Plants may be able to ‘hear’ others

They can “smell” chemicals and respond to light, but can plants hear sounds? It seems chilli seeds can sense neighboring plants even if those neighbors are sealed in a box, suggesting plants have a hitherto-unrecognized sense.

Plants are known to have many of the senses we do: they can sense changes in light level, “smell” chemicals in the air and “taste” them in the soil (New Scientist, 26 September 1998, p 24). They even have a sense of touch that detects buffeting from strong winds.

The most controversial claim is that plants can hear, an idea that dates back to the 19th century. Since then a few studies have suggested that plants respond to sound, prompting somewhat spurious suggestions that talking to plants can help them grow.

A team led by Monica Gagliano at the University of Western Australia in Crawley placed the seeds of chilli peppers (Capsicum annuum) into eight Petri dishes arranged in a circle around a potted sweet fennel plant (Foeniculum vulgare). Sweet fennel releases chemicals into the air and soil that slow other plants’ growth. In some set-ups the fennel was enclosed in a box, blocking its chemicals from reaching the seeds. Other experiments had the box, but no fennel plant inside. In each case, the entire set-up was sealed in a soundproof box to prevent outside signals from interfering.

As expected, chilli seeds exposed to the fennel germinated more slowly than when there was no fennel. The surprise came when the fennel was present but sealed away: those seeds sprouted fastest of all.

Gagliano repeated the experiment with 2400 chilli seeds in 15 boxes and consistently got the same result, suggesting the seeds were responding to a signal of some sort (PLoS One, DOI: 10.1371/journal.pone.0037382). She believes this signal makes the chilli seeds anticipate the arrival of chemicals that slow their growth. In preparation, they undergo a growth spurt. The box surrounding the fennel would have blocked chemical signals, and Gagliano suggests sound may be involved.

“Sound may be the signal that tells the chilli seeds a fennel plant is nearby, causing a growth spurt”
In a separate experiment, chilli seeds growing next to a sealed-off chilli plant also consistently grew differently to seeds growing on their own, suggesting some form of signalling between the two.

Though the research is at an early stage, the results are worth pursuing, says Richard Karban of the University of California-Davis. They do suggest that plants have an as-yet-unidentified means of communication, he says, though it is not clear what that might be.

The key question is whether the boxes around the fennel plants really block all known signals, says Susan Dudley of McMaster University in Hamilton, Ontario, Canada. She concedes that plants make faint noises when water columns in their stems are disrupted, and that hearing functions in much the same way as the sense of touch – which plants have – but wants to see the results replicated before she is convinced that plants can hear. The study, she says, comes as a challenge to botanists to either refute or confirm.