

A very expressive plant : Spathiphyllum shape reactions to water stress

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During a period of drought, the content of water in plants diminishes, with a decrease in turgor pressure. If the effects are not easily visible on trees and other lignified plants, it is not the case with *Spathiphyllum*, a popular interior plant.

After two weeks without watering, the plant seems to desperately cry for help, showing leaves completely falling on the ground (cf. Fig. 1, top). Fortunately, such a state is reversible, and the plant soon recovers its shape after watering. What is so specific about this plant ?

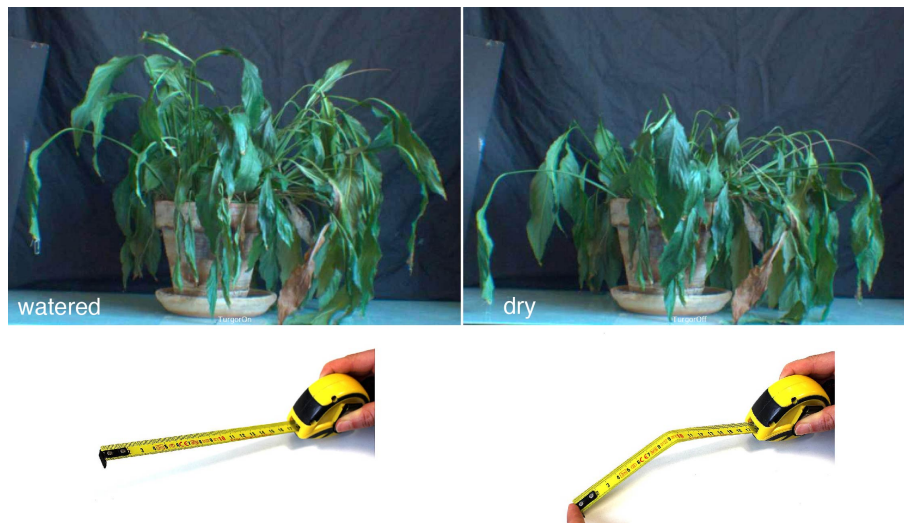


Figure 1. *Spathiphyllum* plant well watered (top left), and suffering a week without watering (top right). Metallic measuring tape undergoing a buckling instability (bottom line).

First, anatomical sections in thin slices of the stem show that it contains a soft core and a stiff external layer. The soft core shrinks under drought. Second, mechanical tests show that the bending rigidity of the stems decreases by 50%, but not enough to explain this dramatic change in shape.

A good answer can be found at the base of the plant : if the stems are round in cross section, their attachment to the base assumes the shape of a thin U-shaped sheet. This base suddenly bends when the plant is dry : this is analogous to the buckling of the metallic measuring tape submitted to an increasing bending force (Fig. 1, bottom). In the case of the plant, this bifurcation is led by a decrease in stiffness and in the transverse curvature of the U-shaped part of the stem. This bifurcation is reversible and seems super-critical, contrary to the metallic tape bending transition.