to King Charles for funding.

Lea atentamente el texto y, luego, responda las actividades.

TODAS LAS RESPUESTAS DEBEN SER PROPORCIONADAS EN ESPAÑOL Y CON LETRA LEGIBLE

Anticipación:

1- Observe el paratexto, piense qué información puede obtener y responda:

a) ¿En qué soporte fue publicado este texto: digital o papel?

b) ¿Sobre qué tema infiere que va a leer?

Lectura:

2- Subraye **5 cognados** (palabras transparentes) en el texto.

3- ¿Qué función cumplen las siguientes palabras en el texto: adjetivo, verbo, adverbio o sustantivo?

eco-minded (L9) ..... exposed (L32) ..... higher (L35) .....

findings (L46) ..... surrounding (L58) .....

4- Encierre [entre corchetes] **4 frases nominales** en el texto.

5- ¿Cuál es el referente de los siguientes pronombres?

THEM (L25) ..... **IT** (L47).....

6- ¿Qué indica el verbo subrayado en el siguiente extracto del texto?

*"The research **may** have practical consequences, too."* (L43)

Sugerencia ☐ Obligación ☐ Potencialidad ☐ Habilidad ☐ Posibilidad ☐ Necesidad ☐

7- ¿Qué resultados se obtuvieron en los estudios luego de exponer a las plantas a distintos sonidos?

8- ¿De qué manera esta investigación podría resultar beneficiosa para las cosechas?

9- Según los estudios, ¿qué pueden comunicar las plantas al producir sonidos?

Poslectura: 10- Realice una síntesis conceptual del texto leído **con sus palabras y en español**. Extensión mínima: 80 palabras. Extensión máxima: 100 palabras.