This Week's Citation Classic

Itai C & Vaadia Y. Kinetin-like activity in root exudate of water-stressed sunflower plants. *Physiologia Plantarum* **18**:941-4, 1965.
[Dept. Plant Physiology, Negev Institute of Arid Zone Research, Beer Sheva, Israel]

Root exudate was chromatographed and bioassayed for cytokinin activity. Water stress decreased the level of activity in the exudate. The data support the hypothesis that modification of leaf metabolism in stressed plants may result from a decreased supply of cytokinin to the shoot. [The *SCI*® indicates that this paper has been cited in over 105 publications since 1965.]

Chanan Itai
Department of Biology
Faculty of Natural Sciences
Ben Gurion University of the Negev
Beer Sheva 84 120
Israel

December 10, 1982

"In mid-1963, I joined the Negev Research Institute in Beer Sheva as a PhD student. At that time, Yoash Vaadia was engaged in forming a plant physiology group there and invited Hans Kende to work in it. The fact that the group was located in a desert research institute dictated the interest in plant response to this environment. The then recently established finding that plants adjust osmotically to drought[1] and salinity[2] shifted our efforts in finding the reasons for growth retardation due to water stress from physical parameters to metabolic ones. At the same time, Kende tried to prove that Chibnall's root factor is a cytokinin and indeed he found cytokinin present in root xylem exudate of sunflower plants.[3] From here, it was only one step to link the effects of water stress such as growth retardation and early senescence to reduction in the level of cytokinin in exudate of water-stressed plants. All of us got carried away by this working hypothesis and found in the literature more and more supporting evidence for it.

"The actual work was rather simple although our facilities were somewhat poor. As a matter of fact, Beer Sheva in those days was still more noted for its role in Abraham and Sarah's life and for its Bedouin camel market than for its scientific contributions. We were using an autoclave in a nearby hospital and constructed a primitive sterile hood to transfer the tissue needed for the bioassay. The only thing we enjoyed in ample supply was enthusiasm, and in retrospect this may account for rushing to publish those very preliminary data. In fact, the paper was rejected by a leading journal although not on the basis of its precocity but because of the editor's opinion that in view of the multitude of processes already known to be affected by water stress, reporting an additional one was not worth a publication. For us this paper served as a starting point. At that time, Aliza Benzioni, Amos Richmond, Moshe Tal, and Joseph Mizrahi joined the group; the original hypothesis was extended to include other environmental stresses such as those caused by salinity, high and low temperature or mineral deprivation, and other phytohormones as well (ABA). With time, other groups were attracted by this hypothesis and as a result of the joint effort our knowledge on the involvement of phytohormones in regulating plant response to environmental stress has been extended significantly as was reviewed recently.[4,5]

"This paper was probably cited since it is the first report on changes in phytohormones due to water stress and one of the few on the involvement of cytokinin."

1. **Slatyer R O.** Effects of several osmotic substrates on the water relationships of tomato. *Aust. J. Biol. Sci.* **14**:519-40, 1961.
2. **Bernstein L.** Osmotic adjustment of plants to saline media. II. Dynamic phase. *Amer. J. Bot.* **50**:360-70, 1963.
3. **Kende H.** Preservation of chlorophyll in leaf sections by substances obtained from root exudate. *Science* **145**:1066-7, 1964.
4. **Itai C & Benzioni A.** Water stress and hormonal response. (Lange O L, Kappen L & Schulze E D, eds.) *Water and plant life: problems and modern approaches.* Berlin: Springer-Verlag, 1976. p. 223-42.
5. **Vaadia Y.** Plant hormones and water stress. *Phil. Trans. Roy. Soc. London B* **273**:513-22, 1976.