

Can a drop of water cause sunburn or fire?

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To the gardening world it may have always been considered a fact, but science has never proved the widely held belief that watering your garden in the midday sun can lead to burnt plants. Now a study into sunlit water droplets, published in *New Phytologist*, provides an answer that not only reverberates across gardens and allotments, but may have implications for forest fires and human sunburn.

"The problem of light focusing by water droplets adhered to plants has never been thoroughly investigated, neither theoretically, nor experimentally", said lead researcher Dr Gabor Horvath, from Hungary's Eotvos University. "However, this is far from a trivial question. The prevailing opinion is that forest fires can be sparked by intense sunlight focused by water drops on dried-out vegetation."

The team conducted both computational and experimental studies to determine how the contact angle between the water droplet and a leaf affects the light environment on a leaf blade. The aim was to clarify the environmental conditions under which sunlit water drops can cause leaf burn.

These experiments found that water droplets on a smooth surface, such as maple or ginkgo leaves, cannot cause leaf burn. However in contrast the team found that floating fern leaves, which have small wax hairs, are susceptible to leaf burn. This is because the hairs can hold the water droplets in focus above the leaf's surface, acting as a magnifying glass. The latter not only partly confirms the widely held belief of gardeners, but also opens an analogous issue of sunburn on hairy human skin after

bathing.

"In sunshine water drops residing on smooth hairless [plant leaves](#) are unlikely to damage the [leaf tissue](#)", summarised Horvath and co-authors. "However water drops held by plant hairs can indeed cause sunburn and the same phenomenon can occur when water droplets are held above human skin by body hair."

While the same process could theoretically lead to forest fires if [water droplets](#) are caught on dried-out vegetation, Horvath and colleagues added a note of caution:

"If the focal region of drops falls exactly on the dry plant surface intensely focused sunlight could theoretically start a fire," Horvath said. "However, the likelihood is reduced as the water drops should evaporate before this, so these claims should be treated with a grain of salt."

Provided by Wiley

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