Why do dew drops do what they do on leaves?

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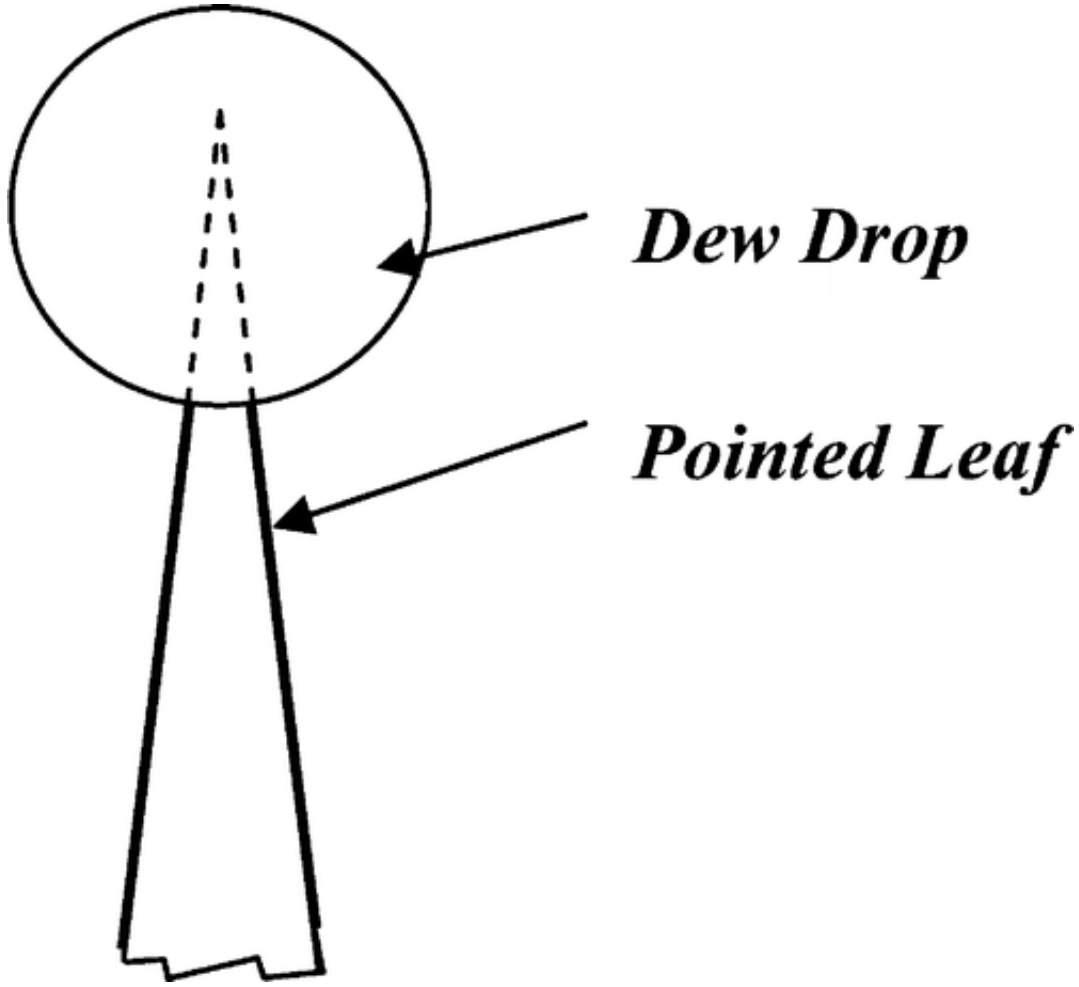

Nobel laureate poet Rabindranath Tagore once wrote, "Let your life lightly dance on the edges of time like dew on the tip of a leaf." Now, a new study is finally offering an explanation for why small dew drops do

as Tagore advised and form on the tips, rather than the flat surfaces, of leaves. It appears in ACS' journal *Langmuir*.

In the study, Martin E. R. Shanahan observes that drops of water have a preference for exactly where they collect on leaves as their surfaces cool in the morning and afternoon. Those droplets, which condense from water vapor — moisture — in the air, collect randomly across the surfaces of flat leaves. However, dew drops tend to accumulate at the tips of spindly leaves, even if that means defying gravity by moving upwards. He explains that an inherent "unwillingness" or "lack of necessity" of water drops to move on a dry surface governs their positioning on flat leaves, causing them to stay where they form. Dew's tendency to head to the end of finely pointed leaves, however, sent Shanahan looking for a different explanation.

The answer is based on the fundamental principle of free energy, that everything in nature seeks the lowest possible energy state. Shanahan modeled two types of dew drops on a theoretical (simplified) cone-shaped leaf: a thin, cylindrical sheath of water and a spherical drop centered on the cone's axis. In both cases, he found that the drop lowered its energy by moving toward the point of the leaf.

More information: On the Behavior of Dew Drops, *Langmuir*, 2011, 27 (24), pp 14919–14922. DOI: 10.1021/la203316k

Abstract
It may be observed that, when dew drops form, although they may be positioned randomly on flat leaves, they tend to accumulate at the pointed ends of thin, slightly conical growths. We discuss here the basic physics leading to this phenomenon.