

Desert rhubarb -- a self-irrigating plant

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Researchers from the University of Haifa-Oranim have managed to decipher the unique self-watering mechanism of this plant in the Negev desert, which harvests 16 times more water than other plants in the region. The plant's surface resembles the topographic structure of the surrounding hills. Credit: Prof. Gidi Ne'eman, University of Haifa

Researchers from the Department of Science Education-Biology at the University of Haifa-Oranim have managed to make out the "self-irrigating" mechanism of the desert rhubarb, which enables it to harvest 16 times the amount of water than otherwise expected for a plant in this region based on the quantities of rain in the desert. This is the first example of a self-irrigating plant worldwide.

The desert rhubarb grows in the mountains of Israel's Negev desert, where average precipitation is particularly low (75 mm per year). Unlike most of the other desert plant species, which have small leaves so as to minimize moisture loss, this plant is unique in that its leaves are

particularly large; each plant's rosette of one to four leaves reaches a total diameter of up to one meter.

Prof. Simcha Lev-Yadun, Prof. Gidi Ne'eman and Prof. Gadi Katzir came across this unique plant growing in the desert while studying the field area with students of the Department of Science Education-Biology of the University of Haifa-Oranim, and noticed that its leaves are unusually large and covered with a waxy cuticle. They observed an exceptionally ridged structure on each leaf, forming a leaf structure that resembles the habitat's mountainous topography.

The scientists explained that these deep and wide depressions in the leaves create a "channeling" mountain-like system by which the rain water is channeled toward the ground surrounding the plant's deep root. Other desert plants simply suffice with the rain water that penetrates the ground in its immediate surroundings.

The findings have shown that the natural selection process has resulted in the evolution of this plant's extremely large leaves, which improved its ability to survive in the arid climate of the desert. The results of experiments and analysis of the plant's growth - in an area with an average annual rainfall of 75 mm - showed that the desert rhubarb is able to harvest quantities of water that are closer to that of Mediterranean plants, reaching up to 426 mm per year.

This is 16 times the amount of water harvested by the small-leafed [plants](#) of the Negev desert region. When the research team watered the plant artificially, they observed how the water flows along the course of the leaf's depressed veins to the ground surrounding the plant's single root and then penetrates the ground to a depth of 10 cm or more. Under the experimental conditions, water penetrated the ground only as deep as 1 cm.

"We know of no other plant in the deserts of the world that functions in this manner," the researchers concluded.

Source: University of Haifa ([news](#) : [web](#))

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