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# “IF A TREE TALKS, IS ANYONE LISTENING?”

Pracheta Janmeda and Divya Kumari

**I**NDIVIDUALS must exchange information (signals) for any living entity to communicate. As they navigate their environments, we know that animals communicate with one another. Imagine lions howling or birds singing. Plants, on the other hand, are frequently thought of as immobile creatures that are unable to communicate in this way. Plant sound generation has been studied for over a century. In 1966, John Milburn showed that xylem cavitation events are the primary source of these noises, which can be identified with specialised equipment. Since 1970, studies have shown that various passive physical processes in plants can also emit sounds. They have also shown that acoustic emissions can be used to track the water status of plants in the field. Charles Darwin himself was among the first scientists to question this idea. Plant-animal and plant-plant communication theories have been sparked by several recent reports of airborne sound emissions by drought-stressed plants.

Charles Darwin and his son Francis carried out several tests on plant roots in the 1880s, which demonstrated that the root tip is the most crucial component of the plant. Stimuli, including light, gravity, chemicals, and sound, are sensed and responded to by the tips of the roots. To initiate processes like growth, directed movement, and the synthesis and release of particular gases, the root tip sends messages that serve as signals. They proposed that the root tip might serve as the plant’s “brain” because the functions of the human and animal brains are similar. Charles Darwin also demonstrated how crucial chemicals are to plants for communication. He

conducted research in the 1870s that produced some of the first reports on plant chemical signalling. Darwin demonstrated how soluble chemicals generated at the expanding shoot tip of barley seedlings were carried along the stems and induced cell proliferation and stem curvature. We now understand that these chemical cues are hormones known as auxins, which circulate throughout the bodies of plants and have a significant impact on their general form and growth pattern.

## Chemical Signals

The most prevalent chemical signals that plants emit are called Volatile Organic Compounds (VOCs). VOCs are tiny molecules emitted as gases and easily move through the atmosphere, away from the source plant. Many animals use pheromones, which share chemical similarities with some plant VOCs. ‘Methyl jasmonate’, one of the most prevalent plants VOCs, is created and released by plants that are being attacked. ‘Methyl salicylate’, another defence-related VOC produced by plants, shares chemical similarities with aspirin, a medication used to treat pain in humans. To warn their neighbours of dangers, plants emit VOCs into the atmosphere. In response, nearby plants prepare to protect themselves before being assaulted.

## Sound Waves

Humans interact with one another through sound waves (expressed in Hertz or Hz); however, not all sound waves are audible to the human ear. Only sound frequencies between