

Fitness tracker for plants alerts growers before they start to wilt

Like a form of agricultural Fitbit, sensors attached to leaves can detect signs of stress and sound the alarm before they begin to wither and die

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How many houseplants have you allowed to wither and die over the years? How many rose bushes have wilted on your watch, how many lawns have browned? If only poorly plants could issue a cry for help before they start to fade.

Gardeners can use fitness trackers to count the calories they burn and the steps they take while toiling over their flowerbeds. But soon they will also be able to use them to monitor the health of their plants.

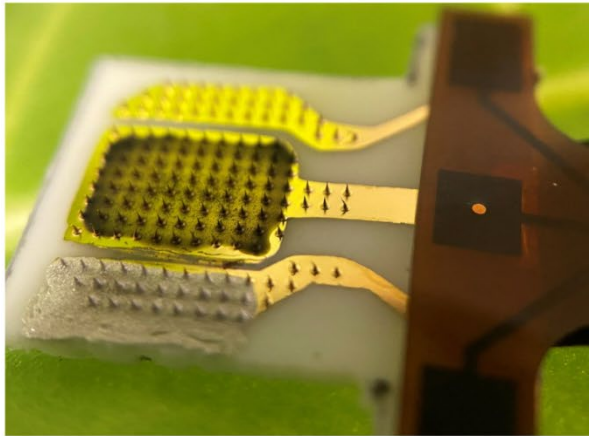
A “wearable patch” fitted to leaves could revolutionise life for gardeners and farmers by sounding the alarm before an ailing plant shows signs of wilting or discolouration, a study suggests.

The patch, which could be seen as a horticultural version of a Fitbit, can detect if a plant is becoming stressed due to dehydration, excess heat, infection or pests.

Growers will then be able to water, feed or treat them before they begin to wither, according to a study published in the American Chemical Society’s journal ACS Sensors. It would cost less than \$1 (77p) per test and take one minute to provide results.

“Environmental conditions can cause damaging stress to plants, posing challenges for home gardeners and farmers,” the society said. “Therefore, early detection — before leaves visibly discolour, wilt or wither — is crucial.

“Researchers have created a wearable patch for plants that quickly senses stress and relays the information to a grower. The electrochemical sensor attaches directly to live plant leaves and monitors hydrogen peroxide, a key distress signal.”



Tiny needles on the sensor, made by researchers in Iowa, pierce the leaf to detect hydrogen peroxide levels

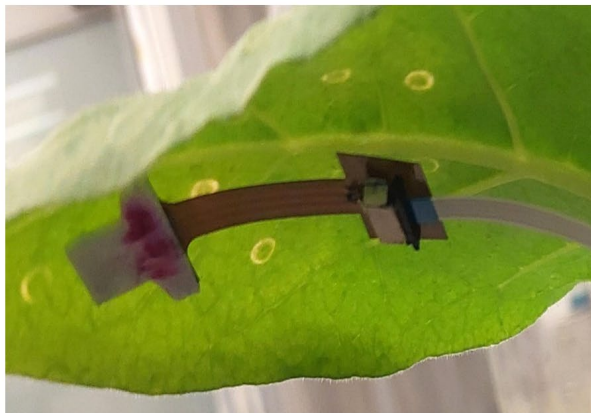
ACS

The scientists who developed the device tested it on plants typically grown as agricultural crops to see if it could help farmers to improve their yields, but said it would be equally valuable for private use among those seeking to keep their flowerbeds and houseplants alive.

Dr Liang Dong of Iowa State University, an author of the study, said it could be useful even in a typical British back garden. “Keeping an eye on urban crops, [houseplants](#), and garden flowerbeds is so important, not just for catching diseases early but for making sure water and nutrients are used wisely.

“With this sensor technology, along with others we’re working on, we can help people avoid unnecessary costs and keep their plants thriving in houses and gardens.”

When a plant experiences some form of stress, it can produce hydrogen peroxide as a form of internal chemical distress signal. This sends a message to cells throughout the plant that they should “activate their defence mechanisms”, researchers said.



The sensors could be used several times
DR. LIANG DONG

Studies have found that plants produce the compound during periods of drought, triggering a reduction in how much water the plant loses through transpiration, in order to prevent itself from drying out too quickly.

Researchers from Iowa developed an electronic patch with microscopic needles that penetrate the underside of a leaf to measure hydrogen peroxide levels within the plant. A gel on the surface reacts with the chemical to create a small, measurable electric current.

They tested the device on live, healthy soybean and tobacco plants and compared them with plants suffering from a bacterial infection.

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