The dual nature of dew: Study measures the effect of dew on desert plants

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When the scientific and spiritual worlds collide, they do so in the most surprising ways. Classical meteorological and plant science has, in the last century, insisted that dew negatively affects plant life, leading to rot and fungus. But in the Judeo-Christian tradition, dew is most welcomed as an important source of vegetative and plant life, celebrated in poetry and prayer.

Now Prof. Pinhas Alpert of Tel Aviv University's Department of Geophysics and Planetary Sciences has developed an explanation for the perplexing paradox with his colleagues. According to scientific literature, he says, dew that accumulates through the night has a negative effect on vegetation and fruits because it creates a "spongy" effect. But in a recent issue of the *Water Resources Journal*, Prof. Alpert demonstrates that dew is an important water source for plant life in climates such as those in the Eastern Mediterranean, where the Judeo-Christian tradition originated, and parts of the U.S. Great Basin Desert.

"Semi-arid zones are dry for over half the year," he explains. "Dew is therefore an important source of moisture in the air. It surrounds the plant leaves nearly every morning for approximately two to three hours past sunrise." This finding, he says, explains why dew is such an important part of Judaeo-Christian traditions. In Judaism, blessings are offered to rain and dew in daily prayer, and there are many references to dew throughout the Bible, including the Old Testament books of Genesis and Isaiah.

Creating the ideal conditions for growth

A plant's growth is based on photosynthesis, employing stomata, the small openings in vegetation and fruit leaves that absorb carbon dioxide. The combination of water, carbon dioxide in the air and sunlight help a plant to produce sugars which allow it to grow. In temperate zones, most of a plant's growth occurs in the middle of the day, when the most sunlight is available.

But there are climatic influences as well. According to Prof. Alpert, plants in a semi-arid zone close these stomatic openings in the midday as a defence mechanism, to avoid losing moisture, or in other words water, when the weather is at its driest. When this happens, photosynthesis and plant growth cannot take place.

For these reasons, the early-morning hours -- and not those of midday -- are the period of maximum growth for plants in the Eastern Mediterranean region, Prof. Alpert says. And it's all due to the dew. "In the early morning, dew surrounds the leaves of a plant with moisture, and the plant does not close its stomata. Therefore, it can grow."

Biblical dew

In order to research the effect of dew on plant life, Prof. Alpert and his fellow scientists studied the interaction between the leaves of a plant and the air. They measured how much moisture departs from the leaves and how much carbon dioxide enters them at various times of the day.

These findings explain a very old paradox, says Prof. Alpert. Despite its negative reputation in other climates, dew is idealized in the Bible for its ability to help fruits and vegetables grow in a dry and inhospitable region -- like the Eastern Mediterranean, where the books of the Bible were

first collected.

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